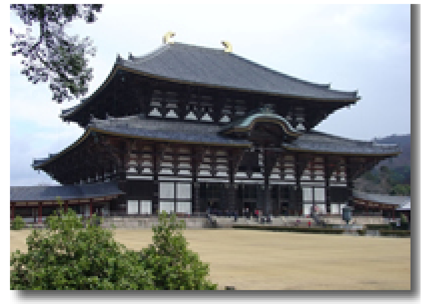
Advanced Solid-State Photonics

Topical Meeting and Tabletop Exhibit



Collocated with:
Workshop on Entanglement and Quantum Decoherence

January 27-30, 2008

Nara-Ken New Public Hall
Nara, Japan

PDP deadline: January 8, 2008 at 12:00 p.m. EST (17.00 GMT)
Housing Deadline: December 25, 2007
Pre-Registration: January 3, 2008

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About Advanced Solid-State Photonics (ASSP) 2008

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, astronomy, medicine, biology and entertainment.

Now in its 23rd year, the Advanced Solid-State Photonics Topical Meeting remains the world's premier forum for discussing new developments in laser and nonlinear optical materials and devices. The upcoming meeting in Nara, Japan 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 2008!

Meeting Topics to Be Considered

- Tunable and New Wavelength Solid-State Lasers
- Diode-Pumped Lasers
- Fiber Lasers
- Photonic-Crystal Lasers
- High-Power Lasers
- Short-Pulse Lasers
- Frequency-Stable Lasers
- Microphotonics, including microchip and compact lasers
- Optically Pumped Semiconductor Lasers
- High-Brightness Diodes
- Optical Sources Based on Nonlinear Frequency Conversion, including OPO, OPA, OPG, SHG, SFG, DFG and Raman
- Laser Media
- Nonlinear Optical Materials
- Engineered Optical Materials
- Applications of Laser Sources in:
  − Science
  − Astronomy, including gravity wave detection and laser guide star
  − Medicine and Biology
  − Remote Sensing
  − Industry
  − Entertainment, including laser display technology

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Exhibitors to ASSP

Tabletop Exhibit:
January 28-30, 2008

Exhibit Space Reservation Contract (PDF, 46 KB)

Note: You need Adobe Acrobat to view the PDF files above. If you do not already have this software, you can download Adobe Acrobat for free from Adobe's web site.

Tabletop exhibit space will be $1,090 for Corporate Members and $1,250 for non-members

All exhibitors receive:

- An attendee list
- One technical digest
- One technical badge
- One ticket to the conference reception
- Two exhibit personnel registrations

If you have questions about exhibiting at ASSP, please contact our exhibit sales staff at 202.416.1428 or exhibitsales@osa.org.

Sponsorship Opportunities at ASSP 2008

Increase your company's visibility among qualified attendees with a sponsorship at the event.

Current ASSP Sponsorship Opportunities include:

- Coffee Break Sponsorships
- Reception Sponsorships
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- Registration Material Inserts
- Advertising Signage Placements

Plus other customizable promotional opportunities
To find out more about one of the sponsorship opportunities listed above or to discuss a customized ASSP promotional package or sponsorship, please contact Melissa Russell at 202.416.1957 or email exhibitsales@osa.org.

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Special Events

2008 Lockheed Martin Coherent Technologies Student Awardees

Best Oral Presentation

Sergio Marchese, ETH Zürich, Switzerland

ME5, Efficient Femtosecond Yb:Lu_2O_3 Thin Disk Laser, *Sergio V. Marchese[1], Cyrill R. E. Baer[1], Anna G. Engqvist[1], Matthias Golling[1], Deran J. H. C. Maas[1], Thomas Südmeyer[1], Ursula Keller[1], Rigo Peters[2], Christian Kränkel[2], Klaus Petermann[2], Günter Huber[2]; [1]Dept. of Physics, Inst. of Quantum Electronics, ETH Zürich, Switzerland, [2]Inst. of Laser-Physics, Univ. of Hamburg, Germany.*

Best Poster Presentation

Susanne Fredrich-Thornton, **Inst. für Laser-Physik, Univ. of Hamburg, Germany**

WB13, Highly Doped Yb:YAG Thin-Disk Lasers: A Comparison between Single Crystal and Ceramic Active Media, *Susanne T. Fredrich-Thornton[1,2], Christian Hirt[1], Friedjof Tellkamp[1], Klaus Petermann[1], Guenter Huber[1], Ken-ichi Ueda[2], Hideki Yagi[3]; [1]Inst. für Laser-Physik, Univ. Hamburg, Germany, [2]Inst. for Laser Science, Univ. of Electro-Communications, Japan, [3]Takuma Works, Konoshima Chemical Co. Ltd., Japan.*

Tour - Tuesday, January 29, 2008

An ASSP excursion is planned for Tuesday afternoon to visit the Horyuji Temple complex and the Kansai Photon Science Institute. Horyuji Temple houses the oldest surviving wooden structures in the world and was designated a UNESCO World Heritage Site in 1993 as a unique storehouse of world Buddhist culture. The Kansai Photon Science Institute is a research institute under the Japan Atomic Energy Agency. The institute develops advanced lasers, including petawatt-class lasers, and a spatially coherent soft X-ray laser, and applies them to generating and utilizing X-rays, high-energy particle beam sources, and X-ray microscopes. Join us to see world-class lasers and culture – it will be a memorable experience! This tour is included with all registrations with the exception of Exhibitor Personnel.

ASSP Best Student Oral and Poster Paper Awards

The ASSP Best Student Oral Paper Award was established in 2001 to encourage excellence in research and scientific presentation skills in the student optics community. The award is sponsored by Lockheed Martin Coherent Technologies and includes a $1000 cash prize and a plaque.

There will also be a competition for the ASSP Best Student Poster Paper Award. The recipient of this award will be presented with a $500 cash prize and a certificate. Students submitting contributed papers who desire to compete for these awards must indicate this intention when submitting the paper. Papers actually presented by advisors or other non-students will not be scored. Student papers accepted for oral presentation will be scored by the ASSP Technical Program Committee with the scores weighted according to the following formula: technical content (50%), oral presentation quality and general poise (25% with no penalty for non-native English speakers) and graphical presentation quality (25%). Student papers accepted for poster presentation will be scheduled in a "Young Scientist Poster Session" and scored according to the same formula as the oral papers. ASSP attendees are highly encouraged to participate in this session to provide feedback to the students and encourage their work.

Invited Speakers

Banquet Speaker

TuC1, Construction of Great Budda in Nara, Symbol of Giant Light Source in Cosmos, *Atsumu Wada, Professor Emeritus, Kyoto Univ.of Education and Leading Researcher, Archaeological Inst. of Kashihara, Nara Prefecture; Japan.*

Atsumu Wada was born in northeastern China (Liaoyang, former Manchukuo) in 1944 and soon after birth he moved to Tawaramoto, Nara Prefecture, Japan, and he was brought up in the historical culture of Yamato (the old name of Nara). He is now living in Kibi, Takatori-cho, Takaichi-Gun, Nara Prefecture, Japan.

He finished his Ph.D. (national history) at the Graduate School of Letters, Kyoto University in 1972. After a Research Associate, Faculty of Letters, Kyoto University, he worked at Kyoto University of Education, where he became a Professor in 1988. He received the Ph.D. degree in literature from Kyoto University. In March, 2007, he took mandatory retirement.

He specializes in Japanese ancient history and is engaged in research in Japanese ancient thought and culture, wood strips, and so forth. Since 1972, as a Leading Researcher, Archaeological Institute of Kashihara, Nara Prefecture, he has been engaged in research activities in order to make the connection between Japanese ancient history and archaeology. He has studied under poet Toshio Mae living in Yoshino, Nara Prefecture, and been a member of the literary coterie “Yamamayu”.

He has written a number of books including, “Nihon-Kodai no Girei to Saishi, Shinkou (Rites, Worship and Belief in Ancient Japan) I, II, III”, Hanawa Shobo, Tokyo, Japan (1995). In addition, he has written a great number of papers.

He writes an article “Yamato Jiku Sanpo (Walking in the space and time of Nara)” every Wednesday for the Sankei Shinbun, a local newspaper.

Plenary Speaker

MA1, The Application of Laser for Automobile: Manufacturing Technology, *Kazuhisa Mikame; Toyota Motor Corp., Japan.*

Kazuhisa Mikame graduated with a degree in Mechanical Engineering from the Toyota Technical College. He then went on to perform production engineering development at Toyota Motor Corporation in Japan where the main area of his work included high energy beam welding such as electron beam welding and laser beam welding. He developed and applied many laser material processing techniques and systems for automotive production, including a multi-station laser welding system for Automatic Transmission gear parts. He is a member of the Japan Welding Society, and director of the Japan Laser Processing Society.

Invited Speakers

MB1, Solid State Lasers: Meeting the Grand Challenges, *Robert L. Byer; Stanford Univ., USA*
MD1, Volume Bragg Gratings in PTR Glass--New Optical Elements for Laser Design, *Leonid B. Glebov; CREOL, The College of Optics and Photonics, Univ. of Central Florida, USA.*
TuA1, 10-Petawatt OPCPA System, *John Collier; Rutherford Appleton Labs, UK*
WA1, High-Peak-Power, Single-Transverse-Mode Fiber Lasers, *Fabio Di Teodoro; Aculight Corp., USA*
WD1, Nonlinear Optics in Japan, *Hiromasa Ito; Tohoku Univ., Japan*
WF1, The Petawatt Field Synthesizer: A New Approach to Ultrahigh Field Generation, *Stefan Karsch; Max-Planck-Inst. für Quantenoptik, Germany*

Ceramic Lasers Summit

Join us for a **Ceramic Lasers Summit** to review the exciting progress in ceramic laser materials and their applications. Leaders from around the world of this emerging field will highlight this new program feature. The special session will be a roundtable event starting with opening statements by the invited panel members, followed by an open discussion and interaction with the audience.

Panelists:
Mitsuhiro Fujita; Covalent Materials Corp., Japan
Jean Huie; Advanced Materials Lab, Raytheon, USA
Gregory Quarles; VLOC, USA
Bob Yamamoto; LLNL, USA
Takagimi Yanagitani; Konoshima Corp., Japan

ASSP 2008 Short Courses

Sunday, January 27, 2008, 1:00 p.m.–5:00p.m.

► SC153 Quasi-Phasematching for Frequency Conversion and All-Optical Signal Processing
Martin M. Fejer; *Stanford Univ., USA*

Course Description
Quasi-phasematching (QPM) has become an important technique for nonlinear optical frequency conversion, and recently for classical and quantum optical signal processing devices. In addition to large nonlinear susceptibilities and noncritical phasematching across broad wavelength ranges, QPM offers control over parameters that allow engineering of properties such as the spectral and spatial distribution of gain.

Well known applications in parametric frequency conversion devices such as harmonic generators and parametric oscillators are now complemented by developments for communications applications such as wavelength convertors for WDM systems, gated mixers for TDM multiplexing and demultiplexing, and spectral inverters for correcting dispersion and Kerr nonlinearities. Recent developments such as supercontinuum generation and devices for quantum optics, including photon-counting with efficient up-conversion and generation of correlated photons by parametric down conversion, will be discussed. The success of QPM is fundamentally tied to developments in microstructured nonlinear materials, such as periodically-poled ferroelectrics and orientation-patterned III-V semiconductors. Staus and properties of these materials will be reviewed, with emphasis on practical issues such as effects limiting their lifetime.

Benefits and Learning Objectives
This course should enable you to:

- Explain the basic ideas of QPM and methods for analyzing QPM interactions.
- Relate properties of QPM interactions to the more familiar birefringent phasematching.
- Discuss qualitative insights and quantitative data on QPM materials like PPLN and OPGaAs.
- Review coherent source applications of QPM media.
- Explain novel methods such as compression of ultrafast pulses based on aperiodic QPM.
- Understand applications in classical and quantum optical communications and signal processing.

Course Level
Advanced Beginner (basic understanding of topic is necessary to follow course material)

Intended Audience
This course is intended for individuals with at least a basic knowledge of lasers and nonlinear optical frequency conversion, though background information necessary for understanding the material in the course will be covered. No prior knowledge of optical signal processing is necessary for optical communications topics.

Instructor Biography
Martin Fejer is a professor of applied physics and senior associate dean of natural sciences at Stanford University. His research focuses on microstructured nonlinear materials, guided wave optics, and devices for generating coherent radiation and for optical signal processing. He received the Optical Society of America's R.W. Wood Prize in 1998 for his work in quasi-phasematched nonlinear optics.

Sunday, January 27, 2008, 1:00 p.m.–5:00p.m.
► SC310 A Review of Ceramic Materials for Optical Applications
Akio Ikesue[1], Yuji Iwamoto[2]; *[1]World Lab Co., Ltd., Japan, [2]Nagoya Inst. of Technology, Japan*

Course Description
This course describes methods of fabricating transparent ceramics and developments in the field of ceramic lasers. It explains both the background and new applications of optical ceramics. The term "ceramics" (polycrystalline materials) includes cement, refractories, chinaware, and structural and functional ceramics. Once just opaque white, ceramics were not appropriate to optical applications. In the late 1950s Dr. Coble ascertained that the loss of transparency in ceramics is due to the residual pores in the ceramic body. His fabrication of translucent alumina by controlling the microstructure of ceramics was applied in the discharge tube of sodium-vapor lamp post of expressways and tunnels. This development brought about translucent ceramics such as MgF_2, Spinel, and $(PbLa)(ZrTi)O_3$ (PLZT). At that time, there was no advanced technology to produce crystals comparable to the single crystal, and the application range of translucent ceramics was restricted.

About 15 years ago, for the first time in the world the course instructor developed optical grade transparent polycrystalline Nd:YAG ceramics in the laser generation comparable to that of the conventional single crystal laser. He reported that high-efficiency laser oscillation and high beam quality can be realized by the Nd:YAG ceramics as Nd ions can be heavily doped in YAG ceramics. Laser generation from ceramics, generation of monochromatic light with high coherency, and high power laser with high efficiency were then reported, beyond the imagination of the traditional solid-state laser. Ceramic laser is not a substituting technology of single crystal; it has the potential to become a central technology of laser for this century. In the future, development of optical ceramics will become active, beginning at ceramic laser.

Benefits and Learning Objectives
This course should enable you to:

- Identify traditional ceramics (chinaware, refractories, cement, structural materials, electronic materials etc.) and technical issues of ceramic materials.
- Explain the basics of ceramic materials (principle of transmittance, fabrication methods, etc.).
- Describe the development of and new technologies in translucent ceramics.
- Describe fabrication technology of current solid-laser materials and technical issues.
- Define the term "Ceramic Laser" by addressing the technological requirement and principle of generation of coherence beam from polycrystalline gain medium.
- Describe ceramic laser technology from 1990s to present.
- Discuss ceramic optics and their applications (excluding laser).
- Discuss future applications of ceramic technology.

Course Level
Beginner (No background or minimal training is necessary to understand course material)

Intended Audience
This course would be useful to anyone interested in understanding basic ceramic technologies and the current and potential applications of ceramic laser technology.

Instructor Biography
Akio Ikesue received bachelor's, master's and doctorate degrees from Nagaoka University of Technology. He is the president of World Lab Co., an executive scientist at SCHOTT AG and an invited professor at Pierre and Marie Curie University. In 1995 he fabricated the optical grade polycrystalline neodymium (Nd)-doped Yttrium Aluminum Garnet (YAG) ceramic and pioneered the high efficiency laser generation using these ceramics. His current research includes development of transparent ceramics for passive and active applications and development for processing single crystal piezo-electric materials and ionic conductive materials by sintering method. He is the recipient of numerous awards and is the author of more than 60 technical publications.

Yuji Iwamoto received bachelor's and master's degrees from Nagoya City University and a doctorate from the University of Tokyo. He is a professor of materials science and engineering at Nagoya Institute of Technology. His current research topic is development of ceramic membranes for high-temperature separation of hydrogen. He has authored or coauthored more than 70 publications and holds 25 patents. He received the Richard M. Fulrath Award from the American Ceramic Society in 2006 and the Academic Achievements Award from the Ceramic Society of Japan in 2007.

Sunday, January 27, 2008, 1:00 p.m.–5:00p.m.
► SC311 Laser Remote Sensing
Takao Kobayashi; *Univ. of Fukui, Japan*

Course Description
This course is intended to introduce a field of solid-state laser application called "laser radar" or "lidar." This field of technology is growing rapidly together with the global interest in the environmental issues. A major application of this technology is the remote sensing of the atmosphere for meteorological and environment monitoring and industrial application. Basic principles of system design and performance are described. Optical interaction processes and laser beam transmission of the atmosphere are compared for laser wavelengths, from infrared to ultraviolet spectra. Eye safety condition is also defined to use intense laser beam in open atmosphere. Optical signal detection techniques are discussed, and the characteristics of the direct detection and the heterodyne detection are compared briefly.

Progress of the lidar systems and the performance are summarized and discussed in detail. Mie scattering lidar is used for aerosol and clouds detection, Raman scattering lidar for temperature and humidity sensing, differential absorption lidar (DIAL) for air pollution and water vapor detection, Doppler lidar for wind field detection, and high-spectral resolution (HSR) lidar for detecting temperature and several accurate parameters of aerosol and clouds. The high-power single frequency solid-state lasers are used mostly in these systems.

The imaging system of explosive leak gas was developed recently for use in the energy industry with infrared tunable sources of OPO, OPG and diode lasers. Satellite borne space lidars have been developed in NASA and ESA by using high-power solid-state lasers for global monitoring of aerosol, clouds and wind. Future potential of application of the lidar technology is discussed in relation with the progress of compact and high-power lasers.

Benefits and Learning Objectives
This course should enable you to:

- Review historical progress of the lidar systems and typical results.
- Compare optical interaction processes and lidar schemes for specific requirements of atmospheric parameters.
- Design the laser and the optical system with respect to maximum detection range, spatial and temporal resolution, accuracy and other conditions.
- Define eye safety conditions for laser power, energy and wavelength.
- Determine present tunable laser sources for leak gas profiler.
- Visualize future images of the laser remote sensors for environmental sensing.

Intended Audience
No special background is required for understanding this course content. Students, engineers, system designers and managers who take interest in the outlook on the present and future laser remote sensing technology are welcome.

