

# World of Photonics Congress

## Program Overview

### Munich ICM

International Congress  
Centre Munich, Germany

**14–19 June 2009**



19th International Congress on Photonics in Europe

collocated with LASER World of PHOTONICS 2009

[www.photonics-congress.com](http://www.photonics-congress.com)

# Preface

This booklet contains the program overview up to the level of sessions for the World of Photonics Congress—the leading international congress for optical technologies in Europe, which is being held in conjunction with LASER World of PHOTONICS 2009 from June 14–19, 2009. One main intention of the congress is to create an intense exchange between the scientific and industrial community. Topics are selected and discussed based on their scientific quality and the industrial relevance. The Congress is sponsored by the German Ministry of Education and Research (BMBF) since 2004.

In 2007, the World of Photonics Congress experienced substantial growth. In more than 2,300 speeches and presentations, leading scientists from around the world presented their research findings to 3,100 participants and examined future scenarios for optical technologies.

In 2009, the World of Photonics Congress will feature some of the most well known events in the sector for optical technologies. The congress consists of the following conferences:

- CLEO Europe/EQEC (organized by EPS, OSA, IEEE Photonics Society)
- European Conferences on Biomedical Optics (ECBO) (organized by OSA and SPIE and the German Biophotonics Research Program as a cooperating organization)
- Optical Metrology (organized by SPIE Europe)
- Lasers in Manufacturing (LiM 2009) (organized by WLT)
- Frontiers in Electronic Imaging, Manufacturing of Optical Components (organized by EOS)
- Medical Laser Applications (organized by DGLM)
- Application Panels—Lasers and Photonics in Actual Practice (organized by MMG & its partners)

The new organizational structure of the World of Photonics Congress, which indicates its application orientation and the topics covered by the various conferences, gives congress participants optimum transparency, which makes it perfect for planning purposes.

All attendees are invited to participate in the opening ceremony of the congress on June 15, at 9.30 am. Additional joint events are open to all attendees, visitors and exhibitors in order to create a platform for exchange.

We are convinced that the World of Photonics Congress will provide an optimum overview that includes all aspects of the photonics sector, and that having the congress and world's leading exhibition under a single roof combined with excellent facilities in Munich will contribute to stimulating discussions and enhance communication between researchers working on basic research and on industrial applications.

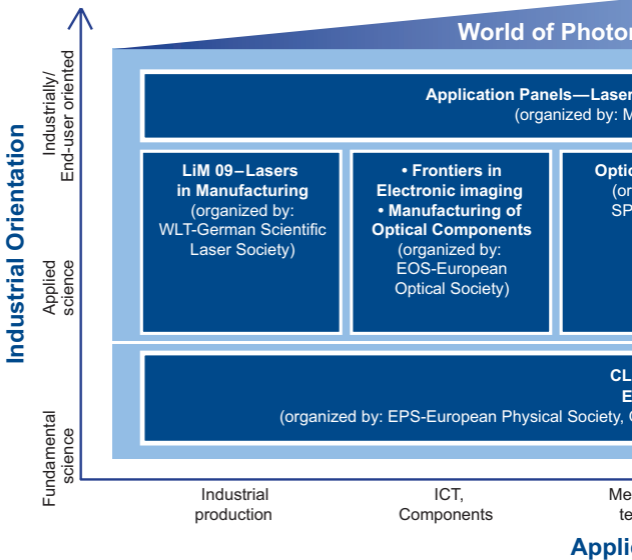


Prof. Peter Loosen  
President of the Steering Committee  
of the World of Photonics Congress



Klaus Dittrich  
Managing Director  
Messe München International

# Structure of the World of Photon



## Application Panels—New

### APPLICATION PANELS—LASERS AND PHOTONICS IN ACTUAL PRACTICE

Once again, the World of Photonics Congress will feature Application Panels—an application-oriented series of lectures that bridge the gap between theory and practice. Application-oriented presentations and workshops allow industry representatives to report on the challenges and solution approaches that pertain to the latest hot topics in optical technologies such as biophotonics, photovoltaics, lighting, etc. and to enter into a dialog with users. Holding the Application Panels at the forums in the exhibition halls at LASER World of PHOTONICS 2009 allows visitors to include the application-oriented lectures in their visit and expand their knowledge.

