SS-1: Optical properties and applications of laser-induced disordered plasmonic metasurfaces.

13:45 - 15:45 Sunday, 25th August, 2024

Presentation type Summer School

SS-1.1 Optical properties and applications of laser-induced disordered plasmonics metasurfaces

Nathalie DESTOUCHES

Univ Lyon, UJM-Saint-Etienne,CNRS, Institut d'Optique, Laboratoire Hubert Curien, SAINT-ETIENNE, France

Abstract

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The lecture explores laser-induced plasmonic metasurfaces, focusing on their structural characteristics and optical properties.Despite their disordered nature,these metasurfaces excel in applications such as color printing, sensing,light manipulation, and energy harvesting, offering advantages over traditional ordered structures through detailed case studies.

Coffee break

15:45 - 16:15 Sunday, 25th August, 2024

SS-2: High throughput and high quality laser ablation, texturing techniques, light manipulation and control in industrial processes with ultra-short pulsed lasers

16:15 - 18:15 Sunday, 25th August, 2024

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Presentation type Summer School

13:45 - 15:45

SS-21 High Throughput and High Quality Laser Ablation, Texturing Techniques, Light Manipulation and Control in Industrial Processes with Ultra-Short Pulsed Lasers

Beat Neuenschwander[1], Beat Jaeggi[2], Stefan Remund[1], Torsten Maehne[3]

[1]Bern University of Applied Sciences, Burgdorf, Switzerland. [2]Lasea Switzerland SA, Biel, Switzerland. [3]Bern University of Applied Sciences, Biel, Switzerland

Abstract

This lecture deals with industrial application of ultrashort laser pulses. Part I discusses process efficiency, its optimization and effects limiting the power scale up whereas strategies to achieve high throughput are presented in Part II.

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SS-3: Fiber lasers – Advancing the frontier of high power light

08:00 - 10:00 Monday, 26th August, 2024
Presentation type Summer School

08:00 - 10:00

SS-3 Fiber Lasers – Advancing the Frontier of High Power Light

Almantas Galvanauskas

University of Michigan, Center for Ultrafast Optical Science, Ann Arbor, USA

Abstract

This summer school lecture will cover fundamentals of rare-earth doped fiber lasers, will describe numerous innovations that enabled ultra-large core fibers constituting the foundation of high power lasers, will survey state-of-the-art performance of different types of laser systems, and will review recent progress in coherently combined fiber lasers.

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Coffee break

10:00 - 10:30 Monday, 26th August, 2024

SS-4: 30 years of PPLN - What is old, what is new, and where next for PPLN and QPM material research

10:30 - 12:30 Monday, 26th August, 2024

Presentation type Summer School

10:30 - 12:30

SS-4 30 years of PPLN - what is old, what is new, and where next for PPLN and QPM material research?

Peter Smith[1,2], Goronwy Tawi[1], Rex H. Bannerman[1], Corin B.E. Gawith[1,2], Paolo Mennea[1], Noelia Palomar Davidson[1], James C Gates[1]

[1]University of Southampton, Southampton, United Kingdom. [2]Covesion Lt Unit, Southampton, United Kingdom

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Abstract

Since the first demonstration of electric field poling in 1993 - by workers at Sony -periodically poled materials (e.g. PPLN) have become ubiquitous in photonics. Their ability to allow quasi-phase matching opens up nonlinear optics across the full transparency bands of a material. In the case of PPLN this spans from the visible out to around 5 microns – offering a powerful route to create light in spectral regions where convenient lasers do not exist. This talk will cover underlying physics, materials, design, manufacturing and applications, as well as looking at next generation applications.

Lunch break

12:30 - 13:45 Monday, 26th August, 2024

SS-5: Is modelocking the successful self-organized phenomenon?

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13:45 - 15:45 Monday, 26th August, 2024
Presentation type Summer School

13:45 - 15:45

SS-5.1 Is modelocking the most successful self-organized phenomenon?

Fatih Ömer Ilday

Ruhr Universität, Bochum, Germany

Abstract

Missing abstract

Coffee break

15:45 - 16:15 Monday, 26th August, 2024

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SS-6: Photoacoustic imaging with applications in the breast

16:15 - 18:15 Monday, 26th August, 2024
Presentation type Summer School

16:15 - 18:15

SS-2.1 Photoacoustic imaging with applications in the breast

Srirang Manohar

University of Twente, Enschede, Netherlands

Abstract

We present the physics, technology and applications of photoacoustic imaging. We start with a motivation for the method, show how image formation takes place, show examples of photoacoustic imaging configurations. We close with potential clinical applications, focusing on breast cancer.

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Welcome reception

18:30 - 20:00 Monday, 26th August, 2024
Horizontas restaurant 16th Floor

TU-1: Extreme-Light lasers

08:15 - 09:00 Tuesday, 27th August, 2024
Presentation type Oral
Chair(s) Uwe Morgner

08:15 - 08:30

TU-1.1 Novel Photocathode Lasers for the hard- and soft- X-ray Free Electron Lasers EuXFEL and FLASH

Christoph Mahnke, Chen Li, Areeb Ahmed, Oender Akcaalan, Frank Brinker, Ye Chen, James Good, Uwe Grosse-Wortmann, Marc Guetg, Denis Illia, Nick Kschuev, Christian Mohr, Harsha Panuganti, Federico Pressacco, Lucas Schaper, Sebastian Schulz, Siegfried Schreiber, Hamed

Tavakol, Henrik Tünnermann, Caterina Vidoli, Lutz Winkelmann, Ingmar Hartl

Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany

Abstract

We developed, constructed and commissioned novel photocathode lasers for the X-ray FELs European XFEL and FLASH which allow emittance optimization via beam shaping. Both facilities operate continuously with those lasers since Jan. 2024 with high uptime and excellent performance

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08:30 - 08:45

TU-1.2 Methods and Applications for Amplified Bursts of Picosecond-Spaced Ultrashort Pulses

Vinzenz Stummer[1], Edgar Kaksis[1], Tobias Flöry[1], Matthias Schneller[1], Markus Zeiler[1], Hongtao Hu[1], Audrius Pugžlys[1,2], Andrius Baltuška[1,2]

[1]TU Wien, Institut für Photonik, Vienna, Austria. [2]Center for Physical Science and Technology, Vilnius, Lithuania

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Abstract

Generating packages of picosecond-spaced ultrashort pulses yields various advantages in their application in nonlinear spectroscopy, micromachining, and plasma generation. We outline methods of burst amplification, with a focus on recent advancements in the generation and application of amplified pulse bursts.

08:45 - 09:00

TU-1.3 Tunable UV Laser for External Seeding of the High Repetition Rate Soft X-ray Free Electron Laser FLASH

Tino Lang, Areeb Ahmed, Skirmantas Alisauskas, Eugenio Ferrari, Uwe Grosse-wortmann, Nhat-Phi Hoang, Christian Mohr, Hamid Rashtabadi, Lucas Schaper, Angad Swiderski, Hamed Tavakol, Jiaan Zheng, Ingmar Hartl

Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany

Abstract

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We are currently developing a tunable high-repetition rate femtosecond UV laser system for external seeding superconducting soft X-ray Free Electron Laser FLASH. Initial results show excellent power and wavelength stability of the Optical Parametric Chirped Pulse Amplification system.

EPS-QEOD Prize 2024

09:00 - 10:00 Tuesday, 27th August, 2024
Chair(s) Uwe Morgner

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144 High Average Power High-Harmonic EUV Sources and High Performance Imaging at the Nanoscale

Jens Limpert & Jan Rothhardt

Helmholtz Institute Jena, Jena, Germany. 2GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany. Institute of Applied Physics, Jena, Germany

Abstract

We will report about the development of fiber-laser-driven high harmonic sources with output power currently exceeding 10 mW. This exceptional performance, combined with structured illumination approaches, enables nanoscale imaging and mapping of the chemical composition of semiconductor- and biological samples at the nanoscale.

Coffee break

10:00 - 10:30 Tuesday, 27th August, 2024

TU-2: Mode-Locked lasers and oscillators dynamics

10:30 - 12:30 Tuesday, 27th August, 2024
Presentation type Oral
Chair(s) Fatih Ömer Ilday

10:30 - 11:00

TU-2.1 Applications of AI in nonlinear fiber optic

Goëry Genty[1], Mathilde Hary[2], Mehdi Mabed[3], Andrei Ermolaev[3], Daniel Brunner[3], John M. Dudley[3]

[1]Tampere University, Photonics Laboratory, Physics Unit, Tampere, Finland. [2]Tampere University, Photonics Laboratory, Physics Unit, Besançon, France. [3]Université Bourgogne Franche-Comté, Institut FEMTO-ST, Besançon, France

Abstract

We will review recent advances in the use of machine learning for ultrafast nonlinear fiber-optics control and optimization.

11:00 - 11:15

TU-2.2 Ultra-Short Pulse Generation at 914 nm from a CW laser source

Raphaël Florentin[1], Arnaud Viry[1], Thierry Robin[2], Kilian Le Corre[2], Giorgio Santarelli[3], Thierry Georges[4], Hervé Gilles[1], Sylvain Girard[1], Mathieu Laroche[1]

[1]CIMAP, Caen, France. [2]Exail, Lannion, France. [3]LP2N, Bordeaux, France. [4]Oxxius, Lannion, France

Abstract

We present an all-PM fiber laser system seeded by a CW laser source generating 230fs pulses at 914nm with a tunable repetition rate. Ultra-short pulses was achieved using a Mach-Zehnder modulator for pulse carving, Nd-doped fibers and a Mamyshev regenerator.

11:15 - 11:30

TU-2.3 Steering in the parameter space of a mode-locked laser

Paul Repgen[1,2], Aladin Şura[1,2], Ghaith Makey[1], Ömer Ilday[1,2]

[1]Bilkent Üniversitesi, Ankara, Turkey. [2]Ruhr-Universität Bochum, Bochum, Germany

Abstract

To evaluate the nonlinear phase space of mode-locking states of a Mamyshev oscillator, we implement a spatial light modulator as one

band-pass filter. This allows us to reliably address and change the mode-locking states all-electronically.

11:30 - 11:45

TU-2.4 Energy-managed soliton fiber laser

Mostafa Mohamed[1,2], Aurélien Coillet[1], Philippe Grelu[1]

[1]Université de Bourgogne, Dijon, France. [2]Alexandria University, Alexandria, Egypt

Abstract

We propose a new cavity design enhancing key dissipative effects with contained frequency chirping and demonstrate the generation of high energy pulses in the few-picoseconds regime.

11:45 - 12:00

TU-2.5 Highly-Stable Microwave Generation System Based on Figure-8 Mode-Locked Fiber Laser for Space Applications

Yuichi Takeuchi, Takahiro Yamada, Yushi Tanaka, Nozomu Takagi, Mitsuru Musha

The University of Electro-Communications, Tokyo, Japan

Abstract

We have developed a spaceborne optical frequency comb based on figure-8 mode-locked fiber laser for highly-stable microwave generation. Our low phase noise, robust and compact mode-locked laser has passed the environment tests for space applications.

12:00 - 12:15

TU-2.6 Megawatt peak power Mamyshev oscillator seeded by sub-nanosecond pulses either at 1064 nm or 1033 nm

Riccardo Gotti[1], Sara Pizzurro[1], Luca Carrà[2], Antonio Agnesi[1], Federico Pirzio[1]

[1]Dipartimento di Ingegneria Industriale e dell'Informazione, Università di Pavia, Pavia, Italy. [2]Bright Solutions srl, Cura Carpignano (PV), Italy

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Abstract

A 1-W average power, >1 MW peak power Mamyshev oscillator was started by a micro-chip laser at 1033/1064 nm. Seeding at 1033 nm provides higher quality, almost pedestal-free, shorter pulses (46-fs) thanks to faster evolution toward gain-managed nonlinear amplification regime.

12:15 - 12:30

TU-2.7 Dispersion-less Soliton Fiber Laser

Mostafa Mohamed[1,2], Aurélien Coillet[1], Philippe Grelu[1]

[1]Université de Bourgogne, Dijon, France. [2]Alexandria University, Alexandria, Egypt

Abstract

By tailoring picosecond pulse generation through spectral filtering, we design fiber lasers generating up to 0.34 µJ dissipative solitons pulses without dispersion. Our design offers flexibility in pulse energy and duration with standard telecom components.

