2012 Laser Damage
XLIV Annual Symposium on Optical Materials for High-Power Lasers

The leading forum on materials for high power/high energy lasers

Technical Program
23–26 September 2012
National Institute of Standards and Technology (NIST)
Boulder, Colorado, USA
spie.org/LD
XLIV Annual Symposium on
Optical Materials for High Power Lasers

Conference Chairs:
- Gregory J. Exarhos, Pacific Northwest National Lab. (USA)
- Vitaly E. Gruzdev, Univ. of Missouri-Columbia (USA)
- Joseph A. Menapace, Lawrence Livermore National Lab. (USA)
- Detlev Ristau, Laser Zentrum Hannover e.V. (Germany)
- M J Soileau, Univ. of Central Florida Office of Research & Commercialization (USA)

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- Carmen S. Menoni, Colorado State Univ. (USA)
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- Jérôme Néauport, Commissariat à l’Énergie Atomique (France)
- Semyon Papernov, Univ. of Rochester (USA)
- Amy L. Rigatti, Univ. of Rochester (USA)
- Jianda Shao, Shanghai Institute of Optics and Fine Mechanics (China)
- Michelle D. Shinn, Thomas Jefferson National Accelerator Facility (USA)
- Christopher J. Stolz, Lawrence Livermore National Lab. (USA)

Mini-Symposium Chair:
- Stavros Demo, Lawrence Livermore National Lab. (USA)

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Sunday Events
Boulder Marriott, 2660 Canyon Blvd., Boulder

REGISTRATION MATERIAL PICK-UP
Room: Montrachet Room (1st floor)
Sun. 17:30 to 20:30

ROUND TABLE DISCUSSION
Boulder Marriott, Montrachet Room (1st floor)
Sun. 18:00 to 19:00
Surface Versus Bulk Laser Damage Mechanisms

Panel Moderators: Stavros Demos, Lawrence Livermore National Lab. (USA); Michael Feit, Lawrence Livermore National Lab. (USA)

The main purpose of the roundtable is to warm up symposium participants intellectually and to prepare them for active discussions during the Symposium. This year, the Round Table discusses the mechanisms of laser induced damage in the bulk and on the surface of optical materials. The discussion starts with a joint presentation by the moderators involving both up to date experimental results and theoretical interpretations. The focus is to identify similarities and differences in important physical properties and localized conditions occurring during a damage event induced on the surface versus in the bulk, and the corresponding material response after energy deposition leading to the formation of damage sites, i.e. irreversible observable modification. Although mostly excitation with nanosecond pulses will be considered in this discussion, some similarities and differences when using ultrashort pulses will be addressed.

WELCOME AND SOCIAL MIXER
Room: Montrachet Room (1st floor)
Sun. 19:00 to 20:30

Registration Material Pick-up continues until 20:30.

SPIE would like to express its deepest appreciation to the co-chairs, international program committee, session chairs, and authors 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 Diane Cline.
Monday 24 September

CONFERENCE LOCATION:
NIST
Building 1 (Radio Bldg.)
324 Broadway, Boulder, CO

REGISTRATION MATERIAL PICK-UP
NIST Lobby Area . . . . . . . . . . . . . . . . . . . . . . . . . . . Mon. 07:30 to 16:00
Attendees must check in with NIST Security at entrance and have photo ID available. Please allow for 15 minutes extra time on Monday.

POSTER PLACEMENT AT NIST
Rooms: 1 & 2 . . . . . . . . . . . . . . . . . . . . . . . . . . . Mon. 07:50 to 08:30

OPENING REMARKS AND 2011 AWARDS PRESENTATION
Room: Auditorium . . . . . . . . . . . . . . . . . . . . . . . . . . . Mon. 08:30 to 09:00

INVITED SESSION
Room: NIST Auditorium . . . . . . . . . . . . . . . . . . . . . Mon. 09:00 to 09:20
Overview of the Pacific Rim Laser Damage Meeting
Presenter: Jianda Shao,
Shanghai Univ. of Optics and Fine Mechanics (China)

2011 Award Winners

Best Oral Presentation:
Electron dynamics in transparent materials under high-intensity laser irradiation
Paper 8190-41
Authors: Bärbel Rethfeld, Oliver Brenk, Technische Univ. Kaiserslautern (Germany)