## ics Congress 2009

### Lasers and Photonics in Actual Practice

(IMG-Munich Trade Fairs)

#### Optical Metrology

(organized by:  
IEEE Europe)

#### ECBO—European Conferences on Biomedical Optics

(organized by OSA—Optical  
Society of America and  
SPIE. Cooperating organi-  
zation: German Biophoto-  
nics Research Program)

#### Medical Laser Applications

(organized by:  
DGLM—German Society  
for Laser Medicine)

#### IEEE Europe/ OEC 2009

(organized by:  
OSA—Optical Society of America, IEEE Photonics Society)

(organized by:  
OSA—Optical Society of America, IEEE Photonics Society)

Measurement  
Technologies

Biological/  
Medical applications

### Application Area

## General Information

### EVENT VENUES

The “Application Panels—Lasers and Photonics in Actual Practice” are being held at the forums in exhibition halls B1, B2 or C1, depending on the topic.

### ADMISSION

Attending the application panels is free of charge. You must purchase an admission ticket to LASER World of PHOTONICS 2009 to gain admission to the halls. The fair is the perfect opportunity to combine expanding your knowledge with making new business contacts.

### LANGUAGE

Some of the application panels will be held in German, and some in English.

### REGISTRATION

Register in advance and secure yourself a reserved seat at the “Application Panels—Lasers and Photonics in Actual Practice.” When you register in advance, you will receive a seat reservation as well as the conference handouts for the application panel you attend free of charge. To register in advance, go to [www.photonics-congress.com/registration](http://www.photonics-congress.com/registration).

# Joint events for all Congress attendees

## Opening and special events

### **Congress Opening Event with Opening Plenary Talk**

Monday, 15 June 2009

Room 1, Ground Floor/1st Floor, Congress Centre, 9:30–11:00

The congress will be opened by European Commissioner Viviane Reding.

### **Evening Reception of Congress and Trade Fair in the Congress Centre**

Monday, 15 June 2009

Foyer ICM, Ground Floor, Congress Centre, 18:00

All exhibitors and attendees of the World of Photonics Congress are cordially invited to attend the opening reception. Enjoy music and cold drinks and use the atmosphere to network.

### **Herbert Walther Award**

Tuesday, 16 June 2009

Room 1, Ground Floor/1st Floor, Congress Centre, 12:30–13:15

Established in 2007, the Herbert Walther Award honors Professor Herbert Walther for the seminal influence of his path-breaking innovations in quantum optics and atomic physics, and for his wide-ranging contributions to the international scientific community. The Award is jointly made by Deutsche Physikalische Gesellschaft (DPG) and the Optical Society of America (OSA) and recognizes distinguished contributions in quantum optics and atomic physics as well as leadership in the international scientific community.

The award will be presented at the World of Photonics Congress in a special session on Tuesday, 16 June, at 12:30 in Room 1 and will be followed by an address from Dr. Wineland, the winner of the first Herbert Walther Award.

### **Medical Laser Applications Exhibition of the Deutsche Gesellschaft für Lasermedizin e.V.**

Sunday, 14 June to Monday, 15 June 2009

Hall B0, (Ground Floor, Congress Centre)

The Medical Laser Applications Conference of the Deutsche Gesellschaft für Lasermedizin will be accompanied by a special exhibit.

The event addresses medical scientists from different special fields, physicians, engineers, scientists from universities and research centres. This two-day special exhibit covers the product fields of laser medical technology (diagnosis and therapy), medical equipment and instruments as well as pharmaceutical preparations. Attendees of the World of Photonics Congress as well as visitors of the trade show LASER World of PHOTONICS 2009 will have access to the show. For the first time visitors will be able to perform tests with the most recent laser equipment at laser cabins and benefit from the personal approach on laser tissue interactions. Further information about the special exhibit is available at:

[www.photonics-congress.com/specialexhibit](http://www.photonics-congress.com/specialexhibit)

## **German Biophotonics Research Program Optical Solutions for Medicine and the Life Sciences**

Monday, 15 June to Thursday, 18 June 2009

B1.141

Highlights of the German Biophotonics Research Program's exhibit include new concepts for cancer diagnostics and the rapid detection of bacteria in the air and in drinking water. The equipment, experiments and posters on display illustrate the progress of 16 ongoing R&D projects supported by the German Ministry for Research and Education (BMBF) as part of the second and third biophotonics funding phase as well as the funding initiative for molecular imaging. Results of previous projects complete the exhibit, which demonstrates the vast potential that biophotonics has to offer physicians, patients, and society as a whole.

