

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Monday, 20 October

08:30 -- 10:30

Room: South Hall 3C

AM1A • From 2 μm to Mid-IR Lasers

Presider: Martin Bernier; Université Laval, Canada

AM1A.1 • 08:30

Picosecond Passive Mode-Locking of a Ho:ZBLAN Waveguide Chip Laser at 2042

nm, JUNHA JUNG^{1,2}, Dale E. Otten², Wenqi Zhang², Ju Han Lee¹, David G. Lancaster^{2,3}; ¹*Univ. of Seoul, Korea (the Republic of)*; ²*Laser Physics and Photonics Devices Laboratory, Univ. of South Australia, Australia*; ³*ARC Centre of Excellence in Microcomb Breakthrough Science (COMBS), Australia*. We demonstrate a passively mode-locked Ho:ZBLAN waveguide chip laser at 2042 nm. By using a combination of a SESAM and a ZnSe-plate dispersion compensator within a folded cavity. 3.1-ps pulses were obtained at 448-MHz.

AM1A.2 • 08:45

Thulium Waveguide Laser Operating With a Birefringent Bragg Reflector, Ji Eun Bae¹, Pavel Loiko¹, Carolina Romero², Javier R. Vázquez de Aldana², Xavier Mateos³, Alain Braud¹, Patrice Camy¹; ¹*CIMAP-CNRS-Université de Caen Normandie, France*; ²*Universidad de Salamanca, Spain*; ³*Universitat Rovira i Virgili, Spain*. Depressed-cladding channel waveguides with a birefringent Bragg reflector are inscribed in Tm³⁺-doped monoclinic double tungstate crystals by ultrafast-laser inscription. Dual-polarization, narrow-linewidth laser operation is achieved in such waveguides at 1.9 μm .

AM1A.3 • 09:00

Mid-Infrared Soliton Mode-Locked Er³⁺: ZBLAN Fiber Laser Using Graphene Saturable Absorbers, Saad Hatim¹, Tristan Guezennec¹, Kirill Ereemeev¹, Marie Guionie¹, Said Idlahcen^{1,2}, Pierre-Henry Hanzard¹, Thomas Godin¹, Thibaud Berthelot², Solenn Cozic², samuel Pouain², Ammar Hideur¹; ¹*CORIA CNRS UMR6614, Université de Rouen Normandie, France*; ²*Le Verre Fluoré, France*. We report on a soliton mode-locked Erbium fluoride fiber laser featuring a graphene-based saturable absorber mirror and operating at 3.46 μm wavelength. Sub-picosecond pulses with 14 nm width are generated.

AM1A.4 • 09:15

All-Fiber Short Pulsed DBR Laser at 2.8 μm , Yigit O. Aydin^{2,1}, Pascal Paradis², Ray Hua¹, Samansa Maneshi¹, R.J.Dwayne Miller^{1,3}, Darren Kraemer⁴, Réal Vallée², Martin Bernier²; ¹*Department of Chemistry, Univ. of Toronto, Canada*; ²*Center for Optics, Photonics and Lasers (COPL), Université Laval, Canada*; ³*Department of Physics, Univ. of Toronto, Canada*; ⁴*Light Matter Interaction Inc., Canada*. We demonstrate an all-fiber gain-switched fluoride laser cavity generating 124 ns pulses at 2825 nm. This simple laser is based on core-pumping of a short distributed Bragg reflector cavity and has the potential for shorter pulses with higher output powers.

AM1A.5 • 09:30

Diode-Pumped Mid-Infrared Tm:CALYO Laser Broadly Tunable Across 2.2 – 2.5

μm , Zeshang Ji³, Kirill Ereemeev², Zhongben Pan³, Pavel Loiko¹, Xiaoxu Yu³, Hongwei Chu³,

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Han Pan³, Ammar Hideur², Patrice Camy¹, Dechun Li³; ¹CIMAP-ENSICAEN, France; ²CORIA-CNRS-UNSA-Université de Rouen Normandie, France; ³Shandong Univ., China. A diode-pumped Tm:CaYAlO₄ laser operating on the ³H₄→³H₅ transition generated 1.10 W at 2.32 μm and its emission wavelength was tuned across 2254–2512 nm for π-polarization. The polarized spectroscopic properties of Tm³⁺ ions were determined.

AM1A.6 • 09:45

Watt-Level Polarization-Maintaining Er³⁺: ZBLAN Fiber Laser Tunable From 3.4 μm to 3.7 μm, Saad Hatim¹, Tristan Guezennec¹, Kirill Ereemeev¹, Marie Guionie¹, Said Idlahcen¹, Pierre-Henry Hanzard¹, Thomas Godin¹, Thibaud Berthelot², Solenn Cozic², samuel Pouain², Ammar Hideur¹; ¹CORIA CNRS UMR6614, Université de Rouen Normandie, France; ²Le Verre Fluoré, France. We report a polarization maintaining Erbium fiber laser for emissions at 3.4-3.7 μm. A 337 nm tuning range and watt-level output power is demonstrated. The polarization extinction ratio (PER) is higher than 21 dB over the whole tuning range.

AM1A.7 • 10:00 (Invited)

Generation of High Energy Short and Ultrashort Pulses Using Mid-IR Fiber Amplifiers, Yu Bai¹, Bohan Zhou¹, Weizhi Du¹, Yifan Cui¹, Almantas Galvanauskas¹; ¹Univ. of Michigan, USA. In this talk we review state-of-the-art in mid-IR Er:ZBLAN fiber amplifiers of mJ-energy short (nanosecond) and sub-mJ energy ultrashort (femtosecond) pulses at ~3μm, and discuss core-size scaling for robust single-mode operation in mid-IR.

08:30 -- 10:30

Room: South Hall 3B

LM1B • Laser-Beam Delivery and Beam Manipulation of High-Power Laser Beams

Presider: Bryan Germann; Aerotech Inc, USA

LM1B.1 • 08:30 (Invited)

Industrial 1 kW 10 mJ Ultrafast Laser for Novel Application Regimes, Dominik Bauer¹, Daniel Grossmann¹, Benjamin Dannecker¹, Michael Scharun¹, Malte Kumkar¹, Marc Sailer¹, Steffen Ruebling¹, Klaus Albers¹; ¹TRUMPF Laser SE, Germany. Ultrafast lasers with tens of millijoules of pulse energy emerge to open new application fields such as generation of EUV or X-ray radiation or large-scale surface processing. A system that delivers 10 mJ of pulse energy at 1 ps pulse length and 100 kHz repetition rate and full flexibility up to 50 MHz and various burst patterns has been realized with M²<1.3 for all configurations. With this system various novel application tests, strategies and regimes have been evaluated and will be presented

LM1B.2 • 08:50 (Invited)

Ultra-Fast Material Processing with Polygon Mirror Scanners and High-Power Lasers, Florian Rößler¹, Sascha Kloetzer^{1,2}, Robby Ebert², André Streek^{1,2}; ¹MOEWE Optical Solutions GmbH, Germany; ²Laser Inst. of Univ. of Applied Science Mittweida, Germany. Polygon scanners enable the distribution of multi-kilowatt laser radiation with speeds up to 1,000 m/s. In manufacturing, laser processes can be driven towards high throughput in macro and micro machining without thermal damaging the substrate.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

LM1B.3 • 09:10 (Invited)

Innovative All-Reflective Laser Beam Shaping for Laser Microprocessing, Frederik Wolf¹; ¹*Midel Photonics GmbH, Germany*. We present an all-reflective laser beam shaping technology using micro-structured mirrors for high-power lasers, enabling efficient, thermally robust beam shaping and maximizing performance in advanced laser micro-processing applications.

LM1B.4 • 09:30 (Invited)

Manufactures Optics for Scanners and Free Space Beam Lines, Jurgen Stollhof¹; ¹*Sill Optics GmbH, Germany*. Abstract not available.

LM1B.5 • 09:50

Spatial and Temporal Shaping of Femtosecond Pulses for Higher Efficiency in Batteries Manufacturing, Eric Audouard¹, Marie Fleureau¹, Quentin Mocaer¹, Vincent Rouffiange¹; ¹*Amplitude, France*. This work presents new results for electrode cutting and structuring by high-power femtosecond laser pulses (100-300 W). The interest of temporal shaping of pulses (bursts of pulses) and spatial shaping (beam splitting for multi-spot processing)

11:30 -- 12:30

Room: South Hall 3C

JM2A • Joint Plenary Session I

Presider: To Be Announced

JM2A.1 • 11:30 (Plenary)

Solid-State Lasers and Their Applications at the Czech Technical Univ. in Prague, Helena Jelinkova¹; ¹*Technical Univ. Prague, Czechia*. An overview of solid-state lasers development for satellites laser ranging, medicine, and research of novel laser-active materials for visible, near- and mid-infrared regions will be given. Developed lasers were also used in nonlinear optics.

14:00 -- 16:00

Room: South Hall 3C

AM3A • Thulium and Holmium Doped Lasers

Presider: Mark Dubinskii; US Army Research Laboratory, USA

AM3A.1 • 14:00

Trivalent Thulium: Old Laser Transitions Revisited, Sascha Kalusniak¹, Moritz Badtke¹, Hiroki Tanaka¹, Christian Kraenkel¹; ¹*Leibniz-Institut für Kristallzüchtung, Germany*. We review the prospects of higher Stark multiplets of Tm³⁺ as upper laser levels. We introduce the spectroscopic properties of the relevant transitions and review the state of the art of such lasers including our latest results.

AM3A.2 • 14:15

Watt-Level Co-Lasing Operation of a Tm³⁺:LiYF₄ Channeled Waveguide Laser at 1.9 and 2.3 μ m, Berke Ayevi¹, Yagiz Morova^{1,2}, Melih K. Kadioglu¹, Eugenio Damiano³, Mauro Tonelli³, Alphan Sennaroglu⁴; ¹*Laser Research Laboratory, Departments of Physics and Electrical-*

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Electronics Engineering, Koç Üniversitesi, Turkey; ²Physics Department, Istanbul Technical Univ., Turkey; ³MEGA Materials, Italy; ⁴Koç Univ. Surface Science and Technology Center (KUYTAM), Koc Univ., Turkey. We report the first watt-level co-lasing operation of a continuous-wave femtosecond laser inscribed Tm³⁺:LiYF₄ waveguide laser near 1.9 and 2.3 μm with a combined output power of 1.24 W and power slope efficiency of 43%.

AM3A.3 • 14:30 (Invited)

Broadly Tunable Thulium Lasers at 2.3 μm and 1.9 μm , Alphan Sennaroglu¹, Yagiz Morova^{1,2}, Berke Ayevi¹, Faik Derya Ince¹, Eylul Nihan Kamun¹, Melih K. Kadioglu¹, Mevlana Yunus Uludag¹, Berna Morova², Eugenio Damiano³, Mauro Tonelli³; ¹Laser Research Laboratory, Koç Üniversitesi, Turkey; ²Istanbul Technical Univ., Turkey; ³Megamaterials s.r.l and Univ. of Pisa, Italy. We present our recent experimental results obtained with Tm³⁺-doped lasers at 1.9 μm and 2.3 μm , including continuous-wave and pulsed operation in waveguide as well as bulk geometries, conventional and upconversion pumping, co-lasing, and tunability.

AM3A.4 • 15:00

Spectroscopy and Broadly Tunable Laser Operation of Heavily Tm³⁺-Doped Germanate Glasses, Simone Normani¹, Pavel Loiko¹, Venkatesan Jambunathan¹, Davide Janner², Alain Braud¹, Patrice Camy¹, Nadia G. Boetti³, Joris Lousteau⁴; ¹Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, France; ²Inst. of Materials Physics and Engineering (DISAT) - Politecnico di Torino, Italy; ³Fondazione LINKS, Italy; ⁴Politecnico di Milano, Italy. We report on spectroscopy and laser operation of novel Tm³⁺-doped germanate glasses. The continuous-wave bulk Tm-glass laser generated 316 mW at 1.92 μm with a slope efficiency of 35.2% and was tuned across 1854-2032 nm.

AM3A.5 • 15:15

Wavelength Tuning of 253 nm in Czochralski-Grown Tm³⁺:YScO₃ Around 2.1 μm , Sascha Kalusniak¹, Ines Arlt¹, Christian Kraenkel¹; ¹Leibniz-Institut für Kristallzüchtung, Germany. We demonstrate continuous-wave 2.1- μm laser operation of Tm³⁺:YScO₃ with up to 66% slope efficiency and realize a wavelength tuning range of 253 nm between 1933 nm and 2186 nm.

AM3A.6 • 15:30

Continuous-Wave Generation and Wavelength Tunability of Resonantly Diode Pumped Tm,Ho:GGAG Laser, Jan Kratochvíl¹, Dominika Popelová¹, Pavel Boháček², Jan Sulc¹, Michal Nemec¹, Helena Jelinkova¹, Bohumil Trunda², Lubomír Havlák², Karel Jurek³, Martin Nikl³; ¹Czech Technical Univ. in Prague, Faculty of Nuclear Sciences and Physical Engineering, Czechia; ²Inst. of Physics of the Czech Academy of Sciences, Division of Condensed Matter Physics, Czechia; ³Inst. of Physics of the Czech Academy of Sciences, Division of Solid State Physics, Czechia. Resonant diode pumping at 1.7 μm was used to obtain efficient 2.1 μm continuous-wave laser based on the Tm, Ho:GGAG disordered garnet crystal. Output power of 2.45 W, slope efficiency of 33% and wavelength tunability range of 2008–2114 nm were achieved.

AM3A.7 • 15:45

7-Rod-Core Thulium-Doped Fiber for Enhanced Fiber Laser Cooling, Ivo Barton¹, Jan Aubrecht¹, Bara Svejkarova¹, Jan Pokorny¹, Michal Kamaradek¹, Ondrej Podrazky¹, Ivan Kasik¹, Martin Grábner¹, Pavel Peterka¹; ¹Inst. of Photonics and Electronics of the CAS,

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Czechia. Structured-core thulium-doped fibers aimed at lower heat load, shorter wavelength operation, and pedestal-free design were developed. Laser slope efficiency of 52% at 1907 nm was demonstrated in a proof-of-principle experiment.

14:00 -- 16:00

Room: South Hall 3B

LM3B • Additive Laser-Based Processing: From Large Scale to Micro Nano Material Processing I

Presider: Ruth Houbertz; ThinkMade Engineering & Consulting, Germany

LM3B.1 • 14:00 (Invited)

Aligned Additive Microfabrication for Advanced Research and Industrial

Manufacturing, Martin Hermatschweiler¹; ¹*Nanoscribe GmbH & Co. KG, Germany.* Recent advancements in two-photon polymerization (2PP) enable groundbreaking research and high-throughput industrial manufacturing. Applications span from ultra-precise fusion targets to high-performance optical couplers in optics and photonics.

LM3B.2 • 14:30 (Invited)

OPTIMAL - an Automated Maskless Laser Lithography Platform for First Time Right

Mixed Scale Patterning, Paul Hartmann¹; ¹*Joanneum Research Forschungsgesellschaft, Austria.* The OPTIMAL platform integrates different laser lithography technologies (Grey scale, TPA, interference), QM-systems and processes with self-learning algorithms to develop novel multiscale micro-and nanostructures for applications like freeform optics, photonics, multifunctional surfaces, lab-on-chip, or AR/VR.

LM3B.3 • 15:00 (Invited)

Simulation-Assisted Adaptive Processing and Closed-Loop Control in Laser Powder Bed

Fusion, Tobias Baranzke¹; ¹*Aconity3D GmbH, Germany.* Combining thermal simulation with real-time thermal emission measurements enables intelligent process control in the L-PBF process. This method aims to minimise the likelihood of errors occurring and support a proactive approach to quality control.

14:00 -- 16:00

Room: South Hall 3A

LsM3C • Remote Sensing I

Presider: Nicolas Riviere; Office Natl d'Etudes Rech Aerospatiales, France

LsM3C.1 • 14:00 (Invited)

ESA's Aeolus Mission: Unveiling Laser and Spectrometer Performance in the First Wind

Lidar in Space, Benjamin Witschas¹, Oliver Lux¹, Christian Lemmerz¹, Oliver Reitebuch¹, Michael Vaughan²; ¹*German Aerospace Center (DLR), Germany;* ²*Optical & Lidar Associates OLA, UK.* ESA's Aeolus mission (2018–2023) successfully demonstrated that spaceborne wind lidar significantly improves numerical weather prediction. This presentation details the laser and spectrometer performance and shares key lessons learned to inform future atmospheric lidar missions.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

LsM3C.2 • 14:30 (Invited)

Aeolus Validation With the DLR Airborne Doppler Wind Lidar, Christian Lemmerz¹, Benjamin Witschas¹, Oliver Lux¹, Stephan Rahm¹, Uwe Marksteiner¹, Andreas Schäfler¹, Thorsten Fehr², Oliver Reitebuch¹; ¹*DLR German Aerospace Center, Germany*; ²*ESA, Netherlands*. Airborne campaigns validated wind products of ESA's Aeolus mission. The aircraft featured two Doppler wind lidars, utilizing UV laser-based direct detection, and scanning 2 μm heterodyne detection technologies for atmospheric wind profiles remote sensing.

LsM3C.3 • 15:00

Signal-to-Noise Ratio Increase in Coherent Doppler Wind Lidar Using Increased SBS Threshold, Compression Gradient Fiber Amplifier, William Patiño-Rosas¹, Anasthase Liméry¹, Laurent Lombard¹; ¹*DOTA, ONERA, Université Paris Saclay, France*. We previously demonstrated the use of a compression gradient fiber amplifier (CGFA) to achieve high peak power through SBS-mitigation. We present in this work the integration of a CGFA into a coherent Doppler wind lidar (CDWL) system to enhance detection range and improve signal-to-noise ratio and wind estimation precision compared to standard fiber amplifier.

LsM3C.4 • 15:15 (Invited)

Telescope Downtime Recovery Using Nonlinear Wavefront Sensing, Justin Crepp¹; ¹*Univ. of Notre Dame, USA*. We study different wavefront sensor technologies in turbulent environments where scintillation and branch points impact sensing performance. Nonlinear reconstructors improve sensitivity and reduce telescope downtime, benefitting a broad range of applications.

LsM3C.5 • 15:45

FMCW LiDAR Using a Monolithically InP Integrated Tunable Laser for CO₂ Detection With High Spectral Resolution, Yu Han¹, Limeng Zhang¹, Victor D. Calzadilla¹; ¹*Eindhoven Hendrik Casimir Inst., Eindhoven Univ. of Technology, Netherlands*. We demonstrated that FMCW LiDAR using an integrated tunable laser and the window-moving approach can profile the CO₂ absorption line at 1572.335nm with a 0.9-pm spectral resolution and a 5- μs data acquisition time.

16:30 -- 18:30

Room: South Hall 3C

AM4A • High Energy/Power 1 μm and Facility-Sized Lasers

Presider: Tino Eidam; Active Fiber Systems GmbH, Germany

AM4A.1 • 16:30

300 W, 100 mJ, 427 fs Cryogenic Yb:YLF Laser System, Mikhail Pergament¹, Martin Kellert¹, Alexey Yakovlev¹, Jelto Thesinga¹, Franz Kärtner^{1,2}; ¹*Center for Free Electron Laser Science, Germany*; ²*Center for Ultrafast Imaging and Department of Physics, Universität Hamburg, Germany*. We report on the development of a cryogenic Yb:YLF laser system delivering 100 mJ, 427 fs pulses at 300 W average power. The system comprises three main units, and their design and performance are discussed.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

AM4A.2 • 17:00

a 1 kHz, 0.1 TW Peak Power Yb: CALGO Dual Crystal Regenerative Amplifier, Jiajun Song¹, Tianze Xu¹, Yujie Peng¹, Yuxin Leng¹; ¹*Shanghai Inst. of Optics and Fine Mechanics (SIOM), Chinese Academy of Sciences (CAS), China*. We present a Yb: CALGO regenerative amplifier system achieving a peak power of 0.1 TW at 1 kHz repetition rate, representing the highest peak power ever demonstrated from a Yb: CALGO-based regenerative amplifier to date.

AM4A.3 • 17:15

Burst-Mode, Ultra-Short, Tunable UV-VIS Pump-Probe Laser for FLASH Free Electron Laser, Yujiao Jiang¹, Joleik Nordmann², Marcus Seidel^{1,3}, Oender Akcaalan¹, Ayhan Tajalli¹, Hamid Rashtabadi¹, Terry Mullins¹, Christian Brahms², John C. Travers², Ingmar Hartl¹, Huseyin Cankaya¹; ¹*Deutsches Elektronen-Synchrotron DESY, Germany*; ²*School of Engineering and Physical Sciences, Heriot-Watt Univ., UK*; ³*Helmholtz Inst. Jena, Germany*. We report the generation of resonant dispersive wave emission in burst mode from hollow-core waveguide, producing a tunable spectrum spanning from 242 nm to 440 nm, with pulse energies reaching up to 12.6 μ J at 100 kHz.

AM4A.4 • 17:30

Characterization of Spatio-Spectral Couplings in few- to Single-Cycle Laser Pulses From Visible to mid-Infrared, Levente Lehotai¹, Bálint Kiss¹, Miguel Miranda³, Matias Charrut³, Rajaram Shrestha¹, Jie Meng¹, Paulo-Tiago Guirreireiro³, Rosa Romero³, Imre Seres¹, Barnabás Gilicze¹, Eric Cormier^{1,2}, Adam Borzsonyi¹, Roland Nagymihály¹; ¹*ELI ERIC, ALPS Facility, Hungary*; ²*Laboratoire Photonique Numérique et Nanosciences (LP2N), UMR 5298, CNRS-IOGS-Université Bordeaux, France*; ³*Sphere Ultrafast Photonics, Portugal*. Spatially resolved Fourier transform spectroscopy was implemented in a versatile setup, where only swapping the detector allows for spatio-spectral characterization of few- to single-cycle pulses from 400 to 4500 nm with an advanced processing method.