Best Poster Presentation:
The impact ionization coefficient in dielectric materials revisited
Paper 8190-77
Authors: C. Karras, Z. Sun, D. N. Nguyen, L. A. Emmert, W. Rudolph, The Univ. of New Mexico (USA)
SESSION 1
Room: NIST Auditorium .......... Mon. 09:20 to 10:00

Fundamental Mechanisms I

Session Chairs: MJ Soileau, Univ. of Central Florida Office of Research & Commercialization (USA); Vitaly E. Gruzdev, Univ. of Missouri-Columbia (USA)

9:20: Mechanisms of femtosecond laser ablation of dielectrics revealed by double pump: probe experiment (Invited Paper), Stéphane Guizard, Alexandros Mouskeftaras, Nikita Fedorov, Sergey Klimentov, Commissariat à l’Énergie Atomique (France) . . . [8530-1]

MONDAY POSTER OVERVIEW
Room: NIST Auditorium .......... Mon. 10:00 to 10:40

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

Poster Session and Refreshment Break ...... 10:40 to 11:30

POSTERS-MONDAY MORNING
Rooms 1 & 2 ......................... Mon. 10:40 to 11:30

Fundamental Mechanisms

Posters will be displayed for viewing during refreshment breaks from 10.40 to 11.30 and 15.40 to 16.30.

Modeling energy transfer and transport in laser-excited dielectrics, Oliver Brenk, Nils Brouwer, Anika Raemer, Technische Univ. Kaiserslautern (Germany); Orkhan Osmani, Donostia International Physics Ctr. (Spain); Bärbel Rethfeld, Technische Univ. Kaiserslautern (Germany) ......................... [8530-46]

Stimulated Raman scattering damage in KDP crystal and its suppression, Wei Han, China Academy of Engineering Physics (China) ......................... [8530-47]

Comparison of material response following exit surface laser-induced breakdown in fused-silica and KDP, Stavros G. Demos, Raluca A. Negres, Rajesh N. Raman, Michael D. Feit, Lawrence Livermore National Lab. (USA) ......................... [8530-82]
**POSTERS-MONDAY**

**Room: Auditorium. .................Mon. 10:40 to 11:30**

**Thin Films**

*Posters will be displayed from 10:40 to 11:30 and 15:40 to 16:30 for viewing.*

**Oxide mixtures for UV coatings**, Céline Gouldieff, Frank R. Wagner, Institut Fresnel (France); Lars O. Jensen, Mathias Mende, Laser Zentrum Hannover e.V. (Germany); Jean-Yves Natoli, Institut Fresnel (France); Detlev Ristau, Laser Zentrum Hannover e.V. (Germany) and Ctr. for Quantum Engineering and Space-Time Research (Germany) .........................................................[8530-48]

**Laser-induced damage thresholds for 355nm AR coatings on LBO crystals**, Shinji Motokoshi, Osaka Univ. (Japan) and ALPROT (Japan); Koji Tsubakimoto, Noriaki Miyanaga, Osaka Univ. (Japan); Masayuki Fujita, Osaka Univ. (Japan) and ALPROT (Japan).[8530-49]

**Databases on damage threshold for HR and AR coatings in UV region**, Shinji Motokoshi, Kota Kato, Katsuhiko Mikami, Takahisa Jitsuno, Osaka Univ. (Japan) ..................................................................................[8530-50]

**Applying hafnia mixtures to enhance the laser-induced damage threshold of coatings for third-harmonic generation optics**, Mathias Mende, Lars O. Jensen, Henrik Ehlers, Laser Zentrum Hannover e.V. (Germany); Stefan Bruns, Michael Vergöhl, Fraunhofer-Institut für Schicht- und Oberflächenforschung (Germany); Peer Burdack, InnoLight GmbH (Germany); Detlev Ristau, Laser Zentrum Hannover e.V. (Germany) and Ctr. of Quantum Engineering and Space-Time Research (Germany) ........................................[8530-51]

