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2012 Astronomical Telescopes+ Instrumentation

Advancing Astronomy with Developments on all Scales

Technical Programme/ Exhibition Guide

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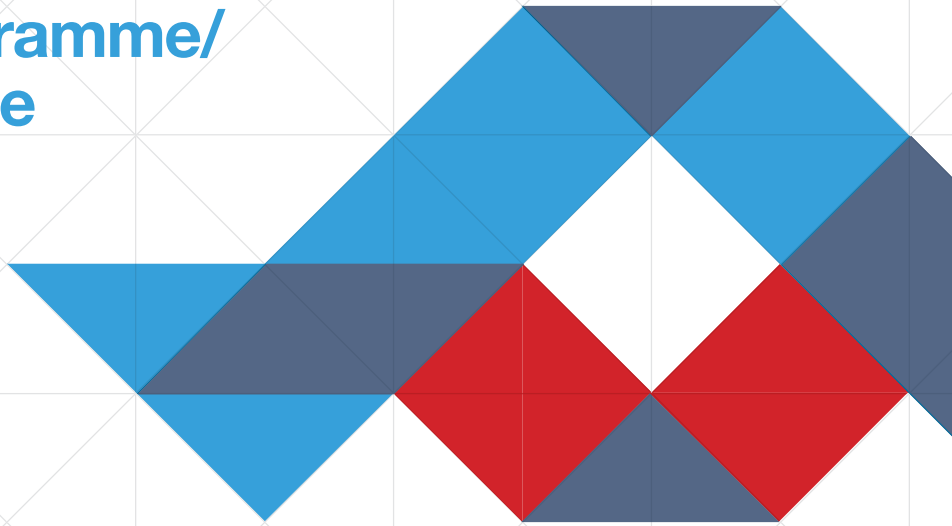

Location
Amsterdam RAI
Amsterdam, The Netherlands

Conference
1–6 July 2012

Exhibition
2–4 July 2012

Topics
Telescopes and Systems
Technology Advancements

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2–4 July 2012
Amsterdam, Netherlands
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Astronomical Telescopes+ Instrumentation

Advancing Astronomy with Developments on all Scales

Conferences and Courses: 1–6 July 2012
Exhibition: 2–4 July 2012
Amsterdam RAI
Amsterdam, The Netherlands

Symposium Chairs:

Kathryn A. Flanagan,
Space Telescope Science Institute (USA)

Mark M. Casali,
European Southern Observatory (Germany)

Symposium Cochairs:

Gillian S. Wright,
UK Astronomy Technology Ctr. (United Kingdom)

Luc Simard,
National Research Council Canada (Canada)

Contents

Cooperating Organisations

American Astronomical Society

Ball Aerospace & Technologies Corp.

Canadian Astronomical Society (CASCA)

European Astronomical Society

European Southern Observatory

International Astronomical Union (IAU)

Korea Astronomy and Space Science Institute

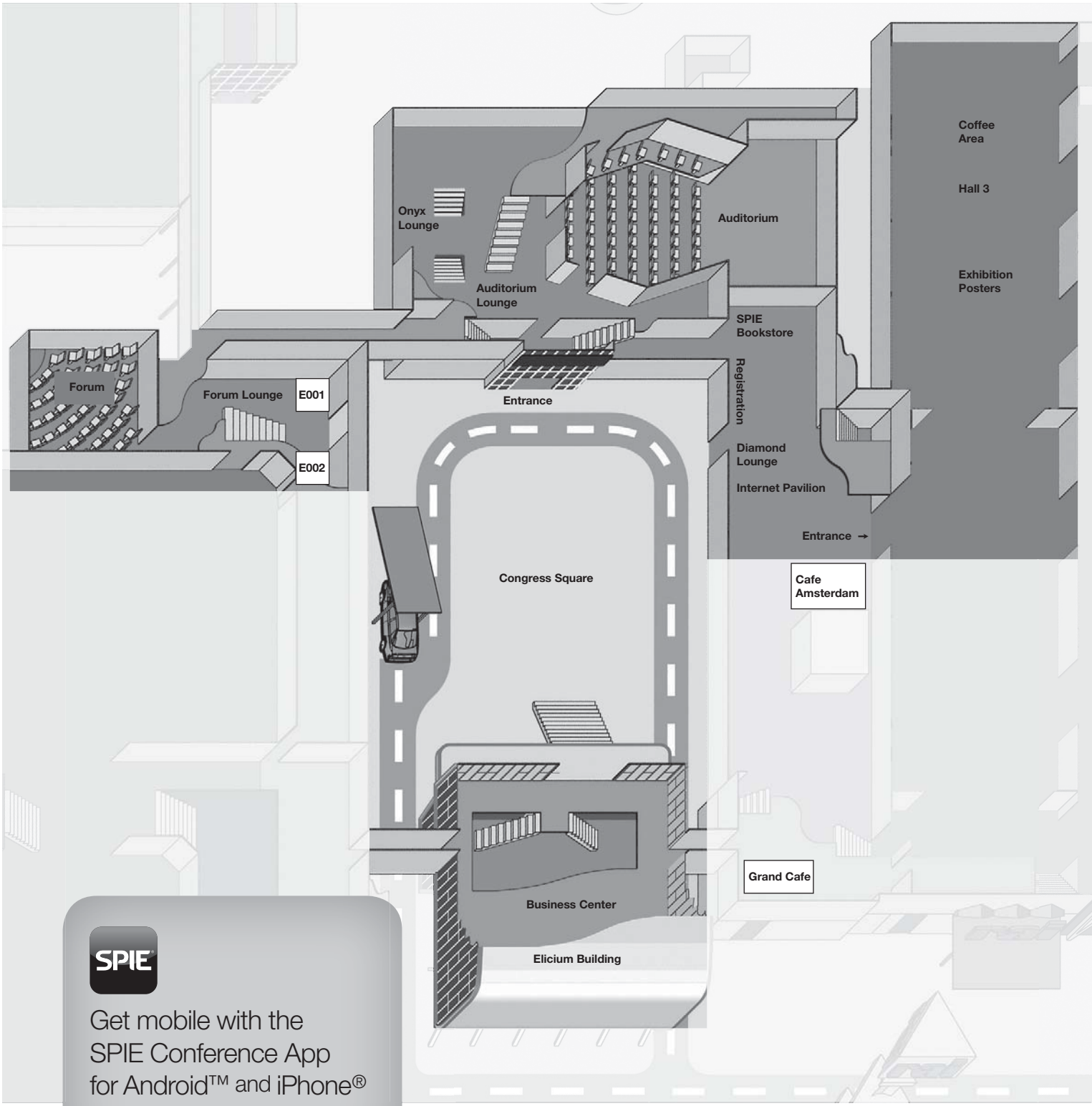
National Radio Astronomy Observatory

Netherlands Institute of Radio Astronomy (ASTRON)

POPsud

TNO

Amsterdam RAI Convention Centre / Ground Floor



SPIE

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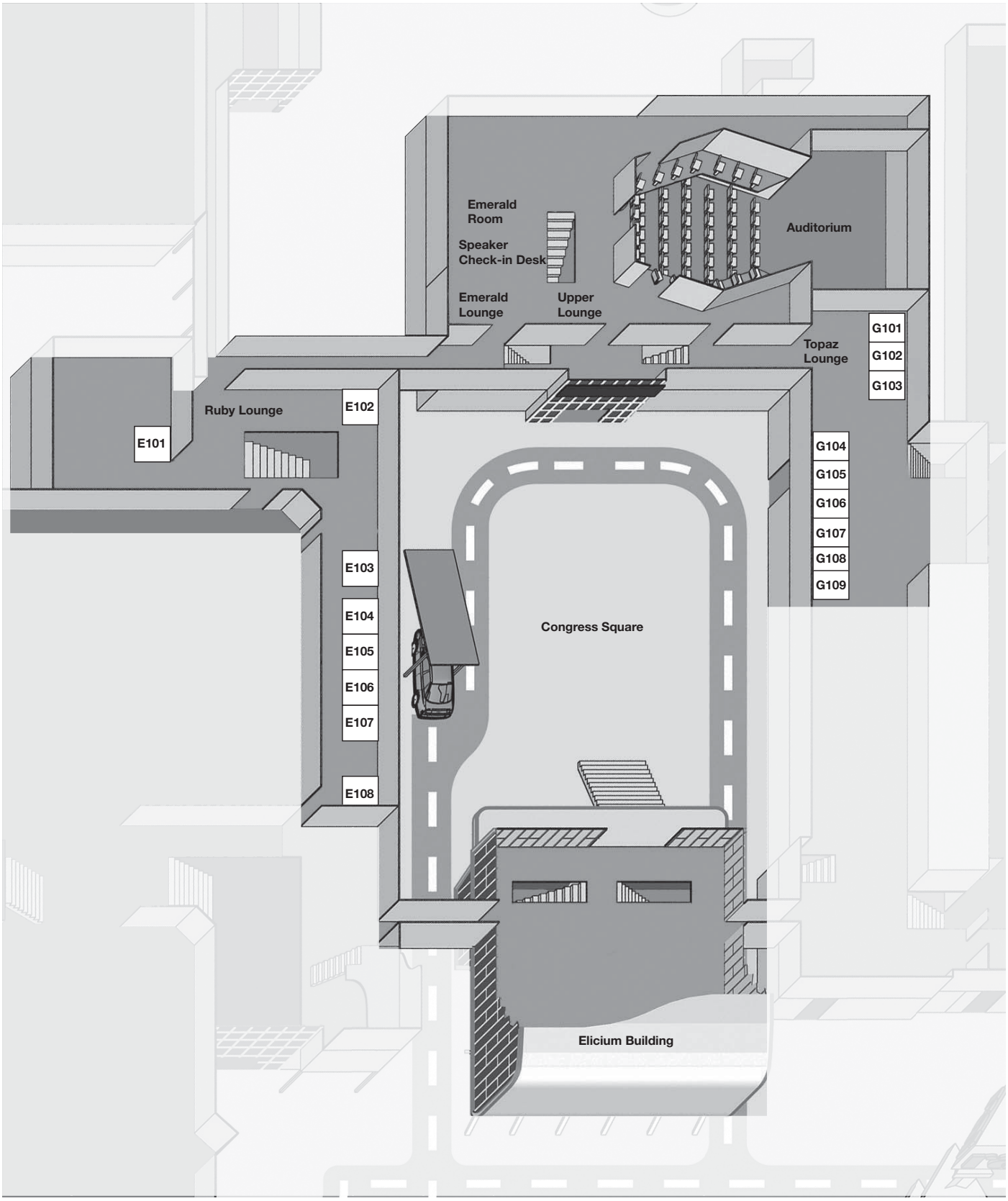
Amsterdam RAI Convention Centre / First Floor



Plenary Presentations

Monday 2 July · Auditorium

08.50 to 09.00 · Welcome

09.00 to 09.30

James Webb Space Telescope: science update and status

Dr. Heidi B. Hammel,
AURA, Inc. (United States)

Abstract: The James Webb Space Telescope (JWST) is NASA's next GreatObservatory, the scientific successor to both the Hubble and Spitzer Space Telescopes. Its scientific equipment will include several cameras to produce amazing images in the tradition of Hubble. JWST will see the first galaxies to form in the universe, and explore how stars are born and develop planetary systems. It will examine planets around other stars to investigate their potential for life, and study planets within our own Solar System. This innovative telescope represents a major step forward in technology, with a segmented mirror three times larger than Hubble that operates a million miles away in the cold, dark environment of Earth's Lagrange 2 point. Dr. Heidi B. Hammel is one of the six Interdisciplinary Scientists for this cutting-edge facility. In her talk, she will give an update of JWST's anticipated science based on recent astronomy results. Some topics will include JWST's potential for measuring water in the atmospheres of exoplanets, the ability of JWST to study icy bodies within our own Solar System, and expected results from JWST for galaxy formation and evolution. She will also discuss the telescope's current status.

Biography: **Dr. Heidi B. Hammel** is the Executive Vice President of AURA, Inc., which operates world-class astronomical observatories including the Hubble Space Telescope. She received her undergraduate degree from MIT in 1982 and her Ph.D. from the University of Hawaii in 1988. She subsequently worked at JPL, MIT, and the Space Science Institute in Boulder, Colorado, before joining AURA. Dr. Hammel has been lauded for her outreach work, including the 2002 Sagan Medal for outstanding communication and the San Francisco Exploratorium's 1998 Public Understanding of Science Award. Hammel is one of the six Interdisciplinary Scientists for the James Webb Space Telescope.

09.30 to 10.00

Exoplanets, unraveling a new paradigm

Prof. Didier Queloz,
Geneva Observatory, Observatory of Geneva (Switzerland)

Abstract: The search for planetary systems orbiting other stars - the exoplanets - and particularly the quest to find planets similar to the Earth is one of the great scientific, technological, and philosophical undertakings of our time. Considered yesterday by most as a wild dream, the search for and study of Earth-like planets outside the solar system is becoming reality.

Until recently, the solar system has provided the only basis for our knowledge of planets and life in the universe. This has changed with the discovery in 1995 of the first giant planet outside the solar system. This discovery has spawned a real revolution in astronomy both in terms of new instrumentation and understanding of planet formation and evolution.

Today spectroscopic and transit exoplanets surveys are revealing a large population of multiple systems composed of Neptune and super-Earth mass planets. These results, combined with the upper mass constraints on planet mass obtained from astrometry and the measurements of the angle of the planetary orbits measured from on-transit spectroscopic, leads us to revisit our views on planet formation and their composition. A new paradigm about the formation, structure and composition of planets is emerging, wider than what we have learned so far from our Solar System.

Biography: **Prof. Didier Queloz** is at the origin of the exoplanet revolution in astrophysics. Since 1995 where he discovered with Michel Mayor the first giant planet outside the solar system, he spent considerable effort improving the precision of the Doppler technique. In 2000, on this way back from a position at JPL, he developed with other colleagues the PRIMA-DDL system ESO/VLTI to detect of planetary orbits by astrometry. More recently he is involved in the emerging area of planetary transit detection where he is collaborating with the WASP team. He was as well a key actor in the first transit detection of a rocky planet by Corot.

Symposium Chairs:

Kathryn A. Flanagan,
Space Telescope Science Institute (USA)

Mark M. Casali,
European Southern Observatory (Germany)

Exciting developments, spanning many orders of magnitude in cost and size, have the goal of achieving scientific discovery. All have a role to play and, uniquely, they all come together at the SPIE Astronomical Instrumentation series of symposia, where science highlights, facility concepts and technical advances are presented. The format for the 2012 meeting in Amsterdam will remain similar to last time, with the conference topics covering most of the relevant technological areas in astronomy. Anyone who has any interest in astronomical technology will find something fascinating in the focused conferences, industrial exhibits and plenary talks. We look forward to seeing you in Amsterdam.

Tuesday 3 July · Auditorium

09.00 to 09.30

The Kepler Exoplanet Survey: instrumentation, performance and results

Dr. Thomas N. Gautier,
Jet Propulsion Lab., Caltech (United States)

Abstract: As of April 2012, after 3 years of operation, the Kepler Mission has found 2321 exoplanet candidates and has confirmed 61 of the candidates as true planets. This talk will describe the mission design and instrumentation that has allowed this remarkable harvest of exoplanets. The latest Kepler discoveries will be discussed and plans for operation of the mission through 2016 will be presented.

Kepler was launched into an Earth trailing heliocentric orbit on 9 March 2009 and began its exoplanet survey on 13 May 2009. The spacecraft continues to function normally. The Kepler photometer consists of a 95cm aperture Schmidt telescope with a 105 square degree field of view populated with 42, 2Kx1K CCD detectors. The focal plane is read out every 6 seconds with pixel data coadded to 1 minute and 30 minute integrations. Kepler always points to a single field between the constellation of Cygnus and Lyra a few degrees north of the galactic plane.

The exoplanet survey continuously monitors ~150,000 dwarf stars of types F, G, K and M looking for brief, periodic dimmings of the stars characteristic of an orbiting planet crossing the face of its star as seen from Kepler. The goal of Kepler is to take a census of planets around solar-like stars in the Solar neighborhood and determine the frequency of Earth-size planets in the habitable zones of their stars, that is the region around the star where the surface temperature of a rocky planet might allow liquid water. Kepler has so far found 46 planets in habitable zones but only 9 such planets small probably small enough to be rocky. The survey is expected to continue for 4 more years to provide good detection efficiency for Earth-size planets in the habitable zones of G type dwarf stars like the Sun.

Biography: **Dr. Gautier** received a B.S. in Physics from the University of Michigan in 1971 and a Ph.D. in Astronomy from the University of Arizona in 1978. Since then he has built instrumentation for infrared observations with ground based telescopes, has participated in the development of six space telescopes including Spitzer, WISE and Kepler and is currently the Project Scientist for Kepler. His research interests include dust in the interstellar medium, circumstellar dust and debris and detection of exoplanets.

09.30 to 10.00

Antarctic astronomy

Prof. John W. V. Storey,
The Univ. of New South Wales (Australia)

Abstract: On the one hand, Antarctica offers extraordinary advantages for astronomy. The domes of the Antarctic plateau are extremely cold, high (up to 4,000 metres), dry (a precipitable water column of below 25 microns has been measured), and have a stable, very calm atmosphere with the lowest wind speeds on earth. On the other hand, there are unique technical challenges---some obvious, some not so---that the instrumentation and telescope designers must confront. Over the past two decades, technical solutions have been found to allow routine and in some cases fully autonomous observatories to be built. As a result, Antarctic astronomy is now a vigorous and rapidly expanding field, with new observatories being built in some of the harshest and most remote locations on earth. In addition to the ground-based photon observatories, Antarctica also hosts major particle astrophysics facilities such as IceCube, and is the launch site for long-duration balloons carrying a multitude of experiments for cosmic microwave background, terahertz, and cosmic ray science.

Biography: **John Storey** has an undergraduate degree in physics from La Trobe University and a PhD in chemistry from Monash University. Following a postdoctoral position at UC Berkeley he worked as a staff scientist at the Anglo-Australian Observatory. He then took up a position at the University of New South Wales and has been a professor there since 1987. He was awarded an Alexander von Humboldt fellowship, allowing him to spend time at the Max Planck Institute for Extraterrestrial Physics in Munich. Storey has been awarded the Pawsey Medal, the Antarctic Service Medal, and has presented the Ellery, Bok, and Pawsey lectures. Storey is currently Chief Officer of the Astronomy and Astrophysics from Antarctica scientific research program of SCAR.

Plenary Presentations

Wednesday 4 July · Auditorium

09.00 to 09.30

Very high energy gamma-ray astronomy with the HESS telescopes

Prof. Werner Hofmann,
Max-Planck-Institut fuer Kernphysik (Germany)

Abstract: In the last decade, very high energy (VHE) gamma ray astronomy - at photon energies of 100 GeV and beyond - has developed in giant steps, with the number of known cosmic VHE gamma ray sources now well over 100. As the first system of large imaging atmospheric Cherenkov telescopes, the High Energy Stereoscopic System - H.E.S.S. - in Namibia has contributed significantly to this development. The presentation will briefly introduce the Cherenkov technique and the performance of the instrument, and then concentrate of the various types of VHE gamma ray sources discovered with H.E.S.S. and on their interpretation. VHE gamma rays cannot be produced in thermal processes; they are created in interactions of high energy particles. Gamma rays trace populations of such particles and allow imaging of the cosmic particle accelerators. One of the major results of H.E.S.S. is that VHE gamma ray emitters are ubiquitous in the Galaxy and beyond; they include supernova remnants, pulsars and pulsar wind nebulae and binary systems, as well as starburst galaxies, radio galaxies and blazars.

Biography: Study of physics at Karlsruhe University, Ph.D. 1977, Postdoc and Heisenberg fellowship at Dortmund Univ. and LBL (1978-83), Faculty UC Berkeley (1984-1988), Director at the Max Planck Institute for Nuclear Physics, Heidelberg (since 1988), Chair of the Chemistry, Physics and Technology Section of the Max Planck Society (2008-2011), Spokesperson of the H.E.S.S. and CTA projects.

09.30 to 10.00

The cosmic microwave background: observing directly the early universe

Prof. Paolo De Bernardis,
Univ. degli Studi di Roma La Sapienza (Italy)

Abstract: The Cosmic Microwave Background (CMB) is a relic of the early universe. Its perfect 2.725K blackbody spectrum demonstrates that the universe underwent a hot, ionized early phase; its anisotropy (about 80 microK rms) provides strong evidence for the presence of photon-matter oscillations in the primeval plasma, shaping the initial phase of the formation of structures; its polarization state (about 3 microK rms), and in particular its rotational component (less than 0.1 microK rms) might allow to study the inflation process in the very early universe, and the physics of extremely high energies, impossible to reach with accelerators.

The CMB is observed by means of microwave and mm-wave telescopes, and its measurements drove the development of ultra-sensitive bolometric detectors, sophisticated modulators, and advanced cryogenic and space technologies.

Here we focus on the new frontiers of CMB research: the precision measurements of its linear polarization state, at large and intermediate angular scales, and the measurement of the inverse-Compton effect of CMB photons crossing clusters of Galaxies. In this framework, we will describe the formidable experimental challenges, faced by ground-based, near-space and space experiments, using large arrays of detectors. We will show that sensitivity and mapping speed improvement obtained with these arrays must be accompanied by a corresponding reduction of systematic effects (especially for CMB polarimeters), and by improved knowledge of foreground emission, to fully exploit the huge scientific potential of these missions.

Biography: **Paolo de Bernardis** is professor of astrophysics at University of Rome “La Sapienza”. His research focuses on the measurement of the detailed properties of the Cosmic Microwave Background by means of cryogenic detectors and telescopes mounted on space carriers, including stratospheric balloons and satellites. He has developed complete microwave telescopes complemented by very sensitive bolometric detectors, like the very successfull BOOMERanG experiment, and is co-investigator of the Planck satellite mission. He has been awarded the Feltrinelli (2001), Balzan (2006), Dan David (2009) and Cocconi (2011) prizes for his CMB measurements.

Thursday 5 July · Auditorium

09.30 to 10.00

ALMA construction and early science

Dr. Thijs de Graauw,
Joint ALMA Observatory (Chile)

Abstract: The Atacama Large Millimeter/submillimeter Array (ALMA) is an international radio observatory under construction in the Atacama region of northern Chile. It is a partnership of Europe, North America and East Asia in cooperation with the Republic of Chile. ALMA is a combination of two arrays of high-precision submm antennas: one comprising 50 antennas of 12-m diameter which can be arranged in configurations with maximum antenna separations ranging from about 150 meters to 16 km. The other, the Atacama Compact Array (ACA), consists of twelve 7-meter diameter antennas operating in closely-packed configurations with maximum antenna separations of about 50 meters. Four additional 12-meter antennas will provide the "zero-spacing" information, which together with the information from the ACA is critical for making accurate images of extended objects. The total collecting area will be 6600 square meters. All the ALMA antennas will be equipped with sensitive sub-millimeter-wave receivers covering most of the frequency range from 35 to 950 GHz. State-of-the-art microwave, digital, photonic and software systems will be used to capture the signals, transfer them to the correlators as well as maintaining accurate synchronization.

ALMA will provide the astronomical community with a (sub)mm facility with a wide range of capabilities to address key questions in all areas of astronomy. It will provide (sub)mm images with Hubble type detail, at a velocity resolution of ~100m/s over wide bandwidths, with great sensitivity and fidelity. This presentation provides a overview of the development of the observatory, the status of its construction and first results of Early Science observations that started 9 months ago.

Biography: **Thijs de Graauw** has served as Director of the Atacama Large Millimeter/submillimeter Array (ALMA) since 2008. Before joining ALMA, he worked at the Netherlands Institute for Space Research (SRON), where he was responsible for the infrared and sub-millimeter research program. In this capacity he acted as Principal Investigator for Herschel-HIFI. He was also a professor at Leiden University, and was the Principal Investigator of the successful Short Wavelength Spectrometer (SWS), which flew on the Infrared Space Observatory, Herschel's predecessor. Recently the American Astronomical Society has awarded the 2012 Joseph Weber Award for Astronomical Instrumentation to Thijs de Graauw, for his leadership in the construction of powerful new astronomical instruments.

Network

Networking Receptions · Student Social Events · SPIE Member Events

Join your colleagues and develop new relationships at these relaxed-atmosphere networking events.

Some events open to all attendees; some require tickets or invitations. See individual event descriptions for details.

All-Symposium Welcome Reception

Monday 2 July · 19.00 to 20.30
Strandzuid · Citybeach Amsterdam

Relax, socialize, and enjoy the refreshments and all that this unique venue has to offer. Located directly behind the RAI Centre and before Beatrix Park.

Please remember to wear your registration badges. Dress is casual. Guest tickets are available for purchase at Cashier. $35 / €30

Lunch with the Experts—

A Student Networking Event

Monday 2 July · 12.30 to 13.30 · Onyx Lounge
Open to Student Attendees

Enjoy a casual meal with colleagues at this engaging networking opportunity. Hosted by SPIE Student Services, this event features experts sharing their experience and wisdom on career paths in optics and photonics. Seating is limited and will be granted on a first-come, first-served basis.

Tour of Astronomical Observing Facilities

Tuesday 3 July · 10.00 to 15.30

Tour of the astronomical observing facilities in The Netherlands are being planned for Tuesday. Additional details including the cost will be available at the meeting.

ASTRON (the Netherlands Institute for Radio Astronomy) Tour

This tour of the ASTRON facility will include a presentation about the institute and the different research and development activities and a tour around the facilities in Dwingeloo. The tour continues with a visit to the LOFAR telescope for a tour around the LOFAR antennas at the superterp.

Reserve your space at the meeting before Monday at noon. Space is limited. A transportation and lunch fee will be charged.

Check at Tour Sign-up area for additional tour opportunities.

Women in Optics Presentation and Reception

Tuesday 3 July · 16.30 to 18.00
Amsterdam RAI Convention Centre · Room E107
Open to all conference attendees

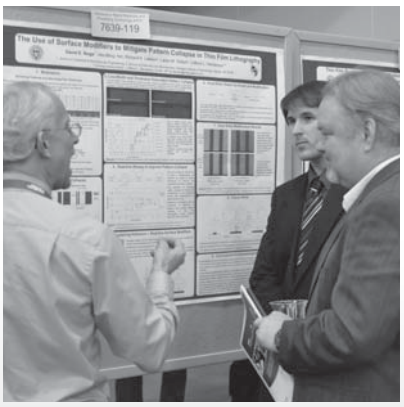
SPEAKER

Sarah Kendrew

The changing face(s) of astronomy

The observatories of the future will change the way we do astronomy. A growing culture of openness and the networked nature of science are driving innovation in communication and collaboration between scientists, and far beyond the research community. Web-based citizen science platforms, such as the Zooniverse, bring together professional astronomers and science enthusiasts around the world - bringing exciting science to a broad audience, fostering trust in the research community, and redefining the answer to the question "Who is an astronomer?"

Sarah Kendrew holds a PhD in Physics from University College London, and is currently employed as a Postdoctoral Fellow and Systems Engineer at the Max Planck Institute for Astronomy in Heidelberg, Germany. She works on several high-profile international instrumentation projects in infrared astronomy, for ground- and space-based observatories. She is a co-organiser of the dotAstronomy conference series and a science team member for the Zooniverse citizen science initiative Milky Way Project.



All-Conference Dinner and Presentation

Wednesday 4 July · 19.00 to 21.30 · Grand Hotel Krasnapolsky

Don't miss the the All-Conference Dinner and Presentation on Wednesday at "Winter Garden" in the Grand Hotel Krasnapolsky.

Tickets for the dinner are sold separately. Space is limited; preregister by Monday 2 July to guarantee your place.

Transportation departs from the RAI starting at 18.00. The evening wli begin with a reception at 18.30 followed by dinner at 19.00.

DINNER SPEAKER

Dr. Jason Spyromilio,
European Southern Observatory (Germany)

Big telescopes and how to make big trouble

Abstract: The evolution of the telescope over the years shall be presented with a view to engineering breakthroughs and challenges. The design of the telescope has been influenced by the engineering possibilities as much as the astronomers' wishes. The interplay between what is dreamt of and what is made possible over the centuries has delivered many of the advances we consider as baseline solutions today. As telescopes grow in cost and complexity, new paradigms may be put in place for the design, construction and management processes for the behemoths of the future. The presentation will focus on the design of the European Extremely Large telescope and the attempt at applying new paradigms.

Biography: **Dr Jason Spyromilio** received his PhD from Imperial College. He has been a researcher and instrument scientist at the Anglo-Australian Observatory. Since 1994 he is an infrared astronomer at the European Southern Observatory. He led the re-commissioning of the New Technology Telescope and the commissioning effort at the Very Large Telescope at Paranal. He has been deputy-director and director of the La Silla Paranal Observatory. He headed the European Extremely Large Telescope project office during the design phase. He is an active researcher studying supernovae.

Poster Previews/Poster Pops

The Optical and Infrared Interferometry III (8445) and Ground-based and Airborne Instrumentation for Astronomy IV (8446) conferences will include short oral poster previews.

Please check the conference program for details on involvement criteria and times of these sessions.

Poster Sessions

Amsterdam RAI Convention Centre · Hall 3 (Ground Floor)

Conference attendees are invited to attend the poster sessions on Sunday, Monday, Tuesday, and Thursday. See conference program for a list of the posters in each session.

Each day will represent a different set of conference poster presentations. Come view the posters, ask questions, and enjoy light refreshments. Authors of poster papers will be present during the Interactive Poster Sessions to answer questions concerning their papers.

As part of the technical program, poster sessions are for paid registrants only. Attendees are required to wear their conference registration badges to the poster sessions.

Daily Schedule

Poster Setup . . . . . Beginning at 10.00

Extended Poster Viewing . . . . . .10.00 to 17.00

Interactive Poster Sessions

Sunday . . . . . .18.00 to 20.00
(Conferences 8442, 8446, 8447, 8451)

Monday . . . . . .17.30 to 19.00
followed by the Welcome Reception
(Conferences 8443, 8444, 8446, 8447, 8453)

Tuesday. . . . . .18.00 to 20.00
(Conferences 8444, 8445, 8446, 8447, 8449, 8450)

Thursday . . . . . .18.00 to 20.00
(Conferences 8443, 8445, 8446, 8447, 8448, 8450)

Daily Conference Schedule

Plenary Sessions

Plenary sessions will take place each morning on Monday, Tuesday, Wednesday, and Thursday from 9.00 to 10.00.

See pages 4-6 for details.

SUNDAY	MONDAY	TUESDAY

Telescopes and Systems Programme Track

8442 Space Telescopes and Instrumentation 2012: Optical, Infrared, and Millimeter Wave

SESSION 1 · **ExoPlanet/Coronagraphic Missions and Technology I**	**PLENARY SESSION**	**PLENARY SESSION**
SESSION 2 · **ExoPlanet/Coronagraphic Missions and Technology II**	SESSION 5 · **SPICA**	SESSION 7 · **Small Missions/ Explorers I**
SESSION 3 · **ExoPlanet/Coronagraphic Missions and Technology III**	SESSION 6 · **Euclid/WFIRST**	SESSION 8 · **Small Missions/ Explorers II**
SESSION 4 · **ExoPlanet/Coronagraphic Missions and Technology IV**		SESSION 9 · **ECHO**
SUNDAY POSTER SESSION		

8443 Space Telescopes and Instrumentation 2012: Ultraviolet to Gamma Ray

SESSION 1 · **UV Missions and Technologies**	**PLENARY SESSION**	**PLENARY SESSION**
SESSION 2 · **Solar Missions and Technologies**	SESSION 5 · **Detector Technology for Future Missions**	SESSION 8 · **Operational Missions**
SESSION 3 · **Gamma-Ray Missions and Technologies**	SESSION 6 · **X-Ray Optics I**	SESSION 9 · **New Missions I**
SESSION 4 · **Gamma-Ray Burst Missions**	SESSION 7 · **X-Ray Optics II**	SESSION 10 · **New Missions II**
	MONDAY POSTER SESSION	

8444 Ground-based and Airborne Telescopes IV

SESSION 1 · **Solar Telescopes I**	**PLENARY SESSION**	**PLENARY SESSION**
SESSION 2 · **Solar Telescopes II**	SESSION 6 · **Telescope Mounts and Enclosures**	SESSION 11 · **Airborne Telescopes I**
SESSION 3 · **Telescopes for Synoptic and Survey Observations I**	SESSION 7 · **Design to Withstand Earthquakes**	SESSION 12 · **Airborne Telescopes II**
SESSION 4 · **Telescopes for Synoptic and Survey Observations II**	SESSION 8 · **Modeling, Measurement, and Control of Wind Buffeting**	SESSION 13 · **Gamma Ray Telescopes**
SESSION 5 · **Upgrades to Existing Observatories**	SESSION 9 · **Concepts for Future Telescopes**	SESSION 14 · **Assembly, Integration, Verification, and Commissioning**
	SESSION 10 · **Industrial Perspectives**	
	MONDAY POSTER SESSION	**TUESDAY POSTER SESSION**

Don't Miss the Free Exhibition

See exhibit directory on pp. 18–31.

WEDNESDAY	THURSDAY	FRIDAY

Conference Chairs: **Mark C. Clampin,** NASA Goddard Space Flight Ctr. (USA); **Giovanni G. Fazio,** Harvard-Smithsonian Ctr. for Astrophysics (USA); **Howard A. MacEwen,** Reviresco LLC (USA); **Jacobus M. Oschmann, Jr.,** Ball Aerospace & Technologies Corp. (USA)

PLENARY SESSION	**PLENARY SESSION**	SESSION 16 · **JWST Overview**
SESSION 10 · **Technology**	SESSION 13 · **Hubble Space Telescope SM4/Spitzer**	SESSION 17 · **JWST Optics/I&T I**
SESSION 11 · **Astrometry/GAiA**	SESSION 14 · **Large Space Optics**	SESSION 18 · **JWST Optics/I&T II**
SESSION 12 · **Exoplanet and Combined Missions**	SESSION 15 · **Solar Missions**	SESSION 19 · **JWST Instruments**

Conference Chairs: **Tadayuki Takahashi,** Japan Aerospace Exploration Agency (Japan); **Stephen S. Murray,** The Johns Hopkins Univ. (USA); **Jan-Willem A. den Herder,** SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands)

PLENARY SESSION	**PLENARY SESSION**	SESSION 17 · **Athena**
SESSION 11 · **X-Ray Polarimetry**	SESSION 14 · **SRG**	SESSION 18 · **LOFT**
SESSION 12 · **Astrophysical Science Drivers for New Observatories**	SESSION 15 · **NuSTAR**	
SESSION 13 · **Future X-Ray Missions**	SESSION 16 · **ASTRO-H**	
	THURSDAY POSTER SESSION	

Conference Chairs: **Larry M. Stepp,** Thirty Meter Telescope (USA); **Roberto Gilmozzi,** European Southern Observatory (Germany); **Helen J. Hall,** NASA Ames Research Ctr. (USA)

PLENARY SESSION	**PLENARY SESSION**	SESSION 25 · **Square Kilometer Array and SKA Pathfinders**
SESSION 15 · **Extremely Large Telescopes**	SESSION 20 · **Project Reviews**	SESSION 26 · **Radio Telescopes**
SESSION 16 · **Science with Extremely Large Telescopes**	SESSION 21 ·**Enabling Technologies for Extremely Large Telescopes I**	SESSION 27 · **Millimeter and Submillimeter Wavelength Telescopes I**
SESSION 17 · **Site Characterization, Testing, and Development**	SESSION 22 · **Enabling Technologies for Extremely Large Telescopes II**	SESSION 28 · **Millimeter and Submillimeter Wavelength Telescopes II**
SESSION 18 · **Design of Telescopes for Extreme Environments**	SESSION 23 · **Segmented Mirror Alignment, Phasing, and Wavefront**	
SESSION 19 · **Control of Thermal Environment**	SESSION 24 · **Observatory Facilities**	

Telescopes and Systems Programme Track continued

8445 Optical and Infrared Interferometry III

SUNDAY	MONDAY	TUESDAY
SESSION 1 · **Space Aperture Imaging**	**PLENARY SESSION**	**PLENARY SESSION**
SESSION 2 · **Science I**	SESSION 4 · **Current Facilities and Instruments I**	SESSION 9 · **Science IV**
SESSION 3 · **Air and Space Interferometers**	SESSION 5 · **Science II**	SESSION 10 · **Planned Facilities and Instruments I**
	SESSION 6 · **Current Facilities and Instruments II**	SESSION 11 · **Science V**
	SESSION 7 · **Science III**	SESSION 12 · **Planned Facilities and Instruments II**
	SESSION 8 · **Current Facilities and Instruments III**	SESSION 13 · **Science VI**
		SESSION 14 · **Current Facilities and Instruments IV**
		POSTER POPS
		TUESDAY POSTER SESSION

8446 Ground-based and Airborne Instrumentation for Astronomy IV

SESSION 1 · **Instrumentation at Major Observatories**	**PLENARY SESSION**	**PLENARY SESSION**
SESSION 2 · **New Instruments**	SESSION 3 · **Multi-Object Instruments I**	SESSION 5 · **Imaging Surveyors I**
POSTER PREVIEWS	**POSTER PREVIEWS**	SESSION 6 · **Imaging Surveyors II**
SUNDAY POSTER SESSION	SESSION 4 · **Multi-Object Instruments II**	SESSION 7 · **Airborne Instruments**
	MONDAY POSTER SESSION	SESSION 8 · **Solar Instruments**
		TUESDAY POSTER SESSION

8447 Adaptive Optics Systems III

SESSION 1 · **Project Status I**	**PLENARY SESSION**	**PLENARY SESSION**
SESSION 2 · **Wavefront Correctors I**	SESSION 5 · **Project Status II**	SESSION 8 · **Project Status III**
SESSION 3 · **Quantitative Astronomy and Science with AO I**	SESSION 6 · **Quantitative Astronomy and Science with AO II**	SESSION 9 · **Advances in AO Control I**
SESSION 4 · **Laser Systems**	SESSION 7 · **Wavefront Sensing I**	SESSION 10 · **Wavefront Sensing II**
SUNDAY POSTER SESSION	**MONDAY POSTER SESSION**	**TUESDAY POSTER SESSION**

Don't Miss the Free Exhibition

See exhibit directory on pp. 18–31.

WEDNESDAY	THURSDAY	FRIDAY

Conference Chairs: **Françoise Delplancke,** European Southern Observatory (Germany); **Jayadev K. Rajagopal,** National Optical Astronomy Observatory (USA); **Fabien Malbet,** Institut de Planétologie et d'Astrophysique de Grenoble (France)

PLENARY SESSION	**PLENARY SESSION**	SESSION 21 · **Critical Sub-Systems I**
SESSION 15 · **Future I**	SESSION 18 · **Software and Image Reconstruction I**	SESSION 22 · **Critical Sub-Systems II**
SESSION 16 · **Technology**	PANEL DISCUSSION: **Interferometric Imaging Software**	SESSION 23 · **Science VIII**
POSTER POPS	SESSION 19 · **Software and Image Reconstruction II**	SESSION 24 · **Critical Sub-Systems III**
SESSION 17 · **Software and Data Reduction**	SESSION 20 · **Science VII**	SESSION 25 · **Observing Techniques**
POSTER POPS	PANEL DISCUSSION: **Future Direction**	SESSION 26 · **Critical Sub-Systems IV**
	IAU DISCUSSION	
	INTERFEROMETRY PRIZE ANNOUNCEMENT	
	THURSDAY POSTER SESSION	

Conference Chairs: **Ian S. McLean,** Univ. of California, Los Angeles (USA); **Suzanne K. Ramsay,** European Southern Observatory (Germany); **Hideki Takami,** Subaru Telescope, National Astronomical Observatory of Japan (Japan)

PLENARY SESSION	**PLENARY SESSION**
SESSION 9 · **ELT Instruments I**	SESSION 12 · **Planet Finders I**
SESSION 10 · **ELT Instruments II**	**POSTER PREVIEWS**
SESSION 11 · **ELT Instruments III**	SESSION 13 · **Planet Finders II**
POSTER PREVIEWS	SESSION 14 · **High Resolution and AO Instruments**
	CLOSING REMARKS
	THURSDAY POSTER SESSION

Conference Chairs: **Brent L. Ellerbroek,** Thirty Meter Telescope (USA); **Enrico Marchetti,** European Southern Observatory (Germany); **Jean-Pierre Véran,** National Research Council Canada (Canada)

PLENARY SESSION	**PLENARY SESSION**	SESSION 19 · **AO Modeling, Analysis and Simulations**
SESSION 11 · **AO Disturbances Modeling and Characterization I**	SESSION 15 · **Wavefront Sensing III**	SESSION 20 · **Postprocessing of AO Data**
SESSION 12 · **AO Disturbances Modeling and Characterization II**	SESSION 16 · **Laser System Tests**	SESSION 21 · **Advances in AO Control III**
SESSION 13 · **Project Status IV**	SESSION 17 · **Advances in AO Control II**	SESSION 22 · **Wavefront Correctors II**
SESSION 14 · **AO for ELTs**	SESSION 18 · **Extreme AO**	SESSION 23 · **Wavefront Sensing IV**
	THURSDAY POSTER SESSION	

SUNDAY	MONDAY	TUESDAY

Telescopes and Systems Programme Track continued

8449 Modeling, Systems Engineering, and Project Management for Astronomy V

Conference Chairs: **George Z. Angeli,** Thirty Meter Telescope (USA); **Philippe Dierickx,** European Southern Observatory (Germany)

SESSION 1 · **Modeling I**	**PLENARY SESSION**	**PLENARY SESSION**
SESSION 2 · **Systems Engineering I**	SESSION 5 · **Project Management II**	SESSION 8 · **Project Management IV**
SESSION 3 · **Systems Engineering II**	SESSION 6 · **Project Management III**	SESSION 9 ·**Modeling III**
SESSION 4 · **Project Management I**	SESSION 7 · **Modeling II**	SESSION 10 · **Modeling IV**
		TUESDAY POSTER SESSION

Technology Advancements Programme Track

8450 Modern Technologies in Space- and Ground-based Telescopes and Instrumentation II

SESSION 1 · **Telescope Structures and Domes**	**PLENARY SESSION**	**PLENARY SESSION**
SESSION 2 · **Active Structures and Optics**	SESSION 3 · **Coronography and High Contrast Imaging**	SESSION 7 · **Optical Fibers and Waveguides**
	SESSION 4 · **Test and Metrology I**	SESSION 8 · **Multi-Object Spectroscopy I**
	SESSION 5 · **Test and Metrology II**	SESSION 9 · **Multi-Object Spectroscopy II**
	SESSION 6 · **Test and Metrology III**	**TUESDAY POSTER SESSION**

8451 Software and Cyberinfrastructure for Astronomy II

SESSION 1 · **Innovations**	**PLENARY SESSION**	**PLENARY SESSION**
SESSION 2 · **Software Engineering**	SESSION 5 · **Computing Innovations**	SESSION 8 · **Cyberinfrastructure and HPC**
SESSION 3 · **Data Management and Processing**	SESSION 6 · **Control Systems II**	SESSION 9 · **Control Systems III**
SESSION 4 · **Control Systems I**	SESSION 7 · **Lightning Talks**	SESSION 10 · **Data Management, Pipelines, and Archives**
SUNDAY POSTER SESSION		

WEDNESDAY	THURSDAY	FRIDAY

8448 Observatory Operations: Strategies, Processes, and Systems IV

Conference Chairs: **Alison B. Peck,** Joint ALMA Observatory (Chile) and National Radio Astronomy Observatory (Chile); **Robert L. Seaman,** National Optical Astronomy Observatory (USA); **Fernando Comeron,** European Southern Observatory (Germany)

PLENARY SESSION	PLENARY SESSION	SESSION 9 · **Program and Observation Scheduling**
SESSION 1 · **Science Operations Processes I**	SESSION 5 · **Observatory Metrics, Legacy, and Bibliography**	SESSION 10 · **Site and Facility Operations I**
SESSION 2 · **Science Operations Processes II**	SESSION 6 · **Time Domain, Target of Opportunity, and Transient Events**	SESSION 11 · **Site and Facility Operations II**
SESSION 3 · **User Support**	SESSION 7 · **Remote and Robotic Operations**	SESSION 12 · **Site and Facility Operations III**
SESSION 4 · **Archives and Virtual Observatory**	SESSION 8 · **Scheduling and Data Flow Management**	
	THURSDAY POSTER SESSION	

Conference Chairs: **Ramón Navarro,** NOVA-ASTRON (Netherlands); **Colin R. Cunningham,** UK Astronomy Technology Ctr. (United Kingdom); **Eric Pietro,** Lab. d'Astrophysique de Marsaille (France)

PLENARY SESSION	PLENARY SESSION		SESSION 16 · **Gratings**
SESSION 10 · **Slit Spectroscopy, Slicers, and Polarimetry I**	SESSION 13a · **Technologies for Cryogenic Instruments I**	SESSION 13b · **Optical Fabrication I**	SESSION 17 · **Revolutionary Technologies**
SESSION 11 · **Slit Spectroscopy, Slicers, and Polarimetry II**	SESSION 14a · **Technologies for Cryogenic Instruments II**	SESSION 14b · **Optical Fabrication II**	**AWARDS CEREMONY**
SESSION 12 · **Slit Spectroscopy, Slicers, and Polarimetry III**	SESSION 15a · **Coatings and Filters**	SESSION 15b · **Optical Fabrication III**	
	THURSDAY POSTER SESSION		

Conference Chairs: **Nicole M. Radziwill,** James Madison Univ. (USA); **Gianluca Chiozzi,** European Southern Observatory (Germany)

PLENARY SESSION
SESSION 11 · **Observing and Imaging**
SESSION 12 · **Communications, Collaboration, and Coordination**
SESSION 13 · **New Directions**

Daily Conference/Course Schedule

SUNDAY	MONDAY	TUESDAY

Technology Advancements Programme Track continued

8452 Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VI

PLENARY SESSION
SESSION 1 · **Current/Near Term Cameras and Arrays**
SESSION 2 · **Transition Edge Sensors: Array Design and Performance**
TUESDAY POSTER SESSION

8453 High Energy, Optical, and Infrared Detectors for Astronomy V

SESSION 1 · **CCDs I**	**PLENARY SESSION**	**PLENARY SESSION**
SESSION 2 · **UV Detection I**	SESSION 7 · **Focal Plane Arrays**	SESSION 10 · **IR Detectors II**
SESSION 3 · **UV Detection II**	SESSION 8 · **X-Ray Detectors I**	SESSION 11 · **IR Detectors III**
SESSION 4 · **Cryogenic Detectors**	SESSION 9 · **IR Detectors I**	SESSION 12 · **Space Radiation Damage**
SESSION 5 · **CMOS Sensors**	**MONDAY POSTER SESSION**	SESSION 13 · **X-Ray Detectors II**
SESSION 6 · **CMOS and Hybrid X-Ray Detectors**		SESSION 14 · **Testing**

Take a course from the experts

SUNDAY	MONDAY	TUESDAY

Telescopes and Systems

WS1002 **The Galileoscope: Bringing Telescope Optics Down To Earth** *(Sparks)* 13.30 to 16.00	SC135 **Adaptive Optics** *(Tyson)* 8.30 to 17.30	SC906 **Introduction to Visible and NIR Spectrograph Design and Development for Astronomy** *(Sheinis)* 8.30 to 12.30

WEDNESDAY	THURSDAY	FRIDAY

Conference Chairs: **Wayne S. Holland,** UK Astronomy Technology Ctr. (United Kingdom); **Jonas Zmuidzinas,** California Institute of Technology (USA)

PLENARY SESSION	PLENARY SESSION	SESSION 9 · **CMB Instrumentation: Current/Near Term**
SESSION 3 · **Transition Edge Sensors: Development and Readout**	SESSION 6 · **Future Cameras and Focal Plane Arrays**	SESSION 10 · **CMB Instrumentation: New Developments I**
SESSION 4 · **Optical Design and Components**	SESSION 7 · **Terahertz Technology**	SESSION 11 · **CMB Instrumentation: New Developments II**
SESSION 5 · **Kinetic Inductance Detectors: Design, Readout and Instruments**	SESSION 8 · **Coherent Detection Technologies**	SESSION 12 · **Mechanical Design and Cryogenics**

Conference Chairs: **Andrew D. Holland,** The Open Univ. (United Kingdom); **James W. Beletic,** Teledyne Imaging Sensors (USA)

PLENARY SESSION
SESSION 15 · **Electronics/Readout**
SESSION 16 · **CCDs II**
SESSION 17 · **CCDs III**
SESSION 18 · **IR Detectors IV**

WEDNESDAY	THURSDAY	FRIDAY

SC1001 **Systems Engineering for Astronomy Projects** *(Schnetler)* 8.30 to 17.30	SC1078 **Advanced Composite Materials for Astronomical Telescopes and Optomechanical Instruments** *(Zweben)* 8.30 to 17.30
	SC1079 **CMOS Image Sensor Architecture and Design for Scientific and Space Applications** *(Dorn)* 8.30 to 17.30

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Monday 2 July . . . . . 17.30 to 19.00
Tuesday 3 July . . 10.00 to 13.00; 15.00 to 20.00
Wednesday 4 July . . . . . 10.00 to 16.00

This Exhibition is highly focused for the telescope industry. See the latest in:

- Devices and components for large ground-based telescopes
- Ground instruments
- Astronomy information technologies
- Space telescopes and instruments
- Detectors
- Specialized optics, materials, and systems

SPIE Astronomical Telescopes + Instrumentation exhibitors are indexed by booth number on page 20, then listed in alphabetical order with details about products or services each is exhibiting. Booth numbers may be cross-referenced with the maps on p. 20.

Companies are additionally cross-indexed by technology areas in the Product Category Index on pages 30–31 to allow you to quickly shop for products for your engineering and business needs, making this Guide an excellent reference tool.

Astronomical Telescopes+ Instrumentation

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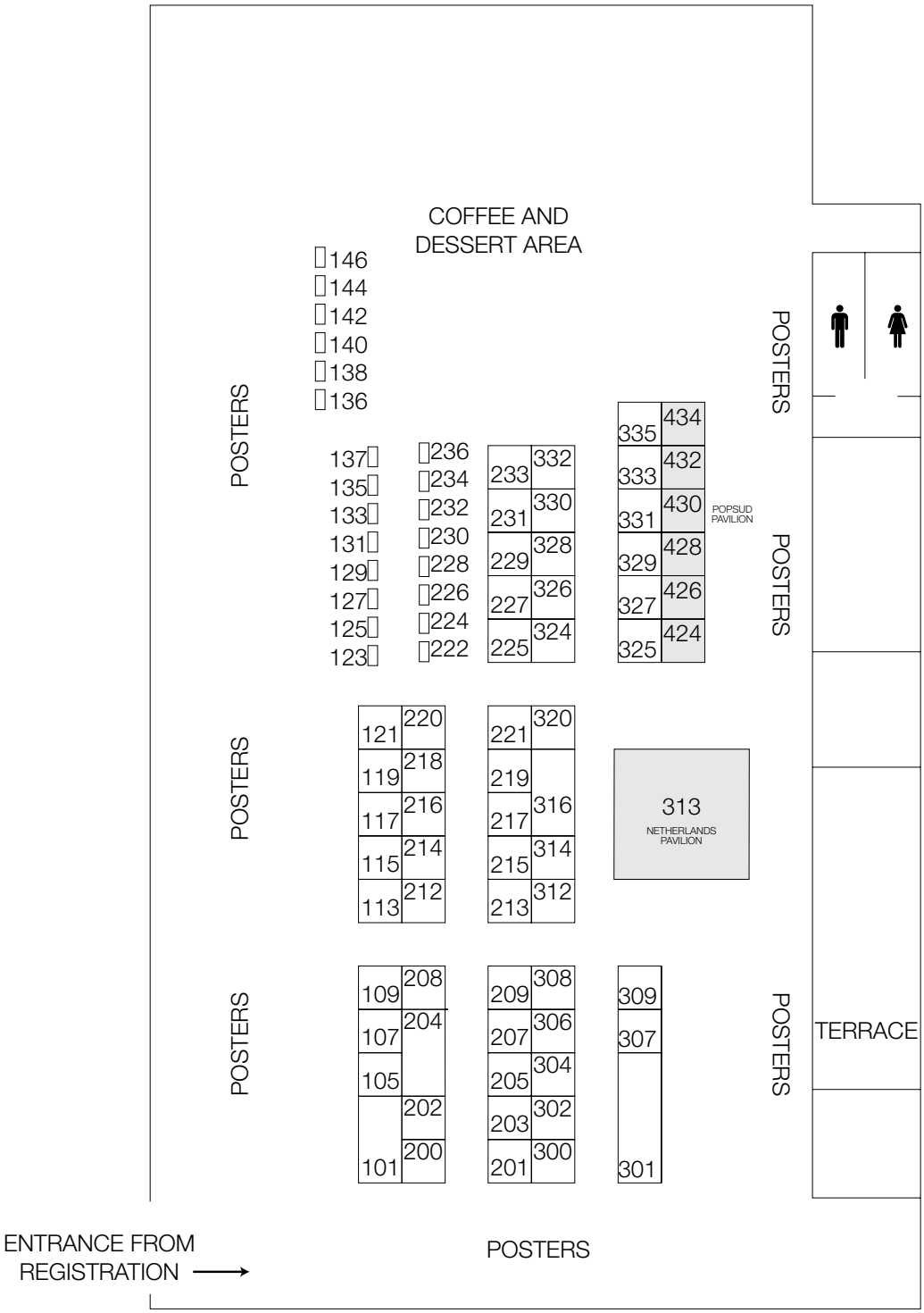
Conference Bag Pen	**Internet Pavilion**	**Lanyards**
Spectral Instruments Inc. Cooled CCD Cameras Booth #109 www.specinst.com	Spectral Instruments Inc. Cooled CCD Cameras Booth #109 www.specinst.com	TELEDYNE IMAGING SENSORS Everywhereyoulook™ Booth # 335 www.teledyne-si.com
Welcome Reception Contributing Sponsor	**Promotional Partners**	
SciMeasure Booth #131 www.scimeasure.com	Photonics Spectra	

Exhibition Floor Plan

Amsterdam RAI Convention Centre / Ground Floor



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4D Technology Corp. #233

SPIE Corporate Member

3280 E Hemisphere Loop Ste 146, Tucson, AZ, 85706-5024 USA
520 294 5600; fax 520 294 5601
info@4dtechnology.com; www.4dtechnology.com

Featured Product: AccuFiz compact Fizeau interferometer, with highest available resolution at mid-spatial frequencies.

4D Technology designs and manufactures laser interferometers and optical profilers for non-contact measurement of optics and optical systems, even in the presence of vibration and turbulence. 4D systems provide high resolution data acquisition in as little as 1microsecond, at wavelengths from DUV through NIR. Applications include astronomy, aerospace, general optics, directed energy and more. Contact: Steven J. Martinek, Director of Sales and Marketing, steve.martinek@4dtechnology.com; Don Roberts, Eastern Region Sales Manager, Don.Roberts@4DTechnology.com

ALMA Observatory #314

Alonso de Cordova 3107, Vitacure Santiago, Chile
+1 562 476 6119
www.alma.cl

Featured Product: Radio Astronomy Observatory.

The Atacama Large Millimeter/submillimeter Array (ALMA), an international partnership of Europe, North America and East Asia in cooperation with the Republic of Chile, is the largest astronomical project in existence. ALMA is a single telescope of revolutionary design still under construction in northern Chile. When completed in 2013, it will be composed of 66 high precision antennas located on the Chajnantor plateau, 5000 meters altitude. ALMA started its first scientific observations in 2011. Contact: William Garnier, Education and Public Outreach Officer, wgarnier@alma.cl

ALPAO #424

3 Allée de Bethléem, Gières, 38610 France
+33 (0)4 76 890965; fax +33 (0)4 76 514532
contact@alpao.fr; www.alpao.fr

AMOS Ltd. #225

Rue des Chasseurs Ardennais 2, Liege Science Park, Angleur
Liege, 4031 Belgium
+32 4 361 4040; fax +32 4 367 2007
info@amos.be; www.amos.be

AMOS was launched in 1983 and is specialised in design & manufacturing to a very high accuracy opto-mechanical systems. They are mainly delivered to space industry as well as professional astronomy and divided into 3 categories: Equipment to test satellite on the ground; On board instruments flying on board satellites, probes or the Space Shuttle; Equipment for professional astronomy ordered by worldwide astronomers. Contact: Jean Pierre CHISOGNE, Sales & Marketing Manager, jp.chisogne@amos.be

ANDANTA GmbH #320

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Stifterstr 5R, Olching, 82140 Germany
+49 8142 487658; fax +49 8142 487659
epost@andanta.de; www.andanta.de

Featured Product: Low Noise 10kx10k BI-Si-CCD; 2x2-mosaics: 444 Mpixel; Low Noise 4kx4k Si-CCD; 2-stage TEC InGaAs-FPA.

Special image sensors for scientific applications: Highest Resolution Si-CCDs, InGaAs-FPAs; Contact: Christian Lochmann, Geschäftsführer, christian.lochmann@andanta.de

ASA Astrosysteme GmbH #301

SPIE Corporate Member

Galgenau 19, Neumarkt i.M., A-4212 Austria
+43 7242 77811 50; fax +43 7242 77811 60
www.astrosysteme.at

Featured Product: High Precision DDM160 mount with twin 500mm Ritchey-Chretien telescopes.

ASA Astrosysteme has achieved to integrate encoders and torque motors into high precision equitorial and alt-az mounts. This mounts are now produced in series and have hence brought down the cost of such systems considerably. ASA also manufactures professional telescopes (Cassegrain, Ritchey-Chretien) with aperatures of up to 2000mm. ASA is also know for its high performance optical correctors. Contact: Egon Doeberl, CEO, e.doeberl@astrosysteme.at; Dietmar Weinzinger, Business Developement, d.weinzinger@astrosysteme.at

Asahi Spectra USA Inc. #213

SPIE Corporate Member

23505 Crenshaw Blvd Ste 229, Torrance, CA, 90505 USA
+1 310 530 5855; fax +1 310 530 1739
info@asahi-spectra.com; http://www.asahi-spectra.com

ASTELCO Systems GmbH #327

Fraunhoferstr 14, Martinsried Muenchen, D-82152 Germany
+49 89 8583 6650; fax +49 89 8583 6644
info@astelco.com; www.astelco.com

Featured Product: Telescopes, observatories, domes, enclosures, scientific instruments, spectrographs, accessories.

ASTELCO Systems is your partner for professional astronomical telescopes and related accessories of any kind. To the benefit of research teams all over the world, ASTELCO designs, develops, builds and services advanced mechanical and optical systems, special instrumentation and dedicated software as well as enclosures, domes and towers. ASTELCO is committed to quality, reliabilty and close connection to science. Contact: Peter Aniol, Director, pa@astelco.com; Mario Costantino, Director, mc@astelco.com

AVS Added Value Solutions #312

Pol.Ind. Sigma Xixilion Kalea 2, Bajo Pabellón 10, Elgoibar
Gipuzkoa, 20870 Spain
+34 943821841; fax +34 943821842
www.a-v-s.es

BOOSTEC S.A. #424

Zone Industrielle, Bazet, 65390 France
+33 562 334500; fax +33 562 334505
www.mersen.com

Boston Micromachines Corp. #230

SPIE Corporate Member

30 Spinelli Pl, Cambridge, MA, 02138-1070 USA
+1 617 868 4178; fax +1 617 868 7996
moreinfo@bostonmicromachines.com;
www.bostonmicromachines.com

Boston Micromachines Corporation (BMC) is the leading provider of microelectromechanical systems (MEMS) mirror products and has expertise in the design of adaptive optics systems. By applying wavefront correction, BMC devices can be used to enhance images blurred by the earth's atmosphere and for imaging biological tissue. They are widely used in a variety of defense applications as well as laser beam shaping, microscopy, astronomy, and vision science. Contact: Michael Feinberg, Director of Marketing and Sales, mrf@bostonmicromachines.com; Laura MacSweeney, Marketing Communications Specialist, laura@bostonmicromachines.com

Exhibitor Directory

Cambridge Innovations #127

1000 Worcester Rd., Framingham, MA, 01702 USA
+1 508 545 2622; fax +1 508 545 2623
info@camb-innov.com; www.camb-innov.com

Featured Product: Discrete amplifier for CILAS deformable mirrors, HV Amp-64 Subsystem, Product lines for MEMS DMs.

We design and manufacture drive electronics for deformable mirrors (DMs), since 1997. Piezo types (CILAS, Fraunhofer), MEMS (Boston Micromachines), and PMN DMs (Xinetics/ Northrop) are now supported with standard and customized products. Actuator counts ranging from 32-4096, voltages to ±400V, frame rates exceeding 400 KHz with sub-microsecond latencies are currently available, via multiple data interfaces. Contact: Michael Barberio, General Manager, barberio@camb-innov.com

Cedrat Technologies SA #236

15 chemin de Malacher Inovallée, Meylan, 38240 France
+33 4 76 90 50 45; fax +33 4 56 36 08 30
actuator@cedrat-tec.com; www.cedrat-technologies.com

Featured Product: Cedrat Technologies' mechatronic products for astronomical instrumentation.

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CeramOptec GmbH #221

Siemensstr 44, Industrial Sales, Bonn, 53121 Germany
+49 228 9 79 67-0; fax +49 228 9 79 67-99
info@ceramoptec.de; www.ceramoptec.de

CeramOptec GmbH is specialized in producing quartz glass multimode step-index fibers. Our product range contains fibers and cables for industrial application as well as fiber bundles for spectroscopy, laser application, sensor technology etc. Based on our own perform production we are able to offer fibers and fiber optic products of customized design within a reasonable time. Contact: Franz Schuberts, schuberts@ceramoptec.de

CILAS #424

ZI St Mitre, avenue de la Roche Fourcade, Aubagne, 13400 France
+33 442 369700; fax +33 442 369701
optics@cilas.com; www.cilas.com

Featured Product: Cilas, expert in Optical Components, Thin Film Coatings and Adaptive Optics.

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Delta Tau UK Limited #229

Unit 2, Faraday Close Gorse Lane Ind., Est, Clacton on Sea, CO15 4TR United Kingdom
44 1255 221 055; fax 44 1255 225 391
ajoslin@deltatau.com; www.Deltatau.co.uk

Featured Product: New GeoBrick LV-IMS-II integrated motion control system.

Since 1975 Delta Tau has been producing high-speed, high-precision, open architecture Motion Controllers from single axes to fully coordinated multi axes systems. Delta Tau's centralised processor architecture and distributed ultra high speed optical data highways has proven to be the most effective solution for all types of processes whether just a few axis or many hundreds of axes. Our product portfolio covers a wide range of motion control platforms that include some unique features. Contact: Andy Joslin, Managing Director, ajoslin@deltatau.com; Tony Jacobs, Technical Support Engineer, tjacobs@deltatau.com

Durham Precision Optics #308

Netpark Research Institute, Centre for Advanced Instrumentation, Sedgefield, TS21 3FB United Kingdom
+44 191 3344822; fax +44 191 3344844
info@@durhamprecisionoptics.co.uk;
www.durhamprecisionoptics.co.uk

Contact: David Robertson, Professorial Fellow, d.j.robetson@durham.ac.uk; David Ryder, Precision Engineer, d.a.ryder@durham.ac.uk

E2V technologies plc #209

SPIE Corporate Member

106 Waterhouse Lane, Chelmsford Essex, CM1 2QU United Kingdom
44 1245 493493; fax 44 1245 492492
enquiries@e2v.com; www.e2v.com

Featured Product: CCD and CMOS Sensors.

e2v provides high performance imaging solutions for programmes requiring CCD and CMOS sensors and cameras for; space and earth observation imaging, science and life science imaging, machine vision, opthalmology and dental x-ray systems. Contact: Andreas Jaeger, Sales Engineer, andreas.jaeger@e2v.com

Engineering Synthesis Design, Inc. #144

SPIE Corporate Member

150 N Tucson Blvd, Tucson, AZ, 85716-4740 USA
+1 520 296 3068; fax +1 520 296 2897
sales@engsynthesis.com; www.engsynthesis.com

Epner Technology Inc. #224

SPIE Corporate Member

78 Kingsland Ave, Brooklyn, NY, 11222-5603 USA
+1 718 782 5948; fax +1 718 963 2930
info@epner.com; www.epner.com

European Industrial Engineering s.r.l. #204

Via Torino 151A, Mestre Venezia, VE, 30172 Italy
+39 41 5317906; fax +39 41 5317757
info@eie.it; www.eie.it

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European Southern Observatory #316

Karl-Schwarzschild-Str 2, Garching bei München, Bavaria, 85748 Germany
+49 89 3200 60; fax +49 89 320 3262
information@eso.org; www.eso.org

Featured Product: E-ELT, ALMA, VLT, NTT.

ESO is the foremost intergovernmental astronomy organisation in Europe and the world's most productive astronomical observatory. It operates three sites in Chile — La Silla, Paranal and Chajnantor — on behalf of its fifteen member states. It builds ALMA together with international partners, and designs the European Extremely Large Telescope.

Fiberguide Industries, Inc. #201

SPIE Corporate Member

1 Bay St, Stirling, NJ, 07980-1529 USA
+1 908 647 6601; fax +1 908 647 8464
info@fiberguide.com; www.fiberguide.com

Fibertech Optica Inc. #136

SPIE Corporate Member

330 Gage Ave Ste 1, Kitchener, ON, N2M 5C6 Canada
+1 519 745 2763; fax 1.519.342.0128
info@fto.ca; www.fibertech-optica.com

Featured Product: Custom fiber optic assemblies and arrays.

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COFFEE BREAK SPONSOR

Finger Lakes Instrumentation #300

7287 West Main Street, Lima, NY, 14485-0819 USA
+1 585 624 3760; fax +1 585 624 9879
www.flicamera.com

Featured Product: ProLine PL16803 4Kx4K cooled CCD camera with Atlas focuser.

FLI designs & manufactures cost-smart cooled CCD cameras, filter wheels, and focusers. Our proprietary Zero Tilt Adapter (ZTA™) prevents tilted components, marred adapters, and wobbly interfaces. Centered aperture dual 5-position 50mm square filter wheel. Atlas focuser's high rigidity yet thin design allows focusing on short-travel optical designs. Camera cooling to 75C below ambient; 1-, 2-, and 4-channel 16 bit readout up to 24MHz throughput; CCDs to 4Kx4K. We excel at customization. Contact: Gregory Terrance, General Manager, greg@flicamera.com; Gary McAnally, Sales & Marketing Manager, gary@flicamera.com

First Light Imaging #424

c/o LAM, Rue Joliot-Curie, Technopole de Chateau-Gombert, Marseille, 13388 France
contact@firstlight.fr; www.firstlight.fr

Featured Product: OCAM^2 Wavefront Sensor Camera. 1500Hz, 0.1 electron noise, 95% QE RAPID Infrared Wavefront Sensor.

First Light Imaging is a company stemming from the sharpest French laboratories in astronomical imaging. The LAM (Laboratoire d'Astrophysique de Marseille), LAOG (Laboratoire d'Astrophysique de l'Observatoire de Grenoble) and OHP (Observatoire de Haute-Provence).

First Light Imaging delivers state of the art technologies worldwide to customers including ESO, ONERA, The Australian National University, the Giant Magellan Telescope, the Yunnan Astronomical Observatory and many others. Contact: David Boutolleau, CEO, david.boutolleau@firstlight.fr; Jean-Luc Gach, Technical Director, jeanluc.gach@firstlight.fr

Flexible Optical B.V. #234

Polakweg 10-11, Rijswijk, 2288 GG Netherlands
+31 70 262 9420; fax +31 70 710 1400
oko@xs4all.nl; www.okotech.com

Featured Product: Imaging through turbulence, adaptive optics, deformable mirror, wavefront sensor.

Flexible Optical B.V. (aka OKO Technologies) develops, manufactures and delivers integral solutions based on smart and adaptive optics for adaptive wavefront correction and generation in scientific, industrial, laser, astronomical, medical and other applications. Contact: Gleb Vdovin, gleb@okotech.com

Gamma Medica - Ideas (Norway) AS #219

Martin Linges vei 25, Fornebu, 1330 Norway
+47 67827171; fax +47 67827172
info@ideas.no; www.ideas.no

Featured Product: ASICs, Integrated Circuits for Radiation Detectors in Space.

Gamma Medica-Ideas (Norway) AS develops radiation detector systems for a wide range of applications. The company develops highly integrated detector readout data acquisition systems for image sensors and radiation spectroscopy. The main products are custom made mixed mode application specific integrated circuits (ASICs), which are used in space missions and in commercial products. The company regularly develops new ASICs for customers worldwide. Contact: Gunnar Maehlum, General Manager, gunnar.maehlum@gm-ideas.com; Dirk Meier, Senior Scientist, dirk.meier@gm-ideas.com

General Dynamics SATCOM Technologies #228

4830 River Green Pkwy, #150, Duluth, GA, 30096 USA
+1 770 689 2052
info@gdsatcom.com; www.gdsatcom.com

Featured Product: Optical and Radio Telescopes.

General Dynamics SATCOM Technologies has installed over 60 major scientific optical and radio telescopes worldwide, and we have provided mount manufacturing, control systems and major subassemblies for three of the five largest radio telescopes currently in operation. Our extensive background in large, high performance dynamic structures and controls provides the experience needed to successfully fulfill even the most demanding program needs and leading edge requirements. Contact: Dave Porter, Director, Business Development, dave.porter@gdsatcom.com; David Finley, Product Line Manager, Optical Telescopes, david.finley@gdsatcom.com

Giant Magellan Telescope Project #207

251 S Lake Ave Ste 300, Pasadena, CA, 91101 USA
+1 626 204 0500; fax +1 626 204 0504
info@gmto.org; www.gmto.org

Featured Product: The Giant Magellan Telescope (GMT) is a 25m class ELT w/integrated AO sited at Las Campanas, Chile.

The GMT Project is a collaboration of major US and international educational and research institutions. Founders include the Carnegie Institution for Science, the Australian National University, Astronomy Australia Limited, Harvard University, the Korea Astronomy and Space Science Institute, the Smithsonian Institution, Texas A&M University, the University of Arizona, the University of Chicago, and The University of Texas at Austin. GMTO website: www.gmto.org. Contact: Patrick McCarthy, Director, pmccarthy@gmto.org; Carolynn LaRocca, Administrative Assistant, clarocca@gmto.org

Exhibitor Directory

Hellma Materials GmbH #324

Moritz-von-Rohr-Str 1, Jena, 07745 Germany
+49 3641 2877 0; fax +49 3641 2877 203
infomaterials@hellma.com; www.hellma-materials.com

Featured Product: Calcium Fluoride Blanks with diameter up to 440 mm. Barium Fluoride crystals Scintillator Crystals.

Hellma Materials produces materials for optical applications from deep UV to IR. Continuing the Calcium Fluoride business of Schott Lithotec, we supply to diverse markets including Microlithography, Excimer Laser Optics, Analytics, Astronomy, Defense and more.

Laser crystals (Yb-doped CaF_2) from Hellma Materials are the first choice material for Diode-pumped solid state lasers (DPSSL). Hellma Materials is introducing scintillation crystals for detection of high-energy particles and radiation. Contact: Gordon von der Goenna, Director Sales and Business Development, gordon.goenna@hellma.com; Daniel Hahn, Area Sales Manager, daniel.hahn@hellma.com

Hembrug BV #216

H. Figeeweg 1A, Haarlem, 2031 137 Netherlands
+31 23 5124900
sales@hembrug.com; www.hembrug.com

Hofstadter Analytical Services, LLC #133

SPIE Corporate Member

10 N Norton Ave Suite 120, Tucson, AZ, 85719 USA
+1 520 747 3282
www.hofstadteranalytical.com

IDOM #200

Avda Zarandoa, 23, Bilbao, 48015 Spain
+34 479 7676; fax +34 476 1804
gzk@idom.com;www.idom.com/ada

Featured Product: Engineering and turnkey solutions for Astronomical Projects: E-ELT & ATST Enclosures, GTC FC Rotator.

IDOM is a multidisciplinary engineering company which provides advanced engineering and turnkey solutions for challenging projects involving applied mechanics, structural design, electronics & control. IDOM is present in 34 offices spread over 16 countries across 5 continents.

IDOM experience in Astronomy Projects involves telescope enclosures (E-ELT, ATST), telescope systems (GTC Folded Cassegrain Sets, QUIJOTE CMB Telescope) and instrumentation (PlanetCam, FastCam, QUIJOTE CMB Instrument). Contact: Gaizka Murga, Business Developer, gzk@idom.com; Isabel Ronco, Assistant, sabel@idom.com

Imagine Optic #138

18 rue Charles de Gaulle, Orsay, Essonne, 91400 France
+33 164 86 1560; fax +33 164 86 1561
contact@imagine-optic.com; www.imagine-optic.com

Featured Product: HASO R-Flex: the compact auto-illuminated wavefront sensor.

Imagine Optic is the world's leading providers of Shack-Hartmann wavefront sensing hardware and software, adaptive optics technologies and professional services in applied optics. We work with scientists and industrials in domains including pure science, laser, industrial quality control, space and defense, astronomy, semiconductors and many others. Since 1996, we've been supplying industry leaders around the world with the high-quality products and services that they need to perform. Contact: Samuel Bucourt, CEO, sbucourt@imagine-optic.com; Caroline Adam, Europe sales manager, cadam@imagine-optic.com

Infrared Labs., Inc. #135

1808 E 17th St, Tucson, AZ, 85719-6560 USA
+1 520 622 7074; fax +1 520 623 0765
infrared@irlabs.com; www.infraredlaboratories.com

Featured Product: Infrared cameras, detectors, and cryogenic products.

A world leader in infrared imaging and detection products and services since 1967. Supplying low-light-level detectors, low-noise electronics, and cryogenic support equipment to Infrared Astronomy and supporting the worldwide astronomical community with infrared cameras, optics and custom cryogenics. In house design and fabrication services meet demanding requirements with a strong commitment to one-on-one customer service and the delivery of the highest quality products. Contact: Steve Zoltowski, Technical Sales Manager, stevez@irlabs.com; Chris Foster, Project Manager Engineer, cfoster@irlabs.com

James Webb Space Telescope #227

3700 San Martin Dr, Baltimore, MD, 21218 USA
+1 410 338 4857
www.stsci.edu

Featured Product: James Webb Space Telescope.

The James Webb Space Telescope (JWST) is a large 6.5 meter space telescope that will be launched later this decade. JWST is optimized to study infrared light from the Universe with four sensitive imaging and spectroscopic instruments. JWST's science goals include answering some of our most fundamental questions about the origin of the cosmos and life in the Universe. The Space Telescope Science Institute (STScI) is the Science and Operations Center (S&OC) for the JWST. Contact: Lucy Albert, Exhibit Coordinator, lalbert@stsci.edu

Kaiser Optical Systems, Inc. #306

371 Parkland Plaza, Ann Arbor, MI, 48103 USA
+1 734 665 8083; fax +1 734 665 8199
gratings@kosi.com; www.kosi.com

Featured Product: Volume Phase Holographic (VPH) gratings and grisms.

Kaiser Optical Systems, a world-recognized leader in the production of instruments, devices, and displays based on holographic optical elements, with over 30 years' experience designing and building head-up display combiners for military fighter aircraft, has leveraged its volume phase holographic technology to produce state-of-the-art VPH diffraction gratings. Contact: James Arns, Senior Systems Engineer, gratings@kosi.com

KiwiStar Optics #208

69 Gracefield Rd, PO Box 31-310, Lower Hutt, 5040 New Zealand
+64 4 931 3341; fax +64 4 931 3718
n.raikabula@irl.cri.nz; www.kiwistar.com

Featured Product: KiwiSpec R4-100, a new advanced high resolution spectrograph for small to medium-sized telescopes.

KiwiStar Optics, a business unit of Industrial Research Ltd has had considerable experience in the development and manufacture of large, precision optical systems for applications in astronomy, instrumentation, defence and surveillance.

KiwiSpec R4-100, a new advanced high resolution spectrograph for small to medium-sized telescopes has been developed. The instrument is bench-mounted, fibre-fed and compact, with versatile optical design allowing multiple camera and detector channels. Contact: Tony Brenton-Rule, CEO, t.brentonrule@irl.cri.nz; Ngaire Raikabula, Coordinator, n.raikabula@irl.cri.nz

Large Synoptic Survey Telescope (LSST) #326

933 N Cherry Ave, Tucson, AZ, 85712-0009 USA
+1 520 881 2626; fax +1 520 881 2627
contact@lsst.org; www.lsst.org

Featured Product: Large Synoptic Survey Telescope.

The Large Synoptic Survey Telescope (LSST) will carry out a ten-year imaging survey in six broad optical bands over the main survey area of 18,000 square degrees. LSST features a 3-mirror wide field optical system with an 8.4 meter primary and a 64 cm, 3.2 gigapixel, focal plane camera. The data management system will reduce, transport, alert, archive the 15 terabytes of data produced nightly, and serve raw and catalog data accumulating at an average of 7 petabytes per year.

Leukos #333

1 Avenue d Ester, ESTER technopole, Limoges Cedex, 87000 France
+33 5 55 35 81 27; fax +33 5 55 35 81 34
contact@leukos-systems.com; www.leukos-systems.com

LZOS was launched in 1939 and is a unique, diversified enterprise of the optical industry. LZOS has complete cycle of optical production starting from glass melting and up to final polishing of the optical items and their assembling.

Main areas of LZOS activities are: 1. Development and production of optical materials including glass melting, production of optical blanks and optical fiber elements; 2. Treatment of optical materials; 3. Development and production of large-scaled optics including large-scaled mirrors of diam. up to 6 meters and lens objectives of the diam. up to 700 mm for space and astronomical application; 4. Development and production of optomechanical and optoeletronic devices and other items. The available manufacturing capacities have allowed LZOS to implement successfully many international projects.

Luxel Corp. #212

SPIE Corporate Member

515 Tucker Ave., Friday Harbor, WA, 98250 USA
+1 360 378 4137; fax +1 360 378 4266
luxel@luxel.com; www.luxel.com

Luxel is the preeminent supplier of ultra-thin freestanding filters. We support customer requirements for X-ray and Extreme Ultraviolet (EUV) programs. Since 1973 we have produced bandpass filters for use in the extreme ultraviolet and soft X-ray portion of the electromagnetic spectrum, for both laboratory and space research. A large portion of our business is in designing and fabricating custom bandpass filters to your specific applications. We seek long term relationships with our customers. Contact: Travis Ayers, President, travis.ayers@luxel.com; Heidi Lopez, Laboratory Manager, heidi.lopez@luxel.com

Lytkarino Optical Glass Factory JSC #325

1 Parkovaya Street, Lytkarino, 140080 Russian Federation
+7 495 552 32 95; fax +7 495 552 17 90
office@lzos.ru; www.lzos.ru

LZOS was launched in 1939 and is a unique, diversified enterprise of the optical industry. LZOS has complete cycle of optical production starting from glass melting and up to final polishing of the optical items and their assembling.

Main areas of LZOS activities are: 1. Development and production of optical materials including glass melting, production of optical blanks and optical fiber elements; 2. Treatment of optical materials; 3. Development and production of large-scaled optics including large-scaled mirrors of diam. up to 6 meters and lens objectives of the diam. up to 700 mm for space and astronomical application; 4. Development and production of optomechanical and optoeletronic devices and other items. The available manufacturing capacities have allowed LZOS to implement successfully many international projects.

MPB Communications Inc. #121

SPIE Corporate Member

147 Hymus Blvd, Pointe Claire, QC, H9R 1E9 Canada
+1 514 694 8751; fax +1 514 694 6869
info@mpbc.ca; www.mpbc.ca

Featured Product: Single Frequency Raman Fibre Amplifiers & Visible Raman Fibre Amplifiers.

Founded in 1976 MPB Communications has been supplying the commercial and scientific markets with industry leading photonics technology. Our Raman fibre amplifiers and Visible Raman Fibre amplifiers systems are used widely in single frequency applications where preservation of the narrow linewidth is of paramount importance. Custom products are our specialty. Contact: Claudette Linton, Business Development, claudette.linton@mpbc.ca

MT Mechatronics GmbH #117

Wilhelm-Theodor-Römheldstr 24, Mainz, 55130 Germany
+49 6131 27770; fax +49 6131 2777 205
info@mt-mechatronics.de; www.mt-mechatronics.de

Nanjing Institute of Astronomical Optics & Technology, Chinese Academy of Sciences #203

188 Bancang Street, Nanjing, Jiangsu, 210042 China
+86 25 85482245; fax +86 25 85412224
jzhen@niaot.ac.cn; www.niaot.ac.cn/english/index.asp

Featured Product: Astronomical Telescopes & Instruments, Spectrographs, Optical Mirrors, LAMOST, Antarctic Telescopes.

NIAOT has over 50 years of experience in research and development of professional astronomical telescopes and instruments, specializes in developing large aperture optical telescopes, solar instruments, radio telescopes, spectrographs, aspherical mirrors and birefringent filters. NIAOT has succeeded in developing about 50 kinds of astronomical instruments to Chinese observatories, including LAMOST, and over 30 instruments to foreign observatories, including USA, Spain, Japan and South Korea etc. Contact: Jian Zheng, Manager, jzhen@niaot.ac.cn; Xuefei Gong, Director of S&T Department, xfgong@niaot.ac.cn

National Instruments #119

Pompmolenlaan 10 - 3447 GK, Woerden, Netherlands
+03 48 433466
www.ni.com

Engineers, scientists, and physicists around the world are working to solve various challenges in areas such as particle physics, fusion, and astronomy. From being able to program embedded real-time systems based on multicore processors and field-programmable gate arrays (FPGAs) to working with high-speed data acquisition systems requiring timing and synchronization, engineers, scientists, and physicists use National Instruments commercial off-the-shelf (COTS) software and hardware to help them meet their control and instrumentation needs.

Nüvü Caméras Inc. #329

5155 Ave Decelles, Pavillon JA Bombardier, Montréal, QC, H3T 2B1 Canada
+1 514 733 8666; fax +1 514 733 8666
info@nuvucameras.com; www.nuvucameras.com

Featured Product: Sensitive EMCCD cameras and controllers for low light imaging and photon counting applications

With completely reinvented electronics, Nüvü Caméras EMCCD imaging components offer the highest SNR (<0.001 é/pixel/frame and an EM gain up to 5000) for the most demanding low light applications. Increase your system performance for more reliable raw images with lesser exposure times, hence faster acquisitions. Initially designed for astronomy, Nüvü's EMCCD cameras and controllers are ideal for any high sensitivity EMCCD chip. For more details, visit conference #8453 on July 1st and booth #329. Contact: astro@nuvucameras.com

Exhibitor Directory

Observatory Sciences Ltd. #226

Cowley Rd, William James House, Cambridge, CB4 0WX United Kingdom
+44 1223 508257; fax +44 1223 508258
contact@observatorysciences.co.uk;
www.observatorysciences.co.uk

Observatory Sciences is a leading developer and supplier of software for the control of 'big science' systems and instruments, including large telescopes and synchrotrons. We have a reputation for completing complex projects on time and to budget. Meeting the needs of scientific, research and technical clients across the globe, Observatory Sciences is behind some of the world's high-profile astronomy and physics projects. Contact: Philip Taylor, Director, pbt@observatorysciences.co.uk; Chris Mayer, Director, cjm@observatorysciences.co.uk

Officina Stellare SRL #302

Via San Sebastiano, 27, Thiene, VI, 36016 Italy
+39 340 399 8061; fax +39 044 538 0463
info@officinastellare.com; www.officinastellare.com

Ohara GmbH #330

Nordring 30 A, Optisches Glas, Hofheim, 65719 Germany
+49 61 9296 5050
info@ohara-gmbh.com; www.ohara-gmbh.com

Featured Product: Ohara glasses are supplied as: Strip, raw glass; Slab, four surfaces generated; Cut Blanks; Pressings.

Ohara is a world leader in the development and manufacturing of optical glasses. We are concentrating on optical applications and related echnical fields. For example, optoelectronics. Our progress and success in the supply of advanced optical materials is more than anything else determining the future development and direction of the Ohara Group.

Ohara was the first supplier to redesign his existing assortment of optical glasses, turning nearly all of them into so called ECO glasses. Contact: Brian K. Jeffery, Manager, brian.jeffery@ohara-gmbh.com; Peter Melcher, Manager, peter.melcher@ohara-gmbh.com

OpTIC #328

St Asaph Business Park, Ffordd William Morgan, St Asaph Denbighshire, LL17 0JD United Kingdom
+1 44 1745 535100; fax +1 44 1745 535101
info@opticinnovations.co.uk; www.opticinnovations.co.uk

Featured Product: Lightweight Optics.

OpTIC specialises in designing, developing and manufacturing customised precision optical and opto-mechanical components for ground and space based telescopes and instruments. We manufacture nano scale precise, freeform or complex mirrors, lenses or flats including: Off axis paraboloids; High resolution, wide angles aspheres; Spherical and flat mirrors; Lightweighted mirrors.

Our optical & opto-mechanical design & engineering services include: Concept Modelling & system design. Contact: John Oliver, Marketing and Sales Director, John.oliver@opticTechnium.com; Mick Card, Commercial Manager.

OPTOCRAFT GmbH #222

Am Weichselgarten 7, Erlangen, 91058 Germany
+49 9131 69 15 00; fax +49 9131 69 15 11
sales@optocraft.com; www.optocraft.com

Contact: Juergen Lamprecht, Product Manager, sales@optocraft.com; Mathias Beyerlein, Managing Partner, sales@optocraft.com

PI (Physik Instrumente) L.P. #101

SPIE Corporate Member

16 Albert St, Piezo Nano Positioning, Auburn, MA, 01501-1304 USA
+1 508 832 3456; fax +1 508 832 0506
info@pi-usa.us; www.pi-usa.us/products/Micropositioning_Stage_Hexapod/hexapod-6-axis-stage.php#ALMA

Featured Product: High-force, 20mm travel piezoceramic linearmotors: low power, self-locking, sub-nm-precision.

PI designs & manufactures hexapods for astronomical telescopes and the fastest & highest precision piezo-driven steering platforms for secondary mirror stabilization & beam steering. Active PI-mirrors to 12" dia. are used in all leading telescopes along with high-load Hexapod parallel-kinematics alignment systems. New: High-force sub-nm-precision piezo ceramic linearmotors. Long-travel precision linear actuators (273 channel system delivered to SALT). Ultrareliable ceramic insulated piezo stacks. Contact: info@pi-usa.us

Polymicro Technologies, A Subsidiary of Molex Incorporated #232

SPIE Corporate Member

18019 N 25th Ave, Phoenix, AZ, 85023-1200 USA
602 375 4100; fax 602 375 4110
polymicrosales@molex.com; www.polymicro.com

Polymicro manufactures multimode, step-index fused silica optical fibers with polyimide, acrylate, silicone & custom buffers; solarization-resistant optical fibers; broad-spectrum optical fibers; hollow silica waveguides; fiber optic cables and assemblies; high strength, high temperature flexible fused silica capillaries; square capillaries; light guiding capillaries; custom precision silica, quartz rod and tubing pieces; custom shaped rod & tubing; multilumen tubing; telecom ferrules/sleeves. Contact: polymicrosales@molex.com, polymicrosales@molex.com .

POPSUD-OPTITEC #424

SPIE Corporate Member

c/o OAMP 38 rue Frédéric Joliot Curie, Technopôle de Chateau-Gombert, Marseille, 13388 France
+0033 (0)4 91 05 69 21
marie.lhoutellier@popsud.Org; www.popsud.org

Featured Product: French competitiveness cluster in Photonics.

POPsud is a community of more than 180 highly committed members, who play key roles in industrial development, research and higher education in optics/photonics and image processing. It is a network that lives, communicates and works to promote a field of expertise, photonics, in the South of France, with the aim of raising it to the first rank at national and European scale. It also represents years of experience in providing pooled technological tools for the benefit of companies and labs. Contact: Marie Lhoutellier, Project Manager, marie.lhoutellier@popsud.org

Princeton Instruments #205

SPIE Corporate Member

3660 Quakerbridge Rd, Trenton, NJ, 08619-1208 USA
+1 609 587 9797; fax +1 609 587 1970
info@princetoninstruments.com;
www.princetoninstruments.com

Featured Product: CCD, ICCD, EMCCD & InGaAs cameras; Spectrometers; Spectrographs; Imaging systems; Optics & Coatings.

Princeton Instruments is the proven choice for high-performance CCD, EMCCD and ICCD cameras, spectroscopy and optical coating solutions for demanding research and industrial applications, with decades of experience helping scientists solve challenging problems. Introducing PIoNIR, the world's first scientific-grade, deep-cooled, large format InGaAs camera for low-light NIR imaging applications. Contact: info@princetoninstruments.com.

RSP Technology B.V. #331

Metaalpark 2, Delfzijl, 9936 BV Netherlands
+31 596 632300; fax +31 596 632678
info@rsp-technology.com; www.rsp-technology.com

Sagem #218

Avenue de la Tour Maury, REOSC, Saint Pierre Du Perray, 91280 France
+33 1 69 89 72 00; fax +33 1 69 89 72 20
reosc@sagem.com; www.sagem-ds.com

Featured Product: Recent successes include delivery of 5 E-ELT segments and VLT M2 thin shell to ESO.

A longstanding partner of the French, European and International astronomical community, Sagem, through its REOSC department, designs and manufactures a complete range of high performance optics and equipments. Drawing on its engineering and technical expertise, Sagem continues to push back the boundaries of possibility to meet the many technological challenges raised by some of the most ambitious projects. Contact: Roland GEYL, VP Sales, roland.geyl@sagem.com; Vincent PATOZ, Sales Manager, vincent.patoz@sagem.com

SCHOTT AG #307

Hattenbergstr 10, Advanced Optics, Mainz, 55122 Germany
+49(0)6131 66 1812; fax +49(0)3641/2899-9047
info.optics@schott.com; www.schott.com/advanced_optics

Featured Product: ZERODUR® NOW presenting 3 new customized CTE thermal expansion grades with tighter tolerances.

SCHOTT Advanced Optics, with its deep technological expertise, is a valuable partner in developing products and customized solutions for applications in optics, lithography, astronomy, opto-electronics, life sciences, and research. With a product portfolio of more than 100 optical glasses, special materials and components, we master the value chain: from customized glass development to high-precision optical product finishing and metrology. SCHOTT: Your Partner for Excellence in Optics. Contact: Thomas Dr. Westerhoff, Strategic Marketing ZERODUR®, thomas.westerhoff@schott.com; Henk van Elst, Sales, henk.van.elst@schott.com

WELCOME RECEPTION CONTRIBUTING SPONSOR

SciMeasure #131

SPIE Corporate Member

1240 Clairmont Rd, Ste 100, Decatur, GA, 30030 USA
+1 404 876 6558; fax +1 404 876 6004
info@scimeasure.com; www.scimeasure.com

Featured Product: High speed low noise CCD and CMOS cameras for use as wavefront sensors and guider cameras.

Contact: Charlie Bleau, CEO, charlie.bleau@scimeasure.com

Semiconductor Technology Associates Inc. #320

27122 Paseo Espada Ste 1004,
San Juan Capistrano, CA, 92675 USA
+1 949 481 1595; fax +1 949 481 1557
customerservice@sta-inc.net; www.sta-inc.net

Featured Product: Low Noise 10kx10k BI-Si-CCD; 2x2-mosaics of 10kx10k Si-CCDs: 444 MPixel; Low Noise 4kx4k BI-Si-CCD.

Highest quality custom CCDs to the commercial and scientific communities: design, fabrication, packaging and characterization of the finest CCDs available in the world. Contact: Richard Bredthauer, President, customerservice@sta-inc.net; Christian Lochmann, for enquiries from Europe, epost@andanta.de

SENER #113

c/ Sabaters, 1, Parc Tecnològic del Vallès,
Cerdanyola del Vallès (Barcelona), 08290 Spain
+34 93 594 00 15
info@nte-sener.es; www.sener.es

Featured Product: Custom-made solutions for precision positioning & pointing systems.

The engineering company supplies custom-made solutions for precision positioning and pointing systems for optical and electro-optical instruments and equipment in the astronomy field. The company's activities range from conceptual studies to the production of high performance systems and instrumentation especially for terrestrial astronomical facilities and space missions. Main services and products are focused on positioning systems for telescope mirrors and mechatronics for optical instruments Contact: Joan Manel Casalta, Product Manager - Science & Astronomy, info@nte-sener.es

Sigmadyne, Inc. #217

SPIE Corporate Member

803 West Ave Ste 311, Rochester, NY, 14611-2447 USA
+1 585 235 6892; fax +1 585 235 6931
www.sigmadyne.com

Featured Product: SigFit is a software product enabling engineers to link mechanical analysis with optical analysis.

Sigmadyne is an engineering consulting firm specializing in optomechanical analysis services and software. Our specialty is integrating mechanical predictions with optical predictions for photonic applications in a wide array of industries. Contact: Gregory Michels, Vice President, michels@sigmadyne.com; Victor Genberg, President, genberg@sigmadyne.com

SILIOS Technologies #424

Zl Peynier-Rousset, Rue Gaston Imbert Prolongée, Peynier, 13790 France
+33 442 53 89 60; fax +33 442 53 89 59
contact@silios.fr; www.silios.com

Featured Product: Turbulence Phase Screens, coronography phase masks and piston plates for simulations in Lab.

SILIOS Technologies is specialized in design and manufacturing of micro-optics, diffractive optics, miniaturized spectrometers and optical instrumentation. The main fields of business are astronomy with turbulence phase screens, coronography phase masks and piston plates, scientific and industrial lasers, spectroscopy and scientific instrumentation. SILIOS Technologies owns a 600 m^2 clean room, an integration hall and an electronic lab for production of prototypes to small and medium size series. Contact: Thierry BERTHOU, Sales Manager, thierry.berthou@silios.fr; Stephane TISSERAND, General Manager, stephane.tisserand@silios.fr

SOFIA Science Center #115

NASA ARC, Bldg N232, Moffett Field, CA, 94035 USA
+1 650 604 1857; fax +1 650 604 1984
EPO@sofia.usra.edu; www.sofia.usra.edu

Featured Product: Stratospheric Observatory for Infrared Astronomy.

NASA's airborne observatory, SOFIA, is a Boeing 747sp fitted with a 20,000kg, 2.5-meter (100-inch) diameter infrared telescope. The observatory operates at altitudes between 39,000 feet and 45,000 feet (12 and 14 km). SOFIA is a joint project between NASA and the German Aerospace Agency (DLR). Science operations are managed for NASA by the Universities Space Research Association (USRA) and the Deutsches SOFIA Institute (DSI). Contact: Darlene Mendoza, EPO Associate, dmendoza@sofia.usra.edu

Exhibitor Directory

CONFERENCE BAG PEN, INTERNET PAVILION SPONSOR

Spectral Instruments, Inc. #109

420 N Bonita Ave, Tucson, AZ, 85745-2747 USA
+1 520 884 8821; fax +1 520 884 8803
info@specinst.com; www.specinst.com

Spectral Instruments specializes in the development and manufacture of cooled CCD cameras for demanding low-light applications. We provide the finest low noise <3e-, high sensitivity, –110C cooling, 16-bit CCD cameras that current technology can offer. New products include cameras built around the world's largest monolithic CCD (10kX10k) and a 2X2 array of 4kX4k devices. Customized camera designs are available for all our cameras with a large selection of CCDs. Contact: Kevin Toerne, Systems Specialist, ktoerne@specinst.com

Spectrum Thin Films Corp. #125

135 Marcus Blvd, Hauppauge, NY, 11788 USA
+1 631 901 1010; fax +1 631 236 4309
sales@spectrumthinfilms.com; www.spectrumthinfilms.com

Featured Product: Manufacture High Technology Optics and Optical Coatings.

Custom manufacturer of optical coatings from .193 to 20 microns using electron beam and Ion Beam Technology (IBS) . Specializes in Astronomical coatings, filters, mirrors, beamsplitters. We have extensive experience with very large CaF3 lenses, large optics up to one meter. Routine coatings A/R 310-1100 nm, Astronomical filters for CCD imaging. We have developed and routine manufactured what we call UV SILVER which has reflection from 310 nm to 2500 nm R>97% passes 24 hour humidity, long life. Contact: Anthony Pirera, President, Tony@spectrumthinfilms.com; Carlos Penalbert, Technical Sales, Sales@spectrumthinfilms.com

Stirling Cryogenics BV #140

Science Park Eindhoven 5003, Son, 5692 EB Netherlands
+31 40 2677 310; fax +31 40 2677 301
info@stirlingcryogenics.com; www.stirlingcryogenics.com

Featured Product: On-site liquid nitrogen production plants and cryogenic closed loop cooling systems.

Stirling Cryogenics is the world leading supplier of stand-alone liquid nitrogen plants. Reliability and longevity are our well-known trademarks, often in extreme and demanding conditions. Stirling LN2 plants are crucial where supply is problematic or not economically feasible.

Our closed loop cooling systems are indispensable where constant cryogenic cooling of applications is essential. Worldwide on-site support is guaranteed by our international service team. Contact: Francesco Dioguardi, Area Sales Manager, f.dioguardi@stirlingcryogenics.com

Symétrie #137

10 allée Charles Babbage, Nimes, 30000 France
+33 4 66 29 43 88; fax +33 4 66 29 54 47
info@symetrie.fr; www.hexapod-system.com

Featured Product: SYMETRIE is specialized in hexapods, which are 6-axis precision positioning systems.

SYMETRIE designs and manufactures high accuracy opto-mechanical positioning systems. The kinematics of hexapods enable an extremely precise motion with the best guarantees of resolution and stiffness. SYMETRIE has more than 10-year experience in providing complete ready-to-use systems with ergonomic control software.

Our hexapods are particularly adequate to position mirrors on ground-based and space telescopes. Contact: Anne DUGET, Sales Manager, anne.duget@symetrie.fr; Olivier LAPIERRE, CEO, olivier.lapierre@symetrie.fr

Tekdata Interconnections Ltd. #220

Festival Way - Etruria, Cryoconnect Div Innovation House - The Glades, Stoke On Trent Staffordshire, ST1 5SQ United Kingdom
+44 0 1782 254 700; fax +44 0 1782 254 701
sales@cryoconnect.com; www.cryoconnect.com

Featured Product: Cryoconnect RFI/EMC Shielding & Connector-less Feedthrough Techniques.

Cryoconnect is a specialist division of Tekdata's Interconnection Systems and focuses on providing interconnection solutions for cryogenic systems of all scales. Whether the requirements are for volumes or one-off harness, anyone involved in the design of cryogenic electronic systems needs highly reliable and well designed harnesses and cable assemblies.

We can also provide thermal design, vacuum bakeout, thermal cycling, vibration, electrical perform and full Test Report and Documentation. Contact: Roy Blake, Business Manager, roy.blake@tekdata-interconnect.com; Terry McManus, Project Manager, terry.mumanus@tekdata-interconnect.com

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Teledyne Imaging Sensors #335

1049 Camino Dos Rios, Thousand Oaks, CA, 91360-2362 USA
805 373 4545; fax 805 373 4775
jbeletic@teledyne.com; www.teledyne-si.com

Teledyne Imaging Sensors is a leading manufacturer of high performance sensors that detect light in x-ray, ultraviolet, visible and infrared wavelengths. Teledyne's imagers enable cutting edge research in astronomy, Earth science and planetary exploration. The Hawaii family of image arrays is the industry standard in infrared astronomy, in use by 8 space missions, and more than 30 ground-based observatories and research organizations. Contact: James Beletic, Executive Director, Space & Astronomy, jbeletic@teledyne.com; Richard Blank, rblank@teledyne.com

THALES SESO #424

305 Rue Louis Armand, PA Aix Les Milles, Aix en Provence, 13593 France
+33 44 21 68500; fax ++33 44 21 68585
info@seso.com; www.seso.com

Featured Product: customized optics and optomechanics

Thales Seso is specialized in optical/mechanical design and complete manufacturing, including AIT activities, of any kind of customized optics and fully integrated optomechanical systems for ground-based Astronomy, Space optics, X-Rays mirrors and Industry. Thales Seso has 75, with more than 30% engineers and technicians and is ISO-9001 certified since 1998. Since early 2011, Thales Seso is now full subsidiary of the Thales Group. Contact: Denis FAPPANI, Sales Manager, fappani@seso.com; Jean-Jacques FERME, Commercial Manager, jjfseso@wanadoo.fr

Thorlabs GmbH #123

Hans-Boeckler-Str 6, Dachau Muenchen, Bavaria, 85221 Germany
+49 8131 59 56 0; fax +49 8131 59 56 99
europe@thorlabs.com; www.thorlabs.com

TICRA #142

Læderstræde 34DK, Copenhagen, DK-1201 Denmark
+45 3312 4572
ticra@ticra.com; www.ticra.com

Featured Product: Consultancy within the design of radio telescope optics. Modeling SW for diffraction patterns/gain.

TICRA is recognized as the world leading developer of reflector modeling software. Two of the main products, GRASP and CHAMP, are indispensable whether you work with simple TVRO parabolic dish designs, advanced satellite systems or radio telescopes. The engineering staff at TICRA has substantial experience in all aspects of antenna RF design, and the company has been involved in various telescope design task including the EISCAT Svalbard Radar, the ALMA projects, the PLANCK spacecraft and more. Contact: Hans-Henrik Viskum, Director of Business Development, hhv@ticra.com

TNO #313
Stieltjesweg 1, Institute of Applied Physics,
Delft, 2628 CK Netherlands
+1 31 (0) 88 866 82 86; fax +1 31 (0) 88 866 06 30
infodesk@tno.nl; www.tno.nl

Tomelleri s.r.l. #129
Via del Lavoro 12/A, Villafranca Verona, VR, 37069 Italy
+39 045 6304812; fax +39 045 6303657
info@tomelleri.com; www.tomelleri.com

Featured Product: Telescope subsystems, Instruments, Hydrostatic bearing systems, Accurate X-Y stages.

TOMELLERI s.r.l. started its activities back in 1984 in the field of the design and manufacturing of Instruments and Subsystems of Telescopes, and particularly Hydrostatic Bearing Systems, and at present is involved in major telescope projects. The supply includes: feasibility study, design, manufacturing, assembly, testing on appropriate Test Benches, and delivery and assistance on site. Contact: Raffaele Tomelleri, General Manager, r.tomelleri@tomelleri.com; Giovanni Negrini, Engineer, g.negrini@tomelleri.com

TOPTICA Photonics AG #121
Lochhamer Schlag 19, Graefelfing Muenchen, 82166 Germany
+49 89 85837 0; fax +49 89 85837 200
sales@toptica.com; www.toptica.com

TOPTICA Photonics AG develops, manufactures and distributes technology-leading diode and fiber lasers and laser systems for scientific and industrial markets. TOPTICA offers the widest range of single-mode tunable light in the 190 to 2900 nm and 0.5-10 THz spectral region and various accessories to measure, characterize and stabilize light. Based on this know-how TOPTICA now presents a narrow-band diffraction-limited laser light source of more than 20 W exactly on the Sodium reso-nance at 589 nm. Contact: Wilhelm Kaenders, President, sales@toptica.com

Winlight System S.A. #332
135 rue Benjamin Franklin ZA St Martin, Pertuis, 84120 France
+33 490077860; fax +33 490777631
info@winlight.system.com; www.winlight-system.com

Featured Product: MULTI-UNIT SPECTROGRAPHS, IMAGE SLICERS.

WINLIGHT is a company which is has been involved in many astronomical projects : X-shooter, Linc-Nirvana, Sphere, Assist, Stella, SWIFT and MUSE. We are making complete sub-assemblies such as spectrographs, objectives, collimator, cameras and image slicers.

Our last big realization is for the MUSE projects for which we have built in close collaboration with the consortium the derotator, the transport lenses, the Fore optics, the 24 image slicers and the 24 spectrographs. Contact: Philippe GODEFROY, CEO, philippe.godefroy@winlight-system.com; Yves SALAUN, CTO, yves.salaun@winlight-optics.com

Zeeko Ltd. #231
4 Vulcan Ct Vulcan Way, Coalville Leicestershire,
LE67 3FW United Kingdom
+44 1530 815 832; fax +44 1530 839 631
info@zeeko.co.uk; www.zeeko.co.uk

Featured Product: Ultra Precision Polishing Machines with Integrated Metrology Solutions for complex surfaces.

Zeeko Ltd manufactures corrective polishing machines for fabricating high precision optics, orthopedic joints, semiconductor applications and precision molds in a number of different materials. The machines are supplied with software and processes suitable for the production of the most complex freeform artifacts. Covering a range of sizes from 1.5mm to 6m they utilize patented processes including the mechanical "ZeekoClassic" technology and the "ZeekoJet" solution. See the latest at the booth. Contact: Avni Sondagar, Marketing Manager, avni.sondagar@zeeko.co.uk; Richard Freeman, Managing Director, richard.freeman@zeeko.co.uk

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Telescopes and Systems

Advanced Composite Materials for Astronomical Telescopes and Optomechanical Instruments

SC1078 ***NEW***

Course level: Intermediate
CEU .65 $575/€440 Member / $690/€525 Non-member USD
Thursday 8.30 to 17.30

Advanced composite materials have been used successfully in optomechanical systems since the 1970s. They are being used increasingly in telescopes, mirrors, and other optomechanical systems. There are a significant and increasing number of spacecraft, airborne and ground-based applications. A growing array of polymer matrix-, metal matrix-, ceramic matrix- and carbon/carbon composites provide great improvements in stiffness, strength, dimensional stability, thermal conductivity and corrosion resistance over conventional materials of construction, and are considerably lighter. Low-cost, net-shape manufacturing processes make many of these materials economically attractive.

INSTRUCTOR: **Carl Zweben**, an independent consultant on composites and advanced thermal management materials, was for many years Advanced Technology Manager and Division Fellow at GE Astro Space. He has over 40 years' experience in development and application of all types of advanced composites in optomechanical systems, dimensionally stable structures, and thermal control. He is a Life Fellow of ASME, a Fellow of ASM and SAMPE, and an Associate Fellow of AIAA. He is the first winner of the GE Engineer-of-the-Year and One-in-a-Thousand awards. He has taught over 200 composites and thermal materials short courses.

CMOS Image Sensor Architecture and Design for Scientific and Space Applications

SC1079 ***NEW***

Course level: Intermediate
CEU .65 $575/€440 Member / $690/€525 Non-member USD
Thursday 8.30 to 17.30

This course provides attendees with an intermediate knowledge of CMOS image sensors and cameras for demanding applications including extremely low light levels, wide scene dynamic range, or harsh environmental conditions (high temperature, radiation exposure, etc.). The course describes recent advances in sensor and pixel architectures as well as the associated processing and software algorithms to achieve the required performance. The course provides examples of high performance image sensors along with the architectures, designs and technologies required to realize them. The current state-of-the-art of the technology is reviewed with a look at areas of research and trends.

INSTRUCTOR: **David Dorn** is currently the manager of the applied technology group for Pelco. Previously he was with Ball Aerospace Inc. leading efforts that have advanced both the engineering and science associated with space-based focal plane arrays (FPAs) at wavelengths from the UV to the IR. With a background originally in detectors, Dorn has been able to optimize how focal plane packages and electronics can maximize the performance of imaging sensors. Dorn has led teams that have built FPAs for the WFC3, ACS, and STIS instruments aboard the Hubble Space telescope, the NIRCam and NIRSpec instruments aboard the James Webb Space Telescope, in addition to FPAs for planetary instruments including HiRise and Ralph. He has authored 25 publications and has patents for CCD and CMOS innovations. Dorn is an Inductee into the Space Technology Hall of Fame for Commercialization of CCD detector technology.

Adaptive Optics

SC135

Course level: Introductory
CEU .65 $645/€492 Member / $770/€585 Non-member USD
Monday 8.30 to 17.30

Adaptive optics are used to improve imagery and the transmission of optical signals by sensing a wavefront disturbance and using the information for real-time control of an active optical element such as a deformable mirror. This course covers the basic principles of adaptive optics with emphasis on improving image resolution by atmospheric turbulence compensation.

INSTRUCTOR:**Robert Tyson** is an Associate Professor of Physics and Optical Science at the University of North Carolina at Charlotte. He has been working in the field of adaptive optics for over 25 years. He is author of *Principles of Adaptive Optics*, *Introduction to Adaptive Optics*, and co-author of *Field Guide to Adaptive Optics*.

COURSE PRICE INCLUDES the text *Principles of Adaptive Optics, Third Edition* (CRC Press, 2011) by Robert Tyson.

Systems Engineering for Astronomy Projects

SC1001

Course level: Introductory
CEU .65 $575/€440 Member / $690/€525 Non-member USD
Wednesday 8.30 to 17.30

This course provides an introduction to lean systems engineering for the development of telescopes, facilities and instruments for astronomy. A primary goal of this course is to illustrate how the rigor of the systems engineering process can help us to build better astronomy products more quickly and cheaply.

The course will be exercise-driven, using an example of an actual instrument. During the course we will explore the various analysis methods that can be used to ensure performance budgets are partitioned and allocated correctly. This will be followed by working through an example to show the interaction between allocations and performance estimations.

INSTRUCTOR: **Hermine Schnetler** has been a Systems Engineer for 25 years, initially working in the Defence industry on products such as inertial navigation systems for aircraft, helmet sighting systems and helicopter mounted sighting systems. She has jointed the United Kingdom Astronomy Technology Centre (UK ATC) five years ago and is the Head of Group: Systems Engineering. She tailored and successfully introduced systems engineering for astronomy and was also involved in a number of instrument studies. She has a first degree in Electronics Engineering and an MSc in Systems Engineering. Both of these were obtained from the University of Pretoria in South Africa. She followed this with a PhD in Software Engineering from Cranfield University, UK. Dr Schnetler is the chair for the International Council on Systems Engineering (INCOSE) Scottish Local Group, a member of the Institute for Engineering Technology and SPIE.

CLASS SIZE IS LIMITED TO 25 STUDENTS. Demand is expected to be strong, so those interested are encouraged to register early.

Introduction to Visible and NIR Spectrograph Design and Development for Astronomy

SC906

Course level: Introductory
CEU .35 $470/€362 member / $625/€477 Non-member USD
Tuesday 8.30 to 12.30

This course provides attendees with an introduction to aerial spectrograph design and development for astronomy. The course concentrates on system configurations and performance optimization and analysis. Specific concepts to be addressed include: image quality, throughput, flexure, performance modeling and system testing.

INSTRUCTOR: **Andrew Sheinis** is a Professor of Astronomy and Astronomical Instrumentation at the University of Wisconsin at Madison. He has been involved in optical system design and engineering for over 25 years. He is currently the PI for the RSS/NIR Spectrograph and Imager for the 11-meter SALT telescope and has developed instruments for Lick Observatory, Keck Observatory and the University of Hawaii as well as medical and defense applications in industry.

COURSE PRICE INCLUDES the text *Astronomical Optics, Second Edition* (Academic Press, 1999) by Daniel J. Schroeder.

The Galileoscope: Bringing Telescope Optics Down To Earth

WS1002

Course level: Introductory
CEU .35 $50/ €23 Member / $50/€23 Non-member USD
Sunday 13.30 to 16.00

This course is designed for scientists and engineers who want to share astronomy and optics in a fun and engaging manner in schools or in after school settings. You will learn how to teach optics using the Galileoscope, a high quality low-cost telescope designed for educational outreach. The Galileoscope was developed by a team of astronomers, optical engineers, and science educators during the International Year of Astronomy 2009 and was named as a "Gear of the Year" by amateur astronomers and has been nominated for an international education prize. The Galileoscope can be used as an optical bench to explore the optics of lenses as well as showing the wonders of the universe including craters on the Moon, the phases of Venus, the Galilean Moons of Jupiter and the rings of Saturn. Each participant will receive a Galileoscope and standards-based teaching materials. But the main outcome is to have fun building and using a Galileoscope.

INSTRUCTOR: **Robert Sparks** is a Science Education Specialist at NOAO. He received his master's degree in Physics from Michigan State University and leads the Galileoscope teacher professional development program at NOAO. In the last 2 years, he has given dozens of optics education workshops.

COURSE PRICE INCLUDES a Galileoscope as well as a CD of Galileoscope education materials.

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Space Telescopes and Instrumentation 2012: Optical, Infrared, and Millimeter Wave


Clampin


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Sunday 1 July

SESSION 1

Room: G102 . . . . . Sun. 09.00 to 10.30

ExoPlanet/Coronagraphic Missions and Technology I

Session Chair: **Wesley Traub,** Jet Propulsion Lab. (USA)

09.00: **Review of small angle coronagraphic techniques in the wake of second-generation adaptive optics systems: choice of coronagraph, optimized wavefront control, observing strategy, and post-processing methods** *(Invited Paper)*, Dimitri P. Mawet, European Southern Observatory (Chile); Pierre Baudoz, LESIA - Observatoire de Paris (France); Jean-Luc Beuzit, Institut de Planétologie et d'Astrophysique de Grenoble (France); Anthony Boccaletti, LESIA - Observatoire de Paris (France); Julien H. V. Girard, European Southern Observatory (Chile); Bertrand P. Mennesson, Jet Propulsion Lab. (USA); Julien Milli, David Mouillet, Institut de Planétologie et d'Astrophysique de Grenoble (France); Laurent A. Pueyo, Johns Hopkins Univ. (USA); Eugene Serabyn, J. Kent Wallace, John E. Krist, John T. Trauger, Jet Propulsion Lab. (USA) . . . . . [8442-01]

09.30: **Coronagraph focal-plane phase masks based on photonic crystal technology: recent progress and observational strategy**, Naoshi Murakami, Hokkaido Univ. (Japan); Jun Nishikawa, National Astronomical Observatory of Japan (Japan); Wesley A. Traub, Jet Propulsion Lab. (USA); Dimitri P. Mawet, European Southern Observatory (Chile); Dwight C. Moody, Brian D. Kern, John T. Trauger, Eugene Serabyn, Jet Propulsion Lab. (USA); Shoki Hamaguchi, Fumika Oshiyama, Moritsugu Sakamoto, Akitoshi Ise, Kazuhiko Oka, Naoshi Baba, Hokkaido Univ. (Japan); Hiroshi Murakami, Japan Aerospace Exploration Agency (Japan); Motohide Tamura, National Astronomical Observatory of Japan (Japan). . . . . [8442-02]

09.50: **Status of the assessment phase of the ESA M3 Mission candidate EChO**, Ludovic Puig, Kate G. Isaak, Martin Linder, Pierre Elie Crouzet, Isabel Escudero-Sanz, Luis Miguel Gaspar Venancio, Alessandro Zuccaro Marchi, Didier Martin, European Space Research and Technology Ctr. (Netherlands) . . . . . [8442-100]

10.10: **A complex apodized Lyot coronagraph for broadband exoplanet imaging and spectroscopy from space**, John T. Trauger, Dwight C. Moody, Brian Gordon, Jet Propulsion Lab. (USA) . . . . . [8442-04]

Coffee Break . . . . . 10.30 to 11.00

SESSION 2

Room: G102 . . . . . Sun. 11.00 to 12.20

ExoPlanet/Coronagraphic Missions and Technology II

Session Chair: **Suzanne Casement,**
Northrop Grumman Aerospace Systems (USA)

11.00: **High contrast vacuum nuller testbed (VNT) contrast, performance, and null control**, Richard G. Lyon, Mark C. Clampin, Peter Petrone, Udayan Mallik, Timothy J. Madison, Matthew R. Bolcar, NASA Goddard Space Flight Ctr. (USA) . . . . . [8442-05]

11.20: **EXCEDE technology development I: first demonstrations of high contrast at 1.2 I/D for an Explorer Space Telescope Mission**, Ruslan Belikov, Eugene Pluzhnik, Fred C. Witteborn, Thomas P. Greene, Dana H. Lynch, Peter T. Zell, NASA Ames Research Ctr. (USA); Glenn H. Schneider, Olivier Guyon, The Univ. of Arizona (USA); Domenick J. Tenerelli, Lockheed Martin Space Systems Co. (USA). . . . . [8442-06]

11.40: **Technology demonstration of starshade manufacturing for NASA's Exoplanet Mission Program**, N. Jeremy Kasdin, Princeton Univ. (USA); Doug Lisman, Stuart B. Shaklan, Mark W. Thomson, Eric J. Cady, Stefan R. Martin, Luis F. Marchen, Jet Propulsion Lab. (USA); Robert J. Vanderbei, Princeton Univ. (USA); Bruce A. Macintosh, Robert E. Rudd, Dmitry Savransky, Lawrence Livermore National Lab. (USA); Julie A. Mikula, Dana H. Lynch, NASA Ames Research Ctr. (USA) . . . . . [8442-07]

12.00: **Electric field reconstruction in the image plane of a high-contrast coronagraph using a set of pinholes around the Lyot plane**, Amir Give'on, Brian D. Kern, Stuart Shaklan, M. Charley Noecker, Jet Propulsion Lab. (USA); Steve Kendrick, Ball Aerospace & Technologies Corp. (USA); J. Kent Wallace, Jet Propulsion Lab. (USA) . . . . . [8442-08]

Lunch Break . . . . . 12.20 to 13.40

SESSION 3

Room: G102 . . . . . Sun. 13.40 to 15.40

ExoPlanet/Coronagraphic Missions and Technology III

Session Chair: **James B. Breckinridge,**
College of Optical Sciences, The Univ. of Arizona (USA)

13.40: **Broadband focal plane wavefront control of amplitude and phase aberrations**, Tyler D. Groff, N. Jeremy Kasdin, Alexis Carlotti, A. J. Eldorado Riggs, Princeton Univ. (USA). . . . . [8442-09]

14.00: **A dark-hole correction test for the step-transmission filter based coronagraph system**, Jiangpei Dou, Nanjing Institute of Astronomical Optics & Technology (China); Deqing Ren, California State Univ., Northridge (USA) and Nanjing Institute of Astronomical Optics & Technology (China); Yongtian Zhu, Xi Zhang, Nanjing Institute of Astronomical Optics & Technology (China) . [8442-10]

14.20: **PICTURE: a sounding rocket experiment for direct imaging of an extrasolar planetary environment**, Supriya Chakrabarti, Timothy Cook, Christopher Mendillo, Brian Hicks, Thomas Bifano, Boston Univ. (USA); Benjamin Lane, Draper Lab. (USA); Rocco Samuele, Northrop Grumman Aerospace Systems (USA); Michael Shao, B. Martin Levin, Shanti Rao, J. Kent Wallace, Edouard Schmidtlin, Jet Propulsion Lab. (USA); Douglas Rabin, David A. Content, NASA Goddard Space Flight Ctr. (USA) . . . . . [8442-11]

14.40: **SPICA coronagraph instrument: characterization of atmospheres and physical parameters of giant planets by direct imaging and spectroscopy**, Takayuki Kotani, Keigo Enya, Takao Nakagawa, Hirokazu Kataza, Hideo Matsuhara, Mitsunobu Kawada, Makoto Mita, Keiji Komatsu, Hideki Uchida, Ken Fujiwara, Shinji Mitani, Shin-ichiro Sakai, Japan Aerospace Exploration Agency (Japan); Kanae Haze, The Graduate Univ. for Advanced Studies (Japan); Kazuya Aono, Takashi Miyata, Shigeyuki Sako, Tomohiko Nakamura, Kentaro Asano, Univ. of Tokyo (Japan); Taro Matsuo, Norio Narita, Takuya Yamashita, Motohide Tamura, Jun Nishikawa, National Astronomical Observatory of Japan (Japan); Yutaka Hayano, Shin Oya, Subaru Telescope, National Astronomical Observatory of Japan (Japan); Eiichiro Kokubo, National Astronomical Observatory of Japan (Japan); Misato Fukagawa, Hiroshi Shibai, Osaka Univ. (Japan); Yoichi Ito, Kobe Univ. (Jamaica); Mitsuhiko Honda, Kanagawa Univ. (Japan); Naoshi Baba, Naoshi Murakami, Hokkaido Univ. (Japan); Yoshiko K. Okamoto, Ibaraki Univ. (Japan); Shigeru Ida, Tokyo Institute of Technology (Japan); Michihiro Takami, Academia Sinica (Taiwan); Lyu Abe, Univ. de Nice Sophia-Antipolis (France); Olivier Guyon, National Astronomical Observatory of Japan (Japan); Tomoyasu Yamamuro, Optcraft Corp. (Japan); Paul A. Bierden, Boston Micromachines Corp. (USA) . . . . . [8442-12]

15.00: **Coronagraphic imaging of exoplanets from a high altitude balloon platform**, Stephen C. Unwin, Wesley A. Traub, John T. Trauger, Geoffrey Bryden, Jet Propulsion Lab. (USA); Charles F. Lillie, Northrop Grumman Aerospace Systems (USA) . . . . . [8442-13]

15.20: **ExoZodi mapper**, Tiffany Glassman, Amy S. Lo, Northrop Grumman Aerospace Systems (USA) . . . . . [8442-14]

Coffee Break . . . . . 15.40 to 16.00

SESSION 4

Room: G102 . . . . . Sun. 16.00 to 18.00

ExoPlanet/Coronagraphic Missions and Technology IV

Session Chair: **Gary W. Matthews,**
NASA Goddard Space Flight Ctr. (USA)

16.00: **SPICES: a 1.5-m space coronagraph for spectro-polarimetric characterization of cold exoplanets**, Anne-Lise K. Maire, Anthony Boccaletti, LESIA - Observatoire de Paris (France); Jean L. Schneider, Observatoire de Paris à Meudon (France); Raphaël Galicher, Herzberg Institute of Astrophysics (Canada); Pierre Baudoz, LESIA - Observatoire de Paris (France); Daphné M. Stam, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); Wesley Traub, Jet Propulsion Lab. (USA); Pierre-Olivier Lagage, Commissariat à l'Énergie Atomique (France); Raffaele Gratton, INAF - Osservatorio Astronomico di Padova (Italy) . . . . . [8442-15]

16.20: **NEAT: a space born astrometric mission for the detection and characterization of nearby habitable planetary systems**, Fabien Malbet, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Renaud Goullioud, Jet Propulsion Lab. (USA); Pierre-Olivier Lagage, Commissariat à l'Énergie Atomique (France); Alain M. Leger, Institut d'Astrophysique Spatiale (France); Michael Shao, Jet Propulsion Lab. (USA); Antoine Crouzier, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); consortium NEAT, from several institutes (http://neat.obs.ujf-grenoble.fr) (France) . . . . . [8442-16]

16.40: **Simultaneous coronagraphic imaging and astrometric mass measurement of habitable exoplanets with the diffractive pupil telescope concept**, Olivier Guyon, The Univ. of Arizona (USA); Eduardo A. Bendek, College of Optical Sciences, The Univ. of Arizona (USA); S. Mark Ammons, Lawrence Livermore National Lab. (USA); Michael Shao, Stuart B. Shaklan, Jet Propulsion Lab. (USA); Robert A. Woodruff, Lockheed Martin Space Systems Co. (USA); Ruslan Belikov, NASA Ames Research Ctr. (USA); Thomas D. Milster, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [8442-17]

17.00: **High contrast imaging and position sensing at the Princeton occulter testbed**, Dan Sirbu, N. Jeremy Kasdin, Robert J. Vanderbei, Princeton Univ. (USA); Eric J. Cady, California Institute of Technology (USA) . . . . . [8442-18]

17.20: **Direct imaging of exoEarths embedded in clumpy debris disks**, Denis Defrère, Max-Planck-Institut für Radioastronomie (Germany); Christopher Stark, Carnegie Institution of Washington (USA); Kerri L. Cahoy, Ingrid Beerer, Massachusetts Institute of Technology (USA) . . . . . [8442-19]

17.40: **Identification of an exoplanet using multiple speckle-limited images,** Elizabeth J. Young, N. Jeremy Kasdin, Alexis Carlotti, Princeton Univ. (USA) . . . . . [8442-20]

POSTERS-SUNDAY

Room: Hall 3 . . . . . Sun. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Sunday. The interactive poster session with authors in attendance will be Sunday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

ECHO

The Exoplanet Characterisation Observatory (EChO) payload electronics, Mauro Focardi, Maurizio Pancrazzi, Univ. degli Studi di Firenze (Italy); Stefano Pezzuto, Anna Maria Di Giorgio, Giuseppe Piccioni, Istituto di Astrofisica e Planetologia Spaziali (Italy); Giuseppina Micela, INAF - Osservatorio Astronomico di Padova (Italy); Emanuele Pace, Univ. degli Studi di Firenze (Italy) . . . [8442-99]

Mechanical and thermal architecture of an integrated payload instrument for the Exoplanet Characterisation Observatory, Paul Eccleston, Tom Bradshaw, STFC Rutherford Appleton Lab. (United Kingdom); John Coker, Univ. College London (United Kingdom); Martin Crook, STFC Rutherford Appleton Lab. (United Kingdom); Gianluca Morgante, Luca Terenzi, INAF - IASF Bologna (Italy); Giovanna Tinetti, Univ. College London (United Kingdom); Bruce M. Swinyard, STFC Rutherford Appleton Lab. (United Kingdom); Berend Winter, Univ. College London (United Kingdom) . . . . . [8442-102]

EChO SWiR: Exoplanet Atmospheres Characterization Observatory sort-wave infrared channel of the EChO payload, Gonzalo Ramos Zapata, Tomas Belenguer-Dávila, Ana Balado, Javier Barandiaran, Iñaki Armendáriz, Joaquin Azcue, Manolo Reina, César Arza, Santiago Rodríguez, Maria Ángeles Alcacera, José A. Fernández, INTA Instituto Nacional de Técnica Aeroespacial (Spain); Giovanna Tinetti, Univ. College London (United Kingdom); Paul Eccleston, Rutherford Appleton Lab. (United Kingdom); Bruce M. Swinyard, Univ. College London (United Kingdom) and RAL Space Rutherford Appleton Lab. (United Kingdom); Marc Ferlet, Rutherford Appleton Lab. (United Kingdom); Maria Rosa Zapatero Osorio, Ctr. de Astrobiología (Spain) . . . . . [8442-103]

The visible and near infrared (VNIR) spectrometer of the EChO Telescope, Alberto Adriani, Istituto di Fisica dello Spazio Interplanetario (Italy); Ernesto Oliva, INAF - Osservatorio Astrofisico di Arcetri (Italy); Mauro Focardi, Emanuele Pace, Univ. degli Studi di Firenze (Italy); Giuseppe Piccioni, INAF - IASF Roma (Italy); Maurizio Pancrazzi, Univ. degli Studi di Firenze (Italy); Andrea Tozzi, INAF - Osservatorio Astrofisico di Arcetri (Italy); Gianrico Filacchione, Istituto di Fisica dello Spazio Interplanetario (Italy); Fabrizio Capaccioni, INAF - IASF Roma (Italy); Giuseppina Micela, Osservatorio Astronomico di Palermo (Italy); Lisa Gambicorti, Istituto Nazionale di Ottica (Italy); Davide Grassi, Istituto di Astrofisica e Planetologia Spaziali (Italy) . . . . . [8442-104]

Modelling the science performance of EChO, Vincent Coudé du Foresto, LESIA - Observatoire de Paris à Meudon (France); Bruce M. Swinyard, Univ. College London (United Kingdom); Marc Ollivier, Institut d'Astrophysique Spatiale (France); Carrie MacTavish, Univ. of Cambridge (United Kingdom) . . . . . [8442-105]

Characterising the atmospheres of transiting planets with a dedicated space telescope, Marcell Tessenyi, Univ. College London (United Kingdom); Marc Ollivier, Institut d'Astrophysique Spatiale (France); Giovanna Tinetti, Univ. College London (United Kingdom); Jean-Philippe Beaulieu, Institut d'Astrophysique (France); Vincent Coudé du Foresto, LESIA - Observatoire de Paris (France); Therese Encrenaz, Observatoire de Paris à Meudon (France); Giuseppina Micela, INAF - Osservatorio Astronomico di Padova (Italy); Bruce M. Swinyard, Univ. College London (United Kingdom) and Rutherford Appleton Lab. (United Kingdom); Ignasi Ribas, Institut d'Estudis Espacials de Catalunya (Spain); Mark R. Swain, Gautam Vasisht, Pieter D. Deroo, Jet Propulsion Lab. (USA); Alan Aylward, Jonathan Tennyson, Univ. College London (United Kingdom); Alessandro Sozzetti, INAF - Osservatorio Astronomico di Torino (Italy) . . . . . [8442-106]

A detector technology investigation for the Exoplanet Characterisation Observatory (EChO), Enzo Pascale, Cardiff Univ. (United Kingdom) . [8442-107]

The study of magnetic activity and exoplanet magnetospheres using EChO vis-channel spectropolarimetry, Mauro Focardi, Maurizio Pancrazzi, Univ. degli Studi di Firenze (Italy); Steven N. Shore, Univ. di Pisa (Italy); Giuseppina Micela, INAF - Osservatorio Astronomico di Padova (Italy); Emanuele Pace, Univ. degli Studi di Firenze (Italy) . . . . . [8442-108]

EUCLID

An end-to-end approach to the Euclid NISP on-board preprocessing operations: tests and latest results, Carlotta Bonoli, Favio Bortoletto, Maurizio D'Alessandro, INAF - Osservatorio Astronomico di Padova (Italy); Leonardo Corcione, Sebastiano Ligori, INAF - Osservatorio Astronomico di Torino (Italy); Luciano Nicastro, Massimo Trifoglio, Luca Valenziano, INAF - IASF Bologna (Italy); Filippo M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); Pierre-Elie Crouzet, Andreas Jung, European Space Research and Technology Ctr. (Netherlands) . . . . . [8442-109]

The on-board electronics for the near infrared spectrograph and photometer (NISP) of the EUCLID Mission, Leonardo Corcione, Sebastiano Ligori, INAF - Osservatorio Astronomico di Torino (Italy); Favio Bortoletto, INAF - Osservatorio Astronimico di Padova (Italy); Carlotta Bonoli, INAF - Osservatorio Astronomico di Padova (Italy); Rafael Toledo-Moreo, Univ. Politécnica de Cartagena (Spain); Luca Valenziano, Massimo Trifoglio, Gianluca Morgante, INAF - IASF Bologna (Italy); Rafael Rebolo-López, Instituto de Astrofísica de Canarias (Spain); Carlos Colodro-Conde, Univ. Politécnica de Cartagena (Spain); Jacinto Muñoz, SENER Ingeniería y Sistemas S.A. (Spain) . . . . . [8442-110]

The command and data processing unit of the EUCLID visible imager: impact of the data compression needs on the unit design, Anna Maria Di Giorgio, Istituto di Fisica dello Spazio Interplanetario (Italy); Paolo Bastia, Thales Alenia Space (Italy); Scige J. Liu, Giovanni Giusi, Istituto di Fisica dello Spazio Interplanetario (Italy); Roberto Scaramella, INAF - Osservatorio Astronomico di Roma (Italy); Mark Cropper, Univ. College London (Italy); Richard Cole, Adrian James, Univ. College London (United Kingdom); Jérôme Amiaux, Commissariat à l'Énergie Atomique (France); Yannick Mellier, Institut d'Astrophysique de Paris (France) . . . . . [8442-111]

Euclid NISP thermal control design, Gianluca Morgante, INAF - IASF Bologna (Italy); Thierry Maciaszek, Ctr. National d'Études Spatiales (France); Laurent Martin, Lab. d'Astrophysique de Marseille (France); Marco Riva, INAF - Osservatorio Astronomico di Brera (Italy); Favio Bortoletto, INAF - Osservatorio Astronomico di Padova (Italy); Eric Prieto, Lab. d'Astrophysique de Marseille (France); Carlotta Bonoli, INAF - Osservatorio Astronomico di Padova (Italy); Leonardo Corcione, INAF - Osservatorio Astronomico di Torino (Italy); Vincenzo De Caprio, INAF - IASF Milano (Italy); Frank Grupp, Max-Planck-Institut für extraterrestrische Phyisk (Germany); Sebastiano Ligori, INAF - Osservatorio Astronomico di Torino (Italy); Massimo Trifoglio, Luca Valenziano, INAF - IASF Bologna (Italy); Filippo M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy) . . . . . [8442-112]

Design concept of the electrical ground support equipment for the AIV and calibration of the Euclid NISP instrument, Massimo Trifoglio, INAF - IASF Bologna (Italy); Carlotta Bonoli, Favio Bortoletto, INAF - Osservatorio Astronomico di Padova (Italy); Andrea A. Bulgarelli, R. Christopher Butler, INAF - IASF Bologna (Italy); Carlos Colodro-Conde, Univ. Politécnica de Cartagena (Spain); Leonardo Corcione, INAF - Osservatorio Astronomico di Torino (Italy); Enrico Franceschi, Fulvio Gianotti, INAF - IASF Bologna (Italy); Sebastiano Ligori, INAF - Osservatorio Astronomico di Torino (Italy); Thierry Maciaszek, Ctr. National d'Études Spatiales (France); Gianluca Morgante, INAF - IASF Bologna (Italy); Jacinto Muñoz, SENER Ingeniería y Sistemas S.A. (Spain); Luciano Nicastro, INAF - IASF Bologna (Italy); Eric Prieto, Observatoire Astronomique de Marseille-Provence (France); Rafael Rebolo-López, Instituto de Astrofísica de Canarias (Spain); Marco Riva, Paolo Spanò, INAF - Osservatorio Astronomico di Brera (Italy); Rafael Toledo-Moreo, Univ. Politécnica de Cartagena (Spain); Luca Valenziano, INAF - IASF Bologna (Italy); Isidro Villó, Univ. Politecnica de Cartagena (Spain); Filippo M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy) . . . . . [8442-113]

Hubble and SPITZER

Vega and the absolute calibration of HST, Susana E. Deustua, Space Telescope Science Institute (USA) . . . . . [8442-114]

Keeping the Hubble Space Telescope in focus, Colin R. Cox, Matthew D. Lallo, Space Telescope Science Institute (USA) . . . . . [8442-115]

Modifications to the Warm Spitzer data reduction pipeline, Patrick J. Lowrance, Sean J. Carey, Jessica E. Krick, Jason A. Surace, William J. Glaccum, Iffat Khan, James G. Ingalls, Seppo Laine, Carl J. Grillmair, Spitzer Science Ctr. (USA) . . . . . [8442-117]

The IRAC point response function in the Warm Spitzer Mission, Joseph L. Hora, Harvard-Smithsonian Ctr. for Astrophysics (USA); Massimo Marengo, Rebecca Park, Denise Wood, Iowa State Univ. (USA); William F. Hoffmann, The Univ. of Arizona (USA); Patrick J. Lowrance, Sean J. Carey, Jason A. Surace, Jessica E. Krick, William J. Glaccum, James G. Ingalls, Seppo Laine, Spitzer Science Ctr. (USA); Giovanni G. Fazio, Steven P. Willner, Matthew L. N. Ashby, Zhong Wang, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8442-118]

JWST

Optical transmission for the James Webb Space Telescope, Paul A. Lightsey, Benjamin B. Gallagher, Neal Nickles, Ball Aerospace & Technologies Corp. (USA) . . . . . [8442-119]

James Webb Space Telescope stray light performance status update, Paul A. Lightsey, Zongying Wei, Ball Aerospace & Technologies Corp. (USA) . . . . . [8442-120]

Multi-field alignment of the James Webb Space Telescope, D. Scott Acton, J. Scott Knight, Ball Aerospace & Technologies Corp. (USA). . . . . [8442-121]

Simulating point spread functions for the James Webb Space Telescope, Marshall D. Perrin, Rémi Soummer, Erin M. Elliott, Matthew D. Lallo, Anand Sivaramakrishnan, Space Telescope Science Institute (USA) . . . . . [8442-122]

The NIRSpec on-ground calibration campaign, Stephan M. Birkmann, Pierre Ferruit, Torsten Böker, Guido De Marchi, Giovanna Giardino, Marco Sirianni, European Space Research and Technology Ctr. (Netherlands); Martin Stuhlinger, European Space Research and Technology Ctr. (Spain); Peter L. Jensen, Maurice B. J. te Plate, Peter Rumler, European Space Research and Technology Ctr. (Netherlands); Xavier Gnata, Thomas Wettemann, EADS Astrium GmbH (Germany) . . . . . [8442-123]

The spectro-photometric calibration concept of the JWST NIRSpec instrument, Torsten Böker, Guido De Marchi, European Space Agency (Netherlands); Tracy Beck, Space Telescope Science Institute (USA); Stephan M. Birkmann, Giovanna Giardino, Marco Sirianni, Pierre Ferruit, European Space Agency (Netherlands) . . . . . [8442-124]