AM4A.5 • 17:45

On-Target Performance of the 1 kHz, 15 TW SYLOS 3 System at ELI-ALPS, Szabolcs Tóth¹, Indranuj Dey¹, Mojtaba Shirozhan¹, Sudipta Mondal², Janos Csontos¹, Prabhash P. Geetha¹, László T. Tóth¹, Tamás Somoskői¹, István Dóra¹, Balázs Kovalovszki¹, Dániel Abt¹, Subhendu Kahaly¹, Adam Borzsonyi¹; ¹*ELI-ALPS, Hungary*; ²*Anubal Fusion Pvt. Ltd., India*. SYLOS3 delivers 8 fs, CEP-stabilized pulses for laser-plasma experiments. A vacuum f-to-2f interferometer ensures <150 mrad CEP noise via active feedback. On-target diagnostics include focal spot and pulse contrast characterization.

AM4A.6 • 18:00

Status Update on the Commissioning of a High Energy Ti:Sa Amplifier in the EPAC Facility, DANIELLE L. CLARKE¹, Paul Mason¹, Robert Heathcote¹, Luke McHugh¹, Thomas B¹, Cristina Hernandez-Gomez¹, John Collier¹; ¹*STFC Rutherford Appleton Laboratory, UK*. We provide an update on the commissioning status of the high energy titanium-doped sapphire amplifier for a petawatt-level laser in the EPAC facility designed to operate at pulse rates up to 10 Hz.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

AM4A.7 • 18:15

Arrival Time Analysis of the Pump-Probe Laser at the SPB/SFX Experiment at the EuXFEL, David Schwickert¹, Anne-Laure Calendron¹, Jayanath Koliyadu², Romain Letrun², Tomas Popelar², Tokushi Sato², Jinxiong Wang², Ulrike Wegner², Daniel Kane², Dimitrios Rompotis², Radu-Costin Saraceanu², Max Lederer², Sebastian Schulz¹, Holger Schlarb¹; ¹*Deutsches Elektronen-Synchrotron DESY, Germany*; ²*European XFEL GmbH, Germany*. The arrival time of the 50 fs pulses of an 800 nm pump-probe laser is measured after transport with respect to a synchronization reference. The measurements show that great care has to be taken to the beamline implementation.

16:30 -- 18:30

Room: South Hall 3B

LM4B • Additive Laser-Based Processing: From Large Scale to Micro Nano Material Processing II

Presider: Ruth Houbertz; ThinkMade Engineering & Consulting, Germany

LM4B.1 • 16:30 (Invited)

Multiphoton Lithography for Biomedical Applications, Aleksandr Ovsianikov¹; ¹*Technische Universität Wien, Austria*. The recent breakthroughs on the material and hardware development side provide new opportunities for biomedical applications of high-resolution 3D printing using femtosecond lasers. In this contribution, the recent progress in this area will be discussed.

LM4B.2 • 17:00 (Invited)

Birefringence — Asymmetric Woodpile and Beyond, Darius Gailevičius¹, Domas Paipulas¹, Maciej Kretkowski², Saulius Juodkazis^{3,1}, Vygantas Mizeikis²; ¹*Laser Research Center, Faculty of Physics, Vilnius Univ., Lithuania*; ²*Research Inst. of Electronics, Shizuoka Univ., Japan*; ³*Optical Sciences Centre, School of Science, Swinburne Univ. of Technology, Australia*. We demonstrate the 3D laser printing of form-birefringent photonic metastructures using mechanically stable 3D photonic crystals. This approach overcomes the instability of 1D gratings, enabling the fabrication of compact, functional Q-plates and phase retarders in polymer.

LM4B.3 • 17:30 (Invited)

3D Micro & Nano Printing With Light, Maria Farsari¹; ¹*FORTH/IESL, Greece*. Multiphoton Polymerization is an advanced micro- and nano-fabrication technique revolutionizing diverse fields from integrated photonics to biomedical engineering. It enables precise 3D structure writing in photosensitive materials, facilitating complex optical circuits, photonic crystals, and tissue scaffolds for regenerative medicine.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

16:30 -- 18:30

Room: South Hall 3A

LsM4C • Free Space Optical Communications I

Presider: Miranda van Iersel; New Mexico State Univ., USA

LsM4C.1 • 16:30 (Invited)

Effects of Adaptive Optics on Performance of Laser Satellite Communications, Muhsin C. Gökçe^{1,2}, Rudolf Saathof³; ¹*Geoscience and Remote Sensing, Delft Univ. of Technology, Netherlands*; ²*Electrical-Electronics Engineering, TED Univ., Turkey*; ³*Space Systems Engineering, Delft Univ. of Technology, Netherlands*. We investigate Gaussian beam propagation from the ground to a LEO satellite, analyzing beam footprint, Strehl ratio, scintillation index, and bit-error rate under atmospheric turbulence with adaptive optics (AO) applied at the transmitter.

LsM4C.2 • 17:00

Heterodyne Wavefront Sensor for High-Speed and Low-Light Applications, Douglas McDonald¹, Raphael Bellossi¹, Andreas Zepp¹, Jürgen Zoz², Szymon Gladysz¹; ¹*Fraunhofer IOSB, Germany*; ²*MBDA Deutschland GmbH, Germany*. The heterodyne wavefront sensor works by frequency shifting a reference beam and combining it with the beam that has propagated through the atmosphere. The detection process results in a time-varying intensity pattern containing the phase.

LsM4C.3 • 17:15

Performance of Binary Polarization Shift Keying in a Free-Space Optical Link Under Turbulence, Jaime A. Anguita^{1,2}, Carlos Pirela^{1,2}, Kei B. Sawada^{1,2}; ¹*Universidad de los Andes (Chile), Chile*; ²*Millennium Inst. for Research in Optics, Chile*. We evaluate the performance of polarization-based modulation at 200 Mb/s over an optical free-space link with emulated turbulence in the lab. Detection uses thresholding from received noisy data without prior knowledge. A 1 km outdoor test is underway to assess system robustness in real conditions. Full results will be presented at the conference.

LsM4C.4 • 17:30 (Student Paper Finalist)

Positional Encoding for Improved Perturbation-Dependent Phase Prediction in Multimode Fiber, Joshua R. Jandrell¹, Mitchell A. Cox¹; ¹*Univ. of the Witwatersrand, South Africa*. Traditional neural networks struggle to learn the complex phase shifts with respect to perturbations in multimode fiber. We provide a neural network with positionally encoded frequency features enabling it to learn these complex-valued fluctuations.

LsM4C.5 • 17:45

Efficiency of Thrust Force Generation by Nanosecond Laser-Induced Ablation to Carbon Fiber Reinforced Plastic (CFRP) for Space Debris Control, Hiroshi Kasuga¹, Tomohiro Tsukihana¹, Hideaki Yamane¹, Katsuhiko Tsuno¹, Yutaka Nagata¹, Noriko Kurose¹, Tatsuya Shinozaki¹, Norihito Saito¹, Takayo Ogawa¹, Satoshi Wada¹; ¹*RIKEN, Japan*. Laser-induced ablation was used as source of thrust force to control space debris. In comparison with wavelength, higher conversion efficiency into thrust force for CFRP was 266nm in Nd:YAG nanosecond laser after the second irradiation.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Tuesday, 21 October

08:30 -- 10:30

Room: South Hall 3C

ATu1A • Pulse Compression & Coherent Beam Combination

Presider: Adam Borzsonyi; ELI-Hu Nonprofit Kft, Hungary

ATu1A.1 • 08:30

100 kHz, 100 W Yb:CALGO Femtosecond Amplifier, JiaLiang Zhou¹, Geyang Wang¹, Wenlong Tian¹, Yang Yu¹, Jiangfeng Zhu¹, Zhiyi Wei²; ¹*Xidian Univ., China*; ²*Inst. of Physics, Chinese Academy of Sciences, China*. This work reported on the demonstration of a high-power Yb:CALGO based two-stage multi-pass amplifier. 46-W seed laser was amplified to 110-W at 100 kHz and its pulse duration after compression was 209-fs.

ATu1A.2 • 08:45

Chirped Pulse Amplification of 100 fs Pulses in Yb:CALYGLO at kHz and MHz Repetition Rate, Dimitar Velkov¹, Jan Bartonicek^{5,6}, Lyuben Petrov^{1,2}, Marta Mladenova¹, Anton Trifonov³, Xiaodong Xu⁴, Ivan Buchvarov^{1,2}; ¹*Sofia Univ. St. Kliment Ohridski, Bulgaria*; ²*John Atanasoff Center for Bio and Nano Photonics (JAC BNP), Bulgaria*; ³*IBPhotonics Ltd., Bulgaria*; ⁴*Jiangsu Normal Univ., China*; ⁵*Extreme Light Infrastructure ERIC, Czechia*; ⁶*Department of Physics, Czech Technical Univ., Czechia*. The chirped pulse amplification performance of the Yb:CALYGLO crystal, proposed as an enhanced alternative to Yb:CALYO, is demonstrated at two distinct repetition rates: 1 kHz and 1 MHz.

ATu1A.3 • 09:00 (Invited)

High-Energy, High-Average-Power Amplifiers at kHz Repetition Rate and Their Nonlinear Pulse Compression, Gaia Barbiero¹, Mikhail Osolodkov¹, Eva Marie Bayer¹, Jessica Meier¹, Abel Hailu Woldegeorgis¹, Jonas Manz¹, Catherine Yuriko Teisset¹, Sandro Klingebiel¹, Thomas Metzger¹; ¹*TRUMPF Scientific Laser GmbH + Co KG, Germany*. We present the latest advancements in Yb-doped thin-disk amplifiers and nonlinear pulse compression using gas- and bulk-based multipass cells, achieving sub-50 fs pulses at kHz rates and high energy and average power.

ATu1A.4 • 09:30

Approaching kW-Class Two-Cycle Fiber Lasers at ELI ALPS, Imre Seres¹, Barnabás Gilicze¹, Tamás Bartyik¹, Zsolt Bengery¹, Zsolt Kovács¹, Bernát Vinkó¹, Zoltán Várallyay¹, Péter Jójárt¹, Adam Borzsonyi¹, Evgeny Shestaev², Maxim Tschernajew², Nico Walther², Christian Gaida², Sven Breitskopf², Tino Eidam², Jens Limpert², Katalin Varjú¹, Gábor Szabó¹; ¹*ELI-ALPS, ELI-HU Non-Profit Ltd., Hungary*; ²*Active Fiber Systems, Germany*. ELI ALPS provides several hundreds of watts, fiber-based few cycle pulses at 100 kHz repetition rate. HR2 recently reached 4mJ, 6.8fs pulses with excellent beam profile. Beamtime is available through ELI ERIC user calls.

ATu1A.5 • 09:45

Tailoring Coherent Beam Combined Fiber Laser Pulse Trains for Laser-Matter Interaction Applications, Corentin Lechevalier¹, Ihsan Fsaifes¹, Jordan Andrieu¹, Claude-Alban Ranély-Vergé-Dépré¹, Igor Jovanovic², Jean-Christophe Chanteloup¹; ¹*Ecole Polytechnique*,

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

France; ²Gérard Mourou Center for Ultrafast Optical Science, USA. We report on a versatile coherently combined ultrashort fiber laser allowing an independent peak and average power adjustment, pulse-on-demand, and repetition rate management, needed for laser-matter interaction applications.

ATu1A.6 • 10:00

Divided Pulse Amplification With Phase Detection Using Second Harmonic

Generation, Haruyuki Miyake¹, Ohki Iguchi¹, Henrik Tünnemann², Akira Shirakawa¹; ¹*The Univ. of Electro-Communications, Japan*; ²*Deutsches Elektronen-Synchrotron (DESY), Germany*. Divided pulse amplification with 4 or more division with modulation-free, all optical detection of phase differences between divided pulses using second harmonic generation was experimentally demonstrated for the first time.

ATu1A.7 • 10:15

Watt-Level sub-30-fs Kerr-Lens Mode-Locked Yb Oscillator, Huang-Jun Zeng¹, Zhang-Lang Lin¹, Ge Zhang¹, Feifei Yuan¹, Zhoubin Lin¹, Pavel Loiko³, Xavier Mateos⁴, Valentin Petrov², Weidong Chen^{1,2}; ¹*Fujian Inst of Res Structure of Matter, China*; ²*Max Born Inst., Germany*; ³*Université de Caen, France*; ⁴*Universitat Rovira i Virgili (URV), Spain*. We report on a Kerr-lens mode-locked Yb:Gd₂SrAl₂O₇ laser delivering 28 fs soliton pulses at 1079.1 nm, with an average output power of 1.17 W at a repetition rate of ~61.1 MHz.

08:30 -- 10:30

Room: South Hall 3B

LTu1B • Brittle Materials Processing

Presider: Stuart McLean; Coherent Corp, USA

LTu1B.1 • 08:30 (Invited)

Ultra-High-Speed and Precision Laser Processing of Transparent Materials Through

Visualization of Ultrafast Light-Matter Interactions, Yusuke Ito¹; ¹*Univ. of Tokyo, Japan*. We demonstrate that by irradiating light with controlled spatial and temporal distributions, the optical properties of the material can be dramatically altered for an ultrashort duration, enabling ultrafast and highly precise machining.

LTu1B.2 • 09:00 (Invited)

Innovative USP Micromachining Strategies for Enhancing Lithium Niobate Crystals for Photonic Applications,

Mareike Schäfer¹; ¹*Inst Oberflächen und Schichtanalytik, Germany*. This work investigates ultrashort-pulse laser micromachining of lithium niobate to enhance surface properties for photonic applications, focusing on laser parameters and hybrid techniques to optimize waveguide performance and photonic device integration.

LTu1B.3 • 09:30 (Invited)

Laser-Based Manufacturing of Optical Components – State of the Art & Challenges,

Astrid Sassmannshausen¹; ¹*Fraunhofer-Institut für Lasertechnik, Germany*. Selective laser-induced etching, ultrashort-pulse laser ablation and CO₂-laser polishing are combined for the fabrication of complex-shaped optical components. High precision can be achieved by pulse duration and wavelength tuning to machine optical glasses and sapphire.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

LTu1B.4 • 10:00 (Invited)

Burst Mode of Femtosecond Laser Pulses as an Enabling Factor for High Quality Industrial Processing of Glass and Silicon Carbide, Michal Nejbauer¹, Natalia Grudzien¹, Bogusz Stepak¹, Rafal Smolin¹, Yuriy Stepanenko¹; ¹*Fluence Technology, Poland*. MHz burst mode of femtosecond lasers, together with pulse duration tuning, greatly enhances the processing throughput and quality of various materials, such as silicon carbide, and also leads to high-speed glass cleaving with minimized chipping. In this talk, I will present a general explanation behind it and provide some practical examples.

08:30 -- 10:30

Room: South Hall 3A

LsTu1C • Remote Sensing II

Presider: Romain Ceolato; Office Natl d'Etudes Rech Aerospatiales, France

LsTu1C.1 • 08:30 (Invited)

FRESH Air: Hyperlocal Urban Pollution Monitoring - Insights and Implications, Stephen Holler¹; ¹*Fordham Univ., USA*. Compact and portable laser-based sensor systems permit the widespread, hyperlocal monitoring of the urban landscape, where complex structures result in varied environmental conditions, while socioeconomic factors have led to asymmetric pollution exposure and health outcomes.

LsTu1C.2 • 09:00 (Invited)

From Energy Fields to Palm Trees With Distributed Fiber-Optic Sensing, Islam Ashry¹, Chun Hong Kang¹, Boon S. Ooi¹; ¹*King Abdullah Univ of Sci & Technology, Saudi Arabia*. This talk presents distributed fiber-optic sensing technologies for oil wells, pipelines, and palm plantations. We highlight hybrid DAS–DTS systems and AI-enhanced pest detection, demonstrating scalable, real-time monitoring across energy and agricultural environments.

LsTu1C.3 • 09:30 (Invited)

High Speed Ejecta's Holography, Nazila Black¹; ¹*Lawrence Livermore National Laboratory, USA*. Abstract not available.

LsTu1C.4 • 10:00

Advances in Aerosol Characterization With Digital Holography, Matthew J. Berg¹; ¹*Kansas State Univ., USA*. Digital holography is a powerful technique to image small particles, several micrometers in size, in a contact-free manner. We apply such imaging to characterize aerosol particles, including the determination of particle shape, size, and concentration. Here we will cover recent advances in this field.

LsTu1C.5 • 10:15

High Performance Dual Comb Spectroscopy Based on Low Noise Cr:ZnS Laser Combs Combined With Real-Time Computational Correction, Mike Mirov¹, Sergey Vasilyev¹, Igor Moskalev¹, Yury Barnakov¹, Andrey Muraviev², Dmitrii Konnov², Roderik Krebbers³, Mathieu Walsh⁴, Jerome Genest⁴, Simona M. Cristescu³, Konstantin Vodopyanov²; ¹*Mid-IR Laser Group, IPG Photonics Corp, USA*; ²*MIR, Mid-Infrared Combs Research Group, CREOL, the College of Optics and Photonics, Univ. of Central Florida, USA*; ³*Analytical Chemistry & Chemometrics, Radboud Univ., Netherlands*; ⁴*Electrical and Computer Engineering, Université Laval*,

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Canada. We report on high resolution Dual Comb Spectroscopy based on low noise, high power mode-locked Cr:ZnS combs leveraging real-time computational correction. The achieved performance sets a new benchmark in long wave IR spectroscopy.

10:30 -- 11:30

Room: Congress Hall Foyer 3 Posters

JTu2A • Joint Poster Session I

JTu2A.1

a Cladding Light Stripper Based on 10/125- μ m Double Clad PM Fiber With Ultra-low Backscattering, Jihwan Kim¹, Ju Han Lee^{2,1}; ¹*Kromanet Inc., Korea (the Republic of)*; ²*Univ. of Seoul, Korea (the Republic of)*. A cladding light stripper based on 10/125 μ m PM LMA DCF was fabricated. A ~99.2% stripping efficiency was achieved with and a ~0.14% backward scattering for 50-W residual pump power while the PER degradation was only ~0.7 dB

JTu2A.2

Controlled Growth and Laser Performance Characterization of 4-Inch ZnGeP₂ Single Crystals for Mid-Infrared Nonlinear Applications, Shichao Cheng^{1,3}, Chongqiang Zhu^{1,3}, Zuotao Lei^{1,3}, Baoquan Yao², Chunhui Yang^{1,3}; ¹*School of Chemistry and Chemical Engineering, Harbin Inst. of Technology, China*; ²*National Key Laboratory of Tunable Laser Technology, Harbin Inst. of Technology, China*; ³*MIIT Key Laboratory of Critical Materials Technology for New Energy Conversion and Storage, Harbin Inst. of Technology, China*. A 4-inch ZnGeP₂ crystal was grown by the Bridgman method to produce a 25×25×30 mm³ device capable of 200 mJ single pulse energy at 200 Hz high repetition rate mid-wave laser operation.

JTu2A.3

Thermo-Mechanical Properties of Hexagonal Ba₂Ga₈GeS₁₆, Michael Susner², Ginka Exner³, Jonathan Goldstein², Aleksandar Grigorov³, Ryan Siebenaller^{2,4}, Kentaro Miyata⁵, Jani Jesenovc⁶, Kevin Zawilski⁶, Valentin Petrov¹; ¹*Max Born Inst., Germany*; ²*WPAFB, USA*; ³*Plovdiv Univ., Bulgaria*; ⁴*The Ohio State Univ., USA*; ⁵*RIKEN, Japan*; ⁶*BAE Systems, USA*. Linear thermal expansion in the 76-310 K range and nanohardness and Young's modulus at room temperature are measured for the newly developed quaternary nonlinear crystal Ba₂Ga₈GeS₁₆ applicable in the mid-IR part of the spectrum.

JTu2A.4

Growth and Optical Properties of Co²⁺:ZnGa₂O₄ Single Crystal, Wenxiang Mu¹; ¹*Shandong Univ., China*. Co²⁺-doped ZnGa₂O₄ crystal was grown by vertical gradient freeze (VGF) method. There was a wide absorption band spanning from 1100 to 1700 nm which making it a highly promising material for 1.5 μ m passive Q-switching.

JTu2A.5

Spectral and Laser Properties of Cr²⁺ and Fe²⁺ Doped and Cr²⁺,Fe²⁺ Co-Doped Chalcogenide Host Materials, Adam Riha¹, Helena Jelinkova¹, Maxim E. Doroshenko², Nazar O. Kovalenko³; ¹*Dept. of Laser Physics and Photonics, Czech Technical Univ. in Prague, Czechia*; ²*General Physics Inst., Russian Academy of Sciences, Russian Federation*; ³*Inst. for Single Crystals, National Academy of Sciences of Ukraine, Ukraine*. We report review of mid-IR lasing in the range of ~2.1-6.05 μ m from Cr²⁺-, Fe²⁺-, and Cr²⁺,Fe²⁺-doped II-VI chalcogenides.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Detailed comparison of the spectroscopic and laser properties of various laser materials enabling efficient mid-IR lasing is presented.

JTu2A.6

Thermal Properties and Structural Analysis of Room Temperature Bonded

Cr:LiSAF/Sapphire Chip Stacks, Florent Cassouret¹, Yoichi Sato^{2,1}, Takunori Taira^{2,1}; ¹*Inst. for Molecular Science, Japan*; ²*Laser-Driven Electron-Acceleration Technology group, Riken SPring-8 Center, Japan*. Cr³⁺:LiSrAlF₆ crystal was successfully bonded to a high thermal conductivity oxide crystal (Al₂O₃) at room temperature, leading to >2.5x improvement of the effective thermal conductivity of the composite. The bonding interface composition is also discussed.

JTu2A.7

Novel Post-Processing Method for Homogeneity Enhancement of Solid-State Laser Gain Media

Jan Kendík¹, Lukáš Beran¹, Karel Nejezchleb¹; ¹*CRYTUR spol. s.r.o., Czechia*. Internal stress is inevitably induced in the production of a solid-state gain medium. By polarimetry, we show an effective post-processing method of stress reduction and increase in the extinction ratio of the laser component.

JTu2A.8

Exploring Photodarkening in Barium Chalcogenide Nonlinear Crystals

Julius Lukosiunas^{2,1}, Robertas Kananavicius¹, Justinas Ceponkus³, Jani Jesenovec⁴, Rokas Danilevicius¹, Andrejus Michailovas^{2,1}; ¹*EKSPLA, Lithuania*; ²*Center for Physical Sciences and Technology, Lithuania*; ³*Vilnius Univ., Lithuania*; ⁴*BAE systems, Inc., USA*. We investigate photodarkening in BGSe and BGGSe crystals in mid-IR OPA under femtosecond 1030 nm pumping to assess crystal quality and its impact on nonlinear performance and transmission in VIS – mid-IR range.