Lunch break

12:30 - 13:30 Tuesday, 27th August, 2024

TU-3: Thin-Disk and Yb-bulk lasers

13:30 - 15:15 Tuesday, 27th August, 2024
Presentation type Oral
Chair(s) Uwe Griebner

13:30 - 13:45

TU-3.1 Modelocked Thin-Disk Laser Oscillator with 550 W of Average Output Power

Moritz Seidel, Lukas Lang, Christopher R. Phillips, Ursula Keller

ETH Zurich, Zurich, Switzerland

Abstract

We present an ultrafast thin-disk laser oscillator providing a record power of 550 W with 100-µJ, 852-fs pulses at a repetition rate of 5.5 MHz. This is

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enabled by a six-pass replicating-cavity multipass scheme and ion-implanted sapphire-bonded SESAMs.

13:45 - 14:00

TU-3.2 High-power, µJ-class Kerr-lens mode-locked thin-disk oscillators at 2.1 µm

Sergei Tomilov, Mykyta Redkin, Yicheng Wang, Weichao Yao, Anna Suzuki, Martin Hoffmann, Clara Saraceno

Ruhr-Universität Bochum, Bochum, Germany

Abstract

We report on the development of two 2-µm high-power Kerr-lens mode-locked thin-disk oscillator configurations based on Ho:YAG crystal, reaching up to 29 W of output power and 1.74 µJ of pulse energy.

14:00 - 14:15

TU-3.3 Carrier-Envelope Phase Stabilization of a 100 MW-Level Thin-Disk Oscillator

Yasmin Kopp, Semyon Goncharov, Oleg Pronin

Helmut-Schmidt University, Hamburg, Germany

Abstract

The first carrier-envelope phase stabilization of a 100 MW-level Kerr-lens mode-locked thin-disk oscillator is presented. The residual minimum in-loop phase noise is measured to be < 200 mrad RMS.

14:15 - 14:30

TU-3.4 High Harmonic Generation with 170 W and 250 MW thin-disk laser-oscillator

Moinuddin Kadiwala, Yasmin Kopp, Semyon Goncharov, Nazar Kovalenko, Oleg Pronin

Helmut-Schmidt University, Hamburg, Germany

Abstract

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We perform high harmonic generation directly with the compressed output of a thin-disk oscillator. First measurements show that we can easily reach *5* x 10^{13} *W/cm*^{2} in a Krypton gas jet and generate 7th harmonic centered around 150 nm.

14:30 - 14:45

TU-3.5 300-mW average power in 22-fs pulses from a multi-mode diode pumped Yb:CALGO oscillator

Firas Trawi, Jakub Drs, Michael Mueller, Marin Hamrouni, Valentin wittwer, Thomas Südmeyer

Université de Neuchâtel, Neuchâtel, Switzerland

Abstract

We present a multi-mode diode-pumped Yb:CALGO laser oscillator based on cross-polarization pumping. Using this method, we demonstrate 22-fs pulses at 0.3 W, which is the shortest duration for any Yb-based bulk laser oscillator utilizing multimode-diode pumping.

14:45 - 15:00

TU-3.6 High gain, multi-pass, femtosecond Yb:KYW crossed-crystals amplifier pumped by high-brightness tapered laser diodes

Simone Dabbene[1], Riccardo Gotti[1], Arne Heirich[2], Manuel Messner[2], Antonio Agnesi[1], Federico Pirzio[1]

[1]Università di Pavia, Pavia, Italy. [2]Pantec Biosolutions AG, Ruggel, Liechtenstein

Abstract

A four-passes amplifier employing two 3-mm-long, 10%-doped Yb:KYW crystals, was pumped by 9-W, M^2<1.5, tapered diode. We obtained a small-signal gain G_0>120, P_{out}=2.1 W seeding with 20-mW average power 300-fs pulses, with excellent temporal, spectral, spatial quality preservation (M^2<1.1).

15:00 - 15:15

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TU-3.7 Sub-20 fs, 80 W, up to 2 mJ Yb-based laser multi-pass-cell post-compression: experimental and numerical results.

Jean-François Hergott, Réau Fabrice, Nicolas Lericheux, Matthieu Guer, Hugo Marroux, Romain Géneaux, Olivier Tcherbakoff, Fabien Lepetit, David Bresteau, Thierry Ruchon, Pascal Salières, Thierry Auguste, Pascal d'Oliveira

CEA, Gif/Yvette, France

Abstract

We report here on the experimental pulse duration compression down to sub-20fs of up to 2mJ, 330fs pulses of an 80W Ytterbium laser, using argon-filled multi-pass-cell reproduced by numerical calculations stressing the role of the driver pulse profile.

Coffee break

15:15 - 15:45 Tuesday, 27th August, 2024

TU-4: Wave-guide lasers

15:45 - 17:30 Tuesday, 27th August, 2024
Presentation type Oral
Chair(s) Eric Cormier

15:45 - 16:15

TU-4.1 Invited Large mode area waveguide based high-energy passively Q-switched laser in silicon photonics

Neetesh Singh

DESY, Hamburg, Germany

Abstract

We demonstrate high energy Q-switched pulse generation with the help of a large mode area gain waveguide in a silicon photonics device. Output pulse energy >150 nJ and laser slope efficiency of 40% is shown.

16:15 - 16:30

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TU-4.2 High efficiency diode-pumped femtosecond-laser-written waveguide lasers based on Pr:$LiLuF_4$

Davide Baiocco[1], Ignacio Lopez-Quintas[2], Javier Rodriguez Vázquez de Aldana[2], Mauro Tonelli[1], Alessandro Tredicucci[1]

[1]Dipartimento di Fisica, Università di Pisa, Largo Bruno Pontecorvo 3, 56127 Pisa (PI), Italy. [2]Grupo de Investigación en Aplicaciones del Láser y Fotánica, Universidad de Salamanca, Pl. La Merced SN. 37008 Salamanca, Spain

Abstract

We report the development of compact, high-efficiency, femtosecond-laser-written waveguide lasers on Pr:$LiLuF_4$. We demonstrated lasing at 523nm, 604nm, and 721nm, with slope efficiencies of 11%, 40% and 51% and output power of 65mW, 275mW and 310mW respectively.

16:30 - 16:45

TU-4.3 Planar waveguide laser at 705 nm based on Eu:KY(WO4)2 epitaxial layer

Amandine Baillard[1], Ji Eun Bae[1], Pavel Loiko[1], Rosa Maria Solé[2], Magdalena Aguiló[2], Francesc Díaz[2], Gurvan Brasse[1], Xavier Mateos[2,3], Patrice Camy[1]

[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, 14050 Caen, France. [2]Física i Cristal·lografia de Materials (FiCMA), Universitat Rovira i Virgili (URV), 43007 Tarragona, Spain. [3]Serra Húnter Fellow, Tarragona, Spain

Abstract

We report on polarized spectroscopy and deep-red laser operation of heavily Eu3+-doped KY(WO4)2 epitaxial layers. The waveguide laser delivered 7 mW at 705 mW with a linear polarization and a laser threshold of 22 mW.

16:45 - 17:00

TU-4.4 Efficient yellow Dy:ZBLAN fiber laser with high-brightness diode-pumping at 450 nm

Jonathan Demaimay[1], Esrom Kifle[1], Pavel Loiko[1], Florence Pau[2], Gilles Recoque[2], Thierry Georges[2], Thiphaine Rault[3], Laurine Bodin[3], Patrice Camy[1], Alain Braud[1]

[1]Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, CAEN, France. [2]Oxxius SA, Lannion, France. [3]Le Verre Fluoré, Bruz, France

Abstract

A yellow continuous-wave Dy:ZBLAN fiber laser generates 92 mW at 575 nm with a record-high optical efficiency of 12% and high beam quality (M^2 ~1.5) via pumping by two high-brightness blue 450-nm GaN laser diodes.

17:00 - 17:15

TU-4.5 Waveguide-based optical parametric oscillator for coherent anti-Stokes Raman scattering

Ming Gao, Kristin Wallmeier, Carsten Fallnich

University of Münster, Münster, Germany

Abstract

A Si_3N_4 waveguide-based optical parametric oscillator is presented that generates narrowband output pulses down to 1.44 nm and with up to 211 pJ pulse energy, allowing coherent Raman scattering spectroscopy and microscopy with sufficient spectral resolution and high contrast.

17:15 - 17:30

TU-4.6 Widely tunable dual-color waveguide-based optical parametric oscillator

Maximilian Timmerkamp, Ming Gao, Carsten Fallnich

University of Münster, Münster, Germany

Abstract

Exploiting four-wave mixing in two orthogonally polarized fundamental modes of Si_3N_4 waveguides and a tunable birefringence in the cavity, an optical parametric oscillator generates two independently tunable output frequencies from 0 to 62 THz difference.

TU-PO: Poster session 1A

17:30 - 18:30 Tuesday, 27th August, 2024
Sapphire A
Presentation type Poster

TU-PO.A.1 Ultrafast 1770 nm laser system based on Tm:Tb:ZBLAN fibers for multi-photon microscopy

Kaito Okada, Dina Banguilan, Takao Fuji

Toyota Technological Institute, Nagoya, Japan

Abstract

This work presents a chirped pulse amplification system based on thulium-doped core and terbium-doped cladding fluoride fibers, enabling the generation of ultrashort pulses at 1770 nm for multi-photon microscopy. The system delivers sub-microjoule pulses with a duration of 254 fs.

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TU-PO.A.2 Growth, spectroscopy and laser operation of in-band pumped Ho^{3+}-doped Yttrium Gallium Garnet

Sami Slimi[1,2], Xavier Mateos[2], Haohai Yu[3], Huaijin Zhang[3], Christian Kränkel[4], Pavel Loiko[5], Rosa Maria Solé[2], Magdalena Aguiló[2], Francesc Díaz[2], Weidong Chen[1,6], Valentin Petrov[1], Uwe Griebner[1]

[1]Max Born Institute, Berlin, Germany. [2]Universitat Rovira i Virgili, Tarragona, Spain. [3]Shandong University, Jinan, China. [4]Leibniz Institute of Crystal Growth, Berlin, Germany. [5]Centre de Recherche sur les Ions, les Matériaux et la Photonique, Caen, France. [6]Fujian Institute of Research on the Structure of Matter, Fuzhou, China

Abstract

We report on the crystal growth of a 2.86 at.% Ho:YGG crystal, its structural and spectroscopic characterization, as well as on its first laser operation near 2.1 μm under in-band pumping by a Tm-fiber laser.

TU-PO.A.3 Low Differential Phase Noise Ytterbium Fibre Amplifier for Coherent Beam Combination

Weilong Yu, Changshun Hou, William Kerridge-Johns, Johan Nilsson

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University of Southampton, Southampton, United Kingdom

Abstract

A two-channel ytterbium-doped fiber amplifier system with active phase-locking reaches a differential phase noise of only 40 mrad (λ/160) at 200-W channel power. Frequencies above 30 Hz did not require noise suppression, thus simplifying advanced beam-shaping through coherent beam combination.

TU-PO.A.4 Influence of intracavity-air loss on 946-nm Nd:YAG laser performance

Isaac Brock, Jacob Mackenzie

University of Southampton, Southampton, United Kingdom

Abstract

We report on the impact of humidity in a cryogenically cooled Nd:YAG laser operating at 946-nm. Performance degrades with increasing cavity length, which is attributed to absorption by water vapour, an additional intracavity loss.

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TU-PO.A.5 Subnanosecond multi-stage microlaser pumped OPA system continuously tunable in the VIS and near UV

Jonas Banys, Augustė Stravinskaitė, Vygandas Jarutis, Julius Vengelis

Vilnius University, Vilnius, Lithuania

Abstract

We demonstrate, to the best of our knowledge, the first subnanosecond multi-stage OPA system continuously tunable throughout the VIS and near UV spectral range. A comprehensive characterization of both the seed source and the OPA with upconversion stage was performed.

TU-PO.A.6 Challenges of temperature-dependent emission spectra measurement of Thulium-doped fibers around 2 µm

Bára Švejkrová[1,2], Jan Aubrecht[1], Richard Švejkar[3], Martin Grábner[1], W. Andrew Clarkson[3], Pavel Peterka[1]

[1]Institute of Photonics and Electronics of the Czech Academy of Sciences, Prague, Czech Republic. [2]Faculty of Nuclear Sciences and Physical

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Engineering, Czech Technical University in Prague, Prague, Czech Republic. [3]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom

Abstract

Understanding temperature's impact on spectroscopic properties in high-power thulium-doped fiber lasers is crucial for accurate numerical modeling. Our study discusses influence of thulium concentration and temperature-induced bend losses on emission spectra measurement.

