XVIIIth International Conference on Ultrafast Phenomena

Welcome to UP2012
8 - 13 July 2012, Lausanne, Switzerland

The **2012 Ultrafast Phenomena** Conference will be the eighteenth in a series of conferences on advances in ultrafast science and technology. This meeting is widely recognized as the main international forum for gathering the community of scientists and engineers working in research and technology related to ultrafast phenomena. It is indeed a unique opportunity to bring together atomic, molecular and condensed matter physicists, physical chemists, biophysicists and scientists developing new tools, methodologies and techniques, all working on the science of ultrafast phenomena. These phenomena cover the time scales ranging from picoseconds (1 ps = 10^{-12} s) to hundreds of attoseconds (1 as = 10^{-18} s).

In the past ten years, the field of ultrafast phenomena has moved ahead in a breathtaking fashion, thanks in part, to the development of new laser-based sources of ultrashort pulses of electrons and light, such as high harmonic generation, few-cycle optical pulses, sources of short wavelength radiation (e.g., the x-ray free electron laser). The spectral range of ultrashort pulses of radiation has been extended to the long wavelength range such as Terahertz radiation, and the short wavelength range such as vacuum ultraviolet and the soft and hard X-ray domains. Together with the development of new methodologies, e.g. multidimensional spectroscopies, THz spectroscopy, electron-based techniques (EELS, PINEM, etc.), these great leaps forward are delivering an impressive degree of insight into phenomena both within atoms and between atoms.

At the same time, the flexibility in methodologies opens perspectives for major applications in the fields of solar energy, molecular electronics, optoelectronic devices, biomimetic devices, etc... Last but not least, all this is accompanied by an improvement in theoretical models, strongly supported by the increase in computational power, which are indispensable for our understanding of phenomena on such ultra short time scales.

The Ultrafast Phenomena Conference series started in 1976 on a biannual basis. The 2012 edition will be the XVIIIth of the series and it will be the fifth time it is hosted in Europe. It will bring together a multidisciplinary group of scientists and engineers sharing a common interest in the generation, manipulation and use of ultra short pulses in the picosecond to the attosecond regimes and their applications to studies of ultrafast phenomena in physics, chemistry, materials

science, electronics, biology, engineering, and medical applications. In addition, submissions involving real world applications of ultrafast technology will be encouraged. Finally, a tabletop exhibit featuring leading companies in lasers, optics and optoelectronics and instrumentation will be held in conjunction with the meeting.

We look forward to welcoming you in Lausanne for an exciting scientific event!

General Chairs

Majed Chergui, École Polytechnique Fédérale de Lausanne, Switzerland

Antoinette Taylor, Los Alamos National Laboratory, USA

Programme Chairs

Steven Cundiff, JILA, NIST and University of Colorado, USA

Kaoru Yamanouchi, University of Tokyo, Japan

Regina de Vivie-Riedle, Ludwig-Maximilians University, Munich, Germany

Topics

List of topics

- **Pulse Generation and Measurement** - New sources, new wavelength regimes, frequency conversion techniques, amplifiers, attosecond pulse generation, pulse shaping, pulse diagnostics, measurement techniques and frequency standards.
- **Physics** - Ultrafast nonlinear optical processes, kinetics of non-equilibrium processes, quantum confinement, coherent transients, nonlinear pulse propagation, novel ultrafast spectroscopic techniques, high intensity physics, attosecond dynamics.
- **Materials science** - highly correlated systems, coherent phonons in solids, carrier dynamics in nanoparticles, carbon-based materials, structural dynamics with X-rays and electrons.
- **Chemistry** - Vibrational and conformational dynamics, energy transfer, femtochemistry, proton and electron transfer, solvation dynamics, wave packet dynamics and coherent control of reactions, structural dynamics with X-rays and electrons.
- **Biology** - Photosynthesis, vision, heme proteins, photoactive proteins, photoisomerization in chromoproteins, wavepacket dynamics, femtobiology, structural dynamics with X-rays and electrons, medical applications.

- **Electronics & Optoelectronics** - Photoconductivity, generation, propagation and detection of ultrafast electrical signals, plasmonics, terahertz radiation, electro-optical sampling and detectors.

- **Applications** - Real world applications of ultrafast technology, including ultrafast near-field, nonlinear and confocal microscopes, real-time/real-space electron microscopy, medical applications, high speed communication, micromachining and more.

Invited Speakers

List of Invited Speakers:

Mischa Bonn, *Max-Planck Institute for Polymer Research, Mainz, Germany and FOM-Institute AMOLF, Amsterdam, The Netherlands*
"Ultrafast dynamics of water at the water-air interface studied by femtosecond surface vibrational spectroscopy"

Tobias Brixner, *University of Würzburg, Würzburg, Germany*
"Coherent Spectroscopies on Ultrashort Time and Length Scales"

Peter Hommelhoff, *Max-Planck Institute for Quantum Optics, Garching, Germany*
"Attosecond physics at a nanoscale metal tip"

Steven L. Johnson, E*TH Zürich, Institute for Quantum Electronics, Zürich, Switzerland*
"A direct view of the dynamics of lattice and spin with femtosecond x-ray diffraction"

Nina Rohringer, *Max-Planck Institute for the Physics of Complex Systems, Hamburg, Germany*
"First experimental realization of an atomic inner-shell x-ray laser in the keV photon-energy regime"