**Measured and simulated nanosecond laser damage probabilities of niobia-silica and zirconia-silica mixtures coatings**, Xinghai Fu, Institut Fresnel (France); Andrius Melninkaitis, Vilnius Univ. (Lithuania); Laurent Gallais, Institut Fresnel (France); Simonas Kicas, Ramutis Drazdys, Institute of Physics (Lithuania); Valdas Sirutkaitis, Vilnius Univ. (Lithuania); Mireille Commandré, Institut Fresnel (France) .................................................................[8530-52]

**Optical resistance of GaN and InGaN thin films**, Mindaugas Šciuka, Mantas Dmukauskas, Tomas Grinyš, Andrius Melninkaitis, Vilnius Univ. (Lithuania) .................................................................[8530-53]

**Optimization of ion beam sputtered Y2O3 for high laser damage resistance**, Dinesh Patel, Peter F. Langston, Laura M. Imbler, Colorado State Univ. (USA); Luke A. Emmert, Wolfgang Rudolph, The Univ. of New Mexico (USA); Ashot S. Markosyan, Roger K. Route, Stanford Univ. (USA); Martin M. Fejer, The Univ. of New Mexico (USA); Carmen S. Menoni, Colorado State Univ. (USA) .................................................................[8530-54]

**Laser-induced damage thresholds and optical properties of TiO2 and Al2O3 coatings prepared by atomic layer deposition**, Lars O. Jensen, Heinrich Mädebach, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany); Jamo Maula, Beneq Oy (Finland); Kartheinz Gührler, Consultant (Germany). .................................................................[8530-55]

**Temperature dependence of the optical absorption in amorphous Ta2O5 and SiO2 dielectric thin films**, Ashot S. Markosyan, Roger Route, Martin M. Fejer, Stanford Univ. (USA); Dinesh Patel, Carmen S. Menoni, Colorado State Univ. (USA) .................................................................[8530-56]
Surfaces, Mirrors, and Contamination

Study of the LIDT degradation of optical components by intentional organic contamination, Benoit Mangote, Isabelle Tovena-Pecaill, Jérôme Néaupot, Commissariat à l’Énergie Atomique (France) .................................................. [8530-57]

Scratch repair on fused silica optics by using a CO2 laser, Philippe Cormont, Commissariat à l’Énergie Atomique (France); Laurent Gallais-During, Institut Fresnel (France); Laurent Laimignère, Jean-Luc Rullier, Patrick Combis, Commissariat à l’Énergie Atomique (France) .................................................. [8530-59]

Effect of conventional fused silica preparation and deposition techniques on surface roughness, scattering, and laser damage resistance, Simona Liuakaityte, Gintare Bataviciute, Egidijus Pupka, Mindaugas Ščiuka, Vilnius Univ. (Lithuania); Irena Kraujieliene, Dainius Tumosa, Alfridas Skrebbutenas, Kestutis Juškevicius, Optolita UAB (Lithuania); Ramutis Drazdys, Rytis Buzelis, Tomas Tolenis, Simonas Kicas, Institute of Physics (Lithuania); Andrius Melninkaitis, Vilnius Univ. (Lithuania) .................................................. [8530-61]

Cleaning practices and facilities for the national ignition facility, James A. Pryatel, Lawrence Livermore National Lab. (USA) [8530-62]

Laser-induced damage resistance of UV coatings on fused silica and CaF2, Byungil Cho, Andy Lyu, Newport Corp. (USA); Mark Feldman, Spectra-Physics®; A Newport Corp. Div. (USA) . . . [8530-83]

SESSION 2
Room: NIST Auditorium ...............Mon. 11:30 to 12:30

Fundamental Mechanisms II

Session Chairs: Carmen S. Menoni, Colorado State Univ. (USA); Semyon Papernov, Univ. of Rochester (USA)

11:30: Dynamics of fracture inside a single crystal induced by a focused femtosecond laser pulse, Masaaki Sakakura, Takaya Tochio, Yuki Ishiguro, Miki Nakabayashi, Yasuhiro Shimotsuma, Kazuyuki Hiroa, Kiyotaka Miura, Kyoto Univ. (Japan) ............... [8530-2]

11:50: Spectroscopic investigation of fs laser-induced defects in polymer and crystal media, Deepak L. N. Kalappali Lakshmi Narayana, Lasers, Plasmas et Procédés Photoniques (France); Narayana Rao Desai, Univ. of Hyderabad (India) ............... [8530-3]