TU-PO.A.7 Subnanosecond fan-out MgO:PPLN optical parametric amplifier using continuum seed

Simona Armalytė, Jonas Banys, Vygandas Jarutis, Julius Vengelis

Vilnius University, Vilnius, Lithuania

Abstract

We present a subnanosecond pulse duration microlaser-pumped optical parametric amplifier based on the fan-out grating
design MgO:PPLN crystal tunable from near- to mid-infrared and using a continuum generated in the photonic crystal fiber as a seed.

TU-PO.A.8 Various fiber optic microlenses fabricated using a large diameter splicing system

Szymon Matczak, Dorota Stachowiak, Grzegorz Soboń

Wroclaw University of Science and Technology, Wroclaw, Poland

Abstract

We developed and fabricated various types of microlenses on optical fiber end facets using a large diameter splicing (LDS) system and analyzed the obtained beam profiles. Numerical simulations support our experimental results.

TU-PO.A.9 Dynamic thermal analysis of pulsed blue diode pumped Ti:Sapphire amplifiers

Daniel Hug[1], Manuel Zeyen[1], Andreas Dax[2], Alexandre Trisorio[2], Romain Carreto[3], Thomas Südmeyer[4], Bojan Resan[1]

[1]Institute of Product and Production Engineering, University of Applied Sciences and Arts Northwestern Switzerland, Windisch, Switzerland.

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[2]Laboratory for Non-linear Optics, Paul Scherrer Institute, Villigen, Switzerland. [3]TLD Photonics AG, Wettingen, Switzerland. [4]Time and Frequency Laboratory, Université de Neuchâtel, Neuchâtel, Switzerland

Abstract

We used the finite difference method to simulate temperature dynamics within Ti:Sapphire laser amplifier crystal pumped by a blue laser diode in different pump pulse configurations. Our analysis showed higher thermal impact, considering temperature-time-dependent properties of the crystal.

TU-PO.A.10 Supercontinuum Generation by Noise-Like Pulses in Ta2O5 Nonlinear Waveguide

Wen-Chen Chen[1], Guan-Hong Li[1], Mitch M. C. Mitch M. C. Chou[2,3], Yu-Cheng Hong[4], Ci-Ling Pan[4], Chao-Kuei Lee[1,3]

[1]Department of Photonics, National Sun Yat-sen University, Kaohsiung, Taiwan. [2]Department of Materials and Optoelectronics Science, National Sun Yat-sen University, Kaohsiung, Taiwan. [3]Center of Crystal Growth, National Sun Yat-sen University, Kaohsiung, Taiwan. [4]Department of Physics, National Tsing Hua University, Hsinchu, Taiwan

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Abstract

In this work, for the first time, noise-like pulse exciting supercontinuum generation ranging from 960 nm to 1240 nm from Ta_2O_5 waveguide was demonstrated and discussed.

TU-PO.A.11 Laser properties of hexagonal Yb-doped fluorapatite (FAP) transparent ceramics

Kazuya Takimoto[1,2], Hiroyasu Sone[2], Shinki Nakamura[3], Hiroaki Furuse[1]

[1]National Institute for Materials Science, Ibaraki, Japan. [2]Kitami Institute of Technology, Hokkaido, Japan. [3]Ibaraki University, Ibaraki, Japan

Abstract

Transparent non-cubic hexagonal fluorapatite ($Ca_{10}(PO_4)_5F_2$: FAP) ceramics with an average grain size of approximately 100 nm are fabricated. The laser operation with slope efficiency over 8% was achieved from AR-coated Yb:FAP ceramics.

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TU-PO.A.12 Highly sensitive multi-stage terahertz parametric upconversion detection based on RbTiOPO4 crystal

Na Ming, Shuzhen Fan, Xingyu Zhang, Xiaohan Chen, Zhenhua Cong, Zhaojun Liu, Dechun Li, Quanxin Guo, Liyuan Guo, Binzhe Jiao, Jiasheng Yuan, Kaiyu Wang, Naichang Liu

Shandong University, Qingdao, China

Abstract

Highly sensitive terahertz frequency upconversion detection was demonstrated with a $RbTiOPO_4$ crystal. The detectable THz frequency ranges were 3.6-4.0, and 5.4-5.7 THz. The minimum detectable terahertz energy at 5.6 THz was about 0.2 fJ.

TU-PO: Poster session 1C

17:30 - 18:30 Tuesday, 27th August, 2024
Sapphire C
Presentation type Poster

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TU-PO.C.1 Optimization of femtosecond fiber laser pulses with selected machine-learning algorithms

Alicja Kwaśny, Mikołaj Krakowski, Grzegorz Soboń

Wrocław University of Science and Technology, Wrocław, Poland

Abstract

We investigate the possibility of optimization of ultrashort laser pulses by spectral phase modulation using machine learning algorithms. We compare the efficiency of two algorithms: Grey Wolf Optimizer and Genetic Algorithm.

TU-PO.C.2 Concentration quenching dynamics in silica glass highly doped with Er^{3+}

Tim Julian Wörmann[1], Martin Brunzell[1], Valdas Pasiskevicius[1], Pawel Maniewski[1,2]

[1]Royal Institute of Technology, Stockholm, Sweden. [2]Optoelectronic Research Centre, Southampton, United Kingdom

Abstract

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In this study, quenching dynamics in RE-doped silica glass were investigated through the measurement of excited-state lifetimes of heavily doped silica micro-hemispheres fabricated directly on the end face of a multimode fiber (MMF).

TU-PO.C.3 Tuning refractive index change of SiNx induced byultrafast laser pulses

Gholamreza Shayeganrad, Martynas Beresna, Gilberto Brambilla, Thalia Domínguez Bucio, Fredric Y. Gardes

Optoelectronics Research Centre, University of Southampton, Southamption, United Kingdom

Abstract

We demonstrate the feasibility of femtosecond laser pulses to tune refractive index of SiNx, enabling direct writing waveguides in SiNx and reconfiguring microring resonators. The refractive index increases with pulse energy and pulse density.

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TU-PO.C.4 Method for nonlinear refractive index estimation in photonic crystal fibers

Miglė Kuliešaitė, Julius Vengelis, Vygandas Jarutis

Laser Research center, Vilnius University, Vilnius, Lithuania

Abstract

We present a new method for estimating the nonlinear refractive index of polarization-maintaining photonic crystal fiber using phase shift between orthogonal polarization modes. The presented experimental technique will be a reliable tool to estimate nonlinear refractive index in optical fibers.

TU-PO.C.5 2-μm energy-managed soliton fiber laser

Mostafa Mohamed[1,2], Aurélien Coillet[1], Philippe Grelu[1]

[1]Université de Bourgogne, Dijon, France. [2]Alexandria University, Alexandria, Egypt

Abstract

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Utilizing standard telecom fiber components at 2μm wavelength, we crafted a laser cavity generating dissipative solitons of 11.5 nJ with ~1 ps pulse duration, showcasing flexibility in central wavelength and repetition rate.

TU-PO.C.6 Development of a blue-violet high-power single-frequency diode laser system for ^{48}Ca isotope separation

Shigeki Tokita[1], Daiki Okazaki[1], Shinichiro Masuno[1], Masahiro Uemukai[2], Izumi Ogawa[3], Hideaki Niki[3], Anawat Rittirong[2], Saori Umehara[2], Sei Yoshida[2], Noriaki Miyanaga[4]

[1]Kyoto University, Kyoto, Japan. [2]Osaka University, Osaka, Japan. [3]University of Fukui, Fukui, Japan. [4]Institute for Laser Technology, Osaka, Japan

Abstract

This study introduces a multi-beam injection-locked laser system employing Gallium Nitride laser diodes, showcasing improvements in wavelength stability and scalability crucial for ^{48}Ca isotope separation.

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TU-PO.C.7 Resonant 1.7 µm diode pumping of Q-switched Tm:YAG laser generating at 2036 nm

Jan Kratochvíl[1], Jan Šulc[1], Karel Nejezchleb[2], Michal Němec[1], Helena Jelínková[1], Štěpán Uxa[2]

[1]Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering, Prague, Czech Republic. [2]CRYTUR, Ltd. TURNOV, Turnov, Czech Republic

Abstract

Resonant 1.7 µm diode pumping of Tm:YAG laser was realized to generate a volume-Bragg-grating-stabilized emission at a 2036 nm atmospheric transmission window. Up to 4.7 W output power with a slope efficiency of 49 % was obtained.

TU-PO.C.8 Large aperture Faraday isolator based on the SiO2 glass for the high energy laser drivers

Ryo Yasuhara

National Institute for Fusion Science, Toki, Japan

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Abstract

The novel optical isolator concept based on the fused-silica glass is proposed. This can make the large aperture with ultra-low optical absorption at operating wavelength for high energy with high rep. rate operation, marking a significant advancement in optical isolation technology.

TU-PO.C.9 Tunable emission of an external-cavity Yb:KGW monolithic solid-state laser

Miguel Cuenca, Angela E. Ortega, Haroldo Maestre

Universidad Miguel Hernandez, Elche, Alicante, Spain

Abstract

Tunable microchip/monolithic lasers are expected to show promising applications. In this work external cavity techniques are applied to a Yb:KGW monolithic laser achieving 35 nm tuning by balancing Nm and Np emission polarizations.

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TU-PO.C.10 Temperature influence on Ho:YAP microchip laser emission

Miroslav Coubal[1], Jan Šulc[1], Michal Němec[1], Helena Jelínková[1], Karel Nejezchleb[2], Štěpán Uxa[2]

[1]Czech Technical University In Prague, Prague, Czech Republic. [2]Crytur, Ltd., Turnov, Czech Republic

Abstract

Temperature dependencies of Ho:YAP spectroscopic (4 - 300 K) properties were investigated and three Ho:YAP crystals ("a"-, "b"-, and "c"-cut) were tested as an active medium of cryogenically-cooled multi-watt microchip laser operating at 2.1 μm spectral region.

TU-PO.C.11 1 mJ 20 kHz efficient and robust end-pumped Yb:YAG femtosecond laser for nonlinear frequency conversion

Julius Lukošiūnas[1,2], Raimundas Burokas[1,2], Aivaras Kazakevičius[1,2], Rokas Danilevičius[2], Andrejus Michailovas[1,2]

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[1]National Center for Physical Sciences and Technology, Vilnius, Lithuania.
[2]Ekspla, Vilnius, Lithuania

Abstract

Efficient and robust 1 mJ-level femtosecond laser based on end-pumped Yb:YAG amplifier operating at 20 kHz pulse repetition rate was demonstrated. Simple laser design with excellent stability makes it promising for nonlinear frequency conversion applications.

TU-PO.C.12 Digital laser with composite resonator for optiocal vortex laser generation

Yuan-Yao Lin

Department of Photonics, National Sun Yat-sen University, Kaohsiung city, Taiwan. Crystal Research Center, National Sun Yat-sen University, Kaohsiung City, Taiwan

Abstract

We propose a composite cavity configuration that resonates a digital laser and seeds it to the master resonator for power boost which shows the potential for power scaling of digital laser system.

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WE-1: Keynote Session FWD+SSL

08:15 - 09:30 Wednesday, 28th August, 2024
Presentation type Keynote
Chair(s) Eric Cormier

08:15 - 09:00

WE-1.1 Keynote Exploiting the uniqueness of fluoride glass fibers for efficient lasing from visible to mid-infrared

Martin Bernier

COPL, Laval University, Québec, Canada

Abstract

This presentation will review recent advances in the development of powerful fiber lasers based on fluoride glass fibers, operating from the visible to the mid-infrared, and from the continuous wave to the femtosecond pulsed regime.

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09:00 - 09:15

WE-1.2 Actively pulse shaped linearly polarized nanosecond hybrid Ho^{3+} and Tm^{3+}-doped silica fiber & Ho^{3+}:YAG MOPA at 2048 nm

Dominik Lorenz[1,2], Marius Rupp[1,2], Dieter Panitzek[1,2], Clément Romano[1], Julian Schneider[1,2], Katharina Goth[1,2], Johannes Deutsch[1,2], Marc Eichhorn[1,2], Christelle Kieleck[1]

[1]Fraunhofer IOSB, Ettlingen, Germany. [2]Karlsruhe Institute of Technology, Karlsruhe, Germany

Abstract

Ho^{3+}:YAG amplifiers are able to efficiently scale pulse energy at wavelengths far shorter than the main emission peak. For 24 W input power at 2048 nm a signal output power of 81.6 W is reached, resulting in 5.3 dB gain.

