20th Anniversary Meeting
Advanced Solid-State Photonics

January 29-February 1, 2006

Hyatt Regency Lake Tahoe Resort
Incline Village, Nevada

Sponsored by:
Optical Society of America
Technical Cosponsor: IEEE/Lasers and Electro-Optics Society

Made possible by the generous support of:

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University of Rochester Lab. For Laser Energetics
Committees

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Irina Sorokina, *Vienna Univ. of Technology, Austria*

Program Chair

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Rüdiger Paschotta, *RP Photonics Consulting GmbH, Switzerland*
Gregory J. Quarles, *VLOC-A Subdivision of II-VI, USA*
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Takunori Taira, *Inst. for Molecular Science, Japan*
Anne Christine Tropper, *Univ. of Southampton, UK*
Jirong Yu, *NASA Langley Res. Ctr., USA*
Jonathan D. Zuegel, *Univ. of Rochester, USA*
About ASSP

January 29 – February 1, 2006

Advances in solid-state lasers, parametric devices and nonlinear frequency conversion provide powerful tools for an increasingly broad range of applications including spectroscopy, metrology, remote sensing, communications, material processing, medicine and entertainment. Now in its 21st year, the Advanced Solid-State Photonics Topical Meeting remains the world’s premier forum for discussion of new developments in laser and nonlinear optical materials and devices. The upcoming meeting, at Lake Tahoe, will provide a spectacular setting for learning about these advances. Take this opportunity to be part of the year’s most significant meeting on advanced solid-state laser sources. Plan to attend Advanced Solid-State Photonics 2006!

Meeting Topics

- Tunable and New Wavelength Solid-State Lasers
- Diode-Pumped Lasers
- Fiber Lasers
- Photonic-Crystal Lasers
- High-Power Lasers
- Short-Pulse Lasers
- Frequency-Stable Lasers
- Microlasers
- Optically-Pumped Semiconductor Lasers
- High Brightness Diodes
- Optical Sources Based on Nonlinear Frequency Conversion
- Frequency Conversion Techniques, Including OPO, OPA, OPG, SHG, SFG, DFG and Raman
- Developments in Laser Media
- Developments in Nonlinear Optical Materials
- Developments in Engineered Optical Materials
- Laser Sources and Their Applications in Science, Medicine, Remote Sensing, Industry or Entertainment
Invited Speakers

- ME1 High Pulse Energy and High Peak Power Fiber Amplifiers, Mark Bowers, Aculight, USA
- TuA1 Overview of Progress on DARPA’s SHEDS and ADHELS Programs, Martin Stickley, DARPA, USA
- TuC1 THz-Wave Frequency-Agile Parametric Oscillator and Future Applications, Hiroaki Minamide, Tohoku Univ., Japan
- WE1 High Power Single-Frequency Laser for Gravitational Wave Detection, Dietmar Kracht, Laser Zentrum Hannover, Germany

Plenary Speakers

- MA1 Inertial Confinement Fusion: First Light from the National Ignition Facility and Future Plans, Ed Moses, LLNL, USA
- WA1 Keeping Light Behind Bars, Philip St. John Russell, Univ. of Bath, UK

Banquet Speaker

- Quo Vadis Solid-State Lasers, Bill Krupke, WFK Lasers, LLC, USA
ASSP Short Courses

Short Courses

With a strong commitment to continuing technical education, ASSP short courses are designed to increase your knowledge of a specific subject, while offering you the experience of expert teachers. Top-quality instructors stay current with the subject matter required to advance your research and career goals. An added benefit of attending a short course is the availability of continuing education units (CEUs).

Continuing Education Units (CEUs)

Short Course attendees who successfully complete a course are eligible to receive continuing education units (CEUs). The CEU is a nationally recognized unit of measure for continuing education and training programs that meet established criteria. CEUs will be calculated and certificates will be mailed to participants after the conference.

Registration

Tuition for the short course is a separate fee. Advance registration is recommended, as the number of seats in each course is limited. Short courses sell out quickly! There will not be a waiting list for short courses. Short course materials are not available for purchase.

Click here for registration information.

Short Course Schedule

Sunday, January 29, 2006

8:00 a.m. –12:00 p.m.
• SC256: Lasers for Ultrashort Pulse Generation
  Rüdiger Paschotta, RP Photonics Consulting GmbH, Switzerland

1:00 p.m.–5:00 p.m.
• SC257: Designing Crystal Nonlinear Optical Devices Using SNLO Models
  Arlee Smith, Sandia Natl. Labs, USA
• SC258: Optical Crystals for Advanced Solid-State Photonic Applications
  David Sumida, HRL Laboratories, LLC, USA
Publications

Conference Program

The printed ASSP 2006 Conference Program and Technical Digest will contain general program information, abstracts of the paper summaries, and the 3-page summaries of all papers presented during the meeting as they were submitted by the authors. At the meeting, each registrant will receive a copy of the printed Conference Program and Technical Digest. Extra copies can be purchased at the meeting for a special price of US$ 100.

Technical Digest

The ASSP 2006 Technical Digest on CD-ROM will contain PDFs of paper summaries presented during the meeting as they were submitted by the authors. At the meeting, each registrant will receive a copy of the Technical Digest on CD-ROM. Extra copies can be purchased at the meeting for a special price of US$ 100.
ASSP Exhibitors

Visit a state-of-the-art exhibit of tabletop displays featuring the latest technological advances of the industry's hottest companies. Connect with the most innovative leaders in the field of Fourier transform spectrometry and hyperspectral imaging and sounding instruments in the atmospheric, land and coastal-ocean disciplinary areas.

For more information contact Cathryn Wanders at +1 202.416.1972 or topicalexhibits@osa.org.

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Cleveland Crystals, Inc.
Cristal Laser
Crystal Fibre A/S
Del Mar Photonics
Deltronic Crystal / Isowave
DILAS Diodenlaser GmbH
EKSPLA
ELS Electronic Laser System
KOHERAS A/S
Laser Focus World
LINOS Photonics
Menlo Systems GmbH
nLight Corporation
Northrop Grumman Cutting Edge Optronics
Northrop Grumman Synoptics
Nufern
Nuvonyx Inc.
Onyx Optics
Oxide Corp.
Photonics Spectra
Precision Photonics Corporation
Princeton Scientific, an IMPEX company
Quintessence Photonics Corp.
RPMC Lasers, Inc.
Scientific Materials Corporation
Spectra Physics
Sydor Instruments
Thorlabs Inc.
Time-Bandwidth Products
VLOC
Welcome to Lake Tahoe and to the Advanced Solid-State Photonics Topical Meeting and Tabletop Exhibit. As you can see from the program, this year’s event brings together a multidisciplinary group sharing a common interest in the experimentation, development, and generation of solid-state photonics. Scientists and researchers in the field of lasers, physics, chemistry, material science, photonics, electronics, biology, engineering and medical applications have joined together to present their latest research, discoveries and applications for solid-state photonics.

This year you will be exposed to over 120 presentations of the highest caliber. We have scheduled 54 oral presentations and over 70 poster presentations for you to consider over the next three days. The program is exceptional. There are also opportunities to participate in short courses, plenary sessions, and networking that will allow you to spend time with colleagues from all over the world.

We hope that you enjoy your time with us this week and the unique opportunity to explore Lake Tahoe.

Sincerely,

Craig Denman, AFRL, USA
Irina Sorokina, Vienna Univ. of Technology, Austria
General Chairs

Timothy J. Carrig, Lockheed Martin Coherent Technologies, USA
Program Chair
Program Committee

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Jirong Yu, NASA Langley Res. Ctr., USA
Jonathan D. Zuegel, Univ. of Rochester, USA

*Representative to OSA’s Science and Engineering Council
# Agenda of Sessions

## Sunday, January 29, 2006

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<th>Time</th>
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<th>Location</th>
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<td>7:00 a.m. - 5:00 p.m.</td>
<td>Registration</td>
<td>Lakeside Foyer</td>
</tr>
<tr>
<td>8:00 a.m. - 12:00 p.m.</td>
<td>SC256: Lasers for Ultrashort Pulse Generation</td>
<td></td>
</tr>
<tr>
<td>9:00 a.m. - 12:00 p.m.</td>
<td>Industrial Symposium – Photonics Meets Industry (free of charge)</td>
<td>Martis Peak B</td>
</tr>
<tr>
<td>12:00 p.m. - 1:00 p.m.</td>
<td>Lunch (on your own)</td>
<td></td>
</tr>
<tr>
<td>1:00 p.m. - 5:00 p.m.</td>
<td>SC257: Designing Crystal Nonlinear Optical Devices Using SNLO Models</td>
<td></td>
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<tr>
<td>1:00 p.m. - 5:00 p.m.</td>
<td>SC258: Optical Crystals for Advanced Solid-State Photonic Applications</td>
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## Monday, January 30, 2006

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<tbody>
<tr>
<td>7:00 a.m. - 5:00 p.m.</td>
<td>Registration</td>
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</tr>
<tr>
<td>8:00 a.m. - 8:30 a.m.</td>
<td>Opening Remarks</td>
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<tr>
<td>8:30 a.m. - 10:00 a.m.</td>
<td>MA: High Power Solid-State Lasers</td>
<td>Lakeside Ballroom</td>
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<tr>
<td>10:00 a.m. - 11:00 a.m.</td>
<td>Exhibits</td>
<td>Regency Ballroom</td>
</tr>
<tr>
<td>11:00 a.m. - 12:30 p.m.</td>
<td>MB: Poster Session I, Coffee Break &amp; Exhibits</td>
<td>Regency Ballroom</td>
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<tr>
<td>12:30 p.m. - 2:00 p.m.</td>
<td>Lunch (on your own)</td>
<td>Lakeside Ballroom</td>
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<tr>
<td>2:00 p.m. - 3:30 p.m.</td>
<td>MD: UV to Mid-IR Solid-State Lasers</td>
<td>Lakeside Ballroom</td>
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<tr>
<td>3:30 p.m. - 4:00 p.m.</td>
<td>Coffee Break &amp; Exhibits</td>
<td>Regency Ballroom</td>
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<tr>
<td>4:00 p.m. - 5:30 p.m.</td>
<td>ME: Pulsed Fiber Amplifiers</td>
<td>Lakeside Ballroom</td>
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<tr>
<td>5:30 p.m. - 7:30 p.m.</td>
<td>Dinner (on your own)</td>
<td>Lakeside Ballroom</td>
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<tr>
<td>7:30 p.m. - 8:30 p.m.</td>
<td>MF: Postdeadline Paper Session</td>
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## Tuesday, January 31, 2006

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<tbody>
<tr>
<td>7:30 a.m. - 1:00 p.m.</td>
<td>Registration</td>
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<tr>
<td>8:00 a.m. - 10:00 a.m.</td>
<td>TuA: Mode-Locked Solid-State Lasers</td>
<td>Lakeside Ballroom</td>
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<tr>
<td>10:00 a.m. - 1:00 p.m.</td>
<td>Exhibits</td>
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<tr>
<td>10:00 a.m. - 11:00 a.m.</td>
<td>TuB: Poster Session II, Coffee Break &amp; Exhibits</td>
<td>Regency Ballroom</td>
</tr>
<tr>
<td>11:00 a.m. - 1:00 p.m.</td>
<td>TuC: THz and Optical Parametric Oscillators</td>
<td>Lakeside Ballroom</td>
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<tr>
<td>7:00 p.m. - 10:00 p.m.</td>
<td>Conference Banquet</td>
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## Wednesday, February 1, 2006

<table>
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<tr>
<th>Time</th>
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</thead>
<tbody>
<tr>
<td>7:30 a.m. - 5:00 p.m.</td>
<td>Registration</td>
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<tr>
<td>8:00 a.m. - 10:00 a.m.</td>
<td>WA: Microstructured Fibers</td>
<td>Lakeside Ballroom</td>
</tr>
<tr>
<td>10:00 a.m. - 4:00 p.m.</td>
<td>Exhibits</td>
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<tr>
<td>10:00 a.m. - 11:00 a.m.</td>
<td>WB: Poster Session III, Coffee Break &amp; Exhibits</td>
<td>Regency Ballroom</td>
</tr>
<tr>
<td>11:00 a.m. - 12:30 p.m.</td>
<td>WC: Ultrashort Pulse Generation and Amplification</td>
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<tr>
<td>12:30 p.m. - 2:00 p.m.</td>
<td>Lunch (on your own)</td>
<td>Lakeside Ballroom</td>
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<tr>
<td>2:00 p.m. - 3:30 p.m.</td>
<td>WD: Novel Laser Architectures</td>
<td>Lakeside Ballroom</td>
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<tr>
<td>3:30 p.m. - 4:00 p.m.</td>
<td>Coffee Break &amp; Exhibits</td>
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<tr>
<td>4:00 p.m. - 6:00 p.m.</td>
<td>WE: Ceramic Lasers</td>
<td>Lakeside Ballroom</td>
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<tr>
<td>6:00 p.m. - 6:30 p.m.</td>
<td>Closing Remarks and Presentation of Best Student Paper Prize</td>
<td>Lakeside Ballroom</td>
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Conference Highlights

► ASSP Industrial Symposium: Photonics Meets Industry
Sunday, January 29, 2006: 8:00 a.m. – 11:00 a.m.
Moderator: Jason Eichenholz, Newport, Inc., USA
Martis Peak B

This programming is free of charge and open to all conference participants. Do not miss this opportunity to become acquainted with the leading photonics companies’ most recent developments in research and technology.

► Poster Sessions
Monday, January 30, 2006: 10:00 a.m. – 11:00 a.m.
Regency Ballroom

Tuesday, January 31, 2006: 10:00 a.m. – 11:00 a.m.
Regency Ballroom

Wednesday, February 1, 2006: 10:00 a.m. – 11:00 a.m.
Regency Ballroom

Poster presentations will be displayed during these times. Poster authors will be present to discuss their work with attendees.

► Conference Banquet
Tuesday, January 31, 2006: 7:00 p.m. – 10:00 p.m.
Lakeside Ballroom

Join your fellow ASSP attendees for dinner and a special presentation at the Conference Banquet.

Banquet Speaker:
Quo Vadis Solid-State Lasers, Bill Krupke, WFK Lasers, LLC, USA. A materials-centric, 40-year perspective on solid state lasers will be presented: historical highlights and a speculative look forward.

