UltrafastOptics
UFO XIII

Program Book

Schedule at a glance

	26th Sunday	*27th Monday*	*28th Tuesday*	*29th Wednesday*	*30th Thursday*	*31st Friday*
08:30		**Opening remarks & M1** Methods for shaping and measuring ultrashort pulses	Plenary II: Katsumi Midorikawa	**W1** Ultrafast user applications that drive technology advancements and innovation	Plenary III: Ursula Keller	**F1** Ultrafast oscillators and frequency combs
09:00						
09:30			**Tu1** Ultrafast nonlinear optics		**Th1** Technologies for laser facilities	
10:00				Coffee Break		
10:30		Coffee Break	Coffee Break	**W2** Ultrashort UV, XUV and X-ray sources		Coffee Break
11:00		**M2** Few-cycle pulses, carrier-envelope phase control	**Tu2** High average and peak power laser systems 2		Coffee Break	**F2** Attosecond physics and pulse generation
11:30					**Th2** Spectral broadening and pulse compression 1	
12:00						
12:30						
13:00		Lunch & Poster Session 1	Lunch		Lunch & Poster Session 2	Lunch
13:30						
14:00						**F3** Spectral broadening and pulse compression 2
14:30						
15:00		**M3** Coherent beam combining and pulse synthesis	**Tu3** Ultrafast mid-infrared and Terahertz sources		**Th3** Technologies for ultrafast sources	
15:30						
16:00						Coffee Break
16:30		Coffee Break	Coffee Break			**F4** Science enabled by ultrafast sources
17:00		**M4** High average and peak power laser systems 1	**Tu4** Novel methods for generating and manipulating ultrashort pulses	**Excursion to Isla Victoria including lunch**		
17:30						
18:00	Reception & Autumn School Posters	Plenary I: Oscar Martínez	Aperitif		**Conference Banquet "Rincon Patagonico"**	Award Ceremony and Closure
18:30			**Tu5** Industry and facilities special session			
19:00		Celebratory aperitif for 40 years of prism compressors				
19:30						
20:00						
20:30						

Schedule at a glance

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Th3	03.30	15:00-17:00	Technologies for ultrafast sources	35-36
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About the Ultrafast Optics conference


Ultrafast Optics XII
Bol, Croatia, October 2019

The field of ultrafast science expanded significantly in the 1990s strongly boosted by the development of chirped pulse amplification. Commercially available laser systems enabled researchers around the world to make rapid advances in ultrafast research in physics, chemistry, materials science, biology, electronics, engineering, and medicine. Conferences organized by large scientific societies such as CLEO and Ultrafast Phenomena were the natural forum for discussion of the science and application of these new sources. However, there was no dedicated conference focused on the science and technology of the generation, manipulation, and measurement of ultrafast laser pulses.

The planners of the first UFO (Ultrafast Optics) conference in Monterey, California (1997) self-organized all aspects of the conference, counting on active engagement from the international community of ultrafast laser research groups and the financial support of several laser and optical component manufacturers. The conference operated as a week-long, single session meeting to enable full participation of all attendees for every presentation. The sense of community was enhanced by social activities and excursions to enable casual interactions among the attendees. The success of this original formula has been duplicated over the past two and a half decades, with the conference switching between locations in North America, Europe, and Asia.

UFO continues to be organized by the individual efforts of the general chairs, program chairs, local organizers, with guidance from an executive committee of previous UFO chairs. The small size (typically 150-200 attendees), single session format, strong support and engagement from exhibitors, memorable locations, and social activities intended to engage participants continues to build and support the international ultrafast optics community.

This edition of the Ultrafast Optics conference, the 13th in the series (UFO XIII) is hosted in Bariloche, in the Patagonia region of Argentina. After cancellation of the conference in 2021, the ultrafast optics community all over the world was anxious to meet once again. It also represents a great opportunity for the South American scientific community to interact with specialists from all over the world.

We hope you enjoy the program and take the opportunity to network in the unique Patagonian setting while learning about the latest advances in the field.

About Bariloche

San Carlos de Bariloche, commonly referred to as Bariloche, is a city located in the province of Río Negro in the Argentine Patagonia. It is situated on the shores of Lake Nahuel Huapi, surrounded by the Andes Mountains, and is known for its stunning natural beauty and outdoor recreation opportunities.

Bariloche has a rich history, dating back to the 19th century when indigenous Mapuche communities lived in the area. In the late 1800s, a group of Swiss and German settlers arrived and established the town, building Swiss-style architecture and introducing alpine-style tourism to the region. This led to the development of the city's tourism industry and a boom in population growth.

During the 20th century, Bariloche became an important center for trade, industry, and tourism in Argentina. It was also a major center of political and cultural activity during the Perón era, attracting many intellectuals and artists to the area. Today, the city continues to be a popular tourist destination, attracting visitors from around the world who come to enjoy its natural beauty and outdoor recreational opportunities.

Bariloche has a rich tradition in science and technology. It is home to Centro Atómico Barilcohe (CAB), an institution for basic and applied research dependent on the National Atomic Energy Commission. CAB also houses the prestigious Instituto Balseiro, dependent on Universidad Nacional de Cuyo, and considered by many as the best Experimental Physics and Nuclear Engineering study center in Latin America. In addition, Bariloche also hosts several departments and laboratories of National University of Comahue, and INVAP, a high-tech company that designs and builds nuclear reactors, radars and satellites. In 2027 the city will be home to Expo 2027 Bariloche, an important education, science and technology exhibition with the purpose of establishing the city as regional reference for science, technology and sustainable development.

Interesting historic fact: Huemul Island on Lake Nahuel Huapi was home to the Huemul Project (1949-1952), an effort lead by Austrian physicist Ronald Ritcher to develop a controlled nuclear fusion power device. Although the project was ultimately a failure, it allegedly sparked interest on funding agencies around the world to support nuclear fusion research programs. Check out the interesting account in Wikipedia about Project Huemul.

There are many places worth visiting in Bariloche that showcase its unique character and history, including:

- Lake Nahuel Huapi - This stunning lake is the centerpiece of the Bariloche region and offers breathtaking views of the Andes Mountains. Visitors can enjoy boating, fishing, and other water activities on the lake.
- Cerro Catedral - This popular ski resort is located just outside of Bariloche and offers excellent ski slopes and breathtaking panoramic views of the surrounding area.
- Parque Nacional Nahuel Huapi - This national park is located around Lake Nahuel Huapi and offers a variety of outdoor activities, including hiking, trekking, and mountain biking.
- Civic Center - This central area of Bariloche is known for its Swiss-style architecture and is a popular gathering place for locals and visitors.
- Centro de Interpretación Histórico Patagónico - This museum is dedicated to the history and culture of the Bariloche region, and provides visitors with an in-depth look at the area's past and present.
- Local breweries - In the last two decades Bariloche has established itself as an Argentine craft beer hub. Visiting one of the many local breweries has become one of the many attractions the city has to offer. Manush, Patagonia, Kunstmann, Konna, Bachmann, Berlina, Blest, Wesley are some of the breweries you can visit for tasty food and good beers.

These are just a few of the many places worth visiting in Bariloche. With its unique mix of history, culture, and natural beauty, Bariloche is a destination that truly has something for everyone, and is well worth a visit for anyone traveling to Argentine Patagonia.

About the Llao Llao Hotel

The **Llao Llao hotel** chosen as a conference location is an icon of Patagonia and has a long history within the history of Argentina.

In 1934, the Patagonia and Andean regions were completely uninhabited and virgin territories. In that year, with the creation of the Nahuel Huapi National Park, the construction of an International Hotel was started with the aim of developing the touristic potential of the area, together with the foundation of towns and development of communication networks.

Architect Alejandro Bustillo chose the Puerto Pañuelo area in order to build the Hotel because, besides the magnificent and beautiful scenery, it had a port. Built with cypress logs and larch tiles in the Canadian home style, it was opened to the public on January 9th, 1938. On October 26th, 1939 a fire destroyed the building completely, but it was reopened on December 15th, 1940. Since then, members of the aristocracy, officials, diplomats and famous guests have stayed at the hotel. Although it closed in 1978 for a period of 15 years, the spirit of the hotel remained intact. The Hotel opened its doors to the public again in 1993 under the name of Llao Llao Hotel & Resort, Golf-Spa.

Enjoy the scenery of the hotel while you enjoy the latest advances in the field of ultrafast optics.

A big *thank you* to our sponsors

The success of the UFO conference as an independent conference is only possible thanks to the very generous contributions of many supporters from the laser and photonics industry, laser facilities and photonics societies. In a time of uncertainty following the COVID-19 outbreak and the war in Ukraine, our sponsors stepped up to make sure UFOXIII is a success. Please make sure you go visit their booths and pay attention to the material in the conference bag.

Their sponsoring enabled us to make a high-quality social program, to support many networking events during the conference and many more items that make this conference outstanding. Last but not least, their support was indispensable in allowing local students and early career researchers from Latin America to attend the conference by supporting us with a large number of registration waivers, which was one of our main objectives to bring the UFO to South America for the first time.

THANK YOU for your generous support of the ultrafast community and the UFO conference!

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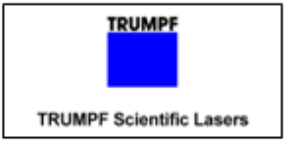

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Oscar E. Martínez, Photonics Laboratory, Institute for Biomedical Engineering, University of Buenos Aires, Argentina

Revisiting compressors after 40 years to rescue the terms disappeared

Abstract: The year 1983 gave birth of the prism compressor and made us aware that spectral angular dispersion gives rise to group delay dispersion. I will review the origins and evolution during the hot 80's and will discuss why and which terms, that give rise to relevant effects, were disappeared. After rescuing those terms, the concept of compression surface and arrival time dispersion will be presented to society and possible applications such as traveling wave pumping will be discussed.

About the speaker: Born in Buenos Aires on 1953. Professor at Universidad de Buenos Aires. He is Fellow of Optica (former OSA) and has been associate member of the International Centre for Theoretical Physics (ICTP). Worldwide recognized for his contributions to ultrafast optics, for the invention of the prism compressor and the Martínez Compressor. The work became a milestone in pulse shaping and is cited directly as "prism pair compressor" or "Prism compressor" without referring to the paper. He pioneered in ultrashort pulse measurement and Chirped Pulse Amplification. He is also the coauthor with Sandra Martínez of the SUPPOSe method that overcomes the ill posed deconvolution problem, allowing standard microscope images to be super-resolved by mathematical processing.

Ursula Keller, ETH Zurich, Switzerland

Dual-comb modelocked diode-pumped solid-state and semiconductor lasers

Abstract: We have invented two new methods for multiplexing a single laser cavity to support a pair of noise-correlated, yet cavity length independent optical frequency combs. They are based on either polarization multiplexing with an intracavity birefringent crystal or spatial laser cavity multiplexing by inserting a monolithic device with two separate angles on the surface, such as a biprism. The two cavity modes share all intracavity components and take a near-common path, but do not overlap on any active elements. With a SESAM we passively modelocked both independent modes and obtain dual-comb operation. We demonstrated this with both diode-pumped Yb-doped solid-state lasers and semiconductor lasers using the MIXSEL technology. The high-Q cavity allows for record-low noise performance. Most recently we have demonstrated a 80-MHz diode-pumped Yb:CaF_2 laser delivering more than 2.4 Watts of average power per comb with sub-140 fs pulses centered at 1052 nm. We reach sub-cycle relative timing jitter of 2.2 fs [20 Hz, 100 kHz] which is a major milestone in single-cavity dual-comb laser

development. With the spatial biprism multiplexing technique, we could implement slow feedback on the repetition rate difference frep, enabling this quantity to be drift-free, low-jitter, and adjustable over a large range – a key combination for practical applications that was lacking in many other single-cavity dual-comb systems. We could obtain record-level short- and long-term stability of (frep)/frep = 1.8 in [20 Hz, 100 kHz] and 2.3 (frep)/frep long-term stability over more than 5 hours (with a frequency counter). This translates to sub-cycle relative timing jitter and thus is a major step forward in the development of single-cavity dual-comb lasers. Such lasers will have a great potential to revolutionize how any normal pump-probe measurements and optical spectroscopy are implemented.

About the speaker: Ursula Keller has been a tenured professor of physics at ETH Zurich since 1993 (www.ulp.ethz.ch) and also a director of the Swiss multi-institute NCCR MUST program in ultrafast science since 2010 (www.nccr-must.ch). She received the Ph.D. from Stanford University in 1989 and the Physics "Diplom" from ETH in 1984. She was a Member of Technical Staff (MTS) at AT&T Bell Laboratories from 1989 to 1993, a "Visiting Miller Professor" at UC Berkeley 2006 and a visiting professor at the Lund Institute of Technologies 2001. She has been a co-founder and board member for Time-Bandwidth Products (acquired by JDSU in 2014) and for a venture capital funded telecom company GigaTera (acquired by Time-Bandwidth in 2003). She was a member of the research council of the Swiss National Science Foundation from 2014-2018. She is the founding president of the ETH Women Professors Forum (WPF).

The focus of her group in research is exploring and pushing the frontiers in ultrafast science and technology. Awards include the OSA Frederic Ives Medal/Jarus W. Quinn Prize (2020) – OSA's (resp. OPTICA's) highest award for overall distinction in optics, SPIE Gold Medal (2020) – SPIE's highest honor, IEEE Edison Medal (2019), European Inventor Award for lifetime achievement (2018), two ERC advanced grants (2012 and 2018), member of the U.S. National Academy of Sciences, Royal Swedish Academy of Sciences, German Academy Leopoldina and Swiss Academy of Technical Sciences. She supervised and graduated 89 Ph.D. students, published >490 journal publications and according to Google Scholar an h-index of 115 with more than 50000 citations.