09:15 - 09:30

WE-1.3 Efficient Resonant Waveguide Grating for High-Power Lasers in the 2-µm Wavelength Range

Ayoub Boubekraoui[1], Sergei Tomilov[2], Mykyta Redkin[2], Danish Bashir[1], Georgia Mourkioti[3], Jacob Mackenzie[3], Clara J. Saraceno[2], Thomas Graf[1], Marwan Abdou Ahmed[1]

[1]Institut für Strahlwerkzeuge, Universität Stuttgart, Pfaffenwaldring 43, 70569, Stuttgart, Germany. [2]Photonics and Ultrafast Laser Science, Ruhr Universität Bochum, Universitätsstrasse 150, 44801, Bochum, Germany. [3]Optoelectronics Research Centre, University of Southampton, Southampton, SO17 1BJ, United Kingdom

Abstract

We present resonant waveguide-grating (RWG) tailored for lasers operating at the 2-µm wavelength range.Utilizing the RWG as a cavity mirror, generation of tunable narrow-bandwidth and linearly-polarized radiation from a Ho:YAG thin-disk laser was demonstrated.

Coffee break

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09:30 - 10:00 Wednesday, 28th August, 2024

WE-2: Alexandrite lasers and LIDARs

10:00 - 12:00 Wednesday, 28th August, 2024
Presentation type Oral
Chair(s) Jacob Mackenzie

10:00 - 10:30

WE-2.1 Invited Alexandrite Lasers : Review of recent laser progress and developments for vegetation lidar

Michael Damzen

Imperial College London, London, United Kingdom

Abstract

A review is made of recent progress in diode-pumped Alexandrite lasers as a high-power, tunable-wavelength source, and our advances in developing Alexandrite as a short-pulse, high-pulse-rate vegetation lidar source for satellite-based Earth Observation.

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10:30 - 10:45

WE-2.2 First thin-disk laser operation of an alexandrite crystal

Stefan Esser, Thomas Graf, Marwan Abdou Ahmed

Institut für Strahlwerkzeuge, University of Stuttgart, Pfaffenwaldring 43, 70569 Stuttgart, Germany

Abstract

We present the first thin-disk laser operation of alexandrite with an average power over 15 W in continuous-wave multimode operation at a wavelength of 750 nm. Additionally, single-mode operation with up to 2.6 W was achieved.

10:45 - 11:00

WE-2.3 Power scaling of LED-pumped alexandrite : the road to high gain multipass amplifiers

Elio Thellier, Hussein Taleb, Catherine Le Blanc, Pierre Pichon, Frédéric Druon, Patrick Georges, François Balembois

Université Paris-Saclay, Institut d'Optique Graduate School, CNRS, Laboratoire Charles Fabry, Palaiseau, France

Abstract

Our experiment demonstrates that LED-pumping through luminescent concentrator enables sufficient pump power for viable alexandrite amplifier gain. In 10 passes we obtain a gain of 19 with 10 W output power, for 50 µs pulses, 20 Hz and 760 nm.

11:00 - 11:15

WE-2.4 Transient Analysis of Pump-induced Lensing Effects in Alexandrite Lasers Using Pump-Probe Technique

Xunuo Jiang, Huaifeng Xiao, Michael Damzen

Imperial College London, London, United Kingdom

Abstract

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A novel transient pump-probe method is used to differentiate thermal and population pump-induced lensing mechanisms. In diode-pumped Alexandrite lasers, excellent agreement is found between theory and experiment and the population lens is found to be dominant in non-lasing amplifier.

11:15 - 11:30

WE-2.5 5-Watt level widely wavelength-tunable UV output from a frequency-doubled Alexandrite laser

Huaifeng Xiao, Michael Damzen

Imperial College London, London, United Kingdom

Abstract

We demonstrate a record 5-Watt level, wavelength tunable, continuous-wave UV output based on a diode-pumped Alexandrite laser employing intra-cavity second harmonic generation. A wide wavelength tuning range from 364nm to 402nm was achieved.

11:30 - 11:45

WE-2.6 3D profiling in a laser micromachining station using dual-comb LiDAR

Justinas Pupeikis[1,2], Hayk Soghomonyan[1], Benjamin Willenberg[1,2], Armin Strumpp[3], Lukas Lang[2,1], Christopher Phillips[1], Bojan Resan[3], Ursula Keller[1]

[1]ETH Zurich, Zurich, Switzerland. [2]K2 Photonics, Zurich, Switzerland. [3]FHNW, Windisch, Switzerland

Abstract

We present a coaxial dual-comb LiDAR integrated into a laser micromachining station, enabling
in-situ 3D profiling of machined parts with sub-micrometer axial precision, offering a cost-effective solution with high precision capability.

11:45 - 12:00

WE-2.7 Diode-pumped, Q-switched Alexandrite laser as emitter for general purpose atmospheric Lidar systems

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Sarah Scheuer[1], Alexander Munk[1], Niklas Hammerschmidt[1], Michael Strotkamp[1], Josef Höffner[2]

[1]Fraunhofer Institute for Laser Technology ILT, Aachen, Germany. [2]Leibniz Institute of Atmospheric Physics IAP, Kühlungsborn, Germany

Abstract

We present design and performance of four prototypes of narrow-bandwidth emitters based on diode-pumped Alexandrite lasers for atmospheric Doppler-Mie, -Rayleigh and -resonance lidar systems. Furthermore, lab results for efficient frequency-doubling into the UV are presented.

Lunch break

12:00 - 13:00 Wednesday, 28th August, 2024

WE-3: Industrial session

13:00 - 14:00 Wednesday, 28th August, 2024

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Presentation type Industrial
Chair(s) Federico Pirzio

13:00 - 13:15

WE-3.1 Autofocus and motion error compensation methods for gantry machine in ultra-precise laser machining applications

Artur Piscalov

Standa UAB, Vilnius, Lithuania

Abstract

Error compensation by applying motion control methods makes auto-focus easy and reliable in micro-machining applications. We present a method for dynamic roll and yaw compensation in gantry machines.

13:15 - 13:30

WE-3.2 From Innovation to Prism Award: What Lies Beyond the Technologies of FemtoLux 30 Laser

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Tadas Bartulevičius[1], Karolis Madeikis[1], Raimundas Burokas[1,2], Mykolas Lipnickas[1], Andrejus Michailovas[1,2]

[1]Ekspla, Vilnius, Lithuania. [2]Center for Physical Sciences and Technology, Vilnius, Lithuania

Abstract

We introduce the ultrafast laser *FemtoLux 30*, featuring enhanced functionality enabling precise and widely tunable operation in the single-pulse regime and flexible GHz-burst mode, including short-, long-bursts, and GHz-bursts-in-MHz-bursts.

13:30 - 14:00

WE-3.3 Invited **Single-cycle CEP-stable Cr:ZnS lasers**

Nathalie Lenke[1,2], Philipp Steinleitner[2], Maciej Kowalczyk[2,3,4,5], Philipp Rosenberger[1], Sebastian Gröbmeyer[1,3], Aleksandar Sebesta[1,2,4], Vladimir Pervak[3], Nicholas Karpowicz[2], Ferenc Krausz[1,2,3,4], Alexander Weigel[2,3,4]

[1]PULSED GmbH, Garching, Germany. [2]Max-Planck-Institut für Quantenoptik, Garching, Germany. [3]Ludwig-Maximilians-Universität

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München, Garching, Germany. [4]Center for Molecular Fingerprinting (CMF), Budapest, Hungary. [5]Wroclaw University of Science and Technology, Wroclaw, Poland

Abstract

We showcase a coherent infrared light source capable of producing single-cycle pulses with exceptional waveform stability. With *ALBATROSS*, a commercial solution is made available to chart new horizons in infrared spectroscopy and high-speed opto-electronics.

WE-4: Microcombs and GHz sources

14:00 - 15:15 Wednesday, 28th August, 2024
Presentation type Oral
Chair(s) Giorgio Santarelli

14:00 - 14:30

WE-4.1 Invited Meta-Dispersion for Microcomb Spectral Design in Photonic-Crystal Rings

Erwan Lucas[1], Su-Pen Yu[2,3], Travis Briles[2], David Carlson[4], Scott B. Papp[2,3]

[1]Laboratoire Interdisciplinaire Carnot de Bourgogne, UMR 6303 CNRS-Université de Bourgogne, Dijon, France. [2]Time and Frequency Division, National Institute of Standards and Technology, Boulder, USA. [3]Department of Physics, University of Colorado, Boulder, USA. [4]Octave Photonics, Louisville, USA

Abstract

Microcombs, essential for various applications, benefit from tailored spectral shaping. Leveraging inverse design, we demonstrate versatile "meta" dispersion control via multimode hybridization in photonic crystal ring resonators, offering promising avenues for advanced microcomb engineering.

14:30 - 14:45

WE-4.2 A synthetic pulse interaction for modelocking at ~100 GHz

Aladin Şura[1,2], Amirhossein Maghsoudi[1,2], Fatih Ömer Ilday[1,2]

[1]Bilkent University, Ankara, Turkey. [2]Ruhr-Universität Bochum, Bochum, Germany

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Abstract

Harmonic modelocking allows high repetition rates but has limited controllability and scalability. We propose a synthetic pulse-to-pulse interaction, acting like a saturable absorber, but imparting loss as a function of temporal delay, as a route to ultrahigh frequency fiber lasers.

14:45 - 15:00

WE-4.3 Fiber optical parametric oscillator pumped by a 16 GHz tunable frequency comb

Muhammad Ghawas[1], Valerian Freysz[2], Lilia Pontagnier[3], Eric Cormier[3], Giorgio Santarelli[3], Eric Freysz[1]

[1]Univ. Bordeaux, Talence, France. [2]Alphanov, Talence, France. [3]CNRS-IOGS-Université Bordeaux, Talence, France

Abstract

We demonstrate a 16 GHz repetition rate fiber-based optical parametric oscillator, pumped by an electro-optical comb tunable around 1.03 µm,

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delivering picosecond and wavelength tunable signal and idler pulses. Build-up and relaxation dynamics of these pulses are reported

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15:00 - 15:15

WE-4.4 50 GHz, 100 fs pulses at 100 W average power from a burst mode, all-single mode, Yb-doped fiber laser system

Mesut Laçin[1,2,3], Paul Repgen[1,2], Amirhossein Maghsoudi[1,2], Aladin Şura[1,2], Umut Aydemir[3,1], Ömer Ilday[1,2]

[1]Bilkent University, Ankara, Turkey. [2]Ruhr-Universität Bochum, Bochum, Germany. [3]Bursa Uludag University, Bursa, Turkey

Abstract

This study presents a unique laser system, utilizing only single-mode fibers, achieving 100 fs ultra-short pulses with 100 W average output power, and achieving burst repetition rates exceeding 50 GHz, enabling material processing in the ablation-cooling regime.

Coffee break

15:15 - 16:00 Wednesday, 28th August, 2024

WE-5: Postdeadline session

16:00 - 17:00 Wednesday, 28th August, 2024
Presentation type Oral
Chair(s) Andrejus Michailovas

16:00 - 16:15

WE-PD.1 Coherent combining of broadband pulses after free space optical parametric amplification

Gaudenis Jansonas[1,2], Emily C. Erdman[1,3], Jakub Novák[1], Roman Antipenkov[1], Vojtěch Grossmann[1,4], Martin Horáček[1], Jack Alexander Naylon[1], Pavel Bakule[1]

[1]ELI Beamlines Facility, The Extreme Light Infrastructure ERIC, Dolní Břežany, Czech Republic. [2]Laser Research Center, Vilnius University, Vilnius, Lithuania. [3]Faculty of Mathematics and Physics, Charles University in Prague, Prague, Czech Republic. [4]Faculty of Nuclear Sciences and

Physical Engineering, Czech Technical University in Prague, Prague, Czech Republic

Abstract

In this study, we present the proof of concept of the polarization-based filled-aperture coherent combination of two distinct broadband sub-20fs transform limited pulse duration optical parametric chirped pulse amplification systems in free-space. An average combination efficiency of 90% is demonstrated.