The accuracy of the NIRSpec grating wheel position sensors, Guido De Marchi, Stephan M. Birkmann, Torsten Böker, Pierre Ferruit, Giovanna Giardino, European Space Research and Technology Ctr. (Netherlands); Peter Jakobsen, Dark Cosmology Ctr. (Denmark); Marco Sirianni, Maurice B. J. te Plate, Jean-Christophe Salvignol, European Space Research and Technology Ctr. (Netherlands); Xavier Gnata, Reiner Barho, Michel Kosse, Peter Mosner, EADS Astrium GmbH (Germany); Bernhard Dorner, Observatoire de Lyon (France); Giovanni Cresci, INAF - Osservatorio Astrofisico di Arcetri (Italy); Martin Stuhlinger, European Space Astronomy Ctr. (Spain); Torsten Gross, Thomas Leikert, Carl Zeiss Optronics GmbH (Germany) . . . . . [8442-125]

James Webb Space Telescope first light boresight to spacecraft alignment determination, Paul A. Lightsey, D. Scott Acton, J. Scott Knight, Ball Aerospace & Technologies Corp. (USA) . . . . . [8442-126]

Global alignment optimization strategies, procedures, and tools for the James Webb Space Telescope (JWST) integrated science instrument module (ISIM), Brent J. Bos, Joseph M. Howard, NASA Goddard Space Flight Ctr. (USA); Philip J. Young, Young Engineering Services (USA); Renee M. Gracey, Ball Aerospace & Technologies Corp. (USA); Lenward T. Seals, Raymond G. Ohl, NASA Goddard Space Flight Ctr. (USA). . . . . [8442-127]

Measuring segmented primary mirror WFE in the presence of vibration and thermal drift on the light-weighted JWST, Tony L. Whitman, Kenneth J. Dziak, Conrad Wells, Gene Olczak, ITT Exelis Inc. (USA) . . . . . [8442-128]

Cryogenic performance test results for the flight model JWST fine guidance sensor, Neil Rowlands, Sandra Delamer, Craig Haley, Eric Harpell, Maria B. Vila, Gerry Warner, Julia Zhou, COM DEV Canada (Canada) . . . . . [8442-130]

Observatory alignment of the James Webb Space Telescope, J. Scott Knight, Paul A. Lightsey, D. Scott Acton, Adam R. Contos, Allison A. Barto, Ball Aerospace & Technologies Corp. (USA) . . . . . [8442-131]

Space qualification of optics for NIRISS onboard JWST, Mathilde Beaulieu, Loic Albert, René Doyon, Philippe Vallée, Univ. de Montréal (Canada); Alan D. Scott, Neil Rowlands, COM DEV Canada (Canada) . . . . . [8442-132]

Space environment challenges with the tunable Fabry-Perot etalon for the JWST fine guidance sensor, Craig Haley, Niladri Roy, Zeljko Osman, Neil Rowlands, Alan D. Scott, COM DEV Canada (Canada) . . . . . [8442-133]

Design status and performance of the James Webb Space Telescope Observatory, Jonathan W. Arenberg, Northrop Grumman Aerospace Systems (USA) . . . . . [8442-134]

Optical metrology lessons learned during the cryogenic testing of the JWST primary mirror segments, James B. Hadaway, The Univ. of Alabama in Huntsville (USA); David M. Chaney, Ball Aerospace & Technologies Corp. (USA); Patrick J. Reardon, The Univ. of Alabama in Huntsville (USA); Koby Z. Smith, Benjamin B. Gallagher, Ball Aerospace & Technologies Corp. (USA). . [8442-135]

SPICA

The focal plane camera for fine guidng and NIR survey on SPICA, Dae-Hee Lee, Woong-Seob Jeong, Korea Astronomy and Space Science Institute (Korea, Republic of); Toshio Matsumoto, Seoul National Univ. (Korea, Republic of); Bongkon Moon, Wonyong Han, Youngsik Park, Kwijong Park, Uk-Won Nam, Korea Astronomy and Space Science Institute (Korea, Republic of); Chol Lee, Korea Advanced Institute of Science and Technology (Korea, Republic of); Shinji Mitani, Japan Aerospace Exploration Agency (Japan) . . . . . [8442-138]

High-resolution and high-precision color-differential astrometry for direct spectroscopy of extrasolar planets onboard SPICA, Lyu Abe, Univ. of Nice Sophia Antipolis (France) and Observatoire de la Côte d'Azur (France); Martin Vannier, Lab. J.L. Lagrange (France) and Observatoire de la Côte d'Azur (France); Jean-Pierre Rivet, Univ. of Nice Sophia Antipolis (France) and Observatoire de la Côte d'Azur (France); Romain Petrov, Observatoire de la Côte d'Azur (France) and Univ. of Nice Sophia Antipolis (France); Carole Gouvret, Lab. J.L. Lagrange (France); Aurélie Marcotto, Univ. of Nice Sophia Antipolis (France) and Observatoire de la Côte d'Azur (France); Keigo Enya, Hirokazu Kataza, Institute of Space and Astronautical Science (Japan). . . . . [8442-139]

SPICA/SAFARI Fourier transform spectrometer mechanism evolutionary design, Teun C. van den Dool, Bob Kruizinga, Ben C. Braam, TNO (Netherlands); Roger F. M. M. Hamelinck, Entechna BV (Netherlands); Nicolas Loix, Micromega Dynamics SA (Belgium); Dennis Van Loon, SRON Netherlands Institute for Space Research (Netherlands). . . . . [8442-140]

Recent progress in the development of mid-infrared medium resolution spectrometer (MRS) installed in SPICA/MCS, Itsuki Sakon, The Univ. of Tokyo (Japan); Hirokazu Kataza, Japan Aerospace Exploration Agency (Japan); Takashi Onaka, The Univ. of Tokyo (Japan); Yoko Okada, Univ. zu Koln (Germany); Yuji Ikeda, Photocoding (Japan); Naofumi Fujishiro, Kyoto Sangyo Univ. (Japan); Kenji Mitsui, Norio Okada, National Astronomical Observatory of Japan (Japan) . . . . . [8442-141]

Experimental and numerical study of stitching interferometry for the optical testing of the SPICA Telescope, Hidehiro Kaneda, Mitsuyoshi Yamagishi, Nagoya Univ. (Japan); Takashi Onaka, The Univ. of Tokyo (Japan); Mitsunobu Kawada, Takao Nakagawa, Tadashi Imai, Haruyoshi Katayama, Masataka Naitoh, Japan Aerospace Exploration Agency (Japan) . . . . . [8442-142]

Cooled scientific instrument assembly onboard SPICA, Hideo Matsuhara, Takao Nakagawa, Yasuhiro Kawakatsu, Mitsunobu Kawada, Hiroshi Murakami, Hiroyuki Sugita, Keisuke Shinozaki, Toshihiko Yamawaki, Yohichi Sato, Shinji Mitani, Japan Aerospace Exploration Agency (Japan); Gerald Crone, Kate G. Isaak, Astrid Heske, European Space Agency/ESTEC (Netherlands) . . [8442-143]

Detector systems for the mid-infrared camera and spectrometer on board SPICA, Takehiko Wada, Hirokazu Kataza, Hideo Matsuhara, Mitsunobu Kawada, Japan Aerospace Exploration Agency (Japan); Daisuke Ishihara, Nagoya Univ. (Japan) . . . . . [8442-145]

The instrument control unit of SPICA SAFARI: a macro-unit to host all the digital control functionalities of the spectrometer, Anna Maria Di Giorgio, David Biondi, Istituto di Fisica dello Spazio Interplanetario (Italy); Bortolino Saggin, Irina Shatalina, Politecnico di Milano (Italy); Maurizio Viterbini, Istituto di Scienze dell'Atmosfera e del Clima (Italy); Giovanni Giusi, Scige J. Liu, Pasquale Cerulli-Irelli, Istituto di Fisica dello Spazio Interplanetario (Italy); Dennis Van Loon, SRON - Netherlands Institute for Space Research (Netherlands); Christophe Cara, Commissariat à l'Énergie Atomique (France) . . . . . [8442-146]

U.S. instrument options for the SPICA Observatory, Dominic J. Benford, Ruth C. Carter, Steve M. Benner, Dino Rossetti, Stephen J. Leete, Jackie A. Townsend, Beth Keer, NASA Goddard Space Flight Ctr. (USA); Chris Davis, NASA Headquarters (USA) . . . . . [8442-147]

Wideband infrared spectrometer for characterization of transiting exoplanets with space telescopes, Keigo Enya, Japan Aerospace Exploration Agency ISAS (Japan) and SCI team (Japan) . . . . . [8442-148]

Missions/Concepts

Design, space-heritage, and photometric performance of the fast infrared exoplanet spectroscopy survey explorer (FINESSE) spectrometer subsystem, Robert O. Green, Mark R. Swain, Muthu Jeganathan, Mayer Rud, Gautam Vasisht, Pieter D. Deroo, Harold Sobel, Brandon Richardson, Daniel W. Wilson, Pantazis Mouroulis, Sven Geier, Jet Propulsion Lab. (USA) . . [8442-149]

The FINESSE payload: a high-stability spectrophotometer for characterization of exoplanet atmospheres, Muthu Jeganathan, Gautam Vasisht, Robert O. Green, Zahidul H. Rahman, Mark R. Swain, Jet Propulsion Lab. (USA) . . . . . [8442-150]

Spectroscopy of exoplanet atmospheres with the FINESSE explorer mission, Pieter D. Deroo, Mark R. Swain, Robert O. Green, Jet Propulsion Lab. (USA); Rachel Akeson, NASA Exoplanet Science Institute (USA); Muthu Jeganathan, Mohammed O. Khan, Gautam Vasisht, Jet Propulsion Lab. (USA) . . . . . [8442-151]

The GAIA photometric data processing, Giorgia Busso, Leiden Observatory (Netherlands) . . . . . [8442-152]

High precision astrometry laboratory demonstration for exoplanet detection using a diffractive pupil, Eduardo A. Bendek, College of Optical Sciences, The Univ. of Arizona (USA); S. Mark Ammons, Lawrence Livermore National Lab. (USA); Ruslan Belikov, Eugene Pluzhnik, NASA Ames Research Ctr. (USA); Olivier Guyon, The Univ. of Arizona (USA) . . . . . [8442-153]

Supplementary information on the near infrared spectroscopic data of the infrared camera (IRC) onboard AKARI, Itsuki Sakon, Takashi Onaka, The Univ. of Tokyo (Japan); Takafumi Ootsubo, Tohoku Univ. (Japan); Hideo Matsuhara, Japan Aerospace Exploration Agency (Japan) and Institute of Space and Astronautical Science (Japan); Jennifer Noble, Univ. of Strathclyde (United Kingdom) . . . . . [8442-154]

Herschel-SPIRE satellite instrument: configurable on-board software for autonomous and real time operation, Scige J. Liu, Sergio Molinari, Stefano Pezzuto, Anna Maria Di Giorgio, Istituto di Fisica dello Spazio Interplanetario (Italy); Sunil Sidher, Rutherford Appleton Lab. (United Kingdom); Pasquale Cerulli-Irelli, Istituto di Fisica dello Spazio Interplanetario (Italy); Ken King, Rutherford Appleton Lab. (United Kingdom) . . . . . [8442-155]

ACCESS: design and test performance, Mary E. Kaiser, Matthew Morris, Murdock Hart, Stephan R. McCandliss, Johns Hopkins Univ. (USA); Bernard J. Rauscher, Randy A. Kimble, Jeffrey W. Kruk, NASA Goddard Space Flight Ctr. (USA); David J. Sahnow, Paul D. Feldman, Russell S. Pelton, Johns Hopkins Univ. (USA); Duncan M. Kahle, David B. Mott, Yiting Wen, Dominic Benford, NASA Goddard Space Flight Ctr. (USA); Ralph C. Bohlin, Susana E. Deustua, William V. Dixon, Space Telescope Science Institute (USA); Jonathan P. Gardner, NASA Goddard Space Flight Ctr. (USA); Robert Kurucz, Harvard-Smithsonian Ctr. for Astrophysics (USA); Michael L. Lampton, Space Sciences Lab. (USA); H. Warren Moos, Johns Hopkins Univ. (USA); Saul Perlmutter, Lawrence Berkeley National Lab. (USA); Adam G. Riess, Johns Hopkins Univ. (USA); Bruce E. Woodgate, NASA Goddard Space Flight Ctr. (USA); Edward L. Wright, Univ. of California, Los Angeles (USA) . . . . . [8442-156]

Nano-JASMINE: degradation of charge-coupled device performance and centroid detection, Yukiyasu Kobayashi, Naoteru Gouda, Taihei Yano, Yoshito Niwa, National Astronomical Observatory of Japan (Japan); Yuki Shimura, The Univ. of Tokyo (Japan); Yoshiyuki Yamada, Kyoto Univ. (Japan) . . . . . [8442-157]

SPEX: a remote sensing spectropolarimeter for characterizing planetary aerosols, clouds, and surfaces, Job M. Smit, Jeroen Rietjens, Daphné M. Stam, Otto P. Hasekamp, SRON Netherlands Institute for Space Research (Netherlands); Frans Snik, Gerard van Harten, Jozua de Boer, Christoph U. Keller, Leiden Observatory (Netherlands); Erik C. Laan, Adrianus L. Verlaan, Willem Vliegenthart, TNO (Netherlands); Rik ter Horst, Ramón Navarro, ASTRON (Netherlands); Klaas Wielinga, Mecon Engineering B.V. (Netherlands); Sandro Hannemann, Scott G. Moon, cosine Research B.V. (Netherlands); Robert Voors, Dutch Space B.V. (Netherlands) . . . . . [8442-158]

To PLAnetary transit or NOT? An extremely large field of view camera with a CaF_2 component tested in thermo-vacuum, Maria Bergomi, INAF - Osservatorio Astronomico di Padova (Italy) and Univ. Degli Studi di Padova (Italy); Demetrio Magrin, Jacopo Farinato, INAF - Osservatorio Astronomico di Padova (Italy); Valentina Viotto, INAF - Osservatorio Astronomico di Padova (Italy) and Univ. Degli Studi di Padova (Italy); Roberto Ragazzoni, INAF - Osservatorio Astronomico di Padova (Italy); Alessandro Brunelli, INAF - Osservatorio Astronomico di Padova (Italy) and Univ. Degli Studi di Padova (Italy); Marco Dima, INAF - Osservatorio Astronomico di Padova (Italy); Piers Christiansen, Daniele Piazza, Univ. of Bern (Switzerland); Isabella Pagano, INAF - Osservatorio Astrofisico di Catania (Italy); Giampaolo Piotto, Univ. degli Studi di Padova (Italy); Giuseppe Basile, SELEX Galileo S.p.A. (Italy); Claude Catala, Observatoire de Paris à Meudon (France) . . . . . [8442-159]

Habitable planet finder, Thomas D. Ditto, 3DeWitt LLC (USA) . . . . . [8442-160]

NanoSpec: a diffraction limited microspectrograph for nano- and pico-satellites, Christopher H. Betters, Joss Bland-Hawthorn, Iver H. Cairns, Xiaofeng Wu, Lisa M. R. Fogarty, Jiro Funamoto, Sergio G. Leon-Saval, Anthony Monger, Size Xiao, The Univ. of Sydney (Australia) . . . . . [8442-161]

Space mission Millimetron for THz astronomy, Andrey V. Smirnov, Nikolay Kardashev, Astro Space Ctr. of P.N. Lebedev Physical Institute (Russian Federation); Andrey M. Baryshev, SRON Netherlands Institute for Space Research (Netherlands) . . . . . [8442-162]

An optical design study of future THz heterodyne instrumentation, Willem Jellema, Andrey M. Baryshev, SRON Netherlands Institute for Space Research (Netherlands) and Univ. of Groningen (Netherlands); Harry van Driel, Univ. of Groningen (Netherlands) and SRON Netherlands Institute for Space Research (Netherlands); Robert Huisman, SRON Netherlands Institute for Space Research (Netherlands) and Univ. of Groningen (Netherlands); Goutam Chattopadhyay, Paul Goldsmith, Jet Propulsion Lab. (USA); Mark Whale, Univ. Bern (Switzerland); Neil Trappe, J. Anthony Murphy, National Univ. of Ireland, Maynooth (Ireland); Mikhail Arkhipov, Sergey Likhachev, Nikolay Kardashev, Astro Space Ctr. of P.N. Lebedev Physical Institute (Russian Federation) . . . . . [8442-163]

Optical telescope BIRT in ORIGIN for high-Z gamma ray burst observing, Robert Content, Australian Astronomical Observatory (Australia); Ray Sharples, Durham Univ. (United Kingdom); Mathew J. Page, Richard Cole, David M. Walton, Berend Winter, Univ. College London (United Kingdom); Kristian Pedersen, Jens Hjorth, Michael Andersen, Univ. of Copenhagen (Denmark); Allan Hornstrup, DTU Space (Denmark); Jan-Willem A. den Herder, SRON Netherlands Institute for Space Research (Netherlands); Luigi Piro, INAF - IASF Roma (Italy) . . . . . [8442-164]

CubeSat Deformable Mirror Demonstration Mission, Kerri L. Cahoy, Anne D. Marinan, Ingrid Beerer, Massachusetts Institute of Technology (USA). [8442-165]

Atmospheric characterization of cold exoplanets with a 1.5-m space coronagraph, Anne-Lise K. Maire, LESIA - Observatoire de Paris (France); Raphaël Galicher, Herzberg Institute of Astrophysics (Canada); Anthony Boccaletti, Pierre Baudoz, LESIA - Observatoire de Paris (France); Jean L. Schneider, Observatoire de Paris à Meudon (France); Kerri L. Cahoy, NASA Goddard Space Flight Ctr. (USA); Daphné M. Stam, SRON Institute for Space Research (Netherlands); Wesley Traub, Jet Propulsion Lab. (USA) . . . [8442-166]

Starshade design driven by stray light from the edges of the occulter, Suzanne Casement, Martin R. Flannery, Tiffany Glassman, Amy S. Lo, Northrop Grumman Aerospace Systems (USA) . . . . . [8442-167]

Solar System

The main power and processing unit for the METIS coronagraph aboard the Solar Orbiter Space Mission, Mauro Focardi, Maurizio Pancrazzi, Univ. degli Studi di Firenze (Italy); Michela Uslenghi, Istituto di Astrofisica Spaziale e Fisica Cosmica (Italy); Gianalfredo Nicolini, Osservatorio Astronomico di Torino (Italy); Enrico Magli, Politecnico di Torino (Italy); Federico Landini, Marco Romoli, Univ. degli Studi di Firenze (Italy); Ester Antonucci, Silvano Fineschi, Osservatorio Astronomico di Torino (Italy); Giampiero Naletto, Piergiorgio Nicolosi, Univ. degli Studi di Padova (Italy); Daniele Spadaro, INAF - Osservatorio Astrofisico di Catania (Italy). . . . . [8442-169]

Stray light control for asteroid detection at low solar elongation for the NEOSSat Micro-Satellite Telescope, Denis G. Laurin, Canadian Space Agency (Canada); Victor Isbrucker, Isbrucker Consulting Inc. (Canada); John Stauder, Space Dynamics Lab. (USA); Allan Hollinger, Canadian Space Agency (Canada) . . . . . [8442-170]

Determination of ghost images for the wide-angle camera of the Rosetta ESA Mission, Vania Da Deppo, Consiglio Nazionale delle Ricerche (Italy) and Univ. degli Studi di Padova (Italy); Fiorangela La Forgia, Univ. degli Studi di Padova (Italy); Giampiero Naletto, Univ. degli Studi di Padova (Italy) and CNR IFN LUXOR Lab. (Italy); Maria-Guglielmina Pelizzo, CNR IFN LUXOR Lab. (Italy) and Univ. degli Studi di Padova (Italy); Cesare Barbieri, Univ. degli Studi di Padova (Italy). . . . . [8442-171]

SOLAR-T: terahertz photometers to observe solar flare emission on stratospheric balloon flights, Pierre Kaufmann, Univ. Presbiteriana Mackenzie (Brazil); Emilio Bortolucci, Univ. Estadual de Campinas (Brazil); Emilia Correia, Univ. Presbiteriana Mackenzie (Brazil); J.A. Diniz, Univ. Estadual de Campinas (Brazil); L.O.T. Fernandes, Univ. Presbiteriana Mackenzie (Brazil); G. Fernandez, Complejo Astronómico El Leoncito (Argentina); C. G. Gimenez de Castro, Univ. Presbiteriana Mackenzie (Brazil); R. Godoy, Complejo Astronómico El Leoncito (Argentina); G. Hurford, Univ. of California, Berkeley (USA); A. S. Kudaka, Univ. Presbiteriana Mackenzie (Brazil); Robert P. Lin, Univ. of California, Berkeley (USA); N. Machado, Propertech Tecnologia Ltda. (Brazil); V. S. Makhmutov, P.N. Lebedev Physical Institute (Russian Federation); R. Marcon, Univ. Estadual de Campinas (Brazil); A. Marun, Complejo Astronómico El Leoncito (Argentina); V. Nicolaev, Tydex (Russian Federation); P. Pereyra, Complejo Astronómico El Leoncito (Argentina); J.-P. Raulin, Univ. Presbiteriana Mackenzie (Brazil); C.M. da Silva, Neuron Eletronica (Brazil); Albert Y. Shih, Univ. of California, Berkeley (USA); Y. Stozhkov, P.N. Lebedev Physical Institute (Russian Federation); A. Timofeevsky, Tydex (Russian Federation); A. Valio, Univ. Presbiteriana Mackenzie (Brazil); T. Villela, Instituto Nacional de Pesquisas Espaciais (Brazil); M. B. Zakia, Univ. Estadual de Campinas (Brazil). . . . . [8442-172]

Echoes: a new concept of spectro-imaging for Jovian seismology, Laurence Soulat, François-Xavier Schmider, Lab. J.L. Lagrange (France); Thierry P. Appourchaux, Institut d'Astrophysique Spatiale (France); Sylvie Robbe-Dubois, Lab. J.L. Lagrange (France); Patrick Gaulme, New Mexico State Univ. (USA); Yves Bresson, Jean Gay, Jean-Baptiste Daban, Carole Gouvret, Lab. J.L. Lagrange (France) . . . . . [8442-173]

Preliminary internal straylight analysis of the METIS instrument for the Solar Orbiter ESA Mission, Enrico Verroi, Univ. degli Studi di Padova (Italy); Vania Da Deppo, Consiglio Nazionale delle Ricerche (Italy); Giampiero Naletto, Univ. degli Studi di Padova (Italy); Silvano Fineschi, Ester Antonucci, INAF - Osservatorio Astronomico di Torino (Italy) . . . . . [8442-174]

THERMAP: a mid-infrared spectro-imager based on an uncooled micro-bolometer for space missions to small bodies of the solar system, Emily Brageot, Olivier Groussin, Philippe L. Lamy, Jean-Louis Reynaud, Observatoire Astronomique de Marseille-Provence (France); Guy Fargant, Thales Alenia Space (France) . . . . . [8442-175]

Image stabilisation system of the photospheric and helioseismic imager, Reiner Volkmer, Bernhard Feger, Kiepenheuer-Institut für Sonnenphysik (Germany); Jose Bosch Estrada, Jose M. Gomez Cama, Univ. de Barcelona (Spain); Frank Heidecke, Wolfgang Schmidt, Michael Sigwarth, Thomas Scheiffelen, Kiepenheuer-Institut für Sonnenphysik (Germany) . . . . . [8442-176]

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Studies on the HCIT broadband contrast performance: effects of dust-particles and dependence on the number of actuators used, Erkin Sidick, Stuart Shaklan, Kunjithapatham Balasubramanian, Jet Propulsion Lab. (USA) . . . . . [8442-177]

A wavefront control approach to segment diffraction for high-contrast imaging, Laurent A. Pueyo, Johns Hopkins Univ. (USA); Rémi Soummer, Space Telescope Science Institute (USA); Bruce A. Macintosh, Lawrence Livermore National Lab. (USA); Mitchell Troy, Jet Propulsion Lab. (USA) . . . . . [8442-178]

The achromatic chessboards: a new concept of phase shifter for nulling interferometry, Damien Pickel, Daniel Rouan, Didier Pelat, Jean-Michel Reess, Olivier Dupuis, Mathieu Cohen, Fanny Chemla, Observatoire de Paris à Meudon (France) . . . . . [8442-179]

Hybrid coronagraph laboratory testing, N. Jeremy Kasdin, Tyler D. Groff, Alexis Carlotti, Princeton Univ. (USA) . . . . . [8442-180]

Kalman filter estimation for focal plane wavefront correction, Tyler D. Groff, N. Jeremy Kasdin, Princeton Univ. (USA) . . . . . [8442-181]

Phase induced amplitude apodization (PIAA) coronagraphy: recent results and future prospects, Olivier Guyon, The Univ. of Arizona (USA); Brian D. Kern, Jet Propulsion Lab. (USA); Ruslan Belikov, NASA Ames Research Ctr. (USA); Stuart B. Shaklan, Andreas C. Kuhnert, Amir Give'on, Jet Propulsion Lab. (USA); Frantz Martinache, Subaru Telescope, National Astronomical Observatory of Japan (USA). . . . . [8442-182]

Count rate non-linearity in near infrared detectors: inverse persistence, Michael W. Regan, Space Telescope Science Institute (USA) . . . . . [8442-183]

Photometry of infrared space telescope images using the grid PRF method Dphot, David G. Elliott, Jet Propulsion Lab., Retired (USA) . . . . . [8442-185]

Phase retrieval on extended sources in the visible and infrared, Daniel Pamplin, D. Scott Acton, Ball Aerospace & Technologies Corp. (USA) [8442-186]

Investigation on the high efficiency volume Bragg gratings performances for spectrometry in space environment: preliminary results, Jérôme J. D. Loicq, Marc Georges, Univ. de Liège (Belgium); Luis Miguel Gaspar Venancio, European Space Agency (Netherlands) . . . . . [8442-187]

Experimental parametric study of the self-coherent camera, Johan Mazoyer, Pierre Baudoz, Marion Mas, Gérard C. Rousset, Observatoire de Paris à Meudon (France); Raphaël Galicher, National Research Council Canada (Canada) . . . . . [8442-188]

Qualification of a null lens using image-based phase retrieval, Matthew R. Bolcar, David L. Aronstein, Peter C. Hill, Jeffrey S. Smith, NASA Goddard Space Flight Ctr. (USA). . . . . [8442-189]

Space target detection with high-speed polarization spectral imaging telescope, Jingyi He, Xiao Yu, Keyan Dong, Yuegang Fu, Xiaolong Ni, Changchun Univ. of Science and Technology (China) . . . . . [8442-190]

High-resolution and high-precision color-differential astrometry: validation test-bench, Lyu Abe, Carole Gouvret, Aurélie Marcotto, Jean-Pierre Rivet, Martin Vannier, Romain Petrov, Univ. of Nice Sophia Antipolis (France) and Observatoire de la Côte d'Azur (France). . . . . [8442-191]

End-to-end coronagraphic modeling including a low-order wavefront sensor, John E. Krist, John T. Trauger, Stephen C. Unwin, Wesley Traub, Jet Propulsion Lab. (USA). . . . . [8442-192]

Optimized shaped pupil masks for pupil with obscuration, Alexis Carlotti, Robert J. Vanderbei, N. Jeremy Kasdin, Princeton Univ. (USA); Keigo Enya, Japan Aerospace Exploration Agency (Japan) . . . . . [8442-193]

Adaptive optics operation with two wavefront sensors in a coronagraph for exoplanet observations, Masahhito Oya, Nihon Univ. (Japan); Jun Nishikawa, National Astronomical Observatory of Japan (Japan); Masaaki Horie, Nihon Univ. (Japan); Naoshi Murakami, Hokkaido Univ. (Japan); Takayuki Kotani, Japan Aerospace Exploration Agency (Japan); Lyu Abe, Univ. de Nice-Sophia Antipolis (Japan); Shiomi Kumagai, Nihon Univ. (Japan); Motohide Tamura, National Astronomical Observatory of Japan (Japan); Takashi Kurokawa, Tokyo Univ. of Agriculture and Technology (Japan); Hiroshi Murakami, Japan Aerospace Exploration Agency (Japan). . . . . [8442-194]

Analysis of the thermomechanical behavior of lightweight space-based telescope mirrors, Rahmani Mahdi, Mohamed Bouafia, Univ. Ferhat Abbas de Sétif (Algeria) . . . . . [8442-196]

Development of CdZnTe immersion grating for spaceborne application, Yuki Sarugaku, Japan Aerospace Exploration Agency (Japan); Yuji Ikeda, Photocoding (Japan) and Kyoto-Sangyo Univ. (Japan); Naoto Kobayashi, Univ. of Tokyo (Japan); Takashi Sukegawa, Shigeru Sugiyama, Canon Inc. (Japan); Keigo Enya, Hirokazu Kataza, Hideo Matsuhara, Takao Nakagawa, Japan Aerospace Exploration Agency (Japan); Hideyo Kawakita, Kyoto-Sangyo Univ. (Japan); Sohei Kondo, Kyoto Sangyo Univ. (Japan); Yasuhiro Hirahara, Nagoya Univ. (Japan); Chikako Yasui, National Astronomical Observatory of Japan (Japan). . . . . [8442-197]

Optimized barcode mask solution for pupil with obscuration, Lyu Abe, Univ. of Nice Sophia Antipolis (France) and Observatoire de la Côte d'Azur (France); Keigo Enya, Japan Aerospace Exploration Agency ISAS (Japan) . . . . [8442-198]

Finding clues of life: a numerical simulation analysis of ground versus space opportunities, Deborah Schierano, Univ. degli studi di Firenze (Italy); Carmelo Arcidiacono, INAF - Osservatorio Astrofisico di Arcetri (Italy) [8442-199]

How Earth atmospheric radiations may affect astronomical observations from low-orbit satellites, Abdanour Irbah, LATMOS, Institut Pierre Simon Laplace (France); Mustapha Meftah, Institut Pierre Simon Laplace (France) . . . . . [8442-200]

A laboratory experiment for a new free-standing pupil mask coronagraph, Kanae Haze, Keigo Enya, Takayuki Kotani, Japan Aerospace Exploration Agency (Japan); Lyu Abe, Lab. J.L. Lagrange (France); Takao Nakagawa, Hideo Matsuhara, Japan Aerospace Exploration Agency (Japan); Toshimichi Satou, National Institute of Advanced Industrial Science and Technology (Japan); Tomoyasu Yamamuro, Optcraft (Japan) . . . . . [8442-201]

Mid-infrared low-temperature coronagraph testbed (MILC-T), Keigo Enya, Kanae Haze, Takayuki Kotani, Japan Aerospace Exploration Agency (Japan); Tomoyasu Yamamuro, Optcraft (Japan) . . . . . [8442-203]

A coronagraph system with unbalanced nulling interferometer: progress of dynamic range, Jun Nishikawa, National Astronomical Observatory of Japan (Japan); Kaito Yokochi, Tokyo Univ. of Agriculture and Technology (Japan); Naoshi Murakami, Hokkaido Univ. (Japan); Takayuki Kotani, Japan Aerospace Exploration Agency (Japan); Lyu Abe, Univ. de Nice-Sophia Antipolis (France); Motohide Tamura, National Astronomical Observatory of Japan (Japan); Takashi Kurokawa, Tokyo Univ. of Agriculture and Technology (Japan); Alexander V. Tavrov, Space Research Institute (Russian Federation); Mitsuo Takeda, The Univ. of Electro-Communications (Japan); Hiroshi Murakami, Japan Aerospace Exploration Agency (Japan). . . . . [8442-205]

Monday 2 July

PLENARY SESSION
Room: Auditorium . . . . . Mon. 08.50 to 10.00

Session Chair: **Mark M. Casali,**
European Southern Observatory (Germany)

08.50: **Introduction**

09.00: **James Webb Space Telescope: science update and status** *(Presentation Only)*, Heidi B. Hammel, AURA, Inc. (USA) . . . . . [8442-501]

09.30: **Exoplanets: unraveling a new paradigm** *(Presentation Only)*, Didier Queloz, Geneva Univ., Observatory of Geneva (Switzerland) . . . . [8442-502]

Coffee Break . . . . . 10.00 to 10.30

SESSION 5
Room: G102 . . . . . Mon. 10.30 to 12.20

SPICA
Session Chair: **Giovanni G. Fazio,**
Harvard-Smithsonian Ctr. for Astrophysics (USA)

10.30: **The next-generation infrared space telescope SPICA** *(Invited Paper)*, Takao Nakagawa, Hideo Matsuhara, Yasuhiro Kawakatsu, Japan Aerospace Exploration Agency (Japan). . . . . [8442-21]

11.00: **Far-infrared spectroscopy at the background limit: BLISS for SPICA**, Charles M. Bradford, Andrew D. Beyer, Matthew E. Kenyon, Thomas Prouve, Pierre M. Echternach, Bruce A. Bumble, Warren A. Holmes, James J. Bock, Jet Propulsion Lab. (USA). . . . . [8442-22]

11.20: **Mid-infrared camera and spectrometer on board SPICA**, Hirokazu Kataza, Takehiko Wada, Japan Aerospace Exploration Agency (Japan); Itsuki Sakon, Naoto Kobayashi, Univ. of Tokyo (Japan); Yuki Sarugaku, Japan Aerospace Exploration Agency (Japan); Yuji Ikeda, Photocoding (Japan) and Kyoto-Sangyo Univ. (Japan); Naofumi Fujishiro, Kyoto-Sangyo Univ. (Japan); Shinki Oyabu, Nagoya Univ. (Japan). . . . . [8442-23]

11.40: **The SAFARI imaging spectrometer for the SPICA Space Observatory**, Peter R. Roelfsema, SRON Netherlands Institute for Space Research (Netherlands); Martin Giard, Institut de Recherche en Astrophysique et Planétologie (France); Francisco Najarro de la Parra, Ctr. de Astrobiología (Spain); Kees Wafelbakker, Willem Jellema, Brian D. Jackson, SRON Netherlands Institute for Space Research (Netherlands); Bruce M. Swinyard, Univ. College London (United Kingdom); Marc Audard, Observatory of Geneva (Switzerland); Anna Maria Di Giorgio, Istituto di Fisica dello Spazio Interplanetario (Italy); Javier R. Goicoechea, Ctr. de Astrobiología (Spain); Matthew J. Griffin, Cardiff Univ. (United Kingdom); Frank P. Helmich, SRON Netherlands Institute for Space Research (Netherlands); Franz Kerschbaum, Univ. Wien (Austria); Michael R. Meyer, ETH Zurich (Switzerland); David A. Naylor, Univ. of Lethbridge (Canada); Albrecht Poglitsch, Max-Planck-Institut für extraterrestrische Physik (Germany); Luigi Spinoglio, Istituto di Fisica dello Spazio Interplanetario (Italy); Bart Vandenbussche, Katholieke Univ. Leuven (Belgium) . . . . . [8442-24]

12.00: **The optical design concept of SPICA-Safari**, Willem Jellema, SRON Netherlands Institute for Space Research (Netherlands); Bob Kruizinga, Huib Visser, Teun C. van den Dool, TNO (Netherlands); Carmen Pastor Santos, Instituto Nacional de Técnica Aeroespacial (Spain); Josefina Torres Redondo, Ctr. de Astrobiología (Spain); Martin Eggens, SRON Netherlands Institute for Space Research (Netherlands); Marc Ferlet, SFTC-RAL Space (United Kingdom); Bruce M. Swinyard, STFC-RAL Space (United Kingdom); Kjetil Dohlen, Observatoire Astronomique de Marseille-Provence (France); Douglas K. Griffin, STFC-RAL Space (United Kingdom); Luis Miguel González Fernández, Tomas Belenguer-Dávila, INTA Instituto Nacional de Técnica Aeroespacial (Spain); Hideo Matsuhara, Mitsunobu Kawada, Japan Aerospace Exploration Agency (Japan); Yasuo Doi, The Univ. of Tokyo (Japan) . . . . . [8442-25]

Lunch Break . . . . . 12.20 to 13.50

SESSION 6
Room: G102 . . . . . Mon. 13.50 to 17.50

Euclid/WFIRST
Session Chair: **James C. Green,** Univ. of Colorado at Boulder (USA)

13.50: **Euclid: ESAs mission to map the geometry of the dark universe** *(Invited Paper)*, René J. Laureijs, Philippe Gondoin, Ludovic Duvet, Gonzalo Saavedra Criado, ESA European Space Research and Technology Ctr. (Netherlands); John Hoar, European Space Astronomy Ctr. (Spain); Jérôme Amiaux, Jean-Louis Auguères, CEA Saclay (France); Richard E. Cole, Mark Cropper, Univ. College London (United Kingdom); Anne Ealet, Ctr. de Physique des Particules de Marseille (France); Pierre Ferruit, Isabel Escudero-Sanz, ESA European Space Research and Technology Ctr. (Netherlands); Knud Jahnke, Max-Planck-Institut für Astronomie (Germany); Ralf Kohley, European Space Astronomy Ctr. (Spain); Thierry Maciaszek, Ctr. National d'Études Spatiales (France); Yannick Mellier, Institut d'Astrophysique de Paris (France); Tim Oosterbroek, ESA European Space Research and Technology Ctr. (Netherlands); Fabio Pasian, INAF - Osservatorio Astronomico di Trieste (Italy); Marc Sauvage, CEA Saclay (France); Roberto Scaramella, INAF - Osservatorio Astronomico di Roma (Italy); Marco Sirianni, ESA European Space Research and Technology Ctr. (Netherlands) . . . . . [8442-26]

14.20: **The Wide Field Infrared Survey Telescope: WFIRST**, James C. Green, Univ. of Colorado at Boulder (USA) and The Wide Field Infrared Camera Science Definition Team (USA) . . . . . [8442-27]

14.40: **VIS: the visible imager for Euclid**, Mark Cropper, Richard E. Cole, Adrian James, Univ. College London (United Kingdom); Yannick Mellier, Institut d'Astrophysique de Paris (France); Jérome Martignac, Commissariat à l'Énergie Atomique (France); Anna Maria Di Giorgio, Istituto di Fisica dello Spazio Interplanetario (Italy); Stéphane Paltani, Ludovic Genolet, ISDC Data Ctr. for Astrophysics (Switzerland); Jean-Jacques Fourmond, Univ. d'Orsay (France); Jérôme Amiaux, Commissariat à l'Énergie Atomique (France); Phil R. Guttridge, David M. Walton, Phil D. Thomas, Kerrin J. Rees, Univ. College London (United Kingdom); Peter J. Pool, James Endicott, e2v technologies plc (United Kingdom); Andrew D. Holland, Jason P. D. Gow, Neil J. Murray, e2v Ctr. for Electronic Imaging at The Open Univ. (United Kingdom); Ludovic Duvet, ESA European Space Research and Technology Ctr. (Netherlands); Jean-Louis Auguères, Commissariat à l'Énergie Atomique (France); René J. Laureijs, Philippe Gondoin, ESA European Space Research and Technology Ctr. (Netherlands); Thomas Kitching, Richard J. Massey, The Royal Observatory, Edinburgh (United Kingdom); Henk Hoekstra, Leiden Observatory (Netherlands) . . . . . [8442-28]

15.00: **Euclid near-infrared spectrophotometer instrument concept at the end of the phase A study**, Eric Prieto, Observatoire Astronomique de Marseille-Provence (France); Jérôme Amiaux, Jean-Louis Auguères, Jean Christophe Barrière, Commissariat à l'Énergie Atomique (France); Carlotta Bonoli, Favio Bortoletto, INAF - Osservatorio Astronimico di Padova (Italy); Cédric Cerna, Ctr. de Physique des Particules de Marseille (France); Leonardo Corcione, INAF - Osservatorio Astronomico di Torino (Italy); Ludovic Duvet, European Space Agency/ESTEC (Netherlands); Anne Ealet, Ctr. de Physique des Particules de Marseille (France); Bianca Garilli, INAF - IASF Milano (Italy); Philippe Gondoin, European Space Agency/ESTEC (Netherlands); Frank Grupp, Max-Planck-Institut für extraterrestrische Phyisk (Germany); Knud Jahnke, Max-Planck-Institut für Astronomie (Germany); René J. Laureijs, European Space Agency/ESTEC (Netherlands); Sebastiano Ligori, INAF - Osservatorio Astronomico di Torino (Italy); Thierry Maciaszek, Ctr. National d'Études Spatiales (France); Francesc Madrid, Institut d'Estudis Espacials de Catalunya (Spain); Jérome Martignac, Commissariat à l'Énergie Atomique (France); Laurent Martin, Observatoire Astronomique de Marseille-Provence (France); Gianluca Morgante, INAF - IASF Bologna (Italy); Yannick Mellier, Institut d'Astrophysique de Paris (France); Tony Pamplona, Observatoire Astronomique de Marseille-Provence (France); Rory Holmes, Max-Planck-Institut für Astronomie (Germany); Robert Grange, Observatoire Astronomique de Marseille-Provence (France); et al.. . . . . [8442-29]

15.20: **The optical baseline concept of the NISP near infrared spectrometer and photometer on board of the ESA/EUCLID satellite**, Frank U. Grupp, Univ. Sternwarte München (Germany) and Max-Planck-Institut für extraterrestrische Physik (Germany); Eric Prieto, Robert Grange, Observatoire Astronomique de Marseille-Provence (France); Andreas Bode, Norbert Geis, Reinhard Katterloher, Max-Planck-Institut für extraterrestrische Physik (Germany); Ralf Bender, Univ. Sternwarte München (Germany) and Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8442-30]

Coffee Break . . . . . 15.40 to 16.10

16.10: **First test results of the Euclid grisms made by microlithography**, Robert Grange, Amandine Caillat, Celine Ong, Marina Ellouzi, Serge Vester, Eric Prieto, Observatoire Astronomique de Marseille-Provence (France) . . . [8442-31]

16.30: **Euclid Mission: building of a reference survey**, Jérôme Amiaux, Jean-Louis Auguères, Commissariat à l'Énergie Atomique (France); Yannick Mellier, Institut d'Astrophysique de Paris (France); Roberto Scaramella, INAF - Osservatorio Astronomico di Roma (Italy); Anne Ealet, Ctr. de Physique des Particules de Marseille (France); Rory Holmes, Knud Jahnke, Max-Planck-Institut für Astronomie (Germany); Mark Cropper, Univ. College London (United Kingdom); Bianca Garilli, INAF - IASF Milano (Italy); Gonzalo Saavedra Criado, Ludovic Duvet, Philippe Gondoin, ESA European Space Research and Technology Ctr. (Netherlands); Jarle Brinchmann, Henk Hoekstra, Leiden Observatory (Netherlands); Thomas Kitching, The Royal Observatory, Edinburgh (United Kingdom); Luigi Guzzo, INAF - Osservatorio Astronomico di Brera (Italy); Will Percival, Univ. of Portsmouth (United Kingdom); René J. Laureijs, ESA European Space Research and Technology Ctr. (Netherlands) . . . . . [8442-32]

16.50: **Wavefront sensing for WFIRST with a linear optical model**, Alden S. Jurling, Univ. of Rochester (USA) and NASA Goddard Space Flight Ctr. (USA); James R. Fienup, Univ. of Rochester (USA); David A. Content, NASA Goddard Space Flight Ctr. (USA) . . . . . [8442-33]

17.10: **Euclid NISP GWA and compensating mechanism**, Marco Riva, INAF - Osservatorio Astronomico di Brera (Italy); Thierry Maciaszek, Ctr. National d'Études Spatiales (France); Eric Prieto, Observatoire Astronomique de Marseille-Provence (France); Luca Valenziano, INAF - IASF Bologna (Italy); Filippo Maria Zerbi, INAF - Osservatorio Astronomico di Brera (Italy) . . [8442-34]

17.30: **Initial results from a laboratory emulation of weak gravitational lensing measurements**, Suresh Seshadri, Jet Propulsion Lab. (USA); Roger M. Smith, California Institute of Technology (USA); Timothy M. Goodsall, Jet Propulsion Lab. (USA); Jason R. Fucik, California Institute of Technology (USA); Barnaby T. P. Rowe, Univ. College London (United Kingdom) and California Institute of Technology (USA) and Jet Propulsion Lab. (USA); Eric Jullo, Observatoire Astronomique de Marseille-Provence (France); Chris Peay, Peter G. Ringold, Jet Propulsion Lab. (USA); Jason D. Rhodes, Jet Propulsion Lab. (USA) and California Institute of Technology (USA) . . . . . [8442-35]

Tuesday 3 July

PLENARY SESSION

Room: Auditorium . . . . . Tues. 09.00 to 10.00

Session Chair: **Kathryn A. Flanagan,**
Space Telescope Science Institute (USA)

09.00: **The Kepler Exoplanet Survey: instrumentation, performance and results**, Thomas N. Gautier III, Jet Propulsion Lab., Caltech (USA) and The Kepler Science Team (USA) . . . . . [8442-503]

09.30: **Antarctic astronomy**, John W. V. Storey, The Univ. of New South Wales (Australia) . . . . . [8446-504]

Coffee Break . . . . . 10.00 to 10.30

SESSION 7

Room: G102 . . . . . Tues. 10.30 to 12.20

Small Missions/Explorers I

Session Chair: **Matthew J. Griffin,** Cardiff Univ. (United Kingdom)

10.30: **Summary of the observations with the infrared camera (IRC) onboard AKARI** *(Invited Paper)*, Takashi Onaka, The Univ. of Tokyo (Japan); Hideo Matsuhara, Takehiko Wada, Japan Aerospace Exploration Agency (Japan); Daisuke Ishihara, Nagoya Univ. (Japan); Youichi Ohyama, Institute of Astronomy and Astrophysics, Academia Sinica (Taiwan); Itsuki Sakon, Takashi Shimonishi, Ryou Ohsawa, Tamami I. Mori, The Univ. of Tokyo (Japan); Fumi Egusa, Fumihiko Usui, Satoshi Takita, Hiroshi Murakami, Japan Aerospace Exploration Agency (Japan); Shinki Oyabu, Mitsuyoshi Yamagishi, Tatsuya Mori, Akio Mouri, Toru Kondo, Satoshi Suzuki, Hidehiro Kaneda, Nagoya Univ. (Japan); Yoshifusa Ita, Takafumi Ootsubo, Tohoku Univ. (Japan) . . . . . [8442-36]

11.00: **Breakthrough capability for the NASA Astrophysics Explorer Program: reaching the darkest sky**, Matthew A. Greenhouse, NASA Goddard Space Flight Ctr. (USA); Scott W. Benson, R. D. Falck, NASA Glenn Research Ctr. (USA); Dale J. Fixsen, Jonathan P. Gardner, James B. Garvin, Jeffrey W. Kruk, NASA Goddard Space Flight Ctr. (USA); Steven R. Oleson, NASA Glenn Research Ctr. (USA); Harley A. Thronson, Jr., NASA Goddard Space Flight Ctr. (USA) . . . . . [8442-37]

11.20: **The Canadian Space Telescope: a wide-field, high-resolution, imaging telescope**, J. J. M. Kavelaars, Patrick Côté, National Research Council Canada (Canada); Alan D. Scott, David A. Aldridge, COM DEV Canada (Canada); Don Asquin, Bristol Aerospace (Canada); Michael Balogh, Univ. of Waterloo (Canada); Jeff Cain, COM DEV Canada (Canada); Raymond G. Carlberg, Univ. of Toronto (Canada); Weiguo Chen, COM DEV Canada (Canada); Laurent Drissen, Univ. Laval (Canada); Jean Dupuis, Canadian Space Agency (Canada); Clinton E. Evans, COM DEV Canada (Canada); Frederic J. Grandmont, ABB Inc. (Canada); Paul Harrison, Bristol Aerospace (Canada); John B. Hutchings, National Research Council Canada (Canada); Christian Lange, Denis G. Laurin, Canadian Space Agency (Canada); Andrew Rader, COM DEV Canada (Canada); Carmelle Robert, Univ. Laval (Canada); Marcin Sawicki, Saint Mary's Univ. (Canada); Warren Soh, Bristol Aerospace (Canada); Ludo van Waerbeke, The Univ. of British Columbia (Canada). . . . . [8442-38]

11.40: **Transiting Exoplanet Survey Satellite (TESS)**, George R. Ricker, Jr., Massachusetts Institute of Technology (USA); Mark C. Clampin, NASA Goddard Space Flight Ctr. (USA); David Latham, Harvard-Smithsonian Ctr. for Astrophysics (USA); Sara Seager, Roland K. Vanderspek, Jesus S. Villaseñor, Joshua Winn, Massachusetts Institute of Technology (USA) . . . . . [8442-39]

12.00: **The FINESSE mission**, Mark R. Swain, Jet Propulsion Lab. (USA) . . . . . [8442-40]

Lunch Break . . . . . 12.20 to 13.50

SESSION 8

Room: G102 . . . . . Tues. 13.50 to 16.20

Small Missions/Explorers II

Session Chair: **Allison A. Barto,**
Ball Aerospace & Technologies Corp. (USA)

13.50: **The FINESSE instrument: enabling 0.7-5.0 micron spectroscopy of extrasolar planets via precision spectrophotometry**, Gautam Vasisht, Mark R. Swain, Robert O. Green, Muthu Jeganathan, Jet Propulsion Lab. (USA)[8442-41]

14.10: **LiteBIRD: a small satellite for the studies of B-mode polarization and inflation from cosmic background radiation detection**, Masashi Hazumi, Yuji Chinone, Masaya Hasegawa, Kaori Hattori, Koji Ishidoshiro, Nobuhiko Katayama, Nobuhiro Kimura, Tomotake Matsumura, Hideki Morii, Makoto Nagai, Ryo Nagata, Nobuaki Sato, Toshikazu Suzuki, Osamu Tajima, Takayuki Tomaru, Mitsuhiro Yoshida, High Energy Accelerator Research Organization (Japan); Hideyuki Fuke, Isao Kawano, Hideo Matsuhara, Kazuhisa Mitsuda, Atsushi Noda, Yohichi Sato, Keisuke Shinozaki, Hiroyuki Sugita, Yoh Takei, Noriko Y. Yamasaki, Tetsuya Yoshida, Kazuhiko Yotsumoto, Japan Aerospace Exploration Agency (Japan); Izumi Ohta, Kinki Univ. (Japan); Julian Borrill, Lawrence Berkeley National Lab. (USA); Matthew A. Dobbs, McGill Univ. (Canada); Takashi Noguchi, Yutaro Sekimoto, Yoshinori Uzawa, National Astronomical Observatory of Japan (Japan); Hirokazu Ishino, Atsuko Kibayashi, Yoshiaki Kibe, Satoru Mima, Okayama Univ. (Japan); Chiko Otani, RIKEN (Japan); Yuki Inoue, Akie Shimizu, Hiroki Watanabe, SOKENDAI (Japan); Makoto Hattori, Tohoku Univ. (Japan); Adnan Ghribi, William L. Holzapfel, Adrian T. Lee, Haruki Nishino, Paul L. Richards, Aritoki Suzuki, Univ. of California, Berkeley (USA); Eiichiro Komatsu, The Univ. of Texas at Austin (USA); Suguru Takada, Univ. of Tsukuba (Japan); Satoshi Murayama, Shogo Nakamura, Kota Natsume, Yuta Takagi, Yokohama National Univ. (Japan) . . . . . [8442-42]

14.30: **WISH for deep and wide NIR survey of the distant universe**, Toru Yamada, Tohoku Univ. (Japan) . . . . . [8442-43]

14.50: **The i-INSPIRE Satellite**, Lisa Fogarty, Joss Bland-Hawthorn, Iver H. Cairns, Xiaofeng Wu, Christopher H. Betters, Jiro Funamoto, Sergio Leon-Saval, Anthony Monger, Adrian Xiao, The Univ. of Sydney (Australia) . . . . . [8442-44]

15.10: **FalconSat-7: a membrane photon sieve CubeSat solar telescope**, Geoff P. Andersen, Michael E. Dearborn, Geoff McHarg, U.S. Air Force Academy (USA) . . . . . [8442-45]

Coffee Break . . . . . 15.30 to 16.00

16.00: **A conceptual design of a near infrared satellite for PAH survey**, Chun Xu, Shanghai Institute of Technical Physics (China); Jinsong Deng, National Astronomial Observatories (China); Yonghe Zhang, Shanghai Engineering Ctr. for MicroSatellites (China). . . . . [8442-46]

SESSION 9

Room: G102 . . . . . Tues. 16.20 to 18.00

ECHO

Session Chair: **Mark J. McCaughrean,**
European Space Research and Technology Ctr. (Netherlands)

16.20: **The science of EChO: the Exoplanet Characterisation Observatory**, Giovanna Tinetti, Univ. College London (United Kingdom); Pierre Drossart, Observatoire de Paris à Meudon (France); Giuseppina Micela, INAF - Osservatorio Astronomico di Palermo Giuseppe S. Vaiana (Italy); Ignasi Ribas, ICE - Institut de Ciències de l'Espai (Spain); James Y. K. Cho, Queen Mary, Univ. of London (United Kingdom); Athena Coustenis, Therese Encrenaz, Observatoire de Paris à Meudon (France); Leigh N. Fletcher, Oxford Univ. (United Kingdom); Francois Forget, Lab. de Météorologie Dynamique (France); Olivier Grasset, Univ. de Nantes (France); Tristan Guillot, Observatoire de la Côte d'Azur (France); Patrick Irwin, Univ. of Oxford (United Kingdom); Mercedes López-Morales, ICE - Institut de Ciències de l'Espai (Spain); Enric Palle, Instituto de Astrofísica de Canarias (Spain); David J. Pinfield, Univ. of Hertfordshire (United Kingdom); Franck Selsis, Lab. d'Astrophysique de Bordeaux (France); Alessandro Sozzetti, INAF - Osservatorio Astronomico di Torino (Italy); Lars Stixrude, Jonathan Tennyson, Univ. College London (United Kingdom); Ingo Mueller-Wodarg, Imperial College London (United Kingdom); Maria Rosa Zapatero Osorio, Ctr. de Astrobiología (Spain) . . . . . [8442-47]

16.40: **The Exoplanet Characterization Observatory (EChO)**, Roy van Boekel, Yan Bétrémieux, Jeroen Bouwman, Max-Planck-Institut für Astronomie (Germany); Leen Decin, Katholieke Univ. Leuven (Belgium); Remco de Kok, SRON Netherlands Institute for Space Research (Netherlands); Manuel Güdel, Univ. Wien (Austria); Peter H. Hauschildt, Hamburg Observatory (Germany) and Univ. Hamburg (Germany); Thomas F. E. Henning, Lisa Kaltenegger, Max-Planck-Institut für Astronomie (Germany); Franz Kerschbaum, Univ. of Vienna (Austria); Oliver Krause, Max-Planck-Institut für Astronomie (Germany); Helmut Lammer, Space Research Institute (Austria); Theresa Rank-Lueftinger, Univ. of Vienna (Austria); Nikku Madhusudhan, Princeton Univ. (USA); Michael R. Meyer, ETH Zurich (Switzerland); Christoph Mordasini, Max-Planck-Institut für Astronomie (Germany); Roland Ottensamer, Univ. Wien (Austria); Sascha P. Quanz, ETH Zurich (Switzerland); Ansgar Reiners, Georg-August-Univ. Göttingen (Germany); Hans-Martin Schmid, ETH Zurich (Switzerland); Ignas A. Snellen, Leiden Observatory (Netherlands); Daphné M. Stam, SRON - Netherlands Institute for Space Research (Netherlands); Bart Vandenbussche, Katholieke Univ. Leuven (Belgium) . . . . . [8442-48]

17.00: **An integrated payload design for the Exoplanet Characterisation Observatory (EChO)**, Bruce M. Swinyard, Rutherford Appleton Lab. (United Kingdom) and Univ. College London (United Kingdom); Giovanna Tinetti, Univ. College London (United Kingdom); Paul Eccleston, Rutherford Appleton Lab. (United Kingdom); Alberto Adriani, Istituto di Fisica dello Spazio Interplanetario (Italy); Jean-Philippe Beaulieu, Institut d'Astrophysique (France); Tomas Belenguer-Dávila, Instituto Nacional de Técnica Aeroespacial (Spain); Neil Bowles, Oxford Univ. (United Kingdom); Ian R. Bryson, UK Astronomy Technology Ctr. (United Kingdom); Vincent Coudé du Foresto, Observatoire de Paris à Meudon (France); Marc Ferlet, Rutherford Appleton Lab. (United Kingdom); Paul Hartogh, Max-Planck-Institut für Sonnensystemforschung (Germany); Pierre-Olivier Lagage, Commissariat à l'Énergie Atomique (France); Mercedes López-Morales, ICFO - Institut de Ciències Fotòniques (Spain); Giuseppina Micela, INAF - Osservatorio Astronomico di Padova (Italy); Gianluca Morgante, INAF - IASF Bologna (Italy); Hans Ulrik Nørgaard-Nielsen, DTU Space (Denmark); Marc Ollivier, Univ. Paris-Sud 11 (France); Emanuele Pace, Univ. degli Studi di Firenze (Italy); Enzo Pascale, Cardiff Univ. (United Kingdom); Gonzalo Ramos Zapata, INTA Instituto Nacional de Técnica Aeroespacial (Spain); Jean-Michel Reess, Observatoire de Paris à Meudon (France); Ignasi Ribas, Consejo Superior de Investigaciones Científicas (Spain); Mark R. Swain, Jet Propulsion Lab. (USA); Berend Winter, Univ. College London (United Kingdom); et al.. . . . . [8442-49]

17.20: **The visible/infrared spectrometer for EChO**, Oliver Krause, Roy van Boekel, Adrian M. Glauser, Max-Planck-Institut für Astronomie (Germany); Manuel Güdel, Univ. Wien (Austria); Thomas F. E. Henning, Max-Planck-Institut für Astronomie (Germany); Michael R. Meyer, ETH Zurich (Switzerland); Daphné M. Stam, SRON Netherlands Institute for Space Research (Netherlands); Bart Vandenbussche, Katholieke Univ. Leuven (Belgium); Ulrich Grözinger, Ulrich Klaas, Rainer Lenzen, Friedrich Müller, Max-Planck-Institut für Astronomie (Germany); Roland Ottensamer, Univ. Wien (Austria); Sascha P. Quanz, ETH Zurich (Switzerland); Etienne Renotte, Univ. de Liège (Belgium); Ralf-Rainer Rohloff, Max-Planck-Institut für Astronomie (Germany); Hans-Martin Schmid, ETH Zurich (Switzerland); Jan-Rutger Schrader, SRON Netherlands Institute for Space Research (Netherlands); Udo J. Wehmeier, ETH Zurich (Switzerland) . . . . . [8442-50]

17.40: **Designing the MWIR channels of EChO**, Jean-Michel Reess, LESIA - Observatoire de Paris (France); Marc Ollivier, Institut d'Astrophysique Spatiale (France); Vincent Moreau, Pierre-Olivier Lagage, Commissariat à l'Énergie Atomique (France); Jean-Christophe Le Clech, Institut d'Astrophysique Spatiale (France) . . . . . [8442-51]

Wednesday 4 July

PLENARY SESSION

Room: Auditorium . . . . . Wed. 09.00 to 10.00

Session Chair: **Luc Simard,**
National Research Council Canada (Canada)

09.00: **Very high energy gamma ray astronomy with the H.E.S.S. telescopes** *(Presentation Only)*, Werner Hofmann, Max-Planck-Institut für Kernphysik (Germany) . . . . . [8442-505]

09.30: **The cosmic microwave background: observing directly the early universe**, Paolo de Bernardis, Silvia Masi, Univ. degli Studi di Roma La Sapienza (Italy) . . . . . [8442-506]

Coffee Break . . . . . 10.00 to 10.30

SESSION 10

Room: G102 . . . . . Wed. 10.30 to 11.50

Technology

Session Chair: **Jean-Pierre Maillard,**
Institut d'Astrophysique de Paris (France)

10.30: **Mirror coatings with atomic layer deposition: initial results**, Wesley Traub, Frank Greer, Shouleh Nikzad, Jet Propulsion Lab. (USA) . . . . . [8442-52]

10.50: **A laboratory facility for emulating high precision astronomical observations**, Roger M. Smith, California Institute of Technology (USA); Suresh Seshadri, Timothy M. Goodsall, Jet Propulsion Lab. (USA); Jason R. Fucik, California Institute of Technology (USA); Barnaby T. P. Rowe, Univ. College London (United Kingdom); Eric Jullo, Lab. d'Astrophysique de Marseille (France); Chris Peay, Jason D. Rhodes, Jet Propulsion Lab. (USA); Richard J. Massey, Institute for Computational Cosmology (United Kingdom) . . . . . [8442-54]

11.00: **The thermal sieve: a diffractive baffle that provides thermal isolation of a cryogenic optical system from an ambient temperature collimator**, James H. Burge, Dae Wook Kim, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [8442-55]

11.30: **Innovative optical setup for testing a stereo camera for space applications**, Giampiero Naletto, Alessandro Albasini, Michele Cesaro, Univ. degli Studi di Padova (Italy); Gabriele Cremonese, INAF - Osservatorio Astronomico di Padova (Italy); Vania Da Deppo, Consiglio Nazionale delle Ricerche (Italy); Gianfranco Forlani, Univ. degli Studi di Parma (Italy); Cristina Re, Univ. degli Studi di Padova (Italy); Riccardo Roncella, Univ. degli Studi di Parma (Italy); Giuseppe Salemi, Univ. degli Studi di Padova (Italy); Emanuele Simioni, Consiglio Nazionale delle Ricerche (Italy) . . . . . [8442-56]

Lunch/Exhibition Break . . . . . 11.50 to 13.40

SESSION 11

Room: G102 . . . . . Wed. 13.40 to 15.20

Astrometry/GAiA

Session Chair: **H. Philip Stahl,** NASA Marshall Space Flight Ctr. (USA)

13.40: **Progress towards precision focal-plane astrometry using micropixel centroiding**, Bijan Nemati, Michael Shao, Chengxing Zhai, Renaud Goullioud, Jet Propulsion Lab. (USA) . . . . . [8442-57]

14.00: **A metrology concept for multiple telescope astrometry**, Mario Gai, Deborah Busonero, Alberto Riva, INAF - Osservatorio Astronomico di Torino (Italy) . . . . . [8442-58]

14.20: **Gaia´s FPA: sampling the sky in silicon**, Ralf Kohley, European Space Astronomy Ctr. (Spain); Philippe Garé, European Space Research and Technology Ctr. (Netherlands); Cyril Vétel, Denis Marchais, François Chassat, EADS Astrium (France) . . . . . [8442-59]

14.40: **Gaia in-orbit realignment: overview and data analysis**, Alcione Mora, European Space Astronomy Ctr. (Spain) and Aurora Technology (Netherlands) . . . . . [8442-60]

15.00: **Gaia basic angle monitoring system**, Wim L. M. Gielesen, Dik de Bruijn, Teun C. van den Dool, Fred Kamphues, Ellart A. Meijer, TNO (Netherlands); Bertrand Calvel, Anouk Laborie, David Monteiro, Claude Coatantiec, Stephane Touzeau, EADS Astrium Toulouse (France); Matthias Erdmann, Philippe Garé, ESA European Space Research and Technology Ctr. (Netherlands) . . . [8442-61]

Coffee Break . . . . . 15.20 to 15.50

SESSION 12

Room: G102 . . . . . Wed. 15.50 to 16.50

Exoplanet and Combined Missions

Session Chair: **Howard A. MacEwen,**
ManTech SRS Technologies (USA)

15.50: **The exoplanetary circumstellar environments and disk explorer (EXCEDE)**, Olivier Guyon, Glenn H. Schneider, The Univ. of Arizona (USA); Ruslan Belikov, NASA Ames Research Ctr. (USA); Domenick J. Tenerelli, Lockheed Martin Space Systems Co. (USA). . . . . [8442-62]

16.10: **Using the ISS as a testbed to prepare for the next generation of space-based telescopes**, Marc Postman, William Sparks, Space Telescope Science Institute (USA); Fengchuan Liu, Jet Propulsion Lab. (USA); Kim Ess, Johnson Space Flight Ctr. (USA); Joseph J. Green, Jet Propulsion Lab. (USA); Kenneth Carpenter, Harley A. Thronson, Jr., NASA Goddard Space Flight Ctr. (USA); Renaud Goullioud, Jet Propulsion Lab. (USA) . . . . . [8442-63]

16.30: **Wide field infrared survey telescope [WFIRST]: telescope design and simulated performance**, Renaud Goullioud, Jet Propulsion Lab. (USA); David A. Content, NASA Goddard Space Flight Ctr. (USA); Gary M. Kuan, James D. Moore, Zensheu Chang, Eric T. Sunada, Jet Propulsion Lab. (USA); J. Villalvazo, Applied Sciences Lab. Inc. (USA); J. P. Hawk, Eric L. Johnson, Cory A. Powell, NASA Goddard Space Flight Ctr. (USA); N. V. Armani, SGT, Inc. (USA) [8442-64]

Thursday 5 July

PLENARY SESSION

Room: Auditorium . . . . . Thurs. 09.30 to 10.00

Session Chair: **Gillian S. Wright,**
UK Astronomy Technology Ctr. (United Kingdom)

09.30: **ALMA construction and early science**, Mattheus W. M. de Graauw, Lewis Ball, Joint ALMA Observatory (Chile). . . . . [8444-507]

Coffee Break . . . . . 10.00 to 10.30

SESSION 13

Room: G102 . . . . . Thurs. 10.30 to 12.10

Hubble Space Telescope SM4/Spitzer

Session Chair: **Domenick J. Tenerelli,**
Lockheed Martin Space Systems Co. (USA)

10.30: **Performance and calibration of the HST wide field camera three**, John W. MacKenty, Space Telescope Science Institute (USA) . . . . . [8442-65]

10.50: **Characterizing persistence in the IR detector within the wide field camera 3 instrument on Hubble Space Telescope**, Knox S. Long, Sylvia M. Baggett, John W. MacKenty, Adam G. Riess, Space Telescope Science Institute (USA) . . . . . [8442-66]

11.10: **A Spitzer measure of the zodiacal light**, Jessica E. Krick, William J. Glaccum, Sean J. Carey, Patrick J. Lowrance, Jason A. Surace, James G. Ingalls, Spitzer Science Ctr. (USA); Joseph L. Hora, Harvard-Smithsonian Ctr. for Astrophysics (USA); William T. Reach, SOFIA / USRA (USA) . . . . . [8442-67]

11.30: **Intra-pixel gain variations and high-precision photometry with the infrared array camera (IRAC)**, James G. Ingalls, Jessica E. Krick, Sean J. Carey, Seppo Laine, Jason A. Surace, William J. Glaccum, Carl J. Grillmair, Patrick J. Lowrance, Spitzer Science Ctr. (USA). . . . . [8442-68]

11.50: **Absolute photometric calibration of IRAC: lessons learned using nine years of flight data**, Sean J. Carey, James G. Ingalls, Spitzer Science Ctr. (USA); Joseph L. Hora, Harvard-Smithsonian Ctr. for Astrophysics (USA); Jason A. Surace, William J. Glaccum, Patrick J. Lowrance, Jessica E. Krick, David M. Cole, Seppo Laine, Spitzer Science Ctr. (USA); Charles W. Engelke, Stephan D. Price, Boston College (USA); Ralph C. Bohlin, Karl D. Gordon, Space Telescope Science Institute (USA) . . . . . [8442-69]

Lunch Break . . . . . 12.10 to 13.40

SESSION 14

Room: G102 . . . . . Thurs. 13.40 to 15.20

Large Space Optics

Session Chair: **Marc Postman,**
Space Telescope Science Institute (USA)

13.40: **Space active optics: performance of a deformable mirror for in-situ wave-front correction in space telescopes**, Marie Laslandes, Claire Hourtoule, Emmanuel Hugot, Marc Ferrari, Observatoire Astronomique de Marseille-Provence (France); Céline Lopez, Société Européenne de Systèmes Optiques (France); Christophe Devilliers, Arnaud Liotard, Thales Alenia Space (France); Frederic Chazallet, Shaktiware (France) . . . . . [8442-70]

14.00: **MOIRE: initial demonstration of a transmissive diffractive membrane optic for large lightweight optical telescopes**, Paul D. Atcheson, Chris Stewart, Jeanette Domber, Kevin Whiteaker, Jerold Cole, Peter Spuhler, Aaron Seltzer, Ball Aerospace & Technologies Corp. (USA); Jerry Britten, Sham Dixit, Lawrence Livermore National Lab. (USA); Brandon Farmer, Lensey Smith, NeXolve Corp. (USA) . . . . . [8442-71]

14.20: **Spherical primary optical telescope (SPOT) segments**, Christopher A. Hall, QED Technologies, Inc. (USA); John G. Hagopian, NASA Goddard Space Flight Ctr. (USA); Michael A. DeMarco, QED Technologies, Inc. (USA) . [8442-72]

14.40: **The path to far-IR interferometry in space: recent developments, plans, and prospects**, David T. Leisawitz, Stephen A. Rinehart, NASA Goddard Space Flight Ctr. (USA) . . . . . [8442-73]

15.00: **Multivariable parametric cost model for space telescopes**, H. Philip Stahl, NASA Marshall Space Flight Ctr. (USA) . . . . . [8442-75]

Coffee Break . . . . . 15.20 to 15.50

SESSION 15

Room: G102 . . . . . Thurs. 15.50 to 16.50

Solar Missions

Session Chair: **Gillian S. Wright,**
UK Astronomy Technology Ctr. (United Kingdom)

15.50: **Design of large aperture solar optical telescope for SOLAR-C Mission**, Yoshinori Suematsu, Yukio Katsukawa, Hirohisa Hara, Masahito Kubo, National Astronomical Observatory of Japan (Japan); Toshifumi Shimizu, Japan Aerospace Exploration Agency (Japan); Kiyoshi Ichimoto, Kyoto Univ. (Japan) . . . . . [8442-76]

16.10: **In-orbit determination of the straylight in the SOHO/LASCO-C2 coronagraph and its temporal evolution**, Antoine Llebaria, Philippe L. Lamy, Observatoire Astronomique de Marseille-Provence (France) . . . . . [8442-77]

16.30: **Optimization of the occulter for the Solar orbiter/METIS coronagraph**, Federico Landini, Univ. degli Studi di Firenze (Italy); Sébastien Vivès, Lab. d'Astrophysique de Marseille (France); Marco Romoli, Univ. degli Studi di Firenze (Italy); Christophe Guillon, Lab. d'Astrophysique de Marseille (France); Maurizio Pancrazzi, Univ. degli Studi di Firenze (Italy); Clement Escolle, Lab. d'Astrophysique de Marseille (France); Ester Antonucci, Silvano Fineschi, INAF - Osservatorio Astronomico di Torino (Italy); Giampiero Naletto, Univ. degli Studi di Padova (Italy); Gianalfredo Nicolini, INAF - Osservatorio Astronomico di Torino (Italy); Piergiorgio Nicolosi, Univ. degli Studi di Padova (Italy); Daniele Spadaro, INAF - Osservatorio Astrofisico di Catania (Italy) . . . . . [8442-78]

Friday 6 July

SESSION 16

Room: G102 . . . . . Fri. 08.30 to 10.10

JWST Overview

Session Chair: **Richard W. Capps,** Jet Propulsion Lab. (USA)

08.30: **Science with the James Webb Space Telescope**, Jonathan P. Gardner, NASA Goddard Space Flight Ctr. (USA) . . . . . [8442-79]

08.50: **Science operations with the James Webb Space Telescope**, Jane R. Rigby, George Sonneborn, NASA Goddard Space Flight Ctr. (USA); Joseph Pollizzi, Thomas M. Brown, John C. Isaacs, Space Telescope Science Institute (USA) . . . . . [8442-80]

09.10: **Overview and status of the James Webb Space Telescope Observatory**, Mark C. Clampin, Charles W. Bowers, NASA Goddard Space Flight Ctr. (USA). . . . . [8442-81]

09.30: **James Webb Space Telescope optical telescope element mirror development history and results**, Lee D. Feinberg, Ritva A. M. Keski-Kuha, Mark C. Clampin, NASA Goddard Space Flight Ctr. (USA); Scott C. Texter, Northrop Grumman Aersopace Systems (USA); Charlie B. Atkinson, Northrop Grumman Aerospace Systems (USA); Mark J. Bergeland, Benjamin B. Gallagher, Ball Aerospace & Technologies Corp. (USA) . . . . . [8442-82]

09.50: **The James Webb Space Telescope sunshield**, Jonathan W. Arenberg, Northrop Grumman Aerospace Systems (USA) . . . . . [8442-83]

Coffee Break . . . . . 10.10 to 10.40

SESSION 17

Room: G102 . . . . . Fri. 10.40 to 12.00

JWST Optics/I&T I

Session Chair: **Jacobus M. Oschmann, Jr.,**
Ball Aerospace & Technologies Corp. (USA)

10.40: **Status of the JWST optical telescope element**, Charlie B. Atkinson, Scott C. Texter, Northrop Grumman Aerospace Systems (USA); Ritva A. M. Keski-Kuha, NASA Goddard Space Flight Ctr. (USA) . . . . . [8442-84]

11.00: **Statistical analysis of the surface figure of the James Webb Space Telescope mirrors**, Paul A. Lightsey, David M. Chaney, Benjamin B. Gallagher, Robert J. Brown, Koby Z. Smith, John P. Schwenker, Ball Aerospace & Technologies Corp. (USA) . . . . . [8442-85]

11.20: **Predicted JWST imaging performance**, J. Scott Knight, Allison A. Barto, Paul A. Lightsey, Ball Aerospace & Technologies Corp. (USA). . . . . [8442-86]

11.40: **Wavefront sensing and controls for the James Webb Space Telescope**, D. Scott Acton, J. Scott Knight, Stefano Grimaldi, Ball Aerospace & Technologies Corp. (USA) . . . . . [8442-87]

Lunch Break . . . . . 12.00 to 13.30

SESSION 18

Room: G102 . . . . . Fri. 13.30 to 15.10

JWST Optics/I&T II

Session Chair: **Mark C. Clampin,**
NASA Goddard Space Flight Ctr. (USA)

13.30: **Actuator usage and fault tolerance of the JWST optical telescope element mirror actuators**, Allison A. Barto, D. Scott Acton, Paul T. Finley, Benjamin B. Gallagher, Bruce Hardy, J. Scott Knight, Paul A. Lightsey, Koby Z. Smith, Ball Aerospace & Technologies Corp. (USA) . . . . . [8442-88]

13.50: **James Webb Space Telescope mirror coatings**, Ritva A. M. Keski-Kuha, NASA Goddard Space Flight Ctr. (USA); Benjamin B. Gallagher, SGT Inc. (USA); Andrew McKay, Northrop Grumman Corp. (USA); James Heaney, SGT Inc. (USA); Ian Stevenson, Quantum Coating Inc. (USA); Manuel Quijada, NASA Goddard Space Flight Ctr. (USA) . . . . . [8442-89]

14.10: **The integration and test program of the James Webb Space Telescope**, Randy A. Kimble, Pamela Davila, Charles Diaz, Lee D. Feinberg, Stuart D. Glazer, NASA Goddard Space Flight Ctr. (USA); Gregory S. Jones, Northrop Grumman Aerospace Systems (USA); James M. Marsh, NASA Goddard Space Flight Ctr (USA); Gary W. Matthews, NASA Goddard Space Flight Ctr. (USA) and ITT Exelis Inc. (USA); Douglas McGuffey, NASA Goddard Space Flight Ctr. (USA); Deborah D. Ramey, NASA Goddard Space Flight Ctr. (USA) and SGT, Inc. (USA); Tony L. Whitman, ITT Exelis Inc. (USA). . . . [8442-90]

14.30: **JWST's cryogenic position metrology system**, Tony L. Whitman, Thomas Scorse, Keith A. Havey, Jr., ITT Exelis Inc. (USA); Stephen A. Smee, Randolph P. Hammond, Johns Hopkins Univ. (USA) . . . . . [8442-91]

14.50: **Status of the James Webb Space Telescope integrated science instrument module system**, Ray A. Lundquist, Matthew A. Greenhouse, NASA Goddard Space Flight Ctr. (USA) . . . . . [8442-92]

Coffee Break . . . . . 15.10 to 15.40

SESSION 19

Room: G102 . . . . . Fri. 15.40 to 17.40

JWST Instruments

Session Chair: **Jonathan W. Arenberg,**
Northrop Grumman Aerospace Systems (USA)

15.40: **The near infrared camera for the James Webb Space Telescope: status and science goals**, Charles A. Beichman, Jet Propulsion Lab. (USA); Marcia J. Rieke, The Univ. of Arizona (USA) . . . . . [8442-93]

16.00: **The JWST near-infrared spectrograph NIRSpec: status**, Pierre Ferruit, Giorgio Bagnasco, Stephan M. Birkmann, Torsten Böker, Guido De Marchi, ESA European Space Research and Technology Ctr. (Netherlands); Bernhard Dorner, Ctr. de Recherche Astronomique de Lyon (France); Ralf Ehrenwinkler, EADS Astrium GmbH (Germany); Massimo Falcolini, Giovanna Giardino, ESA European Space Research and Technology Ctr. (Netherlands); Xavier Gnata, EADS Astrium GmbH (Germany); Peter Jakobsen, Peter L. Jensen, ESA European Space Research and Technology Ctr. (Netherlands); Manfred-Georg Kolm, Ralf Maurer, EADS Astrium GmbH (Germany); Peter Rumler, Jean-Christophe Salvignol, Paolo Strada, Maurice B. J. te Plate, ESA European Space Research and Technology Ctr. (Netherlands); Thomas Wettemann, EADS Astrium GmbH (Germany) . . . . . [8442-94]

16.20: **Overview of MIRI status and first indications of flight performance**, Gillian S. Wright, UK Astronomy Technology Ctr. (United Kingdom); George H. Rieke, Steward Observatory, The Univ. of Arizona (USA); MIRI Team, UK-ATC (United Kingdom). . . . . [8442-95]

16.40: **Ambient alignment verification of JWST-MIRI**, Marc Ferlet, STFC Rutherford Appleton Lab. (United Kingdom); Martyn Wells, UK Astronomy Technology Ctr. (United Kingdom) . . . . . [8442-96]

17.00: **The JWST fine guidance sensor (FGS) and near-infrared imager and slitless spectrograph (NIRISS)**, René Doyon, Univ. de Montréal (Canada); John B. Hutchings, NRC Herzberg Institute of Astrophysics (Canada); Neil Rowlands, Driss Touahri, COM DEV Canada (Canada); Mathilde Beaulieu, Loic Albert, David Lafrenière, Univ. de Montréal (Canada); Roberto Abraham, Univ. of Toronto (Canada); Pierre Chayer, Space Telescope Science Institute (USA); Laura Ferrarese, NRC Herzberg Institute of Astrophysics (Canada); Alex W. Fullerton, Space Telescope Science Institute (USA); Ray Jayawardhana, Univ. of Toronto (Canada); Doug Johnstone, NRC Herzberg Institute of Astrophysics (Canada); André R. Martel, Space Telescope Science Institute (USA); Michael R. Meyer, ETH Zurich (Switzerland); Judith L. Pipher, Univ. of Rochester (USA); Marcin Sawicki, Saint Mary's Univ. (Canada); Anand Sivaramakrishnan, Kevin Volk, Space Telescope Science Institute (USA); Karl Saad, Canadian Space Agency (Canada) . . . . . [8442-97]

17.20: **Exoplanet and black hole science with non-redundant interferometric masks on JWST**, Anand Sivaramakrishnan, Space Telescope Science Institute (USA); Peter G. Tuthill, Univ. of Sydney (Australia) . . . . . [8442-98]

Sunday-Friday 1-6 July 2012 • Proceedings of SPIE Vol. 8443

Space Telescopes and Instrumentation 2012: Ultraviolet to Gamma Ray


Takahashi


Murray


den Herder

Conference Chairs: **Tadayuki Takahashi,** Japan Aerospace Exploration Agency (Japan); **Stephen S. Murray,** The Johns Hopkins Univ. (USA); **Jan-Willem A. den Herder,** SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands)

Program Committee: **Xavier Barcons,** Univ. de Cantabria (Spain); **Didier Barret,** Institut de Recherche en Astrophysique et Planétologie (France); **Martin A. Barstow,** Univ. of Leicester (United Kingdom); **Mark W. Bautz,** MIT Kavli Institute for Astrophysics and Space Research (USA); **Angela Bazzano,** Istituto di Fisica dello Spazio Interplanetario (Italy); **Steven E. Boggs,** Univ. of California, Berkeley (USA); **Carl Budtz-Jørgensen,** DTU Space (Denmark); **Enrico Costa,** INAF - IASF Roma (Italy); **Enectali Figueroa-Feliciano,** Massachusetts Institute of Technology (USA); **Neil A. Gehrels,** NASA Goddard Space Flight Ctr. (USA); **James C. Green,** Univ. of Colorado at Boulder (USA); **Fiona A. Harrison,** California Institute of Technology (USA); **Hideyo Kunieda,** Nagoya Univ. (Japan); **François Lebrun,** Commissariat à l'Énergie Atomique (France); **D. Christopher Martin,** California Institute of Technology (USA); **Kirpal Nandra,** Max-Planck-Institut für extraterrestrische Physik (Germany); **Takaya Ohashi,** Tokyo Metropolitan Univ. (Japan); **Giovanni Pareschi,** INAF - Osservatorio Astronomico di Brera (Italy); **Arvind N. Parmar,** European Space Research and Technology Ctr. (Netherlands); **Biswajit Paul,** Raman Research Institute (India); **Mikhail N. Pavlinsky,** Space Research Institute (Russian Federation); **Paul B. Reid,** Harvard-Smithsonian Ctr. for Astrophysics (USA); **Hiroshi Tsunemi,** Osaka Univ. (Japan); **Peter von Ballmoos,** Institut de Recherche en Astrophysique et Planétologie (France); **Martin C. Weisskopf,** NASA Marshall Space Flight Ctr. (USA); **Nicholas E. White,** NASA Goddard Space Flight Ctr. (USA); **Richard Willingale,** Univ. of Leicester (United Kingdom); **Shuang-Nan Zhang,** Institute of High Energy Physics (China)

Sunday 1 July

SESSION 1

Room: E105 . . . . . Sun. 09.00 to 10.20

UV Missions and Technologies

Session Chair: **Tadayuki Takahashi,** Japan Aerospace Exploration Agency (Japan)

09.00: **Little mirror, big science**, James C. Green, Univ. of Colorado at Boulder (USA) . . . . . [8443-01]

09.20: **Observatory-class science with a low-cost EUV astronomy mission**, Martin A. Barstow, Nigel P. Bannister, Sarah L. Casewell, Univ. of Leicester (United Kingdom); Stuart J. Eves, Nimalraj Navarathinam, Surrey Satellite Technology Ltd. (United Kingdom); Michael P. Kowalski, Kent S. Wood, U.S. Naval Research Lab. (USA) . . . . . [8443-02]

09.40: **An introduction to the World Space Observatory ultraviolet (WSO/UV)**, Stephan Hermanutz, Jürgen Barnstedt, Sebastian Diebold, Christoph Kalkuhl, Norbert Kappelmann, Marc Pfeifer, Thomas Schanz, Eberhard Karls Univ. Tübingen (Germany); Boris M. Shustov, Institute of Astronomy (Russian Federation); Klaus Werner, Eberhard Karls Univ. Tübingen (Germany) . [8443-03]

10.00: **Development and fabrication of the Colorado high-resolution echelle stellar spectrograph (CHESS)**, Kevin France, Matthew Beasley, Robert Kane, Nicholas Nell, Eric B. Burgh, James C. Green, Univ. of Colorado at Boulder (USA) . . . . . [8443-04]

Coffee Break . . . . . 10.20 to 10.50

SESSION 2

Room: E105 . . . . . Sun. 10.50 to 12.30

Solar Missions and Technologies

Session Chair: **James C. Green,** Univ. of Colorado at Boulder (USA)

10.50: **The focusing optics x-ray solar imager: FOXSI**, Sam Krucker, Univ. of California, Berkeley (USA) . . . . . [8443-05]

11.10: **The EUI instrument on board the Solar Orbiter Mission: from breadboard and prototypes to instrument model validation**, Jean-Philippe A. Halain, Pierre Rochus, Etienne Renotte, Univ. de Liège (Belgium); Thierry P. Appourchaux, Institut d'Astrophysique Spatiale (France); David Berghmans, Royal Observatory of Belgium (Belgium); Louise K. Harra, Univ. College London (United Kingdom); Udo H. Schühle, Max-Planck-Institut für Sonnensystemforschung (Germany); Werner K. Schmutz, Physikalisch-Meteorologisches Observatorium Davos (Switzerland); Frédéric Auchère, Institut d'Astrophysique Spatiale (France); Andrei N. Zhukov, Ali Benmoussa, Royal Observatory of Belgium (Belgium); Franck Delmotte, Institut d'Optique (France); Cydalise Dumesnil, Institut d'Astrophysique Spatiale (France); Michael Kahle, Max-Planck-Institut für Sonnensystemforschung (Germany); Thomas E. Kennedy, Univ. College London (United Kingdom); Raymond F. Mercier, Institut d'Optique (France); Dany Pfiffner, Physikalisch-Meteorologisches Observatorium Davos (Switzerland); Laurence Rossi, Univ. de Liège (Belgium); Jason A. Tandy, Philip J. Smith, Univ. College London (United Kingdom) . . . . . [8443-06]

11.30: **The interface region imaging spectrograph for the IRIS Small Explorer Mission**, Jean-Pierre Wuelser, Alan M. Title, James R. Lemen, Bart De Pontieu, Theodore D. Tarbell, Gary D. Kushner, Catherine Y. Chou, Isaac Weingrod, Lockheed Martin Space Systems Co. (USA); Charles C. Kankelborg, Montana State Univ. (USA); Leon Golub, William A. Podgorski, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8443-07]

11.50: **Multi element telescope for imaging and spectroscopy (METIS) coronagraph for the Solar Orbiter Mission**, Ester Antonucci, Silvano Fineschi, INAF - Osservatorio Astronomico di Torino (Italy); Giampiero Naletto, Univ. degli Studi di Padova (Italy); Marco Romoli, Univ. degli Studi di Firenze (Italy); Daniele Spadaro, INAF - Osservatorio Astrofisico di Catania (Italy); Gianalfredo Nicolini, INAF - Osservatorio Astronomico di Torino (Italy); Piergiorgio Nicolosi, Univ. degli Studi di Padova (Italy); Lucia Abbo, INAF - Osservatorio Astronomico di Torino (Italy); Vincenzo Andretta, INAF - Osservatorio Astronomico di Capodimonte (Italy); Frédéric Auchère, Institut d'Astrophysique Spatiale (France); Alessandro Bemporad, INAF - Osservatorio Astronomico di Torino (Italy); Arkadiusz Berlicki, Astronomical Institute of the ASCR, v.v.i. (Czech Republic); Roberto Bruno, INAF - IASF Roma (Italy); Gerardo Capobianco, INAF - Osservatorio Astronomico di Torino (Italy); Angela Ciaravella, INAF - Osservatorio Astronomico di Palermo Giuseppe S. Vaiana (Italy); Giuseppe Crescenzio, INAF - Osservatorio Astronomico di Torino (Italy); Vania Da Deppo, Consiglio Nazionale delle Ricerche (Italy); Raffaella D'Amicis, INAF - IASF Roma (Italy); George A. Doschek, U.S. Naval Research Lab. (USA); Mauro Focardi, Univ. degli Studi di Firenze (Italy); Fabio Frassetto, Univ. degli Studi di Padova (Italy); Peter Heinzel, Astronomical Institute of the ASCR, v.v.i. (Czech Republic); Philippe L. Lamy, Observatoire Astronomique de Marseille-Provence (France); et al. . . . . [8443-08]

12.10: **The x-ray/EUV telescope for the Solar-C Mission: science and development activities**, Taro Sakao, Noriyuki Narukage, Shinsuke Imada, Japan Aerospace Exploration Agency (Japan); Yoshinori Suematsu, Masumi Shimojo, Saku Tsuneta, National Astronomical Observatory of Japan (Japan); Edward E. DeLuca, Harvard-Smithsonian Ctr. for Astrophysics (USA); Shin'nosuke Ishikawa, Univ. of California, Berkeley (USA) . . . . . [8443-09]

Lunch Break . . . . . 12.30 to 14.00

SESSION 3

Room: E105 . . . . . Sun. 14.00 to 16.30

Gamma-Ray Missions and Technologies

Session Chair: **Stephen S. Murray,** Johns Hopkins Univ. (USA)

14.00: **Development status of the LAUE project**, Filippo Frontera, Enrico Virgilli, Vineeth Valsan, Vincenzo Liccardo, Univ. degli Studi di Ferrara (Italy); Ezio Caroli, John B. Stephen, INAF - IASF Bologna (Italy); Ferdinando Cassese, Luca Recanatesi, DTM Srl (Italy); Massimiliano Pecora, Sergio Mottini, Primo Attina, Thales Alenia Space (Italy); Barbara Negri, Agenzia Spaziale Italiana (Italy) . . . . . [8443-10]

14.20: **Critical developments toward building Laue lenses for gamma-ray astronomy**, Nicolas M. Barrière, John A. Tomsick, Steven E. Boggs, Alexander W. Lowell, Maxwell C. Baugh, Univ. of California, Berkeley (USA); Peter von Ballmoos, Institut de Recherche en Astrophysique et Planétologie (France) . . . . . [8443-11]

14.40: **Development of electron tracking Compton camera for both balloon and future satellite experiments for MeV gamma-ray astronomy**, Toru Tanimori, Hideaki Kubo, Kentaro Miuchi, Shigeto Kabuki, Joseph Parker, Yuji Kishimoto, Kazuki Ueno, Shunsuke Kurosawa, Satoru Iwaki, Tatsuya Sawano, Kiseki Nakamura, Yoshihiro Matsuoka, Shotaro Komura, Yasushi Sato, Atsushi Takada, Kyoto Univ. (Japan) . . . . . [8443-12]

15.00: **Concept of a small satellite for sub-MeV all sky survey: the CAST Mission**, Kazuhiro Nakazawa, The Univ. of Tokyo (Japan); Tadayuki Takahashi, Shin Watanabe, Motohide Kokubun, Takeshi Takashima, Takefumi Mitani, Japan Aerospace Exploration Agency (Japan); Hiroyasu Tajima, Nagoya Univ. (Japan); Makoto S. Tashiro, Yukikatsu Terada, Saitama Univ. (Japan); Toru Tamagawa, RIKEN (Japan); Yasushi Fukazawa, Tsunefumi Mizuno, Hiroshima Univ. (Japan); Masaharu Nomachi, Osaka Univ. (Japan) . . . . . [8443-13]

Coffee Break . . . . . 15.20 to 15.50

15.50: **Development of a telescope for medium-energy gamma-ray astronomy**, Stanley D. Hunter, Seunghee Son, Michael P. Dion, Suzanne F. Nowicki, NASA Goddard Space Flight Ctr. (USA); Peter Bloser, James M. Ryan, Mark L. McConnell, Jason Legere, The Univ. of New Hampshire (USA); Georgia A. de Nolfo, Floyd W. Stecker, NASA Goddard Space Flight Ctr. (USA) [8443-14]

16.10: **The space gamma-ray telescope GAMMA-400 for the energy range 100 MeV - 3 TeV**, Nikolay P. Topchiev, P.N. Lebedev Physical Institute (Russian Federation); Arkadiy M. Galper, P.N. Lebedev Physical Institute (Russian Federation) and National Research Nuclear Univ. MEPhI (Russian Federation) . . . . . [8443-15]

SESSION 4

Room: E105 . . . . . Sun. 16.30 to 17.30

Gamma-Ray Burst Missions

Session Chair: **Martin A. Barstow,** Univ. of Leicester (United Kingdom)

16.30: **Moscow State University satellite Mikhail Lomonosov: the multipurpose observatory in space**, Mikhail I. Panasyuk, Lomonosov Moscow State Univ. (Russian Federation) . . . . . [8443-16]

16.50: **Ultra Fast Flash Observatory (UFFO) for observation of early photons from gamma ray bursts**, Il Hung Park, Ewha Womans Univ. (Korea, Republic of) . . . . . [8443-17]

17.10: **The Ultra-Fast Flash Observatory (UFFO)-100 for observations of the rise phase of gamma-ray bursts**, Bruce Grossan, Lawrence Berkeley National Lab. (USA); Il Hung Park, Ewha Womans Univ. (Korea, Republic of) . . . [8443-18]

Monday 2 July

PLENARY SESSION

Room: Auditorium . . . . . Mon. 08.50 to 10.00

Session Chair: **Mark M. Casali,**
European Southern Observatory (Germany)

08.50: **Introduction**

09.00: **James Webb Space Telescope: science update and status** *(Presentation Only)*, Heidi B. Hammel, AURA, Inc. (USA) . . . . . [8442-501]

09.30: **Exoplanets: unraveling a new paradigm** *(Presentation Only)*, Didier Queloz, Geneva Univ., Observatory of Geneva (Switzerland) . . . . . [8442-502]

Coffee Break . . . . . 10.00 to 10.30

SESSION 5

Room: E105 . . . . . Mon. 10.30 to 13.00

Detector Technology for Future Missions

Session Chair: **Jan-Willem A. den Herder,** SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands)

10.30: **Cryogenic micro calorimeters as future imaging detectors for x-ray missions** *(Invited Paper)*, Christian Enss, Ruprecht-Karls-Univ. Heidelberg (Germany) . . . . . [8443-19]

11.00: **The use of CCDs and EM-CCDs for future soft x-ray spectrometers**, James H. Tutt, Andrew D. Holland, Neil J. Murray, David J. Hall, The Open Univ. (United Kingdom); James Endicott, e2v technologies plc (United Kingdom) . . . . . [8443-20]

11.20: **A new design for the gas pixel detector**, Ronaldo Bellazzini, Alessandro Brez, Istituto Nazionale di Fisica Nucleare (Italy); Enrico Costa, Sergio Fabiani, INAF - IASF Roma (Italy); Massimo Minuti, Istituto Nazionale di Fisica Nucleare (Italy); Fabio Muleri, INAF - IASF Roma (Italy); Michele Pinchera, Istituto Nazionale di Fisica Nucleare (Italy); Alda Rubini, Paolo Soffitta, INAF - IASF Roma (Italy); Gloria Spandre, Istituto Nazionale di Fisica Nucleare (Italy) . . . . . [8443-21]

11.40: **Scintillating fibers readout by single photon avalanche diodes (SPAD) for space applications**, Martino Marisaldi, INAF - IASF Bologna (Italy); Piera Maccagnani, Francesco Moscatelli, Istituto per la Microelettronica e Microsistemi (Italy); Claudio Labanti, Fabio Fuschino, INAF - IASF Bologna (Italy); Michela Prest, Alessandro Berra, Davide Bolognini, Univ. degli Studi dell'Insubria (Italy); Andrea Giudice, Georg Simmerle, Micro Photon Devices S.r.l. (Italy); Massimo Ghioni, Ivan Rech, Angelo Gulinatti, Politecnico di Milano (Italy) . . . . . [8443-22]

12.00: **Progress report on kinetic inductance based x-ray detectors**, Sean G. McHugh, Benjamin A. Mazin, Univ. of California, Santa Barbara (USA); Bruce A. Bumble, Jet Propulsion Lab. (USA); Eric Langman, Univ. of California, Santa Barbara (USA) . . . . . [8443-23]

12.20: **Laboratory tests with soft protons and hyper-velocity dust particles: application to ongoing projects of future x-ray space missions**, Emanuele Perinati, Sebastian Diebold, Andrea E. Santangelo, Christoph Tenzer, Eberhard Karls Univ. Tübingen (Germany); Ettore Del Monte, Marco Feroci, INAF - IASF Roma (Italy); Lothar Strüder, Norbert Meidinger, Max-Planck-Institut Halbleiterlabor (Germany); Konrad Dennerl, Michael J. Freyberg, Max-Planck-Institut für extraterrestrische Physik (Germany); Diego Gotz, Bertrand Cordier, Commissariat à l'Énergie Atomique (France); George W. Fraser, Julian P. Osborne, Univ. of Leicester (United Kingdom); Jan-Willem A. den Herder, SRON Nationaal instituut voor Ruimteonderzoek (Netherlands) . . . . . [8443-24]

12.40: **Detector and coating technologies that enable the next generation of cosmic baryon mapping missions**, David Schiminovich, Columbia Univ. (USA) . . . . . [8443-25]

Lunch Break . . . . . 13.00 to 14.30

SESSION 6

Room: E105 . . . . . Mon. 14.30 to 15.30

X-Ray Optics I

Session Chair: **Martin C. Weisskopf,**
NASA Marshall Space Flight Ctr. (USA)

14.30: **Optics of the WFXT (Wide Field X-ray Telescope) mission: design and development**, Oberto Citterio, Marta Civitani, Sergio Campana, Paolo Conconi, Gianpiero Tagliaferri, INAF - Osservatorio Astronomico di Brera (Italy); Vadim Burwitz, Gisela D. Hartner, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8443-26]

14.50: **Development of high angular resolution x-ray telescopes based on slumped glass foils in Europe**, Giovanni Pareschi, Marta Civitani, Paolo Conconi, Oberto Citterio, Mauro Ghigo, Stefano Basso, Laura Proserpio, Gianpiero Tagliaferri, Bianca Salmaso, Daniele Spiga, Giorgia Sironi, Giuseppe Pagano, Alberto Zambra, INAF - Osservatorio Astronomico di Brera (Italy); Marcos Bavdaz, Eric Wille, European Space Research and Technology Ctr. (Netherlands); Giancarlo Parodi, Francesco Martelli, BCV Progetti S.r.l. (Italy); Daniele Gallieni, Matteo Tintori, A.D.S. International S.r.l. (Italy) . . . . . [8443-27]

15.10: **Next generation x-ray optics: high-resolution, light-weight, and low-cost**, William W. Zhang, NASA Goddard Space Flight Ctr. (USA) . . . . . [8443-28]

Coffee Break . . . . . 15.30 to 15.50

SESSION 7

Room: E105 . . . . . Mon. 15.50 to 17.30

X-Ray Optics II

Session Chair: **Carl Budtz-Jørgensen,** DTU Space (Denmark)

15.50: **Technology development of adjustable grazing incidence x-ray optics for sub-arc second imaging**, Paul B. Reid, Vincenzo Cotroneo, William Davis, Daniel A. Schwartz, Harvard-Smithsonian Ctr. for Astrophysics (USA); Susan E. Trolier-McKinstry, Raegan L. Johnson-Wilke, The Pennsylvania State Univ. (USA); Rudeger H. Wilke, Grinnell College (USA); Brian D. Ramsey, NASA Marshall Space Flight Ctr. (USA) . . . . . [8443-29]

16.10: **Progress with MEMS x-ray micro pore optics**, Yuichiro Ezoe, Teppei Moriyama, Tomohiro Ogawa, Takuya Kakiuchi, Takaya Ohashi, Tokyo Metropolitan Univ. (Japan); Ikuyuki Mitsuishi, Kazuhisa Mitsuda, Japan Aerospace Exploration Agency (Japan); Mitsuhiro Horade, Nagoya Univ. (Japan); Susumu Sugiyama, Ritsumeikan Univ. (Japan); Raul E. Riveros, Hitomi Yamaguchi, Univ. of Florida (USA); Yoshiaki Kanamori, Tohoku Univ. (Japan); Kohei Morishita, Kazuo Nakajima, Kyoto Univ. (Japan); Ryutaro Maeda, National Institute of Advanced Industrial Science and Technology (Japan) . . . . . [8443-30]

16.30: **Novel applications of silicon pore optics technology**, Marcelo D. Ackermann, Maximilien Collon, Giuseppe Vacanti, Erik Maddox, Ramses Günther, Rakesh Partapsing, Marco W. Beijersbergen, cosine Research B.V. (Netherlands); Richard Willingale, Gillian I. Butcher, Univ. of Leicester (United Kingdom); Jeroen Haneveld, Mark Olde Riekerink, Micronit Microfluidics BV (Netherlands); Nicolas M. Barriere, Univ. of California, Berkeley (USA) . [8443-31]

16.50: **Progress in the development of critical-angle transmission gratings**, Ralf K. Heilmann, Alexander Bruccoleri, Pran Mukherjee, Mark L. Schattenburg, Massachusetts Institute of Technology (USA) . . . . . [8443-32]

17.10: **X-ray interferometer with a x-ray beam splitter,** Shunji Kitamoto, Kazuya Sakata, Hiroshi Murakami, Yuki Yoshida, Shuzo Ogawa, Rikkyo Univ. (Japan) . . . . . [8443-33]

POSTERS-MONDAY

Room: Hall 3. . . . . Mon. 17.30 to 19.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Monday. The interactive poster session with authors in attendance will be Monday evening from 17.30 to 19.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

Detector Technology for Future Missions

Progress towards a double flux-locked-loop scheme for SQUID readout of TES detector arrays, Guido Torrioli, Istituto di Fotonica e Nanotecnologie (Italy); Claudio Macculi, Luigi Piro, Luca Colasanti, INAF - IASF Roma (Italy). . [8443-90]

Nuclear spallation by cosmic rays in the eROSITA and ATHENA configurations, Emanuele Perinati, Christoph Tenzer, Andrea E. Santangelo, Eberhard Karls Univ. Tübingen (Germany); Georg Weidenspointner, Alexander Stefanescu, Max-Planck-Institut Halbleiterlabor (Germany); Markus Kuster, European XFEL GmbH (Germany); Steffen Haus, Technische Univ. Darmstadt (Germany) . . . . . [8443-91]

Southwest Research Institute intensified detector development capability, Erik Wilkinson, Michael Vincent, Christopher Kofoed, John P. Andrews, Southwest Research Institute (USA); Oswald H. Siegmund, Sensor Sciences, LLC (USA) . . . . . [8443-92]

Application of an EMCCD camera for calibration of hard x-ray telescopes, Julia K. Vogel, Michael J. Pivovaroff, Lawrence Livermore National Lab. (USA); Vivek V. Nargarkar, Haris Kudrolli, Radiation Monitoring Devices, Inc. (USA); Kristin K. Madsen, California Institute of Technology (USA); Jason E. Koglin, Charles J. Hailey, Columbia Univ. (USA); William W. Craig, Lawrence Livermore National Lab. (USA); Finn E. Christensen, Nicolai F. Brejnholt, DTU Space (Denmark) . . . . . [8443-93]

Extending the MPE PANTER x-ray test facility, Vadim Burwitz, Max-Planck-Institut für extraterrestrische Physik (Germany); Marcos Bavdaz, European Space Research and Technology Ctr. (Netherlands); Michael J. Freyberg, Peter Friedrich, Max-Planck-Institut für extraterrestrische Physik (Germany) . [8443-94]

Very fast lossless on-board data compression for future space-based x-ray observatories, Henning Wende, Giuseppe Distratis, Eckhard Kendziorra, Christoph Tenzer, Andrea E. Santangelo, Eberhard Karls Univ. Tübingen (Germany) . . . . . [8443-95]

Low-power readout electronics for micro channel plate detectors with cross-strip anodes, Marc Pfeifer, Jürgen Barnstedt, Sebastian Diebold, Stephan Hermanutz, Christoph Kalkuhl, Norbert Kappelmann, Thomas Schanz, Klaus Werner, Eberhard Karls Univ. Tübingen (Germany) . . . . . [8443-97]

A modulated x-ray source for in-flight calibration of high-energy astrophysics instrumentation, Keith C. Gendreau, Zaven Arzoumanian, Richard G. Koenecke, Philip V. Deines-Jones, NASA Goddard Space Flight Ctr. (USA) . . . . . [8443-98]

Vacuum facility for calibration of space instrumentation in cleanroom, Maria-Guglielmina Pelizzo, Consiglio Nazionale delle Ricerche (Italy); Paola Zuppella, Univ. degli Studi di Padova (Italy); Vanessa Polito, Consiglio Nazionale delle Ricerche (Italy); Alain Jody Corso, Piergiorgio Nicolosi, Univ. degli Studi di Padova (Italy). . . . . [8443-99]

Gamma-Ray Burst Missions

The Slewing Mirror Telescope (SMT) of the Ultra Fast Flash Observatory Pathfinder (UFFO-P), Soomin Jeong, Ewha Womans Univ. (Korea, Republic of); Salleh Ahmad, Univ. Paris-Sud 11 (France); Ki-Beom Ahn, Yonsei Univ. (Korea, Republic of); Pierre Barrillon, Univ. Paris-Sud 11 (France); Søren Brandt, Carl Budtz-Jørgensen, DTU Space (Denmark); Alberto J. Castro-Tirado, Instituto de Astrofísica de Andalucía (Spain); Pisin Chen, SLAC National Accelerator Lab. (USA); Hyunsuk Choi, Korea Institute of Industrial Technology (Korea, Republic of); Yeon Ju Choi, KAIST (Korea, Republic of); Paul H. Connell, Univ. de València (Spain); Sylvie Dagoret-Campagne, Christophe De La Taille, Univ. Paris-Sud 11 (France); Christopher J. Eyles, Rutherford Appleton Lab. (United Kingdom); Bruce Grossan, Univ. of California, Berkeley (USA); Indria Hermann, KAIST (Korea, Republic of); Ming-Huey A. Huang, National United Univ. (Taiwan); Aera Jung, Ji Eun Kim, Minbin Kim, Ewha Womans Univ. (Korea, Republic of); Sug-Whan Kim, Yonsei Univ. (Korea, Republic of); Ye Won Kim, Jik Lee, Heuijin Lim, Ewha Womans Univ. (Korea, Republic of); Eric V. Linder, Univ. of California, Berkeley (USA); Tsung-Che Liu, National Taiwan Univ. (Taiwan); Niels Lund, DTU Space (Denmark); Kyoung-Wook Min, KAIST (Korea, Republic of); Go Woon Na, Ji Woo Nam, Koo Hyun Nam, Ewha Womans Univ. (Korea, Republic of); Mikhail I. Panasyuk, Lomonosov Moscow State Univ. (Russian Federation); Il Hung Park, Jakup Ripa, Ewha Womans Univ. (Korea, Republic of); et al.. . . . . [8443-100]

The readout system and the trigger algorithm implementation for the UFFO Pathfinder, Go Woon Na, Ewha Womans Univ. (Korea, Republic of); Salleh Ahmad, Univ. Paris-Sud 11 (France); Ki-Beom Ahn, Yonsei Univ. (Korea, Republic of); Pierre Barrillon, Univ. Paris-Sud 11 (France); Søren Brandt, Carl Budtz-Jørgensen, DTU Space (Denmark); Alberto J. Castro-Tirado, Instituto de Astrofísica de Andalucía (Spain); Pisin Chen, National Taiwan Univ. (Taiwan); Hyunsuk Choi, Korea Institute of Industrial Technology (Korea, Republic of); Yeon Ju Choi, KAIST (Korea, Republic of); Paul H. Connell, Univ. de València (Spain); Sylvie Dagoret-Campagne, Christophe De La Taille, Univ. Paris-Sud 11 (France); Christopher J. Eyles, Rutherford Appleton Lab. (United Kingdom); Bruce Grossan, Univ. of California, Berkeley (USA); Indria Herman, KAIST (Korea, Republic of); Ming-Huey A. Huang, National United Univ. (Taiwan); Soomin Jeong, Aera Jung, Ji Eun Kim, Minbin Kim, Ewha Womans Univ. (Korea, Republic of); Sug-Whan Kim, Yonsei Univ. (Korea, Republic of); Ye Won Kim, Jik Lee, Heuijin Lim, Ewha Womans Univ. (Korea, Republic of); Eric V. Linder, Lawrence Berkeley National Lab. (USA); Tsung-Che Liu, National Taiwan Univ. (Taiwan); Niels Lund, DTU Space (Denmark); Kyoung-Wook Min, KAIST (Korea, Republic of); Ji Woo Nam, National Taiwan Univ. (Taiwan); Koo Hyun Nam, Ewha Womans Univ. (Korea, Republic of); Mikhail I. Panasyuk, Lomonosov Moscow State Univ. (Russian Federation); Il Hung Park, Jakup Ripa, Ewha Womans Univ. (Korea, Republic of); et al. . . . . [8443-101]

Simulated performance GRB trigger detector of UFFO, Ming-Huey A. Huang, National United Univ. (Taiwan); Tsung-Che Liu, National Taiwan Univ. (Taiwan) . . . . . [8443-102]

Design and implementation of the UFFO burst alert and trigger telescope, Ji Eun Kim, Ewha Womans Univ. (Korea, Republic of); Salleh Ahmad, Univ. Paris-Sud 11 (France); Ki-Beom Ahn, Yonsei Univ. (Korea, Republic of); Pierre Barrillon, Univ. Paris-Sud 11 (France); Søren Brandt, Carl Budtz-Jørgensen, DTU Space (Denmark); Alberto J. Castro-Tirado, Instituto de Astrofísica de Andalucía (Spain); Pisin Chen, SLAC National Accelerator Lab. (USA); Hyunsuk Choi, Korea Institute of Industrial Technology (Korea, Republic of); Yeon Ju Choi, KAIST (Korea, Republic of); Paul H. Connell, Univ. de València (Spain); Sylvie Dagoret-Campagne, Christophe De La Taille, Univ. Paris-Sud 11 (France); Christopher J. Eyles, Rutherford Appleton Lab. (United Kingdom); Bruce Grossan, Univ. of California, Berkeley (USA); Indria Herman, KAIST (Korea, Republic of); Ming-Huey A. Huang, National United Univ. (Taiwan); Aera Jung, Soomin Jeong, Minbin Kim, Ewha Womans Univ. (Korea, Republic of); Sug-Whan Kim, Yonsei Univ. (Korea, Republic of); Ye Won Kim, Jik Lee, Heuijin Lim, Ewha Womans Univ. (Korea, Republic of); Eric V. Linder, Lawrence Berkeley National Lab. (USA); Tsung-Che Liu, National Taiwan Univ. (Taiwan); Niels Lund, DTU Space (Denmark); Kyoung-Wook Min, KAIST (Korea, Republic of); Go Woon Na, Ewha Womans Univ. (Korea, Republic of); Ji Woo Nam, National Taiwan Univ. (Taiwan); Koo Hyun Nam, Ewha Womans Univ. (Korea, Republic of); Mikhail I. Panasyuk, Lomonosov Moscow State Univ. (Russian Federation); et al. . . . . [8443-103]

Gamma-Ray Missions and Technologies

Expected performance of a Laue lens based on bent crystals, Vineeth Valsan, Filippo Frontera, Enrico Virgilli, Vincenzo Liccardo, Univ. degli Studi di Ferrara (Italy) . . . . . [8443-104]

Characterization of bent crystals for Laue lenses, Enrico Virgilli, Filippo Frontera, Vincenzo Liccardo, Vineeth Valsan, Vincenzo Guidi, Valerio Bellucci, Riccardo Camattari, Ilaria Neri, Univ. degli Studi di Ferrara (Italy) . . . . [8443-105]

Bent crystals as high-reflectivity components for a Laue lens: basic concepts and experimental techniques, Vincenzo Guidi, Riccardo Camattari, Ilaria Neri, Univ. degli Studi di Ferrara (Italy) . . . . . [8443-106]

Characterization of curved crystals fabricated by surface grooving, Ilaria Neri, Riccardo Camattari, Vincenzo Guidi, Univ. degli Studi di Ferrara (Italy) . . . . . [8443-107]

Quasi-mosaicity as a tool for focusing hard x-rays, Riccardo Camattari, Ilaria Neri, Vincenzo Guidi, Univ. degli Studi di Ferrara (Italy) . . . . . [8443-108]

Development and performance of a gamma-ray imaging detector, José-Luis Gálvez, Margarita Hernanz, José Manuel Álvarez, Dmitri Karelin, Laura Álvarez, Miguel La Torre, Consejo Superior de Investigaciones Científicas (Spain); Manuel Lozano, Giulio Pellegrini, Miguel Ullán, Enric Cabruja, Ricardo Martínez, Ctr. Nacional de Microelectrónica (Spain); Mokhtar Chmeissani, Carles Puigdengoles, Univ. Autònoma de Barcelona (Spain) . . . . . [8443-109]

Development of a quasi-monoenergetic 6 MeV Gamma Facility for calibration of the AdEPT Telescope, Suzanne F. Nowicki, Julia G. Bodnarik, Michael P. Dion, Stanley D. Hunter, Ann M. Parsons, Seunghee Son, NASA Goddard Space Flight Ctr. (USA) . . . . . [8443-110]

VAMOS, Arturo I. Iriarte Valverde, Ruben Alfaro, Univ. Nacional Autónoma de México (Mexico) . . . . . [8443-111]

A water quality monitoring system for HAWC, Fernando Garfias, Abel Bernal, Silvio J. Tinoco, Arturo I. Iriarte Valverde, Univ. Nacional Autónoma de México (Mexico). . . . . [8443-112]

Simulations for a proposed gamma-ray space telescope using MEGAlib, Suzanne Foley, Univ. College Dublin (Ireland); Andreas C. Zoglauer, Univ. of California, Berkeley (USA); Jochen Greiner, Gottfried Kanbach, Max-Planck-Institut für extraterrestrische Physik (Germany); David Tierney, Univ. College Dublin (Ireland) and on behalf of the GRIPS team (Ireland). . . . . [8443-114]

Background estimation in a wide-field background-limited instrument such as Fermi GBM, Gerard Fitzpatrick, Univ. College Dublin (Ireland); Valerie Connaughton, The Univ. of Alabama in Huntsville (USA); Sheila McBreen, David Tierney, Univ. College Dublin (Ireland) . . . . . [8443-115]

UV Missions and Technologies

ISSIS: the imaging and slitless spectroscopy instrument for surveys in the World Space Observatory ultraviolet space telescope, Ana I. Gomez de Castro, Nestor Sanchez, Paola Sestito, Univ. Complutense de Madrid (Spain); Pablo Rodriguez, Maite Teresa Gomez, Juan Seijas, SENER Ingeniería y Sistemas S.A. (Spain); Victor Rodrigo, Fatima Lopez-Martinez, Univ. Complutense de Madrid (Spain); Jose Quintana, Marcos Ubierna, Jacinto Muñoz, SENER Ingeniería y Sistemas S.A. (Spain) . . . . . [8443-117]

Detector development for the World Space Observatory Ultraviolet (WSO-UV), Sebastian Diebold, Jürgen Barnstedt, Eberhard Karls Univ. Tübingen (Germany); Hans-Rudolf Elsener, EMPA (Switzerland); Philipp Ganz, Karlsruher Institut für Technologie (Germany); Stephan Hermanutz, Christoph Kalkuhl, Norbert Kappelmann, Marc Pfeifer, Eberhard Karls Univ. Tübingen (Germany); Daniel Schaadt, Karlsruher Institut für Technologie (Germany); Thomas Schanz, Klaus Werner, Eberhard Karls Univ. Tübingen (Germany) . . . . . [8443-119]

EXCEED: an extreme ultraviolet spectrometer onboard SPRINT-A, Go Murakami, Japan Aerospace Exploration Agency (Japan); Kazuo Yoshioka, Rikkyo Univ. (Japan); Hiroaki Ishii, Kentaro Uji, Ichiro Yoshikawa, The Univ. of Tokyo (Japan); Masato Kagitani, Fuminori Tsuchiya, Tohoku Univ. (Japan); Atsushi Yamazaki, Kazunori Uemizu, Japan Aerospace Exploration Agency (Japan) . . . . . [8443-120]

Design of UV long-slit spectrometer, Yuri V. Bazhanov, Elena Demura, Natalia Zacharova, Precision Systems and Instruments Corp. (Russian Federation) . . . . . [8443-121]

Vacuum and environmental testing of an all-reflective spatial heterodyne spectrometer designed for wide input angle measurements of H Ly-α at high spectral resolving power, Walter M. Harris, Jason B. Corliss, Univ. of California, Davis (USA); Yan Bétrémieux, Max-Planck-Institut für Astronomie (Germany); Fred L. Roesler, Univ. of Wisconsin-Madison (USA) . . . . . [8443-122]

Solar Missions and Technologies

In-band and out-of-band reflectance calibrations of the EUV telescope mirrors of the atmospheric imaging assembly (AIA) instrument aboard the Solar Dynamics Observatory (SDO), Regina Soufli, Eberhard A. Spiller, Lawrence Livermore National Lab. (USA); David L. Windt, Reflective X-Ray Optics LLC (USA); Jeffrey C. Robinson, Lawrence Livermore National Lab. (USA); Andrew L. Aquila, European XFEL GmbH (Germany); Franklin J. Dollar, Univ. of Michigan (USA); Eric M. Gullikson, Lawrence Berkeley National Lab. (USA); Luis Rodriguez de Marcos, José Antonio Méndez Morales, Consejo Superior de Investigaciones Científicas (Spain); Monica Fernandez-Perea, Lawrence Livermore National Lab. (USA); Juan I. Larruquert, Consejo Superior de Investigaciones Científicas (Spain); Leon Golub, Harvard-Smithsonian Ctr. for Astrophysics (USA); Paul Boerner, Lockheed Martin Space Systems Co. (USA) . . . . . [8443-118]

Design, performance prediction, and measurements of the Interface Region Imaging Spectrograph (IRIS) Telescope, William A. Podgorski, Peter N. Cheimets, Leon Golub, Harvard-Smithsonian Ctr. for Astrophysics (USA); James R. Lemen, Alan M. Title, Lockheed Martin Space Systems Co. (USA) . [8443-123]

Design of interface region imaging spectrograph (IRIS) primary mirror thermal management system, Sang C. Park, Peter N. Cheimets, William A. Podgorski, Henry W. Bergner, Jr., Harvard-Smithsonian Ctr. for Astrophysics (USA); Carl Yanari, Jean-Pierre Wuelser, Lockheed Martin Space Systems Co. (USA) . . . . . [8443-124]

Design, analysis, and performance verification of the Interface Region Imaging Spectrograph (IRIS) Telescope primary mirror assembly, Edward N. Hertz, Peter N. Cheimets, William A. Podgorski, Thomas Perry, Sang C. Park, Henry W. Bergner, Jr., Richard Gates, Vanessa Marquez, Michael F. Honsa, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8443-125]

Radiometric model of METIS coronagraph telescope on board of the Solar Orbiter Mission, Vanessa Polito, CNR IFN LUXOR Lab. (Italy); Alain Jody Corso, Paola Zuppella, Lab. for Ultraviolet and X-ray Optical Research (Italy); Piergiorgio Nicolosi, Univ. degli Studi di Padova (Italy); Silvano Fineschi, Ester Antonucci, INAF - Osservatorio Astronomico di Torino (Italy); David L. Windt, Reflective X-Ray Optics LLC (USA); Maria-Guglielmina Pelizzo, CNR IFN LUXOR Lab. (Italy) . . . . . [8443-126]

METIS: a novel coronagraph design for the Solar Orbiter Mission, Silvano Fineschi, Ester Antonucci, INAF - Osservatorio Astronomico di Torino (Italy); Giampiero Naletto, Univ. degli Studi di Padova (Italy); Marco Romoli, Univ. degli Studi di Firenze (Italy); Daniele Spadaro, INAF - Osservatorio Astrofisico di Catania (Italy); Gianalfredo Nicolini, Lucia Abbo, INAF - Osservatorio Astronomico di Torino (Italy); Vincenzo Andretta, INAF - Osservatorio Astronomico di Capodimonte (Italy); Alessandro Bemporad, INAF - Osservatorio Astronomico di Torino (Italy); Arkadiusz Berlicki, Astronomical Institute of the ASCR, v.v.i. (Czech Republic); Gerardo Capobianco, Giuseppe Crescenzio, INAF - Osservatorio Astronomico di Torino (Italy); Vania Da Deppo, Consiglio Nazionale delle Ricerche (Italy); Mauro Focardi, Federico Landini, Univ. degli Studi di Firenze (Italy); Giuseppe Massone, INAF - Osservatorio Astronomico di Torino (Italy); Marco A. Malvezzi, Univ. degli Studi di Pavia (Italy); J. Dan Moses, U.S. Naval Research Lab. (USA); Piergiorgio Nicolosi, Univ. degli Studi di Padova (Italy); Maria-Guglielmina Pelizzo, Consiglio Nazionale delle Ricerche (Italy); Luca Poletto, Univ. degli Studi di Padova (Italy); Udo H. Schühle, Sami K. Solanki, Max-Planck-Institut für Sonnensystemforschung (Germany); Daniele Telloni, INAF - Osservatorio Astronomico di Torino (Italy); Luca Teriaca, Max-Planck-Institut für Sonnensystemforschung (Germany); Michela Uslenghi, INAF - IASF Milano (Italy) . . . . . [8443-127]

A prototype of the UV detector for METIS on Solar Orbiter, Michela C. Uslenghi, INAF - IASF Milano (Italy); Udo H. Schühle, Luca Teriaca, Max-Plank-Institute für Sonnensystemforschung (Germany); Erik Wilkinson, Southwest Research Institute (USA); Oswald H. Siegmund, Univ. of California, Berkeley (USA) . . . . . [8443-128]

Imaging polarimetry with the METIS coronagraph of the Solar Orbiter Mission, Giuseppe Crescenzio, Silvano Fineschi, Gerardo Capobianco, INAF - Osservatorio Astronomico di Torino (Italy); Marco A. Malvezzi, Univ. degli Studi di Pavia (Italy); Federico Landini, Marco Romoli, Univ. degli Studi di Firenze (Italy); Ester Antonucci, INAF - Osservatorio Astronomico di Torino (Italy) . . . . . [8443-129]

The imaging concept for the spectrometer/telescope for imaging x-rays (STIX) on Solar Orbiter, G. Hurford, Sam Krucker, Univ. of Applied Sciences, Northwestern Switzerland (Switzerland); Gottfried J. Mann, Leibniz-Institut für Astrophysik Potsdam (Germany); H. Frank van Beek, H.F. van Beek Consultancy B.V. (Netherlands) . . . . . [8443-130]

The spectrometer telescope for imaging x-rays onboard Solar Orbiter Space Mission, Arnold Benz, Sam Krucker, Fachhochschule Nordwestschweiz (Switzerland); Aline Meuris, Olivier Limousin, Commissariat à l'Énergie Atomique (France); G. Hurford, Fachhochschule Nordwestschweiz (Switzerland); Piotr Orleanski, Space Research Ctr. (Poland); Hans-Peter Gröbelbauer, Fachhochschule Nordwestschweiz (Switzerland); Gottfried J. Mann, Leibniz-Institut für Astrophysik Potsdam (Germany); Oliver Grimm, ETH Zurich (Switzerland); Konrad R. Skup, Space Research Ctr. (Poland) . . . . . [8443-131]

X-ray reflection gratings and application to future missions, Randall L. McEntaffer, The Univ. of Iowa (USA) . . . . . [8443-132]

Tuesday 3 July

PLENARY SESSION

Room: Auditorium . . . . . Tues. 09.00 to 10.00

Session Chair: **Kathryn A. Flanagan,**
Space Telescope Science Institute (USA)

09.00: **The Kepler Exoplanet Survey: instrumentation, performance and results**, Thomas N. Gautier III, Jet Propulsion Lab., Caltech (USA) and The Kepler Science Team (USA) . . . . . [8442-503]

09.30: **Antarctic astronomy**, John W. V. Storey, The Univ. of New South Wales (Australia) . . . . . [8446-504]

Coffee Break . . . . . 10.00 to 10.30

SESSION 8

Room: E105 . . . . . Tues. 10.30 to 12.30

Operational Missions

Session Chair: **Mark Bautz,**
Massachusetts Institute of Technology (USA)

10.30: **The Chandra X-Ray Observatory: progress report and highlights** *(Invited Paper)*, Martin C. Weisskopf, NASA Marshall Space Flight Ctr. (USA) . . . . . [8443-34]

11.00: **XMM-Newton operations beyond the design lifetime** *(Invited Paper)*, Arvind N. Parmar, European Space Research and Technology Ctr. (Netherlands) . . . . . [8443-35]

11.30: **MVN: x-ray monitor of the sky on Russian segment of ISS**, Mikhail G. Revnivtsev, Space Research Institute (Russian Federation) . . . . . [8443-36]

11.50: **Using ACIS on the Chandra X-ray Observatory as a particle radiation monitor II**, Catherine E. Grant, Peter G. Ford, Marshall W. Bautz, Massachusetts Institute of Technology (USA); Stephen L. O'Dell, NASA Marshall Space Flight Ctr. (USA) . . . . . [8443-37]

12.10: **Cross-calibration of the instruments onboard the Chandra, Suzaku, Swift, and XMM-Newton observatories using 1E 0102.2-7219: an IACHEC study**, Paul P. Plucinsky, Harvard-Smithsonian Ctr. for Astrophysics (USA); Andrew P. Beardmore, Univ. of Leicester (United Kingdom); Joseph M. DePasquale, Harvard-Smithsonian Ctr. for Astrophysics (USA); Daniel Dewey, Massachusetts Institute of Technology (USA); Adam R. Foster, Harvard-Smithsonian Ctr. for Astrophysics (USA); Frank Haberl, Max-Planck-Institut für extraterrestrische Physik (Germany); Eric D. Miller, Massachusetts Institute of Technology (USA); Andrew M. T. Pollock, European Space Astronomy Ctr. (Spain); Jennifer Posson-Brown, Harvard-Smithsonian Ctr. for Astrophysics (USA); Steven F. Sembay, Univ. of Leicester (United Kingdom); Randall K. Smith, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8443-38]

Lunch Break . . . . . 12.30 to 14.00

SESSION 9

Room: E105 . . . . . Tues. 14.00 to 15.20

New Missions I

Session Chair: **Enectali Figueroa-Feliciano,**
Massachusetts Institute of Technology (USA)

14.00: **The Neutron star Interior Composition ExploreR (NICER): an explorer mission of opportunity for soft x-ray timing spectroscopy**, Keith C. Gendreau, Zaven Arzoumanian, NASA Goddard Space Flight Ctr. (USA) . . . . . [8443-39]

14.20: **FFAST mission to study the evolution of the universe in hard x-ray**, Hiroshi Tsunemi, Osaka Univ. (Japan); Hideyo Kunieda, Nagoya Univ. (Japan); Masayuki Itoh, Kobe Univ. (Japan); Shinji Mitani, Isao Kawano, Masanobu Ozaki, Japan Aerospace Exploration Agency (Japan); Koji Mori, Univ. of Miyazaki (Japan); Yoshihiro Ueda, Kyoto Univ. (Japan) . . . . . [8443-40]

14.40: **Concepts for high-performance soft x-ray grating spectroscopy in a moderate-scale mission**, Marshall W. Bautz, Massachusetts Institute of Technology (USA); Webster C. Cash, Univ. of Colorado at Boulder (USA); Ralf K. Heilmann, Massachusetts Institute of Technology (USA); Randall L. McEntaffer, The Univ. of Iowa (USA); Mark L. Schattenburg, Massachusetts Institute of Technology (USA); Scott J. Wolk, Harvard-Smithsonian Ctr. for Astrophysics (USA); William W. Zhang, NASA Goddard Space Flight Ctr. (USA); David P. Huenemoerder, Massachusetts Institute of Technology (USA); Randall K. Smith, Harvard-Smithsonian Ctr. for Astrophysics (USA); Charles F. Lillie, Northrop Grumman Aerospace Systems (USA); Steven Jordan, Ball Aerospace & Technologies Corp. (USA) . . . . . [8443-41]

15.00: **SMART-X: a large-area high-resolution x-ray observatory for the 2020's**, Alexey Vikhlinin, Paul B. Reid, Harvey D. Tananbaum, Daniel A. Schwartz, William R. Forman, Christine Jones, Jay A. Bookbinder, Harvard-Smithsonian Ctr. for Astrophysics (USA); Susan E. Trolier-McKinstry, David N. Burrows, The Pennsylvania State Univ. (USA); Marshall W. Bautz, Ralf K. Heilmann, Massachusetts Institute of Technology (USA); Simon R. Bandler, Martin C. Weisskopf, NASA Goddard Space Flight Ctr. (USA); Stephen S. Murray, Johns Hopkins Univ. (USA) . . . . . [8443-42]

Coffee Break . . . . . 15.20 to 15.50

SESSION 10

Room: E105 . . . . . Tues. 15.50 to 17.30

New Missions II

Session Chair: **Mikhail N. Pavlinsky,**
Space Research Institute (Russian Federation)

15.50: **The Advanced X-ray Spectroscopic Imaging Observatory (AXSIO)**, Jay A. Bookbinder, Harvard-Smithsonian Ctr. for Astrophysics (USA). . [8443-43]

16.10: **Mission design and enabling technologies for mapping cosmic baryons in the ultraviolet**, D. Christopher Martin, California Institute of Technology (USA) . . . . . [8443-44]

16.30: **Status of the diffuse intergalactic oxygen surveyor (DIOS)**, Takaya Ohashi, Yoshitaka Ishisaki, Yuichiro Ezoe, Tokyo Metropolitan Univ. (Japan); Yuzuru Tawara, Nagoya Univ. (Japan); Kazuhisa Mitsuda, Noriko Y. Yamasaki, Yoh Takei, Japan Aerospace Exploration Agency (Japan) . . . . . [8443-45]

16.50: **A ray-trace model for AEGIS**, John E. Davis, Marshall W. Bautz, Daniel Dewey, Ralf K. Heilmann, John C. Houck, David P. Huenemoerder, Herman L. Marshall, Michael A. Nowak, Mark L. Schattenburg, Massachusetts Institute of Technology (USA); Randall K. Smith, Harvard-Smithsonian Ctr. for Astrophysics (USA); Norbert S. Schulz, Massachusetts Institute of Technology (USA) . . . . . [8443-178]

17.10: **Micro-X sounding rocket payload pre-flight performance**, Enectali Figueroa-Feliciano, Massachusetts Institute of Technology (USA). . . . . [8443-47]

Wednesday 4 July

PLENARY SESSION

Room: Auditorium . . . . . Wed. 09.00 to 10.00

Session Chair: **Luc Simard,**
National Research Council Canada (Canada)

09.00: **Very high energy gamma ray astronomy with the H.E.S.S. telescopes** *(Presentation Only)*, Werner Hofmann, Max-Planck-Institut für Kernphysik (Germany) . . . . . [8442-505]

09.30: **The cosmic microwave background: observing directly the early universe**, Paolo de Bernardis, Silvia Masi, Univ. degli Studi di Roma La Sapienza (Italy) . . . . . [8442-506]

Coffee Break . . . . . 10.00 to 10.30

SESSION 11

Room: E105 . . . . . Wed. 10.30 to 11.50

X-Ray Polarimetry

Session Chair: **Enrico Costa,** INAF - IASF Roma (Italy)

10.30: **Performance of an Ar-DME imaging photoelectric polarimeter**, Sergio Fabiani, INAF - IASF Roma (Italy); Ronaldo Bellazzini, Alessandro Brez, Istituto Nazionale di Fisica Nucleare (Italy); Enrico Costa, INAF - IASF Roma (Italy); Massimo Minuti, Istituto Nazionale di Fisica Nucleare (Italy); Fabio Muleri, INAF - IASF Roma (Italy); Michele Pinchera, Istituto Nazionale di Fisica Nucleare (Italy); Alda Rubini, Paolo Soffitta, INAF - IASF Roma (Italy); Gloria Spandre, Istituto Nazionale di Fisica Nucleare (Italy) . . . . . [8443-48]

10.50: **XTP: the X-ray Timing and Polarization Mission**, Yongwei Dong, Fangjun Lu, Institute of High Energy Physics (China) . . . . . [8443-49]

11.10: **Soft x-ray polarimetry using multilayer coated mirrors**, Herman L. Marshall, Norbert S. Schulz, Massachusetts Institute of Technology (USA) . . . . . [8443-50]

11.30: **The background of the gas pixel detectors and its impact on imaging x-ray polarimetry**, Paolo Soffitta, INAF - IASF Roma (Italy); Ronaldo Bellazzini, Alessandro Brez, Istituto Nazionale di Fisica Nucleare (Italy); Enrico Costa, Sergio Fabiani, INAF - IASF Roma (Italy); Massimo Minuti, Michele Pinchera, Istituto Nazionale di Fisica Nucleare (Italy); Alda Rubini, INAF - IASF Roma (Italy); Gloria Spandre, Istituto Nazionale di Fisica Nucleare (Italy) . . . . . [8443-51]

Lunch/Exhibition Break . . . . . 11.50 to 13.10

SESSION 12

Room: E105 . . . . . Wed. 13.10 to 15.30

Astrophysical Science Drivers for New Observatories

Session Chair: **Takaya Ohashi,** Tokyo Metropolitan Univ. (Japan)

13.10: **Gamma ray astronomy from space to ground: the harder they come, the deeper they go** *(Invited Paper)*, Giovanni F. Bignami, Institut de Recherche en Astrophysique et Planétologie (France) . . . . . [8443-52]

13.40: **Small telescopes, big dreams** *(Invited Paper)*, Frederik B. S. Paerels, Columbia Univ. (USA) . . . . . [8443-53]

14.10: **The NASA x-ray mission concepts study**, Robert Petre, NASA Goddard Space Flight Ctr. (USA); Joel N. Bregman, Univ. of Michigan (USA); Mark Bautz, Massachusetts Institute of Technology (USA); David N. Burrows, The Pennsylvania State Univ. (USA); Webster C. Cash, Univ. of Colorado at Boulder (USA); Christine Jones-Forman, Smithsonian Astrophysical Observatory (USA); Stephen S. Murray, Johns Hopkins Univ. (USA); Paul P. Plucinsky, Smithsonian Astrophysical Observatory (USA); Brian D. Ramsey, NASA Marshall Space Flight Ctr. (USA); Ronald Remillard, Massachusetts Institute of Technology (USA); Colleen Wilson-Hodge, NASA Marshall Space Flight Ctr. (USA); Jay A. Bookbinder, Michael R. Garcia, Harvard-Smithsonian Ctr. for Astrophysics (USA); Ann E. Hornschemeier, Andrew F. Ptak, NASA Goddard Space Flight Ctr. (USA); Randall K. Smith, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8443-54]

14.30: **Science metrics for a NASA large optic x-ray microcalorimeter mission**, Randall K. Smith, Jay A. Bookbinder, Michael R. Garcia, Harvard-Smithsonian Ctr. for Astrophysics (USA); Ann E. Hornschemeier, Robert Petre, Andrew F. Ptak, NASA Goddard Space Flight Ctr. (USA). . . . . [8443-55]

14.50: **Probing the cosmic history of baryons with x-ray spectroscopy of GRBs and wide field x-ray observations**, Luigi Piro, INAF - IASF Roma (Italy); Jan-Willem A. den Herder, SRON Nationaal instituut voor Ruimteonderzoek (Netherlands); Chryssa X. Kouveliotou, NASA Marshall Space Flight Ctr. (USA); Takaya Ohashi, Tokyo Metropolitan Univ. (Japan); Dieter H. Hartman, Clemson Univ. (USA) . . . . . [8443-56]

15.10: **Wide Field X-ray Telescope**, Stephen S. Murray, Johns Hopkins Univ. (USA) and and the WFXT Team (USA) . . . . . [8443-57]

Coffee Break . . . . . 15.30 to 16.00

SESSION 13

Room: E105 . . . . . Wed. 16.00 to 17.40

Future X-Ray Missions

Session Chair: **Peter Predehl,**
Max-Planck-Institut für extraterrestrische Physik (Germany)

16.00: **ASTROSAT LAXPC energy response simulation**, Biswajit Paul, Raman Research Institute (India) . . . . . [8443-58]

16.20: **Ultraviolet imaging telescope on ASTROSAT**, Amit S. Kumar, Indian Institute of Astrophysics (India); Swarna Kanti Ghosh, Tata Institute of Fundamental Research (India); John B. Hutchings, National Research Council Canada (Canada); P. U. Kamath, S. Kathiravan, P. K. Mahesh, Jayant Murthy, S. Nagbhushan, M. Nageshwara Rao, S. Sriram, Shyam Narayan Tandon, Indian Institute of Astrophysics (India) . . . . . [8443-59]