William (Bill) Krupke received the B. S. degree in physics from Rensselaer Polytechnic Institute (1958), and M. A. and Ph.D. degrees in physics from the University of California at Los Angeles in 1961 and 1966. He has held technical and management positions at the Hughes Aircraft, Minneapolis Honeywell, and Aerospace Corporation. In 1972, he co-founded the Laser Directorate at the Lawrence Livermore National Laboratory (LLNL), and served variously as Program Leader, Chief Scientist, and Deputy Associate Directorate during his 27-year LLNL tenure. Through the early 1980s, he participated in the design, development, and construction of evermore powerful Nd:glass lasers, and led R&D efforts on solid-state, excimer, copper-vapor, and dye lasers. Since 1985, he has been engaged in development of diode-pumped high-average-power solid-state lasers. In 1999, Bill left LLNL to form WFK Lasers, LLC to consult for start-up high technology companies. Krupke is an OSA Fellow and a member of IEEE LEOS. He has served on the Board of Directors of the OSA, and as chairperson of the Quantum Electronics Division of the OSA Technical Council. He has authored or co-authored over 50 scientific publications in the field of quantum electronics, has published several book chapters, and holds 21 patents.

► Postdeadline Paper Session
Monday, January 30, 2006: 7:30 p.m. – 8:30 p.m.
Lakeside Ballroom
ASSP 2006 Short Courses

► SC256 Lasers for Ultrashort Pulse Generation
Rüdiger Paschotta, RP Photronics Consulting GmbH, Germany

Course Description
This course gives an introduction to the field of ultrashort pulse generation with various kinds of mode-locked lasers. It begins with essential information on laser gain media, techniques for dispersion compensation, and relevant optical nonlinearities, and continues with an overview of the physics of mode-locking in various situations. The latter topic includes the starting of the mode-locking process, an overview of different types of saturable absorbers, soliton mode-locking, harmonic mode-locking, Q-switching instabilities and other destabilizing effects. Finally, different types of mode-locked lasers will be discussed, including various kinds of picosecond and femtosecond diode-pumped solid-state lasers, Ti:sapphire lasers, fiber lasers, diode lasers (very briefly), and optically pumped surface-emitting semiconductor lasers. Some emphasis will be put on mode-locked lasers for operation in extreme parameter ranges, such as Ti:sapphire lasers generating sub-10-fs pulses, thin disk lasers for sub-picosecond pulses with extremely high average power, and miniature lasers for pulse repetition rates of tens of GHz and more. It will become apparent that the kinds of lasers discussed differ greatly, not only concerning the magnitude of various parameters, but also in terms of the important physical mechanisms.

Benefits and Learning Objectives
This course should enable you to:

• Compare different laser gain media in terms of suitability for mode-locking in different parameter ranges;
• List different techniques for dispersion compensation;
• Explain the role of nonlinearities in different kinds of mode-locked lasers;
• Explain the essentials of active and passive mode-locking;
• Identify limiting parameters for pulse durations, output powers and pulse repetition rates; and
• Compare the potential of different kinds of mode-locked lasers in different operation regimes.

Intended Audience
This course should be useful for researchers at universities, as well as R&D staff in the industry who want to get an introduction to the field of ultrashort pulse generation with lasers and an overview of different types of mode-locked lasers, in order to either develop mode-locked lasers themselves or select suitable lasers for particular applications. A general background in lasers and optics (principle of lasers, etc.) is required to understand the course, but no specific knowledge of pulse generation is necessary.

Instructor Biography
Rüdiger Paschotta received the Ph.D. degree in Konstanz, Germany, for achievements in the fields of quantum optics and nonlinear optics. From 1994 to 1997, he worked on fiber lasers and amplifiers at the Optoelectronics Research Centre in Southampton, United Kingdom. After a short stay in Paderborn, Germany, he supervised a research team at ETH Zurich, Switzerland, from 1997 to 2005, who worked on nonlinear integrated optics, within the group of Ursula Keller, developing diode-pumped mode-locked lasers. His work concentrated on the physics of mode-locking, mode-locked lasers for high powers or high repetition rates, mode-locked surface-emitting semiconductor lasers, and high-power nonlinear
frequency conversion. He is now offering technical consultancy to the industry via his company RP Photonics Consulting GmbH.

**SC257 Designing Crystal Nonlinear Optical Devices Using SNLO Models**  
Arlee Smith, *Sandia Natl. Labs, USA*

**Course Description**  
SNLO is a free, Windows-based software package comprising 17 functions relating to crystal nonlinear optics. It is intended as a convenient aid in the selecting of the best crystal for a particular application and in quantitatively modeling the crystal’s performance. For example, the crystal selection functions compute phase-matching properties for angle-tuned crystals or quasi-phase matching properties for periodically-poled crystals. The device performance models cover the time range from fs to cw, and they can be applied to crystals inside or outside of optical cavities. They are physically realistic because they rigorously account for nonlinear interactions, as well as linear propagation of beams with realistic spatial and temporal profiles. Linear propagation includes diffraction and dispersion to account for spatial and temporal walk off, focusing, etc.

The course will cover all of the SNLO modules but it will emphasize the use of the numerical models of nonlinear crystal performance. Each modeling function will be described in detail and numerous examples will be presented in live demonstrations. The mathematics will be minimal. Instead, the emphasis will be on developing intuition regarding the physical principles that determine crystal performance. Attendees will receive notes that explain each of the models and that present a wide variety of illustrative examples with descriptions of each modeled device and the physical principles highlighted by each example. These examples are preloaded in SNLO so running them yourself is quick and easy. There will be ample time allotted to modeling devices suggested by the course participants.

**Benefits and Learning Objectives**  
This course should enable you to:

- Speed the design of nonlinear optical devices by the use of well-benchmarked quantitative models;
- Save dollars spent on optical components and nonlinear crystals by bypassing the trial and error steps in device design;
- Quickly and quantitatively test the feasibility of novel device concepts; and
- Develop a better intuition of crystal nonlinear optics.

**Intended Audience**  
Anyone who uses nonlinear optical crystals or designs devices based on nonlinear optical crystals, including spectroscopists who use crystals to generate tunable laser light across the optical spectrum, optical engineers who design devices such as optical parametric oscillators or laser frequency multipliers, and students who would like to learn the principles of crystal nonlinear optics. No previous experience in numerical modeling or in the use of SNLO is needed.

**Instructor Biography**  
Arlee Smith (Ph.D., physics, University of Michigan) is a staff scientist in the Lasers, Optics and Remote Sensing Department at Sandia National Labs in Albuquerque, New Mexico. He is an OSA fellow with 30
years of experience in the laboratory use of lasers and nonlinear optical devices, as well as in numerical modeling of nonlinear optical processes. He is the author of SNLO.

► SC258 Optical Crystals for Advanced Solid-State Photonic Applications
David Sumida, HRL Labs, LLC, USA

Course Description
The selection of an optical crystal for a particular photonics application involves the consideration of numerous properties of the host crystalline material. In this short course, I focus extensively on the physical, optical, and thermo-mechanical properties of such crystals for laser and other optical elements, leaving a detailed discussion of spectroscopy and laser properties of dopant ions aside for now. The various intrinsic material properties (e.g., crystal structure, refractive index, dn/dT, thermal expansion, thermal conductivity, fracture toughness, etc.) of a wide range of crystalline materials are discussed, including their measurement and relevance to device operation. Existing data on oxide and fluoride crystals is presented in order to provide a comparison of the properties of available crystals. Important optical design issues (e.g., thermally-induced distortions and thermal stress resistance) are evaluated in light of these properties. Finally, we discuss the impact of these properties on solid-state laser and other optical applications.

Benefits and Learning Objectives
This course will enable you to:

- Understand the physical basis of optical and thermo-mechanical crystalline properties;
- Develop familiarity with conventional nomenclature and units of doped and undoped crystalline media;
- Compare the properties of approximately 100 laser host crystals;
- Assess the relative strengths and weaknesses of various solid-state laser crystals; and
- Evaluate the impact of crystalline properties on solid-state laser and photonic devices.

Intended Audience
This course is tailored to help scientists, engineers, students, and managers become more comfortable with making a design decision given the usual “real-world” conflict between what the intended photonics application calls for, and what the material can actually do given its crystalline-material properties. This course is intended to provide attendees the tools with which to evaluate the relative merits of particular crystals for specific laser and photonic applications.

Instructor Biography
David S. Sumida (Senior Research Project Engineer, HRL Laboratories LLC, Malibu, California) has over 20 years of professional experience in advanced solid-state lasers. He received his Ph.D. in physics at the University of Southern California in 1984. He currently manages several advanced solid-state laser research projects involving diode-pumped solid-state laser media, architectures and applications. He has authored or co-authored over 100 technical papers and presentations, co-authored a book chapter on laser host crystals, and he holds 14 U.S. patents. He is a member of the Optical Society of America and, for nearly ten years, he has co-taught a CLEO short course similar in scope to this one.
ASSP 2006 Abstracts

Sunday, January 29, 2006

► 7:00 a.m. – 5:00 p.m.
Registration
Lakeside Foyer

► 8:00 a.m. – 12:00 p.m.
SC256: Lasers for Ultrashort Pulse Generation
Martis Peak A

► 9:00 a.m. – 12:00 p.m.
Industrial Symposium – Photonics Meets Industry (free of charge)
Martis Peak B

► 12:00 p.m. – 1:00 p.m.
Lunch (on your own)

► 1:00 p.m. – 5:00 p.m.
SC257: Designing Crystal Nonlinear Optical Devices Using SNLO Models
Martis Peak A

► 1:00 p.m. – 5:00 p.m.
SC258: Optical Crystals for Advanced Solid-State Photonic Applications
Martis Peak B

Monday, January 30, 2006

► 7:00 a.m. – 5:00 p.m.
Registration
Lakeside Foyer

► 8:00 a.m. – 8:30 a.m.
Opening Remarks
Lakeside Ballroom

MA • High Power Solid-State Lasers
Lakeside Ballroom
8:30 a.m. – 10:00 a.m.
MA • High Power Solid-State Lasers
Jonathan D. Zuegel; Univ. of Rochester, USA, President

MA1 • 8:30 a.m.  Plenary
The National Ignition Facility: The World’s Most Complex and Energetic Laser System, Edward I. Moses; LLNL, USA. NIF, the 192-beam Nd:glass laser facility being built at Lawrence Livermore National Laboratory, will deliver 1.8 Megajoules of ultraviolet energy. The goal is to demonstrate thermonuclear burn and study materials at extreme temperature and pressure conditions.

Edward I. Moses is the Associate Director for National Ignition Facility (NIF) Programs at the Lawrence Livermore National Laboratory and the Director for the National Ignition Campaign to achieve thermonuclear burn in the laboratory. Moses leads the program responsible for completing construction and activation of the NIF, transforming it into a national user facility with the goals of supporting the Stockpile Stewardship Program, furthering basic science at extreme conditions and studying the potential for inertial fusion energy. He is also responsible for leading the development of advance photon sources. Moses earned his B.S. in electrical engineering from Cornell University in 1972 and his Ph.D. from Cornell University in 1977. Moses holds patents in laser technology and computational physics.

MA2 • 9:15 a.m.
19-kW Phase-Locked MOPA Laser Array, Gregory D. Goodno, Hiroshi Komine, Stuart J. McNaught, Ben Weiss, Shawn Redmond, William Long, Randy Simpson, Eric Cheung, Donna Hoveland, Paul Epp, Mark Weber, Michael McClellan, Jeff Soller, Hagop Injejyan; Northrop Grumman, USA. We have developed a scalable architecture of phase-locked Nd:YAG master oscillator power amplifiers. In cw operation a 2x1 array emitted 19.0 kW with 30% optical efficiency and 1.73 x diffraction-limited beam quality.

MA3 • 9:30 a.m.
Toward Petawatt Laser Based on Optical Parametrical Amplification: Status Quo and Perspectives, Vladimir V. Lozhkarev, Gennadiy I. Freidman, Vladislav N. Ginzburg, Eugeny V. Katin1, Efim A. Khuzanov, Alexey V. Kirsanov1, Anatoly N. Mal’shakov1, Grigory A. Luchinin, Michael A. Martynov1, Oleg V. Palashov1, Anatoly K. Potomkin1, Alexander M. Sergeev1, Andrey A. Shagkin1, Ivan V. Yakovlev1, Sergey G. Garanin2, Nikolay N. Rukavishnikov1, Stanislav A. Sukharev1, Alexander V. Charukhin2, Rudolf R. Gerke1, Vladimir E. Yashin1; 1Inst. of Applied Physics, Russian Federation, 2Russian Federal Nuclear Ctr., Russian Federation, 3Res. Inst. for Comprehensive Tests of Opto-Electronic Devices and Systems, Russian Federation, 4HoloGrate JSC, Russian Federation, 5Inst. for Laser Physics, Russian Federation. Laser power of more than 100TW (70fs, 10J) has been achieved in experiments on optical parametric amplification of femtosecond pulses in KDP* crystals. Energy conversion efficiency of optical parametric amplifier is 27%.

MA4 • 9:45 a.m.
The Mercury Project: A High Average Power, Gas-Cooled Laser with Frequency Conversion and Wavefront Correction, Andy J. Bayramian; LLNL, USA. The Mercury laser operated continuously for several hours at 55J and 10Hz with fourteen 4x6cm² Yb:SAP amplifier slabs pumped by eight 100kW
diode arrays. The average power frequency conversion employing YCOB yielded 50% conversion efficiency.

MB • Poster Session I

Regency Ballroom
10:00 a.m. – 11:00 a.m.
MB • Poster Session I

MB1
High Average Power Frequency Conversion on the Mercury Laser, A. J. Bayramian, R. J. Beach, C. Bibens, R. Campbell, C. A. Ebbers, B. L. Freitas, R. Kent, D. Van Lue, Z. Liao, T. Ladranti, S. A. Payne, K. I. Schaffers, S. Sutton, B. Chai, Y. Fei, LLNL, USA, Crystal Photonics, Inc., USA. We have frequency doubled the Mercury laser using a single plate of yttrium calcium oxyborate (YCOB), producing 225 W (22.5 J, 10 Hz) of 523.5 nm light.