## **International Laser Marketplace**

Wednesday, 17 June 2009

Room 4, Ground Floor, Congress Centre, 9:00–14:30

The 9th International Laser Marketplace will be held in conjunction with the LASER World of PHOTONICS 2009 trade fair. The seminar is focused on markets and new technologies in laser materials processing, and is addressed to professionals in marketing, R&D, and corporate decision making. In presentations international experts will give insights in existing applications, international markets and the latest developments related to lasers and laser systems.

The 9th International Laser Marketplace is organized by Optech Consulting and LASER World of PHOTONICS. Further information about the program and terms of participation is available at:

[www.world-of-photonics.net/lasermarketplace](http://www.world-of-photonics.net/lasermarketplace)

# Plenary and Keynote Talks

Sunday, 14 June 2009

Room 5, Ground Floor, Congress Centre

## Plenary Session

### Bridging the Ocean of Biomedical Optics

By European Conferences on Biomedical Optics (ECBO)

13:00–13:15

#### Opening Remarks

Session Chair: Christoph K. Hitzenberger,  
Medical University of Vienna, Austria

13:15–14:00

#### New Techniques for Out-of-Focus Background Rejection

Jerome Mertz, Boston University, USA

The problem of out-of-focus background is ubiquitous in fluorescence microscopy. The most common strategy to reject out-of-focus background requires the use of beam scanning. Highly successful examples are confocal microscopy and two-photon excited fluorescence microscopy. Nevertheless, out-of-focus background remains a problem with these techniques when imaging deep in thick tissue. Recently, alternative strategies have been examined that do not require beam scanning. These include structured illumination microscopy, programmable array microscopy, etc., that can be operated as add-ons to standard widefield microscopes.

I will concentrate mostly on our own work to address the problem of out-of-focus background rejection. In particular, I will describe a novel hybrid technique that requires two raw images. The first image is a standard image that contains both in-focus and out-of-focus components. The second is a purposefully “noisy” image that enables an identification of the out-of-focus component, and hence a rejection of background from the first image. Variations on this simple two-shot hybrid imaging scheme are applied to standard widefield microscopy, endomicroscopy, and two-photon excited fluorescence microscopy.

14:00–14:45

#### The Emerging Era of High-Performance Mesoscopic and Macroscopic Photonic Imaging

Vasilis Ntziachristos, Technical University of Munich and the Institute of Biological and Medical Imaging (IBMI), Germany

With post-genome biology and medicine facing redefined challenges associated with the understanding of dynamic interactions of cellular processes, at different system levels, imaging can play an increasingly important role in dissecting tissue function in vivo. Optical microscopy has been a fundamental tool of biological discovery for more than three centuries. Yet, supported by evolving optical reporters that tag cellular processes and interactions in vivo, new photonic methods are constantly evolving to enhance the ability of longitudinal visualization of cellular mechanisms in unperturbed environments. Of particular interest are technologies that for the first time offer high-resolution imaging beyond the penetration limits of

established microscopy methods. This newfound ability comes with exciting possibilities for discovery in established and emerging fields of biology and medicine, including systems biology and functional -omics interrogations in adult biological organisms, small animals and potentially select human applications. Promising fluorescence molecular tomography (FMT) and multi-spectral opto-acoustic tomography (MSOT) methods with the ability to image tissue fluorochromes across the mesoscopic and macroscopic regimes are presented. These methods are shown capable to offer a highly versatile platform for basic discovery, drug discovery and pre-clinical and clinical imaging applications. Key characteristics associated with different imaging implementations are described and applications from imaging cancer, inflammation, stem cells and developing adult (non-transparent) zebrafish are showcased. Collectively these methods have the potential to become the method of choice in biological and select medical fields.

**Monday, 15 June 2009**

### **Plenary Talk**

#### **Femtosecond Optics: More Than Just Really Fast**

By CLEO®/EUROPE 2009

Room 1, Ground Floor/1st Floor, Congress Centre, 10:15–11:00

Prof. Erich Ippen, Massachusetts Institute of Technology, USA

Advances in ultrafast optics have created dramatic new capabilities for a wide range of applications such as optical clocks, medical imaging, micro-machining, and precision signal processing as well as for a wide range of science.