16.40: **The Chinese-French SVOM Mission: studying the brightest astronomical explosions**, Jean-Luc Atteia, Univ. de Toulouse (France); Jacques Paul, Commissariat à l'Énergie Atomique (France); Jian Yan Wei, National Astronomical Observatories (China); Shuang-Nan Zhang, Institute of High Energy Physics (China); Stéphane Basa, Observatoire Astronomique de Marseille-Provence (France); Didier Barret, Ctr. National de la Recherche Scientifique (France); Arnaud Claret, Commissariat à l'Énergie Atomique (France); Jean-Gabriel Cuby, Lab. d'Astrophysique de Marseille (France); Zigao Dai, Nanjing Univ. (China); Frédéric Daigne, Institut d'Astrophysique de Paris (France); Jinsong Deng, National Astronomical Observatories, CAS (China); Yongwei Dong, Institute of High Energy Physics (China); Olivier Godet, Institut de Recherche en Astrophysique et Planétologie (France); Diego Götz, Commissariat à l'Énergie Atomique (France); Jingyao Hu, National Astronomical Observatories (China); Pierre Mandrou, Institut de Recherche en Astrophysique et Planétologie (France); Julian P. Osborne, Univ. of Leicester (United Kingdom); Yulei Qiu, Jing Wang, National Astronomical Observatories, CAS (China); Bobing Wu, Institute of High Energy Physics (China); Chao Wu, Weimin Yuan, National Astronomical Observatories (China); Bing Zhang, Univ. of Nevada, Las Vegas (USA). [8443-60]

17.00: **The current status of the Hard X-ray Modulation Telescope**, Fangjun Lu, Institute of High Energy Physics (China) . . . . . [8443-61]

17.20: **The GEMS photoelectric x-pay polarimeters**, Joanne E. Hill, NASA Goddard Space Flight Ctr. (USA); J. Kevin Black, NASA Goddard Space Flight Ctr. (USA) and Rock Creek Scientific (USA); Wayne Baumgartner, Edmonia Caldwell, Ashok Desai, NASA Goddard Space Flight Ctr. (USA); Daniel D. Gall, Univ. of Iowa (USA); Scott T. Griffiths, The Univ. of Iowa (USA); Asami Hayato, RIKEN (Japan) and NASA Goddard Space Flight Ctr. (USA); Keith M. Jahoda, NASA Goddard Space Flight Ctr. (USA); Philip E. Kaaret, The Univ. of Iowa (USA); Timothy R. Kallman, Jean H. Swank, NASA Goddard Space Flight Ctr. (USA); Toru Tamagawa, RIKEN (Japan) . . . . . [8443-62]

Thursday 5 July

PLENARY SESSION

Room: Auditorium . . . . . Thurs. 09.30 to 10.00

Session Chair: **Gillian S. Wright,**
UK Astronomy Technology Ctr. (United Kingdom)

09.30: **ALMA construction and early science**, Mattheus W. M. de Graauw, Lewis Ball, Joint ALMA Observatory (Chile). . . . . [8444-507]

Coffee Break . . . . . 10.00 to 10.30

SESSION 14

Room: E105 . . . . . Thurs. 10.30 to 11.50

SRG

Session Chair: **Biswajit Paul,** Raman Research Institute (India)

10.30: **eROSITA**, Peter Predehl, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8443-63]

10.50: **Design, development, and status of the eROSITA x-ray mirrors**, Peter Friedrich, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8443-64]

11.10: **SRG/ART-XC**, Mikhail N. Pavlinsky, Valeriy V. Akimov, Vasily A. Levin, Igor Y. Lapshov, Alexey V. Tkachenko, Nikolay Semena, Mikhail Buntov, Alexander Glushenko, Vadim A. Arefiev, Alexander Yaskovich, Rashid Sunyaev, Eugene Churazov, Marat Gilfanov, Sergey Sazonov, Mikhail G. Revnivtsev, Sergey Grebenev, Rodion Burenin, Alexander A. Lutovinov, Mikhail Kudelin, Space Research Institute (Russian Federation); Sergey G. Garanin, Sergey V. Grigorovich, Dmitri N. Litvin, Valeriy P. Lazarchuk, Igor Roiz, Mikhail Garin, Russian Federal Nuclear Ctr. - All-Russian Research Institute of Experimental Physics (Russian Federation); Vladimir Babyshkin, Ilya Lomakin, Alexander Menderov, D. Moskvinov, Lavochkin Association (Russian Federation); Mikhail V. Gubarev, Brian D. Ramsey, Kiranmayee Kilaru, Stephen L. O'Dell, Ronald F. Elsner, NASA Marshall Space Flight Ctr. (USA) . . . . . [8443-65]

11.30: **The Marshall Space Flight Center development of mirror modules for the ART-XC instrument aboard the Spectrum-Roentgen-Gamma Mission**, Mikhail V. Gubarev, Brian D. Ramsey, Stephen L. O'Dell, Ronald F. Elsner, Jeff E. McCracken, NASA Marshall Space Flight Ctr. (USA); Mikhail N. Pavlinsky, Alexey V. Tkachenko, Space Research Institute (Russian Federation). . [8443-66]

Lunch Break . . . . . 11.50 to 13.00

SESSION 15

Room: E105 . . . . . Thurs. 13.00 to 14.30

NuSTAR

Session Chair: **Giovanni Pareschi,**
INAF - Osservatorio Astronomico di Brera (Italy)

13.00: **The NuSTAR Observatory on-orbit performance** *(Invited Paper)*, Kristin K. Madsen, California Institute of Technology (USA); William W. Craig, Lawrence Livermore National Lab. (USA); Brian W. Grefenstette, California Institute of Technology (USA); Takao Kitaguchi, RIKEN (Japan); Andreas C. Zoglauer, Univ. of California, Berkeley (USA) . . . . . [8443-67]

13.30: **Analysis of the NuSTAR optics performance by raytracing**, Niels Jørgen S. Westergaard, DTU Space (Denmark); Kristin K. Madsen, California Institute of Technology (USA); Nicolai F. Brejnholt, DTU Space (Denmark); Jason E. Koglin, Columbia Univ. (USA); Finn E. Christensen, DTU Space (Denmark); Michael J. Pivovaroff, Lawrence Livermore National Lab. (USA) . . . . . [8443-68]

13.50: **Metrology and x-ray scattering measurements of NuSTAR mirror segments**, Michael J. Pivovaroff, Sherry L. Baker, Monica Fernandez-Perea, Regina Soufli, Julia K. Vogel, Lawrence Livermore National Lab. (USA); Nicolai F. Brejnholt, Finn E. Christensen, DTU Space (Denmark); Charles J. Hailey, Columbia Univ. (USA) . . . . . [8443-69]

14.10: **NuSTAR as-coated multilayers**, Nicolai F. Brejnholt, Finn E. Christensen, DTU Space (Denmark); Charles J. Hailey, Columbia Univ. (USA) . . . . . [8443-70]

SESSION 16

Room: E105 . . . . . Thurs. 14.30 to 17.30

ASTRO-H

Session Chair: **Nicholas E. White,**
NASA Goddard Space Flight Ctr. (USA)

14.30: **The ASTRO-H Mission**, Tadayuki Takahashi, Kazuhisa Mitsuda, Japan Aerospace Exploration Agency (Japan); Richard L. Kelley, NASA Goddard Space Flight Ctr. (USA). . . . . [8443-71]

14.50: **The first measurement of the ASTRO-H soft x-ray telescope performance**, Takashi Okajima, Peter J. Serlemitsos, Yang Soong, Devin J. Hahne, NASA Goddard Space Flight Ctr. (USA). . . . . [8443-72]

15.10: **The high resolution microcalorimeter soft x-ray spectrometer for the Astro-H Mission**, Richard L. Kelley, NASA Goddard Space Flight Ctr. (USA); Kazuhisa Mitsuda, Japan Aerospace Exploration Agency (Japan); Jan-Willem A. den Herder, Henri J. M. Aarts, SRON Nationaal instituut voor Ruimteonderzoek (Netherlands); Philipp Azzarello, Univ. of Geneva (Switzerland); Kevin R. Boyce, NASA Goddard Space Flight Ctr. (USA); Gregory V. Brown, Lawrence Livermore National Lab. (USA); Meng P. Chiao, NASA Goddard Space Flight Ctr. (USA); Cor P. de Vries, SRON Nationaal instituut voor Ruimteonderzoek (Netherlands); Michael J. DiPirro, Megan E. Eckart, NASA Goddard Space Flight Ctr. (USA); Yuichiro Ezoe, Tokyo Metropolitan Univ. (Japan); Ryuichi Fujimoto, Kanazawa Univ. (Japan); Keith C. Gendreau, NASA Goddard Space Flight Ctr. (USA); Daniel Haas, SRON Nationaal instituut voor Ruimteonderzoek (Netherlands); Akio Hoshino, Kanazawa Univ. (Japan); Yoshitaka Ishisaki, Tokyo Metropolitan Univ. (Japan); Caroline A. Kilbourne, NASA Goddard Space Flight Ctr. (USA); Shunji Kitamoto, Rikkyo Univ. (Japan); Maurice A. Leutenegger, NASA Goddard Space Flight Ctr. (USA); Daniel McCammon, Univ. of Wisconsin-Madison (USA); Hiroshi Murakami, Rikkyo Univ. (Japan); Masahide Murakami, Univ. of Tsukuba (Japan); Mina Ogawa, Japan Aerospace Exploration Agency (Japan); Takaya Ohashi, Tokyo Metropolitan Univ. (Japan); Takashi Okajima, NASA Goddard Space Flight Ctr. (USA); et al.. . . . . [8443-73]

Coffee Break . . . . . 15.30 to 15.50

15.50: **Design and performance demonstration of the cooling system for the Soft X-ray Spectrometer (SXS) onboard Astro-H**, Ryuichi Fujimoto, Kanazawa Univ. (Japan); Yoh Takei, Japan Aerospace Exploration Agency (Japan); Shunji Kitamoto, Rikkyo Univ. (Japan); Kazuhisa Mitsuda, Noriko Y. Yamasaki, Masahiro Tsujimoto, Hiroyuki Sugita, Yohichi Sato, Keisuke Shinozaki, Atsushi Okamoto, Japan Aerospace Exploration Agency (Japan); Takaya Ohashi, Yoshitaka Ishisaki, Yuichiro Ezoe, Kumi Ishikawa, Tokyo Metropolitan Univ. (Japan); Toru Tamagawa, RIKEN (Japan); Akio Hoshino, Kanazawa Univ. (Japan); Hiroshi Murakami, Rikkyo Univ. (Japan); Masahide Murakami, Univ. of Tsukuba (Japan); Kenichi Kanao, Seiji Yoshida, Mikio Miyaoka, Shoji Tsunematsu, Sumitomo Heavy Industries, Ltd. (Japan); Michael J. DiPirro, Peter J. Shirron, Gary A. Sneiderman, Kevin R. Boyce, Richard L. Kelley, F. Scott Porter, Caroline A. Kilbourne, NASA Goddard Space Flight Ctr. (USA) . . . . . [8443-74]

16.10: **Soft x-ray imager (SXI) onboard ASTRO-H**, Hiroshi Tsunemi, Kiyoshi Hayashida, Osaka Univ. (Japan); Takeshi G. Tsuru, Kyoto Univ. (Japan); Tadayasu Dotani, Chikara Natsukari, Japan Aerospace Exploration Agency (Japan); Takayoshi Kohmura, Kogakuin Univ. (Japan); Koji Mori, Univ. of Miyazaki (Japan); Hiroshi Murakami, Rikkyo Univ. (Japan); Hiroshi Nakajima, Osaka Univ. (Japan); Junko S. Hiraga, The Univ. of Tokyo (Japan); Naohisa Anabuki, Osaka Univ. (Japan); Aya Bamba, Aoyama Gakuin Univ. (Japan); Isamu Hatsukade, Univ. of Miyazaki (Japan); Masanobu Ozaki, Japan Aerospace Exploration Agency (Japan); Hiroyuki Uchida, Masayoshi Nobukawa, Kyoto Univ. (Japan); Makoto Yamauchi, Univ. of Miyazaki (Japan); Hiroshi Tomida, Japan Aerospace Exploration Agency (Japan); John P. Doty, Noqsi Aerospace, Ltd. (USA) . . . . . [8443-75]

16.30: **Current status of ASTRO-H hard x-ray telescopes (HXTs)**, Hisamitsu Awaki, Ehime Univ. (Japan); Hideyo Kunieda, Akihiro Furuzawa, Yoshito Haba, Nagoya Univ. (Japan); Ryo Iizuka, Chuo Univ. (Japan); Kazunori Ishibashi, Nagoya Univ. (Japan); Manabu Ishida, Japan Aerospace Exploration Agency (Japan); Masayuki Itoh, Kobe Univ. (Japan); Tatsuro Kosaka, Kochi Univ. of Technology (Japan); Yoshitomo Maeda, Japan Aerospace Exploration Agency (Japan); Hironori Matsumoto, Takuya Miyazawa, Nagoya Univ. (Japan); Hideyuki Mori, Japan Aerospace Exploration Agency (Japan); Yoshiharu Namba, Chubu Univ. (Japan); Yasushi Ogasaka, Japan Science and Technology Agency (Japan); Keiji Ogi, Ehime Univ. (Japan); Takashi Okajima, NASA Goddard Space Flight Ctr. (USA); Yoshio Suzuki, Japan Synchrotron Radiation Research Institute (Japan); Keisuke Tamura, Japan Aerospace Exploration Agency (Japan); Yuzuru Tawara, Nagoya Univ. (Japan); Kentaro Uesugi, Japan Synchrotron Radiation Research Institute (Japan); Koujun Yamashita, Japan Science and Technology Agency (Japan); Shigeo Yamauchi, Nara Women's Univ. (Japan) . . . . . [8443-76]

16.50: **Hard x-ray imager (HXI) for the ASTRO-H Mission**, Motohide Kokubun, Japan Aerospace Exploration Agency (Japan); Kazuhiro Nakazawa, The Univ. of Tokyo (Japan); Madoka Kawaharada, Goro Sato, Shin Watanabe, Takayuki Yuasa, Hirokazu Odaka, Yasuyuki Tanaka, Masayuki Ohta, Tadayuki Takahashi, Japan Aerospace Exploration Agency (Japan); Hideki Uchiyama, Kazuo Makishima, The Univ. of Tokyo (Japan); Jun Kataoka, Takeshi Nakamori, Waseda Univ. (Japan); Yasushi Fukazawa, Tsunefumi Mizuno, Hiromitsu Takahashi, Masanori Ohno, Hiroshima Univ. (Japan); Yoichi Yatsu, Tokyo Institute of Technology (Japan); Yukikatsu Terada, Saitama Univ. (Japan); Hiroyasu Tajima, Nagoya Univ. (Japan); Takaaki Tanaka, Teruaki Enoto, Yasunobu Uchiyama, Stanford Univ. (USA); Kazutaka Yamaoka, Aoyama Gakuin Univ. (Japan); Philippe Laurent, Olivier Limousin, François Lebrun, Commissariat à l'Énergie Atomique (France) . . . . . [8443-77]

17.10: **Soft gamma-ray detector for the ASTRO-H Mission,** Shin Watanabe, Japan Aerospace Exploration Agency (Japan); Hiroyasu Tajima, Nagoya Univ. (Japan); Yasushi Fukazawa, Hiroshima Univ. (Japan); Roger D. Blandford, Teruaki Enoto, Stanford Univ. (USA); Jun Kataoka, Waseda Univ. (Japan); Madoka Kawaharada, Motohide Kokubun, Japan Aerospace Exploration Agency (Japan); Philippe Laurent, François Lebrun, Olivier Limousin, Commissariat à l'Énergie Atomique (France); Grzegorz M. Madejski, Stanford Univ. (USA); Kazuo Makishima, The Univ. of Tokyo (Japan); Tsunefumi Mizuno, Hiroshima Univ. (Japan); Takeshi Nakamori, Waseda Univ. (Japan); Kazuhiro Nakazawa, The Univ. of Tokyo (Japan); Kunishiro Mori, Hirokazu Odaka, Japan Aerospace Exploration Agency (Japan); Masanori Ohno, Hiroshima Univ. (Japan); Masayuki Ohta, Goro Sato, Shin'ichiro Takeda, Japan Aerospace Exploration Agency (Japan); Hiromitsu Takahashi, Hiroshima Univ. (Japan); Tadayuki Takahashi, Japan Aerospace Exploration Agency (Japan); Takaaki Tanaka, Stanford Univ. (USA); Makoto S. Tashiro, Yukikatsu Terada, Saitama Univ. (Japan); Hideki Uchiyama, The Univ. of Tokyo (Japan); Yasunobu Uchiyama, Stanford Univ. (USA); Shinya Yamada, RIKEN (Japan); Kazutaka Yamaoka, Aoyama Gakuin Univ. (Japan); Yoichi Yatsu, Tokyo Institute of Technology (Japan); Daisuke Yonetoku, Kanazawa Univ. (Japan); Takayuki Yuasa, Japan Aerospace Exploration Agency (Japan). . . . . [8443-78]

POSTERS-THURSDAY

Room: Hall 3. . . . . Thurs. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Thursday. The interactive poster session with authors in attendance will be Thursday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

X-Ray Optics

Progress report on using magneto-strictive sputtered thin films to modify the shape of a x-ray telescope mirror, Melville P. Ulmer, Xiaoli Wang, Jian Cao, Lien Hoffman, Michael E. Graham, Julia Savoie, Semyon Vaynman, Bridget Bellavia, Northwestern Univ. (USA) . . . . . [8443-133]

Uniform coating of high aspect ratio surfaces through atomic layer deposition, Mark Nolan, Ian M. Povey, Tyndall National Institute (Ireland); Brian J. Shortt, Marcos Bavdaz, European Space Research and Technology Ctr. (Netherlands); Simon Elliot, Nicolas Cordero, Martyn E. Pemble, Tyndall National Institute (Ireland); Stefanie Marggraf, Michael Krumrey, Physikalisch-Technische Bundesanstalt (Germany) . . . . . [8443-134]

Coatings with high 102.6-to-121.6 nm reflectance ratio, Luis Rodriguez de Marcos, Juan I. Larruquert, José Antonio Méndez Morales, José A. Aznarez Candao, Manuela Vidal-Dasilva, Sergio García-Cortés, Consejo Superior de Investigaciones Científicas (Spain) . . . . . [8443-135]

Progress in new ultraviolet reflective coating techniques, Matthew Beasley, Univ. of Colorado at Boulder (USA); Frank Greer, Shouleh Nikzad, Jet Propulsion Lab. (USA) . . . . . [8443-136]

Corrosion-resistant high-performance SiC/Mg multilayer coatings for solar physics in the 25-75 nm wavelength region, Regina Soufli, Monica Fernandez-Perea, Jeffrey C. Robinson, Sherry L. Baker, Jennifer B. Alameda, Lawrence Livermore National Lab. (USA); Eric M. Gullikson, Lawrence Berkeley National Lab. (USA) . . . . . [8443-137]

Reflective coating for lightweight x-ray optics, Kai-Wing Chan, William W. Zhang, NASA Goddard Space Flight Ctr. (USA); Mao-Ling N. Hong, Marton V. Sharpe, SGT, Inc. (USA); David L. Windt, Reflective X-Ray Optics LLC (USA); Vivek H. Dwivedi, NASA Goddard Space Flight Ctr. (USA). . . . . [8443-138]

Multilayer coating of large telescope mirrors by magnetron sputtering, Michael Zeuner, Matthias Nestler, Dirk Rost, Marian Hanf, Alfonz Luca, Roth & Rau MicroSystems GmbH (Germany); Pierre Assus, Observatoire de la Côte d'Azur (France); Patrick Robert, Société Européenne de Systèmes Optiques (France) . . . . . [8443-139]

Ultrathin aluminum/polymer EUV filters with improved infrared blocking and durability, Bruce M. Lairson, Travis Ayers, Heidi C. Lopez, David A. Grove, Luxel Corp. (USA) . . . . . [8443-140]

Grazing-incidence imaging spectrograph for solar observations in the XUV domain, Fabio Frassetto, Stefano Coraggia, Paolo Miotti, Luca Poletto, Univ. degli Studi di Padova (Italy). . . . . [8443-141]

Mirror-concentrator for space telescope with wide field of view and high angular resolution for observation of time-space structure of the atmosphere fluorescence flashes, Sergey A. Sharakin, Boris A. Khrenov, Pavel B. Klimov, Sergey A. Potanin, Ivan V. Yashin, Lomonosov Moscow State Univ. (Russian Federation) . . . . . [8443-142]

Development of the super high angular resolution principle for x-ray imaging, Chen Zhang, National Astronomical Observatories (China); Shuangnan Zhang, Institute of High Energy Physics (China) . . . . . [8443-143]

Design and analysis of modules for segmented glass x-ray optics, Ryan S. McClelland, SGT, Inc. (USA); William W. Zhang, Timo T. Saha, NASA Goddard Space Flight Ctr. (USA) . . . . . [8443-144]

Precise alignment and permanent mounting of thin x-ray segments, Michael Biskach, NASA Goddard Space Flight Ctr. (USA). . . . . [8443-145]

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The LOFT (Large Observatory for X-ray Timing) background simulations, Riccardo Campana, Ettore Del Monte, Marco Feroci, INAF - IASF Roma (Italy); Niels Lund, Carl Budtz-Jørgensen, Søren Brandt, DTU Space (Denmark); José Manuel Álvarez, Margarita Hernanz, Consejo Superior de Investigaciones Científicas (Spain) . . . . . [8443-209]

Simulations of the x-ray imaging capabilities of the silicon drift detectors (SDD) for the LOFT wide-field monitor, Yuri Evangelista, Riccardo Campana, Enrico Costa, Ettore Del Monte, Immacolata Donnarumma, Marco Feroci, Fabio Muleri, Luigi Pacciani, Alda Rubini, Paolo Soffitta, INAF - IASF Roma (Italy); Alexander Rashevsky, Gianluigi Zampa, Nicola Zampa, Istituto Nazionale di Fisica Nucleare (Italy); Søren Brandt, Carl Budtz-Jørgensen, DTU Space (Denmark); Margarita Hernanz, Consejo Superior de Investigaciones Científicas (Spain) . . . . . [8443-210]

The LOFT WFM simulator, Immacolata Donnarumma, Yuri Evangelista, Riccardo Campana, INAF - IASF Roma (Italy); Niels Lund, Søren Brandt, DTU Space (Denmark); Jean J. M. In't Zand, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); Jörn Wilms, Christian Schmid, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) . . . . . [8443-211]

Pseudo-random coded masks for real-time spaceborne applications, Diego Götz, Commissariat à l'Énergie Atomique (France); Andrea Goldwurm, AstroParticule et Cosmologie (France); Aleksandra Gros, Commissariat à l'Énergie Atomique (France); Cyril Lachaud, François Lebrun, AstroParticule et Cosmologie (France); Stéphane Schanne, Commissariat à l'Énergie Atomique (France) . . . . . [8443-212]

Friday 6 July

SESSION 17

Room: E105 . . . . . Fri. 08.30 to 10.30

Athena

Session Chair: **Takaya Ohashi,** Tokyo Metropolitan Univ. (Japan)

08.30: **Athena: the advanced telescope for high energy astrophysics**, Kirpal Nandra, Max-Planck-Institut für extraterrestrische Physik (Germany) . . [8443-79]

08.50: **Status of the ESA L1 mission candidate ATHENA**, Nicola Rando, Didier Martin, David Lumb, Peter Verhoeve, Tim Oosterbroek, Marcos Bavdaz, European Space Research and Technology Ctr. (Netherlands) . . . . . [8443-80]

09.10: **Silicon pore optics developments and status**, Marcos Bavdaz, Eric Wille, Kotska Wallace, Brian J. Shortt, European Space Research and Technology Ctr. (Netherlands); Maximilien Collon, Marcelo D. Ackermann, cosine Research B.V. (Netherlands); Mark Olde Riekerink, Micronit Microfluidics BV (Netherlands); Coen van Baren, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); Markus Erhard, Kayser-Threde GmbH (Germany); Finn E. Christensen, DTU Space (Denmark); Michael Krumrey, Physikalisch-Technische Bundesanstalt (Germany); Michael J. Freyberg, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8443-81]

09.30: **Reference payload of the ESA L1 Mission candidate ATHENA**, Didier Martin, Nicola Rando, David Lumb, Peter Verhoeve, Tim Oosterbroek, Marcos Bavdaz, European Space Research and Technology Ctr. (Netherlands) . . . . . [8443-82]

09.50: **The x-ray microcalorimeter spectrometer onboard of Athena**, Jan-Willem A. den Herder, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); Simon R. Bandler, NASA Goddard Space Flight Ctr. (USA); Xavier Barcons, Univ. de Cantabria (Spain); Marco Barbera, Univ. degli Studi di Palermo (Italy); Didier Barret, Institut de Recherche en Astrophysique et Planétologie (France); Paolo Bastia, Thales Alenia Space (Italy); Michele Biasotti, Univ. degli Studi di Genova (Italy); Kevin R. Boyce, NASA Goddard Space Flight Ctr. (USA); Christophe Cara, Commissariat à l'Énergie Atomique (France); Maite Teresa Ceballos, Univ. de Cantabria (Spain); Leonardo Corcione, INAF - Osservatorio Astronomico di Torino (Italy); Beatriz Cobo, Univ. de Cantabria (Spain); Luca Colasanti, INAF - IASF Roma (Italy); Jelle de Plaa, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); Michael J. DiPirro, NASA Goddard Space Flight Ctr. (USA); William B. Doriese, National Institute of Standards and Technology (USA); Yuichiro Ezoe, Tokyo Metropolitan Univ. (Japan); L. Ferrari, Istituto Nazionale di Fisica Nucleare (Italy); Ryuichi Fujimoto, Kanazawa Univ. (Japan); Flavio Gatti, Univ. degli Studi di Genova (Italy); Luciano Gottardi, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); Phil R. Guttridge, Univ. College London (United Kingdom); Roland H. den Hartog, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); Ian D. Hepburn, Univ. College London (United Kingdom); et al. . . . . [8443-83]

10.10: **The wide field imager of the advanced telescope for high energy astrophysics**, Lothar Strüder, Max-Planck-Institut Halbleiterlabor (Germany) . . . . . [8443-84]

Coffee Break . . . . . 10.30 to 11.00

SESSION 18

Room: E105 . . . . . Fri. 11.00 to 12.40

LOFT

Session Chair: **Didier Barret,**
Ctr. National de la Recherche Scientifique (France)

11.00: **LOFT: the Large Observatory For x-ray Timing**, Marco Feroci, INAF - IASF Roma (Italy); Jan-Willem A. den Herder, SRON Nationaal instituut voor Ruimteonderzoek (Netherlands); Enrico Bozzo, Univ. of Geneva (Switzerland) . . . . . [8443-85]

11.20: **Status of the assessment phase of the ESA M3 mission candidate LOFT**, Carlos Corral van Damme, David Lumb, Alexander D. Short, Nicola Rando, European Space Research and Technology Ctr. (Netherlands) . [8443-86]

11.40: **A large area detector proposed for LOFT: the large observatory for x-ray timing**, Silvia Zane, David M. Walton, Thomas E. Kennedy, Univ. College London (United Kingdom); George W. Fraser, Univ. of Leicester (United Kingdom); Marco Feroci, INAF - IASF Roma (Italy); Andrea Vacchi, Gianluigi Zampa, Istituto Nazionale di Fisica Nucleare (Italy); Martin Pohl, Philipp Azzarello, Univ. of Geneva (Switzerland); Didier Barret, Alain Cros, Ctr. National de la Recherche Scientifique (France); Christoph Tenzer, Eberhard Karls Univ. Tübingen (Germany); Berend Winter, Philip J. Smith, Univ. College London (United Kingdom); Enrico Bozzo, Univ. of Geneva (Switzerland); Jan-Willem A. den Herder, SRON Netherlands Institute for Space Research (Netherlands) . . . . . [8443-87]

12.00: **The LOFT wide field monitor**, Søren Brandt, DTU Space (Denmark); Margarita Hernanz, Consejo Superior de Investigaciones Científicas (Spain) . . . . . [8443-88]

12.20: **The silicon micro-strip detector plane for the LOFT/wide-field monitor**, Andrea Goldwurm, Philippe R. Ferrando, Diego Götz, Aleksandra Gros, Christian Gouiffes, Philippe Laurent, François Lebrun, Olivier Limousin, Jerome Rodriguez, Simona Soldi, Commissariat à l'Énergie Atomique (France); Peggy Varniere, Guillaume Prevot, Univ. Paris 7-Denis Diderot (France) . . . . . [8443-89]

Sunday-Friday 1-6 July 2012 • Proceedings of SPIE Vol. 8444

Ground-based and Airborne Telescopes IV


Stepp


Gilmozzi


Hall

Conference Chairs: **Larry M. Stepp,** Thirty Meter Telescope (USA); **Roberto Gilmozzi,** European Southern Observatory (Germany); **Helen J. Hall,** NASA Ames Research Ctr. (USA)

Program Committee: **Torben E. Andersen,** Lund Observatory (Sweden); **Matthew Colless,** Anglo-Australian Observatory (Australia); **Jean-Gabriel Cuby,** Observatoire Astronomique de Marseille-Provence (France); **Xiangqun Cui,** Nanjing Institute of Astronomical Optics & Technology (China); **Richard F. Green,** Large Binocular Telescope Observatory (USA) and The Univ. of Arizona (USA); **Frank W. Kan,** Simpson Gumpertz & Heger Inc. (USA); **Jeffrey R. Kuhn,** Univ. of Hawai'i (USA); **Heather K. Marshall,** National Solar Observatory (USA); **Javier Marti Canales,** Joint ALMA Observatory (Chile); **Simon J. E. Radford,** California Institute of Technology (USA); **Göran Sandell,** SOFIA/ Universities Space Research Association (USA); **Jason Spyromilio,** European Southern Observatory (Germany); **Donald W. Sweeney,** LSST Corp. (USA); **Tomonori Usuda,** Subaru Telescope, National Astronomical Observatory of Japan (USA)

Sunday 1 July

SESSION 1

Room: Auditorium . . . . . Sun. 08.30 to 10.00

Solar Telescopes I

Session Chair: **Jeffrey R. Kuhn,** Univ. of Hawai'i (USA)

08.30: **The 1.6 m off-axis new solar telescope (NST) in Big Bear** *(Invited Paper)*, Philip R. Goode, Wenda Cao, Big Bear Solar Observatory (USA) . . . . . [8444-01]

09.00: **Applications of infrared techniques in solar telescopes**, Yinzhu Li, Yunnan Astronomical Observatory (China) . . . . . [8444-141]

09.20: **Introduction to the Chinese Giant Solar Telescope**, Zhong Liu, Yunnan Astronomical Observatory (China); Yuanyong Deng, National Astronomical Observatories (China); Haisheng Ji, Purple Mountain Observatory (China) . . . . . [8444-03]

09.40: **Large-field high-resolution mosaic movies**, Robert H. Hammerschlag, Utrecht Univ. (Netherlands); Guus Sliepen, Institute for Solar Physics (Sweden); Felix C. Bettonvil, Utrecht Univ. (Germany); Aswin P. Jägers, Utrecht Univ. (Netherlands) . . . . . [8444-04]

Coffee Break . . . . . 10.00 to 10.30

SESSION 2

Room: Auditorium . . . . . Sun. 10.30 to 12.00

Solar Telescopes II

Session Chair: **Xiangqun Cui,**
Nanjing Institute of Astronomical Optics & Technology (China)

10.30: **The Advanced Technology Solar Telescope: design and early construction** *(Invited Paper)*, Joseph P. McMullin, Thomas R. Rimmele, Stephen L. Keil, Mark Warner, Robert P. Hubbard, Eric R. Hansen, Samuel C. Barden, Steve L. Hegwer, William R. McBride, Bret Goodrich, Scott Bulau, Steve Shimko, Jennifer Ditsler, National Solar Observatory (USA) . . . . . [8444-05]

11.00: **ATST enclosure final design and construction plans**, Gaizka Murga, IDOM (USA); Heather K. Marshall, National Solar Observatory (USA); Javier Ariño, Thomas E. Lorentz, IDOM (USA). . . . . [8444-06]

11.20: **Progress making the top end optical assembly (TEOA) for the 4-meter Advanced Technology Solar Telescope**, Blaise Canzian, J. B. Barentine, James Arendt, Sandra Bader, Greg Danyo, Court Heller, L-3 Brashear (USA) . . . . . [8444-07]

11.40: **The azimuth axes mechanisms for the ATST telescope mount assembly**, Hans J. Kärcher, Ulrich Weis, Oliver Dreyer, MT Mechatronics GmbH (Germany); Paul F. Jeffers, National Solar Observatory (USA); Giovanni Bonomi, Ingersoll Machines Tools, Inc. (USA). . . . . [8444-08]

Lunch Break . . . . . 12.00 to 13.30

SESSION 3

Room: Auditorium . . . . . Sun. 13.30 to 15.20

Telescopes for Synoptic and Survey Observations I

Session Chair: **Tomonori Usuda,** Subaru Telescope, National Astronomical Observatory of Japan (USA)

13.30: **The Large Synoptic Survey Telescope final design status** *(Invited Paper)*, Victor L. Krabbendam, National Optical Astronomy Observatory (USA); Donald W. Sweeney, LSST Corp. (USA) . . . . . [8444-09]

14.00: **Manufacturing and testing of the large field corrector lenses for the Dark Energy Survey (DES) Telescope**, Denis Fappani, Société Européenne de Systèmes Optiques (France); Peter Doel, David Brooks, Univ. College London (United Kingdom); Brenna L. Flaugher, Fermi National Accelerator Lab. (USA) . . . . . [8444-10]

14.20: **The Transneptunian Automated Occultation Survey (TAOS II)**, Matthew J. Lehner, Academia Sinica (Taiwan) and Univ. of Pennsylvania (USA) and Harvard-Smithsonian Ctr. for Astrophysics (USA); Shiang-Yu Wang, Academia Sinica (Taiwan); Charles Alcock, Harvard-Smithsonian Ctr. for Astrophysics (USA); Kem Cook, Academia Sinica (Taiwan); John C. Geary, Harvard-Smithsonian Ctr. for Astrophysics (USA); David Hiriart, Univ. Nacional Autónoma de México (Mexico); Paul T. P. Ho, Academia Sinica (Taiwan); Timothy J. Norton, Harvard-Smithsonian Ctr. for Astrophysics (USA); Mauricio Reyes Ruiz, Univ. Nacional Autónoma de México (Mexico); Andrew Szentgyorgyi, Harvard-Smithsonian Ctr. for Astrophysics (USA); Wei-Ling Yen, Zhi-Wei Zhang, Academia Sinica (Taiwan) . . . . . [8444-11]

14.40: **NGTS: next generation transit survey**, Bruno Chazelas, Didier Queloz, Observatory of Geneva (Switzerland); Don Pollacco, Queen's Univ. Belfast (United Kingdom); Peter J. Wheatley, The Univ. of Warwick (United Kingdom); Richard West, Univ. of Leicester (United Kingdom); Heike Rauer, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [8444-12]

15.00: **The design of a compact wide field telescope for space situational awareness**, David Lee, Andrew J. Born, UK Astronomy Technology Ctr. (United Kingdom) . . . . . [8444-13]

Coffee Break . . . . . 15.20 to 15.50

SESSION 4

Room: Auditorium . . . . . Sun. 15.50 to 17.10

Telescopes for Synoptic and Survey Observations II

Session Chair: **Richard F. Green,**
Large Binocular Telescope Observatory (USA)

15.50: **OAJ: 2.6m Wide Field Survey Telescope**, Olivier Pirnay, Grégory Lousberg, Vincent Moreau, AMOS Ltd. (Belgium) . . . . . [8444-14]

16.10: **Design differences between the Pan-STARRS PS1 and PS2 telescopes**, Jeffrey S. Morgan, Nicholas Kaiser, Univ. of Hawai'i (USA); Vincent Moreau, AMOS Ltd. (Belgium); David Anderson, Rayleigh Optical Corp. (USA); William S. Burgett, Univ. of Hawai'i (USA). . . . . [8444-15]

16.30: **Ground-based search for the brightest transiting planets with the multi-site all-sky camera: MASCARA**, Ignas A. Snellen, Leiden Univ. (Netherlands); Remko Stuik, Leiden Univ. (Netherlands) and NOVA (Netherlands); Ramon Navarro, Felix C. Bettonvil, ASTRON (Netherlands); Matthew A. Kenworthy, Leiden Univ. (Netherlands); Ernst de Mooij, Univ. of Toronto (Canada); Gilles Otten, Leiden Observatory (Netherlands) . . . . . [8444-16]

16.50: **Design of the LSST secondary mirror system assembly**, Douglas R. Neill, William J. Gressler, Jacques Sebag, Bill Schoening, Joe DeVries, Michael Warner, Oliver Wiecha, National Optical Astronomy Observatory (USA) [8444-17]

SESSION 5

Room: Auditorium . . . . . Sun. 17.10 to 17.30

Upgrades to Existing Observatories

Session Chair: **Richard F. Green,**
Large Binocular Telescope Observatory (USA)

17.10: **Current status of the Hobby-Eberly Telescope wide field upgrade**, Gary J. Hill, John A. Booth, Mark E. Cornell, John M. Good, Karl Gebhardt, Hanshin Lee, Phillip J. MacQueen, Dave M. Perry, Marc D. Rafal, Tom H. Rafferty, Chuck Ramiller, Richard D. Savage, Charles A. Taylor III, Brian L. Vattiat, McDonald Observatory (USA); Lawrence W. Ramsey, The Pennsylvania State Univ. (USA); Joseph H. Beno, Timothy A. Beets, Jorge D. Esguerra, Richard J. Hayes, James T. Heisler, Ian M. Soukup, Joseph J. Zierer, Jr., Michael S. Worthington, Nicholas T. Mollison, Douglas R. Wardell, Gregory A. Wedeking, The Univ. of Texas at Austin (USA); Michael P. Smith, Univ. of Wisconsin-Madison (USA). . . . . [8444-19]

Monday 2 July

PLENARY SESSION
Room: Auditorium . . . . . Mon. 08.50 to 10.00

Session Chair: **Mark M. Casali,**
European Southern Observatory (Germany)

08.50: **Introduction**

09.00: **James Webb Space Telescope: science update and status** *(Presentation Only)*, Heidi B. Hammel, AURA, Inc. (USA) . . . . . [8442-501]

09.30: **Exoplanets: unraveling a new paradigm** *(Presentation Only)*, Didier Queloz, Geneva Univ., Observatory of Geneva (Switzerland) . . . . . [8442-502]

Coffee Break . . . . . 10.00 to 10.30

SESSION 6
Room: Auditorium . . . . . Mon. 10.30 to 12.30

Telescope Mounts and Enclosures

Session Chair: **Frank W. Kan,** Simpson Gumpertz & Heger Inc. (USA)

10.30: **ATST telescope pier**, Paul F. Jeffers, National Solar Observatory (USA); Eric Manuel, M3 Engineering & Technology Corp. (USA); Oliver Dreyer, Hans J. Kärcher, MT Mechatronics GmbH (Germany) . . . . . [8444-20]

10.50: **Design concepts for the EST mount**, Hans J. Kärcher, Martin Süss, David Fischer, MT Mechatronics GmbH (Germany) . . . . . [8444-21]

11.10: **Progress on the preliminary structural and mechanical design of the Giant Magellan Telescope**, Michael Sheehan, Giant Magellan Telescope Project (USA); Steve Gunnels, Paragon Engineering (USA); Matt W. Johns, Charlie L. Hull, Jonathan Kern, Stephen A. Shectman, Giant Magellan Telescope Project (USA) . . . . . [8444-22]

11.30: **The E-ELT project: the telescope main structure detailed design study**, Gianpietro Marchiori, Andrea Busatta, Simone De Lorenzi, Leonardo Ghedin, Cristiana Manfrin, Cristina Battistel, Luigino Giacomel, Federico Formentin, European Industrial Engineering s.r.l. (Italy) . . . . . [8444-23]

11.50: **E-ELT dome for modified baseline design**, Armando Bilbao, Gaizka Murga, Celia Gomez, IDOM (Spain); Alistair M. McPherson, Enzo T. Brunetto, European Southern Observatory (Germany) . . . . . [8444-24]

12.10: **The E-ELT project: the dome detailed design study**, Gianpietro Marchiori, Simone De Lorenzi, Andrea Busatta, Leonardo Ghedin, Stefano Mian, Cristiana Manfrin, Cristina Battistel, Luigino Giacomel, Federico Formentin, European Industrial Engineering s.r.l. (Italy) . . . . . [8444-25]

Lunch Break . . . . . 12.30 to 14.00

SESSION 7
Room: Auditorium . . . . . Mon. 14.00 to 15.00

Design to Withstand Earthquakes

Session Chair: **Larry M. Stepp,**
Thirty Meter Telescope Observatory Corp. (USA)

14.00: **Seismic structural analysis for the LSST telescope**, Douglas R. Neill, National Optical Astronomy Observatory (USA) . . . . . [8444-26]

14.20: **The structural response of the Magellan telescopes to earthquakes**, Povilas Palunas, Carnegie Observatories (USA) . . . . . [8444-27]

14.40: **New seismic response models for the telescopes at W.M. Keck Observatory**, Shawn P. Callahan, Michael L. Pollard, W. M. Keck Observatory (USA); Frank W. Kan, Andrew T. Sarawit, Simpson Gumpertz & Heger Inc. (USA) . . . . . [8444-28]

Coffee Break . . . . . 15.00 to 15.30

SESSION 8
Room: Auditorium . . . . . Mon. 15.30 to 16.10

Modeling, Measurement, and Control of Wind Buffeting

Session Chair: **Heather K. Marshall,** National Solar Observatory (USA)

15.30: **GMT Enclosure Wind and Thermal Study**, Arash Farahani, GMTO Corp. (USA); Alexy Kolesnikov, Leighton Cochran, CPP, Inc. (USA); Charles L. Hull, Matt W. Johns, GMTO Corp. (USA) . . . . . [8444-29]

15.50: **Vibration mitigation for wind-induced jitter for the Giant Magellan Telescope**, Roger M. Glaese, CSA Engineering, Inc. (USA); Michael Sheehan, Giant Magellan Telescope Project (USA) . . . . . [8444-30]

SESSION 9
Room: Auditorium . . . . . Mon. 16.10 to 17.10

Concepts for Future Telescopes

Session Chair: **Torben Andersen,** Lund Observatory (Sweden)

16.10: **Feasibility studies to upgrade the Canada-France-Hawaii Telescope site for the next generation Canada-France-Hawaii Telescope**, Kei Szeto, National Research Council Canada (Canada); Mathieu Angers, The Univ. of British Columbia (Canada); Craig Breckenridge, Dynamic Structures Ltd. (Canada); Konstantinos Vogiatzis, Thirty Meter Telescope Observatory Corp. (USA); Steven E. Bauman, Canada-France-Hawaii Telescope (USA); Nathan Loewen, Dynamic Structures Ltd. (Canada); David Loop, National Research Council Canada (Canada); Derrick Salmon, Canada-France-Hawaii Telescope (USA); Siegfried Stiemer, The Univ. of British Columbia (Canada); Christian Veillet, Canada-France-Hawaii Telescope (USA) . . . . . [8444-31]

16.30: **The Astronomical Telescope of New York (ATNY): a new 12-meter astronomical telescope**, Thomas A. Sebring, Xoptx LLC (USA). . . . . [8444-32]

16.50: **A 3.4 m high-image-quality telescope**, Arne Ardeberg, Behrouz Afzalifar, Lund Telescope Group (Sweden) . . . . . [8444-33]

SESSION 10
Room: Auditorium . . . . . Mon. 17.10 to 17.30

Industrial Perspectives

Session Chair: **Torben Andersen,** Lund Observatory (Sweden)

17.10: **Ground telescopes in the 1m to 4m domain can use existing designs to be affordable,** Tony Hull, L-3 Integrated Optical Systems Div. (USA) and The Univ. of New Mexico (USA); Steve Legters, Andrew R. Clarkson, J. B. Barentine, L-3 Brashear (USA) . . . . . [8444-34]

POSTERS-MONDAY
Room: Hall 3. . . . . Mon. 17.30 to 19.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Monday. The interactive poster session with authors in attendance will be Monday evening from 17.30 to 19.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

Airborne Telescopes

Session Chairs: **Helen J. Hall,** NASA Ames Research Ctr. (USA);
Jeffrey R. Kuhn, Univ. of Hawai'i (USA)

Precision attitude control for the BETTII balloon-borne interferometer, Dominic J. Benford, NASA Goddard Space Flight Ctr. (USA); Dale J. Fixsen, NASA Goddard Space Flight Ctr. (USA) and Univ. of Maryland, College Park (USA); Stephen A. Rinehart, NASA Goddard Space Flight Ctr. (USA) . . [8444-97]

First technological steps toward opening a NEAR-IR window at stratospheric altitudes, Fernando Pedichini, Mauro Centrone, Dario Lorenzetti, Massimiliano Mattioli, Masimo Ricci, Fabrizio Vitali, INAF - Osservatorio Astronomico di Roma (Italy) . . . . . [8444-98]

SOFIA in operation: telescope performance during the basic science flights, Hans J. Kärcher, MT Mechatronics GmbH (Germany); Jörg Wagner, Alfred Krabbe, Ulrich Lampater, Holger Jakob, Andreas Reinacher, Jürgen Wolf, Univ. Stuttgart (Germany) . . . . . [8444-99]

A new backup secondary mirror for SOFIA, Martin J. Burgdorf, Michael Lachenmann, Jürgen Wolf, Deutsches SOFIA Institut (Germany) and NASA Ames Research Ctr. (USA) . . . . . [8444-100]

Upgrade of the SOFIA target acquisition and tracking cameras, Manuel Wiedemann, Jürgen Wolf, NASA Ames Research Ctr. (USA) and Deutsches SOFIA Institut (Germany); Donal Sharpe, Andor Technology plc (United Kingdom); Hans-Peter Roeser, Univ. Stuttgart (Germany) . . . . . [8444-101]

Assembly, Integration, Verification, and Commissioning

Session Chair: **Jason Spyromilio,**
European Southern Observatory (Germany)

The 3.6 m Indo-Belgian Devasthal Optical Telescope: assembly, integration, and tests at AMOS, Nathalie Ninane, Christian Bastin, Jonathan Deville, Fabrice R. Michel, Maxime Pierard, Eric Gabriel, Carlo Flebus, AMOS Ltd. (Belgium); Amitesh Omar, Aryabhatta Research Institute of Observational Sciences (India) . . . . . [8444-102]

First tests of the compact low scattered-light 2m-Wendelstein Fraunhofer Telescope, Ulrich Hopp, Univ.-Sternwarte München (Germany); Ralf Bender, Univ.-Sternwarte München (Germany) and MPE Garching (Germany); Frank Grupp, Univ.-Sternwarte München (Germany); Hans D. Thiele, Nancy Ageorges, Kayser-Threde GmbH (Germany); Peter Aniol, ASTELCO Systems GmbH (Germany); Claus A. Gössl, Florian Lang-Bardl, Wolfgang Mitsch, Univ.-Sternwarte München (Germany); Michael Ruder, ASTELCO Systems GmbH (Germany) . . . . . [8444-103]

SALT's transition to science operations, David A. Buckley, J. C. Coetzee, Steven M. Crawford, South African Astronomical Observatory (South Africa); Kenneth H. Nordsieck, Univ. of Wisconsin-Madison (USA); Darragh E. O'Donoghue, South African Astronomical Observatory (South Africa); Theodore Williams, Rutgers, The State Univ. of New Jersey (USA) . . . . . [8444-104]

LSST: integration and testing of the LSST camera, Kevin A. Reil, Aaron J. Roodman, Martin Nordby, Eliazar Ortiz, Andrew P. Rasmussen, SLAC National Accelerator Lab. (USA) . . . . . [8444-105]

Concepts for Future Telescopes

Session Chair: **Torben Andersen,** Lund Observatory (Sweden)

The QUIJOTE-CMB experiment, Jose Alberto Rubiño-Martin, Rafael Rebolo-López, Instituto de Astrofísica de Canarias (Spain); Enrique Martinez-Gonzalez, Eduardo Artal, Univ. de Cantabria (Spain); Lucio Piccirillo, The Univ. of Manchester (United Kingdom); Michael P. Hobson, Univ. of Cambridge (United Kingdom); Roger J. Hoyland, Instituto de Astrofísica de Canarias (Spain) . . . . . [8444-106]

Reviewing off-axis telescope concepts: a quest for higher photometry and dynamic range, Gil Moretto, Institut de Physique Nucléaire de Lyon (France); Jeffrey R. Kuhn, Univ. of Hawai'i (USA); Philip R. Goode, Big Bear Solar Observatory (USA). . . . . [8444-107]

Science requirements and survey strategy for the next generation Canada-France-Hawaii Telescope, Alan W. McConnachie, NRC Herzberg Institute of Astrophysics (Canada) . . . . . [8444-108]

The optics and detector-simulation of the air fluorescence telescope FAMOUS for the detection of cosmic rays, Tim Niggemann, Thomas Hebbeker, Markus Lauscher, Christine Meurer, Lukas Middendorf, Maurice Stephan, Johannes Schumacher, RWTH Aachen (Germany) . . . . . [8444-109]

Control of Thermal Environment

Session Chair: **Jean-Gabriel Cuby,**
Observatoire Astronomique de Marseille-Provence (France)

Experimental characterization of the turbulence inside the dome and in the surface layer, Aziz Ziad, Wassila Dali Ali, Univ. de Nice Sophia Antipolis (France); Marc S. Sarazin, European Southern Observatory (Germany)[8444-110]

Seeing trends from deployable Shack-Hartmann wavefront sensors, MMT Observatory, Arizona, USA, J. Duane Gibson, Grant G. Williams, Thomas Trebisky, MMT Observatory (USA) . . . . . [8444-111]

An updated T-series thermocouple measurement system for high-accuracy temperature measurements of the MMT primary mirror, Dusty L. Clark, J. Duane Gibson, MMT Observatory (USA) . . . . . [8444-112]

Design to Withstand Earthquakes

Session Chair: **Larry M. Stepp,**
Thirty Meter Telescope Observatory Corp. (USA)

Determination of seismic accelerations for the LSST telescope, Douglas R. Neill, National Optical Astronomy Observatory (USA). . . . . [8444-113]

Modeling seismic behavior of static supports of Giant Magellan Telescope (GMT), Frank W. Kan, Andrew T. Sarawit, P. Graham Cranston, Simpson Gumpertz & Heger Inc. (USA) . . . . . [8444-114]

Enabling Technologies for Extremely Large Telescopes

Session Chairs: **Larry M. Stepp,** Thirty Meter Telescope Observatory Corp. (USA); **Heather K. Marshall,** National Solar Observatory (USA)

Design concept for a spectropolarimetric focal station for the E-ELT, Klaus G. Strassmeier, Ilya v. Ilyin, Igor DiVarano, Manfred F. Woche, Leibniz-Institut für Astrophysik Potsdam (Germany); Uwe Laux, Thüringer Landessternwarte Tautenburg (Germany). . . . . [8444-115]

Development of a fast steering secondary mirror prototype for the Giant Magellan Telescope, Myung K. Cho, National Optical Astronomy Observatory (USA); Andrew Corredor, Christoph Dribusch, The Univ. of Arizona (USA); Kwijong Park, Young-Soo Kim, Korea Astronomy and Space Science Institute (Korea, Republic of); Il-Kweon Moon, Korea Research Institute of Standards and Science (Korea, Republic of); Won Hyun Park, College of Optical Sciences, The Univ. of Arizona (USA). . . . . [8444-117]

Development status of the prototype of the GMT fast steering mirror, Young-Soo Kim, Ju Heon Koh, Inwoo Chung, Korea Astronomy and Space Science Institute (Korea, Republic of); Myung K. Cho, National Optical Astronomy Observatory (USA); Ho-Soon Yang, Korea Research Institute of Standards and Science (Korea, Republic of); Ho-Sang Kim, Institute for Advanced Engineering (Korea, Republic of); Hyo-Sung Ahn, Gwangju Institute of Science and Technology (Korea, Republic of); Byeong-Gon Park, Korea Astronomy and Space Science Institute (Korea, Republic of) . . . . . [8444-118]

Performance of industrial scale production of ZERODUR mirrors with diameter of 1.5 m proves readiness for the ELT M1 segments, Thomas Westerhoff, Peter Hartmann, Ralf Jedamzik, Alexander Werz, SCHOTT AG (Germany) . . . . . [8444-119]

Extremely Large Telescopes

Session Chair: **Roberto Gilmozzi,**
European Southern Observatory (Germany)

E-ELT project: geotechnical investigation at Cerro Armazones, Paolo Ghiretti, Volker Heinz, European Southern Observatory (Germany); Daniela Pollak, ARCADIS Chile S.A. (USA); Jose Lagos, ARCADIS Chile S.A. (Chile). . . . . [8444-120]

Gamma Ray Telescopes

Session Chair: **Helen J. Hall,** NASA Ames Research Ctr. (USA)

Technological developments toward the small size telescopes of the Cherenkov Telescope Array, Rodolfo Canestrari, INAF - Osservatorio Astronomico di Brera (Italy) and for the CTA consortium (Italy); Timothy J. Greenshaw, Univ. of Liverpool (United Kingdom); Giovanni Pareschi, INAF - Osservatorio Astronomico di Brera (Italy); Richard White, Univ. of Leicester (United Kingdom). . . . . [8444-121]

SST-GATE: an innovative telescope for the very high energy astronomy, Philippe Laporte, Jean-Laurent Dournaux, Hélène Sol, Observatoire de Paris à Meudon (France); Simon Blake, Durham Univ. (United Kingdom); Catherine Boisson, Observatoire de Paris à Meudon (France); Paula Chadwick, Durham Univ. (United Kingdom); Fatima de Frondat, Observatoire de Paris à Meudon (France); Timothy J. Greenshaw, Univ. of Liverpool (United Kingdom); James Hinton, Univ. of Leicester (United Kingdom); David Horville, Jean-Michel Huet, Observatoire de Paris à Meudon (France); Jürgen Schmoll, Durham Univ. (United Kingdom); Andreas Zech, Observatoire de Paris à Meudon (France). . [8444-254]

Industrial Perspectives

Session Chair: **Torben Andersen,** Lund Observatory (Sweden)

A new era for the 2-4 meters class observatories: an innovative integrated system telescope-dome, Gianpietro Marchiori, Andrea Busatta, Simone de Lorenzi, Francesco Rampini, European Industrial Engineering s.r.l. (Italy); Corrado Perna, Giampaolo Vettolani, Istituto Nazionale di Astrofisica (Italy) . . . . . [8444-122]

Measurement and Control of Telescope Vibration

Session Chair: **Helen J. Hall,** NASA Ames Research Ctr. (USA)

Low-frequency high-sensitivity horizontal monolithic folded-pendulum as sensor in the automatic control of ground-based and space telescopes, Fausto Acernese, Gerardo Giordano, Rocco Romano, Fabrizio Barone, Univ. degli Studi di Salerno (Italy). . . . . [8444-123]

Herzberg Institute of Astrophysics' vibration measurement capabilities with applications to astronomical instrumentation, Peter W. G. Byrnes, National Research Council Canada (Canada) . . . . . [8444-124]

Millimeter and Submillimeter Wavelength Telescopes II

Session Chairs: **Roberto Gilmozzi,** European Southern Observatory (Germany); **Javier Marti Canales,** ALMA (Chile)

ALMA temporal phase stability and the effectiveness of water vapor radiometer, Satoki Matsushita, Academia Sinica (Taiwan); Koh-Ichiro Morita, Denis Barkats, Richard E. Hills, ALMA (Chile); Edward B. Fomalont, National Radio Astronomy Observatory (USA); Bojan Nikolic, Univ. of Cambridge (United Kingdom) . . . . . [8444-125]

ALMA array element astronomical verification, Shin'ichiro Asayama, Paolo Calisse, Paulo C. Cortes, Rieks Jager, Lewis B. G. Knee, Bernhard Lopez, Cristian Lopez, Theodoros Nakos, Neil Phillips, Matias Radiszcz, Richard Simon, Ignacio Toledo, Nicholas D. Whyborn, Hiroshi Yatagai, ALMA (Chile); Pere Planesas, Observatorio Astronómico Nacional (Spain); Joseph P. McMullin, National Solar Observatory (USA) . . . . . [8444-126]

Trajectory generation for parametric rotating scan patterns at the LMT, David R. Smith, MERLAB, P.C. (USA); Kamal Souccar, Univ. of Massachusetts Amherst (USA) . . . . . [8444-127]

Atacama compact array antennas, Masao Saito, Junji Inatani, Kouichiro Nakanishi, Hiro Saito, Satoru Iguchi, National Astronomical Observatory of Japan (Japan) . . . . . [8444-128]

Very large millimeter/submillimeter array toward search for 2nd Earth, Satoru Iguchi, Masao Saito, National Astronomical Observatory of Japan (Japan). . . . . [8444-129]

The MWA digital receiver, Prabu Thiagaraj, K. S. Srivani, P. A. Kamini, M. S. Madhavi, Raman Research Institute (India); Anish Roshi, National Radio Astronomy Observatory (USA); Frank H. Briggs, Research School of Astronomy & Astrophysics (Australia); M. R. Gopalakrishna, Avinash A. Deshpande, N. Udayshankar, Raman Research Institute (India) . . . . . [8444-130]

ACA phase calibration scheme with the ALMA water vapor radiometers, Yoshiharu Asaki, Japan Aerospace Exploration Agency (Japan); Satoki Matsushita, Academia Sinica (Taiwan); Koh-Ichiro Morita, National Astronomical Observatory of Japan (Japan) . . . . . [8444-253]

Solar Telescopes

Session Chairs: **Jeffrey R. Kuhn,** Univ. of Hawai'i (USA);
Xiangqun Cui, Nanjing Institute of Astronomical Optics & Technology (China)

Functional safety for the advanced technology solar telescope, Scott Bulau, Timothy R. Williams, National Solar Observatory (USA) . . . . . [8444-132]

Facility level thermal systems for the advanced technology solar telescope, LeEllen Phelps, National Solar Observatory (USA); Gaizka Murga, IDOM (USA); Mark Fraser, M3 Engineering & Technology Corp. (USA); Tània Climent, IDOM (USA) . . . . . [8444-133]

The new K-coronagraph for the Mauna Loa Solar Observatory, Alfred G. de Wijn, Joan T. Burkepile, Steven Tomczyk, National Ctr. for Atmospheric Research (USA) . . . . . [8444-134]

Quasi-static wavefront control for the ATST, Luke C. Johnson, National Solar Observatory (USA); Robert S. Upton, Johns Hopkins Univ. Applied Physics Lab. (USA); Thomas R. Rimmele, Samuel C. Barden, National Solar Observatory (USA) . . . . . [8444-135]

The Coronal Solar Magnetism Observatory (COSMO) large aperture coronagraph, Dennis J. Gallagher, Steven Tomczyk, National Ctr. for Atmospheric Research (USA) . . . . . [8444-136]

Preliminary design and integrated modeling of the Chinese Giant Solar Telescope structure, Lorenzo Zago, HEIG-VD (Switzerland); Dehua Yang, Nanjing Institute of Astronomical Optics & Technology (China); Yichun Dai, Yunnan Astronomical Observatory (China) . . . . . [8444-137]

Performance verification of the ATST mount by end-to-end simulations, Hans J. Kärcher, Alexei Ippa, Oliver Dreyer, MT Mechatronics GmbH (Germany); Paul F. Jeffers, National Solar Observatory (USA); Giovanni Bonomi, Ingersoll Machines Tools, Inc. (USA) . . . . . [8444-139]

Behavior of a horizontal air curtain subjected to a vertical pressure gradient, James S. Linden, LeEllen Phelps, National Solar Observatory (USA) . . . . . [8444-140]

Telescope Mounts and Enclosures

Session Chair: **Frank W. Kan,** Simpson Gumpertz & Heger Inc. (USA)

ATST telescope mount: machine tool or telescope, Paul F. Jeffers, National Solar Observatory (USA); Günter Stoltz, Giovanni Bonomi, Ingersoll Machines Tools, Inc. (USA); Oliver Dreyer, Hans J. Kärcher, MT Mechatronics GmbH (Germany) . . . . . [8444-143]

Introduction of a 2.5m telescope mount, Guomin Wang, Bozhong Gu, Xiang Jiang, Zhiyong Zhang, Shihai Yang, Yu Ye, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8444-144]

Installation and verification of high precision mechanics in concrete structures at the example of ALMA antenna interfaces, Volker Heinz, Maximilian Kraus, European Southern Observatory (Germany); Eduardo Orellana, Bautek S.A. (Chile). . . . . [8444-145]

E-ELT telescope main structure, Alfredo Orden, Angel Dilla, Manuel Alcantud, Noelia Ballesteros, Empresarios Agrupados (Spain). . . . . [8444-146]

Testing, characterization, and control of a multi-axis high-precision drive system, Ian M. Soukup, Joseph H. Beno, Charles E. Penney, Timothy A. Beets, Jorge D. Esguerra, Richard J. Hayes, James T. Heisler, Joseph J. Zierer, Gregory A. Wedeking, Michael S. Worthington, Douglas R. Wardell, The Univ. of Texas at Austin (USA); John M. Good, John A. Booth, Gary J. Hill, Mark E. Cornell, Marc D. Rafal, McDonald Observatory (USA) . . . . . [8444-147]

Enclosure rotation on the Large Binocular Telescope, James Howard, Robert L. Meeks, David S. Ashby, Large Binocular Telescope Observatory (USA); Warren B. Davison, Steward Observatory (USA); James Wiese, Jeffery Urban, Rick Hansen, Jared Schuh, Large Binocular Telescope Observatory (USA) . . . . . [8444-148]

The 3.6 m Indo-Belgian Devasthal Optical Telescope: the hydrostatic azimuth bearing, Jonathan Deville, Christian Bastin, Maxime Pierard, AMOS Ltd. (Belgium) . . . . . [8444-150]

Telescope positioning and drive system based on magnetic bearings, technical challenges and possible applications in optical stellar interferometry, Roland Lemke, Ruhr-Univ. Bochum (Germany); Lothar Noethe, European Southern Observatory (Germany); Hans J. Kärcher, MT Mechatronics GmbH (Germany). . . . . [8444-151]

Enclosure design for the ARIES 3.6m optical telescope, Anil K. Pandey, Vishal Shukla, Tarun Bangia, Aryabhatta Research Institute of Observational Sciences (India); R. D. Rasker, Rajendra R. Kulkarni, Precision Precast Solutions Pvt. Ltd. (India) . . . . . [8444-152]

An innovative alt-alt telescope for small observatories and amateur astronomers, Marco Riva, Stefano Basso, Rodolfo Canestrari, Paolo Conconi, Dino Fugazza, Mauro Ghigo, Giovanni Pareschi, Paolo Spanò, INAF - Osservatorio Astronomico di Brera (Italy); Raffaele Tomelleri, Tomelleri s.r.l. (Italy); Filippo Maria Zerbi, INAF - Osservatorio Astronomico di Brera (Italy) . . . . . [8444-153]

Prototype enclosure design for KMTNet project, Nathan Kappler, Lawrence G. Kappler, TBR Construction & Engineering (USA); Byeong-Gon Park, Chung-Uk Lee, Seung-Lee Kim, Sang-Mok Cha, Korea Astronomy and Space Science Institute (Korea, Republic of); Wade M. Poteet, Harold Cauthen, CP Systems, Inc. (USA). . . . . [8444-154]

Telescopes for Synoptic and Survey Observations

Session Chairs: **Tomonori Usuda,** Subaru Telescope, National Astronomical Observatory of Japan (USA);
Richard F. Green, Large Binocular Telescope Observatory (USA)

Initial alignment and commissioning plan for the LSST, William J. Gressler, Charles F. Claver, Douglas R. Neill, Jacques Sebag, National Optical Astronomy Observatory (USA). . . . . [8444-18]

Dark energy camera installation at CTIO: overview, Timothy M. Abbott, Freddy Muñoz, Alistair R. Walker, Cerro Tololo Inter-American Observatory (Chile); Chris Smith, National Optical Astronomy Observatory (Chile); Andrés Montane, Brooke Gregory, Cerro Tololo Inter-American Observatory (Chile); Roberto Tighe, Patricio Schurter, Nicole S. van der Bliek, National Optical Astronomy Observatory (Chile); German Schumacher, Eduardo Mondaca, Michael Warner, Diego Hernandez, Ricardo Schmidt, Cerro Tololo Inter-American Observatory (Chile) . . . . . [8444-155]

Dark Energy Camera installation at CTIO: technical challenges, Freddy Muñoz, Andrés Montane, Roberto Tighe, Michael Warner, Timothy M. Abbott, Cerro Tololo Inter-American Observatory (Chile) . . . . . [8444-156]

KMTNet: science cases, Byeong-Gon Park, Jaewoo Lee, Seung-Lee Kim, Chung-Uk Lee, Korea Astronomy and Space Science Institute (Korea, Republic of) . . . . . [8444-157]

Design and development of a wide field telescope, Il-Kweon Moon, Sangon Lee, Korea Research Institute of Standards and Science (Korea, Republic of); Juhee Lim, Kyung Hee Univ. (Korea, Republic of); Ho-Soon Yang, Hyug-Gyo Rhee, Jae Bong Song, Yun Woo Lee, Korea Research Institute of Standards and Science (Korea, Republic of); Jong Ung Lee, Cheongju Univ. (Korea, Republic of); Ho Jin, Kyung Hee Univ. (Korea, Republic of). . . . . [8444-158]

A concept for a powerful flexible Southern Spectroscopic Survey Telescope, Mario L. Mateo, Chris Miller, Joel N. Bregman, Univ. of Michigan (USA) . . . . . [8444-159]

Achieving high precision photometry for transiting exoplanets with a low cost robotic DSLR-based imaging system, Olivier Guyon, Frantz Martinache, Subaru Telescope, National Astronomical Observatory of Japan (USA)[8444-160]

Upgrades to Existing Observatories

Session Chair: **Richard F. Green,**
Large Binocular Telescope Observatory (USA)

An active surface upgrade for the Delingha 13.7-m Radio Telescope, Dehua Yang, Yong Zhang, Guohua Zhou, Aihua Li, Kunxin Chen, Zhenchao Zhang, Guoping Li, National Astronomical Observatories (China); Yingxi Zuo, Ye Xu, Purple Mountain Observatory (China); Lorenzo Zago, HEIG-VD (Switzerland) . . . . . [8444-163]

Development of a new CRFP sub-reflector of the Delingha 13.7-m radio telescope, Kunxin Chen, National Astronomical Observatories (China); Qingguo Wu, Hui Li, National Astronomical Observatories (China) and Graduate Univ. of Chinese Academy of Sciences (China); Dehua Yang, Guoping Li, National Astronomical Observatories (China); Yingxi Zuo, Ye Xu, Purple Mountain Observatory (China). . . . . [8444-164]

Development of a compact precision linear actuator for the active surface upgrade of the Delingha 13.7-m radio telescope, Guohua Zhou, Aihua Li, Dehua Yang, Zhenchao Zhang, Guoping Li, National Astronomical Observatories (China) . . . . . [8444-165]

Upgrading the TNT Telescope: remote observing and future perspectives, Gianluca Di Rico, INAF - Osservatorio Astronomico di Teramo (Italy); Marco Fiaschi, Mfc Elettronica di Fiaschi Marco (Italy); Amico Di Cianno, Angelo Valentini, Gaetano Valentini, INAF - Osservatorio Astronomico di Teramo (Italy) . . . . . [8444-166]

ESPRESSO: design and analysis of a Coudé-train for a stable and efficient simultaneous optical feeding from the four VLT unit telescopes, Alexandre Cabral, André Moitinho, João M. Pinto Coelho, Jorge Lima, Univ. de Lisboa (Portugal); Bernard A. Delabre, Gerardo Avila, European Southern Observatory (Germany); Ricardo Gomes, Univ. de Lisboa (Portugal); Denis Mégevand, Observatory of Geneva (Switzerland); Filippo M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); Paolo Di Marcantonio, INAF - Osservatorio Astronomico di Trieste (Italy); Christophe Lovis, Observatory of Geneva (Switzerland); José M. Rebordão, Univ. de Lisboa (Portugal); Nuno C. Santos, Univ. do Porto (Portugal). . . . . [8444-167]

Recent performance improvements for the LBT primary mirror system, Robert L. Meeks, David S. Ashby, Christopher Biddick, Amjad Chatila, Michael Gusick, Large Binocular Telescope Observatory (USA) . . . . . [8444-169]

Modernization of the 1 meter Swope and 2.5 meter Du Pont telescopes at Las Campanas Observatory, Frank S. Perez, Carnegie Observatories (USA) . . . . . [8444-170]

A happy conclusion to the SALT image quality saga, Lisa A. Crause, South African Astronomical Observatory (South Africa); Darragh E. O'Donoghue, Southern African Large Telescope (South Africa); James E. O'Connor, Francois Strumpfer, Ockert J. Strydom, Craig Sass, South African Astronomical Observatory (South Africa); Charl A. du Plessis, Eben Wiid, Jonathan Love, Martin Wilkinson, Chris Coetzee, Southern African Large Telescope (South Africa). . . . . [8444-171]

Facility calibration unit of Hobby Eberly Telescope wide field upgrade, Hanshin Lee, Gary J. Hill, Brian L. Vattiat, The Univ. of Texas at Austin (USA); Michael P. Smith, Univ. of Wisconsin-Madison (USA) . . . . . [8444-172]

Solid telescopes for interferometric enhancement of existing telescopes, Alberto Riva, Mario Gai, INAF - Osservatorio Astronomico di Torino (Italy) . . . . . [8444-173]

Tuesday 3 July

PLENARY SESSION
Room: Auditorium . . . . . Tues. 09.00 to 10.00

Session Chair: **Kathryn A. Flanagan,**
Space Telescope Science Institute (USA)

09.00: **The Kepler Exoplanet Survey: instrumentation, performance and results**, Thomas N. Gautier III, Jet Propulsion Lab., Caltech (USA) and The Kepler Science Team (USA) . . . . . [8442-503]

09.30: **Antarctic astronomy**, John W. V. Storey, The Univ. of New South Wales (Australia) . . . . . [8446-504]

Coffee Break . . . . . 10.00 to 10.30

SESSION 11
Room: Auditorium . . . . . Tues. 10.30 to 12.00

Airborne Telescopes I

Session Chair: **Helen J. Hall,** NASA Ames Research Ctr. (USA)

10.30: **Early science results from SOFIA** *(Invited Paper)*, Erick T. Young, SOFIA / USRA (USA); Terry L. Herter, Cornell Univ. (USA); Rolf Guesten, Max-Planck-Institut für Radioastronomie (Germany); Edward W. Dunham, Lowell Observatory (USA); Eric E. Becklin, SOFIA / USRA (USA); Pamela M. Marcum, SOFIA / NASA (USA); Alfred Krabbe, Deutsches SOFIA Institut (Germany); B. G. Andersson, William T. Reach, SOFIA / USRA (USA); Hans Zinnecker, Deutsches SOFIA Institut (Germany) . . . . . [8444-35]

11.00: **Active damping of the SOFIA Telescope assembly**, Paul J. Keas, CSA Engineering, Inc. (USA); Ulrich Lampater, Deutsches SOFIA Institut (Germany); Edward W. Dunham, Lowell Observatory (USA); Enrico H. Pfüller, Manuel Wiedemann, Jürgen Wolf, Hans-Peter Roeser, Deutsches SOFIA Institut (Germany) . . . . . [8444-36]

11.20: **Evaluation of the aero-optical properties of the SOFIA cavity by means of computional fluid dynamics and a super fast diagnostic camera**, Christian Engfer, Enrico H. Pfüller, Manuel Wiedemann, Jürgen Wolf, Thorsten Lutz, Ewald Kraemer, Hans-Peter Roeser, Univ. Stuttgart (Germany) . . [8444-37]

11.40: **Optical characterization of the SOFIA Telescope using fast EM-CCD cameras**, Enrico H. Pfüller, Deutsches SOFIA Institut (Germany) and Univ. Stuttgart (Germany) and SOFIA Science Ctr., NASA Ames Research Ctr. (USA); Jürgen Wolf, Univ. Stuttgart (Germany) and SOFIA Science Ctr., NASA Ames Research Ctr. (USA); Helen J. Hall, NASA Ames Research Ctr. (USA) and SOFIA Science Ctr., NASA Ames Research Ctr. (USA); Hans-Peter Roeser, Univ. Stuttgart (Germany) . . . . . [8444-38]

Lunch Break . . . . . 12.00 to 13.30

SESSION 12
Room: Auditorium . . . . . Tues. 13.30 to 14.10

Airborne Telescopes II

Session Chair: **Jeffrey R. Kuhn,** Univ. of Hawai'i (USA)

13.30: **SOFIA observatory performance and characterization**, Pasquale Temi, NASA Ames Research Ctr. (USA); Walter Miller, Orbital Science Corp. (USA); Edward W. Dunham, Lowell Observatory (USA); Ian S. McLean, Univ. of California, Los Angeles (USA); Jürgen Wolf, Univ. Stuttgart (Germany); Eric E. Becklin, NASA Ames Research Ctr. (USA); Thomas A. Bida, Lowell Observatory (USA); Rick Brewster, Orbital Science Corp. (USA); Sean Casey, NASA Ames Research Ctr. (USA); Peter L. Collins, Lowell Observatory (USA); Scott Horner, Holger Jakob, NASA Ames Research Ctr. (USA); Stephen Jensen, NASA Dryden Flight Research Ctr. (USA); Jana Killebrew, Ulrich Lampater, NASA Ames Research Ctr. (USA); Georgi Mandushev, Lowell Observatory (USA); Pamela M. Marcum, NASA Ames Research Ctr. (USA); Allan Meyer, Universities Space Research Association (USA); Enrico H. Pfüller, NASA Ames Research Ctr. (USA); Andreas Reinacher, Hans-Peter Roeser, Univ. Stuttgart (Germany); Maureen L. Savage, Erin C. Smith, NASA Ames Research Ctr. (USA); Stefan Teufel, NASA Dryden Flight Research Ctr. (USA); Manuel Wiedemann, NASA Ames Research Ctr. (USA). . . . . [8444-39]

13.50: **The balloon-borne large-aperture submillimeter telescope for polarimetry--BLAST-Pol: performance and results from the 2010 Antarctic flight**, Enzo Pascale, Cardiff Univ. (United Kingdom) . . . . . [8444-40]

SESSION 13
Room: Auditorium . . . . . Tues. 14.10 to 15.20

Gamma Ray Telescopes

Session Chair: **Larry M. Stepp,**
Thirty Meter Telescope Observatory Corp. (USA)

14.10: **The Cherenkov Telescope Array (CTA): status of the project and development of the telescopes** *(Invited Paper)*, Giovanni Pareschi, INAF - Osservatorio Astronomico di Brera (Italy) . . . . . [8444-41]

14.40: **Optical design and calibration of a MST (medium size telescope) prototype for the CTA (Cherenkov Telescope Array)**, Bagmeet Behera, Juergen Baehr, Deutsches Elektronen-Synchrotron (Germany); Sandra Gruenewald, Humboldt-Univ. zu Berlin (Germany); Gareth Hughes, Deutsches Elektronen-Synchrotron (Germany); Igor Oya, Humboldt-Univ. zu Berlin (Germany); David Melkumyan, Stefan Schlenstedt, Deutsches Elektronen-Synchrotron (Germany); Ullrich Schwanke, Humboldt-Univ. zu Berlin (Germany) and for the CTA consortium (Germany). . . . . [8444-42]

15.00: **Development of a mid-sized Schwarzschild-Couder Telescope for the Cherenkov Telescope Array**, Robert A. Cameron, SLAC National Accelerator Lab. (USA) . . . . . [8444-43]

Coffee Break . . . . . 15.20 to 15.50

SESSION 14
Room: Auditorium . . . . . Tues. 15.50 to 18.00

Assembly, Integration, Verification, and Commissioning

Session Chair: **Jason Spyromilio,**
European Southern Observatory (Germany)

15.50: **Status and performance of the Discovery Channel Telescope during commissioning** *(Invited Paper)*, Stephen E. Levine, Thomas A. Bida, Tomas Chylek, Peter L. Collins, William T. DeGroff, Edward W. Dunham, Paul J. Lotz, Alexander J. Venetiou, Saeid Zoonematkermani, Lowell Observatory (USA) . . . . . [8444-44]

16.20: **The Large Binocular Telescope**, John M. Hill, Richard F. Green, David S. Ashby, Joar G. Brynnel, Large Binocular Telescope Observatory (USA); Norman J. Cushing, Norm Cushing Productions (USA); John K. Little, James H. Slagle, R. Mark Wagner, Large Binocular Telescope Observatory (USA)[8444-45]

16.40: **New Fraunhofer Telescope Wendelstein: assembly, installation, and current status**, Hans D. Thiele, Kayser-Threde GmbH (Germany) . . . . [8444-46]

17.00: **VST: from commissioning to science**, Pietro Schipani, INAF - Osservatorio Astronomico di Capodimonte (Italy); Massimo Capaccioli, Univ. degli Studi di Napoli Federico II (Italy); Carmelo Arcidiacono, INAF - Osservatorio Astronomico di Bologna (Italy); Javier Argomedo, European Southern Observatory (Germany); Massimo Dall'Ora, Sergio D'Orsi, INAF - Osservatorio Astronomico di Capodimonte (Italy); Jacopo Farinato, Demetrio Magrin, INAF - Osservatorio Astronomico di Padova (Italy); Laurent Marty, INAF - Osservatorio Astronomico di Capodimonte (Italy); Roberto Ragazzoni, INAF - Osservatorio Astronomico di Padova (Italy); Gabriele Umbriaco, Univ. degli Studi di Padova (Italy) . . . . . [8444-47]

17.20: **Commissioning results from the Large Binocular Telescope**, Joar G. Brynnel, Norman J. Cushing, Richard F. Green, John M. Hill, Douglas L. Miller, Andrew Rakich, David J. Thompson, The Univ. of Arizona (USA) . . . . . [8444-48]

17.40: **Discovery Channel Telescope active optics system early integration and test,** Alexander J. Venetiou, Thomas A. Bida, Lowell Observatory (USA) . . . . . [8444-49]

POSTERS-TUESDAY
Room: Hall 3. . . . . Tues. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters. for this conference will be on display on Tuesday. The interactive poster session with authors in attendance will be Tuesday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

Active Optics and Precision Position Control Mechanisms

Session Chair: **Larry M. Stepp,**
Thirty Meter Telescope Observatory Corp. (USA)

Optics and the mechanical system of the 62-cm telescope at the Severo Diaz Galindo Observatory in Guadalajara, Jalisco, Mexico, Eduardo de la Fuente Acosta, Univ. de Guadalajara (Mexico); Salvador Zazueta, Juan Manuel Nunez Alfonso, Gerardo Sierra, Benjamín García, Benjamín Martínez, José Luís Ochoa, Francisco Lazo, Univ. Nacional Autónoma de México (Mexico)[8444-168]

Orthogonal vector bending modes for the Magellan primary mirrors, Povilas Palunas, Carnegie Observatories (USA); Hubert Martin, The Univ. of Arizona (USA) . . . . . [8444-174]

Folded Cassegrain sets of the Gran Telescopio Canarias (Grantecan), Alberto Gomez Merchan, Gaizka Murga, Ruben Sanquirce Garcia, Borja Etxeita Arriaga, Alberto Vizcargüenaga, Ander San Vicente Astobiza, Esther Fernandez Santos, IDOM (Spain); Benjamin Siegel, Gran Telescopio CANARIAS (Spain) . . . . . [8444-175]

Design, testing, and installation of a high-precision hexapod for the Hobby-Eberly Telescope dark energy experiment (HETDEX), Joseph J. Zierer, Jr., Gregory A. Wedeking, Joseph H. Beno, John M. Good, The Univ. of Texas at Austin (USA) . . . . . [8444-176]

Prototype pipeline for LSST wavefront sensing and reconstruction, Charles F. Claver, Srinivasan Chandrasekharan, Ming Liang, National Optical Astronomy Observatory (USA); Bo Xin, Enver Alagoz, Kirk Arndt, Ian P. Shipsey, Purdue Univ. (USA) . . . . . [8444-177]

Active optics in Large Synoptic Survey Telescope, Ming Liang, Victor L. Krabbendam, Charles F. Claver, Srinivasan Chandrasekharan, National Optical Astronomy Observatory (USA); Bo Xin, Purdue Univ. (USA). . . . . [8444-178]

Keck 1 deployable tertiary mirror (K1DM3), J. Xavier Prochaska, Univ. of California, Santa Cruz (USA) and Lick Observatory (USA); Christoph Pistor, UCO/Lick Observatory (USA); Jerry E. Nelson, Univ. of California, Santa Cruz (USA); David Cowley, Jerry Cabak, UCO/Lick Observatory (USA) . . . . . [8444-179]

Metrology systems of Hobby-Eberly Telescope wide field upgrade, Hanshin Lee, Gary J. Hill, Mark E. Cornell, Brian L. Vattiat, Tom H. Rafferty, Trey Taylor, Dave M. Perry, Chuck Ramiller, The Univ. of Texas at Austin (USA); Michael Hart, Hart Scientific Consulting International L.L.C. (USA); Marc D. Rafal, Richard D. Savage, The Univ. of Texas at Austin (USA) . . . . . [8444-181]

Optics derotator servo control system for SONG Telescope, Jin Xu, Changzhi Ren, Nanjing Institute of Astronomical Optics & Technology (China); Songfeng Kou, Zhongyu Yue, Yu Ye, Nanjing Institute of Astronomical Optics & Technology (USA); Guomin Wang, Bozhong Gu, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8444-183]

Active optical control system design of the SONG-China Telescope, Yu Ye, Songfeng Kou, Dongsheng Niu, Chen Li, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8444-185]

The 3.6 m Indo-Belgian Devasthal Optical Telescope: the active M1 mirror support, Maxime Pierard, Jean Marc Schumacher, Carlo Flebus, Nathalie Ninane, AMOS Ltd. (Belgium) . . . . . [8444-186]

Synchronous redundant control method used in the drive system of Chinese 20-30 meter infrared optic telescope, Niu Yong, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8444-187]

The M2&M3 positioning control systems of a 2.5m telescope, Yu Ye, Chong Pei, Zhiyong Zhang, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8444-188]

Progress of the active reflector antenna using laser angle metrology system, Yong Zhang, National Astronomical Observatories (China) and Nanjing Institute of Astronomical Optics & Technology (China); Jie Zhang, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate Univ. of Chinese Academy of Sciences (China); Dehua Yang, Guohua Zhou, Aihua Li, Guoping Li, National Astronomical Observatories (China) . . . . . [8444-189]

The active optics system of the VST: concepts and results, Pietro Schipani, INAF - Osservatorio Astronomico di Capodimonte (Italy); Demetrio Magrin, INAF - Osservatorio Astronomico di Padova (Italy); Lothar Noethe, European Southern Observatory (Germany); Carmelo Arcidiacono, INAF - Osservatorio Astronomico di Bologna (Italy); Javier Argomedo, European Southern Observatory (Germany); Sergio D'Orsi, Massimo Dall'Ora, INAF - Osservatorio Astronomico di Capodimonte (Italy); Jacopo Farinato, Roberto Ragazzoni, INAF - Osservatorio Astronomico di Padova (Italy); Gabriele Umbriaco, Univ. degli Studi di Padova (Italy) . . . . . [8444-190]

Performance comparison between two active support schemes for 1-m primary mirror, Dongsheng Niu, Guomin Wang, Bozhong Gu, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8444-191]

Design, development, and testing of the DCT Cassegrain instrument support assembly, Thomas A. Bida, Edward W. Dunham, Ralph A. Nye, Lowell Observatory (USA). . . . . [8444-192]

Alignment of Telescope Optics

Session Chair: **Roberto Gilmozzi,**
European Southern Observatory (Germany)

A laser guide star system for LAMOST, Hua Bai, Xiangyan Yuan, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8444-193]

Experience of primary surface alignment for the LMT using a laser tracker in a non-metrology environment, David M. Gale, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). . . . . [8444-195]

Using a laser tracker for active alignment on the Large Binocular Telescope, Andrew Rakich, Large Binocular Telescope Observatory (USA) . . . . . [8444-196]

Generic misalignment aberration patterns and the subspace of benign misalignment, Paul L. Schechter, Rebecca S. Levinson, Massachusetts Institute of Technology (USA) . . . . . [8444-197]

The VST alignment: strategy and results, Pietro Schipani, INAF - Osservatorio Astronomico di Capodimonte (Italy); Roberto Ragazzoni, INAF - Osservatorio Astronomico di Padova (Italy); Lothar Noethe, European Southern Observatory (Germany); Konrad Kuijken, Leiden Univ. (Netherlands); Carmelo Arcidiacono, INAF - Osservatorio Astronomico di Bologna (Italy); Javier Argomedo, European Southern Observatory (Germany); Massimo Dall'Ora, Sergio D'Orsi, INAF - Osservatorio Astronomico di Capodimonte (Italy); Jacopo Farinato, Demetrio Magrin, INAF - Osservatorio Astronomico di Padova (Italy); Laurent Marty, INAF - Osservatorio Astronomico di Capodimonte (Italy); Gabriele Umbriaco, Univ. degli Studi di Padova (Italy) . . . . . [8444-198]

Alignment strategies for high-resolution space camera, Xiaohui Meng, Yuming Zhou, Beijing Institute of Space Mechanics and Electricity (China) . . . . . [8444-199]

Test system for a Shack-Hartmann sensor based telescope alignment demonstrated at the 40cm Wendelstein Telescope, Frank U. Grupp, Univ.-Sternwarte München (Germany) and Max-Planck-Institut für extraterrestrische Physik (Germany); ShaoMing Hu, Shandong Univ. at Weihai (China); Florian Lang-Bardl, Univ.-Sternwarte München (Germany); Stephanie Bogner, M. Becker, Fachhochschule Jena (Germany); Andreas Bode, Max-Planck-Institut für extraterrestrische Physik (Germany); Jürgen Lamprecht, OPTOCRAFT GmbH (Germany); Ulrich Hopp, Ralf Bender, Univ.-Sternwarte München (Germany) and Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8444-200]

An improved collimation algorithm for the Large Binocular Telescope using source extractor and an on-the-fly reconstructor, Douglas L. Miller, Andrew Rakich, Torsten Leibold, Large Binocular Telescope Observatory (USA) . . . . . [8444-201]

Features of a laser metrology subsystem for astrometric telescopes, Alberto Riva, Mario Gai, Mario G. Lattanzi, INAF - Osservatorio Astronomico di Torino (Italy) . . . . . [8444-202]

Design of Telescopes for Extreme Environments

Session Chair: **Jean-Gabriel Cuby,**
Observatoire Astronomique de Marseille-Provence (France)

Conceptual design of a 5-m terahertz telescope at Dome A, Dehua Yang, Hai Wang, Yong Zhang, Yi Chen, Guohua Zhou, National Astronomical Observatories (China); Jingquan Cheng, National Radio Astronomy Observatory (USA); Guoping Li, National Astronomical Observatories (China). . . . . [8444-203]

Astronomy in the Canadian high arctic: two new exoplanet survey instruments at a new observatory, Nicholas M. Law, Univ. of Toronto (Canada); Suresh Sivanandam, Dunlap Institute for Astronomy & Astrophysics (Canada); Richard Murowinski, National Research Council Canada (Canada); Raymond G. Carlberg, Univ. of Toronto (Canada); Aida Ahmadi, Pegah Salbi, Dunlap Institute for Astronomy & Astrophysics (Canada); Eric Steinbring, National Research Council Canada (Canada); James R. Graham, Dunlap Institute for Astronomy & Astrophysics (Canada) . . . . . [8444-204]

A simple wide-field telescope design for Antarctica, Will Saunders, Australian Astronomical Observatory (Australia) . . . . . [8444-205]

Cases for infrared astronomy and astrophysics for Antarctica, Nicolas Epchtein, Lab. J.L. Lagrange (France); Gil Moretto, Institut de Physique Nucléaire de Lyon (France); Lyu Abe, Lab. J.L. Lagrange (France); Maud P. Langlois-Moretto, Isabelle Vauglin, Ctr. de Recherche Astronomique de Lyon (France); Charling Tao, Ctr. de Physique des Particules de Marseille (France); Thibeau Le Bertre, Observatorie de Paris (France); Andre Tilquin, Institut National de Physique Nucléaire et de Physique des Particules (France) . . . . . [8444-206]

The package cushioning design of the first AST3 and its dynamics analysis, Haikun Wen, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8444-207]

Nonlinear disturbance of Large Optical Antarctic Telescope, Shihai Yang, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8444-208]

Where is Ridge A?, Geoff Sims, The Univ. of New South Wales (Australia); Will Saunders, Australian Astronomical Observatory (Australia); Craig A. Kulesa, Steward Observatory (USA); Michael C. B. Ashley, John W. V. Storey, The Univ. of New South Wales (Australia); Jon S. Lawrence, Australian Astronomical Observatory (Australia) . . . . . [8444-209]

Two years of polar winter observations with the ASTEP400 telescope, Lyu Abe, Jean-Pierre Rivet, Tristan Guillot, Mauro Barbieri, Lab. J.L. Lagrange (France) and Observatoire de la Côte d'Azur (France) and CNRS (France); Nicolas Crouzet, Space Telescope Science Institute (USA); François Fressin, Harvard-Smithsonian Ctr. for Astrophysics (USA); Abdelkarim Agabi, Djamel Mékarnia, Jean-Baptiste Daban, Carole Gouvret, Yan Fanteï-Caujolle, Ivan Gonçalves, Eric Aristidi, François-Xavier Schmider, Alex Robini, Lab. J.L. Lagrange (France) and Observatoire de la Côte d'Azur (France) and CNRS (France); Erick Bondoux, IPEV (France) . . . . . [8444-210]

Observatory Control Systems

Session Chair: **Larry M. Stepp,**
Thirty Meter Telescope Observatory Corp. (USA)

Tracking control system development, tuning, and testing for the Hobby-Eberly Telescope wide field upgrade, Joseph H. Beno, Ian M. Soukup, Charles E. Penney, Jorge D. Esguerra, Marc D. Rafal, Mark E. Cornell, The Univ. of Texas at Austin (USA) . . . . . [8444-211]

An upgrade to the telescope control system (TCS) for the Canada-France-Hawaii Telescope, Kevin K. Ho, William L. Cruise, James N. Thomas, Canada-France-Hawaii Telescope (USA) . . . . . [8444-212]

Automation of the OAN/SPM 1.5-meter Johnson Telescope for operations with RATIR, Alan M. Watson, Michael G. Richer, Univ. Nacional Autónoma de México (Mexico); Joshua S. Bloom, Univ. of California, Berkeley (USA); Nathaniel R. Butler, Arizona State Univ. (USA); Urania Ceseña, David Clark, Enrique Colorado, Antolín Córdova, Alejandro D. Simón Farah, Lester Fox-Machado, Univ. Nacional Autónoma de México (Mexico); Ori D. Fox, National Aeronautics and Space Administration (USA); Benjamín García, Leonid N. Georgiev, J. Jesús González-Hernandez, Gerardo Guisa, Leonel Gutiérrez, Joel Herrera Vazquez, Univ. Nacional Autónoma de México (Mexico); Christopher R. Klein, Univ. of California, Berkeley (USA); Alexander S. Kutyrev, National Aeronautics and Space Administration (USA); Francisco Lazo, William H. Lee, Eduardo López, Esteban A. Luna-Aguilar, Benjamín Martínez, Francisco Murillo, José Manuel Murillo, Juan Manuel Nunez Alfonso, Univ. Nacional Autónoma de México (Mexico); J. Xavier Prochaska, Univ. of California, Santa Cruz (USA); José Luís Ochoa, Fernando Quirós, Univ. Nacional Autónoma de México (Mexico); David A. Rapchun, National Aeronautics and Space Administration (USA); Carlos Román-Zuniga, Gennady Valyavin, Univ. Nacional Autónoma de México (Mexico). . . . . [8444-214]

The first Antarctic Survey Telescope control system, Xiaoyan Li, Daxing Wang, Lingzhe Xu, Jianlin Zhao, Yi Zhang, Fujia Du, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8444-216]

Development of an EtherCAT enabled digital servo controller for the GBT, Peter G. Whiteis, National Radio Astronomy Observatory (USA) . . . . . [8444-217]

Design and development of telescope control system and software for the 50/80 cm Schmidt telescope, Kumar S. Tripurari, Ravi Banavar, Indian Institute of Technology Bombay (India). . . . . [8444-218]

Upgrading the MMT primary mirror actuator test stand: a unique vehicle for evaluating EtherCAT as a future I/O standard for systems, Dusty L. Clark, Skip Schaller, MMT Observatory (USA) . . . . . [8444-219]

MMT nightly tracking logs: a web-enabled database for continuous evaluation of tracking performance, Dusty L. Clark, J. Duane Gibson, Dallan Porter, Thomas Trebisky, MMT Observatory (USA) . . . . . [8444-220]

Pointing and tracking results of VST telescope, Pietro Schipani, Carmelo Arcidiacono, INAF - Osservatorio Astronomico di Capodimonte (Italy); Javier Argomedo, European Southern Observatory (Germany); Massimo Dall'Ora, Sergio D'Orsi, INAF - Osservatorio Astronomico di Capodimonte (Italy); Jacopo Farinato, Demetrio Magrin, INAF - Osservatorio Astronomico di Padova (Italy); Laurent Marty, INAF - Osservatorio Astronomico di Capodimonte (Italy); Roberto Ragazzoni, INAF - Osservatorio Astronomico di Padova (Italy); Gabriele Umbriaco, Univ. degli Studi di Padova (Italy) . . . . . [8444-221]

Project Reviews

Session Chair: **Donald W. Sweeney,** LSST Corp. (USA)

Design and fabrication of three 1.6-meter telescopes for the KMTNet Project, Wade M. Poteet, Harold Cauthen, CP Systems, Inc. (USA) . . [8444-223]

Introduction of Chinese SONG Telescope, Guomin Wang, Bozhong Gu, Songfeng Kou, Changzhi Ren, Lingzhe Xu, Xiang Jiang, Zhiyong Zhang, Dongsheng Niu, Yu Ye, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8444-224]

Perspectives of astronomy in Kazakhstan: from new ground-based telescopes to space ones, Chingis T. Omarov, Zhumabek S. Zhantayev, Fessenkov Astrophysical Institute (Kazakhstan) . . . . . [8444-225]

Development and deployment status of the Las Cumbres Observatory Global Telescope Network, Andrew J. Pickles, Wayne E. Rosing, Las Cumbres Observatory Global Telescope Network (USA); LCOGT d. net, ... [8444-226]

Posters: Radio Telescopes

Session Chair: **Göran Sandell,** NASA Ames Research Ctr. (USA)

The microwave holography system for the Sardinia Radio Telescope, Giampaolo Serra, Pietro Bolli, INAF - Osservatorio Astronomico di Cagliari (Italy); Giovanni Busonera, CRS4 (Italy); Tonino Pisanu, Sergio Poppi, Francesco Gaudiomonte, INAF - Osservatorio Astronomico di Cagliari (Italy); Gianpaolo Zacchiroli, Juri Roda, Marco Morsiani, INAF - Istituto di Radioastronomia (Italy); J. A. Lopez-Perez, Centro Astronomico de Yebes (Spain) . . . . . [8444-227]

Structural optimization of the outer ring of FAST Telescope, Xin-yu Zhang, National Astronomical Observatories (China) and Graduate Univ. of Chinese Academy of Sciences (China); Hui Li, Shi-mo Yang, National Astronomical Observatories (China) . . . . . [8444-228]

Experimental study on the damping of FAST cabin suspension system, Hui Li, Jinghai Sun, National Astronomical Observatories (China); Xin-yu Zhang, National Astronomical Observatories (China) and Graduate Univ. of Chinese Academy of Sciences (China); Wenbai Zhu, Gaofeng Pan, Qingge Yang, National Astronomical Observatories (China) . . . . . [8444-229]

Segmented Mirror Alignment, Phasing, and Wavefront Control

Session Chair: **Xiangqun Cui,**
Nanjing Institute of Astronomical Optics & Technology (China)

Control algorithm for the petal-shape segmented-mirror telescope with 18 mirrors, Atsushi Shimono, The Univ. of Tokyo (Japan); Fumihide Iwamuro, Kyoto Univ. (Japan); Mikio Kurita, Nagoya Univ. (Japan); Yuuki Moritani, Kyoto Univ. (Japan); Masaru Kino, Nagoya Univ. (Japan); Toshinori Maihara, Nano-Optonics Energy (Japan); Hideyuki Izumiura, National Astronomical Observatory of Japan (Japan); Michitoshi Yoshida, Hiroshima Univ. (Japan) . . . . . [8444-230]

How to calibrate edge sensors on segmented mirror telescopes, Jean C. Shelton, Lewis C. Roberts, Jr., Jet Propulsion Lab. (USA) . . . . . [8444-231]

Outdoors phasing progress of dispersed fringe sensing technology in NIAOT, China, Yong Zhang, Xiangqun Cui, Genrong Liu, Yuefei Wang, Jijun Ni, Hongmei Li, Yizhong Zeng, Aihua Li, Yeping Li, Zhixu Wu, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8444-232]

Site Characterization, Testing, and Development

Session Chair: **Helen J. Hall,** NASA Ames Research Ctr. (USA)

The new TNG-DIMM: calibrations and first data analysis, Emilio Molinari, Albar Garcia de Gurtubai Escudero, Jose Juan San Juan, Telescopio Nazionale Galileo (Italy); Valentina Zitelli, Antonio Della Valle, INAF - Osservatorio Astronomico di Bologna (Italy); Sergio Ortolani, Univ. degli Studi di Padova (Italy) . . . . . [8444-233]

E-ELT site testing: first statistics of atmospheric seeing and isoplanatic angle at Jbel Aklim site in Moroccan Anti-Atlas, Zouhair Z. Benkhaldoun, Mohammed Sabil, Mohamed Lazrek, Abdelmajid M. Benhida, Abdelfattah Habib, Youssef Hach, Abdelhadi Jabiri, Youssef El Azhari, Univ. Cadi Ayyad (Morocco) . . . . . [8444-234]

Atmospheric turbulence measurements at Ali Observatory, Tibet, Liyong Liu, Yongqiang Yao, National Astronomical Observatories (China); Jean Vernin, Lab. J.L. Lagrange (France). . . . . [8444-235]

New Moroccan site testing study, El Arbi Siher, Univ. Sultan Moulay Slimane (Morocco) . . . . . [8444-236]

E-ELT seeing and isoplanatic angle: comparison of Aklim site and El Roque de Los Muchachos Observatory, Mohammed Sabil, Zouhair Z. Benkhaldoun, Mohamed Lazrek, Abdelfattah Habib, Abdelmajid M. Benhida, Youssef Hach, Youssef El Azhari, Thami El Halkouj, Univ. Cadi Ayyad (Morocco). . . . [8444-237]

Comparison between astroclimatic parameters and 200 mbar wind at ELT and TMT candidate sites, Aziza Bounhir, Abdelhadi Jabiri, Youssef Hach, Zouhair Z. Benkhaldoun, Univ. Cadi Ayyad (Morocco) . . . . . [8444-238]

Dust concentration and soil properties at the TMT candidate sites, Sebastian G. Els, Thirty Meter Telescope Observatory Corp. (USA) and Gaia Data Processing & Analysis Consortium (Spain); Reed L. Riddle, Caltech Optical Observatories (USA); Matthias Schoeck, Thirty Meter Telescope Observatory Corp. (Canada); Warren A. Skidmore, Tony Travouillon, Thirty Meter Telescope Observatory Corp. (USA). . . . . [8444-239]

Surface layer turbulence measurements on the LSST site El Peñon using microthermal sensors and the lunar scintillometer LuSci, Jacques Sebag, National Optical Astronomy Observatory (USA); Peter C. Zimmer, Jonathan H. Turner, John T. McGraw, The Univ. of New Mexico (USA); Victor L. Krabbendam, National Optical Astronomy Observatory (USA); Andrei A. Tokovinin, Cerro Tololo Inter-American Observatory (Chile); Oliver Wiecha, National Optical Astronomy Observatory (USA) . . . . . [8444-240]

Overview of site monitoring at the SAAO, Timothy E. Pickering, Steven M. Crawford, Laure Catala, South African Astronomical Observatory (South Africa). . . . . [8444-241]

Evaluations of new atmospheric windows at thirty micron wavelengths for astronomy, Takashi Miyata, Shigeyuki Sako, Takafumi Kamizuka, Tomohiko Nakamura, Kentaro Asano, Mizuho Uchiyama, Masahiro Konishi, The Univ. of Tokyo (Japan); Mizuki Yoneda, Tohoku Univ. (Japan); Naruhisa Takato, Subaru Telescope, National Astronomical Observatory of Japan (Japan); Yuzuru Yoshii, Mamoru Doi, Kotaro Kohno, Kimiaki Kawara, Masuo Tanaka, Kentaro Motohara, Takeo Minezaki, Toshihiko Tanabe, Tomoki Morokuma, Yoichi Tamura, Tsutomu Aoki, Takao Soyano, Ken'ichi Tarusawa, Hidenori Takahashi, Shintaro Koshida, Natsuko M. Kato, The Univ. of Tokyo (Japan). . . . . [8444-242]

Atmospheric seeing measurements obtained with MISOLFA in the framework of the PICARD Mission, Rabah Ikhlef, Univ. de Nice Sophia Antipolis (France); Abdenour Irbah, Lab. Atmosphères, Milieux, Observations Spatiales (France); Thierry Corbard, Fréderic Morand, Pierre Assus, Univ. de Nice Sophia Antipolis (France); Maamar Fodil, Ctr. de Recherche en Astronomie, Astrophysique et Géophysique (Algeria); Bertrand Chauvineau, Catherine Renaud, Julien Borgnino, François Martin, Univ. de Nice Sophia Antipolis (France); Mustapha Meftah, Lab. Atmosphères, Milieux, Observations Spatiales (France); Michel Rouze, Ctr. National d'Études Spatiales (France). . . . [8444-243]

Telescope Optical Designs

Session Chair: **Roberto Gilmozzi,**
European Southern Observatory (Germany)

Optical system of Chinese SONG telescope, Songfeng Kou, Guomin Wang, Genrong Liu, Nanjing Institute of Astronomical Optics & Technology (China); . . . . . [8444-244]

Design of an off-axis optical reflective telescope systems, Yuri V. Bazhanov, Vadim Vlahko, Precision Systems and Instruments Corp. (Russian Federation) . . . . . [8444-245]

Interferometric apodization of circular aperture using homothety, part II: application to stellar coronagraphy, Ossama Azagrouze, Habib Abdelfettah, Elazhari Youssef, Zouhair Z. Benkhaldoun, Mohamed Lazrek, Univ. Cadi Ayyad (Morocco) . . . . . [8444-246]

The dome flat-fielding system for the 1.3m Araki Telescope, Tomohiro Yoshikawa, Yuji Ikeda, Naofumi Fujishiro, Kyoto Sangyo Univ. (Japan) and Koyama Astronomical Observatory (Japan); Shunsuke Ichizawa, Cybernet Systems Co., Ltd. (Japan); Akira Arai, Mizuki Isogai, Atsunori Yonehara, Hideyo Kawakita, Kyoto Sangyo Univ. (Japan) and Koyama Astronomical Observatory (Japan). . . . . [8444-248]

Fast and compact wide-field Gregorian telescope, Mehdi Bahrami, Alexander V. Goncharov, National Univ. of Ireland, Galway (Ireland) . . . . . [8444-249]

Optical design for amateur reflecting telescopes based on tilted axial-symmetrical planoidal mirror, Sergey A. Chuprakov, Institute of Solar-Terrestrial Physics (Russian Federation) . . . . . [8444-250]

Preliminary optical design for the WHT two-degree prime focus corrector, Tibor Agocs, ASTRON (Netherlands); Don Carlos Abrams, Diego Cano Infantes, Neil O'Mahony, Isaac Newton Group of Telescopes (Spain); Kevin M. Dee, Engineering & Project Solutions Ltd. (United Kingdom); Jean-Baptiste Daban, Carole Gouvret, Sebastien Ottogalli, Lab. Fizeau (France) . . . . . [8444-251]

Optical system and design of the quasi-Richy-Cretien 1.6 meter wide-field telescope for Sayan Observatory, Pavel G. Papushev, Institute of Solar-Terrestrial Physics (Russian Federation) . . . . . [8444-252]

Wednesday 4 July

PLENARY SESSION

Room: Auditorium . . . . . Wed. 09.00 to 10.00

Session Chair: **Luc Simard,**
National Research Council Canada (Canada)

09.00: **Very high energy gamma ray astronomy with the H.E.S.S. telescopes** *(Presentation Only)*, Werner Hofmann, Max-Planck-Institut für Kernphysik (Germany) . . . . . [8442-505]

09.30: **The cosmic microwave background: observing directly the early universe**, Paolo de Bernardis, Silvia Masi, Univ. degli Studi di Roma La Sapienza (Italy) . . . . . [8442-506]

Coffee Break . . . . . 10.00 to 10.30

SESSION 15

Room: Auditorium . . . . . Wed. 10.30 to 12.20

Extremely Large Telescopes

Session Chair: **Roberto Gilmozzi,**
European Southern Observatory (Germany)

10.30: **E-ELT update of project and effect of change to 39m design** *(Invited Paper)*, Alistair M. McPherson, Enzo T. Brunetto, Philippe Dierickx, Mark M. Casali, Markus Kissler-Patig, European Southern Observatory (Germany) . . . . . [8444-50]

11.00: **Thirty Meter Telescope project update** *(Invited Paper)*, Larry M. Stepp, Gary H. Sanders, Thirty Meter Telescope Observatory Corp. (USA) . . . [8444-51]

11.30: **Giant Magellan Telescope: overview** *(Invited Paper)*, Matt Johns, Patrick J. McCarthy, Keith Raybould, Antonin Bouchez, Arash Farahani, Jose M. Filgueira, George H. Jacoby, Stephen A. Shectman, Michael Sheehan, Giant Magellan Telescope Project (USA) . . . . . [8444-52]

12.00: **Science with the re-baselined European Extremely Large Telescope**, Markus Kissler-Patig, Jochen Liske, European Southern Observatory (Germany) . . . . . [8444-54]

Lunch/Exhibition Break . . . . . 12.20 to 14.10

SESSION 17

Room: Auditorium . . . . . Wed. 14.10 to 15.10

Site Characterization, Testing, and Development

Session Chair: **Helen J. Hall,** NASA Ames Research Ctr. (USA)

14.10: **Opacity measurements at Summit Camp in Greenland and PEARL in northern Canada with 225 GHz tipping radiometer**, Keiichi Asada, Pierre L. Martin-Cocher, Chien-Ping Chen, Satoki Matsushita, Ming-Tang Chen, Yau-De Huang, Makoto Inoue, Paul T. P. Ho, Institute of Astronomy and Astrophysics, Academia Sinica (Taiwan); Scott N. Paine, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8444-55]

14.30: **Site characterization studies in high plateau of Tibet**, Yongqiang Yao, National Astronomical Observatories (China) . . . . . [8444-56]

14.50: **New instruments to calibrate atmospheric transmission**, Peter C. Zimmer, John T. McGraw, Daniel C. Zirzow, Jeffrey C. Karle, The Univ. of New Mexico (USA); Keith R. Lykke, John T. Woodward IV, Claire E. Cramer, National Institute of Standards and Technology (USA) . . . . . [8444-57]

Coffee Break . . . . . 15.10 to 15.40

SESSION 18

Room: Auditorium . . . . . Wed. 15.40 to 17.50

Design of Telescopes for Extreme Environments

Session Chair: **Jean-Gabriel Cuby,** Observatoire Astronomique de Marseille-Provence (France)

15.40: **The Kunlun Dark Universe Survey Telescope** *(Invited Paper)*, Lifan Wang, Texas A&M Univ. (USA); Xiangqun Cui, Xiangyan Yuan, Yongtian Zhu, Nanjing Institute of Astronomical Optics & Technology (China); Zhaohui Shang, Tianjin Normal Univ. (China) . . . . . [8444-58]

16.10: **A new telescope for ground-based THz astronomy**, Raymond Blundell, Smithsonian Astrophysical Observatory (USA); Keiichi Asada, Academia Sinica (Taiwan); Roberto L. Burgos, Smithsonian Astrophysical Observatory (USA); Ming-Tang Chen, Academia Sinica (Taiwan); Paul K. Grimes, Smithsonian Astrophysical Observatory (USA); Paul T. P. Ho, Yau-De Huang, Makoto Inoue, Academia Sinica (Taiwan); Eric Keto, Smithsonian Astrophysical Observatory (USA); Pierre L. Martin-Cocher, George U. Nystrom, Academia Sinica (Taiwan); Scott N. Paine, Nimesh A. Patel, Smithsonian Astrophysical Observatory (USA); Philippe Raffin, Academia Sinica (Taiwan); Tirupati K. Sridharan, Cheuk-Yu E. Tong, Smithsonian Astrophysical Observatory (USA) . . . . . [8444-59]

16.30: **Status of the first Antarctic Schmidt Telescopes (AST3) for Dome A**, Xiangyan Yuan, Nanjing Institute of Astronomical Optics & Technology (China); Xiangqun Cui, Nanjing Institute of Astronomical Optics&Technology (China); Xuefei Gong, Nanjing Institute of Astronomical Optics &Technology (China); Daxing Wang, Fujia Du, Nanjing Institute of Astronomical Optics&Technology (China); Zhengyang Li, Nanjing Institute of Astronomical Optics & Technology (China); Yi Zhang, Nanjing Institute of Astronomical Optics&Technology (China); Yi Hu, National Astronomical Observatories (China); Zhaohui Shang, Tianjin Normal Univ. (China); Lifan Wang, Purple Mountain Observatory (China); Xiaoyan Li, Lingzhe Xu, Nanjing Institute of Astronomical Optics&Technology (China) . . . . . [8444-60]

16.50: **Ukpik: testbed for a miniaturized robotic astronomical observatory on a high Arctic mountain**, Eric Steinbring, Brian M. Leckie, Tim Hardy, Kris Caputa, J. Murray Fletcher, National Research Council Canada (Canada) . . . . . [8444-61]

17.10: **The Gattini South Pole UV experiment**, Anna M. Moore, California Institute of Technology (USA) . . . . . [8444-62]

17.30: **PLATO-R: a new concept for Antarctic science**, Michael C. B. Ashley, Yael Augarten, Colin S. Bonner, Luke Bycroft, The Univ. of New South Wales (Australia); Jon S. Lawrence, Australian Astronomical Observatory (Australia); Daniel M. Luong-Van, Scott McDaid, Campbell McLaren, Geoff Sims, John W. V. Storey, The Univ. of New South Wales (Australia) . . . . . [8444-63]

SESSION 19

Room: Auditorium . . . . . Wed. 17.50 to 18.10

Control of Thermal Environment

Session Chair: **Jean-Gabriel Cuby,** Observatoire Astronomique de Marseille-Provence (France)

17.50: **Canada-France-Hawaii Telescope image quality improvement initiative: thermal assay of the observing environment**, Karunananth G. Thanjavur, Kevin K. Ho, Steven E. Bauman, Derrick Salmon, Sarah Gajadhar, Canada-France-Hawaii Telescope (USA) . . . . . [8444-64]

Thursday 5 July

PLENARY SESSION

Room: Auditorium . . . . . Thurs. 09.30 to 10.00

Session Chair: **Gillian S. Wright,**
UK Astronomy Technology Ctr. (United Kingdom)

09.30: **ALMA construction and early science**, Mattheus W. M. de Graauw, Lewis Ball, Joint ALMA Observatory (Chile) . . . . . [8444-507]

Coffee Break . . . . . 10.00 to 10.30

SESSION 20

Room: Auditorium . . . . . Thurs. 10.30 to 12.00

Project Reviews

Session Chair: **Donald W. Sweeney,** LSST Corp. (USA)

10.30: **New optical telescope projects at Devasthal Observatory** *(Invited Paper)*, Ram Sagar, Brijesh Kumar, Amitesh Omar, Anil K. Pandey, Aryabhatta Research Institute of Observational Sciences (India) . . . . . [8444-65]

11.00: **Toward a National Astronomy Observatory for the United Arab Emirates**, Johan Maree, Yasir Al Muqbel, Emirates Institution for Advanced Science and Technology (United Arab Emirates); Sebastian G. Els, Gaia Data Processing & Analysis Consortium (Spain); Salem Al Marri, Ibrahim Kursany, Abdel Rehman Yousif, Emirates Institution for Advanced Science and Technology (United Arab Emirates); Hamid Al-Naimiy, Univ. of Sharjah (United Arab Emirates) . . . . . [8444-66]

11.20: **The 3.6 m Indo-Belgian Devasthal Optical Telescope: general description**, Nathalie Ninane, Carlo Flebus, AMOS Ltd. (Belgium); Brijesh Kumar, Aryabhatta Research Institute of Observational Sciences (India)[8444-67]

11.40: **Designing, manufacturing, testing, and integrating a 2.5m telescope**, Florence Poutriquet, Patrick Plainchamp, Jacques Billet, Bruno Pernet, Thierry Lagrange, Cyril Cavadore, Jean-Louis Carel, Hervé Leplan, Eric Ruch, Roland Geyl, Jean-Claude Jouve, Sagem Défense Sécurité (France) . . . . . [8444-68]

Lunch Break . . . . . 12.00 to 13.30

SESSION 21

Room: Auditorium . . . . . Thurs. 13.30 to 15.10

Enabling Technologies for Extremely Large Telescopes I

Session Chair: **Larry M. Stepp,**
Thirty Meter Telescope Observatory Corp. (USA)

13.30: **E-ELT optomechanics: overview**, Marc Cayrel, European Southern Observatory (Germany) . . . . . [8444-69]

13.50: **E-ELT M1 test facility**, Martin Dimmler, Juan Marrero, Samuel A. Lévêque, Pablo Barriga, Babak Sedghi, Michael Mueller, European Southern Observatory (Germany) . . . . . [8444-70]

14.10: **Active damping strategies for control of the E-ELT field stabilization mirror**, Babak Sedghi, Martin Dimmler, Michael Mueller, European Southern Observatory (Germany) . . . . . [8444-71]

14.30: **Adaptive optics performance under segmentation errors: measurements versus theoretical predictions**, Michael Esselborn, Natalia Yaitskova, Emmanuel Aller-Carpentier, European Southern Observatory (Germany); Isabelle Surdej, Univ. Libre de Bruxelles (Belgium); Henri Bonnet, European Southern Observatory (Germany); Frédéric Y. J. Gonte, European Southern Observatory (Chile); Lothar Noethe, European Southern Observatory (Germany) . . . . . [8444-72]

14.50: **Repairing stress induced cracks in the Keck primary mirror segments**, Dennis McBride, John S. Hudek, W. M. Keck Observatory (USA) . . . . . [8444-73]

Coffee Break . . . . . 15.10 to 15.40

SESSION 22

Room: Auditorium . . . . . Thurs. 15.40 to 17.00

Enabling Technologies for Extremely Large Telescopes II

Session Chair: **Heather K. Marshall,** National Solar Observatory (USA)

15.40: **Alignment algorithms for the Thirty Meter Telescope**, Gary Chanan, University of California, Irvine (USA) . . . . . [8444-74]

16.00: **Phasing metrology system for the GMT**, D. Scott Acton, Ball Aerospace & Technologies Corp. (USA); Antonin H. Bouchez, Giant Magellan Telescope Project (USA) . . . . . [8444-75]

16.20: **Performance prediction of the fast steering secondary mirror for the Giant Magellan Telescope**, Myung K. Cho, National Optical Astronomy Observatory (USA); Andrew Corredor, Christoph Dribusch, The Univ. of Arizona (USA); Won Hyun Park, College of Optical Sciences, The Univ. of Arizona (USA); Michael Sheehan, Matt Johns, Stephen A. Shectman, Jonathan Kern, Giant Magellan Telescope Project (USA); Young-Soo Kim, Korea Astronomy and Space Science Institute (Korea, Republic of) . . . . . [8444-76]

16.40: **Dynamics, active optics, and scale effects in future extremely large telescopes**, Renaud P. Bastaits, Univ. Libre de Bruxelles (Belgium); Goncalo Rodrigues, European Space Agency (Netherlands); Bilal Mokrani, Univ. Libre de Bruxelles (Belgium); André J. Preumont, Univ. of Brussels (Belgium) . . [8444-77]

SESSION 23

Room: Auditorium . . . . . Thurs. 17.00 to 17.40

Segmented Mirror Alignment, Phasing, and Wavefront Control

Session Chair: **Xiangqun Cui,**
Nanjing Institute of Astronomical Optics & Technology (China)

17.00: **The development of the actuator prototypes for the active reflector of FAST**, Qi-Ming Wang, MingChang Wu, Ming Zhu, JianXing Xue, Qing Zhao, National Astronomical Observatories (China) . . . . . [8444-78]

17.20: **Modeling a large submillimeter-wave observatory with recent results**, John Z. Lou, David C. Redding, Andrew Kissil, Charles M. Bradford, Jet Propulsion Lab. (USA); Steven Padin, David P. Woody, California Institute of Technology (USA) . . . . . [8444-79]

SESSION 24

Room: Auditorium . . . . . Thurs. 17.40 to 18.00

Observatory Facilities

Session Chair: **Xiangqun Cui,**
Nanjing Institute of Astronomical Optics & Technology (China)

17.40: **Design, development, and manufacturing of highly advanced and cost effective aluminium sputtering plant for large area telescopic mirrors**, Rajeev R. Pillai, Hind High Vacuum Co. Pvt. Ltd. (India) and Aryabhatta Research Institute of Observational Sciences (India); Vishal Shukla, Aryabhatta Research Institute of Observational Sciences (India); K. Mohanachandran, Nagarjun Sakhamuri, Sanjith K. Karumana, Hind High Vacuum Co. Pvt. Ltd. (India); Alok Gupta, Aryabhatta Research Institute of Observational Sciences (India) . . . . . [8444-80]

Friday 6 July

SESSION 25

Room: Auditorium . . . . . Fri. 08.30 to 10.30

Square Kilometer Array and SKA Pathfinders

Session Chair: **Helen J. Hall,** NASA Ames Research Ctr. (USA)

08.30: **The Square Kilometre Array** *(Invited Paper)*, Michiel P. van Haarlem, SKA Organisation (United Kingdom) . . . . . [8444-81]

09.00: **ASKAP: the Australian SKA Pathfinder** *(Invited Paper)*, Antony E. Schinckel, Commonwealth Scientific and Industrial Research Organisation (Australia) . . . . . [8444-82]

09.30: **LOFAR, the low frequency array** *(Invited Paper)*, Rene Vermeulen, ASTRON (Netherlands) . . . . . [8444-83]

10.00: **The MeerKAT Radio Telescope** *(Invited Paper)*, Justin Jonas, Rhodes Univ. (South Africa) . . . . . [8444-84]

Coffee Break . . . . . 10.30 to 11.00

SESSION 26

Room: Auditorium . . . . . Fri. 11.00 to 12.20

Radio Telescopes

Session Chair: **Göran Sandell,** NASA Ames Research Ctr. (USA)

11.00: **The RAEGE VLBI 2010 radiotelescope design**, Eberhard Sust, MT Mechatronics GmbH (Germany); José Antonio López Fernández, Instituto Geográfico Nacional (Spain) . . . . . [8444-85]

11.20: **Architecture of the metrology for the SRT**, Tonino Pisanu, Franco Buffa, Gian Luigi Deiana, Pasqualino Marongiu, INAF - Osservatorio Astronomico di Cagliari (Italy); Marco Morsiani, INAF - Istituto di Radioastronomia (Italy); Claudio Pernechele, INAF - Osservatorio Astronomico di Padova (Italy); Sergio Poppi, Giampaolo Serra, INAF - Osservatorio Astronomico di Cagliari (Italy) . . . . . [8444-86]

11.40: **Requirements and considerations of the surface error control for the active reflector of FAST**, MingChang Wu, Qi-Ming Wang, National Astronomical Observatories (China) . . . . . [8444-87]

12.00: **Adjustment and alignment of the Sardinia Radio Telescope mirrors**, Martin Süss, Dietmar Koch, MT Mechatronics GmbH (Germany); Heiko Paluszek, sigma3D (Germany) . . . . . [8444-88]

Lunch Break . . . . . 12.20 to 13.50

SESSION 27

Room: Auditorium . . . . . Fri. 13.50 to 15.20

Millimeter and Submillimeter Wavelength Telescopes I

Session Chair: **Roberto Gilmozzi,**
European Southern Observatory (Germany)

13.50: **Atacama large millimeter/submillimeter array (ALMA): construction and start of early science** *(Invited Paper)*, Mattheus W. M. de Graauw, ALMA (Chile); Satoru Iguchi, National Astronomical Observatory of Japan (Japan); Mark M. McKinnon, National Radio Astronomy Observatory (USA); Wolfgang Wild, European Southern Observatory (Germany); Richard J. Kurz, Richard E. Hills, ALMA (Chile) . . . . . [8444-89]

14.20: **ALMA commissioning and science verification**, Richard E. Hills, Alison B. Peck, Joint ALMA Observatory (Chile) . . . . . [8444-90]

14.40: **Final tests and performances verification of the European ALMA antennas**, Gianpietro Marchiori, Francesco Rampini, European Industrial Engineering s.r.l. (Italy) . . . . . [8444-91]

15.00: **ALMA system verification**, Richard Sramek, Koh-Ichiro Morita, Masahiro Sugimoto, Peter J. Napier, Maurizio Miccolis, Pavel A. Yagoubov, Denis Barkats, William R. Dent, ALMA/JAO (Chile); Satoki Matsushita, ASIAA/JAO (Chile); Nicholas D. Whyborn, Shin'ichiro Asayama, Javier Marti Canales, Ravinder S. Bhatia, Eugene DuVall, Samantha Blair, ALMA/JAO (Chile) . . . . . [8444-92]

Coffee Break . . . . . 15.20 to 15.50

SESSION 28

Room: Auditorium . . . . . Fri. 15.50 to 17.20

Millimeter and Submillimeter Wavelength Telescopes II

Session Chair: **Javier Marti Canales,** Joint ALMA Observatory (Chile)

15.50: **The Large Millimeter Telescope (LMT): current status and preparations for early science observations** *(Invited Paper)*, David H. Hughes, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). . . . . [8444-93]

16.20: **The CCAT 25 m diameter submillimeter-wave telescope**, David P. Woody, Owens Valley Radio Observatory (USA); Steven Padin, Paul Rasmussen, California Institute of Technology (USA); David C. Redding, Andrew Kissil, John Z. Lou, Jet Propulsion Lab. (USA); Eric Chauvin, Consultant (USA) . . . . [8444-94]

16.40: **High performance holography mapping with the LMT**, David R. Smith, MERLAB, P.C. (USA); Kamal Souccar, Univ. of Massachusetts Amherst (USA) . . . . . [8444-95]

17.00: **Photonic local oscillator technics for large-scale interferometers**, Hitoshi Kiuchi, Masao Saito, Satoru Iguchi, National Astronomical Observatory of Japan (Japan) . . . . . [8444-96]

Sunday-Friday 1-6 July 2012 • Proceedings of SPIE Vol. 8445

Optical and Infrared Interferometry III


Delplancke


Rajagopal


Malbet

Conference Chairs: **Françoise Delplancke,** European Southern Observatory (Germany); **Jayadev K. Rajagopal,** National Optical Astronomy Observatory (USA); **Fabien Malbet,** Institut de Planétologie et d'Astrophysique de Grenoble (France)

Program Committee: **Olivier Absil,** Institut d'Astrophysique et de Géophysique de Liège (Belgium); **Rachel L. Akeson,** California Institute of Technology (USA); **Michelle J. Creech-Eakman,** Magdalena Ridge Observatory (USA) and New Mexico Institute of Mining and Technology (USA); **William C. Danchi,** NASA Goddard Space Flight Ctr. (USA); **Stefan Gillessen,** Max-Planck-Institut für extraterrestrische Physik (Germany); **Thomas M. Herbst,** Max-Planck-Institut für Astronomie (Germany); **Michael J. Ireland,** Macquarie Univ. (Australia); **Antoine Mérand,** European Southern Observatory (Chile); **Romain G. Petrov,** Obervatorie de la Cote d'Azur (France); **Hiroshi Shibai,** Osaka Univ. (Japan); **Theo A. ten Brummelaar,** Georgia State Univ. (USA); **Christopher Tycner,** Central Michigan Univ. (USA); **Julien M. Woillez,** W. M. Keck Observatory (USA)

Sunday 1 July

SESSION 1

Room: E102 . . . . . Sun. 13.30 to 15.20

Space Aperture Imaging

Session Chair: **Françoise Delplancke,**
European Southern Observatory (Germany)

13.30: **Cophasing segmented pupils with sparse-aperture interferometry** *(Invited Paper)*, Peter G. Tuthill, Anthony K. Cheetham, The Univ. of Sydney (Australia); Anand Sivaramakrishnan, Space Telescope Science Institute (USA); James P. Lloyd, Cornell Univ. (USA) . . . . . [8445-01]

14.00: **Probing dusty circumstellar environments with polarimetric aperture-masking interferometry (THESIS)**, Barnaby R. Norris, Peter G. Tuthill, The Univ. of Sydney (Australia); Michael J. Ireland, Macquarie Univ. (Australia) and Australian Astronomical Observatory (Australia); Sylvestre Lacour, Observatoire de Paris à Meudon (France) . . . . . [8445-02]

14.20: **Super resolution from diffraction limited images with kernel-phases**, Frantz Martinache, Subaru Telescope, National Astronomical Observatory of Japan (USA). . . . . [8445-03]

14.40: **Progress and challenges with the Dragonfly instrument: an integrated-photonic pupil-remapping interferometer**, Nemanja Jovanovic, Macquarie Univ. (Australia); Peter G. Tuthill, Barnaby R. Norris, The Univ. of Sydney (Australia); Simon Gross, Macquarie Univ. (Australia); Paul Stewart, Ned Charles, The Univ. of Sydney (Australia); Sylvestre Lacour, Observatoire de Paris à Meudon (France); Jon S. Lawrence, Australian Astronomical Observatory (Australia); James G. Robertson, The Univ. of Sydney (Australia); Alexander Fuerbach, Michael J. Withford, Macquarie Univ. (Australia) . . . . . [8445-04]

15.00: **Detecting extrasolar planets with sparse aperture masking**, Michael J. Ireland, Australian Astronomical Observatory (Australia) . . . . . [8445-05]

Coffee Break . . . . . 15.20 to 15.50

SESSION 2

Room: E102 . . . . . Sun. 15.50 to 16.20

Science I

Session Chair: **William C. Danchi,**
NASA Goddard Space Flight Ctr. (USA)

15.50: **Exo-zodiacal light around nearby main sequence stars: What did we learn with the Keck interferometer nuller?** *(Invited Paper)*, Bertrand P. Mennesson, Jet Propulsion Lab. (USA); Rafael Millan-Gabet, California Institute of Technology (USA); Eugene Serabyn, Jet Propulsion Lab. (USA); Philip M. Hinz, The Univ. of Arizona (USA); Marc Kuchner, NASA Goddard Space Flight Ctr. (USA); Olivier Absil, Institut d'Astrophysique et de Géophysique de Liège (France); Denis Defrère, Max-Planck-Institut für Radioastronomie (Germany) . . . . . [8445-06]

SESSION 3

Room: E102 . . . . . Sun. 16.20 to 17.40

Air and Space Interferometers

Session Chair: **William C. Danchi,**
NASA Goddard Space Flight Ctr. (USA)

16.20: **Design and status of the Balloon Experimental Twin Telescope for infrared interferometry (BETTII): an interferometer at the edge of space**, Stephen A. Rinehart, Richard K. Barry, Dominic J. Benford, NASA Goddard Space Flight Ctr. (USA); Dale J. Fixsen, Univ. of Maryland, College Park (USA); Eric T. Gorman, Michael L. Jackson, Christine A. Jhabvala, David T. Leisawitz, NASA Goddard Space Flight Ctr. (USA); Stephen F. Maher, Science System Applications Inc. (USA); Lee G. Mundy, Maxime J. Rizzo, Univ. of Maryland, College Park (USA); Robert F. Silverberg, NASA Goddard Space Flight Ctr. (USA); Johannes G. Staguhn, Johns Hopkins Univ. (USA) . . . . . [8445-07]

16.40: **Spaceborne intensity interferometry via spacecraft formation flight**, Erez N. Ribak, Pini Gurfil, Coral Moreno, Technion-Israel Institute of Technology (Israel) . . . . . [8445-08]

17.00: **Developing wide-field double-Fourier interferometry for far-IR applications**, David T. Leisawitz, Richard G. Lyon, Stephen F. Maher, Nargess Memarsadeghi, Stephen A. Rinehart, Evan J. Sinukoff, NASA Goddard Space Flight Ctr. (USA). . . . . [8445-09]

17.20: **Wide-field imaging interferometry spatial-spectral image synthesis algorithms**, Richard G. Lyon, David T. Leisawitz, Stephen A. Rinehart, Nargess Memarsadeghi, Evan J. Sinukoff, NASA Goddard Space Flight Ctr. (USA) . . . . . [8445-10]

Monday 2 July

PLENARY SESSION

Room: Auditorium . . . . . Mon. 08.50 to 10.00

Session Chair: **Mark M. Casali,**
European Southern Observatory (Germany)

08.50: **Introduction**

09.00: **James Webb Space Telescope: science update and status** *(Presentation Only)*, Heidi B. Hammel, AURA, Inc. (USA) . . . . . [8442-501]

09.30: **Exoplanets: unraveling a new paradigm** *(Presentation Only)*, Didier Queloz, Geneva Univ., Observatory of Geneva (Switzerland). . . . . [8442-502]

Coffee Break . . . . . 10.00 to 10.30

SESSION 4

Room: E102 . . . . . Mon. 10.30 to 12.10

Current Facilities and Instruments I

Session Chair: **Michael J. Ireland,** Macquarie Univ. (Australia) and Australian Astronomical Observatory (Australia)

10.30: **Recent progress at the Keck interferometer** *(Invited Paper)*, Sam Ragland, W. M. Keck Observatory (USA); Rachel L. Akeson, California Institute of Technology (USA); Mark Colavita, Jet Propulsion Lab. (USA); Andrew Cooper, W. M. Keck Observatory (USA); Rafael Millan-Gabet, California Institute of Technology (USA); Tatyana Pantaleeva, Brett Smith, Kellee R. Summers, Peter L. Wizinowich, Julien M. Woillez, Eric C. Appleby, W. M. Keck Observatory (USA); Claude Felizardo, Jennifer Herstein, California Institute of Technology (USA); Douglas A. Morrison, Kevin Tsubota, Colette Tyau, W. M. Keck Observatory (USA) . . . . . [8445-11]

11.00: **The Very Large Telescope interferometer v2012+** *(Invited Paper)*, Pierre Haguenauer, European Southern Observatory (Chile) . . . . . [8445-12]

11.30: **First faint dual field phase referenced observations on the Keck interferometer**, Julien M. Woillez, W. M. Keck Observatory (USA); Rachel Akeson, California Institute of Technology (USA); Mark Colavita, Jet Propulsion Lab. (USA); Joshua Eisner, The Univ. of Arizona (USA); Rafael Millan-Gabet, California Institute of Technology (USA); John D. Monnier, Univ. of Michigan (USA); Jörg-Uwe Pott, Max-Planck-Institut für Astronomie (Germany); Sam Ragland, Peter Wizinowich, Andrew Cooper, Olivier Martin, Tatyana Panteleeva, Brett Smith, Kellee R. Summers, W. M. Keck Observatory (USA) . . . . . [8445-13]

11.50: **Status of PRIMA for the VLTI: heading to astrometry**, Christian Schmid, Roberto N. Abuter, Antoine Merand, European Southern Observatory (Germany); Johannes Sahlmann, Observatoire de Genève (Switzerland); Luigi Andolfato, Gerard T. van Belle, Françoise Delplancke, Frédéric J. Dérie, Nicola Di Lieto, Robert Frahm, European Southern Observatory (Germany); Philippe B. Gitton, European Southern Observatory (Chile); Nuno Gomes, European Southern Observatory (Germany) and SIM (Portugal) and Univ. do Porto (Portugal); Pierre Haguenauer, European Southern Observatory (Chile); B. Justen, Samuel A. Lévêque, Serge Ménardi, European Southern Observatory (Germany); Sebastien Morel, European Southern Observatory (Chile); A. Müller, Max-Planck-Institut für Astronomie (Germany); Than Phan Duc, Eszter Pozna, Nicolas Schuhler, European Southern Observatory (Germany); Damien Ségransan, Observatoire de Genève (Switzerland). . . . . [8445-14]

Lunch Break . . . . . 12.10 to 13.40

SESSION 5
Room: E102 . . . . . Mon. 13.40 to 14.00

Science II
Session Chair: **Françoise Delplancke,** European Southern Observatory (Germany)

13.40: **Imaging rapid rotators with the PAVO beam combiner at CHARA**, Vicente Maestro, Michael J. Ireland, Peter G. Tuthill, Daniel Huber, The Univ. of Sydney (Australia); Gail Schaefer, Mount Wilson Institute (USA) . . . . . [8445-15]

SESSION 6
Room: E102 . . . . . Mon. 14.00 to 15.00

Current Facilities and Instruments II
Session Chair: **Françoise Delplancke,** European Southern Observatory (Germany)

14.00: **Recent technical and scientific highlights from the CHARA array** *(Invited Paper)*, Harold A. McAlister, Theo A. ten Brummelaar, Mount Wilson Institute (USA); Stephen T. Ridgway, National Optical Astronomy Observatory (USA); Douglas R. Gies, Laszlo Sturmann, Judit Sturmann, Nils H. Turner, Gail Schaefer, Tabetha S. Boyajian, Christopher D. Farrington, P. J. Goldfinger, Larry Webster, Mount Wilson Institute (USA). . . . . [8445-16]

14.30: **PIONIER: a status report** *(Invited Paper)*, Jean-Baptiste Le Bouquin, Institut de Planétologie et d'Astrophysique de Grenoble (France); Jean-Philippe Berger, European Southern Observatory (Chile); Bernard Lazareff, Gérard Zins, Institut de Planétologie et d'Astrophysique de Grenoble (France); Olivier Absil, Institut d'Astrophysique et de Géophysique de Liège (Belgium) and Univ. de Liège (Belgium); Myriam Benisty, Nicolas Blind, Alain Delboulbé, Philippe Feautrier, David Gillier, Institut de Planétologie et d'Astrophysique de Grenoble (France); Pierre Haguenauer, European Southern Observatory (Chile); Laurent Jocou, Pierre Kern, Jacques Kluska, Yves Magnard, Fabien Malbet, Didier Maurel, Mickael Micallef, Laurence Michaud, Institut de Planétologie et d'Astrophysique de Grenoble (France); Rafael Millan-Gabet, California Institute of Technology (USA); Jean-Louis Monin, Thibaut Moulin, Karine Rousselet-Perraut, Patrick Rabou, Sylvain Rochat, Frederic Roussel, Alain Roux, Eric Stadler, Institut de Planétologie et d'Astrophysique de Grenoble (France); Wesley Traub, Jet Propulsion Lab. (USA) . . . . . [8445-17]

Coffee Break . . . . . 15.00 to 15.30

SESSION 7
Room: E102 . . . . . Mon. 15.30 to 15.50

Science III
Session Chair: **Julien M. Woillez,** W. M. Keck Observatory (USA)

15.30: **Study of exoplanets host stars with VEGA/CHARA**, Roxanne Ligi, Denis Mourard, Observatoire de la Côte d'Azur (France); Anne-Marie Lagrange, Karine Rousselet-Perraut, Institut de Planétologie et d'Astrophysique de Grenoble (France); Isabelle Tallon-Bosc, Ctr. de Recherche Astronomique de Lyon (France). . . . . [8445-18]

SESSION 8
Room: E102 . . . . . Mon. 15.50 to 17.20

Current Facilities and Instruments III
Session Chair: **Julien M. Woillez,** W. M. Keck Observatory (USA)

15.50: **Performance, results, and prospects of the visible spectrograph VEGA on CHARA**, Denis Mourard, Philippe Berio, Olivier Chesneau, Jean-Michel Clausse, Roxanne Ligi, Nicolas Nardetto, Observatoire de la Côte d'Azur (France); Karine Rousselet-Perraut, Institut de Planétologie et d'Astrophysique de Grenoble (France); Alain Spang, Philippe Stee, Observatoire de la Côte d'Azur (France); Isabelle Tallon-Bosc, Ctr. de Recherche Astronomique de Lyon (France); Harold A. McAlister, Theo A. ten Brummelaar, Mount Wilson Institute (USA); Stephen T. Ridgway, National Optical Astronomy Observatory (USA); Judit Sturmann, Laszlo Sturmann, Nils H. Turner, Christopher D. Farrington, P. J. Goldfinger, Mount Wilson Institute (USA) . . . . . [8445-19]

16.10: **Recent developments at the Navy Optical Interferometer (NOI)**, Michael DiVittorio, U.S. Naval Observatory (USA); Donald J. Hutter, U.S. Naval Observatory (USA) and the NOI Collaboration (USA) . . . . . [8445-138]

16.30: **Building the next generation science camera for the Navy optical interferometer**, Askari Ghasempour, Tennessee State Univ. (USA); Matthew W. Muterspaugh, Tennessee State Univ. (USA) and Ctr. of Excellence in Information Systems (USA); Donald J. Hutter, U.S. Naval Observatory (USA); John D. Monnier, Univ. of Michigan (USA); James A. Benson, U.S. Naval Observatory (USA); J. Thomas Armstrong, U.S. Naval Research Lab. (USA); Michael H. Williamson, Samba Fall, Chelsea Harrison, Christen Sergeyous, Tennessee State Univ. (USA) . . . . . [8445-20]

16.50: **Science and technology progress at the Sydney University stellar interferometer** *(Invited Paper)*, J. Gordon Robertson, The Univ. of Sydney (Australia); Michael J. Ireland, Macquarie Univ. (Australia); William J. Tango, Peter G. Tuthill, The Univ. of Sydney (Australia); Benjamin A. Warrington, Macquarie Univ. (Australia); Yitping Kok, Andrew P. Jacob, The Univ. of Sydney (Australia). . . . . [8445-21]

Tuesday 3 July

PLENARY SESSION
Room: Auditorium . . . . . Tues. 09.00 to 10.00

Session Chair: **Kathryn A. Flanagan,** Space Telescope Science Institute (USA)

09.00: **The Kepler Exoplanet Survey: instrumentation, performance and results**, Thomas N. Gautier III, Jet Propulsion Lab., Caltech (USA) and The Kepler Science Team (USA). . . . . [8442-503]

09.30: **Antarctic astronomy**, John W. V. Storey, The Univ. of New South Wales (Australia). . . . . [8446-504]

Coffee Break . . . . . 10.00 to 10.30

SESSION 9
Room: E102 . . . . . Tues. 10.30 to 10.50

Science IV
Session Chair: **John Monnier,** Univ. of Michigan (USA)

10.30: **Intrincate visibility effects from resolved emission of young stellar objects: the case of MWC158 observed with the VLTI**, Jacques Kluska, Institut de Planétologie et d'Astrophysique de Grenoble (France); Jean-Philippe Berger, European Southern Observatory (Chile); Fabien Malbet, Bernard Lazareff, Jean-Baptiste Lebouquin, Myriam Benisty, François Ménard, Christophe Pinte, Institut de Planétologie et d'Astrophysique de Grenoble (France); Rafael Millan-Gabet, California Institute of Technology (USA); Wesley Traub, Jet Propulsion Lab. (USA) . . . . . [8445-22]

SESSION 10
Room: E102 . . . . . Tues. 10.50 to 12.10

Planned Facilities and Instruments I
Session Chair: **John Monnier,** Univ. of Michigan (USA)

10.50: **The Magdalena Ridge Observatory interferometer: a status update** *(Invited Paper)*, Michelle J. Creech-Eakman, Van D. Romero, Ifan Payne, New Mexico Institute of Mining and Technology (USA); Christopher A. Haniff, David F. Buscher, Univ. of Cambridge (United Kingdom); Allen R. Farris, Colby A. Jurgenson, Fernando G. Santoro, Robert J. Selina, New Mexico Institute of Mining and Technology (USA); John S. Young, Univ. of Cambridge (United Kingdom). . . . . [8445-23]

11.20: **New horizons for VLTI 10 micron interferometry: first scientific measurements with external PRIMA fringe tracking**, Jörg-Uwe Pott, Andre Müller, Max-Planck-Institut für Astronomie (Germany); the ESO-PRIMA commissioning team, ESO (Germany); the MIDI science group, MPIA (Germany) . . . . . [8445-24]

11.40: **MATISSE: perspective of imaging in the mid-infrared at the VLTI** *(Invited Paper)*, Bruno Lopez, Stéphane Lagarde, Observatoire de la Côte d'Azur (France); Walter J. Jaffe, Leiden Observatory (Netherlands); Petrov Romain, Pierre Antonelli, Observatoire de la Côte d'Azur (France); Gerd P. Weigelt, Thomas F. E. Henning, Max-Planck-Institut für Astronomie (Germany); Farrokh Vakili, Observatoire de la Côte d'Azur (France); Sebastian Wolf, Christian-Albrechts-Univ. zu Kiel (Germany); Ramon Navarro, Lars Venema, ASTRON (Netherlands); Udo Beckmann, Uwe Graser, Max-Planck-Institut für Astronomie (Germany); Andreas Glindemann, Juan-Carlos Gonzalez, European Southern Observatory (Germany); Josef Hron, Univ. Wien (Austria); Felix C. Bettonvil, ASTRON (Netherlands); Philippe Berio, Olivier Chesneau, Florentin A. Millour, Sylvie Robbe-Dubois, Observatoire de la Côte d'Azur (France) . . . . . [8445-25]

Lunch Break . . . . . 12.10 to 13.40

SESSION 11

Room: E102 . . . . . Tues. 13.40 to 14.00

Science V

Session Chair: **Theo A. ten Brummelaar,**
George State Univ. (USA) and Mount Wilson Institute (USA)

13.40: **Narrow-angle astrometry with PRIMA (THESIS)**, Johannes Sahlmann, Damien Ségransan, Observatoire de Genève (Switzerland); Antoine Merand, European Southern Observatory (Chile); Christian Schmid, Roberto N. Abuter, European Southern Observatory (Germany); Ralf Launhardt, Max-Planck-Institut für Astronomie (Germany); Adrian Kaminski, Landessternwarte Heidelberg (Germany); Rainer Köhler, Neil Zimmerman, Max-Planck-Institut für Astronomie (Germany); Françoise Delplancke, European Southern Observatory (Germany); Andreas Quirrenbach, Sabine Reffert, Landessternwarte Heidelberg (Germany); Thomas F. E. Henning, Tim Schulze-Hartung, Max-Planck-Institut für Astronomie (Germany); Didier Queloz, Francesco Pepe, Bruno Chazelas, Observatory of Geneva (Switzerland); Nicolas Schuhler, Stephane Brillant, European Southern Observatory (Chile) . . . . . [8445-26]

SESSION 12

Room: E102 . . . . . Tues. 14.00 to 15.20

Planned Facilities and Instruments II

Session Chair: **Theo A. ten Brummelaar,**
George State Univ. (USA) and Mount Wilson Institute (USA)

14.00: **GRAVITY: observing the universe in motion** *(Invited Paper)*, Frank Eisenhauer, Max-Planck-Institut für extraterrestrische Physik (Germany); Guy S. Perrin, LESIA - Observatoire de Paris à Meudon (France); Wolfgang Brandner, Max-Planck-Institut für Astronomie (Germany); Christian Straubmeier, Univ. zu Köln (Germany); Karine Rousselet-Perraut, Institut de Planétologie et d'Astrophysique de Grenoble (France); António Amorim, Univ. de Lisboa (Portugal); Markus Schöller, European Southern Observatory (Germany); Reinhard Genzel, Max-Planck-Institut für extraterrestrische Physik (Germany); Pierre Kervella, Observatoire de Paris à Meudon (France); Myriam Benisty, Max-Planck-Institut für Astronomie (Germany); Sebastian Fischer, Univ. zu Köln (Germany); Laurent Jocou, Institut de Planétologie et d'Astrophysique de Grenoble (France); Paulo J. V. Garcia, Univ. do Porto (Portugal); Gerd H. Jakob, European Southern Observatory (Germany); Stefan Gillessen, Max-Planck-Institut für extraterrestrische Physik (Germany); Yann Clénet, LESIA - Observatoire de Paris (France); Armin Boehm, Max-Planck-Institut für Astronomie (Germany); Constanza Araujo-Hauck, Univ. zu Köln (Germany); Jean-Philippe Berger, Institut de Planétologie et d'Astrophysique de Grenoble (France); Jorge Lima, Univ. de Lisboa (Portugal); Roberto N. Abuter, European Southern Observatory (Germany); Oliver Pfuhl, Thibaut Paumard, Max-Planck-Institut für extraterrestrische Physik (Germany); Casey P. Deen, Max-Planck-Institut für Astronomie (Germany); Michael Wiest, Univ. zu Köln (Germany); et al. . . . . [8445-27]

14.30: **On-sky testing of the LBT interferometer: steps toward routine AO-stabilized interferometric observations** *(Invited Paper)*, Philip M. Hinz, Paul Arbo, Vanessa Bailey, Thomas Connors, Olivier Durney, The Univ. of Arizona (USA); Simone Esposito, INAF - Osservatorio Astrofisico di Arcetri (USA); William F. Hoffmann, The Univ. of Arizona (USA); Terry J. Jones, Univ. of Minnesota, Twin Cities (USA); Jarron M. Leisenring, ETH Zurich (Switzerland); Manny Montoya, Richard Nash, The Univ. of Arizona (USA); Matthew J. Nelson, Univ. of Virginia (USA); Thomas McMahon, The Univ. of Arizona (USA); Enrico Pinna, Alfio Puglisi, INAF - Osservatorio Astrofisico di Arcetri (Italy); Andrew Skemer, The Univ. of Arizona (USA); Michael F. Skrutskie, Univ. of Virginia (USA); Vidhya Vaitheeswaran, The Univ. of Arizona (USA). . . . . [8445-28]

15.00: **LINC-NIRVANA: assembly, integration, and verification update**, Thomas M. Herbst, Univ. zu Köln (Germany); Roberto Ragazzoni, INAF - Osservatorio Astronomico di Padova (Italy); Andreas Eckart, Univ. zu Köln (Germany); Gerd P. Weigelt, Max-Planck-Institut für Astronomie (Germany) . . . . . [8445-29]

Coffee Break . . . . . 15.20 to 15.50

SESSION 13

Room: E102 . . . . . Tues. 15.50 to 16.30

Science VI

Session Chair: **Jayadev K. Rajagopal,**
National Optical Astronomy Observatory (USA)

15.50: **VLTI/AMBER differential interferometry of the broad line region of the QSO 3C273**, Romain G. Petrov, Florentin A. Millour, Martin Vannier, Observatoire de la Côte d'Azur (France). . . . . [8445-30]

16.10: **Studying hot exozodiacal dust with near-infrared interferometry**, Olivier Absil, Institut d'Astrophysique et de Géophysique de Liège (Belgium) and Univ. de Liège (France); Denis Defrère, Max-Planck-Institut für Radioastronomie (Germany); Jean-Baptiste Le Bouquin, Institut de Planétologie et d'Astrophysique de Grenoble (France); Benjamin Mollier, LESIA - Observatoire de Paris (France); Jean-Charles Augereau, Institut de Planétologie et d'Astrophysique de Grenoble (France); Emmanuel Di Folco, Vincent Coudé du Foresto, LESIA - Observatoire de Paris (France); Theo ten Brummelaar, Mount Wilson Institute (USA) . . . . . [8445-31]

SESSION 14

Room: E102 . . . . . Tues. 16.30 to 17.10

Current Facilities and Instruments IV

Session Chair: **Jayadev K. Rajagopal,**
National Optical Astronomy Observatory (USA)

16.30: **Five years of infrared imaging at CHARA with MIRC**, John D. Monnier, Univ. of Michigan (USA) . . . . . [8445-32]

16.50: **Imaging from the first 6-beam infrared combiner,** Xiao Che, John D. Monnier, Stefan Kraus, Fabien Baron, Univ. of Michigan (USA); Ettore Pedretti, European Southern Observatory (Germany); Nathalie Thureau, Univ. of St. Andrews (United Kingdom); Scott Webster, Univ. of Michigan (USA) . . [8445-33]

POSTER POPS

Room: E102 . . . . . Tues. 17.10 to 17.30

Session Chair: **Jayadev K. Rajagopal,**
National Optical Astronomy Observatory (USA)

Each poster author is invited to give a brief (two-minute) preview of his/her research with a maximum of two slides during these poster pops sessions. Please bring your slides in PDF format on a USB stick at the break before the first poster pops session to transfer to the meeting room computer.