Lunch Break ..................12:30 to 14:00
SESSION 3
Room: NIST Auditorium          ..........Mon. 14:00 to 15:40

Fundamental Mechanisms III

Session Chairs: Jianda Shao, Shanghai Institute of Optics and Fine Mechanics (China); Jonathan W. Arenberg, Northrop Grumman Aerospace Systems (USA)

14:00: Optical breakdown threshold and energy deposition in embedded nanostructures, Karol A. Janulewicz, Chul Min Kim, Hak Jae Lee, Asep Hapiddin, Peter V. Nickles, Dickson Joseph, Kurt E. Geckeler, Gwangju Institute of Science and Technology (Korea, Republic of) ...............................................................[8530-5]

14:20: Laser ablation mechanism of transparent dielectrics with picosecond laser pulses, Mingying Sun, Fraunhofer-Institut für Lasertechnik (Germany) and Shanghai Institute of Optics and Fine Mechanics (China); Urs Eppelt, Fraunhofer-Institut für Lasertechnik (Germany) and RWTH Aachen (Germany); Claudia Hartmann, Fraunhofer-Institut für Lasertechnik (Germany); Christof Siebert, TRUMPF Laser- und Systemtechnik GmbH (Germany); Jianqiang Zhu, Shanghai Institute of Optics and Fine Mechanics (China); Wolfgang Schulz, Fraunhofer-Institut für Lasertechnik (Germany) and RWTH Aachen (Germany) ............................................................... [8530-6]

14:40: Optical damage mechanism in borosilicate glass generated by a nanosecond pulsed laser at 1.064 micron, Binh T. Do, Ball Aerospace & Technologies Corp. (USA); Mark W. Kimmel, Michael V. Pack, Randal L. Schmitt, Sandia National Labs. (USA); Arlee V. Smith, AS-Photonics, LLC (USA) ............................................................... [8530-7]

15:00: Direct observation of UV laser-induced high-pressure glass-to-crystal transition and 3D visualization of structural dynamic evolution in fused silica, Chunhong Li, Xin Ju, Univ. of Science and Technology Beijing (China) ............................................................... [8530-8]

15:20: Surface and bulk effects in silica fibers caused by 405 nm CW diode laser irradiation and means for mitigation, Cornell P. Gonschior, Karl-Friedrich Klein, Technische Hochschule Mittelhessen (Germany); Tong Sun, Kenneth T. Grattan, City Univ. London (United Kingdom) ............................................................... [8530-9]

Poster Session and Refreshment Break ..........15:40 to 16:30
POSTERS-MONDAY AFTERNOON
Room: Auditorium .................Mon. 15:40 to 16:30

Posters will be displayed for viewing during refreshment breaks from 10:40 to 11:30 and 15:40 to 16:30.

SESSION 4
Room: NIST Auditorium ..............Mon. 16:30 to 18:10

Fundamental Mechanisms IV

Session Chairs: Amy L. Rigatti, Univ. of Rochester (USA); Stavros G. Demos, Lawrence Livermore National Lab. (USA)


16:50: Evaporation chemistry of CO2-laser heated silica, Selim Elhadj, Manylibo J. Matthews, Steven T. Yang, Diane J. Cooke, Lawrence Livermore National Lab. (USA) \[8530-11\]

17:10: On the Einstein relation under optical absorption coefficient in nanostructured materials in the presence of laser, Subhamoy Singha Roy, JIS College of Engineering (India) \[8530-12\]

17:30: Modeling laser irradiation of dielectrics: a road map to breakdown, Oliver Brenk, Baerbel Rethfeld, Technische Univ. Kaiserslautern (Germany) \[8530-13\]

17:50: Oscillatory term of the Keldysh formula, Vitaly E. Gruzdev, Univ. of Missouri-Columbia (USA) \[8530-14\]

CLOSING REMARKS
Room: NIST Auditorium ..............Mon. 18:10 to 18:20

Open House and Reception
Mon. 18:30 to 20:00
5733 Central Ave, Boulder, CO 80301

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Tuesday 25 September

REGISTRATION MATERIAL PICK-UP
Room: NIST Lobby Area ............... Tues. 07:30 to 16:00

Attendees must wear the NIST Security Badge when returning to NIST property.

