

Technical Program

40th Anniversary

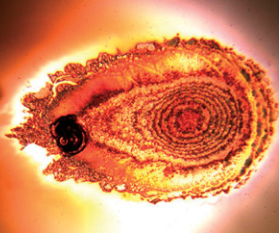
SPIE Boulder Damage

Annual Symposium on
Optical Materials for High Power Lasers

22–24 September 2008

National Institute of Standards and Technology
Boulder, Colorado, USA

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- ▶ **Materials and Measurements**
 - ▶ **Surfaces, Mirrors, and Contamination**
 - ▶ **Thin Films**
 - ▶ **Fundamental Mechanisms**
 - ▶ **MINI-SYMPOSIUM: Damage to Fused Silica**
 - ▶ **Thin Film Damage Competition**
-



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Conference 7132

Monday-Wednesday 22-24 September 2008
Proceedings of SPIE Vol. 7132

40th Anniversary

SPIE **Boulder Damage**

Annual Symposium on
Optical Materials for High Power Lasers

Organizer:



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Pacific Northwest National Lab.
Laser Zentrum Hannover e.V. (Germany)
National Institute of Standards and Technology
Electromagnetic Remote Sensing Defence Technology
Ctr. (United Kingdom)
School of Optics: CREOL & FPCE, Univ. of Central Florida

Founding Organizers: **Arthur H. Guenther** and
Alexander J. Glass

Conference Co-Chairs: **Gregory J. Exarhos**, Pacific Northwest National Lab. (United States); **Detlev Ristau**, Laser Zentrum Hannover e.V. (Germany); **M. J. Soileau**, College of Optics & Photonics/Univ. of Central Florida (United States); **Christopher J. Stolz**, Lawrence Livermore National Lab. (United States)

International Program Committee: **Detlev Ristau**, Laser Zentrum Hannover e.V. (Germany), *Committee Chair*; **James E. Andrew**, AWE plc (United Kingdom); **Hervé Bercegol**, CEA Cesta (France); **Mireille Commandré**, Institut Fresnel (France); **Michael D. Feit**, Lawrence Livermore National Lab. (United States); **Jerry B. Franck**, U.S. Army Night Vision & Electronic Sensors Directorate (United States); **Leonid B. Glebov**, College of Optics & Photonics/Univ. of Central Florida (United States); **Vitaly E. Gruzdev**, Univ. of Missouri/Columbia (United States); **Klaus Mann**, Laser-Lab. Göttingen e.V. (Germany); **Masataka Murahara**, Tokai Univ. (Japan); **Semyon Papernov**, Amy L. Rigatti, Univ. of Rochester (United States); **Jianda Shao**, Shanghai Institute of Optics and Fine Mechanics (China); **Alan F. Stewart**, The Boeing Co. (United States); **Kunio Yoshida**, Osaka Institute of Technology (Japan)

Technical Contact: **Kent Rochford**, National Institute of Standards and Technology

Sunday 21 September

REGISTRATION MATERIAL PICK-UP AND MIXER

Room: Montrachet.Sun. 19.00 to 21.00

The Boulder Marriott, 2660 Canyon Blvd., Boulder

Monday 22 September

REGISTRATION MATERIAL PICK-UP

Room: Lobby Area Mon. 07.30 to 08.30

The Courtyard by Marriott Boulder
4710 Pearl E Circle, Boulder

POSTER PLACEMENT AT NIST

Rooms 1 & 2Mon. 07.30 to 08.30

Fundamental Mechanisms and Thin Film poster authors may set up their posters at this time.