POSTERS-TUESDAY

Room: Hall 3. . . . . Tues. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters. for this conference will be on display on Tuesday. The interactive poster session with authors in attendance will be Tuesday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

Observation Techniques

Revealing habitable exoplanets through their spectral features, Eyal Schwartz, Stephen G. Lipson, Erez N. Ribak, Technion-Israel Institute of Technology (Israel) . . . . . [8445-71]

Self-phase-referencing interferometry with SUSI, Yitping Kok, The Univ. of Sydney (Australia); Michael J. Ireland, Macquarie Univ. (Australia); Peter G. Tuthill, James G. Robertson, The Univ. of Sydney (Australia); Benjamin A. Warrington, Macquarie Univ. (Australia); William J. Tango, The Univ. of Sydney (Australia). . . . . [8445-72]

Effects of anisoplanatism on the visibility amplitudes and phase variances measured by the PRIMA fringe trackers, Nuno Gomes, Univ. do Porto (Portugal) and European Southern Observatory (Germany); Christian Schmid, European Southern Observatory (Germany); Johannes Sahlmann, Observatoire de Genève (Switzerland); Serge Ménardi, Roberto N. Abuter, European Southern Observatory (Germany); Antoine Mérand, European Southern Observatory (Chile); Rainer Köhler, Max-Planck-Institut für Astronomie (Germany); Françoise Delplancke, European Southern Observatory (Germany) . . . . . [8445-73]

Study on the possibility of using PRIMA in the faint object science mode, Nuno Gomes, Univ. do Porto (Portugal) and European Southern Observatory (Germany); Françoise Delplancke, European Southern Observatory (Germany) . . . . . [8445-74]

Long-term trends in the VLTI auxiliary telescopes pointing models, Stanislav Stefl, Andreas Lundgren, European Southern Observatory (Chile). . . . . [8445-75]

Technology

Final results of the PERSEE experiment, Jean-Michel Le Duigou, Ctr. National d'Études Spatiales (France); Julien Lozi, Frédéric Cassaing, Kamel Houairi, Béatrice Sorrente, Joseph Montri, ONERA (France) and Groupement d'Intérêt Scientifique PHASE (France); Sophie Jacquinod, LESIA - Observatoire de Paris (France); Jean-Michel Reess, LESIA - Observatoire de Paris (France) and Groupement d'Intérêt Scientifique PHASE (France); Laurie Pham, Observatoire de Paris à Meudon (France) and Groupement d'Intérêt Scientifique PHASE (France); Emilie Lhome, Jean-Tristan M. Buey, LESIA - Observatoire de Paris (France); François Hénault, Institut de Planétologie et d'Astrophysique de Grenoble (France); Aurélie Marcotto, Univ. de Nice Sophia Antipolis (France); Paul Girard, Nicolas Mauclert, Observatoire de la Côte d'Azur (France); Marc Barillot, Thales Alenia Space (France); Vincent Coudé Du Foresto, LESIA - Observatoire de Paris (France); Marc Ollivier, Institut d'Astrophysique Spatiale (France) . . . . . [8445-76]

Discrete optical multi-aperture combiner: instrumental concept, Stefano Minardi, Friedrich-Schiller-Univ. Jena (Germany); Lucas Labadie, Univ. zu Köln (Germany); Sylvestre Lacour, LESIA - Observatoire de Paris (France) . . [8445-77]

Glass fiber reinforced plastics within the fringe and flexure tracker of LINC-NIRVANA, Semir Smajic, Univ. zu Köln (Germany); Andreas Eckart, Univ. zu Köln (Germany) and Max-Planck-Institut für Radioastronomie (Germany); Matthew Horrobin, Bettina Lindhorst, Christoph Rauch, Steffen Rost, Christian Straubmeier, Evangelia Tremou, Imke Wank, Jens Zuther, Univ. zu Köln (Germany) . . . . . [8445-78]

Observing the sun with micro-interferometric devices: a didactic experiment, Denis Defrère, Max-Planck-Institut für Radioastronomie (Germany); Olivier Absil, Charles Hanot, Pierre Riaud, Univ. de Liège (Belgium); Arnaud Magette, Techspace-Aero (Belgium); Olivier Wertz, Univ. de Liège (Belgium); Francois Finet, Univ. de Liège (Belize); Marin Steenackers, Technische Univ. München (Germany); Serge Habraken, Jean Surdej, Univ. de Liège (Belgium) . . . . . [8445-79]

Self-nulling spectrograph for star glare rejection, Thomas D. Ditto, 3DeWitt LLC (USA) . . . . . [8445-80]

Design of a beam combiner for polarization measurements, David Mozurkewich, Seabrook Engineering (USA); Nicholas M. Elias II, National Radio Astronomy Observatory (USA); Anders M. Jorgensen, New Mexico Institute of Mining and Technology (USA); Henrique R. Schmitt, U.S. Naval Research Lab. (USA); Donald J. Hutter, U.S. Naval Observatory (USA) . . . . . [8445-81]

Accuracy of the ReRRCA algorithm using the Ronchi test and interferometry analysis, Daniel Aguirre, Fermin S. Granados, Maria E. Percino, Brenda Villalobos, Alejandro Cornejo, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) . . . . . [8445-82]

Approaches for achieving broadband achromatic phase shifts for visible nulling coronagraphy, Matthew R. Bolcar, Richard G. Lyon, NASA Goddard Space Flight Ctr. (USA) . . . . . [8445-83]

Demonstration of the wide-field imaging interferometer testbed using a calibrated hyperspectral image projector, Matthew R. Bolcar, David T. Leisawitz, NASA Goddard Space Flight Ctr. (USA); Stephen F. Maher, Science Systems and Applications, Inc. (USA); Stephen A. Rinehart, NASA Goddard Space Flight Ctr. (USA) . . . . . [8445-84]

Wavefront correction inside unbalanced nulling interferometer, Masaaki Horie, Nihon Univ. (Japan); Jun Nishikawa, National Astronomical Observatory of Japan (Japan); Masahito Ohya, Nihon Univ. (Japan); Naoshi Murakami, Hokkaido Univ. (Japan); Lyu Abe, Lab. J.L. Lagrange (France); Ryo Waki, Hosei Univ. (Japan); Shiomi Kumagai, Nihon Univ. (Japan); Motohide Tamura, National Astronomical Observatory of Japan (Japan); Takashi Kurokawa, Tokyo Univ. of Agriculture and Technology (Japan); Hiroshi Murakami, Japan Aerospace Exploration Agency (Japan). . . . . [8445-85]

Sub-nanometer scale measurement of thermal deformation for telescope components by a heterodyne laser interferometer, Yoshito Niwa, Akitoshi Ueda, Taihei Yano, Naoteru Gouda, Yukiyasu Kobayashi, National Astronomical Observatory of Japan (Japan); Yoshiyuki Yamada, Kyoto Univ. (Japan) [8445-86]

Aperture Masking

Non-redundant aperture masking with diffraction-limited integral field unit spectrographs, Anand Sivaramakrishnan, Space Telescope Science Institute (USA) . . . . . [8445-87]

Aperture masking at the Large Binocular Telescope, Julian Stürmer, Andreas Quirrenbach, Landessternwarte Heidelberg (Germany) . . . . . [8445-88]

Facilities

JouFLU: an upgraded FLUOR beam combiner at the CHARA array, Emilie Lhome, LESIA - Observatoire de Paris (France); Nicholas Scott, Theo A. ten Brummelaar, Mount Wilson Institute (USA); Benjamin Mollier, Jean-Michel Reess, Frédéric Chapron, Jean-Tristan M. Buey, Arnaud Sevin, Vincent Coudé du Foresto, LESIA - Observatoire de Paris (France) . . . . . [8445-90]

MATISSE: concept, specifications, design, and performances, Stéphane Lagarde, Sylvie Robbe-Dubois, Romain G. Petrov, Bruno Lopez, Observatoire de la Côte d'Azur (France); Walter J. Jaffe, Leiden Observatory (Netherlands); Lars Venema, ASTRON (Netherlands); Philippe Berio, Pierre Antonelli, Observatoire de la Côte d'Azur (France); Udo Beckmann, Max-Planck-Institut für Radioastronomie (Germany); Felix C. Bettonvil, ASTRON (Netherlands); Yves Bresson, Observatoire de la Côte d'Azur (France); Uwe Graser, Max-Planck-Institut für Radioastronomie (Germany); Ramon Navarro, ASTRON (Netherlands); Alexis Matter, Max-Planck-Institut für Radioastronomie (Germany). . . . [8445-91]

Final mechanical and opto-mechanical design of the Magdalena Ridge Observatory interferometer, Fernando G. Santoro, Andres M. Olivares, Christopher D. Salcido, Stephen R. Jimenez, Colby A. Jurgenson, New Mexico Institute of Mining and Technology (USA); Xiaowei Sun, Christopher A. Haniff, David F. Buscher, Univ. of Cambridge (United Kingdom); Michelle J. Creech-Eakman, Robert J. Selina, New Mexico Institute of Mining and Technology (USA); John S. Young, Martin Fisher, Univ. of Cambridge (United Kingdom); Daniel A. Klinglesmith III, Nicolas C. Torres, Chuck M. Dahl, Alisa V. Shtromberg, New Mexico Institute of Mining and Technology (USA); Donald M. A. Wilson, Univ. of Cambridge (United Kingdom) . . . . . [8445-92]

Wednesday 4 July

PLENARY SESSION

Room: Auditorium . . . . . Wed. 09.00 to 10.00

Session Chair: **Luc Simard,**
National Research Council Canada (Canada)

09.00: **Very high energy gamma ray astronomy with the H.E.S.S. telescopes** *(Presentation Only)*, Werner Hofmann, Max-Planck-Institut für Kernphysik (Germany) . . . . . [8442-505]

09.30: **The cosmic microwave background: observing directly the early universe**, Paolo de Bernardis, Silvia Masi, Univ. degli Studi di Roma La Sapienza (Italy) . . . . . [8442-506]

Coffee Break . . . . . 10.00 to 10.30

SESSION 15

Room: E102 . . . . . Wed. 10.30 to 12.10

Future I

Session Chair: **Fabien Malbet,** Institut de Planétologie et d'Astrophysique de Grenoble (France)

10.30: **Dependence of the quality of an image with the number of telescopes of an array**, Nuno Gomes, Univ. do Porto (Portugal) and European Southern Observatory (Germany); Paulo J. V. Garcia, Univ. do Porto (Portugal); Eric M. Thiébaut, Ctr. de Recherche Astronomique de Lyon (France) . . [8445-34]

10.50: **Construction of a 57m hypertelescope in the southern Alps, France**, Fatmé Allouche, Collège de France (France) and Observatoire de la Côte d'Azur (France); Florian Bolgar, Ecole Normale Supérieure (France); Rijuparna Chakraborty, Jerome Maillot, Collège de France (France); Denis Mourard, Observatoire de la Côte d'Azur (France); Nicolas Palitzyne, Jean-Romain Poletti, Rémi Prud'homme, Jean-Paul Rochaix, André Rondi, Martine Roussel, Collège de France (France); Arun Surya, Indian Institute of Astrophysics (India); Antoine Labeyrie, Collège de France (France) . . . . . [8445-35]

11.10: **Concept of an extremely large hypertelescope (ELHyT) with 1200m sparse aperture for direct imaging at 100 micro-arcsecond resolution**, Antoine Labeyrie, Fatmé Allouche, Rijuparna Chakraborty, Collège de France (France); Julien Dejonghe, Observatoire de Haute-Provence (France); Denis Mourard, Observatoire de la Côte d'Azur (France); Arun Surya, Indian Institute of Astrophysics (India) . . . . . [8445-36]

11.30: **Gravitation astrometric measurement experiment (GAME)**, Mario Gai, Alberto Vecchiato, Sebastiano Ligori, Alberto Riva, Davide Loreggia, Mario G. Lattanzi, Deborah Busonero, INAF - Osservatorio Astronomico di Torino (Italy); Agnès Fienga, Observatoire de Besancon (France) . . . . . [8445-37]

11.50: **A fibered optical long baseline interferometer on the International Space Station**, Julien M. Woillez, W. M. Keck Observatory (USA) . . . . [8445-38]

Lunch/Exhibition Break . . . . . 12.10 to 13.40

SESSION 16
Room: E102 . . . . . Wed. 13.40 to 14.20

Technology

Session Chair: **Françoise Delplancke,**
European Southern Observatory (Germany)

13.40: **Recent advances in the development of mid-IR integrated devices for interferometric arrays**, Lucas Labadie, Univ. zu Köln (Germany); Airan Rodenas, Heriot-Watt Univ. (United Kingdom); Guillermo Martin, Brahim Arezki, Institut de Planétologie et d'Astrophysique de Grenoble (France); Robert R. Thomson, Heriot-Watt Univ. (United Kingdom); Norman C. Anheier, Jr., Hong A. Qiao, Pacific Northwest National Lab. (USA); Pierre Kern, Institut de Planétologie et d'Astrophysique de Grenoble (France); Ajoy K. Kar, Heriot-Watt Univ. (United Kingdom); Bruce E. Bernacki, Pacific Northwest National Lab. (USA) . . [8445-39]

14.00: **Discrete beam combiners: exploring the potential of 3D photonics for interferometry,** Stefano Minardi, Felix Dreisow, Stefan Nolte, Thomas Pertsch, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [8445-40]

POSTER POPS
Room: E102. . . . . Wed. 14.20 to 15.20

Session Chair: **Françoise Delplancke,**
European Southern Observatory (Germany)

Each poster author is invited to give a brief (two-minute) preview of his/her research with a maximum of two slides during these poster pops sessions. Please bring your slides in PDF format on a USB stick at the break before the first poster pops session to transfer to the meeting room computer.

Coffee Break . . . . . 15.20 to 15.50

SESSION 17
Room: E102 . . . . . Wed. 15.50 to 17.30

Software and Data Reduction

Session Chair: **Antoine Mérand,** European Southern Observatory (Chile)

15.50: **Least-squares deconvolution of AMBER dispersed visibilities**, Paulo J. V. Garcia, Univ. do Porto (Portugal); Myriam Benisty, Max-Planck-Institut für Astronomie (Germany); Catherine Dougados, Institut de Planétologie et d'Astrophysique de Grenoble (France) . . . . . [8445-41]

16.10: **Using statistical distributions to accurately measure visibility measurements: application to FLUOR/CHARA data**, Charles Hanot, Univ. de Liège (Belgium); Nicholas Scott, Mount Wilson Institute (USA); Olivier Absil, Univ. de Liège (Belgium); Denis Defrère, Max-Planck-Institut für Radioastronomie (Germany); Benjamin Mollier, Vincent Coudé du Foresto, LESIA - Observatoire de Paris (France); Bertrand P. Mennesson, Jet Propulsion Lab. (USA) . [8445-42]

16.30: **Coherent integration in optical interferometry**, Anders M. Jorgensen, Thomas R. Hall, New Mexico Institute of Mining and Technology (USA); David Mozurkewich, Seabrook Engineering (USA); J. Thomas Armstrong, Henrique R. Schmitt, Ellyn K. Baines, Sergio R. Restaino, U.S. Naval Research Lab. (USA); Don Hutter, U.S. Naval Observatory (USA) . . . . . [8445-43]

16.50: **Geometrical model fitting for interferometric data: GEM-FIND**, Daniela Klotz, Univ. Wien (Austria); Stephane Sacuto, Uppsala Univ. (Sweden); Claudia Paladini, Josef Hron, Univ. Wien (Austria) . . . . . [8445-44]

17.10: **Chromatic imaging with self-calibration in optical interferometry,** Florentin A. Millour, Martin Vannier, Observatoire de la Côte d'Azur (France) . . . . . [8445-45]

POSTER POPS
Room: E102 . . . . . Wed. 17.30 to 17.50

Session Chair: **Antoine Mérand,**
European Southern Observatory (Chile

Each poster author is invited to give a brief (two-minute) preview of his/her research with a maximum of two slides during these poster pops sessions. Please bring your slides in PDF format on a USB stick at the break before the first poster pops session to transfer to the meeting room computer.

Thursday 6 July

PLENARY SESSION
Room: Auditorium . . . . . Thurs. 09.30 to 10.00

Session Chair: **Gillian S. Wright,**
UK Astronomy Technology Ctr. (United Kingdom)

09.30: **ALMA construction and early science**, Mattheus W. M. de Graauw, Lewis Ball, Joint ALMA Observatory (Chile) . . . . . [8444-507]

Coffee Break . . . . . 10.00 to 10.30

SESSION 18
Room: E102 . . . . . Thurs. 10.30 to 11.30

Software and Image Reconstruction I

Session Chair: **Thomas M. Herbst,**
Max-Planck-Institut für Astronomie (Germany)

10.30: **Multi-wavelength imaging algorithm for optical interferometry** *(Invited Paper)*, Eric M. Thiébaut, Ferréol Soulez, Observatoire de Lyon (France)[8445-46]

11.00: **5D image reconstruction for optical interferometry** *(Invited Paper),* Fabien Baron, John D. Monnier, Univ. of Michigan (USA) . . . . . [8445-47]

PANEL DISCUSSION
Room: E102 . . . . . Thurs. 11.30 to 12.00

Interferometric Imaging Software

Panel Members: **Fabien Baron,** Univ. of Michigan (USA); **John D. Monnier,** Univ. of Michigan (USA); **Eric M. Thiébaut,** Ctr. de Recherche Astronomique de Lyon (France)

What could we expect as interferometric imaging software from the current facilities? How can it be adapted to normal scientific users and not only limited to imaging experts?

SESSION 19
Room: E102 . . . . . Thurs. 12.00 to 12.20

Software and Image Reconstruction II

Session Chair: **Thomas M. Herbst,**
Max-Planck-Institut für Astronomie (Germany)

12.00: **The 2012 interferometric imaging beauty contest**, Fabien Baron, Univ. of Michigan (USA); Peter R. Lawson, Jet Propulsion Lab. (USA); Bill Cotton, National Radio Astronomy Observatory (USA); Xiao Che, Univ. of Michigan (USA); Nicholas M. Elias II, National Radio Astronomy Observatory (USA); Karl-Heinz Hofmann, Max-Planck-Institut für Radioastronomie (Germany); Christian A. Hummel, European Southern Observatory (Germany); Brian Kloppenborg, Univ. of Denver (USA); Stefan Kraus, Univ. of Michigan (USA); David Mary, Lab. J.L. Lagrange (France); John D. Monnier, Univ. of Michigan (USA); Sridharan Rengaswamy, European Southern Observatory (Chile); Dieter Schertl, Max-Planck-Institut für Radioastronomie (Germany); Eric M. Thiébaut, Observatoire de Lyon (France); Martin Vannier, Univ. de Nice-Sophia Antipolis (France); Gerd P. Weigelt, Max-Planck-Institut für Radioastronomie (Germany); John Young, Univ. of Cambridge (United Kingdom) . . . . . [8445-48]

Lunch Break . . . . . 12.20 to 13.40

SESSION 20
Room: E102 . . . . . Thurs. 13.40 to 15.10

Science VII

Session Chair: **Fabien Malbet,**
Institut de Planétologie et d'Astrophysique de Grenoble (France)

13.40: **Beating the confusion limit: the necessity of high angular resolution for probing the physics of Sagittarius A*, GRAVITY (VLTI) and LINC-NIRVANA (LBT)** *(Invited Paper)*, Andreas Eckart, Gunther Witzel, Nadeen Sabha, Christian Straubmeier, Univ. zu Köln (Germany) . . . . . [8445-49]

14.10: **The MIDI AGN Large Programme: a statistical sample of resolved AGN tori (THESIS)** *(Invited Paper)*, Leonard Burtscher, Max-Planck-Institut für extraterrestrische Physik (Germany); Klaus Meisenheimer, Max-Planck-Institut für Astronomie (Germany); Konrad Tristram, Max-Planck-Institut für Radioastronomie (Germany); Walter J. Jaffe, Leiden Observatory (Netherlands); Sebastian Hönig, Univ. of California, Santa Barbara (USA); Makoto Kishimoto, Max-Planck-Institut für Radioastronomie (Germany); Jörg-Uwe Pott, Max-Planck-Institut für Astronomie (Germany); Huub J. Röttgering, Leiden Observatory (Netherlands); Marc Schartmann, Max-Planck-Institut für extraterrestrische Physik (Germany); Gerd P. Weigelt, Max-Planck-Institut für Radioastronomie (Germany); Sebastian Wolf, Christian-Albrechts-Univ. zu Kiel (Germany) . . . . . [8445-50]

14.40: **New opportunities with spectro-interferometry and spectro-astrometry** *(Invited Paper)*, Stefan Kraus, Univ. of Michigan (USA) . . . . [8445-51]

Coffee Break . . . . . 15.10 to 15.30

PANEL DISCUSSION
Room: E102 . . . . . Thurs. 15.30 to 17.10

Future Direction

Panel Moderator: **Stephen T. Ridgway,**
National Optical Astronomy Observatory (USA)

Panel Members: **Theo A. ten Brummelaar,** CHARA (USA),
Guy S. Perrin, Observatoire de Paris à Meudon (France),
Chris A. Haniff, Univ. of Cambridge (United Kingdom),
Phillip M. Hinz, Large Binocular Telescope Observatory (USA),
Françoise Delplancke, European Southern Observatory (Germany)

The short- and mid-term future of current interferometric facilities will be presented as well as the long-term perspectives in the US and Europe. This will introduce a community forum where the interferometric community goals for the next 20 years will be discussed.

Please give questions and comments that you would like to raise during this discussion to Steve Ridgway in the first days of the conference. More information and a method to do so will be provided during the conference.

IAU DISCUSSION
Room: E102 . . . . . Thurs. 17.10 to 17.30

Presentation and discussion of the IAU Interferometry Commission, its roles, its activities present and future in the service of the community.

Interferometry Prizes
Room: E102 . . . . . Thurs. 17.30 to 17.50

Please join us to honor the 2012 winners of the Michelson and Fizeau prizes in interferometry. These prizes are sponsored by the IAU Interferometry commission 54, by the Mount Wilson Institute and by the Observatoire de la Cote d'Azur.

POSTERS-THURSDAY
Room: Hall 3. . . . . .Thurs. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Thursday. The interactive poster session with authors in attendance will be Thursday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

Future Interferometers

Portable intensity interferometry, Elliott P. Horch, Matthew A. Camarata, Southern Connecticut State Univ. (USA). . . . . [8445-93]

Interferometric imaging of geostationary satellites: signal-to-noise considerations, Anders M. Jorgensen, New Mexico Institute of Mining and Technology (USA); Henrique R. Schmitt, U.S. Naval Research Lab. (USA); David Mozurkewich, Seabrook Engineering (USA); J. Thomas Armstrong, Sergio R. Restaino, Robert B. Hindsley, U.S. Naval Research Lab. (USA). . . . . [8445-95]

The MROI's capabilities for imaging geosynchronous satellites, John S. Young, Christopher A. Haniff, David F. Buscher, Univ. of Cambridge (United Kingdom); Michelle J. Creech-Eakman, Ifan Payne, Colby Jurgenson, Van D. Romero, New Mexico Institute of Mining and Technology (USA) . . . . . [8445-96]

Systems design and engineering for the Laser Interferometer Gravitational-wave Observatory (LIGO) project, Dennis Coyne, California Institute of Technology (USA) . . . . . [8445-97]

Simulated imaging with an interferometer on a boom, Henrique R. Schmitt, U.S. Naval Research Lab. (USA); David Mozurkewich, Seabrook Engineering (USA); J. Thomas Armstrong, U.S. Naval Research Lab. (USA); Anders M. Jorgensen, New Mexico Institute of Mining and Technology (USA); Ellyn K. Baines, Sergio R. Restaino, Robert B. Hindsley, U.S. Naval Research Lab. (USA) . . . . . [8445-98]

A low-cost fiber-based near-infrared heterodyne interferometer, Ernest A. Michael, Laurent Pallanca, Univ. de Chile (Chile) . . . . . [8445-99]

Critical Sub-Systems

Coherencing of a large diluted telescope mirror using a supercontinuum laser source and first observations with a focal gondola, Hervé Le Coroller, Observatoire de Haute-Provence (France); Julien Dejonghe, Xavier Regal, Rico Sottile, Observatoire de Haute Provence (France); Denis Mourard, Observatoire de la Côte d'Azur (France). . . . . [8445-101]

The GRAVITY spectrometers: optical design, Christian Straubmeier, Sebastian Fischer, Constanza Araujo-Hauck, Michael Wiest, Senol Yazici, Andreas Eckart, Univ. zu Köln (Germany); Frank Eisenhauer, Max-Planck-Institut für extraterrestrische Physik (Germany); Guy S. Perrin, Lab. d'Etudes Spatiales et d'Instrumentation en Astrophysique (France); Karine Rousselet-Perraut, Institut de Planétologie et d'Astrophysique de Grenoble (France); Wolfgang Brandner, Max-Planck-Institut für Astronomie (Germany); António Amorim, Univ. de Lisboa (Portugal) . . . . . [8445-102]

The GRAVITY spectrometers: metrology laser blocking system, Constanza Araujo-Hauck, Christian Straubmeier, Sebastian Fischer, Michael Wiest, Senol Yazici, Univ. zu Köln (Germany); Frank Eisenhauer, Max-Planck-Institut für extraterrestrische Physik (Germany); Guy S. Perrin, Lab. d'Etudes Spatiales et d'Instrumentation en Astrophysique (France); Karine Rousselet-Perraut, Institut de Planétologie et d'Astrophysique de Grenoble (France); Wolfgang Brandner, Max-Planck-Institut für Astronomie (Germany); António Amorim, Univ. de Lisboa (Portugal); Andreas Eckart, Univ. zu Köln (Germany) and Max-Planck-Institut für Radioastronomie (Germany) . . . . . [8445-103]

A linear displacement mechanism for the GRAVITY spectrometers, Senol Yazici, Michael Wiest, Christian Straubmeier, Constanza Araujo-Hauck, Sebastian Fischer, Univ. zu Köln (Germany); Andreas Eckart, Univ. zu Köln (Germany) and Max-Planck-Institut für Radioastronomie (Germany); Frank Eisenhauer, Max-Planck-Institut für extraterrestrische Physik (Germany); Guy S. Perrin, Lab. d'Etudes Spatiales et d'Instrumentation en Astrophysique (France); Karine Rousselet-Perraut, Institut de Planétologie et d'Astrophysique de Grenoble (France); Wolfgang Brandner, Max-Planck-Institut für Astronomie (Germany); António Amorim, Univ. de Lisboa (Portugal). . . . . [8445-104]

Phase-shifting fringe tracking method for sparse aperture interferometer arrays, François Hénault, Institut de Planétologie et d'Astrophysique de Grenoble (France) . . . . . [8445-105]

The cryostat for the GRAVITY beam combiner instrument at the VLTI, Marcus Haug, Frank Eisenhauer, Reiner Hofmann, Stefan Kellner, Frank Haussmann, Josef Eder, Max-Planck-Institut für extraterrestrische Physik (Germany); Jean-Louis Lizon, European Southern Obsevatory (Germany); Guenter Thummes, TransMIT Gesellschaft fur Tech mbH Projekt (Germany); Harald Weisz, WEISZ (Germany). . . . . [8445-106]

Birefringence compensation in PIONIER, Bernard Lazareff, Jean-Baptiste Le Bouquin, Institut de Planétologie et d'Astrophysique de Grenoble (France); Jean-Philippe Berger, European Southern Observatory (Chile); Laurent Jocou, Pierre Y. Kern, Gérard Zins, Institut de Planétologie et d'Astrophysique de Grenoble (France) . . . . . [8445-107]

The integrated optics beam combiner assembly of the GRAVITY/VLTI instrument, Laurent Jocou, Karine Rousselet-Perraut, Axelle Nolot, Yves Magnard, Thibaut Moulin, Institut de Planétologie et d'Astrophysique de Grenoble (France); Pierre R. Labeye, Valerie Lapras, CEA-LETI (France); Michael Wiest, Univ. zu Köln (France); Guy S. Perrin, Observatoire de Paris à Meudon (France); Frank Eisenhauer, Max-Planck-Institut für extraterrestrische Physik (Germany); António Amorim, Univ. of Lisbon (Portugal); Wolfgang Brandner, Max-Planck-Institut für Astronomie (Germany); Christian Straubmeier, Univ. zu Köln (Germany) . . . . . [8445-108]

Simulation of Kalman-filter fringe tracking with PRIMA and FINITO OPD measurements, Elodie Choquet, LESIA - Observatoire de Paris (France) and Groupement d'intérêt Scientifique PHASE (France); Roberto N. Abuter, European Southern Observatory (Germany); Jonathan Menu, Katholieke Univ. Leuven (Belgium); Guy S. Perrin, Pierre Fédou, LESIA - Observatoire de Paris (France) and Groupement d'intérêt Scientifique PHASE (France) . . . . . [8445-109]

Development of new optical adjustment system for FITE (far-infrared interferometric experiment), Ayana Sasaki, Hiroshi Shibai, Takahiro Sumi, Misato Fukagawa, Tetsuo Kanoh, Yusuke Itoh, Kodai Yamamoto, Yukako Aimi, Yuki Kaneko, Yoshihiro Kuwada, Mihoko Konishi, Syoko Sai, Naoki Akiyama, Osaka Univ. (Japan); Masanao Narita, Japan Aerospace Exploration Agency (Japan). . . . . [8445-110]

A new fast data acquisition system for the NOI, Matthew Brown, Anders M. Jorgensen, New Mexico Institute of Mining and Technology (USA); Tim Buschmann, Don Hutter, U.S. Naval Observatory (USA); J. Thomas Armstrong, U.S. Naval Research Lab. (USA) . . . . . [8445-111]

Optimizing the transmission of the GRAVITY/VLTI near-infrared wavefront sensor, Pengqian Yang, Stefan Hippler, Rainer Lenzen, Armin Boehm, Wolfgang Brandner, Casey P. Deen, Thomas F. E. Henning, Armin Huber, Sarah Kendrew, Ralf-Rainer Rohloff, Max-Planck-Institut für Astronomie (Germany); Constanza Araujo-Hauck, Univ. zu Köln (Germany); Oliver Pfuhl, Max-Planck-Institut für extraterrestrische Physik (Germany); Jianqiang Zhu, Shanghai Institute of Optics and Fine Mechanics (China) . . . . . [8445-112]

Coherent integration of optical interferometric data on a graphics processor, M. Paiz, Anders M. Jorgensen, New Mexico Institute of Mining and Technology (USA) . . . . . [8445-113]

Beam control for LINC-NIRVANA: from the binocular entrance pupil to the combined focal plane, Thomas Bertram, Jan Trowitzsch, Thomas M. Herbst, Max-Planck-Institut für Astronomie (Germany); Roberto Ragazzoni, INAF - Osservatorio Astronomico di Padova (Italy) . . . . . [8445-114]

The final design of the GRAVITY acquisition camera and associated VLTI beam monitoring strategy, António Amorim, Jorge Lima, Univ. de Lisboa (Portugal); Paulo J. V. Garcia, Univ. do Porto (Portugal); Frank Eisenhauer, Marcus Haug, Alexander P. Gräter, Markus Thiel, Max-Planck-Institut fur extraterrestrische Physik (Germany); Pedro Carvas, Univ. de Lisboa (Portugal); Narsi Reddy, Univ. do Porto (Portugal); Guy S. Perrin, Observatoire de Paris à Meudon (France); Wolfgang Brandner, Max-Planck-Institut fur Astronomie (Germany); Christian Straubmeier, Univ. zu Köln (Germany); Karine Rousselet-Perraut, Institut de Planétologie et d'Astrophysique de Grenoble (France) . . . . . [8445-115]

Second generation fringe tracker real time architecture, Roberto N. Abuter, Nicola di Lieto, Serge Ménardi, Christian Schmid, European Southern Observatory (Germany) . . . . . [8445-116]

LINC-NIRVANA: optical components of the fringe and flexure tracker, Jens Zuther, Univ. zu Köln (Germany); Udo Beckmann, Max-Planck-Institut für Radioastronomie (Germany); Thomas Bertram, Max-Planck-Institut für Astronomie (Germany); Andreas Eckart, Matthew Horrobin, Univ. zu Köln (Germany); Rainer Lenzen, Max-Planck-Institut für Astronomie (Germany); Bettina Lindhorst, Univ. zu Köln (Germany); Jörg-Uwe Pott, Max-Planck-Institut für Astronomie (Germany); Christoph Rauch, Steffen Rost, Semir Smajic, Christian Straubmeier, Evangelia Tremou, Imke Wank, Univ. zu Köln (Germany) . . . . . [8445-117]

Fringe and flexure tracking system laboratory tests, Imke Wank, Andreas Eckart, Matthew Horrobin, Bettina Lindhorst, Christoph Rauch, Steffen Rost, Semir Smajic, Christian Straubmeier, Evangelia Tremou, Jens Zuther, Univ. zu Köln (Germany) . . . . . [8445-118]

Functional and performance tests of the fringe and flexure tracking system for LINC-NIRVANA, Christoph Rauch, Andreas Eckart, Matthew Horrobin, Bettina Lindhorst, Steffen Rost, Semir Smajic, Christian Straubmeier, Evangelia Tremou, Jens Zuther, Imke Wank, Univ. zu Köln (Germany). . . . . [8445-119]

The LINC-NIRVANA fringe and flexure tracker control system, Steffen Rost, Andreas Eckart, Matthew Horrobin, Bettina Lindhorst, Christoph Rauch, Semir Smajic, Christian Straubmeier, Evangelia Tremou, Imke Wank, Jens Zuther, Univ. zu Köln (Germany); Jörg-Uwe Pott, Max-Planck-Institut für Astronomie (Germany) . . . . . [8445-121]

Control interface concepts for CHARA 6-Telescope fringe tracking with CHAMP+MIRC, Stefan Kraus, John D. Monnier, Fabien Baron, Xiao Che, Univ. of Michigan (USA); Rafael Millan-Gabet, California Institute of Technology (USA); Ettore Pedretti, European Southern Observatory (Germany); Nathalie Thureau, Univ. of St. Andrews (United Kingdom). . . . . [8445-122]

Double polarization active Y-junctions in the mid-IR, based on Ti:diffused lithium niobate waveguides, Samuel Heidmann, Guillermo Martin, Institut de Planétologie et d'Astrophysique de Grenoble (France); Nadège Bodin Courjal, Univ. de Franche-Comté (France) . . . . . [8445-137]

Software and Data Reduction

Data analysis pipeline and data quality of the CHARA array CLIMB beam combiner, Theo A. ten Brummelaar, Judit Sturmann, Harold A. McAlister, Laszlo Sturmann, Nils H. Turner, Christopher D. Farrington, Gail Schaefer, P. J. Goldfinger, Mount Wilson Institute (USA) . . . . . [8445-123]

Image reconstruction for observations at high dynamical range: the case of LINC-NIRVANA simulation of a stellar jet (THESIS), Andrea La Camera, Univ. degli Studi di Genova (Italy); Simone Antoniucci, INAF - Osservatorio Astronomico di Roma (Italy); Mario Bertero, Patrizia Boccacci, Univ. degli Studi di Genova (Italy); Dario Lorenzetti, Brunella Nisini, INAF - Osservatorio Astronomico di Roma (Italy) . . . . . [8445-125]

AIRY: a complete tool for the simulation and the reconstruction of Fizeau interferometric images (THESIS), Andrea La Camera, Univ. degli Studi di Genova (Italy); Marcel Carbillet, Univ. de Nice Sophia Antipolis (France); Chiara Olivieri, Patrizia Boccacci, Mario Bertero, Univ. degli Studi di Genova (Italy) . . . . . [8445-126]

Accompanying the optical interferometry: the JMMC tools and services, Olivier Absil, Univ. de Liège (Belgium); Myriam Benisty, Institut de Planétologie et d'Astrophysique de Grenoble (France); Jean-Philippe Berger, Herve Beust, Institut de Planétologie et d'Astrophysique de Grenoble (France); Daniel Bonneau, Observatoire de la Côte d'Azur (France) and Univ. de Nice Sophia-Antipolis, CNRS (France); Alain E. Chelli, Institut de Planétologie et d'Astrophysique de Grenoble (France); Olivier Chesneau, Pierre Cruzalebes, Observatoire de la Côte d'Azur (France) and Univ. de Nice Sophia-Antipolis, CNRS (France); Xavier Delfosse, Institut de Planétologie et d'Astrophysique de Grenoble (France); Armando Domiciano de Souza, Jr., Univ. de Nice Sophia Antipolis (France); Gilles Duvert, Institut de Planétologie et d'Astrophysique de Grenoble (France); Pierre Kervella, Observatoire de Paris à Meudon (France); Jacques Kluska, Sylvain Lafrasse, Institut de Planétologie et d'Astrophysique de Grenoble (France); Jean-Baptiste Le Bouquin, Institut de Planétologie et d'Astrophysique de Grenoble (France); Fabien Malbet, Institut de Planétologie et d'Astrophysique de Grenoble (France); Serge C. Meimon, ONERA (France); Guillaume Mella, Institut de Planétologie et d'Astrophysique de Grenoble (France); Antoine Merand, European Southern Observatory (Chile); Florentin A. Millour, Observatoire de la Côte d'Azur (France) and Univ. de Nice Sophia-Antipolis, CNRS (France); Jean-Louis Monin, Institut de Planétologie et d'Astrophysique de Grenoble (France); et al. . . . . [8445-128]

Calibration of coherently integrated visibilities, Thomas R. Hall, Anders M. Jorgensen, New Mexico Institute of Mining and Technology (USA); David Mozurkewich, Seabrook Engineering (USA); J. Thomas Armstrong, Henrique R. Schmitt, Ellyn K. Baines, U.S. Naval Research Lab. (USA); Don Hutter, U.S. Naval Observatory (USA). . . . . [8445-129]

Description of the Navy optical interferometer data base, Anders M. Jorgensen, Thomas R. Hall, New Mexico Institute of Mining and Technology (USA); J. Thomas Armstrong, U.S. Naval Research Lab. (USA); Don Hutter, Naval Observatory Flagstaff Station (USA); David Mozurkewich, Seabrook Engineering (USA) . . . . . [8445-130]

High-precision correction of low-resolution interferometric differential phase, Martin Vannier, Romain G. Petrov, Florentin A. Millour, Univ. de Nice Sophia Antipolis (France). . . . . [8445-131]

Parasitic interference in classical and nulling stellar interferometry, Alexis Matter, Denis Defrère, Max Planck Institut für Radioastronomie (Germany); William C. Danchi, NASA Goddard Space Flight Ctr. (USA); Bruno Lopez, Stéphane Lagarde, Martin Vannier, Romain G. Petrov, Observatoire de la Côte d'Azur (France) . . . . . [8445-132]

Precise stellar diameters from coherently averaged visibilities, J. Thomas Armstrong, U.S. Naval Research Lab. (USA); Anders M. Jorgensen, New Mexico Institute of Mining and Technology (USA); David Mozurkewich, Seabrook Engineering (USA); Ellyn K. Baines, U.S. Naval Research Lab. (USA); Henrique R. Schmitt, Computational Physics, Inc. (USA); Robert B. Hindsley, U.S. Naval Research Lab. (USA) . . . . . [8445-133]

Bandwidth smearing in optical interferometry: analytical modeling of the transition to the double fringe packet, Regis Lachaume, Pontificia Univ. Católica de Chile (Chile) and Max-Planck-Institut fur Astronomie (Germany); Jean-Philippe Berger, European Southern Observatory (Chile); Jean-Baptiste Lebouquin, Institut de Planétologie et d'Astrophysique de Grenoble (France); Markus Rabus, Pontificia Univ. Católica de Chile (Chile); Julien H. V. Girard, European Southern Observatory (Chile) . . . . . [8445-134]

Various

Speckle imaging observations of 2005 YU55 with the NACO-VLT no-AO mode, Sridharan Rengaswamy, Christophe Dumas, Julien H. V. Girard, Valentin Ivanov, European Southern Observatory (Chile) . . . . . [8445-135]

A fiber fed interferometer for the optical and infrared, Nicolas Clarke, Univ. College London (United Kingdom); Bruce M. Swinyard, Marc Ferlet, Rutherford Appleton Lab. (United Kingdom) . . . . . [8445-136]

Friday 6 July

SESSION 21

Room: E102 . . . . . Fri. 08.30 to 10.30

Critical Sub-Systems I

Session Chair: **Françoise Delplancke,**
European Southern Observatory (Germany)

08.30: **Tracking faint fringes with the CHARA-Michigan phasetracker (CHAMP)**, John D. Monnier, Fabien Baron, Stefan Kraus, Univ. of Michigan (USA); Rafael Millan-Gabet, California Institute of Technology (USA); Ettore Pedretti, European Southern Observatory (Germany); Nathalie Thureau, Univ. of St. Andrews (United Kingdom); Xiao Che, Univ. of Michigan (USA); Theo ten Brummelaar, Mount Wilson Institute (USA); Nuria Calvet, Univ. of Michigan (USA) . . . . . [8445-52]

08.50: **GRAVITY: report on the fringe tracker algorithms with a laboratory prototype**, Elodie Choquet, Guy S. Perrin, Pierre Fédou, Roderick Dembet, Thibaut Paumard, Vincent Lapeyrère, Sylvestre Lacour, Emmanuel Chambon, LESIA - Observatoire de Paris (France) and Groupement d'intérêt Scientifique PHASE (France). . . . . [8445-53]

09.10: **Fringe tracking performance monitoring and prediction: FINITO at VLTI**, Antoine Mérand, Fabien Patru, European Southern Observatory (Chile); Isabelle Percheron, European Southern Observatory (Germany); Jean-Philippe Berger, Sebastien Poupar, European Southern Observatory (Chile) . . . [8445-54]

09.30: **The Nova Fringe Tracker: a second-generation cophasing facility for up to six telescopes at the VLTI**, Jeffrey A. Meisner, Walter J. Jaffe, Leiden Observatory (Netherlands); Rudolf S. Le Poole, Leiden Observatory (Netherlands) and TNO Science and Industry (Netherlands). . . . . [8445-55]

09.50: **Chromatic phase diversity for cophasing future large array of telescopes**, Denis Mourard, Nassima Tarmoul, Jean-Michel Clausse, Aurélie Marcotto, Nicolas Mauclert, Observatoire de la Côte d'Azur (France); François Hénault, Institut de Planétologie et d'Astrophysique de Grenoble (France) . . . . . [8445-56]

10.10: **The MROI fringe tracker: closing the loop on ICoNN**, Tyler M. McCracken, Colby Jurgenson, Alisa V. Shtromberg, Fernando G. Santoro, Victor Alvidrez, Nicolas C. Torres, Chuck M. Dahl, New Mexico Institute of Mining and Technology (USA); Christopher A. Haniff, David Buscher, John Young, Univ. of Cambridge (United Kingdom); Michelle J. Creech-Eakman, New Mexico Institute of Mining and Technology (USA). . . . . [8445-57]

Coffee Break . . . . . 10.30 to 11.00

SESSION 22

Room: E102 . . . . . Fri. 11.00 to 12.00

Critical Sub-Systems II

Session Chair: **Romain G. Petrov,**
Observatoire de la Côte d'Azur (France)

11.00: **GRAVITY: metrology**, Stefan Gillessen, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8445-58]

11.20: **An experimental testbed for NEAT to demonstrate micro-pixel accuracy**, Antoine Crouzier, Fabien Malbet, Philippe Feautrier, Pierre Y. Kern, Institut de Planétologie et d'Astrophysique de Grenoble (France); Alain M. Leger, Institut d'Astrophysique Spatiale (France); Christophe Cara, Pierre-Olivier Lagage, Commissariat à l'Énergie Atomique (France); Renaud Goullioud, Michael Shao, Jet Propulsion Lab. (USA). . . . . [8445-59]

11.40: **The role of adaptive optics correction for optical/infrared interferometer arrays with moderate sized (D<3m) unit telescopes**, Christopher A. Haniff, Alexander D. Rea, Univ. of Cambridge (United Kingdom) . . . . . [8445-60]

Lunch Break . . . . . 12.00 to 13.30

SESSION 23

Room: E102 . . . . . Fri. 13.30 to 13.50

Science VIII

Session Chair: **Fabien Malbet,**
Institut de Planétologie et d'Astrophysique de Grenoble (France)

13.30: **To be or not to be asymmetric? VLTI and the mass loss geometry of red giants (THESIS)**, Claudia Paladini, Univ. Wien (Austria); Stephane Sacuto, Uppsala Univ. (Sweden); Daniela Klotz, Josef Hron, Univ. Wien (Austria); Markus Wittkowski, Eric Lagadec, European Southern Observatory (Germany); Tijl Verhoelst, Katholieke Univ. Leuven (Belgium); Alain Jorissen, Univ. Libre de Bruxelles (Belgium); Andrea Richichi, European Southern Observatory (Germany); Martin Groenewegen, Royal Observatory of Belgium (Belgium); Hans Olofsson, Onsala Space Observatory (Sweden); Franz Kerschbaum, Univ. of Vienna (Austria); Keiichi Ohnaka, Max-Planck-Institut für Radioastronomie (Germany) . . . . . [8445-61]

SESSION 24

Room: E102 . . . . . Fri. 13.50 to 15.10

Critical Sub-Systems III

Session Chair: **Fabien Malbet,**
Institut de Planétologie et d'Astrophysique de Grenoble (France)

13.50: **The LINC NIRVANA fringe and flexure tracking system: final assembly and predicted on sky performance**, Matthew Horrobin, Andreas Eckart, Univ. zu Köln (Germany); Udo Beckmann, Claus Connot, Max-Planck-Institut für Radioastronomie (Germany); Bettina Lindhorst, Univ. zu Köln (Germany); Edmund Nussbaum, Max-Planck-Institut für Radioastronomie (Germany); Christoph Rauch, Steffen Rost, Semir Smajic, Christian Straubmeier, Evangelia Tremou, Imke Wank, Jens Zuther, Univ. zu Köln (Germany); Thomas Bertram, Max-Planck-Institut für Astronomie (Germany) . . . . . [8445-62]

14.10: **Tracking near-infrared fringes on BETTII: a balloon-borne 8m-baseline interferometer**, Maxime J. Rizzo, Univ. of Maryland, College Park (USA); Stephen A. Rinehart, Richard K. Barry, Dominic J. Benford, NASA Goddard Space Flight Ctr. (USA); Dale J. Fixsen, Univ. of Maryland, College Park (USA); Todd Kale, Univ. of Maryland, Baltimore County (USA); David T. Leisawitz, Richard G. Lyon, John E. Mentzell, NASA Goddard Space Flight Ctr. (USA); Lee G. Mundy, Univ. of Maryland, College Park (USA); Robert F. Silverberg, NASA Goddard Space Flight Ctr. (USA) . . . . . [8445-63]

14.30: **GRAVITY: beam stabilization and light injection subsystems (THESIS)**, Oliver Pfuhl, Marcus Haug, Max-Planck-Institut für extraterrestrische Physik (Germany); António Amorim, Univ. de Lisboa (Portugal); Daniela Penka, Frank Eisenhauer, Stefan Kellner, Max-Planck-Institut für extraterrestrische Physik (Germany); Jorge Lima, Univ. de Lisboa (Portugal); Stefan Gillessen, Alexander P. Gräter, Thomas Ott, Eckhard Sturm, Clemens Kister, Magdalena Lippa, Ekkehard Wieprecht, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8445-64]

14.50: **The MROI fast tip-tilt correction and target acquisition system**, John S. Young, David F. Buscher, Martin Fisher, Christopher A. Haniff, Alexander D. Rea, Eugene B. Seneta, Xiaowei Sun, Donald M. A. Wilson, Univ. of Cambridge (United Kingdom); Allen R. Farris, Andres M. Olivares, Robert J. Selina, New Mexico Institute of Mining and Technology (USA) . . . . . [8445-120]

Coffee Break . . . . . 15.10 to 15.30

SESSION 25

Room: E102 . . . . . Fri. 15.30 to 16.30

Observing Techniques

Session Chair: **Jayadev K. Rajagopal,**
National Optical Astronomy Observatory (USA)

15.30: **Calibration and imaging algorithms for full-Stokes optical interferometry**, Nicholas M. Elias II, National Radio Astronomy Observatory (USA); David Mozurkewich, Seabrook Engineering (USA); Anders M. Jorgensen, New Mexico Institute of Mining and Technology (USA); Henrique R. Schmitt, Computational Physics, Inc. (USA); Stanislav S. Edel, New Mexico Institute of Mining and Technology (USA); Carol E. Jones, Robert J. Halonen, The Univ. of Western Ontario (Canada). . . . . [8445-66]

15.50: **A degeneracy in interferometric astrometry**, David F. Buscher, Univ. of Cambridge (United Kingdom) . . . . . [8445-67]

16.10: **High-precision closure phase for optical interferometry,** Martin Vannier, Romain G. Petrov, Florentin A. Millour, Univ. de Nice Sophia Antipolis (France) . . . . . [8445-68]

Award of the Best PhD Dissertation Prize

Room: E102 . . . . . Fri. 16.30 to 16.45

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SESSION 26

Room: E102 . . . . . Fri. 16.45 to 17.25

Critical Sub-Systems IV

Session Chair: **Jayadev K. Rajagopal,**
National Optical Astronomy Observatory (USA)

16.45: **Spectral dispersion for the FLUOR/CHARA instrument**, Benjamin Mollier, LESIA - Observatoire de Paris (France) . . . . . [8445-69]

17.05: **The GRAVITY spectrometers: system design**, Sebastian Fischer, Christian Straubmeier, Constanza Araujo-Hauck, Michael Wiest, Senol Yazici, Univ. zu Köln (Germany); Frank Eisenhauer, Max-Planck-Institut für extraterrestrische Physik (Germany); Guy S. Perrin, Lab. d'Etudes Spatiales et d'Instrumentation en Astrophysique (France); Andreas Eckart, Univ. zu Köln (Germany); Karine Rousselet-Perraut, Institut de Planétologie et d'Astrophysique de Grenoble (France); Wolfgang Brandner, Max-Planck-Institut für Astronomie (Germany); António Amorim, Univ. de Lisboa (Portugal). . . . . [8445-70]

Ground-based and Airborne Instrumentation for Astronomy IV


McLean


Ramsay


Takami

Conference Chairs: **Ian S. McLean,** Univ. of California, Los Angeles (USA); **Suzanne K. Ramsay,** European Southern Observatory (Germany); **Hideki Takami,** Subaru Telescope, National Astronomical Observatory of Japan (Japan)

Program Committee: **Joss Bland-Hawthorn,** The Univ. of Sydney (Australia); **Stephen S. Eikenberry,** Univ. of Florida (USA); **Christopher J. Evans,** UK Astronomy Technology Ctr. (United Kingdom); **Ramón J. García López,** Instituto de Astrofísica de Canarias (Spain); **Maureen L. Savage,** NASA Univ. Space Research Association (USA); **Luc Simard,** NRC Dominion Astrophysics Observatory (Canada); **Oskar von der Lühe,** Kiepenheuer-Institut für Sonnenphysik (Germany)

Sunday 1 July

SESSION 1

Room: Forum . . . . . Sun. 08.50 to 12.30

Instrumentation at Major Observatories

Session Chair: **Suzanne K. Ramsay,**
European Southern Observatory (Germany)

08.50: **Advances in instrumentation at the W. M. Keck Observatory** *(Invited Paper)*, Sean M. Adkins, Taft E. Armandroff, James Johnson, Hilton A. Lewis, W. M. Keck Observatory (USA); D. Christopher Martin, California Institute of Technology (USA); Ian S. McLean, Univ. of California, Los Angeles (USA); Peter Wizinowich, W. M. Keck Observatory (USA) . . . . . [8446-01]

09.20: **Overview of the ESO instrumentation programme** *(Invited Paper)*, Mark M. Casali, Luca Pasquini, Suzanne K. Ramsay, European Southern Observatory (Germany) . . . . . [8446-02]

09.50: **Instrumentation at Subaru Telescope** *(Invited Paper)*, Naruhisa Takato, Ikuru Iwata, Subaru Telescope, National Astronomical Observatory of Japan (USA) . . . . . [8446-03]

Coffee Break . . . . . 10.20 to 10.50

10.50: **Gemini's instrumentation program: latest results and long-range plan** *(Invited Paper)*, Maxime Boccas, Gemini Observatory (Chile); Eric V. Tollestrup, Scot J. Kleinman, Stephen J. Goodsell, Gemini Observatory (USA); Andrew Adamson, Gustavo Arriagada, Gemini Observatory (Chile); Julian C. Christou, Kevin Hanna, Gemini Observatory (USA); Manuel Lazo, Benoît Neichel, Gemini Observatory (Chile); Douglas A. Simons, Brian Walls, John K. White, Gemini Observatory (USA). . . . . [8446-04]

11.20: **An overview of instrumentation for the Large Binocular Telescope** *(Invited Paper)*, R. Mark Wagner, The Univ. of Arizona (USA) . . . . . [8446-05]

11.50: **Instrumentation at the Magellan Telescopes 2012**, David J. Osip, Las Campanas Observatory (Chile) . . . . . [8446-06]

12.10: **The La Silla - Paranal instrumentation program**, Luca Pasquini, European Southern Observatory (Germany) . . . . . [8446-07]

Lunch Break . . . . . 12.30 to 13.50

SESSION 2

Room: Forum . . . . . Sun. 13.50 to 17.40

New Instruments

Session Chair: **Hideki Takami,** Subaru Telescope, National Astronomical Observatory of Japan (USA)

13.50: **The SALT HRS spectrograph: instrument integration and laboratory test results**, David G. Bramall, Ray M. Sharples, Jürgen Schmoll, Luke M. G. Tyas, Paul Clark, Edward J. Younger, Nigel A. Dipper, Durham Univ. (United Kingdom); Sean G. Ryan, Univ. of Hertfordshire (United Kingdom); David A. Buckley, Janus D. Brink, South African Astronomical Observatory (South Africa) . . . . . [8446-08]

14.10: **Performance of the CHIRON high-resolution echelle spectrograph**, Christian Schwab, Julien F. P. Spronck, Matthew Giguere, Yale Univ. (USA); Andrei A. Tokovinin, Cerro Tololo Inter-American Observatory (Chile); Debra A. Fischer, Yale Univ. (USA). . . . . [8446-09]

14.30: **New fully-depleted, high resistivity CCDs for the low resolution imaging spectrograph at W. M. Keck Observatory: commissioning and science operations.**, Constance M. Rockosi, Lick Observatory (USA); Sean M. Adkins, W. M. Keck Observatory (USA); David Cowley, Lick Observatory (USA); Marc Kassis, W. M. Keck Observatory (USA); Robert I. Kibrick, Christopher Lockwood, Lick Observatory (USA); Nick Mostek, Lawrence Berkeley National Lab. (USA); Michael Peck, Lick Observatory (USA); Natalie A. Roe, Lawrence Berkeley National Lab. (USA); Mingzhi Wei, Lick Observatory (USA) . . . [8446-10]

14.50: **SITELLE--an imaging Fourier transform spectrometer for the Canada-France-Hawaii Telescope: expected science and data simulations**, Laurent Drissen, Alexandre Alarie, Sébastien Lavoie, Carmelle Robert, Univ. Laval (Canada); Julie Mandar, ABB Inc. (Canada); Thomas Martin, Univ. Laval (Canada) . . . . . [8446-11]

Coffee Break . . . . . 15.10 to 15.40

15.40: **VISIR upgrade: overview and status**, Florian Kerber, Hans-Ulrich Käufl, European Southern Observatory (Germany); Pedro Baksai, European Southern Observatory (Chile); Danuta Dobrzycka, Gert Finger, Derek J. Ives, Gerd H. Jakob, Eric Lagadec, Lars Lundin, Dimitri P. Mawet, Leander H. Mehrgan, European Southern Observatory (Germany); Margaret Moerchen, Leiden Observatory (Netherlands); Yazan Momany, European Southern Observatory (Chile); Vincent Moreau, Eric J. Pantin, Commissariat à l'Énergie Atomique (France); Miguel Riquelme, European Southern Observatory (Chile); Ralf Siebenmorgen, European Southern Observatory (Germany); Alain Smette, European Southern Observatory (Chile); Mario E. van den Ancker, European Southern Observatory (Germany); Lars Venema, ASTRON (Netherlands); Irina Yegorova, European Southern Observatory (Chile) . . . . . [8446-12]

16.00: **ARCONS: a 1024 pixel superconducting integral field spectrograph**, Kieran O'Brien, Benjamin A. Mazin, Sean G. McHugh, Seth R. Meeker, Danica Marsden, Univ. of California, Santa Barbara (USA); Bruce A. Bumble, Jet Propulsion Lab. (USA); Eric Langman, Marty Navaroli, Univ. of California, Santa Barbara (USA) . . . . . [8446-13]

16.20: **On-sky performance of the multi-object double spectrograph for the Large Binocular Telescope**, Richard W. Pogge, Bruce Atwood, Thomas P. O'Brien, Paul L. Byard, Mark A. Derwent, Raymond Gonzalez, Paul Martini, Jerry A. Mason, Patrick S. Osmer, Daniel P. Pappalardo, Ross Zhelem, Rebecca A. Stoll, David P. Steinbrecher, David F. Brewer, Christopher Colarosa, Edward J. Teiga, The Ohio State Univ. (USA) . . . . . [8446-14]

16.40: **Performance of the Apache Point Observatory Galactic Evolution Experiment (APOGEE) high-resolution near-infrared multi-object fiber spectrograph**, John C. Wilson, Fred R. Hearty, Michael F. Skrutskie, Steve R. Majewski, Univ. of Virginia (USA); Ricardo Schiavon, Gemini Observatory (USA); Daniel J. Eisenstein, Harvard-Smithsonian Ctr. for Astrophysics (USA); James E. Gunn, Princeton Univ. (USA); Bruce Gillespie, Apache Point Observatory (USA); David H. Weinberg, The Ohio State Univ. (USA); Basil Blank, Charles P. Henderson, PulseRay (USA); Stephen A. Smee, Robert H. Barkhouser, Albert Harding, Steve Hope, Johns Hopkins Univ. (USA); Greg J. Fitzgerald, Todd M. Stolberg, New England Optical Systems (USA); James Arns, Kaiser Optical Systems, Inc. (USA); Matthew J. Nelson, Sophia D. Brunner, Adam Burton, Eric Walker, Charles R. Lam, Univ. of Virginia (USA); Paul A. Maseman, The Univ. of Arizona (USA); Jim Barr, Univ. of Virginia (USA); R. French Leger, Larry N. Carey, Nick MacDonald, Univ. of Washington (USA); Garrett Ebelke, Apache Point Observatory (USA); Stephane Beland, Univ. of Colorado at Boulder (USA); Todd Horne, The Univ. of Arizona (USA); Erick T. Young, NASA Ames Research Ctr. (USA); George H. Rieke, Marcia J. Rieke, The Univ. of Arizona (USA); Thomas P. O'Brien, The Ohio State Univ. (USA); Jeffrey D. Crane, Carnegie Observatories (USA); Michael A. Carr, Princeton Univ. (USA); et al. . . . . [8446-15]

17.00: **FLAMINGOS-2: on-sky acceptance and commissioning results**, Stephen S. Eikenberry, Univ. of Florida (USA); UF and Gemini FLAMINGOS-2 Team, Univ. of Florida (USA) and Gemini Observatory (USA). . . . . [8446-16]

17.20: **MOSFIRE: the multi-object spectrometer for infrared exploration at the Keck Observatory,** Ian S. McLean, Univ. of California, Los Angeles (USA); Charles C. Steidel, California Institute of Technology (USA); Harland W. Epps, Univ. of California, Santa Cruz (USA); Keith Y. Matthews, California Institute of Technology (USA); Sean M. Adkins, W. M. Keck Observatory (USA) . . . [8446-17]

POSTER PREVIEWS

Room: Forum. . . . . .Sun. 17.40 to 18.00

Session Chair: **Christopher J. Evans,**
UK Astronomy Technology Ctr. (United Kingdom)

Poster authors will be contacted and selected to make brief presentations.

POSTERS-SUNDAY

Room: Hall 3. . . . . Sun. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Sunday. The interactive poster session with authors in attendance will be Sunday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

New Instruments and Upgrades/ Reports on Existing Instruments

Design of a full-Stokes polarimeter for VLT/X-Shooter, Frans Snik, Gerard van Harten, Leiden Observatory (Netherlands); Ramon Navarro, ASTRON (Netherlands); Lex Kaper, Univ. van Amsterdam (Netherlands); Paul Groot, Radboud Univ. Nijmegen (Netherlands) . . . . . [8446-76]

Concept of a simultaneous polarimeter and rapid camera in 4 bands: SPARC4, Claudia V. Rodrigues, Instituto Nacional de Pesquisas Espaciais (Brazil); Keith Taylor, Instruments4 (USA); Francisco J. Jablonski, Instituto Nacional de Pesquisas Espaciais (Brazil); Marcelo Assafin, Observatório do Valongo (Brazil); Alex Carciofi, Univ. de São Paulo (Brazil); Deonisio Cieslinski, Joaquim E. R. Costa, Instituto Nacional de Pesquisas Espaciais (Brazil); Ruben Dominguez, Univ. of Arizona (USA); Tania P. Dominici, Lab. Nacional de Astrofísica (Brazil); Gabriel A. P. Franco, Univ. Federal de Minas Gerais (Brazil); Damien J. Jones, Prime Optics (Australia); Antonio Kanaan, Univ. Federal de Santa Catarina (Brazil); René Laporte, Instituto Nacional de Pesquisas Espaciais (Brazil); Antonio M. Magalhaes, Univ. de São Paulo (Brazil); Andre Milone, Instituto Nacional de Pesquisas Espaciais (Brazil); Antonio Pereyra, Observatórió Nacional (Brazil); Luiz Antonio Reitano, Karleyne M. G. Silva, Cesar Strauss, Instituto Nacional de Pesquisas Espaciais (Brazil) . . . . . [8446-77]

Acousto-optical imaging spectrometer for 2.5 m telescope at Caucasian Mountain Observatory, Sergey P. Anikin, Sergey I. Chizhikov, Vladimir Y. Molchanov, Konstantin B. Yushkov, National Univ. of Science and Technology MISiS (Russian Federation); Vera P. Arkhipova, Valentin F. Esipov, Andrey M. Tatarnikov, Sternberg Astronomical Institute (Russian Federation) . . . . [8446-78]

The F/5 instrumentation suite for the Clay Telescope, Andrew H. Szentgyorgyi, Brian A. McLeod, Robert G. Fata, Timothy J. Norton, Mark P. Ordway, John B. Roll, Jr., Henry W. Bergner, Maureen A. Conroy, Harvard-Smithsonian Ctr. for Astrophysics (USA); Dylan L. Curley, Google Pittsburgh (USA); Harland W. Epps, Lick Observatory (USA); Daniel G. Fabricant, Thomas M. Gauron, John C. Geary, Mark Mueller, Harvard-Smithsonian Ctr. for Astrophysics (USA); Alan Uomoto, Carnegie Observatories (USA); Stephen M. Amato, Jack Barberis, Roger Eng, Gabor Furesz, Edward N. Hertz, Harvard-Smithsonian Ctr. for Astrophysics (USA); Charles L. Hull, Giant Magellan Telescope Project (USA); Kenneth McCracken, George U. Nystrom, Harvard-Smithsonian Ctr. for Astrophysics (USA); David J. Osip, Povilas Palunas, Frank S. Perez, Felipe Sanchez, Las Campanas Observatory (Chile); Vincent Suc, Pontificia Univ. Católica de Chile (Chile); David Weaver, Harvard-Smithsonian Ctr. for Astrophysics (USA); Deborah F. Woods, MIT Lincoln Lab. (USA)[8446-79]

The AAO's gemini high-resolution optical spectrogrph (GHOS) concept, Michael J. Ireland, Australian Astronomical Observatory (Australia) and Macquarie Univ. (Australia); Stuart I. Barnes, Stuart Barnes Optical Design (New Zealand); David M. Cochrane, Industrial Research Ltd. (New Zealand); Matthew Colless, Anthony J. Horton, Australian Astronomical Observatory (Australia); Steve Gibson, Industrial Research Ltd. (New Zealand) and Univ. of Canterbury (New Zealand); Jon S. Lawrence, Australian Astronomical Observatory (Australia); Peter J. McGregor, The Australian National Univ. (Australia); Tom Nicolle, Kathryn Nield, Industrial Research Ltd. (New Zealand); David R. Orr, Simon O'Toole, Australian Astronomical Observatory (Australia); James G. Robertson, Australian Astronomical Observatory (Australia) and The Univ. of Sydney (Australia); Stuart D. Ryder, Greg A. Smith, Julia Tims, Pascal Xavier, Australian Astronomical Observatory (Australia); Peter J. Young, The Australian National Univ. (Australia); Jessica Zheng, Australian Astronomical Observatory (Australia). . . . . [8446-80]

GRACES--the Gemini remote access CFHT ESPaDOnS spectrograph: initial design and testing, Eric V. Tollestrup, Gemini Observatory (USA); André Anthony, National Research Council Canada (Canada); Gregory A. Barrick, Canada-France-Hawaii Telescope (USA); Mark Halman, National Research Council Canada (Canada); Eder Martioli, Canada-France-Hawaii Telescope (USA); John Pazder, National Research Council Canada (Canada); Ricardo Schiavon, Gemini Observatory (USA); Christian Veillet, Canada-France-Hawaii Telescope (Canada). . . . . [8446-81]

BASIS: Bayfordbury single-object integral field spectrograph, Samuel N. Richards, William E. Martin, Hugh R. A. Jones, Mark Gallaway, Univ. of Hertfordshire (United Kingdom); Joss Bland-Hawthorn, The Univ. of Sydney (Australia); Elias Brinks, Univ. of Hertfordshire (United Kingdom); Julia J. Bryant, The Univ. of Sydney (Australia); David Campbell, Univ. of Hertfordshire (United Kingdom); Lisa M. R. Fogarty, The Univ. of Sydney (Australia); Michael Goodwin, Australian Astronomical Observatory (Australia); Jon S. Lawrence, Australian Astronomical Observatory (Australia) and Macquarie Univ. (Australia); Sergio Leon-Saval, The Univ. of Sydney (Australia); Marc Sarzi, Daniel J. B. Smith, Univ. of Hertfordshire (United Kingdom) . . . . . [8446-82]

iSHELL: a 1-5 micron cross-dispersed R=70,000 immersion grating spectrograph for IRTF, John T. Rayner, Timothy W. Bond, Morgan B. Bonnet, Alan T. Tokunaga, Univ. of Hawai'i (USA); Gary Muller, National Optical Astronomy Observatory (USA); Daniel T. Jaffe, The Univ. of Texas at Austin (USA) . . . . . [8446-83]

The AAO fiber instrument data simulator, Michael Goodwin, Tony J. Farrell, Scott Smedley, Jeroen Heijmans, Ron Heald, Gayandhi De Silva, Australian Astronomical Observatory (Australia) . . . . . [8446-84]

Front end of the SPIRou spectropolarimeter for Canada-France Hawaii Telescope, Laurent P. Parès, Univ. de Toulouse, UPS-OMP (France) and Institut de Recherche en Astrophysique et Planétologie (France); Sébastien Baratchart, Univ. de Toulouse, UPS-OMP, GET (France); Gregory A. Barrick, Canada-France-Hawaii Telescope (USA); Marc Bouye, Univ. de Toulouse, UPS (France) and Observatoire Midi-Pyrénées (France); Jean-François Donati, Univ. de Toulouse, UPS-OMP (France) and CNRS, IRAP (France); Bruno Dubois, Univ. de Toulouse, UPS-OMP (France); Michel Dupieux, Univ. de Toulouse UPS-OMP (France) and Institut de Recherche en Astrophysique et Planétologie (France); Gérard Gallou, Univ. de Toulouse, UPS (France) and Observatoire Midi-Pyrénées (France); Thierry Gharsa, Univ. de Toulouse, UPS-OMP (France) and Institut de Recherche en Astrophysique et Planétologie (France); Driss Kouach, Univ. de Toulouse, UPS (France) and Observatoire Midi-Pyrénées (France); Yoan Micheau, Univ. de Toulouse, UPS-OMP (France) and Institut de Recherche en Astrophysique et Planétologie (France); Shiang-Yu Wang, Academia Sinica (Taiwan) . . . . . [8446-85]

Stability achieved for the environmentally stabilized FOCES echelle spectrograph (FOCES stability IV), Frank U. Grupp, Anna Brucalassi, Tobias Feger, Univ.-Sternwarte München (Germany); Ronald Holzwarth, Menlo Systems GmbH (Germany); Thomas Udem, Max-Planck-Institut für Quantenoptik (Germany); Florian Lang-Bardl, Univ.-Sternwarte München (Germany); Ralf Bender, Univ.-Sternwarte München (Germany) and Max Planck Institut für extraterrestische Physik (Germany). . . . . [8446-87]

Gemini high-resolution optical spectrograph conceptual optical design, John S. Pazder, Kei Szeto, National Research Council Canada (Canada); Simon Thibault, Univ. Laval (Canada). . . . . [8446-88]

A single-shot optical linear polarimeter for asteroids studies, Claudio Pernechele, INAF - Osservatorio Astronomico di Padova (Italy); Lyu Abe, Philippe Bendjoya, Univ. de Nice Sophia-Antipolis (France); Alberto Cellino, INAF - Osservatorio Astronomico di Torino (Italy); Jean-Pierre Rivet, Observatoire de la Côte d'Azur (France); Paolo Tanga, INAF - Osservatorio Astronomico di Torino (Italy) . . . . . [8446-89]

Gemini high-resolution optical spectrograph conceptual mechanical design, Alexis Hill, André Anthony, John Pazder, Kei Szeto, National Research Council Canada (Canada); Simon Thibault, Univ. Laval (Canada) . . . . . [8446-90]

RINGO3: a multi-colour fast response polarimeter, Doug Arnold, Iain A. Steele, Stuart Bates, Christopher J. Mottram, Robert J. Smith, Liverpool John Moores Univ. (United Kingdom) . . . . . [8446-91]

ECHARPE mechanical design, Vanessa B. P. Macanhan, Lab. Nacional de Astrofísica (Brazil); Marcio Vital de Arruda, Thiago V. Martins, Tania P. Dominici, Bruno V. Castilho, Clemens D. Gneiding, Rodrigo P. Campos, Lab. Nacional de Astrofisica (Brazil) . . . . . [8446-93]

aTmcam: a simple atmosphere transmission monitoring camera for sub 1% photometric precision, Ting Li, Darren L. DePoy, Texas A&M Univ. (USA); David L. Burke, SLAC National Accelerator Lab. (USA); Richard Kessler, The Univ. of Chicago (USA); Jean-Philippe Rheault, Jennifer L. Marshall, Don W. Carona, Steven Boada, Texas A&M Univ. (USA) . . . . . [8446-94]

Image quality tests on the Canarias InfraRed Camera Experiment (CIRCE), Nestor M. Lasso Cabrera, Stephen S. Eikenberry, Alan Garner, Steven N. Raines, Univ. of Florida (USA); Miguel V. Charcos-Llorens, SOFIA / USRA (USA); Michelle L. Edwards, Gemini Observatory (Chile); Antonio Marin-Franch, Ctr. de Estudios de Física del Cosmos de Aragón (Spain) . . . . . [8446-95]

Upgrading CRIRES-VLT to cross-dispersed mode, Ernesto Oliva, Andrea Tozzi, Debora Ferruzzi, INAF - Osservatorio Astrofisico di Arcetri (Italy); Artie P. Hatzes, Thüringer Landessternwarte Tautenburg (Germany); Hans-Ulrich Käufl, European Southern Observatory (Germany); Livia Origlia, INAF - Osservatorio Astronomico di Bologna (Italy); Nikolai A. Piskunov, Uppsala Univ. (Sweden); Ansgar Reiners, Georg-August-Univ. Göttingen (Germany) . . . . . [8446-96]

MSI: a visible multispectral imager for 1.6-m telescope of Hokkaido University, Makoto Watanabe, Yukihiro Takahashi, Mitsuteru Sato, Shigeto Watanabe, Tetsuya Fukuhara, Ko Hamamoto, Akihito Ozaki, Hokkaido Univ. (Japan). . . . . [8446-97]

The MUSE instrument detector system, Roland Reiss, Sebastian Deiries, Jean-Louis Lizon, Gero Rupprecht, European Southern Observatory (Germany) . . . . . [8446-98]

Laboratory performance tests of PANIC, the panoramic NIR imager for Calar Alto, Josef W. Fried, Clemens Storz, Ulrich Mall, Vianak Naranjo, Peter Bizenberger, Max-Planck-Institut für Astronomie (Germany); María Concepción Cárdenas Vázquez, Instituto de Astrofísica de Andalucía (Spain) . . . . . [8446-99]

Low-loss fiber link for the SPIRou near-infrared spectropolarimeter at CFHT, Yoan Micheau, Univ. de Toulouse (France) and Institut de Recherche en Astrophysique et Planétologie (France); Gregory A. Barrick, Canada-France-Hawaii Telescope (USA); François Bouchy, Institut d'Astrophysique de Paris (France) and Observatoire de Haute-Provence (France); Bruno Chazelas, Observatory of Geneva (Switzerland); Jean-François Donati, Gérard Gallou, Laurent P. Parès, Univ. de Toulouse (France) and Institut de Recherche en Astrophysique et Planétologie (France); Francesco Pepe, Observatory of Geneva (Switzerland); Patrick Rabou, Institut de Planétologie et d'Astrophysique de Grenoble (France) . . . . . [8446-101]

Control and protection of outdoor embedded camera for astronomy, François Rigaud, Isabelle Jegouzo, Julien Gaudemard, Observatoire de Paris à Meudon (France) . . . . . [8446-102]

Design and construction progress of LRS2-B: a new low resolution integral-field spectrograph for the Hobby-Eberly Telescope, Taylor S. Chonis, Hanshin Lee, Gary J. Hill, Mark E. Cornell, Sarah E. Tuttle, Brian L. Vattiat, The Univ. of Texas at Austin (USA) . . . . . [8446-103]

Optical design of a red sensitive spectrograph, Emily C. Martin, Darren L. DePoy, Jennifer L. Marshall, Texas A&M Univ. (USA) . . . . . [8446-104]

Optimal resolutions for optical and NIR spectroscopy through atmospheric emission lines, Steven Villanueva, Jr., Darren L. DePoy, Jennifer L. Marshall, Texas A&M Univ. (USA) . . . . . [8446-105]

HexPak and GradPak: variable-pitch dual-head IFUs for the WIYN 3.5m telescope bench spectrograph, Corey M. Wood, Arthur D. Eigenbrot, Matthew A. Bershady, Scott Buckley, Michael P. Smith, Marsha J. Wolf, John S. Gallagher III, Eric J. Hooper, Andrew I. Sheinis, Univ. of Wisconsin-Madison (USA) . . . . . [8446-106]

OCTOCAM as a visitor instrument at the 10.4m GTC, Antonio de Ugarte Postigo, Instituto de Astrofísica de Andalucía (Spain) and Univ. of Copenhagen (Denmark); Javier U. Gorosabel, Instituto de Astrofísica de Andalucía (Spain) . . . . . [8446-107]

Science with OCTOCAM at the 10.4m GTC, Javier U. Gorosabel, Instituto de Astrofísica de Andalucía (Spain); Antonio de Ugarte Postigo, Instituto de Astrofísica de Andalucía (Italy) and Univ. of Copenhagen (Denmark) . . [8446-108]

A new deep-depletion CCD for the red channel of the Palomar double spectrograph, Gustavo Rahmer, Caltech Optical Observatories (USA) and Large Binocular Telescope Observatory (USA); Roger M. Smith, Khanh Bui, Evan Kirby, Richard G. Dekany, Ernest E. Croner, Jennifer W. Milburn, Caltech Optical Observatories (USA) . . . . . [8446-109]

SPIRou @ CFHT: spectrograph optical design, Simon Thibault, Univ. Laval (Canada); Patrick Rabou, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Jean-Francois Donati, Institut de Recherche en Astrophysique et Planétologie (France); Xavier Delfosse, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Francesco Pepe, Observatory of Geneva (Switzerland) . . . . . [8446-110]

Optical design of the multichannel (Vis-NIR) reionization and transient infrared (RATIR) camera, J. Jesús González-Hernandez, Univ. Nacional Autónoma de México (Mexico); Alexander S. Kutyrev, NASA Goddard Space Flight Ctr. (USA); Alan M. Watson, Univ. Nacional Autónoma de México (Mexico); Nathaniel R. Butler, Arizona State Univ. (USA); Rebecca A. Bernstein, Univ. of California Observatories (USA); Alejandro D. Simón Farah, William H. Lee, Univ. Nacional Autónoma de México (Mexico) . . . . . [8446-112]

STELES mechanical design, Ruben Dominguez, The Univ. of Arizona (USA); Vanessa B. P. Macanhan, Lab. Nacional de Astrofísica (Brazil); Bruno V. Castilho, Marcio Vital de Arruda, Clemens D. Gneiding, Andreas Klossek, Ney Diniz, Diego E. Mercadal, Denis Cariello, Sascha Voegel, Beatrice Nehrkorn, Fernando E. Lourenço, Lab. Nacional de Astrofisica (Brazil) . . . . . [8446-113]

CARMENES: optical and opto-mechanical design, Walter Seifert, Landessternwarte Heidelberg (Germany); Miguel A. Sanchez Carrasco, Instituto de Astrofísica de Andalucía (Spain); Wenli Xu, Landessternwarte Heidelberg (Germany) and Optical System Engineering (Germany); Ernesto Sánchez-Blanco Mancera, Diseño de Sistemas Ópticos (Spain); María Concepción Cárdenas Vázquez, Santiago Becerril Jarque, Instituto de Astrofísica de Andalucía (Spain); Carmen Feiz, Landessternwarte Heidelberg (Germany) . . . . . [8446-114]

Perfomance verifications of the ground-based mid-infrared camera MAX38 on the MiniTAO Telescope, Kentaro Asano, Takashi Miyata, Shigeyuki Sako, Takafumi Kamizuka, Tomohiko Nakamura, Mizuho Uchiyama, The Univ. of Tokyo (Japan); Mizuki Yoneda, Tohoku Univ. (Japan); Hirokazu Kataza, Japan Aerospace Exploration Agency (Japan); Yuzuru Yoshii, Mamoru Doi, Kotaro Kohno, Kimiaki Kawara, Masuo Tanaka, Kentaro Motohara, Toshihiko Tanabe, Takeo Minezaki, Tomoki Morokuma, Yoichi Tamura, Tsutomu Aoki, Takao Soyano, Ken'ichi Tarusawa, Natsuko M. Kato, Masahiro Konishi, Shintaro Koshida, Hidenori Takahashi, The Univ. of Tokyo (Japan); Toshihiro Handa, Kagoshima Univ. (Japan); Ken Tateuchi, The Univ. of Tokyo (Japan). . [8446-115]

Gemini high-resolution optical spectrograph conceptual design, Kei Szeto, Alan W. McConnachie, André Anthony, David A. Bohlender, David Crampton, Jennifer Dunn, Tim Hardy, Alexis Hill, Dmitry Monin, John Pazder, National Research Council Canada (Canada); Simon Thibault, Univ. Laval (Canada); Gordon A. H. Walker, National Research Council Canada (Canada); Kimberly Venn, Univ. of Victoria (Canada) . . . . . [8446-116]

ECHARPE: a fiber-fed echelle spectrograph for the Pico dos Dias Observatory, Tania P. Dominici, Bruno V. Castilho, Clemens D. Gneiding, Lab. Nacional de Astrofisica (Brazil); Bernard A. Delabre, European Southern Observatory (Germany); Vanessa B. P. Macanhan, Marcio Vital de Arruda, Antonio Cesar de Oliveira, Lab. Nacional de Astrofísica (Brazil); Jorge Melendez, Univ. de São Paulo (Brazil); Jose Dias do Nacimento, Univ. Federal do Rio Grande do Norte (Brazil); Gabriel A. P. Franco, Univ. Federal de Minas Gerais (Brazil); Germano R. Quast, Lab. Nacional de Astrofisica (Brazil); Gustavo F. Porto de Mello, Univ. Federal do Rio de Janeiro (Brazil); Wagner J. B. Corradi, Luiz P. R. Vaz, Univ. Federal de Minas Gerais (Brazil) . . . . . [8446-117]

MOSFIRE lens bonding, assembly, and alignment, Nicholas P. Konidaris II, California Institute of Technology (USA); Theodore Aliado, Univ. of California, Los Angeles (USA); Harland W. Epps, Lick Observatory (USA); Jason R. Fucik, Keith Y. Matthews, California Institute of Technology (USA); Ian S. McLean, Univ. of California, Los Angeles (USA); Charles C. Steidel, California Institute of Technology (USA); Eric Wang, Univ. of California, Los Angeles (USA); Robert W. Weber, California Institute of Technology (USA) . . . . . [8446-118]

An experimental VLT cryo-cooler instrumentation vibration analysis, Gerd H. Jakob, Jean-Louis Lizon, European Southern Observatory (Germany) [8446-119]

A simple high efficiency high resolution spectropolarimeter, Samuel C. Barden, National Solar Observatory (USA) . . . . . [8446-120]

CYCLOPS2: the fibre image slicer upgrade for the UCLES high resolution spectrograph, Anthony J. Horton, Australian Astronomical Observatory (Australia); Chris G. Tinney, The Univ. of New South Wales (Australia); Jon S. Lawrence, David R. Orr, Stan Miziarski, Scott Case, Luke Gers, Australian Astronomical Observatory (Australia); Damien J. Jones, Prime Optics (Australia) . . . . . [8446-121]

Echelle gratings for the near-infrared, Kenneth H. Hinkle, Richard R. Joyce, Joan R. Najita, Verne V. Smith, Lloyd Wallace, National Optical Astronomy Observatory (USA); Erich Bach, Bernhard W. Bach, Kirk G. Bach, Bach Research Corp. (USA) . . . . . [8446-122]

Fully optimized shaped pupils: preparation for a test at the Subaru Telescope, Alexis Carlotti, Tyler D. Groff, N. Jeremy Kasdin, Robert J. Vanderbei, Princeton Univ. (USA); Olivier Guyon, Subaru Telescope, National Astronomical Observatory of Japan (USA) and The Univ. of Arizona (USA); Frantz Martinache, Subaru Telescope, National Astronomical Observatory of Japan (USA) . . . . . [8446-123]

From the most plain coronograph to the most populated spectrograph: a suite of some new instruments for LBT, Demetrio Magrin, Roberto Ragazzoni, INAF - Osservatorio Astronomico di Padova (Italy); Maria Bergomi, INAF - Osservatorio Astronomico di Padova (Italy) and Univ. degli Studi di Padova (Italy); Alessandro Brunelli, Marco Dima, Jacopo Farinato, Giorgia Gentile, Luca Marafatto, Valentina Viotto, INAF - Osservatorio Astronomico di Padova (Italy) . . . . . [8446-124]

Optical bi-stable shutter development/improvement, Jean-Louis Lizon, European Southern Observatory (Germany); Nicholas Haddad, Roberto Castillo, European Southern Observatory (Chile) . . . . . [8446-125]

A new more efficient grating for the Keck integral field spectrograph OSIRIS, Shelley A. Wright, Dunlap Institute for Astronomy & Astrophysics (Canada); James E. Larkin, Univ. of California, Los Angeles (USA); Sean M. Adkins, W.M. Keck Observatory (USA); James R. Graham, Dunlap Institute for Astronomy & Astrophysics (USA); James E. Lyke, Randall D. Campbell, W.M. Keck Observatory (USA); Bernhard W. Bach, Erich Bach, Kirk G. Bach, Bach Research Corp. (USA) . . . . . [8446-127]

An integrated 1-5 micron test bench for the characterization of cryogenic optical elements, Udo J. Wehmeier, Jarron M. Leisenring, Michael R. Meyer, ETH Zurich (Switzerland); Olivier Durney, Elliott Solheid, ORION Labs. (USA); Gerard A. Luppino, GL Scientific (USA) . . . . . [8446-128]

An on-sky demonstration of a single mode fibre fed spectrograph (NanoSpec), Christopher H. Betters, Joss Bland-Hawthorn, Sergio G. Leon-Saval, The Univ. of Sydney (Australia) . . . . . [8446-129]

Redesign of the integrated photonic spectrograph for improved astronomical performance and frontiers in the mid-IR, Nick Cvetojevic, Nemanja Jovanovic, Macquarie Univ. (Australia); Jon S. Lawrence, Australian Astronomical Observatory (Australia); Michael J. Withford, Macquarie Univ. (Australia); Joss Bland-Hawthorn, The Univ. of Sydney (Australia) . . . [8446-130]

GNOSIS: a new near-infrared OH suppression unit at the AAT, Christopher Q. Trinh, The Univ. of Sydney (Australia); Simon C. Ellis, Jon S. Lawrence, Australian Astronomical Observatory (Australia); Joss Bland-Hawthorn, The Univ. of Sydney (Australia); Anthony J. Horton, Australian Astronomical Observatory (Australia); Sergio G. Leon-Saval, The Univ. of Sydney (Australia); Julia J. Bryant, The Univ. of Sydney (Australia) and CAASTRO (Australia); Scott Case, Matthew Colless, Australian Astronomical Observatory (Australia); Warrick Couch, Swinburne Univ. of Technology (Australia); Kenneth C. Freeman, Research School of Astronomy & Astrophysics (Australia); Luke Gers, Australian Astronomical Observatory (Australia); Karl Glazebrook, Swinburne Univ. of Technology (Australia); Roger Haynes, Leibniz-Institut für Astrophysik Potsdam (Germany); Steve Lee, Australian Astronomical Observatory (Australia); Hans-Gerd Löhmannsröben, Leibniz-Institut für Astrophysik Potsdam (Germany); Stan Miziarski, Australian Astronomical Observatory (Australia); John W. O'Byrne, The Univ. of Sydney (Australia); William N. Rambold, Martin M. Roth, Leibniz-Institut für Astrophysik Potsdam (Germany); Brian P. Schmidt, The Australian National Univ. (Australia); Keith Shortridge, Scott Smedley, Australian Astronomical Observatory (Australia); Chris G. Tinney, The Univ. of New South Wales (Australia); Pascal Xavier, Jessica Zheng, Australian Astronomical Observatory (Australia) . . . . . [8446-131]

MAIA—the mercator advanced imager for asteroseismology: performance verification and first test results, Jeroen Vandersteen, Gert Raskin, Conny Aerts, Steven Bloemen, Florian Merges, Johan Morren, Roy H. Østensen, Jesus Perez Padilla, Wim Pessemier, Saskia Prins, Jan Swevers, Hans Van Winckel, Katholieke Univ. Leuven (Belgium) . . . . . [8446-132]

OSIRIS commissioning and lessons learned, Jordi Cepa, Univ. de La Laguna (Spain) and Instituto de Astrofísica de Canarias (Spain); J. Jesús González-Hernandez, Univ. Nacional Autónoma de México (Mexico); Joss Bland-Hawthorn, The Univ. of Sydney (Australia); Angel Manuel Bongiovanni, Alessandro Ederoclite, Instituto de Astrofísica de Canarias (Spain) and Univ. de La Laguna (Spain); José Ignacio González-Serrano, Univ. de Cantabria (Spain); Ana María Pérez García, Instituto de Astrofísica de Canarias (Spain) and Univ. de La Laguna (Spain); Miguel A. Sánchez-Portal, European Space Astronomy Ctr. (Spain); Emilio J. Alfaro, Instituto de Astrofísica de Andalucía (Spain); Héctor O. Castañeda, Instituto Politécnico Nacional (Mexico) . . . . . [8446-133]

Improving absolute spectroradiometry of standard stars, Claire E. Cramer, John T. Woodward IV, Keith R. Lykke, Ping Shaw, National Institute of Standards and Technology (USA); John T. McGraw, Peter C. Zimmer, The Univ. of New Mexico (USA); Christopher W. Stubbs, Amali Vaz, Harvard Univ. (USA)[8446-134]

A water vapour monitor at Paranal Observatory, Florian Kerber, European Southern Observatory (Germany); Thomas Rose, Radiometer Physics GmbH (Germany); Arlette Chacon, Omar Cuevas, Univ. de Valparaiso (Chile); Harald Czekala, Radiometer Physics GmbH (Germany); Reinhard Hanuschik, European Southern Observatory (Germany); Yazan Momany, Julio Navarrete, European Southern Observatory (Chile); Richard R. Querel, Univ. de Chile (Chile); Alain Smette, Mario E. van den Ancker, European Southern Observatory (Chile); Michel Cure, Univ. de Valparaiso (Chile); David A. Naylor, Univ. of Lethbridge (Canada) . . . . . [8446-135]

Design and lab performance of high resolution Florida IR silicon immersion grating spectrometer, Jian Ge, Bo Zhao, Ji Wang, Xiaoke Wan, Sidney L. Schofield, Adam Fletcher, Univ. of Florida (USA) . . . . . [8446-136]

Commissioning of the WWFI for the Wendelstein Fraunhofer Telescope, Claus A. Gössl, Univ.-Sternwarte München (Germany); Ralf Bender, Univ.-Sternwarte München (Germany) and Max-Planck-Institut für extraterrestrische Physik (Germany); Ulrich Hopp, Ralf Kosyra, Florian Lang-Bardl, Univ.-Sternwarte München (Germany) . . . . . [8446-137]

Testing of the Tor Vergata Fabry-Pérot interferometer prototype, Luca Giovannelli, Francesco Berrilli, Martina Cocciolo, Dario Del Moro, Alberto Egidi, Roberto Piazzesi, Marco Stangalini, Univ. degli Studi di Roma Tor Vergata (Italy) . . . . . [8446-138]

Commissioning results of MMT-POL: the 1-5um imaging polarimeter leveraged from the AO secondary of the 6.5m MMT, Christopher C. Packham, Univ. of Florida (USA); Terry J. Jones, Univ. of Minnesota, Twin Cities (USA); Craig D. Warner, Univ. of Florida (USA); Megan M. Krejny, Dinesh Shenoy, T. Vonderharr, Univ. of Minnesota, Twin Cities (USA); Enrique Lopez, Univ. of Florida (USA); Kathleen Dewahl, Univ. of Minnesota, Twin Cities (USA)[8446-144]

New scientific results with SpIOMM: a testbed for CFHT's imaging Fourier transform spectrometer SITELLE, Laurent Drissen, Alexandre Alarie, Thomas Martin, Dominic Lagrois, Laurie Rousseau-Nepton, Gilles Joncas, Carmelle Robert, Univ. Laval (Canada). . . . . [8446-145]

First results from the GIANO spectrometer, Ernesto Oliva, INAF - Osservatorio Astrofisico di Arcetri (Italy); Livia Origlia, INAF - Osservatorio Astronomico di Bologna (Italy); Carlo Baffa, Valdemaro Biliotti, INAF - Osservatorio Astrofisico di Arcetri (Italy); Pietro Bruno, INAF - Osservatorio Astrofisico di Catania (Italy); Gilberto Falcini, INAF - Osservatorio Astrofisico di Arcetri (Italy); Francesca Ghinassi, Telescopio Nazionale Galileo (Italy); Elisabetta Giani, INAF - Osservatorio Astrofisico di Arcetri (Italy); Manuel Gonzalez, Telescopio Nazionale Galileo (Italy); Franco Leone, INAF - Osservatorio Astrofisico di Catania (Italy); Marcello Lodi, Telescopio Nazionale Galileo (Italy); Roberto Maiolino, INAF - Osservatorio Astrofisico di Arcetri (Italy); Paolo Montegriffo, INAF - Osservatorio Astronomico di Bologna (Italy); Emanuel Rossetti, Univ. degli Studi di Bologna (Italy); Salvatore Scuderi, INAF - Osservatorio Astrofisico di Catania (Italy); Mauro Sozzi, Andrea Tozzi, INAF - Osservatorio Astrofisico di Arcetri (Italy) . [8446-146]

Testing GIANO spectral stability, Carlo Baffa, Elisabetta Giani, Ernesto Oliva, Valdemaro Biliotti, Mauro Sozzi, Andrea Tozzi, INAF - Osservatorio Astrofisico di Arcetri (Italy). . . . . [8446-147]

Improved red sensitivity deep depletion e2v devices for the Gemini North GMOS instrument, Katherine C. Roth, Scot J. Kleinman, Kristin Chiboucas, Ricardo Schiavon, Kevin Hanna, Mathew Rippa, John K. White, Brian Walls, Gemini Observatory (USA); Richard Murowinski, National Research Council Canada (Canada); Kathleen Labrie, Gemini Observatory (USA); German Gimeno, Mark Simpson, Gemini Observatory (Chile) . . . . . [8446-148]

DeSSpOt: a prototype for the determination of stellar spin orientation, Anna-Lea Lesage, Magnus Schneide, Günter Wiedemann, Nils Prange, Hamburger Sternwarte (Germany) . . . . . [8446-149]

The alignment strategy for LINC-NIRVANA, Daniel Meschke, Thomas Bertram, Peter Bizenberger, Max-Planck-Institut für Astronomie (Germany) . . . [8446-150]

First light observation of GIGMICS (germanium immersion grating mid-infrared cryogenic spectrograph) by Kanata 1.5-m Telescope at Higashi-Hiroshima Observatory, Yasuhiro Hirahara, Yoshio Tatamitani, Tsuyoshi Hirao, Keishin Aoki, Kanako Ota, Sho Shibata, Noboru Ebizuka, Nagoya Univ. (Japan); Koji S. Kawabata, Michitoshi Yoshida, Makoto Uemura, Hiroshima Univ. (Japan); Ryuji Fujimori, Hiroki Ohiwa, Hisayuki Nagahiro, Kentaro Kawaguchi, Okayama Univ. (Japan) . . . . . [8446-152]

An unobscured four spherical mirrors based collimator as a trade-off solution for the optical ground support equipment (OGSE) of the high resolution camera (HRIC) of Simbio-sys, Marco Barilli, Alessandro Bartoli, Michele Dami, Fulvio Grifoni, Carlo Pompei, SELEX Galileo S.p.A. (Italy); Enrico Flamini, Roberto Formaro, Francesco Longo, Agenzia Spaziale Italiana (Italy) . . . . . [8446-153]

Commissioning of a new multi-band camera for REM, Paolo Spanò, INAF - Osservatorio Astronomico di Brera (Italy); Vincenzo De Caprio, INAF - Osservatorio Astronomico di Capodimonte (Italy); Dino Fugazza, Stefano Covino, Daniela Tresoldi, INAF - Osservatorio Astronomico di Brera (Italy); Francesco D'Alessio, Fabrizio Vitali, INAF - Osservatorio Astronomico di Roma (Italy); Luciano Nicastro, INAF - IASF Bologna (Italy); Enrico Mattaini, Emilio Sant'Ambrogio, Salvo Incorvaia, INAF - IASF Milano (Italy); Giuseppe Crimi, INAF - Osservatorio Astronomico di Brera (Italy); Emilio Molinari, Telescopio Nazionale Galileo (Spain) . . . . . [8446-154]

Simulations and performances of AMICA at Dome C, Gianluca Di Rico, Mauro M. Dolci, Gaetano Valentini, INAF - Osservatorio Astronomico di Teramo (Italy) . . . . . [8446-155]

WINERED: performances of a warm infrared echelle spectrograph, Sohei Kondo, Yuji Ikeda, Kyoto Sangyo Univ. (Japan); Naoto Kobayashi, Hiroyuki Mito, The Univ. of Tokyo (Japan); Chikako Yasui, National Astronomical Observatory of Japan (Japan); Kei Fukue, Kyoto Sangyo Univ. (Japan) and The Univ. of Tokyo (Japan); Kenshi Nakanishi, Takafumi Kawanishi, Hideyo Kawakita, Akira Arai, Naofumi Fujishiro, Kyoto Sangyo Univ. (Japan) . . . . . [8446-156]

Characterizing the near-infrared sky brightness in the Canadian high Arctic, Suresh Sivanandam, James R. Graham, Dunlap Institute for Astronomy & Astrophysics (Canada); Roberto Abraham, Univ. of Toronto (Canada); Eric Steinbring, National Research Council Canada (Canada); Anthony Tekatch, Unihedron (Canada); Douglas L. Welch, McMaster Univ. (Canada) . . . [8446-157]

APOGEE cryostat performance, Fred R. Hearty, John C. Wilson, Univ. of Virginia (USA); Basil Blank, Charles P. Henderson, PulseRay (USA); Michael F. Skrutskie, Univ. of Virginia (USA); Thomas P. O'Brien, The Ohio State Univ. (USA); Steve R. Majewski, Univ. of Virginia (USA); Ricardo Sciavon, Gemini Observatory (USA); Paul A. Maseman, The Univ. of Arizona (USA); Adam Burton, Univ. of Virginia (USA) . . . . . [8446-158]

AMICA at Dome C: results from the first year of automatic operation tests in Antarctica, Mauro M. Dolci, Angelo Valentini, INAF - Osservatorio Astronomico di Teramo (Italy); Maurizio Ragni, Angelatoni Industrie s.p.a. (Italy); Amico Di Cianno, Gianluca Di Rico, Oscar Straniero, INAF - Osservatorio Astronomico di Teramo (Italy); Alessandro D. Romano, Univ. degli Studi di Roma La Sapienza (Italy); Jean-Marc Christille, Antonfranco Piluso, Univ. degli Studi di Perugia (Italy). . . . . [8446-159]

A new nasmyth mirror mechanism increases the number of focal stations of the Mercator Telescope, Gert Raskin, Katholieke Univ. Leuven (Belgium); Rene Dubosson, Bernard Michaud, Observatory of Geneva (Switzerland); Wim Pessemier, Hans Van Winckel, Katholieke Univ. Leuven (Belgium) . . . [8446-161]

LINC-NIRVANA--integration of an interferometric camera: First verification results, Peter Bizenberger, Harald Baumeister, Thomas M. Herbst, Werner Laun, Ulrich Mall, Lars Mohr, Vianak Naranjo, Clemens Storz, Jan Trowitzsch, Max-Planck-Institut für Astronomie (Germany) . . . . . [8446-162]

KiwiSpec: design and prototype performance of a new high resolution astronomical spectrograph, Steve Gibson, Industrial Research Ltd. (New Zealand) and Univ. of Canterbury (New Zealand); Stuart I. Barnes, Stuart Barnes Optical Design (New Zealand); John B. Hearnshaw, Univ. of Canterbury (New Zealand); Kathryn Nield, David M. Cochrane, Industrial Research Ltd. (New Zealand). . . . . [8446-164]

Catadioptric focal reducers for classic reflectors, Alexey N. Yudin, M. V. Keldysh Institute of Applied Mathematics (Russian Federation); Anatoly V. Sankovitch, Santel Ltd. (Russian Federation) . . . . . [8446-165]

A comparison of the mechanical design of fiber feeds for GRACES and GHOS, André Anthony, Mark Halman, National Research Council Canada (Canada); Alexis Hill, National Resesarch Council Canada (Canada); John Pazder, Kei Szeto, National Research Council Canada (Canada); Eric V. Tollestrup, Gemini Observatory (USA); Gregory A. Barrick, Canada-France-Hawaii Telescope (USA) . . . . . [8446-167]

Tools for DIY site-testing, Federico Flores, Roberto Rondanelli, Accel Abarca, Marcos Diaz, Richard R. Querel, Univ. de Chile (Chile). . . . . [8446-168]

First light with the high resolution near infrared spectrometer for zodiacal light studies, Alexander S. Kutyrev, Eliahu Dwek, Randy A. Kimble, Gennadiy Lotkin, Samuel H. Moseley, David A. Rapchun, Robert F. Silverberg, Corey J. Tucker, NASA Goddard Space Flight Ctr. (USA) . . . . . [8446-169]

Rapid infrared imager-spectrometer (RIMAS) for the Discovery Channel Telescope, Alexander S. Kutyrev, NASA Goddard Space Flight Ctr. (USA); John Capone, Univ. of Maryland, College Park (USA); David A. Content, Ori D. Fox, Neil A. Gehrels, NASA Goddard Space Flight Ctr. (USA); Gennadiy Lotkin, NASA Goddard Space Flight Ctr. (USA) and Global Science & Technology, Inc. (USA); Samuel H. Moseley, NASA Goddard Space Flight Ctr. (USA); David A. Rapchun, NASA Goddard Space Flight Ctr. (USA) and Global Science & Technology, Inc. (USA); Stuart N. Vogel, Sylvain Veilleux, Univ. of Maryland, College Park (USA) . . . . . [8446-170]

Cryogenic mechanical design: SPIROU spectrograph, Vladimir A. Reshetov, Glen Herriot, David Loop, Leslie Saddlemyer, National Research Council Canada (Canada) . . . . . [8446-171]

On-sky operations and performance of LMIRcam at the Large Binocular Telescope, Jarron M. Leisenring, Univ. of Virginia (USA) and ETH Zurich (Switzerland); Michael F. Skrutskie, Matthew J. Nelson, John C. Wilson, Univ. of Virginia (USA); Philip M. Hinz, William F. Hoffmann, Vanessa Bailey, Vidhya Vaitheeswaran, The Univ. of Arizona (USA); Terry J. Jones, Univ. of Minnesota, Twin Cities (USA); Justin Schoenwald, Cornell Univ. (USA); Michael R. Meyer, ETH Zurich (Switzerland) . . . . . [8446-172]

ISAS: interferometric stratospheric astrometry for solar system, Mario Gai, INAF - Osservatorio Astronomico di Torino (Italy); Agnès Fienga, Observatoire de Besançon (France); Mario G. Lattanzi, Alberto Riva, Alberto Vecchiato, INAF - Osservatorio Astronomico di Torino (Italy); Daniele Gallieni, A.D.S. International S.r.l. (Italy); Sebastiano Ligori, Davide Loreggia, INAF - Osservatorio Astronomico di Torino (Italy) . . . . . [8446-173]

Analysis of stellar radiance contamination in observed satellite spectra, R. Anthony Vincent, Francis K. Chun, Michael E. Dearborn, Roger D. Tippets, U.S. Air Force Academy (USA) . . . . . [8446-174]

The GRAVITY spectrometers: final mechanical design, Michael Wiest, Constanza Araujo-Hauck, Sebastian Fischer, Christian Straubmeier, Senol Yazici, Univ. zu Köln (Germany); Frank Eisenhauer, Max-Planck-Institut für extraterrestrische Physik (Germany); Guy S. Perrin, Observatoire de Paris à Meudon (France); Andreas Eckart, Univ. zu Köln (Germany); Karine Rousselet-Perraut, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Wolfgang Brandner, Max-Planck-Institut für Astronomie (Germany); António Amorim, Univ. de Lisboa (Portugal) . . . . . [8446-176]

Optical interferometric spectral construction, Jerry Edelstein, Univ. of California, Berkeley (USA); David J. Erskine, Lawrence Livermore National Lab. (USA); Martin M. Sirk, Univ. of California, Berkeley (USA); Philip S. Muirhead, Cornell Univ. (USA); Andrew Vanderburg, Univ. of California, Berkeley (USA) . . . . . [8446-177]

Khayyam: a tunable spatial heterodyne spectrometer for observing diffuse emission line targets, S. Sona Hosseini, Walter M. Harris, Jason B. Corliss, Univ. of California, Davis (USA) . . . . . [8446-178]

Tips and tricks for aligning an image derotator, Alessandro Brunelli, Maria Bergomi, Univ. degli Studi di Padova (Italy); Marco Dima, Jacopo Farinato, Demetrio Magrin, Luca Maraffatto, Roberto Ragazzoni, Valentina Viotto, INAF - Osservatorio Astronomico di Padova (Italy); Thomas Bertram, Peter Bizenberger, Albert R. Conrad, Thomas M. Herbst, Daniel Meschke, Max-Planck-Institut für Astronomie (Germany). . . . . [8446-179]

A powerful ethernet interface module for digital camera control, John C. Geary, Stephen M. Amato, Smithsonian Astrophysical Observatory (USA) . . . . . [8446-374]

Monday 2 July

PLENARY SESSION

Room: Auditorium . . . . . Mon. 08.50 to 10.00

Session Chair: **Mark M. Casali,** European Southern Observatory (Germany)

08.50: **Introduction**

09.00: **James Webb Space Telescope: science update and status** *(Presentation Only)*, Heidi B. Hammel, AURA, Inc. (USA) . . . . . [8442-501]

09.30: **Exoplanets: unraveling a new paradigm** *(Presentation Only)*, Didier Queloz, Geneva Univ., Observatory of Geneva (Switzerland) . . . . . [8442-502]

Coffee Break . . . . . 10.00 to 10.30

SESSION 3

Room: Forum . . . . . Mon. 10.30 to 12.10

Multi-Object Instruments I

Session Chair: **Ian S. McLean,** Univ. of California, Los Angeles (USA)

10.30: **Status of the KMOS multi-object near-infrared integral field spectrograph**, Ray M. Sharples, Durham Univ. (United Kingdom); Ralf Bender, Univ.-Sternwarte München (Germany) and Max-Planck-Institut für extraterrestrische Physik (Germany); Alex Agudo Berbel, Max-Planck-Institut für extraterrestrische Physik (Germany); Richard J. Bennett, Naidu Bezawada, Michele Cirasuolo, UK Astronomy Technology Ctr. (United Kingdom); Paul Clark, Durham Univ. (United Kingdom); Richard I. Davies, Max-Planck-Institut für extraterrestrische Physik (Germany); Roger L. Davies, Univ. of Oxford (United Kingdom); Cornelis M. Dubbeldam, Durham Univ. (United Kingdom); Alasdair E. Fairley, UK Astronomy Technology Ctr. (United Kingdom); Gert Finger, European Southern Observatory (Germany); Reinhard Genzel, Max-Planck-Institut für extraterrestrische Physik (Germany); Reinhold Haefner, Hans-Joachim Hess, Univ.-Sternwarte München (Germany); Ian J. Lewis, Univ. of Oxford (United Kingdom); David M. Montgomery, John Murray, UK Astronomy Technology Ctr. (United Kingdom); Bernard Muschielok, Univ.-Sternwarte München (Germany); Natascha M. Förster-Schreiber, Max-Planck-Institut für extraterrestrische Physik (Germany); Jean-Francois Pirard, Suzanne K. Ramsay, European Southern Observatory (Germany); Philip Rees II, UK Astronomy Technology Ctr. (United Kingdom); Josef Richter, Univ.-Sternwarte München (Germany); David J. Robertson, Durham Univ. (United Kingdom); Ian Robson, UK Astronomy Technology Ctr. (United Kingdom); Stephen Rolt, Durham Univ. (United Kingdom); et al. . . . . [8446-18]

10.50: **The second generation VLT instrument MUSE: final assembly in Europe and performance assessment**, Roland M. Bacon, Observatoire de Lyon (France) . . . . . [8446-19]

11.10: **Subaru FMOS now and future**, Naoyuki Tamura, Naruhisa Takato, Subaru Telescope, National Astronomical Observatory of Japan (USA); Fumihide Iwamuro, Kyoto Univ. (Japan); Masayuki Akiyama, Tohoku Univ. (Japan); Masahiko Kimura, Philip Tait, Subaru Telescope, National Astronomical Observatory of Japan (USA); Gavin B. Dalton, Univ. of Oxford (United Kingdom); Graham J. Murray, Durham Univ. (United Kingdom); Scott Smedley, Australian Astronomical Observatory (Australia); Toshinori Maihara, Koji Ohta, Yuuki Moritani, Kiyoto Yabe, Masanao Sumiyoshi, Kyoto Univ. (Japan); Hajime Sugai, Hiroshi Karoji, The Univ. of Tokyo (Japan); Shiang-Yu Wang, Youichi Ohyama, Academia Sinica (Taiwan) . . . . . [8446-20]

11.30: **VIRUS: production of a massively replicated fiber integral field spectrograph for the upgraded Hobby-Eberly Telescope**, Gary J. Hill, The Univ. of Texas at Austin (USA); Mark E. Cornell, McDonald Observatory (USA); Darren L. DePoy, Texas A&M Univ. (USA); Niv Drory, Univ. Nacional Autónoma de México (Mexico); Maximilian H. Fabricius, Max-Planck-Institut für extraterrestrische Physik (Germany); Andreas Kelz, Leibniz-Institut für Astrophysik Potsdam (Germany); Hanshin Lee, McDonald Observatory (USA); Jennifer L. Marshall, Texas A&M Univ. (USA); Jeremy D. Murphy, The Univ. of Texas at Austin (USA); Travis Prochaska, Texas A&M Univ. (USA); Sarah E. Tuttle, Brian L. Vattiat, McDonald Observatory (USA); Richard D. Allen, Texas A&M Univ. (USA); Guillermo Blanc, Carnegie Observatories (USA); John A. Booth, McDonald Observatory (USA); Taylor S. Chonis, Karl Gebhardt, The Univ. of Texas at Austin (USA); John M. Good, McDonald Observatory (USA); Dionne M. Haynes, Leibniz-Institut für Astrophysik Potsdam (Germany); Phillip J. MacQueen, Marc D. Rafal, McDonald Observatory (USA); Martin M. Roth, Leibniz-Institut für Astrophysik Potsdam (Germany); Richard D. Savage, McDonald Observatory (USA); Jan M. Snigula, Max-Planck Institut fur Extraterrestrische Physik (Germany) . . . . . [8446-21]

11.50: **SuperMOS: a new class of low resolution multiobject spectrographs,** Benjamin A. Mazin, Kieran O'Brien, Danica Marsden, Sean G. McHugh, Seth R. Meeker, Tommaso Treu, Univ. of California, Santa Barbara (USA). . . . . [8446-22]

POSTER PREVIEWS
Room: Forum. . . . . Mon. 12.10 to 12.30

Session Chair: **Christopher J. Evans,**
UK Astronomy Technology Ctr. (United Kingdom)

Poster authors will be contacted and selected to make brief presentations.

