ASSP

Nineteenth Topical Meeting
and Tabletop Exhibit

February 1-4, 2004

Eldorado Hotel
Santa Fe, New Mexico

Sponsor: Optical Society of America

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About ASSP

February 1-4, 2004

Advances in solid-state lasers and coherent nonlinear optical sources provide powerful tools for an increasingly broad range of applications including spectroscopy, remote sensing, communications, material processing, medicine, and entertainment. In recent years, the Advanced Solid-State Lasers topical meeting has extended its scope to include nonlinear frequency conversion and has been the meeting of choice for new developments in laser and nonlinear materials and devices.

Under the new name, Advanced Solid-State Photonics, the topical meeting is continuing its expansion to include anything that could impact the development of coherent solid-state sources from concepts and basic materials research, to new emerging devices, to the advanced applications that drive the development of the technology. Take this opportunity to be part of the year's most significant meeting on advanced solid-state sources; plan to attend Advanced Solid-State Photonics 2004.

Meeting Topics

Topics to be covered:

- Tunable and new wavelength solid-state lasers
- Diode-pumped lasers
- Fiber lasers
- Optically-pumped semiconductor lasers
- Photonic-crystal lasers
- Short-pulse lasers
- High-power lasers
- Frequency-stable lasers
- Microlasers
- Optical sources based on nonlinear frequency conversion
- Frequency conversion techniques, including OPO, OPA, OPG, SHG, and SFG
- Quasi-phasematching
- Nonlinear waveguides
- Developments in laser media
- Developments in nonlinear optical materials
- Applications enabled by advanced laser technology
- Applications driving the development of new laser technology

Invited Speakers

The preliminary list of invited speakers includes:

Ultra-broadband parametric amplification, Giulio Cerullo, Cristian Manzoni, Dario Polli, Margherita Zavelani-Rossi, Sandro DeSilvestri, *Politécnico di Fisica, Italy*. **MC1**

Beam shaping of high-power diode stacks for kilowatt solid-state laser designs, Claus Schnitzler, Dieter Hoffman, *Fraunhofer-Gesellschaft Institut Solare Energiesysteme*. **WC1**

Laser vision correction with solid-state UV lasers, Georg Korn, Matthias Lenzner, Olaf Kittelmann, Rafal Zatonski, Marcel Kirsch, *Katana Technologies GmbH, Germany*. **WD1**

Power-scaling of (micro-structured) fiber lasers and amplifiers to kW-output powers, Jens Limpert, Tom Schreiber, Andreas Liem, *Friedrich-Schiller Univ., Germany*. **TuA1**

Recent advances in high power fiber lasers, Jayanta Sahu, Yoonchan Jeong, Carlos Algeria, Christophe Codemard, Daniel Soh, Seungin Baek, Valery Philoppov, Laurence Cooper, Johan Nilsson, Richard Williams, Morten Ibsen, Andy Clarkson, David Richardson, David Payne, *Southampton Univ., UK*. **MA1**

High-repetition rate lasers, Kurt J. Weingarten, *Giga Tera, Inc., Switzerland*. **WE1**

Coherently coupled high power fiber arrays, Michael Wickham, Jesse Anderegg, Stephen Brosnan, Dennis Hammons, Hiroshi Komine, Mark Weber, *Northrup-Grumman, USA*. **MA4**

Banquet Speaker

The conference banquet sponsored by **Coherent, Inc** on Tuesday, February 3 at 7:00 p.m. will feature a presentation entitled "**Phase-Conjugate Solid-State Lasers: A Historical Review**" from David A. Rockwell, *Raytheon, USA*.

Phase conjugation and solid-state lasers have enjoyed a synergistic and productive relationship for more than 30 years, motivated by the ability to enhance beam quality and power scalability. This presentation covers the technological history of this relationship, beginning with early concept demonstrations and concluding with ongoing efforts striving toward multi-kilowatt powers.

ASSP Short Courses

Short Courses

With a strong commitment to continuing technical education, OSA offers ASSP short courses designed to increase your knowledge of a specific subject while offering you the experience of expert teachers. Top-quality instructors stay current on the subject matter required to advance your research and career goals.

Continuing Education Units (CEUs)

Short Course attendees who successfully complete a course are eligible to receive continuing education units (CEUs). The CEU is a nationally recognized unit of measure for continuing education and training programs that meet established criteria. To earn CEUs, a participant must complete the CEU credit form and course evaluation and return it to the course instructor at the end of the course. CEUs will be calculated and certificates will be mailed to participants.

Publications

Conference Program

The *Conference Program* will be available on the web in early December 2003. Authors submitting papers, past meeting participants and current committee members will automatically be notified by email when the *Conference Program* is available.

Technical Digest

The ASSP *Technical Digest* will contain the camera-ready summaries of papers presented during the meeting. At the meeting, each registrant will receive a copy of the *Technical Digest* on CD-ROM. Extra CD-ROM copies can be purchased at the meeting for a special price of US$ 45.

TOPS Proceedings Volume

OSA is pleased to announce another proceedings volume in the series, *Trends in Optics and Photonics (TOPS)*, featuring papers presented at the Advanced Solid-State Photonics Topical Meeting in Santa Fe. This *TOPS Proceedings Volume* will offer a snapshot of the most recent developments in quantum electronics and solid-state lasers and promises to be a useful resource for students new to the field and specialists and practitioners who need to be quickly brought up-to-date.

All authors are invited to contribute to the volume by either submitting camera-ready articles on-site at the meeting or online via the OSA electronic submission system. Instructions will be emailed to all corresponding authors.

Each registrant will receive a copy of the *TOPS Advanced Solid-State Photonics Proceedings Volume*, upon publication in June 2004, as part of the registration fee. Extra copies of the volume can be purchased in advance at the meeting for a special price of US$ 60 (shipping & handling included).

Agenda of Sessions

- Sunday, February 1, 2004
- Monday, February 2, 2004
- Tuesday, February 3, 2004
- Wednesday, February 4, 2004

Sunday, February 1, 2004

Time	Event/Location
1:00 p.m. – 5:00 p.m.	**Registration** *North Concourse*
2:00 p.m. – 5:00 p.m.	**SC222*, Optically-Pumped Vertical External-Cavity Surface-Emitting Lasers** *Sunset Room* **SC223*, Bio-Photonics and Optical Sensing for Homeland Security** *Anasazi South Ballroom* (*Short courses, SC222 and SC223, require separate registration fee.)

TOP

Monday, February 2, 2004

Time	Event/Location
7:00 a.m. – 6:30 p.m.	**Registration** *North Concourse*
7:45 a.m. – 8:00 a.m.	**Opening Remarks** *Anasazi South Ballroom*
8:00 a.m. – 10:00 a.m.	**MA, High Power Fiber Lasers** *Anasazi South Ballroom*
10:00 a.m. – 11:00 a.m.	**MB, Poster Session 1 and Coffee Break** *Anasazi North Ballroom and Zia Ballroom*
10:00 a.m. – 4:45 p.m.	**Exhibits** *Anasazi North Ballroom and Zia Ballroom*
11:00 a.m. – 12:30 p.m.	**MC, Optical Parametric Amplification and Chirped Pulsed Amplification** *Anasazi South Ballroom*

12:30 p.m. – 2:00 p.m.	**Lunch Break** *(On Your Own)*
2:00 p.m. – 4:15 p.m.	**MD, Short Pulse and Short Wavelength Fiber Lasers** *Anasazi South Ballroom*
4:15 p.m. – 4:45 p.m.	**Coffee Break** *Anasazi North Ballroom and Zia Ballroom*
4:45 p.m. – 6:15 p.m.	**ME, Postdeadline Session** *Anasazi South Ballroom*

TOP Tuesday, February 3, 2004

Time	Event/Location
7:00 a.m. – 12:30 p.m.	**Registration** *North Concourse*
8:00 a.m. – 9:45 a.m.	**TuA, Fiber and Nonlinear Optics** *Anasazi South Ballroom*
9:45 a.m. – 10:45 a.m.	**Poster Session 2 and Coffee Break** *Anasazi North Ballroom and Zia Ballroom*
9:45 a.m. – 12:15 p.m.	**Exhibits** *Anasazi North Ballroom and Zia Ballroom*
10:45 a.m. – 12:15 p.m.	**TuC, Nonlinear Optics** *Anasazi South Ballroom*
12:15 p.m. – 7:00 p.m.	**Lunch (On Your Own)** *Free Afternoon*
7:00 p.m. – 10:00 p.m.	**Conference Banquet with David Rockwell, *Raytheon, USA*** *Anasazi South Ballroom*

TOP Wednesday, February 4, 2004

Time	Event/Location
7:00 a.m. – 6:30 p.m.	**Registration** *North Concourse*
8:00 a.m. – 10:00 a.m.	**WA, Yb and Mid-IR Lasers** *Anasazi South Ballroom*
10:00 a.m. – 11:00 a.m.	**WB, Poster Session 3 and Coffee Break** *Anasazi North Ballroom and Zia Ballroom*

10:00 a.m. – 4:00 p.m.	**Exhibits** *Anasazi North Ballroom and Zia Ballroom*
11:00 a.m. – 12:30 p.m.	**WC, Advanced Concepts** *Anasazi South Ballroom*
12:30 p.m. – 2:00 p.m.	**Lunch Break** *(On Your Own)*
2:00 p.m. – 3:30 p.m.	**WD, Solid-State Lasers** *Anasazi South Ballroom*
3:30 p.m. – 4:00 p.m.	**Coffee Break** *Anasazi North Ballroom and Zia Ballroom*
4:00 p.m. – 6:15 p.m.	**WE, Mode-Locked Lasers** *Anasazi South Ballroom*
6:15 p.m. – 6:45 p.m.	**Closing Remarks** *Anasazi South Ballroom*

Sunday, February 1, 2004

Room: North Concourse
1:00 p.m. – 5:00 p.m.
Registration

Room: Sunset
2:00 p.m. – 5:00 p.m.
SC222* • Optically-Pumped Vertical External-Cavity Surface-Emitting Lasers
Anne Tropper, *Univ. of Southampton, UK*

Room: Anasazi South Ballroom
2:00 p.m. – 5:00 p.m.
SC223* • Bio-Photonics and Optical Sensing for Homeland Security
Dennis Killinger, *Univ. of South Florida, USA*

(*Short courses, SC222 and SC223, require separate registration fee.)

