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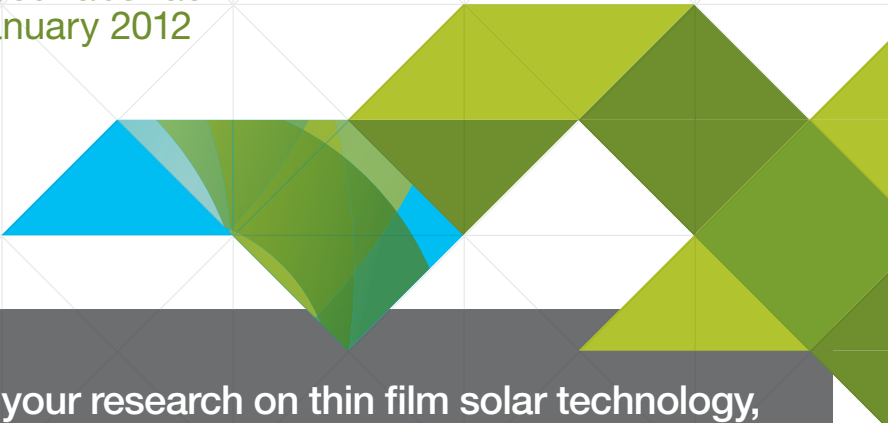
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by 30 January 2012



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Conference Dates

12–16 August 2012

Exhibition Dates

14–16 August 2012

San Diego Convention Center
San Diego, California, USA

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Technologies

- Concentrators
- Solar Hydrogen
- Thin Film Solar Technology
- Next Generation
- Reliability
- OPVs
- Nonimaging Optics
- Materials Processing

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2012

Call for Papers

Submit your abstract
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Conferences and Courses: 12–16 August 2012

Exhibition: 14–16 August 2012

San Diego Convention Center, San Diego, California, USA



Symposium Chair:

Martha Symko-Davies,
National Renewable Energy Lab. (USA)

Technical Organizing Committee:

Neelkanth G. Dhere,
Univ. of Central Florida (USA)

Louay A. Eldada,
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Roland Winston,
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SPIE Optics + Photonics is a leading conference on green photonics technologies such as energy, sustainability, conservation, and environmental monitoring.



Watch for this icon next to conferences discussing innovative ways to help our planet.

High and Low Concentrator Systems for Solar Electric Applications VII (OP201)



Conference Chairs: **Kaitlyn VanSant**, National Renewable Energy Lab. (United States); **Adam P. Plesniak**, Amonix Inc. (United States)

Program Committee: **Daniel J. Friedman**, National Renewable Energy Lab. (United States); **Kanchan Ghosal**, Semprius, Inc. (United States); **Lori E. Greene**, Univ. of California, Irvine (United States); **Raymond K. Kostuk**, The Univ. of Arizona (United States); **Raed A. Sherif**, Ra3 Solar Consulting (United States)

Concentrating Photovoltaics (CPV) and Concentrating Solar Power (CSP) are two areas of solar energy research and development (R&D) that are rapidly evolving and attracting a high level of interest and innovation. These technologies use lenses or mirrors to concentrate sunlight from a large area onto small high-efficiency solar cells or thermal receivers. CPV, compared to non-concentrating photovoltaics, allows the area of the solar cells to be reduced by the concentration ratio, offering a significant reduction in the cost of the photovoltaic system for which the solar cell is one of the most expensive components. The system design of CPV is highly dependent on the concentration ratio. High-concentration systems usually incorporate high-efficiency multi-junction solar cells and track the sun, typically on a 2-axis tracker. The use of a tracker usually makes high concentration CPV primarily compatible with large-scale utility installations. Low-concentration systems, with concentrations less than 10 suns, usually use silicon or thin film technology that do not require trackers and thus are conducive to both roof-top and commercial applications. CSP converts the sun's energy into high-temperature heat, which in turn generates electricity in a steam generator. In order to get high enough temperatures for electricity generation, high-concentration systems are used that have similar optical and tracking requirements as high-concentration PV, which also makes CSP almost exclusively suitable for large utility installations. Both CPV and CSP have the potential to be low cost and to deliver power during periods of peak demand.