Katsumi Midorikawa, RIKEN Center for Advanced Photonics, Tokyo, Japan
The third generation table-top attosecond light sources

Abstract: Research on attosecond pulses changed substantially around 2010. Before then, the Ti:sapphire laser was the de facto standard as the driving light source, so the cutoff energy was limited to ~100 eV and the repetition rate was of the order of 1 kHz. After 2010, Mid-IR OPA, which brings the advantages of extending the cutoff and increasing the repetition rate, became the mainstream driving source. Owing to the quadratic dependence of the cutoff energy on the driving wavelength, the harmonic photon energy was extended to over 300 eV by using an OPA, reaching the water-window spectral region. However, the increase in driving wavelength results in a substantial decrease in conversion efficiency. To improve the low photon flux associated with low conversion efficiency, novel attempts to optimize the driving laser pulse waveform and increase the driving laser energy and repetition rate have been pursued. We have developed the third generation table-top attosecond light sources, which allow a remarkable increase in photon flux of attosecond pulses in the soft x-ray region by shaping the driver pulse field.

About the speaker: Katsumi Midorikawa received Ph.D. degree from the Graduate School of Engineering, Keio University, Japan, in 1983. He joined Laser Science Research Group in RIKEN in 1983 and became a Chief Scientist of Laser Technology Laboratory in 1997. He is currently Director of RIKEN Center for Advanced Photonics and a leader of Attosecond Science Research Team. His research interests include ultrafast intense lasers, nonlinear optics and their applications to ultrafast phenomena, laser microprocessing, and multiphoton spectroscopy. He recently focuses his research on attosecond pulse generation and metrology. He is a Fellow of IEEE, Optical Society of America, American Physical Society, Japan Society of Applied Physics, and the Laser Society of Japan.

Invited speakers

- **Amit Agrawal, National Institute of Standards and Technology, USA**
- **Anne-Lise Viotti, DESY/Lund University, Germany/Sweden**
- **Arûnas Varanavicius, Vilnius University, Lithuania**
- **Christoph Heyl, DESY, Germany**
- **Derryck Reid, Heriot-Watt University, UK**
- **Emily Sistrunk Link, Lawrence Livermore National Lab, USA**
- **Francesca Calegari, Center for Free-Electron Laser Science, DESY, University of Hamburg, Germany**
- **Haochen Tian, The University of Electro-Communications, Japan**
- **Hoang Nguyen, Lawrence Livermore National Lab, USA**
- **Jacob Khurgin, John Hopkins University, USA**
- **Jakub Drs, Université de Neuchâtel, Switzerland**
- **Jeff Moses, Cornell University, USA**
- **Jens Limpert, University Jena, Germany**
- **Katalin Varju, ELI-ALPS, Hungary**
- **Oleg Pronin, Helmut-Schmidt-University Hamburg, Germany**
- **Peter Schunemann, BAE Systems, USA**
- **Reinhard Kienberger, Technical University of Munich, Germany**
- **Spencer Jolly, Universite Libre de Bruxelles, Belgium**
- **Tara Fortier, NIST, USA**

Monday, 27th March
08:30 - 10:30

M1: Methods for shaping and measuring ultrashort pulses

Chair: Günter Steinmeyer, Max Born Institute, Germany

08:30 – 08:45

Welcome and opening remarks

08:45 – 09:15 (M1.1)

Advances in spatio-temporal pulse characterization *(invited)*

Spencer Jolly (ULB).

The burgeoning field of space-time characterization of ultrashort laser pulses will be reviewed, along with a perspective on recent advances and their impact on laser facilities and laser-matter interaction physics.

09:15 – 09:30 (M1.2)

Waveform characterization of synchrotron light using spectral phase interferometry for direct electric-field reconstruction

Takao Fuji (Toyota Technological Institute), Tatsuo Kaneyasu (SAGA Light Source), Masaki Fujimoto (Institute for Molecular Science), Yasuaki Okano (Institute for Molecular Science), Elham Salehi (Institute for Molecular Science), Masahito Hosaka (Nagoya University), Yoshifumi Takashima (Nagoya University), Atsushi Mano (Nagoya University), Hikosaka Yasumasa (University of Toyama), Shin-ichi Wada (Hiroshima University) and Masahiro Katoh (Hiroshima University).

Ultraviolet and extreme ultraviolet electric-fields generated from a synchrotron light source are characterized by using spectral phase interferometry for direct electric-field reconstruction. The reconstructed 10-cycle square envelope electric-field corresponds to the radiation from an electron accelerated with the undulator which consists of 10 periods of permanent magnets.

09:30 – 09:45 (M1.3)

Direct reconstruction of two ultrashort pulses based on non-interferometric frequency-resolved optical gating

Birger Seifert (Pontificia Universidad Católica de Chile), Ricardo Arturo Rojas Aedo (Pontificia Universidad Católica de Chile), Diego Mauricio Hidalgo Rojas (Pontificia Universidad Católica de Chile) and Robert Alastair Wheatley (Pontificia Universidad Católica de Chile).

We describe a non-interferometric ultrashort-pulse measurement technique based on frequency-resolved optical gating (FROG) with which pulses can be reconstructed directly, i.e. non-iteratively. With a single shot FROG setup two different FROG spectrograms are measured, which represent the only information required to reconstruct the amplitudes and phases of two independent input pulses.

09:45 – 10:00 (M1.4)

Single-shot cross-correlation of counter-propagating, short optical pulses using random quasi-phase-matching

Christophe Dorrer (Laboratory for Laser Energetics) and Jessica Shaw (Laboratory for Laser Energetics).

We demonstrate a single-shot cross-correlator based on the transverse sum-frequency generation of counter-propagating pulses in a disordered ferroelectric crystal. It measures the cross-correlation between the two laser pulses, leading to the relative delay between two facilities on every shot for co-timing and study of their relative jitter.

10:00 – 10:15 (M1.5)

Generalized dispersion scan: an inline femtosecond pulse measurement technique for broad- and narrowband pulses

Francisco Silva (Sphere Ultrafast Photonics), Miguel Miranda (Sphere Ultrafast Photonics), Paulo T. Guerreiro (Sphere Ultrafast Photonics), Rosa Romero (Sphere Ultrafast Photonics) and Helder Crespo (Sphere Ultrafast Photonics SA).

We generalized the d-scan technique by multiplexing nonlinear signals encoding temporal, dispersion, and spectral information. This inline measurement retains the robustness of d-scan, without interferometric delays or beam splitting, enabling pulse measurement over a very broad duration range, from 7 fs up to 1 ps, with the same system.

10:15 – 10:30 (M1.6)

Complete Characterization of an OPCPA at High Repetition Rate Using Frequency Resolved Optical Switching

Elissa Haddad (INRS), Adrien Longa (INRS), Philippe Lassonde (INRS), Adrien Leblanc (ENSTA), Heide Ibrahim (INRS), François Légaré (INRS) and Gaëtan Jargot (INRS).

We show that frequency resolved optical switching (FROSt) can be used for full characterization of high repetition rate optical parametric chirped-pulse amplifiers (OPCPA). We characterize supercontinuum seed pulses at up to 500 kHz followed by the tunable near-infrared output signal and idler, simultaneously, of an ytterbium-based OPCPA system.

Coffee Break *sponsored by Trumpf Scientific Lasers*

Monday, 27th March
11:00 - 13:00

M2: Few-cycle pulses, carrier-envelope phase control

Chair: Tara Fortier, National Institute of Standards and Technology, USA

11:00 – 11:30 (M2.1)

CEP-stable few-cycle high power fiber lasers *(invited)*

Jens Limpert (Friedrich Schiller University Jena).

A CEP-stable sub-2-cycle 100-kHz 100-W 1-mJ laser system will be presented. In addition, scaling towards higher pulse energies and average power will be discussed.

11:30 – 11:45 (M2.2)

16 mJ 1.8-cycle pulses at 1 kHz repetition rate from single thin plate compression

Szabolcs Tóth (ELI ALPS), János Csontos (ELI ALPS), Levente Lehotai (ELI ALPS), Imre Seres (ELI ALPS), Ádám Börzsönyi (ELI ALPS), Károly Osvay (University of Szeged) and Roland Sándor Nagymihály (ELI ALPS).

First results of the post-compression experiments with the SYLOS 2 laser system are presented, where a single thin plate spectral broadening stage is utilized. Spectrally broadened pulses with 16 mJ output energy are obtained, where dispersion compensation with custom chirped mirrors and fused silica results in 4.75 fs temporal duration.

11:45 – 12:00 (M2.3)

The secret recipe for passive CEP stabilization

Günter Steinmeyer (Max-Born-Institut), Matthias Schnuerer (Max-Born-Institut), Lutz Ehrentraut (Max-Born-Institut), Raman Maksimenka (Fastlite) and Nicolas Forget (Fastlite).

We discuss the origin of residual carrier-envelope phase jitters in passively stabilized laser systems, comparing measured data at 9 different laser systems with a theoretical model. These considerations strongly suggest the Gordon-Haus jitter of the primary oscillator as the reason for the often observed excessive CEP jitters of these systems.

12:00 – 12:15 (M2.4)

Waveform control of relativistic laser-matter interactions

Jaismeen Kaur (Laboratoire d'Optique Appliquée (LOA), Institut Polytechnique de paris, ENSTA Paris - CNRS - Ecole Polytechnique), Marie Ouillé (Laboratoire d'Optique Appliquée (LOA), Institut Polytechnique de paris, ENSTA Paris - CNRS - Ecole Polytechnique), Zhao Cheng (Laboratoire d'Optique Appliquée (LOA), Institut Polytechnique de paris, ENSTA Paris - CNRS - Ecole Polytechnique), Stefan Haessler (Laboratoire d'Optique Appliquée (LOA), Institut Polytechnique de paris, ENSTA Paris - CNRS - Ecole Polytechnique), Julius Huijts (Laboratoire d'Optique Appliquée (LOA), Institut Polytechnique de paris, ENSTA Paris - CNRS - Ecole Polytechnique), Lucas Rovige (Laboratoire d'Optique Appliquée (LOA), Institut Polytechnique de paris, ENSTA Paris - CNRS - Ecole Polytechnique), Aline Vernier (Laboratoire d'Optique Appliquée (LOA), Institut Polytechnique de paris, ENSTA Paris - CNRS - Ecole Polytechnique), Igor Andriyash (Laboratoire d'Optique Appliquée (LOA), Institut Polytechnique de paris, ENSTA

Paris - CNRS - Ecole Polytechnique), Jérôme Faure (Laboratoire d'Optique Appliquée (LOA), Institut Polytechnique de paris, ENSTA Paris - CNRS - Ecole Polytechnique) and Rodrigo Lopez-Martens (Laboratoire d'Optique Appliquée (LOA), Institut Polytechnique de paris, ENSTA Paris - CNRS - Ecole Polytechnique).

We report on the first experimental evidence of direct waveform-control of relativistic-intensity laser-plasma interactions driven by a kHz near-single-cycle laser source. We show how the driving laser-waveform has a clear and reproducible imprint on the spatio-spectral emission properties of secondary particle and radiation beams from gas jets and plasma mirrors.

12:15 – 12:30 (M2.5)

Spectral coherence properties of continuum generation in bulk crystals

Benjamin Maingot (Fastlite), Gilles Chériaux (InPhyNi), Nicolas Forget (Fastlite) and Aurélie Jullien (InPhyNi).

White-light spectral interferometry quantifies the stochastic phase noise acquired during white light generation in bulk crystals. Spectrally-resolved intensity-to-phase transfer coefficients are extracted.

Monday, 27th March
13:00 - 15:00
Lunch *sponsored by EKSPLA* + **Poster Session 1** (Page 44-48)

Monday, 27th March
15:00 - 16:30

M3: Coherent beam combining and pulse synthesis

Chair: Francesca Calegari, Center for Free-Electron Laser Science, DESY, University of Hamburg, Germany

15:00 – 15:30 (M3.1)

Arbitrary Space-time Wave Packets Synthesis *(invited)*

Amit Agrawal (National Institute of Standards and Technology (NIST)), Lu Chen (NIST), Wenqi Zhu (NIST), Junyeob Song (NIST), Ting Xu (Nanjing University) and Pengcheng Huo (Nanjing University).

The ability to tailor an ultrafast pulse on demand has far-reaching impacts on numerous fields. Here, we demonstrate arbitrary spatiotemporal synthesis of ultrafast optical transients by leveraging the multifunctional control of light at the nanoscale offered by metasurfaces, enabling ready-synthesis of complex space-time wave packets over an ultrawide bandwidth.

15:30 – 15:45 (M3.2)

High-energy, high-peak-power ultrafast fiber laser system using spatio-temporal coherent pulse combination

Henning Stark (Friedrich Schiller University Jena), Maximilian Benner (Friedrich Schiller University Jena), Joachim Buldt (Friedrich Schiller University Jena) and Jens Limpert (Friedrich Schiller University Jena).

A high-energy, high-power ultrafast fiber laser system is presented. Using spatio-temporal coherent pulse combination of 16 ytterbium-doped rod-type fiber amplifiers and 8-pulse bursts, a new record performance of 29 mJ pulse energy at 20 kHz repetition rate and 165 fs pulse duration is achieved.

15:45 – 16:00 (M3.3)

High average/peak powers Coherent Beam Combination digital lasers

Claude-Alban Ranély-Vergé-Dépré (Thales LAS), Ihsan Fsaifes (Ecole Polytechnique), Rezki Becheker (Ecole Polytechnique), Jean-Christophe Chanteloup (Ecole Polytechnique), Eric Lallier (Thales TRT), François Gutty (thales TRT) and Jérôme Bourderionnet (Thales TRT).

We present high average/peak powers coherent beam combining laser prototypes. Ability to generate on demand far field energy distributions while being operated in a digital mode is described as well.

16:00 – 16:15 (M3.4)

Parallel Parametric Synthesis for the Generation of Intense and Custom-Tailored Sub-Cycle Optical Waveforms

Roland E. Mainz (Center for Free-Electron Laser Science), Giulio Maria Rossi (Center for Free-Electron Laser Science), Fabian Scheiba (Center for Free-Electron Laser Science), Miguel A. Silva-Toledo (Center for Free-Electron Laser Science), Maximilian Kubullek (Center for Free-Electron Laser Science), Yudong Yang (Center for Free-Electron Laser Science) and Franz X. Kärtner (Center for Free-Electron Laser Science).