Instructor Biography
Takao Kobayashi graduated from Tohoku University in 1964. He joined the Research Institute of Electrical Communication, Tohoku University, in 1967, where he pioneered the research of laser Raman radar for molecular pollution detection and developed several solid-state lasers. In 1981 he became a professor in the department of electrical and electronics engineering at the University of Fukui. He is involved in the research of Ozone DIAL, Doppler wind lidar, Raman and Rayleigh temperature lidars, and recently in UV high-spectral resolution lidar and leak methane gas imager. From these activities, he received the lifetime achievement award from the International Committee on Laser Atmospheric Sensing in 2006.

Agenda of Sessions

Sunday, January 27, 2008		
12:00 p.m.—6:00 p.m.	Registration	Entrance Foyer
1:00 p.m.—5:00 p.m.	SC153 • Quasi-Phasematching for Frequency Conversion and All-Optical Signal Processing	
1:00 p.m.—5:00 p.m.	SC310 • A Review of Ceramic Materials for Optical Applications	
1:00 p.m.—5:00 p.m.	SC311 • Laser Remote Sensing	
Monday, January 28, 2008		
7:00 a.m.—5:00 p.m.	Registration	Entrance Foyer
8:00 a.m.—8:10 a.m.	Opening Remarks	Noh Theater
8:10 a.m.—8:30 a.m.	MA • Plenary Session	Noh Theater
8:30 a.m.—10:00 a.m.	MB • Solid State Laser Architectures	Noh Theater
10:00 a.m.—11:00 a.m.	MC • Poster Session I	Reception Hall
10:00 a.m.—11:00 a.m.	Coffee Break/Exhibits Open	Reception Hall
11:00 a.m.—12:30 p.m.	MD • Volumetric Diffractive Structures	Noh Theater
12:30 p.m.—2:00 p.m.	Lunch Break	
2:00 p.m.—3:45 p.m.	ME • Ultrafast Oscillators	Noh Theater
3:45 p.m.—4:15 p.m.	Coffee Break/Exhibits Open	Reception Hall
4:15 p.m.—5:30 p.m.	MF • Yb-Doped Materials	Noh Theater
5:30 p.m.—8:00 p.m.	Dinner Break	
8:00 p.m.—9:30 p.m.	MG • Postdeadline Paper Session	Noh Theater
Tuesday, January 29, 2008		
7:00 a.m.—1:00 p.m.	Registration	Entrance Foyer
8:00 a.m.—9:45 a.m.	TuA • Ultrafast Amplifiers	Noh Theater
9:45 a.m.—10:15 a.m.	Coffee Break/Exhibits Open	Reception Hall
10:15 a.m.—11:45 a.m.	TuB • Eyesafe Infrared Sources	Noh Theater
12:15 p.m.	Laboratory Tour and Day Trip: Buses Leave Nara-Ken	
1:15 p.m. - 6:00 p.m	Tour of Horuji and JAEA	
6:00 p.m.	Buses return to Hotel	
7:00 p.m.—10:00 p.m.	TuC • ASSP Banquet	Nara Nikko Hotel, Hiten Room
Wednesday, January 30, 2008		
7:30 a.m.—5:00 p.m.	Registration	Entrance Foyer
8:00 a.m.—10:00 a.m.	WA • Fiber Lasers	Noh Theater
10:00 a.m.—11:00 a.m.	WB • Poster Session II (Student)	Reception Hall
10:00 a.m.—11:00 a.m.	Coffee Break/Exhibits Open	Reception Hall
11:00 a.m.—12:30 p.m.	WC • Ceramic Lasers Summit	Noh Theater
12:30 p.m.—2:00 p.m.	Lunch Break	
2:00 p.m.—3:30 p.m.	WD • Nonlinear Optics	Noh Theater
3:30 p.m.—4:30 p.m.	WE • Poster Session III	Reception Hall
3:30 p.m.—4:30 p.m.	Coffee Break/Exhibits Open	Reception Hall
4:30 p.m.—6:00 p.m.	WF • Novel Ultrafast Sources	Noh Theater
6:00 p.m.—6:10 p.m.	Closing Remarks	Noh Theater

•Sunday, January 27, 2008•

Entrance Foyer
12:00 p.m.–6:00 p.m.
Registration Open

1:00 p.m.–5:00 p.m.
SC153: Quasi-Phasematching for Frequency Conversion and All-Optical Signal Processing

SC310: A Review of Ceramic Materials for Optical Applications

SC311: Laser Remote Sensing

•Monday, January 28, 2008•

Entrance Foyer
7:00 a.m.–5:00 p.m.
Registration Open

Noh Theater
8:00 a.m.–8:10 a.m.
Opening Remarks

MA • Plenary Session

Noh Theater
8:10 a.m.–8:30 a.m.
MA • Plenary Session

MA1 • 8:10 a.m. Plenary
The Application of Laser for Automobile: Manufacturing Technology, *Kazuhisa Mikame; Toyota Motor Corp., Japan.* Since the mid-1980s, Toyota Motor Corporation has applied CO_2 lasers and YAG lasers for processing on automobile parts. In the 20th century diode lasers are applying on plastic welding, and diode pumped YAG lasers are applying on body stitch welding. And continuous laser welding was first adopted for the interior structural members, and one-sided laser welding results in a simplified and lightweight structure.

Kazuhisa Mikame graduated with a degree in Mechanical Engineering from the Toyota Technical College. He then went on to perform production engineering development at Toyota Motor Corporation in Japan where the main area of his work included high energy beam welding such as electron beam welding and laser beam welding. He developed and applied many laser material processing techniques and systems for automotive production, including a multi-station laser welding system for Automatic Transmission gear parts. He is a member of the Japan Welding Society, and director of the Japan Laser Processing Society.

MB • Solid State Laser Architectures

Noh Theater
8:30 a.m.–10:00 a.m.
MB • Solid State Laser Architectures
Upendra Singh; NASA Langley Res. Ctr., USA, Presider

MB1 • 8:30 a.m. Invited
Solid State Lasers: Meeting the Grand Challenges, *Robert L. Byer; Stanford Univ., USA.* Advances in solid state lasers has enabled progress toward meeting grand challenges. Examples to be considered are the detection of gravitational waves; laser acceleration to enable TeV scale physics and the generation of attosecond coherent x-rays.

MB2 • 9:00 a.m.
Power Scaling of GaN Laser Diode Pumped Pr-Lasers, *André Richter[1], Ernst Heumann[1], Günter Huber[1], Daniela Parisi[2], Mauro Tonelli[2]; [1]Inst. of Laser-Physics, Univ. of Hamburg, Germany, [2]Dept. di Fisica dell'Univ. di Pisa, Italy.* Results of Pr^{3+}-lasers in different host materials operated at 523 nm, 607 nm, 640 nm, and 721 nm under GaN diode laser pumping will be presented as well as SHG results obtaining 320 nm radiation.

MB3 • 9:15 a.m.
Integration of Multiple-DFB Dye Lasers and Microflow-Channel on a Polymeric Chip, *Yuji Oki[1], Shusaku Kataoka[1], Noriyuki Kamogawa[1], Hirofumi Watanabe[1], Kenichi Yamashita[2], Masaya Miyazaki[2]; [1]Graduate School of ISEE, Kyushu Univ., Japan, [2]Natl. Inst. of Advanced Industrial Science and Technology, Japan.* Integration techniques of tunable film dye lasers on a plastic optical application chip were studied. We fabricated microflowcytometry chip integrated with DFB film lasers as a first example. Preliminary LIF experiment was also demonstrated.

MB4 • 9:30 a.m. Micro Laser for Engine Ignition Paper
High Peak Power, Passively Q-Switched Cr:YAG/Nd:YAG Micro-Laser for Ignition of Engines, *Masaki Tsunekane[1], Takayuki Inohara[2], Akihiro Ando[2], Kenji Kanehara[2], Takunori Taira[3]; [1]Japan Science and Technology Agency, Japan, [2]Nippon Soken Inc., Japan, [3]Inst. for Molecular Science, Japan.* 3mJ per pulse with 1.2ns pulse width, passively Q-switched Cr:YAG/Nd:YAG micro-laser was developed for ignition of engines. The enhanced combustion by using the micro-laser igniter was successfully demonstrated in comparison with a spark plug.

MB5 • 9:45 a.m.
Effect of Grain Sizes on Modal and Polarization Properties of Laser-Diode-Pumped Microchip Ceramic Lasers, *Takayuki Ohtomo, Koji Kamikariya, Kenju Otsuka; Tokai Univ., Japan.* Modal and polarization properties of laser-diode-pumped YAG ceramic lasers possessing different average grain sizes were examined. Linearly-polarized, single-frequency TEM_{00} mode operations were obtained in micro-grained ceramic lasers whose average grain sizes are a few micrometers.

Reception Hall
10:00 a.m.–11:00 a.m.
Coffee Break/Exhibits Open

MC • Poster Session I

Reception Hall
10:00 a.m.–11:00 a.m.
MC • Poster Session I

MC1
Design of a 10 Hz Femto-Petawatt Laser Pumped by the Mercury Laser Facility, *A. J. Bayramian, J. P. Armstrong, G. K. Beer, R. W. Campbell, R. R. Cross, A. C. Erlandson, B. L. Freitas, R. A. Kent, J. A. Menapace, W. A. Molander, K. I. Schaffers, C. W. Siders, S. B. Sutton, J. B. Tassano, S. Telford, J. E. Wolfe, C. A. Ebbers, J. A. Caird, C. P. J. Barty; Lawrence Livermore Natl. Lab, USA.* The Mercury laser will be used to pump a high average power Ti:sapphire chirped pulse amplifier which will produce a compressed peak power >1 petawatt at 10 Hz.

MC2
New Concept of 100 PW Femtosecond Laser Based on Ceramics Doped with Chromium Ions, *Efim A. Khazanov, Alexander Sergeev; Inst. of Applied Physics of Russian Acad. of Science, Russian Federation.* We propose a new concept of a superpowerful femtosecond laser based on CPA in chromium doped ceramics (Cr:YAG, Cr:YSGG, etc) pumped by a Nd:glass laser. Power of 100PW may be reached at 10kJ pump energy.

MC3
A Hybrid, OPCPA-Nd:Glass Petawatt Laser, *Erhard W. Gaul, Mikael Martinez, Todd Ditmire, Patrick Barber, Joel Blakeney, Skyler Douglas, Douglas Hammond, Watson Henderson, Martin Ringuette; Univ. of Texas at Austin, USA.* The 200 J, 150 fs Texas Petawatt Laser is based on optical parametric chirped pulse amplification (OPCPA) for large, broadband gain followed by a mixed glass high energy booster stage.

MC4
Eye-Safe Picosecond Nd:YAG Laser with Brillouin and Raman Pulse Compression, *Oleg V. Kulagin[1], Alexander K. Kotov[1], Alexander M. Sergeev[1], Michael T. Valley[2]; [1]Inst. of Applied Physics, Russian Federation, [2]Sandia Natl. Labs, USA.* A passively Q-switched Nd:YAG laser produces 50-mJ, 1530-nm pulses of 30-ps duration at 100 Hz, in a near-diffraction-limited beam ($M^2 \leq 1.3$). Pulse compression is provided by consecutive SBS in C_8F_{18} and SRS in $Ba(NO_3)_2$.

MC5
0.35 MW Pulses with 44 W Average Power from a Picosecond Phase-Conjugate Nd:GdVO$_4$ Laser System, *Naoki Shiba[1], Kouji Nawata[1], Kenji Furuki[1], Takashige Omatsu[1,2]; [1]Chiba Univ., Japan, [2]PREST, Japan Science and Technology Agency, Japan.* We demonstrated a 44 W near diffraction-limited pico-second output from a phase-conjugate laser system in combination with a diode-side-pumped Nd:GdVO$_4$ booster amplifier. Peak power of 0.35 MW was achieved.

MC6
High Pulse Energy, Rep-Rated Nd:Glass Laser with Stimulated Brillouin Scattering Phase Compensator, *Ryo Yasuhara[1], Takashi Sekine[1], Takashi Kurita[1], Tadashi Ikegawa[1], Osamu Matsumoto[1], Toshiyuki Kawashima[1], Masahiro Miyamoto[1], Hirofumi Kan[1], Hidetsugu Yoshida[2], Junji Kawanaka[2], Masahiro Nakatsuka[2], Yasukazu Izawa[2], Tadashi Kanabe[3]; [1]Hamamatsu Photonics K. K., Japan, [2]Inst. of Laser Engineering, Osaka Univ., Japan, [3]Graduate School of Engineering, Univ. of Fukui, Japan.* The near diffraction limited quality of 21.3 J in 8.9 ns (2.4 GW peak power) at 10Hz rep-rate beam has been obtained by diode-pumped Nd:glass zig-zag slab laser with a stimulated Brillouin scattering (SBS) mirror.

MC7
Activation of a Kilo Joule Energy Variable Shape Long Pulse System for the Vulcan Glass Laser, *Waseem Shaikh, Ian Musgrave, Cristina Hernandez-Gomez; Central Laser Facility STFC, Rutherford Appleton Lab, UK.* We describe an upgrade to the KJ Vulcan Glass laser system where the temporal shape of the laser pulse can be arbitrarily chosen. We use waveguide modulators before amplification in a diode pumped regenerative amplifier.

MC8
Transient-Grating FROG for Measurement of Sub-10-fs to Few-ps Amplified Pulses, *A. S. Pirozhkov[1,2], M. Mori[1], K. Ogura[1], A. Nishimura[1], H. Murakami[1], Y. Shimada[1], A. Sagisaka[1], S. Orimo[1], T. Kimura[1], H. Daido[1]; [1]Advanced Photon Res. Ctr., Japan, [2]P. N. Lebedev Physical Inst. of the Russian Acad. of Sciences, Russian Federation.* We report on the design and performance of a highly accurate, easy-to-align Transient-Grating FROG apparatus capable to measure amplified pulses with the duration from sub-10 fs to longer than 1 ps.

MC9
Design of PETAL Multipetawatt High-Energy Laser Front-End Based on Optical Parametric Chirped Pulse Amplification, *Emmanuel Hugonnot, Gerard Deschaseaux, Olivier Hartmann, Herve Coic; Commissariat à l'Energie Atomique (CEA), Ctr. d'Etudes Scientifiques et Techniques d'Aquitaine (CESTA), France.* We present the OPCPA based front-end designed for the French LIL multi-Petawatt high-energy Laser Facility (PETAL).

MC10
High-Intense, High-Contrast J-KAREN Laser at Advanced Photon Research Center, *Hajime Okada, Hiromitsu Kiriyama, Michiaki Mori, Yoshiki Nakai, Takuya Shimomura, Manabu Tanoue, Atsushi Akutsu, Tomohiro Motomura, Shuji Kondo, Shuhei Kanazawa, Masaki Kando, Hideyuki Kotaki, Yuji Fukuda, Liming Chen, Izuru Daito, Sergei Bulanov, Hiroyuki Daido, Toyoaki Kimura, Toshiki Tajima; Advanced Photon Res. Ctr., Japan Atomic Energy Agency, Japan.* We demonstrate a compact high-intense, high contrast OPCPA/Ti:sapphire hybrid laser. The 80 TW peak power at 10 Hz repetition rate with ~9 orders temporal contrast in a few picoseconds region was obtained.

MC11
Single-Frequency-Mode Q-Switched Nd:YAG Laser Controlled by Volume Bragg Gratings, *Nikolai Vorobiev[1], Vadim I. Smirnov[2], Leonid Glebov[1]; [1]CREOL, College of Optics and Photonics, Univ. of Central Florida, USA, [2]OptiGrate, USA.* This paper reports on a new type of Q-switched solid state lasers with resonators formed by volume Bragg gratings. This novel design results in a single frequency operation and dramatically simplifies laser optical scheme.

MC12
High Power Volume Bragg Laser Bar for Efficient Pumping of Alkali (Rb) Lasers, *Alexandre Gourevitch[1], George Venus[1], Vadim Smirnov[2], Leonid Glebov[1]; [1]College of Optics and Photonics, Univ. of Central Florida, USA, [2]OptiGrate, USA.* A laser diode bar incorporated in external cavity with reflecting volume Bragg grating produced 30W CW output power within 30pm spectral linewidth at 780nm. Rb vapor cell absorbed more than 85% of laser radiation.

MC13
Site Selective Spectroscopy and Laser Oscillations of Yb^{3+} Ions in BaF_2-SrF_2-CaF_2 Single Crystals of Solid Solution, *Maxim E. Doroshenko, Tasoltan T. Basiev, Pavel P. Fedorov, Vasilii A. Konyushkin, Sergei V. Kouznetsov, Andrei N. Nakladov, Vyacheslav V. Osiko, Ol'ga V. Shlyakhova; Laser Materials and Technology Res. Ctr. of GPI, Russian Federation.* Optical centers of Yb^{3+} ions in SrF_2 crystal and CaF_2-SrF_2 and BaF_2-SrF_2 solid solutions were determined by means of site-selective spectroscopy and their spectroscopic and laser properties were investigated and compared to known CaF_2:Yb^{3+} crystal.

MC14
Preparation and Laser Oscillation of Optical Ceramics Based on LiF:F_2^- Color Center Crystals and CaF_2-SrF_2-YbF_3 Crystals, *Tasoltan T. Basiev, Maxim E. Doroshenko, Pavel P. Fedorov, Vasilii A. Konyushkin, Sergei V. Kouznetsov, Valerii V. Voronov, Vyacheslav V. Osiko; Laser Materials and Technology Res. Ctr., General Physics Inst., Russian Federation.* The new method of fluoride ceramics preparation is suggested. The high optical quality ceramics of LiF:F_2^- was prepared and laser oscillations obtained and compared with single crystal data.

MC15
Thermal-Birefringence-Induced Local Depolarization in Thin YAG Ceramic, *Yu Oishi[1,2], Traian Dascalu[1], Katsumi Midorikawa[2], Takunori Taira[1]; [1]IMS, Japan, [2]RIKEN, Japan.* The thermal-birefringence-induced spatially-distributed local depolarization in thin Nd:YAG ceramics were investigated. We found the variation of local depolarization was increased one order of magnitude when the thickness of ceramics was reduced near the grain size.