The focus of this conference is on increased efficiency/performance, reduced manufacturing cost per unit area, and verified reliability for both CPV and CSP systems. To help reach these goals, the conference will address:

- new or improved optical designs for low and high concentration (including designs that split the solar spectrum or use fluorescent concentrators)
- manufacturability of advanced optics for low and high concentration
- optimizing integration between optics and solar cells
- optical losses including illumination non-uniformity, chromatic aberrations, and reliability issues
- materials development and design of primary and secondary optics

- development, modeling, and reliability of high-efficiency solar cells
- development, modeling, and reliability of solar cell receiver (including cell protection, mounting and interconnect bonding, heat sinking, and thermal management)
- solar thermal heat-exchange system (including material design for heat storage)
- development, modeling, and reliability of tracker
- balance of systems (BOS) development and integration
- general standards and reliability issues.

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Solar Hydrogen and Nanotechnology VII (OP202)



Conference Chair: **Lionel Vayssieres**, National Institute for Materials Science (Japan)

Program Committee: **Hironori Arakawa**, Tokyo Univ. of Science (Japan); **Jan Augustynski**, Univ. of Warsaw (Poland); **Michael Grätzel**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Jinghua Guo**, Lawrence Berkeley National Lab. (United States); **Hicham Idriss**, Univ. of Aberdeen (United Kingdom) and SABIC (Saudi Arabia); **Claude Levy-Clement**, Ctr. National de la Recherche Scientifique (France); **Frank E. Osterloh**, Univ. of California, Davis (United States); **Yasuhiro Tachibana**, RMIT Univ. (Australia); **John A. Turner**, National Renewable Energy Lab. (United States); **Heli Wang**, National Renewable Energy Lab. (United States); **Gunnar Westin**, Uppsala Univ. (Sweden); **Upul Wijayantha**, Loughborough Univ. (United Kingdom); **Jin Zhang**, Univ. of California, Santa Cruz (United States)

The aim of this conference is to offer a forum of discussion for scientists, engineers, and industrials involved in photo- and electrochemical systems and nanotechnology for solar generation of hydrogen (and other fuels). The technical program will address the current status and prospects of R&D activities, major achievements and latest performances, technological limitations and crucial remaining challenges, latest advances in fundamental understanding and development in semiconductor nanostructures, devices fabrication, modeling, simulation and characterization techniques, as well as assessing and establishing the role and contribution of solar hydrogen. Interested individuals from academia, national laboratories, and industries are kindly invited to contribute to this conference by submitting their abstract on the following relevant topics:

- fundamentals of hydrogen generation via photo- and electrochemical water splitting
- modeling and simulation of reactions at semiconductor interfaces
- energetics and electronic structure of photocatalyst semiconductor (hetero) nanostructures
- surface and interface properties of photocatalysts/electrolyte junctions
- optical, chemical, and physical properties of photoelectrodes
- charge generation and transfer dynamics on photocatalysts and semiconductors
- recent advances in time-resolved laser spectroscopies to monitor photo-induced catalytic processes
- long term aqueous stability, corrosion, and photo-corrosion of semiconductors
- recent advances in synthetic techniques for preparation of photocatalysts
- new approaches to bandgap profiling and engineering
- combinatorial approaches to photocatalysts
- new devices, methods, and apparatus for solar hydrogen generation
- national and international solar hydrogen energy systems, projects, and networks
- social, educational, environmental, and economic aspects of solar hydrogen
- hydrogen generation via solar thermal (chemical) and photo-biological systems
- carbon dioxide conversion at irradiated semiconductor surfaces
- photocatalytic production of fuels.

Critical Dates

Abstract Due Date: **30 January 2012**

Author Notification: The contact author will be notified of abstract acceptance by email no later than 9 April 2012.

Manuscript Due Date: **16 July 2012**

Please Note: Submissions imply the intent of at least one author to register, attend the symposium, present the paper as scheduled, whether it is an oral or poster presentation, and submit a full-length manuscript by the deadline.