POSTER PLACEMENT AT NIST
Room: 1 & 2 ......................... Tues. 7:50 to 8:20

Tuesday poster authors may set up their posters at this time.

SESSION 5
Room: NIST Auditorium ............... Tues. 8:20 to 10:00

Thin Films I

Session Chairs: Joseph A. Menapace, Lawrence Livermore National Lab. (USA); Gregory J. Exarhos, Pacific Northwest National Lab. (USA)

8:20: What role do defects play in the last damage behavior of metal oxides? (Invited Paper), Carmen S. Menoni, Peter Langston, Erik M. Krous, Dinesh Patel, Colorado State Univ. (USA); Luke A. Emmert, The Univ. of New Mexico (USA); Ashot S. Markosyan, Stanford Univ. (USA); Brendan A. Reagan, Keith Wensing, Colorado State Univ. (USA); Roger Route, Martin M. Fejer, Stanford Univ. (USA); Jorge J. Rocca, Colorado State Univ. (USA); Wolfgang Rudolph, The Univ. of New Mexico (USA). ..................[8530-15]

9:00: An exhaustive study of laser damage in ion-beam sputtered pure and mixture oxide thin films at 1030 nm with 500 fs pulse durations, Laurent Gallais, Benoit Mangote, Mireille Commandré, Institut Fresnel (France); Mathias Mende, Lars O. Jensen, Henrik Ehlers, Marco Jupé, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany); Andrius Melninkaitis, Valdas Sirutkaitis, Vilnius Univ. (Lithuania); Simonas Kicas, Tomas Tolenis, Ramutis Drazdys, Institute of Physics (Lithuania). ..................[8530-16]

9:20: Effect of laser durations on laser-induced damage threshold of multilayer dielectric gratings in vacuum, Fanyu Kong, Yunxia Jin, Weixiao Chen, Meiping Zhu, Tao Wang, Dawei Li, Zhaoyang Li, Guang Xu, Hongbo He, Jianda Shao, Shanghai Institute of Optics and Fine Mechanics (China). ..................[8530-17]

9:40: Brewster Angle Polarizing Beamsplitter Laser Damage Competition, Christopher J. Stolz, Lawrence Livermore National Lab. (USA); Jeff Runkel, Quantel USA (USA). ..................[8530-18]

TUESDAY POSTER OVERVIEW
Room: NIST Auditorium .......... Tues. 10:00 to 10:30

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

Poster Session and Refreshment Break .......... 10:30 to 11:20

POSTERS-TUESDAY MORNING
Room: 1 & 2 ....................... Tues. 10:30 to 11:20

Posters will be displayed for viewing during refreshment breaks from 10:30 to 11:20 and 15:40 to 16:30.
Materials and Measurements


Separation of different loss channels in DUV optical elements, Klaus Mann, Bernhard Flöter, Uwe Leinhos, Julian Sudradjat, Bernd Schäfer, Laser-Lab. Göttingen e.V. (Germany). [8530-65]


An empirical investigation of the laser survivability curve: III, Jonathan W. Arenberg, Northrop Grumman Aerospace Systems (USA); Wolfgang Riede, Alessandra Ciapponi, Paul Allenspacher, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Jonathan H. Herringer, Arrow Thin Films, Inc. (USA). [8530-69]

Automated laser damage threshold test systems of different test modes for optical elements, Bin Ma, Yanyun Zhang, Hongping Ma, Hongfei Jiao, Xinbin Cheng, Pengfei He, Tongji Univ. (China); Huasong Liu, Yiqin Ji, Tianjin Jinhang Institute of Technology Physics (China); Zhanshan Wang, Tongji Univ. (China). [8530-70]


Effective area of pulsed laser spots within ISO 21254-1,2,3 standards: critical analysis, extensions, and measurements in near ultraviolet: near infrared domain, George Nemes, ASTIGMAT (USA) and National Institute for Lasers, Plasma and Radiation Physics (Romania); Aurel Stratan, Alexandru Zorila, Laurentiu Rusen, National Institute for Lasers, Plasma and Radiation Physics (Romania). [8530-72]