MC16
6.9-W Efficient Tunable Yb:YAG Ceramic Laser at Room Temperature, *Shinki Nakamura[1], Hiroaki Yoshioka[1], Yu Matsubara[1], Takayo Ogawa[2], Satoshi Wada[2]; [1]Ibaraki Univ., Japan, [2]RIKEN, Japan.* The diode-end-pumped Yb:YAG ceramic tunable laser with the maximum output power of 6.9 W and with the highest slope efficiency of 55% was demonstrated. The tunable range of 1023 - 1081 nm was obtained.

MC17
AO Q-switching Operation in Edge-Pumped Composite All-Ceramic Yb:YAG Microchip Laser, *Keiichi Yamaoka[1], Motoi Sasaki[1], Ryouji Koseki[1], Takunori Taira[2]; [1]Shibuya Kogyo Co., Ltd., Japan, [2]Inst. for Molecular Science, Japan.* We have demonstrated AO Q-switched operation without the parasitic oscillation by the core/clad all-ceramic composite Yb:YAG microchip structure. Output power of 46 W at 10 kHz was obtained in the edge-pumping configuration.

MC18
High Average Power 589 nm Generation in LBO, *Ian Lee, Munib Jalali, Neil Vanasse, Zachary Prezkuta, William J. Alford; Lockheed Martin Coherent Technologies, USA.* We report on a 589 nm source from sum frequency mixed 1064 nm and 1319 nm in LBO. An output power of 22 W at 589 nm was obtained with an M^2 of 1.3.

MC19
Photorefractive Damage in Nonlinear Optical Crystals of BiB_3O_6, *Jong Hoon Jang, In Ho Yoon, Choon Sup Yoon; KAIST, Republic of Korea.* We report that the optical damage in BiB_3O_6 crystals is caused by photorefractive effect. The photo-induced birefringence change is 1.87×10^{-3} at exposure to Ar-ion laser of 64.5 kW/cm^2 for an hour.

MC20
Self Frequency Doubling Performances of Yb^{3+} Doped GdCOB and YCOB Based on New Phase Matching Angles Determinations in XY and ZX Principal Planes, *Ke Xu, Pascal Loiseau, Gerard Aka; Ecole Natl. Supérieure de Chimie de Paris, France.* We present the self-frequency doubling performances of 15 at. % Yb^{3+} doped YCOB and GdCOB crystals in XY and ZX principal planes. Crystal's refractive indexes were measured and used to calculate SHG phase matching angles**.**

MC21
Fine Frequency Tuning and ±3 MHz Frequency Stabilisation of a Nanosecond Mid-Infrared Doubly Resonant Optical Parametric Oscillator, *Antoine Berrou, Myriam Raybaut, Antoine Godard, Michel Lefebvre; Onera, France.* Entangled cavity nanosecond optical parametric oscillators are known as powerful devices to fulfill requirements for high resolution spectroscopy. We demonstrate here 100 GHz continuous tuning and ±3MHz frequency stabilization of the signal of such OPO.

MC22
Paper Withdrawn

MC23
Quick Phase-Matching Procedure for High-Energy Harmonic Generation in Single-Shot Regime: Application to 52 J Frequency-Doubling in KTP, *Gabriel Mennerat, Jacques Rault; Commissariat à l'Energie Atomique (CEA), CESTA, France.* We present a rapid experimental procedure to set and optimize phase-matching of large-aperture high-energy harmonic generators in a few shots. We report on 52J second harmonic generation and 76% efficiency in large aperture KTP crystals.

MC24
Sub-Two-Cycle, Self-Phase-Stabilized Mid-Infrared Pulses Generated by Four-Wave Rectification, *Takao Fuji, Toshinori Suzuki; RIKEN, Japan.* Broadband mid-infrared pulses were generated by four-wave mixing of the fundamental and the second harmonic of ultrashort Ti:sapphire laser pulses. The carrier-envelope phase was passively stabilized and the pulse width was measured as 13 fs.

MC25
A CW 266 nm Coherent Light Source Pumped by the SHG Beam of the Single Frequency Fiber Amplifier Radiation, *Shenghong Huang, Tetsuo Ando, Yosuke Orii, Tetsumi Sumiyoshi; Cyber Laser Inc., Japan.* A CW 266 nm light source pumped by a green beam generated in MgO:PPSLT with a fiber MOPA output has been developed. The highest DUV output power was obtained to be 715 mW.

MC26

Nonlinear Refractive Indices in Disordered $NaT(XO_4)_2$ T = Y, La, Gd, Lu and Bi, X = Mo, W Laser Crystals, *Alberto García-Cortés[1], M. D. Serrano[1], Carlos Zaldo[1], Concepción Cascales[1], Gustav Strömqvist[2], Valdas Pasiskevicius[2]; [1]Inst. de Ciencia de Materiales de Madrid, CSIC, Spain, [2]Royal Inst. of Technology, Sweden.* Nonlinear index has been measured using z-scan technique in tetragonal disordered double tungstate and molybdate laser crystals. The n_2 is comparable or larger than in monoclinic double tungstates, with substantial enhancement found in $NaBi(WO_4)_2$.

MC27

Efficient Wavelength Conversion Based on Periodically Poled $MgO:LiNbO_3$ Optical Parametric Oscillator, *Ravi Bhushan[1], Hidetsugu Yoshida[1], Koji Tsubakimoto[1], Hisanori Fujita[1], Masahiro Nakatsuka[1], Nobuaki Miyanaga[1], Yasukazu Izawa[1], Hideki Ishizuki[2], Takunori Taira[2]; [1]Inst. of Laser Engineering, Osaka Univ., Japan, [2]Laser Res. Ctr. for Molecular Science, Japan.* Optical parametric oscillator based on a large aperture periodically poled $MgO:LiNbO_3$ was used to generate 2 μm laser. Total output of 179 mJ with 53% slope efficiency was achieved at low pump fluence.

MC28

Optical Parametric Oscillator with Delayed Double-Pass Pump and Deep-UV Generation by Its Second Harmonic, *Yushi Kaneda[1], N. Peyghambarian[1], Kenshi Miyazono[2], Hiroya Shimatani[2], Yoshiyuki Honda[2], Masashi Yoshimura[2], Yusuke Mori[2], Yasuo Kitaoka[2], Takatomo Sasaki[2]; [1]College of Optical Sciences, Univ. of Arizona, USA, [2]Osaka Univ., Japan.* Using 0.49 mJ of pump energy at 532 nm from a DPSS for an intracavity-doubled SRO with delayed double-pass pump, 0.085 mJ at 488 nm and 0.018 mJ in deep UV were obtained.

MC29

Compact All-in-One THz-Wave Parametric Oscillator Pumped with LD-Pumped Q-Switched Nd:YAG Laser, *Hiroaki Minamide[1], Atsushi Sato[2], Tomofumi Ikari[1], Hiromasa Ito[1,3]; [1]RIKEN Sendai, Japan, [2]Tohoku Inst. of Technology, Japan, [3]Tohoku Univ., Japan.* We developed an all-in-one THz-wave parametric oscillator driven by an original LD-pumped Q-switched Nd:YAG laser. The pump source and a ring-cavity THz-wave parametric oscillator were embedded into the package with almost A3-paper-size dimensions, with 155-mm-height.

MC30

Tunable Terahertz-Wave Parametric Generation Pumped by Microchip Nd:YAG Laser, *Shinichiro Hayashi[1,2], Takayuki Shibuya[1,3], Hiroshi Sakai[4], Hirofumi Kan[4], Takunori Taira[5], Yuichi Ogawa[2], Chiko Otani[1], Kodo Kawase[1,2,3]; [1]RIKEN, Japan, [2]Tohoku Univ., Japan, [3]Nagoya Univ., Japan, [4]Hamamatsu Photonics K. K., Japan, [5]Inst. for Molecular Science, Japan.* We have developed THz-wave parametric generator pumped by microchip Nd:YAG laser. This generated tunable, narrow-linewidth THz-wave with injection seeding by external cavity diode laser. We observed THz-wave tunablity within 1.6-3.0THz, linewidth of less than 10GHz.

MC31

Quasi Phase Matched Parametric Fluorescence in High-Quality GaAs/AlGaAs Waveguides, *Ikuma Ohta, Tomonori Matsushita, Junya Ohta, Takashi Kondo; Univ. of Tokyo, Japan.* We improved fabrication processes of QPM GaAs/AlGaAs structures and suceeded in fabrication of high-quality waveguiding devices. Parametric fluorescence measurements revealed the propagation losses are quit low and the observed efficiencies are comparable to theoretical estimations.

MC32

Reduction of Nonlinear Absorption in $Li_2B_4O_7$ by Controlling Temperature and Repetition Rate, *Masakuni Takahashi[1], Ichiro Sekine[1], Marilou Cadatal[2], Nobuhiko Sarukura[3], Peter F. Moulton[4], Alex Dergachev[4]; [1]Mitsubishi Materials Corp., Japan, [2]Inst. for Molecular Science, Japan, [3]Inst. of Laser Engineering, Osaka Univ., Japan, [4]Q-Peak Inc., USA.* Non-linear absorption limits Nd:YAG fourth harmonic generation in $Li_2B_4O_7$. By characterizing the non-linear absorption coefficient, we determined that it could be reduced by controlling the temperature and repetition rate.

MC33

Highly Transparent Stoichiometric $LiNbO_3$ with MgO Doping *Junji Hirohashi, Tsuyoshi Tago, Yasuyuki Sakata, Shin-ichi Nakanome, Takeshi Ito, Tatsuo Fukui, Akio Miyamoto; OXIDE Corp., Japan.* Highly transparent MgO-doped $LiNbO_3$ crystal is investigated for high power visible light generation. By controlling crystal growth conditions, its absorption especially at UV to green region is remarkably reduced and consequently less GRIILA is observed.

MC34

Efficient Continuous-Wave Yellow Output from a Self-Raman Composite $Nd:YVO_4/YVO_4$ Laser, *Takashige Omatsu[1], Helen M. Pask[2], James A. Piper[2]; [1]Chiba Univ., Japan, [2]Macquarie Univ., Australia.* We report 115mW CW yellow output from a small-scale, diode-pumped intracavity doubled self-stimulating Raman composite $Nd:YVO_4/YVO_4$ laser, with optical efficiency from diode to yellow output of 2.6%.

MC35

355 nm Tailored Pulse Tandem Amplifier, *Xiaoyuan Peng[1], Brian W. Baird[1], Wensheng Ren[1], David M. Hemenway[1], Lei Xu[1], Pascal Deladurantaye[2], Yves Taillon[2], Maik Frede[3], Dietmar Kracht[3]; [1]Electro Scientific Industries, USA, [2]INO, Canada, [3]Laser Zentrum Hannover, Germany.* We report on a 355 nm tailored pulse tandem amplifier. 1064 nm tailored pulse fiber laser output was amplified in a diode-pumped Nd:Vanadate amplifier and then frequency converted to produce 0.6 W at 100 KHz.

MC36

Kerr-Lens Mode-Locking Scheme for Diode-Pumped Yb-Doped-Bulk Lasers, *Sadao Uemura, Kenji Torizuka; Photonics Res. Inst., Natl. Inst. of Advanced Industrial Science and Technology (AIST), Japan.* We have developed a Kerr-lens mode-locking scheme for diode-pumped Yb-doped-bulk lasers, and succeed in generating, to our knowledge, the shortest pulse ever produced from a Yb:YAG laser, where the pulse duration is 100 fs.

MC37

CW 488 nm Laser with External-Cavity Frequency Doubling of a Multi-Longitudinal-Mode Semiconductor Source, *Boris M. Kharlamov, Vincent Issier, Thomas Kraft, Andy Miller, David Simons; JDS Uniphase, USA.* We report efficient 488 nm laser for biotechnology applications. Multi-longitudinal-mode external cavity semiconductor laser radiation is frequency converted in $MgO:PPLiNbO_3$ waveguide. Laser provides excellent beam quality, variable output power, and capability of direct modulation.

MC38

High Average-Power Diode-Pumped Femtosecond Cr^{3+}:LiCAF Laser, *Umit Demirbas[1], Alphan Sennaroglu[2], Andrew Benedick[1], Aleem Siddiqui[1], Franz X. Kärtner[1], James G. Fujimoto[1]; [1]MIT, USA, [2]Koc Univ., Turkey.* 67-fs pulses with an average power of 300 mW and pulse repetition rate of 120 MHz were obtained from a diode-pumped Cr^{3+}:LiCAF laser. A semiconductor saturable absorber mirror enabled stable and self-starting mode-locked operation.

MC39

Raman Lasing in Glycerol Water Microdroplets on a Superhydrophobic Surface, *Alphan Sennaroglu, Alper Kiraz, Mehmet A. Dundar, Adnan Kurt, Adem L. Demirel; Koç Univ., Turkey.* We report on the first observation of Raman lasing near 630 nm from 532-nm-pumped, glycerol-water microdroplets on a superhydrophobic surface. Results of cavity-enhanced Raman scattering and Raman lasing experiments are described.

MC40

Spectroscopy and Femtosecond Laser Performance of $Yb^{3+}:YAlO_3$ Crystal, *Victor E. Kisel[1], Sergei V. Kurilchik[1], Nikilai V. Kuleshov[1], Sofia Smirnova[2]; [1]Inst. for Optical Materials and Technologies BNTU, Belarus, [2]Russian Res. Inst. for the Synthesis of Materials, Russian Federation.* Spectroscopy and laser performance of $Yb^{3+}:YAlO_3$ under diode-laser pumping are reported. CW-laser with output power of 1.2W and slope efficiency of 64.5% was demonstrated. 225fs-pulses with average power of 0.8W were obtained in mode-locked laser.

MC41

In-Band Pumped, High-Power Intracavity Frequency Doubled Nd-Vanadate Thin-Disk Lasers at 530 nm, *Nicolaie Pavel[1], Christian Kränkel[2], Rigo Peters[2], Klaus Petermann[2], Günter Huber[2]; [1]Natl. Inst. for Lasers, Plasma and Radiation Physics, Romania, [2]Inst. of Laser Physics, Univ. of Hamburg, Germany.* Intracavity frequency doubling of $Nd:YVO_4$ and $Nd:GdVO_4$ thin-disk lasers in-band pumped at 0.88 μm, directly into the emitting level $^4F_{3/2}$, yielded 8.5-W and 9.1-W of 0.53-μm green light, respectively, with optical-to-optical efficiency of ~30%.

MC42

Implantation of Bi Infrared Luminescent Center in the Lithium Niobate Crystal Structure, *Yoshiyuki Kuwada, Yasushi Fujimoto, Masahiro Nakatsuka; Inst. of Laser Engineering, Osaka Univ., Japan.* We succeeded to implant Bi infrared luminescent center in the lithium niobate optical crystal. This crystal could be applied to the ultra-short pulse or tunable laser media with excellent non-linearity and ferroelectric property.

MC43

Electrically Switchable Photonic Crystal in the Ultraviolet Range
XiaoHong Sun, XiaoMing Tao; Hong Kong Polytechnic Univ., Hong Kong. A top-cut hexagon prism is designed for fabrication 3-D hexagonal PhC structures in HPDLC films. The PBG along z direction is in the UV range. Far-field diffraction patterns and electrical switching characteristics have been investigated.

MC44

Broadband Wavelength-Tunable Actively Mode-Locked Fiber Ring Laser Using a Bismuth-Oxide-Based Erbium-Doped Fiber, *Yutaka Fukuchi, Saori Yamada, Hiroshi Ikeda, Joji Maeda; Tokyo Univ. of Science, Japan.* We demonstrate an actively mode-locked fiber ring laser employing a 151-cm-long bismuth-oxide-based erbium-doped fiber. Stable short pulses at 10GHz are obtained with a broadband wavelength tuning range of 66nm covering both the C- and L-bands.

MC45

High-Pulse-Energy Mid-Infrared Laser Source Based on Optical Parametric Amplification in $ZnGeP_2$, *Magnus W. Haakestad, Gunnar Arisholm, Espen Lippert, Stephane Nicolas, Gunnar Rustad, Knut Stenersen; FFI (Norwegian Defence Res. Establishment), Norway.* Nonlinear optical conversion of ~500 mJ pulses from a Q-switched Nd:YAG laser to the mid-infrared is demonstrated experimentally. Using optical parametric amplification in $ZnGeP_2$, we obtain up to 6 mJ at 8 μm.

MC46

Tunable, Narrow-Bandwidth Mid-IR Generation in $ZnGeP_2$ Crystals Pumped by a Large Aperture Periodically Poled Mg Doped $LiNbO_3$ Optical Parametric System, *Jiro Saikawa[1], Mitsuhiko Miyazaki[1], Masaaki Fujii[1], Hideki Ishizuki[2], Takunori Taira[2]; [1]Tokyo Inst. of Technology, Japan, [2]Inst. for Molecular Science, Japan.* We have developed a tunable, narrow-bandwidth (~2cm^{-1}) Mid-IR optical parametric system with a large-aperture PPMgLN based pump source. The system tuned from 4.7 to 10.6μm, and the maximum output energy of 1.7mJ was obtained.

MC47

Z-Scan Measurement of ZnO Thin Films Using the Ultraviolet Femtosecond Pulses, *Yun-Pei Chan[1], Ja-Hon Lin[2], Kuei-Huei Lin[3], Wen-Feng Hsieh[1]; [1]Dept. of Photonics and Inst. of Electro-Optical Engineering, Natl. Chiao Tung Univ., Taiwan, [2]Dept. of Electro-Optical Engineering, Natl. Taipei Univ. of Technology, Taiwan, [3]Dept. of Science Education, Taipei Municipal Univ. of Education, Taiwan.* Optical nonlinearities of ZnO thin films were investigated by the Z-scan technique using the ultraviolet femtosecond pulses. The TPA coefficient shows the unexpected enhancement and the γ is positive due to the thermal lensing effect.