JTu2A.9

Resonantly Pumped Tunable 2 μm Lasers Based on Tm³⁺- and Ho³⁺-Doped BaF₂ and SrF₂ Crystals

Michal Nemec¹, Dominika Popelová¹, Jan Sulc¹, Ngoc Q. Nguyen², Pavel Loiko², Helena Jelinkova¹, Karel Veselsky¹, Abdelmjid Benayad², Patrice Camy², Alain Braud²; ¹*Czech Technical Univ. in Prague, Czechia*; ²*Université de Caen, France*. We report on the tunable 2-μm laser operation of singly Ho³⁺-doped and Tm³⁺,Ho³⁺-codoped BaF₂ and SrF₂ fluorite-type crystals under 1.68-μm or 1.94-μm resonant pumping. The broadest tuning range was achieved with Tm,Ho:BaF₂ laser system.

JTu2A.10

Evaluation of BBO, LBO, and YCOB Crystals for High Average Power Femtosecond Second Harmonic Generation With Face and Edge Cooling

David Feng¹, Michael Messerly¹, Paul Pax¹; ¹*Lawrence Livermore National Laboratory, USA*. A modeling study was conducted on three nonlinear crystals (BBO, LBO, YCOB) for second harmonic conversion efficiency of 100-fs pulses with a kW-scale average power thermal load. Two methods of crystal cooling under the thermal load are evaluated.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

JTu2A.11

Rotating Magnetic Flux Generator for Crystalline Orientation Control and Improved Alignment of Grains in Yb:FAP Ceramics, Yoichi Sato^{1,2}, Takunori Taira^{1,2}; ¹*RIKEN SPring-8 Center, Japan*; ²*Inst. for Molecular Science, Japan*. Orientation control in Yb:FAP ceramics was improved from Lotgering factor of 0.02 to 0.99 by eliminating miss-aligned layer. The non-mechanical generator of rotating magnetic flux for slip-casting in the magnetic orientation control was also investigated.

JTu2A.12

Thermal Conductivity of YSAG, YGAG, YAG, and Y₂O₃ Ceramics Compared to YAG and Sapphire Single Crystals, Yoichi Sato², Takunori Taira^{1,2}, Tomohisa Takemasa³; ¹*RIKEN SPring-8 Center, Japan*; ²*Inst. for Molecular Science, Japan*; ³*Konoshima Chemical Co., Japan*. Thermal conductivities (κ) of Nd:YSAG and Nd:YGAG ceramics were evaluated to 70% of Nd:YAG ceramics. Although Y₂O₃ ceramics has higher κ than YAG ceramics, it was inferior to YAG single crystal below 273 K.

JTu2A.13

High-Power Stress-Free Er:YAG Laser Rods, Mirek Martínek¹, Pavel Psota²; ¹*CRYTUR spol. s.r.o., Czechia*; ²*Centrum TOPTEC - Ústav fyziky plazmatu AV ČR, v.v.i., Czechia*. An 850nm interferometer was constructed to assess Er:YAG rod WFE. Our results, presented alongside active output energy characteristics, confirm minimal thermal lensing and overall high quality of the rods.

JTu2A.14

Mid-Infrared Emission Properties of Er³⁺, Dy³⁺-Codoped Fluoroindate Glasses, Ngoc Quynh Hoa NGUYEN¹, Pavel Loiko¹, Thiphany Rault², Jean Letourneur², Solenn Cozic², Saad Hatim³, Kirill Ereemeev³, Pierre-Henry Hanzard³, Tristan Guezennec³, Thomas Godin³, Patrice Camy¹, Alain Braud¹, Ammar Hideur³; ¹*Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, 6 Boulevard Maréchal Juin, France*; ²*Le Verre Fluoré, rue Gabriel Voisin, Campus de Ker-Lann, France*; ³*CORIA UMR 6614, CNRS-INSA-Université de Rouen Normandie, France*. Er³⁺, Dy³⁺-codoped fluoroindate (InF₃) glasses exhibit a broad mid-infrared emission extending up to 4 μ m, efficient Er³⁺ \rightarrow Dy³⁺ energy transfer, and long ⁶H_{13/2} Dy³⁺ luminescence lifetimes, making them promising for broadly tunable mid-infrared fiber lasers.

JTu2A.15

Stabilization of All-Silica Waveplates via Atomic Layer Deposition, Darija Astrauskyte¹, Lina Grineviciute¹; ¹*Center for Physical Sciences and Technology, Lithuania*. Nanostructured coatings can be applied to produce highly laser-resistant waveplates. However, such components are porous and sensitive to humidity. In this work, we present the stabilization of nanostructured waveplates via atomic layer deposition.

JTu2A.16

Fabrication and Laser Operation of Nd-Doped (Ca_{0.5}Sr_{0.5})₁₀(PO₄)₆F₂ Transparent Ceramics, Hiroaki Furuse¹, Sanae Koizumi¹, Kazuya Takimoto^{1,2}, Hiroyasu Sone²; ¹*National Inst. for Materials Science, Japan*; ²*Kitami Inst. of Technology, Japan*. Hexagonal Nd-doped (Ca_{0.5}Sr_{0.5})₁₀(PO₄)₆F₂ transparent ceramics was fabricated with fine microstructure, and laser operation at 1060.1 nm was achieved. The emission spectral width (FWHM) was approximately

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

4.5 nm with a center wavelength of 1061 nm.

JTu2A.17

Green Tb:ZBLAN Fiber Laser, Moritz Badtke¹, Sascha Kalusniak¹, Hiroki Tanaka¹, Christian Kraenkel¹; ¹*Leibniz-Institut für Kristallzüchtung, Germany*. We report on laser oscillation at 542 nm in a Tb:ZBLAN fiber with 6.5 mW output power and 1.2% slope efficiency with respect to the launched pump power at 486 nm.

JTu2A.18

Lasing Behavior of Yb³⁺-Doped Fluorapatite Ceramics, Kazuya Takimoto^{1,2}, Hiroyasu Sone², Shinki Nakamura³, Hiroaki Furuse¹; ¹*National Inst. for Materials Science, Japan*; ²*Kitami Inst. of Technology, Japan*; ³*Ibaraki Univ., Japan*. A laser efficiency exceeding 20% was achieved for Yb-doped FAP non-cubic ceramic materials under quasi-continuous wave operation at 1 ms and 10 Hz. The beam profiles and temporal waveforms of the laser were studied.

JTu2A.19

Thermo-Optical Characteristics of Yb:CALYGLO for High-Average-Power Ultrafast Laser Applications, Kaloyan Georgiev², Stephan Shishkov³, Dimitar Velkov¹, Lyuben Petrov^{1,4}, Anton Trifonov⁵, Xiaodong Xu⁶, Ivan Buchvarov^{1,4}; ¹*Sofia Univ. St. Kliment Ohridski, Bulgaria*; ²*ALPHALAS GmbH, Germany*; ³*Inst. of Solid State Physics, BAS, Bulgaria*; ⁴*John Atanasoff Center for Bio and Nano Photonics (JAC BNP), Bulgaria*; ⁵*IBPhotonics Ltd., Bulgaria*; ⁶*Jiangsu Normal Univ., China*. Thermal conductivities of 1.3 at.% Yb:CALYGLO were measured using long-wave infrared thermography and finite element analysis, revealing superior performance over Yb:CALYO and comparable behavior to Yb:CALGO for ultrafast laser applications.

JTu2A.20

Temperature-Dependent Spectroscopy of Pr³⁺:LiYF₄, Ole Hahn¹, Sascha Kalusniak¹, Hiroki Tanaka¹, Christian Kraenkel¹; ¹*Leibniz-Institut für Kristallzüchtung, Germany*. We present high-resolution temperature-dependent spectroscopy of Pr³⁺:LiYF₄ from cryogenic to elevated temperatures with a focus on the green laser at 523 nm, which originates from higher thermally populated Stark levels.

JTu2A.21

Advanced Czochralski Growth Strategies for Yb-Doped LYSB Crystals Enabling High-Performance NIR Laser Emission, Madalin Greculeasa¹, Alin Broasca¹, Flavius Voicu¹, Stefania Hau¹, Cristina Gheorghe¹, Gabriela Croitoru¹, Nicolaie Pavel¹, Lucian Gheorghe¹; ¹*ECS Laboratory, National Inst. for Laser, Plasma and Radiation Physics, Romania*. Nonlinear optical (NLO) and laser crystals with incongruent melting of pure and Yb-doped La_xY_ySc_{4-x-y}(BO₃)₄ - LYSB were grown by the Czochralski method for the first time. Their main NLO properties and laser performances are reported.

JTu2A.22

Undoped, Yb- and Nd-Doped LGSB Czochralski-Grown Nonlinear and Laser Crystals, Lucian Gheorghe¹, Madalin Greculeasa¹, Alin Broasca¹, Flavius Voicu¹, Stefania Hau¹, Cristina Gheorghe¹, Catalina Susala¹, Gabriela Croitoru¹, Nicolaie Pavel¹; ¹*INFLPR, ECS Laboratory, Romania*. Pure, Yb- and Nd-doped La_xGd_ySc_{4-x-y}(BO₃)₄ incongruent melting nonlinear optical and laser crystals were successfully grown by the Czochralski method, for the

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

first time, and their optical properties and laser performances were evaluated.

JTu2A.23

Automated Detection of Surface Defects on Laser Elements, Lukas Beran¹, Ondrej Hradecky^{2,1}, Karel Nejezchleb¹; ¹*Crytur spol r.o., Czechia*; ²*Technical Univ. of Liberec, Czechia*. This study proposes a cost-effective, high-throughput method for detecting surface defects on polished laser rods. By integrating digital microscopy with machine learning, it offers a practical alternative to conventional quality control systems.

JTu2A.24

Ca₃(Ta, Ga)₅O₁₂:Pr³⁺ Single Crystal: a Promising new Laser Material in the Visible Domain, Cristina Gheorghe¹, Stefania Hau¹, Alin Broasca¹, Madalin Greculeasa¹, Flavius Voicu¹, Monica Enculescu², Lucian Gheorghe¹; ¹*Natl Inst Lasers Plasma & Radiation Phys, Romania*; ²*National Inst. of Materials Physics, Romania*. Ca₃(Ta, Ga)₅O₁₂:Pr³⁺ single crystal was successfully grown by the Czochralski method, for the first time. Based on the optical properties, the crystal may have high potential for obtaining efficient laser emission in the blue domain.

JTu2A.25

Multipass Cells for few-Cycle Pulses for Scientific Applications, Christian Grebing¹, Maxim Tschernajew¹, Florian Karl¹, Hongru Hao¹, Hugo Gerisch¹, Stefano Wunderlich¹, Nico Walther¹, Christian Gaida¹, Tino Eidam¹; ¹*Active Fiber Systems GmbH, Germany*. The efficient generation of high-power few-cycle pulses in single- and double-stage noble gas-filled multipass cells is discussed. High-power compression results for various pulse energies achieved in the 1 μ m wavelength range are reviewed.

JTu2A.26

Excellent Sensing Capabilities of the Multimodal Optical Temperature Sensor Based on Er³⁺ ion Emission in the CdF₂: Er, Y Crystal, Stefania Hau¹, Hani Boubekri⁴, Madjid DIAF³, Reda Fartas², Cristina Gheorghe¹, Alin Broasca¹; ¹*National Inst. for Laser, Plasma, and Radiation Physics, Romania*; ²*08 May 1945 Univ., Algeria*; ³*Laser Physics, Optical Spectroscopy and Optoelectronics Laboratory, Badji Mokhtar Annaba Univ., Algeria*; ⁴*Higher Normal School of Technological Education, Algeria*. Single crystals of CdF₂: 1 % Er, x% Y (x = 10, 20) were grown by the Bridgman technique. Multimodal optical temperature sensing studies demonstrate their high potential in low-temperature sensing applications.

JTu2A.27

100 μ J Energy Level, Picosecond Difference Frequency Generation in Wavelength-Tunable or Discrete-Wavelength Setup in a Range From 5 to 13 μ m, Michal Jelínek¹, Milan Frank¹, Václav Kubeček¹, Ondrej Novák², Jaroslav Huynh², Michal Chyla², Martin Smrz², Tomas Mocek²; ¹*Ceske Vysoke Ucení Technické v Praze, Czechia*; ²*HiLASE Centre, FZU, Czechia*. Picosecond difference frequency generation in AgGaS₂, BaGa₄Se₇, LiGaSe₂, or LiGaS₂ crystals with various lengths is presented in wavelength-tunable or narrowband, discrete-wavelength setup in a 5-13 μ m range.

JTu2A.28

Temperature-Dependent Spectroscopy and Laser Cooling Potential of Tm³⁺-Doped Fluoride Crystals, Zoe Liestmann¹, Sascha Kalusniak¹, Christian Kraenkel¹, Hiroki Tanaka¹; ¹*Leibniz-Institut für Kristallzüchtung (IKZ), Germany*. We investigated the potential of

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Tm³⁺-doped LiYF₄, BaY₂F₈, and KY₃F₁₀ crystals for solid-state laser cooling based on temperature-dependent spectroscopic properties. Tm³⁺:LiYF₄ exhibits the highest cooling figure of merit, showing its promise for 2-μm optical cryocoolers.

JTu2A.29

Withdrawn

JTu2A.30

Temporal Contrast Enhancement by Self-Phase Modulation in a Multi-Pass Cell With Excellent Beam Quality and Pointing Stability, Jiajun Song¹, Yinfei Liu¹, Yujie Peng¹, Yuxin Leng¹; ¹*Shanghai Inst of Optics and Fine Mech, China*.

We demonstrate temporal contrast enhancement through self-phase modulation and subsequent spectral filtering in a gas-filled multi-pass cell. The filtered pulse exhibits a temporal contrast enhancement of over two orders of magnitude, surpassing 10⁹.

JTu2A.31

Superhydrophobic and Self-Cleaning Aluminium Surfaces via Affordable Nanosecond Fibre Laser and Vacuum Treatment, Krystof Kobliha^{1,2}, Petr Hauschwitz¹, Radka Bičíšková¹, Martin Prochazka¹, Jan Brajer¹, Tomas Mocek¹; ¹*HiLase, Czechia*; ²*CVUT FJFI, Czechia*. The fabrication of superhydrophobic and self-cleaning surfaces is usually made by complex and relatively expensive methods. However, the same properties were induced on an aluminium sample using an affordable nanosecond laser combined with vacuum processing.

JTu2A.32

Numerical Simulations of in-Band Clad-Pumped Thulium-Doped Fiber Laser at 820 nm, Martin Grabner¹, Vincent A. Gomes¹, Pavel Honzatko¹, Pavel Peterka¹; ¹*Inst. of Photonics and Electronics, Czechia*. Thulium-doped fiber laser (TDFL) operating at 820 nm and clad-pumped with 790 nm is simulated using a comprehensive numerical model. Performance of two laser setups with 4-4% and 100-4% reflection are compared.

JTu2A.33

Thermal Expansion Studies of the Nonlinear Chalcopyrite Crystal CdGeP₂, Michael Susner², Peter Schunemann³, Kevin Zawilski⁴, Jani Jesenovec⁴, Valentin Petrov¹; ¹*Max Born Inst., Germany*; ²*AFRL, USA*; ³*Onsemi, USA*; ⁴*BAE Systems, USA*. Thermal expansion in the 12-820 K range is measured by X-ray diffraction of powdered CdGeP₂ crystals, applicable for THz-generation from near-IR laser sources. The results indicate strong anisotropy with negligible compression along the optical axis.

JTu2A.34

Two-Photon Absorption Studies of Ge at 2.05 μm, Subhasis Das^{1,3}, Marcin Piotrowski², Martin Bock¹, Dennis Ueberschaer¹, Uwe Griebner¹, Valentin Petrov¹; ¹*Max Born Inst., Germany*; ²*ISL, France*; ³*Burdwan Univ., India*. Two-photon absorption (TPA) measurements are performed on Ge using an open aperture z-scan setup and 2.05 μm, 0.57 ps pulses from a Ho:YLF regenerative amplifier. The derived TPA coefficient amounts to (30 ± 12) cm/GW.

JTu2A.35

Liquid-Phase Epitaxial Growth of Tm³⁺ and Yb³⁺ Doped MgWO₄ Layers, Ghassen Z. Elabedine¹, Rosa M. Solé¹, Magdalena Aguiló¹, Francesc Díaz¹, Weidong Chen², Valentin

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Petrov³, Xavier Mateos¹; ¹*Universitat Rovira i Virgili, Spain*; ²*State Key Laboratory of Functional Crystals and Devices, Fujian Inst. of Research on the Structure of Matter, Chinese Academy of Sciences, China*; ³*Max Born Inst., Germany*. We report the first liquid phase epitaxy growth of Tm³⁺ and Yb³⁺ doped MgWO₄ layers on (010) oriented MgWO₄ substrates. The resulting epitaxial films reach thicknesses of 300 µm thick, are crack-free, and exhibit high crystalline quality.

JTu2A.36

Temperature-Tuning Characteristics of Noncritically Phase-Matched AgGa_{1-x}In_xSe₂

Kiyoshi Kato^{1,2}, Kentaro Miyata³, Satoshi Wada³, Valentin Petrov⁴; ¹*Chitose Inst. of Science and Technology, Japan*; ²*Okamoto Optics Inc., Japan*; ³*RIKEN, Japan*; ⁴*Max Born Inst. for Nonlinear Optics and Ultrafast Spectroscopy, Germany*. Temperature-dependent phase-matching conditions for nonlinear frequency conversion in AgGa_{1-x}In_xSe₂ are studied using different CO₂ laser lines at 9.2714–10.5910 µm by varying the crystal temperature in the 20–180°C range.

JTu2A.37

Cladding-Pumped Neodymium-Doped Fiber Amplifier With 40 dB Gain and Immunity to Seed Dropouts, Dominic E. Blackledge¹, William R. Kerridge-Johns¹, Johan Nilsson¹; ¹*Univ. of Southampton, UK*. A simple cladding-pumped single-stage neodymium-doped fiber amplifier reaches 40 dB of gain and 24 dBm of output power at 1.06 µm. The output remains temporally stable and free of pulsing in the absence of seeding.

JTu2A.38

Spectroscopy of Tm³⁺- and Yb³⁺-Doped Monoclinic MgWO₄ Crystals in a Revised

Dielectric Frame, Ghassen Z. Elabedine¹, Rosa M. Solé¹, Sami Slimi¹, Magdalena Aguiló¹, Francesc Díaz¹, Weidong Chen², Valentin Petrov³, Xavier Mateos¹; ¹*Universitat Rovira i Virgili, Spain*; ²*State Key Laboratory of Functional Crystals and Devices, Fujian Inst. of Research on the Structure of Matter, China*; ³*Max Born Inst., Germany*. We present polarization-resolved spectroscopy of Tm³⁺- and Yb³⁺-doped MgWO₄ crystals, including absorption, stimulated emission, and gain cross-sections, analyzed in a revised dielectric frame, as well as luminescence lifetimes, providing new insights into their lasing potential.

JTu2A.39

Resonantly Pumped Tm,Ho:GSAG Laser Tunable Over 138 nm in the 2.1 µm

Region, Dominika Popelová¹, Jan Kratochvíl¹, Jan Sulc¹, Michal Nemec¹, Jan Pejchal², Jan Havlíček^{2,3}, Helena Jelinková¹, Martin Nikl²; ¹*FNSPE CTU in Prague, Czechia*; ²*Division of Solid State Physics, Inst. of Physics AS CR, Czechia*; ³*Crytur, Ltd., Czechia*. Laser performance and tunability of µ-PD grown Tm,Ho:GSAG were measured under 1688 nm diode pumping, achieving 170 mW maximum average output power, 30% slope efficiency, and wavelength tuning over 138 nm (1995 - 2133 nm).

JTu2A.40

Near-Infrared Efficient Laser Emission From a Diode-Pumped 6.2-at.%Yb:LGSB Crystal

Grown by the Czochralski Method, Gabriela Salamu¹, Madalin Greculeasa¹, Alin Broasca¹, Flavius Voicu¹, Stefania Hau¹, Cristina Gheorghe¹, Nicolaie Pavel¹, Lucian Gheorghe¹; ¹*Natl Inst Lasers Plasma & Radiation Phys, Romania*. Efficient laser emission at 1.03 µm is reported from a diode-pumped 6.2-at.% Yb:La_xGd_xSc_{4-x-y}(BO₃)₄ (Yb:LGSB) crystal. Laser pulses with 5.0-mJ

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

energy at an optical efficiency of 0.68 were obtained; the slope efficiency reached 0.81.

JTu2A.41

the Effect of Fluorine Codoping on the Fluorescence Properties of Tm-Doped Fiber Laser Preforms, Stefan Kuhn¹, Bruno Poletto Rodrigues¹, Dintu Mathew¹, Sigrun Hein¹, Johannes Nold¹, Nicoletta Haarlammer¹, Thomas Schreiber¹; ¹*Fraunhofer IOF, Germany*.

We present the influence of Fluorine codoping on the fluorescence properties like fluorescence lifetime in Thulium doped fiber laser materials. Among others, it will be shown that Fluorine enhances the fluorescence lifetime largely.

JTu2A.42

Y-Branch Splitters Inscribed in Nd:YAG Ceramics With High-Repetition Rate Picosecond-Laser Pulses, Gabriela Salamu¹, Madalin Greculeasa¹, Alin Broasca¹, Florin Jipa¹, Nicolaie Pavel¹; ¹*Natl Inst Lasers Plasma & Radiation Phys, Romania*. Y-branch splitters were inscribed in 1.1-at.% Nd:YAG ceramics using direct-writing technique with a picosecond laser beam. Laser emission at 1.06 μm was obtained under the pump with fiber-coupled diode lasers.