16:15 - 16:30

WE-PD.2 Programmable burst-mode laser system delivering picosecond pulses with continuously tunable 1 to 7 GHz pulse repetition rate and up to 1 kW average power

Hanyu Ye[1], Lilia Pontagnier[1], Abdelkrim Bendahmane[1], Annalisa Guandalini[2], Matthias Kemnitzer[2], Martin Gorjan[2], Jürg Aus der Au[2], André Loescher[3], Florian Bienert[3], Marwan Abdou Ahmed[3], Giorgio Santarelli[1], Eric Cormier[1]

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[1]Laboratoire Photonique Numérique et Nanosciences (LP2N), UMR 5298, CNRS-IOGS-Université Bordeaux, Talence, France. [2]Spectra-Physics, MKS Instruments, Inc., Feldgut 9, Rankweil, Austria. [3]Universität Stuttgart, Institut für Strahlwerkzeuge (IFSW), Pfaffenwaldring 43, Stuttgart, Germany

Abstract

Programmable burst-mode laser system delivering picosecond pulses with continuously tunable 1 to 7 GHz pulse repetition rate and up to 1 kW average power

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16:30 - 16:45

WE-PD.3 Towards direct nonlinear compression of long-pulse lasers to the femtosecond regime

Gaspard Beaufort[1,2], Nayla Jimenez[1,3,4], Victor Hariton[1], Ayhan Tajalli[1], Ingmar Hartl[1], Marcus Seidel[1,3,4]

[1]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany.
[2]Department of Physics, Ecole Normale Supérieure de Lyon, Lyon, France.

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[3]Helmholtz-Institute Jena, Jena, Germany. [4]GSI Helmholtzzentrum für Schwerionenforschnung GmbH, Darmstadt, Germany

Abstract

We simulate spectral broadening of 100-mJ, 300-ps pulses to a sub-300 fs transform-limit in a 1-m diameter multi-pass cell. For proof-of-concept, an 11-mirror cell was set-up and 300 MW peak power pulses were spectrally broadened in air over 297 passes.

16:45 - 17:00

WE-PD.4 First demonstration of ultrafast-electron diffraction using a 3-GHz electro-optical comb generator as a UV photoinjector laser.

Christoph Mahnke[1], Uwe Grosse-Wortmann[1], Max Hachmann[1], Vincent Hennicke[1,2], Chen Li[1], Jan Meyer[1,2], Tim Pakendorf[1,2], Klaus Flöttmann[1], Alke Meents[1,2], Ingmar Hartl[1]

[1]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany. [2]Center for Free-Electron Laser Science, Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany

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Abstract

We demonstrate ultrafast-electron diffraction using an electro-optic comb-generator, emitting a 3 GHz train of ps pulses at 257 nm. This new operation mode improves electron coherence and reduces space-charge effects

Transfer to Belmontas - Bus at hotel entrance

17:50 - 18:10 Wednesday, 28th August, 2024

Photo session Belmontas

18:10 - 18:30 Wednesday, 28th August, 2024

Conference Dinner - Belmontas

18:30 - 22:00 Wednesday, 28th August, 2024

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TH-1: Quantum-Photonics technologies symposium I

08:15 - 09:30 Thursday, 29th August, 2024
Presentation type Oral
Chair(s) Jacob Mackenzie

08:15 - 09:00

TH-1.1 Keynote From Matter Waves to Quantum Sensors

Philippe Bouyer

University of Amsterdam, Van der Waals-Zeeman Institute, Institute of Physics, Amsterdam, Netherlands

Abstract

Matter-wave sensors drive versatile interferometers for on-field operations and fundamental exploration, emphasizing enhanced navigation through quantum-classical integration, promising optimized performance and

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miniaturization. These advancements fuel competitive research in precision metrology, marking a transformative era in scientific exploration and technological innovation.

09:00 - 09:30

TH-1.2 Invited Sub-ps THz-Pulse-Driven Electro-Absorption Switching in Heterostructure Quantum Dots

Rokas Jutas[1], Claudia Gollner[1], Dominik Kreil[2], Dmitry Dirin[3,4], Simon Boehme[3,4], Maksym Kovalenko[3,4], Audrius Pugžlys[1,5]

[1]TU Wien, Vienna, Austria. [2]Johannes Kepler University, Linz, Austria. [3]ETH Zürich, Zürich, Switzerland. [4]Empa-Swiss Federal Laboratories for Materials Science and Technology, Dübendorf, Switzerland. [5]Center for Physical Sciences and Technology, Vilnius, Lithuania

Abstract

Free-space terahertz signal is encoded onto an optical signal probing the absorption of CdSe/CdS core/shell quantum dots, utilizing quantum-confined Stark effect. The demonstrated ultrafast electro-absorption modulation could support Tbit/s data rates with extinction ratio exceeding 6 dB.

Coffee break

09:30 - 10:00 Thursday, 29th August, 2024

TH-2: Quantum-Photonics technologies symposium II

10:00 - 12:00 Thursday, 29th August, 2024
Presentation type Oral
Chair(s) Andrejus Michailovas

10:00 - 10:30

TH-2.1 Non-linear Frequency Conversion Waveguides for Quantum Technology

James Gates[1], Noelia Palomar Davidson[1], Matthew D'Souza[1], Goronwy Tawy[1], Glenn Churchill[1], Paolo Mennea[1], Peter Iveson[1], Peter Smith[1,2], Corin Gawith[1,2]

[1]University of Southampton, Southampton, United Kingdom. [2]Covesion Ltd, Southampton, United Kingdom

Abstract

This talk will describe the fabrication of periodically poled lithium niobate non-linear waveguides for the emerging quantum technology industry. It will address the challenges of optical engineering high-efficiency frequency conversion devices for the field and their application.

10:30 - 10:45

TH-2.2 Tunable 30W all-fiber laser emitting around 1850 nm

Giorgio Santarelli[1], Kentin Poncelet[1,2], Adèle Hilico[1], Germain Guiraud[2], Nick Traynor[2]

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[1]1 LP2N, IOGS, CNRS, Université de Bordeaux,, Talence, France. [2]2 Toptica Photonics SAS, Pessac, France

Abstract

We have demonstrated a tunable polarization maintaining thulium-doped fiber laser spanning the 1830–1880nm range with a fiber-coupled output power as high as 30W CW. The high-power booster stage is made using double clad fibers pumped with 793nm laser diodes .

10:45 - 11:00

TH-2.3 Waveguides Written by Femtosecond Laser in CVD Diamonds

Dmitrii Perevoznik[1,2], Anatoly Glukhovskoy[3], Julia Locmelis[1], Angeliki Afentaki[4], Moritz Hinkelmann[4], Folke Dencker[3], Uwe Morgner[1,2,4], David Zuber[1], Marc Wurz[3]

[1]Institute of Quantum Optics, Leibniz Universität Hannover, Hannover, Germany. [2]Cluster of Excellence PhoenixD (Photonics, Optics, and Engineering -Innovation AcrossDisciplines), Hannover, Germany. [3]Institut für Mikroproduktionstechnik, Hannover, Germany. [4]Laser Zentrum Hannover e.V ., Hannover, Germany

Abstract

This research explores the creation of Type II waveguide configurations in diamond using femtosecond laser technology, focusing on the enhancement of light propagation using pin-structures and extensive parameter investigation, offering significant advances in the fields of photonics and quantum sensing.

11:00 - 12:00

TH-2.4 The European Research Council - Funding for frontier research in Europe

Janne Salo[1], Ömer Ilday[2]

[1]European Research Council, Brussels, Belgium. [2]Ruhr University Bochum, Bochum, Germany

Abstract

The European Research Council provides funding for independent researchers in all research areas and career stages. This session provides basic information on how to prepare an ERC grant proposal and how the ERC funding can support researchers and their careers.

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Lunch break

12:00 - 13:00 Thursday, 29th August, 2024

TH-3: Pulse compression

13:00 - 15:00 Thursday, 29th August, 2024
Presentation type Oral
Chair(s) Thomas Südmeyer

13:00 - 13:30

THU-3.1 Few-cycle pulse generation by multi-pass multi-plate nonlinear pulse compression

Marcus Seidel

Helmholtz-Institute Jena, Jena, Germany. GSI Helmholtzzentrum für Schwerionenforschnung GmbH, Darmstadt, Germany. Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany

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Abstract

The multi-pass multi-plate spectral broadening technique yielded record-high single-stage compression factors of more than thirty. In a double-stage experiment ps pulses were compressed to 8.2 fs FWHM. Few-cycle pulses are enabled by the independent tunability of dispersive and nonlinear lengths.

13:30 - 13:45

THU-3.2 Sub-2-cycle multi-mJ single-stage post-compression in a multipass cell

Louis Daniault[1], Jaismeen Kaur[1], Geoffrey Gallé[2], Cédric Sire[2], François Sylla[2], Rodrigo Lopez-Martens[1]

[1]Laboratoire d'Optique Appliquée, Palaiseau, France. [2]SourceLAB, Palaiseau, France

Abstract

We report on the nonlinear temporal compression of multi-mJ pulses from a commercial Ti:Sa laser in a gas-filled multipass cell down to a record pulse duration of 4 fs with 60% overall efficiency.

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13:45 - 14:00

THU-3.3 Generation of femtosecond pulse bursts at multiple-THz repetition rate by nonlinear self-compression in bulk KTP

Christoffer Oxelmark Krook, Valdas Pasiskevicius

KTH Royal Institute of Technology, Stockholm, Sweden

Abstract

A chirped 470 fs pulse at 1030 nm was used to generate a phonon-polariton wave in bulk KTP by optical rectification. Phase modulation of the pump by the polariton wave resulted in generation of a burst of 20 fs pulses.

14:00 - 14:15

THU-3.4 Dual-beam multipass cell compression for time-resolved femtosecond spectroscopy setups

Alan Omar, Boldizsar Kassai, Martin Hoffmann, Clara J. Saraceno

Ruhr-Universität Bochum, Bochum, Germany

Abstract

We present a dual-beam single multi-pass cell compressor designed for applications in time-resolved pump-probe spectroscopy. A single MPC simultaneously compresses two beams with different pulse energies (82 µJ and 296 µJ) to the same pulse duration of 50 fs with high efficiency.

14:15 - 14:30

THU-3.5 Divided-pulse Bulk Multi-pass Cell for Generating Sub-50 fs multi-GW Peak Power Pulses

Henrik Schygulla[1,2], Nayla Jimenez[1,3,4], Yujiao Jiang[1], Ingmar Hartl[1], Marcus Seidel[1,3,4]

[1]Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany. [2]University of Hamburg, Department of Physics, Hamburg, Germany. [3]Helmholtz-Institute Jena, Jena, Germany. [4]GSI Helmholtzzentrum für Schwerionenforschnung GmbH, Darmstadt, Germany

Abstract

We divided 204-fs pulses into eight identical replicas by calcite crystals, spectrally broadened and recombined them by another three calcites. The pulses were compressed to 43 fs by chirped mirrors. The coherent combination technique introduced less than 6 % excess losses.

14:30 - 14:45

THU-3.6 Pulse non-linear post-compression with tunable wavelength by balancing SPM and SRS

Aref Imani, Edgar Kaksis, Alessandra Bellissimo, Audrius Pugzlys, Andrius Baltuska, Paolo Antonio Carpeggiani

TU Wien, Vienna, Austria

Abstract

In non-linear pulse spectral broadening via SPM, the original central wavelength is preserved; with SRS, it is red-shifted by an amount related to the broadening. We show that, by balancing SPM and SRS, red-shift and broadening can be tuned independently.

14:45 - 15:00

THU-3.7 Self-compression of 4.9 µm pulses to sub-40 fs with 2 mJ energy in Zinc Sulfide

Martin Bock, Dennis Ueberschaer, Uwe Griebner

Max Born Institute, Berlin, Germany

Abstract

Nonlinear self-compression of few-cycle multi-mJ pulses at 4.9 µm in ZnS is presented. 80 fs input pulses are compressed to 37 fs with 2.1 mJ energy at a 1 kHz repetition rate.

Coffee break

15:00 - 15:30 Thursday, 29th August, 2024

TH-4: Lasers at 2um and beyond

15:30 - 17:30 Thursday, 29th August, 2024
Presentation type Oral
Chair(s) Valdas Pasiskevicius

15:30 - 15:45

TH-4.1 Quasi-collinearly Pumped Fe:ZnSe Laser by ~4 µm Radiation

Adam Říha[1], Helena Jelínková[1], Maxim E. Doroshenko[2], Michal Němec[1], Jan Šulc[1], David Vyhlídal[1], Dmitry V. Badikov[3]

[1]Czech Technical University in Prague, Prague, Czech Republic.
[2]Prokhorov General Physics Institute, RAS,, Moscow, Russian Federation.
[3]High Technologies Laboratory, Kuban State University, Krasnodar, Russian Federation

Abstract

Radiation with a wavelength of ~4 µm was used for quasi-collinear excitation of the Fe:ZnSe laser. The highest output energy was achieved at the optimal crystal temperature of 230 K with the generated radiation wavelength of ~4.5 µm.