Thin Film Solar Technology IV (OP203)

Conference Chair: **Louay A. Eldada**, SunEdison (United States)

Program Committee: **Bulent Basol**, EncoreSolar, Inc. (United States); **Howard M. Branz**, National Renewable Energy Lab. (United States); **Paola Delli Veneri**, ENEA (Italy); **David S. Ginley**, National Renewable Energy Lab. (United States); **Ivan Gordon**, IMEC (Belgium); **William N. Shafarman**, Univ. of Delaware (United States); **James R. Sites**, Colorado State Univ. (United States); **Ayodhya N. Tiwari**, EMPA (Switzerland); **Baojie Yan**, United Solar Ovonic, LLC (United States)

Thin film photovoltaics (TF PV) are a compelling alternative to conventional crystalline silicon PV as they are not affected by crystalline silicon supply fluctuations, they have significantly reduced cost with low material usage, and they have the potential for further cost improvement throughout the value chain. Furthermore, TF PV can use high performing materials that are highly efficient and can have high energy output in kWh/kWp. In addition, TF PV can be applied to a variety of rigid and flexible substrates for a variety of applications, and offer superior aesthetics. Papers are solicited in the areas of:

Thin film PV absorber materials

- amorphous Si, microcrystalline Si, nanocrystalline Si, thin film poly-Si, and film crystal silicon PV
- copper indium gallium selenide (CIGS)
- cadmium telluride (CdTe)
- dye-sensitized solar cells (DSSC)
- organic PV (OPV)
- novel material TF PV (e.g., CZTS).

Thin film deposition

- large area plasma processing
- linear sources (evaporation, sputtering, other)
- non-vacuum techniques
- monitoring and control.

Window and contact materials and related formation

- conventional and alternative buffer layers
- transparent conductive oxides (incl. doping)
- high performance doped layers
- metal contacts.

Advanced thin film PV materials

- micro- and nano-structured TF PV materials
- nanomaterial suspension TF PV precursors
- metalorganic solution TF PV precursors
- nanotubes in TF PV.

Light management

- texturing and characterization
- light trapping
- anti-reflection layers (external and internal)
- optical modeling.

Devices and properties of TF PV (experiment and/or theory)

- novel device structures
- tandem cells
- theory/analysis of TF structures (e.g., influence of grain boundaries).

Thin film PV circuits

- circuit design, modeling, and simulation
- scribing (laser, mechanical)
- interconnects and grids
- PV integrated circuits (PVIC).

Thin film PV test and characterization

- microstructure characterization
- electrically active defects and impurities
- light soaking
- novel characterization techniques.

Assembly and packaging of TF PV modules

- edge deletion
- encapsulation
- sealing
- junction box attachment
- novel packaging techniques.

Deployment of TF PV cells, modules, and systems

- module design, modeling, and simulation
- system design, modeling, and simulation
- advanced manufacturing processes
- qualification and reliability testing
- standardization of PV modules
- array issues (mismatch, BOS cost, monitoring)
- energy delivery, rating, and payback time
- system performance and lifetime.

Thin film PV applications and related requirements

- thin film PV for solar farms
- thin film PV for industrial installations
- thin film PV for residential applications
- thin film PV for consumer electronic applications
- building-integrated PV (BIPV): considerations including geometries, colors, materials, transparencies, innovations in lighting, dynamic behavior, and ease of assembly, service, and replacement
- space applications
- new applications.

Refinement of existing schemes as well as new approaches and techniques are within the scope of this call.

Next Generation (Nano) Photonic and Cell Technologies for Solar Energy Conversion III (OP205)



Conference Chair: **Loucas Tsakalacos**, GE Global Research (United States)

Program Committee: **Amanda J. Chatten**, Imperial College London (United Kingdom); **Gavin J. Conibeer**, The Univ. of New South Wales (Australia); **Alberto Salleo**, Stanford Univ. (United States); **Sean Shaheen**, Univ. of Denver (United States); **Wilfried G. J. H. M. van Sark**, Utrecht Univ. (Netherlands); **Deli Wang**, Univ. of California, San Diego (United States); **Xianfan Xu**, Purdue Univ. (United States); **Edward T. Yu**, The Univ. of Texas at Austin (United States)

This conference centers on the science and application of advanced (nano) photonic structures for light management in solar energy conversion, as well as advanced/nanostructured solar cell concepts employing novel device architectures, new physical properties, and/or advanced light-to-energy conversion mechanisms that are enabled by nanostructures and other novel materials systems. While the focus is on photovoltaic (PV) cell-related technologies, research that impacts other parts of a solar energy system is also of interest. The aim of this meeting is to bring together scientists, engineers, and technologists to discuss and review the state-of-the-art in research and application of novel concepts to next generation PV devices and sub-systems.