Monday, February 2, 2004

Room: North Concourse
7:00 a.m. – 6:30 p.m.
Registration

Room: Anasazi South Ballroom
7:45 a.m. – 8:00 a.m.
Opening Remarks

Room: Anasazi South Ballroom
8:00 a.m. – 10:00 a.m.
MA • High Power Fiber Lasers
Craig Denman; AFRL/DELO, USA, Presider

MA1 • 8:00 a.m.
Recent advances in high power fiber lasers, *Jayanta Kumar Sahu, Yoonchan Jeong, Carlos Algeria, Christophe Codemard, Daniel Soh, Seungin Baek, Valery Philoppov, Laurence Cooper, Johan Nilsson, Richard Williams, Morten Ibsen, Andy Clarkson, David Richardson, David Payne; Southampton Univ., UK.* We will review recent progress on cladding-pumped fiber devices with output powers up to the kilowatt level and broad wavelength tunability in the 1 – 2 µm wavelength regime where silica fibers work well.

MA2 • 8:30 a.m.
High power eye-safe fiber transmitter for free space optical communications, *John E. Koroshetz[1], E. Schneider[1], I. T. McKinnie[1], D. Smith[1], J. Unternahrer[1], W. A. Clarkson[2], J. Nilsson[2], A. Carter[3], K. Tankala[3], J. Farroni[3], E. A. Watson[4], B. Stadler[4], G. Duchak[5]; [1]Coherent Technologies, Inc., USA, [2]Univ. of Southampton, UK, [3]Nufern, USA, [4]Air Force Res. Lab., USA, [5]Defense Advanced Res. Projects Agency, USA.* We report a fiber based transmitter suitable for high power eye-safe free space optical communications at 1.5 µm. Greater than 40 W of output power has been achieved with 10 Gb/s on-off keyed data patterns.

MA3 • 8:45 a.m.
A 4.3 W 977 nm ytterbium-doped jacketed-air-clad fiber amplifier, *Daniel B. S. Soh, Christophe Codemard, Jayanta Kumar Sahu, Johan Nilsson, Valery Philippov, Carlos Alegria, Yoonchan Jeong; Optoelectronics Res. Ctr., UK.* A cladding pumped jacketed-air-clad ytterbium-doped fiber amplifier operating at 977 nm produced 4.3 W of single-mode output power with 300 mW of input power from a diode seed laser. The small-signal gain was 20 dB.

MA4 • 9:00 a.m. (Invited)
Coherently coupled high power fiber arrays, *Michael Wickham, Jesse Anderegg, Stephen Brosnan, Dennis Hammons, Hiroshi Komine, and Mark Weber; Northrup-Grumman, USA.* The status of our coherently combined 7-element, high power fiber array will be presented. A description of the architecture, the method of phase correction and a presentation of the results obtained to date will be presented. Details of our recent demonstration of a 155 W, polarization-maintaining fiber amplifier will be presented. This effort represents the results of a multi-year effort to achieve high power for a single element fiber amplifier and to understand the important issues involved in coherently combining many individual elements to obtain weapons class optical power for directed energy weapons. We will also discuss our vision on the next steps for this technology.

MA5 • 9:30 a.m.
High power 30-µm core helically coiled Yb-fiber laser with diffraction limited and linearly polarized output, *Chi-Hung Liu[1], Almantas Galvanauskas[1], Bodo Ehlers[2]; [1]Univ. of Michigan, USA, [2]Fraunhofer USA, USA.* We demonstrate up to 155-W of cw power from a high-birefringence (PANDA) multimode-

core (30-µm diameter) Yb-doped fiber laser producing diffraction-limited ($M^2 = 1.32$) and linearly-polarized output, using helically-coiled sections as mode filters at fiber ends.

MA6 • 9:45 a.m.

Laser fibers designed for single polarization output, *Upendra H. Manyam, Bryce Samson, Victor Khitrov, David P. Machewirth, Nick Jacobson, Julia Farroni, Doug Guertin, Jaroslaw Abrmczyk, Adrian Carter, Kanishka Tankala; Nufern, USA.* Single mode, single-polarization output is demonstrated in LMA fiber laser. Both mode filtering and polarization filtering are demonstrated by coiling multimode Polarization Maintaining Fibers (PMFs). The design is scaleable for all-fiber high power lasers.

Room: Anasazi North Ballroom and Zia Ballroon
10:00 a.m. – 4:45 p.m.
Exhibit Hours

Room: Anasazi North Ballroom and Zia Ballroom
10:00 a.m. – 11:00 a.m.
MB • Poster Session 1 and Coffee Break

MB1

Reduction of the thermal load in highly Nd^{3+}-doped ceramic YAG by laser oscillation, *Ichiro Shoji[1], Takunori Taira[1], Akio Ikesue[2], Kunio Yoshida[3]; [1]Laser Res. Ctr, Inst. for Molecular Science, Japan, [2]Japan Fine Ceramics Ctr., Japan, [3]Osaka Inst. of Technology, Japan.* Depolarization resulting from thermally induced birefringence in 3.5at.% Nd:YAG ceramic under lasing is measured to be 1/3 of that under non-lasing condition, which is comparable to 1.0at.% Nd:YAG single crystal under non-lasing condition.

MB2

879nm-LD-pumped $Nd:GdVO_4$ laser and its thermal property, *Takayo Ogawa[1], Yoshiharu Urata[1], Satoshi Wada[1], Koichi Onodera[2], Hiroshi Machida[1], Hideaki Sagae[3], Mikio Higuchi[3], Kohei Kodaira[3]; [1]RIKEN, Japan, [2]NEC-Tokin, Japan, [3]Hokkaido Univ., Japan.* An 879nm-LD-pumped $Nd:GdVO_4$ laser with maximum slope efficiency of 78% was realized. Optical-optical conversion efficiency reached 70%. We also measured the thermal conductivity and thermal-lens effect to characterize the thermal property of the $Nd:GdVO_4$ laser.

MB3

High average power thin-rod Yb:YAG regenerative amplifier, *Sakae Kawato, Masaaki Fukuda, Kazuhiro Hata, Shingo Takasaki, Takao Kobayashi; Graduate School of Fiber Amenity Engineering, Fukui Univ., Japan.* A diode-end-pumped rectangular thin rod Yb:YAG regenerative amplifier has been developed. Average output power of 30 W was obtained with optical conversion efficiency of 15 % at pulse repetition rate of 30 kHz.

MB4

Synchronized Q-switching of 1064 and 1342 nm laser cavities using a V:YAG saturable absorber, *Peter Tidemand-Lichtenberg, Jiri Janousek, Preben Buchhave; Technical Univ. of Denmark, Denmark.* We prove that pumping of a V:YAG saturable absorber with 1064 nm pulses modulates the transmission of 1342 nm light. We then demonstrate a dual-cavity laser emitting synchronized, Q-switched pulses at 1064 and 1342 nm.

MB5

Quantum-defect-limited operation of diode-pumped Yb:YAG laser at low temperature, *Takahiro Shoji[1], Shigeki Tokita[1], Junji Kawanaka[2], Masayuki Fujita[3], Yasukazu Izawa[1]; [1]Inst. of Laser Engineering, Osaka Univ., Japan, [2]Advanced Photon Res. Ctr, Japan Atomic Energy Res. Inst., Japan, [3]Inst. for Laser Technology, Japan.* A high slope efficiency of 90.3% was obtained in a diode-pumped Yb:YAG oscillator at 70 K. An optical-to-optical efficiency of 74% was also high at a low pump intensity of 2.3 kW/cm^2.

MB6

Quantum efficiency measurements in Nd-doped materials, *Brian M. Walsh, Norman P. Barnes; NASA Langley Res. Ctr., USA.* Quantum efficiency of the Nd 4F3/2 manifold is measured in 10 Nd-doped systems. Luminescence decay in these Nd-doped materials is nonexponential. Evidence for correlation between the nonexponential decay and reduced quantum efficiency is presented.

MB7

Heat transfer measurements and high resolution absolute temperature mapping in diode-end-pumped Yb:YAG, *Sébastien Forget, Sebastien Chenais, Frederic Druon, Francois Balembois, Patrick Georges; Lab Charles Fabry de l'Institut d'Optique, France.* We report high resolution direct absolute temperature measurements in a diode-end-pumped Yb:YAG crystal. For the first time to our knowledge, the heat transfer coefficient has been measured, with four different types of thermal contact.

MB8

Beam quality improvement in thermally birefringent Nd:YAG laser amplifiers by use of radially polarized beams, *Inon Moshe, S. Jackel, A. Meir; Nonlinear Optics Group - Soreq NRC, Israel.* Good beam quality preservation was achieved in high-power rod based Nd:YAG amplifier-chains by use of radially polarized light. A 150W@M^2=3 oscillator probe-beam was amplified by three amplifier stages to 620W with M^2<5.

MB9

Influence of cerium concentration on transmittance and surface damage threshold in Ce-doped KTP, *Norihito Saito[1], M. Kato[2], K. Sakurai[3], Y. Murayama[3], M. Katsumat[4], S. Wada[1]; [1]Solid-State Optical Science Res. Unit, RIKEN, Japan, [2]RIKEN, Japan, [3]Earth Chemical Co., Ltd., Japan, [4]Kogakugiken Co., Ltd., Japan.* Transmittance and surface damage threshold depended on cerium concentration were investigated in cerium-doped KTP. Transmittance in visible region was 7% higher and damage threshold was a factor of 2.4 larger compared with undoped KTP.

MB10

Synchronous tunable optical pulses, *Norman P. Barnes, Brian M. Walsh; NASA Langley Res. Ctr, USA.* Synchronous tunable optical pulses at 2 widely separated wavelengths are generated in a Q-switched Nd:YAG laser. Pulses are collinear and synchronous, independent of pump level, solely through resonator design. Outputs are mixed or doubled.