We present intense sub-cycle optical waveforms (0.6 optical cycles) generated via the energy/power/bandwidth-scalable approach of parallel parametric waveform synthesis. The generated millijoule-level optical pulses spanning from 650 nm to 2.1 µm in bandwidth and open up new possibilities for the generation of tunable isolated attosecond pulses and attosecond science.

16:15 – 16:30 (M3.5)

High power ultrafast laser systems based on rod-type multicore fibers

Arno Klenke (Helmholtz-Institute Jena), Albrecht Steinkopff (FSU Jena), Christopher Aleshire (FSU Jena), Mehran Bahri (FSU Jena), Cesar Jauregui (FSU Jena), Johannes Nold (Fraunhofer IOF), Nicoletta Haarlammert (Fraunhofer IOF), Thomas Schreiber (Fraunhofer IOF), Andreas Tünnermann (Fraunhofer IOF) and Jens Limpert (FSU Jena).

We present the results of Ytterbium-doped multicore fiber-based laser systems. With a fiber containing 16 signal cores, femtosecond pulses with up to 500 W of average power

were generated. We also show the first results of a fiber containing 49 signal cores that provides further power scaling capabilities.

Coffee Break *sponsored by Sphere Photonics*

Monday, 27th March
17:00 - 18:00

M4: High average and peak power laser systems 1

Chair: Thomas Metzger, Trumpf Scientific Lasers, Germany

17:00 – 17:15 (M4.1)

Latest progress on the few-cycle, high average power lasers of ELI-ALPS

Adam Borzsonyi (ELI-ALPS, ELI-Hu Nonprofit Kft.), Eric Cormier (ELI-ALPS, ELI-Hu Nonprofit Kft.), Rodrigo Lopez-Martens (ELI-ALPS, ELI-Hu Nonprofit Kft.), Mikhail Kalashnikov (ELI-ALPS, ELI-Hu Nonprofit Kft.), Balint Kiss (ELI-ALPS, ELI-Hu Nonprofit Kft.), Peter Jojart (ELI-ALPS, ELI-Hu Nonprofit Kft.), Imre Seres (ELI-ALPS, ELI-Hu Nonprofit Kft.), Janos Csontos (ELI-ALPS, ELI-Hu Nonprofit Kft.), Szabolcs Toth (ELI-ALPS, ELI-Hu Nonprofit Kft.), Roland Nagymihály (ELI-ALPS, ELI-Hu Nonprofit Kft.), Katalin Varju (ELI-ALPS, ELI-Hu Nonprofit Kft.) and Gabor Szabo (ELI-ALPS, ELI-Hu Nonprofit Kft.).

We report on the most recent progress of the few-cycle lasers of ELI-ALPS user facility, operating in the 100W average power regime, while peak powers and repetition rates range from 0.1TW at 100kHz up to PW at 10Hz.

17:15 – 17:30 (M4.2)

High Repetition Rate, High Energy Petawatt Laser for the Matter in Extreme Conditions Upgrade

Thomas Spinka (Lawrence Livermore National Laboratory).

The Matter in Extreme Conditions Upgrade (MEC-U) project will combine a hard x-ray free electron laser with high-power optical lasers to produce and understand matter found in extreme environments. We are developing a 10Hz, 150J, 150fs, 1PW laser system to be installed in this upgraded facility.

17:30 – 17:45 (M4.3)

Multipass Cell Based Spectral Broadening of High Energy and High Average Power Thin-Disk Amplifiers

Yanik Pfaff (TRUMPF Scientific Lasers), Gaia Barbiero (TRUMPF Scientific Lasers), Michael Rampp (TRUMPF Scientific Lasers), Haochuan Wang (TRUMPF Scientific Lasers), Sandro Klingebiel (TRUMPF Scientific Lasers), Catherine Y. Teisset (TRUMPF Scientific Lasers), Robert Jung (TRUMPF Scientific Lasers), Abel Hailu Woldegeorgis (TRUMPF Scientific Lasers), Jonathan Brons (TRUMPF Laser GmbH), Clara J. Saraceno (Ruhr University Bochum) and Thomas Metzger (TRUMPF Scientific Lasers).

We discuss multipass cell based nonlinear broadening experiments between 60 mJ and 150 mJ pulse energy from a Yb-doped thin-disk regenerative amplifier at 5 kHz repetition

rate. Moreover, the compressibility to the Fourier transform limit of each experiment, to sub-40 fs or even sub-30 fs, is shown.

17:45 – 18:00 (M4.4)

Ultrafast thin-disk laser oscillator exceeding 400 W average output power using a replicating cavity scheme

Moritz Seidel (ETH Zurich), Lukas Lang (ETH Zurich), Christopher R. Phillips (ETH Zurich) and Ursula Keller (ETH Zurich).

We demonstrate a modelocked thin-disk laser oscillator providing 410 W average power with a pulse duration of 751 fs at a repetition rate of 7.77 MHz. This is enabled by a replicating cavity scheme not demonstrated before in high-power or modelocked oscillator operation and the use of sapphire bonded SESAMs.

Monday, 27th March
18:00 - 19:00

Plenary talk I

Revisiting compressors after 40 years to rescue the terms disappeared

Oscar E. Martínez (Photonics Laboratory, Institute for Biomedical Engineering, University of Buenos Aires, Argentina).

Aperitif in honor of 40 years of Prism Compressors

Tuesday, 28th March
08:30 - 09:30

Plenary talk II

The third generation table-top attosecond light sources

Katsumi Midorikawa (RIKEN Center for Advanced Photonics, Tokyo, Japan).
Sponsored by Source Lab

Tuesday, 28th March
09:30 - 10:30

Tu1: Ultrafast nonlinear optics

Chair: Takao Fuji, Toyota Technical Institute, Japan

09:30 – 10:00 (Tu1.1)

Achieving High Quantum Efficiency Parametric Amplification via Hybridized Nonlinear Optics *(invited)*

Jeffrey Moses (Cornell University).

Hybridization of optical parametric amplification with second harmonic generation allows high pump photon extraction efficiency for ordinary bell-shaped profiles due to altered nonlinear evolution dynamics. This talk will report a 68%-efficient, 48-dB-gain, single-stage mid-infrared hybridized parametric amplifier, a theory of the underlying dynamics, and wide potential applicability to ultrafast systems.

10:00 – 10:30 (Tu1.2)

Free-space quasi-phase matching in multipass cells *(invited)*

Oleg Pronin (Helmut Schmidt University), Victor Hariton (Helmut Schmidt University), Kilian Fritsch (Helmut Schmidt University) and Nazar Kovalenko (Helmut Schmidt University).

We report a new approach to phase matching of nonlinear materials based on the free space multipass cells. This concept shows quasi-phase matching in crystalline quartz and increases the second harmonic generation efficiency by a factor 40. This is the first proof-of-concept demonstration of $\chi(2)$ multipass nonlinear optics.

Coffee Break *sponsored by Horiba*

Tuesday, 28th March
11:00 - 13:00

Tu2: High average and peak power laser systems 2

Chair: Brendan Reagan, Lawrence Livermore National Laboratory, USA

11:00 – 11:30 (Tu2.1)

Scaling Ultrafast Lasers to Simultaneous High Energy and High Average Power *(invited)*

Emily Link (Lawrence Livermore National Laboratory).

Abstract not available.

11:30 – 11:45 (Tu2.2)

Advances in ultrafast kilowatt average power cryogenically cooled Yb:YAG lasers and applications at Colorado State University

Yong Wang (Colorado State University and XUV Lasers), Kristian Dehne (XUV Lasers and Colorado State University), Adam Higginson (Colorado state University), Han Chi (Colorado State University), Vladimir Chvykov (Colorado State University), Aaron Davenport (Colorado State University), Carmen Menoni (XUV Lasers and Colorado State University) and Jorge Rocca (Colorado State University).

Ultrafast pulses of Joule-level energy at kiloHertz repetition rate open new applications. We demonstrated a kW average power cryogenically-cooled Yb:YAG laser that generates picosecond pulses with record energy, >1 J, and efficient doubling of ns J pulses at 1 kHz. Laser filamentation and electrical discharge guiding in air was studied.

11:45 – 12:00 (Tu2.3)

Spatially and Temporally Chirped Beams: The Single Aperture Path to Exawatt Peak-Power Lasers

Kyle Chesnut (UC Irvine) and Christopher Barty (UC Irvine).

We describe a spatially and temporally chirped beam architecture with potential to create 20 kJ pulses with ~100 fs duration resulting in a 0.2 EW peak-power and focused intensity $>10^{25}$ W/cm^2. The various sub-systems, along with the spectral and spatial gain shaping required to maintain bandwidth during amplification, are presented.

12:00 – 12:15 (Tu2.4)

Relativistic nanophotonics: creating extreme environments with ultrafast ultra-intense lasers and nanostructures

Jorge Rocca (Colorado State University), Reed Hollinger (Colorado State University), Shoujun Wang (Colorado State University), Maria Gabriela Capeluto (Departamento de Fisica, UBA & Colorado State University), Yong Wang (Colorado State University), Jerry Lee Clark (Lawrence Livermore National Laboratory), Ronnie Shepherd (Lawrence Livermore National Laboratory), J. Emig (Lawrence Livermore National Laboratory), Edward Magee (Lawrence Livermore National Laboratory), Riccardo Tommasini (Lawrence Livermore National Laboratory), Ryan Nedbailo (Colorado State University), H. Song (Colorado State University), Alexander Pukhov (Heinrich-Heine-Universität Düsseldorf) and Vyacheslav Shlyaptsev (Colorado State University).

Irradiation of ordered nanostructures with ultrafast laser pulses of relativistic intensity creates extreme states of matter and beams of high energy particles. We report ultrafast X-ray K-shell emission measurements of nanowire arrays irradiated at $3x10^{21}$Wcm^{-2} and demonstrate rapid lateral electron heat conduction plays a critical role in the plasma dynamics.

12:15 – 12:30 (Tu2.5)

500 mJ, 1 kHz, thin-disk multipass amplifier

Robert Boge (ELI Beamlines), Wojciech Jerzy Szuba (ELI Beamlines), Jakub Novák (ELI Beamlines), Emily Erdman (ELI Beamlines), Jonathan Tyler Green (ELI Beamlines), Roman Antipenkov (ELI Beamlines), Jack Alexander Naylon (ELI Beamlines), Pavel Bakule (ELI Beamlines) and Bedřich Rus (ELI Beamlines).

We report on the progress on developing a high energy, 1030 nm, 1 kHz, picosecond thin-disk multipass amplifier. Combining thin-disk technology with an imaging setup allows for reliable operation with good beam quality. We address the key challenges of beam-distortion by the disk and gain clamping due to parasitic lasing.

12:30 – 12:45 (Tu2.6)

High Average Power Ti:Sa Amplifier for High Energy High Repetition Rate Laser Plasma Accelerator

Alain Pellegrina (THALES LAS France), Antoine Jeandet (THALES LAS France), Loic Lavenu (THALES LAS France), Sandrine Ricaud (THALES LAS France), Olivier Chalus (THALES LAS France), Aline Vernier (LOA), Alessandro Flacco (LOA), Jérôme Faure (LOA) and Christophe Simon Boisson (THALES LAS France).

Modern laser plasma accelerators require combination of high peak power and high average power from the laser. Ti:Sa CPA remains the best technology for such purpose. However, a higher repetition rate is necessary. A high average power Ti:Sa thick disk amplifier has been developed and implemented.

Lunch *sponsored by Edmund Optics*

Tuesday, 28th March
15:00 - 16:30

Tu3: Ultrafast Mid-infrared and Terahertz sources

Chair: Ioachim Pupeza, Max Planck Institute of Quantum Optics, Germany

15:00 – 15:15 (Tu3.1)

Mid-infrared hyper spectral imaging using sub-half-cycle pulses

Yue Zhao (Toyota Technological Institute), Shota Kusama (Toyota Technological Institute), Yuji Furutani (Nagoya Institute of Technology), Wei-Hong Huang (National Yang Ming Chiao Tung University), Chih-Wei Luo (National Yang Ming Chiao Tung University) and Takao Fuji (Toyota Technological Institute).

Here we report a mid-infrared chemical imaging using chirped pulse upconversion of sub-half-cycle pulses. The spatial resolution is 15 µm and a 640×480 pixel image can be obtained in 8 s at the hyperspectral imaging, which covers a spectral range of 640–3015 cm^{-1} with a wavenumber resolution of ~3 cm^{-1}.

15:15 – 15:30 (Tu3.2)

Efficient and Broadband Mid-Infrared Source Based on Optical Parametric Amplification in Dispersion-Engineered Thin Film Lithium Niobate

Marin Hamrouni (Laboratoire Temps-Fréquence - Université de Neuchâtel), Alex Hwang (E. L. Ginzton Laboratory, Stanford University), Marc Jankowski (NTT Research, Inc. Physics & Informatics Laboratories), Nayara Jornod (E. L. Ginzton Laboratory, Stanford University), Jatadhari Mishra (E. L. Ginzton Laboratory, Stanford University), Hubert Sylwester Stokowski (E. L. Ginzton Laboratory, Stanford University), Timothy P. McKenna (E. L. Ginzton Laboratory, Stanford University), Carsten Langrock (E. L. Ginzton Laboratory, Stanford University), Thomas Südmeyer (Laboratoire Temps-Fréquence - Université de Neuchâtel), Amir Safavi-Naeini (E. L. Ginzton Laboratory, Stanford University) and Martin M. Fejer (E. L. Ginzton Laboratory, Stanford University).

We report on a novel approach for efficient and broadband mid-infrared generation at the picojoule level of pump pulse energies. Driving OPA in thin-film-lithium-niobate waveguides with sub-10-pJ on-chip pump pulse energies, we demonstrate 1.5-pJ idler pulses with 150 µW average power within a 140-nm broad spectrum centered at 3200 nm.

15:30 – 15:45 (Tu3.3)

Carrier-envelope phase-stable few-cycle tunable frequency domain optical parametric amplification source in the mid-infrared

Gaetan Jargot (INRS), Gilles Dalla-Barba (INRS), Philippe Lassonde (INRS), Elissa Haddad (INRS), Antoine Laramée (INRS), Adrien Leblanc (ENSTA), Heide Ibrahim (INRS), Eric Cormier (LP2N) and François Légaré (INRS).

