



17th International Conference
“Laser Optics 2016”
Technical Program

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LASER RADIATION

Saint Petersburg, Russia
June 27 - July 1, 2016

R1. SOLID-STATE LASERS

Location: Stenberg Room, floor 3, 09:00 – 11:00

Solid-State Lasers V

Session Chair: Maximilian Lederer,
European XFEL GmbH, Germany

ThR1-26 Invited 09:00-09:30
High energy and average power laser drivers via large aperture cryogenic composite thin disk method

L.E. Zapata¹, F. Reichert², M. Hemmer¹, F.X. Kaertner^{1,2,3}; 1 - Deutsches Elektronen Synchrotron, Germany, 2 - Univ. Hamburg, Germany, 3 - Massachusetts Inst. of Technology (MIT), United States

We are constructing chirped-pulse multipass amplifiers capable of delivering high energy (to 1-J) at high repetition rate (to 1-kHz) using liquid nitrogen cooled Yb:YAG gain-elements of composite disk geometry. Recent experimental progress that yielded 160 mJ at 250 Hz will be discussed. The ongoing effort in scaling to 1-J/1-kHz output will be presented.

ThR1-27 09:30-09:45
A new beam shaping technique implemented in 260 watt 1 kilohertz repetition rate picosecond pulse amplifier

J. Adamonis¹, A. Aleknavicius¹, S. Balickas¹, T. Gertus¹, A. Michailovas^{1,2}, A. Zaukevicus^{1,3}, K. Michailovas¹, V. Petrauskienė¹; 1 - EKSPLA, 2 - Workshop of Photonics, 3 - Center for Physical Sciences and Technology, Lithuania

We present a practical implementation of a novel beam shaping technique (based on spatially variable phase retardation plate inscription in fused silica glass by femtosecond pulses) in a high average power picosecond pulse amplifier.

ThR1-28 09:45-10:00
Thermal distortions and heat sources in disk laser active element

M.R. Volkov, I.I. Kuznetsov, I.B. Mukhin; Inst. of Applied Physics RAS, Russia

Thermally induced phase distortions of disk laser active element are measured and calculated. Theoretical model shows deviation from experiment. Extra heat sources are expected to be the reason of the deviation.

ThR1-29 10:00-10:15
All-solid-state laser system with coherent combining of independent channels via common laser beam

A.P. Pogoda, A.V. Fedin, A.S. Boreysho; Baltic State Technical Univ., Laser Systems LTD, Russia

The multichannel laser system with coherent combining as a result of fourwave mixing in active laser media is proposed.

ThR1-30 10:15-10:30
Single frequency MOPA based on Nd:YAG bulk and fiber single crystals

Z. Liu, S. Men, Y. Liu, H. Rao, Z. Cong, S. Zhang, X. Zhang; Shandong Univ., China

By employing Nd:YAG single crystal fiber and rods, single frequency 1064-nm master oscillator power amplifier is realized. Output power is 31.3 W with peak power of 464 kW and linewidth of less than 130 MHz.

ThR1-31 10:30-10:45
Thin-tapered-rod Yb:YAG amplifier for fiber oscillator

I.I. Kuznetsov, I.B. Mukhin, O.V. Palashov; Inst. of Applied Physics RAS, Russia

High average power and high-gain laser amplifier based on thin-tapered-rod Yb:YAG crystal with waveguide diode pumping is realized. Signal of the subpicosecond fiber oscillator is amplified up to 15 W average power with 20% optical efficiency.

ThR1-32 10:45-11:00
A 13 W LD-pumped narrow-linewidth linearly polarized Yb-doped fiber laser operating at 1152 nm

L. Huang, H. Zhang, X. Wang, R. Su, P. Zhou; National Univ. of Defense Technology, China

We demonstrate a 1152 nm narrow-linewidth linearly polarized all-fiber laser directly pumped by laser diodes at 976 nm. When temperature of gain fiber is increased to about 115 °C, a maximum output power of 13 W is obtained and corresponding slope efficiency is ~45%. The polarization extinction ratio and 3dB linewidth at the maximum output power are 18 dB and 0.14 nm respectively, which is an attractive result for some special applications such as nonlinear conversion.