MC48

Mechanically Induced Ultra-Broadband Chirped Long-Period Gratings in Photonic Crystal Fiber by a Constant-Period Grooved Metallic Plate, *Hou-Ren Chen[1], Kuei-Huei Lin[2], Ja-Hon Lin[3], Wen-Feng Hsieh[1]; [1]Dept. of Photonics and Inst. of Electro-Optical Engineering, Natl. Chiao Tung Univ., Taiwan, [2]Dept. of Science, Taipei Municipal Univ. of Education, Taiwan, [3]Dept. of Electro-Optical Engineering, Natl. Taipei Univ. of Technology, Taiwan.* Ultrabroadband LPGs are generated in bended PCF by using constant-period grooved plate. Spectral fringes are observed, which can be eliminated by using proper LPG configurations. LPG with rejection bandwidth of 250 nm has been obtained.

MD • Volumetric Diffractive Structures

Noh Theater
11:00 a.m.–12:30 p.m.
MD • Volumetric Diffractive Structures
Gregory D. Goodno; Northrop Grumman, USA, Presider

MD1 • 11:00 a.m. **Invited**
Volume Bragg Gratings in PTR Glass—New Optical Elements for Laser Design, *Leonid B. Glebov; CREOL, The College of Optics and Photonics, Univ. of Central Florida, USA.* This is a survey of achievements in semiconductor, solid state and fiber lasers enabled by the use of new optical elements which are volume Bragg gratings recorded in a photo-thermo-refractive (PTR) glass.

MD2 • 11:30 a.m.
Tunable, High Power, Narrow Band Emission from a Volume Grating-Controlled Diode Bar, *Alan B. Petersen, John Gloyd; Spectra-Physics Lasers, USA.* A single laser diode bar generates over 50W output at 780 nm, with linewidth 0.1 nm. The diode emission wavelength is controlled by a volume transmission grating and is tunable over ≥ 0.4 nm.

MD3 • 11:45 a.m.
Quasi-Two-Level Yb:KYW Laser Using a Volume Bragg Grating, *Björn Jacobsson, Jonas E. Hellström, Valdas Pasiskevicius, Fredrik Laurell; Laser Physics, KTH, Royal Inst. of Technology, Sweden.* A volume Bragg grating is used as input coupler in an Yb:KYW laser to obtain lasing at 998 nm while diode-pumping at 982 nm. The power was 3.6 W with a bandwidth of 10 GHz.

MD4 • 12:00 p.m.
Femtosecond Yb-Fiber CPA System Based on Chirped-Volume-Bragg-Gratings, *Guoqing Chang[1], Matthew Rever[1], Vadim Smirnov[2], Leon Glebov[3], Almantas Galvanauskas[1]; [1]Univ. of Michigan, USA, [2]OptiGrate, USA, [3]CREOL, College of Optics and Photonics, Univ. of Central Florida, USA.* Femtosecond (~650 fs) Yb fiber-CPA with 8.5 W of average power is demonstrated using broadband chirped-volume-Bragg-gratings for pulse stretching and compression. These gratings show a 79% reflection efficiency that is independent of the input power.

MD5 • 12:15 p.m.
Monolithic Waveguide-Lasers Created in Bulk Glass Using the Direct Write Technique, *Graham D. Marshall, Peter Dekker, Martin Ams, James A. Piper, Michael J. Withford; Macquarie Univ., Australia.* We report the creation of monolithic waveguide-lasers created using femtosecond laser direct writing. Utilizing waveguide-Bragg gratings written within the doped guide structure the laser produced narrow linewidth output in the C-band.

12:30 p.m.–2:00 p.m.
Lunch Break

ME • Ultrafast Oscillators

Noh Theater
2:00 p.m.–3:45 p.m.
ME • Ultrafast Oscillators
James Kafka; Newport Corp., USA, Presider

ME1 • 2:00 p.m.
Passively Mode-Locked Yb:$LaSc_3(BO_3)_4$ Oscillator, *Simon Rivier[1], Andreas Schmidt[1], Valentin Petrov[1], Uwe Griebner[1], Christian Kränkel[2], Rigo Peters[2], Klaus Petermann[2], Günter Huber[2], Martin Zorn[3], Markus Weyers[3], Götz Erbert[3]; [1]Max-Born-Inst., Germany, [2]Hamburg Univ., Germany, [3]Ferdinand-Braun-Inst., Germany.* We report on passive mode locking of an Yb-doped lanthanum scandium borate laser. Pulse durations as short as 58 fs and 67 fs were obtained applying a Ti:sapphire- and a diode-laser pump source, respectively.

ME2 • 2:15 p.m.
Approaching the Megawatt Peak Power from Mode-Locked Femtosecond Fiber Oscillator, *Bülend Ortaç[1], Oliver Schmidt[1], Thomas Schreiber[1,2], Jens Limpert[1], Ammar Hideur[3], Andreas Tünnermann[1,2]; [1]Inst. of Applied Physics, Friedrich-Schiller-Univ., Germany, [2]Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany, [3]Groupe d'Optique et d'Optronique, Univ. de Rouen, France.* The generation of 0.5 MW peak power 400 fs pulses from an all-normal mode-locked Ytterbium-doped short-length large-mode-area fiber laser is reported. The self-starting oscillator emits 2.7 W of average power at 10.18 MHz repetition rate.

ME3 • 2:30 p.m.
High-Energy Laser Pulses Directly from the Oscillator: From Thin-Disk to Positive Dispersion, *Uwe Morgner[1,2], Guido Palmer[1], Andy Steinmann[1], Moritz Emons[1], Matthias Pospiech[1], Marcel Schultze[1], Martin Siegel[1]; [1]Inst. of Quantum Optics, Leibniz Univ. Hannover, Germany, [2]Laserzentrum Hannover e.V., Germany.* We report on generation and applications of multi microjoule-pulses directly obtained from laser oscillators with MHz repetition rates based on cavity-dumping and long-cavity concepts of bulk and thin-disk media in different dispersion regimes.

ME4 • 2:45 p.m.
Femtosecond Thin Disk Lasers Exceed Pulse Energies of 10 Microjoules and Enable High Field Physics Experiments, *Cyrill R. E. Baer[1], Sergio V. Marchese[1], Shigeki Hashimoto[1], Michael S. Ruosch[1], Rachel Grange[1], Matthias Golling[1], Thomas Südmeyer[1], Ursula Keller[1], G. Lépine[2], G. Gingras[2], Bernd Witzel[2]; [1]Dept. of Physics, Inst. of Quantum Electronics, ETH Zurich, Switzerland, [2]Dept. de Physique, Univ. Laval, Canada.* We achieve 10-microjoule pulse energies directly from a femtosecond laser oscillator. We underline its suitability for high field experiments at multi-megahertz repetition rate by demonstrating the first electron spectroscopy measurements driven by an oscillator.

ME5 • 3:00 p.m.
Efficient Femtosecond Yb:Lu_2O_3 Thin Disk Laser, *Sergio V. Marchese[1], Cyrill R. E. Baer[1], Anna G. Engqvist[1], Matthias Golling[1], Deran J. H. C. Maas[1], Thomas Südmeyer[1], Ursula Keller[1], Rigo Peters[2], Christian Kränkel[2], Klaus Petermann[2], Günter Huber[2]; [1]Dept. of Physics, Inst. of Quantum Electronics, ETH Zürich, Switzerland, [2]Inst. of Laser-Physics, Univ. of Hamburg, Germany.* We demonstrate the first mode-locked Yb:Lu_2O_3 thin disk laser, obtaining 370-fs pulses with 20.5 W average power. The 43% optical-to-optical efficiency obtained with 523-fs pulses is higher than for previous mode-locked thin disk lasers.

ME6 • 3:15 p.m.
290-fs Passively Mode-Locked Semiconductor Disk Laser, *Peter Klopp[1], Florian Saas[1], Jens W. Tomm[1], Uwe Griebner[1], Martin Zorn[2], Götz Erbert[2], Markus Weyers[2]; [1]Max-Born-Inst., Germany, [2]Ferdinand-Braun-Inst., Germany.* A passively mode-locked semiconductor disk laser employing a graded-gap-barrier design in the gain section is presented. The all-semiconductor laser generates transform-limited pulses as short as 290 fs at 1036 nm.

ME7 • 3:30 p.m.
Modelocked Integrated External-Cavity Surface Emitting Laser (MIXSEL), *Aude-Reine Bellancourt, Deran J. H.C. Maas, Benjamin Rudin, Matthias Golling, Thomas Südmeyer, Ursula Keller; ETH, Switzerland.* We discuss a passively modelocked VECSEL with both gain and saturable absorber integrated into a single semiconductor structure. The MIXSEL generates 195 mW average power in 32-ps pulses in a diffraction limited beam (M2<1.1).

Reception Hall
3:45 p.m.–4:15 p.m.
Coffee Break/Exhibits Open

MF • Yb-Doped Materials

Noh Theater
4:15 p.m.–5:30 p.m.
MF • Yb-Doped Materials
Jens Limpert; Friedrich Schiller Univ., Germany, Presider

MF1 • 4:15 p.m.
Photoconductivity Measurements Indicating a Nonlinear Loss Mechanism in Highly Yb-Doped Oxides, *Christian Hirt, Susanne T. Fredrich-Thornton, Friedjof Tellkamp, Klaus Petermann, Guenter Huber; Insitut für Laser-Physik, Univ. Hamburg, Germany.* Photoconductivity has been measured in highly Yb-doped oxides, revealing the occurrence of an up-conversion mechanism in these materials. A model for the observed phenomenon is suggested and the impact on thin-disk lasers is discussed.

MF2 • 4:30 p.m.
Influence of the Yb-Doping Concentration on the Efficiency of Lu_2O_3 Thin Disk Lasers, *Rigo Peters, Christian Kränkel, Klaus Petermann, Guenter Huber; Inst. of Laser-Physics, Univ. of Hamburg, Germany.* A comparative study of high-power Yb:Lu_2O_3 thin disk lasers with different doping-concentrations is reported. 36.3W output-power at 1035nm with a slope-efficiency of 80% were obtained from a 5at.%-doped disk under diode-pumping with 49.8W at 976nm.

MF3 • 4:45 p.m.
High Energy Diode-Pumped Yb:YAG Laser for ns-Pulses, *Mathias Siebold[1], Sandro Klingebiel[1], Christoph Wandt[1], Zsuzsanna Major[1], Antonia Popp[1], Izhar Ahmad[1], Tie-Jun Wang[1], Joachim Hein[2], Ferenc Krausz[1], Stefan Karsch[1]; [1]Max-Planck-Inst. for Quantum Optics, Germany, [2]Inst. for Optics and Quantum Electronics Jena, Germany.* Nanosecond multi-pass amplification to the 1.7J-level based on diode-pumped Yb:YAG has been achieved. Applying a pump power of 26kW a quasi-CW peak output power of 4.5kW at a duty cycle of 0.1% has been obtained.

MF4 • 5:00 p.m.
Spectroscopic and Lasing Properties of Cryogenically Cooled Yb,Na:CaF_2 , *Audrius Pugzlys[1], Dmitry Sidorov[1,2], Tahir Ali[1], Andrius Baltuska[1], Liangbi Su[2], Jun Xu[2], Ruxin Li[2,3], Romualdas Danielius[3], Linas Giniunas[4]; [1]Vienna Univ. of Technology, Austria, [2]SIOM, China, [3]Light Conversion Ltd., Lithuania.* Absorption, photoluminescence spectra and lasing parameters of Yb^{3+}- Na^{+}-codoped CaF_2 crystal pumped at 980nm are measured in the 70K -290K temperature range. The crystal is a promising host for broadband multi-mJ sub-kHz cw-pumped regenerative amplification.

MF5 • 5:15 p.m.
Efficient cw Thin Disk Laser Operation of Yb:$Ca_4YO(BO_3)_3$ with 20 W Output Power, *Christian Kränkel, Rigo Peters, Klaus Petermann, Günter Huber; Inst. of Laser-Physics, Univ. of Hamburg, Germany.* Yb:YCOB is a potential material for short-pulse-generation at high output-powers. A thin-disk-laser with 20.1W output-power at 50% optical-to-optical-efficiency, a slope-efficiency of 60% and a wide tuning range is demonstrated as a step towards this aim.

5:30 p.m.–8:00 p.m.
Dinner Break

MG • Postdeadline Paper Session

Noh Theater
8:00 p.m.–9:30 p.m.
MG • Postdeadline Paper Session
Presider to Be Announced

•Tuesday, January 29, 2008•

Entrance Foyer
7:00 a.m.–1:00 p.m.
Registration Open

TuA • Ultrafast Amplifiers

Noh Theater
8:00 a.m.–9:45 a.m.
TuA • Ultrafast Amplifiers
Ingmar Hartl; IMRA America, Inc., USA, Presider

TuA1 • 8:00 a.m. Invited
10-Petawatt OPCPA System, *John Collier; Rutherford Appleton Labs, UK.* Abstract not available.

TuA2 • 8:30 a.m.
High-Repetition-Rate Picosecond Pump Laser Based on a Yb:YAG Disk Amplifier for Optical Parametric Amplification, *Thomas Metzger[1], Catherine Y. Teisset[1], Ferenc Krausz[1,2]; [1]Ludwig-Maximilians-Univ., Germany, [2]Max-Planck-Inst. of Quantum Optics, Germany.* We report on an optical synchronized picosecond pump laser for optical parametric amplifiers based on a Yb:YAG thin-disk regenerative amplifier. At 10kHz repetition rate pulse energies of 4.5mJ with 6.8ps pulse duration were achieved.

TuA3 • 8:45 a.m.
High Repetition Rate—Sub 20 fs Optical Parametric Amplifier Pumped by High Power Fiber Amplifier, *Jan Rothhardt[1], Steffen Hädrich[1], Damian N. Schimpf[1], Jens Limpert[1], Andreas Tünnermann[1,2]; [1]Friedrich-Schiller-Univ. Jena, Germany, [2]Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany.* We report on a noncollinear optical parametric amplifier, which is pumped by a fiber-amplifier, producing ultra-short pulses with pulse-durations down to 15.6 fs and pulse-energies up to 500 nJ at 2 MHz repetition rate.

TuA4 • 9:00 a.m.
A Few-Cycle Sub-Millijoule Infrared OPCPA System and Its Application in High-Harmonic Generation, *Xun Gu[1], Gilad Marcus[1], Yunpei Deng[1], Nobuhisa Ishii[1], Takao Fuji[1], Martin Schultze[1], T. Taira[2], R. Hartmann[3], S. Roither[4], M. Kitzler[4], Andrius Baltuska[1,4], Reinhard Kienberger[1], Ferenc Krausz[1]; [1]Max-Planck-Inst. für Quantenoptik, Germany, [2]Inst. for Molecular Science, Japan, [3]MPI Halbleiterlabor, Germany, [4]Inst. für Photonik, Technische Univ. Wien, Austria.* We report the latest development of a 1-kHz OPCPA system, generating carrier-envelope-phase-stabilized 350-μJ 20-fs pulses around 2.1 μm with suppressed superfluorescence. A proof-of-principle high-harmonic-generation experiment in argon was conducted, producing photons up to 250 eV.

TuA5 • 9:15 a.m.
Millijoule Pulse Energy High Repetition Rate Femtosecond Fiber CPA System, *Fabian Röser, Tino Eidam, Jan Rothhardt, Oliver Schmidt, Damian Schimpf, Jens Limpert, Andreas Tünnermann; Friedrich-Schiller-Univ., Inst. of Applied Physics, Germany.* We report on an ytterbium-doped fiber CPA system delivering millijoule level pulse energy at repetition rates above 100 kHz corresponding to an average power of more than 100 W. The compressed pulses are 800 fs.

TuA6 • 9:30 a.m.
High Energy Direct Amplification of Femtosecond Pulse in a Highly Nonlinear Fiber Amplifier, *Yoann Zaouter[1,2], Johan Boullet[1], Lei Huang[1], Claude Aguergaray[1], Dimitris Nicholaus Papadopoulos[3], Marc Hanna[3], Frédéric Druon[3], Eric Mottay[2], Patrick Georges[3], Eric Cormier[1]; [1]Ctr. Lasers Intenses et Applications (CELIA), Univ. de Bordeaux, France, [2]Amplitude Systèmes, France, [3]Lab Charles Fabry de l'Inst. d'Optique, Univ. Paris Sud, France.* We report the direct amplification of femtosecond pulses to 870 nJ, 49 fs, 12 MW and 1.25 μJ, 70 fs, 16 MW from a single stage stretcher-free rod-type fiber amplifier setup.

Reception Hall
9:45 a.m.–10:15 a.m.
Coffee Break/Exhibits Open

TuB • Eyesafe Infrared Sources

Noh Theater
10:15 a.m.–11:45 a.m.
TuB • Eyesafe Infrared Sources
Timothy Carrig; Lockheed Martin Coherent Technologies, USA, Presider

TuB1 • 10:15 a.m.
Mid-Infrared Silicon Raman Amplifier, *Varun Raghunathan[1], David Borlaug[1], Robert Rice[2], Bahram Jalali[1]; [1]Univ. of California at Los Angeles, USA, [2]Northrop Grumman Space Technology, USA.* Raman amplification is demonstrated in mid infrared wavelength region in bulk silicon as well as integrated waveguides. 13dB gain is achieved at 3.4 micron wavelength when silicon is pumped with 5nsec pulses at 2.9 microns.

TuB2 • 10:30 a.m.
QPM Wavelength Converters Based on Crystal Quartz, *Sunao Kurimura[1], Muneyuki Adachi[2], Jun Nakanishi[2], Ken-ichi Hayashi[2]; [1]Natl. Inst. for Materials Science, Japan, [2]Nidek Co., Ltd., Japan.* Recent progress in quasi-phase-matched crystal quartz will be reported. Fine period twinning by mechanical stress application achieved a 12 um twin structure. Milliwatt-level second harmonic generation was demonstrated at 266 nm by 2nd-order QPM.

TuB3 • 10:45 a.m.
High Power and Efficient Long Wave IR $ZnGeP_2$ Optical Parametric Oscillator, *Espen Lippert, Gunnar Rustad, Knut Stenersen; Norwegian Defence Res. Establishment (FFI), Norway.* A high power, efficient, $ZnGeP_2$ optical parametric oscillator tuned to the 8-10-μm wavelength range, pumped by a hybrid 2-micron-laser, is demonstrated. With 8.9W of 2.1μm pump power we obtained 0.95W at 8μm.

