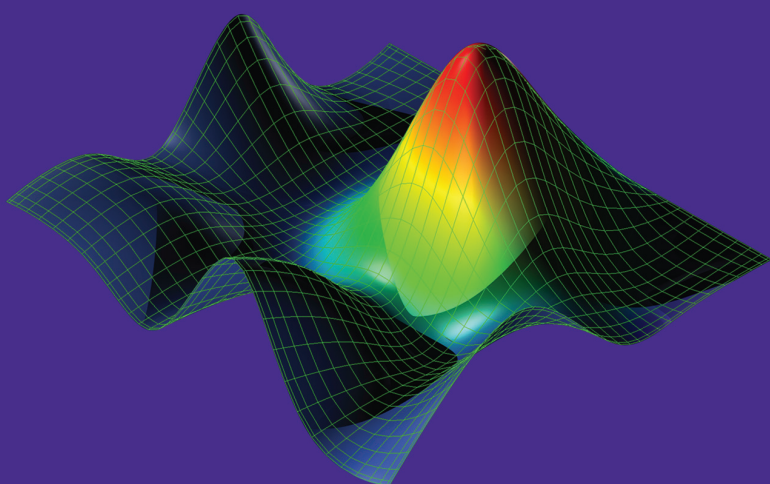


SPIE Europe
Optical Metrology

Optical Measurement
Systems for Industrial
Inspection

Modeling Aspects in
Optical Metrology

O3A: Optics for Arts,
Architecture, and
Archaeology



Munich ICM

International Congress
Centre Munich, Germany

15–18 June 2009

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19th International Congress on Photonics in Europe

Co-located with LASER World of Photonics 2009.

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SPIE Europe Optical Metrology

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Technical Conference

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Technical Committee

- Bernd Bodermann**, Physikalisch-Technische Bundesanstalt (Germany)
- Harald Bosse**, Physikalisch-Technische Bundesanstalt (Germany)
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SPIE Europe Optical Metrology

Conferences: 15-18 June 2009
ICM—International Congress Centre Munich
Munich, Germany

Visit the SPIE Europe Optical Metrology website to make your time in Munich a success!

Everything you need to know about the meeting is at spie.org/eom.

- ▶ Up-to-date paper listings and session times
- ▶ Hotel, travel, and complete registration information
- ▶ Information on driving and parking

www.spie.org/eom

Hotels

SPIE Europe Optical Metrology will be held at the ICM—International Congress Centre Munich.

Information on rooms and rates at this and other nearby hotels is available at <http://spie.org/eom>

Travel

For information on travel to Munich, please see www.spie.org/eom



Monday 15 June	Tuesday 16 June	Wednesday 17 June	Thursday 18 June
Conferences			
Conf. 7389 Optical Measurement Systems for Industrial Inspection V (Lehmann) p. 6			
Conf. 7390 Modeling Aspects in Optical Metrology (Bosse) p. 11		Conf. 7391 Optics for Arts, Architecture, and Archaeology (Pezatti, Salimbeni) p. 14	
Special Events			
Poster Sessions: Conference 7389 & 7390 p. 8	Plenary Presentation p. 5	Welcome Reception p. 3 Poster Session: Joint Poster Session 7389 & EOS Metrology of Advanced Optics p. 8	Poster Sessions: Conference 7391 p. 15

Poster Sessions

Interactive posters will be on display in the Conference Area Hallway. E-posters will be displayed in the ICM internet café. Poster authors, please look for the poster presentation details and poster session schedule for each conference in the SPIE *Europe Optical Metrology 2009* conference programs. Any papers left on the boards at the close of each conference poster session will be considered as unwanted and will be discarded. Poster authors should be at their papers during each conference poster session to answer questions from attendees.

Monday 15 June

12.00 to 13.00 - Photonics Forum Hall B1

Presentation and Reception



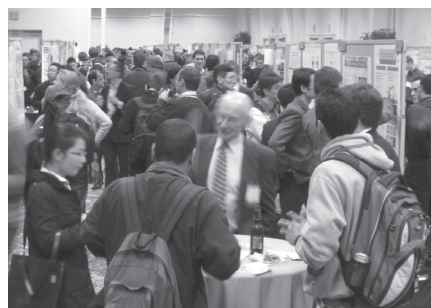
SPIE Visionary Award

Recipient: **Prof. Dr. h. c. Lothar Späth**

Join your colleagues to honour the work of Prof. Dr. h. c. Lothar Späth.

For recognising the potential, and for his leadership role in restoring Jena as a leader in optics research and technology.

The award presentation is followed by a reception featuring champagne and canapés. This event is open to all registrants of World of Photonics Congress.



Wednesday 17 June

10.30 to 11.20 - ICM: Room 1

Plenary Presentation



Adaptive Optics: From Astronomy to Vision Science

Chris Dainty, National University of Ireland, Galway, Ireland

19.30 to 21.30

Welcome and SPIE Member Reception

This evening event will feature a light meal and beverages at one of Munich's premier breweries, the Paulaner Bräuhaus. All registered conference attendees are welcome. A guest may accompany a registered attendee for an additional charge (space available).

SPIE Members are Invited

All SPIE Members attending **SPIE Europe Optical Metrology** or living in Europe (conference attendance not required) are invited to attend the combined Welcome and SPIE Member Reception to be held Wednesday evening 17 June in Munich, Germany.

Please advise our staff at the SPIE stand no. 488 in Hall B2 whether or not you will be able to attend.

For more information

www.spie.org/eom

SPIE Europe Optical Metrology

Conferences: 15-18 June 2009

ICM—International Congress Centre Munich
Munich, Germany



Welcome to Munich!

Enjoy this opportunity to interact with scientists, engineers, researchers, and applications and product developers in the field of optics and laser applications in metrology and art and archaeology conservation. Colocated with Laser 2009 in Munich, Germany, this symposium will address the role of lasers in the following areas:

- Optical Measurement Systems for Industrial Inspection
- Modeling Aspects in Optical Metrology
- O3A: Optics for Arts, Architecture, and Archaeology

You will have a unique opportunity to hear about the latest solutions to practical problems in industrial design and production engineering. Learn about recent advances in using optical technologies to preserve our shared cultural heritage. Find out about new approaches that push optical principles of measurement and testing in the micro- and nanoscales to the forefront of optical metrology.

Exchange new ideas, address your shared concerns, and get access to information not yet published in these topical areas. We are glad that you are here to share the most recent developments and applications at the 2009 Optical Metrology Symposium.

2009 Symposium Chairs



Wolfgang Osten, Univ. Stuttgart
(Germany)



Malgorzata Kujawska, Warsaw Univ.
of Technology (Poland)



Pietro Ferraro, Istituto Nazionale di
Ottica Applicata (Italy)

Optical Metrology Plenary Presentation

Wednesday 17 June, ICM: Room 1

10.30 to 11.20



Adaptive Optics: From Astronomy to Vision Science

Chris Dainty, National University of Ireland, Galway, Ireland

The concept of adaptive optics (AO) was first described over 50 years ago by an astronomer, Horace Babcock, but technological difficulties delayed its practical realisation in astronomy by 30 years, to the late 1980s. Since then, all large optical telescopes have been equipped with customised, expensive, adaptive optics systems and the use of related techniques, such as laser-guide star AO, ground layer AO, multi-conjugate AO and “extreme” AO is growing. The purpose of an AO system in astronomy is to compensate for the deleterious effects of atmospheric turbulence that results in dynamic unpredictable random aberrations to be present in the image: under favourable conditions, AO can achieve diffraction-limited imaging.

Many imaging systems suffer from unpredictable dynamic aberrations: the eye is such a system. Adaptive optics was first applied in the eye about 10 years ago, and now finds application in two separate fields, retinal imaging and vision simulation. Progress in these fields will be summarised.

Biography: **Prof. Dainty** graduated from Regent Street Polytechnic in 1968 with a Diploma in Photographic Technology, obtained an MSc in Applied Optics in 1969 and his PhD in Physics in 1972, both from Imperial College, London. After faculty appointments at The University of London and The University of Rochester (NY), he became Pilkington Professor of Applied Optics at Imperial College in January 1984, a post he held for 18 years before moving to The National University of Ireland, Galway. In 2005 was appointed to the Chair of Applied Physics at NUI Galway.

Professor Dainty has been active in teaching optics and physics throughout his career. He has supervised 49 PhD Theses and currently has 12 research students. Between 1993 and 2003 he was an Editor of OPTICS COMMUNICATIONS, handling over 4900 manuscripts in that period.

Professor Dainty’s research interests are in optical imaging, scattering and propagation. In these areas he has co-authored or edited 6 books, approximately 150 peer-reviewed papers and 250 conference presentations. He is the 1984 recipient of the International Commission of Optics (ICO) Prize, the 1993 Thomas Young Medal and Prize (IoP) and the 2003 C E K Mees Medal and Prize (OSA). He is also a Fellow of The Optical Society of America (OSA), SPIE, The European Optical Society (EOS) and The Institute of Physics (IoP) and in 2008 was elected to Membership of the Royal Irish Academy. He has served on the Board of Directors of OSA, SPIE, IoP, ICO and EOS, and was elected President of ICO (1990-1993) and EOS (2004-2006). He is the 2009 Vice-President of OSA.

Optical Measurement Systems for Industrial Inspection

Conference Chair: **Peter H. Lehmann**, Univ. Kassel (Germany)

Conference Co-Chairs: **Wolfgang Osten**, Univ. Stuttgart (Germany); **Christophe Gorecki**, Univ. de Franche-Comté (France)

Programme Committee: **Oleg V. Angelsky**, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine); **Armando Albertazzi Goncalves, Jr.**, Univ. Federal de Santa Catarina (Brazil); **Anand Krishna Asundi**, Nanyang Technological Univ. (Singapore); **Klaus-Friedrich Beckstette**, Carl Zeiss AG (Germany); **Ralf B. Bergmann**, Bremer Institut für Angewandte Strahltechnik (Germany); **Harald Bosse**, Physikalisch-Technische Bundesanstalt (Germany); **Yuri V. Chugui**, Technological Design Institute of Scientific Instrument Engineering (Russian Federation); **Jürgen W. Czarske**, Technische Univ. Dresden (Germany); **Peter J. de Groot**, Zygo Corp. (USA); **Cosme Furlong**, Worcester Polytechnic Institute (USA); **Marc P. Georges**, Univ. de Liège (Belgium); **Roger M. Groves**, Technische Univ. Delft (Netherlands); **Steen Grüner Hanson**, Riso National Lab./ Danmarks Tekniske Univ. (Denmark); **Roland Höfling**, ViALUX GmbH (Germany); **Pierre M. Jacquot**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Gerd Jaeger**, Technische Univ. Ilmenau (Germany); **Richard M. Kowarschik**, Friedrich-Schiller-Univ. Jena (Germany); **Malgorzata Kujawinska**, Politechnika Warszawska (Poland); **Andrew John Moore**, Heriot-Watt Univ. (United Kingdom); **Gunther Notni**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Eduard Reithmeier**, Univ. Hannover (Germany); **Robert Schmitt**, RWTH Aachen (Germany); **Jörg Seewig**, Univ. Kaiserslautern (Germany); **Peter Seitz**, CSEM and Swiss Federal Institute of Technology EPFL (Switzerland); **Marcus Steinbichler**, Steinbichler Optotechnik GmbH (Germany); **Mitsuo Takeda**, The Univ. of Electro-Communications (Japan); **Wim Van Paepegem**, Univ. Gent (Belgium); **Elmar E. Wagner**, Fraunhofer-Gesellschaft (Germany)