OPENING REMARKS

Room: Auditorium.Mon. 08.30 to 09.00

*Session Chair: Detlev Ristau,
Laser Zentrum Hannover e.V. (Germany)*

KEYNOTE SESSION

Room: Auditorium Mon. 09.00 to 09.40

Fundamental Mechanisms

09.00: **40 year retrospective of fundamental mechanisms**
(*Keynote Presentation*), M. J. Soileau, College of Optics &
Photonics/Univ. of Central Florida (United States) [7132-01]

SESSION 2

Room: Auditorium.Mon. 09.40 to 10.00

Fundamental Mechanisms I

09.40: **The effect of pseudo-accumulation in the measurement of fatigue laser-induced damage threshold**, Andrius Melninkaitis, Julius Mirauskas, Vilnius Univ. (Lithuania); Marco Jupé, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany); Jonathan W. Arenberg, Northrop Grumman Space Technology (United States); Valdas Sirutkaitis, Vilnius Univ. (Lithuania)[7132-02]

POSTER OVERVIEW-MONDAY

Room: Auditorium.Mon. 10.00 to 10.40

Fundamental Mechanisms and Thin Film

Poster authors are asked to give a 2-minute/2-viewgraph overview of their posters in the order they appear in the program.

Coffee/Refreshment Break10.40 to 11.30

POSTERS-MONDAY

Room 1 Mon. 10.40 to 11.30

Fundamental Mechanisms

*Posters will be displayed from 10.40 to 11.30 and
15.00 to 16.00 for viewing.*

Photoionization of wide bandgap silicate glasses by ultrashort IR laser pulses, Leo A. Siiman, Julien Lumeau, Leonid B. Glebov, College of Optics & Photonics/Univ. of Central Florida (United States)[7132-06]

Ejection of glass rings during tightly focused femtosecond laser damage at a glass surface, Jeffrey F. Herbstman, Steven M. Yalisove, Alan J. Hunt, Univ. of Michigan (United States) . . .[7132-07]

Effect of the temporal pulse duration on the initiation of UV-laser damages on fused silica surfaces, Bertrand Bertussi, Philippe Cormont, Stéphanie Palmier, Gael Gaborit, Laurent Lamaignère, Commissariat à l'Energie Atomique (France); Philippe Legros, Univ. Victor Segalen Bordeaux 2 (France); Jean-Luc Rullier, Commissariat à l'Energie Atomique (France)[7132-08]

Laser damage of transparent dielectrics ionized by intensive ultrashort pulses, Vladimir L. Komolov, Sergey G. Przhibel'skii, St. Petersburg State Univ. of Information Technologies, Mechanics and Optics (Russia)[7132-09]

The role of native and photo-induced defects in the multipulse subpicosecond damage behavior of oxide films, Mark Mero, Luke Emmert, Wolfgang G. Rudolph, The Univ. of New Mexico (United States)[7132-10]

POSTERS-MONDAY

Room 2 Mon. 10.40 to 11.30

Thin Film

*Posters will be displayed from 10.40 to 11.30 and
15.00 to 16.00 for viewing.*

SiO₂/HfO₂ multilayers: impact of process parameters and stack geometry on the optical and structural properties, Dinesh Patel, Colorado State Univ. (United States); Ashot Markosyan, Stanford Univ. (United States); Erik M. Krous, Peter Langston, Benjamin Langdon, Colorado State Univ. (United States); Roger K. Route, Martin M. Fejer, Stanford Univ. (United States); Carmen S. Menoni, Colorado State Univ. (United States)[7132-18]

Electron spin resonance and x-ray photo electron spectroscopy investigation of ion beam sputtered HfO₂ and SiO₂ thin films, Benjamin Langdon, Dinesh Patel, Erik M. Krous, Peter Langston, Carmen S. Menoni, Colorado State Univ. (United States); Michelle D. Shinn, Thomas Jefferson National Accelerator Facility (United States)[7132-19]

Effect of substrate temperature and oxygen partial pressure on optical properties of HfO₂ thin films, Li Wang, Zhengxiang Shen, Xinbin Cheng, Tongji Univ. (China); Bin Fan, Optronics Co., Ltd. (Japan); Zhanshan Wang, Lingyan Chen, Tongji Univ. (China)[7132-20]