JTu2A.43

90° Phase-Matched Second-Harmonic and sum-Frequency Generation in CsLiB₆O₁₀, Nobuhiro Umemura¹, Ryota Murai^{2,3}, Masashi Yoshimura^{2,4}, Tomosumi Kamimura^{5,4}, Yusuke Mori^{2,3}; ¹*Chitose Inst of Science and Technology, Japan*; ²*SOSHO-CHOKO, Japan*; ³*Graduate School of Engineering, Osaka Univ., Japan*; ⁴*Inst. of Laser Science, Osaka Univ., Japan*; ⁵*Faculty of Engineering, Osaka Inst. of Technology, Japan*. We report 90° phase-matched second-harmonic and sum-frequency generation at 0.237, 0.2059, and 0.1828 μm based on a Nd:YAG laser at 1.0642 μm . The updated Sellmeier equations which reproduce our experimental results for the phase-matching conditions are presented.

JTu2A.44

Parametric Study of Laser Drilling Process on Glass Fiber Reinforced Polymer Composites, Shaikha Almarzooqi¹, Hamdan Alhashmi¹, Kiran K. Kabotu¹, Sarah AlHosani¹, maryam alraeesi¹, Eisa Alneyadi¹, Edvinas Petraitis¹, Reem Alameri¹, Antaryami Mohanta¹; ¹*Technology Innovation Inst., United Arab Emirates*. The continuous wave (CW) high-power fiber laser drilling process of Glass Fiber Reinforced Polymer (GFRP) composite samples has been investigated to understand the effects of laser power, beam diameter and sample thickness on drilling time.

JTu2A.45

Chalcogenide Racetrack Resonators With Intrinsic Q Factor Above 5 Million, Bright Lu¹, James W. Erikson², Bo Xu², Sinica Guo¹, Mo Zohrabi², Juliet Gopinath^{2,1}, Wounghang Park^{1,3}; ¹*Department of Electrical, Computer, and Energy Engineering, Univ. of Colorado Boulder, USA*; ²*Department of Physics, Univ. of Colorado Boulder, USA*; ³*Materials Science and Engineering Program, Univ. of Colorado Boulder, USA*. We demonstrate a chalcogenide micro-racetrack resonator with intrinsic quality (Q) factors exceeding 5 million. The resonator design features Euler curves that minimize scattering and bending losses and preserve single-mode operation with a reduced device footprint.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

JTu2A.46 (Student Paper Finalist)

High-Quality Silicon Surface Structuring by Combining DLIP and KOH Etching, Tadas Latvys¹, Darius Gailevičius¹, Dominyka Stonyte¹, Domas Paipulas¹; ¹*Laser Research Center, Vilnius Univ., Lithuania*. Periodic silicon structures were fabricated via direct laser interference patterning and chemically etched in 20 wt% KOH solution. This hybrid method significantly increased structure height while maintaining high uniformity, avoiding ablation-induced debris and preserving surface quality.

JTu2A.47

Direct Measurement of the Best Phase-Matching Conditions at 355 nm in the Monoclinic $\text{Ca}_5(\text{BO}_3)_3\text{F}$ (CBF) Nonlinear Crystal, Slimane Raissi², Patricia Segonds¹, Benoît Boulanger¹, Jérôme Debray¹, David Jegouso¹, Pascal Loiseau², Gerard Aka²; ¹*Neel Inst., France*; ²*Chimie ParisTech-CNRS, France*.

We determined the optimal phase-matching conditions at 355 nm in the monoclinic $\text{Ca}_5(\text{BO}_3)_3\text{F}$ (CBF) nonlinear crystal, by recording the angular distribution of the associated conversion efficiency along the tuning curve. This was achieved using Sum Frequency Generation of two incoming wavelengths at 532 nm and 1064 nm.

JTu2A.48

a Platform for Generating Twin-Photons Over 10 Decades of Pump Intensity by Second-Order SPDC, Julien Bertrand^{2,1}, Veronique Boutou¹, Benoît Boulanger^{2,1}; ¹*Institut Néel, France*; ²*Univ. Grenoble Alpes, France*. We generated twin-photons with a flux of 1.1×10^4 Hz to 1.2×10^{21} Hz from SPDC in a phase-matched type II KTP crystal pumped between 2.4 W.cm^{-2} - 3.7 GW.cm^{-2} in the CW, nanosecond and picosecond regimes.

JTu2A.49

Broadband Wavelength-Tunable Mode-Locked Figure-9 Yb-Fiber Laser, LIU HAN¹, Yutong Zhang¹, Yang Yu¹, Wenlong Tian¹, Geyang Wang¹, Zhiyi Wei^{2,3}, Jiangfeng Zhu¹; ¹*Xidian Univ., China*; ²*Chinese Academy of Sciences, China*; ³*Univ. of Chinese Academy of Sciences, China*. We demonstrate a broadband wavelength-tunable mode-locked figure-9 fiber oscillator with central wavelength continuously tunable over 1024 to 1076 nm. The compressed pulses ranging from 120 fs to 142 fs.

JTu2A.50

a High-Energy Femtosecond Laser Based on Hybrid Yb: KGW and Yb: YAG Amplification, Jiajun Song¹, Yinfei Liu¹, Yujie Peng¹, Yuxin Leng¹; ¹*Shanghai Inst of Optics and Fine Mech, China*. A hybrid Yb: KGW/Yb: YAG amplifier produces femtosecond-compatible pulses with energies exceeding 20 mJ. The broad spectral bandwidth supports future compression to sub-200 fs durations at this energy scale.

JTu2A.51

Coherent Random Lasing via Non-Distributed Feedback in a Disordered Optofluidic Device, Ashiq K. M.¹, Ladli Patra², Shivakiran Bhaktha B. N.², Anirban Sarkar¹; ¹*Department of Physics, National Inst. of Technology Calicut, India*; ²*Department of Physics, Indian Inst. of Technology Kharagpur, India*. Emission from an optofluidic device with random scatterers on both sides of a microchannel is investigated. Optical pumping of the device shows non-distributed feedback-based random lasing which is predominantly coherent in nature.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

JTu2A.52

Synergistic Influence of Laser Radiation on Strain-Deformations in SiO₂, Nanocomposites of Multiwalled Carbon Nanotubes and Polymers, Anatoliy P. Onanko¹, Lyudmyla V. Kuzmych¹, Yuriy A. Onanko¹, Galina V. Voropai¹, Oksana P. Dmytrenko¹, Antonina P. Naumenko¹; ¹*Physical, Taras Shevchenko national Univ. of Kyiv, Ukraine.*

After stopping of laser radiation action of fusion solidification begun exactly from the surface, but the crater underbody is extended (molten) and created additional squeezing mechanical tension, that pull central part of crater surface.

JTu2A.53

High-Energy Picosecond Pulses for Ultrafast Rydberg Excitation of Atomic Array, MAHESH T P¹, Florent Cassouret¹, Baptiste Bruneteau¹, Takuya Matsubara¹, Sylvain de Léséleuc^{1,3}, Kenji Ohmori^{1,4}, Takunori Taira^{1,2}; ¹*Inst. for molecular science(IMS), Japan*; ²*RIKEN SPring-8, Japan*; ³*RIKEN, Japan*; ⁴*SOKENDAI, Japan*. We present a four-passes, \geq mJ-energy picosecond Nd:YAG amplifier based on room temperature bonding. Combined with frequency-conversion, it will allow simultaneous excitation of large atomic array to a single Rydberg state in picosecond timescale.

JTu2A.54

Ultra-Compact TE/TM Polarization Combiner Using Slot-Embedded Silicon MMI Structures, dror malka¹; ¹*Holon Inst. of Technology (HIT), Israel*. A silicon polarization combiner using compact multimode interference and slot waveguides is presented. Simulations show efficient self-imaging, high extinction ratio, and low loss across the C-band, providing a robust, ultra-compact solution for integrated photonics.

JTu2A.55

Band-Edge Assisted Nonlinear Optical Limiting in vs₂ Quantum Dots-Embedded TiO₂/Cellulose Acetate Photonic Crystal, Hasana J. EK¹, Amrutha Shivappanayaka¹, Dhanusmith Anitha Vasu¹, Chandrasekharan Keloth¹; ¹*National Inst. of Technology Calicut, India*. We demonstrate the first TiO₂/cellulose acetate organic-inorganic nonlinear photonic crystal embedding VS₂ quantum dots, achieving band-edge-enhanced reverse saturable absorption and optical limiting with a 0.72 J/cm² threshold via slow-photon effects at 532 nm.

JTu2A.56

1 kHz High-Energy Picosecond Laser Based on 4-Passes DFC Amplifier for ⁸⁷Rb Rydberg Excitation, MAHESH T P¹, Florent Cassouret¹, Baptiste Bruneteau¹, Takuya Matsubara¹, Sylvain de Léséleuc^{1,2}, Kenji Ohmori¹, Takunori Taira^{1,2}; ¹*Inst. for molecular science(IMS), Japan*; ²*RIKEN Centre for Quantum Computing (RQC), Japan*. Using 4-passes DFC amplifier at 1 kHz, >20 times amplification of 1064 nm ps-pulses were observed. These pulses were then converted to 480 nm for ⁸⁷Rb Rydberg excitation with high efficiency and narrow bandwidth.

JTu2A.57

Subwavelength 3D Printed Optical Structures for Terahertz Beam Control, Adrianna Nieradka², Mateusz Kaluza², Przemyslaw Zagrajek¹, Agnieszka Siemion²; ¹*Inst. of Optoelectronics, Military Univ. of Technology, Poland*; ²*Faculty of Physics, Warsaw Univ. of Technology, Poland*. This work presents 3D printed, subwavelength optical components for terahertz radiation. Innovative lenses with a constant thickness were manufactured by changing the fill factor and infill geometry in order to obtain the desired refractive indices.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

11:30 -- 12:30

Room: South Hall 3C

JTu3A • Joint Plenary Session II

Presider: To Be Announced

JTu3A.1 • 11:30 (Plenary)

Light in a Blink: Harnessing Few-Cycle Pulses for Extreme Photonics, Jens Biegert¹; ¹*ICFO- The Inst. of Photonic Sciences, Spain*. Few-cycle laser pulses unlock unprecedented control over light-matter interactions. This talk explores the generation of ultrashort, intense light bursts and their transformative impact on attosecond science, strong-field physics, and next-generation photonic technologies.

14:00 -- 16:00

Room: South Hall 3C

ATu4A • Low Phonon Energy Host Materials

Presider: To Be Announced

ATu4A.1 • 14:00

Tunable Unidirectional Cr:ZnSe Ring Laser Without Intra-Cavity Spectral Elements, Zayne Parsons¹, Jonathan Evans¹; ¹*Air Force Inst. of Technology, USA*. A method for creating a tunable, unidirectional Cr:ZnSe laser is presented. This method does not require intra-cavity spectrally selective elements and relies on external feedback. The tuning range achieved was approximately 60 nanometers.

ATu4A.2 • 14:15 (Invited)

Industrial-Grade Single-Cycle CEP-Stable 2 μ m Lasers, Nathalie Lenke¹, Philipp Rosenberger¹, Sebastian Gröbmeyer¹, Lukas Brahmman¹, Aleksandar Sebesta¹, Nils-Holger Haag¹; ¹*PULSED GmbH, Germany*. We present ALBATROSS, a compact, CEP-stable infrared laser delivering single-cycle pulses at 2 μ m. Its exceptional phase and intensity stability, combined with broad spectral coverage, enables advanced mid-IR applications in field-resolved spectroscopy and strong-field physics.

ATu4A.3 • 14:45

Efficient Laser Operation in Nd³⁺-Doped Fluorite Mixed Crystals Co-Doped With Buffer Ions for High-Energy Lasers, Simone Normani¹, Sébastien Montant², Patrice Camy¹, Alain Braud¹; ¹*CNRS CIMAP, France*; ²*CEA CESTA, France*. Record high laser slope efficiency ($\eta \approx 60\%$) is achieved in Nd³⁺:Gd³⁺ doped (Ca_{1-x}Sr_xF₂) mixed crystals around 1 μ m. The broad laser gain spectrum is engineered through the co-doping with buffer ions and the solid-solution composition of the crystals.

ATu4A.4 • 15:00

Direct Bonding and Laser Operation of Er:CaF₂|CaF₂ Composite Fluoride Crystals, Pavel Loiko¹, Vivien Menard¹, Abdelmjid Benayad¹, Gurvan Brasse¹, Sébastien Montant², Alain Braud¹, Patrice Camy¹; ¹*Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, France*; ²*CEA, CESTA, France*. We present an approach of fabricating composite (end-capped)

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

RE:CaF₂|CaF₂ fluoride crystals with improved thermal properties by direct bonding and annealing. A 5 at.% Er:CaF₂|CaF₂ laser generated 0.86 W at 2.80 μ m with 19.3% slope efficiency.

ATu4A.5 • 15:15

Mid-Infrared Emission Properties of Rare-Earth Doped BaF₂ Crystal, Ngoc Quynh Hoa NGUYEN¹, Pavel Loiko¹, Ei Ei Brown², Zackery D. Fleischman², Jason Mckay², Abdelmjid Benayad¹, Patrice Camy¹, Mark Dubinskii², Alain Braud¹; ¹*Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, 6 Boulevard Maréchal Juin, France*; ²*US Army Research Laboratory, ATTN FCDD-RLA-GA, 2800 Powder Mill Rd, USA*. We overview the mid-infrared (2-5 μ m) emission properties of barium fluoride (BaF₂) crystals doped with Tm³⁺, Er³⁺, Ho³⁺, and Dy³⁺ ions, including stimulated-emission cross-sections, probabilities of radiative and non-radiative transitions, and broadly tunable laser operation.

ATu4A.6 • 15:30

High-Repetition-Rate Passively Q-Switched Visible Waveguide Laser, Ji Eun Bae¹, Jonathan Demaimay¹, Pavel Loiko¹, Fabian Rotermund², Gurvan Brasse¹, Alain Braud¹, Patrice Camy¹; ¹*CIMAP-CNRS-Université de Caen Normandie, France*; ²*Korea Advanced Inst. of Science and Technology, Korea (the Republic of)*. We report on a nanosecond high-repetition-rate visible Pr:LiYF₄ ridge waveguide laser Q-switched by single-walled carbon nanotubes. The red waveguide laser delivers 26-ns pulses at 6.73 MHz with an average output power of 335 mW.

ATu4A.7 • 15:45

Watt-Level Continuous-Wave Ground-State Laser Operation of Tm:YLF at 0.8 μ m, Sascha Kalusniak¹, Moritz Badtke¹, Stefan Püschel¹, Hiroki Tanaka¹, Christian Kraenkel¹; ¹*Leibniz-Institut für Kristallzüchtung, Germany*. We report on efficient room-temperature laser operation of Tm³⁺:LiYF₄ on the ³H₄→³H₆ transition with emission wavelengths around 820 nm, yielding slope efficiencies of 54% and a pump-power limited output power of 0.87 W

14:00 -- 16:00

Room: South Hall 3B

LTu4B • Surface Modification & Micromachining

Presider: Golshan Coleiny; Fundamental Optical Solutions LLC, USA

LTu4B.3 • 14:00 (Invited)

Overview of HiLASE Laser Surface Modification Technologies, Sanin Zulic¹, Petr Hauschwitz¹, Jan Brajer¹, Tomas Mocek¹; ¹*HILASE Center, Czechia*. HiLASE Centre presents advancements in laser surface modification using high-intensity diode-pumped lasers, achieving precise control across metals, polymers, glass, and composites. Innovations cover functionalization, shock peening, micromachining, monitoring, and scalable industrial applications in diverse sectors.

LTu4B.2 • 14:30 (Invited)

From Light to Function: Next-Generation Laser Interference Patterning

Technologies, Bogdan Voisiat¹; ¹*SurFunction GmbH, Lithuania*. This talk presents recent

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

advances in Direct Laser Interference Patterning (DLIP), focusing on xDLIP and ELIPSYS® technologies developed at SurFunction. Emphasis is placed on scalable laser-based solutions for functional surface design and industrial patterning applications.

LTu4B.1 • 15:00 (Invited)

Athermalized Multi-Spot Beam Shaping Optics for Multi-kW Laser Applications, Alexander Laskin¹; ¹*AdlOptica Optical Systems GmbH, Germany*. Performance of multi-kW laser technologies is enhanced by multi-spot beam shapers providing specific temperature distribution in process zone. Athermalized optics made of crystal quartz self-compensating thermal lensing guarantees stable operation without focus shift and aberrations.

14:00 -- 16:00

Room: South Hall 3A

LsTu4C • Component Technologies / Quantum Methods for Sensing & Communication

Presider: Maureen Szymanski; US Air Force Research Laboratory, USA

LsTu4C.1 • 14:00 (Invited)

Enhancing Transition Metal Lasers via Hot Isostatic Pressing: Techniques and Applications, Emily m. Heckman¹; ¹*Air Force Research Laboratory, USA*. Performance improvements of Chromium-doped Zinc Selenide (Cr:ZnSe) and other transition metal lasers achieved via a novel hot isostatic pressing (HIP) technique are presented, along with a discussion of prospective and emerging applications for this technology.

LsTu4C.2 • 14:30 (Student Paper Finalist)

Intelligent UAV Based Anaerobic Tank Inspection Using LiDAR-IMU SLAM and Camera Imagery, Yebai Wen¹, Jizhou Lai¹, Shenghong Xie¹, Zehui Fu¹, Hanyu Zhan¹; ¹*Nanjing Univ Aeronautics & Astronautics, China*. An Intelligent UAV system was developed by integrating LiDAR-IMU SLAM and camera imagery for global navigation satellite system denied space inspections. The system for the first time accomplished the unmanned inspection within anaerobic tanks.

LsTu4C.3 • 14:45

Dual-Mechanism Enhanced Miniature Optical Fiber SPR Bio-Probe Based on Nanodiamonds, Lina Ma¹, Yuxin Li¹, Xin Xiong¹, Yaofei Chen¹, Yunhan Luo¹, Gui-shi Liu¹, Lei Chen¹, Zhe Chen^{2,1}; ¹*Jinan Univ., China*; ²*JiHua Laboratory, China*. We present a dual-mechanism nanodiamond-enhanced miniature fiber SPR probe. Its synergistic plasmonic/biological enhancement achieves order-of-magnitude sensitivity improvement in mouse IgG immunodetection for ultrasensitive trace-sample biosensing.

LsTu4C.4 • 15:00

Two-Dimensional Beam Steering Using a Dispersive Optical Phased Array Device for LiDAR Applications, Toijam Sunder Meetei¹, Nan-Ei Yu¹; ¹*Gwangju Inst. of Science and Technology (GIST)), Korea (the Republic of)*. We demonstrate two-dimensional beam steering via wavelength tuning in 64-channel end-fire silica-based dispersive optical phased array device, providing a FOV of 15.8°×12° and full-angle divergence of 0.125°×0.095°, with a total insertion loss of 4.04 dB.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

LsTu4C.5 • 15:15 (Invited)

Withdrawn

LsTu4C.6 • 15:15

Withdrawn

16:30 -- 18:30

Room: South Hall 3C

ATu5A • NLO & Sources for Quantum Optics

Presider: Juliet Gopinath; Univ. of Colorado Boulder, USA

ATu5A.1 • 16:30

1.5 μm Driven High Harmonic Source for Broadband Coherent Imaging, Will Hettel¹, Nicholas Jenkins¹, Gabriella Seifert¹, Benjamin Shearer¹, Drew Morrill¹, Jeremy M. Thurston¹, Rae Larsen¹, Grzegorz Golba¹, Daniel Carlson¹, Henry Kapteyn^{1,2}, Margaret Murnane¹, Michaël Hemmer¹; ¹*Univ. of Colorado Boulder, USA*; ²*Kapteyn-Murnane Laboratories, Inc., USA*. We report a robust high harmonic source driven by a 1.5 μm ultrafast laser that is being optimized for broadband imaging at wavelengths from 13.5 nm to near the carbon K-edge.

ATu5A.2 • 17:00

Demonstration of Near-Infrared Triple-Photon-Generation Stimulated Over one Mode in a Phase-Matched KTP Crystal, Julien Bertrand^{1,2}, Veronique Boutou¹, Corinne Felix¹, David Jegouso¹, Benoit Boulanger^{2,1}; ¹*Institut Néel, France*; ²*Univ. Grenoble Alpes, France*. We achieved the first experimental demonstration of Triple-Photon-Generation seeded over one mode using a 1-cm KTP crystal. The linear dependence on the seeding pulse energy and the polarization behavior are in accordance with quantum theory.

ATu5A.2 • 17:15

Red Picosecond Fiber Optical Parametric Oscillator Pumped at 914 nm by a Nd-Doped Fiber Laser Source, Arnaud Viry¹, Kilian Lecorre², Thierry Robin², Hervé Gilles¹, Sylvain Girard¹, Mathieu Laroche¹; ¹*CIMAP, France*; ²*Exail, France*. We report a picosecond fiber optical parametric oscillator at 645nm, synchronously pumped in the normal-dispersion regime by a Nd-doped all-fiber MOPA laser source at 914nm. The FOPO delivers 35ps pulse at 645nm, with 80mW output power.

ATu5A.3 • 17:30 (Student Paper Finalist)

All-Fiber-Pumped CSP and ZGP Doubly-Resonant OPO for High-Power Mid-IR Generation, Dominik Lorenz^{1,2}, Julian Schneider^{1,2}, Clément Romano¹, Dieter Panitzek^{1,2}, Jan Lautenschläger^{1,2}, Madeleine Eitner¹, Marc Eichhorn^{1,2}, Christelle Kieleck¹; ¹*Inst. of Optronics, System Technologies and Image Exploitation, Fraunhofer, Germany*; ²*Inst. of Control Systems, Karlsruhe Inst. of Technology, Germany*. An all-fiber-pumped doubly-resonant OPO using CSP and ZGP for high-power mid-IR generation is reported. Conversion efficiencies of 48% and 69% at 13.3 W and 25.8 W mid-IR power are achieved, respectively.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

ATu5A.4 • 17:45

Frequency-Stabilized Ultra-Low-Noise Free-Space Brillouin Laser in Diamond, Longjie Zhang^{1,2}, Hui Chen^{1,2}, Wenqiang Fan^{1,2}, Yulei Wang^{1,2}, Zhiwei Lu^{1,2}, Zhenxu Bai^{1,2}; ¹*Center for Advanced Laser Technology, Hebei Univ. of Technology, China*; ²*Hebei Key Laboratory of Advanced Laser Technology and Equipment, China*. We demonstrate a 14.6 W diamond Brillouin laser with an integrated linewidth of 0.85 kHz and a white frequency noise floor at the hertz level. This first noise characterization reveals the exceptional noise-suppression capability of high-power free-space Brillouin lasers.