Monday 15 June

Welcome and Introduction

Room: 14C. Mon. 08.50 to 09.00

Peter H. Lehmann, Univ. Kassel (Germany); **Wolfgang Osten**, Univ. Stuttgart (Germany)

SESSION 1

Room: 14C. Mon. 09.00 to 10.00

Multisensor Approaches and Strategies

Session Chairs: **Wolfgang Osten**, Univ. Stuttgart (Germany); **Peter H. Lehmann**, Univ. Kassel (Germany)

09.00: **Flexible optical metrology strategies for the control and quality assurance of small series production**, Robert Schmitt, RWTH Aachen (Germany); Alberto X. Pavim, RWTH Aachen (Germany) and Conselho Nacional de Desenvolvimento Científico e Tecnológico (Brazil) [7389-01]

09.20: **Sensor and actuator conditioning for multiscale measurement systems**, Wolfram Lyda, Jan Zimmermann, Avinash Burla, Johan Regin, Wolfgang Osten, Oliver Sawodny, Engelbert Westkämper, Univ. Stuttgart (Germany) [7389-02]

09.40: **Remote online monitoring and measuring system for civil engineering structures**, Malgorzata Kujawinska, Robert Sitnik, Grzegorz Dymny, Kuba Michonski, Krzysztof Mularczyk, Jakub F. Krzeslowski, Warsaw Univ. of Technology (Poland) [7389-03]

Coffee Break 10.00 to 10.30

SESSION 2

Room: 14C. Mon. 10.30 to 12.20

Digital Holography

Session Chair: **Thomas M. Kreis**, Bremer Institut für angewandte Strahltechnik (Germany)

10.30: **Resolution-enhanced approaches in digital holography (Invited Paper)**, Pietro Ferraro, Istituto Nazionale di Ottica Applicata-CNR (Italy) [7389-04]

11.00: **Investigation on thermal lens effect of a NdYAG laser**, Andreas Etemeyer, Interstaatliche Hochschule für Technik Buchs NTB (Germany); Jakob J. Juetz, Interstaatliche Hochschule für Technik Buchs NTB (Switzerland); Martin Spiegel, Karl Döbler, High Q Laser Production GmbH (Austria) [7389-05]

11.20: **Several micron range measurements with sub-nanometric resolution by the use of dual-wavelength digital holography and vertical scanning**, Tristan Colomb, Lyncée Tec SA (Switzerland); Jonas Kühn, Christian Depeursinge, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Yves Emery, Lyncée Tec SA (Switzerland) [7389-54]

11.40: **Microfluidic system based on the digital holography microscope for analysis of motile sperm**, Giuseppe Di Caprio M.D., Giuseppe Coppola, Istituto per la Microelettronica e Microsistemi (Italy); Simonetta Grilli, Pietro Ferraro, Istituto Nazionale di Ottica Applicata (Italy); Donatella Balduzzi, Roberto Puglisi, Andrea Galli, Istituto Sperimentale Italiano Lazzaro Spallanzani (Italy) [7389-07]

12.00: **Automated compensation of fringe pattern in digital holography and TV holography**, János Kornis, Richárd Sétel, Budapest Univ. of Technology and Economics (Hungary) [7389-129]

Lunch Break 12.20 to 13.40

SESSION 3

Room: 14C. Mon. 13.40 to 16.00

Fringe Projection and Deflectometry

Session Chair: **Gunther Notni**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

13.40: **Calibration of a combined system with phase measuring deflectometry and fringe projection**, Martin Breitbarth, Peter Kuehnmstedt, Gunther Notni, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [7389-09]

14.00: **Predictive segmentation method for 3D inspection accuracy and robustness improvement**, Jacek Reiner, Maciej Stankiewicz, Mateusz Wójcik, Wroclaw Univ. of Technology (Poland) [7389-10]

14.20: **Quality-guided phase unwrapping algorithm for the modified Fourier transform method**, Hong Guo, Peisen S. Huang, Stony Brook Univ. (United States) [7389-11]

14.40: **3D reconstruction by polarimetric imaging method based on perspective model**, Rindra Rantoso, Christophe Stolz, David Fofi, Fabrice Meriaudeau, Univ. de Bourgogne (France) [7389-12]

15.00: **Optical 3D shape measurement for dynamic object using color fringe pattern projection and empirical mode decomposition**, Xiang Zhou, Hong Zhao, Pengfei Zhang, Xi'an Jiaotong Univ. (China) [7389-13]

15.20: **Combined stereovision and phase shifting method: a new approach for 3D shape measurement**, Xu Han, Peisen S. Huang, Stony Brook Univ. (United States) [7389-125]

15.40: **Development of a high-resolution pattern-projection system using linescan cameras**, Berend Denkena, Univ. Hannover (Germany); Philipp Huke, Leibnitz Univ. Hannover (Germany) [7389-15]

Coffee Break 16.00 to 16.30

Posters—Monday

Mon. 16.30 to 18.00

All symposium attendees are invited to attend Monday poster session. The interactive poster sessions are designed to promote opportunities for networking with colleagues in your field. Attendees are encouraged to review the high-quality papers that are presented in this alternate format and to interact with the poster authors.

Poster presenters may post their poster papers starting at 10.00 hrs on Monday in the Conference Area Hallway. Any papers left on the boards following the end time of the poster session will be considered unwanted and will be discarded.

SPIE Europe assumes no responsibility for posters left up after the end of the poster session. Poster authors should be at their papers from 16.30 to 18.00 hrs to answer questions from attendees. Attendees are requested to wear their conference registration badges to the poster sessions.

Novel fiber grating array vibration monitoring system for large area safety, FanYong Meng, Zhigang Li, Bin Yang, Hebei Univ. of Technology (China); Susan X. Dong, AT Photonics, Inc. (United States) [7389-76]

New 3D high-accuracy optical coordinates measuring technique based on an infrared target and binocular stereo vision, Jinjun Li, Xi'an Research Institute of Hi-Technology (China); Hong Zhao, Xi'an Jiaotong Univ. (China); Qiang Fu, Pengfei Zhang, Xi'an Jiaotong Univ. (China) [7389-77]

Sheath flow stability controlling research in dynamic individual particles scattering measurement, Lu Zhang, Xi'an Jiaotong Univ. (China); Hong Zhao, Pengfei Zhang, Xi'an Jiaotong Univ. (United States) [7389-80]