Influence of pre-treatment conditions on the resistivity of fluoride multilayers, Holger Blaschke, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany); Werner Riggers, Laseroptik GmbH (Germany); Stefan Schippel, Layertec GmbH (Germany) . . .[7132-21]

Laser durability improvement of deep UV fluoride coatings, Shunsuke Niisaka, Yoshinori Watanabe, Nikon Corp. (Japan)[7132-22]

The effect of annealing on the subpicosecond breakdown behavior of hafnia films, Duy N. Nguyen, Luke Emmert, Mark Mero, Wolfgang G. Rudolph, The Univ. of New Mexico (United States); Dinesh Patel, Eric Krous, Carmen S. Menoni, Colorado State Univ. (United States) [7132-23]

Optimization of laser-damage resistance of evaporated hafnia films at 351nm, James B. Oliver, Semyon Papernov, Ansgar W. Schmid, John C. Lambropoulos, Univ. of Rochester (United States) [7132-24]

SESSION 3

Room: Auditorium. Mon. 11.30 to 12.30

Fundamental Mechanisms II

11.30: **Femtosecond laser breakdown of gases and transparent solid states: ultrafast space-time and spectrum-time resolved diagnostics of multicharged microplasma**, Serge V. Garnov, Vladimir Bukin, Alexander A. Malyutin, Vasily Strelkov, A.M. Prokhorov General Physics Institute (Russia) [7132-03]

11.50: **Influence of the nonlinear losses on the modifications induced by femtosecond filaments in fused silica**, Viaceslav Kudriasov, Eugenijus Gaizauskas, Valdas Sirutkaitis, Vilnius Univ. (Lithuania) [7132-04]

12.10: **Energy dependence of effective electron mass and laser-induced ionization of wide bandgap solids**, Vitaly E. Gruzdev, Univ. of Missouri/Columbia (United States) [7132-05]

Lunch Break 12.30 to 14.00

SESSION 4

Room: Auditorium. Mon. 14.00 to 14.20

Fundamental Mechanisms III

14.00: **Fundamental mechanisms of laser induced damage to transparent solids in ns-fs pulse duration range: understanding after 40 years research**, Alexander A. Manenkov, General Physics Institute (Russia) [7132-11]

KEYNOTE SESSION

Room: Auditorium. Mon. 14.20 to 15.00

Thin Film

14.20: **Laser-induced damage in thin-film optical materials: 1970-2008**, Brian E. Newnam, Los Alamos National Lab. (United States) [7132-12]

POSTERS-MONDAY AFTERNOON

Room: Auditorium. Mon. 15.00 to 16.00

Fundamental Mechanisms and Thin Film

Posters will be displayed from 10.40 to 11.30 and 15.00 to 16.00 for viewing.

Please see the list of poster papers in the morning session.

SESSION 6

Room: Auditorium. Mon. 16.00 to 17.20

Thin Film

16.00: **Pulse compression gratings for the PETAL project: A review of various technologies**, Jérôme Néauport, Commissariat à l'Energie Atomique (France); Nicolas Bonod, Institut Fresnel (France); Gerard Raze, Gabriel Dupuy, Commissariat à l'Energie Atomique (France). [7132-13]

16.20: **Analysis of the air vacuum effect in dielectric coatings**, Wolfgang Riede, Paul Allenspacher, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Marco Jupé, Lars O. Jensen, Laser Zentrum Hannover e.V. (Germany) [7132-14]

16.40: **UV damage mechanisms**, Lars O. Jensen, Marco Jupé, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany). . . [7132-15]

17.00: **Formation of a photo-oxidized protective thin film with waterproof and high-power laser tolerance properties**, Masataka Murahara, Tokyo Institute of Technology (Japan) and Tokai Univ. (Japan); Yuji Sato, Takayuki Funatsu, Tokyo Institute of Technology (Japan); Takahisa Jituno, Osaka Univ. (Japan); Yoshiaki Okamoto, Okamoto Optics Co., Ltd. (Japan). [7132-16]

SESSION 6A

Room: Auditorium. Mon. 17.20 to 17.40

Thin film damage competition results

Results of the thin film competition will be discussed.