Lunch Break . . . . . 12.30 to 13.40

SESSION 4

Room: Forum . . . . . Mon. 13.40 to 17.30

Multi-Object Instruments II

Session Chair: **Ian S. McLean,** Univ. of California, Los Angeles (USA)

13.40: **WEAVE: the next generation wide-field spectroscopy facility for the William Herschel Telescope**, Gavin B. Dalton, Science and Technology Facilities Council (United Kingdom) and Univ. of Oxford (United Kingdom); David Carter, Liverpool John Moores Univ. (United Kingdom); Scott C. Trager, Univ. of Groningen (Netherlands); Piercarlo Bonifacio, Observatoire de Paris à Meudon (France); Alfonso Aguerri, Instituto de Astrofisica de Canarias (Spain); Don Carlos Abrams, Isaac Newton Group of Telescopes (Spain); Michael J. MacIntosh, Christopher J. Evans, UK Astronomy Technology Ctr. (United Kingdom); Tibor Agocs, ASTRON (Netherlands); Marc Balcells, Isaac Newton Group of Telescopes (Spain); Stuart Bates, Liverpool John Moores Univ. (United Kingdom); Chris R. Benn, Craige S. Bevil, Isaac Newton Group of Telescopes (Spain); Matthew Brock, Univ. of Oxford (United Kingdom); Diego Cano Infantes, Isaac Newton Group of Telescopes (Spain); Jean-Baptiste Daban, Observatoire de la Côte d'Azur (France); Kevin M. Dee, Engineering & Project Solutions Ltd. (United Kingdom); Sofia Feltzing, Lund Observatory (Sweden); Francis J. H. Gribbin, Isaac Newton Group of Telescopes (Spain); Isabelle Guinouard, Observatoire de Paris à Meudon (France); Vanessa Hill, Observatoire de la Côte d'Azur (France); Michael J. Irwin, Univ. of Cambridge (United Kingdom); Pascal Jagourel, Observatoire de Paris à Meudon (France); Ian J. Lewis, Univ. of Oxford (United Kingdom); Kevin F. Middleton, Science and Technology Facilities Council (United Kingdom); Christopher J. Mottram, Liverpool John Moores Univ. (United Kingdom) . . . . . [8446-23]

14.00: **Mapping the universe with BigBOSS**, Nick Mostek, Kyle Barbary, Christopher J. Bebek, Lawrence Berkeley National Lab. (USA); Arjun T. Dey, National Optical Astronomy Observatory (USA); Michael L. Lampton, Michael E. Levi, Natalie A. Roe, David J. Schlegel, Michael J. Sholl, Lawrence Berkeley National Lab. (USA) . . . . . [8446-24]

14.20: **CARMENES, part I: instrument and survey overview**, Andreas Quirrenbach, Landessternwarte Heidelberg (Germany); Pedro J. Amado, Instituto de Astrofísica de Andalucía (Spain); CARMENES Consortium, ... [8446-25]

14.40: **MOONS: a new conceptual design for a multi-object spectrograph for the VLT**, Michele Cirasuolo, UK Astronomy Technology Ctr. (United Kingdom); Jose M. Afonso, Observatorio Astronomico de Lisboa (Portugal); Ralf Bender, Univ.-Sternwarte München (Germany); Piercarlo Bonifacio, Observatoire de Paris à Meudon (France); Christopher J. Evans, UK Astronomy Technology Ctr. (United Kingdom); Lex Kaper, Univ. van Amsterdam (Netherlands); Ernesto Oliva, INAF - Osservatorio Astrofisico di Arcetri (Italy); Leonardo Vanzi, Pontificia Univ. Católica de Chile (Chile); Miguel Abreu, Univ. de Lisboa (Portugal); Eli Atad-Ettedgui, UK Astronomy Technology Ctr. (United Kingdom); Carine Babusiaux, Observatoire de Paris à Meudon (France); Franz E. Bauer, Pontificia Univ. Católica de Chile (Chile); Philip Best, Naidu Bezawada, Ian R. Bryson, UK Astronomy Technology Ctr. (United Kingdom); Alexandre Cabral, Univ. de Lisboa (Portugal); Carina Kaputi, UK Astronomy Technology Ctr. (United Kingdom); Fanny Chemla, Observatoire de Paris (France); Andrea Cimatti, Univ. degli Studi di Bologna (Italy); Maria-Rosa Cioni, Univ. of Hertfordshire (United Kingdom); Gisella Clementini, INAF - Osservatorio Astronomico di Bologna (Italy); Emanuele Daddi, Commissariat à l'Énergie Atomique (France); James S. Dunlop, The Royal Observatory, Edinburgh (United Kingdom); Sofia Feltzing, Lund Observatory (Sweden); Annette Ferguson, The Royal Observatory, Edinburgh (United Kingdom); Adriano Fontana, INAF - Osservatorio Astronomico di Roma (Italy); Johan Fynbo, Univ. of Copenhagen (Denmark); et al. . . . . [8446-26]

15.00: **4MOST: 4-metre multi-object spectroscopic telescope**, Roelof S. de Jong, Olivier Schnurr, Roger Haynes, Jakob Walcher, Cristina Chiappini, Éric Depagne, Axel Schwope, Matthias Steinmetz, Leibniz-Institut für Astrophysik Potsdam (Germany); Wolfgang R. Ansorge, RAMS-CON Management Consultants (Germany); Eduardo Gonzalez Solares, Ian R. Parry, Nicholas A. Walton, Univ. of Cambridge (United Kingdom); Olaf Iwert, Jean-Louis Lizon, European Southern Observatory (Germany); Piercarlo Bonifacio, Mathieu Cohen, Pascal Jagourel, Shan B. Mignot, Paola Sartoretti, Observatoire de Paris à Meudon (France); Frank Grupp, Florian Lang-Bardl, Bernard Muschielok, Univ.-Sternwarte München (Germany); Hans Böhringer, Thomas Boller, Max-Planck-Institut für extraterrestrische Physik (Germany); Johannes H. Pragt, Ramón Navarro, ASTRON (Netherlands); Gavin B. Dalton, Kevin F. Middleton, Ian A. Tosh, Rutherford Appleton Lab. (United Kingdom); Andreas Quirrenbach, Walter Seifert, Landessternwarte Heidelberg (Germany) . . . . . [8446-27]

Coffee Break . . . . . 15.20 to 15.50

15.50: **SITELLE: a wide-field imaging spectrometer for the Canada-France-Hawaii Telescope**, Frederic J. Grandmont, Julie Mandar, ABB Inc. (Canada); Laurent Drissen, Univ. Laval (Canada) . . . . . [8446-28]

16.10: **KOALA: a wide-field 1000 element integral field unit for the Anglo-Australian Telescope**, Simon C. Ellis, Australian Astronomical Observatory (Australia); Michael J. Ireland, Macquarie Univ. (Australia); Jurek K. Brzeski, Scott Case, Jon S. Lawrence, Will Saunders, Julia Tims, Australian Astronomical Observatory (Australia); Quentin A. Parker, Orsola De Marco, Daniel F. Zucker, Macquarie Univ. (Australia); Matthew Colless, Australian Astronomical Observatory (Australia); Robert G. Sharp, Research School of Astronomy & Astrophysics (Australia); Scott Croom, Joss Bland-Hawthorn, The Univ. of Sydney (Australia); Karl Glazebrook, Warrick Couch, Swinburne Univ. of Technology (Australia); Rachel L. Webster, The Univ. of Melbourne (Australia). . . . . [8446-29]

16.30: **Integrating the HERMES spectrograph for the AAT**, Jeroen Heijmans, Samuel C. Barden, Michael Birchall, Australian Astronomical Observatory (Australia); Joss Bland-Hawthorn, The Univ. of Sydney (Australia); Sarah Brough, Jurek K. Brzeski, Scott Case, Vladimir Churilov, Matthew Colless, Yuriy Condrat, Robert Dean, Tony J. Farrell, Kristin Fiegert, Australian Astronomical Observatory (Australia); Kenneth C. Freeman, Research School of Astronomy & Astrophysics (Australia); Luke Gers, Michael Goodwin, Doug Gray, Ron Heald, Anthony Heng, Australian Astronomical Observatory (Australia); Damien J. Jones, Prime Optics (Australia); Urs Klauser, Jon S. Lawrence, Steve Lee, Darren Mathews, Don Mayfield, Stan Miziarski, Guy J. Monnet, Rolf Muller, Naveen Pai, Robert Patterson, Ed Penny, David R. Orr, Andrew I. Sheinis, Keith Shortridge, Scott Smedley, Gayandhi De Silva, Greg A. Smith, Darren Stafford, Nicholas Staszak, Minh Vuong, Lewis G. Waller, Denis Whittard, Australian Astronomical Observatory (Australia); Elisabeth Wylie de Boer, Research School of Astronomy & Astrophysics (Australia); Pascal Xavier, Jessica Zheng, Daniel F. Zucker, Australian Astronomical Observatory (Australia); Martin Asplund, Research School of Astronomy & Astrophysics (Australia); Chiaki Kobayashi, Univ. of Hertfordshire (United Kingdom). . . . . [8446-213]

16.50: **SAMI: a new multi-object IFU for the Anglo-Australian Telescope**, Julia J. Bryant, The Univ. of Sydney (Australia) and CAASTRO (Australia); Joss Bland-Hawthorn, The Univ. of Sydney (Australia); Jon S. Lawrence, Australian Astronomical Observatory (Australia); Scott Croom, The Univ. of Sydney (Australia) and CAASTRO (Australia); Lisa M. R. Fogarty, The Univ. of Sydney (Australia); Michael Goodwin, Australian Astronomical Observatory (Australia); Samuel N. Richards, Univ. of Hertfordshire (United Kingdom) and The Univ. of Sydney (Australia); Tony J. Farrell, Stan Miziarski, Ron Heald, Australian Astronomical Observatory (Australia); Heath Jones, Monash Univ. (Australia); Steve Lee, Matthew Colless, Michael Birchall, Andrew Hopkins, Sarah Brough, Amanda E. Bauer, Australian Astronomical Observatory (Australia). . . . [8446-31]

17.10: **Prime focus spectrograph: Subaru's future,** Hajime Sugai, Hiroshi Karoji, The Univ. of Tokyo (Japan); Naruhisa Takato, Naoyuki Tamura, Subaru Telescope, National Astronomical Observatory of Japan (USA); Youichi Ohyama, Academia Sinica (Taiwan); Akitoshi Ueda, National Astronomical Observatory of Japan (Japan); Atsushi Shimono, The Univ. of Tokyo (Japan); Hung-Hsu Ling, Academia Sinica (Taiwan); Marcio Vital de Arruda, Lab. Nacional de Astrofísica (Brazil); Robert H. Barkhouser, Charles L. Bennett, Johns Hopkins Univ. (USA); David Braun, Robin J. Bruno, Jet Propulsion Lab. (USA); Michael A. Carr, Princeton Univ. (USA); Richard G. Dekany, Caltech Optical Observatories (USA); Tania P. Dominici, Lab. Nacional de Astrofísica (Brazil); Richard S. Ellis, California Institute of Technology (USA); James E. Gunn, Princeton Univ. (USA); Timothy Heckman, Johns Hopkins Univ. (USA); Paul T. P. Ho, Academia Sinica (Taiwan); Olivier C. Le Fèvre, Laurent Martin, Lab. d'Astrophysique de Marseille (France); Hitoshi Murayama, The Univ. of Tokyo (Japan); Antonio Cesar de Oliveira, Lab. Nacional de Astrofísica (Brazil); Claudia Mendes de Oliveira, Univ. de São Paulo (Brazil); Ligia Souza de Oliveira, Lab. Nacional de Astrofísica (Brazil); Joseph D. Orndorff, Johns Hopkins Univ. (USA); Eric Prieto, Observatoire Astronomique de Marseille-Provence (France); Michael Seiffert, Jet Propulsion Lab. (USA); Stephen A. Smee, Johns Hopkins Univ. (USA) . [8446-32]

POSTERS-MONDAY

Room: Hall 3. . . . . Mon. 17.30 to 19.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Monday. The interactive poster session with authors in attendance will be Monday evening from 17.30 to 19.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

Multi-Object Instruments

Hermes: the engineering challenges, Jurek K. Brzeski, Nicholas Staszak, Luke Gers, Australian Astronomical Observatory (Australia) . . . . . [8446-30]

Detectors and cryostat design for the SuMIRe prime focus spectrograph (PFS), James E. Gunn, Michael A. Carr, Princeton Univ. (USA); Stephen A. Smee, Joseph D. Orndorff, Robert H. Barkhouser, Charles L. Bennett, Johns Hopkins Univ. (USA); Jenny Greene, Princeton Univ. (USA); Timothy Heckman, Johns Hopkins Univ. (USA); Hiroshi Karoji, The Univ. of Tokyo (Japan); Olivier C. Le Fèvre, Observatoire Astronomique de Marseille-Provence (France); Hung-Hsu Ling, Academia Sinica (Taiwan); Laurent Martin, Observatoire Astronomique de Marseille-Provence (France); Brice Menard, Johns Hopkins Univ. (USA) and The Univ. of Tokyo (Japan); Hitoshi Murayama, The Univ. of Tokyo (Japan); Eric Prieto, Observatoire Astronomique de Marseille-Provence (France); David N. Spergel, Michael A. Strauss, Princeton Univ. (USA); Hajime Sugai, The Univ. of Tokyo (Japan); Akitoshi Ueda, National Astronomical Observatory of Japan (Japan); Shiang-Yu Wang, Academia Sinica (Taiwan); Rosemary Wyse, Nadia Zakamska, Johns Hopkins Univ. (USA). . . . . [8446-180]

A spectrograph instrument concept for the prime focus spectrograph on Subaru Telescope, Sébastien Vivès, David Le Mignant, Fabrice Madec, Marc Jaquet, Eric Prieto, Laurent Martin, Olivier C. Le Fèvre, Observatoire Astronomique de Marseille-Provence (France); James E. Gunn, Michael A. Carr, Princeton Univ. (USA); Stephen A. Smee, Johns Hopkins Univ. (USA); Hajime Sugai, The Univ. of Tokyo (Japan); Naoyuki Tamura, National Astronomical Observatory of Japan (Japan) . . . . . [8446-181]

MEGARA: the future optical IFU and multi-object spectrograph for the 10.4m GTC Telescope, Armando Gil de Paz, Univ. Complutense de Madrid (Spain); María Luisa García-Vargas, FRACTAL S.L.N.E (Spain); Jesús Gallego Maestro, Univ. Complutense de Madrid (Spain); Ernesto Sánchez-Blanco Mancera, Ana Pérez Calpena, Manuel Maldonado Medina, FRACTAL S.L.N.E (Spain); Jaime Zamorano Calvo, Univ. Complutense de Madrid (Spain); Esperanza Carrasco Licea, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Francisco M. Sánchez Moreno, Univ. Politécnica de Madrid (Spain); José M. Vílchez Medina, Instituto de Astrofísica de Andalucía (Spain); Daniel Ferrusca, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Africa Castillo Morales, Univ. Complutense de Madrid (Spain); Simon M. Tulloch, FRACTAL S.L.N.E (Spain); María del Carmen Eliche Moral, Sergio Pascual, Univ. Complutense de Madrid (Spain); Esteban González Guardia, Univ. Politécnica de Madrid (Spain) . . . . . [8446-182]

FOCCoS for Subaru PFS, Antonio Cesar de Oliveira, Ligia Souza de Oliveira, Tania P. Dominici, Marcio Vital de Arruda, Jesulino B. dos Santos, Iracema Bonomini, Lab. Nacional de Astrofísica (Brazil); Laerte Sodré, Jr., Claudia Mendes de Oliveira, Univ. de São Paulo (Brazil); Damien J. Jones, Prime Optics (Australia); Hiroshi Karoji, Hajime Sugai, Atsushi Shimono, The Univ. of Tokyo (Japan); Naoyuki Tamura, Naruhisa Takato, Akitoshi Ueda, Subaru Telescope, National Astronomical Observatory of Japan (Japan). . . . . [8446-183]

The development of a wide integral field infrared spectrograph, Suresh Sivanandam, Dunlap Institute for Astronomy & Astrophysics (Canada); Chueh-Yi Chou, Dae-Sik Moon, Ke Ma, Univ. of Toronto (Canada); Maxwell Millar-Blanchaer, Dunlap Institute for Astronomy & Astrophysics (Canada); Stephen S. Eikenberry, Univ. of Florida (USA); Moo-Young Chun, Sang-Chul Kim, Korean Astronomy and Space Science Institute (Korea, Republic of); Steven N. Raines, Univ. of Florida (USA); Joshua Eisner, The Univ. of Arizona (USA) . . . . [8446-184]

OSIRIS tunable imager and spectrograph for the GTC: from design to commissioning, Beatriz Sánchez, Univ. Nacional Autónoma de México (Mexico); Marta Aguiar-González, Roberto Barreto, Santiago Becerril Jarque, Instituto de Astrofísica de Canarias (Spain); Joss Bland-Hawthorn, Anglo-Australian Observatory (Australia); Angel Manuel Bongiovanni, Jordi Cepa, Santiago Correa, Instituto de Astrofísica de Canarias (Spain); Oscar Chapa, Univ. Nacional Autónoma de México (Mexico); Alessandro Ederoclite, Instituto de Astrofísica de Canarias (Spain); Carlos Espejo, Alejandro D. Simón Farah, Univ. Nacional Autónoma de México (Mexico); Ana Belén Fragoso-Lopez, Patricia C. Fernández, Instituto de Astrofísica de Canarias (Spain); Rubén A. Flores-Meza, Univ. Nacional Autónoma de México (Mexico); F. Javier Fuentes Gandia, Fernando Gago Rodriguez, Instituto de Astrofísica de Canarias (Spain); Fernando Garfias, Univ. Nacional Autónoma de México (Mexico); José Vicente Gigante, Instituto de Astrofísica de Canarias (Spain); J. Jesús González-Hernandez, Univ. Nacional Autónoma de México (Mexico); Victor González-Escalera, Belén Hernández, Elvio Hernandez Suarez, Alberto Herrera, Guillermo A. Herrera, Enrique Joven-Alvarez, Instituto de Astrofísica de Canarias (Spain); Rosalia Langarica, Gerardo Lara, Univ. Nacional Autónoma de México (Mexico); José Carlos López-Ruiz, Roberto L. Lopez, Instituto de Astrofísica de Canarias (Spain); Carmelo Militello, Univ. de La Laguna (Spain); et al. . . . . [8446-185]

BATMAN: a DMD-based MOS demonstrator on Galileo Telescope, Frédéric Zamkotsian, Observatoire Astronomique de Marseille-Provence (France); Paolo Spanò, INAF - Osservatorio Astronomico di Brera (Italy); William Bon, Observatoire Astronomique de Marseille-Provence (France); Marco Riva, INAF - Osservatorio Astronomico di Brera (Italy); Luciano Nicastro, INAF - IASF Bologna (Italy); Emilio Molinari, Rosario Cosentino, Adriano Ghedina, Manuel Gonzalez, Telescopio Nazionale Galileo (Italy); Paolo Di Marcantonio, Igor Coretti, Roberto Cirami, INAF - Osservatorio Astronomico di Trieste (Italy); Filippo Maria Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); Luca Valenziano, INAF - IASF Bologna (Italy); Patrick Lanzoni, Laurent Martin, Observatoire Astronomique de Marseille-Provence (France) . . . . . [8446-186]

The design of the MOONS-VLT spectrometer, Ernesto Oliva, INAF - Osservatorio Astrofisico di Arcetri (Italy); Emiliano Diolaiti, INAF - Osservatorio Astronomico di Bologna (Italy); Bianca Garilli, INAF - IASF Milano (Italy); Raffaele Gratton, INAF - Osservatorio Astronomico di Padova (Italy); Dario Lorenzetti, INAF - Osservatorio Astronomico di Roma (Italy); Pietro Schipani, INAF - Osservatorio Astronomico di Capodimonte (Italy); Salvatore Scuderi, INAF - Osservatorio Astrofisico di Catania (Italy); Eros Vanzella, INAF - Osservatorio Astronomico di Trieste (Italy); Michele Cirasuolo, UK Astronomy Technology Ctr. (Italy); Jose M. Afonso, Observatório Astronómico de Lisboa (Portugal); Ralf Bender, Univ-Sternwarte München (Germany); Piercarlo Bonifacio, Observatoire de Paris à Meudon (France); Lex Kaper, Univ. van Amsterdam (Netherlands); Leonardo Vanzi, Pontificia Univ. Católica de Chile (Chile); Carlo Baffa, INAF - Osservatorio Astrofisico di Arcetri (Italy); Andrea Bianco, INAF - Osservatorio Astronomico di Brera (Italy); Dario Bottini, INAF - IASF Milano (Italy); Pietro Bruno, INAF - Osservatorio Astrofisico di Catania (Italy); Luca Carbonaro, INAF - Osservatorio Astrofisico di Arcetri (Italy); Mauro Centrone, INAF - Osservatorio Astronomico di Roma (Italy); Vincenzo De Caprio, INAF - Osservatorio Astronomico di Capodimonte (Italy); Ciro Del Vecchio, INAF - Osservatorio Astrofisico di Arcetri (Italy); Paolo Di Marcantonio, INAF - Osservatorio Astronomico di Trieste (Italy); et al. . . . . [8446-187]

MOHAWK: a 4000 fiber positioner for DESpec, Will Saunders, Greg A. Smith, Rolf Muller, Jurek K. Brzeski, Lewis G. Waller, Stan Miziarski, Tony J. Farrell, James Gilbert, Australian Astronomical Observatory (Australia). . . . . [8446-188]

High resolution spectrograph for the 4MOST facility, Shan B. Mignot, Mathieu Cohen, David Horville, Jean-Philippe Amans, Pascal Jagourel, Observatoire de Paris à Meudon (France). . . . . [8446-189]

M2FS: the Michigan/MIKE fiber system for the Magellan/Clay Telescope, Mario L. Mateo, Univ. of Michigan (USA); Jeffrey D. Crane, Carnegie Observatories (USA); John I. Bailey III, Univ. of Michigan (USA); Stephen A. Shectman, Ian B. Thompson, Alan P. Bagish, Carnegie Observatories (USA); Bruce C. Bigelow, Santa Cruz Instruments (USA); Christoph Birk, Carnegie Observatories (USA); Steve Gunnels, Paragon Engineering (USA); Tyson Hare, Carnegie Observatories (USA); Edward W. Olszewski, The Univ. of Arizona (USA); Ian Roederer, Carnegie Observatories (USA); Matthew Walker, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8446-190]

The metrology cameras for Subaru PFS and FMOS, Shiang-Yu Wang, Youichi Ohyama, Academia Sinica (Taiwan); Naoyuki Tamura, Naruhisa Takato, Subaru Telescope, National Astronomical Observatory of Japan (USA); Hiroshi Karoji, The Univ. of Tokyo (Japan); Yen-Shan Hu, Hsin-Yo Chen, Hung-Hsu Ling, Academia Sinica (Taiwan); Ming-Sen Tsao, National Central Univ. (Taiwan); Hajime Sugai, Atsushi Shimono, The Univ. of Tokyo (Japan); Akitoshi Ueda, National Astronomical Observatory of Japan (Japan). . . . . [8446-191]

A series of detector systems for MUSE, Jean-Louis Lizon, Christophe Dupuy, Roland Reiss, Sebastian Deiries, European Southern Observatory (Germany); Andreas Kelz, Thomas Fechner, Mudit Srivastava, Ole Streicher, Peter Weilbacher, Leibniz-Institut für Astrophysik Potsdam (Germany). . . . . [8446-192]

VIRUS spectrograph assembly and alignment procedures, Travis Prochaska, Richard D. Allen, Emily Boster, Darren L. DePoy, Benjamin Herbig, Texas A&M Univ. (USA); Gary J. Hill, Hanshin Lee, The Univ. of Texas at Austin (USA); Jennifer L. Marshall, Emily C. Martin, William Meador, Jean-Philippe Rheault, Texas A&M Univ. (USA); Sarah E. Tuttle, Brian L. Vattiat, The Univ. of Texas at Austin (USA) . . . . . [8446-193]

Integrating BigBOSS with the Mayall Telescope, Robert W. Besuner, Univ. of California, Berkeley (USA); Christopher J. Bebek, Lawrence Berkeley National Lab. (USA); Arjun T. Dey, William Goble, Richard R. Joyce, National Optical Astronomy Observatory (USA); Kevin A. Reil, SLAC National Accelerator Lab. (USA); Michael J. Sholl, Univ. of California, Berkeley (USA) . . . . . [8446-194]

Hector: a high-multiplex survey instrument for spatially resolved galaxy spectroscopy, Jon S. Lawrence, Australian Astronomical Observatory (Australia); Joss Bland-Hawthorn, Julia J. Bryant, The Univ. of Sydney (Australia); Jurek K. Brzeski, Matthew Colless, Australian Astronomical Observatory (Australia); Scott Croom, The Univ. of Sydney (Australia); Luke Gers, Peter R. Gillingham, Michael Goodwin, Jeroen Heijmans, Anthony J. Horton, Stan Miziarski, Will Saunders, Greg A. Smith, Australian Astronomical Observatory (Australia). . . . . [8446-195]

A fast new reflective design for fiber-fed spectrographs, Will Saunders, Australian Astronomical Observatory (Australia). . . . . [8446-196]

MEGARA spectrograph for the GTC: mechanical and opto-mechanical design, Manuel Maldonado Medina, María Luisa García-Vargas, FRACTAL S.L.N.E (Spain); Armando Gil de Paz, Univ. Complutense de Madrid (Spain); Ernesto Sánchez-Blanco Mancera, Ana Pérez Calpena, FRACTAL S.L.N.E (Spain); Jesús Gallego Maestro, Univ. Complutense de Madrid (Spain); Esperanza Carrasco Licea, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Francisco M. Sánchez Moreno, Univ. Politécnica de Madrid (Spain); José M. Vílchez Medina, Instituto de Astrofísica de Andalucía (Spain). [8446-197]

The dark energy spectrometer: a proposed multi-fiber instrument for the CTIO Blanco 4-meter Telescope, Jennifer L. Marshall, Texas A&M Univ. (USA); Stephen M. Kent, H. Thomas Diehl, Brenna L. Flaugher, Joshua Frieman, Fermi National Accelerator Lab. (USA); Darren L. DePoy, Texas A&M Univ. (USA); Will Saunders, Matthew Colless, Australian Astronomical Observatory (Australia); Ofer Lahav, Filipe Abdalla, Stephanie Jouvel, Donnacha Kirk, Univ. College London (United Kingdom); Huan Lin, James Annis, Fermi National Accelerator Lab. (USA) . . . . . [8446-198]

MIRADAS: system design overview, Stephen S. Eikenberry, Instrument Consortium MIRADAS, Univ. of Florida (USA) . . . . . [8446-199]

MIRADAS: mechanical design overview, Stephen S. Eikenberry, Instrument Consortium MIRADAS, Univ. of Florida (USA) . . . . . [8446-200]

MIRADAS: electrical design overview, Stephen S. Eikenberry, Scott A. Mullin, Instrument Consortium MIRADAS, Univ. of Florida (USA) . . . . . [8446-201]

MIRADAS control software, Francisco Garzón, Josefina Rosich, Instrument Consortium MIRADAS,, Instituto de Astrofísica de Canarias (Spain) . . [8446-202]

MEGARA spectrograph optics, Esperanza Carrasco Licea, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Gonzalo Páez, Ctr. de Investigaciones en Óptica, A.C. (Mexico); María Luisa García-Vargas, Ernesto Sánchez-Blanco Mancera, FRACTAL S.L.N.E (Spain); Armando Gil de Paz, Jesús Gallego Maestro, Univ. Complutense de Madrid (Spain); José Manuel Vílchez, Instituto de Astrofísica de Andalucía (Spain); Francisco M. Sánchez Moreno, Univ. Politécnica de Madrid (Spain) . . . . . [8446-203]

Performance model of SITELLE: a wide-field imaging spectrometer for the Canada-France-Hawaii Telescope, Julie Mandar, Frederic J. Grandmont, ABB Inc. (Canada); Laurent Drissen, Simon Thibault, Univ. Laval (Canada). [8446-204]

Hyper Suprime-Cam: conceptual design to introduce spectroscopic mode, Yutaka Komiyama, National Astronomical Observatory of Japan (Japan). . . . . [8446-205]

MEGARA focal plane subsystems, Ana Pérez Calpena, María Luisa García-Vargas, FRACTAL S.L.N.E (Spain); Xabier Arrillaga, AVS Added Value Solutions (Spain); Armando Gil de Paz, Univ. Complutense de Madrid (Spain); Ernesto Sánchez-Blanco Mancera, FRACTAL S.L.N.E (Spain); Miguel Angel Carrera, AVS Added Value Solutions (Spain); Jesús Gallego Maestro, Univ. Complutense de Madrid (Spain); Esperanza Carrasco Licea, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Francisco M. Sánchez Moreno, Univ. Complutense de Madrid (Spain); José Manuel Vílchez, Instituto de Astrofísica de Andalucía (Spain). . . . . [8446-206]

The influence of motion and stress on optical fibers, Jeremy D. Murphy, The Univ. of Texas at Austin (USA); Gary J. Hill, McDonald Observatory (USA); Seth C. Anderson, The Univ. of Texas at Austin (USA); Mark E. Cornell, McDonald Observatory (USA); Lindsay Fuller, The Univ. of Texas at Austin (USA); John M. Good, McDonald Observatory (USA); Andreas Kelz, Leibniz-Institut für Astrophysik Potsdam (Germany); Phillip J. MacQueen, Walter Moreira, Marc D. Rafal, Tom H. Rafferty, McDonald Observatory (USA); Ian M. Soukup, The Univ. of Texas at Austin (USA); Trey Taylor, Sarah E. Tuttle, Brian L. Vattiat, McDonald Observatory (USA). . . . . [8446-207]

An adjustable slit mechanism for a fiber-fed multi-object spectrograph, John I. Bailey III, Mario L. Mateo, Univ. of Michigan (USA); Alan P. Bagish, Jeffrey D. Crane, Carnegie Observatories (USA); Colin T. Slater, Univ. of Michigan (USA) . . . . . [8446-208]

Methods for evaluating the performance of volume phase holographic gratings for the VIRUS spectrograph array, Taylor S. Chonis, Gary J. Hill, The Univ. of Texas at Austin (USA); J. Christopher Clemens, Bart Dunlap, The Univ. of North Carolina at Chapel Hill (USA); Hanshin Lee, The Univ. of Texas at Austin (USA) . . . . . [8446-209]

ERASMUS-F: enabling technologies for deployable integral-field-units, Martin M. Roth, Andreas Kelz, Leibniz-Institut für Astrophysik Potsdam (Germany); Harald E. Nicklas, Georg-August-Univ. Göttingen (Germany); Marek Kowalski, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany). . . . . [8446-210]

Data analysis and first science with the Sydney-AAO multi-object IFS (SAMI), Lisa M. R. Fogarty, Joss Bland-Hawthorn, The Univ. of Sydney (Australia); Jon S. Lawrence, Australian Astronomical Observatory (Australia); Scott Croom, Julia J. Bryant, The Univ. of Sydney (Australia); Samuel N. Richards, Univ. of Hertfordshire (Australia); Michael Goodwin, Tony J. Farrell, Stan Miziarski, Ron Heald, Australian Astronomical Observatory (Australia); Heath Jones, Monash Univ. (Australia); Steve Lee, Matthew Colless, Michael Birchall, Andrew Hopkins, Sarah Brough, Amanda E. Bauer, Australian Astronomical Observatory (Australia) . . . . . [8446-211]

VIRUS-W: commissioning and first-year results of a new integral field unit spectrograph dedicated to the study of spiral galaxy bulges, Maximilian H. Fabricius, Frank U. Grupp, Max-Planck-Institut für extraterrestrische Physik (Germany) and Univ.-Sternwarte München (Germany); Niv Drory, Univ. Nacional Autónoma de México (Mexico); Ralf Bender, Max-Planck-Institut für extraterrestrische Physik (Germany) and Univ.-Sternwarte München (Germany); Ulrich Hopp, Univ.-Sternwarte München (Germany) and Max-Planck-Institut für extraterrestrische Physik (Germany); James Arns, Kaiser Optical Systems, Inc. (USA); Stuart I. Barnes, The Univ. of Texas at Austin (USA) and McDonald Observatory (USA) and Stuart Barnes Optical Design (New Zealand); Claus A. Gössl, Univ.-Sternwarte München (Germany); Gary J. Hill, The Univ. of Texas at Austin (USA) and McDonald Observatory (USA); Florian Lang-Bardl, Univ.-Sternwarte München (Germany); Phillip J. MacQueen, The Univ. of Texas at Austin (USA); Roberto Saglia, Max-Planck-Institut für extraterrestrische Physik (Germany); Jan M. Snigula, Max-Planck-Institut für extraterrestrische Physik (Germany) and Univ.-Sternwarte München (Germany); Aleksander Wlodarski, POG Präzisionsoptik Gera GmbH (Germany); Philipp Wullstein, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8446-212]

LUCI in the sky: performance and lessons learned in the first two years of near infrared multi object spectroscopy at the LBT, Peter Buschkamp, Max-Planck-Institut für extraterrestrische Physik (Germany); Walter Seifert, Landessternwarte Heidelberg (Germany); Kai Polsterer, Ruhr-Univ. Bochum (Germany); Michael Lehmitz, Max-Planck-Institut für Astronomie (Germany); Reinhard Lederer, Hans Gemperlein, Max-Planck-Institut für extraterrestrische Physik (Germany); Vianak Naranjo, Max-Planck-Institut für Astronomie (Germany); Nancy Ageorges, Kayser-Threde GmbH (Germany); Reiner Hofmann, Frank Eisenhauer, Sebastian Rabien, Mathias Honsberg, Reinhard Genzel, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8446-214]

The VIMOS upgrade programme, Peter L. Hammersley, European Southern Observatory (Germany); Fernando J. Selman, European Southern Observatory (Chile); Hans Dekker, Paul Bristow, European Southern Observatory (Germany); Pierre Bourget, Roberto Castillo, Mark Downing, Nicholas Haddad, European Southern Observatory (Chile); Michael Hilker, Jean-Louis Lizon, Christian Lucuix, Vincenzo Mainieri, European Southern Observatory (Germany); Steffen Mieske, Claudio Reinero, European Southern Observatory (Chile); Marina Rejkuba, European Southern Observatory (Germany); Chester Rojas, Ruben Sanchez-Janssen, Alain Smette, Josefina Urrutia Del Rio, Javier Valenzuela, European Southern Observatory (Chile); Burkhard Wolff, European Southern Observatory (Germany) . . . . . [8446-215]

Integration status of the configurable slit unit for GTC-EMIR, Maurice Teuwen, Huub Janssen, Janssen Precision Engineering B.V. (Netherlands); Joan Manel Casalta Escuer, NTE-SENER S.A. (Spain); Francisco Garzón, Instituto Astofisica de Canarias (Spain). . . . . [8446-216]

Detector vacuum and cryogenic system for MUSE, Jean-Louis Lizon, Domingo Gojak, Matteo Accardo, Roland Reiss, Lothar Kern, European Southern Observatory (Germany) . . . . . [8446-217]

4MOST spectral data simulation, Paola Sartoretti, Nicolas Leclerc, Observatoire de Paris à Meudon (France); Jakob Walcher, Leibniz-Institut für Astrophysik Potsdam (Germany); Elisabetta Caffau, Observatoire de Paris à Meudon (France) and Zentrum für Astronomie der Univ. Heidelberg (Germany); Luca Sbordone, Zentrum für Astronomie der Univ. Heidelberg (Germany) . . . . . [8446-218]

The measuring apparatus research for BigBOSS actuator, Zeng Xiang Zhou, Univ. of Science and Technology of China (China) and Lawrence Berkeley National Lab. (USA); Chao Zhai, Univ. of Science and Technology of China (China); Michael J. Sholl, Univ. of California, Berkeley (USA); Joseph H. Silber, Christopher J. Bebek, Lawrence Berkeley National Lab. (USA) . . . . . [8446-219]

Fore-optics of the MUSE instrument, Laurent P. Parès, Marie Le Floch, Michel Dupieux, Univ. de Toulouse, UPS-OMP (France) and Institut de Recherche en Astrophysique et Planétologie (France); Thierry Gharsa, Univ. de Toulouse, UPS-OMP (France); Hervé Valentin, Patrick Couderc, Univ. de Toulouse, UPS-OMP (France) and Institut de Recherche en Astrophysique et Planétologie (France); Gérard Gallou, Univ. de Toulouse, UPS-OMP (France); Florence Laurent, Magali Loupias, Johan Kosmalski, Roland M. Bacon, Observatoire de Lyon (France) and Ctr. de Recherche Astronomique de Lyon (France) . . . . . [8446-220]

Initial results from VIRUS production spectrographs, Sarah E. Tuttle, McDonald Observatory (USA); Richard D. Allen, Texas A&M Univ. (USA); Taylor S. Chonis, The Univ. of Texas at Austin (USA); Mark E. Cornell, McDonald Observatory (USA); Darren L. DePoy, Texas A&M Univ. (USA); Gary J. Hill, Hanshin Lee, McDonald Observatory (USA); Jennifer L. Marshall, Travis Prochaska, Texas A&M Univ. (USA); Marc D. Rafal, Richard D. Savage, Brian L. Vattiat, McDonald Observatory (USA). . . . . [8446-221]

Development and performance of the MUSE calibration unit, Andreas Kelz, Svend-Marian Bauer, Thomas Hahn, Thomas Jahn, Leibniz-Institut für Astrophysik Potsdam (Germany); Florence Laurent, Observatoire de Lyon (France); Uwe Laux, Thüringer Landessternwarte Tautenburg (Germany); Marie Le Floch, Univ. de Toulouse (France); Magali Loupias, Observatoire de Lyon (France); Jean-Christophe Olaya, Emil Popow, Martin M. Roth, Mudit Srivastava, Ole Streicher, Peter Weilbacher, Leibniz-Institut für Astrophysik Potsdam (Germany); Johan Kosmalski, Roland M. Bacon, Observatoire de Lyon (France) . . . . . [8446-222]

Performance of the main instrument structure and the optical relay system of MUSE, Harald E. Nicklas, Heiko Anwand, Andreas Fleischmann, Christof Koehler, Georg-August-Univ. Göttingen (Germany); Wenli Xu, Optical System Engineering (Germany); Walter Seifert, Landessternwarte Heidelberg (Germany); Florence Laurent, Observatoire de Lyon (France). . . . . [8446-223]

MUSE instrument global performance test, Magali Loupias, Johan Kosmalski, Edgard Renault, Florence Laurent, Roland M. Bacon, Patrick Caillier, Aurélien Jarno, Arlette Pécontal-Rousset, Alban Remillieux, Observatoire de Lyon (France) . . . . . [8446-224]

The impact of surface-polish on the angular and wavelength dependence of fiber focal ratio degradation, Arthur D. Eigenbrot, Corey M. Wood, Matthew A. Bershady, Univ. of Wisconsin-Madison (USA) . . . . . [8446-225]

MUSE optical alignment procedure, Florence Laurent, Observatoire de Lyon (France) and Univ. Claude Bernard Lyon 1 (France) and Ctr. de Recherche Astronomique de Lyon (France); Edgard Renault, Magali Loupias, Johan Kosmalski, Observatoire de Lyon (France); Heiko Anwand, Institut für Astrophysik (Germany); Roland M. Bacon, Didier Boudon, Patrick Caillier, Eric Daguisé, Jean-Pierre Dubois, Observatoire de Lyon (France); Christophe Dupuy, European Southern Observatory (Germany); Andreas Kelz, Leibniz-Institut für Astrophysik Potsdam (Germany); Jean-Louis Lizon, European Southern Observatory (Germany); Harald E. Nicklas, Institut für Astrophysik (Germany); Laurent P. Parès, Institut de Recherche en Astrophysique et Planétologie (France); Alban Remillieux, Observatoire de Lyon (France); Walter Seifert, Zentrum für Astronomie (Germany); Hervé Valentin, Institut de Recherche en Astrophysique et Planétologie (France); Wenli Xu, Optical System Engineering (France) . . . . . [8446-226]

Cryostat and CCD for MEGARA at GTC, Daniel Ferrusca, Edgar Castillo, Miguel V. Velazquez de la Rosa, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Simon M. Tulloch, Isaac Newton Group of Telescopes (Spain) . . . . . [8446-227]

A wide field corrector concept including an atmospheric dispersion corrector for the NTT, Frank U. Grupp, Univ.-Sternwarte München (Germany) and Max Planck Institut für extraterrestische Physik (Germany); Florian Lang-Bardl, Univ.-Sternwarte München (Germany); Ralf Bender, Univ.-Sternwarte München (Germany) and Max Planck Institut für extraterrestische Physik (Germany) . . . . . [8446-228]

The LAMOST low resolution spectrograph stability performance, YongHui Hou, Lei Wang, Zhongwen Hu, Jianing Wang, Zhen Tang, Mingda Jiang, Yongtian Zhu, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8446-229]

A fibre positioner solution for the 4MOST instrument, Florian Lang-Bardl, Frank Grupp, Marco Häuser, Hans-Joachim Hess, Bernard Muschielok, Josef Richter, Jörg Schlichter, Christoph Schwab, Ralf Bender, Univ.-Sternwarte München (Germany) . . . . . [8446-230]

Hyper Suprime-Cam: the control system, Yousuke Utsumi, Satoshi Kawanomoto, National Astronomical Observatory of Japan (Japan); Philip Tait, Eric Jeschke, Subaru Telescope, National Astronomical Observatory of Japan (USA); Yukiko Kamata, Yutaka Komiyama, Satoshi Miyazaki, National Astronomical Observatory of Japan (Japan); Tomoki Morokuma, The Univ. of Tokyo (Japan); Hidehiko Nakaya, Fumihiro Uraguchi, National Astronomical Observatory of Japan (Japan) . . . . . [8446-231]

Hyper suprime-cam: filter exchange unit and shutter, Fumihiro Uraguchi, Yutaka Komiyama, National Astronomical Observatory of Japan (Japan); Shiang-Yu Wang, Hsin-Yo Chen, Academia Sinica (Taiwan); Eric J. Y. Liaw, Chi-Fang Chiu, Cheng-Lin Ho, Tsang-Chih Lai, Yao-Cheng Lee, Dun-Zen Jeng, Chung Shan Institute of Science and Technology (Taiwan); Yukiko Kamata, Satoshi Kawanomoto, Satoshi Miyazaki, National Astronomical Observatory of Japan (Japan); Tomoki Morokuma, The Univ. of Tokyo (Japan); Hidehiko Nakaya, National Astronomical Observatory of Japan (Japan) . . . . . [8446-232]

VXMS: the VISTA extreme multiplex spectrograph, Robert Content, Australian Astronomical Observatory (Australia); Tom Shanks, Ray M. Sharples, David G. Bramall, Durham Univ. (United Kingdom); Will Percival, Univ. of Portsmouth (United Kingdom) . . . . . [8446-233]

Fiber fed spectroscopy in the near infrared, Pedro A. Escárate Monetta, Leonardo Vanzi, Pontificia Univ. Católica de Chile (Chile) . . . . . [8446-235]

The BigBOSS focal plane assembly, Marco Azzaro, Santiago Becerril Jarque, Instituto de Astrofísica de Andalucía (Spain); Robert Besuner, Jerry Edelstein, Lawrence Berkeley National Lab. (USA); H. Hu, Univ. of Science and Technology of China (China); Patrick Jelinsky, Lawrence Berkeley National Lab. (USA); Antonio Montero Dorta, Isaac Morales, Instituto de Astrofísica de Andalucía (Spain); Paul E. Perry, Lawrence Berkeley National Lab. (USA); Francisco Prada, Justo Sánchez, Instituto de Astrofísica de Andalucía (Spain); Christoph Schenk, Michael J. Sholl, Joseph H. Silber, Lawrence Berkeley National Lab. (USA); Chao Zhai, Univ. of Science and Technology of China (China); Z. Zhou, Lawrence Berkeley National Lab. (USA) . . . . . [8446-236]

BigBOSS: A stage IV dark energy redshift survey, Michael J. Sholl, Univ. of California, Berkeley (USA); Mark Ackerman, Sandia Science & Technology Park (USA); Christopher J. Bebek, Robert Besuner, Lawrence Berkeley National Lab. (USA); Arjun T. Dey, National Optical Astronomy Observatory (USA); Jerry Edelstein, Patrick Jelinsky, Michael L. Lampton, Univ. of California, Berkeley (USA); Michael E. Levi, Lawrence Berkeley National Lab. (USA); Ming Liang, National Optical Astronomy Observatory (USA); Paul E. Perry, Natalie A. Roe, David J. Schlegel, Lawrence Berkeley National Lab. (USA) . . . . . [8446-237]

The BigBOSS spectrograph, Patrick Jelinsky, Univ. of California, Berkeley (USA); Christopher J. Bebek, Robert Besuner, Lawrence Berkeley National Lab. (USA); Pierre-Henri Carton, Commissariat à l'Énergie Atomique (France); Jerry Edelstein, Michael L. Lampton, Univ. of California, Berkeley (USA); Claire L. Poppett, Lawrence Berkeley National Lab. (USA); Eric Prieto, Observatoire Astronomique de Marseille-Provence (France); Michael J. Sholl, Univ. of California, Berkeley (USA) . . . . . [8446-238]

GMTNIRS mechanical design, Timothy A. Beets, Joseph H. Beno, Michael S. Worthington, The Univ. of Texas at Austin (USA) . . . . . [8446-301]

Tuesday 3 July

PLENARY SESSION

Room: Auditorium . . . . . Tues. 09.00 to 10.00

Session Chair: **Kathryn A. Flanagan,** Space Telescope Science Institute (USA)

09.00: **The Kepler Exoplanet Survey: instrumentation, performance and results**, Thomas N. Gautier III, Jet Propulsion Lab., Caltech (USA) and The Kepler Science Team (USA) . . . . . [8442-503]

09.30: **Antarctic astronomy**, John W. V. Storey, The Univ. of New South Wales (Australia) . . . . . [8446-504]

Coffee Break . . . . . 10.00 to 10.30

SESSION 5

Room: Forum . . . . . Tues. 10.30 to 12.10

Imaging Surveyors I

Session Chair: **Stephen S. Eikenberry,** Univ. of Florida (USA)

10.30: **Subaru new wide field camera: hyper suprime-cam**, Satoshi Miyazaki, National Astronomical Observatory of Japan (Japan) . . . . . [8446-33]

10.50: **First light with RATIR: an automated 6-band optical/NIR imaging camera**, Nathaniel R. Butler, Arizona State Univ. (USA); Christopher R. Klein, Univ. of California, Berkeley (USA); Ori D. Fox, Gennadiy Lotkin, NASA Goddard Space Flight Ctr. (USA); Joshua S. Bloom, Univ. of California, Berkeley (USA); J. Xavier Prochaska, Enrico Ramirez-Ruiz, Univ. of California, Santa Cruz (USA); José A. de Diego, Leonid N. Georgiev, J. Jesús González-Hernandez, William H. Lee, Michael G. Richer, Carlos Román-Zuniga, Alan M. Watson, Univ. Nacional Autónoma de México (Mexico); Neil A. Gehrels, Alexander S. Kutyrev, NASA Goddard Space Flight Ctr. (USA); Rebecca A. Bernstein, Univ. of California, Santa Cruz (USA); Luis C. Álvarez, Urania Ceseña, David Clark, Univ. Nacional Autónoma de México (Mexico); Enrique Colorado, Antolín Córdova, Univ. Nacional Autónoma de México (USA); Alejandro D. Simón Farah, Benjamín García, Gerardo Guisa, Joel Herrera Vazquez, Univ. Nacional Autónoma de México (Mexico); Francisco Lazo, Univ. Nacional Autónoma de México (USA); Eduardo López, Esteban A. Luna-Aguilar, Benjamín Martínez, Francisco Murillo, Univ. Nacional Autónoma de México (Mexico); José Manuel Murillo, Univ. Nacional Autónoma de México (USA); Juan Manuel Nunez Alfonso, Maria H. Pedrayes, Fernando Quirós, José Luís Ochoa, Gerardo Sierra, Univ. Nacional Autónoma de México (Mexico); et al. . . . [8446-34]

11.10: **Status of the Dark Energy Survey Camera (DECam) project**, Brenna L. Flaugher, Fermi National Accelerator Lab. (USA) . . . . . [8446-35]

11.30: **JPCam: a 1.2Gpixel camera for the J-PAS survey**, Keith Taylor, Observatorio Nacional (Brazil); Antonio Marin-Franch, Ctr. de Estudios de Física del Cosmos de Aragón (Spain); René Laporte, Instituto Nacional de Pesquisas Espaciais (Brazil); Lucas Marrara, TopCooler (Brazil); Jordi Cepa, Instituto de Astrofísica de Canarias (Spain); Andrés Javier Cenarro, Sergio Chueca, David Cristobal-Hornillos, Alessandro Ederoclite, Nicolas Gruel, Mariano Moles, Fernando Rueda, Sergio Rueda, Jesús Varela López, Axel Yanes Díaz, Ctr. de Estudios de Física del Cosmos de Aragón (Spain); Narciso Benitez Lozano, Instituto de Astrofísica de Andalucía (Spain); Renato Dupke, Observatório Nacional (Brazil); Alberto Fernández-Soto, Instituto de Física de Cantabria (Spain); Paul Jorden, e2v technologies plc (United Kingdom); Grégory Lousberg, AMOS Ltd. (Belgium); Claudia Mendes de Oliveira, Univ. de São Paulo (Brazil); Alberto Molino Benito, Instituto de Astrofísica de Andalucía (Spain); Ian Palmer, e2v technologies plc (United Kingdom); Laerte Sodré, Jr., Univ. de São Paulo (Brazil) . . . . . [8446-36]

11.50: **The Keck cosmic web imager: a capable new integral field spectrograph for the W. M. Keck Observatory**, Patrick Morrissey, D. Christopher Martin, Anna M. Moore, California Institute of Technology (USA); Sean M. Adkins, W. M. Keck Observatory (USA); Harland W. Epps, Univ. of California, Santa Cruz (USA); Mateusz Matuszewski, California Institute of Technology (USA); Constance M. Rockosi, Univ. of California, Santa Cruz (USA) . . . . . [8446-37]

SESSION 6

Room: Forum . . . . . Tues. 12.10 to 12.30

Imaging Surveyors II

Session Chair: **Stephen S. Eikenberry,** Univ. of Florida (USA)

12.10: **Design of FOSC for 360-cm Devasthal Optical Telescope**, Amitesh Omar, Ramakant S. Yadav, Vishal Shukla, Aryabhatta Research Institute of Observational Sciences (India); Soumen Mondal, S. N. Bose National Ctr. for Basic Sciences (India); Jayshreekar Pant, Aryabhatta Research Institute of Observational Sciences (India) . . . . . [8446-38]

Lunch Break . . . . . 12.30 to 14.00

SESSION 7

Room: Forum . . . . . Tues. 14.00 to 16.30

Airborne Instruments

Session Chair: **Maureen L. Savage,** SOFIA / USRA (USA)

14.00: **New instrumentation for SOFIA**, Erick T. Young, Pamela M. Marcum, SOFIA / USRA (USA) . . . . . [8446-39]

14.20: **The FORCAST mid-infrared facility instrument and in-flight performance on SOFIA**, Joseph D. Adams, Terry L. Herter, George E. Gull, Justin Schoenwald, Charles P. Henderson, Cornell Univ. (USA); Luke D. Keller, Ithaca College (USA); Thomas Nikola, Gordon J. Stacey, Cornell Univ. (USA); James M. De Buizer, William D. Vacca, SOFIA / USRA (USA) . . . . . [8446-40]

14.40: **FIFI-LS for the post Herschel aera**, Sebastian Colditz, Univ. Stuttgart (Germany); Alfred Krabbe, Univ. Stuttgart (Germany); Fabio Fumi, Univ. Stuttgart (Germany); Norbert Geis, Rainer Hönle, Max-Planck-Institut für extraterrestrische Physik (Germany); Randolf Klein, SOFIA / USRA (USA); Leslie W. Looney, Univ. of Illinois at Urbana-Champaign (USA); Albrecht Poglitsch, Walfried Raab, Max-Planck-Institut für extraterrestrische Physik (Germany); Maureen L. Savage, SOFIA / USRA (USA) . . . . . [8446-41]

Coffee Break . . . . . 15.00 to 15.30

15.30: **HIPO in-flight performance aboard SOFIA**, Edward W. Dunham, Thomas A. Bida, Peter L. Collins, Georgi Mandushev, Lowell Observatory (USA); Ian S. McLean, Univ. of California, Los Angeles (USA); Michael J. Person, Massachusetts Institute of Technology (USA); Erin C. Smith, NASA Ames Research Ctr. (USA); Brian W. Taylor, Boston Univ. (USA); Saeid Zoonematkermani, Lowell Observatory (USA) . . . . . [8446-42]

15.50: **FLITECAM: current status and results from observatory verification flights**, Ian S. McLean, Univ. of California, Los Angeles (USA); Erin C. Smith, NASA Ames Research Ctr. (USA); Eric E. Becklin, SOFIA / USRA (USA); Edward W. Dunham, Lowell Observatory (USA); Jennifer W. Milburn, California Institute of Technology (USA); Maureen L. Savage, SOFIA / USRA (USA) . . . . . [8446-43]

16.10: **Preflight performance of the Echelon-Cross-Echelle spectrograph for SOFIA**, Curtis DeWitt, SOFIA / USRA (USA); Matthew J. Richter, Univ. of California, Davis (USA); Mark E. McKelvey, NASA Ames Research Ctr. (USA); Andreas Seifahrt, The Univ. of Chicago (USA); Peter T. Zell, Dana H. Lynch, Michael E. Case, NASA Ames Research Ctr. (USA) . . . . . [8446-282]

SESSION 8

Room: Forum . . . . . Tues. 16.30 to 17.30

Solar Instruments

Session Chair: **Oskar von der Lühe,**
Kiepenheuer-Institut für Sonnenphysik (Germany)

16.30: **ATST visible broadband imager**, William R. McBride, Friedrich Wöger, Andrew Ferayorni, Steve L. Hegwer, B. Scott Gregory, Alexandra Tritschler, Han Uitenbroek, National Solar Observatory (USA) . . . . . [8446-45]

16.50: **Developments of the wideband spectropolarimeter of the domeless solar telescope at the Hida Observatory**, Tetsu Anan, Kiyoshi Ichimoto, Kyoto Univ. Hida Observatory (Japan); Akihito Oi, Ibaraki Univ. (Japan); Goichi Kimura, Yoshikazu Nakatani, Satoru Ueno, Kyoto Univ. Hida Observatory (Japan) . . . . . [8446-46]

17.10: **SPIES: the spectropolarimetric imager for the energetic Sun,** Haosheng Lin, Univ. of Hawai'i (USA) . . . . . [8446-47]

POSTERS-TUESDAY

Room: Hall 3. . . . . Tues. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters. for this conference will be on display on Tuesday. The interactive poster session with authors in attendance will be Tuesday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

Imaging Surveyors/Solar Instrumentation/ Airborne Instrumentation

Overview of the 3.2 gigapixel camera for the Large Synoptic Survey Telescope, Steven M. Kahn, Nadine Kurita, David K. Gilmore, SLAC National Accelerator Lab. (USA); Pierre E. Antilogus, Institut National de Physique Nucléaire et de Physique des Particules (France); Paul O'Connor, Brookhaven National Lab. (USA); Martin Nordby, Rafe H. Schindler, Aaron J. Roodman, SLAC National Accelerator Lab. (USA); Scot S. Olivier, Vincent J. Riot, Lawrence Livermore National Lab. (USA); Richard Van Berg, Univ. of Pennsylvania (USA); Michael Huffer, SLAC National Accelerator Lab. (USA); Jon Thaler, Univ. of Illinois (USA); Brian J. Langton, John Ku, Gordon B. Bowden, SLAC National Accelerator Lab. (USA) . . . . . [8446-239]

LSST camera optics design, Scot S. Olivier, Lawrence Livermore National Lab. (USA) . . . . . [8446-240]

Wide-field photometry at 20 Hz for the TAOS2 Project, John C. Geary, Smithsonian Astrophysical Observatory (USA); Shiang-Yu Wang, Academia Sinica (Taiwan); Matthew J. Lehner, Univ. of Pennsylvania (USA) . . . . [8446-241]

The PAU camera and the PAU survey at the William Herschel Telescope, Francisco J. Castander, Institut d'Estudis Espacials de Catalunya (Spain) . . . . . [8446-242]

A 3 degree prime focus field for the AAT, Peter R. Gillingham, Australian Astronomical Observatory (Australia) . . . . . [8446-244]

Assembly, alignment, and testing of the DECam wide field corrector optics, Peter Doel, Univ. College London (United Kingdom); Timothy M. Abbott, Cerro Tololo Inter-American Observatory (Chile); Michelle L. Antonik, David Brooks, Univ. College London (United Kingdom); Brenna L. Flaugher, Andrew Stefanik, Stephen M. Kent, Gaston Gutierrez, Fermi National Accelerator Lab. (USA); Herman P. Cease, Alistair R. Walker, Cerro Tololo Inter-American Observatory (Chile); Darren L. DePoy, Texas A & M Univ. (USA); Rebecca A. Bernstein, Lick Observatory (USA); Sue Worswick, Observatory Optics (United Kingdom) . . . . . [8446-245]

Design of the KMTNet large format CCD camera, Bruce Atwood, Thomas P. O'Brien, Christopher Colarosa, Jerry A. Mason, The Ohio State Univ. (USA); Paul Jorden, Steven Darby, Alex Walker, Ryan Renshaw, e2v technologies plc (United Kingdom) . . . . . [8446-246]

T80Cam: the wide field camera for the OAJ 80-cm telescope, Antonio Marin-Franch, Ctr. de Estudios de Física del Cosmos de Aragón (Spain); Keith Taylor, Observatório Nacional (Brazil); Jordi Cepa, Instituto de Astrofísica de Canarias (Spain); René Laporte, Instituto Nacional de Pesquisas Espaciais (Brazil); Andrés Javier Cenarro, Sergio Chueca, David Cristobal-Hornillos, Alessandro Ederoclite, Nicolas Gruel, Mariano Moles, Fernando Rueda, Sergio Rueda, Jesús Varela López, Axel Yanes Díaz, Ctr. de Estudios de Física del Cosmos de Aragón (Spain); Narciso Benitez Lozano, Instituto de Astrofísica de Andalucía (Spain); Renato Dupke, Observatório Nacional (Brazil); Alberto Fernández-Soto, Instituto de Física de Cantabria (Spain); Claudia Mendes de Oliveira, Univ. de São Paulo (Brazil); Gary R. Sims, Spectral Instruments, Inc. (USA); Laerte Sodré, Jr., Univ. de São Paulo (Brazil); Kevin Toerne, Spectral Instruments, Inc. (USA). [8446-247]

Blue camera elastomeric lens mounts of the Keck cosmic web imager (KCWI), Christoph Pistor, Lick Observatory (USA); Constance M. Rockosi, Univ. of California, Santa Cruz (USA) and Lick Observatory (USA); David Cowley, Jerry Cabak, David Hilyard, Terry Pfister, Lick Observatory (USA) . . . . . [8446-248]

Transport and installation of the dark energy survey CCD imager, Gregory E. Derylo, Edward C. Chi, Juan Cruz Estrada, Brenna L. Flaugher, Ken Schultz, Fermi National Accelerator Lab. (USA) . . . . . [8446-249]

Square-core bundles for astronomical imaging, Julia J. Bryant, The Univ. of Sydney (Australia) and CAASTRO (Australia); Joss Bland-Hawthorn, The Univ. of Sydney (Australia) . . . . . [8446-250]

KWFC: four square degree camera for the Kiso Schmidt Telescope, Shigeyuki Sako, Tsutomu Aoki, Mamoru Doi, Nobuyuki Ienaka, Naoto Kobayashi, Noriyuki Matsunaga, Hiroyuki Mito, Takashi Miyata, Tomoki Morokuma, Yoshikazu Nakada, Takao Soyano, Ken'ichi Tarusawa, The Univ. of Tokyo (Japan); Satoshi Miyazaki, National Astronomical Observatory of Japan (Japan); Fumiaki Nakata, Subaru Telescope, National Astronomical Observatory of Japan (USA); Norio Okada, National Astronomical Observatory of Japan (Japan); Yuki Sarugaku, Japan Aerospace Exploration Agency (Japan) . . . . . [8446-251]

DECal: a spectrophotometric calibration system for DECam, Jean-Philippe Rheault, Darren L. DePoy, Jennifer L. Marshall, Travis Prochaska, Richard D. Allen, Jason S. Wise, Emily C. Martin, Patrick Williams, Texas A&M Univ. (USA) . . . . . [8446-252]

Test benches facilities for PAUcam: CCDs and filters characterization, Jorge Jiménez Rojas, Consejo Superior de Investigaciones Científicas (Spain); Laia Cardiel-Sas, Institut de Física d'Altes Energies (Spain); Ricard Casas, Consejo Superior de Investigaciones Científicas (Spain); Javier Castilla, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); Marino Maiorino, Institut de Física d'Altes Energies (Spain); Ignacio Sevilla, Juan de Vicente, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain) . . . . . [8446-253]

Focus and alignment of the Dark Energy Camera using out-of-focus stars, Aaron J. Roodman, SLAC National Accelerator Lab. (USA) . . . . . [8446-254]

Development of MIMIZUKU: a mid-infrared multi-field imager for 6.5m TAO telescope, Takafumi Kamizuka, Takashi Miyata, Shigeyuki Sako, Tomohiko Nakamura, Kentaro Asano, Mizuho Uchiyama, Kazushi Okada, Takashi Onaka, Itsuki Sakon, The Univ. of Tokyo (Japan); Hirokazu Kataza, Japan Aerospace Exploration Agency (Japan); Yuki Sarugaku, Japan Aerospace Exploration Agency (Japan) and The Univ. of Tokyo (Japan); Yuzuru Yoshii, Mamoru Doi, Kotaro Kohno, Kimiaki Kawara, Masuo Tanaka, Kentaro Motohara, Toshihiko Tanabe, Takeo Minezaki, Tomoki Morokuma, Yoichi Tamura, Tsutomu Aoki, Takao Soyano, Ken'ichi Tarusawa, Natsuko M. Kato, Masahiro Konishi, Hidenori Takahashi, Shintaro Koshida, Ken Tateuchi, The Univ. of Tokyo (Japan); Toshihiro Handa, Kagoshima Univ. (Japan) . . . . . [8446-255]

Hyper Suprime-Cam: Implementation and performance of the cryogenic dewar, Yoshiyuki Obuchi, Yutaka Komiyama, Yukiko Kamata, Satoshi Kawanomoto, Satoshi Miyazaki, Tomoki Morokuma, Fumihiro Uraguchi, National Astronomical Observatory of Japan (Japan) . . . . . [8446-256]

The test of the 10k*10k CCD for Antarctic Survey Telescope, Bin Ma, National Astronomical Observatories (China); Zhaohui Shang, Tianjin Normal Univ. (China); Lifan Wang, Purple Mountain Observatory (China) and Texas A&M Univ. (USA); Kasey L. Boggs, Semiconductor Technology Associates Inc. (USA); Yi Hu, Qiang Liu, Qian Song, Suijian Xue, National Astronomical Observatories (China) . . . . . [8446-257]

Commissioning and initial performance of the Dark Energy Camera liquid nitrogen cooling system, Herman P. Cease, Gregory E. Derylo, H. Thomas Diehl, Juan Cruz Estrada, Brenna L. Flaugher, Richard L. Schmitt, Andrew Stefanik, Fermi National Accelerator Lab. (USA); Steve Kuhlmann, Alan Zhao, Argonne National Lab. (USA); Darren L. DePoy, Texas A&M Univ. (USA) . . . . . [8446-259]

Multi-purpose grating spectrograph for the 4-meter European Solar Telescope, Ariadna Calcines Rosario, Manuel Collados Vera, Instituto de Astrofísica de Canarias (Spain); Alex J. Feller, Bianca Grauf, Johann Hirzberger, Max-Planck-Institut für Sonnensystemforschung (Germany); Arturo López Ariste, Themis S.L. (Spain); Roberto L. Lopez, Instituto de Astrofísica de Canarias (Spain); Pierre Mein, Observatoire de Paris à Meudon (France); Frédéric N. Sayéde, L'Observatoire de Paris (France) . . . . . [8446-260]

Development and produce of ground-based reflecting coronagraph for solar applications, Sergey A. Chuprakov, Pavel G. Papushev, Institute of Solar-Terrestrial Physics (Russian Federation) . . . . . [8446-261]

Wide-field Solc type birefringent filter, Valery I. Skomorovsky, Galina I. Kushtal, Valery P. Sadokhin, Institute of Solar-Terrestrial Physics (Russian Federation) . . . . . [8446-262]

A broad band imager for the European Solar Telescope, Matteo Munari, Salvatore Scuderi, INAF - Osservatorio Astrofisico di Catania (Italy); Massimo Cecconi, Fundación Galileo Galilei - INAF (Italy) . . . . . [8446-263]

The visible spectro-polarimeter (ViSP) for the Advanced Technology Solar Telescope, Alfred G. de Wijn, Roberto Casini, National Ctr. for Atmospheric Research (USA); Peter G. Nelson, Sierra Scientific Solutions (USA); Pei Huang, Consultant (USA) . . . . . [8446-264]

Calibration of instrumental crosstalk without synchronization between modulator and detector, Kwangsu Ahn, Wenda Cao, Nicolas Gorceix, Philip R. Goode, Big Bear Solar Observatory (USA) . . . . . [8446-265]

The S4I prototype: a beam-slicer system dedicated to the new generation multichannel subtractive double pass for EST imaging spectropolarimetry, Frédéric N. Sayéde, Pierre Mein, Jean-Philippe Amans, Jacques Moity, Observatoire de Paris à Meudon (France) . . . . . [8446-266]

Polarimeter with a high-speed rotating waveplate for the solar observation, Yoichiro Hanaoka, National Astronomical Observatory of Japan (Japan) . . . . . [8446-267]

Design and status of an optical and near-infrared spectrometer for the IRSF 1.4m Telescope, Takahiro Nagayama, Mikio Kurita, Masaru Kino, Daisuke Mori, Takuma Kokusho, Nagoya Univ. (Japan) . . . . . [8446-268]

Design, testing, and performance of the Hobby Eberly Telescope prime focus instrument package, Brian L. Vattiat, Gary J. Hill, Hanshin Lee, Dave M. Perry, Marc D. Rafal, Tom H. Rafferty, Richard D. Savage, Charles A. Taylor III, The Univ. of Texas at Austin (USA) . . . . . [8446-269]

An optical and near-infrared multipurpose instrument HONIR, Kiyoshi Sakimoto, Koji S. Kawabata, Hiroshi Akitaya, Hiroshima Univ. (Japan); Takuya Yamashita, National Astronomical Observatory of Japan (Japan); Asami Nakashima, Univ. of Tokyo (Japan); Tatsuya Harao, Hiroshima Univ. (Japan); Hidehiko Nakaya, National Astronomical Observatory of Japan (Japan); Takeshi Urano, Michitoshi Yoshida, Takashi Ohsugi, Hiroshima Univ. (Japan) . [8446-270]

Preliminary design of a multi-slit image slicer for EST, Ariadna Calcines Rosario, Roberto L. Lopez, Manuel Collados Vera, Instituto de Astrofísica de Canarias (Spain) . . . . . [8446-271]

HELLRIDE: a new interferometric multiline instrument for the helioseismology of the solar atmosphere, Joachim Staiger, Kiepenheuer-Institut für Sonnenphysik (Germany) . . . . . [8446-272]

PICARD SOL Mission: a ground-based facility for long-term solar radius measurement, Mustapha Meftah, Abdanour Irbah, LATMOS, Institut Pierre Simon Laplace (France) . . . . . [8446-273]

The visible tunable filtergraph for the ATST, Thomas J. Kentischer, Wolfgang Schmidt, Oskar von der Lühe, Michael Sigwarth, Kiepenheuer-Institut für Sonnenphysik (Germany) . . . . . [8446-274]

The chromosphere and prominence magnetometer, Alfred G. de Wijn, Steven Tomczyk, Scott McIntosh, Scott Sewell, National Ctr. for Atmospheric Research (USA) . . . . . [8446-275]

The GREGOR Fabry-Perot interferometer: status report and prospects, Klaus G. Puschmann, Horst Balthasar, Emil Popow, Rohan E. Louis, Leibniz-Institut für Astrophysik Potsdam (Germany); Thomas Seelemann, LaVision GmbH (Germany); Reiner Volkmer, Albert-Ludwigs-Univ. Freiburg (Germany); Manfred F. Woche, Carsten J. Denker, Leibniz-Institut für Astrophysik Potsdam (Germany) . . . . . [8446-276]

The Large-Scale Polarization Explorer (LSPE), Paolo de Bernardis, Giorgio Amico, Elia S. Battistelli, Univ. degli Studi di Roma La Sapienza (Italy); Alessandro Baù, Univ. degli Studi di Milano-Bicocca (Italy); Marco Bersanelli, Univ. degli Studi di Milano (Italy); Andrea Boscaleri, Consiglio Nazionale delle Ricerche (Italy); Francesco Cavaliere, Univ. degli Studi di Milano (Italy); Alessandro Coppolecchia, Angelo Cruciani, Univ. degli Studi di Roma La Sapienza (Italy); Francesco Cuttaia, INAF - IASF Bologna (Italy); Antonio D' Addabbo, Giuseppe D' Alessandro, Simone De Gregori, Francesco Del Torto, Marco De Petris, Univ. degli Studi di Roma La Sapienza (Italy); Lorenzo Fiorineschi, Univ. degli Studi di Firenze (Italy); Cristian Franceschet, Univ. degli Studi di Milano (Italy); Enrico Franceschi, INAF - IASF Bologna (Italy); Massimo Gervasi, Univ. degli Studi di Milano-Bicocca (Italy); David J. Goldie, Univ. of Cambridge (United Kingdom); Anna Gregorio, Univ. degli Studi di Trieste (Italy); Victor Haynes, The Univ. of Manchester (United Kingdom); Luca Lamagna, Univ. degli Studi di Roma La Sapienza (Italy); Bruno Maffei, The Univ. of Manchester (United Kingdom); Davide Maino, Univ. degli Studi di Milano (Italy); Silvia Masi, Univ. degli Studi di Roma La Sapienza (Italy); Aniello Mennella, Univ. degli Studi di Milano (Italy); Gianluca Morgante, INAF - IASF Bologna (Italy); Federico Nati, Univ. degli Studi di Roma La Sapienza (Italy); Ming Wah Ng, The Univ. of Manchester (United Kingdom); et al. . . . . [8446-277]

NIMBUS: A Near-infrared Multi-Band Ultraprecise Spectroimager for SOFIA, Michael W. McElwain, Bruce E. Woodgate, Avi Mandell, Qian Gong, NASA Goddard Space Flight Ctr. (USA); Cullen Blake, Princeton Univ. (USA); Adam Burgasser, Univ. of California, San Diego (USA); Adam S. Burrows, Princeton Univ. (USA); Mark C. Clampin, NASA Goddard Space Flight Ctr. (USA); Charlie Conroy, Harvard-Smithsonian Ctr. for Astrophysics (USA); Drake Deming, NASA Goddard Space Flight Ctr. (USA); Edward W. Dunham, Lowell Observatory (USA); Heather Knutson, California Institute of Technology (USA); Nikku Madhusudhan, Princeton Univ. (USA); Ruth Murray-Clay, Harvard-Smithsonian Ctr. for Astrophysics (USA); Bernard J. Rauscher, Stephen A. Rinehart, NASA Goddard Space Flight Ctr. (USA); David Spiegel, Institute for Advanced Study (USA); Geronimo Villanueva, Catholic Univ. of America (USA) . . . . . [8446-278]

A coherent polarimeter array for the Large Scale Polarisation Explorer (LSPE) balloon experiment, Marco Bersanelli, Aniello Mennella, Univ. degli Studi di Milano (Italy); Gianluca Morgante, INAF - IASF Bologna (Italy); Mario Zannoni, Univ. degli Studi di Milano Bicocca (Italy); Giuseppe Addamo, IEIIT Torino (Italy); Andrea Baschirotto, Alessandro Baù, Univ. degli Studi di Milano Bicocca (Italy); Benedetta Cappellini, INAF - IASF Milano (Italy); Francesco Cavaliere, Univ. degli Studi di Milano (Italy); Francesco Cuttaia, INAF - IASF Bologna (Italy); Francesco Del Torto, Univ. degli Studi di Milano (Italy); Simona Donzelli, INAF - IASF Milano (Italy); Zunnoorain Farooqui, IEIIT Torino (Italy); Marco Frailis, INAF - Osservatorio Astronomico di Trieste (Italy); Cristian Franceschet, Univ. degli Studi di Milano (Italy); Enrico Franceschi, INAF - IASF Bologna (Italy); Todd C. Gaier, Jet Propulsion Lab. (USA); Samuele Galeotta, INAF - Osservatorio Astronomico di Trieste (Italy); Massimo Gervasi, Univ. degli Studi di Milano Bicocca (Italy); Anna Gregorio, Univ. degli Studi di Trieste (Italy); Pekka P. Kangaslahti, Jet Propulsion Lab. (USA); Nicoletta Krachmalnicoff, Univ. degli Studi di Milano (Italy); Charles R. Lawrence, Jet Propulsion Lab. (USA); Gianmarco Maggio, INAF - Osservatorio Astronomico di Trieste (Italy); Roberto Mainini, Univ. degli Studi di Milano Bicocca (Italy); Davide Maino, Univ. degli Studi di Milano (Italy); Nazzareno Mandolesi, INAF - IASF Bologna (Italy); Bruno Paroli, Univ. degli Studi di Milano (Italy); et al. . . . . [8446-279]

Development of a new calibration method for ground-based Paschen alpha imaging data, Ken Tateuchi, Kentaro Motohara, Masahiro Konishi, Hidenori Takahashi, Natsuko M. Kato, Ryou Ohsawa, Yuzuru Yoshii, The Univ. of Tokyo (Japan); Mamoru Doi, The Univ of Tokyo (Japan); Kotaro Kohno, Kimiaki Kawara, Masuo Tanaka, Takashi Miyata, Takeo Minezaki, Shigeyuki Sako, Toshihiko Tanabe, Tomoki Morokuma, Yoichi Tamura, Tsutomu Aoki, Takao Soyano, Ken'ichi Tarusawa, Shintaro Koshida, Takafumi Kamizuka, The Univ. of Tokyo (Japan); Toshihiro Handa, Kagoshima Univ. (Japan); Tomohiko Nakamura, Kentaro Asano, Mizuho Uchiyama, The Univ. of Tokyo (Japan) . . . . . [8446-283]

DIFFRACT: differential remapped aperture coronagraphic telescope, Fatmé Allouche, Massinissa Hadjara, Farrokh Vakili, Lyu Abe, Pierre-Marie Gori, Observatoire de la Côte d'Azur (France) . . . . . [8446-284]

Modified modular imaging system designed for a sounding rocket experiment, Todd Veach, Paul A. Scowen, Arizona State Univ. (USA); Matthew Beasley, Univ. of Colorado at Boulder (USA); Shouleh Nikzad, Jet Propulsion Lab. (USA) . . . . . [8446-285]

ELT Instruments

MICHI: a mid-IR instrument concept for the TMT, Christopher C. Packham, Univ. of Florida (USA); Yoshiko K. Okamoto, Ibaraki Univ. (Japan); Mitsuhiko Honda, Kanagawa Univ. (Japan); Takuya Fujiyoshi, Subaru Telescope, National Astronomical Observatory of Japan (USA); Mark R. Chun, Univ. of Hawai'i (USA); John S. Carr, U.S. Naval Research Lab (USA); Masashi Chiba, Tohoku Univ. (Japan); H. Fujiwara, Masatoshi Imanishi, Subaru Telescope, National Astronomical Observatory of Japan (USA); Y. Ita, Tohoku Univ. (Japan); Hirokazu Kataza, Japan Aerospace Exploration Agency (Japan); Nancy A. Levenson, Gemini Observatory (Chile); Mikako Matsuura, Univ. College London (United Kingdom); Takeo Minezaki, The Univ. of Tokyo (Japan); Joan R. Najita, National Optical Astronomy Observatory (USA); Takashi Onaka, The Univ. of Tokyo (Japan); Takafumi Ootsubo, Tohoku Univ. (Japan); Matthew J. Richter, Univ. of California, Davis (USA); Itsuki Sakon, The Univ. of Tokyo (Japan); Michihiro Takami, Academia Sinica (Taiwan); Charles M. Telesco, Univ. of Florida (USA); Alan T. Tokunaga, Univ. of Hawaii (USA); Takuya Yamashita, National Astronomical Observatory of Japan (Japan) . . . . . [8446-287]

Modelling of highly-muliplexed fibre systems, Jeremy R. Allington-Smith, Graham J. Murray, Ulrike Lemke, Durham Univ. (United Kingdom) . . . [8446-288]

MANIFEST instrument concept and related technologies, Michael Goodwin, Matthew Colless, Australian Astronomical Observatory (Australia); Guy J. Monnet, Ctr. de Recherche Astronomique de Lyon (France); Will Saunders, Jon S. Lawrence, Andrew Hopkins, Jurek K. Brzeski, Scott Case, Tony J. Farrell, Luke Gers, James Gilbert, Jeroen Heijmans, Stan Miziarski, Rolf Muller, Greg A. Smith, Julia Tims, Lewis G. Waller, Australian Astronomical Observatory (Australia). . . . . [8446-289]

Modelling the application of integrated photonic spectrographs to astronomy, Robert J. Harris, Jeremy R. Allington-Smith, Durham Univ. (United Kingdom) . . . . . [8446-290]

Synergies between EAGLE and OPTIMOS-EVE: a combined MOS for the European ELT, Christopher J. Evans, UK Astronomy Technology Ctr. (United Kingdom); Beatriz Barbuy, Univ. de São Paulo (Brazil); Piercarlo Bonifacio, Fanny Chemla, Observatoire de Paris à Meudon (France); Jean-Gabriel Cuby, Observatoire Astronomique de Marseille-Provence (France); Colin R. Cunningham, UK Astronomy Technology Ctr. (United Kingdom); Gavin B. Dalton, Rutherford Appleton Lab. (United Kingdom); Hector Flores, Eric Gendron, Isabelle Guinouard, Jean-François Hammer, Pascal Jagourel, Observatoire de Paris à Meudon (France); Lex Kaper, Univ. van Amsterdam (Netherlands); Simon L. Morris, Durham Univ. (United Kingdom); Ramón Navarro, ASTRON (Netherlands); Phil Parr-Burman, UK Astronomy Technology Ctr. (United Kingdom); Mathieu Puech, Gérard C. Rousset, Observatoire de Paris à Meudon (France); Hermine Schnetler, UK Astronomy Technology Ctr. (United Kingdom) . . . . . [8446-291]

Characterizing the red optical sky background fluctuations from narrow-band imaging, Mathieu Puech, Hector Flores, Observatoire de Paris à Meudon (France); Thiago Signorini Gonçalves, Observatorio do Valongo (Brazil); Jean-François Hammer, Observatoire de Paris à Meudon (France); Myriam Rodrigues, European Southern Observatory (Chile) and Observatoire de Paris à Meudon (France) and Instituto Superior Tecnico (Portugal); Yanbin Yang, Karen Disseau, Observatoire de Paris à Meudon (France). . . . . [8446-292]

Conceptual optical design for GMACS, a wide-field, multi-object, moderate resolution optical spectrograph for the Giant Magellan Telescope (GMT), Robert H. Barkhouser, Johns Hopkins Univ. (USA); Stephen A. Shectman, Carnegie Observatories (USA); Darren L. DePoy, Jennifer L. Marshall, Texas A&M Univ. (USA); Stephen A. Smee, Randolph P. Hammond, Johns Hopkins Univ. (USA); Travis Prochaska, Texas A&M Univ. (USA) . . . . . [8446-293]

Optomechanical design concept for GMACS: a wide-field multi-object moderate resolution optical spectrograph for the Giant Magellan Telescope (GMT), Stephen A. Smee, Johns Hopkins Univ. (USA); Travis Prochaska, Texas A&M Univ. (USA); Stephen A. Shectman, Carnegie Observatories (USA); Randolph P. Hammond, Robert H. Barkhouser, Johns Hopkins Univ. (USA); Darren L. DePoy, Jennifer L. Marshall, Texas A&M Univ. (USA) . . . . . [8446-294]

Sorption-based vibration-free cooler for the METIS instrument on E-ELT, Marcel ter Brake, Yingzhe Wu, Dawid Zalewski, Cris Vermeer, Univ. Twente (Netherlands); Jan Doornink, Eric Boom, Dutch Space B.V. (Netherlands) . . . . . [8446-295]

Design and development of SWIMS: a near-infrared multi-object spectrograph for the University of Tokyo Atacama Observatory, Masahiro Konishi, Kentaro Motohara, Hidenori Takahashi, Ken Tateuchi, Natsuko M. Kato, Yuzuru Yoshii, Mamoru Doi, Kotaro Kohno, Kimiaki Kawara, Masuo Tanaka, Takashi Miyata, Takeo Minezaki, Shigeyuki Sako, Toshihiko Tanabe, Tomoki Morokuma, Yoichi Tamura, Tsutomu Aoki, Takao Soyano, Ken'ichi Tarusawa, Shintaro Koshida, Takafumi Kamizuka, The Univ. of Tokyo (Japan); Toshihiro Handa, Kagoshima Univ. (Japan) . . . . . [8446-296]

The characterization of sky background at near IR-band from FORS2 multi-slit spectroscopy, Yanbin Yang, Hector Flores, Mathieu Puech, Jean-François Hammer, Observatoire de Paris à Meudon (France); Myriam Rodrigues, European Southern Observatory (Chile); Thiago Signorini Gonçalves, Univ. Federal do Rio de Janeiro (Brazil); Karen Disseau, Observatoire de Paris à Meudon (France) . . . . . [8446-297]

A mechanical design concept for EAGLE on the revised E-ELT, Cornelis M. Dubbeldam, Durham Univ. (United Kingdom); Peter R. Hastings, UK Astronomy Technology Ctr. (United Kingdom) . . . . . [8446-298]

The mechanical design of IGRINS cryostat and optical bench, Chan Park, Sungho Lee, Korea Astronomy and Space Science Institute (Korea, Republic of); In-Soo Yuk, Korea Astronomy and Space Science Institute (Korea, Republic of) and The Univ. of Texas at Austin (USA); Moo-Young Chun, Kang-Min Kim, Hwakyung Jung, Korea Astronomy and Space Science Institute (Korea, Republic of); Hanshin Lee, Joseph Strubhar, Daniel T. Jaffe, The Univ. of Texas at Austin (USA) . . . . . [8446-299]

VIENTOS: a feasibility study of innovative pupil systems for the new generation of instruments in the large telescopes, María Luisa García-Vargas, Ana Pérez Calpena, FRACTAL S.L.N.E (Spain); Jesús Gallego Maestro, Armando Gil de Paz, Univ. Complutense de Madrid (Spain); Ernesto Sánchez-Blanco Mancera, Ismael Martínez-Delgado, Manuel Maldonado Medina, FRACTAL S.L.N.E (Spain); Jaime Zamorano Calvo, Univ. Complutense de Madrid (Spain) . . . . . [8446-300]

Wednesday 4 July

PLENARY SESSION

Room: Auditorium . . . . . Wed. 09.00 to 10.00

Session Chair: **Luc Simard,**
National Research Council Canada (Canada)

09.00: **Very high energy gamma ray astronomy with the H.E.S.S. telescopes** *(Presentation Only)*, Werner Hofmann, Max-Planck-Institut für Kernphysik (Germany) . . . . . [8442-505]

09.30: **The cosmic microwave background: observing directly the early universe**, Paolo de Bernardis, Silvia Masi, Univ. degli Studi di Roma La Sapienza (Italy) . . . . . [8442-506]

Coffee Break . . . . . 10.00 to 10.30

SESSION 9

Room: Forum . . . . . Wed. 10.30 to 12.00

ELT Instruments I

Session Chair: **Christopher J. Evans,**
UK Astronomy Technology Ctr. (United Kingdom)

10.30: **A roadmap for the E-ELT instrument suite** *(Invited Paper)*, Suzanne K. Ramsay, Mark M. Casali, Juan Carlos González, Norbert Hubin, Hans-Ulrich Käufl, European Southern Observatory (Germany) . . . . . [8446-48]

11.00: **The instrumentation program for the Thirty Meter Telescope** *(Invited Paper)*, Luc Simard, David Crampton, National Research Council Canada (Canada) and Thirty Meter Telescope Observatory Corp. (USA); Brent L. Ellerbroek, Corinne Boyer, Thirty Meter Telescope Observatory Corp. (USA) . . . . . [8446-49]

11.30: **The instrument development and selection process for the Giant Magellan Telescope** *(Invited Paper)*, George H. Jacoby, Antonin H. Bouchez, Carnegie Observatories (USA); Matthew Colless, Australian Astronomical Observatory (Australia); Darren L. DePoy, Texas A&M Univ. (USA); Daniel G. Fabricant, Harvard-Smithsonian Ctr. for Astrophysics (USA); Philip M. Hinz, The Univ. of Arizona (USA); Daniel T. Jaffe, The Univ. of Texas at Austin (USA); Matt Johns, Giant Magellan Telescope Project (USA); Patrick J. McCarthy, Carnegie Observatories (USA); Peter J. McGregor, The Australian National Univ. (Australia); Stephen A. Shectman, Carnegie Observatories (USA); Andrew H. Szentgyorgyi, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8446-50]

Lunch/Exhibition Break . . . . . 12.00 to 13.50

SESSION 10

Room: Forum . . . . . Wed. 13.50 to 15.30

ELT Instruments II

Session Chair: **Christopher J. Evans,**
UK Astronomy Technology Ctr. (United Kingdom)

13.50: **The GMT-CfA, Carnegie, Catolica, Chicago Large Earth Finder (G-CLEF): a general purpose optical echelle spectrograph for the GMT with precision radial velocity capability**, Andrew Szentgyorgyi, Anna Frebel, Gabor Furesz, Edward N. Hertz, Timothy J. Norton, Harvard-Smithsonian Ctr. for Astrophysics (USA); Jacob Bean, The Univ. of Chicago (USA); Henry W. Bergner, Harvard-Smithsonian Ctr. for Astrophysics (USA); Jeffrey D. Crane, Carnegie Observatories (USA); Janet D. Evans, Ian N. Evans, Thomas M. Gauron, Harvard-Smithsonian Ctr. for Astrophysics (USA); Andrés Jordan, Pontificia Univ. Católica de Chile (Chile); Sang C. Park, Harvard-Smithsonian Ctr. for Astrophysics (USA); Alan Uomoto, Carnegie Observatories (USA); Stuart I. Barnes, Stuart Barnes Optical Design (New Zealand); William Davis, Michael Eisenhower, Harvard-Smithsonian Ctr. for Astrophysics (USA); Harland W. Epps, Lick Observatory (USA); Dani Guzman, Pontificia Univ. Católica de Chile (Chile); Kenneth McCracken, Mark P. Ordway, David A. Plummer, William A. Podgorski, David S. Weaver, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . [8446-52]

14.10: **The GMT integral-field spectrograph (GMTIFS) conceptual design**, Peter J. McGregor, Gabe J. Bloxham, Robert Boz, John Davies, Matthew C. Doolan, Michael Ellis, John Hart, Jon J. Nielsen, Simon Parcell, Robert G. Sharp, Dejan Stevanovic, The Australian National Univ. (Australia) . . . . . [8446-53]

14.30: **The EAGLE instrument for the E-ELT: developments since delivery of Phase A**, Simon L. Morris, Durham Univ. (United Kingdom); Jean-Gabriel Cuby, Observatoire Astronomique de Marseille-Provence (France); Christopher J. Evans, UK Astronomy Technology Ctr. (United Kingdom); Thierry Fusco, ONERA (France); Pascal Jagourel, Observatoire de Paris à Meudon (France); Phil Parr-Burman, UK Astronomy Technology Ctr. (United Kingdom); Gérard C. Rousset, LESIA - Observatoire de Paris (France); Hermine Schnetler, UK Astronomy Technology Ctr. (United Kingdom) . . . . . [8446-54]

14.50: **Second-Earth imager for TMT (SEIT)**, Taro Matsuo, National Astronomical Observatory of Japan (Japan); Takayuki Kotani, Japan Aerospace Exploration Agency (Japan); Naoshi Murakami, Hokkaido Univ. (Japan); Hajime Kawahara, Tokyo Metropolitan Univ. (Japan); Yuka Fujii, The Univ. of Tokyo (Japan); Motohide Tamura, National Astronomical Observatory of Japan (Japan); Naoshi Baba, Hokkaido Univ. (Japan); Norio Narita, National Astronomical Observatory of Japan (Japan); Jun Minagawa, Kenji Takizawa, National Institute for Basic Biology (Japan). . . . . [8446-56]

15.10: **The opto-mechanical design of HARMONI: a first light integral field spectrograph for the E-ELT**, Niranjan A. Thatte, Univ. of Oxford (United Kingdom); Santiago Arribas, Consejo Superior de Investigaciones Científicas (Spain); David W. Lunney, UK Astronomy Technology Ctr. (United Kingdom); Roland M. Bacon, Observatoire de Lyon (France); Evencio Mediavilla, Instituto de Astrofísica de Canarias (Spain); David Freeman, Kidger Optics Associates (United Kingdom); Thierry Fusco, ONERA (France); Mathias Tecza, Fraser Clarke, Univ. of Oxford (United Kingdom); David M. Montgomery, Angus M. Gallie, UK Astronomy Technology Ctr. (United Kingdom); Ana Belén Fragoso-Lopez, Instituto de Astrofísica de Canarias (Spain) . . . . . [8446-55]

Coffee Break . . . . . 15.30 to 16.00

SESSION 11

Room: Forum . . . . . Wed. 16.00 to 17.20

ELT Instruments III

Session Chair: **Luc Simard,**
National Research Council Canada (Canada)

16.00: **METIS: the thermal infrared instrument for the E-ELT**, Bernhard R. Brandl, Leiden Observatory (Netherlands); Rainer Lenzen, Max-Planck-Institut für Astronomie (Germany); Eric J. Pantin, Commissariat à l'Énergie Atomique (France); Joris Blommaert, Katholieke Univ. Leuven (Belgium); Alistair Glasse, UK Astronomy Technology Ctr. (United Kingdom); Michael R. Meyer, ETH Zurich (Switzerland); Lars Venema, ASTRON (Netherlands); Frank Molster, Leiden Observatory (Netherlands); Ralf Siebenmorgen, European Southern Observatory (Germany) . . . . . [8446-57]

16.20: **The GMACS spectrograph for the Giant Magellan Telescope**, Darren L. DePoy, Jennifer L. Marshall, Travis Prochaska, Tyler W. Behm, Texas A&M Univ. (USA); Stephen A. Smee, Robert H. Barkhouser, Randolph P. Hammond, Johns Hopkins Univ. (USA); Stephen A. Shectman, Giant Magellan Telescope Project (USA); Casey Papovich, Texas A&M Univ. (USA) . . . . . [8446-58]

16.40: **NIRMOS: a wide-field near-infrared spectrograph for the Giant Magellan Telescope**, Daniel G. Fabricant, Robert G. Fata, Warren R. Brown, Brian A. McLeod, Mark Mueller, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8446-59]

17.00: **TIGER: a high contrast infrared imager for the Giant Magellan Telescope,** Philip M. Hinz, Johanan L. Codona, Olivier Guyon, William F. Hoffmann, Andrew Skemer, The Univ. of Arizona (USA); Joseph L. Hora, Volker Tolls, Harvard-Smithsonian Ctr. for Astrophysics (USA); Alan Boss, Alycia Weinberger, Carnegie Institution of Washington (USA); Paul Arbo, Thomas Connors, Olivier Durney, Thomas McMahon, Manny Montoya, Vidhya Vaitheeswaran, The Univ. of Arizona (USA). . . . . [8446-60]

POSTER PREVIEWS

Room: Forum. . . . . Wed. 17.20 to 17.40

Session Chair: **Christopher J. Evans,**
UK Astronomy Technology Ctr. (United Kingdom)

Poster authors will be contacted and selected to make brief presentations.

Thursday 5 July

PLENARY SESSION

Room: Auditorium . . . . . Thurs. 09.30 to 10.00

Session Chair: **Gillian S. Wright,**
UK Astronomy Technology Ctr. (United Kingdom)

09.30: **ALMA construction and early science**, Mattheus W. M. de Graauw, Lewis Ball, Joint ALMA Observatory (Chile). . . . . [8444-507]

Coffee Break . . . . . 10.00 to 10.30

SESSION 12

Room: Forum . . . . . Thurs. 10.30 to 12.10

Planet Finders I

Session Chair: **Ramón J. García López,**
Instituto de Astrofísica de Canarias (Spain)

10.30: **SPIRou @ CFHT : science goals and overall instrument design**, René Doyon, Univ. de Montréal (Canada); Jean-Francois Donati, Observatoire Midi-Pyrénées (France); Xavier Delfosse, Institut de Planétologie et d'Astrophysique de Grenoble (France); Etienne Artigau, Univ. de Montréal (Canada); Patrick Rabou, Institut de Planétologie et d'Astrophysique de Grenoble (France); Simon Thibault, Univ. Laval (Canada); Driss Kouach, Observatoire Midi-Pyrénées (France); David Loop, National Research Council Canada (Canada); Francois Dolon, Observatoire Astronomique de Marseille-Provence (France); Olivier Hernandez, Univ. de Montréal (Canada); Marie Le Floch, Yoan Micheau, Laurent P. Parès, Univ. de Toulouse (France); Francesco Pepe, Observatory of Geneva (Switzerland); Vladimir A. Reshetov, Leslie Saddlemyer, National Research Council Canada (Canada); Christian Surace, Observatoire Astronomique de Marseille-Provence (France); Stéphane Udry, Observatory of Geneva (Switzerland); Karunananth G. Thanjavur, Tom Vermeulen, Canada-France-Hawaii Telescope (USA); Shiang-Yu Wang, Academia Sinica (Taiwan) . [8446-61]

10.50: **ESPRESSO: the ultimate rocky exoplanets hunter for the VLT**, Denis Mégevand, Observatory of Geneva (Switzerland); Filippo M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); Alexandre Cabral, Univ. de Lisboa (Portugal); Paolo Di Marcantonio, INAF - Osservatorio Astronomico di Trieste (Italy); Manuel Amate, Instituto de Astrofísica de Canarias (Spain); Francesco Pepe, Observatory of Geneva (Switzerland); Stefano Cristiani, INAF - Osservatorio Astronomico di Trieste (Italy); Rafael Rebolo-López, Instituto de Astrofísica de Canarias (Spain); Nuno C. Santos, Univ. do Porto (Portugal); Hans Dekker, European Southern Observatory (Germany); Manuel Abreu, Univ. de Lisboa (Portugal); Michael Affolter, Univ. Bern (Switzerland); Gerardo Avila, European Southern Observatory (Germany); Veronica Baldini, INAF - Osservatorio Astronomico di Trieste (Italy); Christopher Broeg, Univ. Bern (Switzerland); Pedro Carvas, Univ. de Lisboa (Portugal); Roberto Cirami, INAF - Osservatorio Astronomico di Trieste (Italy); João M. Pinto Coelho, Univ. de Lisboa (Portugal); Maurizio Comari, Igor Coretti, Guido Cupani, Valentina D'Odorico, INAF - Osservatorio Astronomico di Trieste (Italy); Vincenzo De Caprio, INAF - Osservatorio Astronomico di Brera (Italy); Bernard Delabre, European Southern Observatory (Germany); Pedro R. L. Figueira, Univ. do Porto (Portugal); Michel Fleury, Univ. of Geneva (Switzerland); Ana Belén Fragoso-Lopez, Jonay I. González Hernández, Instituto de Astrofísica de Canarias (Spain); Ian Hughes, Observatory of Geneva (Switzerland); et al.. . . . . [8446-62]

11.10: **The habitable-zone planet finder: a stabilized fiber-fed NIR spectrograph for the Hobby-Eberly Telescope**, Suvrath Mahadevan, Lawrence W. Ramsey, The Pennsylvania State Univ. (USA); Fred R. Hearty, Univ. of Virginia (USA); Chad F. Bender, Ryan Terrien, The Pennsylvania State Univ. (USA); Stephen L. Redman, National Institute of Standards and Technology (USA); Samuel Halverson, The Pennsylvania State Univ. (USA); Steven N. Osterman, Univ. of Colorado at Boulder (USA); Scott A. Diddams, National Institute of Standards and Technology (USA); James Kasting, Jason T. Wright, The Pennsylvania State Univ. (USA); Michael Endl, The Univ. of Texas at Austin (USA) . . . . . [8446-63]

11.30: **Infrared Doppler instrument for the Subaru Telescope (IRD)**, Motohide Tamura, Hiroshi Suto, Jun Nishikawa, Wako Aoki, National Astronomical Observatory of Japan (Japan); Tomonori Usuda, Olivier Guyon, Yutaka Hayano, Hideki Takami, Subaru Telescope, National Astronomical Observatory of Japan (Japan); Hideyuki Izumiura, Eiji Kambe, Jun-Ichi Morino, National Astronomical Observatory of Japan (Japan); Hiroshi Terada, Subaru Telescope, National Astronomical Observatory of Japan (Japan); Eiichiro Kokubo, National Astronomical Observatory of Japan (Japan); Naruhisa Takato, Subaru Telescope, National Astronomical Observatory of Japan (Japan); Norio Narita, Jun Hashimoto, National Astronomical Observatory of Japan (Japan); Tomoyuki Kudo, Subaru Telescope, National Astronomical Observatory of Japan (Japan); Ryuji Suzuki, Nobuhiko Kusakabe, Shogo Nishiyama, Taro Matsuo, Yasunori Hori, Akihiko Fukui, Jungmi Kwon, Takuya Suenaga, National Astronomical Observatory of Japan (Japan); Takashi Kurokawa, Ken Kashiwagi, Yosuke Mizuno, Sadahiro Inoue, Tokyo Univ. of Agriculture and Technology (Japan); Yuji Ikeda, Photocoding (Japan); Bun'ei Sato, Masahiro Ikoma, Masashi Omiya, Hiroki Harakawa, Hiroshi Ohnuki, Chihiro Tatsunami, Tokyo Institute of Technology (Japan); Masahiko Hayashi, The Univ. of Tokyo (Japan); Hidenori Genda, The Univ, of Tokyo (Japan); Masayuki Kuzuhara, Yasuhiro H. Takahashi, Teruyuki Hirano, Yuka Fujii, The Univ. of Tokyo (Japan); Tetsuya Nagata, Kyoto Univ. (Japan); Masahiro Ogihara, Nagoya Univ. (Japan); Masahide Hidai, Tokai Univ. (Japan) . . . . . [8446-64]

11.50: **The Gemini Planet Imager: integration and status,** Bruce A. Macintosh, Lawrence Livermore National Lab. (USA); Stephen J. Goodsell, Gemini Observatory (USA); David W. Palmer, Lawrence Livermore National Lab. (USA); James R. Graham, Dunlap Institute for Astronomy & Astrophysics (Canada); René Doyon, Univ. de Montreal (Canada); Jennifer Dunn, National Research Council Canada (Canada); Donald T. Gavel, Univ. of California, Santa Cruz (USA); James E. Larkin, Univ. of California, Los Angeles (USA); Ben R. Oppenheimer, American Museum of Natural History (USA); Leslie Saddlemyer, National Research Council Canada (Canada); J. Kent Wallace, Jet Propulsion Lab. (USA) . . . . . [8446-65]

Poster Previews

Room: Forum . . . . . Thurs. 12.10 to 12.30

Session Chair: **Christopher J. Evans,**
UK Astronomy Technology Ctr. (United Kingdom)

Poster authors will be contacted and selected to make brief presentations.

Lunch Break . . . . . 12.30 to 13.40

SESSION 13

Room: Forum . . . . . Thurs. 13.40 to 15.00

Planet Finders II

Session Chair: **Ramón J. García López,**
Instituto de Astrofísica de Canarias (Spain)

13.40: **Harps-N: the new planet hunter at TNG**, Rosario Cosentino, Telescopio Nazionale Galileo (Spain); Francesco Pepe, Observatory of Geneva (Switzerland); Andrew Collier Cameron, Univ. of St. Andrews (United Kingdom); David Latham, Harvard-Smithsonian Ctr. for Astrophysics (USA); Emilio Molinari, Telescopio Nazionale Galileo (Spain); Stéphane Udry, Christophe Lovis, Observatory of Geneva (Switzerland); David B. Charbonneau, Harvard-Smithsonian Ctr. for Astrophysics (USA); Michel Mayor, Observatory of Geneva (Switzerland); Giuseppina Micela, INAF - Osservatorio Astronomico di Palermo Giuseppe S. Vaiana (Italy); David F. Phillips, Harvard-Smithsonian Ctr. for Astrophysics (USA); Giampaolo Piotto, Univ. degli Studi di Padova (Italy); Don Pollacco, Queen's Univ. Belfast (United Kingdom); Didier Queloz, Observatory of Geneva (Switzerland); Ken Rice, The Royal Observatory, Edinburgh (United Kingdom); Dimitar D. Sasselov, Harvard-Smithsonian Ctr. for Astrophysics (USA); Damien Ségransan, Observatory of Geneva (Switzerland); Alessandro Sozzetti, INAF - Osservatorio Astronomico di Torino (Italy); Andrew H. Szentgyorgyi, Harvard-Smithsonian Ctr. for Astrophysics (USA); Nicolas Buchschacher, Observatory of Geneva (Switzerland); Pedro R. L. Figueira, Univ. do Porto (Portugal); Michel Fleury, Observatory of Geneva (Switzerland); Alberto Galli, Adriano Ghedina, Carlos Gonzalez, Jose Guerra, Telescopio Nazionale Galileo (Spain); Ian Hughes, Observatory of Geneva (Switzerland); et al. . . . . [8446-66]

14.00: **Achieving a few cm/sec calibration repeatability for high resolution spectrographs: the laser frequency comb on HARPS**, Antonio Manescau, Gaspare Lo Curto, Gerardo Avila, Luca Pasquini, European Southern Observatory (Germany); Tobias Wilken, Tilo Steinmetz, Ronald Holzwarth, Menlo Systems GmbH (Germany) and Max-Planck-Institut für Quantenoptik (Germany); Rafael Probst, Thomas Udem, Theodor W. Hänsch, Max-Planck-Institut für Quantenoptik (Germany); Jonay I. González Hernández, Rafael Rebolo-López, Instituto de Astrofisica de Canarias (Spain) . . . . . [8446-67]

14.20: **A demonstration test of the dual-beam polarimetry differential imaging system for the high-contrast observation**, Jiangpei Dou, Nanjing Institute of Astronomical Optics & Technology (China); Deqing Ren, California State Univ., Northridge (USA) and Nanjing Institute of Astronomical Optics & Technology (China); Xue Wang, Yongtian Zhu, Xi Zhang, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8446-68]

14.40: **SPHERE: a planet finder instrument for the VLT**, Jean-Luc Beuzit, Institut de Planétologie et d'Astrophysique de Grenoble (France); Markus Feldt, Max-Planck-Institut für Astronomie (Germany); David Mouillet, Institut de Planétologie et d'Astrophysique de Grenoble (France); Kjetil Dohlen, Lab. d'Astrophysique de Marseille (France); Pascal Puget, Institut de Planétologie et d'Astrophysique de Grenoble (France); François Wildi, Observatory of Geneva (Switzerland); Markus Kasper, European Southern Observatory (Germany); the SPHERE Consortium, Institut de Planétologie et d'Astrophysique de Grenoble (France) . . . . . [8446-69]

Coffee Break . . . . . 15.00 to 15.30

SESSION 14

Room: Forum . . . . . Thurs. 15.30 to 17.30

High Resolution and AO Instruments

Session Chair: **Joss Bland-Hawthorn,** The Univ. of Sydney (Australia)

15.30: **FIRST--a fibered aperture masking instrument: on-sky results**, Elsa Huby, Guy S. Perrin, Observatoire de Paris à Meudon (France); Franck Marchis, SETI Institute (USA); Sylvestre Lacour, Observatoire de Paris à Meudon (France); Takayuki Kotani, Japan Aerospace Exploration Agency (Japan); Gaspard Duchêne, Univ. of California, Berkeley (USA); Elodie Choquet, Observatoire de Paris à Meudon (France); Elinor L. Gates, Univ. of California Observatories (USA) . . . . . [8446-70]

15.50: **Design of ERIS for the VLT**, Paola Amico, Enrico Marchetti, European Southern Observatory (Germany); Andrea Baruffolo, INAF - Osservatorio Astronomico di Padova (Italy); Bernard Delabre, Michel Duchateau, Mustafa Ekinci, European Southern Observatory (Germany); Daniela Fantinel, INAF - Osservatorio Astronomico di Padova (Italy); Gert Finger, Christophe Frank, European Southern Observatory (Germany); Reiner Hofmann, Max-Planck-Institut für extraterrestrische Physik (Germany); Paul D. Jolley, Jean-Louis Lizon, European Southern Observatory (Germany); Harald Weisz, Weisz Ing.-Bureau für den Maschinenbau (Germany) . . . . . [8446-71]

16.10: **AOLI--adaptive optics assisted lucky imager: diffraction limited imaging in the visible on large ground-based telescopes**, Craig D. Mackay, Univ. of Cambridge (United Kingdom); Rafael Rebolo-López, Instituto de Astrofísica de Canarias (Spain); Bruno Femenia Castellá, Univ. Politécnica de Cartagena (Spain); Jonathan S. Crass, David L. King, Univ. of Cambridge (United Kingdom); Lucas Labadie, Univ. zu Köln (Germany); Antonio Pérez Garrido, Univ. Politécnica de Cartagena (Spain); Marc Balcells, Isaac Newton Group of Telescopes (Spain); Anastasio Díaz-Sánchez, Univ. Politécnica de Cartagena (Spain); Jesús Jimenez Fuensalida, Roberto L. Lopez, Alejandro Oscoz, Jorge A. Pérez Prieto, Luis F. Rodríguez-Ramos, Instituto de Astrofísica de Canarias (Spain); Isidro Villó, Univ. Politécnica de Cartagena (Spain) . . . . . [8446-72]

16.30: **15x optical zoom and extreme optical image stabilisation: diffraction limited integral field spectroscopy with the Oxford SWIFT spectrograph**, Mathias Tecza, Fraser Clarke, Niranjan Thatte, Univ. of Oxford (United Kingdom); David Freeman, Optical Design Consult (United Kingdom); James D. Lynn, Univ. of Oxford (United Kingdom); Jennifer E. Roberts, Jet Propulsion Lab. (USA); Richard G. Dekany, California Institute of Technology (USA); Graeme S. Salter, The Univ. of New South Wales (Australia). . . . . [8446-73]

16.50: **Compact high-resolution spectrographs for large and extremely large telescopes: using the diffraction limit**, J. Gordon Robertson, Joss Bland-Hawthorn, The Univ. of Sydney (Australia) . . . . . [8446-74]

17.10: **Current status of FRIDA: diffraction limited NIR instrument for GTC,** Beatriz Sánchez, Univ. Nacional Autónoma de México (Mexico); José Acosta-Pulido, Instituto de Astrofísica de Canarias (Spain); Luis C. Álvarez, Univ. Nacional Autónoma de México (Mexico); Vicente Bringas, Ctr. de Ingeniería y Desarrollo Industrial (Mexico); Nicolás Cardiel, Univ. Complutense de Madrid (Spain); David Clark, Univ. Nacional Autónoma de México (Mexico); Adi Corrales, Ctr. de Ingeniería y Desarrollo Industrial (Mexico); Salvador Cuevas, Oscar Chapa, Univ. Nacional Autónoma de México (Mexico); José Javier Díaz, Instituto de Astrofísica de Canarias (Spain); Stephen S. Eikenberry, Univ. of Florida (USA); María del Carmen Eliche Moral, Univ. Complutense de Madrid (Spain); Carlos Espejo, Rubén A. Flores-Meza, Univ. Nacional Autónoma de México (Mexico); Francisco Garzón, Peter L. Hammersley, Instituto de Astrofísica de Canarias (Spain); Carolina Keiman, Gerardo Lara, José A. López, Univ. Nacional Autónoma de México (Mexico); Pablo L. López Ramos, Instituto de Astrofísica de Canarias (Spain); Diana Lucero, Ctr. de Ingeniería y Desarrollo Industrial (Mexico); Juan M. Montoya, Ctr. de Ingenieria y Desarrollo Industrial (Mexico); Heidy Moreno Arce, Instituto de Astrofísica de Canarias (Spain); Sergio Pascual, Univ. Complutense de Madrid (Spain); Jesús Patrón, Almudena Prieto, Instituto de Astrofísica de Canarias (Spain); Steven N. Raines, Univ. of Florida (USA); Alberto Rodríguez, Jorge Uribe, Ctr. de Ingeniería y Desarrollo Industrial (Mexico); et al.. . . . . [8446-75]

Closing Remarks

Room: Forum . . . . . Thurs. 17.30 to 17.40

Session Chair: **Ian S. McLean,** Univ. of California, Los Angeles (USA)

POSTERS-THURSDAY

Room: Hall 3. . . . . Thurs. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Thursday. The interactive poster session with authors in attendance will be Thursday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

Planet Finders/High Resolution AO Instruments

Conceptual design of a high-contrast planet-finding integral field spectrograph for the Subaru Telescope, Mary A. Peters, N. Jeremy Kasdin, Princeton Univ. (USA); Michael W. McElwain, Qian Gong, NASA Goddard Space Flight Ctr. (USA). . . . . [8446-302]

Very high-resolution spectroscopy for the combined focus of the VLT: the ESPRESSO spectrograph optical design, Paolo Spanò, INAF - Osservatorio Astronomico di Brera (Italy); Bernard Delabre, Hans Dekker, European Southern Observatory (Germany); Francesco Pepe, Observatory of Geneva (Switzerland); Filippo Maria Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); Paolo Di Marcantonio, Stefano Cristiani, INAF - Osservatorio Astronomico di Trieste (Italy); Denis Mégevand, Observatory of Geneva (Switzerland) . . . . . [8446-303]

GRAVITY Coudé Infrared Adaptive Optics (CIAO) wavefront sensor for the VLT Interferometer, Sarah Kendrew, Stefan Hippler, Wolfgang Brandner, Max-Planck-Institut für Astronomie (Germany); Yann Clénet, LESIA - Observatoire de Paris (France); Casey P. Deen, Max-Planck-Institut für Astronomie (Germany); Eric Gendron, LESIA - Observatoire de Paris (France); Armin Huber, Ralf Klein, Werner Laun, Rainer Lenzen, Vianak Naranjo, José R. Ramos, Ralf-Rainer Rohloff, Pengqian Yang, Max-Planck-Institut für Astronomie (Germany); Frank Eisenhauer, Max-Planck-Institut für extraterrestrische Physik (Germany); António Amorim, Univ. de Lisboa (Portugal); Karine Rousselet-Perraut, Institut de Planétologie et d'Astrophysique de Grenoble (France); Guy S. Perrin, LESIA - Observatoire de Paris (France); Christian Straubmeier, Univ. zu Köln (Germany) . . . . . [8446-304]

PlanetCam: a visible and near infrared lucky-imaging camera to study planetary atmospheres and solar system objects, Agustin Sanchez-Lavega, Jose F. Rojas, Ricardo Hueso, Santiago Perez-Hoyos, Univ. del País Vasco (Spain); Lander de Bilbao, Gaizka Murga, Javier Ariño, IDOM (Spain) . [8446-305]

NESSI: An optimized NIR MOS for exoplanet studies, Michelle J. Creech-Eakman, Colby A. Jurgenson, Fernando G. Santoro, Michael A. Hrynevych, Heather Bloemhard, Penelope J. Boston, New Mexico Institute of Mining and Technology (USA); Pieter D. Deroo, Jet Propulsion Lab. (USA); Stephen R. Jimenez, Andres M. Olivares, Matt Napolitano, Dan Rodeheffer, Christopher D. Salcido, Luke M. Schmidt, New Mexico Institute of Mining and Technology (USA); Mark R. Swain, Gautam Vasisht, Jet Propulsion Lab. (USA) . . . [8446-306]

Conceptual study for a sub-pupil instrument having 4 high order adaptive optics path for parallel multi-wavelength high contrast imaging, and medium resolution spectrometry, Frédéric Y. J. Gonte, Dimitri P. Mawet, Pierre Haguenauer, European Southern Observatory (Chile) . . . . . [8446-308]

ESPRESSO design: the realization of an innovative multi-telescope ultra-stable high resolution spectrograph for the VLT, Filippo Maria Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); Alexandre Cabral, Univ. de Lisboa (Portugal); Manuel Amate, Instituto de Astrofisica de Canarias (Spain); Denis Mégevand, Francesco Pepe, Observatory of Geneva (Switzerland); Stefano Cristiani, INAF - Osservatorio Astronomico di Trieste (Italy); Hans Dekker, European Southern Observatory (Germany); Rafael Rebolo-López, Instituto de Astrofisica de Canarias (Spain); Nuno C. Santos, Univ. do Porto (Portugal) . . . . . [8446-309]

An echelle spectrograph for precise radial velocity measurements in the near IR, Amokrane Berdja, Pedro A. Escárate Monetta, Leonardo Vanzi, Andrés Jordan, Pontificia Univ. Catolica de Chile (Chile) . . . . . [8446-311]

Progress on multi-object exoplanet search spectral interferometer, Kai Zhang, Yongtian Zhu, Lei Wang, Zhongwen Hu, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8446-312]

Design of an iodine cell with multi-fiber optical coupling technique, Kai Zhang, Yongtian Zhu, Jin Tang, Zhongyu Yue, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8446-313]

Optical design of new generation compact, high resolution, high throughput, and high Doppler precision optical spectrograph, Bo Zhao, Jian Ge, Univ. of Florida (USA) . . . . . [8446-314]

Optical design of a versatile FIRST high-resolution near-IR spectrograph, Bo Zhao, Jian Ge, Univ. of Florida (USA) . . . . . [8446-315]

The SED machine: a dedicated transient spectrograph, Sagi Ben-Ami, Weizmann Institute of Science (Israel); Nicholas P. Konidaris II, California Institute of Technology (USA); Robert M. Quimby, The Univ. of Tokyo (Japan); Chow-Choong Ngeow, Alexander Rudy, National Central Univ. (Taiwan) . . . . . [8446-316]

Simulations of a near-infrared precision radial velocity spectrograph for finding planets around M dwarfs, Ryan Terrien, Suvrath Mahadevan, Lawrence W. Ramsey, Chad F. Bender, The Pennsylvania State Univ. (USA); Fred R. Hearty, Univ. of Virginia (USA); Samuel Halverson, The Pennsylvania State Univ. (USA) . . . . . [8446-317]

KiwiSpec: an advanced multi-purpose and highly reconfigurable high resolution astronomical spectrograph, Stuart I. Barnes, Stuart Barnes Optical Design (New Zealand); Steve Gibson, Univ. of Canterbury (New Zealand) and Industrial Research Ltd. (New Zealand); Kathryn Nield, David M. Cochrane, Industrial Research Ltd. (New Zealand) . . . . . [8446-318]

Experimental results on wavefront correction using the self-coherent camera, Marion Mas, Pierre Baudoz, Johan Mazoyer, LESIA - Observatoire de Paris (France); Raphaël Galicher, National Research Council Canada (Canada); Gérard C. Rousset, LESIA - Observatoire de Paris (France). . . . . [8446-319]

Buckling failure of the automated planet finder spectrometer determinate spaceframe, Matthew V. Radovan, Gerald Cabak, Lee Laiterman, Univ. of California Observatories (USA) . . . . . [8446-320]

Coronagraphic phase diversity for exoplanet detection, Baptiste Paul, Jean-François Sauvage, Laurent Mugnier, ONERA (France); Mamadou N'Diaye, Kjetil Dohlen, Marc Ferrari, Observatoire Astronomique de Marseille-Provence (France); Thierry Fusco, ONERA (France) . . . . . [8446-321]

Dark hole and planet detection: laboratory results using the self-coherent camera, Pierre Baudoz, Marion Mas, Johan Mazoyer, Observatoire de Paris à Meudon (France); Raphaël Galicher, National Research Council Canada (Canada); Gérard C. Rousset, Observatoire de Paris à Meudon (France) . . . . . [8446-322]

Laboratory test of a polarimetry imaging subtraction system for the high-contrast imaging, Jiangpei Dou, Nanjing Institute of Astronomical Optics & Technology (China); Deqing Ren, California State Univ., Northridge (USA) and Nanjing Institute of Astronomical Optics & Technology (China); Yongtian Zhu, Xi Zhang, Xue Wang, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8446-323]

A passive cost-effective solution for the high accuracy wavelength calibration of radial velocity spectrographs, François P. Wildi, Bruno Chazelas, Francesco Pepe, Observatory of Geneva (Switzerland). . . . [8446-324]

Coronagraphic masks for ground-based detection, Miguel A. Cagigas, Pedro J. Valle, Manuel P. Cagigal, Univ. de Cantabria (Spain) . . . . . [8446-325]

Near-infrared calibration systems for precise radial-velocity measurements, Stephen L. Redman, National Institute of Standards and Technology (USA); Florian Kerber, European Southern Observatory (Germany); Gillian Nave, National Institute of Standards and Technology (USA); Suvrath Mahadevan, The Pennsylvania State Univ. (USA) and Ctr. for Exoplanets and Habitable Worlds (USA); Jonathan Smoker, Hans-Ulrich Käufl, European Southern Observatory (Chile); Pedro R. L. Figueira, Univ. do Porto (Portugal); Lawrence W. Ramsey, The Pennsylvania State Univ. (USA) . . . . . [8446-326]

Development of the Savart-plate lateral-shearing interferometric nuller for exoplanet (SPLINE), Naoshi Murakami, Manabu Kida, Naoshi Baba, Hokkaido Univ. (Japan); Taro Matsuo, National Astronomical Observatory of Japan (Japan); Takayuki Kotani, Japan Aerospace Exploration Agency (Japan); Hajime Kawahara, Tokyo Metropolitan Univ. (Japan); Yuka Fujii, The Univ. of Tokyo (Japan); Motohide Tamura, National Astronomical Observatory of Japan (Japan). . . . . [8446-327]

A grism spectrograph for observing transient events with small telescopes, Boris Zhilyaev, Main Astronomical Observatory, NASU (Ukraine); Oleksandr Sergeev, Maksym Andreev, Vira G. Godunova, ICAMER Observatory (Ukraine); Volodymyr Reshetnyk, National Taras Shevchenko Univ. of Kyiv (Ukraine); Volodymry Tarady, ICAMER Observatory (Ukraine) . . . . . [8446-328]

Optical fiber modal noise in the 0.8 to 1.5 micron region and implications for near infrared precision radial velocity measurements, Lawrence W. Ramsey, Keegan S. McCoy, Suvrath Mahadevan, Samuel Halverson, The Pennsylvania State Univ. (USA); Stephen L. Redman, National Institute of Standards and Technology (USA) . . . . . [8446-329]

A diamond AGPM coronagraph for VISIR, Christian Delacroix, Olivier Absil, Univ. de Liège (Belgium); Dimitri P. Mawet, European Southern Observatory (Chile); Charles Hanot, Univ. de Liège (Belgium); Mikael Karlsson, Uppsala Univ (Sweden); Pontus Forsberg, Uppsala Univ. (Sweden); Jean Surdej, Serge Habraken, Univ. de Liège (Belgium) . . . . . [8446-330]

Bayesian approach including instrument modeling for exoplanet detection, Marie Ygouf, Institut de Planétologie et d'Astrophysique de Grenoble (France) and ONERA (France); Laurent Mugnier, ONERA (France); David Mouillet, Jean-Luc Beuzit, Institut de Planétologie et d'Astrophysique de Grenoble (France); Thierry Fusco, ONERA (France) . . . . . [8446-331]

SPHERE coronagraphs: comparing AITs performance to simulations., Patrice Martinez, Institut de Planétologie et d'Astrophysique de Grenoble (France); Anthony Boccaletti, LESIA - Observatoire de Paris (France); Kjetil Dohlen, Observatoire Astronomique de Marseille-Provence (France); Anne Costille, Institut de Planétologie et d'Astrophysique de Grenoble (France); Arthur Vigan, Univ. of Exeter (United Kingdom); Maud P. Langlois-Moretto, Ctr. de Recherche Astronomique de Lyon (France); Claire Moutou, Observatoire Astronomique de Marseille-Provence (France); Lyu Abe, Lab. J.L. Lagrange (France) . . . . . [8446-332]

The IFS of SPHERE: integration and laboratory performances, Riccardo U. Claudi, Enrico Giro, Raffaele Gratton, Dino Mesa, INAF - Osservatorio Astronomico di Padova (Italy); Massimo Turatto, INAF - Osservatorio Astronomico di Trieste (Italy); Umberto Anselmi, Andrea Baruffolo, INAF - Osservatorio Astronomico di Padova (Italy); Pietro Bruno, INAF - Osservatorio Astrofisico di Catania (Italy); Enrico Cascone, Vincenzo De Caprio, INAF - Osservatorio Astronomico di Capodimonte (Italy); Silvano Desidera, INAF - Osservatorio Astronomico di Padova (Italy); Reinhold J. Dorn, European Southern Observatory (Germany); Daniela Fantinel, Giancarlo Farisato, INAF - Osservatorio Astronomico di Padova (Italy); Gert Finger, European Southern Observatory (Germany); Luigi Lessio, INAF - Osservatorio Astronomico di Padova (Italy); Jean-Louis Lizon, European Southern Observatory (Germany); Emilio Sant'Ambrogio, INAF - IASF Milano (Italy); Bernardo Salasnich, INAF - Osservatorio Astronomico di Padova (Italy); Salvatore Scuderi, INAF - Osservatorio Astrofisico di Catania (Italy); François P. Wildi, Observatory of Geneva (Switzerland); Jean-Luc Beuzit, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Kjetil Dohlen, Observatoire Astronomique de Marseille-Provence (France); Pascal Puget, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Norbert Hubin, Markus Kasper, European Southern Observatory (Germany) . . . . . [8446-333]

Calibration of an echelle spectrograph with an astro-comb: a laser frequency comb with very high repetition rate, David F. Phillips, Alexander G. Glenday, Chih-Hao Li, Gabor Furesz, Sylvain Korzennik, Dimitar D. Sasselov, Andrew H. Szentgyorgyi, Harvard-Smithsonian Ctr. for Astrophysics (USA); Andrew J. Benedick, Guoqing Chang, Li-Jin Chen, Massachusetts Institute of Technology (USA); Franz X. Kärtner, DESY (Germany) and Massachusetts Institute of Technology (USA); Ronald L. Walsworth, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8446-335]

TMAS: the ten milli-arcsecond per pixel camera, Sergi R. Hildebrandt, Richard G. Dekany, Jennifer W. Milburn, Jack T. C. Davis, Ernest E. Croner, California Institute of Technology (USA) . . . . . [8446-336]

Development of a new precision near-infrared Doppler wavelength reference, Samuel Halverson, Suvrath Mahadevan, Lawrence W. Ramsey, Ryan Terrien, The Pennsylvania State Univ. (USA). . . . . [8446-337]

Design, performance, and commissioning results from a new generation compact very high Doppler precision optical spectrograph, Jian Ge, Bo Zhao, Scott Powell, Liang Chang, Adam Fletcher, Xiaoke Wan, Univ. of Florida (USA) . . . . . [8446-338]

SPHERE-IRDIS development in Europe: a final update and performance report, David Le Mignant, Kjetil Dohlen, Claire Moutou, Observatoire Astronomique de Marseille-Provence (France); Maud P. Langlois-Moretto, Ctr. de Recherche Astronomique de Lyon (France); Patrick Blanchard, Michael Carle, Marc Jaquet, Fabrice Madec, Cécile Gry, Alain Origné, Arthur Vigan, Observatoire Astronomique de Marseille-Provence (France); Laurence Gluck, Anne Costille, Patrice Martinez, Institut de Planétologie et d'Astrophysique de Grenoble (France); Jean-Charles Meunier, Franck Ducret, Observatoire Astronomique de Marseille-Provence (France); Pascal Puget, David Mouillet, Jean-Luc Beuzit, Institut de Planétologie et d'Astrophysique de Grenoble (France); François Wildi, Observatory of Geneva (Switzerland) . . . . . [8446-339]

Extreme Doppler precision with octagonal fiber scramblers, Julien F. P. Spronck, Zachary Kaplan, Debra A. Fischer, Christian Schwab, Andrew E. Szymkowiak, Yale Univ. (USA) . . . . . [8446-340]

Stop-less Lyot coronagraph for exoplanet characterization, Arthur Vigan, Univ. of Exeter (United Kingdom); Mamadou N'Diaye, Kjetil Dohlen, Observatoire Astronomique de Marseille-Provence (France) . . . . . [8446-341]

The ZIMPOL high contrast imaging polarimeter for SPHERE: high-contrast laboratory results, Ronald Roelfsema, ASTRON (Netherlands); Daniel Gisler, ETH Zurich (Switzerland); Johannes H. Pragt, ASTRON (Netherlands); Hans-Martin Schmid, Andreas Bazzon, ETH Zurich (Switzerland); Matthew A. Kenworthy, Leiden Observatory (Netherlands); Carsten Dominik, Univ. van Amsterdam (Netherlands); Andrea Baruffolo, INAF - Osservatorio Astronomico di Padova (Italy); Anthony Boccaletti, LESIA - Observatoire de Paris (France); Jean-Luc Beuzit, Univ. Joseph Fourier (France); Kjetil Dohlen, Observatoire Astronomique de Marseille-Provence (France); Mark Downing, European Southern Observatory (Germany); Eddy J. Elswijk, Menno de Haan, ASTRON (Netherlands); Norbert Hubin, Markus Kasper, European Southern Observatory (Germany); Christoph U. Keller, Leiden Observatory (Netherlands); Jean-Louis Lizon, European Southern Observatory (Germany); David Mouillet, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Alexey Pavlov, Max-Planck-Institut für Astronomie (Germany); Pascal Puget, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Florence Rigal, ASTRON (Netherlands); Bernardo Salasnich, INAF - Osservatorio Astronomico di Padova (Italy); Frans Snik, Leiden Observatory (Netherlands); Christian Thalmann, Univ. van Amsterdam (Netherlands); Francois Wildi, Observatory of Geneva (Switzerland) . . . . . [8446-342]

Performance of the integral field spectrograph for the Gemini Planet Imager, Jeffrey Chilcote, James E. Larkin, Univ. of California, Los Angeles (USA); Marshall D. Perrin, Space Telescope Science Institute (USA); Jérôme Maire, Dunlap Institute for Astronomy & Astrophysics (Canada); Michael P. Fitzgerald, Univ.of California, Los Angeles (USA); René Doyon, Univ. de Montréal (Canada) . . . . . [8446-343]

Green astro-comb for HARPS-North, Chih-Hao Li, Alexander G. Glenday, David F. Phillips, Harvard-Smithsonian Ctr. for Astrophysics (USA); Guoqing Chang, Andrew J. Benedick, Massachusetts Institute of Technology (USA); Li-Jin Chen, Thorlabs Inc. (USA); Gabor Furesz, Nick Langellier, Dimitar D. Sasselov, Harvard-Smithsonian Ctr. for Astrophysics (USA); Franz X. Kärtner, Massachusetts Institute of Technology (USA); Andrew H. Szentgyorgyi, Ronald L. Walsworth, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8446-344]

Tests of the demodulating CCDs for the SPHERE / ZIMPOL imaging polarimeter, Hans-Martin Schmid, ETH Zurich (Switzerland); Mark Downing, European Southern Observatory (Germany); Ronald Roelfsema, ASTRON (Netherlands); Andreas Bazzon, Daniel Gisler, ETH Zurich (Switzerland); Johannes H. Pragt, ASTRON (Netherlands); Claudio Cumani, European Southern Observatory (Germany); Alexey Pavlov, Max-Planck-Institut für Astronomie (Germany); Andrea Baruffolo, INAF - Osservatorio Astronomico di Padova (Italy); Jean-Luc Beuzit, Anne Costille, Univ. Joseph Fourier (France); Sebastian Deiries, European Southern Observatory (Germany); Kjetil Dohlen, Observatoire Astronomique de Marseille-Provence (France); Carsten Dominik, Univ. van Amsterdam (Netherlands); Eddy J. Elswijk, ASTRON (Netherlands); Markus Feldt, Max-Planck-Institut für Astronomie (Germany); Markus Kasper, European Southern Observatory (Germany); David Mouillet, Univ Joseph Fourier (France); Bernardo Salasnich, INAF - Osservatorio Astronomico di Padova (Italy); Peter Steiner, ETH Zurich (Switzerland); Christian Thalmann, Univ. van Amsterdam (Netherlands); François Wildi, Observatory of Geneva (Switzerland) . . [8446-345]

Fiber scrambling for precise radial velocities at Lick and Keck Observatories, Julien F. P. Spronck, Debra A. Fischer, Zachary Kaplan, Christian Schwab, Yale Univ. (USA) . . . . . [8446-346]

Astrometric characterization of the Gemini Planet Imager, Quinn M. Konopacky, Univ. of Toronto (Canada); Bruce A. Macintosh, Lawrence Livermore National Lab. (USA); Sandrine J. Thomas, Gemini Observatory (USA); Daren Dillon, Daniel Fabrycky, Univ. of California, Santa Cruz (USA); James R. Graham, Dunlap Institute for Astronomy & Astrophysics (Canada); Jeffrey Chilcote, Univ. of California, Los Angeles (USA); Jérôme Maire, Dunlap Institute for Astronomy & Astrophysics (Canada); Michael P. Fitzgerald, Univ. of California, Los Angeles (USA); Raphaël Galicher, National Research Council Canada (Canada); Paul R. Kalas, Univ. of California, Berkeley (USA); Christian Marois, National Research Council Canada (Canada); Ben R. Oppenheimer, American Museum of Natural History (USA); Michael Shao, Jet Propulsion Lab. (USA); Anand Sivaramakrishnan, Space Telescope Science Institute (USA) . . . . . [8446-347]

Polarimetric performance of the Gemini Planet Imager, Sloane J. Wiktorowicz, Univ. of California, Santa Cruz (USA) and Univ. of California, Berkeley (USA); Maxwell Millar-Blanchaer, Dunlap Institute for Astronomy & Astrophysics (Canada); James R. Graham, Dunlap Institute for Astronomy & Astrophysics (Canada) and Univ. of California, Berkeley (USA); Marshall D. Perrin, Space Telescope Science Institute (USA); Sandrine J. Thomas, Daren Dillon, Univ. of California, Santa Cruz (USA); Michael P. Fitzgerald, Univ. of California, Los Angeles (USA); Jérôme Maire, Dunlap Institute for Astronomy & Astrophysics (Canada); Bruce A. Macintosh, Lawrence Livermore National Lab. (USA); Stephen J. Goodsell, Gemini Observatory (USA). . . . . [8446-348]

A testbed for simultaneous measurement of fiber near and far fied for the evaluation of fiber scrambling properties, Frank U. Grupp, Univ.-Sternwarte München (Germany) and Max Planck Institut für extraterrestische Physik (Germany); Tobias Feger, Univ.-Sternwarte München (Germany); Anna Brucalassi, Max Planck Institute for Extraterrestrial Physics (Germany); Ronald Holzwarth, Menlo Systems GmbH (Germany); Thomas Udem, Max-Planck-Institut für Quantenoptik (Germany); Florian Lang-Bardl, Univ.-Sternwarte München (Germany); Ralf Bender, Univ.-Sternwarte München (Germany) and Max Planck Institut für extraterrestische Physik (Germany) . . . . . [8446-349]

SPHERE / ZIMPOL: laboratory tests of the optical polarization components, Andreas Bazzon, Daniel Gisler, ETH Zurich (Switzerland); Ronald Roelfsema, ASTRON (Netherlands); Hans-Martin Schmid, ETH Zurich (Switzerland); Johannes H. Pragt, Eddy J. Elswijk, Menno de Haan, ASTRON (Netherlands); Mark Downing, European Southern Observatory (Germany); Bernardo Salasnich, INAF - Osservatorio Astronomico di Padova (Italy); Alexey Pavlov, Max-Planck-Institut für Astronomie (Germany); Jean-Luc Beuzit, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Kjetil Dohlen, Observatoire Astronomique de Marseille-Provence (France); David Mouillet, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); François Wildi, Observatory of Geneva (Switzerland) . . . . . [8446-350]

Two Fabry-Perot interferometers for high precision wavelength calibration in the near-infrared, Sebastian Schäfer, Ansgar Reiners, Georg-August-Univ. Göttingen (Germany) . . . . . [8446-351]

Investigating spectrograph design parameters with the Yale Doppler diagnostic facility, Christian Schwab, Julien F. P. Spronck, Debra A. Fischer, Andrew E. Szymkowiak, Yale Univ. (USA). . . . . [8446-353]

High-resolution Fourier transform spectrograph for characterization of echelle spectrograph wavelength calibrators, Alexander G. Glenday, David F. Phillips, Harvard-Smithsonian Ctr. for Astrophysics (USA); Matthew Webber, Northeastern Univ. (USA); Chih-Hao Li, Gabor Furesz, Harvard-Smithsonian Ctr. for Astrophysics (USA); Guoqing Chang, Li-Jin Chen, Massachusetts Institute of Technology (USA); Franz X. Kärtner, DESY (Germany) and Massachusetts Institute of Technology (USA); Dimitar D. Sasselov, Andrew H. Szentgyorgyi, Ronald L. Walsworth, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8446-354]

Alignment of the SPHERE/ZIMPOL imaging polarimeter, Johannes H. Pragt, Ronald Roelfsema, ASTRON (Netherlands); Daniel Gisler, ETH Zurich (Switzerland); Francois Wildi, Observatory of Geneva (Switzerland); Hans-Martin Schmid, ETH Zurich (Switzerland); Florence Rigal, Eddy J. Elswijk, Menno de Haan, ASTRON (Netherlands); Andreas Bazzon, ETH Zurich (Switzerland); Kjetil Dohlen, Observatoire Astronomique de Marseille-Provence (France); Anne Costille, Institut de Planétologie et d'Astrophysique de Grenoble (France); Carsten Dominik, Univ. van Amsterdam (Netherlands) . . . . . [8446-355]

SPHERE-IRDIS assembly, integration and testing: from bits and metal to a planet-hunting machine, Fabrice Madec, Michael Carle, Patrick Blanchard, Marc Jaquet, Alain Origné, David Le Mignant, Kjetil Dohlen, Rudy Barette, Gabriel Moreaux, Gilles Arthaud, Didier Ferrand, Jean-Claude Blanc, Patrick Vors, Observatoire Astronomique de Marseille-Provence (France); Laurence Gluck, Institut de Planétologie et d'Astrophysique de Grenoble (France); Michel Saisse, Christophe Fabron, Philippe Laurent, Jean-Antoine Benedetti, William Bon, Marc Llored, Claire Moutou, Cécile Gry, Jean-Charles Meunier, Arthur Vigan, Lucien Hill, Observatoire Astronomique de Marseille-Provence (France); Maud P. Langlois-Moretto, Ctr. de Recherche Astronomique de Lyon (France); Vianak Naranjo, Max-Planck-Institut für Astronomie (Germany); Roland Brast, European Southern Observatory (Germany); Markus Feldt, Max-Planck-Institut für Astronomie (Germany); Dan Popovic, European Southern Observatory (Germany) . . . . . [8446-356]

First laboratory results of SPHERE/IRDIS dual-band imaging and long slit spectroscopy modes, Arthur Vigan, Univ. of Exeter (United Kingdom); Maud P. Langlois-Moretto, Ctr. de Recherche Astronomique de Lyon (France); Patrice Martinez, Institut de Planétologie et d'Astrophysique de Grenoble (France); David Le Mignant, Kjetil Dohlen, Claire Moutou, Cécile Gry, Fabrice Madec, Lab. d'Astrophysique de Marseille (France) . . . . . [8446-357]

Performance evaluation of the SPHERE/IRDIS classical imaging mode in laboratory conditions, Patrice Martinez, Institut de Planétologie et d'Astrophysique de Grenoble (France); Maud P. Langlois-Moretto, Ctr. de Recherche Astronomique de Lyon (France); Arthur Vigan, Univ. of Exeter (United Kingdom); David Le Mignant, Kjetil Dohlen, Claire Moutou, Cécile Gry, Fabrice Madec, Observatoire Astronomique de Marseille-Provence (France) . [8446-358]

High contrast polarimetry in the infrared with SPHERE on the VLT, Maud P. Langlois-Moretto, Ctr. de Recherche Astronomique de Lyon (France); Kjetil Dohlen, Alain Origné, Observatoire Astronomique de Marseille-Provence (France); Hans-Martin Schmid, ETH Zurich (Switzerland); Claire Moutou, David Le Mignant, Observatoire Astronomique de Marseille-Provence (France); Anne Costille, Institut de Planétologie et d'Astrophysique de Grenoble (France); Francois Wildi, Observatory of Geneva (Switzerland) . . . . . [8446-359]

Adaptive Optics Systems III


Ellerbroek


Marchetti


Véran

Conference Chairs: **Brent L. Ellerbroek,** Thirty Meter Telescope (USA); **Enrico Marchetti,** European Southern Observatory (Germany); **Jean-Pierre Véran,** National Research Council Canada (Canada)

Program Committee: **Laird M. Close,** The Univ. of Arizona (USA); **Rodolphe Conan,** The Australian National Univ. (Australia); **Emiliano Diolaiti,** INAF - Osservatorio Astronomico di Bologna (Italy); **Thierry Fusco,** ONERA (France); **Donald T. Gavel,** Univ. of California, Santa Cruz (USA); **Michael Hart,** The Univ. of Arizona (USA); **Yutaka Hayano,** Subaru Telescope, National Astronomical Observatory of Japan (USA); **Glen Herriot,** National Research Council Canada (Canada); **Norbert Hubin,** European Southern Observatory (Germany); **Markus Kasper,** European Southern Observatory (Germany); **Caroline Kulcsar,** Univ. Paris 13 (France); **Anne-Marie Lagrange,** Lab. d'Astrophysique de l'Observatoire de Grenoble (France); **Bruce A. Macintosh,** Lawrence Livermore National Lab. (USA); **Pierre-Yves Madec,** European Southern Observatory (Germany); **Richard M. Myers,** Durham Univ. (United Kingdom); **Armando Riccardi,** INAF - Osservatorio Astrofisico di Arcetri (Italy); **Francois Rigaut,** Gemini Observatory (Chile); **Andrei A. Tokovinin,** National Optical Astronomy Observatory (USA); **Mitchell Troy,** Jet Propulsion Lab. (USA); **Peter L. Wizinowich,** W. M. Keck Observatory (USA)

Sunday 1 July

SESSION 1

Room: Emerald . . . . . Sun. 09.00 to 10.20

Project Status I

Session Chair: **Peter L. Wizinowich,** W. M. Keck Observatory (USA)

09.00: **Status of the ARGOS ground layer adaptive optics system**, Wolfgang Gässler, Max-Planck-Institut für Astronomie (Germany); Sebastian Rabien, Max-Planck-Institut für extraterrestrische Physik (Germany); Simone Esposito, INAF - Osservatorio Astrofisico di Arcetri (Italy); Michael Lloyd-Hart, The Univ. of Arizona (USA); Lothar Barl, Max-Planck-Institut für extraterrestrische Physik (Germany); Udo Beckmann, Max-Planck-Institut für Radioastronomie (Germany); Thomas Bluemchen, Max-Planck-Institut für Astronomie (Germany); Marco Bonaglia, INAF - Osservatorio Astrofisico di Arcetri (Italy); José Luis Borelli, Max-Planck-Institut für Astronomie (Germany); Guido Brusa, Joar G. Brynnel, Large Binocular Telescope Observatory (USA); Peter Buschkamp, Max-Planck-Institut für extraterrestrische Physik (Germany); Lorenzo Busoni, Luca Carbonaro, INAF - Osservatorio Astrofisico di Arcetri (Italy); Claus Connot, Max-Planck-Institut für Radioastronomie (Germany); Richard I. Davies, Matthias Deysenroth, Max-Planck-Institut für extraterrestrische Physik (Germany); Olivier Durney, The Univ. of Arizona (USA); Richard F. Green, Large Binocular Telescope Observatory (USA); Hans Gemperlein, Max-Planck-Institut für extraterrestrische Physik (Germany); Victor Gasho, The Univ. of Arizona (USA); Marcus Haug, Max-Planck-Institut für extraterrestrische Physik (Germany); Pete Hubbard, The Univ. of Arizona (USA); Sebastian Ihle, Max-Planck-Institut Halbleiterlabor (Germany); et al. . . . . [8447-01]

09.20: **'Imaka: working towards very wide-field of view AO**, Mark R. Chun, Univ. of Hawai'i (USA); Olivier Lai, Jean-Charles J. Cuillandre, Canada-France-Hawaii Telescope (USA); Harvey B. Richer, The Univ. of British Columbia (Canada); Derrick Salmon, Canada-France-Hawaii Telescope (USA); Raymond G. Carlberg, Univ. of Toronto (Canada); Denis Burgarella, Observatoire Astronomique de Marseille-Provence (France); Douglas W. Toomey, Mauna Kea Infrared LLC (USA); Kevin K. Ho, Canada-France-Hawaii Telescope (USA); David R. Andersen, National Research Council Canada (Canada) . . . . . [8447-02]

09.40: **Wide-field adaptive optics for Subaru Telescope**, Yutaka Hayano, Subaru Telescope, National Astronomical Observatory of Japan (USA); Masayuki Akiyama, Tohoku Univ. (Japan); Tadayuki Kodama, Yosuke Minowa, Tetsuo Nishimura, Subaru Telescope, National Astronomical Observatory of Japan (USA); Yoshito Ono, Tohoku Univ. (Japan); Shin Oya, Hideki Takami, Subaru Telescope, National Astronomical Observatory of Japan (USA); Naruhisa Takato, Subaru Telescope, National Astronomical Observatory of Japan . (USA); Naoyuki Tamura, Hiroshi Terada, Daigo Tomono, Tomonori Usuda, Subaru Telescope, National Astronomical Observatory of Japan (USA) . . . . . [8447-03]

10.00: **Robo-AO: autonomous and replicable laser-adaptive-optics and science system**, Christoph Baranec, Reed L. Riddle, California Institute of Technology (USA); Anamparambu N. Ramaprakash, Inter-Univ. Ctr. for Astronomy (India); Nicholas M. Law, Dunlap Institute for Astronomy & Astrophysics (Canada); Shriharsh Tendulkar, Shrinivas R. Kulkarni, Richard G. Dekany, Khanh Bui, Jack T. C. Davis, California Institute of Technology (USA); Mahesh P. Burse, Hillol Das, Inter-Univ. Ctr. for Astronomy (India); Sergi R. Hildebrandt, Roger M. Smith, California Institute of Technology (USA) . [8447-04]

Coffee Break . . . . . 10.20 to 10.50

SESSION 2

Room: Emerald . . . . . Sun. 10.50 to 12.20

Wavefront Correctors I

Session Chair: **Armando Riccardi,**
INAF - Osservatorio Astrofisico di Arcetri (Italy)

10.50: **Overview of deformable mirror technologies for adaptive optics and astronomy** *(Invited Paper)*, Pierre-Yves Madec, European Southern Observatory (Germany) . . . . . [8447-05]

11.20: **TMT DMs final design and advanced prototyping results at Cilas**, Jean-Christophe Sinquin, Arnaud Bastard, CILAS (France); Corinne Boyer, Thirty Meter Telescope Observatory Corp. (USA); Raphael Cousty, CILAS (France); Brent L. Ellerbroek, Thirty Meter Telescope Observatory Corp. (USA); Claude Guillemard, CILAS (France); Glen Herriot, National Research Council Canada (Canada); Albert Iannacone, Hubert Pagès, CILAS (France); Lianqi Wang, Thirty Meter Telescope Observatory Corp. (USA). . . . . [8447-06]

11.40: **Low-cost unimorph deformable mirror with high actuator count for astronomical adaptive optics**, Jianqiang Ma, Ying Liu, Hao Rong, Baoqing Li, Jiaru Chu, Univ. of Science and Technology of China (China) . . . . . [8447-07]

12.00: **The actuator design and the experimental tests of a new technology large deformable mirror for visible wavelengths adaptive optics**, Ciro Del Vecchio, Guido Agapito, Carmelo Arcidiacono, Luca Carbonaro, INAF - Osservatorio Astrofisico di Arcetri (Italy); Fabrizio Marignetti, Enzo De Santis, Univ. degli Studi di Cassino (Italy); Valdemaro Biliotti, Armando Riccardi, INAF - Osservatorio Astrofisico di Arcetri (Italy) . . . . . [8447-08]

Lunch Break . . . . . 12.20 to 13.30

SESSION 3

Room: Emerald . . . . . Sun. 13.30 to 15.30

Quantitative Astronomy and Science with AO I

Session Chair: **Anne-Marie Lagrange,**
Lab. d'Astrophysique de l'Observatoire de Grenoble (France)

13.30: **Extragalactic science with adaptive optics** *(Invited Paper)*, Richard I. Davies, Max-Planck-Institut für extraterrestrische Physik (Germany). . . [8447-09]

14.00: **Adaptive optics observations of the galactic center** *(Invited Paper)*, Sylvana Yelda, Andrea M. Ghez, Mark Morris, Leo Meyer, Univ. of California, Los Angeles (USA); Jessica Lu, Univ. of Hawai'i (USA); Tuan Do, Univ. of California, Irvine (USA) . . . . . [8447-10]

14.30: **Adaptive optics for high contrast imaging** *(Invited Paper)*, Markus Kasper, European Southern Observatory (Germany) . . . . . [8447-11]

15.00: **Quantitative solar system science with AO systems** *(Invited Paper)*, Franck Marchis, SETI Institute (USA) . . . . . [8447-12]

Coffee Break . . . . . 15.30 to 16.00

SESSION 4

Room: Emerald . . . . . Sun. 16.00 to 18.00

Laser Systems

Session Chair: **Francois Rigaut,** Gemini Observatory (Chile)

16.00: **Progress in laser guide star adaptive optics and lessons learned** *(Invited Paper)*, Peter L. Wizinowich, W. M. Keck Observatory (USA) . . [8447-13]

16.30: **An overview of guidestar laser technologies** *(Invited Paper)*, Donald T. Gavel, Univ. of California, Santa Cruz (USA). . . . . [8447-14]

17.00: **RFA-based 589-nm guide star lasers for ESO VLT: a paradigm shift in performance, operational simplicity, reliability, and maintenance**, Axel Friedenauer, Bernhard Ernstberger, Wilhelm G. Kaenders, TOPTICA Photonics AG (Germany); Vladimir I. Karpov, Daoping Wei, Wallace R. L. Clements, MPB Communications Inc. (Canada). . . . . [8447-15]

17.20: **Towards a practical sodium guide star laser source: design for >50 watt LGS based on OPSL**, Juan L. A. Chilla, Jill D. Berger, Sergei Govorkov, Joris F. P. van Nunen, Arnaud Y. Lepert, Coherent, Inc. (USA) . . . . . [8447-16]

17.40: **Simulations of pulsed sodium laser guide stars: an overview,** Ronald Holzlöhner, European Southern Observatory (Germany); Simon M. Rochester, Rochester Scientific, LLC (USA); Domenico Bonaccini Calia, European Southern Observatory (Germany); Dmitry Budker, Univ. of California, Berkeley (USA) and Rochester Scientific, LLC (USA); Thomas Pfrommer, European Southern Observatory (Germany); James M. Higbie, Bucknell Univ. (USA) . . . . . [8447-17]

POSTERS-SUNDAY

Room: Hall 3. . . . . Sun. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Sunday. The interactive poster session with authors in attendance will be Sunday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

Advances in AO Control

The wavefront correction control system for the Advanced Technology Solar Telescope (ATST), Ellyne K. Kinney, Kit Richards, Luke C. Johnson, Thomas R. Rimmele, Samuel C. Barden, National Solar Observatory (USA) . . . . . [8447-94]

Adaptive optics real time processing design for the advanced technology solar telescope, Kit Richards, Luke C. Johnson, Ellyne K. Kinney, Samuel C. Barden, Thomas R. Rimmele, National Solar Observatory (USA) . . . . . [8447-95]

The Robo-AO software: autonomous operation of a laser guide star adaptive optics system, Reed L. Riddle, California Institute of Technology (USA); Mahesh P. Burse, Inter-Univ. Ctr. for Astronomy (India); Shriharsh Tendulkar, Christoph Baranec, California Institute of Technology (USA); Anamparambu N. Ramaprakash, Inter-Univ. Ctr. for Astronomy (India); Nicholas M. Law, Univ. of Toronto (Canada); Richard G. Dekany, California Institute of Technology (USA); Alexander S. Rudy, National Central Univ. (Taiwan); Marland Sitt, Stanford Univ. (USA); Ankit Arya, Mississippi State Univ. (USA); Athanasios Papadopoulos, Aristotle Univ. of Thessaloniki (Greece) . . . . . [8447-96]

Recent development in real time control system of Subaru LGSAO-188, Masayuki Hattori, Yutaka Hayano, Shin Oya, Yosuke Minowa, Mai Shirahata, Subaru Telescope, National Astronomical Observatory of Japan (USA); Hideki Takami, Subaru Telescope, National Astronomical Observatory of Japan (USA) and National Astronomical Observatory of Japan (Japan); Masanori Iye, National Astronomical Observatory of Japan (Japan) . . . . . [8447-97]

SPARTA for the VLT: status and plans, Marcos Suarez Valles, Enrico Fedrigo, Robert H. Donaldson, Christian Soenke, Stefano Zampieri, Reynald Bourtembourg, Helmut Tischer, European Southern Observatory (Germany) . . . . . [8447-98]

FPGA-based real time controller for high order correction in EDIFISE, Luis F. Rodríguez-Ramos, Haresh M. Chulani, Yolanda Martín-Hernando, Taho Dorta, Angel Alonso-Sánchez, Jesús Jimenez Fuensalida, Instituto de Astrofísica de Canarias (Spain) . . . . . [8447-99]

An AO real-time control solution for ELT scale instrumentation and application to EAGLE, Alastair G. Basden, Nigel A. Dipper, Richard M. Myers, Edward J. Younger, Durham Univ. (United Kingdom) . . . . . [8447-100]