- Non-metal elemental analysis by a compact low-energy, high-repetition rate laser-induced-breakdown spectrometer**, Georg Ankerhold, Johannes Ewald, Peter Kohns, Christian Wagner, RheinAhrCampus Remagen (Germany). [7389-81]
- Study of laser vision measurement technology of large-size workpiece straightness**, Xinglin Zhou, Wuhan Univ. of Science and Technology (China); Shenghua Ye, Tianjin Univ. (China) [7389-83]
- Fabrication and optical characteristics of silicon-based two-dimensional photonic crystal wavelength division multiplexing splitter**, Cheng-Yang Liu, Industrial Technology Research Institute (Taiwan) [7389-85]
- Simple method for the measurement of small wavelength differences by optical activity of cholesteric liquid crystal and heterodyne interferometer**, Jing-Heng Chen, Kun-Huang Chen, Hsiang-Yung Hsieh, Wei-Yao Chang, Feng Chia Univ. (Taiwan) [7389-86]
- Study of the measurement of solution concentration by surface plasmon resonance heterodyne interferometer**, Kun-Huang Chen, Jing-Heng Chen, Wei-Yao Chang, Hsiang-Yung Hsieh, Feng Chia Univ. (Taiwan) [7389-87]
- Wavelength-modulated heterodyne speckle interferometry for displacement measurement**, Ju-Yi Lee, Kun-Yi Lin, National Central Univ. (Taiwan) . . [7389-89]
- 3D shape measurement using curvature data**, ByoungChang Kim, MinChel Kwon, Kyungnam Univ. (Korea, Republic of); ByoungUck Choo, InJeong Yoon, Samyang Optics Co. (Korea, Republic of) [7389-92]
- Evaluation of aliasing influence on the performance of hybrid optical-digital speckle correlator**, Leonid I. Muravsky, Olexander M. Sakharuk, G. V. Karpenko Physico-Mechanical Institute (Ukraine); Pavel V. Yezhov, Institute of Physics (Ukraine) [7389-93]
- Automated ethernet based test platform for long wave infrared camera analysis and algorithm evaluation**, Torsten Edeler, Stephan H. Hussmann, Kevin Ohliger, Fachhochschule Westküste Heide (Germany) [7389-94]
- Influence of material dispersion on the measurement accuracy of chromatic sensors**, Antonin Mik?, Jiri Novak, Pavel Novak, Pavel Kajnar, Czech Technical Univ. in Prague (Czech Republic) [7389-95]
- High-precision alignment technique trough quality image analysis**, Josep Arasa, Univ. Politècnica de Catalunya (Spain); Patricia Blanco, Esther Oteo, SnellOptics (Spain) [7389-96]
- Makyoh-topography studies of the morphology of periodic and quasi-periodic surfaces**, Ferenc Riesz, Research Institute for Technical Physics and Materials Science (Hungary) [7389-97]
- Surface quality control in diamond abrasive finishing**, Yuriy D. Filatov, Volodymyr I. Sidorko, V. Bakul Institute for Superhard Materials NASU (Ukraine); Olexandr Y. Filatov, Vasil P. Yashuk, National Taras Shevchenko Univ. of Kyiv (Ukraine); Uwe Heisel, Michael Storchak, Univ. Stuttgart (Germany) [7389-99]
- Analysis of low activity in dynamic speckle patterns**, Marcelo Trivi, Gonzalo H. Sendra, Marcelo N. Guzman, Hector J. Rabal, Ricardo A. Arizaga, Ctr. de Investigaciones Opticas (Argentina) and Univ. Nacional de Mar del Plata (Argentina) [7389-100]
- Rock porosity and fracture parameter estimation by image technique**, Cahanzhi Wang, Univ. of Electronic Science and Technology of China (China) [7389-101]
- Multiple object image segmentation algorithm based on wavelet theory**, Weixing Wang, Univ. of Electronic Science and Technology of China (China) [7389-112]
- Auto-focusing in the scanning white-light interferometer**, Wei Cheng Wang, Jin Liang Chen, Industrial Technology Research Institute (Taiwan) [7389-103]
- Spatial resolution enhancement for Brillouin optical time domain analysis distributed sensor by using of correlation peak**, Hamid Latifi, Soodabeh Nouri Jouybari, Atefeh Ahmadlou, Morteza Karami, Shahid Beheshti Univ. (Iran, Islamic Republic of) [7389-104]
- Simulation and fabrication of white light confocal microscope to attain the surface profile using CCD and image processing techniques**, Hamid Latifi, Ebrahim Behroodi, Ali Mousavian, Shahid Beheshti Univ. (Iran, Islamic Republic of) [7389-105]
- Weighted integral method in white-light interferometry: envelope estimation from fraction of interferogram**, Seichi Sato, Shigeru Ando, The Univ. of Tokyo (Japan) [7389-106]
- Development of 3D Control of a Tiny Dew Droplet by Scattered Laser Light**, Shigeaki Matsumoto, Univ. of Industrial Technology (Japan) [7389-107]
- Measurement of temperature, refractive index, density distribution and convective heat transfer coefficient around a vertical wire by the Michelson Interferometer**, Samira Fatehi, Khosro Madanipour, Parviz Parvin, Amirkabir Univ. of Technology (Iran, Islamic Republic of) [7389-108]
- Novel instrumentation for interferometric nanoscale comparator**, Martin Cizek, Zdenek Buchta, Bretislav Mikel, Josef Lazar, Ondrej Cip, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic) [7389-109]
- Dynamic evaluation of lateral and vertical displacement of thermally actuated MEMS devices**, Kalle Hanhijärvi, Juha P. Aaltonen, Ivan Kassamakov, Univ. of Helsinki (Finland); Lauri Sainiemi, Kestutis Grigoras, Sami Franssila, Helsinki Univ. of Technology (Finland); Edward Hæggsström, Univ. of Helsinki (Finland) [7389-110]
- Performance analysis of interrogators for fiber-Bragg-grating sensors based on arrayed waveguide gratings**, Thorbjörn C. Buck, Mathias S. Müller, Alexander W. Koch, Technische Univ. München (Germany) [7389-111]
- Interferometric characterization of mono- and polycrystalline CVD diamond**, Maurizio M. Vannoni, Giuseppe Molesini, Consiglio Nazionale delle Ricerche (Italy); Silvio Sciortino, Stefano Lagomarsino, Univ. degli Studi di Firenze (Italy); Paolo Olivero, Univ. degli Studi di Torino (Italy) [7389-102]
- Effect of surface defects on the self-images produced by diffraction gratings**, Luis Miguel Sanchez-Brea, Francisco Javier Salgado-Remacha, Francisco Jose Torcal-Milla, José María Rico-García, Univ. Complutense de Madrid (Spain) [7389-113]
- Precise measurement of the length by means of DFB diode and femtosecond laser**, Radek Smid, Ondrej Cip, Josef Lazar, Jan Jezek, Bohdan Ruzicka, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic) [7389-114]
- Classification of mechanical parts using an optical-digital system and the Jacobi-Fourier moments**, Alfonso Padilla-Vivanco, Univ. Politècnica de Tulancingo (Mexico); Carina Toxqui-Quitl, José J. Báez-Rojas, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [7389-115]
- Characterization of deformable elastic lenses using PDI and null screen method**, Agustín Santiago-Alvarado, Univ. Tecnológica de la Mixteca (Mexico); Fermin-Solomon Granados-Agustín, Sergio Vázquez-Montiel, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Manuel Campos-García, Univ. Nacional Autónoma de México (Mexico) [7389-116]
- Correlating buried-finger photodetector for time-of-flight applications**, Gerald Zach, Technische Univ. Wien (Austria); Alexander Nemecek, Fachhochschule Wiener Neustadt (Austria); Klaus Oberhauser, A3PICs Electronics Development GmbH (Austria); Horst K. Zimmermann, Technische Univ. Wien (Austria) [7389-117]
- Modelling for characterizing defects in plates using two-dimensional maps of instantaneous ultrasonic out-of-plane displacement**, Jose Carlos Lopez-Vazquez, Luis Deán, M^a Cristina Trillo Yañez, Ángel F. Doval, José L. Fernández, Univ. de Vigo (Spain); Oscar P. Bruno, Faisal Amlani, California Institute of Technology (United States) [7389-118]
- Determination of thermal lens effect by white light interferometry**, Ahmet Emir, Kocaeli Üniv. (Turkey); Duygu Onal, Gebze Institute Of Technology (Turkey); Zehra Saraç, Zonguldak Karaelmas Univ. (Turkey) [7389-119]
- Double-pass Fizeau interferometer for the measurement of the figure error of large synchrotron optics**, Geoff D. Ludbrook, Diamond Light Source Ltd. (United Kingdom) [7389-121]
- Optical noncontact roughness measurements for the assessment of stress and deformation in tubular metallic parts of auto seats**, Manuel F. Costa, Univ. do Minho (Portugal); Francisco J. Q. Melo, Univ. de Aveiro (Portugal); Joaquim A. O. Carneiro, Univ. do Minho (Portugal) [7389-123]
- Sensor for measurement of hydrocarbons concentration based on optic fiber**, Joanna Pawlat, Waseda Univ. (Japan) [7389-126]
- Three-dimensional shape measurement by means of depth-to-coherence coding of the object shape**, Vicente Micó, Asociacion Industrial De Optica, Color E Imagen (Spain) and Univ. de Valencia (Spain); Estela Valero, Asociacion Industrial De Optica, Color E Imagen (Spain); Javier García, Univ. de Valencia (Spain); Zeev Zalevsky, Bar-Ilan Univ. (Israel) [7389-127]
- Nondestructive testing of aerospace composites with an infrared matrix laser vibrometer**, James M. Kilpatrick, Vladimir B. Markov, MetroLaser, Inc. (United States) [7389-128]
- Multi-focus microscope image fusion analysis based on Daubechies Wavelets**, Alfonso Padilla-Vivanco, Univ. Politècnica de Tulancingo (Mexico); Carina Toxqui-Quitl, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Irwing Tellez-Arriaga, Cesar Santiago-Tepantlan, Univ. Politècnica de Tulancingo (Mexico) [7389-130]
- Combined stereovision and phase shifting method: use of a visibility-modulated fringe pattern**, Xu Han, Peisen S. Huang, Stony Brook Univ. (United States) [7389-131]

Tuesday 16 June

SESSION 4

Room: 14C. Tues. 08.30 to 10.00

Speckle Metrology

Session Chair: **Pietro Ferraro**, Istituto di Cibernetica Eduardo Caianiello (Italy)

08.30: **In-field residual stresses measurement in a pipeline using an achromatic digital speckle interferometer and the hole-drilling method** (*Invited Paper*), Armando Albertazzi Goncalves, Jr., Univ. Federal de Santa Catarina (Brazil); Matias R. Viotti, Photonita (Brazil); João Carlos de Freitas, Transportadora Brasileira Gasoduto Bolivia-Brasil S.A. (Brazil); Marcelo Moya, Transpetro (Brazil) [7389-16]

09.00: **Out-of-plane vibration analysis with a transmission holographic optical element based electronic speckle pattern interferometer**, Vishwanath Bavigadda, Vincent Toal, Raghavendra M. Jallapuram, Emilia M. Mihaylova, Dublin Institute of Technology (Ireland) [7389-17]

09.20: **Out-of-plane deformation dynamic measurement method by using virtual speckle pattern based on Carre algorithm**, Yasuhiko Arai, Kansai Univ. (Japan) [7389-18]

Coffee Break 10.00 to 10.30

SESSION 5

Room: 14C. Tues. 10.30 to 11.50

Measurements of Fibres and Phase Objects

Session Chair: **Armando Albertazzi Goncalves, Jr.**, Univ. Federal de Santa Catarina (Brazil)

10.30: **Measurement of chromatic dispersion of microstructured polymer fibers by white-light spectral interferometry**, Petr Hlubina, Dalibor Ciprian, Technical Univ. of Ostrava (Czech Republic); Michael H. Frosz, Kristian Nielsen, Technical Univ. of Denmark (Denmark) [7389-20]

10.50: **Characterization of optical fibers by digital holographic interferometry**, Thomas M. Kreis, Hamdy H. A. L. Wahba II, Bremer Institut für angewandte Strahltechnik (Germany) [7389-21]

11.10: **Digital holographic tomography of phase objects**, Arun Anand, The Maharaja Sayajirao Univ. of Baroda (India); Vani K. Chhaniwal, Parul Institute of Engineering & Technology (India); Giancarlo Pedrini, Wolfgang Osten, Univ. Stuttgart (Germany) [7389-22]

11.30: **Phase object power mapping and cosmetic defects enhancement by Fourier based deflectometry**, Didier Beghuin, Luc Joannes, Xavier Dubois, LAMBDA-X sa (Belgium) [7389-23]

Lunch Break 11.50 to 13.30

SESSION 6

Room: 14C. Tues. 13.30 to 16.00

Measurement of Shape and Roughness

Session Chair: **Jürgen W. Czarske**, Technische Univ. Dresden (Germany)

13.30: **Mathematical approach to eliminate the influence of the workpiece shape when characterizing surface roughness with scattering light sensors** (*Invited Paper*), Jörg Seewig, Technische Univ. Kaiserslautern (Germany); Rainer Brodmann, OptoSurf GmbH (Germany); Marc Wendel, Horst Bodschiwinna, Technische Univ. Kaiserslautern (Germany) [7389-24]

14.00: **The complete acquisition of the topography of a special multi-mirror arrangement with the help of a Fizeau interferometer**, Haifeng Xu, Andreas Müller, Felix Balzer, Brandon Percle, Eberhard Manske, Gerd Jäger, Technische Univ. Ilmenau (Germany) [7389-25]

14.20: **Ball bearing measurement with white light interferometry**, Joanna Schmit, Sen Han, Erik L. Novak, Veeco Instruments Inc. (United States) [7389-26]

14.40: **Highly sensitive wave front sensor for characterization of micro- to nanometer scale surface flatness deviations**, Irina Lazareva, Andreas Nutsch, Lothar Pfitzner, Lothar Frey, Fraunhofer-Institut für Integrierte System und Bauelementetechnologie (Germany) [7389-27]

15.00: **Perifilometry of semiconductor components by two-colour holography with Bi₁₂TiO₂₀ crystals**, Eduardo Acedo Barbosa, Faculdade de Tecnologia de São Paulo (Brazil); André Oliveira Preto, Univ. de São Paulo (Brazil) [7389-28]

For more information

www.spie.org/eom

15.20: **Fast total scattering facility for 2D inspection of optical and functional surfaces**, Puja Kadkhoda, W. Sakiew, Detlev Ritau, Laser Zentrum Hannover e.V. (Germany) [7389-29]

15.40: **Soft X-ray projection system for robust roundness measurements**, Raimund Volk, Ernst Neumann, Hommel-Etamic GmbH (Germany); Robert Schmitt, Björn Damm, Andreas Hamacher, RWTH Aachen (Germany); Stefan G. Kasperl, Rolf Behrendt, Christoph Funk, Randolf Hanke, Jochen Hiller, Michael Krumm, Sudarsan Acharya, Frank Sukowski, Norman Uhlmann, Fraunhofer-Institut für Integrierte Schaltungen (Germany); Alexander Warrikhoff, Röntgen-Technik Dr. Warrikhoff GmbH & Co. KG (Germany) [7389-30]