Pascal Salières, *CEA Saclay, Gif-sur-Yvette, France*
"Attosecond Electronic and Nuclear Dynamics in High-Harmonic Generation from Aligned Molecules"

Koichiro Tanaka, *Kyoto University, Institute for Integrated Cell-Material Sciences, Kyoto, Japan*
"Nonlinear Terahertz Spectroscopy in Solids with Single-Cycle Terahertz Pulses"

Niek van Hulst, *ICFO, Institut de Ciències Fotòniques, Castelldefels (Barcelona), Spain*
"Persistent Quantum Coherence in Single Light-Harvesting Complexes"

Ahmed H. Zewail, **1999 Chemistry Nobel Prize**, *California Institute of Technology (Caltech), Pasadena, CA, USA*
"4D Electron Microscopy: Development and Applications"

Contributed submissions upgraded to Invited presentations:

Thomas Allison, *JILA, NIST and the University of Colorado, Boulder, CO, USA*
"High Brightness XUV Frequency Combs via Intracavity High Harmonic Generation"

Artem Bakulin, *University of Cambridge, Cambridge, UK*
"Ultrafast Pump-Push Photocurrent Spectroscopy of Organic Photoconversion Systems"

Tenio Popmintchev, *JILA, University of Colorado, Boulder, CO, USA*
"A New Frontier in Nonlinear Optics: Bright Coherent Ultrafast Kiloelectronvolt X-rays on a Tabletop"

Social Programme

Sunday, July 8, 18:30 Welcome Reception
at the UNIL - Amphimax or outside in case of nice weather
Registration desks (at Amphipôle) are open that day from 16:00 to 18:00.

Monday, July 9, 18:00 Student Happy Hour
Kindly sponsored by COHERENT Inc. and the OSA Foundation
Held in conjunction with the poster session (18:00 - 19:30).

Tuesday, July 10, 18:00 Student Happy Hour
Kindly sponsored by Newport Spectra-Physics
Held in conjunction with the poster session (18:00 - 19:30).

Wednesday, July 11, 19:00 Conference Reception
at the Lausanne Palace
Outside terrasse in case of nice weather.

Additional guest tickets can be obtained at a unit cost of **90,- €.**
Registration is required and payment needs to be made before June 28, 2012.
Download the form and send it back to conferences@eps.org
No additional tickets will be sold on site.
As a rule, due to space limitations and necessary advance reservation, on site registrants will not be able to attend the conference dinner. No fee reduction will be applied.

Thursday, July 12, 16:45 Student Happy Hour
Held in conjunction with the poster session (16:45 - 17:45).

Committees

General Chairs :


Majed Chergui, École Polytechnique Fédérale de Lausanne, Switzerland


Antoinette Taylor, Los Alamos National Laboratory, USA

Programme Committee Chairs:


Steven Cundiff, JILA, NIST and University of Colorado, USA


Kaoru Yamanouchi, University of Tokyo, Japan


Regina de Vivie-Riedle, Ludwig-Maximilians University, Munich, Germany

Programme Committee Members:

Martin Aeschlimann, University of Kaiserslautern, Germany
Richard Averitt, Boston University, USA
Jens Biegert, ICFO, Barcelona, Spain
Andrea Cavalleri, University of Oxford, United Kingdom
Lin Chen, Northwestern University, USA
Louis Di Mauro, Ohio State University, USA
Thomas Feurer, University of Bern, Switzerland
Nuh Gedik, Massachusetts Institute of Technology, Cambridge, USA
Tony Heinz, Columbia University, USA
Jan Helbing, University of Zurich, Switzerland
Kevin Kubarych, University of Michigan, USA
Alfred Leitenstorfer, University of Konstanz, Germany
Ruxin Li, Shangai Institute of Optics & Fine Mechanics, China
Manho Lim, Pusan National University, Republic of Korea
Stefan Lochbrunner, University of Rostock, Germany
Jon Marangos, Imperial College of London, United Kingdom
Jennifer Ogilvie, University of Michigan, USA
Greg Scholes, University of Toronto, USA
Charles Schmuttenmaer, Jale University, USA
Olga Smirnova, Max-Born-Institute, Berlin, Germany
Fabrice Vallee, University of Lyon, France
David Villeneuve, University of Ottawa, Canada
Martin Zanni, University of Wisconsin, USA

Advisory Committee:

David Auston, Rice University, USA
Paul Corkum, Steacie Institute for Molecular Science, Canada
Sandro De Silvestri, Politecnico di Milano and ULTRAS INFM-CNR, Italy
Kenneth Eisenthal, Columbia University, USA
Thomas Elsaesser, Max-Born-Institute, Berlin, Germany
Graham Fleming, University of California at Berkeley, USA
James G. Fujimoto, Massachusetts Institute of Technology, Cambridge, USA
Charles Harris, University of California at Berkeley, USA
Robin Hochstrasser, University of Pennsylvania, USA
Erich Ippen, Massachusetts Institute of Technology, Cambridge, USA
David Jonas, University of Colorado, USA
Wolfgang Kaiser, Technical University of Munich, Germany
Wayne Knox, University of Rochester, USA
Takayoshi Kobayashi, University of Tokyo, Japan
Jean-Louis Martin, LOB-ENSTA, France
Arnold Migus, École Polytechnique, France
R. J. Dwayne Miller, University of Toronto, Canada
Gerard Mourou, University of Michigan, USA

Exhibitors

COHERENT, Inc.