MB2
Growth and Characterisation of Nonlinear Optical Crystals: BaNaB6O15 (BaNaBO) and BaCaBO6F (BCBF), Kexu, P. Loiseau, G. Aka, ENSCP, France. Single crystals of BaNaB6O15 and BaCaBO6F have been grown by the Czochralski. The refractive indices were measured by the minimum deviation technique and fitted to the Sellmeier equations. SHG phase matching angle calculations are presented.

MB3
Study of RTP Crystal Used as Electro-Optic Modulator, Hervé Albrect, Philippe Villeval, Christophe Bonnin; Cristal Laser, France. The purpose of this work is to highlight behaviour of RTP crystal in electro-optic configuration. We will review main features of interest, such as extinction ratio, voltage applied, lifetime and damage threshold.

MB4
Optical Parametric Chirped Pulse Amplifier and Spatiotemporal Shaping for Petawatt Laser, Emmanuel Hugonnot, Jacques Luce, Hervé Cöic; CE/CEA/CERTA, France. We present a degenerate non-collinear optical parametric chirped pulse amplifier pumped by a high-energy and diode-pumped Nd:Glass regenerative amplifier. Spatiotemporal mode shaping of the amplified signal is demonstrated.

MB5
High Power Yellow Light Generation for Laser Guide Star, Satoshi Wada, Norihito Saito, Masami Kato, Kazuyuki Akagawa, Akira Takazawa, Yutaka Hayano, Hideaki Takami, Yoshishiko Saito, Masanori Iyem, RIKEN, Japan, 3Megaplo, Japan, 3Nat. Astronomical Observatory of Japan, USA, 3Nat. Astronomical Observatory of Japan, Japan. 6.3W coherent yellow light generation at 589.159 nm was achieved by the sum frequency generation of two mode-locked lasers with wavelengths of 1064nm and 1319 nm for the laser guide star of the astronomical telescope.

MB6
Single-Frequency Fiber Amplifier Emitting 7.8 W at 1030 nm, Matthias Hildebrandt, Mark Frei, Dietmar Kracht, Ingo Freitag, Peter Wefels; 4Laser Zentrum Hannover e.V., Germany, 4Innolight GmbH, Germany. We report on fiber power amplification with a single-frequency Yb:YAG nonplanar ring oscillator seed source. The system emits up to 7.8 W single-frequency radiation at 1030 nm with an M² = 1.1.

MB7
Optical Isolator for Unpolarized Laser Radiation at Multi-Kilowatt Average Power, Kofa Nicklaus, Martin Daniels, Roman Hohn, Dieter Hoffmann; Fraunhofer ILT, Germany. A fiber coupled birefringence compensated Faraday Isolator set-up has been developed. At 2 kW average power a transmission greater than 93% and an isolation of 15 dB was achieved. No degradation in beam quality was observed.

MB8
Nd:BaWO4: Raman Laser, Jan Sule, Helena Jenikova, Maxim E. Doroshenko, Tasoltan T. Basiev, Lyudmila I. Ileva, Vjacheslav V. Osiko, Petr G. Zvezov; 3Czech Technical Univ., FNSPE, Czech Republic, 3General Physics Inst., Russian Federation. Raman laser was constructed on the base of new Nd:BaWO4 material Q-switched by LiF:F3 crystal. Emission at 1169 nm was obtained in 1.3 ns long pulse with energy 0.8 mJ.

MB9
The Raman Effects in Supercontinuum Generation in Highly Nonlinear Microstructured Fibers at 1.5 μm, Evgeni Sorokin, Valdimir V. Kalskunov, Irina T. Sorokiwa; TU Vienna, Photonics Inst., Austria. The influence of Raman scattering on spectral transformation and coherence of white light continuum generated in various highly nonlinear microstructured glass fibers at 1.5 μm were investigated both theoretically and experimentally.

MB10
Stimulated Raman Scattering in the Mid IR Range 2.31-2.75-3.7 μm in a BaWO4 Crystal under 1.9 and 1.56 μm Pumping, Tasoltan T. Basiev, Marina N. Basieva, Maxim E. Doroshenko, Vladimir V. Fedorov, Vjacheslav V. Osiko, Sergey B. Miron; 3Laser Materials and Technology Res. Ctr. of GPI, Russian Federation, 3Univ. of Alabama at Birmingham, USA. The first Stokes component (2.31 μm) and four Stokes components up to 2.75 and 3.7 μm were obtained in a BaWO4 crystal under 1.9-μm and 1.56-μm pumping, respectively. SRS and laser breakdown thresholds were measured.

MB11
Efficient and Broadband Picosecond Stimulated Raman Scattering in KTiOPO4, Valdas Pasiskevicius, Carlota Canalius, Fredrik Laurell; Royal Inst. of Technology, Sweden. Picosecond SRS with single-pass efficiency exceeding 50% and 34 THz bandwidth was observed in KTiOPO4. At peak intensities above 10 GW/cm2 the SRS character changes from narrowband to broadband showing substantial “softening” of polariton modes.
MB12

MB13
High Efficiency Cavity Dumped Operation of Yb:YAG Laser at Room Temperature, Shinichi Matsubara, Tsutomu Ueda, Masahiro Isobe, Motoharu Tanaka, Kazunori Otani, Sakae Kawato, Takao Kobayashi; Fiber Amenity Engineering, Graduate School of Engineering, Univ. of Fukui, Japan. Highly efficient cavity dumping of Yb:YAG laser has been realized at room temperature with the optical to optical conversion efficiency of 72% for the absorbed pump power.

MB14
Development of Dual-Wavelength Injection-Locked Pulsed Laser and Its Application to Generation of an Ultrahigh-Repetition-Rate Train of Ultrashort Pulses, Takashi Onose1, Masayuki Katsuragawa1, Kazuhiro Misawa1; 1Univ. of Electro-Communications, Japan, 2Tokyo Univ. of Agriculture & Technology, Japan. An injection-locked pulsed Ti:sapphire laser oscillating at dual-wavelengths is shown. It is demonstrated on this novel laser system that a 10-THz ultrahigh-repetition-rate train of short pulses is successfully generated with a duration of 20 fs.

MB15
Brightness Conversion Using a Raman Fiber Laser Based on a Multimode Fiber, Nathan B. Terry, Thomas G. Alley, Won B. Rho; Air Force Inst. of Technology, USA. The power and modal characteristics of a Raman Fiber Laser based on multimode fiber are investigated by varying reflectivities of output couplers. Brightness enhancement is observed and slope efficiencies as high as 62% are reported.

MB16
Thermo-Optical Behavior of Rare-Earth-Doped Low-NA Fibers in High Power Operation, Steffen Hübner1, Thomas Schreiber1, Thomas Pertsch1, Jens Limpert1, Thomas Peschel1, R. Eberhardt1, Andreas Tüömmann1; 1Inst. of Applied Physics, Germany, 2Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany. The influence of the internal temperature gradient in rare-earth-doped low-numerical-aperture fibers on modal properties is analyzed. We provide guidelines when a single-mode fiber turns into a multimode fiber and how the mode-field-diameter is affected.

MB17
Hot YAG:Yb5+:Er4+ Crystal: A Potential Laser Medium for High Average Power 1.5 μm Lasers, Boris I. Denker1, Boris I. Galagan1, Vyacheslav V. Osiko1, Sergey E. Sterchko1, Anatoly M. Balbashov1, Jonas E. Hellstrom1, Valdas Paskevicius1, Fredrik Laurell1; 1General Physics Inst., Russian Federation, 2Moscow Power Engineering Inst., Russian Federation, 3Royal Inst. of Technology, Sweden. The near-IR spectroscopic properties of YAG:Yb:Er crystals were investigated at high temperatures. It is shown that at 600-800°C temperatures they become close to their corresponding properties in Er:Yb: phosphate laser glasses.

MB18
Development of Broadband Light Source for OPCPA, Ogawa Kanade, Takeuchi Yasuki, Yoshida Hidekatsu1, Izawa Yasukazu1, Fujita Masayuki1; 1Inst. of Laser Engineering, Osaka Univ., Japan, 2Inst. for Laser Technology, Japan. Basic experiments of OPCPA with a Type I BBO crystal were conducted using the supercontinuum generated in a PCF. Tunable amplification bandwidth of 100nm was demonstrated.

MB19
Intracavity Frequency Doubling of CW Ti:Sapphire Laser Utilizing BiBO Nonlinear Crystal, Morten Thorhauge, Jesper L. Mortensen, Peter Tidemand-Lichtenberg, Preben Buchhave, Jesper R. Rasmussen; Technical Univ. of Denmark, Denmark. Utilising BiBO nonlinear crystal frequency doubling a Ti:Sapphire CW laser gave 100 mW at 405 nm and 53 mW at 392 nm. Stability proved excellent without servo control. Broad tunability was shown around 392 nm.

MB20
Nd:YVO4 Pumped Degenerate PPLN OPO, Ian Elder, David Legge, James Beedell, Rob Marchington; SELEX Sensors and Airborne Systems Ltd., UK. Conversion efficiencies of 44% and 56% are demonstrated in single and double-pass pump geometries respectively for a degenerate 1 micron pumped PPLN OPO. Pump feedback in the double-pass geometry acts as a pulse shortening mechanism.

MB21
Generation of a High-Energy Ultra-Wideband Chirped Source in Periodically Poled Crystals, Gilad Marcus1, Ari Zigler1, David Eger1, Ariel Bruner1, Abraham Englebard1, Moti Katz2, Yosi Ehrlich2; 1Hebrew Univ., Israel, 2Soreq NRC, Israel. A method to generate chirped, ultra-wideband infrared source, by use of optical parametric generation in periodically poled crystals, pumped by a chirped Ti:sapphire, laser is described. Few hundredths of micro-Joule were measured.

MB22
Is the Sign of the Nonlinear Coefficient d2 Reversed in PPLN? Ayelet Ganany1, Ady Arie1, Solomon Saltiel1; 2Tel-Aviv Univ., Israel, 3Univ. of Sofia, Bulgaria. We have verified experimentally that the d2=2YY nonlinear coefficient of LiNbO3 changes its sign as a result of periodic poling along the Z direction. This reversal enables the realization of all-optical polarization rotation in PPLN.

MB23
Efficient All-Solid-State Optical Parametric Oscillator for the Visible Based on Periodically-Poled Stiognometric LiTaO3, Shih-Yu Tu1, A. H. Kung1, Z. D. Gao2, S. N. Zhiu2; 1Inst. of Atomic and Molecular Sciences, Taiwan Republic of China, 2Dept. of Photonics, Natl. Chiao Tung Univ., Taiwan Republic of China, 3Natl. Acad.
Lab of Solid State Microstructures, China. We report the first pulsed high average power visible optical parametric oscillator based on periodically-poled LiTaO3. Stable operation indicates that the 370 mW visible output obtained should be scalable to much higher power.

MB24
Accurate Measurement of Second-Order Nonlinear-Optical Coefficients of Near-Stoichiometric LiNbO3, Ichiro Shoji1, Akinori Arai1, Makato Takei1, Satoshi Nakajima1, Akinori Noduka1, Ryoichi Ito1, Yasunori Furukawa1; 2Chuo Univ., Japan; 3Meiji Univ., Japan, 4Oxide Corp., Japan. Second-order nonlinear-optical coefficients of near-stoichiometric undoped and MgO-doped LiNbO3 are measured at the fundamental wavelength of 1.31 microns. The values are found to be the same with those of congruent LiNbO3 within the experimental accuracy.

MC • Nonlinear Conversion

Lakeside Ballroom
11:00 a.m. – 12:30 p.m.

MC • Nonlinear Conversion
Takunori Taira; Laser Res. Ctr. for Molecular Science, Japan, Presider

MC1 • 11:00 a.m.
An Injection-Seeded Narrow Linewidth Singly Resonant ZGP OPO, Hyung R. Lee1, Jirong Yu2, Norman P. Barnes2, Yingxin Bai3; 1Hampton Univ., USA; 2NASA Langley Res. Ctr., USA, 3Science Applications Intl. Corp., USA. Injection seeding of a singly resonant ZnGeP2 mid-infrared OPO using a CW 3.39 μm laser or tunable near-infrared laser has been demonstrated. The injection seeded OPO provides a narrow idler wavelength linewidth of ~1 nm.

MC2 • 11:15 a.m.
Compact Short Pulse Eyesafe Solid-State Raman Laser, Keith M. Mahoney, David Huang, AnnMarie L. Oien, Glenn T. Bennett, Mark J. Kakla, Keen Burgio, Carl R. Anderson; Coherent Technologies, USA. A compact diode pumped laser was built using a noncollinear geometry to Raman shift a 1338 nm Nd:YAG laser to 1522 nm. Innovative opto-mechanical design allows the entire laser head to be 0.28 ft3 volume.

MC3 • 11:30 a.m.
High-Efficiency Raman Converter Generating 1.5W of Red-Orange Output, Richard P. Mildren, Helen M. Pask, James A. Piper; Ctr. for Lasers and Applications, Australia. We report record Stokes conversion efficiency and output power for a nanosecond pumped Raman laser. Using KGd(WO4)2 in an external cavity Raman laser configuration, we obtained 64% conversion efficiency of a 2.3W 532nm pump laser.

MC4 • 11:45 a.m.
3W CW Generation at 589nm with Narrow Line Linearly Polarized Raman Fibre Laser, S. V. Popov1, A. B. Ralkov1, J. R. Taylor1, A. G. Dronov2, M. Y. Vyatkin1, D. Georgiev1, V. P. Gapontsev1; 1Femtosecond Optics Group, Imperial College, UK, 2NTO IRE Polus, Russian Federation, 3IPG Laser GmbH, Germany. 26W, 0.4nm linewidth CW Raman generation is achieved in linearly polarized single-mode fibre and applied to efficient, over 3W 589nm generation in MgO-PPLN. Watts level generation at any wavelength 550nm to 780nm is feasible.