Coffee Break 16.00 to 16.30

SESSION 7

Room: 14C. Tues. 16.30 to 17.50

3D Interferometry

Session Chair: **Mitsuo Takeda**, The Univ. of Electro-Communications (Japan)

16.30: **High-speed gauge block interferometer using frequency scanning lasers**, Jae Wan Kim, Jong-Ahn Kim, Korea Research Institute of Standards and Science (Korea, Republic of); Roma Jang, Korea Advanced Institute of Science and Technology (Korea, Republic of); Chu-Shik Kang, Korea Research Institute of Standards and Science (Korea, Republic of) [7389-31]

16.50: **Development of an ultrasensitive interferometry system as a key to precision metrology applications**, Martin P. Gohlke, Humboldt-Univ. zu Berlin (Germany); Thilo Schuldt, Hochschule Konstanz (Germany); Dennis Weise, Ulrich Johann, EADS Astrium GmbH (Germany); Achim Peters, Humboldt-Univ. zu Berlin (Germany); Claus Braxmaier, Hochschule Konstanz (Germany) . . . [7389-32]

17.10: **Common-path two-wavelength interferometer with submicron precision for profile measurements in online applications**, Jose M. Enguita, Ignacio Alvarez, Maria Frade, Univ. de Oviedo (Spain); Jorge Marina, DSIPlus (Spain) [7389-33]

17.30: **Digital interferometry using sequentially recorded intensity patterns**, Balázs Gombkötő, János Kornis, Budapest Univ. of Technology and Economics (Hungary) [7389-34]

Posters: Joint Session—Tuesday

Room: ICM Foyer, 1st Floor Tues. 16.30 to 18.00

Optics Measurements: Joint Poster Session with EOS conference on Metrology of Advanced Optics

Fast and precise process control in lens fabrication using multi-wavelength-interferometry, Jürgen Petter, Technische Univ. Darmstadt (Germany) [7389-133]

Segmentation and selective alignment of measurement data for optical surfaces, Robert Schmitt, RWTH Aachen (Germany) [7389-134]

AFM characterization of large area microoptical elements, Maria Oliva, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [7389-135]

Inspection of aspherical lenses by wavefront measurements, Ufuk Ceyhan, Hochschule Bremen (Germany) [7389-136]

Wednesday 17 June

SESSION 8

Room: 14C. Wed. 08.20 to 10.00

Optics Testing

Session Chair: **Klaus-Friedrich Beckstette**, Carl Zeiss AG (Germany)

08.20: **Small lens testing method using phase shift shearing interferometer**, Ryohei Hanayama, Katsuhiko Ishii, Kiyofumi Matsuda, The Graduate School for the Creation of New Photonics Industries (Japan) [7389-35]

08.40: **New approach to workpiece localization in sub-aperture stitching interferometric testing**, Pengfei Zhang, Hong Zhao, Tao Jiang, Xiang Zhou, Jinjun Li, Lu Zhang, Xi'an Jiaotong Univ. (China) [7389-79]

09.00: **Phase analysis error reduction in the Fourier transform method using a virtual interferogram**, Hidemitsu Toba, Zhiqiang Liu, Saori Udagawa, Naoki Fujiwara, Shigeru Nakayama, Takashi Gemma, Nikon Corp. (Japan); Mitsuo Takeda, Univ. of Electro-Communications (Japan) [7389-37]

09.20: **Parameter determination of biconvex lenses using confocal imaging**, Vani K. Chhaniwal, Parul Institute of Engineering & Technology (India); Arun Anand, The Maharaja Sayajirao Univ. of Baroda (India) [7389-38]

09.40: **Optical testing of lens systems with concentric design**, Alexander V. Goncharov, National Univ. of Ireland, Galway (Ireland); Laura Lobato Bailón, Univ. de Barcelona (Spain); Nicholas Devaney, Christopher J. Dainty, National Univ. of Ireland, Galway (Ireland) [7389-39]

Coffee Break 10.00 to 10.30

SPIE Europe Plenary Presentation**Room: 1** **Wed. 10.30 to 11.20****Adaptive Optics: From Astronomy to Vision Science,**
J. Chris Dainty, National University of Ireland, Galway (Ireland)**SESSION 9****Room: 1** **Wed. 10.30 to 11.20****Novel Interferometric Sensors***Session Chair: Steen Grüner Hanson*, Technical Univ. of Denmark
(Denmark)11.30: **Simplified laser Doppler distance sensor employing a single fan-shaped interference fringe system for dynamic position and shape measurement of laterally moving objects**, Thorsten Pfister, Lars Büttner, Jürgen W. Czarske, Technische Univ. Dresden (Germany) [7389-40]11.50: **Surface profile analysis using a fiber-optic low-coherence interferometer**, Robert Schmitt, Fraunhofer-Institut für Produktionstechnologie (Germany) and RWTH Aachen Univ. (Germany); Niels König, Elisa Manfrin de Araújo, Fraunhofer-Institut für Produktionstechnologie (Germany) [7389-41]12.10: **Fiber optical interferometric sensor based on mechanical oscillation**, Peter H. Lehmann, Univ. Kassel (Germany) [7389-42]

Lunch Break 12.30 to 13.40

SESSION 10**Room: 14C** **Wed. 13.40 to 15.50****Optics Measurement I**

Joint Session with EOS conference on Metrology of Advanced Optics

13.40: **Interferometric measurement of rotationally symmetric aspheric surfaces (Presentation Only)**, Michael Küchel, Hochschule Aalen (Germany) [7389-43]14.10: **New approach of high-resolution on-machine-metrology**, Michael Sander (Presentation Only), Leybold Optics USA, Inc. (United States) ... [7389-44]14.30: **New metrology approach for the production of aspheric lenses**, Andreas Beutler, Carl Mahr Holding GmbH (Germany) [7389-45]14.50: **Measuring aspheres with a chromatic Fizeau interferometer**, Lars Seifert, Univ. Stuttgart (Germany) [7389-46]15.10: **Noncontact methods for optical testing of convex aspheric mirrors for future large telescopes**, Alexander V. Goncharov, National Univ. of Ireland, Galway (Ireland); Vladislav V. Druzhin, Vladislav I. Batshev, Bauman Moscow State Technical Univ. (Russian Federation) [7389-47]15.30: **Dual-CGH interferometry test for X-ray mandrels**, Ulf Griesmann, National Institute of Standards and Technology (United States) [7389-48]

Coffee Break 15.50 to 16.20

SESSION 11**Room: 14C** **Wed. 16.20 to 18.00****Optics Measurement II***Session Chair: Christof Pruss*, Univ. Stuttgart (Germany)

Joint Session with EOS conference on Metrology of Advanced Optics

16.20: **Measurement and simulation of striae in optical glass**, Herbert Gross, Carl Zeiss AG (Germany); Marko Hofmann, DILAS Diodenlaser GmbH (Germany); Ralf Jedamzik, SCHOTT North America, Inc. (United States); Peter Hartmann, Schott AG (Germany); Stefan Sinzinger, Technical Univ. Ilmenau (Germany) [7389-49]16.40: **Photo-thermal measurement of absorptance losses, temperature-induced wavefront deformation and compaction in DUV optics**, Bernd Schäfer, Klaus Mann, Laser-Lab. Göttingen e.V. (Germany) [7389-50]17.00: **Development of a cryogenic refractometer for high accuracy measurements of the refractive index at low temperature (Presentation Only)**, Andrea G. Bianco, Osservatorio Astronomico di Brera (Italy) [7389-51]17.20: **Phase matching measurements of KDP and DKDP crystals used on LIL and LMJ facilities (Presentation Only)**, Roger Courchinoux, Commissariat à l'Énergie Atomique (France) [7389-52]17.40: **Reproducibility of contact lens power measurements using the phase shifting schlieren method**, Luc C. Joannes, LAMBDA-X sa (Belgium); Tony Hough, Consultant (United Kingdom) [7389-36]**Thursday 18 June****SESSION 12****Room: 14C** **Thurs. 08.40 to 10.00****Micro-Topography and Thickness Measurement***Session Chair: Jörg Seewig*, Technische Univ. Kaiserslautern
(Germany)08.40: **White-light spectral interferometry and reflectometry to measure thickness of thin films**, Petr Hlubina, Jiri Lunacek, Dalibor Ciprian, Technical Univ. of Ostrava (Czech Republic) [7389-78]09.00: **Digital holographic characterization of liquid microlenses array fabricated in electrode-less configuration**, Melania Paturzo, Lisa Miccio, Istituto di Cibernetica Eduardo Caianiello (Italy); Veronica Vespini, Simonetta Grilli, CNR-INOVA (Italy); Sergio M. De Nicola, Andrea Finizio, Pietro Ferraro, Istituto di Cibernetica Eduardo Caianiello (Italy) [7389-55]09.20: **Optical, mechanical and electro-optical design of an interferometric test station for massive parallel inspection of MEMS and MOEMS**, Kay Gastinger, Karl H. Haugholt, SINTEF (Norway); Malgorzata Kujawinska, Michal Józwiak, Warsaw Univ. of Technology (Poland); Christoph Schäffel, Institut für Mikroelektronik- und Mechatronik- Systeme gemeinnützige GmbH (Germany); Stephan Beer, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland) [7389-56]09.40: **Evaluation of a thin film interferometer using a light source with a non-equidistant, discretely distributed wavelength spectrum**, Florian Hirth, Technische Univ. München (Germany); Sven Dudeck, Siemens AG (Germany); Martin Jakobi, Technische Univ. München (Germany); Detlef Gerhard, Siemens AG (Germany); Alexander W. Koch, Technische Univ. München (Germany) [7389-57]

Coffee Break 10.00 to 10.20

SESSION 13**Room: 14C** **Thurs. 10.20 to 12.40****Position, Displacement, and Vibration Measurement***Session Chair: Marc P. Georges*, Univ. de Liège (Belgium)10.20: **An all-interferometric 6-DOFs sensor based on the Laser-Self-Mixing**, Simona Ottonelli, CNR-INFM Regional Lab. LIT3 (Italy) and Univ. degli Studi di Bari (Italy); Francesco De Lucia, Maurizio Dabbicco, Gaetano Scamarcio, Michela di Vietro, CNR-INFM Regional Lab. LIT3 (Italy) [7389-58]10.40: **Compensated laser encoder with symmetric and quasi-common-path heterodyne interferometry**, Cheng-Chih Hsu, Yuan Ze Univ. (Taiwan); Ju-Yi Lee, National Central Univ. (Taiwan); Chyan-Chyi Wu, Tamkang Univ. (Taiwan) [7389-59]11.00: **Pseudo-periodic patterns for subpixel accuracy visual control: principle, pattern designs and performances**, July A. Galeano, Patrick Sandoz, Univ. de Franche-Comté (France) [7389-60]11.20: **Determination of the frequency spectrum of Lamb waves from a sequence of maps of the instantaneous acoustic displacement obtained with TV holography**, J. Luis Deán, Cristina Trillo, J. Carlos López-Vázquez, Ángel F. Doval, José L. Fernández, Univ. de Vigo (Spain) [7389-61]11.40: **Dynamic holographic interferometry for dilatation measurements in vacuum-thermal environment**, Cedric Thizy, Christian Barbier, Isabelle Tychon, Marc P. Georges, Univ. de Liège (Belgium) [7389-08]12.00: **Insitu position and vibration measurement of rough surfaces using laser Doppler distance sensors**, Jürgen W. Czarske, Thorsten Pfister, Philipp Guenther, Lars Büttner, Technische Univ. Dresden (Germany) [7389-63]12.20: **Study on the Temporal Coherence Function of a Femtosecond Optical Frequency Comb**, Dong Wei, Satoru Takahashi, Kiyoshi Takamasu, Hirokazu Matsumoto, The Univ. of Tokyo (Japan) [7389-62]