We developed a tunable broadband carrier-envelope phase stable source in the MIR region (from 5 µm to 13.5 µm) with 20 µJ of energy per pulse from a frequency domain optical parametric amplifier.

15:45 – 16:00 (Tu3.4)

High-power few-cycle pulses at 12 µm for ultrafast nonlinear spectroscopy

Pia Fuertjes (Max Born Institute), Martin Bock (Max Born Institute), Uwe Griebner (Max Born Institute) and Thomas Elsaesser (Max Born Institute).

A GaSe-based optical parametric chirped pulse amplifier (OPCPA) seeded by a femtoseconde Cr:ZnS oscillator delivers pulses at 11.4 µm with 185 fs duration, an energy of 65 µJ at a 1-kHz repetition rate, and is applied for nonlinear transmission experiments of liquid water.

16:00 – 16:15 (Tu3.5)

Optical rectification using thin lithium niobate inside a high-power thin-disk laser

Yicheng Wang (Ruhr-Universität-Bochum), Samira Mansourzadeh (Ruhr-Universität-Bochum), Tim Vogel (Ruhr-Universität-Bochum) and Clara J. Saraceno (Ruhr-Universität-Bochum).

We demonstrate thin-disk oscillator driven extra/intracavity optical rectification using thin $LiNbO_3$. Extracavity THz transients with up to 600 µW were achieved with a

spectrum extending up to 5 THz. By placing the LN crystal inside a Kerr-lens modelocked thin-disk oscillator, THz average power up to 1.2 mW was measured.

Coffee Break *sponsored by TRUMPF Scientific Lasers*

Tuesday, 27th March
17:00 - 18:30

Tu4: Novel methods for generating and manipulating ultrashort pulses

Chair: Uwe Griebner, Max Born Institute, Germany

17:00 – 17:30 (Tu4.1)

Optical parametric amplification: from fundamental concepts to extreme light sources (in memoriam Algis Piskarskas) *(invited)*

Arûnas Varanavicius (Vilnius University).

Optical parametric amplification: from fundamental concepts to extreme light sources (in memoriam Algis Piskarskas)

17:30 – 17:45 (Tu4.2)

Nonlinearity-tunable regenerative amplifier for ultrashort-pulse generation

Chengyong Feng (University of Rochester), Robert Holcomb (University of Rochester), Gregory Jenkins (University of Rochester), Christophe Dorrer (University of Rochester) and Jake Bromage (University of Rochester).

We introduce cascaded quadratic nonlinearity inside a regenerative amplifier to allow cavity-net nonlinearity tunable in both magnitude and sign. By exploiting the regime with enhanced net positive nonlinearity, we demonstrate direct amplification of 10-uJ, 1.2-ps seed pulses to 0.5 mJ, 200 fs from a Yb:YAG thin-disk regenerative amplifier.

17:45 – 18:00 (Tu4.3)

Perturbative and non-perturbative nonlinear optics with few-cycle erbium-fiber frequency combs

Daniel Lesko (NIST/CU Boulder), Kristina Chang (NIST) and Scott Diddams (NIST/CU Boulder).

High power and few-cycle fiber combs offer compact, low noise, and high precision tools for exploring nonlinear processes. Using a few-cycle 100 MHz Er:fiber comb, we generate broadband visible spectra in lithium niobate for dual comb spectroscopy. With the same source, we measure carrier-envelope phase dependent spectra from zinc oxide.

Drinks *sponsored by Optoman* & Aperitif

Tuesday, 28th March
18:30 - 21:00

Tu5: Industry and Facilities Session

Chair: Alan Fry, SLAC National Accelerator Laboratory, USA

18:30 – 18:42 (Tue5.1)

Transitioning from a startup to a large company

Sven Breitkopf (AFS).

18:42 – 18:54 (Tue5.2)

The Laser Lightning Rod Project

Thomas Metzger (Trumpf Scientific), Yanik Pfaff (Trumpf Scientific).

18:54 – 19:06 (Tue5.3)

Bringing advanced ultrafast lasers to the break-through in neuro-science

Robert Riedel (Class 5 Photonics).

19:06 – 19:18 (Tue5.4)

Breakthroughs in fast femtosecond multibeam micromaching

Martin Smrz (Hilase).

19:18 – 19:30 (Tue5.5)

Advanced temporal shaping of industrial ultrafast lasers

Clemens Hönninger (Amplitude Systems).

19:30 – 19:42 (Tue5.6)

The LaserNetUS Network

Chandra Curry (LaserNetUS).

19:42 – 19:54 (Tue5.7)

Scientists and Industrial Partners on Conferences

Frank Wunderlich (Layertec).

19:54 – 20:06 (Tue5.8)

Once we learned how to amplify the rainbow…

Karolis Neimontas (Light Conversion).

20:06 – 20:18 (Tue5.9)

Broadband OPA technology for ultrashort and incoherent laser pulses

Jonathan Zuegel (LLE), Christophe Dorrer (LLE), Chengyong Feng (LLE).

20:18 – 20:30 (Tue5.10)

From new science to unique ultrafast products

Rosa Romero (Sphere Ultrafast Photonics).

20:30 – 20:42 (Tue5.11)

Novel dual-wavelength front-end with active fiber loop for high intensity laser systems

Justas Varpucianskis (EKSPLA).

20:42 – 20:54 (Tue5.12)

New generation of compact and robust ultrafast laser diagnostics

Antoine Dubrouil (FemtoEasy).

Wednesday, 29th March
08:30 - 10:00

W1: Ultrafast user applications that drive technology advancements and innovation

Chair: Mariano Trigo, SLAC National AcceleratorLaboratory, USA

08:30 – 09:00 (W1.1)

Diode-pumped GHz Ti:sapphire and Yb:ceramic lasers for space and astronomy applications *(invited)*

Derryck Reid (Heriot-Watt University), Hanna Ostapenko (Heriot-Watt University), Toby Mitchell (Heriot-Watt University) and Pablo Castro Marin (Heriot-Watt University).

We describe the development of Kerr-lens-modelocked oscillators at 800nm and 1080nm with repetition rates from 1 GHz to 2.2 GHz and powers around 100 mW. Designs optimising KLM and bonded-optics construction eliminating optomechanics are discussed. These lasers show potential as precision time and frequency sources for astronomy and space applications.

09:00 – 09:15 (W1.2)

Absolute distance measurement based on a coherently synthesized two-color electro-optic frequency comb

Runmin Li (the University of Electro-communications), Haochen Tian (the University of Electro-communications), Takashi Kato (the University of Electro-communications), Akifumi Asahara (the University of Electro-communications) and Kaoru Minoshima (the University of Electro-communications).

A low-noise coherently synthesized two-color EO comb is demonstrated and applied for distance measurement. Nanometer-precision absolute distance measurement within extended non-ambiguity range is realized by combining synthetic-wavelength interferometry and single-wavelength interferometry.

09:15 – 09:30 (W1.3)

Spatiotemporal focusing and imaging of ultrafast laser pulses for rapid, continuous 3D nanoprinting

Xianfan Xu (Purdue University).

We use spatiotemporal focusing and imaging of ultrafast laser pulses to implement a projection two-photon polymerization process in a continuous fashion to fabricate complex 3D structures at a large print rate. Rapid fabrication of millimeter scale structures is achievable with this continuous, layer-by-layer projection two-photon process.

09:30 – 09:45 (W1.4)

Generation of Relativistic Electron Beams exceeding 500 keV by Direct Laser Acceleration using Longitudinal Electric Fields

Jeffrey Powell (INRS-EMT), Simon Vallières (University of Waterloo), Stéphane Payeur (INRS-EMT), Sylvain Fourmaux (INRS-EMT), François Fillion-Gourdeau (INRS-EMT), Florentin Belfio (INRS-EMT), Philippe Lassonde (INRS-EMT), Heide Ibrahim (INRS-EMT), Spencer Jolly (Service OPERA-Photonique, Université Libre de Bruxelles), Steve MacLean (INRS-EMT) and François Légaré (INRS-EMT).

We report on the generation of a relativistic electron beam exceeding 500 keV by direct laser acceleration in a low-density gas using longitudinal electric fields. The electron energy is measured as a function of laser intensity and gas species, revealing a strong dependence on the atomic ionization dynamics.

09:45 – 10:00 (W1.5)

Ultrafast-Lasers -Enabled Simultaneous Figuring and Polishing of Glass

Gong Chen (Rochester Institute of Technology) and Jie Qiao (Rochester Institute of Technology).

We, for the first time to our knowledge, demonstrated simultaneous figuring and surface polishing of glass substrates using a femtosecond laser. Deterministic material removal with nanometer precision was achieved while maintaining sub-nanometer optical surface quality.

Coffee Break *sponsored by Light Conversion*

Wednesday, 29th March
10:30 - 12:00

W2: Ultrashort UV, XUV and X-ray sources

Chair: Sergio Carbajo, UCLA, USA

10:30 – 11:00 (W2.1)

Ultrashort UV light pulses to steer electron dynamics in molecules *(invited)*

Francesca Calegari (CFEL-DESY).

An attosecond beamline combining sub-2fs UV pulses with few-fs IR and/or attosecond XUV pulses is presented. We have exploited this beamline to perform tr-PECD in Methyl-lactate. The UV pulse excites a coherent superposition of Rydberg states. The resulting coherent electron dynamics modulates the chiral response on a sub-15 fs scale.

11:00 – 11:30 (W2.2)

Towards a single-stage 100-eV HHG source *(invited)*

Jakub Drs (Laboratoire Temps-Fréquence (LTF), Institut de Physique, Université de Neuchâtel), Julian Fischer (Laboratoire Temps-Fréquence (LTF), Institut de Physique, Université de Neuchâtel), Michael Müller (Laboratoire Temps-Fréquence (LTF), Institut de Physique,

Université de Neuchâtel), **Norbert Modsching** *(Laboratoire Temps-Fréquence (LTF), Institut de Physique, Université de Neuchâtel)*, **Tobias Ullsperger** *(Institute of Applied Physics, (Friedrich Schiller University Jena))*, **Valentin Johannes Wittwer** *(Laboratoire Temps-Fréquence (LTF), Institut de Physique, Université de Neuchâtel)* **and Thomas Südmeyer** *(Laboratoire Temps-Fréquence (LTF), Institut de Physique, Université de Neuchâtel).*

We discuss the recent progress of our intra-oscillator based HHG system operating at 17 MHz repetition rate. We implemented a pierced mirror as an XUV outcoupling mechanism and demonstrated HHG in neon reaching photon energies of 70 eV, which we expect to increase toward 100 eV in the near future.

11:30 – 11:45 (W2.3)

Continuously tunable high harmonic source for 92 eV/13.5 nm

Alexander Kirsche (Friedrich Schiller University Jena), **Martin Gebhardt** *(Friedrich-Schiller-University Jena)*, **Robert Klas** *(Friedrich-Schiller-University Jena)*, **Maximilian Benner** *(Friedrich-Schiller-University Jena)*, **Wilhelm Eschen** *(Friedrich-Schiller-University Jena)*, **Henning Stark** *(Friedrich-Schiller-University Jena)*, **Joachim Buldt** *(Friedrich-Schiller-University Jena)*, **Jan Rothhardt** *(Friedrich-Schiller-University Jena)* **and Jens Limpert** *(Friedrich-Schiller-University Jena).*

A fully tunable, table-top extreme ultraviolet source providing state-of-the-art photon flux at energies between 80 eV and 120 eV is presented. Based on pulse-chirping and nonlinear blue-shifting followed by high harmonic generation in a gas-filled capillary, this source generates any desired photon energy in this spectral range at maximum efficiency.

11:45 – 12:00 (W2.4)

Soft X-ray continua generation via HHG with sub-cycle synthesized laser fields

Fabian Scheiba (DESY, CFEL, Physics Department and The Hamburg Centre for Ultrafast Imaging, University of Hamburg), **Roland E. Mainz** *(DESY, CFEL, Physics Department, University of Hamburg)*, **Giulio Maria Rossi** *(DESY, CFEL, Physics Department and The Hamburg Centre for Ultrafast Imaging, University of Hamburg)*, **Miguel A. Silva-Toledo** *(DESY, CFEL, Physics Department, University of Hamburg)*, **Maximilian Kubullek** *(DESY, CFEL, Physics Department, University of Hamburg)* **and Franz X. Kärtner** *(DESY, CFEL, Physics Department and The Hamburg Centre for Ultrafast Imaging, University of Hamburg).*

Isolated attosecond soft X-ray continua are presented as generated with a synthesized infrared laser field. Sub-cycle non-sinusoidal electric fields supersede the need for any gating techniques. A vast scan of multiple synthesis parameters is presented and the interplay of waveform dependent macroscopic effects for synthesized sub-cycle driving pulse are discussed.

Wednesday, 29th March
12:30-18:30

Victoria Island and Arrayanes Forest Excursion

Nahuel Huapi National Park was created in 1934, as an addition to the National Park of the South, one of the first national parks in South America. Its creation (1922) was the beginning of the National Park system in Argentina. The territory today occupies 705,000 hectares. The name Nahuel Huapi comes from mapuche, meaning "Island of the Tiger."

The boat departs from Puerto Pañuelo on the imposing Llao Llao peninsula and arrives at the Quetrihue peninsula, location of the Bosque de Arrayanes, north-east of Lago Nahuel Huapi. The park is home to one of the only forest colonies of Arrayanes or Quetri (the origin of the name Peninsula Quetrihue which in mapuche means "place where there are Quetris"). This tree, relative of the Australian Eucalyptus, usually grows on the edge of lakes in humid soil. Pure groves of these trees are only found on the southern edge of Peninsula Quetrihue and the northern edge of Victoria Island (Nahuel Huapi National Park).

After visiting Bosque de Arrayanes ones sails to Puerto Anchorena, on Isla Victoria, where lush vegetation offering incredible views can be found. Following the trails of this beautiful and thousand-year-old island is a pleasure that has been experienced by millions of visitors to the National Park. The island awaits, with its pristine state of conservation and unique Flora and Fauna.