MC5 • 12:00 p.m.
Generation of 491 nm Blue Pulses by Quasi-Intracavity Sum-Frequency Mixing of Q-Switched Diode Pumped Neodymium Lasers, Emile Herault, Francois Balembois, Patrick Georges; Lab Charles Fabry de l’Inst. d’Optique, France. We report the generation of 491-nm laser pulses by quasi-intracavity sum-frequency mixing. 3-ns 1064-nm Q-switched pulses were injected in a 912-nm Q-switched laser. A blue average-power output of 279-mW and a 9.3-kW peak-power were obtained.

MC6 • 12:15 p.m.
High Power Single-Frequency Continuous-Wave and Pulsed Nd:YVO4 Master Oscillator Power Amplifier, Michael J. Yarrow, Ji Won Kim, William A. Clarkson; Optoelectronics Res. Ctr., UK. An efficient single-frequency Nd:YVO4 master-oscillator power-amplifier, which produces 79W of near-diffraction-limited continuous-wave output is described. In pulsed mode, pulses of peak power ~2kW and duration ~1 microsecond were obtained at a repetition frequency of 11kHz.

► 12:30 p.m. – 2:00 p.m.
Lunch (on your own)

MD • UV to Mid-IR Solid-State Lasers

Lakeside Ballroom
2:00 p.m. – 3:30 p.m.

MD • UV to Mid-IR Solid-State Lasers
Gregory Quarles; VLOC, Subsidiary of II-VI Inc., USA, Presider

MD1 • 2:00 p.m.
Low-Threshhold Broadly Tunable Miniature Cerium Lasers, Hua Liu1, David J. Spence1, David W. Coutts1, J. Sato1, T. Fukuda1; 1Macquarie Univ., Australia, 2Tohoku Univ., Japan. We present all solid-state, ultra-low-threshold Ce:LiCAF and Ce:LiLuF4 lasers, that enable full wavelength coverage from 282 - 338 nm using a relatively inexpensive Nd:YVO4 microchip pump laser.

MD2 • 2:15 p.m.
Polarization Stabilizing for Diode-Pumped Passively Q-Switched Nd:YAG Microchip Lasers, Hiroshi Sakai1, Akihiro Sone1, Hirohumi Kani1, Takunori Taira1; 1Hamamatsu Photonics K.K., Japan, 2Inst. of Molecular Science, Japan. We have demonstrated the new way of the polarization stabilizing in the passively Q-switched laser by using a [110]-cut Cr3+:YAG crystal. The 355-nm ultra-violet light was generated with 32% conversion efficiency from 1064 nm.

MD3 • 2:30 p.m.
450 nm Blue Laser Emission by Frequency Doubling of CW Oscillation of Neodymium Doped Strontium and Lanthanum...
Aluminate (Nd:ASL), Cyrille Varona*, Pascal Loisieux*, Gérard Ak†, Bernard Ferrand†, Voicu Lupei†; ENSCP - LCAES, France, 3CEA - LETI, France, 4Inst. of Atomic Physics, Romania. Nd:ASL crystals Sn₃La₃Nd₃Mg₄Al₃O₁₄ (0.05 ≪ 0.5; y ≪ 0.05) were grown by Czochralski. 1.67W at 900nm output power was obtained under Ti:sapphire pumping. Intracavity SHG experiments gave 320mW of 450nm blue power with BiB₃O₉ nonlinear crystal.

MD4 • 2:45 p.m.
Efficient Yellow Light Generation by Frequency Doubling an 1150-nm Yb:Silica Fiber System, Supriyo Sinha, Karel E. Urbanek, Jonathan S. Alden, Carsten Langrock, Michel J. Digonnet, Martin M. Fejer, Robert L. Byer; Stanford Univ., USA. An 89-mW, 1150-nm Yb-fiber oscillator was amplified to 310 mW. The oscillator output was frequency doubled to produce 40 mW of yellow. We also present our progress in long period grating design for ASE suppression.

MD5 • 3:00 p.m.
Power-Scalable Ho:YAG Slab Laser, Intracavity Side-Pumped by a Tm:YLF Slab Laser, Sik Soi†, Jacob I. Mackenzie†, David P. Shepherd†, William A. Clarkson†, John G. Betterton†, Eric K. Gorton†, John A. Terry†; Univ. of Southampton, UK, 2QinetiQ Ltd., UK. We report the first demonstration of an intracavity side-pumped Ho:YAG slab laser, delivering 13W at 2.09μm and discuss the advantages of this scheme as an approach for power scaling.

MD6 • 3:15 p.m.
Room Temperature 3.9-4.5 μm Gain-Switched Lasing of Fe:ZnSe, John Kernal†, Vladimir Fedorov†, Andrew Galliani†, Sergey Mirov†, Valery Badikov†; Univ. of Alabama at Birmingham, USA, 2Kuhn State Univ., Russian Federation. Spectroscopic properties of Fe²⁺ in pure and Cr³⁺ co-doped ZnSe under 4E→3T₁ excitation, via Fe²⁺ ionization transitions, and Cr²⁺→Fe²⁺ energy transfer are studied. RT gain-switched lasing of Fe²⁺:ZnSe tunable over 3.9-4.8μm spectral range is reported.

ME • Pulsed Fiber Amplifiers
Lakeside Ballroom
4:00 p.m. – 5:30 p.m.
ME • Pulsed Fiber Amplifiers
Anne Tropper, Univ. of Southampton, UK, Presider

ME1 • 4:00 p.m. Invited
High Pulse Energy and High Peak Power Fiber Amplifiers, Mark Bowers; Aculight Corp., USA. Advances in fiber designs, fiber handling, and amplifier architectures have led to the demonstration of unprecedented pulse energy and peak power from fiber amplifiers. Recent results from Yb and Er doped fiber sources are presented.

ME2 • 4:30 p.m.
High Repetition Rate Tunable Femtosecond Pulses from Fiber Laser Pumped Parametric Amplifier, Thomas V. Andersen†, Oliver Schmidt†, Jens Limpert†, Claude Aguergaray†, Eric

Cormier†, Andreas Tünnermann†; 4Inst. of Applied Physics, Germany, 5CELIUS, Univ., France. High-energy femtosecond pulses at 1 MHz from a fiber-laser-pumped optical parametric amplifier are demonstrated. A broadband seed from a photonic crystal fiber enables tunability simply by adjusting the temporal delay between pump and signal.

ME3 • 4:45 p.m.
Harmonic Generation of an Yb-Doped Photonic-Crystal Fiber Amplifier to Obtain 1ns Pulses of 410, 160, and 190kW Peak-Power at 531, 354, and 265nm Wavelength, Fabio Di Teodoro, Christopher D. Brooks; Aculight Corp., USA. By frequency doubling, tripling, and quadrupling 1ns, ~10kHz-repetition-rate pulses from a 1062nm-wavelength Yb-doped photonic crystal fiber amplifier, we obtained pulse peak/average powers of 410kW/4W at 531nm, 160kW/1.5W at 354nm, and 190kW/1.8W at 265.5nm.

ME4 • 5:00 p.m.
Generation of 10-Cycle Pulses from a Yb Fiber Laser Using Cubic Phase Compensation, Joel R. Buckley, Stephen W. Clark, Frank W. Wise; Cornell Univ., USA. We demonstrate the use of a prism-grating sequence to reduce third-order dispersion inside a Yb fiber oscillator. Pulses as short as 33-fs, the shortest from a fiber laser, can be generated with extremely clean profiles.

ME5 • 5:15 p.m.
60-fs Pulses with 1 μJ Pulse Energy Generated by Nonlinear Compression of a Short-Pulse Fiber Laser, Fabian Röser, Jan Rothhardt, Claudia Bruchmann, Thomas Schreiber, Andreas Lien, Jens Limpert, Andreas Tünnermann; Inst. of Applied Physics, Germany. We report on the fiber laser based generation of 45 W average power of 60-fs pulses using nonlinear spectral broadening in a large-mode-area photonic crystal fiber followed by compression with chirped mirrors.

► 5:30 p.m. – 7:30 p.m.
Dinner (on your own)

MF • Postdeadline Paper Session
Lakeside Ballroom
7:30 p.m. – 8:30 p.m.
MF • Postdeadline Paper Session
Timothy J. Carrig; Lockheed Martin Coherent Technologies, USA, Presider

Tuesday, January 31, 2006
► 7:30 a.m. – 1:00 p.m.
Registration
Lakeside foyer

21st Annual Conference on Advanced Solid-State Photonics • Hyatt Regency Lake Tahoe Resort • Incline Village, Nevada
TuA • Mode-Locked Solid-State Lasers
Lakeside Ballroom
8:00 a.m. – 10:00 a.m.
TuA • Mode-Locked Solid-State Lasers
Rüdiger Paschotta; RP Photonics Consulting GmbH, Switzerland, Presider

TuA1 • 8:00 a.m. ❇ Invited
Super High Efficiency Diode Sources (SHEDS) and Architecture for Diode High Energy Laser Systems
(ADHELs): An Overview, Martin Stickley, Mark E. Filipkowski, Enrique Parra, Edwin E. Hach; 1DARPA, USA, 2Booz Allen Hamilton, USA. We present a summary view of the DARPA SHEDS and ADHELs programs. The goal of these programs is development of a compact, field-deployable high energy laser (HEL) weapons system.

TuA2 • 8:30 a.m.
50-GHz Mode-Locked VECSELs: An Integrable Alternative to High-Repetition-Rate Solid-State Lasers, Heiko J. Unold, Dirk Lorenser, Deran J. Maas, Benjamin Rudin, Aude-Reine Bellancourt, Ursula Keller, Emilio Gini, Dirk Ebling; ETH Zurich, Switzerland. We present high-repetition-rate passively mode-locked vertical-external-cavity surface-emitting semiconductor lasers in a 1:1 mode configuration, achieving a record repetition rate of 50 GHz in 3.1-ps pulses with 42 mW average output power.

TuA3 • 8:45 a.m.
Pushing the High-Pulse-Repetition-Rate Frontier Using a New Regime of Inverse Saturation Absorption and Novel Low Saturation Fluence SESAMs, Ursula Keller, Rachel Grange, Markus Hainl, Gabriel J. Spühler, Lukas Krainer, Olivier Ostinelli, Matthias Golling, Kurt J. Weingarten; 1ETH Zurich, Switzerland, 2Time-Bandwidth Products Inc., Switzerland. During the last few years we have demonstrated unprecedented performance in high-repetition rate diode-pumped solid-state lasers. Here we explain the two key SESAM design improvements which were necessary to achieve these results.

TuA4 • 9:00 a.m.
A SESAM Passively Mode-Locked Cr:ZnS Laser, Irina T. Sorokina1, Evgeni Sorokin1, Timothy J. Carrig2, Kathleen I. Schaffers3; 1Photonics Inst. TU Vienna, Austria, 2Coherent Technologies, USA, 3LLNL, USA. We report the first mode-locked continuous-wave Cr:ZnS laser, passively mode-locked by an InAs/GaSb based SESAM, operating around 2.45 μm and generating ~1 psec pulses and provide a comparison between the mode-locked Cr:ZnS and Cr:ZnSe lasers.

TuA5 • 9:15 a.m.
914-nm Diode-Pumped Passively-Mode-Locked Laser Based on Nd:YVO4, Pierre Blandin, Frédéric P. Drumont, François Balenbois, Patrick Georges, Sandrine Leveque-Fort; Maitre-Pierre Fontaine-Aupart, 1Lab Charles Fabry, France, 2Lab de Photophysique Moléculaire, France. We demonstrate the first diode-pumped passively-mode-locked Nd:YVO4 laser, operating on the 4F_{17/2}-4I_{15/2} transition of the neodymium ion at 914 nm. Pulses of 8.8 ps at 913.8 nm have been produced.

TuA6 • 9:30 a.m.
A Low-Loss Buried Resonant GaInNAs SESAM for 1.3-μm Nd:YLF Laser at 1.4 GHz, Simon C. Zeller, Rachel Grange, Valeria Liverini, Andreas Rutz, Silke Schön, Markus Hainl, Ursula Keller, Susanne Pavlith, Berthold Schmidt; 1ETH Zürich, Switzerland, 2Bookham AG, Switzerland. We propose a new design for a semiconductor saturable absorber mirror with customized inverse saturable absorption. This design was applied for passively mode-locking a diode-pumped 1.3-μm Nd:YLF laser with a repetition rate of 1.4 GHz.

TuA7 • 9:45 a.m.
Antimonide Semiconductor Saturable Absorber for Passive Mode-locking of a 1.5-μm Er:Yb:Glass Laser at 10 GHz, Simon C. Zeller, Rachel Grange, Silke Schön, Markus Hainl, Ursula Keller, Olivier Ostinelli, Martin Ebnet, Emilio Gini; 1ETH Zürich, Switzerland, 2Avacom Photonics, Switzerland, 3ETH Zürich - FIRST Ctr. for Micro- and Nanoscience, Switzerland. We demonstrate the first antimonide (AlGaAsSb) semiconductor saturable absorber mirror (SESAM) for passive mode-locking of an Er:Yb:glass laser at 1535 nm and 10 GHz. The SESAM is InP-based and grown by MOVPE.

TuB • Poster Session II
Regency Ballroom
10:00 a.m. – 11:00 a.m.
TuB1 • Poster Session II
TuB1
Random Nature of Thermally Induced Depolarization in Polycrystalline Laser Ceramics, Ivan B. Mukhin1, Oleg V. Palashov2, Efim A. Kuzanov3, Akio Kaseue4, Yan L. Aung5; 1Inst. of Applied Physics, Russian Federation, 2Poly-Techno Co., Japan. Spatial modulation of a laser beam is experimentally found at thermal depolarization in Nd:YAG ceramics. This effect, which was theoretically predicted earlier, is inherent in ceramics only and has no analogue in single crystals.

TuB2
Transmitter Technologies for Space Born Water Vapor DIAL Systems in the 940 nm Region, Frank Kallmeyer, Stephan G. Strohmaier, Hanno Rice, Andreas Hermerschmidt, Thomas Rieber; 1Technical Univ. Berlin, Germany, 2EADS Astrium GmbH, Germany. A Titanium Sapphire laser, a Raman laser and a garnet laser are investigated and compared concerning the performance as a laser transmitter for a space born water vapor DIAL in the 940 nm wavelength region.