The scope of the conference will cover the following areas:

- bulk nanostructured and nanocomposite solar cells (organic, hybrid, and inorganic)
- quantum well solar cells
- nanowire and nanotube-based solar cells
- quantum dot solar cells
- nano plasmonic structures for PV
- nanostructures for light management and sub-wavelength optical phenomena
- advanced conversion mechanisms employed in the above structures, such as tandem structures, intermediate bands, hot carrier effects, and multi-exciton generation
- spectrum conversion mechanisms such as up and down conversion
- novel materials for solar energy conversion, including ferroelectrics
- novel photonics, materials, and devices for solar-to-fuel conversion
- concentrators employing advanced photonics and nanostructures
- charge transport in nano PV structures and nanoscale PV device physics.

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Reliability of Photovoltaic Cells, Modules, Components, and Systems V (OP206)



Conference Chair: **Neelkanth G. Dhere**, Univ. of Central Florida (United States)

Cochairs: **John H. Wohlgemuth**, National Renewable Energy Lab. (United States); **Kevin W. Lynn**, U.S. Dept. of Energy (United States)

Program Committee: **David S. Albin**, National Renewable Energy Lab. (United States); **Glenn B. Alers**, Univ. of California, Santa Cruz (United States); **Ward I. Bower**, Sandia National Labs. (United States); **Leila R. O. Cruz**, Instituto Militar de Engenharia (Brazil); **Michael DeBergalis**, DuPont (United States); **Takuya Doi**, National Institute of Advanced Industrial Science and Technology (Japan); **Fernando Fabero**, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); **Vivek S. Gade**, Jabil Circuit, Inc. (United States); **Werner Herrmann**, TÜV Rheinland Group (Germany); **Stephen J. Hogan**, Spire Corp. (United States); **Michael Köhl**, Fraunhofer-Institut für Solare Energiesysteme (Germany); **Ralf Leutz**, Concentrator Optics GmbH (Germany); **Xavier Mathew**, Ctr. de Investigación en Energía (Mexico); **Robert McConnell**, Amonix Inc. (United States); **Yoichi Murakami**, Japan Electrical Safety & Environment Technology Labs. (Japan); **F. John Pern**, National Renewable Energy Lab. (United States); **Shirish V. Pethe**, Solopower, Inc. (United States); **Marianne Rodgers**, Univ. of Central Florida (United States); **Ivan Sinicco**, Oerlikon Solar Ltd. (Switzerland); **Bolko von Roedern**, National Renewable Energy Lab. (United States)

This conference is building on previous successful annual conferences. It centers on the science and technology of reliability of photovoltaic (PV) cells, modules, components, and systems with emphasis on attaining a long service lifetime and providing basis for warranties. The aim of this meeting is to bring together material scientists, chemists, physicists, engineers, and technologists to discuss and review the PV module and system reliability. This year the scope includes fuel cells, batteries and other storage options. Papers are also being solicited in the area of smart grids.

The scope of the conference will cover the reliability of:

- photovoltaic cells and modules
- front sheets
- encapsulants
- transparent and conducting oxides
- superstrates and substrates
- concentrator optics and receivers
- fuel cells, batteries, and other storage options
- BOS components such as inverters, connectors, fuses.

In addition papers are solicited for the following areas:

- PV system field experience
- accelerated testing of PV cells and modules and the correlation to field data
- mechanical, physical, and chemical characterization as tools to evaluate performance changes
- PV module lifetime predictions
- smart grids
- physics of failure approach to reliability.

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Laser Material Processing for Solar Energy (OP207)



Conference Chair: **Edward W. Reutzel**, Applied Research Lab., The Pennsylvania State Univ. (United States)

Program Committee: **Costas P. Grigoropoulos**, Univ. of California, Berkeley (United States); **Aravinda Kar**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States); **Bhushan L. Sopor**i, National Renewable Energy Lab. (United States)

In order for solar energy technology to reach its full potential, improvements in device efficiency and performance must be coupled with reduction in fabrication costs. The industry relentlessly seeks technologies that offer streamlined and flexible solar device production by replacing or eliminating costly conventional processing steps. Laser material processing technology—in many forms—promises to satisfy this need for many steps along the value chain. The precise control of energy deposition afforded by lasers enables them to ablate material, pattern thin films, texture surfaces, diffuse dopants, fuse electrical contacts, anneal, crystallize, and more. The interest in application of laser material processing in the solar industry is fueled by both the range of potential applications, but also by the rapid pace of innovation realized by laser system developers over the last decade, with no end in sight.