Operation of the adaptive optics system at the Large Binocular Telescope, Douglas L. Miller, Juan Carlos Guerra Ramon, Konstantina Boutsia, Large Binocular Telescope Observatory (USA); Luca Fini, Javier Argomedo, INAF - Osservatorio Astrofisico di Arcetri (Italy); Christopher Biddick, Large Binocular Telescope Observatory (USA); Guido Agapito, Carmelo Arcidiacono, Runa Briguglio, INAF - Osservatorio Astrofisico di Arcetri (Italy); Guido Brusa, Large Binocular Telescope Observatory (USA); Lorenzo Busoni, Simone Esposito, INAF - Osservatorio Astrofisico di Arcetri (Italy); John M. Hill, Large Binocular Telescope Observatory (USA); Craig A. Kulesa, Donald W. McCarthy, Jr., Steward Observatory (USA); Enrico Pinna, Alfio T. Puglisi, Fernando Quirós-Pacheco, Marco Xompero, INAF - Osservatorio Astrofisico di Arcetri (Italy) . . . . . [8447-101]

Pupil rotation compensation for LINC-NIRVANA, Matthieu Brangier, Albert R. Conrad, Thomas Bertram, Xianyu Zhang, Jürgen Berwein, Florian Briegel, Thomas M. Herbst, Max-Planck-Institut für Astronomie (Germany); Roberto Ragazzoni, INAF - Osservatorio Astronomico di Padova (Italy) . . . . . [8447-102]

FOAM: modular adaptive optics framework, Tim van Werkhoven, Leiden Observatory (Netherlands); Laurens Homs, Utrecht Univ. (Netherlands); Michiel Rodenhuis, Christoph U. Keller, Leiden Observatory (Netherlands) . . . [8447-103]

General purpose computer cluster for real-time adaptive optics, Julien Charton, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Mathieu Westphal, Philippe Guiseppelli, Institut de Planétologie et d'Astrophysique de Grenoble (France) . . . . . [8447-104]

Multivariate simplex B-splines for large scale wavefront reconstruction, Coen C. de Visser, Rufus Fraanje, Michel Verhaegen, Technische Univ. Delft (Netherlands) . . . . . [8447-105]

LQG control performance with the CANARY MOAO pathfinder, Gaetano Sivo, Univ. Paris 13 (France) and ONERA (France); Caroline Kulcsar, Univ. Paris 13 (France); Jean-Marc Conan, ONERA (France); Henri-François G. Raynaud, Univ. Paris 13 (France); Eric Gendron, Fabrice Vidal, LESIA - Observatoire de Paris (France); Alastair G. Basden, Durham Univ. (United Kingdom) . . [8447-106]

Fixed and scheduled LQG control of an adaptive optics system, Jean-Pierre Folcher, Marcel Carbillet, Univ. de Nice Sophia Antipolis (France). . . . [8447-107]

High performance AO control for time-variant wavefront distortions, Niek Doelman, TNO (Netherlands). . . . . [8447-108]

Infinite impulse response modal filtering in visible adaptive optics, Guido Agapito, Carmelo Arcidiacono, Fernando Quiros-Pacheco, Alfio T. Puglisi, Simone Esposito, INAF - Osservatorio Astrofisico di Arcetri (Italy). . . . [8447-109]

On application of constrained receding horizon control in astronomical adaptive optics, Mikhail V. Konnik, James Welsh, The Univ. of Newcastle (Australia). . . . . [8447-110]

Analysis and experimental demonstration of adaptive optics based on the modal control optimization, Bang Ming Li, Changwei Li, Nanjing Institute of Astronomical Optics & Technology (China); Jia Peng, Nanjing Univ. (China); Sijiong Zhang, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8447-111]

Mitigation of transient meteor events in sodium layer by TMT NFIRAOS, Glen Herriot, National Research Council Canada (Canada); Craig Irvin, Univ. of Victoria (Canada) . . . . . [8447-112]

Experimental test of wavefront forecasting for adaptive optics, Marco Stangalini, Roberto Piazzesi, Luca Giovannelli, Dario Del Moro, Francesco Berrilli, Univ. degli Studi di Roma Tor Vergata (Italy). . . . . [8447-113]

Monday 2 July

PLENARY SESSION

Room: Auditorium . . . . . Mon. 08.50 to 10.00

Session Chair: **Mark M. Casali,**
European Southern Observatory (Germany)

08.50: **Introduction**

09.00: **James Webb Space Telescope: science update and status** *(Presentation Only)*, Heidi B. Hammel, AURA, Inc. (USA) . . . . . [8442-501]

09.30: **Exoplanets: unraveling a new paradigm** *(Presentation Only)*, Didier Queloz, Geneva Univ., Observatory of Geneva (Switzerland) . . . . . [8442-502]

Coffee Break . . . . . 10.00 to 10.30

SESSION 5

Room: Emerald . . . . . Mon. 10.30 to 12.20

Project Status II

Session Chair: **Glen Herriot,**
National Research Council Canada (Canada)

10.30: **GeMS: first on-sky results** *(Invited Paper)*, Francois Rigaut, Benoît Neichel, Maxime Boccas, Celine d'Orgeville, Gustavo Arriagada, Vincent Fesquet, Sarah J. Diggs, Claudio Marchand, Gaston Gausach, Gemini Observatory (Chile); Matthieu Bec, Gelys Trancho, Giant Magellan Telescope Project (USA); William N. Rambold, Javier Lurhs, Shane Walker, Eleazar R. Carrasco, Michelle L. Edwards, Peter Pessev, Ramon L. Galvez, Tomislav B. Vucina, Claudio Arraya, Alejandro Gutierrez, Angelic W. Ebbers, Andrew Serio, Cristian Moreno, Cristian Urrutia, Rolando Rogers, Roberto Rojas, Chadwick Trujillo, Gemini Observatory (Chile); Peter McGregor, The Australian National Univ. (Australia); Peter J. Young, The Australian National Univ. (Australia); Brent L. Ellerbroek, Thirty Meter Telescope Observatory Corp. (USA); Damien Gratadour, LESIA - Observatoire de Paris (France); Aurea Garcia-Rissmann, Bryan Miller, Douglas A. Simons, Ariel Lopez, Vanessa Montes, Gemini Observatory (Chile); Michael Sheehan, Giant Magellan Telescope Project (USA); Herman Diaz, Gemini Observatory (Chile); Matthew C. Doolan, Jan van Harmelen, The Australian National Univ. (Australia); Felipe Daruich, Felipe Colazo, Gemini Observatory (Chile). . . . . [8447-18]

11.00: **The ESO adaptive optics facility: integration completed and readiness for system tests** *(Invited Paper)*, Robin Arsenault, Pierre-Yves Madec, Jérome Paufique, Paolo La Penna, Stefan Ströbele, Elise Vernet, Jean-Francois Pirard, Wolfgang K. Hackenberg, Harald Kuntschner, Lieselotte Jochum, Johann Kolb, Nicolas Muller, Miska Le Louarn, Paola Amico, Clémentine Béchet, Norbert Hubin, Jean-Louis Lizon, Rob Ridings, Jose A. Abad, Gerhard Fischer, Volker Heinz, Mario Kiekebusch, Ralf D. Conzelmann, Sebastien Tordo, Robert H. Donaldson, Christian Soenke, Philippe Duhoux, Enrico Fedrigo, Bernard Delabre, Andreas Jost, Michel Duchateau, Mark Downing, Javier Reyes Moreno, Antonio Manescau, Domenico Bonaccini Calia, Marco Quattri, Christophe Dupuy, Ivan M. Guidolin, Mauro Comin, Ronald Guzman, Bernard Buzzoni, Jutta Quentin, Steffan A. Lewis, European Southern Observatory (Germany); Roberto Biasi, Microgate S.r.l. (Italy); Daniele Gallieni, A.D.S. International S.r.l. (Italy); Remko Stuik, Leiden Univ. (Netherlands). . . . . [8447-19]

11.30: **Tests of open-loop LGS tomography with CANARY** *(Invited Paper)*, Timothy J. Morris, Alastair G. Basden, Durham Univ. (United Kingdom); Fabrice Vidal, LESIA - Observatoire de Paris (France); Andrew P. Reeves, Durham Univ. (United Kingdom); Eric Gendron, LESIA - Observatoire de Paris (France); Richard M. Myers, Durham Univ. (United Kingdom); Zoltan Hubert, LESIA - Observatoire de Paris (France); Edward J. Younger, Durham Univ. (United Kingdom); Andy Longmore, UK Astronomy Technology Ctr. (United Kingdom); Matthieu Cohen, LESIA - Observatoire de Paris (France); Nigel Dipper, Paul Clark, Durham Univ. (United Kingdom); David Henry, UK Astronomy Technology Ctr. (United Kingdom); Gérard C. Rousset, LESIA - Observatoire de Paris (France); Stephen P. Todd, UK Astronomy Technology Ctr. (United Kingdom); Fanny Chemla, LESIA - Observatoire de Paris (France); David C. Atkinson, UK Astronomy Technology Ctr. (United Kingdom); Jean-Michel Huet, LESIA - Observatoire de Paris (France); Brian Stobie, Colin J. Dickson, UK Astronomy Technology Ctr. (United Kingdom). . . . . [8447-20]

12.00: **Image quality and high contrast capability improvements on VLT/ NACO**, Julien H. V. Girard, Jared O'Neal, European Southern Observatory (Chile); Markus Kasper, European Southern Observatory (Germany); Gérard Zins, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Dimitri P. Mawet, European Southern Observatory (Chile); Benoît Neichel, Gemini Observatory (Chile); Johann Kolb, European Southern Observatory (Germany). . . . . [8447-21]

Lunch Break . . . . . 12.20 to 13.50

SESSION 6

Room: Emerald . . . . . Mon. 13.50 to 15.20

Quantitative Astronomy and Science with AO II

Session Chair: **Markus Kasper,**
European Southern Observatory (Germany)

13.50: **Scientific results from ESO's MCAO demonstrator MAD** *(Invited Paper)*, Jorge Melnick, European Southern Observatory (Chile); Enrico Marchetti, Paola Amico, European Southern Observatory (Germany). . . . . [8447-22]

14.20: **Results from the commissioning of the Gemini South adaptive optics imager (GSAOI) at Gemini South Observatory**, Eleazar R. Carrasco, Michelle L. Edwards, Gemini Observatory (Chile); Peter J. McGregor, The Australian National Univ. (Australia); Claudia Winge, Gemini Observatory (Chile); Peter J. Young, Matthew C. Doolan, Jan van Harmelen, The Australian National Univ. (Australia); Francois Rigaut, Benoît Neichel, Gemini Observatory (Chile); Gelys Trancho, Giant Magellan Telescope Project (USA); Etienne Artigau, Univ. de Montréal (Canada); Peter Pessev, Felipe Colazo, Gemini Observatory (Chile); Jennifer Tigner, Univ. of Victoria (Canada); Francesco Mauro, Univ. de Concepción (Chile); Javier Luhrs, William N. Rambold, Gemini Observatory (Chile). . . . . [8447-23]

14.40: **High-contrast imaging in the Hyades with snapshot LOCI**, Katie M. Morzinski, The Univ. of Arizona (USA); Bruce A. Macintosh, Lawrence Livermore National Lab. (USA); Laird M. Close, The Univ. of Arizona (USA); Christian Marois, National Research Council Canada (Canada); Quinn M. Konopacky, Lawrence Livermore National Lab. (USA) . . . . . [8447-160]

15.00: **Microarcsecond relative astrometry with MCAO using a diffractive mask**, S. Mark Ammons, Lawrence Livermore National Lab. (USA); Eduardo A. Bendek, College of Optical Sciences, The Univ. of Arizona (USA); Olivier Guyon, The Univ. of Arizona (USA) . . . . . [8447-25]

Coffee Break . . . . . 15.20 to 15.50

SESSION 7

Room: Emerald . . . . . Mon. 15.50 to 17.30

Wavefront Sensing I

Session Chair: **Enrico Marchetti,**
European Southern Observatory (Germany)

15.50: **Advances in detector technologies for visible and infrared wavefront sensing** *(Invited Paper)*, Philippe Feautrier, Institut de Planétologie et d'Astrophysique de Grenoble (France) and First Light Imaging (France); Jean-Luc Gach, Observatoire Astronomique de Marseille-Provence (France) and First Light Imaging (France); Mark Downing, European Southern Observatory (Germany); Paul Jorden, e2v technologies plc (United Kingdom); Johann Kolb, European Southern Observatory (Germany); Johan Rothman, CEA-LETI (France); Alexandre Kerlain, SOFRADIR (France); Philippe Balard, Observatoire Astronomique de Marseille-Provence (France) and First Light Imaging (France); Eric Stadler, Institut de Planétologie et d'Astrophysique de Grenoble (France) and First Light Imaging (France); Christian Guillaume, Observatoire de Haute-Provence (France) and First Light Imaging (France); David Boutolleau, First Light Imaging (France); Gérard L. Destefanis, Nicolas Lhermet, CEA-LETI (France); Olivier Pacaud, Michel Vuillermet, SOFRADIR (France); Norbert Hubin, Javier Reyes, Markus Kasper, Olaf Iwert, European Southern Observatory (Germany); Wolfgang Suske, Andrew K. Walker, Michael Skegg, e2v technologies plc (United Kingdom); Sophie Derelle, Joel R. Deschamps, Thierry Fusco, Clélia Robert, ONERA (France) . . . . . [8447-26]

16.20: **Measured performance of the prototype polar coordinate CCD array** *(Invited Paper)*, Sean M. Adkins, W. M. Keck Observatory (USA). . . . . [8447-27]

16.50: **The Subaru coronagraphic extreme AO (SCExAO) high sensitivity wavefront sensor: performance comparison between a non modulated pyramid and a non linear curvature wavefront sensor**, Christophe S. Clergeon, Subaru Telescope, National Astronomical Observatory of Japan (USA) and Observatoire de Paris à Meudon (France); Olivier Guyon, Subaru Telescope, National Astronomical Observatory of Japan (USA) and The Univ. of Arizona (USA); Frantz Martinache, Subaru Telescope, National Astronomical Observatory of Japan (USA) . . . . . [8447-28]

17.10: **The AOLI low-order non-linear curvature wavefront sensor: a method for high sensitivity wavefront reconstruction,** Jonathan S. Crass, Univ. of Cambridge (United Kingdom); Bruno Femenia Castellá, Instituto de Astrofísica de Canarias (Spain) and Univ. Politécnica de Cartagena (Spain); David L. King, Craig D. Mackay, Univ. of Cambridge (United Kingdom); Rafael Rebolo-López, Instituto de Astrofísica de Canarias (Spain) and Consejo Superior de Investigaciones Científicas (Spain); Lucas Labadie, Univ. zu Köln (Germany); Antonio Pérez Garrido, Univ. Politécnica de Cartagena (Spain); Marc Balcells, Instituto de Astrofísica de Canarias (Spain) and Isaac Newton Group of Telescopes (Spain); Anastasio Díaz Sánchez, Univ. Politécnica de Cartagena (Spain); Jesús Jimenez Fuensalida, Instituto de Astrofísica de Canarias (Spain) and Univ. de La Laguna (Spain); Roberto L. Lopez, Alejandro Oscoz, Instituto de Astrofísica de Canarias (Spain); Jorge A. Pérez Prieto, Instituto de Astrofísica de Canarias (Spain) and Univ. de La Laguna (Spain); Luis F. Rodríguez-Ramos, Instituto de Astrofísica de Canarias (Spain); Isidro Villó, Univ. Politécnica de Cartagena (Spain) . . . . . [8447-29]

POSTERS-MONDAY

Room: Hall 3. . . . . Mon. 17.30 to 19.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Monday. The interactive poster session with authors in attendance will be Monday evening from 17.30 to 19.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

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Status of Current AO Instrument Projects

Stability and robustness of LBT FLAO system performances during the science demonstration time observations, Juan Carlos Guerra Ramon, Guido Brusa, Large Binocular Telescope Observatory (USA); Carmelo Arcidiacono, Simone Esposito, Enrico Pinna, INAF - Osservatorio Astrofisico di Arcetri (Italy); Konstantina Boutsia, INAF - IASF Roma (Italy); Alfio Puglisi, Javier Argomedo, Armando Riccardi, Fernando Quiros-Pacheco, Marco Xompero, INAF - Osservatorio Astrofisico di Arcetri (Italy); Douglas L. Miller, Large Binocular Telescope Observatory (USA); Donald W. McCarthy, Jr., Craig A. Kulesa, The Univ. of Arizona (USA); Richard F. Green, Large Binocular Telescope Observatory (USA); Runa Bruglio, Lorenzo Buzzoni, INAF - Osservatorio Astrofisico di Arcetri (Italy); Laird M. Close, The Univ. of Arizona (USA). [8447-31]

GALACSI system design, Stefan Ströbele, Paolo La Penna, Robin Arsenault, Ralf D. Conzelmann, Bernard Delabre, Michel Duchateau, Reinhold J. Dorn, Enrico Fedrigo, Norbert Hubin, Jutta Quentin, Paul D. Jolley, Mario Kiekebusch, Jean-Paul Kirchbauer, Barbara Klein, Johann Kolb, Harald Kuntschner, Miska Le Louarn, Jean-Louis Lizon, Pierre-Yves Madec, Lorenzo Pettazzi, Christian Soenke, Sebastien Tordo, Joel Vernet, European Southern Observatory (Germany); Riccardo Muradore, Univ. degli Studi di Verona (Italy). . . . [8447-115]

Status of the GRAAL system development: very wide-field correction with 4 laser guide-stars, Jérome Paufique, Robin Arsenault, Pierre-Yves Madec, Ralf D. Conzelmann, Andreas Jost, Sebastien Tordo, European Southern Observatory (Germany); Albert Catalan, NTE--SENER (Spain); Robert H. Donaldson, European Southern Observatory (Germany) . . . . . [8447-116]

VLT GRAAL main assembly instrument design, manufacturing, integration, and test, Albert Catalan, Joan Manel Casalta Escuer, NTE--SENER (Spain); Jérome Paufique, European Southern Observatory (Germany) . . . . . [8447-117]

Deploying the testbed for the VLT adaptive optics facility: ASSIST, Remko Stuik, Leiden Univ. (Netherlands); Paolo La Penna, Christophe Dupuy, European Southern Observatory (Germany); Menno De Haan, ASTRON (Netherlands); Robin Arsenault, European Southern Observatory (Germany); Wilfried Boland, Leiden Univ. (Netherlands); Eddy J. Elswijk, Rik ter Horst, ASTRON (Netherlands); Norbert Hubin, Pierre-Yves Madec, European Southern Observatory (Germany); Frank Molster, Leiden Univ. (Netherlands); Sebastien Tordo, European Southern Observatory (Germany); Emiel Wiegers, Leiden Univ. (Netherlands) . . . . . [8447-118]

Infrared differential imager and spectrograph for SPHERE: performance status with extreme adaptive optics before shipment to ESO/VLT, Maud P. Langlois-Moretto, Ctr. de Recherche Astronomique de Lyon (France); Arthur Vigan, Univ. of Exeter (United Kingdom); Patrice Martinez, Institut de Planétologie et d'Astrophysique de Grenoble (France); Kjetil Dohlen, David Le Mignant, Claire Moutou, Observatoire Astronomique de Marseille-Provence (France); Anne Costille, David Mouillet, Institut de Planétologie et d'Astrophysique de Grenoble (France); Francois Wildi, Observatory of Geneva (Switzerland); Cyril Petit, Thierry Fusco, ONERA (France) . . . . . [8447-119]

GLAO performance characterization, Eduardo A. Bendek, College of Optical Sciences, The Univ. of Arizona (USA); Michael Lloyd-Hart, The Univ. of Arizona (USA); Andres R. Guesalaga, Angela Cortes, Pontificia Univ. Católica de Chile (Chile); Benoît Neichel, Gemini Observatory (Chile); Keith B. Powell, Vidhya Vaitheeswaran, Kevin Newman, The Univ. of Arizona (USA) . . . . . [8447-120]

New Proposed AO Systems and Concepts

New Observations Made with AO, Use and Capabilities of New Systems

Science with Magellan AO: simulated performance and new frontiers in high spatial resolution AO science, Katherine B. Follette, The Univ. of Arizona (USA) . . . . . [8447-159]

Early science results from the first light AO (FLAO) system for LBT, Carmelo Arcidiacono, INAF - Osservatorio Astronomico di Bologna (Italy); Filippo Mannucci, Simone Esposito, Armando Riccardi, INAF - Osservatorio Astrofisico di Arcetri (Italy); Richard F. Green, Joar G. Brynnel, Large Binocular Telescope Observatory (USA); Donald W. McCarthy, Jr., Laird M. Close, Andrew Skemer, The Univ. of Arizona (USA); Guido Agapito, Runa Briguglio, Lorenzo Busoni, Luca Fini, Enrico Pinna, Alfio Timothy Puglisi, Fernando Quiros-Pacheco, Marco Xompero, INAF - Osservatorio Astrofisico di Arcetri (Italy); Juan Carlos Guerra Ramon, Guido Brusa, Konstantina Boutsia, Douglas L. Miller, Large Binocular Telescope Observatory (USA); Craig A. Kulesa, Jared R. Males, The Univ. of Arizona (USA) . . . . . [8447-161]

Solar adaptive optics at the Hida Observatory: latest achievements of current system and design of new system, Noriaki Miura, Jun-ichi Miyazaki, Susumu Kuwamura, Kitami Institute of Technology (Japan); Naoshi Baba, Hokkaido Univ. (Japan); Yoichiro Hanaoka, National Astronomical Observatory of Japan (Japan); Masashi Yamaguchi, Satoru Ueno, Yoshikazu Nakatani, Shin-ichi Nagata, Reizaburou Kitai, Kiyoshi Ichimoto, Kyoto Univ. (Japan); Hideki Takami, National Astronomical Observatory of Japan (Japan) . . . . . [8447-162]

Optical absolute calibration of capacitive sensors for AO deformable mirrors: strategy and preliminary results, Runa Briguglio, Marco Xompero, Armando Riccardi, INAF - Osservatorio Astrofisico di Arcetri (Italy) . . . [8447-163]

Laser Guide Star Systems

Keck I laser guide star AO system and performance, Jason C. Y. Chin, Olivier Martin, Peter L. Wizinowich, Randall D. Campbell, James E. Lyke, Joe Mastromarino, Douglas A. Morrison, Christopher R. Neyman, Sergey Panteleev, Pete Tucker, Edward Wetherell, W. M. Keck Observatory (USA) . . . . . [8447-164]

La Silla Paranal Observatory laser guide star facility operation: latest performance and future upgrades, José Luis Alvarez, Juan Beltran, Miguel Riquelme, European Southern Observatory (Chile). . . . . [8447-165]

Performance of the SOAR adaptive module with UV Rayleigh guide star, Andrei A. Tokovinin, Roberto Tighe, Patricio Schurter, Rolando Cantarutti, Nicole S. van der Bliek, Manuel Martinez, Eduardo Mondaca, Stephen R. Heathcote, Cerro Tololo Inter-American Observatory (Chile) . . . . . [8447-166]

Testing and integrating the laser system of ARGOS: the ground layer adaptive optics for LBT, Christina L. Loose, Sebastian Rabien, Lothar Barl, Matthias Deysenroth, Hans Gemperlein, Mathias Honsberg, Reinhard Lederer, Walfried Raab, Julian Ziegleder, Max-Planck-Institut für extraterrestrische Physik (Germany); Wolfgang Gässler, José Luis Borelli, Martin Kulas, Max-Planck-Institut für Astronomie (Germany) . . . . . [8447-167]

Vibration compensation for the ARGOS laser launch path, Diethard Peter, Wolfgang Gässler, José Luis Borelli, Max-Planck-Institut für Astronomie (Germany); Lothar Barl, Sebastian Rabien, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8447-168]

A sodium guide star adaptive optics system for the 1.8 meter telescope, Kai Wei, Changhui Rao, Xuejun Zhang, Cheng Li, Ang Zhang, Chunlin Guan, Luchun Zhou, Shanqiu Chen, Xian Hao, Wenli Ma, Yudong Zhang, Institute of Optics and Electronics (China). . . . . [8447-169]

Investigations of long pulse sodium laser guide stars, Rachel Rampy, Donald T. Gavel, Univ. of California, Santa Cruz (USA); Simon M. Rochester, Rochester Scientific (USA); Ronald Holzlöhner, European Southern Observatory (Germany) . . . . . [8447-170]

Improving stability, robustness, and performance of laser systems, Andres R. Guesalaga, Pontificia Univ. Católica de Chile (Chile); Benoît Neichel, Maxime Boccas, Celine d'Orgeville, Francois Rigaut, Gemini Observatory (Chile); Dani Guzman, Pontificia Univ. Católica de Chile (Chile) . . . . . [8447-171]

Design, analysis, and testing of the optical tube assemblies for the ESO VLT four laser guide star facility, Rens Henselmans, David Nijkerk, Martin Lemmen, Niek Rijnveld, Fred Kamphues, TNO (Netherlands) . . . . . [8447-172]

Multiple laser guide stars wavefront sensor prototype for the EELT: design and alignment, Matteo Lombini, Italo Foppiani, INAF - Osservatorio Astronomico di Bologna (Italy); Laura Schreiber, Univ. degli Studi di Bologna (Italy); Emiliano Diolaiti, Giovanni Bregoli, INAF - Osservatorio Astronomico di Bologna (Italy); Giuseppe Cosentino, Univ. degli Studi di Bologna (Italy) . . . . . [8447-173]

Dynamical refocussing laser guide stars with membrane mirrors, Sebastian Rabien, Max-Planck-Institut für extraterrestrische Physik (Germany); Lorenzo Busoni, Simone Esposito, INAF - Osservatorio Astrofisico di Arcetri (Italy); Julian Ziegleder, Max-Planck-Institut fur extraterrestrische Physik (Germany)[8447-175]

Characterization of the sodium layer at Cerro Pachon and impact for GeMS performance, Benoît Neichel, Joseph Callingham, Claudia Winge, Gelys Trancho, Celine d'Orgeville, Francois Rigaut, Gemini Observatory (Chile). . . . . [8447-176]

Recent developments in aircraft protection systems for laser guide star operations, Paul J. Stomski, Jr., Randall D. Campbell, W. M. Keck Observatory (USA); Thomas W. Murphy, Jr., Univ. of California, San Diego (USA). . [8447-177]

A decade of operations with the Laser Traffic Control System: paradigm shift and implied development directions, Douglas Summers, W. M. Keck Observatory (USA); Don Carlos Abrams, Isaac Newton Group of Telescopes (Spain); Paola Amico, Harald Kuntschner, European Southern Observatory (Germany); Jure Skvarc, Isaac Newton Group of Telescopes (Spain) . [8447-261]

Pathfinders to Enable AO on ELTs and new AO Concepts

Speckle nulling experiments with the FFREE bench, Christophe Vérinaud, Institut de Planétologie et d'Astrophysique de Grenoble (France); Jean-François Sauvage, ONERA (France); Olivier Preis, Institut de Planétologie et d'Astrophysique de Grenoble (France); Jacopo Antichi, INAF - Osservatorio Astronomico di Padova (Italy); David Mouillet, Jean-Luc Beuzit, Institut de Planétologie et d'Astrophysique de Grenoble (France); Patrice Martinez, European Southern Observatory (Germany); Noël Ventura, Institut de Planétologie et d'Astrophysique de Grenoble (France); Thierry Fusco, Sarah Dandy, ONERA (France); Emmanuel Aller-Carpentier, Markus Kasper, European Southern Observatory (Germany); Laurent Mugnier, ONERA (France) . [8447-178]

Dense aperture mapping for high contrast imaging: first laboratory results, Fabien Patru, European Southern Observatory (Chile); Jacopo Antichi, INAF - Osservatorio Astronomico di Padova (Italy); Denis Mourard, Observatoire de la Côte d'Azur (France); Patrick Rabou, Institut de Planétologie et d'Astrophysique de Grenoble (France); Enrico Giro, INAF - Osservatorio Astronomico di Padova (Italy); Julien H. V. Girard, European Southern Observatory (Chile) . . . [8447-179]

Intelligent vibration control of ELTs and large AO hardware, Jörg-Uwe Pott, Martin Kürster, Jan Trowitzsch, José Luis Borelli, Wolfgang Gässler, Thomas M. Herbst, Max-Planck-Institut für Astronomie (Germany); Michael Böhm, Oliver Sawodny, Thomas Ruppel, Univ. Stuttgart (Germany) . . . . . [8447-180]

Development of new concepts to minimize the impact of fast telescope vibrations seen by the E-ELT/MICADO wavefront sensors, Alexander Keck, Univ. Stuttgart (Germany); Jörg-Uwe Pott, Max-Planck-Institut für Astronomie (Germany); Oliver Sawodny, Thomas Ruppel, Univ. Stuttgart (Germany) . . . . . [8447-181]

Extremely linear WFS probes to aid LGSs in the ELT design, Jacopo Farinato, Demetrio Magrin, Roberto Ragazzoni, INAF - Osservatorio Astronomico di Padova (Italy); Maria Bergomi, INAF - Osservatorio Astronomico di Padova (Italy) and Univ. degli Studi di Padova (Italy); Alessandro Brunelli, Marco Dima, INAF - Osservatorio Astronomico di Padova (Italy); Marco Sergio Erculiani, Luca Marafatto, INAF - Osservatorio Astronomico di Padova (Italy) and Univ. degli Studi di Padova (Italy); Valentina Viotto, INAF - Osservatorio Astronomico di Padova (Italy). . . . . [8447-182]

DRAGON: a wide-field multipurpose real time adaptive optics test bench, Andrew P. Reeves, Richard M. Myers, Timothy J. Morris, Alastair G. Basden, Nazim A. Bharmal, Stephen Rolt, David G. Bramall, Nigel A. Dipper, Edward J. Younger, Durham Univ. (United Kingdom) . . . . . [8447-183]

Toward an experimental validation of new AO concepts for future E-ELT instrumentation, Kacem El-Hadi, Brice Le Roux, Observatoire Astronomique de Marseille-Provence (France); Thierry Fusco, ONERA (France) and Observatoire Astronomique de Marseille-Provence (France) . . . . . [8447-184]

The HIA MCAO laboratory bench, Jean-Pierre Véran, David R. Andersen, Carlos Correia, Glen Herriot, John Pazder, National Research Council Canada (Canada) . . . . . [8447-185]

A test bench for ARGOS: integration of sub-systems and validation of the ground layer reconstruction, Gilles Orban de Xivry, Sebastian Rabien, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8447-186]

A prototype phasing camera for the Giant Magellan Telescope, Srikrishna Kanneganti, Brian A. McLeod, Mark P. Ordway, Harvard-Smithsonian Ctr. for Astrophysics (USA); Stephen A. Shectman, Giant Magellan Telescope Project (USA) and Giant Magellan Telescope Project (USA); Antonin H. Bouchez, Giant Magellan Telescope Project (USA); Johanan Codona, The Univ. of Arizona (USA); Roger Eng, Thomas M. Gauron, Timothy J. Norton, John B. Roll, Jr., Phil Streechon, David Weaver, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8447-187]

Final optical design of Raven: a MOAO science demonstrator for Subaru, Olivier Lardière, Reston Nash, Univ. of Victoria (Canada); David R. Andersen, National Research Council Canada (Canada); Colin H. Bradley, Univ. of Victoria (Canada) . . . . . [8447-188]

Design and test results of the calibration unit for the MOAO demonstrator RAVEN, Jean-Francois Lavigne, Frederic Lamontagne, Geneviève Anctil, Min Wang, Mathieu Tremblay, INO (Canada); Olivier Lardière, Univ. of Victoria (Canada); David R. Andersen, National Research Council Canada (Canada); Reston Nash, Univ. of Victoria (Canada); Maxime Savard, Patrice Côté, INO (Canada); Colin H. Bradley, Univ. of Victoria (Canada); François Châteauneuf, INO (Canada). . . . . [8447-189]

MOAO test bench in Tohoku University, Masayuki Akiyama, Yoshito Ono, Tohoku Univ. (Japan); Shin Oya, Subaru Telescope, National Astronomical Observatory of Japan (USA); Yuka K. Uchimoto, Kazuhiro Hane, Tong Wu, Tohoku Univ. (Japan). . . . . [8447-190]

Characterization, Measurement and Modeling of the Disturbances Faced by AO

Atmospheric coherent turbulence, Vladimir P. Lukin, Viktor V. Nosov, Andrey V. Torgaev, Pavel G. Kovadlo, V.E. Zuev Institute of Atmospheric Optics (Russian Federation) . . . . . [8447-191]

Impact of Cn^2 profile on tomographic reconstruction performance: application to E-ELT wide field AO systems, Anne Costille, Institut de Planétologie et d'Astrophysique de Grenoble (France); Thierry Fusco, Jean-Marc Conan, ONERA (France) . . . . . [8447-192]

Distributed model identification for efficient prediction of turbulent wavefronts, Ruxandra Mustata, Rufus Fraanje, Michel Verhaegen, Technische Univ. Delft (Netherlands) . . . . . [8447-193]

Accurate measurement of Cn^2 profile with Shack-Hartmann data, Juliette Voyez, Clélia Robert, Nicolas Vedrenne, Vincent Michau, Thierry Fusco, Jean-Marc Conan, ONERA (France). . . . . [8447-194]

MOSE: a feasibility study for optical turbulence forecast with the Meso-Nh mesoscale model to support AO facilities at ESO sites (Paranal, Armazones), Elena Masciadri, Franck Lascaux, INAF - Osservatorio Astrofisico di Arcetri (Italy). . . . . [8447-195]

MOSE: zooming on the Meso-NH mesoscale model performances at the surface layer at ESO sites (Paranal, Armazones), Franck Lascaux, Elena Masciadri, INAF - Osservatorio Astrofisico di Arcetri (Italy) . . . . . [8447-196]

First light AO (FLAO) as test bench for the LINC-NIRVANA adaptive optics system, Carmelo Arcidiacono, Alfio Timothy Puglisi, Simone Esposito, Armando Riccardi, Guido Agapito, Runa Briguglio, Lorenzo Busoni, Enrico Pinna, Fernando Quiros-Pacheco, Marco Xompero, INAF - Osservatorio Astrofisico di Arcetri (Italy). . . . . [8447-197]

Tuesday 3 July

PLENARY SESSION

Room: Auditorium . . . . . Tues. 09.00 to 10.00

Session Chair: **Kathryn A. Flanagan,**
Space Telescope Science Institute (USA)

09.00: **The Kepler Exoplanet Survey: instrumentation, performance and results**, Thomas N. Gautier III, Jet Propulsion Lab., Caltech (USA) and The Kepler Science Team (USA) . . . . . [8442-503]

09.30: **Antarctic astronomy**, John W. V. Storey, The Univ. of New South Wales (Australia). . . . . [8446-504]

Coffee Break . . . . . 10.00 to 10.30

SESSION 8

Room: Emerald . . . . . Tues. 10.30 to 12.10

Project Status III

Session Chair: **Norbert Hubin,**
European Southern Observatory (Germany)

10.30: **Natural guide stars adaptive optics system at LBT: FLAO commissioning and science operations status**, Simone Esposito, Armando Riccardi, Enrico Pinna, Alfio Timothy Puglisi, Fernando Quiros-Pacheco, INAF - Osservatorio Astrofisico di Arcetri (Italy); Carmelo Arcidiacono, INAF - Osservatorio Astronomico di Bologna (Italy); Marco Xompero, Runa Briguglio, Guido Agapito, Javier Argomedo, Lorenzo Busoni, Luca Fini, Alessandro Gherardi, INAF - Osservatorio Astrofisico di Arcetri (Italy); Guido Brusa, Douglas L. Miller, Juan Carlos Guerra Ramon, Large Binocular Telescope Observatory (USA); Paolo Stefanini, INAF - Osservatorio Astrofisico di Arcetri (Italy). [8447-30]

10.50: **LINC-NIRVANA pathfinder: testing the next generation of wave front sensors at LBT**, Albert R. Conrad, Max-Planck-Institut für Astronomie (Germany); Carmelo Arcidiacono, INAF - Osservatorio Astronomico di Bologna (Italy); Harald Baumeister, Max-Planck-Institut für Astronomie (Germany); Maria Bergomi, INAF - Osservatorio Astronomico di Padova (Italy); Thomas Bertram, Jürgen Berwein, Max-Planck-Institut für Astronomie (Germany); Christopher Biddick, Large Binocular Telescope Observatory (USA); Peter Bizenberger, Matthieu Brangier, Florian Briegel, Max-Planck-Institut für Astronomie (Germany); Alessandro Brunelli, INAF - Osservatorio Astronomico di Padova (Italy); Joar G. Brynnel, Large Binocular Telescope Observatory (USA); Lorenzo Busoni, INAF - Osservatorio Astrofisico di Arcetri (Italy); Norman J. Cushing, Large Binocular Telescope Observatory (USA); Fulvio De Bonis, Max-Planck-Institut für Astronomie (Germany); Michele De La Pena, Large Binocular Telescope Observatory (USA); Simone Esposito, INAF - Osservatorio Astrofisico di Arcetri (Italy); Jacopo Farinato, INAF - Osservatorio Astronomico di Bologna (Italy); Luca Fini, INAF - Osservatorio Astrofisico di Arcetri (Italy); Wolfgang Gässler, Max-Planck-Institut für Astronomie (Germany); Richard F. Green, Large Binocular Telescope Observatory (USA); Thomas M. Herbst, Ralph Hofferbert, Frank Kittmann, Martin Kürster, Daniel Meschke, Lars Mohr, Jörg-Uwe Pott, Max-Planck-Institut für Astronomie (Germany); et al. . . . . [8447-121]

11.10: **Status and performance characterization of the Gemini MCAO systems**, Benoît Neichel, Francois Rigaut, Gustavo Arriagada, Maxime Boccas, Celine d'Orgeville, Vincent Fesquet, Ramon L. Galvez, Gaston Gausachs, Tomislav B. Vucina, Vanessa Montes, Cristian Urrutia, Cristian Moreno, Sarah J. Diggs, Chadwick Trujillo, Claudio Arraya, William N. Rambold, Javier Lhurs, Gemini Observatory (Chile) . . . . . [8447-32]

11.30: **First closed-loop visible AO test results for the advanced adaptive secondary AO system for the Magellan Telescope: MagAO's performance and status**, Laird M. Close, Jared R. Males, Derek A. Kopon, Victor Gasho, Katherine B. Follette, Philip M. Hinz, Katie M. Morzinski, The Univ. of Arizona (USA); Alan Uomoto, Tyson Hare, Carnegie Observatories (USA); Armando Riccardi, Simone Esposito, Alfio Puglisi, Enrico Pinna, Lorenzo Busoni, Carmelo Arcidiacono, Marco Xompero, Runa Briguglio, Fernando Quiros-Pacheco, Javier Argomedo, INAF - Osservatorio Astrofisico di Arcetri (Italy) . . . . . [8447-33]

11.50: **Results from the PALM-3000 high-order adaptive optics system**, Jennifer E. Roberts, Jet Propulsion Lab. (USA); Richard G. Dekany, California Institute of Technology (USA); Rick S. Burruss, Tuan N. Truong, Jet Propulsion Lab. (USA); David D. S. Hale, Antonin H. Bouchez, California Institute of Technology (USA); Stephen R. Guiwits, John R. Angione, Jet Propulsion Lab. (USA); Christoph Baranec, Jeff Zolkower, John R. Henning, Ernest E. Croner, California Institute of Technology (USA); Dean L. Palmer, Jet Propulsion Lab. (USA) . . . . . [8447-34]

Lunch Break . . . . . 12.10 to 13.40

SESSION 9

Room: Emerald . . . . . Tues. 13.40 to 15.20

Advances in AO Control I

Session Chair: **Donald T. Gavel,** Univ. of California, Santa Cruz (USA)

13.40: **Vibration mitigation in adaptive optics control** *(Invited Paper)*, Caroline Kulcsar, Paolo Massioni, Univ. Paris 13 (France); Gaetano Sivo, ONERA (France); Henri-François G. Raynaud, Univ. Paris 13 (France); Serge C. Meimon, ONERA (France) . . . . . [8447-35]

14.10: **Distributed control of large deformable mirrors** *(Invited Paper)*, Douglas G. MacMynowski, California Institute of Technology (USA); Rikard Heimsten, Torben Andersen, Mette Owner-Petersen, Lund Observatory (Sweden) . . . . . [8447-36]

14.40: **Design of frequency-based controllers for vibration mitigation at the Gemini-South telescope**, Andres R. Guesalaga, Pontificia Univ. Católica de Chile (Chile); Benoît Neichel, Francois Rigaut, Gemini Observatory (Chile); Dani Guzman, Pontificia Univ. Católica de Chile (Chile) . . . . . [8447-37]

15.00: **On the rejection of vibrations in adaptive optics systems**, Lorenzo Pettazzi, European Southern Observatory (Germany); Riccardo Muradore, Univ. degli Studi di Verona (Italy); Enrico Fedrigo, Richard M. Clare, European Southern Observatory (Germany) . . . . . [8447-38]

Coffee Break . . . . . 15.20 to 15.50

SESSION 10

Room: Emerald . . . . . Tues. 15.50 to 17.30

Wavefront Sensing II

Session Chair: **Emiliano Diolaiti,**
INAF - Osservatorio Astronomico di Bologna (Italy)

15.50: **Comparison of LGS wavefront-sensing with pyramid, yaw, and quad-cell types wavefront sensors**, Eric Gendron, Damien Gratadour, Observatoire de Paris à Meudon (France) . . . . . [8447-39]

16.10: **Wavefront sensing and correction with the Gemini Planet Imager**, Sandrine J. Thomas, Gemini Observatory (USA); Lisa A. Poyneer, Bruce A. Macintosh, Lawrence Livermore National Lab. (USA); Daren Dillon, Lick Observatory (USA); Dmitry Savransky, Lawrence Livermore National Lab. (USA); Robert J. De Rosa, Univ. of Exeter (United Kingdom); Markus Hartung, Gemini Observatory (Chile); Donald T. Gavel, Lick Observatory (USA); J. Kent Wallace, Jet Propulsion Lab. (USA); David W. Palmer, Lawrence Livermore National Lab. (USA) . . . . . [8447-40]

16.30: **Wave front sensing strategies for SPHERE: concepts, performance, and experimental results**, Jean-François Sauvage, Thierry Fusco, Cyril Petit,

ONERA (France) . . . . . [8447-41]

16.50: **Instrumental aberrations retrieval from AO corrected sky PSF using phase diversity**, Laurent Jolissaint, aquilAOptics (Switzerland); Laurent Mugnier, ONERA (France); Christopher R. Neyman, W. M. Keck Observatory (USA); Julian C. Christou, Gemini Observatory (USA); Peter Wizinowich, W. M. Keck Observatory (USA). . . . . [8447-42]

17.10: **Design of a truth sensor for the GMT laser tomography adaptive optics system,** Marcos A. van Dam, Flat Wavefronts (New Zealand); Rodolphe Conan, The Australian National Univ. (Australia); Antonin H. Bouchez, Giant Magellan Telescope Project (USA); Brady Espeland, The Australian National Univ. (Australia) . . . . . [8447-43]

POSTERS-TUESDAY

Room: Hall 3. . . . . Tues. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters. for this conference will be on display on Tuesday. The interactive poster session with authors in attendance will be Tuesday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

AO Modeling, Analysis and Simulation

Simulations for the AO systems of the E-ELT, Miska Le Louarn, Richard M. Clare, European Southern Observatory (Germany). . . . . [8447-199]

A study of MOAO behind GLAO for EAGLE, Alastair G. Basden, Richard M. Myers, Ali Bharmal, Timothy Butterley, Nigel Dipper, Timothy J. Morris, Andrew P. Reeves, Durham Univ. (United Kingdom) . . . . . [8447-200]

Control system modeling and development for the Raven multi-object adaptive optics demonstrator, Kate J. Jackson, Univ. of Victoria (Canada); David R. Andersen, National Research Council Canada (Canada); Colin H. Bradley, Meguru Ito, Olivier Lardiere, Univ. of Victoria (Canada) . . . . . [8447-201]

GMT AO system requirements and error budgets in the preliminary design phase, Gelys Trancho, GMTO Corp. (USA); Brady Espeland, The Australian National Univ. (Australia); Antonin H. Bouchez, Gemini Observatory (Chile); Rodolphe Conan, The Australian National Univ. (Australia); Philip M. Hinz, The Univ. of Arizona (USA); Marcos A. van Dam, Flat Wavefronts (New Zealand). . . . . [8447-202]

Multi-conjugate AO for the European Solar Telescope, Iciar Montilla, Instituto de Astrofísica de Canarias (Spain); Clémentine Béchet, Ctr. de Recherche Astronomique de Lyon (France); Miska Le Louarn, European Southern Observatory (Germany); Michel Tallon, Ctr. de Recherche Astronomique de Lyon (France); Jorge Sánchez-Capuchino, Manuel Collados Vera, Instituto de Astrofísica de Canarias (Spain) . . . . . [8447-203]

Benefits of optimal projection on deformable mirrors with the fractal iterative method for different tomographic AO objectives, Elisabeth Brunner, Observatoire de Lyon (France) and Technische Univ. München (Germany); Michel Tallon, Clémentine Béchet, Observatoire de Lyon (France) . . . [8447-204]

Ground layer adaptive optics system simulation for the 2.5m telescope in Dome A, Jia Peng, Nanjing Univ. (China) and Nanjing Institute of Astronomical Optics & Technology (China); Sijiong Zhang, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8447-205]

Adaptive optics performance simulation on the basis of MASS/DIMM data obtained on Mt. Shatdjatmaz in 2009-2011, Boris S. Safonov, Sternberg Astronomical Institute (Russian Federation) . . . . . [8447-206]

Performance simulation of the ERIS pyramid wavefront sensor module in the VLT adaptive optics facility, Fernando Quiros-Pacheco, Guido Agapito, Armando Riccardi, Simone Esposito, INAF - Osservatorio Astrofisico di Arcetri (Italy); Miska Le Louarn, European Southern Observatory (Germany) . [8447-207]

Calibration strategy of the pyramid wavefront sensor module of ERIS with the VLT deformable secondary mirror, Armando Riccardi, Runa Briguglio, Enrico Pinna, Guido Agapito, Fernando Quiros-Pacheco, Simone Esposito, INAF - Osservatorio Astrofisico di Arcetri (Italy). . . . . [8447-208]

Identification and calibration of the interaction matrix parameters for AO and MCAO systems, Benoît Neichel, Gemini Observatory (Chile); Amélie Parisot, Cyril Petit, Thierry Fusco, ONERA (France); Francois Rigaut, Gemini Observatory (Chile) . . . . . [8447-209]

Analysis techniques for adaptively controlled segmented mirror arrays, Gregory J. Michels, Victor Genberg, Sigmadyne, Inc. (USA) . . . . . [8447-212]

Refined E2E simulator for the high degrees of freedom, Manal Chebbo, Observatoire Astronomique de Marseille-Provence (France); Thierry Fusco, Jean-François Sauvage, Cyril Petit, ONERA (France); Brice Le Roux, Observatoire Astronomique de Marseille-Provence (France) . . . . . [8447-213]

Comparison between end-to-end and analytical numerical modeling of astronomical adaptive optics systems: CAOS versus PAOLA, Marcel Carbillet, Univ. de Nice Sophia Antipolis (France); Laurent Jolissaint, aquilAOptics (Switzerland) . . . . . [8447-214]

GPUs for adaptive optics: simulations and real-time control, Damien Gratadour, LESIA - Observatoire de Paris (France) and Univ. Paris 7-Denis Diderot (France); Arnaud Sevin, Julien Brule, Eric Gendron, LESIA - Observatoire de Paris (France); Gérard C. Rousset, LESIA - Observatoire de Paris (France) and Univ. Paris 7-Denis Diderot (France) . . . . . [8447-215]

Efficient iterative atmospheric tomography reconstruction from LGS and additional tip/tilt measurements, Ronny Ramlau, Johannes Kepler Univ. Linz (Austria); M. Rosensteiner, A. Obereder, MathConsult GmbH (Austria) . . . . . [8447-216]

Wednesday 4 July

PLENARY SESSION

Room: Auditorium. . . . . Wed. 09.00 to 10.00

Session Chair: **Luc Simard,** National Research Council Canada (Canada)

09.00: **Very high energy gamma ray astronomy with the H.E.S.S. telescopes** *(Presentation Only)*, Werner Hofmann, Max-Planck-Institut für Kernphysik (Germany) . . . . . [8442-505]

09.30: **The cosmic microwave background: observing directly the early universe**, Paolo de Bernardis, Silvia Masi, Univ. degli Studi di Roma La Sapienza (Italy) . . . . . [8442-506]

Coffee Break . . . . . 10.00 to 10.30

SESSION 11

Room: Emerald . . . . . Wed. 10.30 to 12.10

AO Disturbances Modeling and Characterization I

Session Chair: **Enrico Marchetti,** European Southern Observatory (Germany)

10.30: **Turbulence modeling and estimation for AO systems** *(Invited Paper)*, Alessandro Beghi, Angelo Cenedese, Andrea Masiero, Univ. degli Studi di Padova (Italy). . . . . [8447-44]

11.00: **Mesospheric sodium structure variability and its impact on adaptive optics** *(Invited Paper)*, Thomas Pfrommer, European Southern Observatory (Germany); Paul Hickson, The Univ. of British Columbia (Canada). . . . . [8447-45]

11.30: **Lunar scintillometer to validate GLAO turbulence distribution measurements**, Kevin Newman, Michael Hart, The Univ. of Arizona (USA); Eduardo A. Bendek, College of Optical Sciences, The Univ. of Arizona (USA); Edison Bustos, Cerro Tololo Inter-American Observatory (Chile). . . . . [8447-46]

11.50: **Estimation of vertical profiles of wind from MASS measurements**, Matwey V. Kornilov, Lomonosov Moscow State Univ. (Russian Federation) . . . . . [8447-47]

Lunch/Exhibition Break . . . . . 12.10 to 13.30

SESSION 12

Room: Emerald . . . . . Wed. 13.30 to 14.10

AO Disturbances Modeling and Characterization II

Session Chair: **Enrico Marchetti,** European Southern Observatory (Germany)

13.30: **Vibrations in AO control: a short analysis of on-sky data around the world**, Caroline Kulcsar, Gaetano Sivo, Henri-François G. Raynaud, Univ. Paris 13 (France); Benoît Neichel, Francois Rigaut, Gemini Observatory (Chile); Julian C. Christou, Gemini Observatory (USA); Andrés R. Guesalaga, Pontificia Univ. Católica de Chile (Chile); Carlos Correia, Jean-Pierre Véran, National Research Council Canada (Canada); Eric Gendron, Fabrice Vidal, Gérard C. Rousset, LESIA - Observatoire de Paris (France); Timothy J. Morris, Durham Univ. (United Kingdom); Simone Esposito, Fernando Quiros-Pacheco, Guido Agapito, INAF - Osservatorio Astrofisico di Arcetri (Italy); Enrico Fedrigo, Lorenzo Pettazzi, Richard M. Clare, European Southern Observatory (Germany); Riccardo Muradore, Univ. degli Studi di Verona (Italy); Serge C. Meimon, Jean-Marc Conan, ONERA (France); Olivier Guyon, Frantz Martinache, Subaru Telescope, National Astronomical Observatory of Japan (USA) . . . . . [8447-48]

13.50: **Tolerancing the fabrication errors of static optical elements for ELT-size wide-field AO systems**, Jean-Pierre Véran, John S. Pazder, National Research Council Canada (Canada) . . . . . [8447-49]

SESSION 13

Room: Emerald . . . . . Wed. 14.10 to 15.00

Project Status IV

Session Chair: **Jean-Pierre Véran,**
National Research Council Canada (Canada)

14.10: **Wavefront correction on the Advanced Technology Solar Telescope** *(Invited Paper)*, Samuel C. Barden, Thomas R. Rimmele, Kit Richards, Luke C. Johnson, Ellyne K. Kinney, B. Scott Gregory, Jose Marino, National Solar Observatory (USA). . . . . [8447-50]

14.40: **Subaru laser guide adaptive optics system: performance and science operation**, Yosuke Minowa, Yutaka Hayano, Hiroshi Terada, Tae-Soo Pyo, Shin Oya, Masayuki Hattori, Mai Shirahata, Hideki Takami, Olivier Guyon, Vincent Garrel, Stephen Colley, H. Mark Weber, Taras Golota, Subaru Telescope, National Astronomical Observatory of Japan (USA); Makoto Watanabe, Hokkaido Univ. (Japan); Yoshihiko Saito, Tokyo Institute of Technology (Japan); Meguru Ito, Univ. of Victoria (Canada); Masanori Iye, National Astronomical Observatory of Japan (Japan) . . . . . [8447-52]

Coffee Break . . . . . 15.00 to 15.50

SESSION 14

Room: Emerald . . . . . Wed. 15.50 to 17.50

AO for ELTs

Session Chair: **Richard M. Myers,** Durham Univ. (United Kingdom)

15.50: **Toward the adaptive optics for the 40 m class European ELT**, Norbert Hubin, European Southern Observatory (Germany) . . . . . [8447-53]

16.10: **The Giant Magellan Telescope adaptive optics program**, Antonin H. Bouchez, Giant Magellan Telescope Project (USA); D. Scott Acton, Ball Aerospace & Technologies Corp. (USA); Francis H. Bennet, The Australian National Univ. (Australia); Guido Brusa-Zappellini, Large Binocular Telescope Project (USA); Johanan L. Codona, The Univ. of Arizona (USA); Rodolphe Conan, The Australian National Univ. (Australia); Thomas Connors, The Univ. of Arizona (USA); Olivier Durney, Large Binocular Telescope Project (USA); Brady Espeland, The Australian National Univ. (Australia); Thomas M. Gauron, Smithsonian Astrophysical Observatory (USA); Michael Lloyd-Hart, Philip M. Hinz, The Univ. of Arizona (USA); Srikrishna Kanneganti, Smithsonian Astrophysical Observatory (USA); Edward J. Kibblewhite, The Univ. of Chicago (USA); Russell P. Knox, The Univ. of Arizona (USA); Brian A. McLeod, Smithsonian Astrophysical Observatory (USA); Thomas McMahon, The Univ. of Arizona (USA); Manny Montoya, Large Binocular Telescope Project (USA); Timothy J. Norton, Mark P. Ordway, Smithsonian Astrophysical Observatory (USA); Simon Parcell, Piotr K. Piatrou, Ian Price, The Australian National Univ. (Australia); John B. Roll, Jr., Smithsonian Astrophysical Observatory (USA); Gelys Trancho, Giant Magellan Telescope Project (USA); Kristina Uhlendorf, The Australian National Univ. (Australia); et al. . . . . [8447-54]

16.30: **TMT adaptive optics program status report**, Brent L. Ellerbroek, Thirty Meter Telescope Observatory Corp. (USA); Sean M. Adkins, W. M. Keck Observatory (USA); David R. Andersen, Jenny Atwood, National Research Council Canada (Canada); Arnaud Bastard, CILAS (France); Yong Bo, Technical Institute of Physics and Chemistry (China); Marc-Andre Boucher, National Research Council Canada (Canada); Corinne Boyer, Thirty Meter Telescope Observatory Corp. (USA); Peter W. G. Byrnes, Kris Caputa, National Research Council Canada (Canada); Shanqiu Chen, Institute of Optics and Electronics (China); Carlos Correia, National Research Council Canada (Canada); Raphael Cousty, CILAS (France); Joeleff T. Fitzsimmons, National Research Council Canada (Canada); Luc Gilles, Thirty Meter Telescope Observatory Corp. (USA); James Gregory, MIT Lincoln Lab. (USA); Glen Herriot, National Research Council Canada (Canada); Paul Hickson, The Univ. of British Columbia (Canada); Alexis Hill, John Pazder, National Research Council Canada (Canada); Hubert Pagès, CILAS (France); Thomas Pfrommer, The Univ. of British Columbia (Canada); Vladimir A. Reshetov, Scott Roberts, National Research Council Canada (Canada); Jean-Christophe Sinquin, CILAS (France); Matthias Schoeck, Malcolm Smith, Jean-Pierre Véran, National Research Council Canada (Canada); Lianqi Wang, Thirty Meter Telescope Observatory Corp. (USA); Kai Wei, Institute of Optics and Electronics (China); Ivan Wevers, National Research Council Canada (Canada) . . . . . [8447-55]

16.50: **Dual-channel multiple natural guide star wavefront sensor for the E-ELT multiconjugate adaptive optics module**, Emiliano Diolaiti, Italo Foppiani, INAF - Osservatorio Astronomico di Bologna (Italy); Jean-Marc Conan, ONERA (France); R. Christopher Butler, INAF - IASF Bologna (Italy); Richard I. Davies, Max-Planck-Institut für extraterrestrische Physik (Germany); Andrea Baruffolo, INAF - Osservatorio Astronomico di Padova (Italy); Michele Bellazzini, Giovanni Bregoli, Paolo Ciliegi, INAF - Osservatorio Astronomico di Bologna (Italy); Giuseppe Cosentino, Univ. degli Studi di Bologna (Italy); Thierry Fusco, ONERA (France); Norbert Hubin, European Southern Observatory (Germany); Matteo Lombini, INAF - Osservatorio Astronomico di Bologna (Italy); Enrico Marchetti, European Southern Observatory (Germany); Cyril Petit, Clélia Robert, ONERA (France); Laura Schreiber, Univ. degli Studi di Bologna (Italy). . [8447-56]

17.10: **Wavefront sensor design for the GMT natural guide star AO system**, Simone Esposito, Enrico Pinna, Fernando Quirós-Pacheco, Alfio T. Puglisi, Luca Carbonaro, Marco Bonaglia, Valdemaro Biliotti, Runa Briguglio, Guido Agapito, INAF - Osservatorio Astrofisico di Arcetri (Italy); Carmelo Arcidiacono, INAF - Osservatorio Astrofisico di Bologna (Italy) and INAF - Osservatorio Astrofisico di Arcetri (Italy); Lorenzo Busoni, Marco Xompero, Armando Riccardi, Luca Fini, INAF - Osservatorio Astrofisico di Arcetri (Italy); Antonin Bouchez, Giant Magellan Telescope Project (USA) . . . . . [8447-57]

17.30: **TMT NFIRAOS: adaptive optics system for the Thirty Metre Telescope**, Glen Herriot, David R. Andersen, Jenny Atwood, National Research Council Canada (Canada); Corinne Boyer, Thirty Meter Telescope Observatory Corp. (USA); Peter W. G. Byrnes, Kris Caputa, Carlos Correia, Jennifer Dunn, National Research Council Canada (Canada); Brent L. Ellerbroek, Thirty Meter Telescope Observatory Corp. (USA); Joeleff T. Fitzsimmons, National Research Council Canada (Canada); Luc Gilles, Thirty Meter Telescope Observatory Corp. (USA); Paul Hickson, The Univ. of British Columbia (Canada); Alexis Hill, Daniel A. Kerley, John S. Pazder, Vladimir A. Reshetov, Scott Roberts, Malcolm Smith, Jean-Pierre Véran, National Research Council Canada (Canada); Lianqi Wang, Thirty Meter Telescope Observatory Corp. (USA); Ivan Wevers, National Research Council Canada (Canada) . . . . . [8447-58]

Thursday 5 July

PLENARY SESSION

Room: Auditorium . . . . . Thurs. 09.30 to 10.00

Session Chair: **Gillian S. Wright,**
UK Astronomy Technology Ctr. (United Kingdom)

09.30: **ALMA construction and early science**, Mattheus W. M. de Graauw, Lewis Ball, Joint ALMA Observatory (Chile). . . . . [8444-507]

Coffee Break . . . . . 10.00 to 10.30

SESSION 15

Room: Emerald . . . . . Thurs. 10.30 to 11.10

Wavefront Sensing III

Session Chair: **Thierry Fusco,** ONERA (France)

10.30: **Wave-front sensing and adaptive optics using curvilinear component analysis**, Christophe Libbrecht, Denis Brousseau, Ermanno F. Borra, Simon Thibault, Univ. Laval (Canada). . . . . [8447-59]

10.50: **LIFT--a noise-effective low order focal-plane sensor: from theory to full experimental validation**, Cedric Plantet, Serge C. Meimon, Jean-Marc Conan, Thierry Fusco, ONERA (France) . . . . . [8447-60]

SESSION 16

Room: Emerald . . . . . Thurs. 11.10 to 12.20

Laser System Tests

Session Chair: **Brent L. Ellerbroek,**
Thirty Meter Telescope Observatory Corp. (USA)

11.10: **The ESO transportable laser guide star unit for on sky measurements of LGS photon return and other experiments** *(Invited Paper)*, Domenico Bonaccini Calia, Ivan M. Guidolin, European Southern Observatory (Germany); Axel Friedenauer, TOPTICA Photonics AG (Germany); Vladimir I. Karpov, MPB Communications Inc. (Canada); Manfred Hager, TOPTICA Photonics AG (Germany); Thomas Pfrommer, Steffan A. Lewis, Ronald Holzlöhner, Wolfgang K. Hackenberg, European Southern Observatory (Germany); Gianluca Lombardi, European Southern Observatory (Chile); Mauro Centrone, INAF - Osservatorio Astronomico di Roma (Italy) . . . . . [8447-61]

11.40: **Gemini South multi-conjugate adaptive optics (GeMS) laser guide star facility on-sky performance results**, Celine d'Orgeville, Benoît Neichel, Francois Rigaut, Gemini Observatory (Chile) . . . . . [8447-62]

12.00: **Photon returns test of the pulsed sodium guide star laser on the 1.8 meter telescope**, Kai Wei, Institute of Optics and Electronics (China); Yong Bo, Technical Institute of Physics and Chemistry (China); Xuewu Cheng, Wuhan Institute of Physics and Mathematics (China); Xianghui Xue, Univ. of Science and Technology of China (China); Cheng Li, Institute of Optics and Electronics (China); Junwei Zuo, Shiyong Xie, Technical Institute of Physics and Chemistry (China); Changhui Rao, Yudong Zhang, Institute of Optics and Electronics (China) . . . . . [8447-63]

Lunch Break . . . . . 12.20 to 13.40

SESSION 17

Room: Emerald . . . . . .Thurs. 13.40 to 15.20

Advances in AO Control II

Session Chair: **Caroline Kulcsar,** Univ. Paris 13 (France)

13.40: **Optimal control of plate-scale modes in laser-guide-star-based multi-conjugate adaptive optics**, Carlos Correia, Jean-Pierre Véran, Glen Herriot, National Research Council Canada (Canada); Brent L. Ellerbroek, Luc Gilles, Lianqi Wang, Thirty Meter Telescope Observatory Corp. (USA) . [8447-64]

14.00: **Ensemble transform Kalman filter, a dynamic control law for AO on ELTs: theoretical aspects and first simulation results**, Morgan Gray, Lab. d'Astrophysique de Marseille (France); Jean-Marc Conan, ONERA (France); Laurent Bertino, Univ. of Bergen (Norway); Brice Le Roux, Lab. d'Astrophysique de Marseille (France); Cyril Petit, ONERA (France) . . . . . [8447-65]

14.20: **Wind prediction with multiple guide stars reduces tomographic errors and expands MOAO field of regard**, S. Mark Ammons, Lisa Poyneer, Lawrence Livermore National Lab. (USA); Donald T. Gavel, Renate Kupke, Claire E. Max, Univ. of California, Santa Cruz (USA); Luke C. Johnson, National Solar Observatory (USA). . . . . [8447-66]

14.40: **Experimental comparison of tomographic control schemes using the Onera WFAO facility**, Amélie Parisot, ONERA (France) and Lab. d'Astrophysique de Marseille (France); Cyril Petit, Thierry Fusco, Jean-Marc Conan, ONERA (France) . . . . . [8447-67]

15.00: **Control and calibration strategies for SPHERE eXtreme AO system: concepts, implementation, and experimental validations**, Thierry Fusco, Cyril Petit, ONERA (France); Arnaud Sevin, LESIA - Observatoire de Paris (France); Jean-Francois Sauvage, Serge C. Meimon, ONERA (France); Marcos Suarez Valles, Enrico Fedrigo, European Southern Observatory (Germany) . . . [8447-68]

Coffee Break . . . . . 15.20 to 15.50

SESSION 18

Room: Emerald . . . . . .Thurs. 15.50 to 17.50

Extreme AO

Session Chair: **Bruce A. Macintosh,**
Lawrence Livermore National Lab. (USA)

15.50: **How ELTs will acquire the first spectra of rocky habitable planets**, Olivier Guyon, Frantz Martinache, Subaru Telescope, National Astronomical Observatory of Japan (USA); Eric J. Cady, Kunjithapatham Balasubramanian, Jet Propulsion Lab. (USA); Ruslan Belikov, NASA Ames Research Ctr. (USA); Christophe S. Clergeon, Subaru Telescope, National Astronomical Observatory of Japan (USA); Mala Mateen, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [8447-69]

16.10: **The Subaru coronagraphic extreme AO project: first observations**, Frantz Martinache, Olivier Guyon, Christophe S. Clergeon, Vincent Garrel, Subaru Telescope, National Astronomical Observatory of Japan (USA) [8447-70]

16.30: **The SPHERE XAO system SAXO: integration, test, and laboratory final performance**, Cyril Petit, Thierry Fusco, Jean-Francois Sauvage, ONERA (France); Arnaud Sevin, LESIA - Observatoire de Paris (France); Marcos Suarez Valles, European Southern Observatory (Germany); Pierre Baudoz, LESIA - Observatoire de Paris (France); Jean-Luc Beuzit, Univ. Joseph Fourier (France); Jean-Tristan M. Buey, LESIA - Observatoire de Paris (France); Julien Charton, Univ. Joseph Fourier (France); Kjetil Dohlen, Observatoire Astronomique de Marseille-Provence (France); Enrico Fedrigo, European Southern Observatory (Germany); Philippe Feautrier, Univ. Joseph Fourier (France); Jean-Luc Gach, Observatoire Astronomique de Marseille-Provence (France); Norbert Hubin, Markus Kasper, European Southern Observatory (Germany); David Mouillet, Univ. Joseph Fourier (France); Denis Perret, LESIA - Observatoire de Paris (France); Pascal Puget, Univ. Joseph Fourier (France); Jean-Christophe Sinquin, CILAS (France); Christian Soenke, European Southern Observatory (Germany); Francois Wildi, Observatory of Geneva (Switzerland) . . . . . [8447-71]

16.50: **Project 1640: the world's first ExAO coronagraphic hyperspectral imager for comparative planetary science**, Ben R. Oppenheimer, American Museum of Natural History (USA); Charles A. Beichman, California Institute of Technology (USA); Douglas S. Brenner, American Museum of Natural History (USA); Rick S. Burruss, Eric J. Cady, Jet Propulsion Lab. (USA); Justin R. Crepp, Lynne Hillenbrand, Sasha Hinkley, California Institute of Technology (USA); Edgar R. Ligon III, Thomas G. Lockhart, Jet Propulsion Lab. (USA); Ian R. Parry, Univ. of Cambridge (United Kingdom); Laurent A. Pueyo, Johns Hopkins Univ. (USA); Emily Rice, American Museum of Natural History (USA); Lewis C. Roberts, Jr., Jennifer E. Roberts, Michael Shao, Jet Propulsion Lab. (USA); Anand Sivaramakrishnan, Rémi Soummer, Space Telescope Science Institute (USA); Gautam Vasisht, Fred E. Vescelus, J. Kent Wallace, Chengxing Zhai, Jet Propulsion Lab. (USA); Neil Zimmerman, Max-Planck-Institut für Astronomie (Germany) . . . . . [8447-72]

17.10: **Extremely fast focal-plane wavefront sensing for extreme adaptive optics**, Christoph U. Keller, Visa A. Korkiakoski, Leiden Observatory (Netherlands); Niek Doelman, TNO (Netherlands); Rufus Fraanje, Michel Verhaegen, Technische Univ. Delft (Netherlands). . . . . [8447-73]

17.30: **On advanced estimation techniques for exoplanet detection and characterization using ground-based coronagraphs,** Peter R. Lawson, Jet Propulsion Lab. (USA); Richard Frazin, Univ. of Michigan (USA); Harrison H. Barrett, Luca Caucci, College of Optical Sciences, The Univ. of Arizona (USA); Nicholas Devaney, National Univ. of Ireland, Galway (Ireland); Szymon Gladysz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Olivier Guyon, The Univ. of Arizona (USA); Lars R. Furenlid, College of Optical Sciences, The Univ. of Arizona (USA); John E. Krist, Jet Propulsion Lab. (USA); Christian Marois, National Research Council Canada (Canada); Dimitri P. Mawet, European Southern Observatory (Chile); David Mouillet, Lab. d'Astrophysique de l'Observatoire de Grenoble (France); Laurent Mugnier, ONERA (France); Lisa A. Poyneer, Lawrence Livermore National Lab. (USA); Laurent A. Pueyo, Johns Hopkins Univ. (USA); Rémi Soummer, Space Telescope Science Institute (USA) . . . . . [8447-74]

POSTERS-THURSDAY

Room: Hall 3. . . . . .Thurs. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Thursday. The interactive poster session with authors in attendance will be Thursday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

Post-Processing of AO Data

New results on a Cn^2 profiler for GeMS, Angela Cortes, Andrés R. Guesalaga, Pontificia Univ. Católica de Chile (Chile); Benoît Neichel, Francois Rigaut, Gemini Observatory (Chile); Pablo Irarrázaval, Dani Guzman, Pontificia Univ. Católica de Chile (Chile) . . . . . [8447-217]

What can be retrieved from adaptive optics real-time data?, Johann Kolb, European Southern Observatory (Germany); Patrice Martinez, Institut de Planétologie et d'Astrophysique de Grenoble (France); Julien H. V. Girard, European Southern Observatory (Chile) . . . . . [8447-219]

Developing a new software package for PSF estimation and fitting of adaptive optics images, Laura Schreiber, Univ. degli Studi di Bologna (Italy) and INAF, Astronomical Observatory of Padova (Italy); Emiliano Diolaiti, Michele Bellazzini, Paolo Ciliegi, Italo Foppiani, INAF - Osservatorio Astronomico di Bologna (Italy); Laura Greggio, INAF - Osservatorio Astronomico di Padova (Italy); Barbara Lanzoni, Univ. degli Studi di Bologna (Italy); Matteo Lombini, Paolo Montegriffo, INAF - Osservatorio Astronomico di Bologna (Italy); Emanuele Dalessandro, Davide Massari, Univ. degli Studi di Bologna (Italy); Antonio Sollima, INAF - Osservatorio Astronomico di Padova (Italy). . . . . [8447-220]

PSF reconstruction for wide field AO systems: application to the GALACSI-MUSE instrument on the VLT, Remy Villecroze, ONERA (France) and Observatoire de Lyon (France); Thierry Fusco, ONERA (France); Roland M. Bacon, Observatoire de Lyon (France); Pierre-Yves Madec, European Southern Observatory (Germany) . . . . . [8447-221]

Estimation of errors on the PSF reconstruction process for myopic deconvolution, Jonathan Exposito, Damien Gratadour, Yann Clénet, Gérard C. Rousset, LESIA - Observatoire de Paris (France) . . . . . [8447-222]

Statistical moments of the Strehl ratio, Natalia Yaitskova, European Southern Observatory (Germany); Szymon Gladysz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Michael Esselborn, Miska Le Louarn, European Southern Observatory (Germany); Aurea Garcia-Rissmann, Lab. Nacional de Astrofísica (Brazil) . . . . . [8447-223]

Experimental validation of optimization concepts for focal-plane image processing with adaptive optics, Visa A. Korkiakoski, Christoph U. Keller, Leiden Observatory (Netherlands); Niek Doelman, TNO (Netherlands); Rufus Fraanje, Raluca M. Andrei, Michel Verhaegen, Technische Univ. Delft (Netherlands) . . . . . [8447-224]

Preserving the photometric integrity of companions in high-contrast imaging observations using locally optimized combination of images, Jérôme Maire, Dunlap Institute for Astronomy & Astrophysics (Canada); Jonathan Gagné, David Lafrenière, René Doyon, Univ. de Montréal (Canada); James R. Graham, Dunlap Institute for Astronomy & Astrophysics (Canada); Jean-Pierre Véran, National Research Council Canada (Canada); Lisa A. Poyneer, Lawrence Livermore National Lab. (USA) . . . . . [8447-225]

Wave-Front Correction

Specifications and design of the E-ELT M4 adaptive unit, Elise Vernet, Norbert Hubin, Michael Mueller, European Southern Observatory (Germany); Roberto Biasi, Microgate S.r.l. (Italy); Daniele Gallieni, A.D.S. International S.r.l. (Italy) . . . . . [8447-226]

Numerical modeling and simulation studies for the M4 adaptive mirror of the E-ELT, Marcel Carbillet, Univ. de Nice Sophia Antipolis (France); Armando Riccardi, INAF - Osservatorio Astrofisico di Arcetri (Italy). . . . . [8447-227]

LBT adaptive secondary mirrors: procedures and optical calibration for chopping on the test bench, Runa Briguglio, Marco Xompero, Armando Riccardi, INAF - Osservatorio Astrofisico di Arcetri (Italy). . . . . [8447-228]

Novel unimorph adaptive mirrors for astronomy applications, Peter Rausch, Sven Verpoort, Ulrich Wittrock, Fachhochschule Münster (Germany) . [8447-229]

Wave-Front Sensing

Friday 6 July

SESSION 19

Room: Emerald . . . . . Fri. 08.40 to 10.10

AO Modeling, Analysis and Simulations

Session Chair: **Rodolphe Conan,** The Australian National Univ. (Australia)

08.40: **Computer simulations and real-time control of ELT AO systems using graphical processing units** *(Invited Paper)*, Lianqi Wang, Brent L. Ellerbroek, Thirty Meter Telescope Project (USA) . . . . . [8447-75]

09.10: **Modeling anisoplanatism in the Keck II laser guide star AO system**, Michael P. Fitzgerald, Univ. of California, Los Angeles (USA); Matthew Britton, the Optical Sciences Company (tOSC) (USA); Andrea M. Ghez, Leo Meyer, Breann N. Sitarski, Eric E. Becklin, Univ. of California, Los Angeles (USA); Randall D. Campbell, W. M. Keck Observatory (USA); Carina Cheng, Univ. of California, Los Angeles (USA); Tuan Do, Univ. of California, Irvine (USA); Jessica R. Lu, Univ. of Hawai'i (USA); Keith Y. Matthews, California Institute of Technology (USA); Mark Morris, Univ. of California, Los Angeles (USA); Christopher R. Neyman, W. M. Keck Observatory (USA); Glenn A. Tyler, the Optical Sciences Company (tOSC) (USA); Peter Wizinowich, W. M. Keck Observatory (USA); Sylvana Yelda, Univ. of California, Los Angeles (USA) . . . . . [8447-76]

09.30: **Size of the halo of the adaptive optics PSF**, Szymon Gladysz, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Miska Le Louarn, Natalia Yaitskova, European Southern Observatory (Germany); Aurea Garcia-Rissmann, Lab. Nacional de Astrofísica (Brazil); Lee Kann, Jack D. Drummond, Robert L. Johnson, Air Force Research Lab. (USA) . . . . . [8447-77]

09.50: **A Fresnel propagation modeling of NFIRAOS/IRIS high-contrast exoplanet imaging capabilities**, Christian Marois, Jean-Pierre Véran, Carlos Correia, National Research Council Canada (Canada) . . . . . [8447-78]

Coffee Break . . . . . 10.10 to 10.40

SESSION 20

Room: Emerald . . . . . Fri. 10.40 to 12.10

Postprocessing of AO Data

Session Chair: **Laird M. Close,** The Univ. of Arizona (USA)

10.40: **Aperture masking behind AO systems** *(Invited Paper)*, Michael J. Ireland, Macquarie Univ. (Australia) and Australian Astronomical Observatory (Australia). . . . . [8447-79]

11.10: **Recent advances in adaptive optics PSF reconstruction for Gemini-North and W.M. Keck systems**, Laurent Jolissaint, aquilAOptics (Switzerland); Christopher R. Neyman, W. M. Keck Observatory (USA); Julian C. Christou, Gemini Observatory (USA); Laurent Mugnier, ONERA (France); Peter Wizinowich, W. M. Keck Observatory (USA) . . . . . [8447-80]

11.30: **Long exposure point spread function estimation for laser guide star multi-conjugate adaptive optics**, Luc Gilles, Brent L. Ellerbroek, Lianqi Wang, Thirty Meter Telescope Observatory Corp. (USA); Carlos Correia, Jean-Pierre Véran, National Research Council Canada (Canada) . . . . . [8447-81]

11.50: **Temporal convergence of phase spatial covariance matrix measurements in tomographic adaptive optics**, Olivier Martin, Eric Gendron, Gérard C. Rousset, Observatoire de Paris à Meudon (France). . . . . [8447-218]

Lunch Break . . . . . 12.10 to 13.30

SESSION 21

Room: Emerald . . . . . Fri. 13.30 to 15.10

Advances in AO Control III

Session Chair: **Michael Lloyd-Hart,** The Univ. of Arizona (USA)

13.30: **First on-sky calibration of an high order adaptive optics system**, Enrico Pinna, Armando Riccardi, Fernando Quirós-Pacheco, Runa Briguglio, Alfio T. Puglisi, Lorenzo Busoni, INAF - Osservatorio Astrofisico di Arcetri (Italy); Carmelo Arcidiacono, INAF - Osservatorio Astrofisico di Bologna (Italy) and INAF - Osservatorio Astrofisico di Arcetri (Italy); Marco Xompero, Javier Argomedo, Simone Esposito, INAF - Osservatorio Astrofisico di Arcetri (Italy); Enrico Marchetti, European Southern Observatory (Germany) . . . . . [8447-83]

13.50: **Optimization of adaptive optics correction during observations: fast algorithms and system parameters identification in closed-loop**, Clémentine Béchet, Michel Tallon, Eric M. Thiébaut, Ctr. de Recherche Astronomique de Lyon (France). . . . . [8447-84]

14.10: **Calibration strategy of the AOF**, Johann Kolb, Miska Le Louarn, Nicolas Muller, European Southern Observatory (Germany); Clémentine Béchet, Ctr. de Recherche Astronomique de Lyon (France) . . . . . [8447-85]

14.30: **A high-performance FPGA platform for adaptive optics real-time control**, Heng Zhang, Zoran Ljusic, National Research Council Canada (Canada) . . . . . [8447-86]

14.50: **Design and implementation of the PALM-3000 real-time control system**, Tuan N. Truong, Jet Propulsion Lab. (USA); John R. Angione, Physical Optics Corp. (USA); Antonin H. Bouchez, Giant Magellan Telescope Project (USA); Rick S. Burruss, Jet Propulsion Lab. (USA); Richard G. Dekany, California Institute of Technology (USA); Stephen R. Guiwits, Jet Propulsion Lab. (USA); David D. S. Hale, California Institute of Technology (USA); Jennifer E. Roberts, Jean C. Shelton, Mitchell Troy, Jet Propulsion Lab. (USA). . . . . [8447-87]

Coffee Break . . . . . 15.10 to 15.40

SESSION 22

Room: Emerald . . . . . Fri. 15.40 to 16.20

Wavefront Correctors II

Session Chair: **Pierre-Yves Madec,** European Southern Observatory (Germany)

15.40: **VLT deformable secondary mirror: integration and electromechanical tests results**, Roberto Biasi, Mario Andrighettoni, Gerald Angerer, Christian Mair, Dietrich Pescoller, Microgate S.r.l. (Italy); Paolo Lazzarini, Enzo Anaclerio, Marco Mantegazza, Daniele Gallieni, A.D.S. International S.r.l. (Italy); Elise Vernet, Robin Arsenault, Pierre-Yves Madec, Philippe Duhoux, European Southern Observatory (Germany); Armando Riccardi, Marco Xompero, Runa Briguglio, INAF - Osservatorio Astrofisico di Arcetri (Italy); Mauro Manetti, Marco Morandini, Politecnico di Milano (Italy) . . . . . [8447-88]

16.00: **Manufacturing of glassy thin shell for adaptive optics: results achieved**, Florence Poutriquet, Andre Rinchet, Jean-Louis Carel, Eric Ruch, Roland Geyl, Hervé Leplan, Gilles Marque, Sagem Défense Sécurité (France) . . . . . [8447-89]

SESSION 23

Room: Emerald . . . . . Fri. 16.20 to 17.40

Wavefront Sensing IV

Session Chair: **Mitchell Troy,** Jet Propulsion Lab. (USA)

16.20: **Global wavefront sensing for extremely large telescopes**, Roberto Ragazzoni, Maria Bergomi, Alessandro Brunelli, Marco Dima, Marco Sergio Erculiani, Jacopo Farinato, Demetrio Magrin, INAF - Osservatorio Astronomico di Padova (Italy); Luca Marafatto, Univ. degli Studi di Padova (Italy); Valentina Viotto, INAF - Osservatorio Astronomico di Padova (Italy) . . . . . [8447-90]

16.40: **An interferometric wavefront sensor for high-sensitivity low-amplitude measurements**, Nazim A. Bharmal, Richard M. Myers, Alastair G. Basden, Durham Univ. (United Kingdom) . . . . . [8447-91]

17.00: **A phase-shifting Zernike wavefront sensor for the Palomar P3K adaptive optics system**, J. Kent Wallace, Frank Loya, Jet Propulsion Lab. (USA) . . . . . [8447-92]

17.20: **Fast computer-free holographic adaptive optics**, Geoff P. Andersen, Fassil Ghebremichael, U.S. Air Force Academy (USA) . . . . . [8447-93]

Wednesday-Friday 4-6 July 2012 • Proceedings of SPIE Vol. 8448

Observatory Operations: Strategies, Processes, and Systems IV


Peck


Seaman


Comeron

Conference Chairs: **Alison B. Peck,** Joint ALMA Observatory (Chile) and National Radio Astronomy Observatory (Chile); **Robert L. Seaman,** National Optical Astronomy Observatory (USA); **Fernando Comeron,** European Southern Observatory (Germany)

Program Committee: **David S. Adler,** Space Telescope Science Institute (USA); **Lori E. Allen,** National Optical Astronomy Observatory (USA); **Joshua Simon Bloom,** Univ. of California, Berkeley (USA); **Dennis R. Crabtree,** Gemini Observatory (Canada) and National Research Council Canada (Canada); **Suzanne R. Dodd,** Jet Propulsion Lab. (USA); **Richard F. Green,** Large Bionocular Telescope (USA) and The Univ. of Arizona (USA); **Andreas Kaufer,** European Southern Observatory (Chile); **Douglas Pierce-Price,** European Southern Observatory (Germany); **Nicole M. Radziwill,** James Madison Univ. (USA); **Arnold H. Rots,** Harvard-Smithsonian Ctr. for Astrophysics (USA)

Wednesday 4 July

PLENARY SESSION
Room: Auditorium . . . . . Wed. 09.00 to 10.00

Session Chair: **Luc Simard,**
National Research Council Canada (Canada)

09.00: **Very high energy gamma ray astronomy with the H.E.S.S. telescopes** *(Presentation Only)*, Werner Hofmann, Max-Planck-Institut für Kernphysik (Germany) . . . . . [8442-505]

09.30: **The cosmic microwave background: observing directly the early universe**, Paolo de Bernardis, Silvia Masi, Univ. degli Studi di Roma La Sapienza (Italy) . . . . . [8442-506]

Coffee Break . . . . . 10.00 to 10.30

SESSION 1
Room: E104 . . . . . Wed. 10.30 to 12.30

Science Operations Processes I

Session Chair: **Alison B. Peck,**
National Radio Astronomy Observatory (Chile)

10.30: **ALMA: the first year of science operations**, Andreas Lundgren, Lars-Åke Nyman, European Southern Observatory (Chile) . . . . . [8448-01]

10.50: **The building blocks for JWST I&T to operations: from simulator to flight units**, Curtis C. Fatig, William R. Ochs, Alan Johns, NASA Goddard Space Flight Ctr. (USA); Wallace Jackson, Northrop Grumman Technical Services (USA); Ronald Jones, NASA Goddard Space Flight Ctr. (USA); Francis Wasiak, General Dynamics C4 Systems (USA); Bonita Seaton, Cynthia Adams, NASA Goddard Space Flight Ctr. (USA) . . . . . [8448-02]

11.10: **Spaceborne survey instrument operations from Planck/LFI to Euclid NISP: lessons learned and new concepts**, Luca Valenziano, INAF - IASF Bologna (Italy); Anna Gregorio, Univ. degli Studi di Trieste (Italy); R. Christopher Butler, INAF - IASF Bologna (Italy); Jérôme Amiaux, Commissariat à l'Énergie Atomique (France); Carlotta Bonoli, Favio Bortoletto, INAF - Osservatorio Astronomico di Padova (Italy); Carlo Burigana, INAF - IASF Bologna (Italy) and Univ. degli Studi di Ferrara (Italy); Leonardo Corcione, INAF - Osservatorio Astronomico di Torino (Italy); Marco Frailis, INAF - Osservatorio Astronomico di Trieste (Italy); Sebastiano Ligori, INAF - Osservatorio Astronomico di Torino (Italy); Elisabetta Maiorano, Gianluca Morgante, Luciano Nicastro, INAF - IASF Bologna (Italy); Fabio Pasian, INAF - Osservatorio Astronomico di Trieste (Italy); David Pearson, Jet Propulsion Lab. (USA); Marco Riva, INAF - Osservatorio Astronomico di Brera (Italy); Roberto Scaramella, INAF - Osservatorio Astronomico di Roma (Italy); Filomena Schiavone, INAF - IASF Bologna (Italy); Daniele Tavagnacco, INAF - Osservatorio Astronomico di Trieste (Italy); Rafael Toledo-Moreo, Univ. Politécnica de Cartagena (Spain); Massimo Trifoglio, INAF - IASF Bologna (Italy); Andrea Zacchei, INAF - Osservatorio Astronomico di Trieste (Italy); Filippo M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); Thierry Maciaszek, Ctr. National d'Études Spatiales (France) . . . . . [8448-03]

11.30: **Updating Chandra high-radiation safing in response to changing observatory conditions**, Michael Juda, Mark Baski, Chris Eagan, Jeffrey D. Holmes, Sabina Hurley, Eric R. Martin, Harold Rice, Paul R. Viens, Brent S. Williams, Daniel Wong, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8448-04]

11.50: **Improving operations prioritization by detecting emerging patterns in trouble tickets**, Nicole M. Radziwill, James Madison Univ. (USA). . . . . [8448-05]

12.10: **The slitmask alignment tool: robust, efficient, and astronomer-friendly software for aligning multi-object slitmasks**, Marc Kassis, Gregory D. Wirth, W. M. Keck Observatory (USA); Andrew C. Phillips, Univ. of California, Santa Cruz (USA); Charles C. Steidel, California Institute of Technology (USA) . . . . . [8448-06]

Lunch/Exhibition Break . . . . . 12.30 to 13.40

SESSION 2
Room: E104 . . . . . Wed. 13.40 to 14.40

Science Operations Processes II

Session Chair: **Fernando Comeron,**
European Southern Observatory (Germany)

13.40: **Operational concept of the VLT's adaptive optics facility and its instruments**, Harald Kuntschner, Paola Amico, Johann Kolb, Pierre-Yves Madec, Robin Arsenault, European Southern Observatory (Germany); Douglas Summers, W. M. Keck Observatory (USA) . . . . . [8448-07]

14.00: **Improving the observing efficiency of SINFONI and KMOS at the VLT by factors of 2-4: sophisticated sky subtraction algorithms**, Niranjan A. Thatte, Univ. of Oxford (United Kingdom); Nicholas Scott, Swinburne Univ. of Technology (Australia); Ryan Houghton, Univ. of Oxford (United Kingdom); Dieter Nuernberger, European Southern Observatory (Chile); Roberto N. Abuter, European Southern Observatory (Germany); Mathias Tecza, Univ. of Oxford (United Kingdom). . . . . [8448-08]

14.20: **Optimisation of solar synoptic observations**, Miroslav Klvana, Michal Sobotka, Michal Svanda, Astronomical Institute of the ASCR, v.v.i. (Czech Republic) . . . . . [8448-09]

SESSION 3
Room: E104 . . . . . Wed. 14.40 to 15.20

User Support

Session Chair: **Fernando Comeron,**
European Southern Observatory (Germany)

14.40: **User-support models at the Isaac Newton group of telescopes**, Chris R. Benn, Isaac Newton Group of Telescopes (Spain) . . . . . [8448-10]

15.00: **User support to Guoshoujing Telescope (LAMOST)**, Xiaoyan Chen, Ali Luo, Yong-Heng Zhao, National Astronomical Observatories (China) . . [8448-11]

Coffee Break . . . . . 15.20 to 15.50

SESSION 4
Room: E104 . . . . . Wed. 15.50 to 17.50

Archives and Virtual Observatory

Session Chair: **Suzanne R. Dodd,** Jet Propulsion Lab. (USA)

15.50: **The role in the virtual astronomical observatory in the era of massive data sets**, Graham B. Berriman, California Institute of Technology (USA) . . . . . [8448-12]

16.10: **Running a distributed virtual observatory: U.S. Virtual Astronomical Observatory operations**, Thomas McGlynn, NASA Goddard Space Flight Ctr. (USA); Robert J. Hanisch, Space Telescope Science Institute (USA); Graham B. Berriman, California Institute of Technology (USA); Ani Thakar, Johns Hopkins Univ. (USA) . . . . . [8448-13]

16.30: **The TAOS II Observatory operations and data management system: another multi-petabyte project**, Kem H. Cook, Matthew J. Lehner, Shiang-Yu Wang, Academia Sinica (Taiwan); Charles Alcock, John C. Geary, Harvard-Smithsonian Ctr. for Astrophysics (USA); David Hiriart, Univ. Nacional Autónoma de México (Mexico); Paul T. P. Ho, Academia Sinica (Taiwan); Timothy J. Norton, Harvard-Smithsonian Ctr. for Astrophysics (USA); Mauricio Reyes Ruiz, Observatorio Astronómico Nacional (Mexico); Andrew Szentgyorgyi, Harvard-Smithsonian Ctr. for Astrophysics (USA); Wei-Ling Yen, Zhi-Wei Zhang, Academia Sinica (Taiwan) . . . . . [8448-14]

16.50: **The GTC and Calar Alto Virtual Observatory archives**, Enrique Solano, Ctr. de Astrobiología (Spain) and Spanish Virtual Observatory (Spain); Raul Gutierrez, Jose Manuel Alacid, Francisco Jimenez, Ctr. de Astrobiología (Spain) . . . . . [8448-15]

17.10: **Current status and future directions of the ESO science archive facility: content and services**, Martino Romaniello, Magda Arnaboldi, Pascal Ballester, European Southern Observatory (Germany); Christophe Dumas, European Southern Observatory (Chile); Vincenzo Forchí, Wolfram Freudling, Reinhard Hanuschik, Jörg Retzlaff, Alain Smette, Stefano Zampieri, European Southern Observatory (Germany) . . . . . [8448-16]

17.30: **The JWST data management system engineering database**, Maria A. Nieto-Santisteban, Space Telescope Science Institute (USA) . . . . . [8448-17]

Thursday 5 July

PLENARY SESSION

Room: Auditorium . . . . . Thurs. 09.30 to 10.00

Session Chair: **Gillian S. Wright,**
UK Astronomy Technology Ctr. (United Kingdom)

09.30: **ALMA construction and early science**, Mattheus W. M. de Graauw, Lewis Ball, Joint ALMA Observatory (Chile) . . . . . [8444-507]

Coffee Break . . . . . 10.00 to 10.30

SESSION 5

Room: E104 . . . . . Thurs. 10.30 to 12.10

Observatory Metrics, Legacy, and Bibliography

Session Chair: **David S. Adler,** Space Telescope Science Institute (USA)

10.30: **Meaningful metrics for observatory publication statistics**, Arnold H. Rots, Sherry L. Winkelman, Glenn E. Becker, Smithsonian Astrophysical Observatory (USA) . . . . . [8448-18]

10.50: **Telescope bibliographies: an essential component of archival data management and operations**, Alberto Accomazzi, Harvard-Smithsonian Ctr. for Astrophysics (USA); Edwin Henneken, Smithsonian Astrophysical Observatory (USA); Christopher Erdmann, Harvard-Smithsonian Ctr. for Astrophysics (USA); Arnold Rots, Smithsonian Astrophysical Observatory (USA) . . . . . [8448-19]

11.10: **DOME: operational metrics under one roof**, Francesca Primas, Stéphane Marteau, Lowell Tacconi-Garman, Vincenzo Mainieri, Marina Rejkuba, European Southern Observatory (Germany) . . . . . [8448-20]

11.30: **CFHT Legacy Survey: calibration and curation of the final official release T0007**, Jean-Charles J. Cuillandre, Canada-France-Hawaii Telescope (USA) . . . . . [8448-21]

11.50: **Applying decades of HST experience to JWST data processing**, Francesco Pierfederici, Michael Swam, Gretchen Greene, Space Telescope Science Institute (USA) . . . . . [8448-22]

Lunch Break . . . . . 12.10 to 13.40

SESSION 6

Room: E104 . . . . . Thurs. 13.40 to 15.20

Time Domain, Target of Opportunity, and Transient Events

Session Chair: **Arnold Rots,**
Smithsonian Astrophysical Observatory (USA)

13.40: **Timekeeping for observatory operations**, Robert L. Seaman, National Optical Astronomy Observatory (USA); Arnold H. Rots, Smithsonian Astrophysical Observatory (USA) . . . . . [8448-23]

14.00: **Connecting the time domain community with the virtual astronomical observatory**, Matthew J. Graham, Ashish A. Mahabal, Andrew J. Drake, S. George Djorgovski, California Institute of Technology (USA) and VAO (USA); Raymond L. Plante, Univ. of Illinois at Urbana-Champaign (USA) and VAO (USA); Jeffrey Kantor, LSST Corp. (USA) . . . . . [8448-24]

14.20: **Rapid alerts for following up gravitational wave event candidates**, Peter S. Shawhan, Univ. of Maryland, College Park (USA) . . . . . [8448-25]

14.40: **Responding to the event deluge**, Roy D. Williams, California Institute of Technology (USA); Scott Barthelmy, NASA Goddard Space Flight Ctr. (USA); Robert B. Denny, DC-3 Dreams, SP (USA); Matthew J. Graham, California Institute of Technology (USA); John Swinbank, Univ. van Amsterdam (Netherlands) . . . . . [8448-26]

15.00: **High-level simulation of JWST event-driven operations**, Ronald Henry, Wayne M. Kinzel, Space Telescope Science Institute (USA) . . . . . [8448-27]

Coffee Break . . . . . 15.20 to 15.50

SESSION 7

Room: E104 . . . . . Thurs. 15.50 to 16.30

Remote and Robotic Operations

Session Chair: **Alison B. Peck,**
National Radio Astronomy Observatory (Chile)

15.50: **Remote observing with NASA's Deep Space Network**, Thomas B. H. Kuiper, Walid A. Majid, Jet Propulsion Lab. (USA); Santa Martinez, European Space Astronomy Ctr. (Spain); Cristina Garcia-Miro, INTA Instituto Nacional de Técnica Aeroespacial (Spain); J. Ricardo Rizzo, Ctr. de Astrobiología (Spain) . . . . . [8448-28]

16.10: **Pi of the Sky: system of autonomous robotic telescopes for monitoring the sky**, Malgorzata Siudek, Ctr. for Theoretical Physics (Poland) . . . . . [8448-29]

SESSION 8

Room: E104 . . . . . Thurs. 16.30 to 17.50

Scheduling and Data Flow Management

Session Chair: **Alison B. Peck,**
National Radio Astronomy Observatory (Chile)

16.30: **Review of data processing operations for LAMOST pilot survey**, Ali Luo, Haotong Zhang, Jian-Jun Chen, Zhongrui Bai, Feng-Fei Wang, JianNan Zhang, Yong-Heng Zhao, National Astronomical Observatories (China) [8448-30]

16.50: **The use of a genetic algorithm for ground-based telescope observation scheduling**, William Mahoney, Christian Veillet, Canada-France-Hawaii Telescope (USA) . . . . . [8448-31]

17.10: **The 4MOST facility simulator--new fiber-to-target assignments, VISTA/NTT, and positioner trade-offs: results from 5 years observation of scheduling simulation for Gaia and eROSITA sources**, Thomas Boller, Hans Böhringer, Tom Dwelly, Max-Planck-Institut für extraterrestrische Physik (Germany); Jakob Walcher, Leibniz-Institut für Astrophysik Potsdam (Germany); Paola Sartoretti, Observatoire de Paris à Meudon (France); Eduardo Gonzalez Solares, Univ. of Cambridge (United Kingdom) . . . . . [8448-32]

17.30: **eROSITA in-orbit calibration strategy and plan,** Michael J. Freyberg, Konrad Dennerl, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8448-33]

POSTERS: THURSDAY

Room: Hall 3. . . . . Thurs. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Thursday. The interactive poster session with authors in attendance will be Thursday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

Pointing effects and their consequences for Spitzer IRAC exoplanet observations, Carl J. Grillmair, Sean J. Carey, John R. Stauffer, California Institute of Technology (USA); Mark E. Fisher, Ryan Olds, Lockheed Martin Space Systems Co. (USA); James G. Ingalls, Jessica E. Krick, William J. Glaccum, Seppo Laine, Jason A. Surace, California Institute of Technology (USA) . . . . . [8448-47]

Fermi Large Area Telescope operations: progress over 4 years, Robert A. Cameron, SLAC National Accelerator Lab. (USA) . . . . . [8448-57]

Telescope infrastructure maintenance at high altitude: lessons learned from Atacama Pathfinder Experiment operations, Michael Cantzler, European Southern Observatory (Germany) . . . . . [8448-58]

Research on schedulers for astronomical observatories, Josep Colome, Institut d'Estudis Espacials de Catalunya (Spain); Pau Colomer, GTD Ingeniería de Sistemas y de Software S.A. (Spain); Jordi Campreciós, Institut d'Estudis Espacials de Catalunya (Spain); Thierry Coiffard, GTD Ingeniería de Sistemas y de Software S.A. (Spain); Josep Guàrdia, Francesc Martínez, Ignasi Ribas, Florian Rodler, Institut d'Estudis Espacials de Catalunya (Spain) . . . . . [8448-59]

MABEL at IPAC: managing address books and email lists at the Infrared Processing and Analysis Center, Megan Crane, Carolyn Brinkworth, Dawn Gelino, Ellen O'Leary, California Institute of Technology (USA) . . . . . [8448-60]

Cryogenics maintenance strategy at the ALMA Observatory, Fabiola Cruzat, ALMA (Chile) . . . . . [8448-61]

Challenges and peculiarities of ESPRESSO data flow cycle: from target choice to scientific results, Paolo Di Marcantonio, INAF - Osservatorio Astronomico di Trieste (Italy); Danuta Sosnowska, Christophe Lovis, Observatoire de Genève (Switzerland); Valentina D'Odorico, Guido Cupani, INAF - Osservatorio Astronomico di Trieste (Italy); Sergio Sousa, Univ. do Porto (Portugal); Jonay I. González Hernández, Instituto de Astrofísica de Canarias (Spain); Roberto Cirami, INAF - Osservatorio Astronomico di Trieste (Italy); Gaspare Lo Curto, European Southern Observatory (Germany); Denis Mégevand, Observatoire de Genève (Switzerland); Stefano Cristiani, INAF - Osservatorio Astronomico di Trieste (Italy) . . . . . [8448-62]

Long term performance of the VISIR/VLT instrument before the upgrade, Danuta Dobrzycka, Lars Lundin, Yazan Momany, Ralf Siebenmorgen, Hans-Ulrich Käufl, Alain Smette, Florian Kerber, Mario E. van den Ancker, European Southern Observatory (Germany) . . . . . [8448-63]

Preparing the Pico dos Dias Observatory for fully remote operations, Tania P. Dominici, Francisco Rodrigues, Rodrigo P. Campos, Marcio Vital de Arruda, Orlando Verducci, Jr., Rogerio Ottoboni, Sergio dos Santos Rodrigues, Daniel Kubiak, Rodrigo L. Fernandez, Saulo R. Gargaglioni, Marcos Reno, Ronaldo da Cunha Vasconcelos, Rodrigo M. P. Vilaça, Lab. Nacional de Astrofísica (Brazil); Rafael G. Cardoso, Lab. Nacional de Astrofisica (Brazil); Jose M. Duarte, Jose Magno da Silva, Antonio Cesar de Oliveira, Lab. Nacional de Astrofísica (Brazil) . [8448-64]

Scheduler for the JPAS survey, Alessandro Ederoclite, David Cristobal-Hornillos, Mariano Moles, Andrés Javier Cenarro, Antonio Marin-Franch, Axel Yanes Díaz, Nicolas Gruel, Jesús Varela López, Sergio Chueca, Fernando Rueda, Sergio Rueda, Ctr. de Estudios de Física del Cosmos de Aragón (Spain) . . . . . [8448-65]

Conceptual design of the data handling for the European Solar Telescope, Ilaria Ermolli, INAF - Osservatorio Astronomico di Roma (Italy); Gianna Cauzzi, INAF - Osservatorio Astrofisico di Arcetri (Italy); Manuel Collados Vera, Instituto de Astrofisica de Canarias (Spain); Frederic Paletou, Institut de Recherche en Astrophysique et Planétologie (France); Kevin Reardon, INAF - Osservatorio Astrofisico di Arcetri (Italy); Jean Aboudarham, Observatoire de Paris à Meudon (France); Roberto Cirami, INAF - Osservatorio Astronomico di Trieste (Italy); Rosario Cosentino, INAF - Osservatorio Astrofisico di Catania (Italy); Dario Del Moro, Univ. degli Studi di Roma Tor Vergata (Italy); Paolo Di Marcantonio, INAF - Osservatorio Astronomico di Trieste (Italy); Fabrizio Giorgi, INAF - Osservatorio Astronomico di Roma (Italy); Martine Lafon, Institut de Recherche en Astrophysique et Planétologie (France); Ermanno Pietropaolo, Univ. degli Studi dell'Aquila (Italy); Paolo Romano, INAF - Osservatorio Astrofisico di Catania (Italy) . . . . . [8448-66]

All sky monitoring network with amateur telescopes, Zhonghua Fang, Shanghai Zhenheng Electro-Optical Systems Co., Ltd. (China); Chun Xu, Shanghai Institute of Technical Physics (China) . . . . . [8448-67]

The next GALEX chapter: transition of a space astrophysics observatory from NASA to private operation, Karl Forster, D. Christopher Martin, California Institute of Technology (USA); Kerry Erickson, Jet Propulsion Lab. (USA) . . . . . [8448-69]

Optimizing the observing efficiency of the James Webb Space Telescope, Karl D. Gordon, Victoria Balzano, William Blair, Henry Ferguson, Wayne M. Kinzel, Jennifer Lotz, Space Telescope Science Institute (USA); George Sonneborn, NASA Goddard Space Flight Ctr. (USA); Jason Tumlinson, Space Telescope Science Institute (USA) . . . . . [8448-70]

Calibration plan for J-PAS and J-PLUS surveys, Nicolas Gruel, Jesús Varela López, Mariano Moles, David Cristobal-Hornillos, Andrés Javier Cenarro, Antonio Marin-Franch, Sergio Chueca, Axel Yanes Díaz, Sergio Rueda, Fernando Rueda, Alessandro Ederoclite, Ctr. de Estudios de Física del Cosmos de Aragón (Spain) . . . . . [8448-71]

An observation planning algorithm applied to multi-objective astronomical observations and its simulation in COSMOS field, Yi Jin, Yonggang Gu, Zhai Chao, Univ. of Science and Technology of China (China) . . . . . [8448-72]

Testing JWST's proposal planning system: early progress, Ian J. E. Jordan, Alan P. Patterson, Denise C. Taylor, Wayne M. Kinzel, Ron A. Downes, Space Telescope Science Institute (USA) . . . . . [8448-73]

Observatory bibliographies: current practices, Jill P. Lagerstrom, Space Telescope Science Institute (USA); Sherry L. Winkelman, Smithsonian Astrophysical Observatory (USA); Uta Grothkopf, European Southern Observatory (Germany); Marsha J. Bishop, National Radio Astronomy Observatory (USA). . . . . [8448-74]

Autonomous real-time all-sky cloud detection over Mauna Kea, William Mahoney, Glenn Morrison, Grant Matsushige, Canada-France-Hawaii Telescope (USA) . . . . . [8448-75]

Spitzer operations: scheduling the out years, William A. Mahoney, California Institute of Technology (USA); Mark J. Effertz, Mark E. Fisher, Lockheed Martin Space Systems Co. (USA); Lisa J. Garcia, California Institute of Technology (USA); Joseph C. Hunt, Jr., Jet Propulsion Lab. (USA); Vincent Mannings, Douglas B. McElroy, Elena Scire, California Institute of Technology (USA) . . . . . [8448-76]

PROP: ESO's portal for reporting of operational problematics, Stéphane Marteau, Serouche Rahimpour, John Lockhart, European Southern Observatory (Germany) . . . . . [8448-77]

The ESO telescope bibliography at your fingertips, Uta Grothkopf, Silvia Meakins, European Southern Observatory (Germany) . . . . . [8448-78]

A software complex for TNG Observatory efficiency measurements, Emilio Molinari, Nauzet Hernandez, Telescopio Nazionale Galileo (Italy) . . . . . [8448-79]

The on-board software of the HERSCHEL/PACS instrument: three successful years of in-flight operations, Stefano Pezzuto, Istituto di Fisica dello Spazio Interplanetario (Italy); Alain Mazy, Univ. de Liège (Belgium); Roland Ottensamer, Univ. Wien (Austria); Helmut Feuchtgruber, Max-Planck-Institut für extraterrestrische Physik (Germany); Anna Maria Di Giorgio, Istituto di Fisica dello Spazio Interplanetario (Italy); Bart Vandenbussche, Katholieke Univ. Leuven (Belgium); Milena Benedettini, Scige J. Liu, Sergio Molinari, Daniele Schito, Istituto di Fisica dello Spazio Interplanetario (Italy) . . . . . [8448-80]

An integrated scheduling and program management system, MMT Observatory, Arizona, U.S., Dallan Porter, J. Duane Gibson, Grant G. Williams, MMT Observatory (USA) . . . . . [8448-81]

Success of long term preventive maintenance on telescope subsystems using the example of the VLT adapter-rotators at the ESO Paranal Observatory, Fernando Salgado, Gerhard Hudepohl, Juan Pablo Haddad, Rolando Medina, European Southern Observatory (Chile) . . . . . [8448-82]

Operation, control, and data system for Antarctic Survey Telescope, Zhaohui Shang, Tianjin Normal Univ. (China) and National Astronomical Observatories (China); Keliang Hu, Yi Hu, National Astronomical Observatories (China); Jiliang Li, Tianjin Univ. (China); Jin Li, Qiang Liu, Bin Ma, National Astronomical Observatories (China); Jizhou Sun, Tianjin Univ. (China); Lifan Wang, Purple Mountain Observatory (China) and Texas A&M Univ. (USA); Jian Xiao, Tianjin Univ. (China); Jia Yu, National Astronomical Observatories (China); Ce Yu, Mujin Yang, Tianjin Univ. (China); Zhen Zeng, National Astronomical Observatories (China) . . . . . [8448-83]

Remote observing at the Isaac Newton group of telescopes, Ian Skillen, Raine Karjalainen, Isaac Newton Group of Telescopes (Spain) . . . . . [8448-84]

HTTP-based remote operational options for the Vacuum Tower Telescope, Tenerife, Joachim Staiger, Albert-Ludwigs-Univ. Freiburg (Germany). . [8448-85]

Observatory bibliographies: not just for statistics anymore, Sherry L. Winkelman, Arnold Rots, Smithsonian Astrophysical Observatory (USA)[8448-86]

The plate candidates and tiling method for LAMOST pilot survey, Hailong Yuan, National Astronomical Observatories (China) . . . . . [8448-88]

Estimation of system efficiency of fiber spectroscopic telescope, Haotong Zhang, Zhongrui Bai, Wei Zhang, National Astronomical Observatories (China) . . . . . [8448-89]

Friday 6 July

SESSION 9

Room: E104 . . . . . Fri. 08.50 to 10.10

Program and Observation Scheduling

Session Chair: **Nicole M. Radziwill,** James Madison Univ. (USA)

08.50: **JWST observation specification and expansion to support planning and scheduling**, Wayne M. Kinzel, Robert E. Douglas, Jr., Space Telescope Science Institute (USA) . . . . . [8448-34]

09.10: **Measuring the effectiveness of simulated LSST observing programs**, Stephen T. Ridgway, Srinivasan Chandrasekharan, National Optical Astronomy Observatory (USA); Kem Cook, Eureka Scientific, Inc. (USA); R. Lynne Jones, K. Simon Krughoff, Zeljko Ivezic, Univ. of Washington (USA) . . . . . [8448-35]

09.30: **Evolution of RTS2: meta-queues scheduling for FLWO 1.2m Telescope**, Petr Kubanek, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Emilio Falco, Harvard-Smithsonian Ctr. for Astrophysics (USA); Martin Jelínek, Instituto de Astrofísica de Andalucía (Spain); Michael Prouza, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Jan ?trobl, Astronomical Institute of the ASCR, v.v.i. (Czech Republic); Martin Fuchs, ?tefánikova hvezdárna (Czech Republic); Javier U. Gorosabel, Instituto de Astrofísica de Andalucía (Spain) . . . . . [8448-36]

09.50: **Introducing precipitable water vapour as an observing constraint for infrared observations on Paranal**, Mario E. van den Ancker, Florian Kerber, European Southern Observatory (Germany); Guillermo Valdes, European Southern Observatory (Chile); Danuta Dobrzycka, Reinhard Hanuschik, Christian A. Hummel, Hans-Ulrich Käufl, Eric Lagadec, European Southern Observatory (Germany); Dimitri P. Mawet, European Southern Observatory (Chile); Margaret Moerchen, Leiden Observatory (Netherlands); Ralf Siebenmorgen, European Southern Observatory (Germany); Thomas Rose, Radiometer Physics GmbH (Germany); Alain Smette, Jonathan Smoker, Irina Yegorova, European Southern Observatory (Chile) . . . . . [8448-37]

Coffee Break . . . . . 10.10 to 10.40

SESSION 10

Room: E104 . . . . . Fri. 10.40 to 12.00

Site and Facility Operations I

Session Chair: **Suzanne R. Dodd,** Jet Propulsion Lab. (USA)

10.40: **Keeping the Hubble Space Telescope operating efficiently in its third decade**, David S. Adler, Space Telescope Science Institute (USA) and CSC (USA) . . . . . [8448-39]

11.00: **Science commissioning of JWST: applying Hubble's lessons to the Webb**, Carl P. Biagetti, Victoria Balzano, Space Telescope Science Institute (USA) . . . . . [8448-40]

11.20: **Mixing completion, commissioning, and operations at the LBT**, Richard F. Green, John M. Hill, Joar G. Brynnel, James H. Slagle, David S. Ashby, Norman J. Cushing, John K. Little, Large Binocular Telescope Observatory (USA); R. Mark Wagner, Ohio State Univ. (USA) . . . . . [8448-41]

11.40: **Organizational transformation into the operational phase of the GTC**, Michiel van der Hoeven, Gran Telescopio CANARIAS (Spain); René Rutten, Pedro Alvarez Martín, Instituto de Astrofísica de Canarias (Spain). . . . . [8448-42]

Lunch Break . . . . . 12.00 to 13.30

SESSION 11

Room: E104 . . . . . Fri. 13.30 to 15.10

Site and Facility Operations II

Session Chair: **Fernando Comeron,**
European Southern Observatory (Germany)

13.30: **66 antennas, up to 15 km baselines, 5000 m elevation, 28 km from support; the coming challenge of ALMA Observatory antenna group operations and maintenance**, Dean Chalmers, Felipe Daruich, Brian Hoff, Cristobal Jara, Andres Ginsberg, ALMA (Chile) . . . . . [8448-43]

13.50: **New challenges for the maintenance strategies on large astronomical facilities at remote observing sites**, Armin Silber, European Southern Observatory (Chile) and ALMA-JAO (Chile). . . . . [8448-44]

14.10: **Taming the beast: operating the world largest low-frequency radio observatory LOFAR**, Arno Schoenmakers, Harm Munk, ASTRON (Netherlands) . . . . . [8448-45]

14.30: **The Observatorio Astrofisico de Javalambre: goals and current status**, Andrés Javier Cenarro, Mariano Moles, David Cristobal-Hornillos, Antonio Marin-Franch, Nicolas Gruel, Axel Yanes Díaz, Sergio Chueca, Carlos Hernández-Monteagudo, Jesús Varela López, Alessandro Ederoclite, Ctr. de Estudios de Física del Cosmos de Aragón (Spain); Olivier Pirnay, AMOS Ltd. (Belgium); Juan Luis Antón, Luis Alberto Díaz-García, Miguel Chioare Díaz-Martín, Susana Gracia-Gracia, Luis Guillén, José Luis Lamadrid, Angel López, Natalio Maicas, Fernando Rueda, Sergio Rueda, Luisa Valdivielso, Kerttu Viironen, Ctr. de Estudios de Física del Cosmos de Aragón (Spain) . . . [8448-52]

14.50: **Goals and strategies in global control design of the OAJ Robotic Observatory**, Axel Yanes Díaz, Sergio Rueda, Juan Luis Antón, Andrés Javier Cenarro, Mariano Moles, Fernando Rueda, Miguel Chioare Díaz-Martín, Antonio Marin-Franch, David Cristobal-Hornillos, Sergio Chueca, Alessandro Ederoclite, Luis Guillén, Nicolas Gruel, Jesús Varela López, Ctr. de Estudios de Física del Cosmos de Aragón (Spain) . . . . . [8448-87]

Coffee Break . . . . . 15.10 to 15.40

SESSION 12

Room: E104 . . . . . Fri. 15.40 to 17.40

Site and Facility Operations III

Session Chair: **Richard F. Green,**
Large Binocular Telescope Observatory (USA)

15.40: **Paranal instruments: installation, maintenance, optimization, and operation**, Frédéric Y. J. Gonte, Alain Smette, European Southern Observatory (Chile). . . . . [8448-48]

16.00: **The Keck way: vision and reality of technical operations at Keck**, Hilton A. Lewis, Richard Matsuda, W. M. Keck Observatory (USA) . . . . [8448-49]

16.20: **Spitzer Space Telescope: maximizing the science return in the extended mission phase**, Lisa J. Storrie-Lombardi, California Institute of Technology (USA); Suzanne R. Dodd, Jet Propulsion Lab. (USA) . . . . . [8448-46]

16.40: **NuSTAR Observatory operations**, Karl Forster, Fiona A. Harrison, California Institute of Technology (USA); Manfred Bester, Univ. of California, Berkeley (USA). . . . . [8448-50]

17.00: **A minimalist operating mode for UKIRT**, Tom Kerr, Gary R. Davis, Simon C. Craig, Craig Walther, Tim Chuter, Joint Astronomy Ctr. (USA)[8448-51]

17.20: **All-sky mid-infrared imagery to characterize sky conditions and improve STELLA's observational performance**, Michael Weber, Leibniz-Institut für Astrophysik Potsdam (Germany); Dimitri Klebe, Denver Museum of Nature and Science (USA); Klaus G. Strassmeier, Thomas Granzer, Leibniz-Institut für Astrophysik Potsdam (Germany); Ronald D. Blatherwick, Univ. of Denver (USA) . . . . . [8448-53]

Modeling, Systems Engineering, and Project Management for Astronomy V


Angeli


Dierickx

Conference Chairs: **George Z. Angeli,** Thirty Meter Telescope (USA); **Philippe Dierickx,** European Southern Observatory (Germany)

Program Committee: **Torben E. Andersen,** Lund Observatory (Sweden); **Roberto Biasi,** Microgate S.r.l. (Italy); **Simon C. Craig,** Joint Astronomy Ctr. (USA); **David T. Finley,** General Dynamics SATCOM Technologies (USA); **Eric R. Hansen,** National Solar Observatory (USA); **Danniella M. Muheim,** NASA Goddard Space Flight Ctr. (USA); **Jan R. Nijenhuis,** TNO (Netherlands); **Lee D. Peterson,** Jet Propulsion Lab. (USA); **Hermine Schnetler,** UK Astronomy Technology Ctr. (United Kingdom); **David C. Redding,** Jet Propulsion Lab. (USA); **Donald W. Sweeney,** LSST Corp. (USA); **Alberto Vizcargüenaga,** IDOM (Spain); **François P. Wildi,** Observatoire de Genève (Switzerland)

Sunday 1 July

SESSION 1

Room: E104 . . . . . Sun. 09.00 to 10.20

Modeling I

Session Chairs: **Philippe Dierickx,** European Southern Observatory (Germany); **Alberto Vizcargüenaga,** IDOM (Spain)

09.00: **Thermal seeing modeling validation through observatory measurements**, Konstantinos Vogiatzis, Angel C. Otarola, Warren A. Skidmore, Tony Travouillon, George Z. Angeli, Thirty Meter Telescope Observatory Corp. (USA) . . . . . [8449-01]

09.20: **A fluid dynamic study of the CFHT dome using CFD and water tunnel tests**, Marc R. Baril, Tom Benedict, Karunananth G. Thanjavur, Canada-France-Hawaii Telescope (USA); Konstantinos Vogiatzis, Thirty Meter Telescope (USA); René Racine, Univ. de Montréal (Canada); Derrick Salmon, Canada-France-Hawaii Telescope (USA); Shiang-Yu Wang, Yin-Chang Chang, Academia Sinica (Taiwan) . . . . . [8449-02]

09.40: **LSST summit enclosure: facility design optimization using aero-thermal modeling**, Jacques Sebag, National Optical Astronomy Observatory (USA); Konstantinos Vogiatzis, Thirty Meter Telescope (USA); Jeffrey D. Barr, Douglas R. Neill, National Optical Astronomy Observatory (USA) . . . . . [8449-03]

10.00: **Wind responses of the LSST secondary mirror**, Myung K. Cho, National Optical Astronomy Observatory (USA); Konstantinos Vogiatzis, Thirty Meter Telescope (USA); Jacques Sebag, Douglas R. Neill, National Optical Astronomy Observatory (USA) . . . . . [8449-04]

Coffee Break . . . . . 10.20 to 10.50

SESSION 2

Room: E104 . . . . . Sun. 10.50 to 12.10

Systems Engineering I

Session Chairs: **Danniella M. Muheim,** NASA Goddard Space Flight Ctr. (USA); **Torben Andersen,** Lund Observatory (Sweden)

10.50: **Systems engineering implementation in the preliminary design phase of the Giant Magellan Telescope**, Jessica Maiten, Matt W. Johns, Gelys Trancho, Giant Magellan Telescope Project (USA); Pradeep Mady, Cognition Corp. (USA) . . . . . [8449-05]

11.10: **System engineering of the Atacama Large Millimeter/submillimeter Array**, Ravinder S. Bhatia, Javier Marti Canales, Shin'ichiro Asayama, Denis Barkats, ALMA (Chile); William Brundage, National Radio Astronomy Observatory (USA); Eugene DuVall, ALMA (Chile); Juan Carlos Echaniz, European Southern Observatory (Germany); Brian Glendenning, Wes Grammer, National Radio Astronomy Observatory (USA); Christoph Haupt, European Southern Observatory (Germany); Ulrike Hautmann, ALMA (Chile); Rafael Hiriart, National Radio Astronomy Observatory (USA); Herve Kurlandczyk, European Southern Observatory (Germany); Richard J. Kurz, ALMA (Chile); Richard J. Lacasse, National Radio Astronomy Observatory (USA); Maurizio Miccolis, ALMA (Chile); Norikazu Mizuno, National Astronomical Observatory of Japan (Japan); Koh-Ichiro Morita, ALMA (Chile); Peter J. Napier, National Radio Astronomy Observatory (USA); Gary S. Parks, Eduardo Pizarro, ALMA (Chile); Tony Rodriguez, National Radio Astronomy Observatory (USA); Alejandro Saez, ALMA (Chile); Kamaljeet S. Saini, National Radio Astronomy Observatory (USA); William Snow, ALMA (Chile); Richard Sramek, National Radio Astronomy Observatory (USA); Masahiro Sugimoto, ALMA (Chile); Gianluca Verzichelli, European Southern Observatory (Germany); Nicholas D. Whyborn, ALMA (Chile); Pavel A. Yagoubov, European Southern Observatory (Germany). . . . . [8449-06]

11.30: **Modeling and simulations in systems engineering of the Large Synoptic Survey Telescope**, Charles F. Claver, National Optical Astronomy Observatory (USA); Andrew Connolly, Univ. of Washington (USA); John Peterson, Purdue Univ. (USA); Jesse G. Jernigan, Univ. of California, Berkeley (USA); Tim Axelrod, LSST Corp. (USA); James Bartlett, AstroParticule et Cosmologie (France); R. Lynne Jones, K. Simon Krughoff, Rob Gibson, Peter Yoachim, Univ. of Washington (USA) . . . . . [8449-07]

11.50: **Management of the JWST MIRI pFM environmental and performance verification test campaign**, Paul Eccleston, Rutherford Appleton Lab. (United Kingdom); Alistair Glasse, UK Astronomy Technology Ctr. (United Kingdom); Tim Grundy, Rutherford Appleton Lab. (United Kingdom); Örs Hunor Detre, Max-Planck-Institut für Astronomie (Germany); Brian J. O'Sullivan, EADS Astrium Ltd. (United Kingdom); Bryan M. Shaughnessy, Rutherford Appleton Lab. (United Kingdom); Jonathan Sykes, Univ. of Leicester (United Kingdom); John Thatcher, EADS Astrium Ltd. (United Kingdom); Helen Walker, Rutherford Appleton Lab. (United Kingdom); Martyn Wells, UK Astronomy Technology Ctr. (United Kingdom); David Wright, EADS Astrium Ltd. (United Kingdom); Gillian S. Wright, UK Astronomy Technology Ctr. (United Kingdom) . . . . . [8449-08]

Lunch Break . . . . . 12.10 to 13.30

SESSION 3

Room: E104 . . . . . Sun. 13.30 to 15.30

Systems Engineering II

Session Chairs: **Hermine Schnetler,** UK Astronomy Technology Ctr. (United Kingdom); **Jan R. Nijenhuis,** TNO (Netherlands)

13.30: **Developing an instrument simulator: experience feedback from the JWST/NIRSpec and VLT/MUSE simulators**, Aurélien Jarno, Laure Piqueras, Roland M. Bacon, Observatoire de Lyon (France); Pierre Ferruit, European Space Research and Technology Ctr. (Netherlands); Xavier Gnata, EADS Astrium GmbH (Germany); Émeline Legros, Univ. Claude Bernard Lyon 1 (France); Arlette Pécontal-Rousset, Observatoire de Lyon (France); Ole Streicher, Peter Weilbacher, Leibniz-Institut für Astrophysik Potsdam (Germany). . . . . [8449-09]

13.50: **Transitioning from conceptual design to construction performance specification**, Paul F. Jeffers, Mark Warner, Robert P. Hubbard, National Solar Observatory (USA); Simon C. Craig, Joint Astronomy Ctr. (USA); Heather K. Marshall, National Solar Observatory (USA) . . . . . [8449-10]

14.10: **Usability-driven evolution of a space instrument**, Alec J. McCalden, SRON Netherlands Institute for Space Research (Netherlands) . . . . . [8449-11]

14.30: **Building information models (BIM) for astronomy projects**, Javier Ariño, Gaizka Murga, Ramón Campo, IDOM (Spain) . . . . . [8449-12]

14.50: **Managing successful industry engagement: the ASKAP experience**, Carole A. Jackson, Commonwealth Scientific and Industrial Research Organisation (Australia) . . . . . [8449-64]

15.10: **Astrometric instrument modeling in the Gaia astrometric verification context: tasks and activities**, Deborah Busonero, INAF - Osservatorio Astronomico di Torino (Italy) . . . . . [8449-14]

Coffee Break . . . . . 15.30 to 16.00

SESSION 4

Room: E104 . . . . . Sun. 16.00 to 18.00

Project Management I

Session Chairs: **David T. Finley,** General Dynamics SATCOM Technologies (USA); **Roberto Biasi,** Microgate S.r.l. (Italy)

16.00: **The information management tool (IMT) of Gaia DPAC and its potential as tool for large scale software development projects**, Gabriele Comoretto, Julio Gallegos, Sebastian G. Els, Gracia Gonzalo, Timothy Lock, Emmanuel Mercier, William O'Mullane, European Space Astronomy Ctr. (Spain) . . . . . [8449-15]

16.20: **The organization and management of the Virtual Astronomical Observatory**, Graham B. Berriman, California Institute of Technology (USA); Robert J. Hanisch, Space Telescope Science Institute (USA); Joseph W. Lazio, Jet Propulsion Lab. (USA); Alexander Szalay, Johns Hopkins Univ. (USA); Giuseppina Fabbiano, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8449-16]

16.40: **Managing distributed software development in the Virtual Astronomical Observatory**, Janet D. Evans, Smithsonian Astrophysical Observatory (USA); Raymond L. Plante, Univ. of Illinois at Urbana-Champaign (USA); Nina Boneventura, Smithsonian Astrophysical Observatory (USA); Ivo Busko, Space Telescope Science Institute (USA); Mark L. Cresitello-Dittmar, Stephen Doe, Smithsonian Astrophysical Observatory (USA); Rick Ebert, Infrared Processing and Analysis Ctr. (USA); Omar Laurino, Smithsonian Astrophysical Observatory (USA); Olga Pevunova, Infrared Processing and Analysis Ctr. (USA); Brian Refsdal, Smithsonian Astrophysical Observatory (USA) and SAY Media, Inc. (USA); Brian Thomas, National Optical Astronomy Observatory (USA); Randall Thompson, Space Telescope Science Institute (USA). . . . . [8449-17]

17.00: **Observatory facility staff requirements and local labor markets**, David Rabanus, European Southern Observatory (Chile); Marylin Keating, ALMA (Chile). . . . . [8449-18]

17.20: **Astronomical large projects managed with MANATEE: management tool for effective engineering**, María Luisa García-Vargas, FRACTAL S.L.N.E (Spain); Emma Mujica-Alvarez, Ana Pérez Calpena, FRACTAL S.L.N.E. (Spain) . . . . . [8449-19]

17.40: **The important role of maintenance in the functionality and life of the observatories: the international standard S1000D for ALMA antennas**, Gianpietro Marchiori, Federico Formentin, Andrea Busatta, Luigi Fardella, Luigino Giacomel, Stefano Grotto, European Industrial Engineering s.r.l. (Italy) . . . . . [8449-20]

Monday 2 July

PLENARY SESSION
Room: Auditorium . . . . . Mon. 08.50 to 10.00

Session Chair: **Mark M. Casali,** European Southern Observatory (Germany)

08.50: **Introduction**

09.00: **James Webb Space Telescope: science update and status** *(Presentation Only)*, Heidi B. Hammel, AURA, Inc. (USA) . . . . . [8442-501]

09.30: **Exoplanets: unraveling a new paradigm** *(Presentation Only)*, Didier Queloz, Geneva Univ., Observatory of Geneva (Switzerland). . . . . [8442-502]

Coffee Break . . . . . 10.00 to 10.30

SESSION 5
Room: E104 . . . . . Mon. 10.30 to 12.00

Project Management II
Session Chairs: **Donald W. Sweeney,** LSST Corp. (USA); **George Z. Angeli,** Thirty Meter Telescope Observatory Corp. (USA)

10.30: **Management of large astronomical contracts: the E-ELT case** *(Invited Paper)*, Alistair M. McPherson, Donald Tait, Jason Spyromilio, European Southern Observatory (Germany) . . . . . [8449-21]

11.00: **The Large Synoptic Survey Telescope project management control system**, Jeffrey Kantor, LSST Corp. (USA). . . . . [8449-22]

11.20: **But I'm an engineer--not a contracts lawyer!**, Mark Warner, Harvey S. Bass, National Optical Astronomy Observatory (USA) . . . . . [8449-23]

11.40: **Assembly, integration, and verification (AIV) in ALMA: series processing of array elements**, Bernhard Lopez, Rieks Jager, Nicholas D. Whyborn, Lewis B. G. Knee, Atacama Large Millimeter Array (Chile); Joseph P. McMullin, National Solar Observatory (USA). . . . . [8449-24]

Lunch Break . . . . . 12.00 to 13.40

SESSION 6
Room: E104 . . . . . Mon. 13.40 to 15.20

Project Management III
Session Chairs: **Danniella M. Muheim,** NASA Goddard Space Flight Ctr. (USA); **Philippe Dierickx,** European Southern Observatory (Germany)

13.40: **Managing complex space missions: the James Webb Space Telescope** *(Invited Paper)*, William R. Ochs, NASA Goddard Space Flight Ctr. (USA) . . . . . [8449-25]

14.10: **Successfully project managing a large European consortium in a trans-Atlantic relationship** *(Invited Paper)*, John Thatcher, EADS Astrium Ltd. (United Kingdom). . . . . [8449-26]

14.40: **Incentive contracts for development projects**, David T. Finley, General Dynamics SATCOM Technologies (USA); William T. DeGroff, Lowell Observatory (USA); Byron W. Smith, X Double Dot, LLC (USA) . . . . . [8449-37]

15.00: **PS2: managing the next step in the Pan-STARRS wide field survey system**, William S. Burgett, Univ. of Hawai'i (USA) . . . . . [8449-28]

Coffee Break . . . . . 15.20 to 15.50

SESSION 7
Room: E104 . . . . . Mon. 15.50 to 17.10

Modeling II
Session Chairs: **Torben Andersen,** Lund Observatory (Sweden); **Simon C. Craig,** Joint Astronomy Ctr. (USA)

15.50: **Systems modeling of the James Webb Space Telescope**, Danniella M. Muheim, Michael T. Menzel, NASA Goddard Space Flight Ctr. (USA) . . [8449-29]

16.10: **Integrated telescope model for James Webb Space Telescope**, J. Scott Knight, Allison A. Barto, Paul A. Lightsey, Ball Aerospace & Technologies Corp. (USA). . . . . [8449-30]

16.30: **The Large Synoptic Survey Telescope (LSST) instrument model development**, David K. Gilmore, Steven M. Kahn, Patrick Hascall, Martin Nordby, Aaron J. Roodman, SLAC National Accelerator Lab. (USA); Vincent J. Riot, Lawrence Livermore National Lab. (USA) . . . . . [8449-31]

16.50: **Simulation of Chinese SONG telescope**, Liang Gao, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate Univ. of Chinese Academy of Sciences (China); Guomin Wang, Nanjing Institute of Astronomical Optics & Technology (China); Chen Li, Nanjing Institute of Astronomical Optics & Technology (China) and Graduate Univ. of Chinese Academy of Sciences (China) . . . . . [8449-33]

Tuesday 3 July

PLENARY SESSION
Room: Auditorium . . . . . Tues. 09.00 to 10.00

Session Chair: **Kathryn A. Flanagan,** Space Telescope Science Institute (USA)

09.00: **The Kepler Exoplanet Survey: instrumentation, performance and results**, Thomas N. Gautier III, Jet Propulsion Lab., Caltech (USA) and The Kepler Science Team (USA). . . . . [8442-503]

09.30: **Antarctic astronomy**, John W. V. Storey, The Univ. of New South Wales (Australia). . . . . [8446-504]

Coffee Break . . . . . 10.00 to 10.30

SESSION 8
Room: E104 . . . . . Tues. 10.30 to 12.10

Project Management IV
Session Chairs: **Simon C. Craig,** Joint Astronomy Ctr. (USA); **Francois Wildi,** Observatory of Geneva (Switzerland)

10.30: **The black hole of U.S. export controls: effective techniques for navigating away from the gravitation pull** *(Invited Paper)*, Kerry Scarlott, Goulston & Storrs (USA) . . . . . [8449-34]

11.00: **Managing SPHERE, a multinational instrument project for VLT** *(Invited Paper)*, Pascal Puget, Lab. d'Astrophysique de l'Observatoire de Grenoble (France) . . . . . [8449-35]

11.30: **The MUSE project face to face with reality**, Patrick Caillier, Observatoire de Lyon (France) . . . . . [8449-36]

11.50: **Managing large astronomy projects: Herschel-HIFI and ALMA**, Mattheus W. M. de Graauw, Richard J. Kurz, ALMA (Chile); Kees Wafelbakker, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands). . . . . [8449-27]

Lunch Break . . . . . 12.10 to 13.40

SESSION 9
Room: E104 . . . . . Tues. 13.40 to 15.20

Modeling III
Session Chairs: **Eric R. Hansen,** National Solar Observatory (USA); **David T. Finley,** General Dynamics SATCOM Technologies (USA)

13.40: **Modeling the polarimetric behavior of optical systems with the M&m's code**, Maria de Juan Ovelar, Frans Snik, Leiden Observatory (Netherlands); Ronald Roelfsema, ASTRON (Netherlands); Christoph U. Keller, Leiden Observatory (Netherlands). . . . . [8449-38]

14.00: **CODEX optical stability under microvibration environment: Is the Nasmith focal station suitable or not?**, Marco Riva, Filippo M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy); Luca Pasquini, European Southern Observatory (Germany) . . . . . [8449-39]

14.20: **Using local entropy as a merit function in a sensorless AO arrangement**, Vincent Suc, Univ. Politècnica de Catalunya (Spain) and Pontificia Univ. Católica de Chile (Chile); Santiago Royo, Univ. Politècnica de Catalunya (Spain); Andrés Jordan, Pontificia Univ. Católica de Chile (Chile) . . . . . [8449-40]

14.40: **Modelling the optical pathway of the Large Binocular Telescope**, Michael Böhm, Univ. Stuttgart (Germany) and Max-Planck-Institut für Astronomie (Germany); Jörg-Uwe Pott, Max-Planck-Institut für Astronomie (Germany); Oliver Sawodny, Univ. Stuttgart (Germany); Thomas M. Herbst, Martin Kürster, Max-Planck-Institut für Astronomie (Germany) . . . . . [8449-41]

15.00: **Dynamical attitude model for Gaia and attitude reconstruction**, Daniel Risquez, Leiden Observatory (Netherlands); Floor van Leeuwen, Univ. of Cambridge (United Kingdom); Anthony G. A. Brown, Leiden Observatory (Netherlands) . . . . . [8449-42]

Coffee Break . . . . . 15.20 to 15.50

SESSION 10

Room: E104 . . . . . Tues. 15.50 to 17.30

Modeling IV

Session Chairs: **George Z. Angeli,** Thirty Meter Telescope Observatory Corp. (USA); **David C. Redding,** Jet Propulsion Lab. (USA)

15.50: **Modeling for instrument diagnostics: study and analysis of Gaia non-nominal configurations impact on astrometric performance**, Deborah Busonero, Davide Loreggia, Alberto Riva, INAF - Osservatorio Astronomico di Torino (Italy) . . . . . [8449-57]

16.10: **E-ELT seismic devices analysis and prototype testing**, Celia Gomez, Alexander Aviles, Armando Bilbao, IDOM (Spain); Franz Koch, Paolo Ghiretti, European Southern Observatory (Germany); Daniel Siepe, Peter Nawrotzki, GERB Schwingungsisolierungen GmbH & Co. KG (Germany) . . . . . [8449-44]

16.30: **A new optomechanical structural optimization approach: coupling FEA and Raytracing sensitivity matrices**, Marco Riva, INAF - Osservatorio Astronomico di Brera (Italy) . . . . . [8449-45]

16.50: **Dynamic analysis of active control system for CGST**, Yichun Dai, Zhong Liu, Yunnan Astronomical Observatory (China); Dehua Yang, Nanjing Institute of Astronomical Optics & Technology (China); Lorenzo Zago, Univ. of Applied Sciences of Western Switzerland (Switzerland) . . . . . [8449-46]

17.10: **Integrated modeling support of the FINESSE mission: achieving a very stable LOS in low-earth orbit,** Michael D. Lieber, Jeff Bladt, Steven Jordan, Gretchen Reavis, Ball Aerospace & Technologies Corp. (USA); Mark R. Swain, Jet Propulsion Lab. (USA) . . . . . [8449-47]

POSTERS-TUESDAY

Room: Hall 3. . . . . Tues. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters. for this conference will be on display on Tuesday. The interactive poster session with authors in attendance will be Tuesday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

Project Management

ALMA band 3 receiver maintenance plan, Keith K. Yeung, Kerry Seifried, National Research Council Canada (Canada); William Randolph, National Radio Astronomy Observatory (USA); Charles T. Cunningham, National Research Council Canada (Canada) . . . . . [8449-48]

Product and quality assurance processes and ECSS compliance within a science ground segment using Gaia as an example, Timothy Lock, Sebastian G. Els, Gabriele Comoretto, Gracia Gonzalo, Emmanuel Mercier, William O'Mullane, European Space Astronomy Ctr. (Spain) . . . . . [8449-49]