MB11

An efficient method for quasi-continuous-wave generation at 589 nm by sum-frequency mixing in periodically poled KTP, *Norihito Saito[1], Kazuyuki Akagawa[2], Norihito Saito[3], Yoshihiko Saito[3], Hideki Takami[4], Satoshi Wada[5]; [1]Solid-State Optical Science Res. Unit, RIKEN, Japan, [2]MegaOpto Corp., Japan, [3]Natl. Astronomical Observatory of Japan, Japan, [4]Subaru Telescope, Natl. Astronomical Observatory of Japan, Japan, [5]RIKEN, Japan.* We achieved quasi-continuous-wave generation at 589 nm by sum-frequency mixing in periodically-poled KTP of synchronized mode-locked pulses at 1064 and 1319 nm. Conversion efficiency was reached to 14%, even for single-pass pumping using 5-mm-long-crystal.

MB12

Peculiarities of green light-induced infrared absorption dynamics in PPKTP, *Shunhua Wang, Valdas Pasiskevicius, Fredrik Laurell; Royal Inst. of Technology, Sweden.* High-sensitivity thermal lens technique has been used to investigate GRIIRA dynamics in KTP and PPKTP. The higher GRIIRA amplitude and different dynamics in PPKTP is explained by changes in native defect concentration produced by poling.

MB13

Parasitic second-harmonic generation in optical parametric chirped-pulse amplification, *Ildar A. Begishev[1], V. Bagnoud[2], M. J. Guardalben[2], J. Puth[2], L. J. Waxer[2], J. D. Zuegel[2]; [1]Lab. for Laser Energetics, Univ. of Rochester, USA, [2]Lab. for Laser Energetics, USA.* Parasitic SHG in an LBO OPCPA system has been observed. It can significantly reduce the useful signal energy and heavily distort the output spectrum. Operating conditions to eliminate this effect are identified and demonstrated.

MB14
High-power, short-pulse, compact SLR2000 laser transmitter, *Yelena Isyanova[1], Kevin F. Wall[1], John H. Flint[1], Peter F. Moulton[1], John J. Degnan[2]; [1]Q-Peak, Inc., USA, [2]Sigma Space Corp., USA.* This paper reports on the design and performance of a satellite-ranging transmitter consisting of a Cr:YAG passively Q-switched Nd:YAG microlaser and an air-cooled $Nd:YVO_4$ power amplifier, generating 235-μJ, 270-ps pulses at a 2-kHz rate.

MB15
High-power and high-efficiency LD pumped Yb:YAG micro-thickness slab laser, *Keiichi Sueda; Res. Ctr. for Industrial Science and Technology, Japan.* A high-power and high-efficiency Yb:YAG oscillator has been developed using a micro-thickness slab gain structure. Laser output power of 260 W was obtained in cw oscillation with 42% optical conversion efficiency.

MB16
Development of diode-pumped Yb:S-FAP laser system for laser-Compton X-ray generation, *Ken-ichi Maeda[1], Shinji Ito[2], Masakazu Washio[1], Fumio Sakai[2], Terunobu Nakajo[3], Tatsuya Yanagida[3], Kenji Torizuka[4]; [1]Waseda Univ., Japan, [2]The Femtosecond Technology Res. Assn., Japan, [3]Sumitomo Heavy Industries, Ltd., Japan, [4]Natl. Inst. of Advanced Industrial Science and Technology, Japan.* We are developing a diode-pumped Yb:S-FAP laser system for laser-Compton X-ray generations. We obtained the amplified pulse energy up to 210-mJ at 50-Hz after the double-pass preamplifier of the Yb:S-FAP laser system in preliminary experiments.

MB17
High-energy, 5-Hz repetition rate laser amplifier using wavefront corrected Nd:YLF laser rods, *Vincent Bagnoud[1], Jason Puth[1], Jonathan D. Zuegel[1], Ted Mooney[2], Paul Dumas[2]; [1]Lab. for Laser Energetics, USA, [2]QED Technologies, USA.* We report on a high-energy laser for pumping an optical parametric chirped-pulse amplification system using 1”-aperture, Nd:YLF laser rods. Improved system performance is demonstrated after Magnetorheological Finishing correction of the large laser rod aberration.

MB18
Wave-front aberration of CW-LD-pumped high-power rod amplifier and its correction with deformable mirror, *Satoshi Wada[1], Michio Sakashita[1], Taisuke Miura[1], Toshimasa Koseki[2], Akira Takazawa[2], Yoshiharu Urata[2]; [1]RIKEN, Japan, [2]Megaopto Corp., Japan.* The wave-front aberration of a 700W CW-LD-pumped high-power Nd:YAG MOPA system is investigated. With a membrance type of deformable mirror, the wave front was corrected to be flat.

MB19
Diode-pumped zig-zag slab laser for inertial fusion energy and applications, *Toshiyuki Kawashima[1], O. Matsumoto[1], M. Miyamoto[1], T. Sekine[1], T. Kurita[1], S. Matsuoka[1], T. Kanzaki[1], H. Kan[1], T. Kanabe[2], R. Yasuhara[2], Y. Fukumoto[2], T. Ashizuka[2], M. Yamanaka[2], T. Norimatsu[2], N. Miyanaga[2], M. Nakatsuka[2], Y. Izawa[2], H. Furukawa[3], S. Motokoshi[3], C. Yamanaka[3], H. Nakano[4], S. Nakai[5]; [1]Hamamatsu Photonics K.K., Japan, [2]Inst. of Laser Engineering, Osaka Univ., Japan, [3]Inst. for Laser Technology, Japan, [4]School of Science and Engineering, Kinki Univ., Japan, [5]Kochi Natl. College of Technology, Japan.* A quasi-cw 290-kW diode-pumped zig-zag slab laser is being developed in order to demonstrate a concept of the IFE driver. Thermally managed amplifier has yielded a gain of 10, promising 10-J output at 10 Hz.

MB20
High-energy fiber power amplifier for broadband beam smoothing with FM-modulated laser pulses on OMEGA, *Chi-Hung Liu[1], Almantas Galvanauskas[1], Jonathan Zuegel[2], John Marciante[2]; [1]Univ. of Michigan, USA, [2]Univ. of Rochester, USA.* We report on the performance of a large-mode-area, Yb-doped fiber power amplifier system amplifying broadband FM-modulated pulses at 1053 nm. A two-stage amplifier produces nearly diffraction-limited output with pulse energies of up to 270 μJ.

Room: Anasazi South Ballroom
11:00 a.m. – 12:30 p.m.
MC • Optical Parametric Amplification and Chirped Pulsed Amplification
Fredrik Laurell; Royal Inst. of Technology, Sweden, Presider

MC1 • 11:00 a.m. **(Invited)**
Ultra-broadband parametric amplification, *Sandro DeSilvestri; Politecnico di Fisica, Italy.*

MC2 • 11:30 a.m.
Front-end system for multi-petawatt laser based on non-generaive optical parametric amplification in KD*P, *Gennady Freidman[1], Nikolay Andreev[1], Victor Bespalov[1], Vladimir Bredikhin[1], Vladislav Ginzburg[1], Eugeny Katin[1], Efim A. Khazanov[1], Anatoly Mal'shakov[1], Vladimir Lozhkarev[1], Oleg Palashov[1], Anatoly Poteomkin[1], Alexander Sergeev[1], Ivan Yakovlev[1], Segrey Garanin[2], Nikolay Rukavishnikov[2], Stanislav Sukharev[2]; [1]Inst. of Applied Physics, Russian Federation, [2]Russian Federal Nuclear Ctr., Russian Federation.* In a three-cascade optical parametric chirp pulse amplifier based on KD*P crystal the pulse energy was 100mJ at 911nm wavelength. Adding two more parametrical amplifiers (100mm and 300mm diameter) will result in a multipetawatt laser.

MC3 • 11:45 a.m.
Amplified femtosecond laser system based on continuum generation and chirped pulse parametric amplification, *Emmanuel Hugonnot[1], M. Somekh[1], D. Villate[2], F. Salin[2], E. Freysz[3]; [1]CEA CESTA, France, [2]Cte des Lasers Intenses et Applications, Univ. Bordeaux, France, [3]Ctr. de Physique Moléculaire Optique et Hertzienne, Univ. Bordeaux, France.* The combination of a femtosecond laser oscillator, a photonic fiber and a nanosecond amplifier makes possible to propose a new widely tunable laser source. The validity of the concept is experimentally demonstrated.

MC4 • 12:00 p.m.
High-beam-quality optical parametric chirped-pulse amplification in periodically-poled $KTiOPO_4$, *Christopher A. Ebbers, Jason R. Schmidt, Igor Jovanovic; Lawrence Livermore Natl. Lab., USA.* We have demonstrated a high-gain optical parametric chirped-pulse amplifier for Nd:glass-based short-pulse laser systems based on periodically poled potassium-titanyl-phosphate. Our amplifier produced high single-pass gain, broad bandwidth, excellent beam quality and stability.

MC5 • 12:15 p.m.
Diode-pumped Yb:$LiYF_4$ chirped-pulse regenerative amplifier for high average power operation, *Junji Kawanaka[1], Koichi Yamakawa[1], Hajime Nishioka[2], Ken-Ichi Ueda[2]; [1]Advanced Photon Res. Ctr, Japan, [2]Inst. for Laser Science, Japan.* 10-mJ output power was obtained using a diode-pumped regenerative amplifier with a cooled Yb:$LiYF_4$ crystal. The pump duration as short as 1-ms would enable 1-kHz repetition rate with a continuous wave pump.

12:30 p.m. – 2:00 p.m.
Lunch Break (On Your Own)

Room: Anasazi South Ballroom
2:00 p.m. – 4:15 p.m.
MD • Short Pulse and Short Wavelength Fiber Lasers
Franz Kaertner; MIT, USA, Presider

MD1 • 2:00 p.m.
Megawatt peak power level fiber laser system based on compression in air-guiding photonic bandgap fiber, *Jens Limpert, Thomas Schreiber, Andreas Liem, Stefan Nolte, Holger Zellmer, Andreas Tuennermann; Friedrich Schiller Univ., Jena, Germany.* We report on the experimental demonstration of a Megawatt peak power level all fiber CPA system based on a step-index fiber stretcher and an air-guiding photonic crystal fiber compressor.