Lunch Break 12.30 to 13.40

SESSION 14**Room: B21** **Thurs. 13.40 to 16.00****Object Inspection and Defect Detection***Session Chair: Peter H. Lehmann*, Univ. Kassel (Germany)13.40: **Structural damage identification based on laser ultrasonic propagation imaging technology**, Jung-Ryul Lee, Chonbuk National Univ. (Korea, Republic of) [7389-64]14.00: **Real-time defect detection in transparent multi-layer polymer films using structured illumination and 1D filtering**, Walter Michaeli, Oliver Osterbrink, Klaus Berdel, RWTH Aachen (Germany) [7389-65]

Conference 7389 - continued

14.20: **Polarized optical scattering measurements of metallic nanoparticles upon a silicon wafer (stand-by oral presentation)**, Cheng-Yang Liu, Wei-En Fu, Industrial Technology Research Institute (Taiwan) [7389-84]

14.40: **Novel fiber-based technique for inspection of holes in narrow-bore tubes**, Tony Flaherty, Fabien Bernard, Gerard M. O'Connor, National Univ. of Ireland, Galway (Ireland) [7389-67]

15.00: **Development and application of a photogrammetric endoscopic system for measurement of misalignment and internal profile of welded joints in pipelines**, Armando Albertazzi Goncalves, Jr., Univ. Federal de Santa Catarina (Brazil); Allan C. Hoffmann, Petrobrás (Brazil); Adriana Warzecha, IMEP-LAHC (France) [7389-68]

15.20: **Industrial online surface defects detection in continuous casting hot slabs**, Ignacio Alvarez, Univ. de Oviedo (Spain); Jorge Marina, Desarrollo de Soluciones Integrales Plus S.L. (Spain); Jose Maria Enguita, Univ. de Oviedo (Spain); Cesar Fraga, ArcelorMittal España S.A. (Spain); Ricardo Garcia, Desarrollo de Soluciones Integrales Plus S.L. (Spain) [7389-69]

15.40: **Optical classification for quality and defect analysis of train brakes**, Stefan Glock, Stefan Hausmann, Sebastian Gerke, Alexander Warok, Ostwestfalen-Lippe Univ. of Applied Sciences (Germany); Peter A. Spiess, DB Systemtechnik (Germany); Stefan Witte, Volker Lohweg, Ostwestfalen-Lippe Univ. of Applied Sciences (Germany) [7389-70]

Coffee Break 16.00 to 16.20

SESSION 15

Room: B21. Thurs. 16.20 to 18.00

Nondestructive Testing

Session Chair: **Christophe Gorecki**, Univ. de Franche-Comté (France)

16.20: **Two-sided laser device for online paper caliper measurement and control**, Michael K. Y. Hughes, Honeywell Vancouver Ctr. of Excellence (Canada); Markus Bengtsson, Honeywell Process Solutions (Sweden); Pak W. Hui, Graham I. Duck, Honeywell Vancouver Ctr. of Excellence (Canada) [7389-71]

16.40: **Calibration method for accurate optical measurement of thickness profile for paper industry**, Jussi S. Graeffe, Metso Automation (Finland) [7389-72]

17.00: **FASEP®-automated analysis of fibre length distribution in glass-fibre-reinforced products**, Mark Hartwich, Hochschule Darmstadt (Germany) [7389-73]

17.20: **Electro-optic sensors dedicated to noninvasive electric field characterization**, Adriana Warzecha, Gwenaél Gaborit, IMEP-LAHC (France); Maxime Bernier, Le Lab. de Conception et d'Intégration des Systèmes (France); Jean-Louis Lasserre, La Délégation Générale pour l'Armement (France); Lionel Duvillaret, IMEP-LAHC (France) [7389-74]

17.40: **Spectral peak tracking for enhanced fiber optic sensing**, Markus P. Plattner, Technische Univ. München (Germany); Thomas Zeh, Kayser-Threde GmbH (Germany); Thorbjörn C. Buck, Florian Hirth, Mathias S. Müller, Alexander W. Koch, Technische Univ. München (Germany) [7389-75]

Closing Remarks

Room: B21. Thurs. 18.00 to 18.05

Christophe Gorecki, Univ. de Franche-Comté (France)

For more information

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Conference 7390 - Room B13

Monday-Tuesday 15-16 June 2009 • Proceedings of SPIE Vol. 7390

Modeling Aspects in Optical Metrology

Conference Chair: **Harald Bosse**, Physikalisch-Technische Bundesanstalt (Germany)

Conference Co-Chairs: **Bernd Bodermann**, Physikalisch-Technische Bundesanstalt (Germany); **Richard M. Silver**, National Institute of Standards and Technology (USA)

Programme Committee: **Markus Bär**, Physikalisch-Technische Bundesanstalt (Germany); **Joerg Bischoff**, TEL/Timbre Technologies, Inc. (USA); **Sven Burger**, Zuse Institut Berlin (Germany); **Andreas Erdmann**, Fraunhofer-Institut für Integrierte System und Bauelem (Germany); **Christian Hafner**, ETH Zürich (Switzerland); **Wolfgang Holzapfel**, DR. JOHANNES HEIDENHAIN GmbH (Germany); **Bernd H. Kleemann**, Carl Zeiss AG (Germany); **Roderick Köhle**, Qimonda AG (Germany); **Wolfgang Osten**, Univ. Stuttgart (Germany); **Andreas Rathsfeld**, WIAS (Germany); **Thomas Scherübel**, Carl Zeiss SMS GmbH (Germany); **Patrick Schiavone**, Lab. des Technologies de la Microelectronique CNRS (France); **Irwan Setija**, ASML Netherlands B.V. (Netherlands); **Michael Totzeck**, Carl Zeiss SMT AG (Germany); **Jari Pekka Turunen**, Univ. Joensuu (Finland); **Frank Wyrowski**, Friedrich-Schiller-Univ. Jena (Germany)

Monday 15 June

Opening Remarks

Room: B13. Mon. 08.00 to 08.10

Harald Bosse, Physikalisch-Technische Bundesanstalt (Germany)

SESSION 1

Room: B13. Mon. 08.10 to 10.00

Optical Systems

Session Chair: **Harald Bosse**, Physikalisch-Technische Bundesanstalt (Germany)

08.10: **Lithography simulation: modeling techniques and selected applications** (*Invited Paper*), Andreas Erdmann, Fraunhofer-Institut für Integrierte System und Bauelementetechnologie (Germany). [7390-01]

08.40: **Metallic nonlinear magneto-optical nonreciprocal isolator**, Hala Jarallah El-Khozondar, Islamic Univ. of Gaza (Palestinian Territory, Occupied); Rifa Jarallah El-Khozondar, Al-Aqsa Univ. (Palestinian Territory, Occupied); Mohammed M. Shabat, Islamic Univ. of Gaza (Palestinian Territory, Occupied); Alexander W. Koch, Technische Univ. München (Germany). [7390-02]

09.00: **Traceability of the F25 vision system for calibration of grated structures with sub-micron accuracy**, Ancuta I. Mares, Robbert H. Bergmans, NMI (Netherlands) [7390-03]

09.20: **Inverse optical design: building and testing an artificial eye**, Alexander V. Goncharov, National Univ. of Ireland, Galway (Ireland); Brice Lerat, Institut d'Optique Graduate School (France); Maciej Nowakowski, Christopher J. Dainty, National Univ. of Ireland, Galway (Ireland) [7390-04]

09.40: **Inspection of misalignment factors in lens assembly**, Xiang Li, Liping Zhao, Zhong Ping Fang, A*STAR Singapore Institute of Manufacturing Technology (Singapore). [7390-05]

Coffee Break 10.00 to 10.30

SESSION 2

Room: B13. Mon. 10.30 to 11.50

Wave Propagation and Polarization

Session Chair: **Wolfgang Osten**, Univ. Stuttgart (Germany)

10.30: **Measurement errors from internal shear strain within Fiber-Bragg-grating sensors**, Mathias S. Müller, Thorbjörn C. Buck, Hala Jarallah El-Khozondar, Alexander W. Koch, Technische Univ. München (Germany). [7390-06]

10.50: **Variable waveplate-based polarimeter for polarimetric metrology**, Angel Lizana, Univ. Autònoma de Barcelona (Spain); Claudio C. Lemmi, Univ. de Buenos Aires (Argentina); Andrés Ruiz Márquez, Univ. de Alicante (Spain); Ignacio Soriano Moreno, Univ. Miguel Hernández de Elche (Spain); Alba Peinado, Juan Campos, María J. Yzuel, Univ. Autònoma de Barcelona (Spain) [7390-07]

11.10: **Spatial elliptical polariscope for polarization distribution measurements**, Wladyslaw A. Wozniak, Sławomir Drobczynski, Piotr Kurzynowski, Warsaw Univ. of Technology (Poland) [7390-08]

11.30: **Sensitivity of Double-Negative Metamaterial Optical waveguide**, Hala Jarallah El-Khozondar, Islamic Univ. of Gaza (Palestinian Territory, Occupied); Rifa Jarallah El-Khozondar, Al-Aqsa Univ. (Palestinian Territory, Occupied); Mathias S. Müller, Technische Univ. München (Germany); Mohammed Mosa Shabat, Islamic Univ. of Gaza (Palestinian Territory, Occupied); Alexander W. Koch, Technische Univ. München (Germany). [7390-09]

Lunch Break 11.50 to 14.00

SESSION 3

Room: B13. Mon. 14.00 to 16.00

Interferometry and Phase

Session Chair: **Bernd Bodermann**, Physikalisch-Technische Bundesanstalt (Germany)

14.00: **Adaptive Bessel-autocorrelation of ultrashort pulses with phase-only spatial light modulators**, Silke Huferath-von Luepke, Bremer Institut für angewandte Strahltechnik (Germany); Jörg Seewig, Technische für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Ruediger Grunwald, Bremer Institut für angewandte Strahltechnik (Germany) [7390-10]

14.20: **Assistance system for optical sensors**, Friedel Koerfer, Fraunhofer-Institut für Produktionstechnologie (Germany); Jörg Seewig, Technische Univ. Kaiserslautern (Germany); Robert Schmitt, Fraunhofer-Institut für Produktionstechnologie (Germany); Wolfgang Osten, Univ. Stuttgart (Germany); Albert A. Weckenmann, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [7390-11]