Session Chair: Christopher J. Stolz,
Lawrence Livermore National Lab.

17.20: **Results of the BDS thin film competition**, Christopher J. Stolz, Lawrence Livermore National Lab. (United States). . . [7132-17]

Open House and Reception . Mon. 18.30 to 19.30

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Laser-Induced Damage in Optical Materials 2008

Conference Co-Chairs: Gregory J. Exarhos, Pacific Northwest National Lab. (United States); **Detlev Ristau**, Laser Zentrum Hannover e.V. (Germany); **M. J. Soileau**, College of Optics & Photonics/Univ. of Central Florida (United States); **Christopher J. Stolz**, Lawrence Livermore National Lab. (United States)

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Tuesday 23 September

POSTER PLACEMENT AT NIST

Rooms: 1 & 2 Tues. 07.30 to 08.30

Materials and Measurements and Surface, Mirrors, and Contamination

Poster authors may set up their posters at this time.

KEYNOTE SESSION

Room: Auditorium Tues. 08.40 to 09.20

Materials and Measurements

08.40: **The transparent-media characterization dedicated to laser damage studies: a key task, multi-faceted and always renewed** (*Keynote Presentation*), Mireille Commandré, Institut Fresnel (France). [7132-25]

SESSION 8

Room: Auditorium. Tues. 09.20 to 10.00

Materials and Measurements I

09.20: **Laser-induced deflection (LID) technique for thermal lens evaluation and direct absorption measurements**, Arne Bochmann, Christian Mühlig, Wolfgang Triebel, Siegfried Kufert, IPHT Jena (Germany) [7132-26]

09.40: **High sensitivity absorption measurements based on a modified thermographic technique**, Michelle D. Shinn, Stephen Benson, Joseph Gubeli III, Thomas Jefferson National Accelerator Facility (United States); Ashot Markosyan, Roger K. Route, Stanford Univ. (United States); Amanda Olmsted, Thomas Jefferson National Accelerator Facility (United States) [7132-27]

POSTER OVERVIEW-TUESDAY

Room: Auditorium. Tues. 10.00 to 10.40

Materials and Measurements and Surface, Mirrors, and Contamination

Poster authors are asked to give a 2-minute/2-viewgraph overview of their posters in the order they appear in the program.

Coffee/Refreshment Break 10.40 to 11.30

POSTERS-TUESDAY

Room 1 Tues. 10.40 to 11.30

Materials and Measurements

Posters will be displayed from 10.40 to 11.30 and 15.00 to 16.00 for viewing.

Interactions between X-ray induced transient defects and pre-existing damage precursors in DKDP crystals, Raluca A. Negres, Cheng K. Saw, Stavros G. Demos, Lawrence Livermore National Lab. (United States). [7132-39]

Investigation of bulk laser damage in transparent YAG ceramics controlled with microstructural refinement, Tomosumi Kamimura, Yutaka Kawaguchi, Tatsuya Arai, Wataru Shirai, Osaka Institute of Technology (Japan); Takuya Mikami, Takayuki Okamoto, Okamoto Optics Co., Ltd. (Japan); Yan Lin Aung, Akio Ikesue, World Lab Co., Ltd. (Japan) [7132-41]

A novel approach to improve switch performance of linear negative tapered Bragg gratings, Jianfeng Tian, Taiyuan Normal Univ. (China)[7132-42]

TIR-based photothermal/photo-acoustic deflection, Wolfgang Riede, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Jerry B. Franck, U.S. Army Night Vision & Electronic Sensors Directorate (United States); Paul Allenspacher, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany)[7132-43]