TuB4 • 11:00 a.m.
Cryo-Laser Performance of Resonantly-Pumped Er^{3+}:Sc_2O_3 Ceramic, *Nikolay Ter-Gabrielyan[1], Larry D. Merkle[1], George A. Newburgh[1], Mark Dubinskii[1], Akio Ikesue[2]; [1]US ARL, USA, [2]World Lab Co., Ltd., Japan.* Laser performance of Er^{3+}-doped scandia (Sc_2O_3) ceramic is reported for the first time. Resonantly-pumped, eyesafe, 1.6-μm Er:Sc_2O_3 cryo-laser slope efficiency of 77% and output power ~ 2.35 W have been achieved in this first experiment.

TuB5 • 11:15 a.m.
Single-Frequency, Widely-Tunable, and Multi-Watt Polycrystalline CW Cr^{2+}:ZnSe Lasers, *Igor S. Moskalev, Vladimir V. Fedorov, Sergey B. Mirov; Univ. of Alabama at Birmingham, USA.* We demonstrate polycrystalline Cr^{2+}:ZnSe CW rapidly-tunable (4.5 μm/s) high-power (150 mW) single-longitudinal-mode laser; widely-tunable (2.12-2.77 μm) multi-watt (2 W) laser; high-power (6 W) highly-efficient (48%) laser; and high-power (3 W) highly-efficient (41%) microchip laser.

TuB6 • 11:30 a.m.
Multiplex Molecular Fingerprinting with a Mid-Infrared Cr^{2+}:ZnSe Femtosecond Laser, *Evgeni Sorokin[1], Irina T. Sorokina[2], Julien Mandon[3], Guy Guelachvili[3], Nathalie Picqué[3]; [1]Photonics Inst., Technische Univ. Wien, Austria, [2]Physics Dept., Norwegian Univ. of Science and Technology, Norway, [3]Lab de Photophysique Moléculaire, CNRS, Univ. Paris-Sud, France.* A 130-fs Cr^{2+}:ZnSe laser is used to record, in 13 s, molecular spectra covering simultaneously 135 nm at 3.6 GHz resolution. The high signal-to-noise ratio of 3800 suggests 0.2 ppbv detection level for HF molecule.

12:15 p.m.
Laboratory Tour and Day Trip: Buses Leave Nara-Ken

1:15 p.m.–6:00 p.m.
Tour of Horuji and JAEA

6:00 p.m.
Buses Return to Hotel

TuC • Banquet

Nara Nikko Hotel, Hiten Room
7:00 p.m.–10:00 p.m.
ASSP Banquet

TuC • Banquet Speaker **Invited**
Construction of Great Budda in Nara, Symbol of Giant Light Source in Cosmos, *Atsumu Wada, Professor Emeritus, Kyoto Univ.of Education and Leading Researcher, Archaeological Inst. of Kashihara, Nara Prefecture; Japan.*

Atsumu Wada was born in northeastern China (Liaoyang, former Manchukuo) in 1944 and soon after birth he moved to Tawaramoto, Nara Prefecture, Japan, and he was brought up in the historical culture of Yamato (the old name of Nara). He is now living in Kibi, Takatori-cho, Takaichi-Gun, Nara Prefecture, Japan.

He finished his Ph.D. (national history) at the Graduate School of Letters, Kyoto University in 1972. After a Research Associate, Faculty of Letters, Kyoto University, he worked at Kyoto University of Education, where he became a Professor in 1988. He received the Ph.D. degree in literature from Kyoto University. In March, 2007, he took mandatory retirement.

He specializes in Japanese ancient history and is engaged in research in Japanese ancient thought and culture, wood strips, and so forth. Since 1972, as a Leading Researcher, Archaeological Institute of Kashihara, Nara Prefecture, he has been engaged in research activities in order to make the connection between Japanese ancient history and archaeology. He has studied under poet Toshio Mae living in Yoshino, Nara Prefecture, and been a member of the literary coterie “Yamamayu.”

He has written a number of books including, “Nihon-Kodai no Girei to Saishi, Shinkou (Rites, Worship and Belief in Ancient Japan) I, II, III,” Hanawa Shobo, Tokyo, Japan (1995). In addition, he has written a great number of papers.

He writes an article “Yamato Jiku Sanpo (Walking in the space and time of Nara)” every Wednesday for the Sankei Shinbun, a local newspaper.

•Wednesday, January 30, 2008•

Entrance Foyer
7:30 a.m.–5:00 p.m.
Registration Open

WA • Fiber Lasers

Noh Theater
8:00 a.m.–10:00 a.m.
WA • Fiber Lasers
Alphan Sennaroglu; Koc Univ., Turkey, Presider

WA1 • 8:00 a.m. **Invited**
High-Peak-Power Pulsed Fiber Lasers, *Fabio Di Teodoro; Aculight Corp., USA.* We describe pulsed fiber-based optical sources relying on very-large-core fibers, which attain high peak power (up to multiple megawatts) and pulse energy (up to multiple millijoules), while retaining excellent beam quality and narrow spectral linewidth.

WA2 • 8:30 a.m.
Phase Locking of a Pulsed Fiber Amplifier, *Eric C. Cheung, Mark Weber, Robert R. Rice; Northrop Grumman Space Technology, USA.* The 180-μJ, 1-nsec output of a pulsed fiber amplifier is phase locked to a master oscillator. As a precursor step for coherent beam combination, chirp is reproducible pulse to pulse and phase is robustly locked.

WA3 • 8:45 a.m.
Precision Phase Stabilization of Amplified Yb:Fiber Frequency Comb with Average Power >10W, *Thomas R. Schibli[1], Dylan C. Yost[1], Jun Ye[1], Ingmar Hartl[2], Andrius Marcinkevičius[2], Martin E. Fermann[2]; [1]JILA, Natl. Inst. of Standards and Technology and Univ. of Colorado, USA, [2]IMRA America, Inc., USA.* We implement complete phase stabilization of a mode-locked Yb:fiber laser and its subsequent amplifier, producing a precise optical frequency comb with >10W average power and significantly improved noise performance compared to Er:fiber based frequency combs.

WA4 • 9:00 a.m.
Four-Channel, High Power, Passively Phase Locked Fiber Array, *Thomas H. Loftus[1], Alison M. Thomas[1], Marc Norsen[1], John Minelly[1], Pat Jones[1], Eric Honea[1], Sami A. Shakir[2], Sami Hendow[2], William Culver[2], Burke Nelson[2], Mike Fitelson[3]; [1]Aculight Corp., USA, [2]Northrop Grumman, NGIT/DES, USA, [3]Northrop Grumman, NGES, USA.* We demonstrate passive phasing in a four channel high power passively phase-locked Yb fiber laser array. We achieved an output power of 710W with high fringe visibility from an array of LMA Yb fiber lasers.

WA5 • 9:15 a.m.
Coherent Combination of Fiber Lasers with a Diffractive Optical Element, *Michael Wickham, Eric C. Cheung, James G. Ho, Gregory D. Goodno, Robert R. Rice, Josh Rothenberg, Peter Thielen, Mark Weber; Northrop Grumman Space Technology, USA.* An actively phase-locked array of five fiber lasers is coherently combined using a diffractive optical element with 91% efficiency and M^2=1.04. Calculations and power handling measurements suggest this approach is scalable to high powers.

WA6 • 9:30 a.m.
1 kW Narrow-Linewidth Fiber Amplifier for Spectral Beam Combining, *Christian Wirth[1], Oliver Schmidt[2], Igor Tsybin[1], Thomas Schreiber[1], Ramona Eberhardt[1], Jens Limpert[2], Andreas Tünnermann[1,2]; [1]Fraunhofer IOF Jena, Germany, [2]Inst. for Applied Physics, Friedrich-Schiller Univ. Jena, Germany.* We report on a narrow linewidth fiber amplifier system emitting a total output power of 1 kW. Limiting nonlinear effects like stimulated Raman and Brillouin scattering as well as self-phase modulation are discussed in detail.

WA7 • 9:45 a.m.
Single-Mode, Highly Polarized Yb-Doped Fiber Laser with 850 W Output Power, *Jens Geiger, Oliver Fitzau, Bernhard Zintzen, Dieter Hoffmann; Fraunhofer-Inst. für Lasertechnik, Germany.* An 850 W linearly polarized, pump power limited, fiber laser based on a simple coiling technique is presented. The degree of polarization is measured by two means, different fiber lengths and pump wavelengths are used.

Reception Hall
10:00 a.m.–11:00 a.m.
Coffee Break/Exhibits Open

WB • Poster Session II (Student)

Reception Hall
10:00 a.m.–11:00 a.m.
WB • Poster Session II (Student)

WB1 **Micro Laser for Engine Ignition Paper**
Development of a High Peak Power Solid-State Laser for Engine Ignition, *Heinrich Kofler, Johannes Tauer, Kurt Iskra, Georg Tartar, Ernst Wintner; Photonics Inst., Vienna Univ. of Technology, Austria.* A compact monolithic Nd:YAG-Cr^{4+}:YAG high peak power, passively Q-switched, longitudinally diode-pumped laser was constructed for laser ignition. The system yielded pulses with energies of 8 mJ and durations of 1ns at 225W pump power.

WB2
Resonance Transition 795-nm Rubidium Laser Using ^{3}He Buffer Gas, *Sheldon S. Q. Wu[1,2], Thomas F. Soules[1], Ralph H. Page[1], Scott C. Mitchell[1], V. Keith Kanz[1], Raymond J. Beach[1]; [1]Lawrence Livermore Natl. Lab, USA, [2]Dept. of Electrical and Computer Engineering, Univ. of California at San Diego, USA.* Demonstration of 795-nm Rubidium laser using a buffer gas consisting of pure ^{3}He is reported. The use of ^{3}He yields enhanced mixing of Rb fine-structure levels and enables efficient lasing at reduced buffer gas pressures.

WB3
Volume Bragg Grating Tuned Large Mode Area Fiber Laser, *Pär Jelger, Fredrik Laurell; Applied Physics, Royal Inst. of Technology (KTH), Sweden.* A narrow linewidth ytterbium-doped large-mode area VBG-tuned fiber laser is demonstrated. The output power was >4.3W (77% slope efficiency) and the tuning range was 33 nm (5 GHz linewidth) with nearly diffraction limited output (M^2<1.3).

WB4

Spectroscopy and Efficient High-Power Laser Operation of $Er,Yb:YAl_3(BO_3)_4$ Crystal at 1.5-1.6 μm, *Nikolai A. Tolstik[1], Sergey V. Kurilchik[1], Victor E. Kisel[1], Nikolai V. Kuleshov[1], Guenter Huber[2], Victor V. Maltsev[3], Oleg V. Pilipenko[3], Elizaveta V. Koporulina[3], Nikolai I. Leonyuk[3]; [1]Inst. for Optical Materials and Technologies, BNTU, Belarus, [2]Inst. of Laser Physics, Hamburg Univ., Germany, [3]Geological Faculty, Moscow State Univ., Russian Federation.* We report on the spectroscopic properties and high-power diode-pumped CW laser operation of $Er,Yb:YAl_3(BO_3)_4$ crystals at 1602, 1555 and 1531 nm. An output power of 1 W and a slope efficiency of 35% were demonstrated.

WB5

Comparison between 2 Different Composite $Nd^{3+}:YVO_4$ Crystals in a Fibre Coupled Diode Pumped Laser, *Jérôme Goujon, Olivier Musset; Inst. Carnot de Bourgogne, Univ. de Bourgogne, France.* We detail the performances of two composite $Nd^{3+}YVO_4$ crystals, realised with two different sticking techniques. We tested them inside a fibre coupled diode end pumped laser.

WB6

Diode-End-Pumped $Tm:GdVO_4$ Laser at Selected Wavelengths, *M.J.Daniel Esser, Christoph Bollig, Dieter Preussler; Natl. Laser Ctr., CSIR, South Africa.* A $Tm:GdVO_4$ laser was operated at 1915 nm and 1818 nm by selection of output coupler reflectivity. The maximum QCW output power of the laser was 8.7 W, or 175 mJ energy per pulse.

WB7

Characteristics of CW and A-O Q-Switched $Nd:GdVO_4$ Laser Operation at 912 nm, *Jing Gao, Xin Yu, Fei Chen, Xudong Li, Zhen Zhang, Junhua Yu, Yuezhu Wang; Harbin Inst. of Technology, China.* 8.6 W CW output power of 912 nm $Nd:GdVO_4$ laser is presented. For the A-O Q-switched mode, minimum pulse width of 20 ns and maximum peak power of 7.1 kW at 10 kHz is obtained.

WB8

Nd:GSAG Laser at 943 nm with High Pulse Energy, *Frank Kallmeyer, Xin Wang, Marcus Dziedzina, Hanjo Rhee, Hans J. Eichler; Technical Univ. Berlin, Germany.* A Nd:GSAG laser end-pumped by pulsed laser diodes is presented. A maximum output energy of 160mJ at 10Hz repetition rate was obtained in free-running mode. In Q-switched mode an output energy of 31mJ was achieved.

WB9

Diode-Pumped Sub-100-fs Kerr-Lens Mode-Locked $Yb^{3+}:Sc_2O_3$ Ceramic Laser with High Average Power, *Masaki Tokurakawa[1], Akira Shirakawa[1], Ken-ichi Ueda[1], Hideki Yagi[2], Takagimi Yanagitani[2], Alexsander A. Kaminskii[3]; [1]Univ. of Electro-Communications, Japan, [2]Takuma Works, Konoshima Chemical Co. Ltd., Japan, [3]Inst. of Crystallography, Russian Acad. of Sciences, Crystal Laser Physics, Russian Federation.* Diode-pumped Kerr-lens mode-locked laser operations of $Yb^{3+}:Sc_2O_3$ ceramics have been achieved. 92 fs pulses with the average power of 850 mW under 3.89-W incident pump power were obtained at a center wavelength of 1042 nm.

WB10

Growth, Micro-Structuring, Spectroscopy, and Optical Gain in As-Deposited $Al_2O_3:Er$ Waveguides, *Jonathan D. B. Bradley[1], Dimitri Geskus[1], Tom Blauwendraat[1], Feridun Ay[1], Kerstin Wörhoff[1], Markus Pollnau[1], Andreas Kahn[2], Hanno Scheife[2], Klaus Petermann[2], Guenter Huber[2]; [1]Univ. of Twente, Netherlands, [2]Inst. of Laser-Physics, Univ. of Hamburg, Germany.* Deposition and micro-structuring of $Al_2O_3:Er$ layers with low background losses (0.11 dB/cm) and lifetimes up to 7 ms have been optimized for active devices. Net gain of 0.7 dB/cm at 1533 nm has been measured.

WB11

Investigating Thermal Stresses in Quasi-CW Pumped Tm:YLF Laser Crystals, *Edward H. Bernhardi[1,2], Christoph Bollig[1], Lesley Harris[3], M. J. D. Esser[1], Andrew Forbes[1,2]; [1]CSIR Natl. Laser Ctr., South Africa, [2]School of Physics, Univ. of Kwazulu-Natal, South Africa, [3]CSIR Materials Science and Manufacturing, South Africa.* Time dependant thermally induced stresses in an end-pumped Tm:YLF laser rod are investigated numerically. The variation of the maximum incident pump power at the fracture point with respect to pulse length is investigated.

WB12

N_g-cut Nd:KGW Crystal for Efficient Flash-Lamp Pumped Laser Operation at High Repetition Rates, *Konstantin V. Yumashev[1], Vasili G. Savitski[1], Nikolay V. Kuleshov[1], A. A. Pavlyuk[2], Dmitry D. Molotkov[3], Alexander L. Protasenya[3]; [1]Inst. for Optical Materials and Technologies BNTU, Belarus, [2]Inst. of Inorganic Chemistry, Siberian Branch of Russian Acad. of Sciences, Russian Federation, [3]SOLAR Laser Systems, Belarus.* Relatively weak, nearly spherical and positive thermal lens in a N_g-grown Nd:KGW results in higher average output power and higher repetition rates available in flash-lamp pumped laser in comparison with a *b*-cut Nd:KGW.

WB13

Highly Doped Yb:YAG Thin-Disk Lasers: A Comparison between Single Crystal and Ceramic Active Media, *Susanne T. Fredrich-Thornton[1,2], Christian Hirt[1], Friedjof Tellkamp[1], Klaus Petermann[1], Guenter Huber[1], Ken-ichi Ueda[2], Hideki Yagi[3]; [1]Inst. für Laser-Physik, Univ. Hamburg, Germany, [2]Inst. for Laser Science, Univ. of Electro-Communications, Japan, [3]Takuma Works, Konoshima Chemical Co. Ltd., Japan.* Despite the very similar spectroscopic properties, efficient lasing in the thin-disk laser set-up has not been possible for highly doped Yb:YAG single crystals so far, whereas 20%Yb:YAG ceramics display a 60.6% slope efficiency.

WB14

Spectroscopy and Modelling of a High Power Diode-pumped 2.3 μm Yb:Tm:YLF Laser, *Niklaus Ursus Wetter, Paulo Sergio Fabris de Matos, Laércio Gomes, Izilda Márcia Ranieri, Sonia Licia Baldochi; Ctr. de Lasers e Aplicações - IPEN/SP, Brazil.* Energy transfer processes in Yb:Tm:YLF under 960 nm pumping have been quantitatively studied and a computer simulation considering the full rate-equation scheme has been performed. The 2.3 μm laser achieved 620 mW of output power.

WB15

Ultrafast Yb:KYW Regenerative Amplifier with Combined Gain Spectra of the Optical Axes Nm and Np, *Udo Buenting, Peter Wessels, Hakan Sayinc, Oliver Prochnow, Dieter Wandt, Dietmar Kracht; Laser Zentrum Hannover e.V., Germany.* A Yb:KYW regenerative amplifier directly diode pumped is demonstrated to study a novel approach to reduce gain-narrowing. Two gain spectra (10 nm separated) are combined by using the crystal directions Nm and Np of Yb:KYW.

WB16

Diode-Pumped 65-fs Kerr-Lens Mode-Locked Combined Yb-Doped Sesquioxide Ceramic Laser, *Masaki Tokurakawa[1], Akira Shirakawa[1], Ken-ichi Ueda[1], Hideki Yagi[2], Takagimi Yanagitani[2], Alexsander A. Kaminskii[3]; [1]Univ. of Electro-Communications, Japan, [2]Takuma Works, Konoshima Chemical Co. Ltd., Japan, [3]Inst. of Crystallography, Russian Acad. of Sciences, Crystal Laser Physics, Russian Federation.* Diode-pumped Kerr-lens mode-locked laser operation of Yb^{3+}:Lu_2O_3 and Y_2O_3 combined ceramic laser has been achieved. 65 fs pulses with the average power of 320 mW under 5-W pump power were obtained at 1032 nm.