14.40: **Shape measurement of diffuse and transparent objects by two wavelength contouring using phase retrieval**, Arun Anand, The Maharaja Sayajirao Univ. of Baroda (India); Vani K. Chhaniwal, Parul Institute of Engineering & Technology (India); Giancarlo Pedrini, Wolfgang Osten, Univ. Stuttgart (Germany) [7390-12]

15.00: **Sensing performance of a Shack Hartmann wavefront sensor versus the properties of the light beam**, Li-Ping Zhao, A*STAR Singapore Institute of Manufacturing Technology (Singapore); Wenjiang Guo, Nanyang Technological Univ. (Singapore); Xiang Li, A*STAR Singapore Institute of Manufacturing Technology (Singapore); Zhao-Wei Zhong, Nanyang Technological Univ. (Singapore) [7390-13]

15.20: **Full-field absolute phase measurements in the heterodyne interferometer with an electro-optic modulator**, Yen-Liang Chen, National Chiao Tung Univ. (Taiwan) and Industrial Technology Research Institute (Taiwan); Hung-Chih Hsieh, Wang-Tsung Wu, Der-Chin Su, National Chiao Tung Univ. (Taiwan) [7390-14]

15.40: **Method for measuring the refractive index distribution of a GRIN lens with heterodyne interferometry**, Hung-Chih Hsieh, Yen-Liang Chen, Wang-Tsung Wu, Der-Chin Su, National Chiao Tung Univ. (Taiwan) [7390-15]

Coffee Break 16.00 to 16.30

Posters—Monday

Room: B13. Mon. 16.30 to 17.30

All symposium attendees are invited to attend Monday poster session. The interactive poster sessions are designed to promote opportunities for networking with colleagues in your field. Attendees are encouraged to review the high-quality papers that are presented in this alternate format and to interact with the poster authors.

Poster presenters may post their poster papers starting at 10:00 hrs on Monday in the Conference Area Hallway. Any papers left on the boards following the end time of the poster session will be considered unwanted and will be discarded.

SPIE Europe assumes no responsibility for posters left up after the end of the poster session. Poster authors should be at their papers from 16:30 to 17:30 hrs to answer questions from attendees. Attendees are requested to wear their conference registration badges to the poster sessions.

Modeling of adaptive compensation of aberrations of optical system using deformable mirror, Antonin Miks, Jiri Novák, Pavel Novak, Czech Technical Univ. in Prague (Czech Republic) [7390-35]

Optimized square Fresnel zone plates for microoptics applications, Francisco Javier Salgado-Remacha, José María Rico-García, Luis Miguel Sanchez-Brea, F. Javier Alda Serrano, Univ. Complutense de Madrid (Spain) [7390-36]

Optical testing of a parabolic trough solar collector by a null screen with stitching, Victor I. Moreno-Oliva, Univ. de la Cienega del Estado de Michoacan de Ocampo (Mexico); Manuel Campos-García, Univ. Nacional Autónoma de México (Mexico); Fermin-Solomon Granados-Agustin, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Manuel Arjona-Pérez, Univ. de la Cienega del Estado de Michoacan de Ocampo (Mexico); Rufino Díaz-Urbe, Maximino M. Avendaño-Alejo, Univ. Nacional Autónoma de México (Mexico) [7390-37]

Talbot effect with aberrated beams, Francisco J. Torcal-Milla, Luis Miguel Sanchez-Brea, Eusebio Bernabeu, Univ. Complutense de Madrid (Spain) [7390-38]

Modelling of laser range measurement of underwater objects in maritime environment, Artur Cywinski, Polish Naval Academy (Poland); Roman Ostrowski, Military Univ. of Technology (Poland) [7390-39]

Numerical study of the characteristic functions of polygon scanners and sources of errors in the scanning process and methods of correction, Virgil-Florin Duma, Aurel Vlaicu Univ. of Arad (Romania) [7390-42]

Determination of phase and modulation transfer function of a printer by convolution of transmission function measuring, Ameneh Bostani, Khosro Madanipour, Parviz Parvin, Amirkabir Univ. of Technology (Iran, Islamic Republic of) [7390-41]

Optical characteristics of a one-dimensional photonic crystal with an additional regular layer, Vladimir A. Tolmachev, Ioffe Physico-Technical Institute (Russian Federation); Anna Baldycheva, Elena Y. Krutkova, Tatiana S. Perova, Trinity College Dublin (Ireland); Kevin Berwick, Dublin Institute of Technology (Ireland) [7390-40]

Modeling of the polarization mode dispersion in the single mode optical fiber links, Cherbi A. Lynda, Ecole Nationale Supérieure Polytechnique d'Alger (Algeria) [7390-43]

Far field of binary phase gratings with errors in the height of the strips, José María Rico-García, Luis Miguel Sanchez-Brea, Univ. Complutense de Madrid (Spain) [7390-45]

Fabrication of tunable grating with silver nanoparticles, I-Min Jiang, National Sun Yat-Sen Univ. (Taiwan) [7390-46]

Interferometric Ronchi test by using substructured grids, Manuel Campos-García, Univ. Nacional Autónoma de México (Mexico); Fermin-Solomon Granados-Agustin, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [7390-47]

Depth-of-field extension and 3D reconstruction in digital holographic microscopy, Isabelle Bergoënd, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Tristan Colomb, Lycée Tec SA (Switzerland); Nicolas Pavillon, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Yves Emery, Lycée Tec SA (Switzerland); Christian D. Depeursinge, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [7390-49]

Influence of a missing apple core in diffraction microtomography with sample rotation, Stanislas Vertu, Physikalisch-Technische Bundesanstalt (Germany); Olivier Haeberlé, Univ. de Haute Alsace (France); Jens Flügge, Physikalisch-Technische Bundesanstalt (Germany); Jean-Jacques Delaunay, The Univ. of Tokyo (Japan) [7390-50]

Prospects and limits of the Rayleigh Fourier approach for diffraction modelling in scatterometry and lithography, Jörg Bischoff, OSIRES (Germany); Karl Hehl, OPTIMOD (Germany) [7390-51]

Tuesday 16 June

SESSION 4

Room: B13. Tues. 08.30 to 10.00

Maxwell Solvers

Session Chair: Andreas Erdmann, Fraunhofer-Institut für Integrierte System und Bauelementetechnologie (Germany)

08.30: **3D finite-element simulation of light scattering off metallic nanostructures** (*Invited Paper*), Sven Burger, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany); Lin W. Zschiedrich, JCMwave GmbH (Germany); Jan Pomplun, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany); Frank Schmidt, JCMwave GmbH (Germany); Benjamin Kettner, Daniel Lockau, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany) [7390-16]

09.00: **Reduced basis method for fast and robust simulation of electromagnetic scattering problems**, Jan Pomplun, Frank Schmidt, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany) and JCMwave GmbH (Germany) [7390-17]

09.20: **Comparison of electromagnetic field solvers for the 3D analysis of plasmonic nanoantennas**, Johannes Hoffmann, Christian Hafner, Patrick Leidenberger, Jan Hesselbarth, ETH Zürich (Switzerland); Sven Burger, JCMwave GmbH (Germany); Dirk Baumann, A*STAR Institute of High Performance Computing (Singapore) [7390-18]

09.40: **Method of matrix Riccati equation for nanoshape control of diffraction gratings**, Mikhail Y. Barabanenkov, Institute of Microelectronics Technology and High Purity Materials (Russian Federation); Sergei Y. Shapoval, Institute of Microelectronics Technology and High Purity Materials (United States) . [7390-19]
Coffee Break 10.00 to 10.30

SESSION 5

Room: B13. Tues. 10.30 to 11.50

Surface Metrology

Session Chair: Markus Bär, Physikalisch-Technische Bundesanstalt (Germany)

10.30: **Power spectral density specification and analysis of large optical surfaces**, Erkin Sidick, Scott A. Basinger, Jet Propulsion Lab. (United States) [7390-20]

10.50: **Measuring and modelling the appearance of coated steel surfaces**, Veerle Goossens, Erik W. Stijns, Vrije Univ. Brussel (Belgium); Sake K. Van Gils, Ocas N.V. (Belgium); Robert Finsy, Herman Terry, Vrije Univ. Brussel (Belgium) [7390-21]

11.10: **Improvement of the accuracy in surface reconstruction by sequential lateral shearing**, Josep Vidal, Josep Nicolás, CELLS - ALBA (Spain); Juan Campos, Univ. Autònoma de Barcelona (Spain) [7390-22]

11.30: **Model-based approach to reference-free straightness measurement at the Nanometer Comparator**, Christoph Weichert, Manuel Stavridis, Monika Walzel, Clemens Elster, Axel Wiegmann, Michael Schulz, Rainer G. J. Köning, Jens Flügge, Physikalisch-Technische Bundesanstalt (Germany); Rainer Tutsch, Technische Univ. Braunschweig (Germany) [7390-28]
Lunch Break 11.50 to 13.30

SESSION 6

Room: B13. Tues. 13.30 to 16.00

Scatterometry

Session Chair: Bernd Bodermann, Physikalisch-Technische Bundesanstalt (Germany)

13.30: **Angle-resolved optical metrology using multi-technique nested uncertainties** (*Invited Paper*), Richard M. Silver, Bryan M. Barnes, Hui Zhou, Nien-Fan Zhang, Ronald G. Dixon, National Institute of Standards and Technology (United States) [7390-24]

14.00: **Numerical reconstructions of lithographic masks in DUV scatterometry**, Mark-Alexander Henn, Regine Model, Markus Bär, Matthias Wurm, Bernd Bodermann, Physikalisch-Technische Bundesanstalt (Germany); Andreas Rathsfeld, Weierstrass-Institute für Angewandte Analysis und Stochastik (Germany); Hermann A. Gross, Physikalisch-Technische Bundesanstalt (Germany) [7390-25]

14.20: **Numerical investigations prospects, challenges and limitations of non-imaging optical metrology of structured surfaces**, Bernd Bodermann, Matthias Wurm, Physikalisch-Technische Bundesanstalt (Germany) . . . [7390-26]

14.40: **Critical dimension measurements using a 193 nm scatterfield microscope**, Richard Quintanilha, Yeung Joon Sohn, Lowell P. Howard, Richard M. Silver, National Institute of Standards and Technology (United States) [7390-27]

15.00: **Evaluations of measurement uncertainties in EUV scatterometry**, Hermann A. Gross, Frank Scholze, Physikalisch-Technische Bundesanstalt (Germany); Andreas Rathsfeld, Weierstrass-Institute für Angewandte Analysis und Stochastik (Germany); Markus Bär, Physikalisch-Technische Bundesanstalt (Germany) [7390-23]

15.20: **Nanoshaped objects of equal phase volume: scattered far field comparison**, Alexander Normatov, Boris Spektor, Technion-Israel Institute of Technology (Israel) [7390-29]

15.40: **Specular and diffuse scattering from random asperities of any profile using the rigorous method for x-rays and neutrons**, Leonid I. Goray, Russian Academy of Sciences for Research and Education (Russian Federation) and Institute for Analytical Instrumentation (Russian Federation) [7390-30]