- Coffee Break -

Location: Stenberg Room, floor 3, 11:30 – 13:15

Solid-State Lasers VI

Session Chair: Uwe Griebner,
Max-Born-Inst., Germany

ThR1-33 Invited 11:30-12:00
High-power Yb:amplifiers seeded by a femtosecond Er:fiber laser

D. Brida, J. Fischer, P. Storz, A. Leitenstorfer; Univ. of Konstanz and Center for Applied Photonics, Germany

We present two alternative implementations of high-power Yb:amplifiers designed for advanced applications in ultrafast science. The seed is generated by ultrabroadband Er:fiber laser technology. Our fiber-based setup produces pulses at 1030 nm with energies of 6 μJ at a repetition rate of 10 MHz and duration of 145 fs. The thin-disk amplifier is operated at 3 kHz repetition rate and generates 655-fs pulses with energies up to 17 mJ.

ThR1-34 12:00-12:15
Dispersion-managed soliton generation in the hybrid mode-locked Erbium-doped All-fiber ring raser

D.A. Dvoretzkiy¹, S.G. Sazonkin¹, V.S. Voropaev¹, S.O. Leonov¹, A.B. Pnev¹, V.E. Karasik¹, A.A. Krylov², E.D. Obraztsova²; 1 - Bauman Moscow State Technical Univ., 2 - Fiber Optics Research Center RAS, 3 - Prokhorov General Physics Inst. RAS, Russia

We report on the ultra-short dispersion-managed soliton generation in the erbium-doped all-fiber ring laser hybrid mode-locked with Carbon:Boron Nitride Single-Walled Nanotubes in the co-action with a nonlinear polarization evolution.

ThR1-35 12:15-12:30
Uni- and bidirectional hybrid mode-locked Erbium-doped isolator-free fibre laser

M. Chernysheva¹, M. Al Aarimi^{1,2}, S. Sukhanov^{1,3}, R. Arif¹, A. Rozhin¹; 1 - Aston Inst. of Photonic Technologies, Aston Univ., United Kingdom, 2 - Al MUnited Statesna College of Technology, Sultanate of Oman, 3 - Gagarin Saratov State Technical Univ., Russia, 4 - Univ. of Sulaimani, Iraq

We have investigated a hybrid mode-locked Erbium-doped fibre ring laser without optical isolator. Creating different losses in the cavity for counter-propagating pulses via net birefringence adjusting, the laser can operate in both unidirectional regimes with extinction over 22 dB, as well as can establish stable bidirectional generation.

ThR1-36 12:30-12:45
Generation of harmonic oscillations in ring resonator with high Q-factor

S.A. Kolpakov, H. Khashi, Yu. Loika, S. V. Sergeev; Aston Univ., United Kingdom

We report on generation of harmonic oscillations with frequencies of hundreds of MHz and radio-frequency linewidth of 13 Hz in unidirectional ring laser oscillator. This high stability makes these oscillators a suitable substitute for existing quartz resonators used in high frequency optoelectronics applications.

ThR1-37 12:45-13:00
All-fiber hybridly mode-locked similariton ring laser for frequency metrology

V.A. Lazarev¹, A.A. Krylov², S.G. Sazonkin¹, A.B. Pnev¹, S.O. Leonov¹, D.A. Shelestov¹, M.K. Tarabrin¹, V.E. Karasik¹, A.N. Kireev³, M.A. Gubin^{3,4}; 1 - Bauman Moscow State Technical Univ., 2 - Fiber Optics Research Center RAS, 3 - Lebedev Physical Inst. RAS, 4 - National Research Nuclear Univ. MEPhI, Russia

We demonstrate the generation of stable 127 fs selfsimilar pulses at a central wavelength of 1560 nm with 7.14 mW average output power. Similariton lasers have low repetition rate deviation in the averaging time interval 1 – 1·10³ s, a low relative intensity noise –125 dBc/Hz, a narrow single comb line width of 32 kHz, and high reliability. Thus, such lasers are highly promising for further development of the stabilized combs.

ThR1-38 13:00-13:15
Highly compact stretcher-compressor module for ultrafast chirped pulse amplification laser system

B. Lee¹, B. Jeong¹, S.A. Chizhov¹, E.G. Sall¹, J. Yang¹, V.E. Yashin², G.H. Kim¹; 1 - Korea Electrotechnology Research Inst., Republic of Korea, 2 - Vavilov State Optical Inst., Russia

We introduce and demonstrate a simple, compact stretcher-compressor module that uses a single transmission diffraction grating. Three stretcher-compressor modules with different compression ratio have been compared.

- Lunch Break -