WB17

High-Power Femtosecond Pulse Generation from a Yb-Doped Large-Mode-Area Microstructure Fiber Laser, *Caroline Lecaplain[1], Clovis Chédot[1], Ammar Hideur[1], Bülend Ortaç[2], Jens Limpert[2]; [1]Groupe d'Optique et d'Optronique, Univ. de Rouen, France, [2]Inst. of Applied Physics, Friedrich Schiller Univ., Germany.* We report on a passively mode-locked laser based on a large-mode-area ytterbium-doped microstructure fiber. The laser delivers 3.3 W of average power at 46 MHz repetition rate. These pulses are extra-cavity dechirped to 516 fs.

WB18

Ce:LiCAF Crystal Grown by the Micro-Pulling Down Method and Its Ultraviolet Lasing Properties, *Marilou Cadatal[1,2], Minh H. Pham[1,2], Toshihiro Tatsumi[3], Ayumi Saiki[3], Yusuke Furukawa[3], Elmer Estacio[3], Nobuhiko Sarukura[3], Toshihisa Suyama[4], Kentaro Fukuda[4,5], Kyoung Jin Kim[5], Akira Yoshikawa[5], Fumiyoshi Saito[5]; [1]Inst. for Molecular Science, Japan, [2]Graduate Univ. for Advanced Studies, Japan, [3]Inst. of Laser Engineering, Osaka Univ., Japan, [4]Tokuyama Corp., Japan, [5]Tohoku Univ., Japan.* We report the first successful micro-pulling down method growth and ultraviolet emission from a Ce:LiCAF crystal. The 10% slope efficiency is expected to increase with improved crystal quality owing to optimized growth parameters.

WB19

Comparison of a Ti:S Laser and a Tapered External Cavity Diode Laser for Sum Frequency Generation in a High-Finesse 1342 nm Nd:YVO_4 Laser, *Martin T. Andersen[1], Peter Tidemand-Lichtenberg[1], Emir Karamehmedović[2], Christian Pedersen[2]; [1]Technical Univ. of Denmark, Denmark, [2]Risø Natl. Lab, Denmark.* Using a Brewster cut periodically poled KTP crystal intra-cavity in a high finesse diode pumped CW 1342 nm laser, efficient sum-frequency generation is obtained by single passing a 765 nm beam from a Ti:Sapphire ring-laser.

WB20

Polarization-Tuning of Yb:KGW by Use of Internal Conical Refraction, *Jonas E. Hellström[1], Hanna Henricsson[1], Valdas Pasiskevicius[1], Udo Bünting[2], Dirk Haussman[2]; [1]Kungliga Tekniska Högskolan, Sweden, [2]Vision Crystal Technology AG, Germany.* We demonstrate that both direction and extinction ratio of the polarization in an Yb:KGW laser can be arbitrarily controlled using conical refraction. No additional components are necessary. Output power was 8.6W and slope efficiency 60.5%.

WB21

Passively Mode-Locked Erbium-Doped Fiber Oscillator with Pulse Energies above 10 nJ, *Axel Ruehl, Vincent Kuhn, Dieter Wandt, Dietmar Kracht; Laser Zentrum Hannover e. V., Germany.* We report on an erbium-doped fiber oscillator mode-locked by nonlinear polarization rotation operating in the normal dispersion regime. The laser generated highly-stretched pulses with energies above 10 nJ externally compressed to below 75 fs.

WB22

Gain Limitations and Consequences for Short Length Fiber Amplifiers, *Fabian Röser[1], Damian Schimpf[1], Jan Rothhardt[1], Tino Eidam[1], Jens Limpert[1], Andreas Tünnermann[1], Francois Salin[2]; [1]Inst. of Applied Physics, Friedrich-Schiller-Univ., Germany, [2]EOLITE, France.* We numerically and experimentally analyze gain limitations due to pump light bleaching in large core short length fiber amplifiers and discuss consequences such as the efficiency and accumulated nonlinear phase.

WB23

105 kHz, 85 ps, 3 MW Peak Power Microchip Laser Fiber Amplifier System , *Oliver Schmidt, Dirk Nodop, Jens Limpert, Andreas Tünnermann; Inst. of Applied Physics, Friedrich-Schiller-Univ., Germany.* We report on a fiber amplified passively Q-switched microchip-laser delivering 85ps pulses with an energy of up to 0.26mJ, corresponding to a peak-power of 3MW. The repetition rate is 105kHz, resulting in 27W average power.

WB24

Tandem Fiber Laser, *Ramatou Bello Doua[1,2], François Salin[1], Eric Freysz[2]; [1]EOLITE, France, [2]Univ. Bordeaux, France.* Two coupled laser fiber produces dual and tunable laser outputs. The system provides two 6.7 ns and diffraction limited Q-switched laser pulses with 110 kW peak power at repetition rates between 10 and 100 kHz.

WB25

Widely Tunable Dual-Wavelength Fiber Laser Using Self-Seeded Fabry-Perot Laser, *Chien-Hung Yeh[1], Fu-Yuan Shih[2], Chien-Nan Lee[2], Chang-Tai Chen[2], Sien Chi[2,3]; [1]Industrial Technology Res. Inst., Taiwan, [2]Dept. of Electrical Engineering, Yuan Ze Univ., Taiwan, [3]Dept. of Photonics and Inst. of Electro-Optical Engineering, Natl. Chiao Tung Univ., Taiwan.* We propose a stable and tunable dual-wavelength erbium-doped fiber ring laser employing a self-injected Fabry-Perot laser diode. By tuning tunable bandpass filter within a gain cavity, the fiber laser can lase two wavelengths simultaneously.

WB26
Micro-Pulling Down Nd:YAG Single Crystal Fibers for High Power Linearly Polarized CW and Q-Switched Lasers, *Damien Sangla[1,2], Julien Didierjean[1], Nicolas Aubry[3], Didier Perrodin[3], François Balembois[1], Kherreddine Lebbou[2], Alain Brenier[2], Patrick Georges[1], Jean-Marie Fourmigué[3], Olivier Tillement[2]; [1]Lab Charles Fabry de l'Inst. d'Optique, Univ. Paris Sud, France, [2]Lab de Physico-Chimie des Matériaux Luminescents (LPCML), Univ. Lyon, France, [3]Fibercryst SAS, France.* We achieved 16-W polarized and 20-W unpolarized cw power at 1064 nm for 120-W of pump power and 360 kW peak power in the Q-Switched regime with Nd:YAG single-crystal fibers grown by micro-pulling-down technique.

WB27
Twenty-Watt Average Output Power, Picosecond Thin-Rod Yb:YAG Regenerative Chirped Pulse Amplifier with 200 μJ Pulse Energy, *Shinichi Matsubara, Motoharu Tanaka, Masaki Takama, Sakae Kawato, Takao Kobayashi; Fiber Amenity Engineering, Graduate School of Engineering, Univ. of Fukui, Japan.* A laser-diode-pumped, ps-pulse thin-rod Yb:YAG laser amplifier was developed. The average output power of 20 W was achieved with a output pulse width of 2 ps at a pulse repetition rate of 100 kHz.

WB28
An All-Normal-Dispersion Yb-Doped Fiber Laser without the Spectral Filtering, *Chun Zhou, Peng Li, Yongheng Dai, Zhigang Zhang; Inst. of Quantum Electronics, Univ. of Beijing, China.* We demonstrated a simple all-normal-dispersion Yb-doped femtosecond fiber laser which delivers a pulse with 8.9 nJ and 33 MHz. After the extracavity compression with a grating pair, the pulse was compressed to 210 fs.

WB29
Frequency Combs Generated by Stimulated Raman Scattering of Mode-Locked Lasers, *Hanjo Rhee[1], Christoph Theiss[1], Stefan Meister[1], Hans Joachim Eichler[1], Alexander A. Kaminskii[2]; [1]Technische Univ. Berlin, Germany, [2]A.V.Shubnikov Inst. of Crystallography, Russian Acad. of Sciences, Russian Federation.* A method to generate a self-referencing multi-octave spanning frequency comb by Raman shifting the output of mode-locked picosecond lasers is proposed. The number of comb modes and the frequency offset can be determined by extrapolation.

WB30
Sub-Nanosecond Infrared Optical Parametric Pulse Generation in PPLN Pumped by a Seeded Fiber Amplifier, *Matthew D. Cocuzzi[1], Kenneth L. Schepler[1], Peter E. Powers[2], Ivan T. Lima[3]; [1]AFRL, USA, [2]Dept. of Physics and Electro-Optics Program, Univ. of Dayton, USA, [3]Dept. of Electrical and Computer Engineering, North Dakota State Univ., USA.* Sub-nanosecond pulses generated in a microchip laser were amplified in an Yb-doped, polarization-maintaining fiber amplifier and converted with 24% efficiency to infrared wavelengths using a periodically poled lithium niobate optical parametric generator.

WB31
Angular Selectivity of Third Harmonic Generated in a PTR Transmitting Bragg Grating by Femtosecond Pulses, *Leo Siiman[1], Julien Lumeau[1], Leonid B. Glebov[1], Lionel Canioni[2]; [1]CREOL, College of Optics and Photonics, Univ. of Central Florida, USA, [2]CPMOH, Univ. of Bordeaux, France.* The angular selectivity of third harmonic beams generated in a PTR grating by femtosecond pulses is reported. A model of the angular profiles with a cubic combination of transmitted and diffracted pulse intensities is proposed.

WB32
Harmonics Generation from Rod-Type Doped Fiber Laser, *Ramatou Bello Doua[1], Francois Salin[1], Eric Freysz[2]; [1]EOLITE, France, [2]Univ. Bordeaux, France.* We presents a diode pumped, Q-switched Yb doped rod-type fiber laser which makes possible to produce near diffraction limited frequency doubled and tripled beams with a conversion efficiency of respectively 62% and 38%.

WB33
Transverse Mode Conversion by Second Harmonic Generation Using Axially Symmetric, Polarized Laser Beams, *Yuichi Kozawa, Shunichi Sato; Inst. of Multidisciplinary Res. for Advanced Materials, Tohoku Univ., Japan.* Second harmonic generation from a (110) zinc selenide crystal is demonstrated using focused axially symmetric, polarized beams. Transverse mode conversion to higher order Hermite-Gaussian mode are observed showing unique intensity and polarization distribution.

WB34
Efficient THz Radiation from Nanocrystalline Silicon-Based Multilayer Photomixer, *N. S. Daghestani[1], G. S. Sokolovskii[2], Alexei V. Tolmatchev[2], Natalia E. Bazieva[1], Wilson Sibbett[3], Edik U. Rafailov[1]; [1]Univ. of Dundee, UK, [2]Ioffe Inst., Russian Acad. of Sciences, Russian Federation, [3]Univ. of St. Andrews, UK.* In this paper we propose and model a novel multiple-layer photomixer based on amorphous/nano-crystalline-Si. The output power from such a photomixer is at least 10 times higher than conventional LTG-GaAs photomixers at 1 THz.

WC • Ceramic Lasers Summit

Noh Theater
11:00 a.m.–12:30 p.m.
WC • Ceramic Lasers Summit

WC1 • 11:00 a.m. Invited
Ceramic Lasers Summit, *Takagimi Yanagitani; Konoshima Corp., Japan.* The number of the adoption of ceramic laser gain medium has increased when a new laser system is developed in recent years. The feature of ceramics contributes to the characteristic improvement of an individual system.

WC2 • 11:15 a.m. Invited
Making and Properties of Transparent YAG Ceramics, *Mitsuhiro Fujita; Covalent Materials Corp., Japan.* Transparent YAG ceramics were made from Al_2O_3 and Y_2O_3 powders. The laser performance of Nd:YAG ceramics has been studied, and it was confirmed that their slope efficiency was equivalent to that of single crystal.

WC3 • 11:30 a.m. Invited
Ceramic Lasers Summit: Manufacturing and Applications of Next-Generation Ceramic Laser Gain Materials, *Gregory Quarles; VLOC, USA.* Ceramic laser gain materials have the opportunity to revolutionize the engineering and designs of future solid state laser systems, especially if tailored dopant profiles, planar waveguides, and edge-clad devices can be manufactured with ease.

WC4 • 11:45 a.m. **Invited**

Raytheon Ceramic YAG Material Development for Laser Gain and IR Windows Application, *Jean Huie; Advanced Material Lab, Raytheon, USA.* This communication presents Raytheon's current development status in the fabrication of optically transparent ceramic YAG for uses in laser gain media and IR transparent windows.

WC5 • 12:00 p.m. **Invited**

The Use of Large Transparent Ceramics in a High Powered, Diode Pumped Solid-State Laser, *Bob M. Yamamoto, Balbir S. Bhachu, Kurt P. Cutter, Scott N. Fochs, Steven A. Letts, Charles W. Parks, Mark D. Rotter, Thomas F. Soules; Lawrence Livermore Natl. Lab, USA.* The advent of large transparent ceramics is one of the key enabling technological advances that have shown that the development of very high average power compact solid-state lasers is achievable.

12:30 p.m.–2:00 p.m.
Lunch Break

WD • Nonlinear Optics

Noh Theater
2:00 p.m.–3:30 p.m.
WD • Nonlinear Optics
Valdas Pasiskevicius; Royal Inst. of Technology, Sweden, Presider

WD1 • 2:00 p.m. **Invited**

Ultra-Broadband, Frequency-Agile THz-Wave Generator and Its Applications, *Hiromasa Ito[1,2], K. Miyamoto[1], H. Minamide[1]; [1]RIKEN Sendai, Inst. of Physical and Chemical Res., Japan, [2]Graduate School of Engineering, Tohoku Univ., Japan.* Ultra-broadband as well as frequency-agile THz-wave generation has become feasible via phase-matched DAST-DFG. Covered frequency region is 1 THz to beyond 40 THz. The random-frequency access and the broad tunability provide promising THz-wave applications in various industrial and research fields. The THz-wave source and its applications will be discussed.

WD2 • 2:30 p.m.

New THz Source Based on Resonantly Enhanced Frequency Conversion in Periodically-Inverted GaAs, *Konstantin L. Vodopyanov[1], Joe E. Schaaar[1], Paulina S. Kuo[1], M. M. Fejer[1], Anjie Lin[1], Jim S. Harris[1], Walter C. Hurlbut[2], Vlad G. Kozlov[2], David Bliss[3], Candace Lynch[3]; [1]Stanford Univ., USA, [2]Microtech Instruments, Inc., USA, [3]Hanscom AFRL, USA.* We report mW-average-power widely tunable (0.5-3.5 THz) monochromatic THz source based on frequency mixing in periodically-inverted GaAs, between the two closely spaced 'signal' and 'idler' waves, inside the resonant cavity of a synchronously-pumped picosecond OPO.

WD3 • 2:45 p.m.

High Average Power Frequency Conversion with Large Aperture YCOB, *Christopher A. Ebbers[1], A. J. Bayramian[1], R. W. Campbell[1], R. Cross[1], B. L. Freitas[1], Z. M. Liao[1], K. I. Schaffers[1], J. A. Caird[1], C. P. J. Barty[1], Y. Fei[2], B. H. T. Chai[2]; [1]Lawrence Livermore Natl. Lab, USA, [2]Crystal Photonics Inc., USA.* We have demonstrated frequency doubling of a high-average-power, high-pulse-energy laser with YCOB, producing 317 W at 10 Hz. Improved stoichiometry control and post-growth anneal has led to improved optical reliability and eliminated spontaneous boule cracking.

WD4 • 3:00 p.m.

9.6-W cw Green Output from Diode Edge-Pumped Composite Vanadate Microchip Laser with Small Packaged Volume, *Tsuyoshi Suzudo[1], Masaki Hiroi[1], Yasuhiro Higashi[1], Yasuhiro Satoh[1], Yoichi Sato[2], Hideki Ishizuki[2], Takunori Taira[2], Yasunori Furukawa[3]; [1]RICOH Co., Ltd., Japan, [2]Inst. of Molecular Science, Japan, [3]Oxide Corp., Japan.* 9.6-W cw green output power from 150-cm^3 volume was achieved. In order to reduce the package size including intra cavity frequency doubling using LiB_3O_5, a composite vanadate microchip was directly edge-pumped by diode bars.

WD5 • 3:15 p.m.

A Promising NLO Crystal for UV Light Generation: $Ca_5(BO_3)_3F$, *Ke Xu[1], Pascal Loiseau[1], Gérard Aka[1], Takunori Taira[2]; [1]Lab de Chimie de la Matière Condensée de Paris, France, [2]Laser Res. Ctr., Japan.* A new promising non linear crystal was investigated: $Ca_5(BO_3)_3F$. Its optical properties were measured and its phase matching angles were notably determined for the second, third and fourth harmonics of NIR lasers.

Reception Hall
3:30 p.m.–4:30 p.m.
Coffee Break/Exhibits Open

WE • Poster Session III

Reception Hall
3:30 p.m.–4:30 p.m.
WE • Poster Session III

WE1 **Micro Laser for Engine Ignition Paper**

Laser-Induced Breakdown of Air with Double-Pulse Excitation, *Taketoshi Fujikawa[1], Kazuhiro Akihama[1], Masaki Ebina[1], Takunori Taira[2]; [1]Toyota Central Res. and Development Labs, Japan, [2]Inst. for Molecular Science, Japan.* Experimental investigation of air-breakdown induced by double-pulse laser with nanosecond pulse duration is conducted. The effects of pulse interval and energies on laser absorption and plasma brightness are presented.