Coherent, Inc. designs, manufactures and markets state-of-the-art laser systems in CW, Q-Switched and mode-locked operations ranging in output wavelength from 190 nm to 20 microns. These systems are used in a wide range of scientific research applications including ultrafast and high resolution spectroscopy, multiphoton microscopy, and other laser-based imaging techniques.

KMLabs, Inc. (Kapteyn-Murnane Laboratories, Inc.)

KMLabs (Kapteyn-Murnane Laboratories, Inc.) is a leading manufacturer of high-performance, ultrafast femtosecond laser systems, featuring the new 400nJ Swift-Cascade oscillator. Regenerative amplifiers include the Wyvern single-stage series, capable of pulse repetition rates from 1kHz – 1MHz, pulse energies up to 5.5mJ and Multi-stage systems up to 50W or 30mJ.

ALTECHNA Co. Ltd.

Altechna Co. Ltd. is a laser technology company operating in the fields of photonics and laser research since 1996.
Main activities:
➢ Laser technology solutions
➢ Sales of laser components
➢ Spectroscopy and microscopy solutions
Altechna products:
➢ Lasers and their equipment
➢ Spectroscopes
➢ CCD cameras
➢ Positioning systems
➢ Laser crystals and optics
➢ Other laboratory equipment

AMPLITUDE TECHNOLOGIES

Amplitude Technologies mission is to produce robust and reliable ultra-intense femtosecond systems with the best performances, from the point of view of pulse duration, temporal contrast, and spatial beam quality. Our engagement in performances continues after the delivery and our collaboration with the customer guarantees laser specification over the whole life-span of the laser.

BIOPHOTONIC SOLUTIONS, Inc.

BioPhotonic Solutions, Inc. develops and manufactures integrated solutions for automated characterization, compression and shaping of ultrashort (femtosecond) laser pulses. The adaptive pulse compression is based on the company's proprietary MIIPS® technology. This technology eliminates the need for manual tweaking and allows for routine delivery of transform-limited or engineered laser pulses right at the point of the experiment. From the compact (15-cm cube) femtoFit® to the 2012 CLEO/Laser Focus World Innovation Award winner femtoAdaptivTM, our portfolio of pulse shaping instruments empower a wide range of ultrafast laser systems for a variety of applications.

CE OPTICS Ltd.

CE Optics has been known as the first and so far only company offering wavelenght and bandwidth independent device for measuring of carrier envelope offset phase of femtosecond - picosecond pulse trains. Furthermore, a novel method has been developed and a device patented for full, two dimensional characterisation of angular dispersion accross any laser beam. As a result of industrial development of spatially and spectrally resolved interferometry, CE Optics offers a wide range of devices capable for measurement of material dispersion as well as angular dispersion to high precision.

DÖHRER Elektrooptik GmbH

DÖHRER Elektrooptik GmbH is the German representative of GT Advanced Crystal Systems, manufacturer of Ti:Sapphire, BioPhotonic Solutions and CE Optics Ltd.

DÖHRER Elektrooptik GmbH is your expert partner in optical components for the laser technology.

CLARK-MXR, Inc.

Clark-MXR, Inc. specializes in the development and manufacturing of ultra fast lasers for use in both industrial and scientific applications.

DYNEOS AG (representing: KMLabs, M Squared Lasers, APE Berlin and Light Conversion UAB MGF)

KMLabs is well known for robust and repeatable mode-locked Ti:sapphire laser capable of generating ultra short pulses with high energy at different repetition rates with "hands off" operation. Due to the patented cryogenic cooling, the systems offer unprecedented and unmatched performance.
Extreme UV:The XUUS product is a table top soft X ray source, highly coherent in the range of 13 to 47 nm.
M Squared Lasers, formed in 2006, develops and manufactures next-generation lasers and photonic instruments that bring new capabilities, higher reliability and greater ease of use to a diverse range of industrial and scientific applications.
The product portfolio spans the entire laser performance spectrum, from continuous wave (CW)

to femtosecond (fs) lasers, and from deep ultraviolet (DUV) to terahertz (THz) wavelengths.
APE, Angewandte Physik & Elektronik GmbH, is a manufacturer of instruments for the measurement and manipulation of ultrafast laser pulses. The product range covers autocorrelators, spectrometers, diagnostic systems for laser amplifiers as well as acousto-optical instruments and synchronously pumped optical parametric oscillators. A broad range of harmonic generators for short pulse lasers are available.
Light Conversion UAB MGF, well known manufacturer of TOPAS and compact ultra fast laser systems with variable pulse duration and rep.rate.
Dyneos AG was founded in 2002 as a private limited company and is registered at the Swiss Commercial Register. Experienced physicists and engineers are at your service to help you choosing the optimum solution.
We work in a very close collaboration with our suppliers together in order to find specific solutions to the requirements of our customer (OEM applications, special designs).

ELSEVIER

Elsevier has a rich history in the field of ultrafast phenomena and publishes flagship journals such as Chemical Physics Letters (of which Ahmed Zewail was Editor) and Chemical Physics. These journals have a wide reach in the community and ca. 2.5 million PDFs of the online articles are downloaded each year.