ATu5A.5 • 18:00

Multiwavelength Ultrafast Entangled Photon Sources via Femtosecond-Pumped Parametric Down-Conversion, Karel Veselsky^{2,1}, Ashley Driesbach², Sanjit Karmakar², Chen-Ting Liao²; ¹*Ceske Vysoke Ucení Technické v Praze, Czechia*; ²*Indiana Univ., USA*. Multiwavelength, quantum-entangled, ultrashort-pulsed light sources are developed using a 90 fs Yb:KGW laser amplifier. Second- and third-harmonic of the 1030nm pump produces wavelength-tunable, entangled biphotons at 810nm, 1030nm, and 1414nm via spontaneous or high-gain parametric down-conversion.

ATu5A.6 • 18:15

Sum-Frequency Generation of High-Power Single-Frequency low-Noise 840 nm Emission for Quantum Applications, Thomas N. Dubé¹, Coline Lavit¹, Kentin Poncelet^{1,2}, Dia Darwich², Mathieu Goepfner², Germain Guiraud², Nicholas Traynor², Adèle Hilico³, Giorgio Santarelli¹; ¹*LP2N, IOGS, CNRS UMR 5298, Université de Bordeaux, France*; ²*Toptica Photonics SAS, France*; ³*LPL, Université Sorbonne Paris Nord, CNRS UMR 7538, France*. We report the generation of 13.4 W of low-noise 840 nm emission based on the sum-frequency generation (SFG) of two high-power single-frequency low-intensity noise fiber master oscillator power amplifier (MOPA) systems in a MgO:PPLN crystal.

16:30 -- 18:30

Room: South Hall 3B

LTu5B • ML/AI for Laser Materials Processing

Presider: Thomas Grunberger; Plasmo Industrietechnik GmbH, Austria

LTu5B.1 • 16:30 (Invited)

Sensing Acoustic and Optical Signals for Monitoring Microfabrication Processes, Andrés F. Lasagni¹; ¹*Fraunhofer IWS, Germany*. This work describes optical, infrared, and acoustic monitoring approaches for laser microstructuring processes. Real-time sensing enables characterization of LIPSS and DLIP features, providing insights into topography, homogeneity, and process dynamics essential for precision manufacturing.

LTu5B.2 • 17:00 (Invited)

Machine Learning and Thermography as Tools for Local Porosity Prediction in Additive Manufacturing of Metals, Simon Altenburg¹, Simon Oster¹, Scheuschner Nils², Keerthana Chand³; ¹*Thermographic Methods, Bundesanstalt für Materialforschung und -prüfung, Germany*; ²*Information Technology, Bundesanstalt für Materialforschung und -prüfung, Germany*; ³*X-ray Imaging, Bundesanstalt für Materialforschung und -prüfung, Germany*. Quality

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

assurance of metal additive manufacturing (PBF-LB/M) is still a challenge. Offering deep process insights, thermography is a well-suited monitoring technique. Here, we show how machine learning based on thermographic data enables a local part porosity prediction.

LTu5B.3 • 17:30 (Invited)

Multimodal Deep Learning for Real-Time Laser Cutting Monitoring and Control, Roland Richter¹; ¹*EMPA - Swiss federal laboratories, Switzerland*. Abstract not available.

LTu5B.4 • 18:00 (Invited)

Physics-Informed Machine Learning for Laser Welding Process Optimization, Moritz Fuchsloch¹; ¹*Universität Stuttgart, Germany*. We introduce a physics-informed machine learning framework for laser welding optimization, embedding physical knowledge into Gaussian process models to steer Bayesian optimization toward desired weld geometries while significantly reducing experimental effort.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Wednesday, 22 October

08:30 -- 10:30

Room: South Hall 3C

AW1A • High Energy/Power 2 μ m Sources

Presider: M J Daniel Esser; Heriot-Watt Univ., UK

AW1A.1 • 08:30

195 mJ, 20 ns, 2.05- μ m Ho:YLF MOPA System at 1-kHz Repetition Rate, Yuchun Liu^{2,1}, Enhao Li², Panqiang Kang², Weichao Yao², Yujie Peng², Yuxin Leng², Zhizhan Xu^{2,1}; ¹*School of Physical Science and Technology, ShanghaiTech Univ., China*; ²*State Key Laboratory of Ultra-intense Laser Science and Technology, Shanghai Inst. of Optics and Fine Mechanics, China*. A high-energy and high-power 2.05- μ m laser with 195.7-mJ pulse energy and 20-ns pulse width at 1-kHz repetition rate is demonstrated from a two-stage Ho:YLF-MOPA system, representing the highest reported pulse energy for kHz-repetition-rate 2- μ m lasers.

AW1A.2 • 08:45

Highly Efficient 70 W Core-Pumped Ho-Doped Silica Fibre Laser, Jan Pokorny^{2,3}, Richard Svejkar¹, Bara Svejkarova^{2,3}, Jan Aubrecht³, Michal Kamaradek³, Ivo Barton³, Ivan Kasik³, Pavel Honzatko³, W. A. Clarkson¹, Pavel Peterka³; ¹*Optoelectronics Research Centre, Univ. of Southampton, UK*; ²*Faculty of Nuclear Sciences and Physical Engineering, Czech Technical Univ. in Prague, Czechia*; ³*Inst. of Photonics and Electronics of the Czech Academy of Sciences, Czechia*. A core-pumped Ho-doped silica fibre laser, pumped at 1940 nm by a Tm-doped laser using a nested-ring active fibre, is demonstrated with a record output power of 70 W and a slope efficiency of 84 %.

AW1A.3 • 09:00

2.6-mJ, 1-kHz Ho:CALGO Regenerative Amplifier at 2.08- μ m Wavelength, Anna Suzuki¹, Boldizsar Kassai¹, Michael Mueller^{1,2}, Yicheng Wang¹, Sergei Tomilov¹, Clara J. Saraceno¹; ¹*Ruhr Universitat Bochum, Germany*; ²*Rayven Laser, Germany*. We present energy scaling of a Ho:CALGO regenerative amplifier system to 2.6-mJ, achieving 1.4-ps pulses at 1-kHz repetition rate and at 2.08- μ m wavelength.

AW1A.4 • 09:15 (Student Paper Finalist)

High-Energy Rectangular-Shaped Nanosecond Pulses From a 200 W Photonic Crystal Fiber Amplifier at 2048 nm, Julian Schneider^{1,2}, Dominik Lorenz^{1,2}, Clément Romano¹, Dieter Panitzek¹, Jan Lautenschläger^{1,2}, Marc Eichhorn^{1,2}, Christelle Kieleck¹; ¹*Fraunhofer IOSB, Germany*; ²*Inst. of Control Systems, Karlsruhe Inst. of Technology, Germany*. A linearly polarized photonic crystal fiber amplifier is reported generating 2 mJ rectangular pulses with a pulse width of 49 ns. The system delivers 207 W average power with a narrow linewidth at 2048 nm, high peak power, and excellent beam quality.

AW1A.5 • 09:30

Cr:ZnS Seeded Two-Stage Cr:ZnS/Se CPA Pumped by Radiation 1645 nm Er:YAG Laser, Rem Danilin¹, Dmitry Martyshev¹, Sergey Vasilyev², Jeremy Pigeon³, Vladimir Fedorov¹, Sergey B. Mirov¹; ¹*Univ. of Alabama at Birmingham, USA*; ²*IPG Photonics Corporation, USA*; ³*Laboratory for Laser Energetics, Univ. of Rochester, USA*. We demonstrate a two-stage

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Cr:ZnS and Cr:ZnSe CPA at 2.35 μm wavelength, achieving a single-pass gain of 2400 of fs-pulses in the first stage and 5 mJ pulses after five passes in the second stage.

AW1A.6 • 09:45

Power and Energy Scaling of Tm-Doped Fiber Lasers, Christian Gaida¹, Mathias Lenski², Felix Wanitschke^{2,3}, Philipp Gierschke^{2,4}, Mehran Bahri², Cesar Jauregui^{2,4}, Warunya Röder⁴, Tobias Heuermann¹, Jens Limpert^{2,3}, Tino Eidam¹; ¹*Active Fiber Systems GmbH, Germany*; ²*Inst. of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-Universität Jena, Germany*; ³*Helmholtz-Inst. Jena, Germany*; ⁴*Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany*. We present a high-power, in-band-pumped Thulium-doped fiber MOPA laser at 2 μm with high efficiency and high pulse energy extraction. Challenges include reducing quantum defect, managing thermal issues, and optimizing in-band pumping for efficient energy extraction.

AW1A.7 • 10:00

Simulation and Experimental Results of High-Power Single-Frequency Tm-Fiber Amplifiers at 2050 nm for Next-gen GWD, Stefanie Unland¹, Peter Weißels¹, Jörg Neumann¹, Dietmar Kracht^{1,2}; ¹*Laser Zentrum Hannover e.V., Germany*; ²*Inst. of Photonics, Germany*. This study investigates laser systems for future gravitational wave detectors, with an emphasis on high-power, linear polarization, and single-frequency operation. Various all-fiber amplifier designs using Tm-doped fibers are numerically simulated and affirmed by experimental results.

AW1A.8 • 10:15

Ultrashort Pulse High-Power Tm-Doped Fiber Laser System, Donguhn Kang¹, Toshio Otsu¹, Yohei Kobayashi¹; ¹*Univ. of Tokyo, Japan*. We demonstrated a simple method of generating 75-fs, >1 W, 40 MHz pulses via self-compression in a Tm-doped fiber, and subsequently seeded a 100-W class power amplifier system with them.

08:30 -- 10:30

Room: South Hall 3B

LW1B • Fusion Energy

Presider: Vincent Issier; MKS Instruments Inc, USA

LW1B.1 • 08:30 (Invited)

Progress in Laser Fusion Energy, Edward Moses¹; ¹*Longview Fusion, USA*. Abstract not available.

LW1B.2 • 08:45 (Invited)

Fusion Ecosystem, Jana J. Jung¹; ¹*Marvel Fusion GmbH, Germany*. This presentation explores accelerating progress in laser-driven fusion, political momentum, and investment trends. It presents Marvel Fusion's roadmap, addresses industry challenges, and highlights the need for global collaboration to realize clean, abundant fusion energy soon.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

LW1B.3 • 09:00 (Invited)

Title to be Announced, Franck e. Leibreich¹; ¹*Thales, France*. Abstract note available.

LW1B.4 • 09:15 (Invited)

Title to be Announced, Marc Tricard¹; ¹*Newport Corporation, USA*. Abstract not available.

08:30 -- 10:30

Room: South Hall 3A

LsW1C • Free Space Optical Communications II

Presider: Jaime Anguita; Universidad de los Andes (Chile), Chile

LsW1C.1 • 08:30 (Invited)

Mitigation of Nonlinearity, Spatial and Temporal Interferences in Optical Wireless Communication Using Artificial Neural Networks, Sujan Rajbhandari¹; ¹*Inst. of Photonics, Univ. of Strathclyde, UK*.

Optical Wireless Communication (OWC) is one of the important technologies for achieving low-latency, high-speed connectivity in next-generation networks, thanks to the availability of over 300 THz of license-free optical spectrum. Although the optical spectrum offers bandwidth several orders of magnitude greater than that of radio frequencies, practical limitations such as the low bandwidth of optoelectronic devices leading to temporal interference, spatial interference in multiple-input multiple-output (MIMO) systems, and device nonlinearity significantly degrade communication performance and achievable data rates. To overcome these challenges, artificial neural networks (ANNs) can be trained to compensate for individual or combined impairments in OWC systems. In this talk, a novel ANN-based approach to jointly mitigate nonlinearity, spatial, and temporal interference in MIMO-based OWC systems is discussed. The performance of the proposed scheme will be evaluated and compared with traditional techniques, highlighting the improvements in communication performance and the key advantages of adopting ANN-based compensation

LsW1C.2 • 09:00

Wavefront Measurement Using an Angular-Selective Transmission Filter, Andreas Zepp¹, Raphael Bellossi¹, Julien Garnier^{1,2}, Emma Branigan³, Kevin P. Murphy³, Szymon Gladysz¹; ¹*Fraunhofer IOSB, Germany*; ²*Univ. Paris-Saclay, Institut d'Optique Graduate School, Palaiseau, France, France*; ³*Centre for Industrial and Engineering Optics, School of Physics, Clinical and Optometric Sciences, Technological Univ. Dublin, Ireland, Ireland*. We propose a wavefront sensor that utilizes the angular selectivity of an optical transmission filter. This sensor converts phase gradients into an intensity distribution. Simulations demonstrate the applicability of the sensor in atmospheric turbulence.

LsW1C.3 • 09:15

Withdrawn

LsW1C.4 • 09:30 (Invited)

Turbulence-Resilient and High Data Rate Coherent Optical Wireless

Communications, Szymon Gladysz¹; ¹*Fraunhofer IOSB, Germany*. In this presentation we will discuss the most relevant effects and manifestations of atmospheric turbulence on coherent free-space optical communications (FSOC) and address the methods of suppressing these effects. The measurement routines and mitigation strategies have been implemented in an 800-m FSOC link.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

LsW1C.5 • 10:00

Characterization of Underwater Optical Turbulence in Lake Superior Using an Autonomous Underwater Vehicle, Jeremy P. Bos¹, Linda Abro¹, Ian Q. Mattson¹; ¹*Michigan Technological Univ., USA*. We present an experiment designed to characterize underwater turbulence for optical communication links. An autonomous underwater images a target board with an LED array. Turbulence strength along the path can be analyzed via differential tilts.

LsW1C.6 • 10:15

Progression of OAM Recognition From Spatial to Temporal Domain, Purnesh S. Badavath¹, Vijay Kumar¹; ¹*NIT Warangal, India*. This work presents the progression of Orbital Angular Momentum recognition from the spatial to temporal domain, utilizing speckle-learned machine learning algorithms for high-speed information demultiplexing in advanced communication and sensing systems

10:30 -- 11:30

Room: Congress Hall Foyer 3

JW2A • Joint Poster Session II

JW2A.1

Burn Severity Measurement System Using Imaging Photoplethysmography Based on Multi-Wavelength Laser Diodes and Dual-Wavelength Cameras, Joo Beom Eom¹; ¹*Department of Biomedical Science, Dankook Univ., Korea (the Republic of)*. We introduce a non-contact burn severity assessment system using the imaging photoelectric plethysmography (IPPG) technique by developing an imaging system using a multi-wavelength laser diode and a dual-wavelength camera.

JW2A.2

Detection of Mineral Pollution Near Basra oil Refineries Using Absorption and Fluorescence

Techniques, Ahmad K. Khedher¹, Thamer M. Mohammed²; ¹*Al Nahrain Univ., Iraq*; ²*College of Dentistry, Tikrit Univ., Iraq*. This work employed fluorescence and absorption spectroscopy to analyze wastewater near Basra oil refineries using wideband (200–1000 nm) light. Key peaks at 278, 400, and 733 nm identified dissolved metals, providing trustworthy environmental monitoring.

JW2A.3

Microscopic Ghost Imaging With Table top XUV Source, Sukyoon Oh^{1,2}, Monalisa Mallick¹, Thomas Siefke³, Christian Spielmann^{1,2}; ¹*Friedrich-Schiller-Universität Jena, Germany*; ²*GSI Helmholtz Centre for Heavy Ion Research, Germany*; ³*Inst. of Applied Physics, Abbe Center of Photonics, Germany*. Our novel lensless XUV ghost imaging technique, utilizing a compact HHG source, overcomes conventional optical challenges. This enables high-resolution microscopy with low photon flux and reduced radiation, crucial for applications in materials science, biology, and nanotechnology, highlighting the feasibility of tabletop XUV imaging systems.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

JW2A.4

Ultrafast Filamentation in air at 333 kHz Employing Coherently Combined Fiber

Laser, Ihsan Fsaifes¹, Corentin Lechevalier¹, Jordan Andrieu¹, Leandro Frigerio², Milos Burger², Igor Jovanovic², Jean-Christophe Chanteloup¹; ¹*Laboratoire LULI, France*; ²*Univ. of Michigan, USA*. Plasma filaments in air are generated using a coherently combined ultrashort fiber laser, reaching the highest repetition rate of 333 kHz reported to date. Cumulative effects on the filament length and longitudinal shift are investigated.

JW2A.5 (Student Paper Finalist)

Termination Control Between Collinear Segments in 3D Laser-Written Photonic

Circuits, Ji Qin¹, Yunuen Montelongo¹, Adithya Pradeep¹, Zhi Kai Pong¹, Zipei Song¹, Tianxin Wang¹, Stephen M. Morris¹, Steve J. Elston¹, Patrick S. Salter¹, Martin J. Booth¹; ¹*Department of Engineering Science, Univ. Of Oxford, UK*. We investigate coupling efficiency in waveguides fabricated by direct laser writing through experiments and theory. It is realized that precision control of the end facet writing reduces scattering losses, which enables low-loss photonics integration.

JW2A.6

Single-Cycle Pulse Generation With 30 μ J Energy at 3.2 μ m and 100 kHz Repetition

Rate, Rajaram Shrestha¹, Roland Nagymihály¹, Katalin Pirisi¹, Zoltán Kis¹, Levente Ábrók¹, Jie Meng¹, Eric Cormier^{1,2}, Bálint Kiss¹; ¹*ELI ERIC, ALPS Facility, Hungary*; ²*Laboratoire Photonique Numérique et Nanosciences, France*. We demonstrate two-stage post-compression of 3.2 μ m, 45 fs pulses to single-cycle 11.2 fs, 30 μ J at 100 kHz, using spectral broadening in BaF₂/Si and compression with TOD mirrors and CaF₂/BaF₂ windows, characterized using TIPTOE and ICE technique.

JW2A.7

Direct Electronical Readout of Surface Plasmon Resonance Biosensor Enabled by on-Fiber Graphene/PMMA Photodetector, Chao Shen¹, Shiqi Hu¹, Yaofei Chen¹, Gui-shi Liu¹, Lei Chen¹, Zhe Chen^{1,2}, Yunhan Luo¹; ¹*Jinan Univ., China*; ²*JiHua Laboratory, China*. We present the first optical fiber device integrating hyperbolic-metamaterial SPR sensor with on-fiber graphene/PMMA photodetector, incorporating side-polished fiber for electrical readout in visible to near-infrared spectral range, validated in urea and glucose detection.

JW2A.8

Withdrawn

JW2A.9

Compact Tm³⁺:YLF Laser Utilizing a Mechanical Q-Switch, Johannes Eckhardt^{1,2}, Marius Rupp¹, Steffen Guentert¹, Marc Eichhorn^{1,2}, Christelle Kieleck¹; ¹*Fraunhofer IOSB, Germany*; ²*Karlsruher Institut für Technologie, Germany*. This work presents a Tm³⁺:YLF laser setup featuring a compact mechanical Q-switch. Results demonstrate excellent beam quality, a slope efficiency of 30% and a pulse energy of 0.8 mJ with pulse duration of 85 ns.

JW2A.10

Pointing Control of Coherently Combined Laser Beam Without Steering Optics, Jong-Won Lee¹, Kwang Hyun Lee¹, Hwihyeong Lee¹, Juseung Lee¹, Junhan Park¹, Seungwook Yoon¹, Suhun Jung¹, Joonhoi Koo¹, Seungwon Jun¹, Wansoon Shin¹; ¹*Agency for Defense*

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Development, Korea (the Republic of). Coherent beam combining technique has tremendous advantage to achieve brightness light on target by locking all of phases. Furthermore, by controlling optical phases, beam can be structurally turned. In this paper, we computationally demonstrate pointing control of combined beam using control of phase feedback receiver without the steering optics.

JW2A.11

Phase-Modulated Seeded Commercial Turnkey Q-Switch Lasers: a Solution for Brillouin Effect Challenges in Thick Optics Damage Testing., jean-francois gleyze¹, charles bouyer¹, sara sadocki¹, jordan ilien¹, laurent lamaignere¹; ¹CEA-CESTA, France. To our knowledge, this is the first industrial integration of a phase-modulated seeder with a control loop in a commercial Q-switch laser, enhancing precision and efficiency without cavity adjustments, based on a CEA patent.

JW2A.12

Multiphysics Simulation of Tm³⁺-Doped Solid-State Resonators: Integrated Laser Dynamics in Tm³⁺:YAP and Tm³⁺:YLF, Marius Rupp¹, Johannes Eckhardt^{1,2}, Marc Eichhorn^{1,2}, Christelle Kieleck¹; ¹Fraunhofer Inst. of Optronics, System Technologies and Image Exploitation, Germany; ²Karlsruhe Inst. of Technology, Germany. A multi-physics simulation for Tm³⁺-doped solid-state lasers at 2 μm is presented, which integrates rate equations, material parameters, and spectral dynamics. It is validated against Tm³⁺:YAP and Tm³⁺:YLF experiments in compact linear resonators.

JW2A.13

Pump Beam Shaping for Energy Maximization in Passively Q-Switched Nd:YAG-Based Microchip Lasers, Krystof Kadlec¹, Jan Sulc¹, Helena Jelinkova¹, Karel Nejezchleb²; ¹FNSPE CTU in Prague, Czechia; ²Crytur, Ltd., Czechia. Pump beam modification improved nanosecond pulse energy in Nd:YAG-based microchip lasers, achieving over fourfold energy increases: up to 420 μJ at 1.06 μm , 135 μJ at 1.34 μm , and 91 μJ at 1.44 μm .

JW2A.14

Development of a Mid-Infrared Laser Source for Glycomics, Marie-Celine Gauthier¹, Xavier Délen¹, Michele Natile², Marc Hanna¹, Patrick Georges¹; ¹Institut d'Optique Laboratoire Charles Fabry, France; ²33600, Amplitude, France. We report on a CW-seeded OPA, pumped by an Yb-doped fiber laser, delivering Mid-IR tunable, sub-ns, pulses at high repetition rate. We study the conversion efficiency and output beam quality versus pump energy.