MD2 • 2:15 p.m.
Yb fiber laser chirped pulse amplifier system using a fiber Bragg grating stretcher matched to the Treacy compressor, *Ingmar Hartl, Gennady Imeshev, Martin E. Fermann; IMRA America, Inc., USA.* Chirped-pulse amplification of a modelocked Yb fiber laser in a large mode-area polarization-maintaining Yb-fiber using a nonlinearly-chirped fiber Bragg-grating stretcher is demonstrated. Pulses with 8nm bandwidth are amplified to 43uJ and 1000x recompressed to 900fs.

MD3 • 2:30 p.m.
Femtosecond pulse compression in air-guiding PCF, *Andrei B. Rulkov[1], Sergei V. Popov[2], James Roy Taylor[2], T. P. Hansen[3], Jes Broeng[3]; [1]NTO IRE-Polus, Russian Federation, [2]Femtosecond Optics Group, Imperial College, UK, [3]Crystal Fibre AS, Denmark.* A 5.7-fold pulse-duration compression around 1µm wavelength is achieved in an air-guiding anomalously dispersive photonic-crystal-fibre. 3.6ps pulses from Yb fibre laser are compressed to 163fs in the totally-fibre integrated format. Peak power/energy scalability is feasible.

MD4 • 2:45 p.m.
Generation of 23-fs pulses at 1µm by photonic-crystal-fiber compression of a diode-pumped Yb:SYS oscillator, *Frédéric Druon, François Balembois, Patrick Georges; Lab. Charles Fabry, France.* 23-fs pulses have been demonstrated using a photonic crystal fiber for nonlinear pulse compression of a 110 fs diode-pumped Yb:SYS laser.

MD5 • 3:00 p.m.
All-fibre, 2ps Yb laser with 60kW peak power, *Alexei V. Avdokhin[1], Mikhail Y. Vyatkin[1], Alexandr G. Getman[1], Andrei B. Rulkov[1], Sergei V. Popov[2], James Roy Taylor[2], Valentin P. Gapontsev[3]; [1]NTO IRE-Polus, Russian Federation, [2]Femtosecond Optics Group, Imperial College, UK, [3]IPG Photonics, USA.* We demonstrate 2-20ps fibre laser in Yb-wavelength range with up to 60kW peak and 9W average powers. Pulses from a self-starting, ring-fibre-cavity Yb laser with spectral gain/pulse-duration control were amplified in 2m-long, Yb-doped fiber.

MD6 • 3:15 p.m.
Tunable, high-repetition-rate, harmonicallymode-locked, ytterbium fiber laser, *Nick G. Usechak[1], Govind P. Agrawal[1], Jonathan D. Zuegel[2]; [1]The Inst. of Optics, USA, [2]Lab. for Laser Energetics, USA.* We report the first ytterbium fiber laser mode-locked at frequencies as high as 10.3 GHz. The laser produces tunable, low jitter, linearly polarized, 2.6-ps, chirped pulses with up to 38-mW of average output power.

MD7 • 3:30 p.m.
3-Watt blue source based on 914-nm Nd:YVO4 passively-Q-switched laser amplified in cladding-pumped Nd:fiber, *Thomas J. Kane, Gregory Keaton, Mark A. Arbore, David R. Balsley, John F. Black, Janet L. Brooks, Mark Byer, Loren A. Eyres, Manuel Leonardo, James J. Morehead, Charles Rich, Derek J. Richard, Laura A. Smoliar, Yidong Zhou; Lightwave Electronics, USA.* A cladding-pumped Nd:silica fiber was used for amplification at 914 nm. Pulses from an Nd:YVO4 passively Q-switched laser were amplified and then frequency doubled in LBO to produce blue with 3-W average power.

MD8 • 3:45 p.m.
Scalable 11W 938nm Nd^{3+} doped fiber laser, *Jay W. Dawson[1], Raymond Beach[1], Alex Drobshoff[1], Zhi Liao[1], Deanna M. Pennington[1], Stephen A. Payne[1], Luke Taylor[2], Wolfgang Hackenberg[2], Domenico Bonaccini[2]; [1]Lawrence Livermore Natl. Lab., USA, [2]European Southern Observatory, Germany.* 11W of 938nm light was produced in an Nd^{3+} fiber laser. Optimization of the ratio of the fiber core and cladding areas permitted operation of the laser at room temperature by minimizing 1088nm gain.

MD9 • 4:00 p.m.
A cladding pumped neodymium-doped fiber laser tunable from 932 nm to 953 nm, *Daniel B. S. Soh[1], Seong Woo Yoo[1], Jayanta Kumar Sahu[1], Laurence J. Cooper[1], Seungin Baek[1], Johan Nilsson[1], Kyunghwan*

Oh[2]*;* [1]*Optoelectronics Res. Ctr., UK,* [2]*K-JIST, Republic of Korea.* A cladding-pumped neodymium-doped fiber laser tunable from 932 nm to 953 nm produced a single-mode laser output with maximum power 705 mW at 944 nm. An effective design was used to avoid competing four-level transition.

Room: Anasazi North Ballroom and Zia Ballroom
4:15 p.m. – 4:45 p.m.
Coffee Break

Room: Anasazi South Ballroom
4:45 p.m. – 6:15 p.m.
ME • Postdeadline Session

Tuesday, February 3, 2004

Room: North Concourse
7:00 a.m. – 12:30 p.m.
Registration

Room: Anasazi South Ballroom
8:00 a.m. – 9:45 a.m.
TuA • Fiber and Nonlinear Optics
M.E. Fermann; IMRA America, Inc, USA, Presider

TuA1 • 8:00 a.m. (Invited)
Power-scaling of (micro-structured) fiber lasers and amplifiers to kW-output powers, *Jens Limpert, Tom Schreiber, Andreas Liem; Friedrich-Schiller Univ., Jena, Germany.* We discuss power-scaling capabilities of rare-earth-doped fiber lasers and amplifiers. The potential of conventional multi-clad fiber designs will be compared to air-clad micro-structured fibers.

TuA2 • 8:30 a.m.
Thermo-optical analysis of air-clad photonic crystal fiber lasers, *Thomas Schreiber[1], Jens Limpert[1], Andreas Liem[1], Stefan Nolte[1], Holger Zellmer[1], Thomas Peschel[2], Volker Guyenot[2], Andreas Tuennermann[2,1]; [1]Friedrich Schiller Univ., Jena, Germany, [2]Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany.* We report on the investigation of the thermo-optical behavior of air-clad ytterbium-doped microstructured fiber lasers. Analytical and numerical models are applied to calculate the heat distribution and induced stresses.

TuA3 • 8:45 a.m.
Low noise, high-brightness, broadband, all-fiber CW sources for OCT around 1300nm, *Christiano J. S. de Matos[1], Sergei V. Popov[1], James Roy Taylor[1], K. P. Hansen[2]; [1]Imperial College, UK, [2]Crystal Fibre AS, Denmark.* We analyzed noise, coherence and spectral-power-density properties of a 5.5W, CW Raman-soliton continuum with >300nm width around 1.3µm generated in a holey-fibre pumped by Yb-fibre source. The demonstrated source is ideal for high-resolution/sensitivity OCT imaging.

TuA4 • 9:00 a.m.
Supercontinuum generation from a Cr^{4+}:YAG laser using a soft-glass extruded PCF, *Evgeni Sorokin[1], Sergei Naumov[1], Vladimir V. Kalashnikov[1], Irina T. Sorokina[1], V. V. Ravi Kanth Kumar[2], Alan K. George[2], Jonathan C. Knight[2], Philip St. J. Russel[2]; [1]TU Vienna, Photonics Inst., Austria, [2]Optoelectronics Group, Univ. of Bath, UK.* We report on supercontinuum and third-harmonic generation in the high-n2 extruded photonic crystal fiber using a Cr^{4+}:YAG laser with 70 fs pulse duration and less than 40 mW of average output power.

TuA5 • 9:15 a.m.
25W average-power, 775nm second-harmonic-generation of linearly-polarized fiber source in PPKTP, *Mikhail Y. Vyatkin[1], Roman I. Yagodkin[1], Alexei V. Avdokhin[1], Alexandr G. Dronov[1], Sergei V. Popov[2], James Roy Taylor[2], Valentin P. Gapontsev[3]; [1]NTO IRE-Polus, Russian Federation, [2]Femtosecond Optics Group, Imperial College, UK, [3]IPG Photonics, USA.* An Yb-Er, PM-format, quasi-CW fibre source with 1.2kW peak power is presented and used for 76% efficient SHG in PPKTP. The single-mode, 25W 775nm source was used for SHG at 388nm with average powers >1W.

TuA6 • 9:30 a.m.
1.5-2µm, multi-Watt white-light generation in CW format in highly-nonlinear fibres, *Andrei B. Rulkov[1], Sergei V. Popov[2], James Roy Taylor[2]; [1]NTO IRE-Polus, Russian Federation, [2]Femtosecond Optics Group, Imperial College, UK.* Over 6W power, CW Raman-soliton continua are generated in a highly-nonlinear-fibre in the 1.56-2.05µm range with spectral brightness 16mW/nm and flatness <1dB peak-to-peak. Fibre-integrated pumping with single-mode, high power Yb/Er laser is employed.

Room: Anasazi North Ballroom and Zia Ballroom
9:45 a.m. – 12:15 p.m.
Exhibit Hours

Room: Anasazi North Ballroom and Zia Ballroom
9:45 a.m. – 10:45 a.m.
TuB • Poster Session 2 and Coffee Break

TuB1
New crystalline material for 1.5 micrometer lasers: Yb,Er-activated $GdCa_4O(BO_3)_3$, *Boris Denker[1], Boris Galagan[1], Ludmila Ivleva[1], Vuacheslav Osiko[1], Irina Voronina[1], Sergei Sverchkov[1], Gunnar Karlsson[2], Frederik Laurell[2]; [1]Laser Materials and Technologies Res. Ctr. of General Physics Inst., Russian Federation, [2]Royal Inst. of Technology, Sweden.* A new crystalline medium for 1.5 micron Yb-Er lasers is proposed: $GdCa_4O(BO_3)_3$ (GdCOB). Its melting point allows crystal growth using Pt instead of Ir crucibles. Spectroscopic and laser tests of the new material are described.