FASTLITE

FASTLITE offers ultrafast pulse shaping systems (DAZZLER) and solutions, as well as ultrafast pulse measurement systems (PHAZZLER, WIZZLER) to femtosecond laser users over wide spectral ranges (from UV to MIR).

The WIZZLER, based on Self-Referenced Spectral Interferometry, provides real time and reliable spectral phase measurement and time intensity retrieval of Fourier Transform Limited pulses with the highest dynamic range.

FEMTOLASERS Produktions GmbH

FEMTOLASERS is the premiere manufacturer of reliable ultrafast laser oscillator and amplifier solutions. We offer optical pulses down to 7 fs with multi-MW and GW peak powers at MHz and kHz repetition rates. We also feature the patented FEMTOOPTICS™ portfolio of high performance optics for demanding ultrafast applications.

GIGAOPTICS GmbH

Gigaoptics GmbH designs and manufactures ultracompact Ti:sapphire Femtosecond Lasers with repetition rates as high as 1 GHz and is provider of advanced ultrafast time-domain and THz spectroscopy systems and components.

Featured product at UP 2012 is TACCOR, a turn-key ultrafast laser with a 1 GHz repetition that delivers up to 1W of average power in 15fs pulses. Its innovative design combines a compact,

hermetically sealed, vibration-resistant laser head that incorporates the Ti:Sapphire oscillator and pump laser, with a full feature support unit. The result is a highly stable and reproducible product with a long lifetime and low cost of ownership, offering a 3 year/9000 hour warranty.

GMP SA & GSI GROUP Ltd

GMP SA represents **Quantronix**, **Swamp Optics** and **Gentec EO** in Switzerland.

GMP SA: Since 1977, GMP is active in the fields of lasers, spectroscopy, photonics and micropositioning. Thanks to an efficient sales and service organization, GMP has become not only a top distributor of high technology products, but is also able to propose turnkey solutions for equipment integration, developed by GMP's engineering department.

Quantronix (www.quantronixlasers.com) was founded in 1967 and pioneered the first commercial CW-pumped Nd:YAG laser. Thereafter, the company has continued to build upon that early spirit of innovation. Today, Quantronix offers hundreds of laser systems in a myriad of configurations and has successfully installed over 15,000 laser systems for various applications worldwide. Our focus is on the innovation of CW pumped Q-switched solid-state lasers and ultrafast lasers for the implementation of cutting edge laser technology in advanced industrial, scientific, and commercial applications.
Quantronix is a subsidiary of GSI. Inc (www.gsig.com).

Swamp Optics offers compact, convenient, and inexpensive devices for measuring ultrashort laser pulses completely in real time. It also offers custom devices for nearly every pulse-measurement problem as well as an elegant pulse compressor. Awards include the R&D100, Circle of Excellence, and the SPIE Prism Award.

Gentec EO has a 40 year track record of innovation and providing quality solutions for laser power and energy measurements from the factory to the hospital and the laboratory. Gentec EO is committed to providing the best NIST traceable measurement available anywhere and is also the first worldwide supplier of large aperture calorimeters to measure the highest pulse energies.

LASER QUANTUM Ltd

Laser Quantum is a world-class manufacturer of high quality solid-state lasers. Our products are known for reliability, performance-excellence and a long operational life. You'll find our products in laboratories and integrated in systems world-wide.

Our expertise meets the needs of industry, aerospace, biomedicine and research. By working with our customers, our lasers are found in applications including femtosecond Ti:Sapphire pumping, PIV, microscopy, fluorescence imaging and Raman spectroscopy.

LAYERTEC GmbH

LIGHTHOUSE PHOTONICS INC.

Lighthouse Photonics develops & manufactures innovative DPSS lasers with a unique blend of performance, compactness and value. Sprout offers up to 15W at 532nm in a near-perfect TEMoo mode with extremely low noise and impressive power stability. Sprout is specifically designed for applications that demand excellent beam quality and high stability such as pumping ultrafast Ti:Sapphire oscillators. Visit our booth and see Sprout.

MENLO SYSTEMS GmbH

NEWPORT SPECTRA-PHYSICS GmbH

Newport Corporation is a leading global supplier of advanced-technology products and systems to customers in the scientific research, microelectronics manufacturing, aerospace and defense/security, life and health sciences and precision industrial manufacturing markets. Newport includes leading brands such as Corion®, New Focus™, Oriel® Instruments, Richardson Gratings™ and Spectra-Physics®.

ONEFIVE GmbH

Onefive is a leading global supplier of industry-proven, low-noise ultrafast and narrow-linewidth single-frequency laser products for OEM and R&D. The portfolio containing compact air-cooled maintenance-free lasers offers wider choice:UV-IR wavelength range, picosecond to sub-100 fs pulse duration, single-shot to GHz repetition rate, and nJ to >40 uJ pulse energy.

THORLABS, INC.

Thorlabs designs, develops, and manufactures building blocks for the Photonics industry, including optomechanics, motion control electronics, nanopositioning stages, fiber and optical components, laser diodes, tunable lasers, and vibration isolation systems. In addition, we can provide system-level solutions including complete OCT and imaging systems, like confocal and adaptive scanning optical microscopes.