Measuring surface deformation of optical components with surface thermal lens technique, Mingqiang Liu, Bincheng Li, Yanru Wang, Honggang Hao, Institute of Optics and Electronics (China)[7132-44]

Measurement of laser power resistance of fibers for PIV systems, Hendrik Gebauer, Marco Jupé, Lars Richter, Detlev Ristau, Rainer Kling, Andreas Ostendorf, Laser Zentrum Hannover e.V. (Germany)[7132-45]

Investigation in the degradation of CaF₂ outcouplers in excimer lasers operating at 193nm, Detlev Ristau, Holger Blaschke, Nils Beermann, Henrik Ehlers, Laser Zentrum Hannover e.V. (Germany); Martin Bischoff, Dieter Gäbler, Norbert Kaiser, Fraunhofer Institut Angewandte Optik und Feinmechanik (Germany); Sigrid Jukresch, Ansgar Matern, Andreas J. Görtler, Coherent GmbH (Germany); Dirk Wulff-Molder, Korth Kristalle GmbH (Germany); Christoph Zaczek, Claudia Schlebusch, Carl Zeiss SMT AG (Germany)[7132-46]

POSTERS-TUESDAY

Room 2 Tues. 10.40 to 11.30

Surface, Mirrors, and Contamination

Posters will be displayed from 10.40 to 11.30 and 15.00 to 16.00 for viewing.

Surface metrology and increased laser damage thresholds using polymer strip coatings on high-power laser optics, James P. Hamilton, Eric S. Bailey, Univ. of Wisconsin/Platteville (United States)[7132-56]

Nanosecond 1064nm damage thresholds for bare and anti-reflection coated silica surfaces, Arlee V. Smith, AS-Photonics, LLC (United States); Binh T. Do, Ball Aerospace & Technologies Corp. (United States); John C. Bellum, Sandia National Labs. (United States); Rod Schuster, Newport Corp. (United States); David R. Collier, Alpine Research Optics Corp. (United States)[7132-62]

353nm high-fluence irradiation of fused silica, Alfons Burkert, IPHT Jena (Germany); Ute Natura, SCHOTT AG (Germany).[7132-63]

Laser-based cleaning methods for optics, Chad Y. Sheng, Robert R. Bousquet, Robert A. Rashford, Genesis Engineering Solutions, Inc. (United States)[7132-64]

Short pulse laser damage testing on nitrocellulose and polyimide thin films in vacuum with application to laser debris shields, Jens Schwarz, Mark Kimmel, Patrick K. Rambo, Briggs W. Atherton, Sandia National Labs. (United States).[7132-65]

Nonlinear optical remote control of surface quality and pre-damage by second harmonic generation, Oleg A. Aktsipetrov, Lomonosov Moscow State Univ. (Russia).[7132-66]

Mitigation of UV-enhanced silica contamination, Alexandre A. P. Pereira, Maryse R. M. Reymermier, Commissariat à l'Énergie Atomique (France)[7132-67]

Cleaning practices and facilities for the National Ignition Facility, James Pryatel, William Gourdin, Susan Frieders, Lawrence Livermore National Lab.[7132-68]

SESSION 9

Room: Auditorium. Tues. 11.30 to 12.30

Materials and Measurements II

- 11.30: **Time-resolved imaging of material response during laser-induced bulk damage in optical materials**, Stavros G. Demos, Raluca A. Negres, Lawrence Livermore National Lab. (United States)[7132-28]
- 11.50: **The HMDS coating flaw removal tool**, Marcus V. Monticelli, Lawrence Livermore National Lab. (United States).[7132-29]
- 12.10: **System for detection of small inclusions in large optics**, Justin E. Wolfe, Lawrence Livermore National Lab. (United States)[7132-30]
- Lunch Break12.30 to 14.00