TuB2
Modular high repetition rate ultrafast all-fiber Er^{3+} oscillator-amplifier system with µJ pulse energy, *Peter Adel, Martin Engelbrecht, Carsten Fallnich; Laser Zentrum Hannover e.V., Germany.* A compact fiber-based device with high-beam quality is demonstrated generating sub-800 fs pulses at 1.56 µm with pulse energies of 2.6–4.8 µJ at 300–100 kHz repetition rate.

TuB3
Passive Q-switching of diode pumped Er:glass laser with V^{3+}:YAG saturable absorber, *Svetlana A. Zolotovskaya[1], K. V. Yumashev[1], N. V. Kuleshov[1], A. V. Sandulenko[2]; [1]International Laser Ctr., Belarus, [2]Vavilov State Optical Inst., Russian Federation.* Passive Q-switching of diode-pumped 1.54mcm Er:glass laser with V^{3+}:YAG crystal as a saturable absorber has been demonstrated. Slope efficiency of 10% and average output power of 30 mW with Q-switching efficiency of 37% were achieved.

TuB4
Properties of amplitude-to-phase noise conversion in self-referencing method using microstructure fibers for carrier-envelope phase control, *Katsuaki Okubo[1], Shinki Nakamura[1], Yahei Koyamada[1], Masayuki Kakehata[2], Yohei Kobayashi[2], Hideyuki Takada[2], Kenji Torizuka[2], Hiroaki Takamiya[3], Kazuki Nishijima[3], Tetsuya Homma[3], Hideo Takahashi[3]; [1]Dept. of Media & Telecommunications Engineering, Ibaraki Univ., Japan, [2]Natl. Inst. of Advanced Industrial Science and Technology, Japan, [3]Shibaura Inst. of Technology, Japan.* We present detailed properties of the amplitude to phase noise conversion coefficient in the self-referencing carrier-envelope phase measurement method using microstructure fiber, and its effects on carrier-envelope phase control.

TuB5
High sensitivity beam quality measurements on large-mode-area fiber amplifiers, *Peter Weßels, Carsten Fallnich; Laser Zentrum Hannover e.V., Germany.* We investigated the beam quality of ytterbium-doped large-mode-area fiber amplifiers using a high-sensitivity mode filter. Depending on the coiling diameter, more than 97% of the output power were contained within the polarized (1:200) TEM00 mode.

TuB6
Comprehensive comparison of experiments and model for double cladding YDFA in the CW and repetitive pulse regimes, *Youming Chen, Carlos Avila, William Torruellas, Richard Utano, Ralph Burnham, Horacio Verdun; Fibertek Inc., USA.* We can accurately predict the performance of YDFAs between the CW regime and 1 MHz operation for pulse widths varying between 1ns and several microseconds. Comparisons between experiments and modeling will be presented.

TuB7
Theoretical and experimental study of the amplication of a 976-nm laser diode in a single-mode ytterbium-doped fiber, *Aude Bouchier, Gaëlle Lucas-Leclin, François Balembois, Patrick Georges; Lab. Charles Fabry de l'Institut d'Optique, France.* We present the amplification of a diode laser at 976 nm with a 920-nm-pumped single-mode ytterbium-doped fiber in continuous and pulsed regime in order to obtain a blue source at 488 nm.

TuB8
Phase and frequency locking in pump-modulated erbium-doped fiber laser, *Alexander N. Pisarchik, Yuri O. Barmenkov, Alexander V. Kir'yanov; Centro de Investigaciones en Optica, Mexico.* Phase-and frequency-locked states (Arnold's tongues) are mapped out directly in an erbium-doped fiber laser subjected to harmonic modulation of the diode pump laser current at frequencies lower than the fundamental laser frequency.

TuB9
Self Raman conversion in YVO_4:Nd microchip laser, *Alexandre A. Demidovich[1], Ludmila E. Batay[2], Alexander S. Grabtchikov[2], Victor A. Lisinetskii[2], Valentin A. Orlovich[2], Andrey N. Kuzmin[3]; [1]Inst. of Molecular and Atomic Physics, Natl. Acad. of Sciences of Belarus, Belarus, [2]Stepanov Inst. of Physics, Natl. Acad. of Sciences of Belarus, Belarus, [3]ILPB, State Univ. of New York at Buffalo, USA.* The sub-nanosecond passively Q-switched Nd:YVO_4 / Cr^{4+}:YAG microchip laser with self Raman conversion has been investigated. The pulse duration obtained at the Raman wavelength (1.18 µm) was as short as 830 ps.

TuB10
Stimulated Raman scattering of picosecond pulses in $GdVO_4$ and YVO_4 crystals, *Petr G. Zverev, Alexander Ya Karasik, Alexander A. Sobol, Dmitrii S. Chunaev, Tasoltan T. Basiev, Alexander I. Zagumennyi, Yuri D. Zavartsev, Sergey A. Kutovoi, Vyacheslav V. Osiko, Ivan A. Shcherbakov; Laser Materials and Technology Res. Ctr., General Physics Inst., Russian Federation.* Stimulated Raman scattering of 11 ps pump pulses was investigated in $GdVO_4$ and YVO_4 crystals. Values of Raman threshold energy were measured and well correlate with spontaneous Raman spectroscopic data.

TuB11
High-energy $BaWO_4$ Raman laser pumped by a self-phase-conjugate Nd:GGG laser, *Tasoltan T. Basiev[1], Yuri K. Danileiko[1], Maxim E. Doroshenko[1], Vyacheslav V. Osiko[1], Alexander V. Fedin[2], Andrey V. Gavrilov[2], Sergey N. Smetanin[2]; [1]Res.Ctr. of Laser Materials and Technologies of A.M. Prokhorov General Physics Inst. of Russian Acad. of Sciences, Russian Federation, [2]Kovrov State Technological Acad., Russian Federation.* SRS in $BaWO_4$ crystal under high-energy pumping of self-phase-conjugate LiF:F_2^--Q-switched Nd:GGG laser is investigated. Output SRS radiation obtained had pulse train energy of two joules, peak power of megawatt at conversion efficiency of twenty percents.

TuB12
All-solid-state, multi-kilohertz, 1.5µm intracavity Raman laser based on Nd:YVO_4 and KGd$(WO_4)_2$, *Hamish Ogilvy, Helen M. Pask, James A. Piper; Ctr. for Lasers and Applications, Australia.* Multi-kilohertz operation at 1497nm and 1528nm has been demonstrated with an Nd:YVO4 laser on the 1342nm transition using intracavity Stimulated Raman Scattering in KGd$(WO_4)_2$. Average powers at 1497nm and 1528nm were 200mW and 100mW respectively.

TuB13
Coherently pumped passively Q-switched/mode-locked Nd:SrWO4 Raman laser, *Jan Sulc[1], Helena Jelinkova[1], Pavel Cerny[1], Maxim Doroschenko[2], Vadim V. Skornyakov[2], Sergey B. Kravtsov[2], Tasoltan T. Basiev[2], Peter G. Zverev[2]; [1]Czech Technical Univ. FNSPE, Czech Republic, [2]Laser Materials and Technology Res. Ctr., General Physics Inst, Russian Federation.* Nd^{3+}:$SrWO_4$ crystal was pumped by alexandrite laser radiation. Raman self-conversion at 1170nm was achieved in Q-switched (by LiF:F_2^- crystal) or mode-locked (by ML51 or 3955 saturable absorber) regime. Yellow emission at 585nm (SHG) was reached.

TuB14
Intra-cavity pumped PPLN OPO with double ring configuration, *Jirong Yu[1], Yingxin Bai[2], Norman P. Barnes[1], Hyung R. Lee[3], Mulugeta Petros[4], Songsheng Chen[2], Bo C. Trieu[1]; [1]NASA Langley Res. Ctr., USA, [2]Science Applications International Corp., USA, [3]Hampton Univ., USA, [4]Science and Technology Corp., USA.* A tunable continuous-wave intracavity pumped PPLN OPO has been developed. The idler tunable range of 2.3-3.9 µm with linewidth less than 15 MHz and output power at 3.4 µm of 370 mW is demonstrated.

TuB15
High brightness tunable tandem optical parametric oscillator at 8-12µm, *Yosi Ehrlich, S. Pearl, S. Fastig; Soreq NRC, Israel.* Nd:YAG radiation at 1.064µm is converted to the 8-12 µ m region, using two consecutive OPOs based on KTP and $AgGaSe_2$ crystals. Despite the wide high-energy beams, low divergence is achieved using unstable confocal resonators.

TuB16
Pulsed noncollinear optical parametric oscillator with tilted periodically poled grating structure, *Jürgen Bartschke, U. Bäder, X. Liang, M. Peltz, J. P. Meyn, A. Borsutzky, R. Wallenstein; Univ. Kaiserslautern, Germany.* We report on a 1064nm pumped, 10kHz noncollinear PPLN-OPO. It generates 5.8ns pulses at 1566nm with an average power of 3.6W. The tilted QPM grating improves substancially the signal beam quality ($M^2 < 1.2$).

TuB17
Passively mode-locked Nd^{3+}-doped $Y_3ScAl_4O_{12}$ ceramic laser, *Jiro Saikawa[1], Y. Sato[1], I. Shoji[1], T. Taira[1], A. Ikesue[2]; [1]Laser Res. Ctr. for Molecular Science, Japan, [2]Materials Res. and Development Lab., Japan.* We report on a passively mode-locked Nd^{3+}-doped $Y_3ScAl_4O_{12}$ ceramic laser. A cascaded quadratic nonlinear mirror was used for mode locking. The laser generates pulses of ~10 ps with 560-mW average power (35% optical-to-optical efficiency).

TuB18
Pulse energy dynamics of passively mode-locked solid-state lasers above the Q-switching threshold, *Adrian Schlatter, Simon C. Zeller, Rachel Grange, Rüdiger Paschotta, Ursula Keller; ETH Zürich, Switzerland.* We describe a novel method to measure the dynamical behavior of passively mode-locked solid-state lasers. This method helped to clarify the cause of unexpectedly low Q-switching thresholds in two cases.