JW2A.15

Investigation of Uni-Directional Planar Ho³⁺:YAG Ring Lasers, Katharina Goth¹, Marius Rupp¹, Madeleine Eitner¹, Marc Eichhorn^{1,2}, Christelle Kieleck¹; ¹Fraunhofer IOSB, Germany; ²Karlsruhe Inst. of Technology, Germany. A four-mirror planar Ho³⁺:YAG ring laser is investigated with regards to cavity design and power scaling. Uni-directional operation is ensured by providing feedback in one operation direction. Simulations support the experimental observations.

JW2A.16

Narrow-Line Tunable Laser With Direct UV Emission Based on Ce³⁺:LiCAF, Hendrik Bükér^{1,2}, Eduardo Granados¹, Katerina Chrysalidis¹, Marc Eichhorn^{2,3}; ¹Council Européenne

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Recherche Nucleaire, Switzerland; ²Inst. of Control Systems (IRS), Karlsruhe Inst. of Technology (KIT), Germany; ³Fraunhofer IOSB (Inst. of Optronics, System Technologies and Image Exploitation, Germany. We propose a GHz-linewidth deep UV laser based on $\text{Ce}^{3+}:\text{LiCAF}$ as a compact, tunable alternative in nuclear spectroscopy. Its broad Ce-ion emission enables stable, long-term operation across the 285–315 nm range.

JW2A.17

Hybrid Q-Switched Mode-Locked Vortex Lasers in an Azimuthal Symmetry Breaking Resonator, YuanYao Lin¹, Zhen-Ho Wu¹, Jia-Yang Chen¹; ¹*National Sun Yat-Sen Univ. (Taiwan), Taiwan.*

A 12-ps Q-switched mode-locked optical vortex pulse with unit topological charge was generated via hybrid active–passive modulation in an azimuthal symmetry-breaking ring laser resonator, enabling vortex laser emission with high spatiotemporal coherence.

JW2A.18

5J, 8GW Pulses From a Room-Temperature DFC-PowerChip Laser, Vincent Yahia^{2,1},

Hideho Odaka^{2,1}, Mitsuhiro Yoshida³, Takunori Taira^{2,1}; ¹*Inst. for Molecular Science, Japan; ²RIKEN SPring-8 Center, Japan; ³KEK, Japan.* We present a room-temperature breadboard-mounted J-class laser based on distributed face-cooling composite gain-chips, delivering 5 J, 620 ps pulses at 5 Hz, and up to 1.8 J at 100 Hz in burst mode.

JW2A.19 • 10:30

Addressing Temporal and Spectral Instabilities in a Tm:LLF Hybrid Stable-Unstable Laser Resonator, Ross Tully¹, Lucas Sadovy Cockburn¹, Jake Sanwell¹, Leon Martin¹, Lucas Groult¹,

M J Daniel Esser¹; ¹*Inst. of Photonics and Quantum Sciences, Heriot-Watt Univ., UK.* Temporal and spectral instabilities observed in a thin-slab Tm:LLF laser employing a hybrid stable-unstable resonator are investigated using experimental methods and numerical mode analysis.

JW2A.20

Kerr-Beam-Self-Cleaning in a Large-Core GRIN Fiber, Barak Messica¹, Pavel

Sidorenko¹; ¹*Electrical and Computer Engineering, Technion Israel Inst. of Technology, Israel.* We demonstrate KBSC in a 300 μm GRIN fiber with 220ns/8.5mJ and 7ns/0.4mJ pulses, achieving high-energy pulse delivery. We show that beam-quality improvement is input-limited and the cleaned beam is more environmentally stable than in linear-propagation.

JW2A.21

Eye-Safe Optical Vortex Generation From the Pump-Wave off-Axis Pumped OPO, Chun-

Yu Cho¹, C. W. Li¹, T. Y. Lu¹, Y. H. Huang¹; ¹*National United Univ., Taiwan.* The eye-safe high-order transverse mode can be generated by using the pump-wave off-axis pumped OPO. A compact continuous-wave output from the intracavity OPO and a kW pulsed output from the extracavity OPO are separately demonstrated.

JW2A.22

Femtosecond Mid-Infrared Cr:ZnS Lasers Utilizing Graphene-ZnSe Saturable

Absorber, Seong Hyeon KIM¹, Dong Ho Shin², Young Tea Chun¹, Fabian Rotermund³, Won Bae Cho¹; ¹*Department of Nano-Semiconductor Engineering, National Korea Maritime and Ocean Univ., Korea (the Republic of); ²Digital Biomedical Research Division, Electronics and Telecommunications Research Inst., Korea (the Republic of); ³Department of Physics, Korea Advanced Inst. of Science and Technology, Korea (the Republic of).* In this work, using

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

monolayer graphene on a ZnSe substrate with high nonlinearity, the passively mode-locked polycrystalline Cr:ZnS laser generated Fourier transform-limited 128 fs pulses near 2340 nm.

JW2A.23

Spatial Analysis and Temporal Stabilisation of a Diode-Pumped Passively Q-Switched Tm:YLF Laser at 2.3 μm , Matthieu Glasset¹, Hippolyte Dupont¹, Patrick Georges¹, Frédéric druon¹; ¹*Institut d'optique, Lab Charles Fabry, France*. We report on a diode pumped, Q-switched, Tm:YLF laser emitting at 2.3 μm . Pulse train instabilities analysis shows that dynamics of the different transversal modes is uncorrelated and stability can be achieved by spatial selection.

JW2A.24

TMI Threshold Measurements via Beam Stability Metrics, Przemyslaw Gontar¹, Lukasz Gorajek¹, Jan Jabczynski¹; ¹*Inst. of Optoelectronics, Military Univ. of Technology, Poland*. A simple definition of the TMI threshold in high-power fiber lasers is proposed. Demonstrated on a 10 kW system using three diagnostic methods, it shows potential for broader applicability across different measurement and system configurations.

JW2A.25

1605 nm PM Picosecond Fiber Laser, Jean-bernard Lecourt¹, Jean-Paul Yehouessi¹, Yves Hernandez¹; ¹*Multitel, Belgium*. SESAM-free Mode-Lock fiber oscillator combined with innovative 4-pass pre-amplifier and Large-Mode-Area Er/Yb amplifier have been developed for delivering 1605nm 20 ps pulses exhibiting kilowatt peak power, Watt-level average power and spectral linewidth under 1 nm.

JW2A.26

9-mJ 1-kHz Yb:CALGO Single Crystal Regen Amplifier, Fengchen Zhang¹, Yutong Zhang¹, Geyang Wang¹, Yang Yu¹, Wenlong Tian¹, Yishan Wang², Jiangfeng Zhu¹, Zhiyi Wei¹; ¹*Xidian Univ., China*; ²*Xi'an Inst. of Optics and Precision, Mechanics (XIOPM), China*. **Abstract:** We demonstrated a high-energy Yb:CALGO single-crystal regenerative amplifier, delivering 9.2 mJ output at 1 kHz. The gain narrowing effect was mitigated by using a birefringent filter, enabling an amplified spectrum bandwidth of 10.1 nm.

JW2A.27

922 nm Single-Mode Nd-Doped All-Fiber Laser Using a Chirped Tilted Fiber Bragg Grating., Alban Leleux¹, Yigit O. Aydin¹, William Bisson¹, Mathieu Gagné², Bertrand Morasse², Guillaume Brochu², Martin Bernier¹; ¹*Université Laval, Canada*; ²*indie (TeraXion), Canada*. We present a single-mode all-fiber laser emitting 4.7 W at 922 nm, based on a neodymium-doped silica step-index fiber and a chirped tilted fiber Bragg grating cavity filter suppressing the competing amplified spontaneous emission at 1060 nm.

JW2A.28

Development of Yb:YAG Thin Rod Amplifier With Atomic Diffusion Bonding, Yasuhiro Kamba¹, Ryo Kageyama¹, Atsushi Fuchimukai¹, Taisuke Miura¹, Miyuki Uomoto^{2,3}, Takehito Shimatsu^{2,3}; ¹*Gigaphoton Inc, Japan*; ²*Research Inst. of Electrical Communication, Tohoku Univ., Japan*; ³*Frontier Research Inst. for Interdisciplinary Sciences, Tohoku Univ., Japan*. A fiber laser seed was amplified using a double-pass Yb:YAG ceramic rod amplifier with atomic diffusion bonding, achieving 33.8 W output and 5.63 mJ pulse energy with enhanced beam

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

quality and efficiency.

JW2A.29

Radiation-Hardened Er-Doped Figure-8 Mode-Locked Fiber Lasers for Spaceborne Optical Frequency Comb, Mitsuru Musha¹, Yuichi Takeuchi¹, Nozomu Takagi¹, Sou Aiba¹, Ren Kondo¹, Yushi Tanaka¹, Aru Suemasa², Saya Matsushita², Toshitaka Sasaki², Hiroshi Takigusch², Isao Kawano², Satoshi Kogure²; ¹*Inst. for Laser Science, Univ. of Electro-communications, Japan*; ²*Japan Aerospace Exploration Agency, Japan*. We have developed spaceborne optical frequency comb with figure-8-type mode-locked fiber lasers, in which specially-customed radiation-hardened high-doped Er-doped fibers are used for further enhancement of radiation tolerance up to total dose of 150 krad.

JW2A.30

Sub-fs Timing Jitter Control for a ULtrafast Regenerative Amplifier, Niu Siyuan¹, Yang Yu¹, Wenlong Tian¹, Geyang Wang¹, Jiangfeng Zhu¹, Zhiyi Wei², Wu Bowen¹; ¹*Xidian Univ., China*; ²*Inst. of Physics, Chinese Academy of Sciences, China*. We report on 0.876 fs RMS timing fluctuation correction between a free-running femtosecond seed source and regenerative amplifier using the fast-slow loop feedback within four hours.

JW2A.31

Narrowband ZGP OPO Emission at 3.98 μm in Non-Planar Ring Cavity With Si Etalons, Marcin Piotrowski¹, Achille Bogas-Droy¹, Gerhard Spindler², Stefano Bigotta¹, Anne Hildenbrand-Dhollande¹; ¹*French-German Research Inst. of Saint-Louis, France*; ²*Independent Researcher, Germany*. We present a study of high-power ZGP OPO in the non-planar resonator with spectral narrowing by intra-cavity elements down to single nanometres linewidths around 4 μm .

JW2A.32

Design of 7-Channel Fiber Positioner Array With Parallelogram-Structured PZT Actuators for Coherent Beam Combining, Suhun Jung¹, Hwihyeong Lee¹, Joonhoi Koo¹, Junhan Park¹, Juseung Lee¹, Seungwook Yoon¹, Jong-Won Lee¹, Seungwon Jun¹, Kwang Hyun Lee¹, Wansoon Shin¹; ¹*Agency for Defense Development, Korea (the Republic of)*. We propose a seven-channel tiled fiber laser array integrated with a fiber positioner for coherent beam combining. The fiber positioner incorporates four piezoelectric benders in a parallelogram configuration allowing high-precision control. The PZT actuator module was evaluated through step response and target-in-the-loop (TIL) experiments.

JW2A.33

Thin-Disk Laser Module Comparison, Sabina Kudelkova¹, Radim Kudelka¹, Antonin Fajstavr¹, Michal Chyla², Pawel Sikocinski², Jiri Muzik²; ¹*CRYTUR spol. s.r.o., Czechia*; ²*Hilase, Czechia*. Thin-disk laser modules produced in Crytur for high power applications are introduced. SiC and diamond substrates and different coating techniques are compared in terms of heat management and resulting output efficiency.

JW2A.34

Pulsed 1062.78-nm Yb Doped Fiber Amplifier for Generating Light Source of Hydrogen Lyman- α Resonance Light, Tatsuya Shinozaki¹, Norihito Saito¹, Yu Oishi^{2,3}, Takayo Ogawa¹, Satoshi Wada¹; ¹*Photonics Control Technology Team, RIKEN, Japan*; ²*Muon Science*

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Laboratory, Institute of Materials Structure Science, KEK, Japan; ³Muon Science Section, Inst. of Materials and Life Science Division, J-Parc Center, Japan. we report a pulsed 1062.78-nm light source. The pulsed light was generated by an intensity modulator. It was amplified a Yb doped fiber amplifier. The output energy was 20 nJ at 100 kHz.

JW2A.35

Tunable Single-Frequency Cascaded Stokes Orders in Monolithic Diamond Raman

Lasers, Eduardo Granados¹, Cyril Bernerd¹, Katerina Chrysalidis¹, Daniel T. Echarri¹, Valentin N. Fedosseev¹, Reinhard Heinke¹, Bruce Marsh¹, Eva Roiková¹, Sebastian Rothe¹, Georgios Stoikos¹; ¹*Council Européenne Recherche Nucleaire, Switzerland.* We present results of a temperature-tunable, cascaded single-frequency diamond Raman laser that significantly extends the wavelength coverage in the visible spectral range, enabling broader isotope shift measurements at CERN.

JW2A.36

Wavefront Stabilization of High-Energy Few-Cycle Pulses via Vacuum Enclosure in

SYLOS2, Janos Csontos¹, Szabolcs Tóth¹, László T. Tóth¹, István Dóra¹, Dániel Abt¹, Prabhash P. Geetha¹, Balázs Kovalovszki¹, Tamás Somoskói¹, Balázs Nagyillés¹, Balázs Farkas¹, Zsolt Divéki¹, Andor Körmöczi¹, Adam Borzsonyi¹; ¹*ELI-HU, Hungary.* Vacuum-enclosing the SYLOS2 laser's beam expansion and pre-compression stages significantly improved wavefront stability by reducing air-induced aberrations, enhancing beam quality for attosecond and particle source applications at ELI ALPS.

JW2A.37

Investigating the Evolution of Optical Vortex Arrays in Laser Beams via Second

Harmonic Generation, Jung-Chen Tung¹, Jia-Ming Chen¹, Chen-Kai Sung¹; ¹*National Taipei Univ. of Technology, Taiwan.* High-order laser modes are generated via off-axis pumping and second-harmonic generation, converted into vortex arrays using an astigmatic mode converter, and analyzed theoretically in terms of their propagation, phase fields, and gradients.

JW2A.38

Laser Architecture for Burst-Mode Electro-Optic Frequency Combs Beyond 100 W

Eva Roiková^{1,2}, Vitaliy Goryashko², Eduardo Granados¹; ¹*CERN, Switzerland*; ²*Department of Physics and Astronomy, Uppsala Univ., Sweden.* We propose a burst-mode laser architecture based on a combination of Yb fiber and Nd bulk gain media for amplifying an electro-optic frequency comb to more than 100 W, enabling laser-particle interaction experiments at high intensity.

JW2A.39

Passively Q-Switched Tm:YLF Laser Utilizing Ho:YAG Saturable Absorber at 1907

nm, Salman Noach¹, Neria Suliman¹, Ishay Shalman¹, Rotem Nahear¹; ¹*Jerusalem College of Technology, Israel.* Demonstration of enhanced performance of a passively Q-switched Tm:YLF laser using Ho:YAG as saturable absorber, wavelength-stabilized using etalons to the 1907 nm holmium absorption peak, achieving pulse energies up to 4.2 mJ with 9.6% optical efficiency.

JW2A.40

Picosecond Synchronously Pumped Crystalline Raman Lasers for Advanced Applications - Overview

Milan Frank¹, Michal Jelinek¹, David Vyhlídal¹, Václav

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Kubeček¹; ¹*Czech Technical Univ., Czechia*. In this contribution, unique, comprehensive and complex overview of picosecond synchronously pumped Raman lasers based on crystalline medium is presented. The experimentally achieved results and theoretical simulations are commented in detail.

JW2A.41

ESTER: a Compact 60 mJ Air-Cooled Q-Switched Nd:YAG Laser for Field

Application, Krystof Polak¹, Antonin Fajstavr¹, Michal Chyla², Matej Zacek², Pavel Porizka³; ¹*CRYTUR spol. s.r.o., Czechia*; ²*HiLASE Centre, Inst. of Physics CAS, Czechia*; ³*Lightigo s.r.o., Czechia*. ESTER is a 1064~nm nanosecond laser source delivering 10~ns pulses with energies exceeding 60~mJ at 50~Hz and over 50~mJ at 100~Hz, featuring excellent pulse-to-pulse stability. It is fully air-cooled, powered by 24~V, with integrated electronics.

JW2A.42

Method to Calculate Resonator Losses Including Diffractive Elements, Hendrik Bükér^{1,2}, Eduardo Granados¹, Katerina Chrysalidis¹, Marc Eichhorn^{1,2}; ¹*Council Européenne Recherche Nucleaire, Switzerland*; ²*Inst. of Control Systems (IRS), Karlsruhe Inst. of Technology (KIT), Germany*. A ray transfer matrix approach incorporates birefringence, and diffractive effects to quantify spectral resonator losses. The framework supports design optimization for advanced resonators in linewidth variable and tunable laser systems.

JW2A.43

Ultra-Short Single-Frequency DFB Yb-Doped Fiber Laser, Artem Shigapov¹, Evgenii Seregin¹, Mikhail Likhachev¹, Yulia Gromova¹; ¹*GREITLEX PHOTONICS DOO, Serbia*. The record-short (~ 10 mm) single-frequency DFB Yb-doped laser operated near 1064 nm have been demonstrated. Output power of more than 13 mW (pump power of ~ 240 mW) was achieved.

JW2A.44

Thermal Management Efficiency Investigation of Passive Elements in SWIR Fiber

Lasers, Helena Picmausova^{1,2}, Michael Pisarik¹, Clément Romano¹, Dieter Panitzek¹, Jan Farlík², Marc Eichhorn^{1,3}, Christelle Kieleck¹; ¹*Fraunhofer IOSB, Germany*; ²*Univ. of Defence, Czechia*; ³*Inst. of Control Systems (IRS), Karlsruhe Inst. of Technology (KIT), Germany*. This paper presents a numerical and experimental investigation of passive thermal management of fiber lasers and amplifiers, emphasizing fiber splice performance. Strategies for reducing thermal stress and improving heat transfer in fiber lasers are highlighted.

JW2A.45

Cascaded Optical Parametric Generation of mid-Wave Infrared Nanosecond Pulses in

CdSiP₂, Marius-Andrei Codescu¹, Joel Murray², Kevin T Zawilski³, Peter G. Schunemann³, Timothy H. Runcorn¹, Robert T. Murray¹, Shekhar Guha⁴; ¹*Imperial College London, UK*; ²*UES, Inc., USA*; ³*BAE Systems, Inc, USA*; ⁴*Materials and Manufacturing Directorate, Air Force Research Laboratory, USA*. We demonstrate tunable 3.7–4.3 μm mid-wave infrared generation using cascaded optical parametric generation in non-critically cut CdSiP₂, pumped by two different 1.064 μm lasers at 10 Hz–5 mJ and 1 kHz–1 mJ.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

JW2A.46

Broadband Incoherent Source Based on Semiconductor Optical Amplifier

for Fusion Applications, Loïc MEIGNIEN¹, Titouan Degrandcourt¹, Marc Hanna¹, Pierre Lebegue¹, Patrick Audebert¹, Jean Christophe Delagnes¹; ¹CNRS, France. This work presents a broadband incoherent laser source based on a semiconductor optical amplifier, suitable for inertial confinement fusion. It enables efficient temporal shaping, high contrast, and shows promising potential for ICF experiments.

JW2A.47

High-Efficiency All-Solid-State Deep-Ultraviolet Femtosecond Laser, junxiao bai¹, Geyang Wang¹, Wenlong Tian¹, Yang Yu¹, Zhiyi Wei², Jiangfeng Zhu¹; ¹xidian Univ., China; ²Inst. of Physics, Chinese Academy of Sciences (IOPCAS), China. This paper reports on a high-efficiency all-solid-state deep-ultraviolet femtosecond laser system with 19.87% and 2.85% conversion efficiencies from the fundamental 1- μ m laser to 259 nm and 207 nm lasers, respectively.

JW2A.48

Thin-Disk Laser Head as a Pump Module for Pumping Thin-Disk Gain Media, Petr Bjorgen¹, Antonin Fajstavr¹, Sabina Kudelkova¹, Martin Smrz², Michal Chyla², Jiri Muzik², Pawel Sikocinski²; ¹CRYTUR, spol. s r. o., Czechia; ²Centrum HiLASE, Czechia. Thin-disk laser head with active medium for high-power solid-state laser was fully tested with a laser source power of up to 1 kW, with an average output power exceeding 500 W in MM and 300 W in SM.

JW2A.49

All-Coaxial Optical Waveform Manipulator for Sub-Petahertz-Band Harmonics

Light, Kazumichi Yoshii¹, Ryo Mitsumoto¹; ¹Ryukoku Univ., Japan. We demonstrate that all-coaxial method for amplitude and phase manipulation works for harmonic light with a bandwidth of 0.8 peta-Hz, generating a pulse width of 520 attoseconds with a pulse interval of 3.5 fs.

JW2A.50

Record Pulse Energy From Compact Nanosecond Nd:YAG/v:YAG Laser Emitting at 1.3 μ m, Jan Sulc¹, Krystof Kadlec¹, Helena Jelinkova¹, Matej Zacek², Martin Smrz², Lukáš Beran³, Radim Kudelka³, Karel Nejezchleb³; ¹Czech Technical Univ. in Prague, Czechia; ²HiLASE Centre, Inst. of Physics ASCR, v.v.i., Czechia; ³Crytur, Ltd., Czechia. We present a compact passively Q-switched laser producing sub-3 ns pulses at 1338 nm. Cavity and pump optimization enabled pulse energies exceeding 1 mJ and peak powers up to 0.4 MW.

JW2A.51

Deep Learning-Assisted Angle-Resolved Scatterometry of 3D NAND Channel Hole

Structure, Lingjie Li¹, Yichi Pan¹, Haokang zhang¹, Wei Liang¹, Chong Shen¹, Dekun Yang¹; ¹Hainan Univ., China. Nanoscale critical dimension profiling of high-aspect-ratio channel holes in 3D NAND flash memory is achieved via optical metrology and neural networks, enabling accurate, high-throughput, and non-destructive measurement for advanced semiconductor memory manufacturing.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

JW2A.52

Experimental Study on Laser Surface Texturing of AISI 416 Stainless Steel Verified by Speckle Imaging, Samar R. AlSayed Ali¹, Doaa Youssef¹; ¹*Laser Inst. (NILES) Cairo Univ., Egypt*. This study investigated laser surface texture as a primary factor improving AISI 416 stainless steel surface by varying the laser processing parameters. Surface modification was evaluated and confirmed through affordable, nondestructive laser speckle imaging.