Gemini planet imager (GPI): project managment and oversight, Stephen J. Goodsell, Gemini Observatory (USA); David W. Palmer, Bruce A. Macintosh, Lawrence Livermore National Lab. (USA); Leslie Saddlemyer, National Research Council Canada (Canada) . . . . . [8449-50]

Project Status

The preresearch of the deploy technology for the large aperture space astronomical telescope, Fanghua Jiang, Heng Zuo, Guoping Li, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8449-51]

Gaia mock-up: an educational demonstrative Gaia model, Alberto Riva, Mario G. Lattanzi, Mario Gai, Davide Loreggia, INAF - Osservatorio Astronomico di Torino (Italy); Isidoro Sciarratta, Imparare Sperimentando (Italy) . . . . [8449-52]

VST system engineering and management of commissioning, Pietro Schipani, INAF - Osservatorio Astronomico di Capodimonte (Italy) . . . . [8449-53]

Systems Engineering

Analysis and optimization of the SONG Telescope, Zhiyong Zhang, Guomin Wang, Bozhong Gu, Xiang Jiang, Dongsheng Niu, Zhongyu Yue, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8449-54]

ALMA system performance analysis tool, Masahiro Sugimoto, ALMA (Chile); Pavel A. Yagoubov, European Southern Observatory (Germany); Javier Marti Canales, ALMA (Chile) . . . . . [8449-55]

Use of failure modes and effects analysis in design of the tracker system for the HET wide-field upgrade, Richard J. Hayes, Timothy A. Beets, Joseph H. Beno, John A. Booth, Mark E. Cornell, John M. Good, James T. Heisler, Herman J. Kriel, Charles E. Penney, Marc D. Rafal, Richard D. Savage, Ian M. Soukup, Michael S. Worthington, Joseph J. Zierer, The Univ. of Texas at Austin (USA) . . . . . [8449-56]

Modeling

MESS: the METIS instrument software simulator, Gianalfredo Nicolini, INAF - Osservatorio Astronomico di Torino (Italy); Vincenzo Andretta, INAF - Osservatorio Astrofisico di Arcetri (Italy); Lucia Abbo, Ester Antonucci, Alessandro Bemporad, Giuseppe Crescenzio, Gerardo Capobianco, Silvano Fineschi, INAF - Osservatorio Astronomico di Torino (Italy); Mauro Focardi, Univ. degli Studi di Firenze (Italy); Enrico Magli, Politecnico di Torino (Italy); Giampiero Naletto, Piergiorgio Nicolosi, Univ. degli Studi di Padova (Italy); Maurizio Pancrazzi, Marco Romoli, Univ. degli Studi di Firenze (Italy); Michela C. Uslenghi, INAF - IASF Milano (Italy); Cosimo Antonio Volpicelli, INAF - Astronomical Observatory of Torino (Italy) . . . . . [8449-32]

Thermo-structural analysis of stresses during fabrication of an optical element for the APF camera, Gerald Cabak, David Hilyard, Univ. of California Observatories (USA) . . . . . [8449-58]

Design and analysis of China SONG Telescope control system, Changzhi Ren, Nanjing Institute of Astronomical Optics & Technology (China) . . . [8449-59]

The design and simulation of a six-axis vibration isolator for space applications, Yongliang Zhang, Beijing Institute of Technology (China) [8449-60]

An end-to-end instrument model for the proposed E-ELT instrument METIS, Eva Schmalzl, Leiden Observatory (Netherlands); Lars Venema, ASTRON (Netherlands); Sarah Kendrew, Max-Planck-Institut für Astronomie (Germany); Bernhard R. Brandl, Leiden Observatory (Netherlands); Joris Blommaert, Katholieke Univ. Leuven (Belgium); Alistair Glasse, UK Astronomy Technology Ctr. (United Kingdom); Rainer Lenzen, Max-Planck-Institut für Astronomie (Germany); Michael R. Meyer, ETH Zurich (Switzerland); Frank Molster, Leiden Observatory (Netherlands); Eric J. Pantin, Commissariat à l'Énergie Atomique (France) . . . . . [8449-61]

A new calculation of LAMOST optical vignetting, Shuang Li, Ali Luo, Jian-Jun Chen, National Astronomical Observatories (China); Genrong Liu, Nanjing Institute of Astronomical Optics & Technology (China); Georges Comte, Observatoire Astronomique de Marseille-Provence (France) . . . . . [8449-62]

WaFER: a tool to derive the focal surface of optical configurations and characterise their optical response, Maura Sandri, Luca Valenziano, INAF - IASF Bologna (Italy) . . . . . [8449-63]

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Modern Technologies in Space- and Ground-based Telescopes and Instrumentation II


Navarro


Cunningham


Prieto

Conference Chairs: **Ramón Navarro,** NOVA-ASTRON (Netherlands); **Colin R. Cunningham,** UK Astronomy Technology Ctr. (United Kingdom); **Eric Prieto,** Observatoire Astronomique de Marseille-Provence (France)

Program Committee: **Daniel R. Blanco,** WIYN Observatory (USA); **V. Alfonso Feria,** Jet Propulsion Lab. (USA); **Roland Geyl,** Sagem SA (France); **Peter Hartmann,** SCHOTT AG (Germany); **Huub Janssen,** Janssen Precision Engineering B.V. (Netherlands); **David M. Montgomery,** UK Astronomy Technology Ctr. (United Kingdom); **Andrew T. Sarawit,** Simpson Gumpertz & Heger Inc. (USA); **Jinxue Wang,** Raytheon Co. (USA)

Sunday 1 July

SESSION 1

Room: G104 . . . . . Sun. 09.00 to 12.10

Telescope Structures and Domes

Session Chair: **Andrew T. Sarawit,**
Simpson Gumpertz & Heger Inc. (USA)

09.00: **Design, modeling, and development plan for space environment qualification of the EUCLID near infrared spectrometer SiC main structure**, Tony Pamplona, Laurent Martin, Eric Prieto, Serge Vester, Lab. d'Astrophysique de Marseille (France) . . . . . [8450-01]

09.20: **Silicon carbide optics for space and ground-based astronomical telescopes**, Joseph L. Robichaud, Jay Schwartz, Chris Wainer, L-3 Communications SSG-Tinsley (USA) . . . . . [8450-02]

09.40: **LISA telescope assembly optical stability characterization**, Adrianus L. Verlaan, TNO (Netherlands) . . . . . [8450-03]

10.00: **Vibration damping for the Segmented Mirror Telescope**, Joseph Maly, CSA Engineering, Inc. (USA); Adam Yingling, Naval Postgraduate School (USA); Trevor Chambers, CSA Engineering, Inc. (USA); Richard Cobb, Air Force Institute of Technology (USA); Brij Agrawal, Naval Postgraduate School (USA) . [8450-04]

Coffee Break . . . . . 10.20 to 10.50

10.50: **Mechanical design of First Antarctic Survey Telescope**, Xuefei Gong, Haikun Wen, Zhenqiu Yao, Ru Zhang, Fang Zhou, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8450-05]

11.10: **Overall performance of the ALMA antenna during solar observation**, Francesco Rampini, Gianpietro Marchiori, European Industrial Engineering s.r.l. (Italy) . . . . . [8450-06]

11.30: **The GREGOR dome, pathfinder for the EST dome**, Robert H. Hammerschlag, Utrecht Univ. (Netherlands); Johannes N. Kommers, Hankom Engineering (Netherlands); Simon Visser, Poly-Ned BV (Netherlands); Simon J. van Leverink, Royal Duyvis Wiener B.V. (Netherlands); Felix C. Bettonvil, Utrecht Univ. (Netherlands) and Technology Foundation STW (Netherlands); Guus Sliepen, Stockholm Univ. (Sweden) and Technology Foundation STW (Netherlands); Aswin P. Jägers, Utrecht Univ. (Netherlands) and Technology Foundation STW (Netherlands) . . . . . [8450-07]

11.50: **The solid telescope as answer to specific application requirements**, Alberto Riva, INAF - Osservatorio Astronomico di Torino (Italy) . . . . . [8450-08]

Lunch Break . . . . . 12.10 to 13.30

SESSION 2

Room: G104 . . . . . Sun. 13.30 to 17.40

Active Structures and Optics

Session Chair: **David M. Montgomery,**
UK Astronomy Technology Ctr. (United Kingdom)

13.30: **The opto-mechanical performance prediction of thin mirror segments for E-ELT**, Jan R. Nijenhuis, TNO (Netherlands) . . . . . [8450-09]

13.50: **Co-phasing of the segmented mirror based on the generalized phase diversity wavefront sensor**, Changwei Li, Sijiong Zhang, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8450-10]

14.10: **Extremely stable piezo mechanisms for the new Gravitational Wave Observatory**, Joep Pijnenburg, Niek Rijnveld, Harm Hogenhuis, TNO (Netherlands) . . . . . [8450-11]

14.30: **Metrology for a Solar imaging Fourier transform spectrometer working in the far UV: from the instrumental concept to the first experimental results**, Claudia Ruiz de Galarreta Fanjul, Mehdi Bouzit, Anne Philippon, Jean-Claude Vial, Thierry P. Appourchaux, Institut d'Astrophysique Spatiale (France); Jean-Pierre Maillard, Institut d'Astrophysique de Paris (France) . . . . . [8450-12]

14.50: **Shape memory alloys for astronomical instrumentation: space and ground-based applications**, Marco Riva, Francesco Zanetti, Daniela Rigamonti, INAF - Osservatorio Astronomico di Brera (Italy); Elena Villa, Francesca Passaretti, CNR-IENI (Italy); Filippo M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy) . . . . . [8450-13]

Coffee Break . . . . . 15.10 to 15.40

15.40: **Liquid atmospheric dispersion corrector**, Jessica Zheng, Will Saunders, Jon S. Lawrence, Florent Bastien, Faustine Cantalloube, Australian Astronomical Observatory (Australia) . . . . . [8450-14]

16.00: **Analysis of gravitational effects on liquid lenses (ANGEL)**, Kevin Newman, The Univ. of Arizona (USA); Kyle Stephens, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [8450-15]

16.20: **Flexure mount for a MEMS deformable mirror for the Gemini Planet Imager**, Alexis Hill, National Research Council Canada (Canada); Steven Cornelissen, Boston Micromachines Corp. (USA); Daren Dillon, Univ. of California, Santa Cruz (USA); Charlie Lam, Boston Micromachines Corp. (USA); David W. Palmer, Lawrence Livermore National Lab. (USA); Leslie Saddlemyer, National Research Council Canada (Canada) . . . . . [8450-16]

16.40: **Curvature wavefront sensing performance simulations and tests for active correction of wide field telescopes**, Sergio Chueca, Andrés Javier Cenarro, Mariano Moles, Fernando Rueda, Sergio Rueda, David Cristobal-Hornillos, Ctr. de Estudios de Física del Cosmos de Aragón (Spain) . . . [8450-17]

17.00: **Active optics: deformation systems compensating for optical aberrations with a limited number of actuators**, Marie Laslandes, Emmanuel Hugot, Marc Ferrari, Lab. d'Astrophysique de Marseille (France) . . . . . [8450-18]

17.20: **Stabilized dispersive focal plane systems for space**, Peter W. A. Roming, Chip R. Beebe, Mark J. Brooks, Michael W. Davis, Robert A. Klar, John M. Roberts, Randall J. Rose, Gregory S. Winters, Southwest Research Institute (USA) . . . . . [8450-19]

Monday 2 July

PLENARY SESSION

Room: Auditorium . . . . . Mon. 08.50 to 10.00

Session Chair: **Mark M. Casali,**
European Southern Observatory (Germany)

08.50: **Introduction**

09.00: **James Webb Space Telescope: science update and status** *(Presentation Only)*, Heidi B. Hammel, AURA, Inc. (USA) . . . . . [8442-501]

09.30: **Exoplanets: unraveling a new paradigm** *(Presentation Only)*, Didier Queloz, Geneva Univ., Observatory of Geneva (Switzerland) . . . . . [8442-502]

Coffee Break . . . . . 10.00 to 10.30

SESSION 3

Room: G104 . . . . . Mon. 10.30 to 11.30

Coronography and High Contrast Imaging

Session Chair: **Jinxue Wang,** Raytheon Co. (USA)

10.30: **Architecture impacts on planning and activity scheduling in external occulter missions**, Ian J. E. Jordan, Computer Sciences Corp. (USA) [8450-215]

10.50: **The vector-APP: a broadband apodizing phase plate that yields complementary PSFs**, Frans Snik, Matthew A. Kenworthy, Gilles Otten, Leiden Observatory (Netherlands); Johanan Codona, The Univ. of Arizona (USA); Christopher C. Packham, Univ. of Florida (USA); Michael Escuti, North Carolina State Univ. (USA) . . . . . [8450-21]

11.10: **Lab results of the circular phase mask concepts for high-contrast imaging**, Mamadou N'Diaye, Kjetil Dohlen, Lab. d'Astrophysique de Marseille (France); Thierry Fusco, ONERA (France); Kacem El-Hadi, Lab. d'Astrophysique de Marseille (France); Rémi Soummer, Space Telescope Science Institute (USA); Salvador Cuevas, Univ. Nacional Autónoma de México (Mexico); Myriam Zerrad, Institut Fresnel (France); Marc Ferrari, Lab. d'Astrophysique de Marseille (France) . . . . . [8450-22]

SESSION 4

Room: G104 . . . . . Mon. 11.30 to 12.30

Test and Metrology I

Session Chair: **V. Alfonso Feria,** Jet Propulsion Lab. (USA)

11.30: **A review of the KMOS IFU component metrology programme**, Stephen Rolt, Andrew K. Kirby, Durham Univ. (United Kingdom). . . . . [8450-23]

11.50: **Test results of high-precision large cryogenic lens holders**, Csaba Gal, Arnd Reutlinger, Anton Boesz, Amir Mottaghibonab, Theresa Leberle, Kayser-Threde GmbH (Germany); Frank Grupp, Andreas Bode, Norbert Geis, Max-Planck-Institut für extraterrestrische Phyisk (Germany); Ralf Bender, Univ.-Sternwarte der Ludwig- Maximilians-Univ. (Germany) . . . . . [8450-24]

12.10: **CTE measurement setup with 10 ppb/K sensitivity for characterizing lightweight and highly stable materials for space applications**, Ruven Spannagel, Hochschule Konstanz (Germany); Martin Gohlke, EADS Astrium GmbH (Germany) and Humboldt-Univ. zu Berlin (Germany); Thilo Schuldt, Hochschule Konstanz (Germany); Ulrich Johann, Dennis Weise, EADS Astrium GmbH (Germany); Claus Braxmaier, Hochschule Konstanz (Germany) and EADS Astrium GmbH (Germany) . . . . . [8450-25]

Lunch Break . . . . . 12.30 to 13.40

SESSION 5

Room: G104 . . . . . Mon. 13.40 to 15.20

Test and Metrology II

Session Chair: **V. Alfonso Feria,** Jet Propulsion Lab. (USA)

13.40: **Wavefront calibration testing of the James Webb Space Telescope primary mirror center of curvature optical assembly**, Gene Olczak, Conrad Wells, David J. Fischer, Mark T. Connolly, ITT Exelis Inc. (USA) . . . . . [8450-26]

14.00: **Tunable laser techniques for improving the precision of optical astronomy**, Claire E. Cramer, Steven W. Brown, Keith R. Lykke, Ping Shaw, John T. Woodward IV, National Institute of Standards and Technology (USA); John T. McGraw, Peter C. Zimmer, The Univ. of New Mexico (USA); Stephen Bailey, Lawrence Berkeley National Lab. (USA); Adam S. Bolton, Joel Brownstein, The Univ. of Utah (USA); David J. Schlegel, Lawrence Berkeley National Lab. (USA); Peter E. Doherty, Christopher W. Stubbs, Amali Vaz, Harvard Univ. (USA); Andrew Szentgyorgyi, Harvard-Smithsonian Ctr. for Astrophysics (USA) . . . . . [8450-27]

14.20: **Results of the new metrology system of the European ALMA antenna**, Francesco Rampini, Gianpietro Marchiori, European Industrial Engineering s.r.l. (Italy) . . . . . [8450-28]

14.40: **An imaging displacement sensor with nanometer accuracy**, David P. Woody, Owens Valley Radio Observatory (USA); David C. Redding, Jet Propulsion Lab. (USA) . . . . . [8450-29]

15.00: **Fine optical alignment correction of astronomical spectrographs via in-situ full-field moment-based wavefront sensing**, Hanshin Lee, Gary J. Hill, Sarah E. Tuttle, Brian L. Vattiat, The Univ. of Texas at Austin (USA) . . [8450-192]

Coffee Break . . . . . 15.20 to 15.50

SESSION 6

Room: G104 . . . . . Mon. 15.50 to 17.30

Test and Metrology III

Session Chair: **Roland Geyl,** Sagem Défense Sécurité (France)

15.50: **SCOTS: a large dynamic range reverse Hartmann test for Giant Magellan Telescope primary mirrors**, Peng Su, Shanshan Wang, Manal Khreishi, College of Optical Sciences, The Univ. of Arizona (USA); Tom Zobrist, Hubert Martin, The Univ. of Arizona (USA); James H. Burge, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [8450-31]

16.10: **Applications of subaperture stitching interferometry for very large mirrors**, James H. Burge, Chunyu Zhao, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [8450-32]

16.30: **Photochromic point diffraction interferometer for optical testing**, Martino Quintavalla, Politecnico di Milano (Italy); Giorgio Pariani, Giuseppe Crimi, Andrea Bianco, INAF - Osservatorio Astronomico di Brera (Italy); Chiara Bertarelli, Politecnico di Milano (Italy) . . . . . [8450-33]

16.50: **Testing large flats with computer generated holograms**, Giorgio Pariani, Daniela Tresoldi, Paolo Spanò, Andrea Bianco, INAF - Osservatorio Astronomico di Brera (Italy) . . . . . [8450-34]

17.10: **Full characterization of photochromic computer generated holograms for optical testing**, Giorgio Pariani, INAF - Osservatorio Astronomico di Brera (Italy) and Politecnico di Milano (Italy); Chiara Bertarelli, Politecnico di Milano (Italy) and CNST@PoliMi - IIT (Italy); Andrea Bianco, INAF - Osservatorio Astronomico di Brera (Italy); Christof Pruss, Univ. Stuttgart (Germany) . . . . . [8450-35]

Tuesday 3 July

PLENARY SESSION

Room: Auditorium . . . . . Tues. 09.00 to 10.00

Session Chair: **Kathryn A. Flanagan,**
Space Telescope Science Institute (USA)

09.00: **The Kepler Exoplanet Survey: instrumentation, performance and results**, Thomas N. Gautier III, Jet Propulsion Lab., Caltech (USA) and The Kepler Science Team (USA) . . . . . [8442-503]

09.30: **Antarctic astronomy**, John W. V. Storey, The Univ. of New South Wales (Australia) . . . . . [8446-504]

Coffee Break . . . . . 10.00 to 10.30

SESSION 7

Room: G104 . . . . . Tues. 10.30 to 12.40

Optical Fibers and Waveguides

Session Chair: **Eric Prieto,**
Observatoire Astronomique de Marseille-Provence (France)

10.30: **Second generation OH suppression filters using multicore fibers** *(Invited Paper)*, Roger Haynes, Jean-Christophe Olaya, Dionne M. Haynes, Leibniz-Institut für Astrophysik Potsdam (Germany); Tim A. Birks, Univ. of Bath (United Kingdom); Joss Bland-Hawthorn, The Univ. of Sydney (Australia) . . . . . [8450-36]

11.00: **On-telescope performance simulations of a fibre Bragg grating-based instrument for high spectral and temporal resolution astronomical observations**, Geraldine Mariën, Nemanja Jovanovic, Nick Cvetojevic, Robert J. Williams, Macquarie Univ. (Australia); Roger Haynes, Leibniz-Institut für Astrophysik Potsdam (Germany); Jon S. Lawrence, Australian Astronomical Observatory (Australia) and Macquarie Univ. (Australia); Quentin A. Parker, Macquarie Univ. (Australia) and Australian Astronomical Observatory (Australia); Michael J. Withford, Macquarie Univ. (Australia) . . . . . [8450-37]

11.20: **Optical fibers for precise radial velocities: an update**, Bruno Chazelas, Francesco Pepe, François Wildi, Observatoire de Genève (Switzerland) . . . . . [8450-124]

11.40: **Light propagation in a fiber-brush-shape converter**, Weimin Sun, Haijiao Yu, Xiaoqi Liu, Jiang Yu, Feiru Wang, Jinlai Xue, Harbin Engineering Univ. (China); Zhongwen Hu, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8450-39]

12.00: **Enabling photonic technologies on seeing limited telescopes: fabrication of integrated photonic lanterns on a chip**, Izabela Spaleniak, Macquarie Univ. (Australia); Nemanja Jovanovic, Macquarie Univ. (Australia) and Australian Astronomical Observatory (Australia); Simon Gross, Macquarie Univ. (Australia); Michael J. Ireland, Jon S. Lawrence, Macquarie Univ. (Australia) and Australian Astronomical Observatory (Australia); Michael J. Withford, Macquarie Univ. (Australia) . . . . . [8450-40]

12.20: **Nano-optical fiber evanescent field sensors**, Radhi M. Chyad, Mohd Zubir M. Jafri, Kamarulazizi B. Ibrahim, Univ. Sains Malaysia (Malaysia) . . . . . [8450-128]

Lunch Break . . . . . 12.40 to 14.00

SESSION 8

Room: G104 . . . . . Tues. 14.00 to 15.20

Multi-Object Spectroscopy I

Session Chair: **Eric Prieto,**
Observatoire Astronomique de Marseille-Provence (France)

14.00: **Developments in high-density Cobra fiber positioners for the Subaru Telescope's prime focus spectrometer**, David Braun, Robin J. Bruno, Jet Propulsion Lab. (USA); Richard G. Dekany, Richard S. Ellis, California Institute of Technology (USA); Charlie Fisher, Jet Propulsion Lab. (USA); Roger M. Smith, California Institute of Technology (USA); Michael Seiffert, Jet Propulsion Lab. (USA) . . . . . [8450-41]

14.20: **Concepts for multi-IFU robotic positioning systems**, Stan Miziarski, Jurek K. Brzeski, Australian Astronomical Observatory (Australia); Joss Bland-Hawthorn, The Univ. of Sydney (Australia); Michael Goodwin, Jeroen Heijmans, Anthony J. Horton, Jon S. Lawrence, Will Saunders, Greg A. Smith, Nicholas Staszak, James Gilbert, Australian Astronomical Observatory (Australia) . . . . . [8450-42]

14.40: **Recent testing of a micro autonomous positioning system for multiobject instrumentation**, William A. Cochrane, Heriot-Watt Univ. (United Kingdom) and UK Astronomy Technology Ctr. (United Kingdom) and Institute for Astronomy (United Kingdom); David C. Atkinson, Tom E. C. Baillie, Colin J. Dickson, UK Astronomy Technology Ctr. (United Kingdom); Theodore Lim, Xichun Luo, Heriot-Watt Univ. (United Kingdom); David M. Montgomery, Hermine Schnetler, UK Astronomy Technology Ctr. (United Kingdom); William D. Taylor, Institute for Astronomy (United Kingdom); Brian Wilson, UK Astronomy Technology Ctr. (United Kingdom) . . . . . [8450-43]

15.00: **Starbugs: all-singing, all-dancing fibre positioning robots**, James Gilbert, Jeroen Heijmans, Michael Goodwin, Rolf Muller, Stan Miziarski, Jurek K. Brzeski, Lewis G. Waller, Will Saunders, Alex Bennet, Julia Tims, Australian Astronomical Observatory (Australia) . . . . . [8450-44]

15.20: **Analysis of heat transfer on the fiber positioning unit and the focal plane of LAMOST**, Yi Jin, Rui Zhang, Yonggang Gu, Chao Zhai, Univ. of Science and Technology of China (China) . . . . . [8450-45]

Coffee Break . . . . . 15.40 to 16.10

SESSION 9

Room: G104 . . . . . Tues. 16.10 to 17.30

Multi-Object Spectroscopy II

Session Chair: **David M. Montgomery,**
UK Astronomy Technology Ctr. (United Kingdom)

16.10: **Wide field tracking of moving objects with a compact multi-object dispersed fixed-delay interferometer**, Jian Ge, Xiaoke Wan, Scott Powell, Univ. of Florida (USA) . . . . . [8450-46]

16.30: **Optical MEMS for space spectro-imagers**, Arnaud Liotard, Thales Alenia Space (France); Frédéric Zamkotsian, Lab. d'Astrophysique de Marseille (France); Wilfried Noell, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Thierry Viard, Thales Alenia Space (France); Benedikt J. Guldimann, Stefan Kraft, Marco Freire, European Space Research and Technology Ctr. (Netherlands) . . . . . [8450-47]

16.50: **Large micromirror array for generating programmable slit masks for multi-object spectroscopy**, Michael Canonica, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Frederic Zamkotsian, Patrick Lanzoni, Lab. d'Astrophysique de Marseille (France); Wilfried Noell, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [8450-48]

17.10: **Optical metrology for the James Webb Space Telescope microshutters,** Victor J. Chambers, NASA Goddard Space Flight Ctr. (USA); Peter A. Morey, Barbara J. Zukowski, Ball Aerospace & Technologies Corp. (USA); Alexander S. Kutyrev, Univ. of Maryland, College Park (USA); Nicholas R. Collins, Nargess Memarsadeghi, Samuel H. Moseley, Leroy M. Sparr, Peter N. Blake, NASA Goddard Space Flight Ctr. (USA) . . . . . [8450-49]

POSTERS-TUESDAY

Room: Hall 3. . . . . Tues. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters. for this conference will be on display on Tuesday. The interactive poster session with authors in attendance will be Tuesday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

Optical Fibers and Positioners

Understanding incomplete scrambling in fibres: experimental investigations, Ulrike Lemke, Durham Univ. (United Kingdom) and Georg-August-Univ. Göttingen (Germany); Jeremy R. Allington-Smith, Durham Univ. (United Kingdom). . . . . [8450-38]

Optical fiber systems for the BigBOSS instrument, Jerry Edelstein, Univ. of California, Berkeley (USA); Claire L. Poppett, Lawrence Berkeley National Lab. (USA); Martin M. Sirk, Univ. of California, Berkeley (USA); Robert W. Besuner, Robin E. Lafever, Lawrence Berkeley National Lab. (USA); Graham J. Murray, Jeremy R. Allington-Smith, Durham Univ. (United Kingdom); Christopher J. Bebek, Lawrence Berkeley National Lab. (USA) . . . . . [8450-114]

BigBOSS: guiding, focus and alignment system, Kevin A. Reil, SLAC National Accelerator Lab. (USA); Robert Besuner, Univ. of California, Berkeley (USA); Aaron J. Roodman, SLAC National Accelerator Lab. (USA); Michael L. Lampton, Univ. of California, Berkeley (USA); Christopher J. Bebek, Lawrence Berkeley National Lab. (USA) . . . . . [8450-115]

Design and performance of an R-θ fiber positioner for the BigBOSS instrument, Joseph H. Silber, Christoph Schenk, Zengxaing Zhou, Mario Cepeda, Rodney Post, Robert Besuner, Michael J. Sholl, Paul E. Perry, Lawrence Berkeley National Lab. (USA) . . . . . [8450-116]

Metrology system for the calibration of multi-dof precision mechanisms, Lorenzo Zago, HEIG-VD (Switzerland) . . . . . [8450-117]

A predesign setup for fiber end position measurement of fiber positioner, Zeng Xiang Zhou, Chao Zhai, Univ. of Science and Technology of China (China); Michael J. Sholl, Christopher J. Bebek, Lawrence Berkeley National Lab. (USA) . . . . . [8450-118]

A high-resolution measurement device for detecting the positioning accuracy of the optical fiber positioner, Yonggang Gu, Jianlei Xu, Yi Jin, Chao Zhai, Univ. of Science and Technology of China (China) . . . . . [8450-119]

A high-density integrated optical focal plane positioning system, Hongzhuan Hu, Univ. of Science and Technology of China (China); Jianping Wang, Zhigang Liu, Zhai Chao, Jiaru Chu, Univ of Science and Technology of China (China) . . . . . [8450-120]

LAMOST fiber unit positional precision detection exploiting the technique of template matching, Mengxin Wang, Yong-Heng Zhao, Ali Luo, National Astronomical Observatories (China) . . . . . [8450-121]

A novel calibration method of CCD camera for LAMOST, Yonggang Gu, Yi Jin, Chao Zhai, Univ. of Science and Technology of China (China) . . . [8450-122]

Applied stress on coated multimode optical fibres: a different point of view on bending losses, Yazmin Padilla Michel, Leibniz-Institut für Astrophysik Potsdam (Germany); Mo Zoheidi, LEONI Fiber Optics GmbH (Germany); Martin M. Roth, Roger Haynes, Jean-Christophe Olaya, Leibniz-Institut für Astrophysik Potsdam (Germany). . . . . [8450-123]

Development of different kind of IFU prototypes for the OPTIMOS-EVE study for the E-ELT, Isabelle Guinouard, Observatoire de Paris à Meudon (France); Ligia Souza de Oliveira, Antonio Cesar de Oliveira, Lab. Nacional de Astrofísica (Brazil); Beatriz Barbuy, Univ. de São Paulo (Brazil); Jean-François Hammer, Fanny Chemla, Marc Huertas-Company, Jean-Michel Huet, Simona Mei, Observatoire de Paris à Meudon (France). . . . . [8450-125]

Development of the fibres of MOONS, Isabelle Guinouard, Piercarlo Bonifacio, Fanny Chemla, Jean-Philippe Amans, Observatoire de Paris à Meudon (France); Michele Cirasuolo, Hermine Schnetler, UK Astronomy Technology Ctr. (United Kingdom) . . . . . [8450-126]

Development of the single fibres and IFUs of WEAVE, Isabelle Guinouard, Observatoire de Paris à Meudon (France); Ian J. Lewis, Univ. of Oxford (United Kingdom); Gavin B. Dalton, Rutherford Appleton Lab. (United Kingdom) and Univ. of Oxford (United Kingdom); Pascal Jagourel, Piercarlo Bonifacio, Observatoire de Paris à Meudon (France). . . . . [8450-127]

Optical fiber tapers: focal reduction and magnification, Dionne M. Haynes, Jean-Christophe Olaya, Leibniz-Institut für Astrophysik Potsdam (Germany); Sergio G. Leon-Saval, The Univ. of Sydney (Australia); Roger Haynes, Leibniz-Institut für Astrophysik Potsdam (Germany) . . . . . [8450-129]

Multimode to single-mode converters: new results on 1-to-61 photonic lanterns, Jean-Christophe Olaya, Dionne M. Haynes, Roger Haynes, Leibniz-Institut für Astrophysik Potsdam (Germany); Sergio G. Leon-Saval, The Univ. of Sydney (Australia); Katjana Ehrlich, Daniel Schirdewahn, Leibniz-Institut für Astrophysik Potsdam (Germany). . . . . [8450-130]

Multicore fibre Bragg grating developments for OH suppression, Seong-sik Min, Anglo-Australian Observatory (Australia) and The University of Sydney (Australia); Christopher Q. Trinh, Sergio Leon-Saval, The Univ. of Sydney (Australia); Nemanja Jovanovic, Peter R. Gillingham, Anglo-Australian Observatory (Australia); Joss Bland-Hawthorn, The Univ. of Sydney (Australia); Jon S. Lawrence, Anglo-Australian Observatory (Australia); Tim A. Birks, Univ. of Bath (United Kingdom); Martin M. Roth, Roger Haynes, Leibniz-Institut für Astrophysik Potsdam (Germany); Lisa Fogarty, The Univ. of Sydney (Australia). . . . . [8450-131]

Coatings, Filters, Gratings and Spectrographs

Tests of VPHGs in the NIR at cryogenic temperatures, Francisco Garzón, Maider Insausti, Instituto de Astrofísica de Canarias (Spain) . . . . . [8450-132]

Slanted VPHGs in astronomical instrumentation: tests and perspectives, Andrea Bianco, Paolo Spanò, INAF - Osservatorio Astronomico di Brera (Italy); Hans Dekker, European Southern Observatory (Germany); James Arns, Kaiser Optical Systems, Inc. (USA); Filippo M. Zerbi, INAF - Osservatorio Astronomico di Brera (Italy) . . . . . [8450-133]

Reflective coating for near infrared immersion gratings, Paul J. Kuzmenko, Lawrence Livermore National Lab. (USA); Yuji Ikeda, Photocoding (Japan); Naoto Kobayashi, The Univ. of Tokyo (Japan); Paul B. Mirkarimi, Jennifer B. Alameda, Lawrence Livermore National Lab. (USA) . . . . . [8450-134]

Fabrication and testing of germanium grisms for LMIRcam, Paul J. Kuzmenko, Steve L. Little, Liesl M. Little, Lawrence Livermore National Lab. (USA); John C. Wilson, Michael F. Skrutskie, Univ. of Virginia (USA); Philip M. Hinz, The Univ. of Arizona (USA); Jarron M. Leisenring, ETH Zurich (Switzerland); Olivier Durney, The Univ. of Arizona (USA) . . . . . [8450-135]

Large filters for wide field survey telescope LSST, Nazario N. Morgado, Laurent Pinard, Benoit Sassolas, Raffaele Flaminio, Danielle Forest, Bernard Lagrange, Christophe Michel, LMA, IN2P3/CNRS (France) . . . . . [8450-136]

MUSE optical coatings, Alban Remillieux, Magali Loupias, Ctr. de Recherche Astronomique de Lyon (France) and Ctr. National de la Recherche Scientifique (France) and Univ. Claude Bernard Lyon 1 (France); Nazario N. Morgado, Univ. Claude Bernard Lyon 1 (France) and Ctr. National de la Recherche Scientifique (France); Beatrix Ploss, Optics Balzers Jena GmbH (Germany); Patrick Caillier, Louisa Adjali, Roland M. Bacon, Johan Kosmalski, Florence Laurent, Edgard Renault, Ctr. de Recherche Astronomique de Lyon (France) and Ctr. National de la Recherche Scientifique (France) and Univ. Claude Bernard Lyon 1 (France) . . . . . [8450-137]

Design of the J-PAS 56 filter system, Antonio Marin-Franch, Sergio Chueca, Mariano Moles, Ctr. de Estudios de Física del Cosmos de Aragón (Spain); Narciso Benitez Lozano, Instituto de Astrofísica de Andalucía (Spain); Keith Taylor, Univ. de São Paulo (Brazil); Jordi Cepa, Instituto de Astrofísica de Canarias (Spain); Andrés Javier Cenarro, David Cristobal-Hornillos, Alessandro Ederoclite, Nicolas Gruel, Fernando Rueda, Sergio Rueda, Jesús Varela López, Axel Yanes Díaz, Ctr. de Estudios de Física del Cosmos de Aragón (Spain); Renato Dupke, Observatórió Nacional (Brazil); Alberto Fernández-Soto, INAF - Osservatorio Astronomico di Brera (Spain); Claudia Mendes de Oliveira, Laerte Sodré, Jr., Univ. de São Paulo (Brazil) . . . . . [8450-138]

Research on a project of the new computational hyperspectral imager, Huan Li, Beijing Institute of Space Mechanics and Electricity (China) . [8450-139]

Reflectivity, polarization properties and durability of metallic mirror coatings for the European Solar Telescope, Alex J. Feller, Nagaraju Krishnappa, Oksana Pleier, Max-Planck-Institut für Sonnensystemforschung (Germany); Mark Schürmann, Paul Johannes Jobst, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany). . . . . [8450-140]

Developing metal coated mesh filters for mid-infrared astronomy, Shigeyuki Sako, Takashi Miyata, Takafumi Kamizuka, Tomohiko Nakamura, Kentaro Asano, Mizuho Uchiyama, Takashi Onaka, Itsuki Sakon, The Univ. of Tokyo (Japan); Takehiko Wada, Japan Aerospace Exploration Agency (Japan). . . . . [8450-141]

Octadecanthiol for tarnish-resistant silver coatings, Andrew C. Phillips, Andrew Cowley, Lick Observatory (USA) . . . . . [8450-142]

Design and preparation of antifrost coating for the Antarctic Telescope, Jinfeng Wang, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8450-143]

Development of an integral field unit for a near-infrared multi-object imaging spectrograph SWIMS, Shinobu Ozaki, National Astronomical Observatory of Japan (Japan); Kentaro Motohara, Masahiro Konishi, Hidenori Takahashi, The Univ. of Tokyo (Japan); Tomohiro Yoshikawa, Koyama Astronomical Observatory (Japan); Ken Tateuchi, The Univ. of Tokyo (Japan). . . . . [8450-144]

An Offner-spectrograph for tilted focal planes: the BATMAN case for TNG, Paolo Spanò, INAF - Osservatorio Astronomico di Brera (Italy); Frederic Zamkotsian, Lab. d'Astrophysique de Marseille (France) . . . . . [8450-145]

Electro-optical polarimeters for ground-based and space-based observations of the solar K-corona, Gerardo Capobianco, Silvano Fineschi, Giuseppe Massone, INAF - Osservatorio Astronomico di Torino (Italy); Emanuele Balboni, Associazione Apriticielo (Italy); Marco A. Malvezzi, Univ. degli Studi di Pavia (Italy); Giuseppe Crescenzio, Luca Zangrilli, INAF - Osservatorio Astronomico di Torino (Italy); Paolo Calcidese, Osservatorio Astronomico della regione Autonoma (Italy) . . . . . [8450-146]

Photopolymer-based volume phase holographic grating for astronomical instrumentations, Alessio Zanutta, Andrea Bianco, Filippo Zerbi, INAF - Osservatorio Astronomico di Brera (Italy) . . . . . [8450-148]

Spectrally-quantified chemical reactivity optical fluids and materials in the GMACS spectrograph for GMT, Tyler W. Behm, Jean-Philippe Rheault, Jennifer L. Marshall, Darren L. DePoy, Texas A&M Univ. (USA) . . . . . [8450-149]

Echelle VPHG: a step forward, Andrea Bianco, INAF - Osservatorio Astronomico di Brera (Italy); Noboru Ebizuka, Nagoya Univ. (Japan) . . [8450-150]

Comparing modelling techniques when designing VPH gratings for BigBOSS, Claire L. Poppett, Jerry Edelstein, Lawrence Berkeley National Lab. (USA); James Arns, Kaiser Optical Systems, Inc. (USA); Michael L. Lampton, Lawrence Berkeley National Lab. (USA) . . . . . [8450-151]

A single-mode Echelle spectrograph: eliminating modal variation, enabling higher precision Doppler study, Askari Ghasempour, John Kelly, Matthew W. Muterspaugh, Michael H. Williamson, Tennessee State Univ. (USA) . . [8450-152]

Planar integrated photonics spectrograph on silicon-nitride-on-insulator: densely integrated systems for astrophotonics and spectroscopy, Harendra N. J. Fernando, Andreas Stoll, Jose C. Boggio, Roger Haynes, Martin M. Roth, Leibniz-Institut für Astrophysik Potsdam (Germany). . . . . [8450-153]

A high-resolution Fourier transform spectrometer for astronomical: observations and development of wavelength standards, Ulrike Lemke, Ansgar Reiners, Sebastian Schäfer, Guillem Anglada, Univ. Göttingen (Germany) . . . . . [8450-217]

Cryogenic Space and Ground-Based Instrumentation

Immersion grating mount design for IGRINS and GMTNIRS, Bongkon Moon, Korea Astronomy and Space Science Institute (Korea, Republic of); Weisong Wang, The Univ. of Texas at Austin (USA); In-Soo Yuk, Chan Park, Moo-Young Chun, Korea Astronomy and Space Science Institute (Korea, Republic of) . . . . . [8450-154]

A common tool-less cryogenic mounting solution for flat optics, Niels Tromp, Jan W. Kragt, Martijn P. Zijlstra, Eddy J. Elswijk, ASTRON (Netherlands) . . . . . [8450-155]

Improved stress prediction in adhesive bonded optical components, Jan de Vreugd, Martijn te Voert, Jan R. Nijenhuis, Erik Tabak, Joep Pijnenburg, TNO (Netherlands) . . . . . [8450-156]

Passive vibration isolation in the closed cycle cooler refrigerated cryostats for SITELLE, Marc R. Baril, Tom Benedict, Gregory A. Barrick, Kevin K. Ho, Canada-France-Hawaii Telescope (USA) . . . . . [8450-157]

Cryogenic actuator for subnanometer positioning, Bart van Bree, Richard Albers, Sander L. Paalvast, Huub Janssen, Janssen Precision Engineering B.V. (Netherlands) . . . . . [8450-158]

Cryogenic actuator testing for the SAFARI ground calibration setup, Chris de Jonge, Martin Eggens, Pieter Dieleman, SRON Netherlands Institute for Space Research (Netherlands) . . . . . [8450-159]

MATISSE selection mechanism development, Jan W. Kragt, Niels Tromp, Gabby Kroes, Attila Jaskó, ASTRON (Netherlands) . . . . . [8450-160]

Cryogenic fast shutter design and test results for the MATISSE instrument, Jan W. Kragt, Eddy J. Elswijk, Albert P. van Duin, ASTRON (Netherlands) . . . . . [8450-161]

Conceptual phase; a design of a cryogenic shutter mechanism for the SAFARI flight instrument, Udo J. Wehmeier, ETH Zurich (Switzerland); Gabriele Messina, Aurèle Vuilleumier, RUAG Space AG (Switzerland); Michael R. Meyer, ETH Zurich (Switzerland) . . . . . [8450-162]

Engineering technology development in the UK for HARMONI: an E-ELT first light instrument, David M. Montgomery, Angus M. Gallie, UK Astronomy Technology Ctr. (United Kingdom) . . . . . [8450-163]

Frida integral field unit optomechanical design, Salvador Cuevas, Univ. Nacional Autónoma de México (Mexico); Stephen S. Eikenberry, Univ. of Florida (USA) . . . . . [8450-164]

An alternative design for a metal image slicing IFU for EAGLE, Cornelis M. Dubbeldam, David J. Robertson, Stephen Rolt, Gordon Talbot, Durham Univ. (United Kingdom). . . . . [8450-166]

Modeling and structural analysis of honeycomb structure mirror, Yeping Li, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8450-167]

CARMENES (III): an innovative and challenging cooling system for an ultra-stable NIR spectrograph, Santiago Becerril Jarque, Instituto de Astrofísica de Andalucía (Spain) and and the CARMENES consortium (Spain) . . . . . [8450-168]

Unintended consequences on vacuum hold time with conversion to PolyCold closed-cycle coolers, Tom Benedict, Gregory A. Barrick, Canada-France-Hawaii Telescope (USA) . . . . . [8450-170]

Wednesday 4 July

PLENARY SESSION

Room: Auditorium . . . . . Wed. 09.00 to 10.00

Session Chair: **Luc Simard,**
National Research Council Canada (Canada)

09.00: **Very high energy gamma ray astronomy with the H.E.S.S. telescopes** *(Presentation Only)*, Werner Hofmann, Max-Planck-Institut für Kernphysik (Germany) . . . . . [8442-505]

09.30: **The cosmic microwave background: observing directly the early universe**, Paolo de Bernardis, Silvia Masi, Univ. degli Studi di Roma La Sapienza (Italy) . . . . . [8442-506]

Coffee Break . . . . . 10.00 to 10.30

SESSION 10

Room: G104 . . . . . Wed. 10.30 to 12.10

Slit Spectroscopy, Slicers, and Polarimetry I

Session Chair: **Eric Prieto,**
Observatoire Astronomique de Marseille-Provence (France)

10.30: **Performance of a laser frequency comb calibration system with a high-resolution solar echelle spectrograph**, Hans-Peter Doerr, Thomas J. Kentischer, Morten Franz, Kiepenheuer-Institut für Sonnenphysik (Germany); Tilo Steinmetz, Rafael Probst, Ronald Holzwarth, Max-Planck-Institut für Quantenoptik (Germany); Wolfgang Schmidt, Kiepenheuer-Institut für Sonnenphysik (Germany) . . . . . [8450-50]

10.50: **Generation of an optical frequency comb for wavelength calibration of an astronomical spectrograph**, Jose C. Boggio, Daniel Bodenmueller, Roger Haynes, Martin M. Roth, Leibniz-Institut für Astrophysik Potsdam (Germany) . . . . . [8450-51]

11.10: **A near infrared frequency comb for Y-band astronomical spectroscopy**, Steven N. Osterman, Univ. of Colorado at Boulder (USA); Gabriel G. Ycas, Scott A. Diddams, Franklyn Quinlan, National Institute of Standards and Technology (USA); Chad F. Bender, Suvrath Mahadevan, Lawrence W. Ramsey, The Pennsylvania State Univ. (USA) . . . . . [8450-52]

11.30: **Potential applications of ring resonators for astronomical instrumentation**, Simon C. Ellis, Anglo-Australian Observatory (Australia); Joss Bland-Hawthorn, The Univ. of Sydney (Australia); Jon S. Lawrence, Anglo-Australian Observatory (Australia); Antoine Crouzier, Lab. d'Astrophysique de l'Observatoire de Grenoble (France) . . . . . [8450-53]

11.50: **TIGER: the photonic integral field microspectrograph**, Sergio G. Leon-Saval, Christopher H. Betters, Joss Bland-Hawthorn, The Univ. of Sydney (Australia). . . . . [8450-54]

Lunch/Exhibition Break . . . . . 12.10 to 13.30

SESSION 11

Room: G104 . . . . . Wed. 13.30 to 15.10

Slit Spectroscopy, Slicers, and Polarimetry II

Session Chair: **Huub Janssen,**
Janssen Precision Engineering B.V. (Netherlands)

13.30: **Development of a slicer integral field unit for the existing optical spectrograph FOCAS**, Shinobu Ozaki, National Astronomical Observatory of Japan (Japan); Yoko Tanaka, Takashi Hattori, Subaru Telescope, National Astronomical Observatory of Japan (USA); Kenji Mitsui, Mitsuhiro Fukusima, Norio Okada, Satoshi Miyazaki, Takuya Yamashita, National Astronomical Observatory of Japan (Japan) . . . . . [8450-55]

13.50: **The KMOS Integral Field System: fabrication, alignment and test of 1000+ optical surfaces**, Cornelis M. Dubbeldam, Paul Clark, Robert Content, Andrew K. Kirby, Kenneth Parkin, David J. Robertson, Stephen Rolt, David A. Ryder, Ray M. Sharples, Durham Univ. (United Kingdom) . . . . . [8450-56]

14.10: **Multiplexing 32,000 spectra onto 8 detectors: the HARMONI field splitting, image slicing and wavelength selecting optics**, Mathias Tecza, Niranjan Thatte, Fraser Clarke, Univ. of Oxford (United Kingdom); David Freeman, Kidger Optics Associates (United Kingdom); Johan Kosmalski, Observatoire de Lyon (France) . . . . . [8450-57]

14.30: **A new numerical tool for Zemax® to build an image slicer**, Philippe Godefroy, Winlight Optics (France); Yves Salaun, Daniel Soler, Winlight System S.A. (France) . . . . . [8450-58]

14.50: **CEOI microslice spectrograph**, Robert Content, Australian Astronomical Observatory (Australia); Simon Blake, Colin Dunlop, Ray Sharples, Gordon Talbot, David Nandi, Tom Shanks, Danny Donoghue, Nikolaos Galiatsatos, Peter Luke, Durham Univ. (United Kingdom) . . . . . [8450-59]

Coffee Break . . . . . 15.10 to 15.40

SESSION 12

Room: G104 . . . . . Wed. 15.40 to 17.40

Slit Spectroscopy, Slicers, and Polarimetry III

Session Chair: **Jinxue Wang,** Raytheon Co. (USA)

15.40: **Fast solar polarimeter: a new instrument for polarimetric observations on the Sun**, Nagaraju Krishnappa, Alex J. Feller, Max-Planck-Institut für Sonnensystemforschung (Germany); Daniel Gisler, ETH Zurich (Switzerland) . . . . . [8450-60]

16.00: **Electro-optical spectro-polarimeter for ground- and space-based observations of coronal line-emission**, Silvano Fineschi, Gerardo Capobianco, Giuseppe Massone, Alessandro Bemporad, Lucia Abbo, Carlo Benna, INAF - Osservatorio Astronomico di Torino (Italy); Paolo Calcidese, Osservatorio Astronomico della regione Autonoma (Italy); Tom Baur, Meadowlark Optics, Inc. (USA) . . . . . [8450-61]

16.20: **Near field calibration of an objective spectrophotometer to NIST radiometric standards for the creation and maintenance of standard stars for ground- and space-based applications**, John T. McGraw, Peter C. Zimmer, Daniel C. Zirzow, The Univ. of New Mexico (USA); John T. Woodward IV, Keith R. Lykke, Claire E. Cramer, National Institute of Standards and Technology (USA); Susana E. Deustua, Space Telescope Science Institute (USA); Dean C. Hines, The Univ. of New Mexico (USA) . . . . . [8450-62]

16.40: **The ERA2 facility: towards application of a fibre-based astronomical spectrograph for hyperspectral imaging in life science**, Bernhard Roth, Paul Singh, Thomas Jahn, Andreas Kelz, Mudit Srivastava, Leibniz-Institut für Astrophysik Potsdam (Germany); Karl Zenichowski, Univ. Potsdam (Germany); Christer Sandin, Emil Popow, Thomas Fechner, Dieter Wolter, Svend-Marian Bauer, Marvin Stolz, Silvia Adelhelm, Leibniz-Institut für Astrophysik Potsdam (Germany); Martin M. Roth, Leibniz-Institut für Astrophysik Potsdam (Germany) and Leibniz-Institut für Astrophysik Potsdam (Germany); Oliver Reich, Hans-Gerd Löhmannsröben, Univ. Potsdam (Germany) and Leibniz-Institut für Astrophysik Potsdam (Germany). . . . . [8450-63]

17.00: **CARMENES (V): non-cryogenic solutions for YJH-band NIR instruments**, Pedro J. Amado, Instituto de Astrofísica de Andalucía (Spain) and and the CARMENES consortium (Spain) . . . . . [8450-64]

17.20: **PRAXIS: a low background NIR spectrograph for fibre Bragg grating OH suppression**, Anthony J. Horton, Simon C. Ellis, Jon S. Lawrence, Australian Astronomical Observatory (Australia); Joss Bland-Hawthorn, The Univ. of Sydney (Australia). . . . . [8450-65]

Thursday 5 July

PLENARY SESSION

Room: Auditorium . . . . . Thurs. 09.30 to 10.00

Session Chair: **Gillian S. Wright,**
UK Astronomy Technology Ctr. (United Kingdom)

09.30: **ALMA construction and early science**, Mattheus W. M. de Graauw, Lewis Ball, Joint ALMA Observatory (Chile). . . . . [8444-507]

Coffee Break . . . . . 10.00 to 10.30

Session 13a and 13b run concurrently

SESSION 13a

Room: G104 . . . . . Thurs. 10.30 to 12.20

Technologies for Cryogenic Instruments I

Session Chair: **Colin R. Cunningham,**
UK Astronomy Technology Ctr. (United Kingdom)

10.30: **MATISSE cold optics: optomechanical design strategy, an iterative approach** *(Invited Paper)*, Niels Tromp, Gabby Kroes, Jan W. Kragt, Ramon Navarro, Florence Rigal, Rik ter Horst, Felix C. Bettonvil, Tibor Agocs, Eddy J. Elswijk, Lars Venema, Menno de Haan, ASTRON (Netherlands) . . . . . [8450-66]

11.00: **Cryogenic tests on FRIDA optomechanical building blocks**, Salvador Cuevas, Luis C. Álvarez, Univ. Nacional Autónoma de México (Mexico); Vicente Bringas, Ctr. de Ingenieria y Desarrollo Industrial (Mexico); Oscar Chapa, Univ. Nacional Autónoma de México (Mexico); Adi Corrales, Ctr. de Ingenieria y Desarrollo Industrial (Mexico); Carlos Espejo, Rubén A. Flores-Meza, Carolina Keiman, Univ. Nacional Autónoma de México (Mexico); René Estrada, Ctr. de Ingenieria y Desarrollo Industrial (Mexico); Gerardo Lara, Univ. Nacional Autónoma de México (Mexico); Diana Lucero, Juan M. Montoya, Alberto Rodríguez, Ctr. de Ingenieria y Desarrollo Industrial (Mexico); Beatriz Sánchez, Univ. Nacional Autónoma de México (Mexico); Jorge Uribe, Ctr. de Ingenieria y Desarrollo Industrial (Mexico) . . . . . [8450-67]

11.20: **Experience on a cryogenic linear mechanism based on superconducting levitation**, Javier Serrano-Tellez, Mikel Lamensans, Fernando Romera-Juarez, David Gonzalez-de-Maria, Heribert Argelaguet-Vilaseca, LIDAX (Spain); Jose-Luis Perez-Diaz, Efrén Díez-Jimenez, Juan Sanchez-Casarrubios, Ignacio Valiente-Blanco, Univ. Carlos III de Madrid (Spain) . . . . . [8450-68]

11.40: **The JWST MIRI flight model wheel mechanisms characterisation for open loop drive**, Örs Hunor Detre, Ulrich Grözinger, Oliver Krause, Silvia Scheithauer, Max-Planck-Institut für Astronomie (Germany) . . . . . [8450-69]

12.00: **Development of the METIS cold chopper demonstrator**, Sander L. Paalvast, Maurice Teuwen, Huub Janssen, Janssen Precision Engineering B.V. (Netherlands); Robert Huisman, SRON Netherlands Institute for Space Research (Netherlands); Bernhard Brandl, Leiden Observatory (Netherlands); Frank Molster, NOVA (Netherlands); Lars Venema, ASTRON (Netherlands) . . [8450-70]

Lunch Break . . . . . 12.20 to 13.30

SESSION 13b

Room: G106 . . . . . Thurs. 10.30 to 12.30

Optical Fabrication I

Session Chair: **Roland Geyl,** Sagem Défense Sécurité (France)

NOTE ROOM CHANGE

10.30: **JWST: Tinsley achievements on the largest beryllium polishing project** *(Invited Paper)*, John Kincade, Jay Daniel, L-3 Communications Tinsley Labs. Inc. (USA); Tony Hull, L-3 Communications Tinsley Labs. Inc. (USA) and Univ. of New Mexico (USA) . . . . . [8450-82]

11.00: **Zero-expansion glass ceramic ZERODUR®: recent developments reveal high potential** *(Invited Paper)*, Peter Hartmann, Ralf Jedamzik, Thomas Westerhoff, SCHOTT AG (Germany) . . . . . [8450-83]

11.30: **Prototypes segment polishing and testing for ELT M1**, Jacques F. Rodolfo, Laurent Chouarche, Gilles Chaussat, Anne-Laure Hamy, Jean-Louis Carel, Bruno Pernet, Jacques Billet, Hervé Leplan, Eric Ruch, Sagem Défense Sécurité (France) . . . . . [8450-84]

11.50: **Stress polishing of segments for future extremely large telescopes: results obtained on a full scale demonstrator**, Emmanuel Hugot, Johan Floriot, Nicolas Rousselet, Marie Laslandes, Marc Ferrari, Gerard R. Lemaitre, Lab. d'Astrophysique de Marseille (France) . . . . . [8450-87]

12.10: **Tinsley proves stress mirror polishing for giant segmented telescopes**, Jay Daniel, Uli Muller, J. B. Barentine, L-3 Communications Tinsley Labs. Inc. (USA). . . . . [8450-86]

Lunch Break . . . . . 12.30 to 13.30

Session 14a and 14b run concurrently

SESSION 14a

Room: G104 . . . . . Thurs. 13.30 to 14.50

Technologies for Cryogenic Instruments II

Session Chair: **Huub Janssen,**
Janssen Precision Engineering B.V. (Netherlands)

13.30: **Development of a cryogenic all-silicon imaging telescope (CAIT)**, Douglas R. McCarter, McCarter Machine, Inc. (USA) . . . . . [8450-71]

13.50: **Ultra stable isostatic bonded optical mount designs for high-performance space telescopes**, Joep Pijnenburg, Martijn te Voert, Jan de Vreugd, Amir Vosteen, Willem van Werkhoven, Jeroen Mekking, Bjorn Nijland, TNO (Netherlands). . . . . [8450-72]

14.10: **Iue test results for high-precision large cryogenic lens holder**, Arnd Reutlinger, Csaba Gal, Anton Boesz, Theresa Leberle, Amir Mottaghibonab, Kayser-Threde GmbH (Germany); Frank Grupp, Norbert Geis, Max-Planck-Institut für extraterrestrische Phyisk (Germany); Ralf Bender, Univ.-Sternwarte der Ludwig- Maximilians-Univ. (Germany) . . . . . [8450-74]

14.30: **A new generation active arrays for optical flexibility in astronomical instrumentation**, Gabby Kroes, Johannes H. Pragt, Menno de Haan, Lars Venema, ASTRON (Netherlands). . . . . [8450-75]

Coffee Break . . . . . 14.50 to 15.40

SESSION 14b

Room: G106 . . . . . Thurs. 13.30 to 15.10

Optical Fabrication II

Session Chair: **Peter Hartmann,** SCHOTT AG (Germany)

NOTE ROOM CHANGE

13.30: **Edge-control and surface-smoothness in sub-aperture polishing of mirror segments**, David D. Walker, OpTIC Glyndwr Ltd. (United Kingdom); Guoyu Yu, Glyndwr Univ. (United Kingdom); Hongyu Li, Univ. College London (United Kingdom); Seraj Hamidi, Glyndwr Univ. (United Kingdom); Wilhelm Messalink, Zeeko Ltd. (United Kingdom); Mike Parry-Jones, OpTIC Glyndwr Ltd. (United Kingdom). . . . . [8450-85]

13.50: **Status of test production of the segmented mirror for the Thirty Meter Telescope**, Tetsuji Oota, Kotaro Akutsu, Hirohiko Shinonaga, Yuichiro Hashimoto, Itaru Otsuka, Canon Inc. (Japan); Masanori Iye, Takuya Yamashita, Ryuji Suzuki, National Astronomical Observatory of Japan (Japan) . . . . [8450-88]

14.10: **Support design for the polishing experiment of the primary mirror segments of the TMT**, Xinnan Li, Yi Chen, Dehua Yang, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8450-89]

14.30: **Production of 8.4 m segments for the Giant Magellan Telescope**, Hubert M. Martin, Richard G. Allen, The Univ. of Arizona (USA); James H. Burge, College of Optical Sciences, The Univ. of Arizona (USA); Brian Cuerden, The Univ. of Arizona (USA); Dae Wook Kim, College of Optical Sciences, The Univ. of Arizona (USA); Jeffrey S. Kingsley, Kevin Law, Randy Lutz, Peter A. Strittmatter, The Univ. of Arizona (USA); Peng Su, College of Optical Sciences, The Univ. of Arizona (USA); Michael T. Tuell, Steve Warner, Steven C. West, The Univ. of Arizona (USA); Ping Zhou, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [8450-90]

14.50: **Light-weight glass optics for segmented x-ray mirrors**, Anita M. Winter, Peter Friedrich, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8450-91]

Coffee Break . . . . . 15.10 to 15.40

Session 15a and 15b run concurrently

SESSION 15a

Room: G104 . . . . . Thurs. 15.40 to 17.40

Coatings and Filters

Session Chair: **Roland Geyl,** Sagem Défense Sécurité (France)

15.40: **Fabrication and tolerances of moth-eye structures for perfect antireflection in the mid-infrared wavelength region**, Hiroaki Imada, Univ. of Tsukuba (Japan); Takashi Miyata, Shigeyuki Sako, Takafumi Kamizuka, Tomohiko Nakamura, Kentaro Asano, Mizuho Uchiyama, Kazushi Okada, The Univ. of Tokyo (Japan); Takehiko Wada, Takao Nakagawa, Japan Aerospace Exploration Agency (Japan); Takashi Onaka, Itsuki Sakon, The Univ. of Tokyo (Japan). . . . . [8450-76]

16.00: **Progress in UCO's search for silver-based telescope mirror coatings**, Andrew C. Phillips, Joseph S. Miller, Michael Bolte, Brian DuPraw, Matthew V. Radovan, David Cowley, Lick Observatory (USA). . . . . [8450-77]

16.20: **Enhanced MgF $_2$ and LiF over-coated Al mirrors for FUV space astronomy**, Manuel Quijada, Stephen Rice, NASA Goddard Space Flight Ctr. (USA); John Lehan, SGT, Inc. (USA); Felix Threat, NASA Goddard Space Flight Ctr. (USA). . . . . [8450-78]

16.40: **Further advances in the use of SOL-GEL for high-performance optical and IR antireflection coatings**, Joseph S. Miller, Andrew C. Phillips, David Hilyard, Brian Dupraw, Lick Observatory (USA) . . . . . [8450-79]

17.00: **Towards ultra-precise optical interference filters on large area: computational and experimental optimization of the homogeneity of magnetron-sputtered precision optical filters**, Michael Vergöhl, Andreas Pflug, Daniel Rademacher, Fraunhofer-Institut für Schicht- und Oberflächentechnik (Germany) . . . . . [8450-80]

17.20: **Optical coatings from VUV to IR**, Mark Schürmann, Paul Johannes Jobst, Sergiy Yulin, Torsten Feigl, Hanno Heiße, Steffen Wilbrandt, Olaf Stenzel, Norbert Kaiser, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . . . . . [8450-81]

SESSION 15b

Room: G106 . . . . . Thurs. 15.40 to 18.00

Optical Fabrication III

Session Chair: **Peter Hartmann,** SCHOTT AG (Germany)

NOTE ROOM CHANGE

15.40: **Astrositall application in astronomical and space optics production**, Magomed A. Abdulkadyrov, Alexandr N. Ignatov, Alexey P. Patrikeev, Alexandr P. Semenov, Yury A. Sharov, Lytkarino Optical Glass Factory JSC (Russian Federation) . . . . . [8450-92]

16.00: **Diamond turning and polishing tests on new RSP aluminum alloys**, Rik ter Horst, Menno de Haan, ASTRON (Netherlands); Guido Gubbels, RSP Technology (Netherlands); Bart van Venrooy, André Hoogstrate, TNO (Netherlands) . . . . . [8450-93]

16.20: **New era of metal optics for visible applications: bare Be, bare Al and EN cladding**, Keith Carrigan, J. B. Barentine, Marty Kwitek, L-3 Communications Tinsley Labs. Inc. (USA) . . . . . [8450-94]

16.40: **Design, fabrication, and testing of an aluminum scene mirror for the thermal infrared sensor instrument**, Jason G. Budinoff, Melissa Edgerton, NASA Goddard Space Flight Ctr. (USA) . . . . . [8450-95]

17.00: **The 3,2m sintered sic telescope for Spica**, Didier Castel, Emmanuel Sein, EADS Astrium (France); Gerald Crone, European Space Research and Technology Ctr. (Netherlands); Michel Bougoin, BOOSTEC S.A. (France); Kate G. Isaak, Thierry Tirolien, Dominic Doyle, Sebastiaan Fransen, Luis Miguel Gaspar Venancio, European Space Research and Technology Ctr. (Netherlands) . . . . . [8450-96]

17.20: **Manufacturing of high-precision aspherical and freeform optics**, André Hoogstrate, Rens Henselmans, Bart van Venrooy, Casper van Drunen, TNO (Netherlands). . . . . [8450-97]

17.40: **Development of CFRP mirrors in low-temperature application for satellite telescopes,** Shin Utsunomiya, Japan Aerospace Exploration Agency (Japan). . . . . [8450-98]

POSTERS-THURSDAY

Room: Hall 3. . . . . Thurs. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Thursday. The interactive poster session with authors in attendance will be Thursday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

Optical Fabrication

Optimization of the process chain for mirrors made of silicon carbide, Daniel Waechter, Fraunhofer-Institut für Lasertechnik (Germany); Matthias Krödel, ECM Engineered Ceramic Materials GmbH (Germany); Fritz Klocke, Fraunhofer-Institut für Produktionstechnologie (Germany). . . . . [8450-171]

Deformation dynamic response test of the active stressed lap based on PXI platform, Ying Li, Yi Zheng, Yinghu Wang, Daxing Wang, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8450-172]

ZERODUR® for stress mirror polishing II: improved modeling of the material behavior, Ralf Jedamzik, Clemens Kunisch, Thomas Westerhoff, SCHOTT AG (Germany). . . . . [8450-173]

Fabrication of the LSST monolithic primary-tertiary mirror, Michael T. Tuell, Hubert M. Martin, The Univ. of Arizona (USA); James H. Burge, College of Optical Sciences, The Univ. of Arizona (USA); Dean A. Ketelsen, Kevin Law, The Univ. of Arizona (USA); William J. Gressler, National Optical Astronomy Observatory (USA); Chunyu Zhao, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [8450-174]

Accomplished the task of production of primary and secondary mirrors of DOT telescope under the project ARIES (India, Belgium, Russia): fabrication features, Aleksandr P. Semenov, Lytkarino Optical Glass Factory JSC (Russian Federation) . . . . . [8450-176]

Methods of testing of large size convex secondary mirrors with diameter up to 4m, Magomed A. Abdulkadyrov, Lytkarino Optical Glass Factory JSC (Russian Federation) . . . . . [8450-178]

Methods of fabrication and testing of unique large size optics in LZOS, JSC (VST, VISTA and other projects), Aleksandr P. Semenov, Magomed A. Abdulkadyrov, Sergey P. Belousov, Vladimir E. Patrikeev, Vitaliy V. Pridnya, Lytkarino Optical Glass Factory JSC (Russian Federation) . . . . . [8450-179]

Mirror fabrication of the prototype of fast steering secondary mirror for GMT, Ho-Soon Yang, Il-Kweon Moon, Byong-Hyok Chon, Jae-Hyeob Lee, Korea Research Institute of Standards and Science (Korea, Republic of); Young-Soo Kim, Korea Astronomy and Space Science Institute (Korea, Republic of); Yun Woo Lee, Korea Research Institute of Standards and Science (Korea, Republic of) . . . . . [8450-180]

Diamond milling of metal mirros with optical surface quality, Christof Iserlohe, Christian Straubmeier, Andreas Eckart, Damian Moratschke, Univ. zu Köln (Germany); Bernhard R. Brandl, Leiden Observatory (Netherlands) . . . . . [8450-181]

Fabrication of Φ550mm aspheric surface by ion beam figuring, Yonggang Wang, Jiyou Zhang, Lindi Xu, Ruimin Fu, Beijing Institute of Space Mechanics and Electricity (China) . . . . . [8450-182]

Manufacturing and testing of a convex aspherical mirror for assist, Rik ter Horst, ASTRON (Netherlands); Remko Stuik, Leiden Univ. (Netherlands) . . . . . [8450-183]

Design of a null compensator for testing convex secondary mirror of extremely large aperture optical telescope, Xinnan Li, Chen Xu, Junhua Pan, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8450-184]

The development of testing convex hyperbolic mirror using Hindle method based on stitching technology, Zibo Jiang, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8450-185]

Game-changing approaches to affordable advanced lightweight mirrors II: new cases analyzed for extreme ZERODUR® lightweighting and relief from the classical polishing parameter constraint, Tony Hull, L-3 Integrated Optical Systems Div. (USA) and Univ. of New Mexico (USA); Thomas Westerhoff, SCHOTT AG (Germany); John W. Pepi, L-3 Communications SSG-Tinsley (USA); Ralf Jedamzik, SCHOTT AG (Germany); George J. Gardopee, François Piché, Andrew R. Clarkson, L-3 Brashear (USA); Antoine Leys, SCHOTT North America, Inc. (USA); Martin Schaefer, SCHOTT AG (Germany); Volker Seibert, SCHOTT North America, Inc. (USA); Raymond M. Bell, Jr., Lockheed Martin Space Systems Co. (USA) . . . . . [8450-186]

Development of high-throughput silicon lens and grism with moth-eye antireflection structure for mid infrared astronomy, Takafumi Kamizuka, Takashi Miyata, Shigeyuki Sako, The Univ. of Tokyo (Japan); Hiroaki Imada, Univ. of Tsukuba (Japan); Tomohiko Nakamura, Kentaro Asano, Mizuho Uchiyama, Kazushi Okada, The Univ. of Tokyo (Japan); Takehiko Wada, Takao Nakagawa, Japan Aerospace Exploration Agency (Japan); Takashi Onaka, Itsuki Sakon, The Univ. of Tokyo (Japan) . . . . . [8450-187]

Development of full shell foil x-ray mirrors for NICER, Erin Balsamo, Univ. of Maryland, Baltimore County (USA); Keith C. Gendreau, NASA Goddard Space Flight Ctr. (USA); Zaven Arzoumanian, NASA Goddard Space Flight Ctr. (USA) and Ctr. for Research and Exploration in Space Science and Technology (USA) and Universities Space Research Association (USA); Lalit Jalota, NASA Goddard Space Flight Ctr. (USA) and Univ. of Maryland, Baltimore County (USA) and Ctr. for Research and Exploration in Space Science and Technology (USA); Steven J. Kenyon, David Fickau, Nicholas Spartana, NASA Goddard Space Flight Ctr. (USA); Devin J. Hahne, NASA Goddard Space Flight Ctr. (USA) and Bastion Technologies, Inc. (USA); Richard G. Koenecke, NASA Goddard Space Flight Ctr. (USA); Yang Soong, NASA Goddard Space Flight Ctr. (USA) and Ctr. for Research and Exploration in Space Science and Technology (USA) and Universities Space Research Association (USA); Peter J. Serlemitsos, Takashi Okajima, NASA Goddard Space Flight Ctr. (USA); Robert Campion, Thomas Jefferson High School for Science and Technology (USA); Louis Detweiler, The Univ. of Alabama in Huntsville (USA). . . . . [8450-189]

Test and Metrology

New modelling of freeform surfaces for optical design of astronomical instruments, Sandrine Pascal, Morgan Gray, Sébastien Vivès, David Le Mignant, Marc Ferrari, Emmanuel Hugot, Jean-Gabriel Cuby, Lab. d'Astrophysique de Marseille (France) . . . . . [8450-30]

Experimental validation of advanced dispersed fringe sensing (ADFS) algorithm using advanced wavefront sensing and correction testbed (AWCT), Xu Wang, Fang Shi, Norbert Sigrist, Byoung-Joon Seo, Hong Tang, Siddarayappa Bikkannavar, Scott Basinger, Oliver Lay, Jet Propulsion Lab. (USA) . . . . . [8450-190]

Image moment-based wavefront sensing for in-situ full-field image quality assessment, Hanshin Lee, Gary J. Hill, The Univ. of Texas at Austin (USA) . . . . . [8450-191]

Opto-mechanical design, manufacturing and metrology of MUSE image slicer, Edgard Renault, Didier Boudon, Johan Kosmalski, Observatoire de Lyon (France); Yves Salaun, Winlight System S.A. (France); Florence Laurent, Louisa Adjali, Eric Daguisé, Observatoire de Lyon (France) . . . . . [8450-193]

MAPS: where have the robots got to?, William D. Taylor, Hermine Schnetler, Stewart McLay, William A. Cochrane, UK Astronomy Technology Ctr. (United Kingdom) . . . . . [8450-194]

The optical alignment of the Gemini Planet Imager adaptive optics bench, John S. Pazder, National Research Council Canada (Canada) . . . . . [8450-195]

4DAD, a device to align angularly and laterally a high-power laser using a conventional sighting telescope as metrology, Christophe Dupuy, Thomas Pfrommer, Domenico Bonaccini Calia, European Southern Observatory (Germany) . . . . . [8450-196]

Finite element simulation in fabrication of high-precision reflector panels, Lei Yan, Yi Chen, Nanjing Institute of Astronomical Optics & Technology (China). [8450-197]

The research on large aperture telescope drive control technology, Xiaoyan Li, Daxing Wang, Zhenchao Zhang, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8450-198]

Design and control of one precise tracking simulation bed for Chinese 30 meter optic infrared telescope, Changzhi Ren, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8450-199]

Active Instruments

Potential of phase-diversity for metrology of active instruments, Visa A. Korkiakoski, Leiden Observatory (Netherlands); Lars Venema, Tibor Agocs, ASTRON (Netherlands); Christoph U. Keller, Leiden Observatory (Netherlands); Niek Doelman, TNO (Netherlands); Rufus Fraanje, Raluca Andrei, Michel Verhaegen, Technische Univ. Delft (Netherlands). . . . . [8450-200]

Control system for a novel active 6-DOF mechanism for sub-mirrors in giant telescopes, Aihua Li, Dehua Yang, Hui Wang, Zhenchao Zhang, You Wang, Nanjing Institute of Astronomical Optics & Technology (China) [8450-201]

Optimizing optical systems with active components, Tibor Agocs, Lars Venema, Gabby Kroes, ASTRON (Netherlands); Visa Korkiakovski, Leiden Observatory (Netherlands). . . . . [8450-202]

Design and test of a novel cost-effective piezo driven actuator with a two-stage flexure amplifier for chopping mirrors, Qingguo Wu, Nanjing Institute of Astronomical Optics & Technology (China) and Key Laboratory of Astronomical Optics & Technology, Nanjing Institute of Astronomical Optics & Techn (China) and Graduate University of Chinese Academy of Sciences (China); Dehua Yang, Aihua Li, Guohua Zhou, Nanjing Institute of Astronomical Optics & Technology (China) and Key Laboratory of Astronomical Optics & Technology, Nanjing Institute of Astronomical Optics & Techn (China); Bintang Yang, Shanghai Jiao Tong Univ. (China). . . . . [8450-203]

Research of active optics force actuator based on voice coil motor, Yonggang Gu, Zihao Chen, Yi Jin, Chao Zhai, Univ. of Science and Technology of China (China). . . . . [8450-204]

Extinction controlled adaptive mask coronagraph Lyot and phase mask dual concept for wide extinction area, Pierre Bourget, Nicolas Schuhler, Dimitri P. Mawet, Pierre Haguenauer, European Southern Observatory (Chile). . . . . [8450-205]

A VUV half-wave polarimeter optimized for observations of resonance scattering polarization from diffuse H Ly-α sources in the solar system, Jason B. Corliss, Univ. of California, Davis (USA) and Univ. of Wisconsin-Madison (USA); Walter M. Harris, Univ. of California, Davis (USA). . . . [8450-206]

Analog front end board electronics proposal for the HAWC observatory, Abel Bernal, Arturo I. Iriarte Valverde, Univ. Nacional Autónoma de México (Mexico). . . . . [8450-207]

ELENA MCP detector: absolute efficiency measurement for low-energy neutral atoms, Rosanna Rispoli, Elisabetta De Angelis, Nello Vertolli, Luca Colasanti, Stefano Orsini, Alessandro Mura, INAF - IASF Roma (Italy); Juergen Scheer, Univ. Bern (Switzerland); Stefano Selci, Consiglio Nazionale delle Ricerche (Italy); Anna Milillo, INAF - IASF Roma (Italy); Peter Wurz, Univ. Bern (Switzerland); Marco D'Alessandro, INAF - IASF Roma (Italy); Andrea Maria Di Lellis, AMDL srl (Italy); Roberto Leoni, Francesco Mattioli, Sara Cibella, Istituto di Fotonica e Nanotecnologie (Italy) . . . . . [8450-208]

Coarse-fine actuator for positioning of large telescope mirror segments, Niek Rijnveld, Jan R. Nijenhuis, TNO (Netherlands) . . . . . [8450-209]

Synchronous control design for active surface of radio telescope, Di Wang, Zhenchao Zhang, Xiaoli Song, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8450-210]

New technologies and new performances of the JCMT radio-telescope: a preliminary design study, Francesco Rampini, Stefano Mian, Simone De Lorenzi, Leonardo Ghedin, Gianpietro Marchiori, European Industrial Engineering s.r.l. (Italy); Simon C. Craig, Joint Astronomy Ctr. (USA) . . . . . [8450-211]

A smart car for the surface shape measurement of large antenna based on laser tracker, Yonggang Gu, Jing Hu, Yi Jin, Chao Zhai, Univ. of Science and Technology of China (China). . . . . [8450-212]

Study on functional integration of the SKA and the solar thermal power system, Zhi-Ming Dong, Chongqing Univ. of Science and Technology (China). . . . . [8450-213]

High stability piezomotor driven mirror mounts for LINC-NIRVANA, Harry Marth, Arne Bramigk, Physik Instrumente (PI) GmbH & Co. KG (Germany); Ralf-Rainer Rohloff, Max-Planck-Institut für Astronomie (Germany) . . . . . [8450-216]

Friday 6 July

SESSION 16

Room: G104 . . . . . Fri. 08.30 to 12.20

Gratings

Session Chair: **Colin R. Cunningham,**
UK Astronomy Technology Ctr. (United Kingdom)

08.30: **Near infrared metrology of high-performance silicon immersion gratings** *(Invited Paper)*, Michael Gully-Santiago, Weisong Wang, Cindy Brooks, Casey P. Deen, The Univ. of Texas at Austin (USA); Daniel W. Wilson, Richard E. Muller, Jet Propulsion Lab. (USA); Daniel T. Jaffe, The Univ. of Texas at Austin (USA) . . . . . [8450-99]

09.00: **Development of silicon immersed grating for METIS on E-ELT**, Aaldert H. van Amerongen, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); Tibor Agocs, ASTRON (Netherlands); Govert Nieuwland, Philips Innovation Services (Netherlands); Hedser van Brug, TNO Science and Industry (Netherlands); Lars Venema, ASTRON (Netherlands); Ruud Hoogeveen, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands) . . . . . [8450-100]

09.20: **Optical performance of silicon immersion gratings**, Jian Ge, Xiaoke Wan, Bo Zhao, Liang Chang, Univ. of Florida (USA). . . . . [8450-101]

09.40: **Optical performance of the ZnSe immersion grating for the short NIR infrared application**, Yuji Ikeda, Photocoding (Japan); Naoto Kobayashi, The Univ. of Tokyo (Japan); Paul J. Kuzmenko, Lawrence Livermore National Lab. (USA); Yuki Sarugaku, Japan Aerospace Exploration Agency (Japan); Chikako Yasui, Sohei Kondo, Hiroyuki Mito, The Univ. of Tokyo (Japan); Kei Fukue, Kenshi Nakanishi, Takafumi Kawanishi, Kyoto Sangyo Univ. (Japan) . [8450-102]

10.00: **High-performance astronomical gratings by Canon**, Takashi Sukegawa, Shigeru Sugiyama, Tsuyoshi Kitamura, Yukinobu Okura, Masatsugu Koyama, Canon Inc. (Japan) . . . . . [8450-103]

Coffee Break . . . . . 10.20 to 10.50

10.50: **Materials for VPHGs: practical considerations in the case of astronomical instrumentation** *(Invited Paper)*, Andrea Bianco, Giorgio Pariani, Alessio Zanutta, INAF - Osservatorio Astronomico di Brera (Italy); Chiara Bertarelli, Politecnico di Milano (Italy) . . . . . [8450-104]

11.20: **Performance of volume phase gratings manufactured using ultrafast laser inscription**, David Lee, UK Astronomy Technology Ctr. (United Kingdom); Robert R. Thomson, Heriot-Watt Univ. (United Kingdom); Colin R. Cunningham, UK Astronomy Technology Ctr. (United Kingdom) . . . . . [8450-105]

11.40: **Novel diffraction gratings fabricated by means of plasma nanotechnologies**, Noboru Ebizuka, Kenji Ishikawa, Hiroki Kondo, Masaru Hori, Nagoya Univ. (Japan); Andrea Bianco, INAF - Osservatorio Astronomico di Brera (Italy); Wako Aoki, National Astronomical Observatory of Japan (Japan) . . . . . [8450-106]

12.00: **High-performance dielectric diffraction gratings for space applications**, Uwe D. Zeitner, Frank Fuchs, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Ernst-Bernhard Kley, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [8450-107]

Lunch Break . . . . . 12.20 to 13.30

SESSION 17

Room: G104 . . . . . Fri. 13.30 to 15.40

Revolutionary Technologies

Session Chair: **Ramon Navarro,** ASTRON (Netherlands)

13.30: **Innovative technology for optical and infrared astronomy: an updated roadmap** *(Invited Paper)*, Colin R. Cunningham, Christopher J. Evans, UK Astronomy Technology Ctr. (United Kingdom); Frank Molster, Leiden Univ. (Netherlands) . . . . . [8450-108]

14.00: **Recent advances in diffractive optics** *(Invited Paper)*, H. Paul Urbach, Technische Univ. Delft (Netherlands) . . . . . [8450-109]

14.30: **Extremely aspheric mirrors: prototype development of an innovative manufacturing process based on active optics**, Zalpha Challita, Emmanuel Hugot, Marc Ferrari, Nicolas Rousselet, Joël Le Merrer, Sébastien Vivès, David Le Mignant, Jean-Gabriel Cuby, Lab. d'Astrophysique de Marseille (France) . . . . . [8450-110]

14.50: **Fast figuring of large optics by reactive atom plasma**, Marco Castelli, Renaud Jourdain, Paul Morantz, Paul Shore, Cranfield Univ. (United Kingdom). . . . . [8450-111]

DISCUSSION SESSION

Room: G104 . . . . . Friday 15:10 to 15:40

What new technologies will revolutionize how we build instruments and telescopes in the future?

We invite contributions to a discussion session on how new technology might impact on astronomy in the future. Bring along new ideas or things that have caught your eye during the conference, and join in what we hope will be a lively debate.

One slide Powerpoints welcome.

Award Ceremony

Room: G104 . . . . . Fri. 15.40 to 15.50

Session Chair: **Ramon Navarro,** ASTRON (Netherlands)

The chairs propose two special awards for the best oral presentation and the best poster presented at this conference. These awards are based both on content, such as technical or scientific achievements, as well as the original way of presentation, e.g. a live demonstration.

Sunday-Wednesday 1-4 July 2012 • Proceedings of SPIE Vol. 8451

Software and Cyberinfrastructure for Astronomy II


Radziwill


Chiozzi

Conference Chairs: **Nicole M. Radziwill,** James Madison Univ. (USA); **Gianluca Chiozzi,** European Southern Observatory (Germany)

Program Committee: **Alan Bridger,** UK Astronomy Technology Ctr. (United Kingdom); **Kim K. Gillies,** Thirty Meter Telescope (USA); **Bret Goodrich,** National Solar Observatory, ATST (USA); **Juan C. Guzman,** ASKAP, Commonwealth Scientific and Industrial Research Organisation (Australia); **Hilton A. Lewis,** W. M. Keck Observatory (USA); **David L. Terrett,** Rutherford Appleton Lab. (United Kingdom)

Sunday 1 July

SESSION 1

Room: G106 . . . . . Sun. 09.00 to 10.20

Innovations

Session Chair: **Nicole M. Radziwill,** James Madison Univ. (USA)

09.00: **A next-generation open-source toolkit for FITS file image viewing**, Eric Jeschke, Takeshi Inagaki, Russell Kackley, Subaru Telescope, National Astronomical Observatory of Japan (USA) . . . . . [8451-01]

09.20: **Data mining and exploration resources for astronomy in the web 2.0 age**, Stefano Cavuoti, Univ. degli Studi di Napoli Federico II (Italy); Massimo Brescia, INAF - Osservatorio Astronomico di Capodimonte (Italy); Marianna Annunziatella, Mauro Garofalo, Marisa Guglielmo, Univ. degli Studi di Napoli Federico II (Italy); Amata Mercurio, INAF - Astronomical Observatory of Capodimonte (Italy); Alfonso Nocella, Maurizio Paolillo, Giuseppe Longo, Univ. degli Studi di Napoli Federico II (Italy). . . . . [8451-56]

09.40: **The science ground segment for the ESA Euclid Mission**, Fabio Pasian, INAF - Osservatorio Astronomico di Trieste (Italy); John Hoar, European Space Astronomy Ctr. (Spain). . . . . [8451-03]

10.00: **The VO-Dance web application at the IA2 Data Center**, Marco Molinaro, Cristina Knapic, Riccardo Smareglia, INAF - Osservatorio Astronomico di Trieste (Italy) . . . . . [8451-04]

Coffee Break . . . . . 10.20 to 10.50

SESSION 2

Room: G106 . . . . . Sun. 10.50 to 12.20

Software Engineering

Session Chair: **David L. Terrett,**
Rutherford Appleton Lab. (United Kingdom)

10.50: **Distributed agile software development for the SKA** *(Invited Paper)*, Andreas J. Wicenec, The Univ. of Western Australia (Australia); Rebecca J. Parsons, ThoughtWorks, Inc. (USA); Slava Kitaeff, The Univ. of Western Australia (Australia); Paul Nelson, David Reed, ThoughtWorks, Inc. (USA); Kevin Vinsen, Chen Wu, The Univ. of Western Australia (Australia) . . . . . [8451-05]

11.20: **Applying the agile organizing framework to astronomical software development**, Nicole M. Radziwill, Morgan C. Benton, James Madison Univ. (USA) . . . . . [8451-06]

11.40: **Discovery Channel Telescope software component template and state design: principles and implementation**, Paul J. Lotz, Michael J. Lacasse, Ryan C. Godwin, Lowell Observatory (USA). . . . . [8451-07]

12.00: **Instrument control software development process for the multi-star AO system ARGOS**, Martin Kulas, José Luis Borelli, Wolfgang Gässler, Max-Planck-Institut für Astronomie (Germany); Lothar Barl, Sebastian Rabien, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8451-08]

Lunch Break . . . . . 12.20 to 13.40

SESSION 3

Room: G106 . . . . . Sun. 13.40 to 16.20

Data Management and Processing

Session Chair: **Bret Goodrich,** National Solar Observatory (USA)

13.40: **Data management for the EVLA** *(Invited Paper)*, Bryan J. Butler, Claire J. Chandler, National Radio Astronomy Observatory (USA). . . . . [8451-09]

14.10: **Design and capabilities of the MUSE data reduction software and pipeline**, Peter Weilbacher, Ole Streicher, Tanya Urrutia, Leibniz-Institut für Astrophysik Potsdam (Germany); Aurélien Jarno, Arlette Pécontal-Rousset, Roland M. Bacon, Observatoire de Lyon (France) . . . . . [8451-10]

14.30: **Significantly reducing the processing times of high-speed photometry data sets using a distributed computing model**, Paul F. Doyle, Fred Mtenzi, Dublin Institute of Technology (Ireland); Niall Smith, Cork Institute of Technology (Ireland) . . . . . [8451-11]

14.50: **The Dark Energy Survey data processing and calibration system**, Joseph J. Mohr, Ludwig-Maximilians-Univ. München (Germany); Robert Armstrong, Univ. of Pennsylvania (USA); Emmanuel Bertin, Institut d'Astrophysique de Paris (France); Arthur Carlson, Ludwig-Maximilians-Univ. München (Germany); Greg Daues, Univ. of Illinois at Urbana-Champaign (USA); Shantanu Desai, Ludwig-Maximilians-Univ. München (Germany); Michelle Gower, Robert Gruendl, William Hanlon, Univ. of Illinois at Urbana-Champaign (USA); Rick Kessler, The Univ. of Chicago (USA); Nikolay Kuropatkin, Huan Lin, John Marriner, Fermi National Accelerator Lab. (USA); Donald Petravic, Univ. of Illinois at Urbana-Champaign (USA); Ignacio Sevilla, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); Molly Swanson, Smithsonian Astrophysical Observatory (USA); Todd Tomashek, Univ. of Illinois at Urbana-Champaign (USA); Douglas Tucker, Fermi National Accelerator Lab. (USA); Yuxuan Yang, Univ. of Illinois at Urbana-Champaign (USA); Brian Yanny, Fermi National Accelerator Lab. (USA) . . . . . [8451-12]

Coffee Break . . . . . 15.10 to 15.40

15.40: **ALTEC DPC infrastructure and operations in support of the Italian participation to the Gaia data processing**, Rosario Messineo, ALTEC spa (Italy); Roberto Morbidelli, INAF - Osservatorio Astronomico di Torino (Italy); Michele Martino, Enrico Pigozzi, Angelo Fabio Mulone, ALTEC spa (Italy) . . . . . [8451-13]

16.00: **Automated and generalized integral-field spectroscopy data reduction using p3d**, Christer Sandin, Peter Weilbacher, Fachreddin Tabataba-Vakili, Ole Streicher, Leibniz-Institut für Astrophysik Potsdam (Germany) . . . . . [8451-14]

SESSION 4

Room: G106 . . . . . Sun. 16.20 to 18.10

Control Systems I

Session Chair: **David L. Terrett,**
Rutherford Appleton Lab. (United Kingdom)

16.20: **INO340 Telescope control system architecture and development** *(Invited Paper)*, Reza Ravani, Asghar Jafarzadeh, Institute for Studies in Theoretical Physics and Mathematics (Iran, Islamic Republic of). . . . . [8451-15]

16.50: **Development of the ACS+OPCUA-based control system for a CTA medium size telescope prototype**, Bagmeet Behera, Deutsches Elektronen-Synchrotron (Germany); Igor Oya, Emrah Birsin, Humboldt-Univ. zu Berlin (Germany); Hendryk Koeppel, David Melkumyan, Stefan Schlenstedt, Deutsches Elektronen-Synchrotron (Germany); Torsten Schmidt, High Tech Consulting (Germany); Ullrich Schwanke, Humboldt-Univ. zu Berlin (Germany); Peter Wegner, Stephan Wiesand, Deutsches Elektronen-Synchrotron (Germany); Michael Winde, Deutsches Elektronen-Synchrotron (Germany) and for the CTA consortium (Germany). . . . . [8451-16]

17.10: **Software control of the Advanced Technology Solar Telescope enclosure PLC hardware using COTS software**, Alastair J. Borrowman, Observatory Sciences Ltd. (United Kingdom); Lander de Bilbao, Javier Ariño, Gaizka Murga, IDOM (USA); Bret Goodrich, John R. Hubbard, National Solar Observatory (USA); Alan Greer, Chris Mayer, Philip Taylor, Observatory Sciences Ltd. (United Kingdom) . . . . . [8451-17]

17.30: **Simultaneous control of multiple instruments at the ATST**, Erik M. Johansson, Bret Goodrich, National Solar Observatory (USA). . . . . [8451-18]

17.50: **The STELLA robotic observatory on Tenerife,** Michael Weber, Thomas Granzer, Klaus G. Strassmeier, Manfred F. Woche, Leibniz-Institut für Astrophysik Potsdam (Germany). . . . . [8451-19]

POSTERS-SUNDAY

Room: Hall 3. . . . . Sun. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Sunday. The interactive poster session with authors in attendance will be Sunday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

The EMIR experience in the use of software control simulators to speed up the time to telescope, Pablo L. López Ramos, José Carlos López-Ruiz, Heidy Moreno Arce, Josefina Rosich, Instituto de Astrofísica de Canarias (Spain) . . . . . [8451-02]

More flexibility in representing geometric distortion in astronomical images, David L. Shupe, Jet Propulsion Lab. (USA); Russ R. Laher, Lisa J. Storrie-Lombardi, Jason A. Surace, Carl J. Grillmair, David Levitan, Branimir Sesar, California Institute of Technology (USA) . . . . . [8451-57]

Network infrastructure to support dynamic system reconfiguration in ALMA, Tzu-Chiang Shen, Nicolas Ovando, Marcelo Bartsch, Andres Robles, Ruben Soto, Jorge F. Ibsen, Chirstian Saldias, Atacama Large Millimeter Array (Chile). . . . . [8451-58]

Software latency test of the LINC-NIRVANA wavefront-sensor system, Jürgen Berwein, Florian Briegel, Frank Kittmann, Albert R. Conrad, Thomas Bertram, Max-Planck-Institut für Astronomie (Germany) . . . . . [8451-59]

Reflector adjustment for large radio telescope based on active optics, Li Tongying, National Astronomical Observatories (China); Zhenchao Zhang, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8451-60]

A mask quality tool for the OSIRIS multi-object spectrograph, José Carlos López-Ruiz, Jacinto Javier C. Vaz, Alessandro Ederoclite, Victor González-Escalera, Instituto de Astrofísica de Canarias (Spain). . . . . [8451-61]

ALMA software regression tests: the evolution under an operational environment, Ruben Soto, Victor Gonzalez, Jorge F. Ibsen, Matias Mora, Norman Saez, Tzu-Chiang Shen, Atacama Large Millimeter Array (Chile). . . . . [8451-62]

ALMA operation support software and infrastructure, Tzu-Chiang Shen, Ruben Soto, Jorge F. Ibsen, Rodrigo A. Olguin, Atacama Large Millimeter Array (Chile). . . . . [8451-63]

Development of telescope control system for the 50cm telescope of the UC Santa Martina Observatory, Tzu-Chiang Shen, Pontificia Univ. Católica de Chile (Chile); Ruben Soto, Univ. Tecnica Federico Santa Maria (Chile); Johnny Reveco, Univ. de Concepcion (Chile); Leonardo Vanzi, Pedro A. Escárate Monetta, Vincent Suc, Pontificia Univ. Católica de Chile (Chile). . . . . [8451-64]

The MUSE observation preparation tool, Laure Piqueras, Johan Richard, Arlette Pécontal-Rousset, Roland M. Bacon, Observatoire de Lyon (France) and Univ. de Lyon (France) and Ctr. de Recherche Astronomique de Lyon (France); Pedro Baksai, European Southern Observatory (Chile); Joel Vernet, European Southern Observatory (Germany) . . . . . [8451-65]

Data management plan for the KMTNet project, Chung-Uk Lee, Dong-Jin Kim, Seung-Lee Kim, Byeong-Gon Park, Sang-Mok Cha, Korea Astronomy and Space Science Institute (Korea, Republic of) . . . . . [8451-66]

On-board data handling of current and future IR space observatories, Roland Ottensamer, Franz Kerschbaum, Armin Luntzer, Univ. Wien (Austria) . . . . . [8451-67]

HARPS-N: software path from the observing block to the image, Danuta Sosnowska, Observatoire de Genève (Switzerland); Andy Vick, UK Astronomy Technology Ctr. (United Kingdom); Marcello Lodi, Jose Guerra, Telescopio Nazionale Galileo (Spain); Dennis Kelly, Xiaofeng Gao, UK Astronomy Technology Ctr. (United Kingdom); Nicolas Buchschacher, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Christophe Lovis, Francesco Pepe, Observatoire de Genève (Switzerland); Emilio Molinari, Telescopio Nazionale Galileo (Spain); Andrew Collier Cameron, Univ. of St. Andrews (United Kingdom); David Latham, Harvard-Smithsonian Ctr. for Astrophysics (USA); Stéphane Udry, Observatoire de Genève (Switzerland) . . . . . [8451-68]

Research of simulation framework for telescope wireless networks control system, Xiaoying Shuai, Nanjing Univ. of Science and Technology (China) and Chizhou College (China) . . . . . [8451-71]

Toolkit of automated database creation and cross-match, Yanxia Zhang, Tong Pei, Yong-Heng Zhao, National Astronomical Observatories (China) . . . . . [8451-72]

MUSE instrumentation software, Gérard Zins, Lab. d'Astrophysique de l'Observatoire de Grenoble (France) . . . . . [8451-73]

SPHERE instrumentation software: a progress report, Andrea Baruffolo, INAF - Osservatorio Astronomico di Padova (Italy); Pietro Bruno, INAF - Osservatorio Astrofisico di Catania (Italy); Daniela Fantinel, INAF - Osservatorio Astronomico di Padova (Italy); Enrico Fedrigo, European Southern Observatory (Germany); Laurence Gluck, Institut de Planétologie et d'Astrophysique de Grenoble (France); Mario Kiekebusch, European Southern Observatory (Germany); Mickael Micallef, Institut de Planétologie et d'Astrophysique de Grenoble (France); Dan Popovic, Bernardo Salasnich, European Southern Observatory (Germany); Peter Steiner, ETH Zurich (Switzerland); Gérard Zins, Institut de Planétologie et d'Astrophysique de Grenoble (France) . . . . . [8451-74]

Remote monitoring and fault recovery for FPGA-based field controllers of telescope and instruments, Yuhua Zhu, Dan Zhu, Nanjing Univ. of Posts and Telecommunications (China); Jianing Wang, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8451-75]

Commissioning the VST telescope control software, Pietro Schipani, INAF - Osservatorio Astronomico di Capodimonte (Italy); Javier Argomedo, European Southern Observatory (Germany); Laurent Marty, INAF - Osservatorio Astronomico di Capodimonte (Italy) . . . . . [8451-76]

Using ODGWs with GSAOI: software and firmware implementation challenges, Peter J. Young, Peter McGregor, Jan van Harmelen, The Australian National Univ. (Australia); Benoît Neichel, Gemini Observatory (Chile). . [8451-77]

Cure-WISE: HETDEX data reduction with Astro-WISE, Jan M. Snigula, Max-Planck-Institut für extraterrestrische Physik (Germany) and Universitätssternwarte München (Germany); Niv Drory, Univ. Nacional Autónoma de México (Mexico); Mark E. Cornell, The Univ. of Texas at Austin (USA); Maximilian H. Fabricius, Max-Planck-Institut für extraterrestrische Physik (Germany); Karl Gebhardt, Gary J. Hill, The Univ. of Texas at Austin (USA); Martin Landriau, Max-Planck-Institut für extraterrestrische Physik (Germany) . [8451-78]

Multiple guide star acquisition software for LINC-NIRVANA, Thomas Bertram, Max-Planck-Institut für Astronomie (Germany) . . . . . [8451-79]

OpenROCS: a software tool to control robotic observatories, Josep Colome, Josep Sanz, Francesc Vilardell, Ignasi Ribas, Institut d'Estudis Espacials de Catalunya (Spain) . . . . . [8451-80]

The 3.6 m Indo-Belgian Devasthal Optical Telescope: the control system, Eric Gabriel, Christian Bastin, Maxime Pierard, AMOS Ltd. (Belgium) . . [8451-82]

Technical solutions in preparing data for the Keck Obervatory archive, Hien D. Tran, Jeff Mader, Robert R. Goodrich, Myrna Tsubota, W. M. Keck Observatory (USA). . . . . [8451-83]

Verification of the LINC-NIRVANA derotation control software, Frank Kittmann, Thomas Bertram, Albert R. Conrad, Florian Briegel, Lars Mohr, Jürgen Berwein, Max-Planck-Institut für Astronomie (Germany) . . . . . [8451-84]

OPERA: open source pipeline for ESPaDOnS reduction and analysis, Eder Martioli, Douglas Teeple, Daniel Devost, Nadine Manset, Kanoa Withington, Canada-France-Hawaii Telescope (USA) . . . . . [8451-86]

MESA: Mercator scheduler and archive system, Florian Merges, Saskia Prins, Mercator Telescope (Spain) and Katholieke Univ. Leuven (Belgium); Wim Pessemier, Gert Raskin, Katholieke Univ. Leuven (Belgium); Jesus Perez Padilla, Mercator Telescope (Spain); Hans Van Winckel, Katholieke Univ. Leuven (Belgium) . . . . . [8451-87]

Service-oriented architecture for the ARGOS instrument control software, José Luis Borelli, Max-Planck-Institut für Astronomie (Germany); Lothar Barl, Max-Planck-Institut für extraterrestrische Physik (Germany); Wolfgang Gässler, Martin Kulas, Max-Planck-Institut für Astronomie (Germany); Sebastian Rabien, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8451-88]

SDAI: a key piece of software to manage the new wide band backend at Robledo, J. Ricardo Rizzo, Miguel Gutierrez, Jose Cernicharo, Ctr. de Astrobiología (Spain); Ioana Sotuela, Madrid Deep Space Communication Complex (Spain); Antonio Pedreira Rios, INTA Instituto Nacional de Técnica Aeroespacial (Spain) . . . . . [8451-89]

Confronting the numerical simulations of the VLT/MUSE instrument with the first real data, Aurélien Jarno, Roland M. Bacon, Arlette Pécontal-Rousset, Observatoire de Lyon (France); Ole Streicher, Peter Weilbacher, Leibniz-Institut für Astrophysik Potsdam (Germany) . . . . . [8451-91]

The future of TNG telescope control system, Jose Guerra, Nauzet Hernandez, Marcello Lodi, Jose Juan San Juan, Telescopio Nazionale Galileo (Italy)[8451-92]

A simulation and testing framework for the Magdalena Ridge Observatory interferometer control system, Allen R. Farris, Rodrigo Lopes, Jan Deininger, Victor Alvidrez, Daniel A. Klinglesmith III, Nicolas C. Torres, Chuck M. Dahl, Ron King, New Mexico Institute of Mining and Technology (USA); David Buscher, John Young, Univ. of Cambridge (United Kingdom). . . . . [8451-93]

A standard framework for developing instrument controllers for the ATST, John R. Hubbard, Erik M. Johansson, Steve Wampler, Bret Goodrich, National Solar Observatory (USA) . . . . . [8451-95]

Software-centric view on the LINC-NIRVANA beam control concept, Jan Trowitzsch, Thomas Bertram, Max-Planck-Institut für Astronomie (Germany) . . . . . [8451-96]

Database design of LAMOST data processing and production, Yanxin Guo, Ali Luo, Feng-Fei Wang, Zhongrui Bai, Jian Li, National Astronomical Observatories (China) . . . . . [8451-97]

OSIRIS software tools for multi-object spectroscopy, Jacinto Javier C. Vaz, José Carlos López-Ruiz, Alessandro Ederoclite, Angel Manuel Bongiovanni, Victor González-Escalera, Instituto de Astrofísica de Canarias (Spain) . [8451-98]

The improvement of CCD auto-guiding system for 2.5m telescope, Liyan Chen, Zhenchao Zhang, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8451-99]

Diving into the Sardinia Radio Telescope minor servo system, Marco Buttu, Franco Buffa, INAF - Osservatorio Astronomico di Cagliari (Italy); Franco Fiocchi, INAF - Istituto di Radioastronomia (Italy); Andrea Melis, Carlo Migoni, INAF - Osservatorio Astronomico di Cagliari (Italy); Marco Morsiani, Andrea Orlati, INAF - Istituto di Radioastronomia (Italy); Sergio Poppi, INAF - Osservatorio Astronomico di Cagliari (Italy); Simona Righini, INAF - Istituto di Radioastronomia (Italy); Gian Paolo Vargiu, INAF - Osservatorio Astronomico di Cagliari (Italy); Gianpaolo Zacchiroli, INAF - Istituto di Radioastronomia (Italy) . . . . . [8451-100]

The control software for the Sardinia Radio Telescope, Andrea Orlati, INAF - Istituto di Radioastronomia (Italy); Marco Buttu, Andrea Melis, Carlo Migoni, Sergio Poppi, INAF - Osservatorio Astronomico di Cagliari (Italy); Simona Righini, INAF - Istituto di Radioastronomia (Italy) . . . . . [8451-101]

Open-source framework for documentation of scientific software written on MATLAB-compatible programming languages, Mikhail V. Konnik, James Welsh, The Univ. of Newcastle (Australia). . . . . [8451-102]

A motion control networked solution for the PAUCam slow control, Otger Ballester, Cristobal Pio, Carles Hernández, Institut de Física d'Altes Energies (Spain) . . . . . [8451-103]

Design and implementation of a distributed system for the PAUCam camera control system, Otger Ballester, Cristobal Pio, Institut de Física d'Altes Energies (Spain); Jorge Carretero, Port d'Informació Científica (Spain); Carles Hernández, Marino Maiorino, Institut de Física d'Altes Energies (Spain); Christian Neissner, Port d'Informació Científica (Spain); Santiago Serrano, Institut de Física d'Altes Energies (Spain); Nadia Tonello, Port d'Informació Científica (Spain); Isaac Troyano, Institut de Física d'Altes Energies (Spain) . . . . . [8451-104]

Progress on the development of an electronic inverter of the radiative transfer equation, Jose Carlos del Toro Iniesta, Instituto de Astrofísica de Andalucía (Spain). . . . . [8451-105]

GCS component development cycle, Jose A. Rodriguez Losada, Rosa M. Macías-Verde, Jordi Molgo Sendra, Marti Pi Puig, Dailos Guerra Ramos, Instituto de Astrofísica de Canarias (Spain) . . . . . [8451-106]

Automated site monitoring at the SAAO, Timothy E. Pickering, Steven M. Crawford, Laure Catala, South African Astronomical Observatory (South Africa). . . . . [8451-107]

Control software for the CARMENES instrument, Josep Guàrdia, Josep Colome, Ignasi Ribas, Institut d'Estudis Espacials de Catalunya (Spain) . . . . . [8451-108]

RTS2: multichannel experience, Petr Kubanek, Michael Prouza, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Ivan V. Kotov, Paul O'Connor, Brookhaven National Lab. (USA); Peter E. Doherty, Harvard Univ. (USA); James S. Frank, Brookhaven National Lab. (USA) . . . . . [8451-109]

A complete solar eruption activities processing system with robotization and real time, Ganghua Lin, National Astronomical Observatories (China) . . . . . [8451-110]

Evolution of the top level control software of astronomical instruments at ESO, Eszter Pozna, European Southern Observatory (Germany). . . . . [8451-111]

Design and first commissioning results of PLC-based control systems for the Mercator Telescope, Wim Pessemier, Gert Raskin, Geert Deconinck, Katholieke Univ. Leuven (Belgium); Philippe Saey, Katholieke Hogeschool Sint-Lieven (Belgium); Hans Van Winckel, Katholieke Univ. Leuven (Belgium) . . . . . [8451-112]

A mask designer tool for the OSIRIS multi-object spectrograph, Jacinto Javier Vaz-Cedillo, Alessandro Ederoclite, José Carlos López-Ruiz, Angel Manuel Bongiovanni, Instituto de Astrofísica de Canarias (Spain) . . . . [8451-113]

ESPRESSO front-end guiding algorithm, Marco Landoni II, Marco Riva, INAF - Osservatorio Astronomico di Brera (Italy); Alexandre Cabral, Univ. de Lisboa (Portugal); Stefano Cristiani, INAF - Osservatorio Astronomico di Trieste (Italy); Denis Mégevand, Observatory of Geneva (Switzerland); Filippo Maria Zerbi, INAF - Osservatorio Astronomico di Brera (Italy). . . . . [8451-115]

Image acquisition system with three CCD cameras, Binhua Li, Yigong Zhang, Kunming Univ. of Science and Technology (China); Lei Yang, Wei Mao, Yunnan Astronomical Observatory (China). . . . . [8451-116]

Final redshift determination of LAMOST pilot survey, including star, galaxy, and QSO spectra, Feng-Fei Wang, Ali Luo, Haotong Zhang, National Astronomical Observatories (China) . . . . . [8451-117]

Design and realization of the backup field controllers for LAMOST spectroscopes, Jianing Wang, Zhongyi Han, Yizhong Zeng, Zhongwen Hu, Yongtian Zhu, Lei Wang, Yonghui Hou, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8451-118]

LAMOST 2D pipeline, Zhongrui Bai, National Astronomical Observatories (China) . . . . . [8451-119]

Design and practice multichannel real time system on deformation control of optical plate, Yi Zheng, Yinhu Wang, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8451-120]

Support vector machines for photometric redshift measurement of quasars, Hongwen Zheng, North China Electric Power Univ. (China); Yanxia Zhang, National Astronomical Observatories (China) . . . . . [8451-121]

Review of techniques for photometric redshift estimation, Hongwen Zheng, North China Electric Power Univ. (China); Yanxia Zhang, National Astronomical Observatories (China) . . . . . [8451-122]

Survey of approaches for targeting quasars, Yanxia Zhang, Ali Luo, Yong-Heng Zhao, National Astronomical Observatories (China) . . . . . [8451-123]

Upper computer software design for active optics, Chen Li, Guomin Wang, Liang Gao, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8451-124]

A spectral featured-based stellar parameter pipeline: comparison version for estimation of LAMOST stellar parameter, Bing Du, Ali Luo, JianNan Zhang, Yue Wu, YanXin Guo, National Astronomical Observatories (China) . . . . . [8451-125]

An automatic program to identify morphological characteristics of sunspot groups from white light images, Jongyeob Park, Yong-Jae Moon, Kyung Hee Univ. (Korea, Republic of); Seonghwan Choi, Korea Astronomy and Space Science Institute (Korea, Republic of) and Kyung Hee Univ. (Korea, Republic of). . . . . [8451-126]

The optical synthetic aperture image restoration based on the improved maximum-likelihood algorithm, Zexun Geng, Qing Xu, Baoming Zhang, Zhihui Gong, Zhengzhou Institute of Surveying and Mapping (China) . . . . . [8451-127]

Estimate stellar parameters of O type stars for LAMOST commissioning spectra by POLLUX, Fang Zuo, Ali Luo, JianNan Zhang, National Astronomical Observatories (China) . . . . . [8451-129]

Data access and analysis system for Gaia data handling during operations: scientific validation and results monitoring approach in support of the AVU operations, Roberto Morbidelli, INAF - Osservatorio Astronomico di Torino (Italy); Rosario Messineo, ALTEC spa (Italy); Deborah Busonero, Alberto Vecchiato, Alberto Riva, INAF - Osservatorio Astronomico di Torino (Italy) . . . . . [8451-130]

The global sphere reconstruction for the Gaia mission in the Astrometric Verification Unit, Alberto Vecchiato, Ummi Abbas, INAF - Osservatorio Astronomico di Torino (Italy); Ugo Becciani, INAF - Osservatorio Astrofisico di Catania (Italy); Luca Bianchi, Beatrice Bucciarelli, Mario G. Lattanzi, INAF - Osservatorio Astronomico di Torino (Italy) . . . . . [8451-132]

Qsys NOC-based MPSOC design for LAMOST spectrometer, Zhongyi Han, Jianing Wang, Yizhong Zeng, Jun Shao, Nanjing Institute of Astronomical Optics & Technology (China) . . . . . [8451-133]

The current status of OCS, Shiwei Sun, Ali Luo, National Astronomical Observatories (China) . . . . . [8451-135]

The system software development for prime focus spectrograph on Subaru Telescope, Atsushi Shimono, The Univ. of Tokyo (Japan); Naoyuki Tamura, Subaru Telescope, National Astronomical Observatory of Japan (USA); Hajime Sugai, Hiroshi Karoji, The Univ. of Tokyo (Japan). . . . . [8451-136]

Test results for the Gemini Planet Imager data reduction pipeline, Jérôme Maire, Dunlap Institute for Astronomy & Astrophysics (Canada); Marshall D. Perrin, Space Telescope Science Institute (USA); René Doyon, Univ. de Montréal (Canada); Jeffrey Chilcote, James E. Larkin, Jason L. Weiss, Univ. of California, Los Angeles (USA); Christian Marois, National Research Council Canada (Canada); Quinn M. Konopacky, Maxwell Millar-Blanchaer, James R. Graham, Dunlap Institute for Astronomy & Astrophysics (Canada); Jennifer Dunn, Raphaël Galicher, National Research Council Canada (Canada); Franck Marchis, Sloane J. Wiktorowicz, Univ. of California, Berkeley (USA); Kathleen Labrie, Sandrine J. Thomas, Stephen J. Goodsell, Gemini Observatory (USA); Fredrik T. Rantakyro, Gemini Observatory (Chile); David W. Palmer, Bruce A. Macintosh, Lawrence Livermore National Lab. (USA) . . . . . [8451-137]

Electronics and mechanism control system for FRIDA: infrared imager and dissector for adaptive optics, Rubén A. Flores-Meza, Salvador Cuevas, Carlos Espejo, Carolina Keiman, Gerardo Lara, Beatriz Sánchez, Univ. Nacional Autónoma de México (Mexico) . . . . . [8451-138]

SPIRou @ CFHT: data reduction software and simulation tools, Etienne Artigau, Univ. de Montréal (Canada); Jean-Francois Donati, Observatoire Midi-Pyrénées (France); Xavier Delfosse, Institut de Planétologie et d'Astrophysique de Grenoble (France); François Bouchy, Institut d'Astrophysique de Paris (France); Xavier Bonfils, Institut de Planétologie et d'Astrophysique de Grenoble (France); Karunananth G. Thanjavur, Canada-France-Hawaii Telescope (USA); Pedro R. L. Figueira, Univ. de Geneve (Switzerland); René Doyon, Univ. de Montréal (Canada); Christian Surace, Claire Moutou, Observatoire Astronomique de Marseille-Provence (France); Christophe Lovis, Observatory of Geneva (Switzerland); Isabelle Boisse, Univ. do Porto (Portugal) . . . . . [8451-141]

SPIRou @ CFHT: design of the instrument control system, Gregory A. Barrick, Tom Vermeulen, Canada-France-Hawaii Telescope (USA); Sébastien Baratchart, Institut de Recherche en Astrophysique et Planétologie (France); Shiang-Yu Wang, Academia Sinica (Taiwan); Jennifer Dunn, National Research Council Canada (Canada); Francois Dolon, Observatoire Astronomique de Marseille-Provence (France); Olivier Hernandez, Univ. de Montréal (Canada); Francesco Pepe, Observatoire de Genève (Switzerland); François Bouchy, Lab. d'Astrophysique de Marseille (France); Michel Dupieux, Gérard Gallou, Thierry Gharsa, Marie Le Floch, Institut de Recherche en Astrophysique et Planétologie (France); Francois Moreau, Observatoire Astronomique de Marseille-Provence (France); Laurent P. Parès, Institut de Recherche en Astrophysique et Planétologie (France); Vladimir A. Reshetov, National Research Council Canada (Canada); James N. Thomas, Canada-France-Hawaii Telescope (USA); Chi-Hung Yan, Institute of Astronomy and Astrophysics (Taiwan) . . . . . [8451-142]

Data reduction for the imaging Fourier transform spectrometers SpIOMM and SITELLE, Thomas Martin, Laurent Drissen, Gilles Joncas, Univ. Laval (Canada) . . . . . [8451-143]

Monday 2 July

PLENARY SESSION

Room: Auditorium . . . . . Mon. 08.50 to 10.00

Session Chair: **Mark M. Casali,** European Southern Observatory (Germany)

08.50: **Introduction**

09.00: **James Webb Space Telescope: science update and status** *(Presentation Only)*, Heidi B. Hammel, AURA, Inc. (USA) . . . . . [8442-501]

09.30: **Exoplanets: unraveling a new paradigm** *(Presentation Only)*, Didier Queloz, Geneva Univ., Observatory of Geneva (Switzerland) . . . . . [8442-502]

Coffee Break . . . . . 10.00 to 10.30

SESSION 5

Room: G106 . . . . . Mon. 10.30 to 12.30

Computing Innovations

Session Chair: **Juan C. Guzman,** ASKAP, Commonwealth Scientific and Industrial Research Organisation (Australia)

10.30: **Virtual clouds on an astronomical observatory: virtualization at ESO, its status and its future** *(Invited Paper)*, Andrea Balestra, European Southern Observatory (Germany) . . . . . [8451-20]

11.00: **Towards dynamic light-curve catalogues** *(Invited Paper)*, Bart Scheers, Ctr. voor Wiskunde en Informatica (Netherlands) and Astronomical Institute Anton Pannekoek, Univ. of Amsterdam (Netherlands) . . . . . [8451-21]

11.30: **Design and implementation of a general main axis controller for the ESO telescopes**, Stefan Sandrock, Nicola Di Lieto, Lorenzo Pettazzi, Toomas M. Erm, European Southern Observatory (Germany) . . . . . [8451-134]

11.50: **Mirror support system controller design for INO340 Telescope**, Asghar Jafarzadeh, Reza Ravani, Institute for Studies in Theoretical Physics and Mathematics (Iran, Islamic Republic of) . . . . . [8451-23]

12.10: **UAF: a generic OPC unified architecture framework**, Wim Pessemier, Geert Deconinck, Gert Raskin, Katholieke Univ. Leuven (Belgium); Philippe Saey, Katholieke Hogeschool Sint-Lieven (Belgium); Hans Van Winckel, Katholieke Univ. Leuven (Belgium) . . . . . [8451-36]

Lunch Break . . . . . 12.30 to 13.50

SESSION 6

Room: G106 . . . . . Mon. 13.50 to 15.40

Control Systems II

Session Chair: **Hilton A. Lewis,** W. M. Keck Observatory (USA)

13.50: **The last mile of the ALMA software development: lessons learned** *(Invited Paper)*, Jorge F. Ibsen, European Southern Observatory (Chile); A. Maurizio Chavan, European Southern Observatory (Germany); Brian Glendenning, Jeffrey Kern, National Radio Astronomy Observatory (USA); George Kosugi, Subaru Telescope, National Astronomical Observatory of Japan (Japan); Gianni Raffi, National Radio Astronomy Observatory (Chile); Erich Schmid, Joseph Schwarz, European Southern Observatory (Germany) [8451-25]

14.20: **Adoption of new software and hardware solutions at the VLT: the ESPRESSO control architecture case**, Roberto Cirami, Paolo Di Marcantonio, Igor Coretti, Paolo Santin, Marco Mannetta, Veronica Baldini, Stefano Cristiani, INAF - Osservatorio Astronomico di Trieste (Italy); Manuel Abreu, Alexandre Cabral, Univ. de Lisboa (Portugal); Manuel Monteiro, Univ. do Porto (Portugal); Denis Mégevand, Observatoire de Genève (Switzerland); Filippo Zerbi, INAF - Osservatorio Astronomico di Brera (Italy) . . . . . [8451-26]

14.40: **Conceptual design of the control software for the European Solar Telescope**, Paolo Di Marcantonio, Roberto Cirami, INAF - Osservatorio Astronomico di Trieste (Italy); Paolo Romano, INAF - Osservatorio Astronomico di Catania (Italy); Rosario Cosentino, Telescopio Nazionale Galileo (Spain); Ilaria Ermolli, INAF - Osservatorio Astronomico di Roma (Italy) . . . . . [8451-27]

15.00: **Software systems for control, monitoring, and data acquisition of the South Pole Telescope**, Kyle Story, Kavli Institute for Cosmological Physics (USA) and The Univ. of Chicago (USA); Peter A. Ade, Cardiff Univ. (United Kingdom); Jason E. Austermann, Univ. of Colorado at Boulder (USA); James A. Beall, Daniel T. Becker, National Institute of Standards and Technology (USA); Bradford Benson, Lindsey Bleem, Kavli Institute for Cosmological Physics (USA) and The Univ. of Chicago (USA); Joe W. Britton, National Institute of Standards and Technology (USA); John E. Carlstrom, Clarence L. Chang, Kavli Institute for Cosmological Physics (USA) and The Univ. of Chicago (USA) and Argonne National Lab. (USA); Hsiao-Mei Cho, National Institute of Standards and Technology (USA); Thomas Crawford, Abigail T. Crites, Kavli Institute for Cosmological Physics (USA) and The Univ. of Chicago (USA); Aaron M. Datesman, Argonne National Lab. (USA); Tijmen de Haan, Matthew A. Dobbs, McGill Univ. (Canada); Wendeline Everett, Kavli Institute for Cosmological Physics (USA); A. Ewall-Wice, Kavli Institute for Cosmological Physics (USA) and The Univ. of Chicago (USA); Elizabeth M. George, Univ. of California, Berkeley (USA); Nils W. Halverson, Univ. of Colorado at Boulder (USA); Nicholas Harrington, Univ. of California, Berkeley (USA); Jason W. Henning, Univ. of Colorado at Boulder (USA); et al. . . . . [8451-28]

15.20: **A modern approach to upgrading the telescope control system of the CTIO Blanco 4-m Telescope**, Michael Warner, Rolando Cantarutti, German Schumacher, Eduardo Mondaca, Omar Estay, Manuel Martinez, Victor Aguirre, Rodrigo Alvarez, Rodrigo Leiva, Timothy M. Abbott, Nicole S. van der Bliek, Cerro Tololo Inter-American Observatory (Chile) . . . . . [8451-29]

Coffee Break . . . . . 15.40 to 16.00

SESSION 7

Room: G106 . . . . . Mon. 16.00 to 18.00

Lightning Talks

Session Chair: **Nicole M. Radziwill,** James Madison Univ. (USA

Lightning talks are short (less than 5 minute) interest-driven talks where you can ask questions to the audience, present a new idea or insight, share an untested hypothesis, or just communicate lessons learned or other things you've found useful in your work. Simply show up and present your proposal and be prepared to give your brief presentation if selected.

You are encouraged to visit: http://perl.plover.com/lt/osc2003/lightning-talks.html for examples of past sessions.

Tuesday 3 July

PLENARY SESSION

Room: Auditorium . . . . . Tues. 09.00 to 10.00

Session Chair: **Kathryn A. Flanagan,** Space Telescope Science Institute (USA)

09.00: **The Kepler Exoplanet Survey: instrumentation, performance and results**, Thomas N. Gautier III, Jet Propulsion Lab., Caltech (USA) and The Kepler Science Team (USA) . . . . . [8442-503]

09.30: **Antarctic astronomy**, John W. V. Storey, The Univ. of New South Wales (Australia) . . . . . [8446-504]

Coffee Break . . . . . 10.00 to 10.30

SESSION 8

Room: G106 . . . . . Tues. 10.30 to 12.20

Cyberinfrastructure and HPC

Session Chair: **Bret Goodrich,** National Solar Observatory (USA)

10.30: **Data management cyberinfrastructure for the Large Synoptic Survey Telescope** *(Invited Paper)*, David M. Freemon, Univ. of Illinois at Urbana-Champaign (USA); Kian-Tat Lim, Jacek Becla, Gregory Dubois-Felsman, SLAC National Accelerator Lab. (USA); Jeffrey Kantor, LSST Corp. (USA) . . . [8451-30]

11.00: **ALMA software scalability experience with growing number of antennas**, Matias Mora, Atacama Large Millimeter Array (Chile); Jorge Avarias, National Radio Astronomy Observatory (USA); Heiko Sommer, Bogdan Jeram, European Southern Observatory (Germany); Alexis Tejeda, Juan Pablo Gil, Atacama Large Millimeter Array (Chile); Kyoko Ashitagawa, National Radio Astronomy Observatory (USA) . . . . . [8451-31]

11.20: **The DIRP framework: flexible HPC-based scientific processing of petabyte scale surveys**, Christopher J. Harris, Andreas J. Wicenec, Alessio Checcucci, Slava Kitaeff, Dave Pallot, Kevin Vinsen, Chen Wu, Peter J. Quinn, The Univ. of Western Australia (Australia) . . . . . [8451-32]

11.40: **A complete history of everything**, Kyle Lanclos, William T. S. Deich, Lick Observatory (USA). . . . . [8451-33]

12.00: **UKIRT remote operations fail-safe system**, Bryan H. Gorges, Craig Walther, Tim Chuter, Joint Astronomy Ctr. (USA). . . . . [8451-34]

Lunch Break . . . . . 12.20 to 13.40

SESSION 9

Room: G106 . . . . . Tues. 13.40 to 15.30

Control Systems III

Session Chair: **Juan C. Guzman,** ASKAP, Commonwealth Scientific and Industrial Research Organisation (Australia)

13.40: **Interaction design challenges and solutions for ALMA operations monitoring and control** *(Invited Paper)*, Emmanuel Pietriga, INRIA (France) and CIRIC (Chile); Pierre-Henri Cubaud, Conservatoire National des Arts Métiers (France); Joseph Schwarz, Marcus Schilling, European Southern Observatory (Germany); Romain Primet, INRIA (France); Denis Barkats, Emilio Barrios, Baltasar Vila-Vilaro, Joint ALMA Office (Chile) . . . . . [8451-35]

14.10: **GMT software and controls overview**, Jose M. Filgueira, Matthieu Bec, Jose Soto, Ning Liu, Giant Magellan Telescope Project (USA). . . . . [8451-131]

14.30: **The readout and control system of the Dark Energy Camera**, Klaus Honscheid, The Ohio State Univ. (USA) . . . . . [8451-37]

14.50: **Instrument control software for the visible broadband imager using ATST common services framework and base**, Andrew Ferayorni, National Solar Observatory (USA) . . . . . [8451-38]

15.10: **Intercontinental network control platform and robotic observation for Chinese Antarctic telescopes**, Lingzhe Xu, Nanjing Institute of Astronomical Optics & Technology (China). . . . . [8451-39]

Coffee Break . . . . . 15.30 to 16.00

SESSION 10

Room: G106 . . . . . Tues. 16.00 to 17.50

Data Management, Pipelines, and Archives

Session Chair: **Alan Bridger,** UK Astronomy Technology Ctr. (United Kingdom)

16.00: **A distributed data management system for data-intensive radio astronomy** *(Invited Paper)*, Arne Grimstrup, Univ. of Calgary (Canada); Venkat Mahadevan, UBC Okanagan (Canada); Olivier Eymere, IBM Canada Ltd. (Canada); Ken Anderson, UBC Okanagan (Canada); Cameron Kiddle, Univ. of Calgary (Canada); Erik Rosolowsky, UBC Okanagan (Canada); Andrew R. Taylor, Univ. of Calgary (Canada) . . . . . [8451-40]

16.30: **J-PAS data management pipeline and archiving**, David Cristobal-Hornillos, Nicolas Gruel, Angel López, Mariano Moles, Andrés Javier Cenarro, Antonio Marin-Franch, Jesús Varela López, Ctr. de Estudios de Física del Cosmos de Aragón (Spain); Alessandro Ederoclite, Instituto de Astrofísica de Canarias (Spain); Axel Yanes Díaz, Sergio Rueda, Sergio Chueca, Fernando Rueda, Ctr. de Estudios de Física del Cosmos de Aragón (Spain). . . . . [8451-41]

16.50: **The LOFAR long term archive: e-infrastructure on petabyte scale**, Hanno Holties, ASTRON (Netherlands). . . . . [8451-42]

17.10: **The MWA archive infrastructure: archiving terabytes of data over dedicated WAN connections**, Andreas J. Wicenec, Dave Pallot, Alessio Checcucci, Christopher J. Harris, Slava Kitaeff, Kevin Vinsen, Chen Wu, The Univ. of Western Australia (Australia) . . . . . [8451-43]

17.30: **ESO archive data and metadata model**, Adam Dobrzycki, Cristiano da Rocha, Ignacio Vera Sequeiros, My-Ha Vuong, Thomas Bierwirth, Vincenzo Forchí, Nathalie Fourniol, Christophe Moins, Stefano Zampieri, European Southern Observatory (Germany) . . . . . [8451-44]

Wednesday 4 July

PLENARY SESSION

Room: Auditorium . . . . . Wed. 09.00 to 10.00

Session Chair: **Luc Simard,** National Research Council Canada (Canada)

09.00: **Very high energy gamma ray astronomy with the H.E.S.S. telescopes** *(Presentation Only)*, Werner Hofmann, Max-Planck-Institut für Kernphysik (Germany) . . . . . [8442-505]

09.30: **The cosmic microwave background: observing directly the early universe**, Paolo de Bernardis, Silvia Masi, Univ. degli Studi di Roma La Sapienza (Italy) . . . . . [8442-506]

Coffee Break . . . . . 10.00 to 10.30

SESSION 11

Room: G106 . . . . . Wed. 10.30 to 12.20

Observing and Imaging

Session Chair: **Gianluca Chiozzi,** European Southern Observatory (Germany)

10.30: **The ALMA OT in early science: supporting multiple customers** *(Invited Paper)*, Alan Bridger, UK Astronomy Technology Ctr. (United Kingdom); Andrew Biggs, European Southern Observatory (Germany); Stewart McLay, UK Astronomy Technology Ctr. (United Kingdom); Marcus Schilling, Rodrigo Tobar, European Southern Observatory (Germany); Stewart Williams, UK Astronomy Technology Ctr. (United Kingdom); Hiroshi Yatagai, National Astronomical Observatory of Japan (Japan) . . . . . [8451-45]

11.00: **Evolution of the phase 2 preparation and observation tools at the VLT**, Dario Dorigo, Thomas Bierwirth, Yves Jung, Fabio Sogni, European Southern Observatory (Germany) . . . . . [8451-46]

11.20: **Accelerated speckle imaging with the ATST visible broadband imager**, Friedrich Wöger, Andrew Ferayorni, National Solar Observatory (USA) . . . . . [8451-47]

11.40: **The MOSFIRE desktop: a highly customizable, GUI-building user interface for the MOSFIRE instrument**, Jason L. Weiss, Univ. of California, Los Angeles (USA) . . . . . [8451-48]

12.00: **Advanced PANIC quick-look tool using Python**, Jose-Miguel Ibáñez Mengual, Antonio J. Garcia, Instituto de Astrofísica de Andalucía (Spain); Clemens Storz, Josef W. Fried, Max-Planck-Institut für Astronomie (Germany); Matilde Fernández, Julio F. Rodríguez Gómez, Instituto de Astrofísica de Andalucía (Spain). . . . . [8451-49]

Lunch/Exhibition Break . . . . . 12.20 to 13.50

SESSION 12

Room: G106 . . . . . Wed. 13.50 to 15.30

Communications, Collaboration, and Coordination

Session Chair: **Hilton A. Lewis,** W. M. Keck Observatory (USA)

13.50: **Astro-WISE information system**, Edwin A. Valentijn, Andrey Belikov, Gijs Verdoes Kleijn, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands) . . . . . [8451-50]

14.10: **EVALSO, a high-bandwidth communication infrastructure to efficiently connect the ESO Paranal and the Cerro Armazones observatories to Europe: demonstration activities and start of operations**, Roland Lemke, Rolf Chini, Ruhr-Univ. Bochum (Germany); Fernando Comeron, Giorgio Filippi, European Southern Observatory (Germany); Jim Emerson, Queen Mary, Univ. of London (United Kingdom); Konrad Kuijken, Leiden Univ. (Netherlands); Danuta Dobrzycka, European Southern Observatory (Germany); Andrew Wright, European Southern Observatory (Chile); Stefano Zampieri, European Southern Observatory (Germany); Fernando Liello, Univ. degli Studi di Trieste (Italy) . . . . . [8451-51]

14.30: **Enabling efficient electronic collaboration between LIGO and other astronomy communities using federated identity and COmanage**, Scott Koranda, Univ. of Wisconsin-Milwaukee (USA); Heather Flanagan, Internet2 (USA); Marie Huynh, Univ. of Wisconsin-Milwaukee (USA); Ken Klingenstein, Benn Oshrin, Internet2 (USA) . . . . . [8451-52]

14.50: **REMOTES: a reliable and modular telescope solution for seamless operation and monitoring of various observation facilities**, Michal Jakubec, Michal Jakubec, Jan Štrobl, Petr Skala, Milan Sedlácek, Martin Nekola, Astronomical Institute of the ASCR, v.v.i. (Czech Republic); Martin Blažek, René Hudec, Astronomical Institute of the ASCR, v.v.i. (Czech Republic) and Czech Technical Univ. in Prague (Czech Republic) . . . . . [8451-53]

15.10: **A symbiotic relationship between HST and JWST operations software systems development**, Denise C. Taylor, Tony Roman, Maria Bertch, Robert E. Douglas, Jr., Mark Giuliano, Space Telescope Science Institute (USA) . [8451-54]

Coffee Break . . . . . 15.30 to 16.00

SESSION 13

Room: G106 . . . . . Wed. 16.00 to 18.00

New Directions

Session Chair: **Alan Bridger,**
UK Astronomy Technology Ctr. (United Kingdom)

Open Forum: Astroshare and expanding collaboration in our community

This session is intended to continue discussions from 2008 in Marseille and 2010 in San Diego regarding how to stimulate collaboration within the astronomical software development community in between meeting at SPIE conferences. The Astroshare wiki, other new possibilities to foster connections and collaboration, and any new ideas you bring to the open forum will be discussed.