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15:45 - 16:00

TH-4.2 Effect of the doping level on the 2.8-µm laser performance of Er^{3+}:CaF_2 crystals

Venkatesan Jambunathan[1], Pavel Loiko[1], Simone Normani[1], Liza Basyrova[1], Abdelmjid Benayad1[1], Alain Braud[1], Ammar Hideur[2], Patrice Camy[1]

[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, 14050, Caen, France. [2]CORIA UMR6614, CNRS-INSA-Université de Rouen, Normandie Université, Avenue de l'université, BP. 12, 76801, Saint Etienne du Rouvray, France

Abstract

The effect of doping level (0.1-10 at.%) on mid-infrared laser performance of Er:CaF_2 crystals was investigated. The Er:CaF_2 laser delivered 1.17 W at 2798 nm with 35.8% slope efficiency and was tuned across 2690-2830 nm.

16:00 - 16:15

TH-4.3 1.3 W, super-octave-spanning Pulses at 2.3 µm from a Cr:ZnS Amplifier

Džiugas Kimbaras[1,2], Alexander Fuerbach[1,3], Wei Liang[4], Philipp Steinleitner[1], Sebastian Gröbmeyer[4,5], Nicholas Karpowicz[1], Ferenc Krausz[1,2,4], Alexander Weigel[1,2,4]

[1]Max-Planck-Institute of Quantum Optics, Garching, Germany. [2]Center for Molecular Fingerprinting, Budapest, Hungary. [3]Macquarie University, Macquarie Park, Australia. [4]Ludwig-Maximilians-Universität München, Garching, Germany. [5]PULSED GmbH, Garching, Germany

Abstract

We investigate spectral broadening in TiO_2 seeded by > 2 W, $\tau_{0.5}$ = 26 fs, 23 MHz pulses from a Cr:ZnS amplifier. We generate pulses covering spectrum from 1.1 to 3.2 µm at the -20-dB level at 1.3 W.

16:15 - 16:30

TH-4.4 Dual-oscillator field-resolved infrared spectroscopy with 2-octave-spanning spectral coverage

Philipp Steinleitner[1], Dionysios Potamianos[2,3], Arun Paudel[2,4], Sebastian Gröbmeyer[2], Aleksandar Sebesta[1,3], Amaj Chamankar[2], Hojjat Heydarian[1], Behnam Abbasvand Jahedi[1], Maciej Kowalczyk[5], Nathalie Lenke[1], Ferenc Krausz[1,2,3], Alexander Weigel[1,2,3]

[1]Max-Planck-Institut of Quantum Optics, Garching, Germany. [2]Ludwig-Maximilians-Universität München, Garching, Germany. [3]Center for Molecular Fingerprinting, Budapest, Hungary. [4]Center for Molecular Fingerprinting, Budapest, Germany. [5]Laser & Fiber Electronics Group, Faculty of Electronics, Photonics and Microsystems, Wrocław University of Science and Technology, Wrocław, Poland

Abstract

We present dual-oscillator field-resolved infrared spectroscopy based on two ultrafast Cr:ZnS oscillators. The instrument combines cascaded intra-pulse-difference-frequency generation with ultra-rapid electro-optic sampling to record infrared spectra over the range 800-3300 cm^{-1} at sub-millisecond scan times.

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16:30 - 16:45

TH-4.5 Amplification of Long-Wave Infrared Pulses in a Multicolor Non-Collinearly Pumped OPCPA for High-Energy Output

Rokas Jutas[1], Joris Roman[1], Ignas Astrauskas[1], Aref Imani[1], Paolo Carpeggiani[1], Pavel Polynkin[2], Edgar Kaksis[1], Tobias Floery[1], Jonas Kolenda[3], Tadas Bartulevičius[3], Kirilas Michailovas[3], Andrejus Michailovas[3,4], Andrius Baltuška[1,4], Audrius Pugžlys[1,4]

[1]TU Wien, Vienna, Austria. [2]University of Arizona, Tucson, USA. [3]Ekspla, Vilnius, Lithuania. [4]Center for Physical Sciences and Technology, Vilnius, Lithuania

Abstract

Non-collinearly-seeded, KTA-based NOPCPA is used to generate multicolor, angularly separated pump pulses above 2 μm wavelength. These multicolor pump channels are used to amplify LWIR pulses in a non-collinearly-pumped ZGP NOPCPA to sub-mJ level, with potential scalability beyond 10 mJ.

16:45 - 17:00

TH-4.6 Broadband regenerative amplifier based on Ho:CALGO at 2.1 µm

Anna Suzuki, Shahwar Ahmed, Yicheng Wang, Sergei Tomilov, Clara Saraceno

PULS, Ruhr-Universität Bochum, Bochum, Germany

Abstract

We present a broadband Ho:CALGO regenerative amplifier operating at 2.1 µm, delivering a pulse energy of 342 µJ at 1 kHz with a spectral bandwidth of 5 nm, supporting sub-ps pulse duration.

17:00 - 17:15

TH-4.7 Generation of 22-mJ, 2.0-ps Pulses from a 1-kHz Ho:YLF Regenerative Chirped Pulse Amplifier

Martin Bock, Lorenz von Grafenstein, Mark Mero, Tamas Nagy, Uwe Griebner

Max Born Institute, Berlin, Germany

Abstract

We report a CW-pumped Ho:YLF regenerative amplifier (RA) delivering pulses with 22.5-mJ energy and 2.0-ps duration at 1 kHz. The RA emitting at 2051 nm is broadband-seeded and implemented in a chirped pulse amplification system.

17:15 - 17:30

TH-4.8 Continuous-wave and SESAM mode-locked 2.3-µm Tm:$LiYF_4$ lasers: Upconversion pumping at 1.45 µm

Ji Eun Bae[1], Marco Gaulke[2], Pavel Loiko[1], Jonas Heidrich[2], Matthias Golling[2], Said Idlahcen[3], Lauren Guillemot[1], Abdelmjid Benayad[1], Thomas Godin[3], Ursula Keller[2], Patrice Camy[1], Ammar Hideur[3]

[1]CIMAP, UMR 6252 CEA-CNRS-ENSICAEN, Université de Caen Normandie, Caen, France. [2]ETH Zürich, Zürich, Switzerland. [3]CORIA UMR 6614, CNRS-INSA-Université de Rouen Normandie, Rouen, France

Abstract

A Tm:$LiYF_4$ laser operating on the $^3H_4 \rightarrow {}^3H_5$ transition with upconversion pumping at 1.45 µm generates 831 mW at 2313 nm with 34.0% slope

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efficiency. Mode-locked by a GaSb-based SESAM, it delivers 855-fs pulses at 104.4-MHz.

TH-PO: Poster session 2A

17:30 - 18:30 Thursday, 29th August, 2024
Sapphire A
Presentation type Poster

TH-PO.A.1 Design, fabrication and characterization of a grating waveguide structure with embedded quantum wells based on the GaInP/AlGaInP platform

Maxim Leyzner[1], Peter Gierss[2], Ana Ćutuk[2], Kai Currle[2], Rebecca Rühle[2], Michael Jetter[2], Peter Michler[2], Thomas Graf[1], Marwan Abdou Ahmed[1]

[1]Institut für Strahlwerkzeuge (IFSW), Universität Stuttgart, Stuttgart, Germany. [2]Institut für Halbleiteroptik und Funktionelle Grenzflächen, Center for Integrated Quantum Science and Technology (IQST) and Research Center SCoPE, Universität Stuttgart, Stuttgart, Germany

Abstract

We propose a grating waveguide structure with embedded quantum wells that shows potential for improving the cooling scheme for red-emitting VECSELs. The reflectivity map, the internal field distribution and the transmission spectra of our recently fabricated structures are presented.

TH-PO.A.2 Single hollow-core fiber for the guidance of IR (1030 nm) and visible (515 nm) ultrashort pulsed laser radiations

Bowen Chen[1,2], Tim Kühlthau[1], Götz Kleem[1], Thomas Graf[1], Marwan Abdou Ahmed[1]

[1]Institut für Strahlwerkzeuge (IFSW), Stuttgart, Germany. [2]Graduate School of Excellence advanced Manufacturing Engineering (GSaME), Stuttgart, Germany

Abstract

We present in this contribution a single large-mode area inhibited-coupling hollow-core fiber for guiding laser beam at a wavelength of

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1030 nm and its second harmonic at 515 nm with confinement losses below 30 dB/km.

TH-PO.A.3 Impact of femtosecond pulse duration on SRS amplification in KGW crystal

Raimundas Burokas[1,2], Milan Frank[3], Michal Jelínek[3], Václav Kubeček[3], Rokas Danilevičius[2], Andrejus Michailovas[1,2]

[1]State research institute Center for Physical Sciences and Technology, Vilnius, Lithuania. [2]Ekspla Ltd, Vilnius, Lithuania. [3]Faculty of Nuclear Sciences and Physical Engineering, Prague, Czech Republic

Abstract

We report on experimental and numerical investigation of SRS amplification in KGW crystal. The experiments were performed using 300 fs transform-limited and chirped up to 1 ps, 1030 nm pulses.

TH-PO.A.4 Spectral behavior in $ZnGeP_2$ and $CdSiP_2$-based high-power nanosecond pulsed mid-IR parametric sources

Marcin Piotrowski, Gerhard Spindler, Achille Bogas-Droy, Stefano Bigotta, Anne Hildenbrand-Dhollande

French-German Research Institute, Saint-Louis, France

Abstract

We present the study of the spectral properties of the two most promising nonlinear optical crystals for high-power mid-IR laser sources, ZGP and CSP, summarising our experimental results supported by numerical tools for simulating broadband parametric processes.

TH-PO.A.5 Thulium Holmium co-doped tunable fiber laser

Hussein Tofaili[1,2], Adrian Grande[1,3], Veronique Jubera[2], Eric Cormier[1]

[1]LP2N, Talence, France. [2]ICMCB, Pessac, France. [3]Alphanov, Talence, France

Abstract

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A tunable Tm-Ho fiber laser is demonstrated with a 1965-2120 nm tuning range, >60 dB OSNR, and linear polarization with 0.7% RMS stability. The 5.2 m active fiber and adjustable grating enable broad tunability for Ho-doped material spectroscopy.

TH-PO.A.6 Output parameters optimization of Q-switched Nd:YAG/V:YAG microchip laser generating at 1.44 μm

Kryštof Kadlec[1], Jan Šulc[1], Michal Němec[1], Helena Jelínková[1], Karel Nejezchleb[2]

[1]Czech Technical University in Prague, Prague, Czech Republic. [2]Crytur, Ltd, Turnov, Czech Republic

Abstract

We present a Q-switched Nd:YAG/V:YAG microchip laser generating nanosecond impulses at 1.44 μm and optimization of its output radiation parameters. An increase in pulse energy and peak power up to 91 μJ and 14 kW was achieved.

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TH-PO.A.7 Pedestal-cladding-pumped holmium fiber laser optimization using an analytical model

Jan Pokorný[1,2], Jan Aubrecht[1], Martin Grábner[1], Pavel Peterka[1]

[1]Institute of Photonics and Electronics, Czech Academy of Sciences, Prague, Czech Republic. [2]Czech Technical University in Prague Faculty of Nuclear Sciences and Physical Engineering, Prague, Czech Republic

Abstract

An analytical model of holmium-doped fiber laser is used to calculate optimal fiber length, pump wavelength and signal wavelength under in-band pumping conditions while considering fiber losses. The calculations show the advantages of a new type of pedestal-cladding-pumped fiber.

TH-PO.A.8 Development and error analysis of a 2 µm-centered polarimeter for complete Stokes' vectors measurements

Nathanaëll Benon[1,2], Clément Romano[1], Marc Eichhorn[1,3], Christelle Kieleck[1]

[1]Fraunhofer IOSB (Institute of Optronics, System Technologies and Image Exploitation), Ettlingen, Germany. [2]Institut d'Optique Gratuate School

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(IOGS), Palaiseau, France. [3]Institute of Control Systems (IRS), Karlsruhe Institute of Technology, Karlsruhe, Germany

Abstract

Developing a device to retrieve the full Stokes' vector at high-speed requires a careful design. We present an analysis of the measurement error of a polarimeter as a function of all optical component defects.