SESSION 10

Room: Auditorium. Tues. 14.00 to 15.00

Materials and Measurements III

- 14.00: **Accurate high-reflectivity measurement based on a novel optical feedback cavity ring-down technique**, Yuan Gong, Bincheng Li, Yanling Han, Mingqiang Liu, Institute of Optics and Electronics (China).[7132-31]
- 14.20: **Presentation and comparison of damage test procedures for fused silica and KDP crystals**, Laurent Lameignère, Thierry Donval, Marc Loiseau, Caroline Meslin, Stephane Bouillet, Roger Courchinoux, Jean-Christophe Poncetta, Gerard Raze, Gabriel Dupuy, Bertrand Bertussi, Hervé Bercegol, Commissariat à l’Energie Atomique (France)[7132-32]
- 14.40: **Statistical interpretation of S-on-1 data and the damage initiation mechanism**, Frank R. Wagner, Anne Hildenbrand, Laurent Gallais, Hassan Akhouayri, Mireille Commandre, Jean-Yves Natoli, Institut Fresnel (France)[7132-33]

POSTERS-TUESDAY AFTERNOON

Rooms 1 & 2 Tues. 15.00 to 16.00

Materials and Measurements and Surface, Mirrors, and Contamination

Posters will be displayed from 10.40 to 11.30 and 15.00 to 16.00 for viewing.

Please see the list of poster papers in the morning session.

SESSION 11

Room: Auditorium. Tues. 16.00 to 17.40

Materials and Measurements IV

- 16.00: **Calculation of error bars for laser damage observations**, Jonathan W. Arenberg, Northrop Grumman Space Technology (United States). [7132-34]
- 16.20: **Effect of thermal annealing on laser damage resistance of KDP at 3w**, Francois P. Guillet, Bertrand Bertussi, David Damiani, Laurent Lamaignère, Audrey S. Surmin, Karine Vallé, Cédric Maunier, Commissariat à l'Energie Atomique (France) [7132-35]
- 16.40: **Solvent effect on optical limiting and anti-damage properties of dicyanomethylene derivatives at 1064nm**, Yuxia Zhao, Jinxin Guan, Feipeng Wu, Xiangyun Fang, Junfang Zhao, Technical Institute of Physics and Chemistry (China). [7132-36]
- 17.00: **Comparative damage study on Ytterbium-doped materials for diode-pumped high-energy lasers**, Mathias Siebold, Max-Planck-Institut für Quantenoptik (Germany); Markus Wolf, Joerg Koerner, Malte C. Kaluza, Joachim Hein, Friedrich-Schiller-Univ. Jena (Germany) [7132-37]
- 17.20: **Reliability of multistriple laser arrays**, Niloy K. Dutta, Franklin Nash, LGS Innovations Inc. (United States) [7132-38]

RECEPTION Tues. 18.00 to 20.00

Wine and Cheese Reception at NCAR

Wednesday 24 September

SESSION 12

Room: Auditorium. Wed. 08.40 to 10.40

MINI-SYMPOSIUM: Damage to Fused Silica

- 08.40: **Fracture related initiation and growth of surface laser damage in fused silica**, Hervé Bercegol, Pierre Grua, Jean-Pierre Morreeuw, Stéphanie Palmier, Jean-Luc Rullier, Laurent Lamaignère, Commissariat à l'Energie Atomique (France) [7132-47]
- 09.00: **Using shaped pulses to probe energy deposition during laser-induced damage of SiO₂ surfaces**, Christopher W. Carr, Lawrence Livermore National Lab. (United States). [7132-48]
- 09.20: **Laser damage thresholds of silica glasses at low temperature**, Shinji Motokoshi, Katsuhiko Mikami, Takahisa Jitsuno, Masayuki Fujita, Junji Kawanaka, Ryo Yasuhara, Osaka Univ. (Japan). [7132-49]
- 09.40: **Picosecond-nanosecond bulk damage of fused silica at 1064nm**, Arlee V. Smith, AS-Photonics, LLC (United States); Binh T. Do, Ball Aerospace & Technologies Corp. (United States) . . [7132-50]
- 10.00: **Photo-thermal measurement of absorption and wavefront deformations in fused silica**, Klaus Mann, Armin Bayer, Jonas Gloger, Uwe Leinhos, Thierry Rousseau, Bernd Schäfer, Laser-Lab. Göttingen e.V. (Germany) [7132-51]
- 10.20: **Accelerated lifetime testing of fused silica upon ArF laser irradiation**, Christian Mühlig, Wolfgang Triebel, Siegfried Kufert, IPHT Jena (Germany); Ute Natura, SCHOTT AG (Germany). [7132-52]
- Refreshment Break 10.40 to 11.20