THE OPTICAL SOCIETY OF AMERICA

OSA brings together the global optics community through its programs. OSA has worked to advance common interests of the field, providing educational resources to scientists, engineers and business leaders by promoting the science of light and the advanced technologies made possible by optics and photonics. OSA publications, events, technical groups and programs foster optics knowledge and scientific collaboration.

ULTRAFAST INNOVATIONS GmbH

UltraFast Innovations provides customized premium ultrafast optics and devices. Many years of know-how in optics design and manufacturing allow us to implement latest research results into novel optics solutions. Our optics can be found in the laser sources of most major femtosecond OEM manufacturers. Our optics portfolio features: Ultra-broadband mirrors for

pulse compression down to sub-4 femtoseconds, highly dispersive and high-reflectance mirrors. We also provide specialized diagnostic and instrumentation for ultrafast applications.

VENTEON

VENTEON Laser Technologies offers comprehensive solutions in the field of few-cycle femtosecond laser technology, covering the generation, characterization and application of ultrashort laser pulses. The leading-edge femtosecond systems by VENTEON feature the shortest pulses commercially available, high pulse energies, and octave-spanning output spectra for direct CEP stabilization and OPCPA seeding. The product portfolio is completed by pulse characterization tools such as SPIDER, broadband femtosecond optics, ultrafast equipment and custom-designed solutions.

ZURICH INSTRUMENTS

Zurich Instruments makes lock-in amplifiers, phase-locked loops, and impedance spectroscopes that have revolutionized instrumentation in the high-frequency (HF) and ultra-high-frequency (UHF) ranges by combining frequency-domain tools and time-domain tools within each product. This reduces the complexity of laboratory setups, removes sources of problems and provides new measurement approaches that support the progress of research.

SUNDAY JULY 8TH 2012				
Contributions	**Session**	**Session title or Event**	**Location**	**Time**
		Begin of Registration	Amphipôle	16:00 - 18:00
		Welcome Reception	Amphimax or outside	18:30 - 20:30
MONDAY JULY 9TH 2012				
		Welcome and Opening Remarks	Room 350/351	08:15 - 08:30
Invited, Oral	MON.1	High Harmonic Spectroscopy	Room 350/351	08:30 - 10:15
Oral	MON.2A	Attosecond Dynamics	Auditorium A	10:45 - 12:30
Oral	MON.2B	X-Ray Absorption Spectroscopy	Auditorium B	10:45 - 12:30
Invited, Oral	MON.3	Water at Surfaces and Hydration Shells	Room 350/351	14:00 - 15:45
Oral	MON.4A	Vibrational Coherences	Auditorium A	16:15 - 18:00
Oral	MON.4B	Molecules in Strong Fields	Auditorium B	16:15 - 18:00
Poster	MON.PI	Poster Session I & Student Happy Hour Sponsored by Coherent and the OSA Foundation	Poster area	18:00 - 19:30
TUESDAY JULY 10TH 2012				
Contributions	**Session**	**Session title or Event**	**Location**	**Time**
Invited, Oral	TUE.1	Nonlinear Terahertz Dynamics	Room 350/351	08:30 - 10:15
Invited, Oral	TUE.2A	2D Spectroscopy of Electronic States	Auditorium A	10:45 - 12:30
Oral	TUE.2B	Ultrafast Pulse Generation	Auditorium B	10:45 - 12:30
Oral	TUE.3A	Ultrafast Spectroscopy of Semiconductors and Organic Solids	Auditorium A	14:00 - 15:45
Invited, Oral	TUE.3B	Recollision Phenomena	Auditorium B	14:00 - 15:30
Oral	TUE.4A	Ultrafast Dynamics of Biomolecules	Auditorium A	16:15 - 18:00
Oral	TUE.4B	Nonlinear Optics and Plasmonics	Auditorium B	16:15 - 18:00
Poster	TUE.PII	Poster Session II & Student Happy Hour Sponsored by Newport Spectra-Physics	Poster area	18:00 - 19:30
WEDNESDAY JULY 11TH 2012				
Contributions	**Session**	**Session title or Event**	**Location**	**Time**
Invited, Oral	WED.1	Photosynthesis	Room 350/351	08:30 - 10:15
Oral	WED.2A	Ultrafast Currents and Metamaterials and Polariton Dynamics	Auditorium A	10:45 - 12:30
Invited, Oral	WED.2B	XFEL Physics	Auditorium B	10:45 - 12:30
Oral, Invited	WED.3	Short Wavelengths and Applications	Room 350/351	14:00 - 15:45
Oral	WED.4A	Ultrafast Chemical Reactions	Auditorium A	16:15 - 18:00
Oral	WED.4B	Ultrafast Dynamics on the Nanoscale	Room 350/351	16:15 - 18:00
		Conference Buffet Dinner	Lausanne Palace	19:00 - 22:30
THURSDAY JULY 12TH 2012				
Contributions	**Session**	**Session title or Event**	**Location**	**Time**
Invited, Oral	THU.1	High Harmonic Generation	Room 350/351	08:30 - 10:15
Invited, Oral	THU.2A	Energy Transfer and Charge Generation in Organic Systems	Auditorium A	10:45 - 12:30
Oral	THU.2B	Ultrafast Dynamics in Correlated Systems	Auditorium B	10:45 - 12:30
Oral	THU.3A	Ultrafast Photobiology	Auditorium A	14:00 - 15:45
Invited, Oral	THU.3B	Spin, Charge and Lattice Dynamics	Auditorium B	14:00 - 15:45
Poster	THU.PIII	Poster Session III & Student Happy Hour	Poster area	16:15 - 17:45
Oral	THU.4	Post deadline papers	Room 350/351	20:00 - 21:30
FRIDAY JULY 13TH 2012				
Contributions	**Session**	**Session title or Event**	**Location**	**Time**
Oral	FRI.1A	Ultrafast Dynamics in Materials and Systems	Auditorium A	08:30 - 10:15
Oral	FRI.1B	Extreme Light Generation	Auditorium B	08:30 - 10:15
Invited, Oral	FRI.2	Electron and X-ray Diffraction + Closing	Room 350/351	10:45 - 12:30