WE2 **Micro Laser for Engine Ignition Paper**

Simulation and Experiments of the Laser Induced Breakdown of Air for Femtosecond to Picosecond Order Pulses, *James Koga[1], Kengo Moribayashi[1], Yuji Fukuda[1], Sergei V. Bulanov[1,2,3], Akito Sagisaka[1], Koichi Ogura[1], Hiroyuki Daido[1], Mitsuru Yamagiwa[1], Toyoaki Kimura[1], Taketoshi Fujikawa[4], Kazuhiro Akihama[4], Masaki Ebina[4]; [1]Advanced Photon Res. Ctr., Japan, [2]Moscow Inst. of Physics and Technology, Russian Federation, [3]A. M. Prokhorov Inst. of General Physics of the Russian Acad. of Sciences, Russian Federation, [4]Toyota Central Res. and Development Labs, Inc., Japan.* Simulations including the laser propagation, multi-photon and impact ionization, and heating of the electrons and experimental results for the laser induced breakdown of air for pulses of duration from femtoseconds to picoseconds are presented.

WE3 **Micro Laser for Engine Ignition Paper**

Ignition with Laser Break-Down, *Hirohide Furutani[1], Takeshi Saito[2]; [1]Natl. Inst. of Advanced Industrial Science and Technology, Japan, [2]Meisei Univ., Japan.* It is considered that ignition with laser break-down is one of the applications of solid-state lasers. This paper shows basic experimental results indicating the advantages of laser ignition and result of engine test.

WE4

New Gain Medium for Mid-IR Room Temperature Lasers Based on Fe Doped CdMnTe Crystals, *Will Mallory[1], Vladimir V. Fedorov[1], Sergey B. Mirov[1], Uwe Hommerich[2], W. Palosz[3], Sudhir B. Trivedi[3]; [1]Univ. of Alabama at Birmingham, USA, [2]Hampton Univ., USA, [3]Brimrose Corp. of America, USA.* Spectroscopic characterization of the Fe^{3+} ions in the CdMnTe in the 2000-7000 nm spectral range at 14-300K temperatures demonstrates feasibility of the gain-switched oscillation of the crystal at room temperature over 4000-6500 nm spectral range.

WE5

Absorption and Fluorescence Singularities in the Nd:YCOB Monoclinic Crystal, *Yannick Petit[1], Benoît Boulanger[1], Patricia Segonds[1], Corinne Félix[1], Bertrand Ménaert[1], Julien Zaccaro[1], Gérard Aka[2]; [1]Inst. Néel, France, [2]Ecole Natl. Supérieure de Chimie de Paris, France.* We report the first measurements of angular distribution of absorption and luminescence in a biaxial monoclinic crystal. The patterns follow the index surface topology but main values are not in the optical frame.

WE6

Spectroscopy of $RbPb_2Cl_5:Pr^{3+}$ Laser Crystal in Near- and Mid-IR, *Andrey Okhrimchuk[1], Irina Shestakova[1], Ninel Lichkova[2], Vladimir Zagorodnev[2], Kirill Boldyrev[3]; [1]Fiber Optics Res. Ctr. at GPI, Russian Acad. of Sciences, Russian Federation, [2]Inst. of Microelectronics Technology, Russian Acad. of Sciences, Russian Federation, [3]Inst. of Spectroscopy, Russian Acad. of Sciences, Russian Federation.* Nature of spectral broadening of absorption bands corresponding to *f-f* transitions in Pr^{3+} ion is investigated by low temperature absorption spectroscopy and selective laser spectroscopy.

WE7

High-Resolution Spectroscopic Characterization of Nd-Doped GSGG Crystals and Transparent Ceramics, *Voicu Lupei[1], Aurelia Lupei[1], Cristina Gheorghe[1], Akio Ikesue[2]; [1]Inst. of Atomic Physics, Romania, [2]World Lab Co. Ltd., Japan.* High-resolution spectroscopic investigation of Nd:GSGG transparent ceramics and single crystals indicates that their structural (nature and structure of doping centers, distribution of doping ions) and spectroscopic (energy levels, transition probabilities, energy transfer) properties are similar.

WE8

Simultaneous Measurement of Thermal Lens and Temperature Map in Ytterbium-Doped Fluoride Crystals, *Justine Boudeile[1], Julien Didierjean[1], Frédéric P. Druon[1], François Balembois[1], Patrick Georges[1], Jean-Louis Doualan[2], Patrice Camy[2], A. Benayad[2], Vincent Ménard[2], Richard Moncorgé[2]; [1]Lab Charles Fabry de l'Inst. d'Optique, Univ. Paris Sud, France, [2]Ctr. de Recherche sur les Ions et les Matériaux pour la Photonique (CIMAP), France.* We report on the simultaneous characterization of temperature map and thermal lensing in $Yb^{3+}:CaF_2$ and $Yb^{3+}:SrF_2$ crystals under high-power pumping with/without laser operation. This in situ measurement would allow proper designs of high-power cavities.

WE9

Specificity of Thermal Effects in Laser Ceramics as Compared to Single Crystals, *Efim Khazanov, Ivan Mukhin, Oleg Palashov, Ilya Snetkov, Alexander Soloviev; Inst. of Applied Physics, Russian Federation.* We predicted and experimentally studied strong statistical dispersion of thermal lensing and thermally induced depolarization in ceramics. This effect is specific to ceramics and has no analogues either in glasses or in single crystals.

WE10

Spectral-Luminescent Properties of Bi- and Bi -Yb- Doped Phosphate-Based Glasses, *Boris I. Denker[1], Evgenii M. Dianov[2], Boris I. Galagan[1], Vyacheslav V. Osiko[1], Sergey E. Sverchkov[1]; [1]A.M.Prokhorov General Physics Inst., Russian Federation, [2]Fiber Optics Res. Ctr. of RAS, Russian Federation.* The spectral-luminescent properties of Bi-doped boro-alumino-phosphate glass in 0.4-1.6 micrometers range with the especial emphasis on the investigations of emission excitation spectra, luminescence rise and decay kinetics were carried out.

WE11

Spectroscopic and Laser Properties of Yb^{3+} Doped CaF_2, SrF_2 and BaF_2 Laser Crystals, *Jean-Louis Doualan, Patrice Camy, Abdelmjid Benayad, Michael von Edlinger, Vivien Ménard, Richard Moncorgé; Ctr. de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), France.* We report a comparative study of the spectroscopic and thermo-mechanical properties and of the laser slope efficiencies and tuning ranges of three Yb^{3+} doped CaF_2, SrF_2 and BaF_2 single crystals grown in the same conditions.

WE12

Crystal Growth, Spectroscopic Characterisation and Eye-Safe Laser Operation of Er and Yb Doped $KLu(WO_4)_2$, *Stefan Bjurshagen[1], Valdas Pasiskevicius[1], I. Parreu[2], M. C. Pujol[2], M. Aguiló[2], Francesc Diaz[2]; [1]Royal Inst. of Technology, Sweden, [2]Física i Cristallografia de Materials (FiCMA), Univ. Rovira i Virgili, Spain.* High quality $Er:Yb:KLu(WO_4)_2$ have been grown using TSSG method and spectroscopically investigated . The laser performance is compared with that in $Er:Yb:KY(WO_4)_2$. Role of upconversion processes and optimum doping concentrations have been estimated.

WE13

GaN LD Pumped Pr^{3+}-Doped Solid-State Laser, *Kohei Hashimoto[1], Toshihiro Kamimura[2], Fumihiko Kannari[2]; [1]Lasertec Corp., Japan, [2]Dept. of Electronics and Electrical Engineering, Keio Univ., Japan.* Efficient and high-power diode-pumped Pr^{3+} doped solid-state laser are reported. We also report on characteristics of Pr^{3+} doped material such as spontaneous emission spectra, lifetimes, and thermal loading which are critical for laser display applications.

WE14

LD-Pumped Continuous Wave Nd:CNGG Laser Operating at 935nm, *Qinan Li[1], Baohua Feng[1], Zhiyi Wei[1], Dehua Li[1], Zhiguo Zhang[1], Huaijin Zhang[2], Jiyang Wang[2]; [1]Inst. of Physics, Chinese Acad. of Sciences, China, [2]State Key Lab of Crystal Material and Inst. of Crystal Material, China.* An efficient CW LD-pumped Nd-doped $Ca_3(NbGa)_{2-x}Ga_3O_{12}$(CNGG) laser operating at 935nm is demonstrated for the first time. The maximum average output power is more than 800mW with slope efficiency of 8% and optical-to-optical efficiency is 6%.

WE15

Improved Optical Quality for Ti:Sapphire Using MRF, *Kathleen I. Schaffers[1], A. J. Bayramian[1], P. J. Davis[1], J. A. Menapace[1], C. A. Ebbers[1], J. E. Wolfe[1], J. A. Caird[1], C. P. J. Barty[1], D. B. Joyce[2], K. Schmid[2], F. Schmid[2]; [1]Lawrence Livermore Natl. Lab, USA, [2]Crystal Systems, Inc., USA.* Magneto-rheological finishing (MRF) imprinting techniques have been applied to Ti:sapphire crystals to compensate for submillimeter distortions, thereby, improving the transmitted wavefront and increasing the availability of large aperture parts.

WE16

Diffusion Bonding of Monoclinic Yb:KY(WO_4)$_2$/KY(WO_4)$_2$ and Its Continuous-Wave Laser Operation, *Simon Rivier[1], Andreas Schmidt[1], Valentin Petrov[1], Uwe Griebner[1], Andreas Gross[2], Sophie Vernay[2], Volker Wesemann[2], Daniel Rytz[2], Andreas Klehr[3], Götz Erbert[3]; [1]Max-Born-Inst., Germany, [2]FEE GmbH, Germany, [3]Ferdinand-Braun-Inst., Germany.* Diffusion bonding of the strongly anisotropic Yb:KY(WO_4)$_2$ and KY(WO_4)$_2$ crystals was successfully demonstrated. Efficient continuous-wave laser operation with slope efficiencies as high as 70% and 811 mW output power was obtained.

WE17

Improved Crystal Growth and Revisited Spectroscopic Parameters of the 4.5 μm Er^{3+}:KPb_2Cl_5 Laser Material, *Matias Velázquez, Alban Ferrier, Vivien Ménard, Richard Moncorgé; Ctr. de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), Univ. de Caen, France.* Er^{3+}-doped laser rods were successfully grown by the Bridgman-Stockbarger method. Modified material synthesis and ampoule preparation processes were developed that eventually led to crack- and bubble-free 8 cm long laser crystals.

WE18

Generation of Ti:Sapphire Laser Beam with Radial Polarization, *Hikaru Kawauchi, Yuichi Kozawa, Shunichi Sato; Inst. of Multidisciplinary Res. for Advanced Materials, Tohoku Univ., Japan.* The generation of a Ti:sapphire laser beam with radial polarization is demonstrated by using a c-cut Ti:sapphire crystal as an active medium and a c-cut YVO_4 crystal for the selection of the radial polarization.

WE19

A Study of a Thermal Conductivity: A General Model for Optical Materials, *Yoichi Sato, Hideki Ishizuki, Takunori Taira; Laser Res. Ctr. for Molecular Science, Inst. for Molecular Science, Japan.* Thermal conductivity with temperature dependence was simulated in various optical materials. This novel model for thermal conductivity requires one parameter for specific heat and two parameters for thermal diffusivity in calculation of each optical material.

WE20

Comparison of Nd:$GdVO_4$ and Nd:YVO_4 in a Pulsed Diode Pumped Passively Mode-locked Laser in a Bounce Geometry, *Vaclav Kubecek[1], Michal Drahokoupil[1], Karel Zvonicek[1], Andreas Stintz[2], Jean-Claude Diels[2]; [1]Czech Technical Univ., Czech Republic, [2]Univ. of New Mexico, USA.* Operation of a pulsed Nd:$GdVO_4$ and Nd:YVO_4 lasers in a bounce geometry in a free running and mode-locked regime using a semiconductor saturable absorber is compared. Higher efficiency of Nd:$GdVO_4$ in both regimes was achieved.

WE21

Spectroscopy and Laser Operation of Tm^{3+} in Disordered Crystals of Tetragonal NaLu(WO_4)$_2$, *Mauricio Rico[1], Xiumei Han[1], José María Cano-Torres[1], Concepción Cascales[1], Carlos Zaldo[1], Xavier Mateos[2], Simon Rivier[2], Valentin Petrov[2], Uwe Griebner[2]; [1]Inst. de Ciencia de Materiales de Madrid, Consejo Superior de Investigaciones Cientificas, Spain, [2]Max-Born-Inst. for Nonlinear Optics and Ultrafast Spectroscopy, Germany.* Broadly tunable (1825-2000 nm) continuous-wave laser operation with maximum output power of 435 mW and slope efficiency of 57.5% is demonstrated for the first time with the disordered Tm:NaLu(WO_4)$_2$ crystal.

WE22

Quantum Efficiency Measurements in Nd-Doped Materials, *Brian M. Walsh, Norman P. Barnes; NASA Langley Res. Ctr., USA.* The quantum efficiency of the Nd $^4F_{3/2}$ manifold is measured in 10 Nd-doped systems. Luminescence decay in these Nd-doped materials was found to be nonexponential. Correlation between nonexponential decay and reduced quantum efficiency is presented.

WE23

Spatial Distribution of Photodarkening in Large Mode Area Ytterbium Doped Fibers, *Mircea Hotoleanu, Joona Koponen, Teemu Kokki; Liekki Corp., Finland.* We have modeled the photodarkening rate distribution in ytterbium fiber cross-section. We have found that photodarkening is not uniformly distributed in LMA fibers and depends on coiling diameter. This affects the fiber application usage.

WE24

Scalable, Single-Frequency, Er-only Doped Fiber Amplifier Cladding-Pumped by Multimode 980-nm Diode Lasers, *Mark Dubinskii[1], Valerii V. Ter-Mikirtychev[2]; [1]US ARL, USA, [2]NovaWave Technologies, Inc., USA.* We present laser characterization results of an all-fiber cladding-pumped Er-only doped LMA amplifier. Diffraction-limited, single-frequency output of 3.5 W is believed to be the highest reported to-date power out of this type of amplifier.

WE25

Self-Starting Passively Mode-Locked Chirped-Pulse Fiber Oscillator, *Bülend Ortac[1], Marco Plötner[1], Jens Limpert[1], Andreas Tuennermann[1,2]; [1]Inst. of Applied Physics, Friedrich Schiller Univ., Germany, [2]Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany.* We report on a self-starting passively mode-locked fiber laser operating in the chirped-pulse regime for the first time. A chirped fiber Bragg grating provides positive dispersion with negligible nonlinearity.

WE26

Passively Mode-Locked Single-Polarization Microstructure Fiber Laser, *Bülend Ortaç[1], Caroline Lecaplain[2], Ammar Hideur[2], Thomas Schreiber[1,3], Jens Limpert[1], Andreas Tünnermann[1,3]; [1]Inst. of Applied Physics, Friedrich-Schiller-Univ., Germany, [2]Groupe d'Optique et d'Optronique, Univ. de Rouen, France, [3]Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany.* We report on an environmentally-stable all-normal dispersion mode-locked single-polarization large-mode-area microstructure fiber. The self-starting laser generates 1.6 W of average power at 63 MHz repetition rate. The positively-chirped pulses are externally compressed to 750 fs.

WE27

Experimental and Numerical Study of Pulse Dynamics in Positive Net-Cavity Dispersion Mode-Locked Yb-Doped All-Fiber Lasers, *Bülend Ortaç[1], Marco Plötner[1], Thomas Schreiber[1,2], Jens Limpert[1], Andreas Tünnermann[1,2]; [1]Inst. of Applied Physics, Friedrich-Schiller-Univ., Germany, [2]Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany.* We report on environmentally-stable mode-locked Yb-doped all-fiber lasers operating in the wave-breaking-free and stretched-pulse regime. The laser generates positively-chirped pulses with parabolic spectral profile in both regimes. Numerical simulations confirm the intra-cavity pulse evolution.

WE28

High Power Diode Pumped Yb^{3+}:$CaGdAlO_4$ Laser, *Justine Boudeile[1], Julien Didierjean[1], François Balembois[1], Frédéric P. Druon[1], Patrick Georges[1], Johan Petit[2], Philippe Goldner[2], Bruno Viana[2]; [1]Lab Charles Fabry de l'Inst. d'Optique, France, [2]Lab de Chimie Appliquée Etat Solide de l'Ecole Natl. Supérieure de Chimie de Paris, France.* We study the performance of Yb^{3+}:$CaGdAlO_4$ under 100W diode pumping with a standard laser design. We also investigate the laser properties of Yb^{3+}:$CaGdAlO_4$ for different doping in order to optimize the absorption and wavelength tunability.

WE29

High-Power Laser Beam Combination Using Acousto-Optic Deflection, *Ronald Holzlöhner, Domenico Bonaccini Calia; European Southern Observatory (ESO), Germany.* We combine incoherent high-power laser beams using beam deflection on multiple simultaneous acoustic gratings in an anisotropic paratellurite (TeO_2) crystal by reversing the usual direction of beam deflection. We discuss loss mechanisms and parameter optimization.

WE30

High Energy Femtosecond Thin Disk Regenerative Amplifier with a Repetition Rate of 50 kHz, *Mikhail Larionov[1], Adolf Giesen[2], Frank Butze[3]; [1]TGSW mbH, Germany, [2]Inst. of Technical Physics, German Aerospace Ctr. (DLR), Germany, [3]Von Ardenne Anlagentechnik GmbH, Germany.* A regenerative thin disk amplifier was operated in different modes varying the net gain and the amount of nonlinearity. Gauss and Lorentz pulse shapes were observed at energies of up to 400 μJ.

WE31

Dispersion Management of Femtosecond Pulse Amplification for Octave-Spanning Optical Frequency Comb Generation , *Yoshiaki Nakajima[1], Hajime Inabe[2], Feng-Lei Hong[2], Atsushi Onae[2], Kaoru Minoshima[2], Takao Kobayashi[1], Masataka Nakazawa[3], Hirokazu Matsumoto[2]; [1]Univ. of Fukui, Japan, [2]Natl. Metrology Inst. of Japan (NMIJ), AIST, Japan, [3]Tohuku Univ., Japan.* An optimized method for amplifying femtosecond pulses by using dispersion management is reported. An amplifier with an optimal amplification region enhances the output power with spectral broadening by adiabatic narrowing in an EDF.