Laser damage testing of optical components under cryogenic conditions, Jindrich Oulehla, Pavel Pokorny, Josef Lazar, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic). [8530-74]

Laser-induced damage performance of three kinds fluorophosphates glass with different doped ions, Fuquan Li, China Academy of Engineering Physics (China). [8530-75]
Laser removal of positive-tone diazonaphthoquinone/novolak (DNQ/novolak) resist without occurring laser-induced damage to the silicon wafer, Hiroki Muraoka, Yuki Yanama, Yoshiaki Matsura, Tomosumi Kamimura, Osaka Institute of Technology (Japan); Hideo Horibe, Kanazawa Institute of Technology (Japan). [8530-76]

Investigation of laser damage initiation and the defect volume density in transparent YAG ceramics, Yuki Yamana, Tomosumi Kamimura, Hiroki Muraoka, Haruki Nakagawa, Osaka Institute of Technology (Japan); Katsushiro Mikami, Shinji Motokoshi, Takahisa Jitsuno, Osaka Univ. (Japan); Takayuki Okamoto, Okamoto Optics Works (Japan); Yan Lin Aung, Akio Ikuesue, World Lab Co., Ltd. (Japan). [8530-77]

Sandwich concept: enhancement for direct absorption measurements by laser-induced deflection (LID) technique, Christian Mühlig, Simon Bublitz, Institut für Photonische Technologien e.V. (Germany). [8530-79]

Automated test station for laser-induced damage threshold measurements according to ISO 21254-1,2,3,4 standards, Aurel Stratman, National Institute for Lasers, Plasma and Radiation Physics (Romania); George Nemes, ASTIGMAT (USA) and National Institute for Lasers, Plasma and Radiation Physics (Romania); Alexandru Zorila, Laurentiu Rusen, Sandel Simion, Constantin Bianaru, Constantin G. Fenc, Liviu Neagu, National Institute for Lasers, Plasma and Radiation Physics (Romania). [8530-80]

Parallel use of detection channels for LIDT testing in the UV range, Stefan Schrammeyer, Marco Jupé, Lars O. Jensen, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany). [8530-81]

SESSION 6
Room: NIST Auditorium . . . . . . . . . . . Tues. 11:20 to 13:00

Thin Films II
Session Chairs: Mireille Commandré, Institut Fresnel (France); Vitaly E. Gruzdev, Univ. of Missouri-Columbia (USA)

11:20: Damage study of HR coatings irradiated from substrate-side by 1064 nm nanosecond laser pulses, Xinbin Cheng, Jiangtao Lu, Bin Ma, Zhanshan Wang, Tongji Univ. (China). [8530-19]

11:40: Continued advancement of laser damage resistant optically functional microstructures, Douglas S. Hobbs, Bruce D. MacLeod, Ernest Sabatino, TelAztec LLC (USA). [8530-20]

12:00: Multiple wavelength laser-induced damage of multilayer beam splitters, Lei Yan, Chaoyang Wei, Yuanan Zhao, Kui Yi, Jianda Shao, Shanghai Institute of Optics and Fine Mechanics (China). [8530-21]

12:20: A statistical correlation study between surface quality and LIDT at 1064 nm, Trey Turner, Quentin Turchette, Alex R. Martin, Research Electro-Optics, Inc. (USA). [8530-22]

12:40: Thin film formation for strong adhesion with substrate and laser tolerance by photo-oxidized silicone oil, Masataka Murahara, Tokai Univ. (Japan); Yuji Sato, Tokyo Institute of Technology (Japan); Takahisa Jitsuno, Osaka Univ. (Japan); Etsuo Fujiwara, Univ. of Hyogo (Japan); Yoshiaki Okamoto, Okamoto Optics Works (Japan). [8530-23]

Lunch Break . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .13:00 to 14:20

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SESSION 7
Room: NIST Auditorium ............... Tues. 14:20 to 15:40

Materials and Measurements I
Session Chairs: Christopher J. Stolz, Lawrence Livermore National Lab. (USA); James E. Andrew, AWE plc (United Kingdom)

14:20: Dispersive multilayer optics: toward high-power applications (Invited Paper), Vladimir Pervak, Ludwig-Maximilians-Univ. München (Germany) and Ultrafast innovations GmbH (Germany). [8530-43]

15:00: Coatings of oxide composites (Invited Paper), Lars O. Jensen, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany). [8530-24]

Poster Session and Refreshment Break ............... 15:40 to 16:30

POSTERS-TUESDAY AFTERNOON
Room: 1 & 2 ...................... Tues. 15:40 to 16:30

Posters will be displayed for viewing during refreshment breaks from 10:30 to 11:20 and 15:40 to 16:30.