TuB19
Two ways of compensation of thermally induced modal distortions in Faraday isolators, *Efim A. Khazanov, Nikolay Andreev, Anatoly Mal'shakov, Oleg Palashov, Anatoly Poteomkin, Andrey Shaykin, Victor Zelenogorsky; Inst. of Applied Physics, Russian Federation.* Two methods of reduction of thermal lens in Faraday isolators were theoretically and experimentally investigated and compared: compensation by means of ordinary negative lens and by means of glass inducing negative thermal lens when heated.

Room: Anasazi South Ballroom
10:45 a.m. – 12:15 p.m.
TuC • Nonlinear Optics
Peter Moulton; Q-Peak Inc., USA, Presider

TuC1 • 10:45 a.m.
Two-stage optical parametric generator with multi-watt outputs in ultrashort pulses around 800 nm and 1450 nm, *Felix Brunner[1], Edith Innerhofer[1], Thomas Sudmeyer[1], Rudiger Paschotta[1], Ursula Keller[1], T. Usami[2], H. Ito[2], M. Nakamura[3], K. Kitamura[3]; [1]ETH Zurich, Switzerland, [2]RIEC, Tohoku Univ., Japan, [3]Natl. Inst. for Materials Science, Japan.* With a passively mode-locked thin disk Yb:YAG laser we

pumped a two-stage optical parametric generator producing ultrashort pulses with 11 W average power at 799 nm and 3.6 W at 1448 nm.

TuC2 • 11:00 a.m.
Optical parametric oscillator pumped at 1645 nm by a 9 W, fiber-laser-pumped, Q-switched Er:YAG laser, *York E. Young, Scott D. Setzler, Thomas M. Pollak, E. P. Chicklis; BAE Systems, USA.* We describe a 3.7 W optical parametric oscillator utilizing periodically poled lithium niobate and pumped at 1645 nm by a 9 W, fiber-laser-pumped, repetitively Q-switched Er:YAG laser.

TuC3 • 11:15 a.m.
High pulse energy $ZnGeP_2$ singly resonant OPO, *Hyung R. Lee[1], Jirong Yu[2], Norman P. Barnes[2], Yingxin Bai[3]; [1]Hampton Univ., USA, [2]NASA Langley Res. Ctr., USA, [3]Science Applications International Corp., USA.* We report a high pulse energy singly resonant $ZnGeP_2$ OPO, pumped by a Q-switched Ho:Tm:$LuLiF_4$ 2μm laser. It generates up to 17.3 mJ in the 4.3-10.1 μm ranges at conversion efficiency of 27.5%.

TuC4 • 11:30 a.m.
Spectral and spatial limiting in idler-resonant optical parametric oscillator with PPKTP, *Mikael Tiihonen, Valdas Pasiskevicius, Fredrik Laurell; Royal Inst. of Technology, Sweden.* Spectral and spatial properties of a non-collinear signal- and idler -resonant PPKTP OPO have been investigated. Idler-resonant OPO allows for generation of two-times smaller spectral bandwidths in lower-M^2 beams. OPO efficiencies around 70-% were demonstrated.

TuC5 • 11:45 a.m.
TeO_2: solid-state SBS material with exceptionally high gain, *Mark A. Dubinskii, Larry D. Merkle; US ARL, USA.* We observe very low threshold phase conjugation by stimulated Brillouin scattering in crystalline TeO_2. The resulting steady-state gain parameter, 100 cm/GW, is to our knowledge the largest ever reported for a solid-state material.

TuC6 • 12:00 p.m.
Efficient yellow, orange and red laser output from a 5kHz, 532nm-pumped, $KGd(WO_4)_2$ Raman oscillator, *Richard P. Mildren[1], Marc Convery[1], Helen M. Pask[1], James A. Piper[1], Tim Mckay[2]; [1]Ctr. for Lasers and Applications, Macquarie Univ., Australia, [2]Defence Science and Technology Organisation, Australia.* Efficient $KGd(WO_4)_2$ Raman lasers are demonstrated using external resonator and intracavity configurations. Operation at six wavelengths (555, 559, 579, 588, 606 & 621nm) is reported with output power as high as 1.7W.

12:15 p.m. – 7:00 p.m.
Free Afternoon

Room: Anasazi South Ballroom
7:00 p.m. – 10:00 p.m.
Conference Banquet with David Rockwell, Raytheon, USA

Wednesday, February 4, 2003

Room: North Concourse
7:00 a.m. – 6:30 p.m.
Registration

Room: Anasazi South Ballroom
8:00 a.m. – 10:00 a.m.
WA • Yb and Mid-IR Lasers
Raymond Beach; Lawrence Livermore Natl. Lab., USA, Presider

WA1 • 8:00 a.m.
High-average-power side-pumped Yb:YAG thin disk lasers, *Takayuki Yanagisawa, Syuhei Yamamoto, Yoshihito Hirano; Mitsubishi Electric Corp., Japan.* High-average-power continuous-wave operations of side-pumped Yb:YAG thin disk lasers were demonstrated. The maximum output power of 104-W from three compact single-bar pumping modules and 235-W form a high-power 6-bar pumping module were achieved.

WA2 • 8:15 a.m.
Continuous-wave 90-W output power diode edge-pumped microchip composite Yb:YAG laser, *Traian Dascalu[1,2], Nicolaie Pavel[3,2], Masaki Tsunekane[1,3], Takunori Taira[3]; [1]CREATE – JST (Japan Science and Technology Corp.), Japan, [2]Inst. of Atomic Physics, Romania, [3]Inst. for Molecular Science, Japan.* Continuous-wave 90-W output power is reported from 400-microns thick Yb:YAG/YAG composite structure with 10-at.% Yb:YAG core of 2x2-mm^2 area. Optical phase distortions measurement gives focus shift bellow 0.05 m and shows the absence of astigmatism.

WA3 • 8:30 a.m.
Yb^{3+}-doped ceramic lasers, *Kazunori Takaichi[1], Hideki Yagi[2,1], Jianren Lu[1], Jean-Francois Bisson[1], Todor S. Petrov[1,3], Akira Shirakawa[1], Ken-ichi Ueda[1], Takagimi Yanagitani[2], Alexander A. Kaminskii[4]; [1]Inst. for Laser Science, Univ. of Electro-Communications, Japan, [2]Konoshima Chemical Co., Ltd., Japan, [3]Inst. of Solid State Physics, Bulgarian Acad. of Sciences, Bulgaria, [4]Inst. of Crystallography, Russian Acad. of Sciences, Russian Federation.* We have been succeeding in fabrication of highly transparent ceramics and developing new solid-state lasers, ceramic lasers. Femtosceond ceramic lasers and highly efficient cw ceramic lasers were demonstrated with Yb-doped ceramics.

WA4 • 8:45 a.m.
Nanosecond pulsed thin disk Yb:YAG lasers, *Frank Butze, Mikhail A. Larionov, Karsten Schuhmann, Christian Stolzenburg, Adolf Giesen; IFSW, Germany.* 18mJ pulse energy at 1kHz with a pulse duration of 230ns have been achieved with the Q-switched laser. 26mJ with 8ns pulse length have been demonstrated with the regenerative amplifier, tunable within 6nm around 1030nm.

WA5 • 9:00 a.m.
CPA-free femtosecond thin disk Yb:KYW regenerative amplifier with high repetition rate, *Angelika Beyertt, Daniel Müller, Detlef Nickel, Adolf Giesen; Inst. für Strahlwerkzeuge, Univ. Stuttgart, Germany.* We report of an improved Yb:KYW thin disk amplifier system to provide ultra short pulses with high energies at high repetition rates. Without using CPA, 100-µJ, 750-fs pulses were generated with up to 45 kHz.

WA6 • 9:15 a.m.
High-power eyesafe YAG lasers for coherent laser radar, *Andrew Malm, Ross Hartman, Robert C. Stoneman; Coherent Technologies, Inc., USA.* We report developments of high-power eyesafe YAG lasers for coherent laser radar applications. Upper-state pumped 2.1 µm Ho:YAG and 1.6 µm Er:YAG lasers produced output powers greater than 7 W with diffraction-limited beam quality.

WA7 • 9:30 a.m.
High power Q-switched Tm:$YAlO_3$ lasers, *Amy C. Sullivan, Gregory J. Wagner, Douglas Gwin, Robert C. Stoneman, Andrew I.R Malm; Coherent Technologies, Inc., USA.* We have demonstrated 50 W of output power from a free-running Tm:$YAlO_3$ laser at 1940 nm. We have also obtained Q-switched operation with 7 mJ of output energy at a 5 kHz repetition rate.

WA8 • 9:45 a.m.
3.7-watt single-frequency cw Ho:YAG ring laser end-pumped by cladding-pumped Tm-doped silica fibre laser, *D.Y. Shen, W.A. Clarkson, L.J. Cooper, R.B. Williams; Optoelectronics Res. Ctr., Univ. of Southampton, UK.* Acousto-optically induced unidirectional operation of a Ho:YAG ring laser pumped by a Tm-doped silica fibre laser has been demonstrated. 3.7W of single-frequency output at 2114nm for 8.8W of incident pump power at 1905nm was obtained.

Room: Anasazi North Ballroom and Zia Ballroom
10:00 a.m. – 4:00 p.m.
Exhibits

Room: Anasazi North Ballroom and Zia Ballroom
10:00 a.m. – 11:00 a.m.
WB • Poster Session 3 and Coffee Break

WB1
Spectroscopic properties and efficient laser performances of Yb^{3+}-doped $Y_3ScAl_4O_{12}$ ceramics, *Jiro Saikawa[1], Y. Sato[1], T. Taira[1], A. Ikesue[2]; [1]Laser Res. Ctr. for Molecular Science, Japan, [2]Materials Res. and Development Lab., Japan Fine Ceramics Ctr., Japan.* We report on the spectroscopic properties and continuous-wave laser performances of Yb^{3+}-doped disordered $Y_3Al_5O_{12}/Y_3Sc_2Al_4O_{12}$ (Yb:$Y_3ScAl_4O_{12}$) ceramics. Efficient laser oscillation of over 70% slope efficiency was obtained with over 40 nm tuning range at room temperature.

