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CLEO:2016

Laser Science to Photonic Applications

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Meeting Room 211 B

CLEO: Science & Innovations

SF2I • Ultrafast Amplifiers—Continued

SF2I.4 • 11:15

Chirped-Pulse Amplifier System Based on Thulium-Doped ZBLAN Fibers, Yutaka Nomura¹, Takao Fujii¹; ¹*Inst. for Molecular Science, Japan*. We demonstrate a chirped-pulse amplifier system operating around 1900 nm using thulium-doped ZBLAN fibers. Pulses with a duration of 150 fs are obtained with average output power of 2.5 W.

SF2I.5 • 11:30

Sub-ps Pulses with multi-mJ Energy at kHz Repetition Rate from an Yb:YAG Thin-disk Amplifier, Jonathan Fischer¹, Patrick Storz¹, Alexander-Cornelius Heinrich¹, Simon Maier¹, Julian Jungwirth¹, Daniele Brida¹, Alfred Leitenstorfer¹; ¹*Universität Konstanz, Germany*. Combined Cr:Yb:fiber and Yb:thin-disk technology produces 615 fs pulses at 1030 nm with an energy of 17 mJ at 3 kHz repetition rate. The sub-ps duration allows efficient white-light generation and optical parametric amplification.

SF2I.6 • 11:45

High Power Femtosecond Yb:Lu₂O₃ Amplifier and Sub-100 fs Yb:Lu₂O₃ Oscillator, Etienne Caracciolo^{1,2}, Samuele D. Di Dio Caliso^{1,2}, Federico Pirzio¹, Matthias Kemnitzer², Martin Gorjan², Annalisa Guandolini², Florian Kienle², Antonio Agnesi¹, Juerg Ausder Au²; ¹*Universita degli Studi di Pavia, Italy*; ²*Spectra-Physics Rankweil, Austria*. We obtained up to 42 W with 780 fs-long pulses at 500 kHz repetition rate with M²=1.2 in a Yb:Lu₂O₃ based regenerative amplifier. Also, sub-100-fs pulse generation in a low-power SESAM mode-locked oscillator are presented.

Meeting Room 212 A

CLEO: Applications & Technology

AF2J • A&T Topical Review on Lasers in Additive Manufacturing II—Continued

AF2J.3 • 11:30

Beam steering in highly coherent implant-defined vertical cavity surface emitting laser array, Meng Xun¹, Chen Xu¹, Yiyang Xie¹, Guoqing Jiang¹, Guanzhong Pan¹, Yibo Dong¹, Hongda Chen²; ¹*Beijing Univ. of Technology, China*; ²*Inst. of Semiconductor, Chinese Academy of Sciences, China*. Electronically controlled beam steering was achieved via highly coherent in-phase implant defined vertical cavity surface emitting laser arrays. The total power in the central lobe is above 36% in 1×2 array when steering.

Meeting Room 212 B

Joint

JF2K • Symposium Mid-IR Lasers: Advancing from Research Topic to Application II—Continued

JF2K.3 • 11:30

Highly Integrated Gas Sensors based on Bi-functional Quantum Cascade Structures, Rolf Szedlak¹, Andreas Harrier², Benedikt Schwarz², Martin Holzbauer², Harald Moser², Donald MacFarland¹, Tobias Zederbauer², Hermann Detz⁴, Aaron Maxwell Andrews¹, Werner Schrenk², Bernhard Lendl³, Gottfried Strasser^{1,2}; ¹*Inst. of Solid State Electronics, TU Wien, Austria*; ²*Center for Micro- and Nanostructures, TU Wien, Austria*; ³*Inst. of Chemical Technologies and Analytics, TU Wien, Austria*; ⁴*Austrian Academy of Sciences, Austria*. We present gas sensors based on two concentric vertically emitting and detecting quantum cascade ring structures on the same chip. Both rings can be used as laser and detector at the same wavelength.

JF2K.4 • 11:45

Multi-species sensing using multi-mode absorption spectroscopy with mid-infrared interband cascade lasers, Paul Ewart¹, Seamus O'Hagan¹, Henry Northern¹, Benjamin Gras², Chul Soo Kim³, Mijin Kim⁴, Jerry R. Meyer⁴, William Bewley³, Charles Merritt¹, Chadwick Canedy², Igor Vurgaftman²; ¹*Univ. of Oxford, UK*; ²*Ecole Nationale Supérieure d'Ingénieurs de CAEN, France*; ³*Naval Research Lab, USA*; ⁴*Sotera Defense Solutions, Inc., USA*. Multi-mode absorption spectroscopy, MUMAS, with a mid-IR inter-band cascade laser, is used to measure concentrations of methane, acetylene and formaldehyde with uncertainties of 1% in pure samples and <10% in mixtures of three gases.

Meeting Room 212 C

CLEO: Science & Innovations

SF2L • Reduced Dimensionality Lasers—Continued

SF2L.4 • 11:30

All Photonic Crystal electrically pumped CW mid-IR lasers, Antoine Monmayrant¹, Brice Adelin¹, Pascal Dubreuil¹, Aurélie Lecestre¹, Yves Rouillard², G Boissier², M Bahriz², Aurore Vicet², Olivier Gauthier-Lafaye¹; ¹*LAAS-CNRS, France*; ²*Univ. Montpellier, IES, UMR 5214, France*. Electrically-pumped all-photonic-crystal lasers are reported on GaSb materials. Lasers show single-mode emission around 2.4 μm with more than 35 dB of SMSR over a wide range of currents.

SF2L.5 • 11:45

Room-Temperature InGaAs/InP Quantum-Well-in-Nanopillar Laser Directly Grown on Silicon, Indrasen Bhattacharya¹, Fanglu Lu¹, Gilliard N. Malheiros-Silveira¹, Saniya Deshpande¹, Kar Wei Ng¹, Connie J. Chang-Hasnain¹; ¹*Univ. of California Berkeley, USA*. We demonstrate room-temperature transparency and optically pumped lasing with an InGaAs quantum well active region integrated in an InP nanoresonator cavity grown monolithically on silicon. As-grown silicon transparent lasers will enable on-chip optical interconnects.