SESSION 8
Room: NIST Auditorium ............... Tues. 16:30 to 18:10

Materials and Measurements II
Session Chairs: Michelle D. Shinn, Thomas Jefferson National Accelerator Facility (USA); MJ Soileau, Univ. of Central Florida Office of Research & Commercialization (USA)

16:30: The role of polymer-mediated dopant correlations in damage moderation and self healing, Mark G. Kuzyk, Shiva K. Ramini, Washington State Univ. (USA). [8530-26]

16:50: The influences of key optical component performances to optical efficiency in high-power Yb:YAG thin-disk laser, Jianli Shang, Huazhong Univ. of Science and Technology (China) and Wuhan National Lab. for Optoelectronics (China) and Wuhan Meiman Technology (Group) Co., Ltd., (China). [8530-27]

17:10: A high-energy fibre-to-fibre connection for direct optical initiation systems, Michael D. Bowden, Sarah L. Knowles, Matthew C. Cheeseman, AWE plc (United Kingdom). [8530-28]

17:30: Energy losses in thermally cycled optical fibers constrained in small bend radii, Eric M. Guild, Gregg L. Morelli, Honeywell Federal Manufacturing & Technologies, LLC (USA). [8530-29]

17:50: Neutron testing of high-power optical fibers, Matthew C. Cheeseman, Michael D. Bowden, AWE plc (United Kingdom); Adrian A. Akinici, Los Alamos National Lab. (USA); Sarah L. Knowles, Lee Webb, AWE plc (United Kingdom). [8530-30]

CLOSING REMARKS
Room: NIST Auditorium ............... Tues. 18:10 to 18:20
Wine and Cheese Tasting Reception
Tues. 19:00 to 20:30
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Wednesday 26 September

REGISTRATION MATERIAL PICK-UP
Room: NIST Lobby Area ...............Wed. 07:30 to 16:00
Attendees must check in with NIST Security at entrance and have photo identification available.

SESSION 9
Room: NIST Auditorium ...............Wed. 08:20 to 10:00
Materials and Measurements III

Session Chairs: Klaus Mann, Laser-Lab. Göttingen e.V. (Germany); Semyon Papernov, Univ. of Rochester (USA)

8:20: Analysis of residual absorptions in optical materials using OPO-based pulsed photoacoustic spectroscopy with ppm/cm sensitivity, Niklas Waasem, Fraunhofer-Institut für Physikalische Messtechnik (Germany) and Albert-Ludwigs-Univ. Freiburg (Germany); Stephan Fieberg, Frank Kuehnemann, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Karsten Buse, Fraunhofer-Institut für Physikalische Messtechnik (Germany) and Albert-Ludwigs-Univ. Freiburg (Germany) . . . . . . . . . . . . . . . . . . . . . . . . . . .[8530-32]

8:40: Photothermal common-path interferometry: capabilities beyond the absorption test measurements, Ashot S. Markosyan, Roger Route, Martin M. Fejer, Stanford Univ. (USA) . . . . . . . . . . . . . . [8530-33]

9:00: Light scattering to detect imperfections relevant for laser-induced damage, Sven Schröder, Tobias Herfurth, Marcus Trost, Angela Duparrè, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . . . . . . . . . . . . . . . [.8530-34]
9:20: Multichannel laser-induced contamination test bench, Helmut B. Schröder, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Gintare Bataviciute, Vilnius Univ. (Lithuania); Karl Cichon, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Istvan Balasa, Lars O. Jensen, Laser Zentrum Hannover e.V. (Germany); Wolfgang Riede, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Adrian P. Tighe, European Space Research and Technology Ctr. (Netherlands).