Digest and Copyright Information

The papers included in this digest comprise the short summaries of the XVIII International Conference on Ultrafast Phenomena held in Lausanne, Switzerland from July 9th to 13th 2012. The extended version of the papers (2-page summaries in pdf format) will be made available on-line within 2 months after the conference. A link with login and password is provided on a separate sheet.

All web browsers (Firefox, Internet Explorer, Safari or similar) allow you to download the digest.
A .pdf viewer (tested with Adobe Acrobat) is necessary to view the papers. This software can be downloaded from **www.adobe.com**

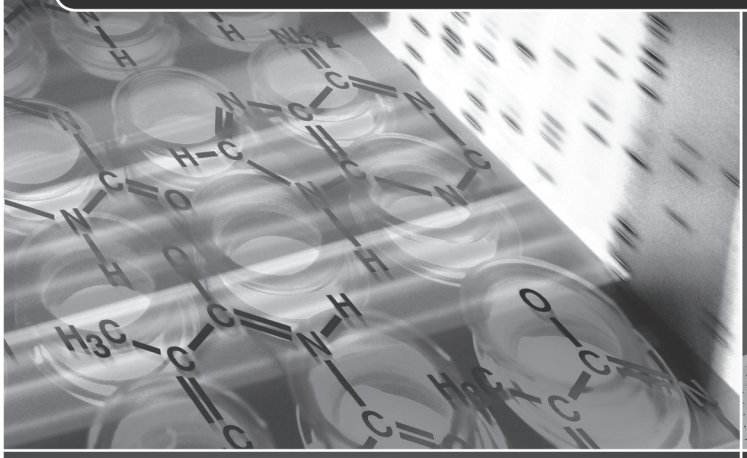
The papers reflect the authors' opinion and are published as presented, without any changes in the interest of timely dissemination. Their inclusion in this publication and the extended on-line version does not necessarily constitute endorsement by the editors, the European Physical Society.

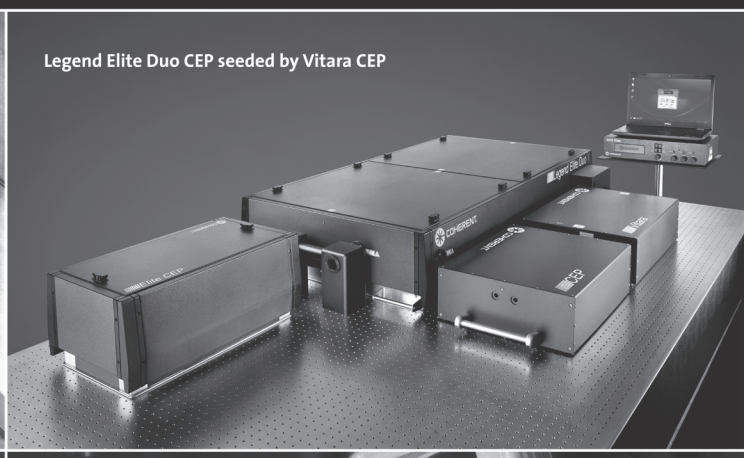
Copyright and Reprint permissions:

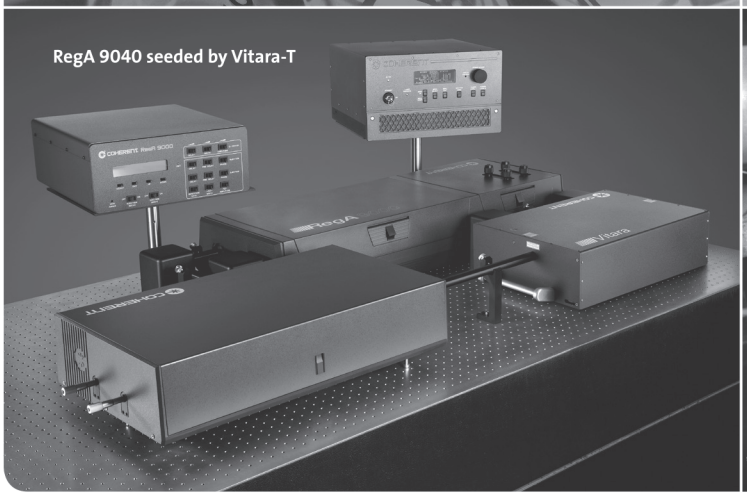
Europhysics Conference Abstracts Volume 36B, ISBN: 2-914771-76-2