TuB3
and Development Lab, Poly-Techno, Japan. We have demonstrated laser oscillation in a ceramic layered composite Nd:YAlO$_3$/Nd:YScAlO$_3$. The slope efficiency was 39% even if uncoated material. After the investigation of spectroscopic property, the possibility of tailored fluorescence spectral profile was discussed.

TuB4
Spectroscopy and Laser Performance of a Pulsed
Tm:Germanate Fiber Laser, Norman P. Barnes, Brian M. Walsh, Donald J. Reiche, Shibin Jiang, 1NASA Langley Res. Ctr., USA, 2NP Photonics, USA. Tm:germanate, a novel fiber laser, was predicted to make efficient lasers when pumped with 0.792 µm diodes because of their low phonon energies. Spectroscopic and pulsed laser performance showing quantum efficiency of 1.5 is presented.

TuB5
High Power 2.3 µm Yb:Tm:YLF Laser, Simultaneously Diode-Pumped at 685 nm and 960 nm, Paulo Sergio de Matos, Niklaus Ursus Wetter; Ctr. de Lasers e Aplicações, Brazil. Simultaneous pumping of the 2.3µm Yb:Tm:YLF laser at 685 nm and 960 nm is demonstrated, showing higher slope efficiency than 960 nm alone. The output power of 620 mW is the highest reported so far.

TuB6
Multi-Watt and Tunable Diode-Pumped Operation of Tm:GdVO$_4$ Crystal Grown by a Floating Zone Method, Pavel Cerny, Jiri Osvald, Jan Sule, Helena Jelinikova, Yoshiharu Utara, Mikio Higuchi, 1Inst. of Physics, Czech Republic, 2Czech Technical Univ., Czech Republic, 3Megaopto Co., Ltd., Japan, 4Hokkaido Univ., Japan. Improved diode-pumped laser performance is reported with a floating-zone grown Tm:GdVO$_4$ crystal. Up to 2.6 W output with 31% slope efficiency was obtained. Continuous tuning under diode pumping from 1840 to 1970 nm is demonstrated.

TuB7
Highly Efficient Operation of Tm:Fiber Laser Pumped Ho:YLF Laser, Yingxin Bai, Malugeta Petrov, Jirong Yu, Paul Petz, Bo Trieu, Songsheng Chen, Huyng Lee, Upendra Singh. 1Science Applications Intl. Corp., USA, 2Science and Technology Corp., USA, 3NASA Langley Res. Ctr., USA, 4Dept. of Physics, Hampton Univ., USA. A 19 W, TEM$_{00}$ mode, Ho:YLF laser pumped by continuous wave Tm:FB laser has been demonstrated at the room temperature. The slope efficiency and optical-to-optical efficiency are 65% and 55%, respectively.

TuB8
Tunable Single Mode ErYb:Glass Laser Locked by a Bulk Glass Bragg Grating, Bjorn Jacobsson, Valdas Pasikievicius, Fredrik Laurdell; Royal Inst. of Technology, Sweden. We demonstrate single mode-locking of an ErYb:glass laser at 1552.6 nm using feedback from a bulk glass Bragg grating, tunable over 0.25 nm (31 GHz) in steps of 17 pm (2.1 GHz).

TuB9
Soliton Self-Frequency Shift from 1.03 µm to 1.55 µm, Jian Chen, Fatih O. Ilday, Franz X. Kaertner; MIT, USA. Soliton self-frequency shift over 520 nm from 1.03 µm to 1.55 µm is demonstrated. Potential applications such as seeding of parametric amplifiers and optical frequency metrology are discussed.

TuB10
Efficient Ho:YAG Laser Resonantly Pumped by Tm-Fiber Laser, Igor Moskalov, Vladimir Fedorov, Sergey Mironov, Andrei Babushkin, Valentin Gapontsev, Denis Gapontsev, Nikolai Platousov; 1Univ. of Alabama at Birmingham, USA, 2IPG Photonics Corp., USA. We report an efficient, Ho:YAG laser system pumped by 22W Tm-fiber laser producing 10 W of CW power and 15 mJ of pulse energy in the Q-switched regime with a pulse duration of 17 ns.

TuB11
High Repetition Rate Ti:Sapphire Laser System with Nanosecond Pulses and a Tunability from the UV to the NIR, Bernd Jungbluth, Jochen Wuempel, Marcel Vierkotten, Jens Geiger, Dieter Hoffmann, Reinhard Poprawe, Juergen Ortmann; 1Frauenhofer Inst. for Lasertechnology, Germany, 2Ortmann Digitaltechnik, Germany. A kilohertz repetition rate Ti:Sapphire laser system provides a nearly continuous tuning range from 210 to 1020 nm. A breadboard prototype with fully automated wavelength tuning has been developed.

TuB12
Novel Design of Powerful Femtosecond Laser at 800nm Wavelength, Efim A. Khazanov; Inst. of Applied Physics, Russian Federation. A simple and reliable femtosecond laser design is suggested, which comprises a Er:erbium laser at 1550nm, a fiber stretcher, a BBO optical parametric amplifier with wavelength conversion to 800nm, Ti:Sapphire/BBO amplifiers, and a usual compressor.

TuB13
Athermal, Diode-Pumped Nd:YLF Regenerative Amplifier, Andrey V. Okshev, Jonathan D. Zuegel; Univ. of Rochester, USA. A new athermal, highly-stable, diode-pumped Nd:YLF regenerative amplifier has been developed that can amplify shaped pulses with durations of up to 10 ns.

TuB14
Compact, High Efficiency, Passively Q-Switched Nd:YAG MOPA for Spaceborne Laser-Altimetry, Sten Hahn, Rafael Hu, Joerg Neumann, Ralf Wilhelm, Maik Frede, Dietmar Kracht, Peter Peuser; 1Laserzentrum Hannover, Germany, 2European Aeronautic Defense and Space Co., Germany. An high efficiency passively Q-switched Nd:YAG MOPA with 62 mJ of pulse energy, 2.8 ns pulse duration and high temperature stability, suitable for space application was demonstrated.

TuB15
1003 nm Single-Frequency High-Power Optically Pumped Semiconductor Laser, Manuela Domenech, Mathieu Jacquetet, Gaelle Lucas-Lectin, Patrick George, Julie Dion, Martin Strassner, Isabelle Sagnes, Arnaud Garnache; 1Lab Charles Fabry, France, 2Lab of Photonique et de Nanostructures, France, 3Crs. d’Electronique et de Micro optoelectronique de Montpellier, France. We report high power single-frequency laser operation at $\lambda = \ldots$
1003 nm of an optically pumped external-cavity semiconductor laser in which the gain structure is bonded to a SiC heatspreader. Intracavity frequency-doubling is also demonstrated.

TuB16
High-Average-Power, Highly-Efficient Operation of Q-Switched Cryogenic Yb:YAG Laser, Shigeki Tokita1, Junji Kawanaka1, Yasukazu Izawa1, Masayuki Fujita1, Toshiyuki Kavashima2; 1Inst. of Laser Engineering, Osaka Univ., Japan; 2Inst. for Laser Technology, Japan, 3Crl. Res. Lab, Hamamatsu Photonics K. K., Japan. We have demonstrated a cryogenically-cooled Q-switched Yb:YAG laser oscillator with diode pumping, 74-W average power was obtained with pulse energy of several millijoules, optical-optical efficiency of 60%, and M² factor of less than 1.4.

TuB17
Diode Pumped 18W Long Nd: Glass Waveguide Laser, Xin Ye, Tao Fang, Jianqiu Xu; Shanghai Inst. of Optics and Fine Mechanics, Chinese Acad. of Sciences, China. A long Nd-doped phosphate glass waveguide laser pumped by laser diodes is demonstrated, which is air-cooled to provide around 18 W CW output power. Influence of the thermal lensing and pump distribution is discussed.

TuB18
Explanation for Beam Quality Deterioration of Lasers for Operation near Frequency Degeneracy of Transverse Cavity Modes, Rüdiger Paschotta; RP Photonics Consulting GmbH, Switzerland. A simple resonant mode coupling model explains why the beam quality of a laser is strongly deteriorated near resonator frequency degeneracy points, and leads to important conclusions concerning laser beam quality in more general cases.

TuB19
Pulsed, All Solid-State Light Source in the Visible Spectral Region Based on Nonlinear Cavity Dumping, Peter Tidemand-Milchberg1, Martin Andersen2, Sandra Johansson3, Jiri Janousek4, Preben Buchhave5, Fredrik Laurell6; 1Technical Univ. of Denmark, Denmark, 2Laser Physics and Quantum Optics, KTH, AlbaNova, Sweden. We propose a novel generic approach for generation of pulsed light in the visible spectrum, based on SFG between the high circulating-intra-cavity power of a high finesse CW laser and a single-pass pulsed laser.

TuB20
Continuous-Wave Lasing of Yb:LuVO₄, Junhai Liu1, Valentin Petrov1, Xavier Mateos1, Uwe Griebner2, Huijuan Zhang1, Liqiang Wang1, Minhua Jiang3, Christian Kränkel4, Klaus Petermann1; 1Max-Born-Inst., Germany, 2Shandong Univ., China, 3Univ. of Hamburg, Germany. We report on the crystal growth, spectroscopy and laser operation of Yb:LuVO₄ achieving an output power of 0.36 W at 1041 nm with Ti:sapphire and 2.85 W (slope efficiency of 51.3%) with diode laser pumping.

TuB21

TuB22
Spectroscopy and Continuous-Wave Diode-Pumped Laser Operation of Er³⁺,Yb³⁺:YVO₄ Single Crystal, Nikolai A. Tolstiti1, Andrei E. Troskin1, Victor E. Kisel2, Nikolai V. Kuleshov3, V. N. Matrosev4, T. A. Matrosova2, M. I. Kapchenko2; 1Inst. of Optical Materials and Technologies BNTU, Belarus, 2Sailix Ltd., Belarus. We report on the spectroscopic properties, energy transfer and CW laser operation of a diode-pumped Er,Yb:YVO₄ laser. Output power of 170 mW with slope efficiency of 8% with respect to absorbed pump power was demonstrated.

TuB23
Compact, High-Rep-rate Rate 336nm Source Based on a Frequency Quadrupled, Diode-Pumped Nd:YVO₄ Laser, Hamish Ogilvy, James A. Piper; Macquarie Univ., Australia. Intracavity nonlinear second harmonic generation from a Q-switched, diode-end-pumped Nd:YVO₄ laser (1342nm) and subsequent external fourth harmonic generation in BBO have been used to demonstrate up to 20mW average power at 336nm at multi-kilohertz repetition-rates.

TuB24
Thermal Effects on the Scalability of High Power Third Harmonic Generation at 355 nm in LBO, Jens Löhrling, Marco Höfer, Rolf Wester, Hans-Dieter Hoffmann, Reinhart Poprawe; Fraunhofer Inst. für Laser Technik, Germany. Numerical calculations with an experimentally evaluated model show drop of the conversion efficiency above 100W UV caused by thermal effects. With an optimized experimental setup 36W@355nm with M²<1.5 at 100W fundamental power are demonstrated.

TuC • THz and Optical Parametric Oscillators

Lakeside Ballroom
11:00 a.m. – 1:00 p.m.

TuC • THz and Optical Parametric Oscillators
Christopher A. Ebbers; LLNL, USA, Presider

TuC1 • 11:00 a.m. Invited

THz-Wave Frequency-Agile Parametric Oscillator and Future Applications, Hiroki Minamiida1, Koichi Akikuno1, Hiromasa Ito1; 1RIKEN PDC, Japan, 3Res. Inst. of Electrical Communication, Tohoku Univ., Japan. We have developed frequency-agile THz-wave parametric oscillators (TPO). The random-frequency access and the rapid tunability provide promising THz-wave applications in various industrial and research fields. The THz-wave source and its applications will be discussed.
TuC2 • 11:30 a.m.
High-Power Source of THz Radiation Based on Orientation-Patterned GaAs Pumped by a Fiber Laser, G. Imeshev1, M. E. Fermann1, K. L. Vodopyanov2, M. M. Fejer1, X. Yu1, J. S. Harris1, D. Bliss1, D. Wegburen1; IMRA America, Inc, USA, E. L. Ginztin Lab, Stanford Univ., USA, Solid State Photonics Lab, Stanford Univ., USA, Hanscom AFRL, USA. We demonstrate a μW-level, 100-MHz repetition rate THz source based on parametric down-conversion in orientation-patterned GaAs pumped by a femtosecond all-fiber laser at 2 μm. The demonstrated source should be suitable for imaging and spectroscopy.

TuC3 • 11:45 a.m.
100nJ Output Optical Parametric Oscillation Using Periodically Poled MgO:LiNbO3, Hideki Ishizuki, Jiro Saikawa, Takunori Taira; Laser Res. Ctr., Inst. for Molecular Science, Japan. Quasi phase-matched optical parametric oscillation using periodically poled MgO-doped congruent LiNbO3 with 5 mm thickness and 32.3 μm period was demonstrated. We achieved the total output of ~100 mJ at 2 μm wavelength.

TuC4 • 12:00 p.m.
Narrow Linewidth Near-Degenerate Optical Parametric Oscillation in Periodically Poled LiNbO3 with Volume Bragg Grating Output Coupler, Markus Henriksson1, Lars Sjöqvist1, Valdas Pasiskervicius1, Fredrik Laurell1; FOI, Sweden, Royal Inst. of Technology, Sweden. A periodically poled LiNbO3 (PPLN) OPO with Volume Bragg Grating output coupler and signal wavelength of 2008 nm pumped by a Nd:YVO4-laser is presented. A signal linewidth of approximately 0.5 nm was achieved.

TuC5 • 12:15 p.m.
Frequency Locking in a Degenerate Polarization Mixing Optical Parametric Oscillator, Pinhas Blau1, Shaul Pearl1, Gal Kallman2, Ady Arie2, Arlee Y. Smith1; SOREQ NRC, Israel, Dept. of Electronic Engineering, Tel-Aviv Univ., Israel, Sandia Natl. Labs, USA. A polarization mixing OPO was demonstrated, that emits a single, linearly polarized narrow linewidth beam, fixed at degeneracy, independent of crystal temperature. The frequency locking is explained in terms of balanced roundtrip phase-matching condition.