### **Keynote**

#### **Visible and Ultraviolet Semiconductor Disk Lasers**

By CLEO®/EUROPE 2009

Room 14b, 1st Floor, Congress Centre, 11:00–12:00

Prof. Martin Dawson, University of Strathclyde, United Kingdom

### **Tutorial**

#### **Metamaterials**

By EQEC 2009

Room 22, 2nd Floor, Congress Centre, 11:00–12:00

Prof. Allan Boardman, University of Salford, United Kingdom

### **Keynote**

#### **Plasmonics: from Nanoscale Integrated Circuits to Nano-photovoltaics**

By EQEC 2009

Room 1, Ground Floor/1st Floor, Congress Centre, 14:30 – 15:30

Prof. Albert Polman,

FOM-Institute for Atomic and Molecular Physics, The Netherlands

# Plenary and Keynote Talks

## Keynote

### **Metamaterials: A Paradigm for Tailoring Light**

By EQEC 2009

Room 22, 2nd Floor, Congress Centre, 16:30–17:30

Prof. Nader Engheta, University of Pennsylvania, USA

## Plenary session

By Lasers in Manufacturing

Room 13b, 1st Floor, Congress Centre, 11:00–12:45

### **Laser Cutting Today and Tomorrow**

Friedrich Kilian, Trumpf

### **Laser-Based Direct-Write Methods for Nanomanufacturing**

Prof. Craig B. Arnold, Princeton University

### **Precise Surface and Bulk Laser Structuring of Initially Transparent Materials**

Prof. Vitaly I. Konov, General Physics Institute Moscow

The use of lasers in all fields of manufacturing is still continuously growing. Originally driven by high power laser applications in the transportation industry lasers are applied much for widespread covering also applications in the micro- and nanofabrication field today. Motivated by the balance between innovation in the field of laser sources and laser processing and needs in manufacturing the opening session of LiM 2009 will impressively demonstrate how lasers can be used in manufacturing tomorrow. Three international high-level speakers from science and industry will share their fascinating visions on the use of lasers in manufacturing.

## Tuesday, 16 June 2009

## Plenary Talk

### **Exploring the Quantumness of Light**

By EQEC 2009

Room 1, Ground Floor/1st Floor, Congress Centre, 10:30–11:30

Prof. Serge Haroche, Laboratoire Kastler Brossel de l'Ecole Normale Supérieure, France

The quantum nature of light, recognized a century ago by Planck and Einstein, has been revealed by pioneering optical photon counting experiments which will be briefly recalled. We will then focus on recent studies of microwave fields trapped in ultra-high-Q superconducting cavities and probed by Rydberg atoms. These experiments, which open a new chapter in the exploration of light's "quantumness," count photons non-destructively, observe the quantum jumps of light and demonstrate dramatically the quantum Zeno effect. Non-destructive photon counting combined with homodyne field mixing allows us also to fully reconstruct trapped field states. Non-classical states such as Fock and "Schrödinger cats" are reconstructed and movies of their decoherence obtained. These studies directly record how light evolves from quantum to classical and open promising perspectives for protecting photonic states from decoherence in quantum information applications.

## **Tutorial**

### **Nanophotonics—Research Challenges and Applications**

By CLEO®/EUROPE 2009

Room 13b, 1st Floor, Congress Centre, 14:30–15:30

Prof. Alfred Forchel, University of Würzburg, Germany

## **Keynote**

### **Nanoplasmonics from Attoseconds to Terahertz**

By CLEO®/EUROPE 2009

Room 13b, 1st Floor, Congress Centre, 16:30–17:30

Prof. Mark Stockman, Georgia State University, USA

## **Wednesday, 17 June 2009**

## **Plenary Talk**

### **Adaptive Optics: From Astronomy to Vision Science**

By Optical Metrology

Room 1, Ground Floor / 1st Floor, Congress Centre, 10:30–11.20

Prof. J. 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.