Specialized guides from the National Park will provide accurate and necessary information for this tour to be even more rewarding.

The vessel: Cau Cau is one of the most modern vessels of its kind. Its design is oriented towards panoramic views. The services available on board make it the ideal vessel for exploring the fascinating Lake Nahuel Huapi. Lunch will be provided to all participants during the boat trip, **sponsored by Source Lab**.

Important! It is recommended to wear comfortable informal clothing for the excursion. The weather in March can be variable, so please also think of bringing some warm gear.

Thursday, 30th March
08:30 - 09:30

Plenary talk III

Dual-comb modelocked diode-pumped solid-state and semiconductor lasers

Ursula Keller (ETH Zurich, Switzerland).
Sponsored by ELI

Thursday, 30th March
09:30 - 11:00

Th1: Technologies for laser facilities

Chair: Alan Fry, SLAC National Accelerator Laboratory, USA

09:30 – 10:00 (Th1.1)

New results in attosecond metrology powered by artificial intelligence *(invited)*

Reinhard Kienberger (Technical University Munich)

"Attosecond streaking" has been used to investigate electron dynamics from gases, liquids, and solids, with unprecedented resolution. Evaluation of streaking traces needs quite an amount of computation and time. Deep learning has been applied to reconstruct streaking traces and made possible to compare them online to reconstructed traces.

10:00 – 10:15 (Th1.2)

High Repetition Rate Materials Science Beamline at Artemis

Adam Wyatt (STFC Central Laser Facility), Yu Zhang (STFC Central Laser Facility), Charlotte Sanders (STFC Central Laser Facility), Gourab Chatterjee (STFC Central Laser Facility), Gabriel Karras (STFC Central Laser Facility), Ota Michalek (STFC Central Laser Facility), Richard Chapman (STFC Central Laser Facility), Luca Poletto (National Council for Research of Italy), Gregory Greetham (STFC Central Laser Facility) and Emma Springate (STFC Central Laser Facility).

We present first results of the high-repetition-rate beamline for time- and angle-resolved photoelectron spectroscopy (Tr-ARPES). The laser parameters are 150-200µJ energy at 100kHz, 50-100fs duration and tuneable wavelength of 1450-1850nm or 250-3680nm. The extreme ultraviolet probe parameters are 17-41 eV photon energy, 150meV spectral, 70fs temporal, and35 µm spatial resolution.

10:15 – 10:30 (Th1.3)

Attosecond Capabilities at LCLS

Paris Franz (Stanford University), Zhaoheng Guo (Stanford University), Dorian Bohler (SLAC National Accelerator Laboratory), David Cesar (SLAC National Accelerator Laboratory), Xinxin Cheng (SLAC National Accelerator Laboratory), Taran Driver (SLAC National Accelerator Laboratory), Joseph Duris (SLAC National Accelerator Laboratory), Andrei Kamalov (SLAC National Accelerator Laboratory), Siqi Li (SLAC National Accelerator Laboratory), Ming-Fu Lin (SLAC National Accelerator Laboratory), Razib Obaid (SLAC National Accelerator Laboratory), River Robles (Stanford University), Nick Sudar (SLAC National Accelerator Laboratory), Anna Li Wang (Stanford University), Zhen Zhang (SLAC National Accelerator Laboratory), James Cryan

(SLAC National Accelerator Laboratory) and Agostino Marinelli (SLAC National Accelerator Laboratory).

We report the experimental generation of GW-level soft x-ray attosecond pump/attosecond probe pairs and generation of high power soft x-ray attosecond pulses with TW-scale peak power at the Linac Coherent Light Source (LCLS).

10:30 – 10:45 (Th1.4)

Ultrafast Laser Systems for High Repetition Rate Seeded Soft X-Ray Free Electron Laser Facility FLASH

Ingmar Hartl (DESY).

The free electron laser facility FLASH will be the first externally seeded soft x-ray free electron laser worldwide. We describe the ultrafast laser systems which are currently under construction to operate this facility

10:45 – 11:00 (Th1.5)

S2E Model of CPA and NLO Systems

Jack Hirschman (SLAC National Accelerator Laboratory), Randy Lemons (SLAC National Accelerator Laboratory), Minyang Wang (UCLA) and Sergio Carbajo (UCLA).

Modeling chirped pulse amplification and nonlinear optical systems from start to end to perform ground-up design, inverse engineering, and reverse engineering is essential to efficiently drive laser research and applications. We present a comprehensive start-to-end software model and demonstrate its capabilities.

Coffee Break *sponsored by Amphos*

Thursday, 30th March
11:30 - 13:00

Th2: Spectral broadening and pulse compression 1

Chair: Bruno Schmidt, Few-cycle Inc., Canada

11:30 – 12:00 (Th2.1)

Opportunities for ultrafast lasers and nonlinear optics opened by multi-pass cells *(invited)*

Christoph Heyl (1. German Electron Synchrotron DESY, 2. Helmholtz-Institute Jena).

Nonlinear multi-pass cells (MPCs) have brought along exciting possibilities to the field of ultrafast optics, ranging from great advances for post-compressed ultrafast lasers to novel frequency conversion schemes. We here discuss underlying principles and opportunities offered by nonlinear quasi-guiding MPCs as well as selected recent results reaching beyond post-compression.

12:00 – 12:15 (Th2.2)

High average power multi-pass cell post-compression at 2 µm wavelength

Philipp Gierschke (Fraunhofer Institute for Applied Optics and Precision Engineering IOF Jena), Christian Grebing (Active Fiber Systems GmbH), Mahmoud Abdelaal (Institute of Applied Physics, Friedrich Schiller University Jena), Mathias Lenski (Institute of Applied Physics, Friedrich Schiller University Jena), Joachim Buldt (Institute of Applied Physics, Friedrich Schiller University Jena), Ziyao Wang (Institute of Applied Physics, Friedrich Schiller University Jena), Tobias Heuermann (Institute of Applied Physics, Friedrich Schiller University Jena, Helmholtz-Institute Jena,), Michael Müller (Institute de Physique, Université de Neuchâtel), Martin Gebhardt (School of Engineering and Physical Sciences, Heriot-Watt University), Jan Rothhardt (Fraunhofer IOF Jena, Institute of Applied Physics Jena, Friedrich Schiller University Jena, Helmholtz-Institute Jena) and Jens Limpert (Fraunhofer IOF Jena, Institute of Applied Physics Jena, Friedrich Schiller University Jena, Helmholtz-Institute Jena).

We present the post compression of an ultrafast Thulium-laser via a gas-filled multi-pass cell. Delivering 51W average power, 35fs pulses at 1940nm wavelength. These results mark the highest average-power multi-pass cell post compression in the short-wavelength-infrared to date. This source is an ideal platform to drive nonlinear frequency conversion experiments.

12:15 – 12:30 (Th2.3)

Few-cycle Yb laser source at 20 kHz using multidimensional solitary states in hollow-core fibers

Adrien Longa (INRS), Loic Arias (INRS), Gaetan Jargot (INRS), Antoine Pomerleau (INRS), Philippe Lassonde (INRS), Guangyu Fan (DESY), Reza Safaei (University of Ottawa), Paul B. Corkum (University of Ottawa), Fabio Boschini (INRS), Heide Ibrahim (INRS) and Francois Legare (INRS).

We demonstrate pulse compression from 300 fs down to 17 fs up to 20 kHz using multidimensional solitary states in a hollow-core fiber filled with N2O in differential pressure to mitigate thermal effects.

12:30 – 12:45 (Th2.4)

Average power scaling of pulse compression in molecular gas-filled hollow core fibers

Christopher Lantigua (University of Central Florida), Tran-Chau Truong (University of Central Florida), John Beetar (University of Central Florida), Madugula Nrisimhamurty (University of Central Florida) and Michael Chini (University of Central Florida).

Thermal effects in molecular gas-filled hollow core fibers limit spectral broadening at high repetition rates. Here, we show that these effects can be mitigated by introducing helium buffer gas to an N_2O-filled fiber. Both the energy throughput and spectral bandwidth are improved at high repetition rates.

12:45 – 13:00 (Th2.5)

Spectral Broadening of 2 mJ Femtosecond Pulses in a Compact Multipass Cell in Ambient Air

Alan Omar (Ruhr-Universität Bochum), Tim Vogel (Ruhr-Universität Bochum), Martin Hoffmann (Ruhr-Universität Bochum) and Clara Saraceno (Ruhr-Universität Bochum).

We demonstrate spectral broadening of 2.1-mJ pulses at 100 kHz repetition rate to a spectral bandwidth of 24.5 nm, supporting 133 fs pulses with 96 % efficiency, in a compact convex-concave multipass cell operated in ambient air.

Thursday, 30th March
13:00 - 14:30
Lunch *sponsored by EKSPLA* + **Poster Session 2** (Page 48-52)

Thursday, 30th March
15:00 - 17:00

Th3: Technologies for ultrafast sources

Chair: Valentin Wittwer, Université de Neuchâtel, Switzerland

15:00 – 15:30 (Th3.1)

Advancements in High Fluence Multilayer Dielectric Gratings for Ultrafast Lasers *(invited)*

Hoang Nguyen (Lawrence Livermore National Laboratory), Brad Hickman (Lawrence Livermore National Laboratory), Candis Jackson (Lawrence Livermore National Laboratory), James Nissen (Lawrence Livermore National Laboratory), Sean Tardif (Lawrence Livermore National Laboratory), Erhard Gaul (Marvel Fusion) and Daniel Kramer (ELI-Beamlines, Institute of Physics).

We have developed a new class of meter-sized, MLD gratings based on a low-dispersion design of 1136 lines/mm for a Littrow out-of-plane compressor design operating at 1060nm. This new class of MLD gratings allows for approximately 3.4X more total energy on grating compared to the present state of the art.

15:30 – 16:00 (Th3.2)

New nonlinear crystals for ultrafast frequency conversion in the mid-infrared *(invited)*

Peter Schunemann (BAE Systems).

Improved all-epitaxial processing of orientation-patterned OP-GaAs and OP-GaP, advances in size and quality of $ZnGeP_2$ and $CdSiP_2$, and the advent of $BaGa_4S_7$, $BaGa_4S_7$, and their quaternary analogues, are extending ultrafast laser output deep into the mid-infrared. Here we report on growth, processing, properties, device performance, and search for new materials.

16:00 – 16:15 (Th3.3)

Amorphous oxide coatings for demanding laser science applications

Carmen Menoni (Colorado State University), Aaron Davenport (Colorado State University), Kristian Dehne (Colorado State University), Yong Wang (Colorado State University), Ruth Osovsky (Colorado State University) and Jorge Rocca (Colorado State University).

The most recent advances in amorphous oxide multilayer coatings for near infrared ultrafast lasers and ultrastable optical cavities are presented. Materials and coating architectures challenges to advance near infrared interference coatings to new performance heights and functionality are described.

16:15 – 16:30 (Th3.4)

1.4 octave spanning dispersive mirror in NIR

Vladimir Pervak (Ludwig Maximilians University) and Daniel Hahner (LMU).

We overview Si/SiO2 mirrors operating in the spectral range 1.2-3.2 um. The coatings exhibit reflectance exceeding 99% and provide group delay dispersion of -100 fs^2. The mirrors are key elements of Cr:ZnS/Cr:ZnSe femtosecond lasers and oscillators.

16:30 – 16:45 (Th3.5)

Tight Focusing in Air of a mJ-class Femtosecond Laser: A Radiation Safety Issue

Simon Vallières (University of Waterloo), Jeffrey Powell (Institut national de la recherche scientifique), Tanner Connell (McGill University Health Center), Michael Evans (McGill University Health Center), Sylvain Fourmaux (Institut national de la recherche scientifique), Stéphane Payeur (Institut national de la recherche scientifique), Philippe Lassonde (Institut national de la recherche scientifique), François Fillion-Gourdeau (Institut national de la recherche scientifique), Steve MacLean (Institut national de la recherche scientifique) and François Légaré (Institut national de la recherche scientifique).

We present a straightforward method to generate MeV-ranged high dose-rate electron beams in ambient air through the tight focusing of a mJ-class femtosecond laser. We demonstrate that relativistic intensities are reached through an intensity clamping suppression effect and that the technique is promising for performing FLASH radiation therapy.

Thursday, 30th March
17:30 - 21:00
Conference Banquet at Rincón Patagónico

The conference dinner at Rincón Patagónico will feature a traditional Argentine “asado”: grilled beef and lamb cooked in the so-called “asador” style. Vegan and vegetarian options will be available. Transportation from Llao Llao to the restaurant and back will be provided.

Friday, 31st March
08:30 - 10:30

F1: Ultrafast oscillators and frequency combs

Chair: Christophe Dorrer, Laboratory for Laser Energetics, USA

08:30 – 09:00 (F1.1)

Stabilized femtosecond mode-locked lasers for precise frequency and phase comparison of atomic clocks *(invited)*

Tara Fortier (NIST, Boulder).

Optical frequency combs based on femtosecond modelocked lasers have helped to unite the ultrafast with the ultrastable, providing a means to compare, synthesize, and share phase information between ultraprecise optical and microwave atomic references.

09:00– 09:30 (F1.2)

Linewidth and Bandwidth of the QCL Frequency Comb with Arbitrary Temporal Profile *(invited)*

Jacob Khurgin (Johns Hopkins University).

We investigate analytically two essential characteristics of the frequency modulated combs generated by quantum cascade lasers: bandwidth (number of spectral lines)and linewidth and show that despite their very different temporal profiles, MIR and THz QCL OFCs are just as good for most applications as any other frequency comb.

09:30 – 09:45 (F1.3)

Low-noise high-repetition rate femtosecond Cr-ZnS Oscillator

Ajanta Barh (ETH Zürich), Jonas Heidrich (ETH Zürich), Marco Gaulke (ETH Zürich), Matthias Golling (ETH Zürich), Christopher R. Phillips (ETH Zürich) and Ursula Keller (ETH Zürich).