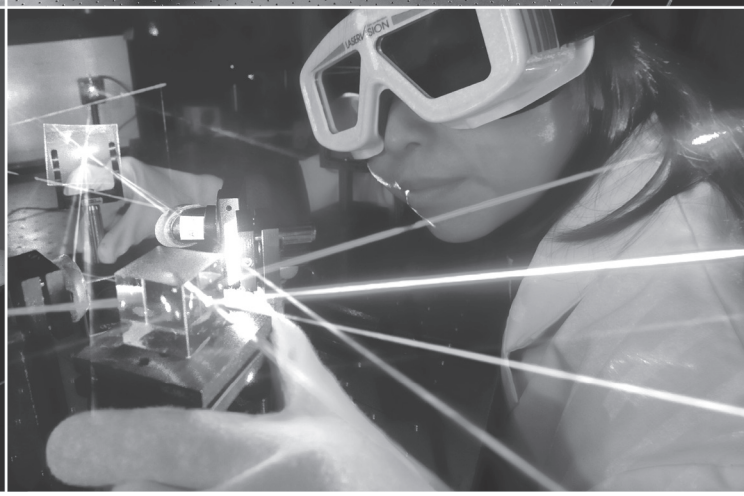
Better Ultrafast, Every Day.

Performance. Portfolio. Support.









Your research moves as rapidly as your creativity and ingenuity. The lasers you use must also keep pace, enabling fast, accurate and reliable results.

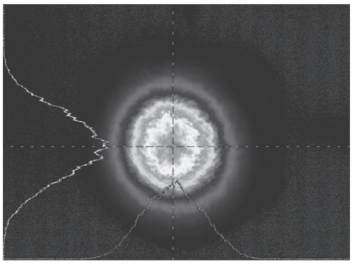
Coherent offers:

- Exceptional product performance and flexibility so you can expand your set up as your research evolves over time
- The most comprehensive range of ultrafast lasers available today: from pump lasers to optical parametric amplifiers
- The best worldwide and regional support no matter where your laboratory is located

Discover the broadest ultrafast laser portfolio on the market today. Our newest ultrafast catalog will be available at our UP 2012 booth. Pick one up while visiting us at the show.

Visit us at www.Coherent.com/ultrafastlasers to learn more.

Near-Field Beam Profile (Duo HE+ USP)



COHERENT®

tech.sales@Coherent.com
www.Coherent.com
toll free: (800) 527-3786
phone: (408) 764-4983

Benelux +31 (30) 280 6060
China +86 (10) 8215 3600
France +33 (0)1 8038 1000
Germany +49 (6071) 968 333

Italy +39 (02) 31 03 951
Japan +81 (3) 5635 8700
Korea +82 (2) 460 7900
UK +44 (1353) 658 833

Superior Reliability & Performance

UP2012 is organized in cooperation with

http://qeod.epsdivisions.org
www.eps.org

http://lsu.epfl.ch

www.unil.ch/index.html

Principal industrial sponsor:

www.coherent.com

Co-sponsors:

SNF – Swiss National Foundation
www.snf.ch/F/Pages/default.aspx

www.loreal.fr/_fr/_fr/index.aspx

http://harima.riken.jp/eng/index.html

NCCR - Molecular Ultrafast Science and Technology
www.nccr-must.ch/home.html

www.kmlabs.com

www.time-bandwidth.com

www.psi.ch/psi-home

www.elsevier.com

European Synchrotron Radiation Facility
www.esrf.eu

KGF - KontaktGruppe für Forschungsfragen (Contact Group for Research Matters)
www.kgf.ch

www.newport.com

www.osa.org

XVIII International Conference on Ultrafast Phenomena
July 9th to 13th 2012, Lausanne, Switzerland

WELCOME to Lausanne and to the International Conference on Ultrafast Phenomena!

This year's event - the XVIII biannual international conference - continues the tradition of bringing together a multidisciplinary group of researchers sharing a common interest in science and technology at the highest temporal resolution. Scientists and engineers from nearly 40 countries and at least three continents will take part to this event.

The conference will include 417 oral and poster contributions, an exceptionally high and all-time record number of presentations. We have scheduled 12 invited, 163 oral and 242 poster presentations from 38 countries for you to consider over what should be five very full days. Not only is the number of submissions and presentations exceptional, but in our opinion also the scientific quality and range of topics. As the technology matures, even more interesting ways of utilizing ultrashort electromagnetic pulses - from X-rays to THz - are found.

A tabletop exhibit featuring leading companies will be held in conjunction with the meeting.

We hope that you will enjoy the unique beauty of Lausanne, the program, and the opportunity to spend time with colleagues from around the globe.

Sincerely,

General Chairs
Majed Chergui, *École Polytechnique Fédérale de Lausanne, Switzerland*
Antoinette Taylor, *Los Alamos National Laboratory, USA*

Programme Chairs
Steven Cundiff, *JILA, NIST and University of Colorado, USA*
Kaoru Yamanouchi, *University of Tokyo, Japan*
Regina de Vivie-Riedle, *Ludwig-Maximilians University, Munich, Germany*

Conference Topics

Pulse Generation and Measurement
New sources, new wavelength regimes, frequency conversion techniques, amplifiers, attosecond pulse generation, pulse shaping, pulse diagnostics, measurement techniques and frequency standards.