Tuesday-Friday 3-6 July 2012 • Proceedings of SPIE Vol. 8452

Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VI


Holland


Zmuidzinas

Conference Chairs: **Wayne S. Holland,** UK Astronomy Technology Ctr. (United Kingdom); **Jonas Zmuidzinas,** California Institute of Technology (USA)

Program Committee: **Sarah E. Church,** Stanford Univ. (USA); **Jian-Rong Gao,** SRON Netherlands Institute for Space Research (Netherlands) and Delft Univ. of Technology (Netherlands); **Kent D. Irwin,** National Institute of Standards and Technology (USA); **J. Anthony Murphy,** National Univ. of Ireland, Maynooth (Ireland); **Albrecht Poglitsch,** Max-Planck-Institut für extraterrestrische Physik (Germany); **Karl-Friedrich Schuster,** IRAM-Domaine Univ. de Grenoble (France); **Gordon J. Stacey,** Cornell Univ. (USA); **Christopher K. Walker,** Steward Observatory, The Univ. of Arizona (USA)

Tuesday 3 July

SESSION 1

Room: G109 . . . . . Tues. 13.30 to 15.30

Current/Near Term Cameras and Arrays

Session Chair: **Wayne S. Holland,**
UK Astronomy Technology Ctr. (United Kingdom)

13.30: **A new era of wide-field submillimetre imaging: on-sky performance of SCUBA-2**, Jessica T. Dempsey, Joint Astronomy Ctr. (USA); Wayne S. Holland, UK Astronomy Technology Ctr. (United Kingdom); Antonio C. Chrysostomou, David Berry, Daniel Bintley, Joint Astronomy Ctr. (USA); Edward L. Chapin, The Univ. of British Columbia (Canada); Simon C. Craig, Iain M. Coulson, Gary R. Davis, Per Friberg, Tim Jenness, Joint Astronomy Ctr. (USA); Andy G. Gibb, The Univ. of British Columbia (Canada); Harriet A. L. Parsons, Holly S. Thomas, Remo P. J. Tilanus, Craig A. Walther, Joint Astronomy Ctr. (USA) . . . . . [8452-01]

13.50: **The NIKA 2011 run: results and perspectives towards a resident camera for the Pico Veleta Observatory**, Martino Calvo, Institut NÉEL (France) and for the NIKA collaboration (France); Markus Roesch, IRAM-Domaine Univ. de Grenoble (France); Alessandro Monfardini, Institut NÉEL (France); Jochem J. Baselmans, SRON Nationaal Instituut voor Ruimteonderzoek (Netherlands); Alain Benoit, Nicolas Boudou, Institut NÉEL (France); Olivier Bourrion, LPSC Grenoble (France); Philippe Camus, Institut NÉEL (France); Angelo Cruciani, Institut NÉEL (France) and Univ. degli Studi di Roma La Sapienza (Italy); François X. Désert, Institut de Planétologie et d'Astrophysique de Grenoble (France); Simon M. Doyle, Cardiff Univ. (United Kingdom); Christian Hoffmann, Institut NÉEL (France); Samuel Leclercq, IRAM-Domaine Univ. de Grenoble (France); Philip D. Mauskopf, Cardiff Univ. (United Kingdom); Juan-Francisco Macias-Perez, Nicolas Ponthieu, LPSC Grenoble (France); Karl Schuster, IRAM-Domaine Univ. de Grenoble (France). . . . . [8452-02]

14.10: **First observations with SuperCam and future plans**, Jenna L. Kloosterman, Tiara Cottam, Brandon J. Swift, David H. Lesser, Paul Schickling, The Univ. of Arizona (USA); Christopher E. Groppi, Arizona State Univ. (USA); Michael B. Borden, Allison Towner, Per Schmidt, Craig A. Kulesa, Christian Y. Drouet d'Aubigny, Christopher K. Walker, Dathon R. Golish, The Univ. of Arizona (USA); Sander Weinreb, Glenn E. Jones, California Institute of Technology (USA); Hamdi Mani, Arizona State Univ. (USA); Jacob W. Kooi, California Institute of Technology (USA); Arthur W. Lichtenberger, Univ. of Viriginia (USA); Patrick Puetz, Univ. zu Köln (Germany); Gopal Narayanan, Univ. of Massachusetts Amherst (USA). . . . . [8452-03]

14.30: **Status of MUSIC, the multicolor submillimeter inductance camera**, Sunil R. Golwala, California Institute of Technology (USA); Clint Bockstiegel, Spencer Brugger, Univ. of Colorado at Boulder (USA); Nicole G. Czakon, California Institute of Technology (USA); Peter K. Day, Jet Propulsion Lab. (USA); Thomas P. Downes, Ran P. Duan, California Institute of Technology (USA); Jiansong Gao, National Institute of Standards and Technology (USA); Amandeep K. Gill, Jason Glenn, Univ. of Colorado at Boulder (USA); Matthew I. Hollister, Henry G. LeDuc, Jet Propulsion Lab. (USA); Philip R. Maloney, Univ. of Colorado at Boulder (USA); Benjamin A. Mazin, Sean G. McHugh, Univ. of California, Santa Barbara (USA); Omid Noroozian, California Institute of Technology (USA); Hien T. Nguyen, Jet Propulsion Lab. (USA); Jack Sayers, California Institute of Technology (USA); James A. Schlaerth, California Institute of Technology (USA) and Univ. of Colorado at Boulder (USA); Seth Siegel, Anastasios K. Vayonakis, California Institute of Technology (USA); Philip R. Wilson, Jet Propulsion Lab. (USA); Jonas Zmuidzinas, California Institute of Technology (USA) and Jet Propulsion Lab. (USA) . . . . . [8452-04]

14.50: **First results of the polarimeter for the Large APEX Bolometer Camera (LABOCA)**, Giorgio Siringo, European Southern Observatory (Chile); Ernst Kreysa, Talayeh Hezareh, Max-Planck-Institut für Radioastronomie (Germany); Attila Kovács, Univ. of Minnesota, Twin Cities (USA); Helmut Wiesemeyer, Axel Weiss, Max-Planck-Institut für Radioastronomie (Germany); Frederic Schuller, Rodrigo Parra, Francisco Montenegro, Michael Dumke, European Southern Observatory (Chile); Rolf Guesten, Karl M. Menten, Max-Planck-Institut für Radioastronomie (Germany) . . . . . [8452-05]

15.10: **Design and first-light performance of TES bolometer arrays for submillimeter spectroscopy with ZEUS-2**, Carl Ferkinhoff, Thomas Nikola, Stephen C. Parshley, Gordon J. Stacey, Cornell Univ. (USA); Kent D. Irwin, Hsiao-Mei Cho, Michael D. Niemack, National Institute of Standards and Technology (USA); Mark Halpern, Matthew Hasselfield, The Univ. of British Columbia (Canada) . . . . . [8452-06]

Coffee Break . . . . . 15.30 to 16.00

SESSION 2

Room: G109 . . . . . Tues. 16.00 to 17.40

Transition Edge Sensors: Array Design and Performance

Session Chair: **Jian-Rong Gao,**
SRON Netherlands Institute for Space Research (Netherlands)

16.00: **Scaling the summit of the submillimetre: instrument performance of SCUBA-2**, Daniel Bintley, Joint Astronomy Ctr. (USA); Michael J. MacIntosh, Wayne S. Holland, UK Astronomy Technology Ctr. (United Kingdom); Jessica T. Dempsey, Per Friberg, John T. Kuroda, Erik G. Starman, Holly S. Thomas, Craig A. Walther, Joint Astronomy Ctr. (USA); Xiaofeng Gao, UK Astronomy Technology Ctr. (United Kingdom); Kent D. Irwin, Gene C. Hilton, Michael D. Niemack, National Institute of Standards and Technology (USA); Mandana Amiri, Viktoria Asboth, Edward L. Chapin, Mark Halpern, Matthew Hasselfield, The Univ. of British Columbia (Canada); Peter A. Ade, Rashmi V. Sudiwala, Cardiff Univ. (United Kingdom); Camelia Dunare, William Parkes, Anthony J. Walton, Scottish Microelectronics Ctr. (United Kingdom); Adam L. Woodcraft, QMC Instruments Ltd. (United Kingdom) and UK Astronomy Technology Ctr. (United Kingdom) . . . . . [8452-07]

16.20: **TES arrays for the short wavelength band of the SAFARI instrument on SPICA**, Pourya Khosropanah, Richard A. Hijmering, Marcel L. Ridder, SRON Netherlands Institute for Space Research (Netherlands); Jian-Rong Gao, SRON Netherlands Institute for Space Research (Netherlands) and Technische Univ. Delft (Netherlands); Dmitry Morozov, Philip D. Mauskopf, Cardiff Univ. (United Kingdom); Neil Trappe, Créidhe M. O'Sullivan, J. Anthony Murphy, National Univ. of Ireland, Maynooth (Ireland); Douglas K. Griffin, Rutherford Appleton Lab. (United Kingdom); David J. Goldie, Dorota M. Glowacka, Stafford Withington, Univ. of Cambridge (United Kingdom); Brian D. Jackson, Damian A. Audley, Gert de Lange, SRON Netherlands Institute for Space Research (Netherlands) . . . . . [8452-08]

16.40: **Ultra low-noise transition edge sensors for the SAFARI L-band on SPICA**, David J. Goldie, Univ. of Cambridge (United Kingdom); Jian-Rong Gao, SRON Netherlands Institute for Space Research (Netherlands); Dorota M. Glowacka, Univ. of Cambridge (United Kingdom); Douglas K. Griffin, Rutherford Appleton Lab. (United Kingdom); Richard A. Hijmering, Pourya Khosropanah, Brian D. Jackson, SRON Netherlands Institute for Space Research (Netherlands); Philip D. Mauskopf, Dmitry Morozov, Cardiff Univ. (United Kingdom); J. Anthony Murphy, National Univ. of Ireland, Maynooth (Ireland); Marcel L. Ridder, SRON Netherlands Institute for Space Research (Netherlands); Neil Trappe, Créidhe M. O'Sullivan, National Univ. of Ireland, Maynooth (Ireland); Stafford Withington, Univ. of Cambridge (United Kingdom) . . . . . [8452-09]

17.00: **Measurements of the optical performance of the SPICA/SAFARI bolometer arrays**, Damian A. Audley, Gert de Lange, SRON Netherlands Institute for Space Research (Netherlands); Jian-Rong Gao, SRON Netherlands Institute for Space Research (Netherlands) and Technische Univ. Delft (Netherlands); Pourya Khosropanah, Lorenza Ferrari, SRON Netherlands Institute for Space Research (Netherlands) . . . . . [8452-10]

17.20: **Hybridized, kilopixel, backshort-under-grid bolometer arrays with superconducting through wafer vias for far infrared imaging, spectroscopy, and polarimetry,** Dominic Benford, Christine A. Jhabvala, NASA Goddard Space Flight Ctr. (USA) . . . . . [8452-11]

POSTERS-TUESDAY

Room: Hall 3. . . . . Tues. 18.00 to 20.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters. for this conference will be on display on Tuesday. The interactive poster session with authors in attendance will be Tuesday evening from 18.00 to 20.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

POLOCAM: a millimeter wavelength cryogenic polarimeter prototype for MUSIC-POL, Glenn T. Laurent, Southwest Research Institute (USA); John E. Vaillancourt, Universities Space Research Association (USA); Giorgio Savini, Univ. College London (United Kingdom); Jason Glenn, Univ. of Colorado at Boulder (USA); Matthew I. Hollister, Jet Propulsion Lab. (USA); Philip R. Maloney, Univ. of Colorado at Boulder (USA); Jack Sayers, Jet Propulsion Lab. (USA); Peter A. Abe, Cardiff Univ. (United Kingdrom) . . . . . [8452-64]

BoA: a versatile software for bolometer data reduction, Frederic Schuller, European Southern Observatory (Chile) and Max-Planck-Institut für Radioastronomie (Germany) . . . . . [8452-65]

Development of an extremely low background test facility for the SPICA-SAFARI on-ground calibration, Pieter Dieleman, SRON Netherlands Institute for Space Research (Netherlands); Bart Vandenbussche, Katholieke Univ. Leuven (Belgium); Bruce M. Swinyard, Rutherford Appleton Lab. (United Kingdom); Lenze Meinsma, Annex (Netherlands); Wouter M. Laauwen, Lorenza Ferrari, SRON Netherlands Institute for Space Research (Netherlands). [8452-66]

The DCU: the detector control unit of the SAFARI instrument onboard SPICA, Antoine Clenet, Laurent Ravera, Yann Parot, Bernard Bertrand, Anthony Sournac, Alain Cros, Etienne Pointecouteau, Ngocthach Ta, Institut de Recherche en Astrophysique et Planétologie (France); Brian D. Jackson, Rui Hou, Bert-Joost van Leeuwen, Dennis Van Loon, SRON Netherlands Institute for Space Research (Netherlands) . . . . . [8452-67]

A generic readout system for astrophysical detectors, Eric Doumayrou, Michel Lortholary, Commissariat à l'Énergie Atomique (France) . . . . . [8452-68]

RF characterization of a cold-electron bolometer integrated with a unilateral finline, Ernst Otto, Univ. of Oxford (United Kingdom) and Chalmers Univ. of Technology (Sweden); Mikhail A. Tarasov, Chalmers Univ. of Technology (Sweden) and Kotel'nikov Institute of Radio Engineering and Electronics (Russian Federation); Paul K. Grimes, Univ. of Oxford (United Kingdom); Leonid S. Kuzmin, Chalmers Univ. of Technology (Sweden); Ghassan Yassin, Univ. of Oxford (United Kingdom); Stafford Withington, Univ. of Cambridge (United Kingdom) . . . . . [8452-69]

Phase-controlled polarization modulators, David T. Chuss, NASA Goddard Space Flight Ctr. (USA); Megan M. Krejny, BAE Systems (USA); Samuel H. Moseley, NASA Goddard Space Flight Ctr. (USA); Giles Novak, Northwestern Univ. (USA); Giampaolo Pisano, The Univ. of Manchester (United Kingdom); Kongpop U-Yen, Edward J. Wollack, NASA Goddard Space Flight Ctr. (USA) . . . . . [8452-70]

Water vapour radiometers for the Australia Telescope compact array, Balthasar T. Indermuehle, Commonwealth Scientific and Industrial Research Organisation (Australia) . . . . . [8452-71]

The cosmology large angular scale surveyor (CLASS): 40 GHz optical design, Joseph R. Eimer, Charles L. Bennett, Johns Hopkins Univ. (USA); David T. Chuss, NASA Goddard Space Flight Ctr. (USA); Tobias Marriage, Johns Hopkins Univ. (USA); Edward J. Wollack, NASA Goddard Space Flight Ctr. (USA); Lingzhen Zeng, Johns Hopkins Univ. (USA) . . . . . [8452-72]

ALMA nutator design and preliminary performances, Pierre L. Martin-Cocher, Institute of Astronomy and Astrophysics (Taiwan); John M. Ford, National Radio Astronomy Observatory (USA); Chih-Wen Ni, RealScene Technology (Taiwan); Ming-Tang Chen, Philippe Raffin, Institute of Astronomy and Astrophysics (Taiwan); Ching-Long Ong, Aeronautical Research Labs. (Taiwan); Patrick M. Koch, Paul T. P. Ho, Institute of Astronomy and Astrophysics (Taiwan); Arthur H. Symmes, National Radio Astronomy Observatory (USA) . . . . . [8452-73]

Large-aperture, wide-bandwidth, antireflection-coated silicon lenses for ACTPol, Rahul Datta, Univ. of Michigan (USA); Michael D. Niemack, National Institute of Standards and Technology (USA); Jeffrey J. McMahon, Univ. of Michigan (USA); Joe W. Britton, National Institute of Standards and Technology (USA); Edward J. Wollack, NASA Goddard Space Flight Ctr. (USA); James A. Beall, National Institute of Standards and Technology (USA); Mark J. Devlin, Univ. of Pennsylvania (USA); Johannes Hubmayr, Joseph W. Fowler, Kent D. Irwin, National Institute of Standards and Technology (USA); Jeff Klein, Univ. of Pennsylvania (USA); Laura Newburgh, Princeton Univ. (USA); John Nibarger, National Institute of Standards and Technology (USA); Lyman Page, Princeton Univ. (USA); Benjamin L. Schmitt, Univ. of Pennsylvania (USA); Suzanne T. Staggs, Princeton Univ. (USA); Robert J. Thornton, Jr., Univ. of Pennsylvania (USA); William W. Zhang, NASA Goddard Space Flight Ctr. (USA) . . . . [8452-74]

Stereolithographed W-band waveguide components for large-format array instruments, Bruno Maffei, The Univ. of Manchester (United Kingdom); Peter T. Timbie, Univ. of Wisconsin-Madison (USA); Emile de Rijk, SWISSto12 (Switzerland); John Grade, Terra-X, LLC (USA); Alessandro Macor, SWISSto12 (Switzerland); Giampaolo Pisano, The Univ. of Manchester (United Kingdom); Daniel W. van der Weide, Univ. of Wisconsin-Madison (USA) . . . . . [8452-75]

Aperture and spill-over measurements in the Atacama Cosmology Telescope, Rolando Dunner, Patricio Gallardo, Pontificia Univ. Católica de Chile (Chile); Edward J. Wollack, NASA Goddard Space Flight Ctr. (USA); Fernando Henriquez, Carlos Jerez, Pontificia Univ. Católica de Chile (Chile). . . . . [8452-76]

Far-sidelobe measurements in the Atacama Cosmology Telescope, Patricio Gallardo, Rolando Dunner, Pontificia Univ. Católica de Chile (Chile); Edward J. Wollack, NASA Goddard Space Flight Ctr. (USA); Fernando Henriquez, Carlos Jerez, Pontificia Univ. Católica de Chile (Chile) . . . . . [8452-77]

Optical performance of the Keck array polarimeter at the South Pole, Abigail Vieregg, Harvard-Smithsonian Ctr. for Astrophysics (USA); The Keck Array Collaboration The Keck Array Collaboration, ... [8452-78]

Experimental performance comparison of two polarimeter techniques for CMB applications, Bruno Maffei, Giampaolo Pisano, Victor Haynes, Ming Wah Ng, Fahri Ozturk, The Univ. of Manchester (United Kingdom) . . . . . [8452-80]

A negative refractive index metamaterial wave plate for millimetre-wave applications, Imran Mohamed, Giampaolo Pisano, Ming Wah Ng, Bruno Maffei, Victor Haynes, Fahri Ozturk, The Univ. of Manchester (United Kingdom)[8452-81]

The optical design of the QUBIC beam combiner, Donnacha F. Gayer, David G. Bennett, Créidhe M. O'Sullivan, Stephen Scully, National Univ. of Ireland, Maynooth (Ireland); Gareth S. Curran, National Univ. of Ireland, Maynooth (Ireland) and Institute of Technology Blanchardstown (Ireland); Paul Kelly, National Univ. of Ireland, Maynooth (Ireland); Jean-Christophe Hamilton, Marie-Anne Bigot-Sazy, Jean Kaplan, Michel R. Piat, AstroParticule et Cosmologie (France); Andrea Tartari, AstroParticule et Cosmologie (France) and Univ. degli Studi di Milano-Bicocca (Italy); Massimo Gervasi, Univ. degli Studi di Milano-Bicocca (Italy) . . . . . [8452-83]

Development of the experimental interferometer for ALMA, Rodrigo A. Olguin, Tzu-Chiang Shen, Alejandro Saez, Rodrigo Brito, ALMA (Chile) [8452-84]

Nonequilibrium superconductivity in kinetic inductance detectors due to readout power dissipation, David J. Goldie, Stafford Withington, Univ. of Cambridge (United Kingdom) . . . . . [8452-85]

MKID readout for 100-kilopixel arrays, Attila Kovács, California Institute of Technology (USA) and Univ. of Minnesota (USA); Loren J. Swenson, Hien T. Nguyen, California Institute of Technology (USA); Charles M. Bradford, Jet Propulsion Lab. (USA); Charles D. Dowell, Jonas Zmuidzinas, California Institute of Technology (USA) . . . . . [8452-86]

Recent advances in the development of SWIFTS for broadband millimeter spectroscopy, Nicolas Boudou, Alessandro Monfardini, Christian Hoffmann, Institut NÉEL (France) . . . . . [8452-87]

A 3mm multipixel SIS receiver for Pico Veleta Telescope, Fontana A. Anne Laure, IRAM-Domaine Univ. de Grenoble (France). . . . . [8452-88]

Electromagnetic design for SuperSpec, a lithographically-patterned millimeter-wave spectrograph, Peter Barry, Cardiff Univ. (United Kingdom); Erik D. Shirokoff, California Institute of Technology (USA); Charles M. Bradford, Jet Propulsion Lab. (USA); Attila Kovács, Univ. of Minnesota, Twin Cities (USA); Steven Hailey-Dunsheath, California Institute of Technology (USA); Goutam Chattopadhyay, Jet Propulsion Lab. (USA); Simon M. Doyle, Cardiff Univ. (United Kingdom); Christopher McKenny, California Institute of Technology (USA); Henry G. LeDuc, Jet Propulsion Lab. (USA); Nuria Llombart, Univ. Complutense de Madrid (Spain); Roger C. O'Brient, Loren J. Swenson, Steven Padin, California Institute of Technology (USA); Peter K. Day, Jet Propulsion Lab. (USA); Daniel P. Marrone, The Univ. of Arizona (USA); Philip D. Mauskopf, Cardiff Univ. (United Kingdom); Jonas Zmuidzinas, California Institute of Technology (USA) . [8452-89]

SuperSpec: circuit design, Attila Kovács, California Institute of Technology (USA); Charles M. Bradford, Jet Propulsion Lab. (USA); Peter Barry, Cardiff Univ. (United Kingdom); Goutam Chattopadhyay, Peter K. Day, Jet Propulsion Lab. (USA); Simon M. Doyle, Cardiff Univ. (United Kingdom); Steven Hailey-Dunsheath, Christopher McKenny, California Institute of Technology (USA); Henry G. LeDuc, Jet Propulsion Lab. (USA); Nuria Llombart, Univ. Complutense de Madrid (Spain); Daniel P. Marrone, The Univ. of Arizona (USA); Philip D. Mauskopf, Cardiff Univ. (United Kingdom); Roger C. O'Brient, Steven Padin, Loren J. Swenson, Jonas Zmuidzinas, California Institute of Technology (USA) . . . . . [8452-90]

1.6 THz twin-slot antenna coupled NbN HEB mixers, Wen Zhang, Purple Mountain Observatory (China); Darren J. Hayton, SRON Netherlands Institute for Space Research (Netherlands); Jian-Rong Gao, SRON Netherlands Institute for Space Research (Netherlands) and Technische Univ. Delft (Netherlands); Merlijn Hajenius, SRON Netherlands Institute for Space Research (Netherlands); Wei Miao, Don Liu, Purple Mountain Observatory (China); Teunis M. Klapwijk, SRON Netherlands Institute for Space Research (Netherlands); Sheng-Cai Shi, Purple Mountain Observatory (China). . . . . [8452-91]

Vertically illuminated TW-UTC photodiodes for terahertz generation, Ernest A. Michael, Claudio M. Barrientos, Victor Calle, F. Patricio Mena, Univ. de Chile (Chile); Josip Vukusic, Jan Stake, Chalmers Univ. of Technology (Sweden) . . . . . [8452-92]

A 4mm spectroscopic dual-beam receiver for the Robert C. Byrd Green Bank Radio Telescope, Steven D. White, David T. Frayer, Robert Simon, Michael J. Stennes, Galen Watts, Roger Norrod, Eric Bryerton, Sivasankaran Srikanth, National Radio Astronomy Observatory (USA) . . . . . [8452-93]

Cryogenic analog-to-digital converters using spread spectrum technology for coherent receivers, Yu-Shao Shiao, National Taiwan Univ. (Taiwan) and National Nano Device Labs. (Taiwan); Tzihong Chiueh, National Taiwan Univ. (Taiwan); Robert Hu, National Chiao Tung Univ. (Taiwan) . . . . . [8452-94]

A 4 GHz digital receiver using the UniBoard platform, Giovanni Comoretto, Antonietta Russo, INAF - Osservatorio Astrofisico di Arcetri (Italy); Pascal Camino, Benjamin Quertier, Philippe Cais, Univ. Bordeaux 1 (France) . [8452-95]

The UniBoard: generic hardware for radio astronomy signal processing, Jonathan Hargreaves, Joint Institute for VLBI in Europe (Netherlands) . [8452-96]

Practical implementation and on the field test results of an enhanced algorithm for polarization optimization of the line length corrector of ALMA central local oscillator, Jorge A. Castillo, ALMA (Chile) and Univ. de Chile (Chile); Ernest A. Michael, Univ. de Chile (Chile) . . . . . [8452-97]

ALMA band 1 development at Universidad de Chile, Nicolas Reyes, Pablo Zorzi, Franco Colleoni, Claudio Jarufe, Jose Pizarro, Ricardo Finger, Ernest A. Michael, F. Patricio Mena, Leonardo Bronfman, Univ. de Chile (Chile) . [8452-98]

European low-noise MMIC technologies for cryogenic millimetre wave radio astronomical applications, Andrea Cremonini, Sergio Mariotti, INAF - Istituto di Radioastronomia (Italy); Luca Valenziano, INAF - IASF Bologna (Italy) . . . . . [8452-99]

Development of receiver and local oscillator components for Atacama large-millimeter/submillimeter array (ALMA) band-1 in Taiwan, Yuh-Jing Hwang, Chau-Ching Chiong, Yue-Fang Kuo, Chi-Chang Lin, Chin-Ting Ho, Ching-Chi Chuang, Academia Sinica (Taiwan); Yo-Sheng Lin, Hong-Yeh Chang, National Central Univ. (Taiwan); Zuo-Min Tsai, National Chung-Cheng Univ. (Taiwan); Huei Wang, National Taiwan Univ. (Taiwan) . . . . . [8452-100]

A cryogenic set-up for accurate measurements of S-parameters, Mario Zannoni, Alessandro Baù, Andrea Passerini, Univ. degli Studi di Milano Bicocca (Italy); Andrea Tartari, Univ. Paris 7-Denis Diderot (France); Massimo Gervasi, Stefano Banfi, Univ. degli Studi di Milano Bicocca (Italy); Luca Valenziano, INAF - IASF Bologna (Italy) . . . . . [8452-101]

The broadband backend for host country radio astronomy in the Spanish DSN Robledo complex, J. Ricardo Rizzo, Ctr. de Astrobiología (Spain); Thomas B. H. Kuiper, Jet Propulsion Lab. (USA); Antonio Pedreira Rios, INTA Instituto Nacional de Técnica Aeroespacial (Spain); Jose Maria Castro Ceron, Ioana Sotuela, Madrid Deep Space Communication Complex (Spain); Juan R. Larrañaga, INTA Instituto Nacional de Técnica Aeroespacial (Spain); Cristina Garcia-Miro, Madrid Deep Space Communication Complex (Spain); Jose Cernicharo, Ctr. de Astrobiología (Spain); Laura Ojalvo, INTA Instituto Nacional de Técnica Aeroespacial (Spain) . . . . . [8452-102]

An 8 GHz digital spectrometer for millimeter-wave astronomy, Roberto G. García, Olivier Gentaz, Maryse Baldino, Marc Torres, IRAM-Domaine Univ. de Grenoble (France) . . . . . [8452-103]

The L-band 180° hybrid for the L-P dual-band coaxial receiver, Giuseppe Valente, Tonino Pisanu, Pasqualino Marongiu, INAF - Osservatorio Astronomico di Cagliari (Italy) . . . . . [8452-104]

From a MMIC chip to a working cryogenic low-noise amplifier: a detailed study on packaging, Luca Valenziano, INAF - IASF Bologna (Italy); Sergio Mariotti, INAF - Istituto di Radioastronomia (Italy); Andreina Armogida, RTW Ride the Wave srl (Italy); Matteo Biggi, Pasquali Microwave Systems (Italy); Luca Carbonaro, INAF - Osservatorio Astrofisico di Arcetri (Italy); Andrea Cremonini, INAF - Istituto di Radioastronomia (Italy); Adriano De Rosa, INAF - IASF Bologna (Italy); Massimo Gervasi, Univ. degli Studi di Milano Bicocca (Italy); Filomena Schiavone, INAF - IASF Bologna (Italy); Mario Zannoni, Univ. degli Studi di Milano Bicocca (Italy); Juri Zuccarelli, INAF - IASF Bologna (Italy) . . . . [8452-105]

The DBBC environment for millimeter radioastronomy, Gino Tuccari, INAF - Istituto di Radioastronomia (Italy); Giovanni Comoretto, INAF - Osservatorio Astrofisico di Arcetri (Italy); Andrea Melis, INAF - Osservatorio Astronomico di Cagliari (Italy); Salvo Buttaccio, INAF - Istituto di Radioastronomia (Italy) . . . . . [8452-106]

A 3mm dual polarization heterodyne HEMT receiver for Pico Veleta Telescope, Patrice Serres, IRAM-Domaine Univ. de Grenoble (France) . . . . . [8452-107]

Spurious signal suppression for ALMA, Koh-Ichiro Morita, ALMA (Chile) and National Astronomical Observatory Japan (Japan); Peter J. Napier, National Radio Astronomy Observatory (USA); Denis Barkats, ALMA (Chile); Arancha C. Carrizo, IRAM-Domaine Univ. de Grenoble (France); William R. Dent, Richard E. Hills, Maurizio Miccolis, Alejandro Saez, ALMA (Chile); Richard Sramek, National Radio Astronomy Observatory (USA); Pavel A. Yagoubov, European Southern Observatory (Germany) . . . . . [8452-108]

ALMA SIS mixer optimization for stable operation, Shin'ichiro Asayama, Joint ALMA Observatory (Chile) and National Astronomical Observatory of Japan (Japan); Nicholas D. Whyborn, Joint ALMA Observatory (Chile); Pavel A. Yagoubov, European Southern Observatory (Germany); Kamaljeet S. Saini, National Radio Astronomy Observatory (USA) . . . . . [8452-109]

Photonic phased array technology for radio telescope systems, Peter Maat, Klaas Dijkstra, ASTRON (Netherlands) . . . . . [8452-110]

New capabilities for the Southern 1.2-m mm-Wave Telescope, Rafael Rodríguez, Ricardo Finger, Pablo Vásquez, Univ. de Chile (Chile); Ricardo Bustos, Univ. de Concepción (Chile) and Univ. de Chile (Chile); Nicolas Reyes, Pablo Zorzi, F. Patricio Mena, Leonardo Bronfman, Univ. de Chile (Chile) . . . . . [8452-111]

A new phase-lock algorithm for the ALMA receivers, Juan Pablo Garcia, Claudio Alvarez, ALMA (Chile) . . . . . [8452-112]

The status of the QUIJOTE multifrequency instrument, Roger J. Hoyland, Marta Aguiar-González, Instituto de Astrofísica de Canarias (Spain); Beatriz Aja, Univ. de Cantabria (Spain); Javier Ariño, IDOM (Spain); Eduardo Artal, Univ. de Cantabria (Spain); Belen Barreiro, Instituto de Física de Cantabria (Spain); Edward J. Blackhurst, The Univ. of Manchester (United Kingdom); Jaime Cagigas, Juan Luis Cano de Diego, Fransisco Casas, Univ. de Cantabria (Spain); Richard D. Davis, Clive Dickinson, The Univ. of Manchester (United Kingdom); Borja Etxeita Arriaga, IDOM (Spain); Raul Fernandez-Cobos, Luisa de la Fuente, Univ. de Cantabria (Spain); Ricardo Génova-Santos, Instituto de Astrofísica de Canarias (Spain); Alberto Gómez, Celia Gomez, IDOM (Spain); Francisca Gómez-Reñasco, Instituto de Astrofísica de Canarias (Spain); Keith Grainge, Univ. of Cambridge (United Kingdom); Diego Herran, Univ. de Cantabria (Spain); José-Miguel Herreros, Guillermo A. Herrera, Instituto de Astrofísica de Canarias (Spain); Michael P. Hobson, Anthony N. Lasenby, Univ. of Cambridge (United Kingdom); Marcos Lopez-Caniego, Univ. de Cantabria (Spain); Carlos López-Caraballo, Instituto de Astrofísica de Canarias (Spain); Bruno Maffei, The Univ. of Manchester (United Kingdom); Enrique Martinez-Gonzalez, Angel Mediavilla, Univ. de Cantabria (Spain); Gaizka Murga, IDOM (Spain); David Ortiz, Instituto de Física de Cantabria (Spain); Lucio Piccirillo, Giampaolo Pisano, The Univ. of Manchester (United Kingdom); et al. . . . . [8452-113]

The control system architecture of QUIJOTE multifrequency instrument I, Francisca Gómez-Reñasco, Marta Aguiar-González, José-Miguel Herreros, Roger J. Hoyland, Vicente Sanchez de la Rosa, Afrodisio Vega-Moreno, Teodora A. Viera-Curbelo, Ricardo Génova-Santos, Carlos López-Caraballo, Rafael Rebolo-López, Jose Alberto Rubiño-Martin, Instituto de Astrofísica de Canarias (Spain) . . . . . [8452-114]

Instrument status and performance of the ACTPol receiver, Emily Grace, Princeton Univ. (USA) . . . . . [8452-115]

Characterization system with cryogenically cooled loads for next-generation CMB polarimeters, Makoto Nagai, Koji Ishidoshiro, Masaya Hasegawa, Masashi Hazumi, Osamu Tajima, High Energy Accelerator Research Organization (Japan) . . . . . [8452-116]

New demodulation scheme for coherent polarimeters in CMB experiments, Koji Ishidoshiro, Masaya Hasegawa, Masashi Hazumi, Makoto Nagai, Osamu Tajima, High Energy Accelerator Research Organization (Japan) . . . . [8452-117]

Multichroic CMB polarimeter arrays, Hsiao-Mei Cho, National Institute of Standards and Technology (USA); Jeffrey J. McMahon, Univ. of Michigan (USA); John Appel, Princeton Univ. (USA); Jason E. Austermann, Univ. of Colorado at Boulder (USA); James A. Beall, Daniel T. Becker, National Institute of Standards and Technology (USA); Rahul Datta, Univ. of Michigan (USA); Anna Fox, National Institute of Standards and Technology (USA); Emily Grace, Princeton Univ. (USA); Nils W. Halverson, Jason W. Henning, Univ. of Colorado at Boulder (USA); Gene C. Hilton, Johannes Hubmayr, Kent D. Irwin, Dale Li, National Institute of Standards and Technology (USA); Charles Munson, Univ. of Michigan (USA); Laura Newburgh, Princeton Univ. (USA); John Nibarger, Michael D. Niemack, National Institute of Standards and Technology (USA); Lucas P. Parker, Suzanne T. Staggs, Princeton Univ. (USA); Jeff Van Lanen, National Institute of Standards and Technology (USA) . . . . . [8452-118]

Design and characterization of 90 GHz feedhorn-coupled TES polarimeter pixels in the SPTPol camera, Peter A. Ade, Cardiff Univ. (United Kingdom); Kenneth Aird, The Univ. of Chicago (USA); Jason E. Austermann, Univ. of Colorado at Boulder (USA); James A. Beall, Daniel T. Becker, National Institute of Standards and Technology (USA); Bradford Benson, Lindsey Bleem, Kavli Institute for Cosmological Physics (USA) and The Univ. of Chicago (USA); Joe W. Britton, National Institute of Standards and Technology (USA); John E. Carlstrom, Clarence L. Chang, Kavli Institute for Cosmological Physics (USA) and The Univ. of Chicago (USA); Hsiao-Mei Cho, National Institute of Standards and Technology (USA); Thomas Crawford, Kavli Institute for Cosmological Physics (USA) and The Univ. of Chicago (USA); Abigail T. Crites, Kavli Institute for Cosmological Physics (USA); Aaron M. Datesman, Argonne National Lab. (USA); Tijmen de Haan, Matthew A. Dobbs, McGill Univ. (Canada); Wendeline Everett, A. Ewall-Wice, Kavli Institute for Cosmological Physics (USA); Elizabeth M. George, Univ. of California, Berkeley (USA); Nils W. Halverson, Univ. of Colorado, Boulder (USA); Nicholas Harrington, Univ. of California, Berkeley (USA); Jason W. Henning, Univ. of Colorado at Boulder (USA); Gene C. Hilton, National Institute of Standards and Technology (USA); William L. Holzapfel, Univ. of California, Berkeley (USA) . . . . . [8452-119]

Feedhorn-coupled TES polarimeter camera modules at 150 GHz for

CMB polarization measurements with SPTpol, Jason W. Henning, Univ. of Colorado at Boulder (USA); Johannes Hubmayr, National Institute of Standards and Technology (USA); Jason E. Austermann, Univ. of Colorado at Boulder (USA); Peter A. Ade, Cardiff Univ. (United Kingdom); Kenneth Aird, The Univ. of Chicago (USA); James A. Beall, Daniel T. Becker, National Institute of Standards and Technology (USA); Bradford Benson, Lindsey Bleem, Kavli Institute for Cosmological Physics (USA); Joe W. Britton, National Institute of Standards and Technology (USA); John E. Carlstrom, Clarence L. Chang, Kavli Institute for Cosmological Physics (USA); Hsiao-Mei Cho, National Institute of Standards and Technology (USA); Thomas Crawford, The Univ. of Chicago (USA); Abigail T. Crites, Kavli Institute for Cosmological Physics (USA); Aaron M. Datesman, Argonne National Lab. (USA); Tijmen de Haan, Matthew A. Dobbs, McGill Univ. (Canada); Wendeline Everett, A. Ewall-Wice, Kavli Institute for Cosmological Physics (USA); Elizabeth M. George, Univ. of California, Berkeley (USA); Nils W. Halverson, Univ. of Colorado at Boulder (USA); Nicholas Harrington, Univ. of California, Berkeley (USA); Gene C. Hilton, National Institute of Standards and Technology (USA); William L. Holzapfel, Univ. of California, Berkeley (USA); Stephen Hoover, Kavli Institute for Cosmological Physics (USA) . . . . . [8452-120]

The polarization calibration of the new South Pole Telescope polarimeter (SPTpol), Tyler J. Natoli, Kavli Institute for Cosmological Physics (USA); Peter A. Ade, Cardiff Univ. (United Kingdom); Kenneth Aird, The Univ. of Chicago (USA); Jason E. Austermann, Univ. of Colorado at Boulder (USA); Daniel T. Becker, National Institute of Standards and Technology (USA); A. Bender, McGill Univ. (Canada); Bradford Benson, Lindsey Bleem, Kavli Institute for Cosmological Physics (USA); Joe W. Britton, National Institute of Standards and Technology (USA); John E. Carlstrom, Clarence L. Chang, H. C. Chiang, Kavli Institute for Cosmological Physics (USA); Hsiao-Mei Cho, National Institute of Standards and Technology (USA); Thomas Crawford, The Univ. of Chicago (USA); Abigail T. Crites, Kavli Institute for Cosmological Physics (USA); Aaron M. Datesman, Argonne National Lab. (USA); Tijmen de Haan, Matthew A. Dobbs, McGill Univ. (Canada); Wendeline Everett, A. Ewall-Wice, Kavli Institute for Cosmological Physics (USA); Elizabeth M. George, Univ. of California, Berkeley (USA); Nils W. Halverson, Univ. of Colorado at Boulder (USA); Nicholas Harrington, Univ. of California, Berkeley (USA); Jason W. Henning, Univ. of Colorado at Boulder (USA); Gene C. Hilton, National Institute of Standards and Technology (USA); William L. Holzapfel, Univ. of California, Berkeley (USA); Stephen Hoover, N. Huang, Kavli Institute for Cosmological Physics (USA) . . . . . [8452-121]

Performance of the SCUBA-2 dry dilution refrigerator: 4 years of operation at the JCMT, Daniel Bintley, Simon C. Craig, John T. Kuroda, Erik G. Starman, Joint Astronomy Ctr. (USA); Wayne S. Holland, UK Astronomy Technology Ctr. (United Kingdom). . . . . [8452-122]

The high altitude qualification tests of the cryogenic and vacuum system for ALMA, Armin Silber, European Southern Observatory (Chile) and Joint ALMA Office (Chile); Fabiola Cruzat, Sebastian Pincheira, ALMA (Chile) . . . . [8452-123]

POLARBEAR-2 optical and polarimeter designs, Tomotake Matsumura, High Energy Accelerator Research Organization (Japan); Peter A. Ade, Cardiff Univ. (United Kingdom); Kam S. Arnold, Univ. of California, Berkeley (USA); Darcy Barron, Univ. of California, San Diego (USA); Yuji Chinone, High Energy Accelerator Research Organization (USA); Matthew A. Dobbs, McGill Univ. (Canada); Josquin Errard, AstroParticule et Cosmologie (France); William F. Grainger, Cardiff Univ. (United Kingdom); Nils W. Halverson, Univ. of Colorado at Boulder (USA); Masaya Hasegawa, High Energy Accelerator Research Organization (Japan); Kaori Hattori, Univ. of California, Berkeley (USA); Masashi Hazumi, High Energy Accelerator Research Organization (Japan); William L. Holzapfel, Univ. of California, Berkeley (USA); Yuki Inoue, High Energy Accelerator Research Organization (Japan); Sou Ishii, Univ. of Tsukuba (Japan); Yuta Kaneko, High Energy Accelerator Research Organization (Japan); Brian G. Keating, Univ. of California, San Diego (USA); Zigmund D. Kermish, Univ. of California, Berkeley (USA); Nobuhiro Kimura, High Energy Accelerator Research Organization (Japan); Adrian T. Lee, Univ. of California, Berkeley (USA); Hideki Morii, High Energy Accelerator Research Organization (Japan); Michael J. Myers, Haruki Nishino, Univ. of California, Berkeley (USA); Takahiro Okamura, High Energy Accelerator Research Organization (Japan); et al. . . . . [8452-124]

A bolometric polarimeter for the Large-scale Polarization Explorer, Paolo de Bernardis, Giorgio Amico, Elia S. Battistelli, Alessandro Coppolecchia, Angelo Cruciani, Antonio D' Addabbo, Giuseppe D' Alessandro, Marco De Petris, Univ. degli Studi di Roma La Sapienza (Italy); David J. Goldie, Univ. of Cambridge (United Kingdom); Victor Haynes, The Univ. of Manchester (United Kingdom); Luca Lamagna, Univ. degli Studi di Roma La Sapienza (Italy); Bruno Maffei, The Univ. of Manchester (United Kingdom); Silvia Masi, Federico Nati, Univ. degli Studi di Roma La Sapienza (Italy); Ming Wah Ng, The Univ. of Manchester (United Kingdom); Luca Pagano, Francesco Piacentini, Univ. degli Studi di Roma La Sapienza (Italy); Lucio Piccirillo, Giampaolo Pisano, The Univ. of Manchester (United Kingdom); Giovanni Romeo, Istituto Nazionale di Geofisica e Vulcanologia (Italy); Maria Salatino, Alessandro Schillaci, Univ. degli Studi di Roma La Sapienza (Italy); Stafford Withington, Univ. of Cambridge (United Kingdom) . . . . . [8452-125]

Thermal stability of the BICEP 2 Telescope, Jonathan P. Kaufman, Univ. of California, San Diego (USA). . . . . [8452-126]

Multichroic dual-polarization bolometric focal plane for studies of the cosmic microwave background, Aritoki Suzuki, Kam S. Arnold, Univ. of California, Berkeley (USA); Jen Edwards, Univ. of California, San Diego (USA); Greg A. Engargiola, Adnan Ghribi, William L. Holzapfel, Adrian T. Lee, Xiaofan Meng, Michael J. Myers, Univ. of California, Berkeley (USA); Roger C. O'Brient, California Institute of Technology (USA); Erin Quealy, Univ. of California, Berkeley (USA); Gabriel M. Rebeiz, Univ. of California, San Diego (USA); Paul L. Richards, Darin Rosen, Univ. of California, Berkeley (USA) . . . . . [8452-127]

Stray light suppression in the Goddard IRAM 2-millimeter observer, Elmer H. Sharp III, Johannes G. Staguhn, Dominic Benford, Dale J. Fixsen, Edward J. Wollack, NASA Goddard Space Flight Ctr. (USA). . . . . [8452-128]

Wednesday 4 July

PLENARY SESSION

Room: Auditorium . . . . . Wed. 09.00 to 10.00

Session Chair: **Luc Simard,**
National Research Council Canada (Canada)

09.00: **Very high energy gamma ray astronomy with the H.E.S.S. telescopes** *(Presentation Only)*, Werner Hofmann, Max-Planck-Institut für Kernphysik (Germany) . . . . . [8442-505]

09.30: **The cosmic microwave background: observing directly the early universe**, Paolo de Bernardis, Silvia Masi, Univ. degli Studi di Roma La Sapienza (Italy) . . . . . [8442-506]

Coffee Break . . . . . 10.00 to 10.30

SESSION 3

Room: G109 . . . . . Wed. 10.30 to 12.10

Transition Edge Sensors: Development and Readout

Session Chair: **Kent D. Irwin,**
National Institute of Standards and Technology (USA)

10.30: **Low-dimensional phononic structures for ultra-low-noise transition edge sensors**, Stafford Withington, David J. Goldie, Univ. of Cambridge (United Kingdom) . . . . . [8452-12]

10.50: **Improved performance of TES bolometers using digital feedback**, Tijmen de Haan, Graeme Smecher, Matthew A. Dobbs, McGill Univ. (Canada) . . . . . [8452-13]

11.10: **Frequency division multiplexed readout of TES detectors with baseband feedback**, Roland H. den Hartog, Damian A. Audley, SRON Netherlands Institute for Space Research (Netherlands); Joern Beyer, Physikalisch-Technische Bundesanstalt (Germany); Dick Boersma, Marcel P. Bruijn, Luciano Gottardi, Brian D. Jackson, Ad Nieuwenhuizen, Jan van der Kuur, Bert-Joost van Leeuwen, Dennis Van Loon, Patrick van Winden, SRON Netherlands Institute for Space Research (Netherlands) . . . . . [8452-14]

11.30: **Development of fast, background-limited transition-edge sensors for the background-limited infrared/sub-mm spectrograph (BLISS) for SPICA**, Andrew D. Beyer, California Institute of Technology (USA) and Jet Propulsion Lab. (USA); Matthew E. Kenyon, Pierre M. Echternach, Talso C. Chui, Bruce A. Bumble, Jet Propulsion Lab. (USA); Charles M. Bradford, California Institute of Technology (USA) and Jet Propulsion Lab. (USA); Warren A. Holmes, Jet Propulsion Lab. (USA); James J. Bock, California Institute of Technology (USA) and Jet Propulsion Lab. (USA) . . . . . [8452-15]

11.50: **Low-temperature readout system for the POLARBEAR-2 experiment**, Hideki Morii, Univ. of California, Berkeley (USA) and High Energy Accelerator Research Organization (Japan); Kam S. Arnold, Kaori Hattori, Univ. of California, Berkeley (USA); Masashi Hazumi, High Energy Accelerator Research Organization (Japan); Zigmund D. Kermish, Adrian T. Lee, Univ. of California, Berkeley (USA); Tomotake Matsumura, High Energy Accelerator Research Organization (Japan); Michael J. Myers, Paul L. Richards, Aritoki Suzuki, Univ. of California, Berkeley (USA); Takayuki Tomaru, High Energy Accelerator Research Organization (Japan) . . . . . [8452-16]

Lunch/Exhibition Break . . . . . 12.10 to 13.30

SESSION 4

Room: G109 . . . . . Wed. 13.30 to 15.10

Optical Design and Components

Session Chair: **J. Anthony Murphy,**
National Univ. of Ireland, Maynooth (Ireland)

13.30: **Systematic effects introduced by lenses at mm-wavelengths in CMB applications**, Fahri Ozturk, Bruno Maffei, Giampaolo Pisano, Ming Wah Ng, Victor Haynes, The Univ. of Manchester (United Kingdom) . . . . . [8452-17]

13.50: **Review and comparison of recent and future CMB telescope optics designs**, Michael D. Niemack, National Institute of Standards and Technology (USA) . . . . . [8452-18]

14.10: **Dielectrically embedded mesh half wave plate beam impact studies**, Giampaolo Pisano, Bruno Maffei, Ming Wah Ng, Fahri Ozturk, The Univ. of Manchester (United Kingdom). . . . . [8452-19]

14.30: **Optical modeling of horn antenna coupled TES detectors towards the SAFARI instrument for SPICA**, Neil Trappe, National Univ. of Ireland, Maynooth (Ireland); Jian-Rong Gao, SRON Netherlands Institute for Space Research (Netherlands); Dorota M. Glowacka, David J. Goldie, Univ. of Cambridge (United Kingdom); Douglas K. Griffin, Rutherford Appleton Lab. (United Kingdom); Richard A. Hijmering, Brian D. Jackson, Pourya Khosropanah, SRON Netherlands Institute for Space Research (Netherlands); Philip D. Mauskopf, Dmitry Morozov, Cardiff Univ. (United Kingdom); J. Anthony Murphy, Créidhe M. O'Sullivan, National Univ. of Ireland, Maynooth (Ireland); Marcel L. Ridder, SRON Netherlands Institute for Space Research (Netherlands); Stafford Withington, Univ. of Cambridge (United Kingdom); Stephen Doherty, Colm Bracken, National Univ. of Ireland, Maynooth (Ireland) . . . . . [8452-20]

14.50: **Silicon platelet feedhorn arrays for astrophysics**, Kent D. Irwin, James A. Beall, Joe W. Britton, Hsiao-Mei Cho, Anna Fox, Gene C. Hilton, Johannes Hubmayr, Dale Li, National Institute of Standards and Technology (USA); Jeffrey J. McMahon, Univ. of Michigan (USA); John Nibarger, Michael D. Niemack, Jeff Van Lanen, National Institute of Standards and Technology (USA); Ki Won Yoon, Stanford Univ. (USA) . . . . . [8452-21]

Coffee Break . . . . . 15.10 to 15.40

SESSION 5

Room: G109 . . . . . Wed. 15.40 to 17.40

Kinetic Inductance Detectors: Design, Readout and Instruments

Session Chair: **Jonas Zmuidzinas,**
California Institute of Technology (USA)

15.40: **Dynamical behaviour of kinetic inductance detectors under readout-frequency, readout-power, and signal-power switching**, Sarah E. Thompson, Stafford Withington, David J. Goldie, Univ. of Cambridge (United Kingdom) . . . . . [8452-22]

16.00: **Electronics and data acquisition for kilopixels kinetic inductance camera**, Olivier Bourrion, Christophe Vescovi, Laurent Gallin-Martel, Juan-Francisco Macias-Perez, LPSC Grenoble (France); Alessandro Monfardini, Alain Benoit, Martino Calvo, Institut NÉEL (France) . . . . . [8452-23]

16.20: **A pathfinder instrument for on-sky demonstration of low-cost 350 micron imaging arrays**, Loren J. Swenson, California Institute of Technology (USA) and Jet Propulsion Lab. (USA); Peter K. Day, Jet Propulsion Lab. (USA); Charles D. Dowell, Jet Propulsion Lab. (USA) and California Institute of Technology (USA); Byeong-Ho Eom, Matthew I. Hollister, California Institute of Technology (USA) and Jet Propulsion Lab. (USA); Attila Kovács, California Institute of Technology (USA) and Univ. of Minnesota, Twin Cities (USA); Henry G. Leduc, Jet Propulsion Lab. (USA); Christopher M. McKenney, California Institute of Technology (USA); Anthony K. Mroczkowski, California Institute of Technology (USA) and Jet Propulsion Lab. (USA); Hien T. Nguyen, Jet Propulsion Lab. (USA); Jonas Zmuidzinas, California Institute of Technology (USA) and Jet Propulsion Lab. (USA) . . . . . [8452-24]

16.40: **Development of 1000 arrays MKID camera for the CMB observation**, Kenichi Karatsu, National Astronomical Observatory of Japan (Japan); Masato Naruse, The Univ. of Tokyo (Japan) and National Astronomical Observatory of Japan (Japan); Tom Nitta, Univ. of Tsukuba (Japan) and National Astronomical Observatory of Japan (Japan); Masakazu Sekine, The Univ. of Tokyo (Japan) and National Astronomical Observatory of Japan (Japan); Yutaro Sekimoto, Takashi Noguchi, Yoshinori Uzawa, Hiroshi Matsuo, Hitoshi Kiuchi, National Astronomical Observatory of Japan (Japan) . . . . . [8452-25]

17.00: **MKID development for SuperSpec: an on-chip, mm-wave, filter-bank spectrometer**, Erik D. Shirokoff, California Institute of Technology (USA); Peter Barry, Cardiff Univ. (United Kingdom); Charles M. Bradford, Goutam Chattopadhyay, Peter K. Day, Jet Propulsion Lab. (USA); Simon M. Doyle, Cardiff Univ. (United Kingdom); Steven Hailey-Dunsheath, California Institute of Technology (USA); Attila Kovács, Univ. of Minnesota, Twin Cities (USA); Christopher McKenny, California Institute of Technology (USA); Henry G. LeDuc, Jet Propulsion Lab. (USA); Nuria Llombart, Univ. Complutense de Madrid (Spain); Daniel P. Marrone, The Univ. of Arizona (USA); Philip D. Mauskopf, Cardiff Univ. (United Kingdom); Roger C. O'Brient, Steven Padin, Loren J. Swenson, California Institute of Technology (USA); Jonas Zmuidzinas, California Institute of Technology (USA) and Jet Propulsion Lab. (USA) . . . . . [8452-26]

17.20: **Design of a far-infrared kilo-pixel array using radio-frequency kinetic inductance detectors**, Christopher M. McKenney, California Institute of Technology (USA); Peter K. Day, Byeong-Ho Eom, Henry G. LeDuc, Jet Propulsion Lab. (USA); Loren J. Swenson, Jonas Zmuidzinas, California Institute of Technology (USA) . . . . . [8452-27]

Thursday 5 July

PLENARY SESSION

Room: Auditorium . . . . . Thurs. 09.30 to 10.00

Session Chair: **Gillian S. Wright,**
UK Astronomy Technology Ctr. (United Kingdom)

09.30: **ALMA construction and early science**, Mattheus W. M. de Graauw, Lewis Ball, Joint ALMA Observatory (Chile). . . . . [8444-507]

Coffee Break . . . . . 10.00 to 10.30

SESSION 6

Room: G109 . . . . . Thurs. 10.30 to 12.30

Future Cameras and Focal Plane Arrays

Session Chair: **Gordon J. Stacey,** Cornell Univ. (USA)

10.30: **The GISMO-2 bolometer camera**, Johannes G. Staguhn, Dominic J. Benford, Dale J. Fixsen, Christine A. Jhabvala, NASA Goddard Space Flight Ctr. (USA); Attila Kovács, Univ. of Minnesota, Twin Cities (USA); Stephen F. Maher, Timothy M. Miller, Samuel H. Moseley, Elmer H. Sharp III, Edward J. Wollack, NASA Goddard Space Flight Ctr. (USA) . . . . . [8452-28]

10.50: **The PILOT experiment for the measurement of interstellar dust polarization: the camera ground calibration**, Vincent Buttice, Institut d'Astrophysique Spatiale (France); Jean-Philippe Bernard, Institut de Recherche en Astrophysique et Planétologie (France); François P. Pajot, Institut d'Astrophysique Spatiale (France); Christophe R. Marty, Institut de Recherche en Astrophysique et Planétologie (France). . . . . [8452-29]

11.10: **Development of a 4.7-THz frontend for the GREAT heterodyne spectrometer on SOFIA**, Heiko Richter, Sergey Pavlov, Alexei D. Semenov, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Martin Wienold, Lutz Schrottke, Klaus Biermann, Rudolf Hey, Holger Grahn, Paul-Drude-Institut für Festkörperelektronik (Germany); Konstantin S. Il'in, Michael Siegel, Karlsruher Institut für Technologie (Germany); Heinz-Wilhelm Hübers, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [8452-30]

11.30: **Sensitive semiconductor detectors of terahertz radiation for spaceborne applications based on Pb1-xSnxTe(In)**, Dmitry Dolzhenko, Ludmila I. Ryabova, Lomonosov Moscow State Univ. (Russian Federation); Andrey V. Nicorici, Institute of Applied Physics (Moldova); Dmitry R. Khokhlov, Lomonosov Moscow State Univ. (Russian Federation) . . . . . [8452-31]

11.50: **DESHIMA: redshift machine based on an on-chip filterbank**, Akira Endo, Technische Univ. Delft (Netherlands); Jochem J. Baselmans, SRON Netherlands Institute for Space Research (Netherlands); Paul P. van der Werf, Leiden Univ. (Netherlands); David J. Thoen, Reinier M. Janssen, Pieter J. de Visser, Teunis M. Klapwijk, Technische Univ. Delft (Netherlands); Lorenza Ferrari, Stephen Yates, Andrey M. Baryshev, Jan-Joost Lankwarden, SRON Netherlands Institute for Space Research (Netherlands). . . . . [8452-32]

12.10: **The Kilopixel Array Pathfinder Project (KAPPa), a 16 pixel integrated heterodyne focal plane array**, Christopher E. Groppi, Caleb H. Wheeler, Hamdi Mani, Arizona State Univ. (USA); Sander Weinreb, Damon Russell, Jacob W. Kooi, California Institute of Technology (USA); Arthur W. Lichtenberger, Univ. of Virginia (USA); Christopher K. Walker, The Univ. of Arizona (USA). . . . . [8452-33]

Lunch Break . . . . . 12.30 to 13.40

SESSION 7

Room: G109 . . . . . Thurs. 13.40 to 15.20

Terahertz Technology

Session Chair: **Albrecht Poglitsch,** Max-Planck-Institut für extraterrestrische Physik (Germany)

13.40: **Stabilized HEB-QCL heterodyne spectrometer at super-terahertz**, Yuan Ren, J. Niels Hovenier, Technische Univ. Delft (Netherlands); Darren J. Hayton, Moxi Cui, SRON Netherlands Institute for Space Research (Netherlands); Jian-Rong Gao, Teunis M. Klapwijk, Technische Univ. Delft (Netherlands); Sheng-Cai Shi, Purple Mountain Observatory (China); Tsung-Yu Kao, Qing Hu, Massachusetts Institute of Technology (USA); John L. Reno, Sandia National Labs. (USA) . . . . . [8452-34]

14.00: **Stabilized HEB heterodyne receiver at 2.5 THz**, Darren J. Hayton, SRON Netherlands Institute for Space Research (Netherlands); Jian-Rong Gao, Technische Univ. Delft (Netherlands); Jacob W. Kooi, California Institute of Technology (USA); Yuan Ren, Technische Univ. Delft (Netherlands); Wen Zhang, Purple Mountain Observatory (China); Gert de Lange, SRON Netherlands Institute for Space Research (Netherlands). . . . . [8452-35]

14.20: **Terahertz-frequency waveguide HEB receivers**, Faouzi M. Boussaha, Jonathan H. Kawamura, Jeffery Stern, Anders J. Skalare, Victor White, Cecile Jung, Jet Propulsion Lab. (USA) . . . . . [8452-36]

14.40: **Local oscillator sub-systems for array receivers in the 1-3 THz range**, Imran Mehdi, Jet Propulsion Lab. (USA) . . . . . [8452-37]

15.00: **Membrane-based quasi-optical superconducting HEB mixers at terahertz frequencies**, Gregory Gay, Yan Delorme, Roland Lefevre, Alexandre Feret, Thibaut Vacelet, Laurent Pelay, Observatoire de Paris (France); Wei Miao, Purple Mountain Observatory (China); Frederic Dauplay, Laurent Pagani, Jean-Michel Krieg, Observatoire de Paris (France) . . . . . [8452-38]

Coffee Break . . . . . 15.20 to 15.50

SESSION 8

Room: . . . . . Thurs. 15.50 to 17.30

Coherent Detection Technologies

Session Chair: **Christopher K. Walker,** The Univ. of Arizona (USA)

15.50: **Sideband separating SIS mixer for 600-720 GHz for ALMA band 9 upgrade**, Andrey Khudchenko, SRON Netherlands Institute for Space Research (Netherlands); Ronald Hesper, Univ. of Groningen (Netherlands); Andrey M. Baryshev, SRON Netherlands Institute for Space Research (Netherlands) and Univ. of Groningen (Netherlands); F. Patricio Mena, Univ. de Chile (Chile); Jan Barkhof, Univ. of Groningen (Netherlands); Teunis M. Klapwijk, Technische Univ. Delft (Netherlands); Marco C. Spaans, Univ. of Groningen (Netherlands)[8452-40]

16.10: **A wideband superconducting parametric amplifier for the microwave and millimeter-wave bands**, Peter K. Day, Henry G. Leduc, Jet Propulsion Lab. (USA); Byeong-Ho Eom, Jonas Zmuidzinas, California Institute of Technology (USA) . . . . . [8452-41]

16.30: **The ALMA photonic local oscillator system**, Bill Shillue, Wes Grammer, Christophe Jacques, National Radio Astronomy Observatory (USA); Rodrigo Brito, ALMA (Chile); Jack Meadows, Jason Castro, National Radio Astronomy Observatory (USA); Yoshihiro Masui, Fujitsu TEN (USA); Robert Treacy, National Radio Astronomy Observatory (USA); Jean-Francois Cliche, TeraXion Inc. (Canada) . . . . . [8452-42]

16.50: **Performance highlights of the ALMA correlators**, Alain Baudry, Univ. Bordeaux 1 (France) and European Southern Observatory (Germany); Richard J. Lacasse, Raymond P. Escoffier, John C. Webber, Joseph Greenberg, Laurence Platt, Robert Treacy, National Radio Astronomy Observatory (USA); Alejandro Saez, ALMA Observatory (Chile); Philippe Cais, Univ. Bordeaux 1 (France); Giovanni Comoretto, INAF - Osservatorio Astrofisico di Arcetri (Italy); Benjamin Quertier, Univ. Bordeaux 1 (France); Sachiko K. Okumura, National Astronomical Observatory of Japan (Japan); Takeshi Kamazaki, ALMA Observatory (Chile); Yoshihiro Chikada, Manabu Watanabe, Takeshi Okuda, Yasutake Kurono, Satoru Iguchi, National Astronomical Observatory of Japan (Japan) . . . [8452-43]

17.10: **Interferometry using dual photon response of submm direct detectors**, Andrey M. Baryshev, SRON Netherlands Institute for Space Research (Netherlands); Ronald Hesper, Univ. of Groningen (Netherlands); Andrey Khudchenko, SRON Netherlands Institute for Space Research (Netherlands); Teunis M. Klapwijk, Technische Univ. Delft (Netherlands) . . . . . [8452-44]

Friday 6 July

SESSION 9

Room: G109 . . . . . Fri. 08.30 to 10.10

CMB Instrumentation: Current/Near Term

Session Chair: **Jonas Zmuidzinas,** California Institute of Technology (USA)

08.30: **QUIET science results and instrument performance: towards a measurement of inflation using the polarized cosmic microwave background**, Laura Newburgh, Princeton Univ. (USA) and for the QUIET Collaboration (USA) . . . . . [8452-45]

08.50: **BICEP2 and Keck array operational overview and status of observations**, Reuben W. Ogburn IV, Stanford Univ. (USA); The BICEP2 Collaboration, The Keck Collaboration, ... [8452-46]

09.10: **Optimization and sensitivity of the Keck array**, Sarah A. Kernasovskiy, Stanford Univ. (USA) . . . . . [8452-47]

09.30: **The POLARBEAR experiment**, Zigmund D. Kermish, Univ. of California, Berkeley (USA); Peter A. Ade, Cardiff Univ. (United Kingdom); Kam S. Arnold, Univ. of California, Berkeley (USA); Aubra Anthony, Univ. of Colorado at Boulder (USA); Darcy Barron, Univ. of California, San Diego (USA); Julian Borrill, Lawrence Berkeley National Lab. (USA) and Univ. of California, Berkeley (USA); Yuji Chinone, High Energy Accelerator Research Organization (Japan); Matthew A. Dobbs, McGill Univ. (Canada); Josquin Errard, Giulio Fabbian, AstroParticule et Cosmologie (France); Daniel Flanigan, Univ. of California, Berkeley (USA); George Fuller, Univ. of California, San Diego (USA); William F. Grainger, Cardiff Univ. (United Kingdom); Nils W. Halverson, Univ. of Colorado at Boulder (USA); Masaya Hasegawa, Masashi Hazumi, High Energy Accelerator Research Organization (Japan); William L. Holzapfel, Jacob Howard, Univ. of California, Berkeley (USA); Peter O. Hyland, Austin College (USA); Andrew Jaffe, Imperial College London (United Kingdom); Brian G. Keating, Univ. of California, San Diego (USA); Adrian T. Lee, Univ. of California, Berkeley (USA) and Lawrence Berkeley National Lab. (USA); Theodore S. Kisner, Lawrence Berkeley National Lab. (USA); Maude Le Leune, AstroParticule et Cosmologie (France); Eric V. Linder, Lawrence Berkeley National Lab. (USA); et al. . . . . [8452-48]

09.50: **The bolometric focal plane array of the POLARBEAR CMB experiment**, Kam S. Arnold, Univ. of California, Berkeley (USA); Peter A. Ade, Cardiff Univ. (United Kingdom); Aubra Anthony, Univ. of Colorado at Boulder (USA); Darcy Barron, Univ. of California, San Diego (USA); Julian Borrill, Lawrence Berkeley National Lab. (USA); Yuji Chinone, High Energy Accelerator Research Organization (Japan); Matthew A. Dobbs, McGill Univ. (Canada); Josquin Errard, Giulio Fabbian, AstroParticule et Cosmologie (France); Daniel Flanigan, Univ. of California, Berkeley (USA); George Fuller, Univ. of California, San Diego (USA); William F. Grainger, Cardiff Univ. (United Kingdom); Nils W. Halverson, Univ. of Colorado at Boulder (USA); Masaya Hasegawa, Kaori Hattori, Masashi Hazumi, High Energy Accelerator Research Organization (Japan); William L. Holzapfel, Jacob Howard, Univ. of California, Berkeley (USA); Peter O. Hyland, Austin College (USA); Andrew Jaffe, Imperial College London (United Kingdom); Brian G. Keating, Univ. of California, San Diego (USA); Zigmund D. Kermish, Univ. of California, Berkeley (USA); Theodore S. Kisner, Lawrence Berkeley National Lab. (USA); Adrian T. Lee, Univ. of California, Berkeley (USA); Maude Le Leune, AstroParticule et Cosmologie (France); Eric V. Linder, Lawrence Berkeley National Lab. (USA); Marius Lungu, Univ. of California, Berkeley (USA); et al.. . . . . [8452-49]

Coffee Break . . . . . 10.10 to 10.40

SESSION 10

Room: G109 . . . . . Fri. 10.40 to 12.20

CMB Instrumentation: New Developments I

Session Chair: **Karl Schuster,** IRAM-Domaine Univ. de Grenoble (France)

10.40: **SPTpol: an instrument for CMB polarization measurements with the South Pole Telescope**, Jason E. Austermann, Univ. of Colorado at Boulder (USA); SPTpol Collaboration, Univ. of Chicago (USA) . . . . . [8452-50]

11.00: **Performance and on-sky optical characterization of the SPTpol instrument**, Peter A. Ade, Cardiff Univ. (United Kingdom); Kenneth Aird, The Univ. of Chicago (USA); Jason E. Austermann, Univ. of Colorado at Boulder (USA); James A. Beall, Daniel T. Becker, National Institute of Standards and Technology (USA); A. Bender, McGill Univ. (Canada); Bradford Benson, Lindsey Bleem, Kavli Institute for Cosmological Physics (USA) and The Univ. of Chicago (USA); Joe W. Britton, National Institute of Standards and Technology (USA); John E. Carlstrom, Clarence L. Chang, Kavli Institute for Cosmological Physics (USA) and Argonne National Lab. (USA) and The Univ. of Chicago (USA); H. C. Chiang, Kavli Institute for Cosmological Physics (USA) and The Univ. of Chicago (USA); Hsiao-Mei Cho, National Institute of Standards and Technology (USA); Thomas Crawford, Abigail T. Crites, Kavli Institute for Cosmological Physics (USA) and The Univ. of Chicago (USA); Aaron M. Datesman, Argonne National Lab. (USA); Tijmen de Haan, Matthew A. Dobbs, McGill Univ. (Canada); Wendeline Everett, Kavli Institute for Cosmological Physics (USA); A. Ewall-Wice, Kavli Institute for Cosmological Physics (USA) and The Univ. of Chicago (USA); Elizabeth M. George, Univ. of California, Berkeley (USA); Nils W. Halverson, Univ. of Colorado at Boulder (USA); et al. . . . . [8452-51]

11.20: **Fully monolithic focal planes of antenna-coupled TES bolometers for a diverse assortment of CMB polarimetry experiments**, Roger C. O'Brient, James J. Bock, Jet Propulsion Lab. (USA); Howard Hui, Martin V. Lueker, California Institute of Technology (USA); Zachary Staniszewski, Jet Propulsion Lab. (USA); Grant P. Teply, Rebecca S. Tucker, California Institute of Technology (USA); Hien T. Nguyen, Jet Propulsion Lab. (USA); Marcus C. Runyan, Jeffrey P. Filippini, California Institute of Technology (USA); Sunil R. Golwala, Anthony D. Turner, Joseph A. Bonetti, Peter K. Day, Jet Propulsion Lab. (USA) . . . [8452-52]

11.40: **The POLARBEAR-2 experiment**, Takayuki Tomaru, Masashi Hazumi, High Energy Accelerator Research Organization (Japan); Peter A. Ade, Cardiff Univ. (United Kingdom); Kam S. Arnold, Univ. of California, Berkeley (USA); Darcy Barron, Univ. of California, San Diego (USA); Yuji Chinone, High Energy Accelerator Research Organization (Japan); Matthew A. Dobbs, McGill Univ. (Canada); Josquin Errard, AstroParticule et Cosmologie (France); William F. Grainger, Cardiff Univ. (United Kingdom); Nils W. Halverson, Univ. of Colorado at Boulder (USA); Masaya Hasegawa, High Energy Accelerator Research Organization (Japan); Kaori Hattori, William L. Holzapfel, Univ. of California, Berkeley (USA); Yuki Inoue, High Energy Accelerator Research Organization (Japan); Sou Ishii, Univ. of Tsukuba (Japan); Yuta Kaneko, High Energy Accelerator Research Organization (Japan); Brian G. Keating, Univ. of California, San Diego (USA); Zigmund D. Kermish, Univ. of California, Berkeley (USA); Nobuhiro Kimura, High Energy Accelerator Research Organization (Japan); Adrian T. Lee, Univ. of California, Berkeley (USA); Tomotake Matsumura, Hideki Morii, High Energy Accelerator Research Organization (Japan); Michael J. Myers, Haruki Nishino, Univ. of California, Berkeley (USA); Takahiro Okamura, High Energy Accelerator Research Organization (Japan); Hans Paar, Univ. of California, San Diego (USA); et al. . . . . [8452-53]

12.00: **Design and integration of ACTPol, a polarization sensitive receiver for the Atacama Cosmology Telescope**, Benjamin L. Schmitt, Univ. of Pennsylvania (USA) . . . . . [8452-54]

Lunch Break . . . . . 12.20 to 13.30

SESSION 11

Room: G109 . . . . . Fri. 13.30 to 15.10

CMB Instrumentation: New Developments II

Session Chair: **Sarah E. Church,** Stanford Univ. (USA)

13.30: **The primordial inflation polarization explorer (PIPER)**, Alan J. Kogut, NASA Goddard Space Flight Ctr. (USA); Peter A. Ade, Cardiff Univ. (United Kingdom); Dominic J. Benford, NASA Goddard Space Flight Ctr. (USA); Charles L. Bennett, Johns Hopkins Univ. (USA); David T. Chuss, NASA Goddard Space Flight Ctr. (USA); Jessie L. Dotson, NASA Ames Research Ctr. (USA); Joseph R. Eimer, Johns Hopkins Univ. (USA); Dale J. Fixsen, NASA Goddard Space Flight Ctr. (USA); Mark Halpern, The Univ. of British Columbia (Canada); Gene C. Hilton, National Institute of Standards and Technology (USA); James Hinderks, NASA Goddard Space Flight Ctr. (USA); Gary F. Hinshaw, The Univ. of British Columbia (Canada); Kent D. Irwin, National Institute of Standards and Technology (USA); Christine A. Jhabvala, NASA Goddard Space Flight Ctr. (USA); Bradley Johnson, Columbia Univ. (USA); Justin S. Lazear, Johns Hopkins Univ. (USA); Luke Lowe, Timothy M. Miller, Paul Mirel, Samuel H. Moseley, Samaleys Rodriguez, Elmer H. Sharp III, Johannes G. Staguhn, George M. Voellmer, Amy Weston, Edward J. Wollack, NASA Goddard Space Flight Ctr. (USA) . . . . . [8452-55]

13.50: **Silicon feedhorn-coupled TES polarimeter arrays for SPTpol, ACTPol and next-generation CMB experiments**, Johannes Hubmayr, National Institute of Standards and Technology (USA); John Appel, Princeton Univ. (USA); Jason E. Austermann, Univ. of Colorado at Boulder (USA); James A. Beall, Daniel T. Becker, National Institute of Standards and Technology (USA); Bradford Benson, Lindsey Bleem, John E. Carlstrom, Clarence L. Chang, Kavli Institute for Cosmological Physics (USA); Hsiao-mei Cho, National Institute of Standards and Technology (USA); Abigail T. Crites, Kavli Institute for Cosmological Physics (USA); Rahul Datta, Univ. of Michigan (USA); Thomas Essinger-Hileman, Princeton Univ. (USA); Anna E. Fox, National Institute of Standards and Technology (USA); Elizabeth M. George, Univ. of California, Berkeley (USA); Emily Grace, Princeton Univ. (USA); Nils W. Halverson, Univ. of Colorado at Boulder (USA); Nicholas Harrington, Univ. of California, Berkeley (USA); Jason W. Henning, Univ. of Colorado at Boulder (USA); Gene C. Hilton, National Institute of Standards and Technology (USA); William L. Holzapfel, Univ. of California, Berkeley (USA); Kent D. Irwin, Dale Li, National Institute of Standards and Technology (USA); Jeffrey J. McMahon, Univ. of Michigan (USA); Jared Mehl, Kavli Institute for Cosmological Physics (USA); Charles Munson, Univ. of Michigan (USA); et al. . . . . [8452-56]

14.10: **A novel experiment for CMB polarization measurement using highly multimoded bolometers**, Akito Kusaka, Princeton Univ. (USA); Dale J. Fixsen, Alan J. Kogut, NASA Goddard Space Flight Ctr. (USA); Stephan S. Meyer, The Univ. of Chicago (USA); Suzanne T. Staggs, Princeton Univ. (USA); Thomas R. Stevenson, NASA Goddard Space Flight Ctr. (USA) . . . . . [8452-57]

14.30: **GroundBIRD: an experiment for CMB polarization measurements at a large angular scale from the ground**, Osamu Tajima, Masashi Hazumi, Masanori Kawai, Mitsuhiro Yoshida, High Energy Accelerator Research Organization (Japan) . . . . . [8452-58]

14.50: **Detector architecture of the cosmology large angular scale surveyor status and preliminary results**, Karwan Rostem, NASA Goddard Space Flight Ctr. (USA); Charles L. Bennett, Johns Hopkins Univ. (USA); David T. Chuss, Nicholas P. Costen, Erik Crowe, Kevin Denis, NASA Goddard Space Flight Ctr. (USA); Joseph R. Eimer, Johns Hopkins Univ. (USA); Nathan Lourie, NASA Goddard Space Flight Ctr. (USA); Tobias Marriage, Johns Hopkins Univ. (USA); Samuel H. Moseley, Thomas R. Stevenson, Deborah Towner, Kongpop U-Yen, George M. Voellmer, Edward J. Wollack, NASA Goddard Space Flight Ctr. (USA); Lingzhen Zeng, Johns Hopkins Univ. (USA) . . . . . [8452-59]

Coffee Break . . . . . 15.10 to 15.40

SESSION 12

Room: G109 . . . . . Fri. 15.40 to 17.00

Mechanical Design and Cryogenics

Session Chair: **Wayne S. Holland,**
UK Astronomy Technology Ctr. (United Kingdom)

15.40: **Millikelvin cryocooler for space and ground-based detector systems**, Jo Bartlett, Graham Hardy, Ian D. Hepburn, Univ. College London (United Kingdom) . . . . . [8452-60]

16.00: **Thermal architecture of the SPICA/SAFARI instrument**, Ivan Charles, Commissariat à l'Énergie Atomique (France); Lionel Duband, Jean-Marc Duval, Commissariat à l'Energie Atomique (France); Brian D. Jackson, Willem Jellema, SRON Netherlands Institute for Space Research (Netherlands); Nicolas Luchier, Commissariat à l'Energie Atomique (France); Thierry Tirolien, European Space Research and Technology Ctr. (Netherlands); Henk J. van Weers, Peter P. Kooijman, SRON Netherlands Institute for Space Research (Netherlands) . . . . . [8452-61]

16.20: **Performance and impact of the cryogenic cooling system on Planck**, David Pearson, Jet Propulsion Lab. (USA) and the Planck Collaboration (Netherlands) . . . . . [8452-62]

16.40: **The optical, mechanical, and thermal design and performance of ZEUS-2**, Stephen C. Parshley, Carl Ferkinhoff, Thomas Nikola, Gordon J. Stacey, Cornell Univ. (USA); Peter A. Ade, Carole E. Tucker, Cardiff Univ. (United Kingdom) . . . . . [8452-63]

Sunday-Wednesday 1-4 July 2012 • Proceedings of SPIE Vol. 8453

High Energy, Optical, and Infrared Detectors for Astronomy V


Holland


Beletic

Conference Chairs: **Andrew D. Holland,** The Open Univ. (United Kingdom); **James W. Beletic,** Teledyne Imaging Sensors (USA)

Program Committee: **Megan E. Eckart,** NASA Goddard Space Flight Ctr. (USA); **Gert Finger,** European Southern Observatory (Germany); **Fiona A. Harrison,** California Institute of Technology (USA); **Paul Jorden,** e2v technologies plc (United Kingdom); **Didier Martin,** European Space Research and Technology Ctr. (Netherlands); **Satoshi Miyazaki,** National Astronomical Observatory of Japan (Japan); **Peter C. Moore,** National Optical Astronomy Observatory (USA); **S. Harvey Moseley,** NASA Goddard Space Flight Ctr. (USA); **Robert H. Philbrick,** Ball Aerospace & Technologies Corp. (USA); **Roger M. Smith,** California Institute of Technology (USA); **Lothar Strüder,** Max-Planck-Institut Halbleiterlabor (Germany); **Tadayuki Takahashi,** Japan Aerospace Exploration Agency (Japan); **Hiroshi Tsunemi,** Osaka Univ. (Japan)

Sunday 1 July

SESSION 1

Room: G107 . . . . . Sun. 08.40 to 10.10

CCDs I

Session Chair: **Andrew D. Holland,**
e2v Ctr. for Electronic Imaging at The Open Univ. (United Kingdom)

08.40: **Photon counting EMCCDs: new opportunities for high time resolution astrophysics** *(Invited Paper),* Craig D. MacKay, Univ. of Cambridge (United Kingdom) . . . . . [8453-01]

09.10: **Characterization results of EMCCDs for extreme low-light imaging**, Olivier Daigle, Nüvü Caméras Inc. (Canada); Oleg Djazovski, Denis G. Laurin, Canadian Space Agency (Canada); Etienne Artigau, René Doyon, Univ. de Montréal (Canada); Hervé Lavoie, Nüvü Caméras Inc. (Canada) . . . . . [8453-02]

09.30: **Charge-coupled devices for the ESA Euclid M-class Mission**, James Endicott, Steven Darby, Ian Swindells, Tim Eaton, e2v technologies plc (United Kingdom); Ludovic Duvet, European Space Research and Technology Ctr. (Netherlands) . . . . . [8453-03]

09.50: **CCD research and development at Lawrence Berkeley National Laboratory**, Stephen E. Holland, Peter Denes, Donald E. Groom, Sufia Haque, Armin Karcher, William F. Kolbe, Julie S. Lee, Nick P. Palaio, Guobin Wang, Lawrence Berkeley National Lab. (USA) . . . . . [8453-04]

Coffee Break . . . . . 10.10 to 10.40

SESSION 2

Room: G107 . . . . . Sun. 10.40 to 12.00

UV Detection I

Session Chair: **S. Harvey Moseley,**
NASA Goddard Space Flight Ctr. (USA)

10.40: **UV photon-counting CCD detectors that enable the next generation of UV spectroscopy missions: low-noise and high-dynamic range**, Patrick Morrissey, California Institute of Technology (USA) . . . . . [8453-05]

11.00: **UV photon-counting CCD detectors that enable the next generation of UV spectroscopy missions: why the red-leak is a non-problem**, David Schiminovich, Columbia Univ. (USA) . . . . . [8453-06]

11.20: **Far ultraviolet sensitivity of silicon CMOS sensors**, Michael W. Davis, Southwest Research Institute (USA); Yibin Bai, James W. Beletic, Teledyne Imaging Sensors (USA); Thomas K. Greathouse, Kurt D. Retherford, Gregory S. Winters, Southwest Research Institute (USA) . . . . . [8453-07]

11.40: **UV photon-counting CCD detectors that enable the next generation of UV spectroscopy missions: AR coatings that can achieve 80-90% QE**, Erika T. Hamden, David Schiminovich, Columbia Univ. (USA); Shouleh Nikzad, Jet Propulsion Lab. (USA); D. Christopher Martin, California Institute of Technology (USA) . . . . . [8453-08]

Lunch Break . . . . . 12.00 to 13.30

SESSION 3

Room: G107 . . . . . Sun. 13.30 to 14.10

UV Detection II

Session Chair: **Tadayuki Takahashi,**
Japan Aerospace Exploration Agency (Japan)

13.30: **Temperature dependence of the dark current and activation energy at avalanche onset of a GaN avalanche photodiodes**, Melville P. Ulmer, Erdem Cicek, Ryan P. McClintock, Zahra Vashaei, Manijeh Razeghi, Northwestern Univ. (USA) . . . . . [8453-09]

13.50: **UV photon counting detectors enabling the next generation of UV spectroscopy missions**, Shouleh Nikzad, Michael Hoenk, Frank Greer, Steve Monacos, Blake Jacquot, Todd Jones, Jet Propulsion Lab. (USA); Erika T. Hamden, David Schiminovich, Columbia Univ. (USA); D. Christopher Martin, Patrick Morrissey, California Institute of Technology (USA) . . . . . [8453-10]

SESSION 4

Room: G107 . . . . . Sun. 14.10 to 14.30

Cryogenic Detectors

Session Chair: **Tadayuki Takahashi,**
Japan Aerospace Exploration Agency (Japan)

14.10: **Optical lumped element microwave kinetic inductance detectors**, Danica Marsden, Univ. of California, Santa Barbara (USA) and California Institute of Technology (USA); Benjamin A. Mazin, Kieran O'Brien, Sean McHugh, Univ. of California, Santa Barbara (USA); Bruce A. Bumble, Jet Propulsion Lab. (USA); Seth R. Meeker, Univ. of California, Santa Barbara (USA) . . . . . [8453-11]

SESSION 5

Room: G107 . . . . . Sun. 14.30 to 15.20

CMOS Sensors

Session Chair: **Tadayuki Takahashi,**
Japan Aerospace Exploration Agency (Japan)

14.30: **Backside-illuminated, high-QE, 3e- RoN, fast 700fps, 1760x1760 pixels CMOS imager for AO with highly parallel readout** *(Invited Paper)*, Mark Downing, Dietrich Baade, European Southern Observatory (Germany); Philippe Balard, Observatoire Astronomique de Marseille-Provence (France); Arnaud Defernez, Bart Dierickx, Benoit Dupont, Caeleste (Belgium); Philippe Feautrier, Institut de Planétologie et d'Astrophysique de Grenoble (France); Martin Fryer, e2v technologies plc (United Kingdom); Jean-Luc Gach, Observatoire Astronomique de Marseille-Provence (France); Norbert Hubin, Olaf Iwert, European Southern Observatory (Germany); Paul Jerram, Paul Jorden, e2v technologies plc (United Kingdom); Johann Kolb, European Southern Observatory (Germany); Andrew Pike, Jerome Pratlong, e2v technologies plc (United Kingdom); Javier Reyes, European Southern Observatory (Germany); Andrew K. Walker, e2v technologies plc (United Kingdom) . . . . . [8453-12]

15.00: **High-performance CMOS image sensors at BAE Systems Imaging Solutions**, Paul Vu, Boyd A. Fowler, Chiao Liu, Stephen W. Mims, Janusz Balicki, Peter Bartkovjak, Hung Do, Wang Li, BAE Systems Imaging Solutions (USA) . . . . . [8453-13]

Coffee Break . . . . . 15.20 to 15.50

SESSION 6

Room: G107 . . . . . Sun. 15.50 to 17.10

CMOS and Hybrid X-Ray Detectors

Session Chair: **Lothar Strüder,**
Max-Planck-Institut Halbleiterlabor (Germany)

15.50: **Recent progress on developments and characterization of hybrid CMOS x-ray detectors**, Abraham D. Falcone, Stephen D. Bongiorno, David N. Burrows, Christopher V. Griffith, Zachary R. Prieskorn, The Pennsylvania State Univ. (USA) . . . . . [8453-15]

16.10: **Characterization of an x-ray hybrid CMOS detector with low interpixel capacitive crosstalk**, Christopher V. Griffith, Stephen D. Bongiorno, David N. Burrows, Abraham D. Falcone, Zachary R. Prieskorn, The Pennsylvania State Univ. (USA) . . . . . [8453-16]

16.30: **Development of monolithic CMOS detectors as x-ray imaging spectrometers**, Almus T. Kenter, Harvard-Smithsonian Ctr. for Astrophysics (USA); Stephen S. Murray, Johns Hopkins Univ. (USA); Ralph P. Kraft, Harvard-Smithsonian Ctr. for Astrophysics (USA); James R. Janesick, Sarnoff Corp. (USA) . . . . . [8453-17]

16.50: **Development and performance of Kyoto's x-ray astronomical SOI pixel sensor**, Takeshi G. Tsuru, Syukyo G. Ryu, Shinya Nakashima, Kyoto Univ. (Japan); Yauso Arai, Ayaki Takeda, High Energy Accelerator Research Organization (Japan); Atsushi Iwata, Toshifumi Imamura, Takafumi Ohmoto, Tomoaki Maeda, A-R-Tec Corp. (Japan); Mark W. Bautz, MIT Kavli Institute for Astrophysics and Space Research (USA); Gregory Y. Prigozhin, Steven E. Kissel, Beverly J. LaMarr, Massachusetts Institute of Technology (USA); Richard F. Foster, MIT Kavli Institute for Astrophysics and Space Research (USA); Hiroshi Tsunemi, Hiroshi Nakajima, Osaka Univ. (Japan); John P. Doty, Noqsi Aerospace, Ltd. (USA) . . . . . [8453-18]

Monday 2 July

PLENARY SESSION

Room: Auditorium . . . . . Mon. 08.50 to 10.00

Session Chair: **Mark M. Casali,** European Southern Observatory (Germany)

08.50: **Introduction**

09.00: **James Webb Space Telescope: science update and status** *(Presentation Only)*, Heidi B. Hammel, AURA, Inc. (USA) . . . . . [8442-501]

09.30: **Exoplanets: unraveling a new paradigm** *(Presentation Only)*, Didier Queloz, Geneva Univ., Observatory of Geneva (Switzerland) . . . . . [8442-502]

Coffee Break . . . . . 10.00 to 10.30

SESSION 7

Room: G107 . . . . . Mon. 10.30 to 12.10

Focal Plane Arrays

Session Chair: **Satoshi Miyazaki,** National Astronomical Observatory of Japan (Japan)

10.30: **Scientific focal plane array advancements at MIT Lincoln Laboratory**, Vyshnavi Suntharalingam, MIT Lincoln Lab. (USA) . . . . . [8453-19]

10.50: **A gigapixel commercially manufactured cryogenic camera for the J-PAS 2.5m Survey Telescope**, Paul Jorden, Matthew Bastable, e2v technologies plc (United Kingdom); Matthew J. Clapp, Rutherford Appleton Lab. (United Kingdom); Steven Darby, Mike Dryer, Tim Eaton, Graham Fenemore-Jones, Paul Jerram, e2v technologies plc (United Kingdom); Antonio Marin-Franch, Ctr. de Estudios de Física del Cosmos de Aragón (Spain); Ian Palmer, Roger Pittock, Peter J. Pool, Ryan Renshaw, e2v technologies plc (United Kingdom); Keith Taylor, Instruments4 (USA); Nick Waltham, Rutherford Appleton Lab. (United Kingdom); Patrick Wheeler, e2v technologies plc (United Kingdom) . . . . . [8453-20]

11.10: **GPC1 and GPC2, the Pan-STARRS 1.4 gigapixel mosaic focal plane CCD cameras with an on-sky, on-CCD, tip-tilt image compensation**, Peter M. Onaka, Sidik Isani, Craig Rae, John L. Tonry, Aaron Lee, Gregory K. Ching, Louis M. Robertson, Robin Uyeshiro, Univ. of Hawai'i (USA) . . . . . [8453-21]

11.30: **Development of the LSST raft tower modules**, Paul O'Connor, Ivan V. Kotov, Peter Z. Takacs, James S. Frank, Stephen Plate, Brookhaven National Lab. (USA); Richard Van Berg, Mitch Newcomer, Univ. of Pennsylvania (USA); Pierre E. Antilogus, Institut National de Physique Nucléaire et de Physique des Particules (France); Hervé Lebbolo, Univ. Pierre et Marie Curie (France); Vanessa Tocut, Institut National de Physique Nucléaire et de Physique des Particules (France); Claire Juramy, Univ. Pierre et Marie Curie (France); Peter E. Doherty, Nathan Felt, Harvard Univ. (USA) . . . . . [8453-22]

11.50: **4K×4K format, 10 micron pixel pitch H4RG-10 hybrid CMOS visible focal plane array for space astronomy**, Yibin Bai, William E. Tennant, Selmer W. Anglin, Min Xu, Mark C. Farris, Andre Wong, Eric J. Holland, Joseph R. Hosack, Brian Starr, Richard Blank, James W. Beletic, Teledyne Imaging Sensors (USA); Gerard A. Luppino, GL Scientific (USA) . . . . . [8453-23]

Lunch Break . . . . . 12.10 to 13.20

SESSION 8

Room: G107 . . . . . Mon. 13.20 to 15.30

X-Ray Detectors I

Session Chair: **Hiroshi Tsunemi,** Osaka Univ. (Japan)

13.20: **New simulation and measurement results on gateable DEPFET devices**, Alexander Bähr, Max-Planck-Institut Halbleiterlabor (Germany) and Max-Planck-Institut für extraterrestrische Physik (Germany); Stefan Aschauer, Katrin Hermenau, PNSensor GmbH (Germany); Sven Herrmann, Max-Planck-Institut Halbleiterlabor (Germany) and Max-Planck-Institut für extraterrestrische Physik (Germany); Peter H. Lechner, Gerhard Lutz, Petra Majewski, PNSensor GmbH (Germany); Danilo Miessner, Matteo Porro, Max-Planck-Institut Halbleiterlabor (Germany) and Max-Planck-Institut für extraterrestrische Physik (Germany); Rainer H. Richter, Max-Planck-Institut Halbleiterlabor (Germany) and Max-Planck-Institut für Physik (Germany); Gerhard Schaller, Max-Planck-Institut Halbleiterlabor (Germany) and Max-Planck-Institut für extraterrestrische Physik (Germany); Christian Sandow, PNSensor GmbH (Germany); Martina Schnecke, Max-Planck-Institut Halbleiterlabor (Germany) and Max-Planck-Institut für Physik (Germany); Florian Schopper, Alexander Stefanescu, Lothar Strüder, Max-Planck-Institut Halbleiterlabor (Germany) and Max-Planck-Institut für extraterrestrische Physik (Germany); Johannes Treis, PNDetector GmbH (Germany) and PNSensor GmbH (Germany). . . . . [8453-24]

13.40: **A new four side buttable camera for x-ray imaging and spectroscopy with large dynamic range for future x-ray missions**, Lothar Strüder, Max-Planck-Institut Halbleiterlabor (Germany); Robert Hartmann, Heike Soltau, PNSensor GmbH (Germany); Raphael Strecker, Max-Planck-Institut Halbleiterlabor (Germany) . . . . . [8453-25]

14.00: **Design and performance of the eROSITA focal plane instrumentation**, Norbert Meidinger, Max-Planck-Institut Halbleiterlabor (Germany) . . . . [8453-26]

14.20: **DEPFET macropixel detectors for MIXS: integration and calibration of the flight hardware**, Petra Majewski, PNSensor GmbH (Germany); Ladislav Andricek, Max-Planck-Institut für Physik (Germany) and Max-Planck-Institut Halbleiterlabor (Germany); Florian Aschauer, Alexander Bähr, Max-Planck-Institut für extraterrestrische Physik (Germany) and Max-Planck-Institut Halbleiterlabor (Germany); Ulrich Christensen, Max-Planck-Institut für Sonnensystemforschung (Germany); Bettina Günther, Max-Planck-Institut für extraterrestrische Physik (Germany) and Max-Planck-Institut Halbleiterlabor (Germany); Martin Hilchenbach, Max-Planck-Institut für Sonnensystemforschung (Germany); Katrin Hermenau, PNSensor GmbH (Germany); Sven Herrmann, Thomas Lauf, Max-Planck-Institut für extraterrestrische Physik (Germany); Peter H. Lechner, Gerhard Lutz, PNSensor GmbH (Germany); Danilo Miessner, Matteo Porro, Jonas Reiffers, Max-Planck-Institut für extraterrestrische Physik (Germany); Rainer H. Richter, Max-Planck-Institut für Physik (Germany); Gerhard Schaller, Max-Planck-Institut für extraterrestrische Physik (Germany); Martina Schnecke, Max-Planck-Institut für Physik (Germany); Florian Schopper, Max-Planck-Institut für extraterrestrische Physik (Germany); Heike Soltau, PNSensor GmbH (Germany); Alexander Stefanescu, Raphael Strecker, Lothar Strüder, Max-Planck-Institut für extraterrestrische Physik (Germany); Johannes Treis, PNSensor GmbH (Germany); Giulio de Vita, Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8453-27]

14.40: **Performance of new generation swept charge devices for lunar x-ray spectroscopy on Chandrayaan-2**, Phillipa H. Smith, Jason P. D. Gow, Neil J. Murray, Ross Burgon, Andrew D. Holland, The Open Univ. (United Kingdom); Peter J. Pool, e2v technologies plc (United Kingdom); P. Sreekumar, Shyama Narendranath, ISRO Satellite Ctr. (India). . . . . [8453-28]

15.00: **Development status of a CZT spectrometer prototype with 3D spatial resolution for hard x-ray astronomy** *(Invited Paper)*, Ezio Caroli, INAF - IASF Bologna (Italy); Natalia Auricchio, Univ. degli Studi di Ferrara (Italy); Angelo Basili, INAF - IASF Bologna (Italy); Carl Budtz-Jørgensen, DTU Space (Denmark); Rui M. Curado da Silva, Univ. de Coimbra (Portugal); Stefano Del Sordo, INAF - IASF Palermo (Italy); Irfan Kuvvetli, DTU Space (Denmark); Francesco Moscatelli, Istituto per la Microelettronica e Microsistemi (Italy); John B. Stephen, INAF - IASF Bologna (Italy); Massimiliano Zanichelli, Andrea Zappettini, Consiglio Nazionale delle Ricerche (Italy) . . . . . [8453-29]

Coffee Break . . . . . 15.30 to 15.50

SESSION 9

Room: G107 . . . . . Mon. 15.50 to 17.30

IR Detectors I

Session Chair: **Andrew D. Holland,** e2v Ctr. for Electronic Imaging at The Open Univ. (United Kingdom)

15.50: **Evaluation and optimization of NIR HgCdTe avalanche photodiode arrays for adaptive optics and interferometry** *(Invited Paper)*, Gert Finger, European Southern Observatory (Germany); Ian M. Baker, SELEX Galileo Infrared Ltd. (United Kingdom); Derek J. Ives, Siegfried Eschbaumer, Leander H. Mehrgan, Manfred Meyer, Joerg Stegmeier, European Southern Observatory (Germany); Peter Thorne, Harald J. Weller, SELEX Galileo Infrared Ltd. (United Kingdom) . . . . . [8453-30]

16.30: **Operation and performance of new NIR detectors from SELEX**, David C. Atkinson, Naidu Bezawada, UK Astronomy Technology Ctr. (United Kingdom); Nick Shorrocks, Les G. Hipwood, Helen Milne, SELEX Galileo Infrared Ltd. (United Kingdom) . . . . . [8453-31]

16.50: **Development of the H4RG-15 focal plane array**, Richard Blank, James W. Beletic, Donald E. Cooper, Mark C. Farris, Teledyne Imaging Sensors (USA); Donald N. B. Hall, Klaus W. Hodapp, Univ. of Hawai'i (USA); Gerard A. Luppino, GL Scientific (USA); Eric C. Piquette, Min Xu, Teledyne Imaging Sensors (USA) . . . . . [8453-32]

17.10: **Performance of the first HAWAII 4RG-15 arrays in the laboratory and at the telescope,** Donald N. B. Hall, Univ. of Hawai'i (USA); Richard Blank, Mark Farris, Teledyne Imaging Sensors (USA); Shane M. Jacobson, Univ. of Hawai'i (USA); Markus Loose, Markury Scientific, Inc. (USA); Klaus W. Hodapp, Univ. of Hawai'i (USA). . . . . [8453-33]

POSTERS-MONDAY

Room: Hall 3. . . . . Mon. 17.30 to 19.00

Authors should be prepared to display their poster at morning coffee break beginning at 10.00. Posters for this conference will be on display on Monday. The interactive poster session with authors in attendance will be Monday evening from 17.30 to 19.00. Authors should remove their posters at the end of the poster session. Posters left displayed will be considered unwanted and will be discarded.

Poster presentation guidelines are available: http://spie.org/x34104.xml

EMCCD camera noise performance for the Brazilian tunable filter imager, Denis F. Andrade, Univ. de São Paulo (Brazil); Olivier Daigle, Nüvü Caméras Inc. (Canada); Dani Guzman, Pontificia Univ. Católica de Chile (Chile); Keith Taylor, Claudia Mendes de Oliveira, Javier Ramirez-Fernandez, Univ. de São Paulo (Brazil) . . . . . [8453-66]

Readout of LSST CCDs with the ASPIC2 chip, Claire Juramy, Pierre E. Antilogus, Philippe Bailly, Univ. Pierre et Marie Curie (France); Jimmy Jeglot, Univ. Paris-Sud 11 (France); Hervé Lebbolo, David Martin, Univ. Pierre et Marie Curie (France); Vanessa Tocut, Univ. Paris-Sud 11 (France) . . . . . [8453-67]

First results from a novel curving process for large area scientific imagers, Olaf Iwert, European Southern Observatory (Germany); David Ouellette, Michael P. Lesser, The Univ. of Arizona (USA); Bernard Delabre, European Southern Observatory (Germany) . . . . . [8453-68]

Hyper Suprime-Cam: characteristics of 116 fully depleted back-illuminated CCDs, Yukiko Kamata, Satoshi Miyazaki, Hidehiko Nakaya, National Astronomical Observatory of Japan (Japan); Hisanori Suzuki, Yasuhito Miyazaki, Masaharu Muramatsu, Hamamatsu Photonics K.K. (Japan) . . . . . [8453-69]

High quantum efficiency performance and specifications for a back side illuminated (BSI) CCD based spectral image sensor, Sukhbir Kullar, David R. Cochrane, Nixon O, Gary R. Allan, Thomas Pian, Francois Dion, Teledyne DALSA (Canada) . . . . . [8453-70]

Deep-depletion Hamamatsu CCDs for the Gemini multi-object spectrograph, Tim Hardy, National Research Council Canada (Canada); Kevin Hanna, Gemini Observatory (USA); Kei Szeto, Greg Burley, National Research Council Canada (Canada) . . . . . [8453-71]

Detailed PSF measurement and modelling for wide-field of view telescope, and its applications in analysis and simulation of the 'Pi of the Sky' detector data, Lech W. Piotrowski, Univ. of Warsaw (Poland) . . . . . [8453-72]

UV calibration of CCD, Qian Song, National Astronomical Observatories (China); Ping Li, National Institute of Metrology (China); Zhiwei Feng, Yangbin Liu, National Astronomical Observatories (China). . . . . [8453-73]

ESA's CCD test bench for the Euclid visible channel, Peter Verhoeve, Nathalie Boudin, Udo Telljohann, Hans Smit, Thierry Beaufort, Bart Butler, Isabel Escudero-Sanz, Didier Martin, European Space Research and Technology Ctr. (Netherlands) . . . . . [8453-74]

Preliminary results of CCD characterisation at ESA in support of the Euclid visible channel, Nathalie Boudin, European Space Research and Technology Ctr. (Netherlands) and Cosine Research BV (Netherlands); Peter Verhoeve, Tim Oosterbroek, Udo Telljohann, Didier D. Martin, European Space Research and Technology Ctr. (Netherlands). . . . . [8453-75]

An advanced CCD emulator with 32MB image memory, Jack Fried, Paul O'Connor, Ivan V. Kotov, Brookhaven National Lab. (USA) . . . . . [8453-76]

Development of an optical test bench for analysis of charge transfer in radiation damaged CCDs for Euclid, Edgar A. H. Allanwood, Neil J. Murray, David J. Hall, Thomas A. Greig, Jason P. D. Gow, Andrew D. Holland, The Open Univ. (United Kingdom) . . . . . [8453-77]

PAU camera: detectors characterization, Ricard Casas, Consejo Superior de Investigaciones Científicas (Spain); Laia Cardiel-Sas, Institut de Física d'Altes Energies (Spain); Javier Castilla, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); Jorge Jiménez Rojas, Consejo Superior de Investigaciones Científicas (Spain); Marino Maiorino, Institut de Física d'Altes Energies (Spain); Ignacio Sevilla, Juan de Vicente, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain)[8453-78]

Performance characterization of the near infrared detector system for RSS-NIR on SALT, Marsha J. Wolf, Donald J. Thielman, Michael P. Smith, Kurt P. Jaehnig, Andrew I. Sheinis, Gregory Mosby, Univ. of Wisconsin-Madison (USA) . . . . . [8453-79]

Scientific CCD characterisation at Universidad Complutense LICA Laboratory, Simon M. Tulloch, Isaac Newton Group of Telescopes (Spain); Jesús Gallego Maestro, Armando Gil de Paz, Jaime Zamorano Calvo, Univ. Complutense de Madrid (Spain) . . . . . [8453-80]

Test set up description and performances for HAWAII-2RG detector characterization at ESTEC, Pierre-Elie Crouzet, Fritz De Wit, Joerg Ter Haar, Thierry Beaufort, Bart Butler, Hans Smit, Cornelis van der Luijt, European Space Research and Technology Ctr. (Netherlands) . . . . . [8453-81]

NIRSpec detectors: how bad pixels impact operation and sensitivity, Marco Sirianni, Pierre Ferruit, Peter Jakobsen, Stephan M. Birkmann, Giovanna Giardino, Torsten Böker, Guido De Marchi, European Space Research and Technology Ctr. (Netherlands); Martin Stuhlinger, European Space Astronomy Ctr. (Spain); Peter L. Jensen, Paolo Strada, European Space Research and Technology Ctr. (Netherlands); Bernard J. Rauscher, Don J. Lindler, NASA Goddard Space Flight Ctr. (USA) . . . . . [8453-82]

The ESO 4-Kelvin mid-IR detector test facility, Gerd H. Jakob, Derek J. Ives, Hans-Ulrich Käufl, Florian Kerber, European Southern Observatory (Germany) . . . . . [8453-83]

Assessment of MCT detectors for the EChO Mission, Adrian M. Glauser, Max-Planck-Institut für Astronomie (Germany) and UK Astronomy Technology Ctr. (United Kingdom) and ETH Zurich (Switzerland); Ulrich Grözinger, Max-Planck-Institut für Astronomie (Germany); Wolfgang Fick, Stefan Hanna, AIM INFRAROT-MODULE GmbH (Germany); Oliver Krause, Max-Planck-Institut für Astronomie (Germany); Hans-Peter Nothaft, Richard Wollrab, AIM INFRAROT-MODULE GmbH (Germany) . . . . . [8453-84]

Development and characterization of very low dark current p/n MCT detector arrays at CEA: a candidate for ECHO LWIR detectors, Vincent Moreau, Olivier Gravrand, Olivier Boulade, Commissariat à l'Énergie Atomique (France) . . . . . [8453-85]

Standard modes of MPIA's current H2/H2RG-readout systems, Clemens Storz, Vianak Naranjo, Ulrich Mall, José R. Ramos, Max-Planck-Institut für Astronomie (Germany). . . . . [8453-86]

Investigation of linear-mode, photon-counting HgCdTe APDs for astronomical observations, Marta L. Bryan, Donald N. B. Hall, Univ. of Hawai'i (USA); George Chapman, Michael D. Jack, Raytheon Co. (USA); Shane M. Jacobson, Univ. of Hawai'i (USA); Justin Wehner, Raytheon Co. (USA) [8453-87]

Ultra-low noise, large-area InGaAs quad photoreceiver with low crosstalk for space-based gravitational wave detection, Abhay Joshi, Shubhashish Datta, Jim Rue, Discovery Semiconductors, Inc. (USA); Jeffrey Livas, Robert F. Silverberg, NASA Goddard Space Flight Ctr. (USA); Felipe Guzman, Max-Planck-Institut für Gravitationsphysik (Germany) . . . . . [8453-88]

Enabling large focal plane arrays through mosaic hybridization, Timothy M. Miller, Christine A. Jhabvala, NASA Goddard Space Flight Ctr. (USA); Edward S. Leong, Tomoko A. Adachi, Nicholas P. Costen, MEI Technologies, Inc. (USA); Dominic J. Benford, NASA Goddard Space Flight Ctr. (USA). . . . . [8453-89]

EMIR high-dynamic range readout modes and performances, Miguel Nuñez, Francisco Garzón, José Javier Díaz, Maria Barreto, Jesús Patrón, Instituto de Astrofísica de Canarias (Spain) . . . . . [8453-90]

Improvements in performance of the H2RG infrared sensor, Richard Demers, John Auyeung, Sidharth Bhargava, James W. Beletic, Richard Blank, Craig A. Cabelli, Mark C. Farris, Kenneth Ho, Eric C. Piquette, William K. Smith, Andre Wong, Teledyne Imaging Sensors (USA) . . . . . [8453-91]

X-ray performance of 0.18 µm CMOS APS test arrays for solar observation, Ben J. Dryer, Andrew D. Holland, The Open Univ. (United Kingdom); Paul Jerram, David Burt, e2v technologies plc (United Kingdom) . . . . . [8453-92]

Experimental measurements of charge carrier mobility: lifetime products for a large sample of pixilated CZT detectors, Santosh V. Vadawale, Physical Research Lab. (India). . . . . [8453-93]

Modelling charge transport in swept charge devices for Chandrayaan-2 large area soft x-ray spectrometer (CLASS), Subramania P. Athiray, ISRO Satellite Ctr. (India) and Univ. of Calicut (India); Shyama Narendranath, Radhakrishna V., P. Sreekumar, ISRO Satellite Ctr. (India). . . . . [8453-94]

Development of a BI CCD for low-energy x rays, Junko S. Hiraga, The Univ. of Tokyo (Japan); Takashi Abematsu, Yokohama National Univ. (Japan); Hiroshi Tsunemi, Osaka Univ. (Japan); Kazuma Nishimura, Yokohama National Univ. (Japan); James H. Tutt, Andrew D. Holland, The Open Univ. (United Kingdom); Hisanori Suzuki, Masaharu Muramatsu, Shin-ichiro Takagi, Yasuhito Miyazaki, Hamamatsu Photonics K.K. (Japan) . . . . . [8453-95]

High-resolution gamma-ray detection using phonon-mediated detection, Brett Cornell, David Moore, Sunil R. Golwala, California Institute of Technology (USA); Bruce A. Bumble, Jet Propulsion Lab. (USA); Benjamin A. Mazin, Univ. of California, Santa Barbara (USA); Jiansong Gao, National Institute of Standards and Technology (USA); Peter K. Day, Henry G. Leduc, Jet Propulsion Lab. (USA); Jonas Zmuidzinas, California Institute of Technology (USA) . . . . . [8453-96]

Circuit design of an EMCCD camera, Binhua Li, Kunming Univ. of Science and Technology (China); Qian Song, National Astronomical Observatories (China); Chun He, Jianhui Jin, Kunming Univ. of Science and Technology (China) . . . . . [8453-98]

Architecture of PAU survey camera readout electronics, Javier Castilla, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); Laia Cardiel-Sas, Institut de Física d'Altes Energies (Spain); Juan de Vicente, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); Joseph Illa, Institut de Física d'Altes Energies (Spain); Jorge Jiménez Rojas, Consejo Superior de Investigaciones Científicas (Spain); Marino Maiorino, Institut de Física d'Altes Energies (Spain); Gustavo Martínez, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain) . . . . . [8453-99]

The Dark Energy Camera readout system, Theresa M. Shaw, Fermi National Accelerator Lab. (USA); Otger Ballester, Laia Cardiel-Sas, Institut de Física d'Altes Energies (Spain); Javier Castilla, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); Steve Chappa, Fermi National Accelerator Lab. (USA); Juan de Vicente, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); Scott Holm, Dave Huffman, Mark Kozlovsky, Fermi National Accelerator Lab. (USA); Gustavo Martínez, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); Todd Moore, Univ. of Illinois at Urbana-Champaign (USA); Jamieson Olsen, Fermi National Accelerator Lab. (USA); Vaidas Simaitis, Univ. of Illinois at Urbana-Champaign (USA); Walter Stuermer, Fermi National Accelerator Lab. (USA) . . . . . [8453-100]

Hyper Suprime-Cam: performance of the CCD readout electronics, Hidehiko Nakaya, National Astronomical Observatory of Japan (Japan); Tomohisa Uchida, High Energy Accelerator Research Organization (Japan); Hironao Miyatake, Hiroki Fujimori, Sogo Mineo, Hiroaki Aihara, The Univ. of Tokyo (Japan); Hisanori Furusawa, Yukiko Kamata, Hiroshi Karoji, Satoshi Kawanomoto, Yutaka Komiyama, Satoshi Miyazaki, Yoshiyuki Obuchi, Yuki Okura, National Astronomical Observatory of Japan (Japan); Manobu Tanaka, High Energy Accelerator Research Organization (Japan); Yoko Tanaka, Fumihiro Uraguchi, Yousuke Utsumi, National Astronomical Observatory of Japan (Japan)[8453-101]

Software solution for autonomous observations with H2RG detectors and SIDECAR ASICs for the RATIR camera, Christopher R. Klein, Univ. of California, Berkeley (USA); Petr Kubanek, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Ori D. Fox, David A. Rapchun, Alexander S. Kutyrev, NASA Goddard Space Flight Ctr. (USA); Nathaniel R. Butler, Arizona State Univ. (USA); Joshua S. Bloom, Univ. of California, Berkeley (USA). . . . . [8453-102]

Performances and results of the detector acquisition system of the GIANO spectrometer, Ernesto Oliva, Valdemaro Biliotti, Carlo Baffa, Elisabetta Giani, Mauro Sozzi, Andrea Tozzi, INAF - Osservatorio Astrofisico di Arcetri (Italy) . . . . . [8453-103]

The detector control system for the ISAS balloon-borne experiment, Sebastiano Ligori, Leonardo Corcione, Mario Gai, Mario G. Lattanzi, Alberto Riva, Alberto Vecchiato, Davide Loreggia, INAF - Osservatorio Astronomico di Torino (Italy). . . . . [8453-104]

A simple controller for bidimensional detectors, Fernando Angeles, Luis A. Martinez, Univ. Nacional Autónoma de México (Mexico) . . . . . [8453-105]

Interfacing the new Small-Cam Leach controller with a suborbital flight control system, Paul A. Scowen, Todd Veach, Arizona State Univ. (USA); Matthew Beasley, Univ. of Colorado at Boulder (USA). . . . . [8453-107]

Torrent: meeting observatory budget constraints with a generic image acquisition system, Peter C. Moore, Nick C. Buchholz, Ron George, Mark R. Hunten, Guillermo Montijo, David G. Sawyer, Dee Stover, Kathie Zelaya, National Optical Astronomy Observatory (USA) . . . . . [8453-108]

A readout for large arrays of microwave kinetic inductance detectors, Sean McHugh, Benjamin A. Mazin, Univ. of California, Santa Barbara (USA); Bruno Serfass, Univ. of California, Berkeley (USA); Kieran O'Brien, Seth R. Meeker, Univ. of California, Santa Barbara (USA); Ran P. Duan, California Institute of Technology (USA); Richard Raffanti, Techne Instruments, Inc. (USA); Dan Werthimer, Univ. of California, Berkeley (USA) . . . . . [8453-109]

SIDECAR ASIC implementation and performance, Raphael Ricardo, Jing Chen, Michael Eads, Lalit Bhambani, Richard Blank, Craig A. Cabelli, Teledyne Imaging Sensors (USA); Gerard A. Luppino, GL Scientific (USA); Jianmei Pan, James Beletic, Teledyne Imaging Sensors (USA) . . . . . [8453-110]

Frequency analysis of the noise in the Fowler(n) with the SIDECAR ASIC, Florent Marmol, Institut National de Physique Nucléaire et de Physique des Particules (France); Gerard Smadja, Institut de Physique Nucléaire de Lyon (France); Cédric Cerna, Ctr. de Physique des Particules de Marseille (France); Alain Castera, Institut de Physique Nucléaire de Lyon (France); Anne Ealet, Institut National de Physique Nucléaire et de Physique des Particules (France) . . . . . [8453-111]

The low earth orbit radiation environment and its impact on the prompt background of hard x-ray focusing telescopes, Valentina Fioretti, Andrea A. Bulgarelli, Giuseppe Malaguti, Valentina Bianchin, Fulvio Gianotti, Massimo Trifoglio, INAF - IASF Bologna (Italy). . . . . [8453-112]

The effects of radiation damage on the spectral resolution of the Chandrayaan-1 x-ray spectrometer over the full mission duration, Thomas E. Walker, David R. Smith, Brunel Univ. (United Kingdom). . . . . [8453-113]

A multiplexer for the AC/DC characterization of TES-based bolometers and microcalorimeters, Luciano Gottardi, SRON Netherlands Institute for Space Research (Netherlands); Joseph S. Adams, Catherine N. Bailey, Megan E. Eckart, Fred M. Finkbeiner, John E. Sadleir, Stephen J. Smith, NASA Goddard Space Flight Ctr. (USA); Joern Beyer, Physikalisch-Technische Bundesanstalt (Germany); Mikko Kiviranta, VTT Technical Research Ctr. of Finland (Finland); Pourya Khosropanah, Richard A. Hijmering, Marcel L. Ridder, Jan van der Kuur, Jian-Rong Gao, Henk F. C. Hoevers, Mark A. Lindeman, Marcel P. Bruijn, SRON Netherlands Institute for Space Research (Netherlands); Caroline A. Kilbourne, Simon R. Bandler, Richard L. Kelley, F. Scott Porter, NASA Goddard Space Flight Ctr. (USA); Roland H. den Hartog, SRON Netherlands Institute for Space Research (Netherlands); James A. Chervenak, NASA Goddard Space Flight Ctr. (USA) . . . . . [8453-114]

A system for the characterization of the HAWC PMTs sensitivity, Luis A. Martinez, Rosalia Langarica, Gerardo Lara, Silvio J. Tinoco, Arturo I. Iriarte Valverde, Ruben Alfaro, Andres Sandoval, Pablo Vanegas, Univ. Nacional Autónoma de México (Mexico); For The HAWC Collaboration For The HAWC Collaboration, Univ Nacional Autónoma de México (Mexico). . . . . [8453-115]

BoGEMMS: the Bologna Geant4 multi-mission simulator, Andrea A. Bulgarelli, Valentina Fioretti, Pino Malaguti, Massimo Trifoglio, Fulvio Gianotti, INAF - IASF Bologna (Italy) . . . . . [8453-116]

HST/WFC3 UVIS detectors: radiation damage effects and mitigation, Sylvia M. Baggett, Kai G. Noeske, Jay Anderson, Larry D. Petro, John W. MacKenty, Vera Kozhurina-Platais, Space Telescope Science Institute (USA) . . . [8453-119]

Tuesday 3 July

PLENARY SESSION

Room: Auditorium . . . . . Tues. 09.00 to 10.00

Session Chair: **Kathryn A. Flanagan,** Space Telescope Science Institute (USA)

09.00: **The Kepler Exoplanet Survey: instrumentation, performance and results**, Thomas N. Gautier III, Jet Propulsion Lab., Caltech (USA) and The Kepler Science Team (USA). . . . . [8442-503]

09.30: **Antarctic astronomy**, John W. V. Storey, The Univ. of New South Wales (Australia). . . . . [8446-504]

Coffee Break . . . . . 10.00 to 10.30

SESSION 10

Room: G107 . . . . . Tues. 10.30 to 12.10

IR Detectors II

Session Chair: **Gert Finger,** European Southern Observatory (Germany)

10.30: **An overview of astronomy detector development at Raytheon Vision Systems**, Elizabeth Corrales, James W. Bangs, Michael D. Jack, Robert E. Mills, Richard Peralta, Christopher Tracy, Jinxue Wang, Raytheon Co. (USA) [8453-34]

10.50: **Read noise for a 2.5µm cutoff Teledyne H2RG at 1-1000Hz frame rates**, Roger M. Smith, David D. S. Hale, California Institute of Technology (USA) . . . . . [8453-35]

11.10: **The EUCLID NISP detectors system**, Cédric Cerna, Ctr. de Physique des Particules de Marseille (France); Jean Claude Clemens, Anne Ealet, Institut National de Physique Nucléaire et de Physique des Particules (France); Gerard Smadja, Alain Castera, Institut de Physique Nucléaire de Lyon (France); Florent Marmol, Institut National de Physique Nucléaire et de Physique des Particules (France); Carlotta Bonoli, Favio Bortoletto, INAF - Osservatorio Astronomico di Padova (Italy); Leonardo Corcione, INAF - Osservatorio Astronomico di Torino (Italy); Pierre Elie Crouzet, Ludovic Duvet, Pierre Ferruit, European Space Research and Technology Ctr. (Netherlands); Enrico Giro, INAF - Osservatorio Astronomico di Padova (Italy); Andreas Jung, European Space Research and Technology Ctr. (Netherlands); Sebastiano Ligori, INAF - Osservatorio Astronomico di Torino (Italy); Laurent Martin, Observatoire Astronomique de Marseille-Provence (France); Thierry Maciaszek, Ctr. National d'Études Spatiales (France); Eric Prieto, Observatoire Astronomique de Marseille-Provence (France); Marco Sirianni, Paolo Strada, European Space Research and Technology Ctr. (Netherlands) . . . . . [8453-36]

11.30: **Improved infrared sensor reliability**, James W. Beletic, William E. Tennant, Eric C. Piquette, Teledyne Imaging Sensors (USA); Donald L. Lee, Teledyne Imaging Sensors (Afghanistan); Sidharth Bhargava, Majid Zandian, John Auyeung, Robert Kopp, Teledyne Imaging Sensors (USA); Bernard J. Rauscher, Matthew A. Greenhouse, NASA Goddard Space Flight Ctr. (USA); Marcia J. Rieke, The Univ. of Arizona (USA); Robert J. Hill, Conceptual Analytics, LLC (USA) . . . . . [8453-37]

11.50: **AQUARIUS, the next generation mid-IR detector for ground-based astronomy**, Derek J. Ives, Gert Finger, Leander H. Mehrgan, Manfred Meyer, Joerg Stegmeier, Siegfried Eschbaumer, European Southern Observatory (Germany) . . . . . [8453-38]

Lunch Break . . . . . 12.10 to 13.40

SESSION 11
Room: G107 . . . . . Tues. 13.40 to 14.00

IR Detectors III
Session Chair: **Gert Finger,** European Southern Observatory (Germany)

13.40: **Pixel classification for the JWST fine guidance sensor**, Neil Rowlands, Gerry Warner, Charles Berndt, COM DEV Canada (Canada); Loic Albert, Univ. de Montréal (Canada); Pierre Chayer, Space Telescope Science Institute (USA) . . . . . [8453-39]

SESSION 12
Room: G107 . . . . . Tues. 14.00 to 15.20

Space Radiation Damage
Session Chair: **Didier D. Martin,**
European Space Research and Technology Ctr. (Netherlands)

14.00: **CMOS sensor and camera for the PHI instrument onboard the Solar Orbiter Mission: evaluation of the radiation tolerance**, Juan-José Piqueras-Meseguer, Max-Planck-Institut für Sonnensystemforschung (Germany) and Institut für Datentechnik und Kommunikationsnetze (Germany); Klaus Heerlein, Stephan Werner, Rainer Enge, Udo H. Schühle, Joachim Woch, Max-Planck-Institut für Sonnensystemforschung (Germany); Tine De Ridder, Guy Meynants, Bram Wolfs, CMOSIS nv (Belgium) . . . . . [8453-40]

14.20: **Modelling charge transfer in a radiation damaged charge coupled device for Euclid**, David J. Hall, Andrew D. Holland, Neil J. Murray, Jason P. D. Gow, Andrew S. Clarke, The Open Univ. (United Kingdom) . . . . . [8453-41]

14.40: **Assessment of proton radiation-induced charge transfer inefficiency in the CCD273 detector for the Euclid Dark Energy Mission**, Jason P. D. Gow, Neil J. Murray, David J. Hall, Andrew S. Clarke, The Open Univ. (United Kingdom); David Burt, e2v technologies plc (United Kingdom); Andrew D. Holland, The Open Univ. (United Kingdom) . . . . . [8453-42]

15.00: **Mitigating radiation-induced charge transfer inefficiency in full-frame CCD applications by 'pumping' traps**, Neil J. Murray, Andrew D. Holland, David J. Hall, Edgar A. H. Allanwood, Jason P. D. Gow, The Open Univ. (United Kingdom); James Endicott, David Burt, e2v technologies plc (United Kingdom) . . . . . [8453-43]

Coffee Break . . . . . 15.20 to 15.50

SESSION 13
Room: G107 . . . . . Tues. 15.50 to 16.50

X-Ray Detectors II
Session Chair: **Andrew D. Holland,** e2v Ctr. for Electronic Imaging at The Open Univ. (United Kingdom)

15.50: **Characterization of the silicon drift detector for NICER instrument**, Gregory Y. Prigozhin, Massachusetts Institute of Technology (USA); Keith C. Gendreau, NASA Goddard Space Flight Ctr. (USA); Richard F. Foster, Jesus S. Villaseñor, George R. Ricker, Jr., Massachusetts Institute of Technology (USA); John P. Doty, Noqsi Aerospace, Ltd. (USA); Steven J. Kenyon, Zaven Arzoumanian, NASA Goddard Space Flight Ctr. (USA); Robert Redus, Alan C. Huber, Amptek, Inc. (USA) . . . . . [8453-44]

16.10: **Development of a laboratory-based XRF facility for measuring elemental abundance ratios in planetary analogue powder samples**, Thomas E. Walker, David R. Smith, Brunel Univ. (United Kingdom). . . . . [8453-45]

16.30: **A compact, high-speed pnCCD camera for optical and x-ray applications**, Sebastian Ihle, PNSensor GmbH (Germany); Ivan Ordavo, PNSensor GmbH (Germany) and PNDetector GmbH (Germany); Robert Hartmann, Peter Holl, PNSensor GmbH (Germany); Norbert Meidinger, Max-Planck-Institut Halbleiterlabor (Germany) and Max-Planck-Institut für extraterrestrische Physik (Germany); Heike Soltau, PNSensor GmbH (Germany); Lothar Strüder, Max-Planck-Institut Halbleiterlabor (Germany) and Max-Planck-Institut für extraterrestrische Physik (Germany) . . . . . [8453-46]

SESSION 14
Room: G107 . . . . . Tues. 16.50 to 17.30

Testing
Session Chair: **Andrew D. Holland,**
e2v Ctr. for Electronic Imaging at The Open Univ. (United Kingdom)

16.50: **Charge diffusion measurement using 55Fe x rays**, Ivan V. Kotov, James S. Frank, Alexandra I. Kotov, Paul O'Connor, Veljko Radeka, Peter Z. Takacs, Brookhaven National Lab. (USA); Petr Kubanek, Institute of Physics of the ASCR, v.v.i. (Czech Republic) . . . . . [8453-47]

17.10: **A test-based comparison between commercial cameras for solar simulators characterization**, Maurizio Pancrazzi, Federico Landini, Univ. degli Studi di Firenze (Italy); Sébastien Vivès, Clement Escolle, Christophe Guillon, Observatoire Astronomique de Marseille-Provence (France); Mauro Focardi, Univ. degli Studi di Firenze (Italy) . . . . . [8453-48]

Wednesday 4 July

PLENARY SESSION
Room: Auditorium . . . . . Wed. 09.00 to 10.00

Session Chair: **Luc Simard,**
National Research Council Canada (Canada)

09.00: **Very high energy gamma ray astronomy with the H.E.S.S. telescopes** *(Presentation Only)*, Werner Hofmann, Max-Planck-Institut für Kernphysik (Germany) . . . . . [8442-505]

09.30: **The cosmic microwave background: observing directly the early universe**, Paolo de Bernardis, Silvia Masi, Univ. degli Studi di Roma La Sapienza (Italy) . . . . . [8442-506]

Coffee Break . . . . . 10.00 to 10.30

SESSION 15
Room: G107 . . . . . Wed. 10.30 to 11.50

Electronics/Readout
Session Chair: **Andrew D. Holland,**
e2v Ctr. for Electronic Imaging at The Open Univ. (United Kingdom)

10.30: **Development of a test system for the characterisation of DCDS CCD readout techniques**, Matthew J. Clapp, Rutherford Appleton Lab. (United Kingdom) . . . . . [8453-49]

10.50: **Subelectron readout noise in CCDs**, Juan Cruz Estrada, Fermi National Accelerator Lab. (USA) . . . . . [8453-50]

11.10: **Reducing the read noise of near-infrared detector systems by improved reference sampling and subtraction**, Bernard J. Rauscher, Richard G. Arendt, Dale J. Fixsen, Don J. Lindler, NASA Goddard Space Flight Ctr. (USA); Markus Loose, Markury Scientific, Inc. (USA); Matthew Lander, Samuel H. Moseley, Donna V. Wilson, NASA Goddard Space Flight Ctr. (USA) . . . [8453-51]

11.30: **SIDECAR ASIC, its operation and performance with VIRGO2K near-infrared detectors**, Nagaraja N. Bezawada, UK Astronomy Technology Ctr. (United Kingdom); Domingo Alvarez, Pyreos Ltd. (United Kingdom); David C. Atkinson, UK Astronomy Technology Ctr. (United Kingdom) . . . . . [8453-52]

SESSION 16
Room: G107 . . . . . Wed. 11.50 to 12.10

CCDs II
Session Chair: **Paul Jorden,** E2V technologies plc (United Kingdom)

11.50: **Modeling and model verification for the Euclid CCD273 detector**, Andrew S. Clarke, David J. Hall, Neil J. Murray, Andrew D. Holland, The Open Univ. (United Kingdom); David Burt, e2v technologies plc (United Kingdom) . . . . . [8453-53]

Lunch/Exhibition Break . . . . . 12.10 to 13.40

SESSION 17

Room: G107 . . . . . Wed. 13.40 to 15.20

CCDs III

Session Chair: **Paul Jorden,** E2V technologies plc (United Kingdom)

13.40: **Charge-coupled devices for the ESA PLATO M-class Mission**, James Endicott, Andrew K. Walker, Peter Turner, Daniel Allen, e2v technologies plc (United Kingdom); Osvaldo Piersanti, Alexander D. Short, European Space Research and Technology Ctr. (Netherlands); David M. Walton, Univ. College London (United Kingdom) . . . . . [8453-54]

14.00: **Persistence and charge diffusion in an E2V CCD42-90 deep-depletion CCD**, Gregory A. Barrick, Jeffrey Ward, Jean-Charles J. Cuillandre, Canada-France-Hawaii Telescope (USA) . . . . . [8453-55]

14.20: **Recent astronomical detector development at the University of Arizona**, Michael P. Lesser, The Univ. of Arizona (USA) . . . . . [8453-56]

14.40: **STA1600LN: low-noise 10560 x 10560 pixel high-resolution CCD for astronomy**, Richard A. Bredthauer, Gregory R. Bredthauer, Kasey L. Boggs, Semiconductor Technology Associates Inc. (USA); Michael P. Lesser, The Univ. of Arizona (USA) . . . . . [8453-57]

15.00: **A novel CCD for application in high-frame rate geostationary space-based imaging**, Richard A. Bredthauer, Gregory R. Bredthauer, Kasey L. Boggs, Semiconductor Technology Associates Inc. (USA); Michael P. Lesser, The Univ. of Arizona (USA); Earl K. Aamodt, Lockheed Martin Space Systems Co. (USA); Hugh Christian, Ryco Design and Research, Inc. (USA) . . . . . [8453-58]

Coffee Break . . . . . 15.20 to 15.50

SESSION 18

Room: G107 . . . . . Wed. 15.50 to 17.50

IR Detectors IV

Session Chair: **James Beletic,** Teledyne Imaging Sensors (USA)

15.50: **Performance and calibration of H2RG detectors and SIDECAR ASICs for the RATIR camera**, Ori D. Fox, NASA Goddard Space Flight Ctr. (USA); Alexander S. Kutyrev, NASA Goddard Space Flight Ctr. (USA) and Univ. of Maryland, College Park (USA); David A. Rapchun, NASA Goddard Space Flight Ctr. (USA); Christopher R. Klein, Univ. of California, Berkeley (USA); Nathaniel R. Butler, Arizona State Univ. (USA); Josh Bloom, Univ. of California, Berkeley (USA); José A. de Diego, Alejandro D. Simón Farah, Univ. Nacional Autónoma de México (Mexico); Neil A. Gehrels, NASA Goddard Space Flight Ctr. (USA); Leonid N. Georgiev, J. Jesús González-Hernandez, William H. Lee, Univ. Nacional Autónoma de México (Mexico); Markus Loose, Markury Scientific, Inc. (USA); Gennadiy Lotkin, Samuel H. Moseley, NASA Goddard Space Flight Ctr. (USA); J. Xavier Prochaska, Enrico Ramirez-Ruiz, Univ. of California, Santa Cruz (USA); Michael G. Richer, Univ. Nacional Autónoma de México (Mexico); Frederick D. Robinson, NASA Goddard Space Flight Ctr. (USA); Carlos Román-Zuniga, Univ. Nacional Autónoma de México (Mexico); Mathew V. Samuel, Leroy M. Sparr, NASA Goddard Space Flight Ctr. (USA); Alan M. Watson, Univ. Nacional Autónoma de México (Mexico). . . . . [8453-59]

16.10: **Hemispherical infrared focal plane arrays: a new design parameter for the instruments**, Manuel Fendler, Delphine Dumas, Commissariat à l'Énergie Atomique (France); Fanny Chemla, Mathieu Cohen, Observatoire de Paris à Meudon (France); Etienne Le Coarer, Institut de Planetologie et d'Astrophysique de Grenoble (France); Jérome Primot, ONERA (France); Hervé Ribot, Commissariat à l'Énergie Atomique (France) . . . . . [8453-60]

16.30: **Control electronics for large mosaics of SIDECAR ASIC driven detectors**, Markus Loose, Markury Scientific, Inc. (USA); Edward Cheng, Conceptual Analytics, LLC (USA); James Lohr, David B. Mott, Augustyn Waczynski, Yiting Wen, Donna V. Wilson, NASA Goddard Space Flight Ctr. (USA) . . . . . [8453-61]

16.50: **Characterization of HAWAII-2RG detector and SIDECAR ASIC for Euclid Mission at ESA**, Pierre-Elie Crouzet, Fritz De Wit, Joerg Ter Haar, Thierry Beaufort, Bart Butler, Hans Smit, Cornelis van der Luijt, European Space Research and Technology Ctr. (Netherlands) . . . . . [8453-62]

17.10: **Performance of the HgCdTe detector for MOSFIRE, an imager and multi-object spectrometer for Keck Observatory**, Kristin R. Kulas, Ian S. McLean, Univ. of California, Los Angeles (USA); Charles C. Steidel, California Institute of Technology (USA) . . . . . [8453-63]

17.30: **NIRSpec detectors: noise properties and the effect of signal dependent inter-pixel crosstalk**, Giovanna Giardino, Marco Sirianni, Stephan M. Birkmann, Pierre Ferruit, Torsten Böker, Guido De Marchi, European Space Research and Technology Ctr. (Netherlands); Martin Stuhlinger, European Space Astronomy Ctr. (Spain); Peter L. Jensen, Paolo Strada, European Space Research and Technology Ctr. (Netherlands); Bernard J. Rauscher, Don J. Lindler, NASA Goddard Space Flight Ctr. (USA). . . . . [8453-64]

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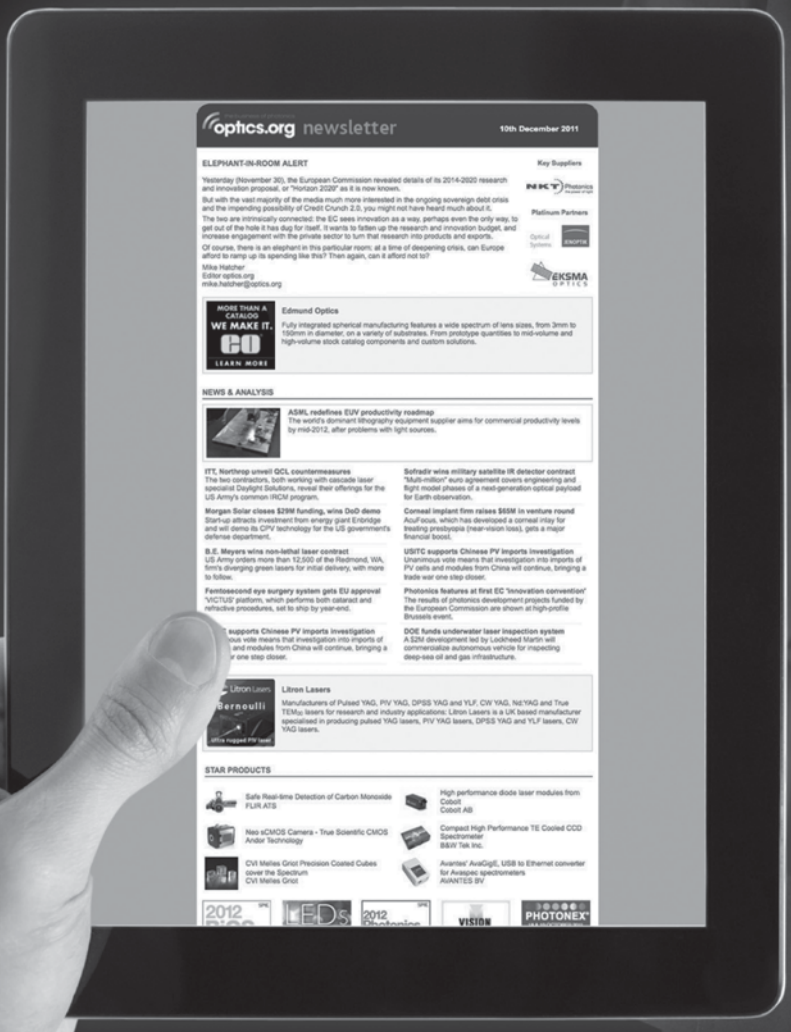

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Sunday 1 July . . . . . 07.00 to 16.00
Monday 2 July . . . . . 07.30 to 17.00
Tuesday 3 July . . . . . 07.30 to 17.00
Wednesday 4 July . . . . . 07.30 to 17.00
Thursday 5 July . . . . . 07.30 to 17.00
Friday 6 July . . . . . 07.45 to 17.00

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Tuesday 3 July . . . . . 10.00 to 17.00
Thursday 5 July . . . . . 10.00 to 17.00

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Travel

Transportation

Amsterdam RAI Hotel & Travel Shuttle Service is operated by the Airport Service of Verstraaten Business Travel. For more information visit https://reservation.verstraaten-bt.nl/taxi/en/book.html

- **Train**
  Trains to Amsterdam Centraal Station from AMS leave every 15 minutes. The Amsterdam Centraal Station is more than a train station, it is a major attraction. And of course the Amsterdam Centraal station also serves as a hub of many departure points for domestic and international train trips.

  Amsterdam Central Station Services - www.amsterdam.info/central-station/services/

  How to Use the Train Ticket Machines - www.amsterdam.info/transport/tickets/

- **Taxis**
  Taxis can be handy when travelling to and from the airport, late at night when the trams have stopped running or when you're running late. Depending on the traffic during peak times, however, public transport may get you there even quicker. For more information visit Schiphol Travel Taxi www.schiphol.nl/Travellers/ToFromSchiphol/SchipholTravelTaxi.htm

- **Bike Rental**
  Renting a bike is a great way to get around and see the city. Bike rental costs about 10 euro a day. For more on bike rental locations in Amsterdam visit www.iamsterdam.com/en/visiting/touristinformation/gettingaround/rental/bikehire

Policies

Audio, Video, Digital Recording Policy

CONFERENCES, COURSES, AND POSTER SESSIONS: For copyright reasons, recordings of any kind are prohibited without prior written consent of the presenter. Consent forms are available at Speaker Check-In. Individuals not complying with this policy will be asked to leave a given session and asked to surrender their recording media.

EXHIBITION HALL: For security and courtesy reasons, recordings of any kind are prohibited unless one has explicit permission from on-site company representatives. Individuals not complying with this policy will be asked to surrender their recording media and to leave the exhibition hall.

Your registration signifies your agreement to be photographed or videotaped by SPIE in the course of normal business. Such photos and video may be used in SPIE marketing materials or other SPIE promotional items.

Laser Pointer Safety Information/Policy

SPIE supplies tested and safety approved laser pointers for all conference meeting rooms. For safety reasons, SPIE requests that presenters use our provided laser pointers available in each meeting room. Use of a personal laser pointer at an SPIE event represents user's acceptance of liability for use of a non-SPIE supplied laser pointer device. Misuse of any laser pointer could lead to eye damage.

Underage Persons on Exhibition Floor Policy

For safety and insurance reasons, no one under the age of 16 will be allowed in the exhibition area during move-in and move-out. During open exhibition hours, only children over the age of 12 accompanied by an adult will be allowed in the exhibition area.

Unauthorized Solicitation Policy

Unauthorized solicitation in the Exhibition Hall is prohibited. Any non-exhibiting manufacturer or supplier observed to be distributing information or soliciting business in the aisles, or in another company's booth, will be asked to leave immediately.

Unsecured Items Policy

Personal belongings should not be left unattended in meeting rooms or public areas. Unattended items are subject to removal by security. SPIE is not responsible for items left unattended.

Wireless Internet Service Policy

SPIE provides wireless access for attendees during the conference and exhibition but cannot guarantee full coverage in all locations, all of the time. Please be respectful of your time and usage so that all attendees are able to access the internet. Excessive usage (streaming video, gaming, multiple devices) reduces bandwidth and increases cost for all attendees. No routers may be attached to the network.

Properly secure your computer before accessing the public wireless network. Failure to do so may allow unauthorized access to your laptop as well as potentially introduce viruses to your computer and/or presentation. SPIE is not responsible for computer viruses or other computer damage.

Mobile Phones and Related Devices Policy

Mobile phones, tablets, laptops, pagers, and any similar electronic devices should be silenced during conference sessions. Please exit the conference room before answering or beginning a phone conversation.

Misconduct Policy

SPIE is a professional, not-for-profit society that is committed to providing valuable conference experiences. SPIE is dedicated to equal opportunity and treatment for all its members and meeting attendees. Attendees are expected to be respectful to other attendees, SPIE staff, and contractors. Harassment and other misconduct will not be tolerated; violators will be asked to leave the event.

SPIE Astronomical Telescopes + Instrumentation

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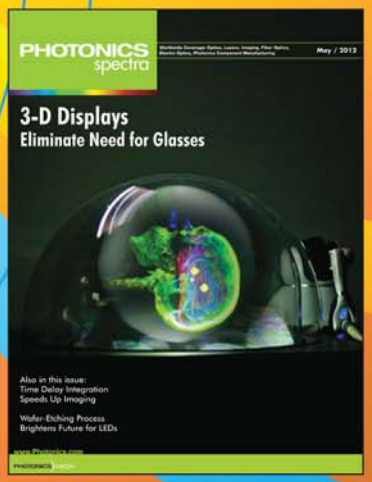

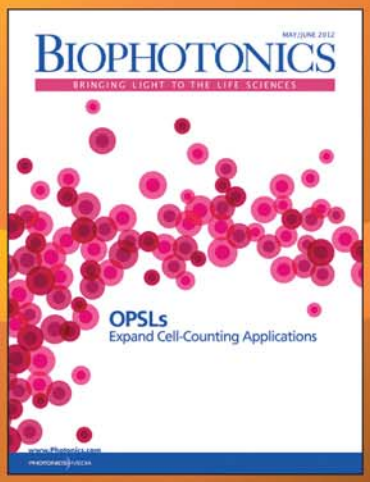

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