SESSION 12B

Room: Auditorium.Wed. 11.20 to 12.00

MINI-SYMPOSIUM: Damage to Fused Silica

11.20: Laser damage growth in fused silica with simultaneous 351nm and 1053nm irradiation, Mary A. Norton, Lawrence Livermore National Lab. (United States)[7132-57]

11.40: Optimizing fused silica polishing processes for 351nm high-power laser application, Jérôme Néauport, Hervé Bercegol, Nathalie Darbois, Philippe Cormont, Laurent Lamaignère, Chrystel Ambard, Fabien Pilon, Commissariat à l'Energie Atomique (France)[7132-59]

Lunch Break12.00 to 13.20

KEYNOTE SESSION

Room: Auditorium.Wed. 13.20 to 14.00

Surfaces, Mirrors, and Contamination

13.20: Laser-induced surface damage of optical materials: absorption sources, initiation, growth, and mitigation (*Keynote Presentation*), Semyon Papernov, Ansgar W. Schmid, Univ. of Rochester (United States)[7132-53]

SESSION 14

Room: Auditorium.Wed. 14.00 to 15.20

Surfaces, Mirrors, and Contamination

14.00: Laser damage threshold measurements of microstructure-based high-reflectors, Douglas S. Hobbs, TelAztec LLC (United States)[7132-54]

14.20: Investigation of growth mechanisms for laser-induced contamination deposit formation on space optics in vacuum, Adrian P. Tighe, Federico Pettazzi, Jorge Alves, Denny Wernham, European Space Agency (Netherlands); Wolfgang Riede, Helmut Schroeder, Paul Allenspacher, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Hamid Kheyrandish, CSMA Ltd. (United Kingdom)[7132-55]

14.40: Simultaneous figuring and damage mitigation of optical surfaces, Pradeep K. Subrahmanyam, Kurt Pang, Tom H. Yu, RAPT Industries, Inc. (United States)[7132-58]

15.00: Characterization of plasma mirrors on the HELEN laser infrared CPA beam, James E. Andrew, Andrew J. Comley, Atomic Weapons Establishment (United Kingdom)[7132-61]

Closing RemarksWed. 15.40 to 15.50

Session Chair: Christopher J. Stolz,
Lawrence Livermore National Lab.

Conference Site

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2007 Award Winners

Best Oral presentation:

**High laser-damage threshold surface relief
microstructures for antireflection and laser
cavity mirror applications**

paper: 6720-68

Authors: **Douglas Hobbs, Bruce MacLeod,**
TelAztec LLC

Best Poster presentation:

**Laser damage metrology in biaxial nonlinear
crystals using focused test beams**

paper: 6720-44

Authors: **Anne Hildenbrand, Frank Wagner, Hassan
Akhouayri, Jean-Yves Natoli, Mireille Commandré,**
Institut Fresnel (France)

Questions?

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SPIE would like to express its deepest appreciation to the co-chairs, program committee, and session chairs who have so generously given of their time and advice to make this symposium possible. The symposium, like our other conferences and activities, would not be possible without the dedicated contributions of our participants and members.

This program is based on commitments received up to the time of publication and is subject to change without notice. The SPIE Event Manager for this symposium is Bobbie Lively.