TH-PO.A.9 Two-photon absorption of radiation in potassium-gadolinium tungstate (KGW) crystals and its effect on the operation of high-energy yellow Raman lasers

Aleksandr Tarasov, Hong Chu, Kyutai Park

Laseroptek, Seongnam, Korea, Republic of

Abstract

Two-photon absorption (TPA) of 532 nm radiation in KGW crystals, which leads to pump energy loss and additional heating of active crystals in high-energy Raman lasers is studied. TPA coefficient β = 0.12±0.02 cm/GW was measured.

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TH-PO.A.10 Enhancement of Laser-Induced Damage Threshold of Nd:YAG Laser Rods through Improved Polishing Processes

Lukáš Beran[1], Jan Šulc[2], Karel Nejezchleb[1], Helena Jelínková[2]

[1]Crytur, Ltd., Turnov, Czech Republic. [2]Czech Technical University, Faculty of Nucleat Sciences and Physical Engineering, Prague, Czech Republic

Abstract

This paper investigates the enhancement of the laser-induced damage

threshold in Nd:YAG laser rods through improvements in the polishing process.

By refining this crucial step, this study aims to increase the durability of this

laser system component.

TH-PO.A.11 High energy and average power solid-state UV laser for industrial applications

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Nicolas Bruel, Olivier Casagrande, Christophe Derycke, Tony Tiago, Arnaud Bihel, Frederic Caradec, Christophe Simon-Boisson, Hervé Besaucele

Thales LAS France, Elancourt, France

Abstract

High energy and average power solid-state UV laser involves several challenges to manage degradation due to UV radiations. Recent results achieved in this direction are presented.

TH-PO.A.12 Thermal management in quasi-waveguide amplifiers based on Herriott cells

Johann Gabriel Meyer, Andrea Zablah, Oleg Pronin

Helmut-Schmidt-Universität, Hamburg, Germany

Abstract

We present a new geometry for laser amplifiers with bulk laser gain media based on the quasi-waveguide property of Herriott cells. A proof-

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of-principle experiment and numerical simulations of the heat equation indicate a potential advantage in terms of thermal management.

TH-PO: Poster session 2C

17:30 - 18:30 Thursday, 29th August, 2024
Sapphire C
Presentation type Poster

TH-PO.C.1 Gain-Managed Nonlinear Amplification in Erbium-Doped Fibers

Mikołaj Krakowski, Jakub Bogusławski, Alicja Kwaśny, Grzegorz Soboń

Wrocław University of Science and Technology, Wrocław, Poland

Abstract

This experiment aimed to characterize Gain-Managed Nonlinear amplification (GMN) in Erbium-doped fibers. This effect has so far been

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presented in Ytterbium-doped fibers and only simulated on Erbium-doped fibers.

TH-PO.C.2 2.3 J, 25 Hz Nd:YAG/sapphire composite powerchip amplifier operating at room temperature

Arvydas Kausas[1,2], Vincent Yahia[2,1], Hideho Odaka[1,2], Mitsuhiro Yoshida[3,2], Takunori Taira[1,2]

[1]RIKEN SPring-8 Center, Sayo, Japan. [2]Institute for Molecular Science, Okazaki, Japan. [3]KEK, Tsukuba, Japan

Abstract

We demonstrate a sub-nanosecond Joule-class room-temperature diode-pumped solid-state chip laser comprising of periodically bonded Nd:YAG and sapphire crystal plates, delivering the peak power over 3 GW. In addition, a model describing parasitic oscillations in a composite, high-gain media is developed.

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TH-PO.C.3 Theoretical simulation of depolarization compensation by a spatially variable wave plate

Aivaras Kazakevičius[1,2], Julius Lukošiūnas[1,2], Raimundas Burokas[1,2], Rokas Danilevičius[2], Andrejus Michailovas[1,2]

[1]National Centre for Physical Sciences and Technology, Vilnius, Lithuania. [2]Ekspla ltd., Vilnius, Lithuania

Abstract

High average power solid state amplifiers are limited by thermally induced stress under high average pump power levels. We report a theoretical analysis of beam distortions in a 100 W end-pumped Yb:YAG amplifier featuring a novel depolarization compensation method.

TH-PO.C.4 Mid-infrared supercontinuum generation by tellurite oval-core optical fiber

Keita Takahata, Asuka Nakatani, Jonathan de Clermont-Gallerande, Takenobu Suzuki, Yasutake Ohishi

Toyota Technological Institute, Nagoya, Japan

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Abstract

For generating polarization-maintained mid-infrared supercontinuum light, we have simulated, and fabricated tellurite oval-core optical fiber. Polarization-maintained supercontinuum light from 1660 to 2570 nm has been generated from the fabricated tellurite oval-core optical fiber.

TH-PO.C.5 Using UV absorption measurements for estimation of laser damage thresholds in ultrafast laser applications

Sebastian Riese, Philipp Hanke

LAYERTEC GmbH, Mellingen, Germany

Abstract

Laser damage for ultrafast pulses is connected to the UV absorption edge via bandgap. This connection may be used to facilitate damage testing and thus coating development. Preliminary results are presented here, along with an introduction to laser induced damage.

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TH-PO.C.6 Investigation of Elemental Distribution in Yb:RE^{3+} Laser via Surface Analysis Techniques

Wei-Chun Lin[1,2], Mitch Ming-Chi Chou[2,3], Chao-Kuei Lee[1,2], Yuan-Yao Lin[1,2]

[1]Department of Photonics, Kaohsiung, Taiwan. [2]Center of Crystal Research, Kaohsiung, Taiwan. [3]Department of Materials and Optoelectronic Science, Kaohsiung, Taiwan

Abstract

Diverse analysis techniques, ToF-SIMS, XPS, and AES, are conducted to monitor the lateral and vertical elemental/molecular distribution of the dopant in Yb:RE^{3+} laser crystal, aiming to enhance the synthetic parameters and methods for obtaining a high-quality laser gain medium.

TH-PO.C.7 Efficient multiphoton microscopy with picosecond pulse trains

Katarzyna Kunio, Jakub Bogusławski, Grzegorz Soboń

Wrocław University of Science and Technology, Wrocław, Poland

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Abstract

We present an all-fiber, portable setup for multiphoton microscopy with reduced f_{rep} employing a high-energy Yb:fiber NALM laser producing 10 ps pulses. Longer pulses are less susceptible to chromatic dispersion, enhancing image brightness and contrast over conventional femtosecond pulses.

TH-PO.C.8 Delivery of the diode pumped Er:YLF laser radiation by special hollow glass waveguides

Zuzana Fialkova[1], Michal Nemec[1], Jan Sulc[1], Helena Jelinkova[1], Katsumasa Iwai[2], Hiroyuki Takaku[2], Mitsunobu Miyagi[3]

[1]Czech Technical University in Prague, Prague, Czech Republic. [2]National Institute of Technology, Sendai, Japan. [3]Tohoku Institute of Technology, Sendai, Japan

Abstract

The diode pumped Er:YLF laser emitting at wavelength 2825 nm was constructed. Radiation delivery by special hollow glass waveguides with

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inner diameters of 700, 540, 320, or 250 μm was investigated. The power transmission was up to 91 %.

TH-PO.C.9 Er,Yb:GdMgB5O10 microchip laser passively Q-switched by Cr:ZnS thin layer saturable absorber

Konstantin Gorbachenya[1], Elena Volkova[2], Viktor Maltsev[2], Nikolay Kuleshov[1], Viktor Kisel[1]

[1]Center for Optical Materials and Technologies of BNTU, Minsk, Belarus.
[2]Moscow State University, Moscow, Russian Federation

Abstract

Er,Yb:$GdMgB_5O_{10}$ microchip passively Q-switched laser was realized by using of Cr:ZnS layer as a saturable absorber. Laser pulses with duration of 24 ns and energy of 3 μJ at the repetition rate of 50 kHz were obtained at 1568 nm.

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TH-PO.C.10 Neural Network Method for Dielectric Optical Coating Design

Utsa Chattopadhyay[1,2], Florian Carstens[3], Andreas Wienke[3], Ingmar Hartl[2], Nihat Ay[1], Christoph Heyl[2,4,5], Henrik Tuennermann[2]

[1]TUHH, Hamburg, Germany. [2]DESY, Hamburg, Germany. [3]LZH, Hannover, Germany. [4]HI-JENA, Jena, Germany. [5]GSI, Darmstadt, Germany

Abstract

We use neural networks to address the challenge of deriving dielectric coating designs from the desired optical properties. We show that our trained neural network can automatically design common laser mirror coatings types efficiently.

TH-PO.C.11 Study of ppLN crystals for sum frequency generation of CW laser demonstrating 20 nm tunability in the visible range from 616 to 636 nm, through temperature tuning

Ruizhe Gu[1], Giorgio Santarelli[2], Mathieu Chauvet[3], Florent Bassignot[4], Adèle Hilico[1]

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[1]LP2N, IOGS, CNRS, Université de Bordeaux, rue F. Mitterrand,, Talence, France. [2]LP2N, IOGS, CNRS, Université de Bordeaux, rue F. Mitterrand, Talence, France. [3]FEMTO-ST, UMR 6174, Université de Franche Comté, 16, route de Gray,, Besançon, France. [4]FEMTO-Engineering 15B avenue des Montboucons, Besançon, France

Abstract

This work presents the study of custom-made nonlinear ppLN crystals enabling the generation of CW laser around 626 nm demonstrating over 500mW over a 20 nm tunability range using temperature tuning, through SFG of tunable 1 and 1.5μm lasers.

TH-PO.C.12 Development of fiber rod based high repetition rate and average output power laser system using pre-chirp managed nonlinear amplification

Jokūbas Pimpė[1,2], Jonas Banys[1], Simona Armalytė[1], Vygandas Jarutis[1], Julius Vengelis[1]

[1]Vilnius University, Vilnius, Lithuania. [2]Light Conversion, Vilnius, Lithuania

Abstract

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We demonstrate pre-chirp managed ytterbium-doped fiber amplifier system emitting excellent beam quality, high repetition rate (76 MHz) and high average output power (>70W) pulses with nearly transform limited duration of 100 fs and with roughly 1 µJ of pulse energy.

FR-1: Thulium fiber lasers

08:15 - 09:30 Friday, 30th August, 2024
Presentation type Oral
Chair(s) Martin Bernier

08:15 - 08:30

FR-1.1 Experimental and numerical study of a monolithic single-oscillator thulium-doped fiber laser in continuous-wave regime

Félix Sanson[1,2], Christophe Louot[1], Inka Manek-Hönninger[2], Stefano Bigotta[1], Caterina Clemente[1,3], Anne Hildenbrand-Dhollande[1]

[1]French-german research Institute of Saint-Louis, Saint-Louis, France.
[2]Université de Bordeaux, CNRS CEA, CELIA UMR5107, Talence, France.
[3]Université de Rennes, CNRS ISCR UMR6226, Rennes, France

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Abstract

An all-fiber continuous-wave single-oscillator thulium-doped laser source is developed and achieves 585 W at 2036 nm. The experimental slope efficiency of 42 % confirmes the numerical study of the laser performed by using rate equations.

08:30 - 08:45

FR-1.2 Amplification at 2.3-µm in 1.9-µm thulium-doped silica fiber laser

changshun Hou[1], Debasis pal[2,1], Tony Zhou[3], Daniel Rhonehouse[4], Jasbinder Sanghera[4], Colin C Baker[4], Johan Nilsson[1]

[1]Optoelectronics Research Centre, southampton, United Kingdom. [2]Central Glass & Ceramic Research Institute, Kolkata, India. [3]URF, 6411 Ivy Lane Suite 110, Greenbelt, USA. [4]Naval Research Laboratory, Washington, USA

Abstract

A high-power 1.9-µm Tm^{3+}-doped silica fiber laser generates 7.3-dB of gain at 2.3 µm when cladding-pumped with 207 W of power at 793 nm. We attribute the 2.3-µm gain to the transition $^3H_4$ à $^3H_5$ of Tm^{3+}.