We present noise performance of SESAM-modelocked, high-repetition rate, femtosecond 2.4-µm Cr:ZnS oscillators in a free-running condition. A fiber laser-pumped 2-GHz oscillator shows an integrated RIN of 0.14% rms, which is further reduced to 0.05% rms for a diode laser-pumped 0.44-GHz oscillator and a low timing jitter is achieved.

09:45 – 10:00 (F1.4)

Progress in Few-Cycle and GHz Kerr-Lens Mode-Locked Yb:CALGO Oscillators

Michael Mueller (Laboratoire Temps-Fréquence, Université de Neuchâtel), Marin Hamrouni (Laboratoire Temps-Fréquence, Université de Neuchâtel), Norbert Modsching (Laboratoire Temps-Fréquence, Université de Neuchâtel), François Labaye (Laboratoire Temps-Fréquence, Université de Neuchâtel), Valentin J. Wittwer (Laboratoire Temps-Fréquence, Université de Neuchâtel), Eric Cormier (Laboratoire Photonique, Numérique et Nanosciences, Université Bordeaux) and Thomas Südmeyer (Laboratoire Temps-Fréquence, Université de Neuchâtel).

We present on the progress of efficient and powerful Kerr-lens mode-locked Yb:CALGO laser oscillators. Pulses, short as 22 fs are demonstrated using a unique cross-polarized

pumping scheme. Also, a 1 GHz-repetition-rate system is shown with a record average power of 6.9 W at 94 fs. Further scaling is discussed.

10:00 – 10:15 (F1.5)

High-power mode-locked Ho:CALGO lasers at 2.1 µm

Weichao Yao (Ruhr-Universität Bochum), Yicheng Wang (Ruhr-Universität Bochum), Shahwar Ahmed (Ruhr-Universität Bochum), Martin Hoffmann (Ruhr-Universität Bochum) and Clara J. Saraceno (Ruhr-Universität Bochum).

We report watt-level average power, mode-locked Ho:CALGO bulk lasers with record power at 2.1 µm. With SESAM mode-locking, we demonstrate 8.7-W average power (369 fs) at 2118 nm at an optical-to-optical efficiency of 38.2%. Using soft-aperture KLM, we demonstrate 112-fs pulse duration at an average power of 1.1 W.

10:15 – 10:30 (F1.6)

Femtosecond InGaSb VECSEL at 2 µm

Ajanta Barh (ETH Zürich), Marco Gaulke (ETH Zürich), Jonas Heidrich (ETH Zürich), Maximilian Schuchter (ETH Zürich), Nicolas Huwyler (ETH Zürich), Matthias Golling (ETH Zürich) and Ursula Keller (ETH Zürich).

We present backside-cooled femtosecond VECSELs at 2 µm. Our 1st generation gain chip introduces a large GDD, which is compensated with a special top-coated SESAM and a highly dispersive optics for modelocking. A newly developed GDD-optimized gain chip overcomes this issue and delivers stable 331-fs pulses in a simpler setting.

Coffee Break *sponsored by TRUMPF Scientific Lasers*

Friday, 31st March
11:00 - 13:00

F2: Attosecond physics and pulse generation

Chair: Cord Arnold, Lund University, Sweden

11:00 – 11:30 (F2.1)

Attosecond Science at ELI Scale *(invited)*

Katalin Varju (ELI ALPS), Adam Borzsonyi (ELI ALPS), Subhendu Kahaly (ELI ALPS) and Balázs Major (ELI ALPS).

The ELI-ALPS facility supports laser based fundamental and applied research at extreme short timescales, operating specialized lasers which drive nonlinear frequency conversion and acceleration processes. The attosecond beamlines based on advanced HHG techniques will be reviewed along with first experiments.

11:30 – 11:45 (F2.2)

Orbital-based perspective of high harmonic generation from bulk ReS_2

Chandler Bossaer (National Research Council of Canada), Alvaro Jimenez Galan (National Research Council of Canada), Rui Silva (Instituto de Ciencia de Materiales de Madrid, CSIC), Adina Luican-Mayer (University of Ottawa) and Giulio Vampa (National Research Council of Canada).

We demonstrate a strong polarization and intensity dependence of bulk ReS_2 in the high harmonic spectrum and show how it is a manifestation of interferences between localized orbitals in the lattice, quantifying the contribution of the atomic sites to the high harmonic emission and showing the possibility of real-space control.

11:45 – 12:00 (F2.3)

Spatially- and Spectrally-Resolved Structures in High Harmonic Generation from Solids

Adam Wyatt (STFC Central Laser Facility), Katarzyna Kowalczyk (Imperial College), Hortense Allegre (Imperial College), Emma Springate (STFC Central Laser Facility), John Tisch (Imperial College), Jon Marangos (Imperial College) and Mary Matthews (Imperial College).

We present spatially- and spectrally-resolved measurements of high harmonic generation in MgO and sapphire from 30fs pulses at 780nm. We show ring-like features that are distinctly different to gas-phase HHG. The harmonic yield shows harmonic independent 4-fold rotational symmetry from MgO and harmonic dependent 6-fold symmetry in sapphire.

12:00 – 12:15 (F2.4)

A Real-Space Perspective on Dephasing in Solid-State High Harmonic Generation

Graham Brown (Max Born Institute) and Mikhail Ivanov (Max Born Institute).

We use real-space perspective on high harmonic generation in crystals to address the physical origin of the unusually short dephasing times. Our approach leads to clear high harmonic spectra and demonstrates that the requirement for ultrafast dephasing times stems from the need for suppressing large electron-hole separations during radiative recombination.

12:15 – 12:30 (F2.5)

Direct Measurement of Attosecond Emission Delays in High Harmonic Generation

Adam Wyatt (STFC Central Laser Facility), David Lloyd (University of Oxford), Richard Chapman (STFC Central Laser Facility), Christopher Thornton (STFC Central Laser Facility), Paulina Majchrzak (STFC Central Laser Facility), Alfred Jones (STFC Central Laser Facility), Emma Springate (STFC Central Laser Facility) and Kevin O'Keeffe (Swansea University).

We present direct measurements of attosecond delays in the emission of extreme ultraviolet pulses from high harmonic generation in different gases using an inline interferometer. Relative to argon, we measure a delay of -130±50as for krypton, -400±50as for xenon, 370±20as for nitrogen (N_2) and 190±20as for carbon dioxide (both unaligned).

12:30 – 12:45 (F2.6)

New aspects of HHG efficiency considerations – towards the Watt level

Robert Klas (Friedrich Schiller University Jena), Martin Gebhardt (Friedrich Schiller University Jena), Maximilian Karst (Friedrich Schiller University Jena), Jan Rothhardt (Helmholtz Institute Jena) and Jens Limpert (Friedrich Schiller University Jena).

In this contribution a quantitative scaling law of the phase-matched high-order harmonic generation (HHG) efficiency with the driving pulse length will be presented in theory and experiment. In combination with multipass-cell based pulse compression, this knowledge will enable HHG sources up to Watt level.

12:45 – 13:00 (F2.7)

Isosteric molecules in the time-domain

Maximilian Pollanka (Technische Universität München), Christian Schröder (Technische Universität München), Michael Mittermair (Technische Universität München), Andreas Duensing (Technische Universität München) and Reinhard Kienberger (Technische Universität München).

Photoemission timing measurements are performed on isosteric molecules in the gas phase on attosecond timescales. Comparing the photoemission time delay between the σ and π orbitals in the inner and outer valence states of CO_2 and N_2O leads to a deeper insight into the characteristics of isosterism in the time-domain.

Lunch *sponsored by OPTICA*

Friday, 31st March
14:30 - 16:00

F3: Spectral broadening and pulse compression 2

Chair: John Travers, Heriot-Watt University, Edinburgh, Scotland

14:30 – 15:00 (F3.1)

Compact multi-pass spectral broadening schemes for XUV pulse generation *(invited)*

Anne-Lise Viotti (Lund University), Marcus Seidel (DESY), Gunnar Arisholm (FFI), Cord L. Arnold (Lund University), Chen Guo (Lund University), Ingmar Hartl (DESY), Christoph M. Heyl (DESY), Anne L'Huillier (Lund University), Chen Li (DESY), Ann-Kathrin Raab (Lund University), Ivan Sytcevich (Lund University) and Lutz Winkelmann (DESY).

This talk addresses the recent developments of the multi-pass cell approach for post-compression to the few-cycle regime. At Lund University and DESY, our current setups employ hybrid multi-pass multi-plates schemes to reach the sub-10 fs regime and drive high repetition rate attosecond XUV pulse generation in a compact manner.

15:00 – 15:15 (F3.2)

High-fidelity few-cycle pulse generation via nonlinear ellipse rotation in a multipass cell at the mJ-level

Jaismeen Kaur (LOA, Institut Polytechnique de paris, ENSTA Paris - CNRS - Ecole Polytechnique, 91120 Palaiseau, France), Louis Daniault (LOA, Institut Polytechnique de paris, ENSTA Paris - CNRS - Ecole Polytechnique, 91120 Palaiseau, France), Zhao Cheng (LOA, Institut Polytechnique de paris, ENSTA Paris - CNRS - Ecole Polytechnique, 91120 Palaiseau, France), Jean-François Hergott (Université Paris-Saclay, CEA, CNRS, LIDYL, 91191 Gif-sur-Yvette, France), Fabrice Réau (Université Paris-Saclay, CEA, CNRS, LIDYL, 91191 Gif-sur-Yvette, France), Olivier Tcherbakoff (Université Paris-Saclay, CEA, CNRS, LIDYL, 91191 Gif-sur-Yvette, France) and Rodrigo Lopez-Martens (LOA, Institut Polytechnique de paris, ENSTA Paris - CNRS - Ecole Polytechnique, 91120 Palaiseau, France).

We report on the generation of high-fidelity few-cycle pulses via nonlinear ellipse rotation in an Argonfilled multipass cell at the mJ-level. We obtain a good spatio-temporal beam quality, with at least 3-orders of magnitude of contrast improvement, and high internal efficiency of 69%.

15:15 – 15:30 (F3.3)

Supercontinua from Multimodal HCFs

Alexis Labranche (few-cycle Inc.), Younggyun Jeong (INRS-EMT), Riccardo Piccoli (Politecnico di Milano), Gabriel Tempea (few-cycle Inc.), Antoine Raffray (few-cycle Inc.), Luca Zanotto (INRS-EMT), Pedram Ghaderi (few-cycle Inc.), Roberto Morandotti (INRS-EMT), Francois Legare (INRS-EMT), Arnaud Couairon (Ecole Polytechnique, Palaiseau), Luca Razzari (INRS-EMT) and Bruno Schmidt (few-cycle.com).

Nonlinear interaction between spatial modes inside a single Ar filled hollow-capillary fiber (HCF) compresses 1mJ, 175fs IR pulses directly to 20µJ, 4.6fs in the VIS (~2 cycles) without post-compression. Employing two cascaded HCFs with 70% total throughput generates smooth, high-brightness supercontinua as a platform for subsequent multioctave frequency conversion.

15:30 – 15:45 (F3.4)

Nonlinear pulse compression in a gas-filled capillary delivering >100 W, mJ-level, sub-two cycle pulses at 2 µm wavelength

Ziyao Wang (Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-University Jena), Tobias Heuermann (Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-University Jena), Martin Gebhardt (Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-University Jena), Mathias Lenski (Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-University Jena), Philipp Gierschke (Fraunhofer Institute for Applied Optics and Precision Engineering IOF), Robert Klas (Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-University Jena), Cesar Jauregui (Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-University Jena) and Jens Limpert (Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-University Jena).

We present a 126W average power, 1.25mJ pulse energy laser source providing sub-two cycle pulses at 1.84µm central wavelength. The result is enabled by nonlinear pulse

compression of a high-power ultrafast thulium-doped fiber laser system using a gas-filled capillary. This is the highest average-power few-cycle SWIR source reported to date.

15:45 – 16:00 (F3.5)

Post-compression of high power, high repetition rate OPCPA pulses in a multipass cell

Tobias Witting (Max-Born-Institut), Mikhail Osolodkov (Max-Born-Institut), Sebastián Dávila Lara (Max-Born-Institut), Marc Vrakking (Max-Born-Institut) and Federico Furch (Max-Born-Institut).

We report pulse compression of sub-10fs 800nm pulses and pulse energies of up to 190 uJ at 100 kHz repetition rate delivered by an OPCPA system by spectral broadening in a compact multipass cell setup with a quartz plate as nonlinear medium. Compression to sub-4 fs is demonstrated.

Coffee Break *sponsored by LaserNet US*

Friday, 31st March
16:30 - 18:00

F4: Science enabled by ultrafast sources

Chair: Carmen Menoni, Colorado State University, USA

16:30 – 17:00 (F4.1)

Dual-comb spectroscopy using free-running combs with digital phase correction *(invited)*

Haochen Tian (University of Electro-Communications), Runmin Li (University of Electro-Communications), Lukasz Sterczewski (Wroclaw University of Science and Technology), Takeru Endo (University of Electro-Communications), Takashi Kato (University of Electro-Communications), Akifumi Asahara (University of Electro-Communications) and Kaoru Minoshima (University of Electro-Communications).

We realize dual-comb spectroscopy measurements using two types of free-running optical frequency combs, independent Yb:fiber combs with 750-MHz repetition rate and mechanical sharing Er:fiber combs with 51-MHz repetition rate. Assisted by all-computational digital phase correction techniques, the absorption features of gaseous cells are characterized with sufficient signal-to-noise ratio.

17:00 – 17:15 (F4.2)

Accessing fundamental dynamics at the nanoscale: EUV transient grating

Laura Foglia (Elettra Sincrotrone Trieste), Riccardo Mincigrucci (Elettra Sincrotrone Trieste), Dario De Angelis (Elettra Sincrotrone Trieste), Danny Fainozzi (Elettra Sincrotrone Trieste), Ettore Paltanin (Elettra Sincrotrone Trieste) and Filippo Bencivenga (Elettra Sincrotrone Trieste).

Collective dynamics of matter, which determine its optical, thermal and magnetic properties, often exhibit strong dependence on the length scale. In this contribution we preset the capability of extreme ultraviolet transient grating spectroscopy to access

mesoscopic length scale dynamics and its peculiarities with respect to the optical counterpart.