TuC6 • 12:30 p.m.
Tunable fs Laser Pulses from OPA with MHz Repetition Rate, Andy Steinmann1, Alexander Killi1, Guido Palmer1, Uwe Morgner1, Hartmut Bartelt1; Jens Kobelke1; Inst. für Quantenoptik, Univ. Hannover, Germany, Inst. für Physikalische Hochtechnologie e.V., Germany. We demonstrate an optical parametric amplifier with 1 MHz repetition frequency and 30 nJ, 16 fs pulses. It is tunable from 0.65 to 0.85 μm (signal) and 1.4 to 2.5 μm (idler) respectively.

TuC7 • 12:45 p.m.
High-Performance OPCA Laser System, Jonathan D. Zuegel1, V. Bagnoud1, J. Bromage1, I. A. Begishev1, J. Puth1; Univ. of Rochester, USA, GSI, Germany. A high-performance optical parametric chirped-pulse amplifier (OPCA) system that delivers 530-mJ chirped pulses at a 5-Hz repetition rate has been demonstrated.

Wednesday, February 1, 2006

WA • Microstructured Fibers
Lakeside Ballroom
8:00 a.m. – 10:00 a.m.
WA • Microstructured Fibers
Ingrid Hart;i IMRA America, Inc., USA, President

WA1 • 8:00 a.m.
Plenary
Keeping Light Behind Bars, Philip Russell; Univ. of Erlangen, Germany. Two-dimensional arrays of nano/microscopic cylinders with raised or lowered refractive index can be used “to keep light behind bars.” By judicious structural control, resonance and anti-resonance can be used to play new tricks with light.

Philip Russell is the Alfred Krupp von Bohlen und Halbach Professor, and Director of the Max-Planck Research Group for Optics at the University of Erlangen, Germany. From 1996 to 2005 he was a professor in the department of Physics at the University of Bath, where he founded and led the Photonics & Photonic Materials Group. He obtained his D.Phil. (1979) degree at the University of Oxford, subsequently working in Europe and the USA. Since 1977, he has specialised in the behaviour of light in periodic structures, as well as nonlinear optics, waveguides and optical fibres. In 2001, he founded BlazePhotonics Ltd., with the commercial aim of exploiting photonic crystal fibre (PCF). He has over 600 publications and a substantial number of patents. A Fellow of the Optical Society of America, in 2000, he won its Joseph Fraunhofer Award/Robert M. Burley Prize for the invention of PCF. He won the Applied Optics Division Prize (2002) and the Thomas Young Prize (2005) of the UK Institute of Physics. In 2004, he received a Royal Society/Wolfson Research Merit Award and in 2005 he was elected Fellow of the Royal Society and received the Körber Prize for European Science. He is currently an IEEE-LEOS Distinguished Lecturer.

WA2 • 8:45 a.m.
Extension of Supercontinuum Generation to the Blue in Cascaded Holey Fibers, J. C. Travers, S. V. Popov, J. R. Taylor; Femtosecond Optics Group, Imperial College, UK. Combining holey-fibers with sequentially decreasing zero dispersion wavelengths, pumped with an all-fiber picosecond ytterbium laser, produced a 1.2W average power white light continuum 0.44-1.89μm. Enhancement of short wavelength generation is associated with optimized phase-matched four-wave-mixing.
WA3 • 9:00 a.m.
High Power Operation of a Low-Nonlinearity Single Polarization Photonic Crystal Fiber, Thomas Schreiber, Oliver Schmidt, Fabian Röser, Ian Rothhardt, Jens Limpert, Andreas Tünnermann; Inst. of Applied Physics, Germany. We report on the design and high power operation (147 W) of a single-polarization single-transverse mode large-mode-area photonic crystal fiber, which is realized by including index-matched stress-applying elements in the photonic cladding.

WA4 • 9:15 a.m.
1-mJ Energy, 1-MW Peak-Power, 10-W Average-Power, Diffraction-Limited Pulses from an Yb-Doped Photonic Crystal Fiber Amplifier, Fabio Di Teodoro, Christopher D. Brooks; Acuitylight Corp., USA. A dual-stage amplifier seeded by a pulsed micro-laser and featuring an Yb-doped photonic crystal fiber generated 1062 nm-wavelength, 1 ns, ~10 kHz repetition-rate, diffraction-limited (M2 ~ 1.05) pulses of energy >1 mJ, peak/average power >1 MW/10 W, and spectral linewidth <9 GHz.

WA5 • 9:30 a.m.
High Energy and High Average Power Q-Switched Photonic Crystal Fiber Laser, Oliver Schmidt, Fabian Röser, Sebastian Linke, Thomas Schreiber, Jens Limpert, S. Ermenets, P. Yvernaud, F. Salin, Andreas Tünnermann; Inst. of Applied Physics, Germany. 2FEMLIGHT, France. We report on the generation of sub-10 ns pulses with 2.5 mJ energy at low repetition rates and up to 100-W average power at 100-kHz from a Q-switched fiber laser with a 60 μm single-transverse-mode core.

WA6 • 9:45 a.m.

WB • Poster Session III
Regency Ballroom
10:00 a.m. – 11:00 a.m.
WB • Poster Session III

WB1 Polared Z-Scan Measurements of Nonlinear Refractive Index for Yb-Doped KY(WO₄)₂ and YVO₄ Laser Crystals, Konstantin Yamashin, Andrea Selivanov, Igor Denisov, Nikolai Kuleshov; Inst. for Optical Materials and Technologies, Belarus. The nonlinear refractive indices of the Yb₃⁺:KY(WO₄)₂ and Yb₃⁺:YVO₄ laser crystals are characterized using a z-scan technique at wavelength of 1.08 μm for different polarizations.

WB2 Crystal Growth of Gd₃⁺:R.CaO(BO₃)₃ (R = Sc or Lu) for Non Critical Phase Matched (NCPM) Second Harmonic Generation (SHG) at 800 nm, Lucian Gheorghe, Voicu Lupa, Pascal Loiseau, Gerard Akar, Takunori Taira; 1Inst. of Atomic Physics, Lab of Solid-State Quantum Electronics, Romania, 2ENSCP, Lab de Chimie Appliquée de l’Etat Solide, France, 3Laser Res. Ctr. for Molecular Science, Inst. for Molecular Science, Japan. We have grown Gd₃⁺:Sc.CaO(BO₃)₃ (x = 0.10) and Gd₃⁺:Lu.CaO(BO₃)₃ (x = 0.07, 0.13) nonlinear crystals and succeeded in generating a SHG of Ti:sapphire laser at almost 800 nm under non-critical phase matching conditions.

WB3 Recent Progress in X-Related Optical Process Experimental Technique: Raman Lasing, Andrei Matisko, Anatoly Savchenko, Dmitriy Strekalov, Lute Maleki; JPL/NASA, USA. We describe theoretically and demonstrate experimentally a simple single-scan technique for analyzing conversion efficiency and threshold of intracavity Raman lasers. The method uses dependence of the ring-down time of the mode on the mode energy.

WB4 Optical Properties of the Yb-Doped Vanadates for Ultra Short Pulse Application, Takayo Ogawa, Yoshiharu Urata, Satoshi Wada, Mikio Higuchi, Jun-ichi Takahashi; 1RIKEN, Japan, 2Hokkaido Univ., Japan. We grew high-quality Yb:YVO₄, Yb:GdVO₄ and Yb:LuVO₄ by the floating zone method. Favorable optical properties were measured with these crystals. Maximum absorption coefficient and fluorescence bandwidth of 27 cm⁻¹ and 20 nm (FWHM) were observed for Yb:LuVO₄.

WB5 Experimental Investigation of the Athermal Orientation in Yb:KGW, Jonas E. Hellström, Stefan Byurshagen, Valdas Pasiskevicius, Fredrik Laurell; Kungliga Tekniska högskolan, Sweden. A comparative, experimental study between b-cut Yb:KGW and Yb:KGW cut along a proposed athermal direction is presented. The athermal direction gives a significantly weaker thermal lens, lower astigmatism and higher beam quality under lasing conditions.

WB6 Heat Generation Following Direct Pumping of Nd:YVO₄ with and in the Absence of Stimulated Emission, Raphy Lavi, Sharone Goldring, Soreq NRC, Israel. Measurements of heat generated in Nd:YVO₄ following pumping at 880 nm is reported. Two different mechanisms govern the heat creation while lasing and during the fluorescence stage - reabsorption of the lasing photon and cross-relaxation, respectively.

WB7 Long-Pulse Q-Switched Operation of Tunable Micro-Rod Yb:YAG Laser, Rakesh Bhandari, Toshikazu Kamiya, Takunori Taira; 1SINIX Ltd., Japan, 2Inst. for Molecular Science, Japan. A new method for generating microsecond-long pulses is proposed. Using this method, a micro-rod Yb:YAG laser,
tunable over 27 nm, has been developed, which can generate 3.6 microsecond-long pulses in single axial mode.

WB8
**Efficient Active-Mirror Laser Oscillator with a Cooled Yb:YAG Ceramics**, Junji Kawanači, Shigeki Tokita, Hajeine Nishioka, Ken-ichi Ueda, Masayuki Fujita, Toshiyuki Kawashima, Hideki Yagi, Takagini Yagishita; 1Inst. of Laser Engineering, Japan, 1Inst. for Laser Science, Japan, 3Inst. of Laser Technology, Japan, 3Hamamatsu Photonics K. K., Japan, 3Konoshima Chemical Co. Ltd., Japan. 30W active-mirror oscillator with a liquid-nitrogen-cooled Yb:YAG ceramics has been demonstrated in quasi-cw diode pump. The optical efficiency and slope efficiency were high at 62% and 71%, respectively, in both of free-running and Q-switching operation.

WB9
**High Average Power LD Pumped Yb:YAG Regenerative Amplifier at High Repetition Rates**, Keiichi Sueda, Sakae Kato, Shinichi Matsubara, Akira Takazawa, Kazuyuki Akagawa, Satoshi Wada, Takao Kabağashi; 1Res. Ctr. for Industrial Science and Technology, Japan, 2Univ. of Fukui, Japan, 3Megaopto Corp., Japan. A diode pumped Yb:YAG regenerative amplifier has been developed. 10 W average output power was achieved at a repetition rate of 100 kHz with a pulse width of 6.2 ps.

WB10
**Efficient Dual-Wavelength Laser Performance of Yb:YAG Crystal Grown by Temperature Gradient Technique**, Jun Dong, Akira Shira rat, Ken-ichi Ueda, Jun Xu, Peizhen Deng; 1Inst. for Laser Science, Univ. of Electro-Communications, Japan, 2Shanghai Inst. of Optics and Fine Mechanics, Chinese Acad. of Sciences, China. Efficient dual-wavelength laser performance of Yb:YAG crystal grown by temperature gradient technique was achieved at room temperature. Slope efficiencies of 57%, 68% at 1049 nm and 1030 nm were achieved for 10 at.% Yb:YAG sample.

WB11
**Compact, Diode Side-Pumped Nd:YVO₄ cw Laser with 74% Slope Efficiency and 22 W Output Power**, Fabiola Almeida Camargo, Nikolaos Ursus Wetter; 1Ctr. de Lasers e Aplicações - IPEN/SP, Brazil, 2Ctr. de Lasers e Aplicações, Brazil. We demonstrate 63% optical-to-optical conversion efficiency and 22 W of multi-mode output power in a compact, 8 cm long Nd:YVO₄ oscillator. The slope efficiency of 74% is to our knowledge the highest so far reported.

WB12
**OPCPA Output Wavelength Tuning by Adjusting Time Delay between Seed and Pump Pulses**, Ilidar A. Begishev, Vincent Bagnum, Mark J. Guardado, Jonathan D. Zuegel; Lab for Laser Energetics, Univ. of Rochester, USA. Fine-tuning of LBO-OPCPA output wavelength has been demonstrated by adjusting time delay between the seed and pump pulses. Because of the saturation of amplification, the output spectrum has a rectangular shape over a tuning range.

WB13

WB14
**Acousto-Optic Q-Switching and Mode-locking in Diode Pumped Nd:YVO₄ Laser**, Jan K. Jabłczynski, Waldemar Zendezi, Jackie Kwiatkowski; Inst. of Optoelectronics, Poland. Q-Switching and Mode-locking applying acousto-optic modulator was demonstrated in Nd:YVO₄ laser end pumped by 20-25 laser diode. 3-W average power, 0.13 mJ of the envelope energy with 5-8 mode locked pulses were achieved.

WB15
**High Power End-Pumped Nd:YVO₄ Amplifier**, Bastian Schulz, Maik Frede, Ralf Wilhelm, Dieter Kracht; Laser Zentrum Hannover e. V., Germany. An end-pumped Nd:YVO₄-amplifier for efficient amplification of laser sources at 1064 nm will be presented with an optical efficiency > 70%. With an input of 12 W an output power of 47.2 W was achieved.

WB16
**Hybrid Mode-Locking of a Nd:YVO₄ Laser with a Partially Poled KTP Crystal**, Stefan J. Holmgren, Anna Frøgman, Valdas Pasiekevičius, Fredrik Laurell; Royal Inst. of Technology, Sweden. A Nd:YVO₄ laser is mode-locked with a hybrid active and passive modulator incorporated in a single PPKTP crystal. A periodically poled part provides negative cascaded Kerr-lensing and a bulk part with electrodes provides phase modulation.

WB17
**Measuring Small Intracavity Phase Changes in a Bidirectional Ring Diode Pumped Mode-Locked Nd:YVO₄ Laser**, Vaclav Kubec1, Miroslav Cec1, Petr Hirs1, Jean-Claude Dief1, Vaclav Skoda1,2; Czech Technical Univ., Czech Republic, 2Univ. of New Mexico, USA. CRYTUR s.r.o., Czech Republic. Application of bidirectionally passively mode-locked Nd:vanadate ring laser pumped by low power laser diode for measuring of small intracavity phase changes is reported.