## **Keynote**

### **Optical Superoscillations**

By EQEC 2009

Room B0.R1, Ground Floor, Congress Centre Hall B0, 10:30–11:30

Prof. Michael Berry, HH Wills Physics Laboratory, United Kingdom

# Plenary and Keynote Talks

## **Tutorial**

### **Applications of Femtosecond Lasers in Materials Processing**

By CLEO®/EUROPE 2009

Room 14a, 1st Floor, Congress Centre, 16:30–17:30

Prof. Eric Mazur, Harvard University, USA

## **Keynote**

### **Orbital Angular Momentum and Quantum Entanglement**

By EQEC 2009

Room 21, 2nd Floor, Congress Centre, 16:30–17:30

Prof. Han Woerdman, Leiden University, The Netherlands

## **Thursday, 18 June 2009**

## **Tutorial**

### **Optical Cavity Quantum Electrodynamics**

By EQEC 2009

Room B0.R1, Ground Floor, Congress Centre Hall B0, 8:30–9:30

Prof. Gerhard Rempe,

Max-Planck-Institut für Quantenoptik, Germany

## **Keynote**

### **Femtosecond-laser-written Optical Waveguides for Optical Communications and Biophotonic Applications**

By CLEO®/EUROPE 2009

Room 12, 1st Floor, Congress Centre, 9:00–10:00

Prof. Giulio Cerullo, Politecnico di Milano, Italy

## **Keynote**

### **Astrophotonics: the Next Wave in Observational Cosmology**

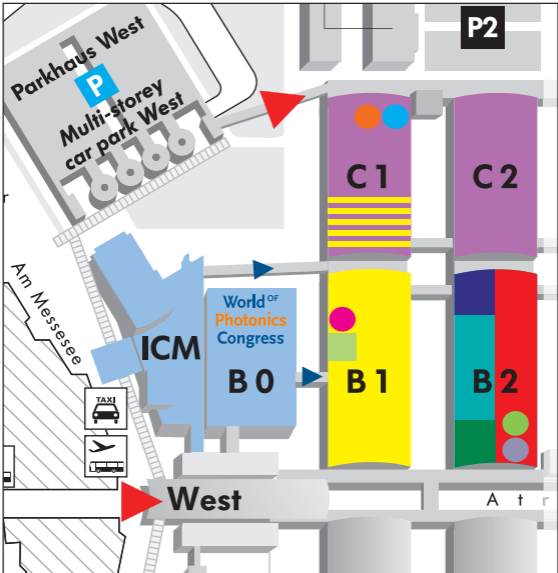
By CLEO®/EUROPE 2009

Room 14a, 1st Floor, Congress Centre, 11:00–12:00

Prof. Joss Bland-Hawthorn, University of Sydney, Australia

# Trade show overview

The trade show diagram will help you to remain oriented at both the congress and the fair.



**B1/C1** Laser und Optronik  
*Lasers and optronics*

**B1** Biophotonik und Life Sciences  
*Biophotonics and life sciences*

**B1** Photonics Forum Halle B1 „Biophotonik und Life Sciences“  
*Photonics Forum Hall B1 “Biophotonics and life sciences”*

**B2** Optische Informationstechnologie  
*Optical information technology*

**B2** Optik / Fertigungstechnik für Optiken  
*Optics / Manufacturing technology for optics*

**B2** Sensorik, Mess- und Prüftechnik / Optische Mess-Systeme  
*Sensors, test and measurement / Optical measurement systems*

**B2** Imaging  
*Imaging*

**B2** Career Center  
*Career Center*

**B2** Photonics Forum Halle B2 „Optische Technologien“  
*Photonics Forum Hall B2 “Optical technologies”*

**C1/C2** Laser und Lasersysteme für die Fertigung  
*Lasers and laser systems for production engineering*

**C1** Sonderschau „Photons in Production“  
*Special Exhibit “Photons in Production”*

**C1** Photonics Forum Halle C1 „Laser und Lasersysteme für die Fertigung“  
*Photonics Forum Hall C1 “Lasers and laser systems for production engineering”*

**ICM** World of Photonics Congress

# Attendee Services

## **ONLINE DATABASE**

The entire program of events at the World of Photonics Congress is available online at [www.photonics-congress.com/lectures](http://www.photonics-congress.com/lectures). The database features versatile search functions and can help you to compile a personal congress schedule that you can transfer to your PDA. It also features information about all lectures and poster shows on specific topics and about the companies with exhibits at the fair.

## **POSTER EXHIBITION**

There will also be several poster shows during the **World of Photonics Congress**. Different poster sessions will be presented by the various conferences on each day of the congress.

## **E-POSTER TERMINAL**

Due to the large number of posters on display at the World of Photonics Congress, each day's poster shows have different themes. However, all posters will be available electronically at the e-Poster Terminal (in the W-LAN Lounge at the Congress Centre), where they may also be printed out.