The focus of the conference is to bring together scientists, engineers, and industry representatives to share and discuss the myriad of developing laser material processing technologies that improve the performance and reduce the manufacturing cost of solar energy devices. Papers are solicited in the areas of:

Laser Material Interactions

- Modeling and simulation of laser interactions with materials of interest in the solar industry
- Characterization of material effects caused by laser interaction.

Laser Ablation

- Cutting and scribing
- Edge isolation
- Thin film ablation / Laser patterning
- Surface texturing
- Grooves
- Drilling.

Laser Doping

- Laser-doped shallow emitter
- Laser-doped selective emitter
- Characterization of material and electrical properties of laser doped emitters.

Laser Fired Contacts

- Laser processing parameters for firing of contacts in different material systems
- Characterization of material and electrical properties of LFCs.

Laser Sources and Systems

- New laser source technology for solar energy devices
- New laser optics and beam delivery for solar energy devices
- New laser beam automation, scanning, and system technology for solar energy devices.

Other Laser Processes

- Laser crystallization
- Pulsed laser deposition
- Laser chemical vapor deposition
- Laser nanoparticle thin film deposition
- Laser-based inspection technologies
- Laser glass cutting
- Laser welding/soldering of cell and module components
- Laser welding of dissimilar materials.

Critical Dates

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Author Notification: The contact author will be notified of abstract acceptance by email no later than 9 April 2012.

Manuscript Due Date: **16 July 2012**

Please Note: Submissions imply the intent of at least one author to register, attend the symposium, present the paper as scheduled, whether it is an oral or poster presentation, and submit a full-length manuscript by the deadline.

Organic Photovoltaics XIII (OP213)



Conference Chair: **Zakya H. Kafafi**, National Science Foundation (United States)

Cochairs: **Christoph J. Brabec**, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); **Paul A. Lane**, U.S. Naval Research Lab. (United States)

Program Committee: **Paul L. Burn**, The Univ. of Queensland (Australia); **Katsuhiko Fujita**, Kyushu Univ. (Japan); **René A. J. Janssen**, Technische Univ. Eindhoven (Netherlands); **Bernard Kippelen**, Georgia Institute of Technology (United States); **Barry P. Rand**, IMEC (Belgium); **Ifor D. W. Samuel**, Univ. of St. Andrews (United Kingdom); **Sean Shaheen**, Univ. of Denver (United States); **Jiangeng Xue**, Univ. of Florida (United States); **Yang Yang**, Univ. of California, Los Angeles (United States); **Teketel Yohannes**, Addis Ababa Univ. (Ethiopia)

This conference centers on the science and technology of organic photovoltaics (OPVs) with particular focus on high performance light-harvesting and carrier transporting materials, highly efficient, stable OPVs, device physics including interfaces, morphology, carrier generation, and transport, and new techniques for fabrication, encapsulation, and printing of solar cells including large area fabrication of flexible solar cells and modules. The aim of this meeting is to bring together chemists, engineers, material scientists, physicists, and technologists, to discuss and review the state-of-the-art of organic photovoltaics.

The scope of the conference will cover but is not limited to the following areas:

- molecular and polymeric organic photovoltaics (OPVs)
- solid state dye-sensitized (photoelectrochemical) solar cells
- hybrid organic/inorganic nanostructures
- interpenetrating polymer and donor/acceptor networks
- tandem and multi-color solar cells
- plasmonic and photonic structures
- new electron donors/hole transporters
- new electron acceptors/transporters
- new electrode and flexible substrate materials
- primary processes, carrier generation, and transport

- the roles of interfaces and morphology in OPVs
- new techniques for fabrication, encapsulation, and printing of solar cells
- large area fabrication of solar cells and modules
- stability, lifetime, and reliability of solar cells and modules
- future prospects for organic solar cell technology.

Highlights:

- Joint sessions on the reliability of photovoltaics and nanoscale technologies
- Joint session on plasmonics
- Panel discussion on the impact of and future of organic photovoltaics with industry representatives.

Manuscripts for the conference proceedings will be peer reviewed.

Journal of
Photonics for Energy

Zakya H. Kafafi, Editor

The Journal of Photonics for Energy is an online journal focusing on the applications of photonics for renewable energy harvesting, conversion, storage, distribution, monitoring, consumption, and efficient usage.