Coffee Break 16.00 to 16.30

SESSION 7

Room: B13..... Tues. 16.30 to 17.50

Holography and OCT

Session Chair: Richard M. Silver, National Institute of Standards and Technology (USA)

16.30: **Multiplexing and demultiplexing of digital holograms recorded in microscopic configuration**, Melania Paturzo, Istituto Nazionale di Ottica Applicata (Italy); Pasquale Memmolo, Istituto Nazionale di Ottica Applicata and Univ. degli Studi di Napoli Federico II; Antonia Tulino, Univ. degli Studi di Napoli Federico II (Italy); Andrea Finizio, Lisa Miccio, Pietro Ferraro, Istituto Nazionale di Ottica Applicata (Italy) [7390-31]

16.50: **Estimation of 3D reconstruction errors in a stereo-vision system**, Abdelkrim Belhaoua, Ecole Nationale Supérieure de Physique de Strasbourg (France); Sophie Kohler, Univ. de Haute Alsace (France); Ernest Hirsch, Univ. Louis Pasteur Strasbourg (France) [7390-32]

17.10: **Towards deconvolution in holography**, Nan Wang, Claas Falldorf, Christoph von Kopylow, Bremer Institut für angewandte Strahltechnik (Germany) [7390-33]

17.30: **Roughness measurement methodology according to DIN 4768 using optical coherence tomography (OCT)**, Marcello M. Amaral, Marcus P. Raele, Ricardo E. Samad, Nilson Dias Vieira, Jr., Anderson Zanardi de Freitas, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [7390-34]

Wednesday 17 June

SPIE Europe Plenary Session

Room: 1 Wed. 10.30 to 11.20

Adaptive Optics: From Astronomy to Vision Science,
J. Chris Dainty, National University of Ireland, Galway (Ireland)

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Conference 7391 - Room: B13

Wednesday-Thursday 17-18 June 2009 • Proceedings of SPIE Vol. 7391

03A: Optics for Arts, Architecture, and Archaeology

Conference Chairs: **Luca Pezzati**, Istituto Nazionale di Ottica Applicata/INOA CNR (Italy); **Renzo Salimbeni**, Istituto di Fisica Applicata Nello Carrara (Italy)

Programme Committee: **John F. Asmus**, Univ. of California, San Diego (USA); **Marta Castillejo**, Consejo Superior de Investigaciones Científicas (Spain); **Alberto de Tagle**, Netherlands Institute for Cultural Heritage (Netherlands); **Igor P. Gurov**, St. Petersburg State Univ. of Information Technologies, Mechanics and Optics (Russian Federation); **Jana Kolar**, Univ. v Ljubljani (Slovenia); **Alexander J. Kossolapov**, The Hermitage Museum (Russian Federation); **Michel Menu**, Ctr. de Recherche et des Restauration des Musees de France (France); **David R. Saunders**, The British Museum (United Kingdom); **Piotr Targowski**, Nicolaus Copernicus Univ. (Poland)

Wednesday 17 June

Welcome and Introduction

Room: B13. Wed. 08.40 to 09.00

Luca Pezzati, Istituto Nazionale di Ottica Applicata/INOA CNR (Italy);
Renzo Salimbeni, Istituto di Fisica Applicata Nello Carrara (Italy)

Keynote Presentation

Room: B13. Wed. 09.00 to 09.30

09.00: **Paul Gauguin in Brittany** (*Invited Paper*), John F. Asmus, Univ. of California, San Diego (United States) [7391-01]

SESSION 1

Room: B13. Wed. 09.30 to 10.00

Spectroscopy I

Session Chair: **John F. Asmus**, Univ. of California, San Diego (United States)

09.30: **Visible and infrared imaging spectroscopy of paintings: pigment mapping and improved infrared reflectography** (*Invited Paper*), John K. Delaney, Mathieu Thoury, Michael Palmer, National Gallery of Art (United States); Jason G. Zeibel, Roy T. Littleton, U.S. Army Night Vision & Electronic Sensors Directorate (United States); E. René de la Rie, National Gallery of Art (United States) [7391-05]

Coffee Break 10.00 to 10.30

SPIE Europe Plenary Session

Room: 1 Wed. 10.30 to 11.20

Adaptive Optics: From Astronomy to Vision Science,
J. Chris Dainty, National University of Ireland, Galway (Ireland)

SESSION 2

Room: B13. Wed. 11.30 to 12.50

Spectroscopy II

Session Chair: **John F. Asmus**, Univ. of California, San Diego (United States)

11.30: **UV-fluorescence spectroscopy for identification of vanishes in works of art: influence of the under layer on the emission spectrum**, Mady Elias, Caroline V. Magnain, Univ. Pierre et Marie Curie (France); Carlos Barthou, Ctr. National de la Recherche Scientifique (France); Daniela Comelli, Gianluca Valentini, Austin Nevin, Politecnico di Milano (Italy) [7391-03]

11.50: **Application of visible-induced luminescence imaging to the examination of museum objects**, Giovanni Verri, The British Museum (United Kingdom) [7391-04]

12.10: **Use of visible and infrared reflectance and luminescence imaging spectroscopy to study illuminated manuscripts: pigment identification and visualization of underdrawings**, Paola Ricciardi, John K. Delaney, Mathieu Thoury, Lisha Glinsman, E. René de la Rie, National Gallery of Art (United States) [7391-02]

12.30: **Double laser LIBS and micro-XRF spectroscopy applied to the characterization of materials coming from the Greek-Roman theater of Taormina**, Tiziano Schillaci, Maria Brai, Luigi Tranchina, Univ. degli Studi di Palermo (Italy) [7391-06]

Lunch Break 12.50 to 14.30

SESSION 3

Room: B13. Wed. 14.30 to 16.00

Visualisation

Session Chair: **Luca Pezzati**, Istituto Nazionale di Ottica Applicata/INOA CNR (Italy)

14.30: **Influence of the artistic techniques on the visual appearance of complexions in art** (*Invited Paper*), Caroline V. Magnain, Mady Elias, Jean-Marc Frigerio, Institut des NanoSciences de Paris (France) [7391-07]

15.00: **2.5D virtual-reality visualisation of shearography strain data from a canvas painting**, Roger M. Groves, Technische Univ. Delft (Netherlands) and Univ. Stuttgart (Germany); Ameng Li, Xiaoli Liu, Shenzhen Univ. (China); Stephen Hackney, TATE (United Kingdom); Xiang Peng, Shenzhen Univ. (China); Wolfgang Osten, Univ. Stuttgart (Germany) [7391-08]

15.20: **Application of graphically oriented programming to imaging of structure deterioration of historic glass by Optical Coherence Tomography**, Marcin Sylwestrzak, Ewa A. Kwiatkowska, Nicolaus Copernicus Univ. (Poland); Pawel Karaszkiweicz, Academy of Fine Arts, Cracow (Poland); Magdalena Iwanicka, Piotr Targowski, Nicolaus Copernicus Univ. (Poland) [7391-09]

15.40: **Optical applications in the investigation of the bronze hand appeared in the Roman Forum of Lucentum**, Luis Granero Montagud, Francisco Diaz, Ruben Dominguez, Asociacion Industrial De Optica, Color E Imagen (Spain) [7391-10]

Coffee Break 16.00 to 16.30

SESSION 4

Room: B13. Wed. 16.30 to 17.40

Terahertz Imaging

Session Chair: **Mady Elias**, Institut des nanosciences de Paris, INSP CNRS (France)

16.30: **Terahertz metrology of tree rings for dendrochronology and cultural heritage applications** (*Invited Paper*), J. Bianca Jackson, Julien Labaune, Gérard A. Mourou, Ecole Nationale Supérieure de Techniques Avancées (France); Irl N. Duling III, Picometrix, LLC (United States); Catherine Lavier, Michel Menu, Ctr. de Recherche et de Restauration des Musées de France (France) [7391-11]

17.00: **Terahertz imaging systems applied to noninvasive analyses of historic paintings**, Kaori Fukunaga, National Institute of Information and Communications Technology (Japan); Irl N. Duling III, Picometrix, LLC (United States); Marcello Picollo, Istituto di Fisica Applicata Nello Carrara (Italy) and Univ. of Joensuu (Finland) [7391-12]

17.20: **Multi-sensor evaluation of a wooden panel painting using terahertz imaging and shearography**, Roger M. Groves, Technische Univ. Delft (Netherlands) and Univ. Stuttgart (Germany); Boris Pradarutti, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Eleni Kouloumpi, National Art Gallery and Alexandros Soutzos Museum (Greece); Wolfgang Osten, Univ. Stuttgart (Germany); Gunther Notni, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [7391-13]

Posters—Wednesday

Conference Area Hallway Wed. 17.30 to 18.30

All symposium attendees are invited to attend Wednesday poster session. The interactive poster sessions are designed to promote opportunities for networking with colleagues in your field. Attendees are encouraged to review the high-quality papers that are presented in this alternate format and to interact with the poster authors.

Poster presenters may post their poster papers starting at 10.00 on Monday in the Conference Area Hallway and present them during Monday poster session (16.30 to 17.30). **Please note that Conference 7390, O3A: Optics for Arts, Architecture, and Archaeology Posters Session will take place on Wednesday 17.30 to 18.30.** Any papers left on the boards following 12.00 on Thursday will be considered unwanted and will be discarded.

SPiE Europe assumes no responsibility for posters left up after the end of the poster session. Poster authors should be at their papers on Wednesday from 17.30 to 18.30 to answer questions from attendees. Attendees are requested to wear their conference registration badges to the poster sessions.