JW2A.53

Laser Surface Modification of Nodular Graphite Cast Iron (NGCI) by High Power Nd:YAG Laser, Samar R. AlSayed Ali¹, Adel Nofal²; ¹*Laser Inst. (NILES) Cairo Univ., Egypt*; ²*Central Metallurgical Research and Development Inst. (CMRDI), Egypt*. Microstructural modification of NGCI was investigated as a function of laser parameters, including laser power, scanning speed, and interaction time. High laser energy transformed and refined the microstructure, resulting in enhanced surface hardness.

JW2A.54

2.3 W, 2.79 μm Emission From a Diode-Pumped Er:CaF₂ Single-Crystal Fiber Laser, Xu Wu¹, zhen zhang¹, Xiabing Zhou², Dapeng Jiang¹, Guoqiang Xie², Liangbi Su¹; ¹*Shanghai Inst. of Ceramics, Chinese Academy of Sciences, China*; ²*Shanghai Jiao Tong Univ., School of Physics and Astronomy, Key Laboratory for Laser Plasmas (Ministry of Education), Collaborative Innovation Center of IFSA (CICIFSA), China*. A 2.3 W continuous-wave (CW) Er:CaF₂ laser at 2.79 μm has been achieved with laser diodes pumping a $\Phi 1\text{mm} \times 40\text{mm}$ single crystal fiber fabricated by the laser heated pedestal growth (LHPG) method.

JW2A.55

Enhanced Energy Transfer From Laser Radiation to Matter Doped by Resonating Nanoantennas, Konstantin Zsukovszkij¹; ¹*Wigner Research Center for Physics, Hungary*. Nanodopes in matter subject to laser radiation increases energy of ions. 3D-crossed nanoantennas yield 3-4 times higher energy than a resonating dipole, which gives almost 100 times energy gain.

JW2A.56

Benchmarking THz Imaging of Painted Canvases: Absorption, Pearson Correlation, and Label-Free PCA for Hidden Underdrawings, emma vannini^{1,2}, dal fovo alice¹, raffaella fontana¹, ilaria catapano³, alessandra rocco¹, roberto Aiello¹, Valentina Di Sarno¹, pasquale maddaloni¹; ¹*CNR-Istituto Nazionale di Ottica, Italy*; ²*Dipartimento di Fisica e Astronomia, Universita di Firenze, Italy*; ³*IREA-CNR, Italy*. We benchmark absorption, Pearson correlation, and label-free PCA on THz-TDS canvases. Together they robustly reveal concealed underdrawings: absorption quantifies spectral parameters, correlation is frequency-agnostic, and PCA provides reference-free masks—complementary strengths enabling resilient heritage imaging workflows.

JW2A.57

Cryogenically-Cooled Yb:YAG Amplifier for Pumping High Energy and High Repetition Rate OPCPA, Jan Bartonicek^{1,2}, Jan Eisenschreiber¹, Martin Fibrich¹, Jonathan T. Green¹, Bedrich Rus¹; ¹*Extreme Light Infrastructure ERIC, Czechia*; ²*Department of Physics, Faculty of*

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Mechanical Engineering, Czech Technical Univ. in Prague, Czechia. We report on the latest results in the development of a cryogenically-cooled ≥ 10 J Yb:YAG DPSSL for pumping OPCPA at 20 Hz providing 100TW class pulses for laser wakefield acceleration.

11:30 -- 12:30

Room: South Hall 3C

JW3A • Joint Plenary Session III

Presider: To Be Announced

JW3A.1 • 11:30 (Plenary)

Has the Time for Optical Wireless Communications Finally Arrived?, Harald Haas¹; ¹*Univ. of Cambridge, UK.* This plenary address explores how optical wireless communications can tackle connectivity challenges and enhance networks underwater, on land and in space, while also addressing current limitations and proposing potential solutions.

14:00 -- 16:00

Room: South Hall 3C

AW4A • Visible Laser Materials

Presider: Pavel Loiko; CIMAP, Université de Caen Normandie, France

AW4A.1 • 14:00

Cryogenic Cascade Lasing of Tm:YLF With 39 mW Output Power at 450 nm, Moritz Badtke¹, Sascha Kalusniak¹, Hiroki Tanaka¹, Christian Kraenkel¹; ¹*Leibniz-Institut für Kristallzüchtung, Germany.* We report on UV-pumped room-temperature laser experiments with Tm³⁺:LiYF₄ at 1.9 μ m and cryogenic 450-nm/1.9- μ m cascade lasing at 78 K yielding 39 mW output power and 17% slope efficiency at 450 nm.

AW4A.2 • 14:15

Nd-Doped LGYSB: a New Bifunctional Crystal for Efficient Laser Emission and Frequency Conversion, Alin Broasca¹, Madalin Greculeasa¹, Flavius Voicu¹, Stefania Hau¹, Cristina Gheorghe¹, Gabriela Croitoru¹, Nicolaie Pavel¹, Lucian Gheorghe¹; ¹*INFLPR, Romania.* Nd-doped LGYSB crystals with a noncentrosymmetric structure were grown using the Czochralski method. Laser experiments at 1062 nm demonstrated high slope efficiencies, confirming their strong potential for efficient laser emission and frequency conversion.

AW4A.3 • 14:30

Effect of Lanthanum on the Spectroscopy and Laser Performance of Pr:Sr_{1-x}La_xMg_xAl_{12-x}O₁₉ Hexaaluminates, Alix Guerber¹, Jonathan Demaimay², Florent Cassouret¹, Noémie Sandre¹, Zhonghuan Zhang³, Pavel Loiko², Alain Braud², Patrice Camy², Xavier Mateos³, Xiaodong Xu⁴, Alban Ferrier¹, Pascal Loiseau¹, Gerard Aka¹; ¹*PSL Univ., Chimie ParisTech - CNRS, Institut de Recherche de Chimie Paris IRCP, France;* ²*Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, France;* ³*Universitat Rovira i Virgili (URV), Física i Cristallografia de Materials (FiCMA), Spain;* ⁴*Jiangsu Key Laboratory of Advanced Laser Materials and Devices, School of Physics and Electronic Engineering, Jiangsu Normal Univ., China.* We systematically study the effect of lanthanum addition on the spectroscopic and laser properties of Pr:Sr_{1-x}

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

$x\text{La}_x\text{Mg}_{1-x}\text{Al}_{12-x}\text{O}_{19}$ (Pr:ASL) hexaaluminates. A 465-nm GaN-diode pumped red Pr:ASL laser generated 156 mW at 644 nm with 12.2% slope efficiency.

AW4A.4 • 14:45

Violet, Blue and Infrared Cryogenic Lasing From the $^5\text{D}_3$ Level in Tb^{3+} , Moritz Badtke¹, Sascha Kalusniak¹, Hiroki Tanaka¹, Christian Kraenkel¹; ¹*Leibniz-Institut für Kristallzüchtung, Germany*. We report on cryogenic laser operation using the $^5\text{D}_3$ level in Tb:YLF as the upper laser level. At 78 K, lasers at 413 nm, 435 nm and 1746 nm are realized under UV pumping.

AW4A.5 • 15:00 (Student Paper Finalist)

Yellow Lasing From Dy^{3+} -Doped Fluoride Whispering Gallery Mode

Microsphere, Abhishek Sureshkumar¹, Loraïen R. Kalathil¹, Jonathan Demaimay², Georges Perin¹, Christelle Velly¹, Hélène Ollivier¹, Yannick Dumeige¹, Pavel Loiko², Gurvan Brasse², Alain Braud², Patrice Camy², Stéphane Trebaol¹; ¹*Univ. of Rennes, France*; ²*Univ. of Caen Normandy, France*. Dy^{3+} -doped amorphous fluoride microspheres are fabricated from $\text{Dy}:\text{LiYF}_4$ crystals by the plasma torch method. Yellow lasing at 573 nm is achieved under blue GaN-diode pumping at 454 nm with a threshold of 190 μW .

AW4A.6 • 15:15

Diode-Pumped, Q-Switched $\text{Sm}^{3+}:\text{YLF}$ Laser at 605 nm, Yushi Kaneda¹, Hiroki Tanaka², Val Temyanko³; ¹*Univ of Arizona, Coll of Opt Sciences, USA*; ²*IKZ Berlin, Germany*; ³*TIPD LLC, USA*. We report the first Q-switched operation of $\text{Sm}^{3+}:\text{YLF}$ laser at 605 nm. An average power of >100 mW and a pulse width of 250 ns were observed at a repetition rate of 500 Hz.

AW4A.7 • 15:30 (Invited)

Nanostructured GLAD Coatings for High-Power Lasers: Antireflective, High-Reflective, and Polarizing Optics, Lina Grineviciute¹; ¹*Ctr for Physical Sciences & Technology, Lithuania*. Only silica-based antireflective and high-reflective coatings exhibit superior laser damage thresholds and low stress. Anisotropic thin-film designs enable the development of waveplates and 0° AOI polarizers, demonstrating high performance for UV nanosecond lasers and beyond.

14:00 -- 16:00

Room: South Hall 3B

LW4B • EUV, X-Ray Generation & Particle Acceleration I

Presider: Lahsen Assoufid; Argonne National Laboratory, USA

LW4B.1 • 14:00 (Invited)

Laser-Powered Accelerators at High Average Powers, Stephen Milton¹; ¹*Tau Systems, USA*. Abstract not available.

LW4B.2 • 14:30 (Invited)

From Plasma Waves to Coherent Light: Compact XUV FEL Development via

LWFA, Yanjun Gu¹; ¹*The Univ. of Osaka, Japan*. Quasi-monoenergetic electron beams with the energy spread less than 1%, pointing stability less than 0.5 mrad, energy stability less than 6% and a central energy of 400 MeV have been generated. By sending these beams into undulator,

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

a FEL gain in XUV range has been demonstrated.

LW4B.3 • 15:00 (Invited)

DFG THz Generation for the Particle Acceleration Using High Power 1 μ m Laser and Large PPMgLN, Mitsuhiro Yoshida¹; ¹KEK, Japan. Abstract not available.

LW4B.4 • 15:30 (Invited)

Emerging Long-Wave IR Lasers for Particle Acceleration and x-ray Radiation

Sources, Igor V. Pogorelsky¹, Mikhail N. Polyanskiy¹, Mark N. Palmer¹, Marcus N. Babzien¹, William N. Li¹, Navid Vafai-Najafabadi^{2,1}, Mikhail N. Fedurin¹, Yusuke N. Sakai¹, Sandra Biedron^{3,4}; ¹Brookhaven National Laboratory, USA; ²Stony Brook Univ., USA; ³Element Aero, USA; ⁴Center for Bright Beams, USA. Expanding spectral coverage of ultra-intense, ultra-fast lasers into Long-Wave IR (~9-11 mm) spectral range opens new opportunities for perfecting novel laser-based mechanisms of charged particle acceleration and generation of radiation from THz to gammas.

14:00 -- 16:00

Room: South Hall 3A

LsW4C • Remote Sensing III

Presider: Hanyu Zhan; Nanjing Univ Aeronautics & Astronautics, China

LsW4C.1 • 14:00 (Invited)

Laser Sensing for Autonomous Mobility: Lidar-Driven Navigation in Unmanned Systems, Cheng Yuan¹; ¹Nanjing Univ Aeronautics & Astronautics, China. As unmanned systems tackle more complex missions, robust navigation in challenging environments becomes essential. This presentation introduces a Lidar-driven multi-sensor fusion framework enabling reliable missions in dynamic and GPS-denied conditions.

LsW4C.2 • 14:30 (Invited)

Blue GaN Laser Diodes for Underwater Sensing and Communication, Ondrej Kitzler¹, Zixuan Li¹, Carolyn Taylor¹, Judith M. Dawes¹, David J. Spence¹, James E. Downes¹, Helen M. Pask¹; ¹Macquarie Univ., Australia. Blue GaN laser diodes enable compact, high-speed optical systems. Their short wavelength and modulation capabilities make them ideal for underwater LiDAR and communication, offering superior resolution and data rates in marine environments.

LsW4C.3 • 15:00

Neural Network-Based Feature Tracking Models for Studying

Atmospheric Refraction, Haoxin Tian¹, Hanyu Zhan¹, Jizhou Lai¹, Cheng Yuan¹; ¹Nanjing Univ Aeronautics & Astronautics, China. Field measurements of scenes viewed through the lower atmosphere are made by using a time-lapse camera system. We develop and employ neural network models for the precise tracking of subtle feature shifts between frames due to atmospheric refraction.

LsW4C.4 • 15:15

Negative-Index Terahertz Metamaterial Sensor With Merged Circular SRRs for Ultra-Sensitive Refractive Index Detection, Sumaia Jahan Mishu¹, Yaser M. Banad¹, Sarah Sharif¹; ¹Univ. of Oklahoma, USA. The study presents a novel terahertz metamaterial absorber with a merged circular SRR design that achieves perfect absorption at 2.55 THz, exhibiting a Q-

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

factor of 71.8, sensitivity of 892 GHz/RIU, and FoM of 26.2 for RI sensing

LsW4C.5 • 15:30 (Invited)

Title to be Announced, Michael Tatarakis¹; ¹*Hellenic Mediterranean Univ., Greece*. Abstract not available.

LsW4C.6 • 16:00

Withdrawn

16:30 -- 17:30

Room: South Hall 3C

AW5A • Near Infrared Lasers

Presider: Takunori Taira; RIKEN / IMS, Japan

AW5A.1 • 16:30

Spectroscopy and Mode-Locked Laser Operation of a Disordered

Yb:LaCa₄O(BO₃)₄ Crystal, Honghao Xu³, Huang-Jun Zeng¹, Hai-Yu Nie¹, Zhang-Lang Lin¹, Ge Zhang¹, Yuxia Zhang³, Sami Slimi⁴, Xavier Mateos⁴, Pavel Loiko⁵, Hsing-Chih Liang⁶, Valentin Petrov², Weidong Chen^{1,2}; ¹*Fujian Inst of Res Structure of Matter, China*; ²*Max Born Inst. for Nonlinear Optics and Short Pulse Spectroscopy, Germany*; ³*Qingdao Univ., China*; ⁴*Universitat Rovira i Virgili (URV), Spain*; ⁵*Université de Caen, France*; ⁶*National Yang Ming Chiao Tung Univ., Taiwan*. We report on spectroscopy and SESAM mode-locked laser operation of a disordered borate crystal, Yb:LaCa₄O(BO₃)₄. 37-fs soliton pulses are generated at 1052.2 nm with an average output power of 246 mW at ~74 MHz.

AW5A.2 • 16:45

Nd:LuAP Laser at 1083 nm for Atmospheric Helium LiDAR, Sascha Kalusniak¹, Steffen Ganschow¹, Markus Stypa¹, Christian Büdenbender², Christian Kraenkel¹; ¹*Leibniz-Institut für Kristallzüchtung, Germany*; ²*Institut für Physik der Atmosphäre, Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany*. We present growth, spectroscopy and laser operation of Nd:LuAlO₃ (Nd:LuAP) for the detection of atmospheric helium and obtain up to 64% slope efficiency at 1083 nm with 1.6 W of output power under Ti:sapphire-pumping.

AW5A.3 • 17:00

Kerr-Lens Mode-Locked Yb:SrF₂ Laser, Huang-Jun Zeng¹, Zhang-Lang Lin¹, Ge Zhang¹, Pavel Loiko³, Abdelmjid Benayad³, Patrice Camy³, Xavier Mateos⁴, Valentin Petrov², Weidong Chen^{1,2}; ¹*Fujian Inst of Res Structure of Matter, China*; ²*Max Born Inst., Germany*; ³*Université de Caen, France*; ⁴*Universitat Rovira i Virgili (URV), Spain*. We report on a Kerr-lens mode-locked Yb:SrF₂ laser delivering 37 fs soliton pulses at 1066.4 nm with an average output power of 85 mW at a repetition rate of ~71.8 MHz.

AW5A.4 • 17:15 (Student Paper Finalist)

Protocols and Analysis of Wavefront Distortions in Nd:Glass Amplifiers During Flash-Pumping : Towards the Active Coherent Beam Combining of Kilojoule-Class Laser Chains.

Pierre Lebeugue^{1,2}, Cyril rapeneau², doina badarau², marie froidevaux², joanna de sousa², Loïc MEIGNIEN², Ivan Doudet³, Nolan Chan³, Benoit Wattelier³, Patrick Audebert², Dimitris Papadopoulos², Frédéric druon¹; ¹*Institut d'Optique Lab Fabry, France*; ²*Laboratoire pour*

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

l'utilisation des lasers intenses, France; ³Phasics S.A, France. We present an innovative protocol to characterize “on-shot aberrations” of large-scale flash-lamp amplifiers. Our results are obtained with a high-speed wavefront sensor at 61k-fps and aim to pave the way to active coherent beam combing

16:30 -- 17:30

Room: South Hall 3B

LW5B • EUV, X-Ray Generation & Particle Acceleration II

Presider: Lahsen Assoufid; Argonne National Laboratory, USA

LW5B.1 • 16:30 (Invited)

ELI Beamlines Facility – Technology for Advanced Laser Experiments, Pavel Bakule¹, Bedrich Rus¹, Daniele Margarone¹; ¹ELI, Czechia. We present an overview of the large-scale laser technologies and associated user stations available at ELI Beamlines, and demonstrate the current capabilities, including the beam transport systems that enable fast switching between multiple user stations.

LW5B.2 • 17:00

Filament Assisted X-ray Generation Using Ultrashort Pulses and Loose Focusing, Balys Momgaudis¹, Vakaris Lekas¹, Vytautas Jukna¹, Audrius Dubietis¹; ¹Vilnius Univ., Lithuania. Applicability of ultrashort pulses for generation of X-rays at intermediate distances is investigated. UV luminescence was validated as a proxy to direct X-ray spectroscopy and impact on brightness from pulse parameters and interaction geometry measured.

17:30 -- 18:30

Room: South Hall 3C

AW6A • Postdeadline Paper Session

Presider: Yushi Kaneda; Univ of Arizona, Coll of Opt Sciences, USA

AW6A.1 • 17:30

Beam Shaping With Neural Network Coherent Beam Combination, William R. Kerridge-Johns¹, Fedor Chernikov¹, Zedi Zhang¹, Dominic Blackledge¹, Changshun Hou¹, Ben Mills¹, Michalis Zervas¹, Johan Nilsson¹; ¹Optoelectronics Research Centre, UK. Three Yb-fiber amplifier outputs were phase-locked and beam-shaped in a tiled aperture CBC array using a neural network algorithm executed at 1100Hz, achieving low differential phase noise (40mrad, $\lambda/150$) with beam shaping in a single step (1ms).

AW6A.2 • 18:00

>1.14 kW QCW Thulium-Doped Fiber Laser at 2 μm , Dieter Panitzek^{1,2}, Michael Pisarik¹, Helena Picmausova^{1,3}, Julian Schaal^{1,2}, Jan Lautenschläger^{1,2}, Dominik Lorenz^{1,2}, Julian Schneider^{1,2}, Marc Eichhorn^{1,2}, Christelle Kieleck¹; ¹Fraunhofer IOSB, Germany; ²Inst. of Control Systems, Karlsruhe Inst. of Technology, Germany; ³Univ. of Defence, Czechia. This paper reports on a thulium-doped fiber laser in QCW operation. A peak power of 1142 W at 2031 nm is obtained and modulation instabilities caused by intermodal FWM are investigated.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

AW6A.3 • 18:15

Towards Ultra-Compact 1-GHz VIS-to-MIR Frequency Combs With one-Step Self-Referencing on-Chip, xuan zhang^{3,1}, Yuchen Wang³, Junguo Xu^{3,1}, Qiankun Li², Xueying Sun², Yongyuan Chu², guangzi feng^{3,4}, Xia Hou³, Chengbo Mou², Hairun Guo^{2,5}, Sida Xing³; ¹*Univ. of Chinese Academy of Science, China*; ²*Key laboratory of Specialty Fiber Optics and Optical Access Networks, Shanghai Univ., China*; ³*Shanghai Inst. of Optics and Fine Mechanics, Chinese Academy of Sciences, China*; ⁴*ShanghaiTech Univ., China*; ⁵*Hefei National Laboratory, Univ. of Science and Technology of China, China*. We demonstrate a compact 1-GHz fiber-chip-hybrid frequency comb that generates a three-octave supercontinuum (350–3280 nm, 0.76 PHz) and provides a robust f-3f beat note for direct carrier-envelope-offset stabilization, enabling high-speed broadband spectroscopy and metrology.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Thursday, 23 October

South Hall 3C

08:30 -- 10:30

ATH1A • Mid-IR Laser Materials and Technologies

Presider: Marcin Piotrowski; Inst Franco-Allemand Recherches St Louis, France

ATH1A.1 • 08:30 (Invited)

High-Power Continuous-Wave Mid-Infrared Laser Form Erbium-Doped Fluorite

Crystals, Liangbi Su¹; ¹*Shanghai Inst. of Ceramics CAS, China*. A room-temperature 15 W continuous-wave Er:CaF₂ laser at 2.79 μm has been realized by optimization of mode-match and heat dissipation in a dual-end pumped crystal slab scheme

ATH1A.2 • 09:00

Withdrawn

ATH1A.3 • 09:15

High-Power and Highly-Efficient Polycrystalline Fe:ZnSe Laser at 4.1 μm

Richard Svejkar¹, Jan Sulc¹, Adam Riha¹, Helena Jelinkova¹; ¹*Faculty of Nuclear Sciences and Physical Engineering, Czech Technical Univ. in Prague, Czechia*. We demonstrate multi-watt operation of Fe:ZnSe laser at 77 K, pumped by DPSS Er:YAG laser. The compact set-up allowed to generate up to 16.3 W of output power at 4.1 μm with 45 % slope efficiency.