17:15 – 17:30 (F4.3)

Dual-Comb Spectroscopy of Laser Plasmas in the UV to VUV

R. Jason Jones (University of Arizona).

We perform time-resolved dual-comb spectroscopy (DCS) of laser-produced plasmas in the UV using harmonics of a 50W Yb-fiber dual frequency comb system. We also demonstrate for the first time DCS absorption measurements of atomic transitions utilizing intra-cavity high-harmonic generation of the dual frequency combs.

17:30 – 17:45 (F4.4)

Material-specific imaging at the nanoscale using a 13.5 nm high-harmonic source

Wilhelm Eschen (Helmholtz Institute Jena), Chang Liu (Helmholtz Institute Jena), Daniel Penagos (Helmholtz Institute Jena), Lars Loetgering (Helmholtz Institute Jena), Robert Klas (Helmholtz Institute Jena), Vittoria Schuster (Helmholtz Institute Jena), Alexander Kirsche (Helmholtz Institute Jena), Jens Limpert (Helmholtz Institute Jena) and Jan Rothhardt (Helmholtz Institute Jena).

We present a high-harmonic-driven coherent extreme ultraviolet (EUV) microscope operating at 13.5 nm wavelength. Sub-20 nm resolution is demonstrated by utilizing a combination of structured illumination and a highly stable EUV source. We demonstrate the application of nanoscale EUV imaging to a variety of samples from life and material sciences.

17:45 – 18:00 (F4.5)

Controlling Ultrafast Photoemission via Simultaneous Laser Mixing and Shaping

Randy Lemons (SLAC National Accelerator Laboratory), Jack Hirschman (SLAC National Accelerator Laboratory), Nicole Neveu (SLAC National Accelerator Laboratory), Joseph Duris (SLAC National Accelerator Laboratory), Agostino Marinelli (SLAC National Accelerator Laboratory), Charles Durfee (Colorado School of Mines) and Sergio Carbajo (University of California, Los Angeles).

We present a novel, versatile framework to generate W-level temporally shaped, near transform-limited, UV picosecond pulses via non-colinear sum frequency generation and demonstrate it producing temporally flattop, high-power UV pulses capable of enhancing femtosecond- and attosecond-level electron and X-ray free electron lasers brightness.

Monday, 27th March
13:00 - 15:00

Poster Session 1

P1.1

Argon ionization by laser of fundamental frequency and its second-harmonic: Phase delays

Diego Arbó (Institute for Astronomy and Space Physics - IAFE) and Sebastián López (Institute for Astronomy and Space Physics - IAFE)

P1.2

190 mW, 220 fs laser with 0.5 to 1.3 GHz tunable pulse repetition rate

Roger Wüst (FHNW University of Applied Sciences and Arts Northwestern Switzerland), Daniel Hug (FHNW University of Applied Sciences and Arts Northwestern Switzerland), Benjamin Rudin (Menhir Photonics), Florian Emaury (Menhir Photonics) and Bojan Resan (FHNW University of Applied Sciences and Arts Northwestern Switzerland).

P1.3

Shorter Duration Ultrafast Electro-Optic Frequency Combs via Multi-Wavelength Seeding

Michael Seggebruch (University of California Irvine) and Christopher Barty (University of California Irvine).

P1.4

Path to 100 fs multi-MeV gamma rays from extremely brilliant Compton sources

Trevor Reutershan (University of California - Irvine), Yoonwoo Hwang (Lumitron Technologies, Inc.), Haytham Effarah (University of California - Irvine) and Christopher Barty (University of California - Irvine).

P1.5

Multi-pass cell contrast improvement via enhanced frequency chirping

Maximilian Benner (Friedrich Schiller University Jena), Maximilian Karst (Friedrich Schiller University Jena), Cristina Amaya Mendez (Fraunhofer Institute for Applied Optics and Precision Engineering), Henning Stark (Friedrich Schiller University Jena) and Jens Limpert (Friedrich Schiller University Jena).

P1.6

1.86 mJ, 188 W ultrafast coherently combined Tm-doped fiber laser system

Tobias Heuermann (Friedrich-Schiller University Jena, Helmholtz Institute Jena, GSI Darmstadt), Ziyao Wang (Friedrich-Schiller University), Mathias Lenski (Friedrich-Schiller-University Jena), Martin Gebhardt (Friedrich-Schiller University Jena, Helmholtz Institute Jena, GSI Darmstadt, Herriot-Watt University Edinburgh), Christian Gaida (Friedrich-Schiller University Jena, Active Fiber Systems GmbH Jena), Mahmoud Abdelaal (Friedrich-Schiller University Jena), Joachim Buldt (Friedrich-Schiller University Jena), Michael Müller (Friedrich-Schiller University Jena, University of Neuchatel), Arno Klenke (Helmholtz Institute Jena, GSI Darmstadt) and Jens Limpert (Friedrich-Schiller University Jena, Helmholtz Institute Jena, GSI Darmstadt, Fraunhofer IOF Jena).

P1.7

Ultrafast dynamics of a class of weak push-pull azobenzene derivatives.

Rafael Garcia (University of São Paulo), Tiago Buckup (University of Heidelberg), Éléna Ishow (University of Nantes) and Leonardo De Boni (University of São Paulo).

P1.8

Direct CEP Stabilization of a high-repetition rate, few-cycle OPCPA chain with a single feedback loop, employing a Stereo-ATI

Dominik Hoff (Lund University), Sara Mikaelsson (Lund University), Chen Guo (Lund University), Anne L'Huillier (Lund University), Cord Arnold (Lund University) and Mathieu Gisselbrecht (Lund University).

P1.9

Exploring symmetries in ultrafast photoelectron holography with two-color linearly polarized fields

Carla Faria (University College London) and Thomas Rook (University College London).

P1.10

Controlled femtosecond pulse interference and combining with an ultrasonic Bragg grating

Konstantin Yushkov (National University of Science and Technology MISIS) and Vladimir Molchanov (National University of Science and Technology MISIS).

P1.11

Generation and optimization of optical vortices in PW-class laser systems

Vicentiu Iancu (IFIN-HH / ELI-NP), Anda-Maria Talposi (IFIN-HH / ELI-NP), Stefan Popa (IFIN-HH / ELI-NP), Petru Ghenuche (IFIN-HH / ELI-NP), Mihail Cernaianu (IFIN-HH / ELI-NP), Domenico Doria (IFIN-HH / ELI-NP), Razvan Ungureanu (INFLPR / CETAL), Ioan Dancus (IFIN-HH / ELI-NP), Olivier Chalus (THALES LAS France) and Daniel Ursescu (IFIN-HH / ELI-NP).

P1.12

Ultrafast laser writing tool kit for quantum technologies

Giulio Coccia (IFN - CNR, Milano), Sajedeh Shahbazi (Institute for Quantum Optics, Ulm), Akhil Kuriakose (IFN - CNR, Como), Yanzhao Guo (Cardiff University, Cardiff), Argyro N. Giakoumaki (IFN - CNR, Milano), Vibhav Bharadwaj (Institute for Quantum Optics, Ulm), Mihael K. Koch (Institute for Quantum Optics, Ulm), Michael Hoese (Institute for Quantum Optics, Ulm), Ottavia Jedrkiewicz (IFN - CNR, Como), Paul E. Barclay (University of Calgary, Calgary), Jp Hadden (Cardiff University, Cardiff), Anthony J. Bennett (Cardiff University, Cardiff), Paolo Olivero (University of Torino, Torino), Roberta Ramponi (IFN - CNR, Milano), Alexander Kubanek (Institute for Quantum Optics, Ulm) and Shane M. Eaton (IFN - CNR, Milano).

P1.13

CAPELLA: A light field synthesizer to generate unlimited tailored waveforms

Verónica Oliver (UltraFast Innovations GmbH), Asger Kreiner (UltraFast Innovations GmbH), Minjie Zhan (UltraFast Innovations GmbH), Daniel Cardenas (UltraFast Innovations GmbH), Vladimir Pervak (UltraFast Innovations GmbH), Eleftherios Goulielmakis (Universität Rostock) and Alexander Guggenmos (UltraFast Innovations GmbH).

P1.14

Fs-laser pulses for Nitrogen-Vacancy centers placement in diamond

Filipe Couto (University of São Paulo), Lucas Nolasco (University of Sao Paulo), Juliana Almeida (Federal University of Sao Carlos), Charlie Oncebay (National University of Engineering,), Sergio Muniz (University of Sao Paulo) and Cleber Mendonca (University of Sao Paulo).

P1.15

Optically induced DC current in unbiased dielectrics and semiconductors - a straightforward nonlinear optical effect.

Jacob Khurgin (Johns Hopkisn University).

P1.16

Design of a high-power MID-IR laser for generating keV isolated attosecond pulses

Torsten Golz (Class 5 Photonics), Sebastian Starosielec (https://www.class5photonics.com/), Heye Buss (Class 5 Photonics), Philipp Markl (Class 5 Photonics), Luke Maidment (Class 5 Photonics), Michael Schulz (Class 5 Photonics), Mihail Petev (Class 5 Photonics), Mark Prandolini (Class 5 Photonics), Bálint Kiss (ELI-ALPS, ELI-HU Non-Profit Ltd.), Eric Cormier (ELI-ALPS, ELI-HU Non-Profit Ltd.), Máté Kurucz (ELI-ALPS, ELI-HU Non-Profit Ltd.), Adam Börzsönyi (ELI-ALPS, ELI-HU Non-Profit Ltd.), Katalin Varjú (ELI-ALPS, ELI-HU Non-Profit Ltd.) and Robert Riedel (Class 5 Photonics).

P1.17

Low-Noise tunable source for Stimulated Raman Scattering Imaging

Ines Martin (Fastlite, Institut Fresnel), Simone Bux (Fastlite), Nicolas Y Joly (Max-Plank Institute for the Science of Light), Hervé Rigneault (Institut Fresnel), Nicolas Forget (Fastlite), Markus Lippl (Max-Plank Institute for the Science of Light) and Michael Frosz (Max-Plank Institute for the Science of Light).

P1.18

Laser-Driven MeV X-ray Imaging for Science and Applications

Sasi Palaniyappan (Los Alamos National Laboratry), Joseph Strehlow (Los Alamos National Laboratry), Alem Bogale (UCSD), Rebecca Fitzgarrald (University of Michigan), Justin Twardowski (Ohio State University), Farhat Beg (UCSD), Enam Chowdhury (OSU), Juan Fernandez (Los Alamos National Laboratry), Donald Gautier (Los Alamos National Laboratry), Chengkun Huang (Los Alamos National Laboratry), Chris Hamilton (Los Alamos National Laboratry), Reed Hollinger (Colorado State University), Jorge Rocca (Colorado State University), Ben Jones (Colorado State University), Scott Luedtke (Los Alamos National Laboratry), Eli Medina (UT Austin), Tyler Mix (UT Austin), Hernan Quevedo (UT Austin), David Stark (UT Austin), Chris Tomkin (Los Alamos National Laboratry), Ashlyn Van Pelt (Los Alamos National Laboratry), James Hunter (Los Alamos National Laboratry), Lin Yin (Los Alamos National Laboratry) and Brian Albright (Los Alamos National Laboratry).

P1.19

Single-Cycle Laser Pulses through Nonlinear Pulse Compression

Mariana Silva (Instituto Superior Técnico), Victor Hariton (Instituto Superior Técnico), Patrícia Estrela (Instituto Superior Técnico), Gareth Williams (Instituto Superior Técnico), Gonçalo Figueira (Instituto Superior Técnico), Louis Daniault (Laboratoire d'Optique Appliquée), Rodrigo Lopez-Martens (Laboratoire d'Optique Appliquée) and Marta Fajardo (Instituto Superior Técnico).

P1.20

Machine Learning for spatial filtering of laser beams

Karlo Lajtner (Institute of Product and Production Engineering, FHNW University of Applied Sciences and Arts Northwestern Switzerland), Martin Huppert (Paul Scherrer Institute), Christopher König (inspire AG), Alisa Rupenyan (inspire AG), Alexandre Trisorio (Paul Scherrer Institute) and Bojan Resan (Institute of Product and Production Engineering, FHNW University of Applied Sciences and Arts Northwestern Switzerland).

P1.21

Two-color femtosecond laser beam shaping with independent wavelength and spatial frequency tuning

Dmitry Obydennov (Lomonosov Moscow State University), Konstantin Yushkov (National University of Science and Technology MISIS) and Vladimir Molchanov (National University of Science and Technology MISIS).

P1.22

Simultaneous determination of the materials' nonlinear refraction and ultrashort pulse properties by single-beam nonlinear ellipse signal

Renato Mafra Moyses (Instituto de Física de São Carlos, University of Sao Paulo), Emerson Cristiano Barbano (Departamento de Fisica, Universidade Federal do Paraná) and Lino Misoguti (Instituto de Fisica de Sao Carlos, University of Sao Paulo).

P1.23

Robust GHz Repetition Rate Optical Frequency Combs

Stefan Droste (Vescent Photonics), Henry Timmers (Vescent Photonics), Andrew Attar (Vescent Photonics), Daniel Hickstein (Octave Photonics), Zach Newman (Octave Photonics), David Carlson (Octave Photonics), Benjamin Rudin (Menhir Photonics), Florian Emaury (Menhir Photonics), Kurt Vogel (Vescent Photonics) and Kevin Knabe (Vescent Photonics).

P1.24

Ultrafast, all-optical, and highly efficient imaging of molecular chirality via low-order nonlinear processes

Josh Vogwell (Imperial College London), Laura Rego (Imperial College London), Olga Smirnova (Max-Born-Institut Berlin) and David Ayuso (Imperial College London).

P1.25

A new d-scan-based tool to assess the quality of dispersion compensating mirrors

Vitor A. Amorim (Sphere Ultrafast Photonics SA), Miguel Miranda (Sphere Ultrafast Photonics SA), Paulo T. Guerreiro (Sphere Ultrafast Photonics SA), Helder Crespo (Sphere Ultrafast Photonics SA) and Rosa Romero (Sphere Ultrafast Photonics SA)

P1.26

Taking ultrafast microscopy to widefield with off-axis holography

Martin Hörmann (Politecnico di Milano), Federico Visentin (Politecnico di Milano), Andrea Zanetta (University of Pavia), Johann Osmond (ICFO), Giulia Grancini (University of Pavia), Niek F. van Hulst (ICFO), Matz Liebel (ICFO), Giulio Cerullo (Politecnico di Milano) and Franco V. A. Camargo (CNR-IFN).