9:40: Advanced LIDT testing station in the frame of the HiLASE Project, Jan Vanda, Laura Gemini, Roman Svabek, Tomas Mocek, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Gilles Cheriaux, Ecole Nationale Supérieure de Techniques Avancées (France).

Coffee Break.

SESSION 10
Room: NIST Auditorium. Wednesday 10:30 to 11:50

Materials and Measurements IV
Session Chairs: Amy L. Rigatti, Univ. of Rochester (USA); Takahisa Jitsuno, Osaka Univ. (Japan)

10:30: Pulse-width dependent femtosecond damage threshold measurements for pulse compression gratings, Enam Chowdhury, Patrick Poole, Richard Freeman, The Ohio State Univ. (USA); Douglas J. Smith, Plymouth Grating Lab. (USA).

10:50: Laser-induced surface damage density measurements with small and large beams: the representativeness light, Laurent Lamaignère, Thierry Donval, Gabriel Dupuy, Commissariat à l’Énergie Atomique (France).

11:10: Electric field dependant decay and recovery of anthraquinones doped into PMMA thin films: beyond 100% recovery, Benjamin R. Anderson, Mark G. Kuzyk, Washington State Univ. (USA).

11:30: 355nm absorption in HfO2 and SiO2 monolayers with embedded Hf nanoclusters studied using photothermal heterodyne imaging, Semyon Papernov, Univ. of Rochester (USA); Eunsung Shin, Paul T. Murray, Univ. of Dayton Research Institute (USA); Ansgar W. Schmid, James B. Oliver, Univ. of Rochester (USA).

Lunch Break.

NIST FACILITY TOURS
Wednesday 11:50 to 12:50 · 2 tours offered

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SESSION 11
Room: NIST Auditorium .................Wed. 13:30 to 15:10

Mini-Symposium: Laser-Induced Plasma Interactions

Session Chairs: Stavros G. Demos, Lawrence Livermore National Lab. (USA); Detlev Ristau, Laser Zentrum Hannover e.V. (Germany)

13:30: Plasma-particle interactions in a laser-induced plasma (Invited Paper), David W. Hahn, Michael E. Asgill, Prasoon K. Diwakar, Univ. of Florida (USA) ..................[8530-40]

14:10: Laser ablation for chemical analysis: 50 years (Invited Paper), Richard E. Russo, Jhanis J. Gonzalez, Vassilia Zormpa, Inhee Choi, Lawrence Berkeley National Lab. (USA); Alexander A. Bolshakov, Applied Spectra, Inc. (USA); Javier Ruiz, Samuel S. Mao, Lawrence Berkeley National Lab. (USA); Jong H. Yoo, Applied Spectra, Inc. (USA) ..........................[8530-41]

14:50: Laser-induced gas plasma etching of fused silica under ambient conditions, Selim Elhadj, Gabe Guss, Isaac L. Bass, Manylibo J. Matthews, Lawrence Livermore National Lab. (USA) ..........................[8530-42]

Coffee Break ..................................15:10 to 15:40

SESSION 12
Room: NIST Auditorium .................Wed. 15:40 to 16:20

Surfaces, Mirrors, and Contamination

Session Chairs: Joseph A. Menapace, Lawrence Livermore National Lab. (USA); Michelle D. Shinn, Thomas Jefferson National Accelerator Facility (USA)

15:40: Measurement of debris and shrapnel plumes from cylindrical metal targets used in high-power laser systems, James E. Andrew, Kathryn A. Wallace, AWE plc (United Kingdom) ..................[8530-44]

16:00: Influences of oil-contamination on LIDT and optical properties in dielectric coatings, Takahisa Jitsuno, Hidetoshi Murakami, Shinji Motokoshi, Eiji Sato, Katsuhiro Mikami, Kota Kato, Tetsuji Kawasaki, Yoshiki Nakata, Nobuhiko Sarukura, Toshihiko Shimizu, Hiroyuki Shiraga, Noriaki Myyanaga, Hiroshi Azechi, Osaka Univ. (Japan) ..........................[8530-45]

CLOSING REMARKS
Room: NIST Auditorium .................Wed. 16:20 to 16:30

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