## **W-LAN LOUNGE AND INTERNET AREA**

All congress participants have free access to the Internet in the Internet Area in hall C1 or using their own laptops in the W-LAN Lounge at the Congress Centre.

## **CATERING**

All attendees of the World of Photonics Congress are invited to attend free coffee-breaks. Between the coffee breaks a number of gastronomy facilities are available. Depending on the weather the beergarden outside will be opened.

## **NETWORKING EVENTS**

Benefit from all new contacts that you can make at this year's Congress networking events such as the Opening Reception.

## **TRADE SHOW TICKET**

The admission fee for the World of Photonics Congress includes admission to the trade fair LASER World of PHOTONICS 2009.

## **CAREER CENTER**

In the "Career Center" in hall B2 university graduates, young professionals and employees in the photonics industry can inform themselves about career opportunities and job offers in the photonics industry. The consulting company wirth + partner will inform people looking for a vacancy neutrally and professionally and can show possible career opportunities and assess the current market situation.

# Registration and Fees

Full member*	EUR 535
Non-member*	EUR 660
Student member**	EUR 140
Student non-member**	EUR 175
One day	EUR 250

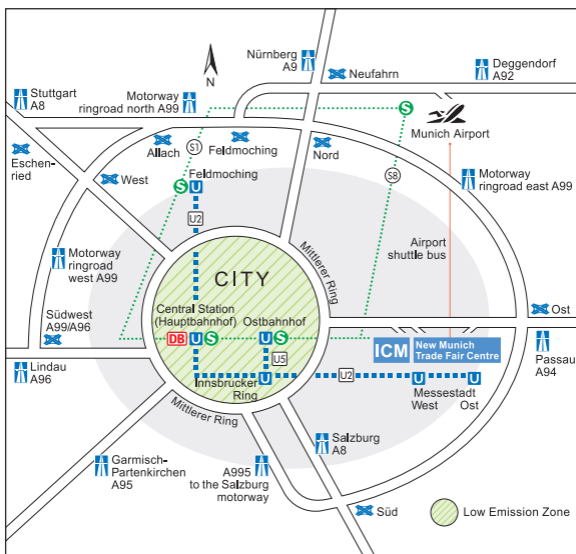
\* incl. proceedings

\*\* some conferences do not include proceedings in this package

Every ticket includes entrance to the LASER World of PHOTONICS 2009 show.

For further information on the registration process please access the internet at [www.photonics-congress.com/registration](http://www.photonics-congress.com/registration)

## Getting there



**CLEO®/EUROPE-EQEC 2009  
EUROPEAN CONFERENCE ON LASERS  
AND ELECTRO-OPTICS AND  
EUROPEAN QUANTUM ELECTRONICS CONFERENCE  
2009**

EPS—European Physical Society  
B. P. 2136, 68060 Mulhouse, France  
Tel. (+33 3) 89 32 94 48, Fax (+33 3) 89 32 94 49  
conferences@eps.org

**EUROPEAN CONFERENCES ON BIOMEDICAL OPTICS  
(ECBO)**

OSA—Optical Society of America  
2010 Massachusetts Ave., NW  
Washington, DC 20036-1012 USA  
Tel. (+1) 202 416 1907 or 800 723 4632 (in N. America)  
Fax (+1) 202 416 6140  
cust.serv@osa.org

**FRONTIERS IN ELECTRONIC IMAGING  
MANUFACTURING OF OPTICAL COMPONENTS**

EOS—European Optical Society  
Hollerithallee 8, 30419 Hannover, Germany  
Tel. (+49 5 11) 2 78 81 59, Fax (+49 5 11) 2 78 81 19  
munich@myeos.org, www.myeos.org/MUNICH2009

**LASERS IN MANUFACTURING (LIM 2009)**

WLT—Wissenschaftliche Gesellschaft für Lasertechnik e.V.  
c/o Laser Zentrum Hannover e.V.  
Hollerithallee 8, 30419 Hannover, Germany  
Tel. (+49 511) 2788-432 (Mr. P. Jaeschke)  
Fax (+49 511) 2788-100  
lim@lzh.de, www.lzh.de/lim2009-wlt

**OPTICAL METROLOGY**

SPIE Europe  
2 Alexandra Gate, Ffordd Pengam, CF24 2SA, Cardiff, UK  
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info@spieeurope.org

**MEDICAL LASER APPLICATIONS**

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