ATH1A.4 • 09:30 (Student Paper Finalist)

Watt-Level Raman Amplification at 3.98 μm in Nitrogen-Filled Silica Hollow-Core Fiber Pumped at 2.06 μm

Achille Bogas-Droy^{1,3}, Nicolas Dalloz¹, Stefano Bigotta¹, Michael Frosz³, Marcin Piotrowski¹, Anne Hildenbrand-Dhollande¹, Nicolas Y. Joly^{2,3}; ¹*French-German Research Inst. of Saint-Louis, France*; ²*Friedrich-Alexander Universität Erlangen-Nürnberg, Germany*; ³*Max Planck Inst. for the Science of Light, Germany*. We present a Raman amplifier emitting over 1W average power at 3.98 μm using a nitrogen-filled silica hollow-core fiber, pumped by a 2.06 μm nanosecond laser and seeded with a spectrally narrowed ZGP OPO.

ATH1A.5 • 09:45

Ultrafast Laser Inscription of Mid-Infrared Waveguides in Pr³⁺-Doped Sulfide

Glasses, Mariel Ledesma¹, Ngoc Q. Nguyen², Pavel Loiko², Patrice Camy², Alain Braud², Pascal Masselin³, Catherine Boussard-Plédel¹, David Le Coq¹; ¹*Université de Rennes, France*; ²*CIMAP, France*; ³*Université du Littoral Côte d'Opale, France*. Mid-infrared single-mode waveguides consisting of a hexagonal mesh of positive refractive index channels are produced in Pr³⁺-doped sulfide glasses with a broadband emission at 3.5-5.5 μm . The waveguides are studied by μ -Raman and μ -luminescence spectroscopy.

ATH1A.6 • 10:00

Performance of 3- μm Er:YLF Lasers at Cryogenic and Room Temperatures: Comparative Study

Nikolay Ter-Gabrielyan¹, mark dubinskii¹, viktor fromzel¹; ¹*US Army Research Laboratory, USA*. While cryogenic cooling considerably enhances laser output power and efficiency in CW and free running pulsed (Q-CW) modes of operation, in the Q-switched

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

operation room temperature regime may result in substantially higher pulse energies.

ATh1A.7 • 10:15

2.8 μm Er³⁺:LiYF₄ Channeled Waveguide Laser Upconversion Pumped Near 1.5 μm , Berke Ayevi¹, Yagiz Morova^{1,3}, Melih K. Kadioglu¹, Mauro Tonelli⁴, Alphan Sennaroglu^{1,2}; ¹*Laser Research Laboratory, Departments of Physics and Electrical-Electronics Engineering, Koç Universitesi, Turkey;* ²*Koç Univ. Surface Science and Technology Center (KUYTAM), Koc Univ., Turkey;* ³*Physics Department, Istanbul Technical Univ., Turkey;* ⁴*MEGA Materials, Italy.* We present the first demonstration of a room-temperature, continuous-wave, femtosecond laser written channeled Er³⁺:LiYF₄ waveguide laser operating at 2810 nm which is upconversion pumped near 1.5 μm with a threshold pump power as low as 93 mW.

08:30 -- 10:30

Room: South Hall 3B

LTh1B • THz Generation & Applications

Presider: Kei Takeya; Inst. for Molecular Science, Japan

LTh1B.1 • 08:30 (Invited)

Optoelectronic THz Systems and Emerging Industrial Applications, Anselm Deninger¹; ¹*TOPTICA Photonics AG, Germany.* Over the past years, optoelectronic terahertz instrumentation has improved significantly. My presentation reviews the concepts of time-domain and frequency-domain approaches, and presents emerging applications such as thickness gauging, semiconductor inspection and high-bandwidth vector network analysis.

LTh1B.2 • 09:00 (Invited)

THz-Field Generation and Control for High-Field Applications From Accelerating Electrons to Exciting Material Collective Modes, Nicholas H. Matlis¹; ¹*Physics, Arizona State Univ., USA.* We describe methods to generate and control THz-frequency electromagnetic fields for novel applications like electron acceleration and collective-mode control in condensed-matter systems requiring field strengths and pulse energies bordering gigavolts per meter and millijoules, respectively.

LTh1B.3 • 09:30 (Invited)

Dynamically Selectable Terahertz-Wave Parametric Down-Conversion by Slant-Stripe-Type Quasi-Phase Matching, Yuma Takida¹, Hiroaki Minamide¹; ¹*RIKEN, Japan.* We present highly efficient and dynamically selectable terahertz (THz)-wave parametric down-conversions achieved by backward and forward quasi-phase matching (QPM) in a slant-stripe-type periodically poled lithium niobate (PPLN) crystal.

LTh1B.4 • 10:00 (Invited)

Materials and Devices for THz Wave Generation , Junji Hirohashi¹; ¹*Oxide Corporation, Japan.* Several methods of THz Wave Generation by using ferroelectrics (such as LiNbO₃ and LiTaO₃) are demonstrated. Cherenkov and DFG types of THz generation methods are investigated from material/device fabrication point of view.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

11:00 -- 13:00

Room: South Hall 3C

ATH2A • Fiber Lasers

Presider: Anne-Laure Calendron; Deutsches Elektronen Synchrotron, Germany

ATH2A.1 • 11:00

Static and Dynamic Mode Coupling in Polarization Maintaining Yb-Doped 20/400µm Fiber Amplifier, Friedrich P. Möller¹, Gonzalo Palma-Vega¹, Till Walbaum¹, Thomas

Schreiber¹; ¹*Fraunhofer IOF, Germany*. We experimentally investigate modal energy transfer below the transverse mode instability threshold in polarization-maintaining Yb-doped fiber amplifiers in 20/400 µm geometry. Our findings verify earlier published numerical simulations and define requirements for polarization stabilization methods.

ATH2A.2 • 11:15

Compact 500 W-Class Ultrafast Laser Based on Multi-Core Fiber Amplification, Vincent Leonhardi¹, Francisco Schwarzl¹, Yannik Atzbach¹, Arno Klenke^{2,3}, Stefano Wunderlich¹, Christian Gaida¹, Jens Limpert^{2,3}, Tino Eidam¹; ¹*Active Fiber Systems GmbH, Germany*; ²*Inst. of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-Universität, Germany*; ³*Helmholtz-Inst. Jena, Germany*. We present a coherently combined femtosecond fiber chirped-pulse-amplification system based on a rod-type, ytterbium-doped, multicore fiber with 4×4 cores. A high average power of up to >500 W could be achieved with excellent beam quality. This architecture is intrinsically power scalable by increasing the number of cores in the fiber.

ATH2A.3 • 11:30 (Invited)

High Power Fluoride Fiber Laser Operating at Long-Wavelength, Wei Shi¹, lu Zhang¹, Shijie Fu¹, Quan Sheng¹, Junxiang Zhang¹, Jianquan Yao¹; ¹*Tianjin Univ., China*. Recent works of our group on power scaling, wavelength extension and single-frequency operation of Er-doped fluoride fiber lasers operating with ${}^4F_{9/2} \rightarrow {}^4I_{9/2}$ transition were comprehensively reviewed.

ATH2A.4 • 12:00

Above-3kW Average Power, 3x3 Multicore Fiber Laser System, Yahia Khalil¹, Mehran Bahri¹, Arno Klenke^{1,2}, Felix Wanitschke^{1,2}, Cesar Jauregui^{1,3}, Johannes Nold³, Nicoletta Haarlammert³, Thomas Schreiber³, Jens Limpert^{1,2}; ¹*Inst. of Applied Physics, Germany*; ²*Helmholtz-Inst. Jena, Germany*; ³*Fraunhofer Inst. for Applied Optics and Precision Engineering, Germany*. We present a 3.2kW, Yb-doped, pump-limited, multi-core fiber laser system with excellent short- and long-term stability (RMS of 0.14% and 0.11%, respectively). The system exhibited an optical-to-optical efficiency of 86.3%.

ATH2A.5 • 12:15

Efficiency Enhancement of Frequency Doubling via Spatio-Temporal Beam Shaping in Multi-Core Fiber Lasers, Mehran Bahri¹, Yucheng Sun¹, Arno Klenke¹, Cesar Jauregui¹, Jens Limpert¹; ¹*Friedrich-Schiller-Universität Jena, Inst. of Applied Physics, Germany*. We present the scaling of the second-harmonic conversion efficiency by tailoring the temporal and spatial shapes of the incoherent beamlet array emitted from a 49-core Ytterbium-doped fiber. A conversion efficiency of up to 67% was achieved.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

ATH2A.6 • 12:30

Nonlinear Thulium-Doped Fiber Amplifier With Up-Chirped Pulse Evolution for Energy Scaling, Benedikt Schuhbauer¹, Joe Pius¹, Frithjof Haxsen¹, Uwe Morgner^{1,3}, Jörg Neumann^{1,2}, Dietmar Kracht^{1,4}; ¹*Laser Zentrum Hannover, Germany*; ²*Cluster of Excellence PhoenixD (Photonics, Optics, and Engineering Innovation Across Disciplines), Germany*; ³*Institut für Quantenoptik, Leibniz Universität Hannover, Welfengarten 1, 30167 Hannover, Germany, Germany*; ⁴*Leibniz Univ. Hannover, Inst. of Photonics, Nienburger Straße 17, 30167 Hannover, Germany, Germany*. A monolithic PM nonlinear fiber amplifier based on thulium is presented, which allows to generate ultrashort pulses with over 50 nJ pulse energy, corresponding to wide spanning spectra and compressed pulse durations of 121 fs.

ATH2A.7 • 12:45

Longitudinally Segmented Thulium-Doped Fiber for High-Power Fiber Lasers, Bara Svejkarova^{1,2}, Martin Grábner¹, Jan Aubrecht¹, Richard Svejkar³, Jan Pokorny^{1,2}, Michal Kamaradek¹, Ondrej Podrazky¹, Ivan Kasik¹, Pavel Honzatko¹, W. A. Clarkson³, Pavel Peterka¹; ¹*Inst. of Photonics and Electronics of the Czech Academy of Sciences, Czechia*; ²*Faculty of Nuclear Sciences and Physical Engineering, Czech Technical Univ. in Prague, Czechia*; ³*Optoelectronics Research Centre, Univ. of Southampton, UK*. Thulium-doped fiber laser using a longitudinal gradient of doping to reduce the heat load local maxima is presented. Laser achieved 50 W of output power at 1939 nm with a slope efficiency exceeding 62 %.

11:00 -- 13:00

Room: South Hall 3B

LTh2B • Global Security and Directed Energy

Presider: Sandra Biedron; Element Aero, USA

LTh2B.1 • 11:00 (Invited)

EUV Lasers for Lithography, X-ray Lasers for Metrology – Securing the Supply Chain, Erik Hosler¹; ¹*PsiQuantum, USA*. Abstract not available.

LTh2B.2 • 11:15 (Invited)

High-Power Laser-Plasma Chemistry: Radiation, Particles, Currents, Fields, and Chemical Reactions in Large Laser Sparks, Libor Juha¹; ¹*FZU - Inst. of Physics of the Czech, Czechia*. A review will be given of chemical reactions initiated by plasmas produced in molecular gases by focused beams of high-power lasers. The relationship between the physics and chemistry of large laser sparks will be discussed.

LTh2B.3 • 11:30 (Invited)

Unique Remote Sensing, Sergio Carbajo¹; ¹*Univ. of California Los Angeles, USA*. We present computationally intelligent photon-diversity techniques for quantum atmospheric sensing and adaptive beam control. It aims to overcome deep turbulence and enable predictive stewardship for directed energy and similar systems.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

LTh2B.4 • 11:45 (Invited)

Laser Overview, Franck e. Leibreich¹; ¹*Thales, France*. Abstract not available.

LTh2B.5 • 12:00 (Invited)

Title to be Announced, Ian Thomson¹; ¹*Leonardo UK Ltd, UK*. Abstract not available.

14:30 -- 16:30

Room: South Hall 3C

ATh3A • Advanced NLO & Frequency Conversion

Presider: Patricia Segonds; Neel Inst., France

ATh3A.1 • 14:30

Nonlinear Characterizations of $\text{YAl}_3(\text{BO}_3)_4$ Crystals for Frequency Conversion in Green and UV Ranges, Florent Cassouret¹, Helinand Robin^{2,1}, Denis Balitski⁴, Slimane Raissi², Pascal Loiseau², Gerard Aka², Takunori Taira^{3,1}; ¹*Inst. for Molecular Science, Japan*; ²*Institut de Recherches de Chimie Paris, PSL Univ., France*; ³*Laser-Driven Electron-Acceleration Technology group, Riken SPring-8 center, Japan*; ⁴*Cristal Laser, France*. In this work we characterize YAB properties for second harmonic generation at 532 nm and 266 nm. Angular and thermal acceptances are measured as well as conversion efficiencies for both wavelengths' generation.

ATh3A.2 • 14:45

Q-Switched Tb^{3+} :YLF Laser Frequency Doubled to 293 nm, Valery Temyanko¹, Leonid Kotov¹, adoum mahamat¹, Hiroki Tanaka², Johnathan Hair³, Amin Nehrir³, Yushi Kaneda^{4,5}; ¹*TIPD LLC, USA*; ²*IKZ, Germany*; ³*NASA, USA*; ⁴*Optical Sciences, Univ. of Arizona, USA*; ⁵*Oxide, Japan*. We report 293 nm output by intracavity frequency-doubling of Q-switched Tb^{3+} :YLF laser. The output is 0.2 mJ at 500 Hz in 165 ns in bidirectional outputs, which are combined by polarization for O3 DIAL application.

ATh3A.3 • 15:00

Bright Tabletop Vacuum-Ultraviolet Laser for Thorium-229 Spectroscopy, Jeremy M. Thurston¹, Emma Burton¹, Ivan Dickson¹, Drew Morrill¹, Will Hettel¹, Keegan Finger¹, Margaret Murnane¹, Henry Kapteyn^{1,2}; ¹*Univ. of Colorado at Boulder JILA, USA*; ²*Kapteyn-Murnane Laboratories, USA*.

We present a bright tunable tabletop VUV laser amenable to upconverting ultrastable infrared frequency combs to the thorium-229m nuclear isomer at 8.36 eV.

ATh3A.4 • 15:15

Continuous-Wave Radiation Source at 148 nm for Excitation of the Nuclear Transition in ^{229}Th , Vishal Lal¹, Maksim Okhapkin¹, Johannes Tiedau¹, Niels Irwin¹, Valentin Petrov², Ekkehard Peik¹; ¹*Physikalisch-Technische Bundesanstalt, Germany*; ²*Max-Born-Inst. for Nonlinear Optics and Ultrafast Spectroscopy, Germany*. We demonstrate continuous-wave second-harmonic generation in random quasi-phase matched strontium tetraborate SrB_4O_7 (SBO) at 148.4 nm for the excitation of the nuclear isomeric transition in ^{229}Th with a power of $0.9^{-0.4+0.5}$ nW.

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

ATh3A.5 • 15:30

Offset-Phase-Tunable Burst-Pumped fs OPA for Hyper Resolution Stimulated Raman Spectroscopy, Matthias Schneller¹, Vinzenz Stummer¹, Hongtao Hu¹, Xinhua Xie², Edgar Kaksis¹, Audrius Pugzlys^{1,3}, Andrius Baltuška^{1,3}; ¹*Photonics Inst., TU Wien, Austria*; ²*Paul Scherrer Inst., SwissFEL, Switzerland*; ³*Center for Physical Sciences & Technology, Lithuania*. We demonstrate an efficient two-color laser source for nonlinear coherent Raman spectroscopy of gases which achieves spectral resolution below 0.2 cm⁻¹ and replaces conventional tuning of pump and/or Stokes frequencies with an AOM-based phase scan.

ATh3A.6 • 15:45

Passively Stable Femtosecond Pulse Generation in Continuous-Wave Pumped Optical Parametric Oscillator, Himani Sharma¹, Rojalin Padhi¹, Alfredo Daniel Sanchez^{2,3}, Gopal Prasad Sahu¹, Majid Ebrahim-Zadeh^{3,4}, Kavita Devi¹; ¹*Indian Inst. of Technology Dharwad, India*; ²*FunGlass, Alexander Dubček Univ. of Trenčín, Študentská, Slovakia*; ³*ICFO-Institut de Ciències Fotoniques, Spain*; ⁴*Institució Catalana de Recerca i Estudis Avançats (ICREA), Spain*. We present sub-50-fs pulse generation in a compact, SESAM-driven, dispersion-compensated cw OPO, which has been numerically analyzed and found to offer high peak intensity, broad spectral bandwidth, and potential for optical frequency comb applications.

ATh3A.7 • 16:00

Diode-Pumped 320nm CW Efficient, Low Noise, Single Frequency Laser Based on a Monolithic Cavity, Thierry Georges¹, Julien Rouvillain¹, Christophe Bonnin¹, Nicolas Landru¹; ¹*Oxxius SAS, France*. A GaN diode pumped 320 nm laser based on a Pr:YLF amplifier and a monolithic cavity demonstrates low noise 80 mW single-frequency operation with a 16% slope efficiency

ATh3A.8 • 16:15

CW Injection-Seeded, Non-Resonant Optical Parametric Oscillator Based on Periodically-Poled LiNbO₃, Tugba Temel^{1,2}, Subhasis Das^{1,3}, Gerhard Spindler⁴, Andre Schirrmacher⁵, Robert T. Murray², Marcin Piotrowski⁶, Li Wang⁷, Weidong Chen^{1,8}, Valentin Petrov¹; ¹*Max Born Inst., Germany*; ²*Imperial College London, UK*; ³*Burdwan Univ., India*; ⁴*Untere Gaisäckerstr. 10, Germany*; ⁵*CANLAS GmbH, Germany*; ⁶*ISL, France*; ⁷*Anhui Inst. of Optics and Fine Mechanics, China*; ⁸*Fujian Inst. of Research on the Structure of Matter, China*. A PPLN non-resonant optical parametric oscillator injection-seeded by narrowband CW radiation at the signal wavelength produces >3-W average idler power at 2376 nm for a 20-kHz repetition rate, with a spectral linewidth of ~2 nm.

14:30 -- 16:30

Room: South Hall 3B

JTh3B • Joint: Use of Laser Momentum Transfer to Help Remediate Space Debris (LAC & LS&C)

Presider: Fabien Armogathe, Eutelsat, USA

JTh3B.1 • 14:30 (Invited)

ESA Project "ADAMO": High-Power Adaptive Optics for Laser Momentum

Transfer, Szymon Gladysz¹; ¹*Fraunhofer IOSB, Germany*. In the ESA-funded project "ADAMO",

Optica Laser Congress

Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 10 October. For updated and complete information with special events, reference the online schedule or mobile app.

Fraunhofer IOSB, Fraunhofer IOF, and HEIG-VD will develop demonstrators for adaptive optics technologies, which are necessary to efficiently pre-compensate high-energy lasers in order to make laser momentum transfer effective in low-Earth orbit.

JTh3B.2 • 14:45 (Invited)

Laser Applications to Space Safety, Massimiliano Vasile¹; ¹*Univ. of Strathclyde, UK*. This talk will be dedicated to the application of lasers to space safety. A few examples of high- power lasers for asteroid manipulation, debris detumbling and removal will be presented before introducing the concept of a reconnaissance mission where lasers are used to measure the mass of asteroids during fast flybys.

JTh3B.3 • 15:00 (Invited)

OMLET Phase a/B1 Study, Martin Divoky⁴, Jürgen Kästel², Jens Rodmann², Stefan Scharring², Micheal Steinbatz³, Ivana Novak⁵, Daniel Hampf⁶, Anton Kürten⁶, Laurent Jolissaint⁷, Didrik Karlsen⁸, Bente Larsen⁸, Catherine Yuriiko Teisset⁹, Katja Grünfeld¹⁰, Doris Grosse¹², Nadezhda M. Bulgakova¹, Alexander Bulgakov¹, Inam Mirza¹, Ondrej Denk⁴, Yoann Levy⁴, Andrea Di Mira¹¹, Tim Flohrer¹¹; ¹*FZU - Inst. of Physics of the Czech Academy of Sciences, Czechia*; ²*Inst. of Technical Physics, German Aerospace Center, Germany*; ³*ASA Astrosysteme GmbH, Austria*; ⁴*HiLASE, Inst. of Physics of the Czech Academy of Sciences, Czechia*; ⁵*Cosylab Switzerland GmbH, Switzerland*; ⁶*DiGOS Potsdam GmbH, Germany*; ⁷*Haute École Spécialisée de Suisse Occidentale, Switzerland*; ⁸*Rheinmetall Nordic AS, Norway*; ⁹*TRUMPF Scientific Lasers GmbH + Co. KG,, Germany*; ¹⁰*Univ. of Cologne, Germany*; ¹¹*ESOC, European Space Agency (ESA), Germany*; ¹²*ANU Enterprise Pty Ltd, Australia*. Orbit Maintenance via Laser Momentum Transfer (OMLET) is an ESA project on the concept design of a Laser Momentum Transfer Engineering Station. Subsystems, functional and performance requirements, as well as laboratory experiments will be presented.

JTh3B.4 • 15:15 (Invited)

Laser Propulsion for Space Debris Removal: Problem Overview, Present Tactics, and Strategy, Nadezhda M. Bulgakova¹; ¹*FZU - Inst. of Physics of the Czech, Czechia*. Enhanced risk for space missions from increasing population of artificial space debris requires urgent development of measures that will be overviewed, focusing on laser propulsion. Raising propulsion efficiency with spatiotemporally shaped beams will be discussed.

JTh3B.5 • 15:30 (Invited)

Introduction to the Czech Space Environment and Overview of Czech Priorities in ESA's Space Safety Program Period 3, Vaclav Nesladek¹; ¹*Ministry of Transport of Czech Republic, Czechia*. The presentation provides an overview of the Czech space ecosystem and its institutional and strategic framework, as well as the evolving role of the Czech Republic within the European space landscape. It introduces the National Space Plan 2026+, which outlines the country's long-term vision and priorities for space activities. Focus is placed on the Czech Republic's participation in ESA's Space Safety Program Period 3 (S2P P3). The presentation also details the country's strategic priorities within S2P P3, including laser applications, and emphasizes the importance of technological innovation and resilience in the face of emerging space