WE32

An Optical Differentiator Based on a Regenerative Amplifier with an Intracavity Tunable Volume Bragg Grating Filter, *Andrey V. Okishev[1], Vadim I. Smirnov[2], Leonid B. Glebov[3], Jonathan D. Zuegel[1]; [1]Lab for Laser Energetics, Univ. of Rochester, USA, [2]OptiGrate, USA, [3] CREOL, College of Optics and Photonics, Univ. of Central Florida, USA.* An optical differentiator based on a regenerative amplifier with temperature-tuned volume Bragg grating as an intracavity spectral filter is demonstrated for the first time. Its applications for temporal contrast enhancement and other areas are discussed.

WE33

High-Power Diode-Pumped Tm:YLF Laser in Rod and Slab Geometry, *Martin Schellhorn; French-German Res. Inst., ISL, France.* Using two (one) Tm:YLF rods in a single cavity, 55W (30W) at 1.91μm was obtained. The first result from a Tm:YLF laser in slab geometry was 22W of output power.

WE34

Efficient Operation of Conductively Cooled Ho:Tm:LuLiF Laser Oscillator/Amplifier, *Yingxin Bai[1], Jirong Yu[2], Bo Trieu[2], Mulugeta Petros[3], Paul Petzar[4], Hyung Lee[4], Upendra Singh[2]; [1]Science Systems and Applications, Inc., USA, [2]NASA Langley Res. Ctr., USA, [3]Science and Technology Corp., USA, [4]Natl. Inst. of Aerospace, USA.* A conductively-cooled Ho:Tm:LuLiF laser oscillator generates 1.6J normal mode pulses at 10Hz with optical to optical efficiency of 20%. When the laser head module is used as the amplifier, the double-pass small-signal amplification excesses 25.

WE35

Intra-Cavity Frequency Tripling in Actively Q-Switched Miniature Nd:YVO_4 Laser for MALDI/TOFMS, *Koji Tojo[1], Naoya Ishigaki[1], Akiyuki Kadoya[1], Kazuma Watanabe[1], Yutaka Ido[1], Takunori Taira[2]; [1]Shimadzu Corp., Japan, [2]Laser Res. Ctr., Inst. for Molecular Science, Japan.* A compact UV-light source for MALDI/TOFMS based on an intra-cavity frequency tripled, actively Q-switched Nd:YVO_4 miniature laser, with 437mW average power at 16kHz and 8.6% overall optical to optical efficiency, is reported.

WE36

Yb:SFAP Crystal, Intracavity and Indirectly Diode-Pumped at 914 nm, for a cw Laser Emission at 985 nm, *Marc Castaing[1,2], Francois Balembois[1], Patrick Georges[1], Thierry Georges[2], Kathleen Schaffers[3], John Tassano[3]; [1]Lab Charles Fabry de l'Inst. d'Optique, CNRS, Univ. Paris-Sud, France, [2]Oxxius S.A, France, [3]Lawrence Livermore Natl. Lab, USA.* We present the first experiment of intracavity pumping at 914nm of an Yb:S-FAP crystal emitting at 985nm on the three-level-laser transition. We obtained 250mW output power at 985nm for 9.7W incident pump power at 808nm.

WE37

High Repetition and High Average Power Nd:YAG Laser for EUV Lithography, *Hisanori Fujita, Masahiro Nakatsuka, Ravi Bhushan, Koji Tsubakimoto, Hidetsugu Yoshida, Noriaki Miyanaga, Yasukazu Izawa; Inst. of Laser Engineering, Osaka Univ., Japan.* We have been developing a high repetition (5-100 kHz) and high power Nd: YAG laser system pumped by cw LDs. Average power of 4.6 kW was obtained at 28.8 kW of pumping power.

WE38

High Brightness Diode-Pumped Passively Q-Switched Nd:YAG Microchip Laser with Amplifier, *Hiroshi Sakai[1], Akihoro Sone[1], Hirohumi Kan[1], Takunori Taira[2]; [1]Hamamatsu Photonics K.K., Japan, [2]Inst. for Molecular Science, Japan.* We developed a high brightness passively Q-switched laser and amplifier using microchips. The pulse energy of 1.8 mJ with a pulse width of 820 ps was obtained with 46 mW/pulse low electrical power.

WE39

Efficient, Room-Temperature Tm,Ho:GdVO$_4$ Microchip Laser, *Atsushi Sato[1], Kazuhiro Asai[1], Shoken Ishii[2], Kohei Mizutani[2], Toshikazu Itabe[2]; [1]Tohoku Inst. of Technology, Japan, [2]Natl. Inst. of Information and Communications Technology, Japan.* A diode-pumped Tm,Ho:GdVO$_4$ microchip laser demonstrated an output power of 0.55 W and a conversion efficiency of 23.7%. To our knowledge, it is the highest efficiency reported for Tm:Ho-codoped vanadate lasers operating near room temperature.

WE40

Anisotropy of Nonlinear Absorption in Co^{2+}:MgAl$_2$O$_4$ and V^{3+}:Y$_3$Al$_5$O$_{12}$ Crystal Passive Q-Switches, *Igor Denisov[1], Vasili Savitski[1], Alexander Malyarevich[1], Konstantin Yumashev[1], Yuri Volk[1], Vladimir Matrosov[2], Tatiana Matrosova[2], Mikhail Kupchenko[2], Aleksander Sandulenko[3]; [1]Inst. for Optical Materials and Technologies, Belarus, [2]Solix Ltd., Belarus, [3]S.I. Vavilov State Optical Inst., Russian Federation.* Anisotropy of nonlinear absorption and its influence on the passive Q-switch performance of V^{3+}:Y$_3$Al$_5$O$_{12}$ and Co^{2+}:MgAl$_2$O$_4$ crystal passive shutters at the wavelengths of 1.08 and 1.35 μ m has been experimentally studied.

WE41

High-Power Diode-Pumped Passively Q-Switched Yb^{3+}:KLu(WO$_4$)$_2$ Laser, *Junhai Liu[1], Valentin Petrov[2], Uwe Griebner[2], Huaijin Zhang[3], Jiyang Wang[3]; [1]Quingdao Univ., China, [2]Max-Born-Inst., Germany, [3]Shandong Univ., China.* Output power of 11.5 W in the continuous-wave regime and 4.3 W (fundamental at 1031.7 nm) plus 1.15 W (Raman at 1139.3 nm) in the Q-switched regime were obtained with a diode-pumped Yb:KLu(WO$_4$)$_2$ laser.

WE42

Paper Withdrawn

WE43

1.4-MHz Repetition Rate EO-Q-Switched Nd-YVO$_4$ Laser, *Ryusuke Horiuchi, Koji Adachi, Koichi Saiki, Kazuyoku Tei, Shigeru Yamaguchi; Dept. of Physics, Tokai Univ., Japan.* A repetition rate of 1.4 MHz with a pulse width of 39 ns was achieved using Nd:YVO$_4$ crystal and an EO-deflector. An power of 2.7 W was obtained at a pump power of 6.5 W.

WE44

10 mJ, Acousto-Optic Q-Switched, Tunable, Diode Pumped Tm:YLF Laser , *Jan K. Jabczyński[1], Lukasz Gorajek[1], Waldemar Zendzian[1], Jacek Kwiatkowski[1], Helena Jelinkova[2], Jan Sulc[2], Michal Nemec[2]; [1]Inst. of Optoelectronics, Military Univ. of Technology, Poland, [2]Faculty of Nuclear Science and Physical Engineering, Czech Technical Univ., Czech Republic.* The 1845-1935 nm tuning range with 3-nm linewidth was demonstrated in Tm:YLF laser pumped by 30-W fiber coupled diode laser. 10-mJ energy, 22-ns pulse duration was demonstrated in acousto-optic Q-switching regime.

WE45

CW and Q-Switched Laser Operation of Yb:LuAG Crystal, *Jun Dong[1], Ken-ichi Ueda[1], Alexander Kaminskii[2]; [1]Inst. for Laser Science, Univ. of Electro-Communications, Japan, [2]Inst. of Crystallography, Russian Acad. of Sciences, Russian Federation.* Efficient CW laser operation based on Yb:LuAG crystals has been obtained at 1030 and 1047 nm. Stable, subnanosecond passively Q-switched Yb:LuAG/Cr^{4+}:YAG microchip lasers were demonstrated with slope efficiencies of 40% for the first time.

WE46

High Performance 1645-nm Er:YAG Laser, *Da-Wun Chen, Todd S. Rose, Steven M. Beck, Milton Birnbaum; Aerospace Corp., USA.* The performance of the resonantly fiber-laser pumped Er:YAG lasers at 1645 nm using 0.25% and 0.5% doped crystals were compared in cw and Q-switched operation. Superior performance of the 0.25% crystals was observed.

WF • Novel Ultrafast Sources

Noh Theater
4:30 p.m.–6:00 p.m.
WF • Novel Ultrafast Sources
Kurt Weingarten; Time Bandwidth, Switzerland, Presider

WF1 • 4:30 p.m. **Invited**

The Petawatt Field Synthesizer: A New Approach to Ultrahigh Field Generation, *Stefan Karsch[1], Zsuzsanna Major[1], József Fülöp[1,2], Izhar Ahmad[1], Tie-Jun Wang[1], Andreas Henig[1,2], Sebastian Kruber[1], Raphael Weingartner[1,2], Mathias Siebold[1], Joachim Hein[3], Christoph Wandt[1], Sandro Klingebiel[1], Jens Osterhoff[1], Rainer Hörlein[1,2], Ferenc Krausz[1,2]; [1]Max-Planck-Inst. für Quantenoptik, Germany, [2]Ludwig-Maximilians-Univ. München, Germany, [3]Friedrich-Schiller-Univ. Jena, Germany.* The Petawatt Field Synthesizer (PFS) at MPQ will deliver few-cycle pulses at Petawatt power. Short-pulse OPCPA and a diode-pumped, CPA Yb:YAG pump laser are key technologies, and results of the ongoing development will be presented.

WF2 • 5:00 p.m.

Ultrashort Pulse Generation of Yb:KLuW Using Single-Walled Carbon Nanotube Saturable Absorbers, *Andreas Schmidt[1], Simon Rivier[1], Günter Steinmeyer[1], Valentin Petrov[1], Uwe Griebner[1], Jong Hyuk Yim[2], Won Bae Cho[2], Soonil Lee[2], Fabian Rotermund[2], Maria C. Pujol[3], Magdalena Aguiló[3], Francesc Díaz[3]; [1]Max-Born-Inst., Germany, [2]Ajou Univ., Republic of Korea, [3]Tarragona Univ., Spain.* Single-walled carbon nanotube saturable absorbers were designed and characterized (modulation depth <0.5%, relaxation time <450 fs) for passive mode-locking near 1 μm. Pulses of 115 fs were generated at 1048 nm with an Yb:KLuW laser.

WF3 • 5:15 p.m.

Er,Yb:YAl$_3$(BO$_3$)$_4$: A New Crystal for High-Power Ultrashort Pulse Generation around 1500nm, *Alexander A. Lagatsky[1], Wilson Sibbett[1], V. E. Kisel[2], A. E. Troshin[2], N. A. Tolstik[2], N. V. Kuleshov[2], E.U. Rafailov[3], N.I. Leonyuk[4]; [1]Univ. of St Andrews, UK, [2]Inst. for Optical Materials and Technologies, Belarus Natl. Technical Univ., Belarus, [3]Univ. of Dundee, UK, [4]Moscow State Univ., Russian Federation.* Efficient passive mode locking in a diode-pumped Er,Yb:YAl$_3$(BO$_3$)$_4$ laser has been demonstrated using low-loss GaInNAs-based SESAMs. 3.2-ps and 5.1-ps pulses were produced at 1530nm and 1550nm, respectively, with corresponding average powers of 280mW and 103mW.

WF4 • 5:30 p.m.
Cr:YAG Chirped Pulse Oscillator , *Evgeni Sorokin[1], Vladimir L. Kalashnikov[1], Julien Mandon[2], Guy Guelachvili[2], Nathalie Picqué[2], Irina T. Sorokina[3]; [1]Photonics Inst., Technische Univ. Wien, Austria, [2]Lab de Photophysique Moléculaire, CNRS, Univ. Paris-Sud, France, [3]Physics Dept., Norwegian Univ. of Science and Technology, Norway.* We demonstrate the chirped pulse operation in the positive dispersion regime of the Cr^{4+}:YAG laser. The pulses are readily compressed in 3.2 m of silica fiber to ~120 fs, and generate supercontinuum in high-nonlinearity fibers.

WF5 • 5:45 p.m.
High-Energy Pulse Generation Using Stretcher-Free Fiber Nonlinear Amplifiers, *Dimitris N. Papadopoulos[1], Marc Hanna[1], Frédéric Druon[1], Patrick Georges[1], Yoann Zaouter[2], Eric Cormier[2], Eric Mottay[3]; [1]Lab Charles Fabry de Inst. d'Optique, France, [2]Ctr. Lasers Intenses et Applications (CELIA), France, [3]Amplitude Systèmes, France.* We demonstrate the generation of high quality 74-fs pulses with pulse energy of 380 nJ from polarization-maintaining ytterbium-doped fiber nonlinear amplification systems by operating them beyond the gain bandwidth limit.

Noh Theater
6:00 p.m.–6:10 p.m.
Closing Remarks

NOTES

Key to Authors and Presiders

(**Bold** indicates Presider or Presenting Author)

• Monday, January 28, 2008 •

MG • Postdeadline Papers

Noh Theater
8:00 p.m.–9:24 p.m.
MG • Postdeadline Papers
Christopher A. Ebbers; Lawrence Livermore Natl. Lab, USA, Presider

MG1 • 8:00 p.m.
Multimillijoule Optically Synchronized and Carrier-Envelope-Phase-Stable Chirped Parametric Amplification at 1.5 µm, *Oliver D. Muecke[1], Dmitry Sidorov[1], Peter Dombi[1], Audrius Pugžlys[1], Andrius Baltuška[1], Skirmantas Ališauskas[2], Jonas Pocius[3], Linas Giniūnas[3], Romualdas Danielis[3]; [1]Vienna Univ. of Technology, Austria, [2]Vilnius Univ., Lithuania, [3]Light Conversion Ltd., Lithuania.* Efficient infrared 35-THz-wide parametric amplification with energies >3 mJ is obtained in a 3-stage OPCPA using a combination of a 1030-nm 200-fs Yb- and a 1064-nm 60-ps Nd amplifier seeded with a common Yb oscillator.

MG2 • 8:12 p.m.
Diode-Pumped Kerr-Lens Mode-Locked Yb^{3+}:Sc_2O_3 and Yb^{3+}:Y_2O_3 Combined Active Media Ceramic Laser, *Masaki Tokurakawa[1], Hiroaki Kurokawa[1], Akira Shirakawa[1], Ken-ichi Ueda[1], Hideki Yagi[2], Takagimi Yanagitani[2], Alexsander A. Kaminskii[3]; [1]Univ. of Electro-Communications, Japan, [2]Takuma Works, Konoshima Chemical Co. Ltd., Japan, [3]Crystal Laser Physics Lab, Inst. of Crystallography, Russian Acad. of Sciences, Russian Federation.* Diode-pumped Kerr-lens mode-locked Yb^{3+}:Sc_2O_3 and Yb^{3+}:Y_2O_3 combined ceramic laser has been achieved. 66 fs pulses with the average power of 1.5 W and 53 fs pulses with the average power of 1 W were obtained.

MG3 • 8:24 p.m.
Passively Mode-Locked Thulium-Doped Fiber Oscillator with a Pulse Energy of 4 nJ, *Axel Ruehl, Martin Engelbrecht, Frithjof Haxen, Dieter Wandt, Dietmar Kracht; Laser Zentrum Hannover e.V., Germany.* An ultrafast thulium-doped fiber oscillator is demonstrated which constitutes an increase of the pulse energy by two orders of magnitude. The pulses were centered at 1974 nm and could be externally dechirped to 173 fs.

MG4 • 8:36 p.m.
Efficient 100 kHz-Repetition-Rate Ultrafast Laser System with OPA/NOPA Frequency Conversion, *Sterling J. Backus, Iain T. McKinnie, Dirk Müller, Hsiao-Hua Liu, Henry C. Kapteyn, Margaret M. Murnane; Kapteyn-Murnane Labs Inc., USA.* We report an innovative ultrafast Ti:Sapphire laser-amplifier/OPA/NOPA system accessing a new operating regime of 30% efficient, tunable, 100kHz-repetition-rate, 20µJ, 50fs pulses, enabling applications in micromachining, imaging, and spectroscopy. Millijoule pulses are attainable using cryogenic cooling.

MG5 • 8:48 p.m.
A 20 W Continuous-Wave Green Laser with Line Beam for a GxL Laser Display, *Takahiro Mochizuki, Kaoru Kimura, Yuki Maeda, Koji Takahashi, Nobutake Iwase, Michio Oka, Masaki Saito; Sony Corp., Japan.* We report a high-power continuous-wave green laser with line beam using periodically-poled stoichiometric lithium tantalate (PPSLT). The maximum output power was 20.8 W. The conversion efficiency from input LD power was as high as 30%.

MG6 • 9:00 p.m.
New Nonlinear Optical Crystal for Mid-IR OPOs: $CdSiP_2$, *Peter G. Schunemann[1], Kevin T. Zawilski[1], Thomas M. Pollak[1], David E. Zelmon[2], Nils C. Fernelius[2], F. Kenneth Hopkins[2]; [1]BAE Systems, USA, [2]AFRL, USA.* $CdSiP_2$ is a new negative uniaxial NLO crystal for 1-µm- or 1.5-µm-pumped mid-IR OPOs with much higher nonlinearity and thermal conductivity than existing materials such as $AgGaS_2$, $AgGaSe_2$, and PPLN.

MG7 • 9:12 p.m.
Single-Polarization Ultra-Large-Mode-Area Yb-Doped Photonic Crystal Fiber, *Oliver Schmidt[1], Jan Rothhardt[1], Tino Eidam[1], Fabian Röser[1], Jens Limpert[1], Andreas Tünnermann[1], Kim P. Hansen[2], C. Jakobsen[2], Jes Broeng[2]; [1]Friedrich-Schiller-Univ., Germany, [2]Crystal Fibre A/S, Denmark.* We report on an ytterbium-doped, single-polarization, single-mode photonic crystal fiber possessing a 70µm active core (mode-field-area: 2300µm^2). Characterization and comparison to a similar fiber without polarization control demonstrates the potential of the fiber design.

Key to Authors and Presiders