WB18
**Comparative Study of Nd:GdVO₄ and Nd:YVO₄ and Test of a Composite Nd:YVO₄/YVO₄ Rod Using a New Method of Bonding**, Julien Didierjean1, François Balentsbois1, Frédéric P. Druin2, Patrick Georges1, Johan Petits, Philippe Goldner2, Bruno Viura2; 1Lab Charles Fabry, France, 2Lab de Chimie Appliquée de l’Ecole Supérieure de Chimie Paris, France. We demonstrate by a systematic study that Nd:GdVO₄ has no better thermal management than Nd:YVO₄. Complementary, we present a new method of bonding that effectively reduces temperature elevation in vanadate lasers.
WB20
Tm:LuVO₃: A New Material for 2 μm Diode-Pumped Lasers, Pavel Cery, Lari Osvaldi, Jian Su, Helena Jelinkova, Yoshitomo Urata, Mikio Higuchi; Institute of Physics, Czech Republic, Czech Technical University, Czech Republic, Megaopto Co., Ltd., Japan. Novel 2-μm laser material Tm:LuVO₃ was developed. Spectroscopic investigation revealed peak absorption cross-section of 6.2 ± 10⁻²⁰ cm² and broad luminescence centered at 1810 nm. Laser action was achieved under quasi-continuous-wave diode pumping with 19% slope efficiency.

WB21
Mid-Infrared Electroluminescence of Cr³⁺ Ions in ZnSe Crystals, Vladimír V. Fedorov, Igor Moskalov, Lawrence Luke, Andrew Gallian, Sergey B. Mirov; Univ. of Alabama at Birmingham, USA. We report the first observation of the room-temperature middle-infrared electroluminescence of n-type Cr doped bulk ZnSe crystals in the spectral range of 1800-2800 nm.

WB22
Luminescence Characteristics of Nd³⁺-Doped Silicone-Urea Copolymers, Umit Demirbas, Adnan Kurt, Alphan Semaroglu, Emet Yilgor, Iskerden Yilgor; Univ. of Istanbul, Turkey. We describe the synthesis and spectroscopic investigation of neodymium-doped silicone-urea copolymers. Absorption and luminescence analysis show that neodymium-doped silicone-urea copolymers are promising candidates for the development of polymer-based active photonic devices in the near infrared.

WB23
Cooperative Luminescence in TeOₓ-ZnO Glasses Doped with Yb³⁺, Jonas Jakutis; Niklaus Ursus Wetter; Márcio Alencar; Luciana Reves Kassab; Renata Andrade Kobyashi; Ctr. of Lasers e Aplicações - IPEN/SP, Brazil; UNIFESP/EPM, Brazil; Federal de Alagoas, Brazil; Faculdade de Tecnologia de Sao Paulo, Brazil; Faculdade de Tecnologia de Sao Paulo, Brazil. For the first time, characteristics of Yb³⁺ doped binary TeOₓ-ZnO glasses are presented, such as cooperative luminescence, high refractive index (2.1), high absorption coefficient (3.3 cm⁻¹) and large transmission window (0.36–5.6 μm).

WB24
Amplified Spontaneous Emission in Organic Solids Composed of Excited-State Intramolecular Proton Transfer Molecules, Hwan Hong Lim, Shinmugam Boonmadi, Oc-Youb Jeon, Kwangseok Kyung, Myeong-Sik Cha, Sanghyuk Park, Sehoon Kim, Soo Young Park; 1Pusan Natl. Univ., Republic of Korea, 2Seoul Natl. Univ., Republic of Korea. Amplified spontaneous emission associated with excited-state intramolecular proton transfer was investigated in organic single crystals and glasses.

The closely packed single crystals were shown to be a promising candidate for gain medium for pulsed excitation.

WC • Ultrashort Pulse Generation and Amplification

Lakeside Ballroom
11:00 a.m. – 12:30 p.m.
WC • Ultrashort Pulse Generation and Amplification
Franz X. Kaertner; MIT, USA, Presider

WC1 • 11:00 a.m.
Intense 5.1-fs Carrier-Envelope-Phase Controlled Pulse Generation through Filamentation, Annalisa Guandalini, Petrissa Eckle, Marcel Auscombe, Philipp Schulz, Jens Biegert, Ursula Keller; ETH Zurich, Switzerland. Intense 5.1-fs pulses were generated through filamentation in argon. The CEO (carrier envelope offset) phase control is investigated using the intense, octave-spanning spectrum generated during this process, directly for single shot 1-2 fs spectral interferometry.

WC2 • 11:15 a.m.
Towards Ultrabroad Parametric Gain Bandwidth in Periodically Poled KTiOPO₄, Mikael Tiihonen, Asna Fragemann, Carlota Canalias, Valdas Paskevicius, Fredrik Laurell; Royal Inst. of Technology, Sweden. We present Ti:sapphire pumped degenerate parametric generator bandwidths exceeding 130 THz in 8-mm-long PPKTP crystals. Collinear and noncollinear interaction schemes are investigated with the goal of obtaining ultrabroad gain bandwidth with zero-angular dispersion.

WC3 • 11:30 a.m.

WC4 • 11:45 a.m.
Diode-Pumped Yb:CaGdAlO₃: Femtosecond Laser, Yoann Zanoter, Julien Didierjean, Gaëlle Lucas-Lectin, François Balemoins, Frédéric P. Drauon, Patrick Georges, Johan Petti, Philippe Goldner, Bruno Viana; Lab Charles Fabry, France. We present the first demonstration in femtosecond regime of an Yb³⁺:CaGdAlO₃ crystal. Pulses as short as 47 fs at 1050 nm have been produced.

WC5 • 12:00 p.m.
High Power Femtosecond Source Based on Passively Mode-Locked 1053-nm VCSEL and Yb-Fibre Power Amplifier, Hannah D. Foreman, Keith G. Wilcox, Anne C. Tropier, Pascal Dupriez, Andrei Malinovskii, Jaganta K. Safar, Johan Nilsson, David J. Richardson, François Morier-Genoud, Ursula Keller; John

21st Annual Conference on Advanced Solid-State Photonics • Hyatt Regency Lake Tahoe Resort • Incline Village, Nevada
S. Roberts; 1School of Physics and Astronomy, Univ. of Southampton, UK; 2Optoelectronics Res. Ctr., Univ. of Southampton, UK; 3Ultrafast Laser Physics, Inst. of Quantum Electronics, Swiss Federal Inst. of Technology, ETH Honggerberg HPT, Switzerland; 4EPSRC Natl. Ctr. for III-V Technologies, Univ. of Sheffield, UK. We report 5-ps pulses at 160 W average power and 910 MHz repetition rate from a passively mode-locked VCSEL, source seeding an Yb-doped fibre power amplifier. The amplified pulses were compressed to 291 fs duration.

WC6 • 12:15 p.m.  
Acousto-Optically Q-Switched 300 kHz Femtosecond  
Yb:KGW Regenerative Amplifier, Martin Delaigue1, Inka Manek-Hönninger1, François Salin1, Clemens Hönninger1, Pierre Rigail2, Antoine Courjaud2, Eric Mottay2; 1Celia, France; 2Amplitude Systèmes, France. We report a diode-pumped high repetition rate chirped-pulse Yb:KGW regenerative amplifier delivering tens of microjoules pulse energy at repetition rates of up to 300 kHz.

► 12:30 p.m. – 2:00 p.m.  
Lunch (on your own)

WD • Novel Laser Architectures  
Lakeside Ballroom  
2:00 p.m. – 3:30 p.m.

WD • Novel Laser Architectures  
Robert Rice; Northrop Grumman, USA, President

WD1 • 2:00 p.m.  
Quest of Athermal Solid-State Laser: Case of Yb:CaGdAlO4, Johan Petit1, Philippe Goldner1, Bruno Vianat1, Julien Didierjean2, François Balembois2, Frédéric P. Druon2, Patrick Georges2; 1Lab de Chimie Appliquée de l’Etat Solide - Ecole Superieure de Chimie Paris, France, 2Lab Charles Fabry, France. Yb:CALGO is a very promising crystal because of its broad emission spectrum and good thermal conductivity. Those properties enable us to demonstrate a laser with a quantum defect of 0.8%, the lowest ever measured.

WD2 • 2:15 p.m.  
High-Power Yb:LaSc2(BO3)3 Thin Disk Laser, Christian Kräkel1, Jens Johannsen, Michael Mond, Klaus Petermann, Günter Huber1; Inst. of Laser-Physics, Germany. We report on power scalability of Yb:LaSc2(BO3)3 (Yb:LSB) using the thin-disk geometry. 16.6 W at ~1 μm with 39% slope efficiency was obtained from a 10% Yb:LSB under diode-pumping with 58 W at 974 nm.

WD3 • 2:30 p.m.  
A High Energy TmYLF-Fiber-Laser (1.9μm) Pumped Ho:YAG MOPA (2.09μm) Laser System, Günther Renz1, Manfred Klöse1, Christoph Reiter1, Frank Massmann1, Heike Voss1; 1DLR, Germany, 2Industrial Broad-Spectrum Laser AG (IB Laser), Germany. A single mode Ho:YAG MOPA (2.09 μm) laser system with 80 mJ and 20 ns at 100 Hz which is end-pumped by Tm-fiber-lasers has been developed for countermeasure applications.

WD4 • 2:45 p.m.  
Electro-Optically Q-Switched Er:YAG Laser In-Band Pumped by an Er,Yb Fiber Laser, Deyuan Shen, Jayantha Sahu, William Clarkson; Univ. of Southampton, UK. Electro-optically Q-switched operation of an Er:YAG laser at 1645 nm end-pumped by a cladding-pumped Er,Yb fiber laser is reported. Pulse energies up to 15 mJ have been generated at a pulse repetition frequency of 29 Hz.

WD5 • 3:00 p.m.  
242W Single-Mode CW Fiber Laser Operating at 1030nm  
Lasing Wavelength and with 0.35nm Spectral Width, Victor Khitrov1, Bryce Samson, David Machewirth, Kanishka Tankala; Nufern, USA. Conventional high-power, single-mode CW fiber lasers typically have operating ranges limited to 1060-1110 nm. Here we demonstrate a fiber laser with 242W output power, operating at 1030 nm with narrow 0.35 nm line-width and diffraction limited beam M2=1.05.

WD6 • 3:15 p.m.  
2KHz Single Frequency 1083nm Ytterbium Doped MOPA Fiber Laser System, Shenghong Huang, Guanshi Qin, Akira Shikakawa, Mitsura Musha, Ken-ichi Ueda; Inst. for Laser Science, Univ. of Electro-Communications, Japan. 2 KHz single frequency 1083 nm ytterbium fiber MOPA system was demonstrated, the maximum output power was 177 mW. The laser oscillator was a linear fiber cavity with loop mirror filter and polarization controller.

WE • Ceramic Lasers  
Lakeside Ballroom  
4:00 p.m. – 6:00 p.m.

WE • Ceramic Lasers  
Günter Huber; Inst. f. Laser-Physik, Germany, President

WE1 • 4:00 p.m.  
High Power Single-Frequency Laser for Gravitational Wave Detection, Dietmar Kracht1, Ralf Wilhelm1, Maik Frede2, Carsten Fallnich2, Frank Seifert3, Benno Wille3, Karsten Danzmann3; 1 Laser Zentrum Hannover e.V., Germany, 2Physikalisch-Technische Bundesanstalt, Germany, 3Albert-Einstein-Instit., Germany. In the field of gravitational wave detection linearly polarized fundamental mode laser sources in single-frequency operation with output power levels up to 200W are required. The current status of suitable solid-state lasers will be presented.

WE2 • 4:30 p.m.  
A Fabry-Perot Cavity Used as a High-Extinction-Ratio Resonant Polarizer with Application to Quantum Optics Measurements, Shailendru Saraf, Karel Urbanek, Robert L. Byer; Stanford Univ., USA. The use of Fabry-Perot ring cavities with an odd number of reflections as high-extinction-ratio resonant polarizers is shown. Experimental results from quantum-noise
measurements using cavities as spatial and spectral filters, and resonant polarizers are presented.

**WE3 • 4:45 p.m.**
**Quasi-CW Yb\(^{3+}\)-Doped Y:O\(_2\) Ceramic Laser, Mark Dubinskii\(^1\), Jed Simmons\(^3\), Arockiasamy Michael\(^4\), Alex Newburgh\(^5\), Larry Merkle\(^6\), Vida Castille\(^7\), Greg Quarles\(^8\), \(^1\)ARL, USA, \(^2\)VLOC, Subsidiary of II-VI Inc., USA.** We present laser characterization results of a high-power longitudinally diode-pumped Yb\(^{3+}\)-doped Y:O\(_2\) ceramic laser. Slope efficiency as high as 44.5%, quasi-CW power in excess of 26 W and acousto-optically Q-switched operation are reported.

**WE4 • 5:00 p.m.**
**300 W CW Operation of Diode Edge-Pumped, Composite Single Crystal Yb:YAG/Ceramic YAG Microchip Laser, Masaki Tsuchikane, Takunori Taira; Inst. for Molecular Science, Japan.** >300 W CW operation of a diode edge-pumped, hybrid Yb:YAG/YAG microchip, active mirror laser was demonstrated. The Au-Sn soldered microchip shows 17% drop of temperature rise compared to the thermally conductive glue bonded one.

**WE5 • 5:15 p.m.**
**High Peak Power, High Repetition Rate, TEM\(_{00}\) Q-Switched Lasers in Yb-YAG and Nd-YAG Ceramic, Santtu Basu, Arun K. Sridharan; Sparkle Optics Corp., USA.** We report recent results in power scaling of high repetition rate TEM\(_{00}\) Q-switched lasers in Yb-YAG and Nd-YAG ceramic. 72.8 W of Q-switched power was obtained at 50 kHz in 69 ns pulses in Yb-YAG.

**WE6 • 5:30 p.m.**
**End-Pumped Nd:YAG Laser Applying a Novel Laser Crystal with Longitudinal Hyperbolic Dopant Distribution, Denis Freiburg\(^1\), Ralf Wilhelm\(^1\), Maik Frede\(^1\), Dietmar Kracht\(^1\), Klaus Dupré\(^2\), Lothar Ackermann\(^2\), \(^1\)Laser Zentrum Hannover, Germany, \(^2\)FEE GmbH, Germany.** An end-pumped Nd:YAG rod laser design with a longitudinal hyperbolic dopant distribution is presented and 77 W of output power are demonstrated. Numerical calculations indicate a homogenization of the longitudinal temperature profile.