08:45 - 09:00

FR-1.3 Build-up dynamics of a self-mode-locked Thulium-doped fiber laser explored by dispersive Fourier transformation

Dennis Christian Kirsch, Maria Chernysheva

Leibniz Institute of Photonics Technology, Jena, Germany

Abstract

A recently discovered self-mode-locking method for Thulium-doped lasers is examined via dispersive Fourier transform measurement for the first time. We chart the real-time initiation process of self-reinforced nonlinear waves, such as loosely bound soliton molecules transitioning into a conservative soliton.

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09:00 - 09:15

FR-1.4 High-power, air-cooled Thulium doped fiber amplifier with 71 % slope efficiency

Mathias Lenski[1], Qian Xu[1], Ziyao Wang[1], Philipp Gierschke[1,2], César Jáuregui[1,2], Jens Limpert[1,2,3,4]

[1]Friedrich-Schiller-Universität, Jena, Germany. [2]Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany. [3]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany. [4]Helmholtz-Institute Jena, Jena, Germany

Abstract

We present on a thulium-doped fiber amplifier in which the active fiber is air-cooled. The amplifier achieves an average output power of 78W and a slope efficiency of 71%. This exceptional achievement is accomplished by utilizing in-band pumping at 1692nm.

09:15 - 09:30

FR-1.5 Statistical analysis of a self-starting linear Mamyshev oscillator with two symmetric Tm-doped fiber gain sections

Dennis Christian Kirsch[1], Maria Chernysheva[1], Mikhail E. Likhachev[2], Svetlana S. Aleshkina[2], Mikhail V. Yashkov[3]

[1]Leibniz Institute of Photonics Technology, Jena, Germany. [2]Prokhorov General Physics Institute of the Russian Academy of Sciences, Dianov Fiber Optics Research Center, Moscow, Russian Federation. [3]Institute of Chemistry of High Purity Substances of the Russian Academy of Sciences, Nizhny Novgorod, Russian Federation

Abstract

An innovative concept to achieve a self-starting, all-fibre and all-normal dispersion Mamyshev oscillator for the 1.9 µm wavelength domain is explored. A machine-aided approach is chosen to investigate systematically the constrictions between filter offset, output coupling ratio and pump power.

Coffee break

09:30 - 10:00 Friday, 30th August, 2024

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FR-2: Parametric devices and visible lasers

10:00 - 12:00 Friday, 30th August, 2024
Presentation type Oral
Chair(s) Federico Pirzio

10:00 - 10:15

FR-2.1 Sub-millijoule-level Fe:ZnSe chirped pulse amplifier seeded by KTA-based OPA system

Daiki Okazaki[1], Tsuneto Kanai[1], Linpeng Yu[2], Yuri Kirita[1], Ryo Yasuhara[2], Shigeki Tokita[1]

[1]Institute for Chemeical Research, Kyoto University, Kyoto, Japan.
[2]National Institute for Fusion Science, Gihu, Japan

Abstract

We developed a Fe:ZnSe chirped pulse amplifier with a KTA-based optical parametric amplifier, achieving 0.6 mJ pulses at 4-micron

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wavelength. It should be inherently carrier envelope phase stable and applicable to strong field science.

10:15 - 10:30

FR-2.2 Backward Wave Optical Parametric Oscillator Targeting CO_2 Absorption Lines at 2.7 µm

Adrian Vågberg[1], Martin Brunzell[1], Max Widarsson[2], Patrick Mutter[1,2], Andrius Zukauskas[1], Fredrik Laurell[1], Valdas Pasiskevicius[1]

[1]KTH Royal Institute of Technology, Stockholm, Sweden. [2]SLF Svenska Laserfabriken AB, Stockholm, Sweden

Abstract

The first demonstration of a 2.7 µm CO_2 gas sensing source exploiting a backward wave optical parametric oscillator (BWOPO). Transmission measurements of the backward wave are demonstrated through air with good agreement with simulations.

10:30 - 10:45

FR-2.3 High-power ultrafast pulsed 2060 nm laser from a self-phase-locked doubly resonant optical parametric oscillator

Han Rao[1,2], Christian M. Dietrich[1], Jose R.C. Andrade[3], Robin Mevert[1,2], Fridolin J. Geesmann[1], Ayhan Demircan[1,2], Ihar Babushkin[1,2,3], Uwe Morgner[1,2]

[1]Institute of Quantum Optics, Hannover, Germany. [2]Cluster of Excellence PhoenixD, Hannover, Germany. [3]Max Born Institute, Berlin, Germany

Abstract

We present a high-power self-phase-locked doubly resonant optical parametric oscillator (DROPO), which delivers a 4.9 W, 229 fs pulse train at 2-µm.

10:45 - 11:00

FR-2.4 Ultra-broadband non-collinear optical parametric oscillators: A reliable source of rapidly tunable femtosecond laser pulses

Robin Mevert[1,2], Fridolin Jakob Geesmann[1,2], Tino Lang[3], Yuliya Binhammer[1], David Zuber[1,2], Uwe Morgner[1,2,4]

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[1]Institute of Quantum Optics, Leibniz University Hannover, Hannover, Germany. [2]Cluster of Excellence PhoenixD, Hannover, Germany. [3]Deutsches Elektronen Synchrotron DESY, Hamburg, Germany. [4]Laser Zentrum Hannover e.V., Hannover, Germany

Abstract

Non-collinear phase matching in optical parametric oscillators enables unique possibilities ranging from ultra-broadband rapid spectral tuning to intrinsic advantages in power scaling. This work is an overview of this concept adapted to different wavelength ranges.

11:00 - 11:15

FR-2.5 Orange Sm:$LiYF_4$ lasers emitting at 605 nm

Jonathan Demaimay[1], Pavel Loiko[1], Esrom Kifle[1,2], Florence Pau[2], Gilles Recoque[2], Abdelmjid Benayad[1], Thierry Georges[2], Patrice Camy[1], Alain Braud[1]

[1]Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), UMR 6252 CEA-CNRS-ENSICAEN, CAEN, France. [2]Oxxius SA, Lannion, France

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Abstract

We report on polarized spectroscopy and orange laser operation under 2ω-OPSL and GaN-diode pumping of Sm:$LiYF_4$ crystals. The Samarium laser delivers 12 mW at 605 nm with a threshold of 51 mW and a linear polarization.

11:15 - 11:30

FR-2.6 Generation and 2D field imaging of THz vortex beams

Yaqun Liu, Valdas Pasiskevicius

KTH Royal Institute of Technology, Stockholm, Sweden

Abstract

Optical rectification along three-fold axis in zincblende-symmetry crystal is used to generate vector and scalar vortex beams in THz. 2D electro-optic imaging is used for frequency-resolved THz field amplitude and phase characterization.

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11:30 - 11:45

FR-2.7 Measuring ultrafast vector pulses with amplitude swing

Cristian Barbero, Benjamín Alonso, Íñigo J. Sola

Universidad de Salamanca, Salamanca, Spain

Abstract

The amplitude swing technique is demonstrated theoretically and experimentally to measure time-varying polarization ultrashort laser pulses, using a simple setup. The reconstruction strategy extracts all the vector pulse information from a single trace measurement.

11:45 - 12:00

FR-2.8 Improved Performance of Frequency Tripling Mirrors: A Promising Approach for Simple and Efficient Third Harmonic Generation

David Zuber[1,2], Sebastian Balendat[1,3], Holger Badorreck[2,3], Marco Jupé[2,3], Detlev Ristau[1,2,3], Uwe Morgner[1,2,3]

[1]Leibniz Universitaet Hannover, Institute of Quantum Optics, Hannover, Germany. [2]Cluster of Excellence PhoenixD (Photonics, Optics, and Engineering-Innovation Across Disciplines), Hannover, Germany. [3]Laser Zentrum Hannover e.V, Hannover, Germany

Abstract

Frequency tripling mirrors offer a promising alternative to complicated cascaded arrangements for third harmonic generation. By incorporating optimised dielectric layers, we have achieved a remarkable conversion efficiency of 3.5%. We will give a deep insight into FTMs and discuss applications.

Lunch break

12:00 - 13:15 Friday, 30th August, 2024

FR-3: High power fiber lasers and high harmonic generation

13:15 - 14:45 Friday, 30th August, 2024
Presentation type Oral
Chair(s) Ammar Hideur

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13:15 - 13:30

FR-3.1 50-fs pulse bursts via gain-managed nonlinear amplification

Amirhossein Maghsoudi[1,2], Paul Repgen[1,2], Mesut Laçin[1,2], Aladin Şura[1,2], Ömer Ilday[1,2]

[1]Bilkent University, Ankara, Turkey. [2]Ruhr Universität Bochum, Bochum, Germany

Abstract

We report the first gain-managed nonlinear amplifier operating in burst mode, delivering 50-fs, 600-nJ pulses. Due to a complex interplay between nonlinearity and gain, the amplification is influenced non-trivially and collectively by all the pulses within a burst.

13:30 - 13:45

FR-3.2 Towards Yb-doped silica optical fibers with improved photodensification threshold

Gholamreza Shayeganrad[1], Martynas Beresna[1], Gilberto Brambilla[1], Michalis Zervas[1,2]

[1]Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom. [2]Advanced Laser Laboratory, Optoelectronics Research Centre, University of Southampton, Southampton, United Kingdom

Abstract

We demonstrate that Yb-doped silica glass exhibits a densification threshold ~35% that of undoped silica glass. This threshold varies depending on co-dopants such as Al, F, and P, decreasing with Al and increasing with P/F.

13:45 - 14:00

FR-3.3 500-W Average Power, 100-mJ level Pulse Energy by Q-switched 7x7 Multicore Fiber Lasers

Mehran Bahri[1], Cesar Jauregui[1], Arno Klenke[1], Mathias Lenski[1], Yahia Khalil[1], Johannes Nold[2], Nicoletta Haarlammert[2], Thomas Schreiber[2], Jens Limpert[1]

[1]Friedrich Schiller University Jena, Institute of Applied Physics, jena, Germany. [2]Fraunhofer Institute for Applied Optics and Precision Engineering, jena, Germany

Abstract

This work focuses on achieving high peak and average power through incoherent beam combination of Q-switched 49-core fiber laser. Results show 1.5-MW peak power and 502-W average power between 1-10 kHz repetition rates.

14:00 - 14:15

FR-3.4 35 Core Polarization-Maintaining Multi-core Fiber for High Power Operation

Yahia Khalil[1], Moritz Grimm[1], Arno Klenke[1,2,3,4], Mehran Bahri[1], Cesar Jauregui[1], Johannes Nold[4], Nicoletta Haarlammert[4], Thomas Schreiber[4], Jens Limpert[1,2,3,4]

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[1]Friedrich Schiller University Jena, Institute of Applied Physics, Abbe Center of Photonics, Jena, Germany. [2]Helmholtz-Institute Jena, Jena, Germany. [3]GSI Helmholtzzentrum for heavy ion research, Darmstadt, Germany. [4]Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany

Abstract

This work presents a novel rod-type 35 core multi-core fiber design that is capable of overcoming the inherent lack of polarization maintenance in such structures. A polarization extinction ratio of 10.5dB is achieved.

14:15 - 14:30

FR-3.5 High-brightness table-top coherent XUV source at 130eV

Maxim Tschernajew[1], Vinzenz Hilbert[1], Robert Klas[2,3], Anke Heilmann[1], Oliver Herrfurth[1], Sven Breitkopf[1], Jan Rothhardt[2,3], Tino Eidam[1], Jens Limpert[1,2,3,4]

[1]Active Fiber Systems GmbH, Jena, Germany. [2]Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-Universität Jena,

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Jena, Germany. [3]Helmholtz-Institute Jena, Jena, Germany. [4]Fraunhofer Institute for Applied Optics and Precision Engineering, Jena, Germany

Abstract

We present a highly stable, easy-to-use, table-top coherent XUV source delivering a brightness of >1kW/(mm²sr)/1%BW at 130eV (9.5nm). It is based on high-harmonic generation driven by an ultrastable ytterbium-based fiber laser and a multipass-cell-based post-compression to 35fs.

14:30 - 14:45

FR-3.6 A Faraday isolator based on fused silica in a Herriott cell

Johann Gabriel Meyer, Andrea Zablah, Kristaps Kapzems, Nazar Kovalenko, Oleg Pronin

Helmut Schmidt University, Hamburg, Germany

Abstract

We demonstrated a multipass Faraday isolator based on fused silica. The polarization rotation angle of 45° was accumulated in a Herriott cell. The

concept enables the use of magneto-optic materials with low Verdet constants in Faraday isolators.

Student award and Closing Ceremony

14:45 - 15:00 Friday, 30th August, 2024

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