WB2
Computation of laser cavity eigenmodes by the use of a 3D finite element approach, *Konrad Altmann[1], Christoph Pflaum[2], David Seider[3]; [1]LAS-CAD GmbH, Germany, [2]Univ. Erlangen, Lehrstuhl für Informatik X, Germany, [3]Univ. Würzburg, Inst. für Angewandte Mathematik und Statistik, Germany.* A new approach for computing eigenmodes of a laser resonator by the use of finite element analysis (FEA) is presented. The obtained results have been successfully verified by the use of the gaussian mode algorithm.

WB3
Spectroscopy and continuous-wave laser action demonstration of Yb^{3+}-doped lanthanum scandium borate, *Juan J. Romero, Klaus Petermann, Guenter Huber, Ernst Heumann; Laser Physics Inst., Germany.* Spectroscopic properties of Yb^{3+}:$LaSc_3(BO_3)_4$ are presented. Broad emission bands observed will permit developing tunable lasers. First demonstration of continuous wave laser action with efficiency of 36% at a laser wavelength of 1045 nm is shown.

WB4
Anisotropy of nonlinear change of refractive index in Cr^{4+}:YAG at continuous-wave resonant excitation, *Alexander V. Kir'yanov; Ctr. de Investigaciones en Optica, Mexico.* The nonlinear change of refractive index in Cr^{4+}:YAG under the powerful resonant continuous-wave excitation is modelled. The intensity- and thermo-induced anisotropy of refractive index nonlinear change are addressed for the first time to our knowledge.

WB5
Near quantum limit laser oscillation and spectroscopic properties of Nd:$GdVO_4$ single crystal, *Yoichi Sato, Nicolaie Pavel, Takunori Taira; Laser Res. Ctr. for Molecular Science, Inst. for Molecular Science, Japan.* The highest optical-optical efficiency of 79.0% has been achieved in 1-µm cw laser oscillation by

$Nd:GdVO_4$, where slope efficiency was 80.3% with respect to the launched power. Detailed spectroscopic properties of $Nd:GdVO_4$ were also discussed.

WB6
Spectroscopic properties of heavily Nd^{3+}-doped GGG and NdGG single crystals, *Yoichi Sato[1], Takunori Taira[1], Osamu Nakamura[2], Yasunori Furukawa[2]; [1]Laser Res. Ctr. for Molecular Science, Inst. for Molecular Science, Japan, [2]New Product Development Group, Oxide, Japan.* We have fabricated the highly concentrated Nd:GGG single crystals, and investigated the spectroscopic properties of them. It was also found that all Gd^{3+} ions in GGG crystals could be replaced to Nd^{3+}, such as NdGG.

WB7
Luminescence lifetime measurements in Yb^{3+}-doped $KY(WO_4)_2$ and KGd $(WO_4)_2$, *V. E. Kisel, A. E. Troshin, V. G. Shcherbitsky, N. V. Kuleshov; International Laser Ctr., Belarus.* Emission decay measurements with suppression of reabsorption effect were performed for Yb:KYW and Yb:KGW crystals and the radiative lifetimes of 233 and 243 microseconds, respectively, were determinated.

WB8
Modified reciprocity method in laser crystals spectroscopy, *A. S. Yasukevich, V. G. Shcherbitsky, V. E. Kisel, A. V. Mandrik, N. V. Kuleshov; International Laser Ctr., Belarus.* A modified reciprocity method to determine stimulated emission cross section spectra on the basis of absorption cross section spectra and the radiative lifetime of the impurity center in a solid state host is reported.

WB9
Multiphonon relaxation of mid-IR transitions of RE ions in fluorite type crystals, *Yurii V. Orlovskii[1], Tasoltan T. Basiev[1], Konstantin K. Pukhov[1], Nikolay A. Glushkov[1], Olim K. Alimov[1], Sergey B. Mirov[2]; [1]Laser Materials and Technologies Res. Ctr. of General Physics Inst., Russian Federation, [2]Univ. of Alabama at Birmingham, USA.* Multiphonon relaxation rates are analyzed for laser transitions in the 4-6 µm spectral range in fluorite type rare-earth doped laser crystals where they may have dominant contribution to relaxation rates of optical excitations.

WB10
Slow nonradiative decay for rare earths in KPb_2Br_5 and $RbPb_2Br_5$, *Katja Rademaker[1, 2], Stephen A. Payne[1], Guenter Huber[2], Klaus Petermann[2], William F. Krupke[1], Ralph H. Page[1], Alexander P. Yelisseyev[3], Ludmila I. Isaenko[3], Utpal N. Roy[4], Arnold Burger[4], Krishna C. Mandal[5], Karel Nitsch[6]; [1]Lawrence Livermore Natl. Lab., USA, [2]Inst. fuer Laser-Physik, Univ.Hamburg, Germany, [3]Design and Technological Inst. for Monocrystals, Siberian Branch, Russian Acad. of Sciences, Russian Federation, [4]Ctr. for Photonic Materials and Devices, Dept. of Physics, Fisk Univ., USA, [5]Materials Science Div., EIC Lab., Inc., USA, [6]Inst. of Physics, Acad. of Sciences of the Czech Republic, Czech Republic.* We report on spectroscopic investigations of Nd^{3+}- and Tb^{3+}- doped low phonon energy, moisture-resistant host crystals, KPb_2Br_5 and $RbPb_2Br_5$, and their potential to serve as new solid state laser materials at new wavelengths.

WB11
High-gain / extraction 1.9-micron end-pumped single-pass Ho:YAG amplifier, *Peter Budni, C. R. Ibach, E. P. Chicklis; BAE Systems, USA.* High-gain (Go ~ 8) and gain-coefficient of 0.6/cm is demonstrated with a 1.9micron end-pumped Ho:YAG amplifier, >50% extraction efficiency is achieved relative to the stored energy, at only 1.2 times the saturation fluence, delivering >50mJ/pulse (60Hz).

WB12
Single-frequency Cr:ZnSe laser, *Gregory J. Wagner, Bruce G. Tiemann, William J. Alford, Timothy J. Carrig; Coherent Technologies, Inc., USA.* We have demonstrated, to the best of our knowledge, the first single-longitudinal mode Cr:ZnSe laser. The laser produced ~10 mW of output at 2460 nm and had a linewidth of less than 20 MHz.

WB13
Widely tunable Tm-Ho:KYF_4 laser around 2 µm, *G. Galzerano[1], S. Taccheo[1], P. Laporta[1], A. Toncelli[2], M. Toncelli[2], Elisa Sani[2]; [1]Istituto di Fotonica e Nanotecnologie-CNR and Isituto Nazionale per la Fisica della Materia, Italy, [2]NEST-INFM Physics Dept.- Univ. of Pisa, Italy.* The development of room-temperature diode-pumped 2 µm Tm-Ho:KYF_4 laser is reported for the first time. 268 mW output power, 33% efficiency and 100 nm tunability are demonstrated. Single-mode operation is selected using an intracavity etalon.

WB14
Room-temperature lasing in nanocrystalline Cr^{2+}:ZnSe random laser, *Irina T. Sorokina[1], Evgeni Sorokin[1], Victor G. Shcherbitsky[2], Nikolai V. Kuleshov[2], Mikhail A. Noginov[3]; [1]Photonics Inst., Austria, [2]International Laser Ctr., Belarus, [3]Ctr. for Materials Res., Norfolk State Univ., USA.* We report the first room-temperature pulsed lasing around 2.4 µm from the single-crystalline Cr^{2+}:ZnSe powder active medium with an average particle size of 230 nm and the threshold pump intensity of ~10 kW/cm2.

WB15
Pulse laser deposition growth and spectroscopic properties of chromium doped ZnS crystalline thin films, *Sergey Mirov[1], Shengyuan Wang[2], Vladimir Fedorov[1], Renato Camata[1]; [1]Univ. of Alabama at Birmingham, USA, [2]Univ. of Alabama, USA.* It is demonstrated that pulsed laser deposition is a promising "alternative route" for synthesis of mid-IR laser media based on chromium doped ZnS crystalline thin films with a precisely controllable concentration of dopant.

WB16
Emission lifetime measurements and laser performance of Cr:ZnSe under diode pumping at 1770 nm, *V. E. Kisel[1], V. G. Shcherbitsky[1], N. V. Kuleshov[1], V. I. Konstantinov[2], L. I. Postnova[2], V. I. Levchenko[2], E. Sorokin[3], I. Sorokina[3]; [1]International Laser Ctr., Belarus, [2]Inst. of Solid State and Semiconductor Physics, Belarus, [3]Photonics Inst., Technische Univ., Austria.* Concentration and temperature dependence of the emission lifetime was investigated for the Cr^{2+}:ZnSe single crystals. Continuous-wave Cr:ZnSe laser with an output power of 152 mW has been demonstrated under diode pumping at 1.77 µm.

WB17
Ytterbium, thulium Co-doped fiber laser at 2 µm, *Nathan A. Brilliant, Timothy J. Carrig, Kenneth M. Dinndorf; Coherent Technologies, USA.* We describe an 85 mW fiber laser based on ytterbium to thulium energy transfer. The fiber was pumped at 975 nm and oscillated at 2 µm.

WB18
LD-pumped CW Tm:$GdVO_4$ laser operated at room temperature, *Yoshiharu Urata[1], Satoshi Wada[2]; [1]Megaopto Corp., Japan, [2]RIKEN, Japan.* Laser performance of a Czochralski-grown Tm:$GdVO_4$ crystal was investigated. CW oscillation was carried out using single-stripe, 808-nm LDs in room temperature. A slope efficiency of 28% and an output power of 420 mW were exhibited.

WB19
Room-temperature continuous-wave diode-pumped Tm:Ho:LuLF laser at 2.1µm, *Vikas Sudesh[1], Kazuhiro Asai[2], Atsushi Sato[2], Upendra N. Singh[3], Brian M. Walsh[3], Norman P. Barnes[3]; [1]Science and Technology Corp., USA, [2]Tohoku Inst. of Technology, Japan, [3]NASA Langley Res. Ctr., USA.* CW laser action at room-temperature is demonstrated for the first time in Tm:Ho:LuLF. Output power in excess of 285mW, and slope efficiency of 32% were achieved experimentally.