**WE7 • 5:45 p.m.**
**High-Power Multi-Segmented End-Pumped Nd:YAG Laser, Maik Frede\(^1\), Ralf Wilhelm\(^1\), Dietmar Kracht\(^1\), Klaus Dupré\(^2\), Lothar Ackermann\(^2\), \(^1\)Laser Zentrum Hannover, Germany, \(^2\)FEE GmbH, Germany.** The first results on power scaling of end-pumped Nd:YAG lasers by applying a multi-segmented-rod will be presented. A maximum laser output power of 407 W with an optical-to-optical efficiency of 54 % was demonstrated.

▶ 6:00 p.m. – 6:30 p.m.
**Closing Remarks and Presentation of Best Student Paper Prize**
**Lakeside Ballroom**
Key to Authors and Presiders

A
Ackermann, Lothar - WE6, WE7
Agueraray, Claude - ME2
Aka, Gérard - MB2, MD3, WB2, WB19
Akagawa, Kazuyuki - MB5, WB9
Akiyama, Koichi - TuC1
Albrecht, Hervé - MB3
Alden, Jonathan S. - MD4
Alencar, Márcio - WB23
Alley, Thomas G. - MB15
Andersen, Martin - TuB19
Andersen, Thomas Y. - ME2
Anderson, Carl R. - MC2
Anscombe, Marcel - WC1
Arai, Akinori - MB24
Arie, Ady - MB22, TuC5
Aung, Yan L. - TuB1

B
Babuskin, Andrei - TuB10
Badikov, Valery - MD6
Bagnoud, Vincent - TuC7, WB12
Bai, Yingxin - MC1, TuB7
Balbashov, Anatoly M. - MB17
Balembois, François - MC5, TuA5, WB18, WC4, WD1
Barnes, Norman P. - MC1, TuB4
Bartelt, Hartmut - TuC6
Basiev, Tasoltan T. - MB8, MB10, TuB21
Basieva, Marina N. - MB10
Basu, Santana - WE5
Bayramian, Andy J. - MA4, MB1
Beach, R. J. - MB1
Beeddell, James - MB20
Begishev, Ildar A. - TuC7, WB12
Bellancourt, Aude-Reine - TuA2
Bennett, Glenn T. - MC2
Betterton, John G. - MD5
Bhandari, Rakesh - WB7
Bibeau, C. - MB1
Biegert, Jens - WC1
Bjurshagen, Stefan - WB5
Blandin, Pierre - TuA5
Blau, Pinhas - TuC5
Bliss, D. - TuC2
Bonnin, Christophe - MB3
Boomadevi, Shanmugam - WB24
Bowers, Mark - ME1
Bromage, J. - TuC7
Brooks, Christopher D. - ME3, WA4
Brown, C. T. A. - MB12, WC3
Bruchmann, Claudia - ME5
Brunner, Ariel - MB21
Buchhave, Preben - MB19, TuB19
Buckley, Joel R. - ME4
Burgio, Kevin - MC2
Byer, Robert L. - MD4, WE2

C
Camargo, Fabiola A. - WB11
Campbell, R. - MB1
Canalias, Carlota - MB11, WC2
Carrig, Timothy J. - MF, TuA4
Castillo, Vida - WE3
Cech, Miroslav - WB17
Cerny, Pavel - TuB6, WB20
Cha, Myoungsik - WB24
Chai, B. - MB1
Charukhchev, Alexander V. - MA3
Chen, Jian - TuB9
Chen, Songsheng - TuB7
Cheung, Eric - MA2
Clark, Stephen W. - ME4
Clarkson, William A. - MC6, MD5, WD4
Coic, Hervé - MB4
Cormier, Eric - ME2
Courjaud, Antoine - WC6
Courts, David W. - MD1

D
Daniels, Martin - MB7
Danzmann, Karsten - WE1
de Matos, Paulo S. Fabris. - TuB5
Delaigue, Martin - WC6
Demirbas, Umit - WB22
Deng, Peizhen - WB10
Denisov, I. A. - WB1, WC3
Denker, Boris I. - MB17
Di Teodoro, Fabio - ME3, WA4
Didierjean, Julien - WB18, WC4, WD1
Diels, Jean-Claude - WB17
Digonnet, Michel J. F. - MD4
Dion, Julie - TuB15
Domen, Manuela - TuB15
Dong, Jun - WB10
Doroshenko, Maxim E. - MB8, MB10, TuB21
Dronov, A. G. - MC4
Druon, Frédéric P. - TuA5, WB18, WC4, WD1
Dubinskii, Mark - WE3
Duple, Klaus - WE6, WE7
Dupriez, Pascal - WC5

E
Ebers, Christopher A. - MB1, TuC
Eberhardt, R. - MB16
Ebling, Dirk - TuA2
Ebnöter, Martin - TuA7
Eckle, Petriisa - WC1
Eger, David - MB21
Ehrlich, Yosi - MB21
Eichler, Hans J. - TuB2
Elder, Ian - MB20
Englander, Abraham - MB21
Epp, Paul - MA2
Erneneux, S. - WA5

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Fang, Tao - TuB17
Fedorov, Vladimir V. - MB10, MD6, TuB10, WB21
Fei, Y. - MB1
Fejer, Martin M. - MD4, TuC2
Ferrmann, M. E. - TuC2
Ferrand, Bernard - MD3, WB19
Filipkowski, Mark E. - TuA1
Fontaine-Aupart, Maire-Pierre - TuA5
Foreman, Hannah D. - WC5
Fragemann, Anna - WB16, WC2
Frede, Maik - MB6, TuB14, WB15, WE1, WE6, WE7
Freiburg, Denis - WE6
Freidman, Gennady I. - MA3
Freitag, Ingo - MB6
Freitas, B. L. - MB1
Fujita, Masayuki - TuB16, WB8
Fukuda, T. - MD1
Furukawa, Yasunori - MB24

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Gaponenko, M. S. - MB12
Gapontsev, Denis - TuB10
Gapontsev, Valentin - MC4, TuB10
Garanin, Sergey G. - MA3
Garnache, Arnaud - TuB15
Geiger, Jens - TuB11
Georges, Patrick - MC5, TuA5, TuB15, WB18, WC4, WD1
Georgiev, D. - MC4
Gerke, Rudolf R. - MA3
Gheorghe, Lucian - WB2
Gini, Emilio - TuA2, TuA7
Ginzburg, Vladislav N. - MA3
Goldner, Philippe - WB18, WC4, WD1
Goldring, Sharone - WB6
Golling, Matthias - TuA3
Goodno, Gregory D. - MA2
Gorton, Eric K. - MD5
Grange, Rachel - TuA3, TuA6, TuA7
Griebner, Uwe - TuB20
Guandalini, Annalisa - WC1
Guardalben, Mark J. - WB12

H
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Hädrich, Steffen - MB16
Hahn, Sven - TuB14
Haïm, Markus - TuA3, TuA6, TuA7
Harris, J. S. - TuC2
Hartl, Ingmar - WA
Hayano, Yutaka - MB5
Hayashi, Junpei - WB13
Hellström, Jonas E. - MB17, WB5
Henriksson, Markus - TuC4
Herault, Emilie - MC5
Hermerschmidt, Andreas - TuB2
Hidetsugu, Yoshida - MB18
Higuchi, Mikio - TuB6, WB4, WB20
Hildebrandt, Matthias - MB6
Hirs, Petri - WB17
Höfer, Marco - TuB24
Hoffmann, Dieter - MB7, TuB11
Hoffmann, Hans-Dieter - TuB24
Hohn, Roman - MB7
Holmgren, Stefan J. - WB16
Hönninger, Clemens - WC6
Howland, Donna - MA2
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Huber, Günter - WD2, WE
Hugonnart, Emmanuel - MB4
Huš, Rafael - TuB14
Hwang, David - MC2

I
Ikesue, Akio - TuB1, TuB3
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Imosev, G. - TuC2
Injeyan, Hagop - MA2
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Inoue, Masahiro - MB13
Ishizuki, Hideki - TuC3
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Iye, Masanori - MB5
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Jacobsson, Bjorn - TuB8
Jacquemet, Mathieu - TuB15
Jaktis, Jonas - WB23
Janousek, Jiri - TuB19
Jelinkova, Helena - MB8, TuB6, WB20
Jeon, Oc-Youe - WB24
Jiang, Minhua - TuB20
Jiang, Shibin - TuB4
Johannsen, Jens - WD2
Johansson, Sandra - TuB19
Jungbluth, Bernd - TuB11

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Kalashnikov, Valdimir V. - MB9
Kallmeyer, Frank - TuB2
Kalmani, Gal - TuC5
Kamiya, Toshikazu - WB7
Kan, Hirohumi - MD2
Kanode, Ogawa - MB18
Kassab, Luciana R. P. - WB23
Katin, Eugeny V. - MA3
Kato, Mayumi - MB5
Katsuragawa, Masayuki - MB14
Katz, Moti - MB21
Kawanaka, Junji - TuB16, WB8
Kawashima, Toshiyuki - TuB16, WB8
Kawato, Sakae - MB13, WB9
Keller, Ursula - TuA2, TuA3, TuA6, TuA7, WC1, WC5
Kant, R. - MB1
Kernal, John - MD6
Khazanov, Efim A. - MA3, TuB1, TuB12
Khitrov, Victor - WD5
Killi, Alexander - TuC6
Kim, Ji Won - MC6
Kim, Sehoon - WB24
Kirsanov, Alexey V. - MA3
Kisel, Victor E. - TuB22, WC3
Klose, Manfred - WD3
Kobayashi, Renata A. - WB23
Kobayashi, Takao - MB13, WB9
Kobolke, Jens - TuC6
Komikado, Toshiyuki - WB13
Komine, Hiroshi - MA2
Kracht, Dietmar - MB6, TuB14, WB15, WE1, WE6, WE7
Kraiger, Lukas - TuA3
Krankel, Christian - TuB20, WD2
Kubecek, Vaclav - WB17
Kukla, Mark J. - MC2
Kuleshov, Nikolai V. - TuB22, WB1, WC3
Kung, A. H. - MB23
Kupchenko, M. I. - TuB22, WC3
Kurt, Adnan - WB22
Kwaickowski, Jacek - WB14
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Lagatsky, Alexander A. - MB12, WC3
Langrock, Carsten - MD4
Laurell, Fredrik - MB11, MB17, TuB8, TuB19, TuC4, WB5, WB16, WC2
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Leveque-Fort, Sandrine - TuA5
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Liem, Andreas - ME5
Lim, Hwan Hong - WB24
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Loiseau, Pascal - MB2, MD3, WB19, WB2
Long, William - MA2
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Lozhkarev, Vladimir V. - MA3
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Luce, Jacques - MB4
Luchinin, Grigory A. - MA3
Luke, Lawrence - WB21
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Steinmann, Andy - TuC6
Stickley, Martin - TuA1
Strassner, Martin - TuB15
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Strohmaier, Stefan G. P. - TuB2
Sueda, Keiichi - WB9
Sukharev, Stanislav A. - MA3
Sulc, Jan - MB8, TuB6, WB20
Sumida, David S. - SC258
Sutton, S. - MB1
Sverchkov, Sergey E. - MB17

T
Taira, Takunori - MC, MD2, TuB3, TuC3, WB2, WB7, WE4
Takahashi, Jun-ichi - WB4
Takami, Hideaki - MB5
Takazawa, Akira - MB5, WB9
Takeda, Makoto - MB24
Tanaka, Motoharu - MB13
Tankala, Kanishka - WD5
Taylor, J. R. - MC4, WA2
Terry, John A. C. - MD5
Terry, Nathan B. - MB15
Thorhauge, Morten - MB19
Tidemand-Lichtenberg, Peter - MB19, TuB19
Tiibon, Mikael - WC2
Tokita, Shigeki - TuB16, WB8
Tolstik, Nikolai A. - TuB22

Travers, J. C. - WA2
Treichel, Rainer - TuB2
Trieu, Bo - TuB7
Tropper, Anne C. - ME , WC5
Trostin, Andrei E. - TuB22, WC3
Tsunekane, Masaki - WE4
Tu, Shih-Yu - MB23
Tünnemann, Andreas - MB16, ME2, ME5, WA3, WA5, WA6

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Umegaki, Shinsuke - WB13
Unold, Heiko J. - TuA2
Urata, Yoshiharu - TuB6, WB4, WB20
Urbanek, Karel E. - MD4, WE2

V
Van Lue, D. - MB1
Varona, Cyrille - MD3, WB19
Vassiliev, Sergey V. - TuB21
Viana, Bruno - WB18, WC4, WD1
Vierkoeetter, Marcel - TuB11
Villeval, Philippe - MB3
Vodopyanov, K. L. - TuC2
Voss, Heike - WD3
Vyatkin, M. Y. - MC4

W
Wada, Satoshi - MB5, WB4, WB9
Walsh, Brian M. - TuB4
Wang, Jiyang - TuB20
Weber, Mark - MA2
Weingarten, Kurt J. - TuA3
Weiss, Ben - MA2
Weßels, Peter - MB6
Wester, Rolf - TuB24
Wetter, Niklaus U. - TuB5, WB11, WB23
Weyburne, D. - TuC2
Wilcox, Keith G. - WC5
Wilhelm, Ralf - TuB14, WB15, WE1, WE6, WE7
Willke, Benno - WE1
Wise, Frank W. - ME4
Wueppen, Jochen TuB11

X
Xu, Jianqiu - TuB17
Xu, Jun - WB10
Xu, Ke - MB2

Y
Yagi, Hideki - WB8
Yakovlev, Ivan V. - MA3
Yanagitani, Takagimi - WB8
Yarrow, Michael J. - MC6
Yashin, Vladimir E. - MA3
Yasukazu, Izawa - MB18
Yasuki, Takeuchi - MB18
Ye, Xin - TuB17
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Yu, Jirong - MC1, TuB7
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Yumashev, Konstantin - WB1
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Yvernault, P. - WA5

Z
Zaouter, Yoann - WC4
Zeller, Simon C. - TuA6, TuA7
Zendzian, Waldemar - WB14
Zhang, Huaijin - TuB20
Zhlin, A. A. - MB12
Zhu, S. N. - MB23
Zigler, Arie - MB21
Zuegler, Jonathan D. - MA, TuB13, TuC7, WB12
Zverev, Petr G. - MB8
Notes