Comparative evaluation of ultrafast laser beam interaction with the silvering in late Roman coins, Alexandros Panagiotis A. Serafatinides, Eleni A. Drakaki, Evgenia Fabrikesi, Maria Kandyla, Ioanna Zergioti, National Technical Univ. of Athens (Greece) [7391-24]

LIBS identification of pigments from Aula Leopoldina vault, Roman Ostrowski, Wojciech Skrzeczanowski, Jan Marczak, Antoni Sarzynski, Military Univ. of Technology (Poland) [7391-25]

Analysis of the European lacquer technique and technology of polychromed wooden decoration of Chinese room in Wilanów Palace in Warsaw, Irmina Zadrozna, Academy of Fine Arts in Warsaw (Poland) and Warsaw Univ. of Technology (Poland); Anna Guzowska, Museum Palace at Wilanow (Poland); Elzbieta Jezewska, Academy of Fine Arts in Warsaw (Poland) [7391-26]

Conservation of wooden art works and laser cleaning, Andrzej Koss, Academy of Fine Arts in Warsaw (Poland); Jan A. Marczak, Marek Strzelec, Military Univ. of Technology (Poland); Maria Lubryczynska, Joanna Czernichowska, Izabela Uchman-Laskowska, Krzysztof Chmielewski, Magdalena Mazur, Agnieszka Markowska, Academy of Fine Arts in Warsaw (Poland) [7391-27]

Set of advanced laser cleaning heads and systems, Jan A. Marczak, Marek Strzelec, Roman Ostrowski, Antoni Rycyk, Military Univ. of Technology (Poland) [7391-28]

In-depth assessment of modifications induced during the laser cleaning of modern paintings, Alexandros Selimis, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); Panagiota Vounisiou, Univ. of Ioannina (Greece) and Foundation for Research and Technology-Hellas (Greece); Kristalia Melessanaki, Paraskevi Pouli, Giorgos Filippidis, Foundation for Research and Technology-Hellas (Greece); Costas Beltsios, Univ. of Ioannina (Greece); Savas K. Georgiou, Foundation for Research and Technology-Hellas (Greece); Costas Fotakis, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece) [7391-29]

3D scanner in the analysis of material damages, Andrea Adami, Caterina Balletti, Univ. Iuav di Venezia (Italy) [7391-30]

Wooden models: a virtual possibility, Paolo Vernier, Francesco Guerra, Univ. Iuav di Venezia (Italy) [7391-31]

Imaging data integration for painting diagnostics, Claudia Daffara, Istituto Nazionale di Ottica Applicata (Italy); Dario Ambrosini, Univ. degli Studi dell'Aquila (Italy); Roberta Di Biase, Univ. Degli Studi Dell Aquila (Italy); Raffaella E. M. Fontana, Istituto Nazionale di Ottica Applicata (Italy); Domenica Paoletti, Univ. degli Studi dell'Aquila (Italy); Luca Pezzati, Istituto Nazionale di Ottica Applicata (Italy); Sandra Rossi, Soprintendenza Speciale per il Polo Museale Veneziano (Italy) [7391-32]

X-ray CT imaging as a scientific tool to study the capillary water absorption in sedimentary rocks used in cultural heritages, Tiziano Schillaci, Maria Brai, Antonio Lo Casto, Univ. degli Studi di Palermo (Italy) [7391-33]

Noninvasive conoscopic holography-based device for artworks surface acquisition, Andrea Della Patria, Luca Pezzati, Paolo Pingi, Pierluigi Carcagni, Roberta Piccolo, Emanuela Cavallo, Gabriella Gianfrate, Istituto Nazionale di Ottica Applicata (Italy) [7391-34]

Spectral imaging methodology for determining in-situ the optimum cleaning level of stonework, Vassilis Papadakis, Afrodite Loukaiti, Paraskevi Pouli, Foundation for Research and Technology-Hellas (Greece) [7391-35]

Thursday 18 June

SESSION 5

Room: B13. Thurs. 10.30 to 12.20

Optical Coherence Tomography

Session Chair: **Raffaella Fontana**, Istituto Nazionale di Ottica Applicata, INOA CNR (Italy)

10.30: **Absolute LIBS stratigraphy with Optical Coherence Tomography (Invited Paper)**, Ewa A. Kwiatkowska, Nicolaus Copernicus Univ. (Poland); Jan Marczak, Roman Ostrowski, Wojciech Skrzeczanowski, Military Univ. of Technology (Poland); Marcin Sylwestrzak, Magdalena A. Iwanicka, Piotr Targowski, Nicolaus Copernicus Univ. (Poland) [7391-14]

11.00: **Picosecond laser ablation system with process control by optical coherence tomography**, Piotr Targowski, Nicolaus Copernicus Univ. (Poland); Roman Ostrowski, Jan Marczak, Military Univ. of Technology (Poland); Marcin Sylwestrzak, Ewa A. Kwiatkowska, Nicolaus Copernicus Univ. (Poland) . [7391-15]

11.20: **Fourier domain optical coherence tomography for high-precision profilometry**, Samuel J. Lawman, Haida Liang, Nottingham Trent Univ. (United Kingdom) [7391-16]

11.40: **Laser-induced breakdown spectroscopy (LIBS) applied to stratigraphic elemental analysis and optical coherence tomography (OCT) to damage determination of heritage Brazilian coins**, Marcello M. Amaral, Marcus P. Raele, Anderson Zanardi de Freitas, Guilherme Zahn, Ricardo E. Samad, Nilson Dias Vieira, Jr., Luiz V. Gomes Tarelho, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [7391-17]

12.00: **Study of wood and wood finishes with optical coherence tomography in both visible and infrared domains**, Gaël Latour, Gaëlle Georges, Laure Siozade, Carole Deumié-Raviol, Institut Fresnel (France); Jean-Philippe Echard, Cite de la Musique (France) [7391-18]

Lunch Break 12.20 to 14.00

SESSION 6

Room: B13. Thurs. 14.00 to 15.50

3D

Session Chair: **Piotr Targowski**, Nicolaus Copernicus Univ. (Poland)

14.00: **Automated full-3D shape measurement of cultural heritage objects (Invited Paper)**, Robert Sitnik, Maciej Karaszewski, Wojciech Zaluski, Pawel Bolewicki, Warsaw Univ. of Technology (Poland) [7391-19]

14.30: **3D Synchrotron x-ray Microtomography of painting samples**, Ester S. B. Ferreira, Swiss Institute for Art Research (Switzerland); Jaap J. Boon, Jerre van der Horst, FOM Institute for Atomic and Molecular Physics (Netherlands); Federica Marone, Marco Stampanoni, Paul Scherrer Institut (Switzerland) [7391-20]

14.50: **NIR confocal microscopy for painting diagnostics**, Pierluigi Carcagni, Claudia Daffara, Raffaella E. M. Fontana, Luca Pezzati, Istituto Nazionale di Ottica Applicata (Italy) [7391-21]

15.10: **Comparison of carved panels from two Irish high crosses using laser scans**, Thierry P. Daubos, Dáibhí Ó Cróinín, National Univ. of Ireland, Galway (Ireland) [7391-22]

15.30: **Dual scale structural health monitoring system combining FBG sensors and laser scanning**, Hugo F. Lima, Fátima Fonseca Domingues, João Lemos Pinto, Rogerio Nunes Nogueira, Univ. de Aveiro (Portugal) [7391-23]

For more information

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General Information

Registration Hours

Location: ICM – Entry Lobby

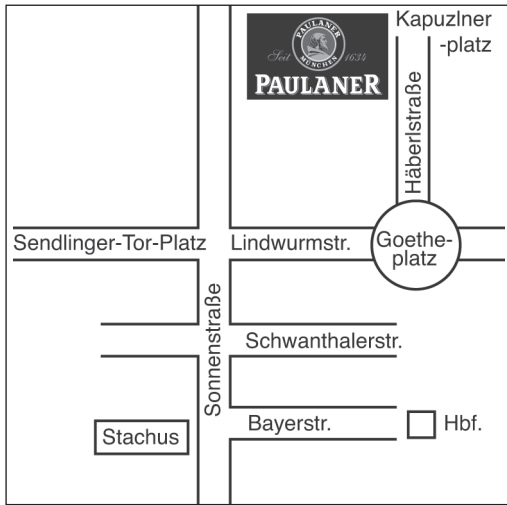
Sunday 14.00 to 17.00
Monday through Wednesday 8.00 to 17.00
Thursday 8.00 to 14.00
The Congress registration fee includes entry into LASER 2009.

Welcome Reception

Wednesday 17 June 19.30 to 21.30

The Welcome Reception will be held at one of Munich’s premier breweries, the Paulaner Brewery. Admission for conference delegates is by ticket only included in the registration fee. Guest tickets can also be purchased via the registration form or at the registration desk subject to availability.

SPIE Members are also invited to this Welcome Reception with a valid entry ticket. Please ensure that you RSVP to the invitation sent by SPIE Membership Services.



How to reach the ICM – International Congress Centre Munich

At Munich Central Station take the underground U2. The journey to the trade fair grounds takes about 17 minutes. Please refer to the LASER 2009 website for more detailed information, http://www.messe-muenchen.de/en/Home/cn/Getting_there

Transportation from airport to city centre

The Franz Josef Strauss Airport (MUC) is located 27 km northeast of the centre of Munich. Please refer to the Munich International Airport website for more detailed information, <http://www.munich-airport.de/EN/index.html>

Transportation from Munich city centre to ICM - International Congress Centre Munich

The ICM is about 30-45 minutes from downtown Munich. For the most current information about all transport options, schedules, and prices, please visit: <http://www.munich-airport.de/en/consumer/anab/index.jsp>

Free Public Transport

All registered conference attendees are eligible to use all Munich City Transport (MW - urban railway, underground, trams, and buses) and LASER Airport shuttle by presenting a corresponding ticket together with a conference entrance pass. Passes will be provided onsite with registration.

For the most current information about all transport options, schedules, and prices, please visit: <http://www.munich-airport.de/EN/Areas/Consumer/Verkehrsanbindung/index.html>

About Munich

Munich, “the city with a heart,” is the capital of Bavaria, and has established itself as Germany’s high-tech hub (Silicon Bavaria) and is one of the most important industrial and economic centres in the European community. It boasts of such hi-tech corporations as BMW and Daimler-Chrysler Aerospace. In addition to being the country’s leading university centre and hub for insurance, banking, electronic, and mechanical engineering, Munich offers its visitors shopping, music, art, gourmet restaurants, beer gardens, outdoor cafes, ethnic restaurants, popular night spots, grand cathedrals, and opulent palaces.

For more information on Munich and the surrounding area, please refer to the following websites:

- <http://www.tyzo.com/europe/germany/munich/>
- http://www.muenchen-tourist.de/englisch/index_e.htm
- <http://www.munichfound.de/>



SPIE Europe Optical Metrology

15-18 June 2009
Munich, Germany

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Bold = SPIE Member

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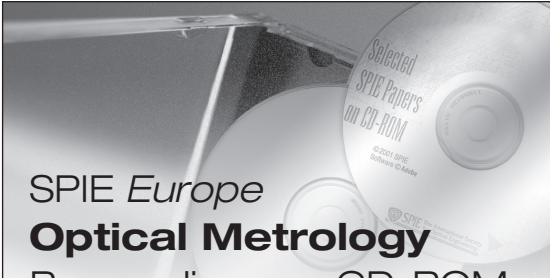
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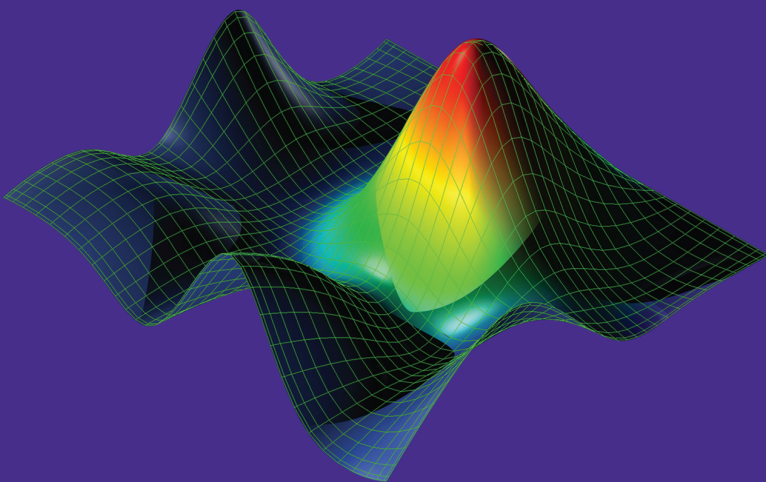
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