WB20
Diode-pumped Ho: Tm: LuLF laser oscillator and laser amplifier at 2 µm, *Songsheng Chen[1], Jirong Yu[2], Mulugeta Petros[3], Upendra N. Singh[2], Yingxin Bai[1], Norman P. Barnes[2], Bo C. Trieu[2]; [1]Science Applications International Corp., USA, [2]NASA Langley Res. Ctr., USA, [3]Science and Technology Corp., USA.* A Q-switched 2-µm oscillator and a double-passed amplifier based on recently identified efficient

Ho:Tm:LuLF laser material were developed. 380-mJ single pulse energy and 630-mJ double pulse energy have been achieved with high efficiency.

Room: Anasazi South Ballroom
11:00 a.m. – 12:30 p.m.
WC • Advanced Concepts
Timothy Carrig; Coherent Technology, Inc, USA, Presider

WC1 • 11:00 a.m. (Invited)
Beam shaping of high-power diode stacks for kilowatt solid-state laser designs, *Claus Schnitzler, Dieter Hoffmann; Fraunhofer-Gesellschaft Inst. Solare Energiesysteme, Germany.*

WC2 • 11:30 a.m.
Efficient technology for wavelength stabilization and spectrum narrowing of high-power multimode laser diodes and arrays, *Boris Volodin, S. V. Dolgy, E. D. Melnik, E. Downs, J. Shaw, V. S. Ban; PD-LD Inc., USA.* We present a technology for achieving a significant line narrowing (by approximately an order of magnitude) and stabilization of the emission wavelength of multimode high-power laser diodes and arrays.

WC3 • 11:45 a.m.
Pure optical processors, *Simon Field, Mark Sher, Larry Marshall; Lightbit, USA.* We present pure optical processors that eliminate electrical processors and enable parallel processing of multiple independent data channels at speeds up to 160Gb/s, creating new devices including near-noiseless amplifiers, and multichannel optical regenerators.

WC4 • 12:00 p.m.
End-pumped 895 nm Cs laser, *Raymond J. Beach[1], William F. Krupke[2, 1], V. Keith Kanz[1], Stephen A. Payne[1], Mark A. Dubinskii[3], Larry D. Merkle[3]; [1]Lawrence Livermore Natl. Lab., USA, [2]Applied Lasers, USA, [3]U.S. ARL, USA.* A Cs laser has been demonstrated with slope efficiency of 0.59 W/W. A laser energetics model which accurately predicts laser performance, compatibility with laser diode array pumping, and scaling to high average powers is presented.

WC5 • 12:15 p.m.
Femtosecond pulse encoding and self phase-reconstruction by a two-photon-recorded single-tip diffractive optics, *Hajime Nishioka, Ken-ichi Ueda; Inst. for Laser Science, Japan.* A new scheme for femtosecond pulse recording, time-reversed playback, and self-pulse recompression in a single tip diffractive device was proposed. Self-pulse reconstruction has been demonstrated with a two-photon recorded glass tip.

12:30 p.m. – 2:00 p.m.
Lunch Break (On Your Own)

Room: Anasazi South Ballroom
2:00 p.m. – 3:30 p.m.
WD • Solid-State Lasers
Norman Barnes; Langley Res. Ctr., USA, Presider

WD1 • 2:00 p.m. (Invited)
Laser vision correction with solid-state UV lasers, *Georg Korn, Matthias Lenzner, Olaf Kittelmann, Rafal Zatonski, Marcel Kirsch; Katana Technologies GmbH, Germany.* Abstract: We review the development and application of all-solid-state laser systems for refractive surgery. LASIK and PRK procedures with our system show excellent clinical results (safety, efficacy, achieved correction) using this new approach to LVC.

WD2 • 2:30 p.m.
Short-pulse, high-repetition rate, high-power Nd:YLF MOPA system, *Alex Dergachev, Peter F. Moulton; Q-Peak, Inc., USA.* We report a diode-pumped, Nd:YLF, Q-switched, short-pulse, 30-100-kHz MOPA system producing, to our knowledge, the highest third-and fourth-harmonic powers (25 and 10 W, respectively) yet reported for high-pulse-rate Nd-doped lasers.

WD3 • 2:45 p.m.
High-power green generation at room temperature in a periodically poled $MgO:LiNbO_3$ by frequency doubling of a diode end-pumped $Nd:GdVO_4$ laser, *Nicolaie Pavel[1], Ichiro Shoji[1], Takunori Taira[1], Kiminori Mizuuchi[2], Akihiro Morikawa[2], Tomoya Sugita[2], Kazuhisa Yamamoto[2]; [1]Inst. for Molecular Science, Japan, [2]Matsushita Electric Industrial Co., Japan.* Continuous-wave power of 1.18 W at 531 nm with 16.8% conversion efficiency is reported at room temperature from a 2-mm-thick, 25-mm long uncoated periodically polled $MgO:LiNbO_3$ by single-pass frequency doubling of a $Nd:GdVO_4$ laser.

WD4 • 3:00 p.m.
Single-mode operation at 1003.4 nm with Yb:YSO, *Mathieu Jacquemet[1], François Balembois[1], Frédéric Druon[1], Patrick Georges[1], Bernard Ferrand[2]; [1]Lab. Charles Fabry de l'Institut d'Optique, France, [2]LETI/DOPT/Lab. Cristallogenèse Appliquée CEA-Grenoble, France.* Single-mode laser emission at 1003.4 nm with an ytterbium-doped crystal (Yb:YSO) is reported for the first time under diode pumping at 978 nm. A power of 190 mW at 1003.4 nm was obtained.

WD5 • 3:15 p.m.
High-power injection-locked single-frequency laser for the next generation of ground-based gravitational wave detectors, *Maik Frede[1], Ralf Wilhelm[1], Martina Brendel[1], Carsten Fallnich[1], Frank Seifert[2], Benno Willke[2]; [1]Laser Zentrum Hannover, Germany, [2]Albert-Einstein-Inst., Germany.* Experiments on a high-power Nd:YAG rod laser with 114 W output power in a $TEM_{0,0}$ mode and 87 W injection-locked single-frequency output power for the next generation of gravitational wave detectors will be presented.

Room: Anasazi North Ballroom and Zia Ballroom
3:30 p.m. – 4:00 p.m.
Coffee Break

Room: Anasazi South Ballroom
4:00 p.m. – 6:15 p.m.
WE • Mode-Locked Lasers
Irina Sorokina; Photonics Inst., Austria, Presider

WE1 • 4:00 p.m. **(Invited)**
High-repetition rate lasers, *Kurt J. Weingarten; Giga Tera, Inc., Switzerland.*

WE2 • 4:30 p.m.
Kerr-lens mode-locked diode-pumped Cr^{4+}:YAG laser, *Sergei Naumov, Evgeni Sorokin, Irina T. Sorokina; TU Vienna, Photonics Inst., Austria.* We report the first directly diode-pumped prismless Kerr-lens mode-locked Cr^{4+}:YAG laser generating 65 fs near transform-limited pulses at 30 mW average output power with a repetition rate of 100 MHz centred around 1569 nm.

WE3 • 4:45 p.m.
A low-loss and low-saturation-fluence GaInNAs SESAM for ultrafast 1.3-µm solid-state lasers, *Rachel Grange, Silke Schoen, Valeria Liverini, Simon C. Zeller, Markus Haiml, Ursula Keller; ETH Zurich, Switzerland.* We demonstrate a 1.3-µm GaInNAs semiconductor saturable absorber mirror self-starting and passively mode locking a sub-10-ps Nd:YLF laser. Its low saturation fluence, below 10 µJ/cm2, and negligible nonsaturable losses support very stable mode locking.

WE4 • 5:00 p.m.
Femtosecond Cr^{4+}:YAG laser with a 4GHz pulse repetition rate, *Christopher Gilmour Leburn, Alexander A. Lagatsky, Christian Thomas Brown, Wilson Sibbett; Univ. of St. Andrews, UK.* We report a three-element Kerr-lens modelocked femtosecond Cr^{4+}:YAG laser which generated transform-limited 82fs pulses at 1525 nm and a pulse repetition frequency up to 4.02 GHz.

WE5 • 5:15 p.m.
Diode-pumped femtosecond laser oscillator with cavity dumping, *Alexander Killi[1], Uwe Morgner[1], Max Lederer[2], Daniel Kopf[2]; [1]Max-Planck-Inst., Germany, [2]HighQLaser Production, Austria.* A diode pumped self starting Yb:glass femtosecond laser oscillator with electro-optical cavity dumping generates pulses with energies exceeding 150nJ at a rate up to 180kHz. This laser forms a compact laser source for micromachining applications.

WE6 • 5:30 p.m.
Ultra-long cavity passively mode-locked diode-pumped Nd:YVO_4 laser, *Dimitris Papadopoulos[1], Sébastien Forget[1], Francois Balembois[1], Sandrine Lévêque-Fort[2], Marie-Pierre Fontaine-Aupart[2], Patrick Georges[1]; [1]Lab. Charles Fabry de l'Institut d'Optique, France, [2]Lab. de Photophysique Moléculaire, France.* We demonstrate the operation of a 24-kW-peak-power, 16-picoseconds diode-pumped-Nd:YVO_4 passively-mode-locked laser oscillator with the lowest repetition rate (below 1 MHz) ever generated without cavity dumping. Application to fluorescence lifetime imaging measurements is presented.

WE7 • 5:45 p.m.
Novel compact femtosecond lasers based on multi-pass cavities, *Alphan Sennaroglu, Andrew M. Kowalevicz, Franz X. Kaertner, Erich P. Ippen, James G. Fujimoto; MIT, USA.* We describe the design and mode-locked operation of compact (30cm x 45 cm) femtosecond multi-pass-cavity Ti^{3+}:Al_2O_3 lasers which operate at 31 MHz and can generate 19-fs, 3.65 nJ pulses with only 1.5 W of pump.

WE8 • 6:00 p.m.
Pulse shortening and power scaling of passively mode-locked feedback-stabilised Nd:KGW laser, *Pavel Cerny, Gareth Valentine, David Burns; Inst. of Photonics, Univ. of Strathclyde, UK.* We show that by incorporating negative feedback stabilisation to allow on increasing the modulation depth of the saturable absorber in a diode-pumped mode-locked Nd:KGd$(WO_4)_2$ laser leads to significant pulse shortening.

Room: Anasazi South Ballroom
6:15 a.m. – 6:45 p.m.
Closing Remarks