P1.27

Concatenation of filament-driven optical waveguides formed in air

Patrick Skrodzki (Los Alamos National Laboratory), Tanner Nutting (University of Michigan), Miloš Burger (University of Michigan), Lauren Finney (Johns Hopkins University), John Nees (University of Michigan) and Igor Jovanovic (Univeristy of Michigan).

P1.28

Probing well aligned molecular environments on surfaces in the time-domain

Pascal Scigalla (Technical University Munich), Christian Schröder (Technical University Munich), Peter Feulner (Technical University Munich) and Reinhard Kienberger (Technical University Munich).

Thursday, 30th March
13:00 - 14:30

Poster Session 2

P2.1

Intra- and intercycle interferences govern phase delays in ω-2ω strong field ionization

Diego Arbó (Institute for Astronomy and Space Physics - IAFE) and Sebastián López (Institute for Astronomy and Space Physics - IAFE).

P2.2

Towards Blue Diode-Pumped Ti:Sapphire Regenerative Amplifier at Room Temperature

Daniel Hug (University of Applied Sciences and Arts Northwestern Switzerland), Andreas Dax (Paul Scherrer Institute), Alexandre Trisorio (Paul Scherrer Institute), Romain Carreto (TLD Photonics AG), Thomas Südmeyer (Université de Neuchâtel) and Bojan Resan (University of Applied Sciences and Arts Northwestern Switzerland).

P2.3

Synthesis of Multi-GHz Ultrafast Pulse Trains via Harmonic Bandwidth Broadening of Electro-Optic Frequency Combs

Michael Seggebruch (University of California Irvine) and Christopher Barty (University of California Irvine).

P2.4

Space-Time Correlated Foci of Exotic Spatially Chirped Femtosecond Beams

Eric Nelson (University of California, Irvine) and Christopher Barty (University of California, Irvine).

P2.5

Amplitude Neutral Temporal Electric-field Autocorrelator with Exquisite Resolution (ANTEATER)

Kyle Chesnut (University of California, Irvine), Eric Nelson (University of California, Irvine), Haytham Effarah (University of California, Irvine) and Christopher Barty (University of California, Irvine).

P2.6

Design considerations for multi-mJ, kW-level ultrafast pump-probe beamlines

Christian Grebing (Active Fiber Systems GmbH), Christian Gaida (Active Fiber Systems GmbH), Christian Kern (Active Fiber Systems GmbH), Florian Just (Active Fiber Systems GmbH), Maxim Tschernajew (Active Fiber Systems GmbH), Evgeny Shestaev (Active Fiber Systems GmbH), Anke Heilmann (Active Fiber Systems GmbH), Vinzenz Hilbert (Active Fiber Systems GmbH), Marco Kienel (Active Fiber Systems GmbH), Oliver Herrfurth (Active Fiber Systems GmbH), Sven Breitkopf (Active Fiber Systems GmbH), Tino Eidam (Active Fiber Systems GmbH) and Jens Limpert (Active Fiber Systems GmbH).

P2.7

Sub-16 fs, 0.44 mJ, 22.4 W a multipass cell based post-compression at 515 nm

Maximilian Karst (Friedrich-Schiller-University Jena), Pauline Pfaller (Friedrich-Schiller-University Jena), Robert Klas (Friedrich-Schiller-University Jena), Philipp Gierschke (Friedrich-Schiller-University Jena), Ziyao Wang (Friedrich-Schiller-University Jena), Jan Rothhardt (Friedrich-Schiller-University Jena) and Jens Limpert (Friedrich-Schiller-University Jena).

P2.8

Revisiting methods for triplet quantum yield determination with double pulse fluorescence excitation.

Rafael de Queiroz Garcia (University of São Paulo) and Leonardo De Boni (University of São Paulo).

P2.9

Few-cycle SWIR light source at 2µm for strong-field experiments at 200kHz repetition rate

Ivan Sytcevich (Lund University), Anne-Lise Viotti (Lund University), Chen Guo (Lund University), Jan Vogelsang (Oldenburg University), Fabian Langer (Zeiss AG), Anne L'Huillier (Lund University) and Cord L. Arnold (Lund University).

P2.10

Controlling strong-field ionization with machine-learning techniques

Carla Faria (University College London), Heloise Chomet (University College London) and Samuel Plesnik (University College London).

P2.11

Initial conditions, re-scattering and momentum mapping in Coulomb-distorted approaches in ultrafast photoelectron holography

Lidice Cruz Rodriguez (University College London), Bradley Augstein (University College London), Thomas Rook (University College London) and Carla Figueira de Morisson Faria (University College London).

P2.12

Wavefront optimization of Laguerre-Gaussian ultrashort pulses

Milos Burger (University of Michigan), Jon Murphy (University of Michigan), Lauren Finney (Johns Hopkins University), Nicholas Peskosky (University of Michigan), John Nees (University of Michigan), Karl Krushelnick (University of Michigan) and Igor Jovanovic (University of Michigan).

P2.13

Progress towards an in-vacuum, refreshable nanoparticle source exploiting optical tweezers for use in high-intensity experiments

Guillaume St-Germain (Institut national de la recherche scientifique), Jeffrey Powell (Institut national de la recherche scientifique), Stéphane Payeur (Institut national de la recherche scientifique), Steve MacLean (Institut national de la recherche scientifique) and François Légaré (Institut national de la recherche scientifique).

P2.14

Machine Learning interatomic potentials for solids excited by intense ultrashort laser pulses

Bernd Bauerhenne (University of Kassel), Pascal Plettenberg (University of Kassel) and Martin Garcia (University of Kassel).

P2.15

Two-photon dual-comb diagnostics of pulsed lasers

Lukasz Sterczewski (Wroclaw University of Science and Technology) and Jaroslaw Sotor (Wroclaw University of Science and Technology).

P2.16

High Harmonic Tubes: Generating EUV vortex beams with extended focal field

Patrícia Estrela (Instituto de Plasmas e Fusão Nuclear, Group of Lasers and Plasmas), Ermelinda Maçôas (Centro de Química Estrutural (CQE) and Institute of Molecular Sciences (IMS)), José Luís Figueiredo (Instituto de Plasmas e Fusão Nuclear, Group of Lasers and Plasmas), Gareth Williams (Instituto de Plasmas e Fusão Nuclear, Group of Lasers and Plasmas) and Marta Fajardo (Instituto de Plasmas e Fusão Nuclear, Group of Lasers and Plasmas).

P2.17

Laser Ablation thresholds of thin Aluminium films

Jose Camilo Diaz Bustamante (Centro de Investigaciones Opticas de La Plata), Dmitry Ivanov (Lebedev Physical Institute of RAS) and Gabriel Bilmes (Centro de Investigaciones Opticas de La Plata).

P2.18

Extreme pressure and temperature conditions on tabletop via micro-explosions in dielectrics driven by fs SSTF laser beams

Weibo Cheng (College of Optical Sciences, University of Arizona), Xiao-Long Liu (Academy of Opto-Electronics, Chinese Academy of Sciences, Beijing 100094, China), Ya Cheng (Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai 201800, China), Anton Rudenko (College of Optical Sciences, University of Arizona) and Pavel Polynkin (University of Arizona).

P2.19

3D+1 Crank-Nicolson algorithm implementation for solving nonlinear ultrafast pulse propagation in a Multi-pass cell

Pedro Rueda (Centro de Investigaciones Opticas), Federico Furch (Max Born Institute), Fabian Videla (Centro de Investigaciones Opticas) and Gustavo Torchia (Centro de Investigaciones Opticas CONICET CIC).

P2.20

Pulse shaping for third order nonlinear fiber characterization via D-Scan

Pablo Bedoya Rios (Bridgewater State University), Daniel Tocco (Bridgewater State University) and Samuel Serna Otalvaro (Bridgewater State University).

P2.21

Ultrafast exciton diffusion measurements using photoluminescence depletion

Guillermo Daniel Brinatti Vazquez (ICFO), Giulia Lo Gerfo (ICFO) and Niek F. van Hulst (ICFO, ICREA).

P2.22

X-ray dose rate and spectral measurements from ultrafast laser-matter interaction

Milutin Kovacev (Leibniz University Hannover).

P2.23

Study of acoustic phonons propagation by femtosecond ellipsometry

Shirly Espinoza (ELI Beamlines), Mateusz Rebarz (ELI Beamlines), Stefan Zollner (New Mexico State University), Adam Dubroka (Masaryk University), Carola Emminger (New Mexico State University), Carlos Armenta (New Mexico State University), Martin Zahradnik (ELI Beamlines) and Jakob Andreasson (ELI Beamlines).

P2.24

A Versatile Experimental Platform for Broadband Femtosecond Ellipsometry at ELI Beamlines Facility

Mateusz Rebarz (ELI Beamlines Facility, Extreme Light Infrastructure ERIC), Shirly Espinoza (ELI Beamlines Facility, Extreme Light Infrastructure ERIC) and Jakob Andreasson (ELI Beamlines Facility, Extreme Light Infrastructure ERIC).

P2.25

Simulations and Measurements for Signatures of Spatio-Temporal Couplings in Laser Fields

Anda-Maria Talposi (Extreme Light Infrastructure - Nuclear Physics (ELI-NP)), Vicentiu Iancu (Extreme Light Infrastructure - Nuclear Physics (ELI-NP)), Dan-Gheorghita Matei (Extreme Light Infrastructure - Nuclear Physics (ELI-NP)) and Daniel Ursescu (Extreme Light Infrastructure - Nuclear Physics).

P2.26

Ultrafast 1.8 µm fiber laser system for in vivo three- and four-photon fluorescence microscopy

Takao Fuji (Toyota Technological Institute), Hiromi H. Ueda (National Institute for Physiological Sciences), Ryuichiro Goto (FiberLabs Inc.), Kosuke Hamada (Toyota Technological Institute), Yutaro Hasegawa (National Institute for Physiological Sciences) and Hideji Murakoshi (National Institute for Physiological Sciences).

P2.27

Second and Third Harmonic Generation of Millimeter-Sized Zn(3-ptz)2 Metal-Organic Framework Crystals

Diego Hidalgo-Rojas (Pontificia Universidad Católica de Chile), Ricardo Rojas-Aedo (University of Luxembourg), Robert A. Wheatley (Pontificia Universidad Católica de Chile), Javier Enríquez (Universidad de Santiago de Chile), Juan M. Garcia-Garfido (Universidad de Santiago de Chile), Dinesh P. Singh (Universidad de Santiago de Chile), Felipe Herrera (Universidad de Santiago de Chile) and Birger Seifert (Pontificia Universidad Católica de Chile).

P2.28

Noise mitigation by ultrafast oversampling and decimation based on temporal Talbot effects

Manuel Fernandez (Institut national de la recherche scientifique (INRS)), Saket Kaushal (Institut national de la recherche scientifique (INRS)), Benjamin Crockett (Institut national de la recherche scientifique (INRS)), Laureano A. Bulus-Rossini (Instituto Balseiro), Pablo Costanzo (Instituto Balseiro) and Jose Azaña (Institut national de la recherche scientifique (INRS)).

P2.29

Focusing PW laser pulses after post-compression with an adaptive optics

Efim Khazanov (Institute of Applied Physics of the Russian Academy of Sciences), Sergey Mironov (Institute of Applied Physics of the Russian Academy of Sciences), Alexander Kotov (Institute of Applied Physics of the Russian Academy of Sciences), Mikhail Martyanov (Institute of Applied Physics of the Russian Academy of Sciences), Sergey Perevalov (Institute of Applied Physics of the Russian Academy of Sciences), Roman Zemskov (Institute of Applied Physics of the Russian Academy of Sciences), Mikhail Starodubtsev (Institute of Applied Physics of the Russian Academy of Sciences), Alexander Alexandrov (Institute of Geosphere Dynamics, Russian Academy of Sciences), Ilya Galaktionov (Institute of Geosphere Dynamics, Russian Academy of Sciences), Vadim Samarkin (Institute of Geosphere Dynamics, Russian Academy of Sciences), Alexis Kudryashov (Institute of Geosphere Dynamics, Russian Academy of Sciences), Ivan Yakovlev (Institute of Applied Physics of the Russian Academy of Sciences), Vladislav Ginzburg (Institute of Applied Physics of the Russian Academy of Sciences), Anton Kochetkov (Institute of Applied Physics of the Russian Academy of Sciences), Ilya Shaikin (Institute of Applied Physics of the Russian Academy of Sciences), Alexey Kuzmin (Institute of Applied Physics of the Russian Academy of Sciences), Sergey Stukachev (Institute of Applied Physics of the Russian Academy of Sciences) and Andrey Shaykin (Institute of Applied Physics of the Russian Academy of Sciences).

P2.30

Photoemission chronoscopy on iodated hydrocarbons

Christian Schröder (Chair for Laser and X-ray Physics E11, Fakultät für Physik, Technische Universität München), Maximilian Pollanka (Chair for Laser and X-ray Physics E11, Fakultät für Physik, Technische Universität München), Pascal Scigalla (Technical University Munich), Andreas Duensing (Chair for Laser and X-ray Physics E11, Fakultät für Physik, Technische Universität München), Michael Mittermair (Chair for Laser and X-ray Physics E11, Fakultät für Physik, Technische Universität München), Maximilian Forster (Chair for Laser and X-ray Physics E11, Fakultät für Physik, Technische Universität München), Matthias Ostner (Chair for Laser and X-ray Physics E11, Fakultät für Physik, Technische Universität München) and Reinhard Kienberger (Chair for Laser and X-ray Physics E11, Fakultät für Physik, Technische Universität München).


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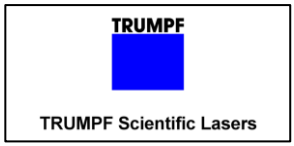
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