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Nonimaging Optics: Efficient Design for Illumination and Solar Concentration IX (OP221)

Conference Chairs: **Roland Winston**, Univ. of California, Merced (United States); **Jeffrey M. Gordon**, Ben-Gurion Univ. of the Negev (Israel)

Program Committee: **Pablo Benítez**, Univ. Politécnica de Madrid (Spain) and Light Prescriptions Innovators LLC (United States); **William J. Cassarly**, Synopsys, Inc. (United States); **Daniel Feuermann**, Ben-Gurion Univ. of the Negev (Israel); **Ralf Leutz**, Concentrator Optics GmbH (Germany); **Juan Carlos Miñano**, Univ. Politécnica de Madrid (Spain) and Light Prescriptions Innovators LLC (United States); **Narkis Shatz**, SAIC (United States)

Many important optical subsystems are concerned with power transfer and brightness rather than with image fidelity. Nonimaging optics is a design approach that departs from the methods of traditional optical design to develop techniques for maximizing the collecting power of concentrator and illuminator systems.

Nonimaging devices substantially outperform conventional imaging lenses and mirrors in these applications, approaching the theoretical (thermodynamic) limit. Nonimaging design methods usually involve solving ordinary or partial differential equations, calculating the flow lines of the ray bundles, coupling the edge rays of extended sources and targets or optimizing a multi-parameter merit function computed by ray-tracing techniques. While geometrically based, the design fundamentals have been extended to the diffraction limited and even sub-wavelength domain. Therefore applicability exists in near-field optical microscopy and nanometer scale optics.

This conference will address the theory of nonimaging optics and its application to the design and experimental realization of illumination and concentration systems, tailored freeform optics, display backlighting, condenser optics, high-flux solar and infrared concentration, daylighting, LED optical systems, laser pumping, and luminaires.

The revival of considerable work in solar energy concentration for both photovoltaic and thermal applications, much of which includes nonimaging optics, prompts reincorporating these fields into this conference.

The use of nonimaging optics promises higher efficiency, relaxed physical tolerances, improved optical uniformity, and reduced manufacturing costs. We encourage submissions ranging from fundamentals to critical design issues and practical applications.

Paper submissions are also solicited in the following and related areas:

- radiative transfer near the étendue limit
- concentrator optics
- illumination and irradiation optics
- solar photovoltaic and solar thermal concentration
- fiber-optic and light-pipe optical systems
- radiometry
- daylighting
- characterization of light-transfer devices
- freeform optics
- optical furnaces and radiative heating
- infrared detection
- LED applications
- laser pumping
- condenser optics.

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Venue

SPIE Optics+Photonics 2012 will be held at the San Diego Convention Center, 111 West Harbor Dr., San Diego, CA 92101 and at the San Diego Marriott Hotel & Marina located adjacent to the Convention Center at 333 West Harbor Dr.

Technical Program

Available April 2012

The comprehensive Advance Technical Program for this symposium will list conferences, paper titles, and authors in order of presentation, and an outline of all planned special events at spie.org/op

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All participants, including invited speakers, contributed speakers, session chairs, co-chairs, and committee members, must pay a registration fee.

Pricing and registration details will be available in April 2012 at spie.org/op

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A limited amount of contingency student travel grants will be awarded based on need. Grant applications can be found in the Resources for Students area of SPIE.org, under the Student Travel Grants section. Applications must be received no later than 4 June 2012. Eligible applicants must present an accepted paper at this meeting. Offer applies to undergraduate/graduate students who are enrolled full time and have not yet received their PhD.

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An author or coauthor (including keynote, invited, oral, and poster presenters) will:

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- Make the presentation as scheduled in the program.
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- Obtain funding for their registration fees, travel, and accommodations, independent of SPIE, through their sponsoring organizations.
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- Please also submit a 100-word text summary suitable for early release. If accepted, this summary text will be published prior to the meeting in the online or printed programs promoting the conference.
- Only original material should be submitted.
- Abstracts should contain enough detail to clearly convey the approach and the results of the research.
- Commercial papers, papers with no new research/development content, and papers where supporting data or a technical description cannot be given for proprietary reasons will not be accepted for presentation in this conference.
- Please do not submit the same, or similar, abstracts to multiple conferences.

Review, Notification, and Program Placement Information

- To ensure a high-quality conference, all submissions will be assessed by the Conference Chair/Editor for technical merit and suitability of content.
- Conference Chair/Editors reserve the right to reject for presentation any paper that does not meet content or presentation expectations.
- The contact author will receive notification of acceptance and presentation details by email no later than 9 April 2012.
- Final placement in an oral or poster session is subject to the Chairs' discretion.

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