Physics
Ultrafast nonlinear optical processes, kinetics of non-equilibrium processes, quantum confinement, coherent transients, nonlinear pulse propagation, novel ultrafast spectroscopic techniques, high intensity physics, attosecond dynamics.

Materials Science
Highly correlated systems, coherent phonons in solids, carrier dynamics in nanoparticles, carbon-based materials, structural dynamics with X-rays and electrons.

Chemistry
Vibrational and conformational dynamics, energy transfer, femtochemistry, proton and electron transfer, solvation dynamics, wave packet dynamics and coherent control of reactions, structural dynamics with X-rays and electrons.

Biology
Photosynthesis, vision, heme proteins, photoactive proteins, photoisomerization in chromoproteins, wavepacket dynamics, femtobiology, structural dynamics with X-rays and electrons, medical applications.

Electronics & Optoelectronics
Photoconductivity, generation, propagation and detection of ultrafast electrical signals, plasmonics, terahertz radiation, electro-optical sampling and detectors.

Applications
Real world applications of ultrafast technology, including ultrafast near-field, nonlinear and confocal microscopes, real-time/real-space electron microscopy, medical applications, high speed communication, micromachining and more.

Poster Sessions

242 posters will be presented during three sessions that will take place on Monday July 9th, Tuesday July 10th (both sessions scheduled from 18:00 to 19:30) and Thursday July 12th (from 16:15 to 17:45). There will be no oral presentations during this time. Student Happy Hours will be organised during the sessions.

Instructions to Poster Presenters

Poster sessions are scheduled to provide an opportunity for selected papers to be presented in greater visual details and to facilitate discussions among attendees. To display his/her poster, each author is provided with an 84 cm wide x 118,4 cm high space (maximum dimensions). Authors are invited to fix their posters on the boards from the first day of the conference and for the entire week. This should help informal discussions during coffee breaks. Poster presenters are, however, asked to be at their posters during the poster session that their presentation was assigned to. Note: Fixing material will be provided. The boards will be marked with the poster session code.

Speakers' Information

Duration of oral presentations are:
- ✓ 15 minutes (including 3 minutes for discussion) for contributed talks,
- ✓ 30 minutes (including 5 minutes for discussion) for invited talks.

WARNING! Speakers are requested to upload and check their presentations on the computers provided by the conference in the assigned lecture room during the coffee break preceding the talk or the afternoon of the day before for those scheduled early morning. This is mandatory as the schedule is tight and time has to be respected in order for listeners to move from one lecture hall to the other during parallel sessions. A student will be there to assist them.
Speakers are asked to check-in with the session chair in the conference room ten minutes before the session begins.
The lecture halls are equipped with microphones, projectors and computers, that are connected to the internet.

Post Deadline Contributions

As a tradition, the XVIII International Conference on Ultrafast Phenomena will showcase post deadline presentations. The purpose of these contributions is to give conference participants the opportunity to hear new and significant results in rapidly advancing areas. Only those papers

judged to be truly excellent and compelling in their timeliness will be accepted for presentation as an oral contribution.
The post deadline papers are scheduled for **oral presentation on Thursday, July 12th between 20:00 - 21:30 in Lecture Room 350/351.**
Authors will be notified whether their papers have been accepted on Monday, July 9th directly at the conference desk.
Post deadline papers may be included in the proceedings if the authors can submit the manuscript in a timely manner.

Proceedings

As at previous conferences, a book of Proceedings of the Ultrafast Phenomena XVIII will be published. Authors of all accepted contributions (invited, oral and poster) are invited to submit a paper for the book of Proceedings. We anticipate the latter to contain around 400 articles of 3 pages each. The Proceedings will be published by EDP Sciences Web of Conferences (www.webofconferences.org), online with open access as well as a black and white hard copy, which will be sent to each conference participant.
All papers must follow the same format and style to meet the conditions for publication. These conditions are set by EPJ Web of Conferences to allow for a uniform appearance within the final volume. A detailed description of the paper format and layout is given on the conference web site. The most salient information is the following:

- ✓ The paper is limited to not more than 3 pages, including all text, figures, and references.
- ✓ Papers are to be submitted in pdf format by electronic upload. Papers must be submitted no later than 10:00 pm, July 17th 2012 - GMT+1, Lausanne local time.
- ✓ No late papers, incorrectly formatted papers, or papers longer than 3 pages will be accepted.

Conference Language

The official language of the conference is English.

Conference Digest

The registration fee includes an online technical digest including the two-page summaries.

Exhibition

A tabletop exhibit will be organised. See list of exhibitors in the separate leaflet.
The exhibit will run at the same times as the conference, except that Friday will be optional.
The exhibition space is located next to the lecture halls and close to the poster area, in order to allow easy and frequent contact with the attendees. Coffee breaks and happy hours are arranged to give the participants the opportunity to visit the stands.

Exhibitor Information

The UNIL conference site will be open on Sunday July 8th (10:00 to 18:30) allowing exhibitors to prepare their stands. The conference registration (participants and exhibitors) will begin Sunday July 8th from 16:00 to 18:30.
All exhibition equipment/material must be removed by Friday 14:00 at the latest.

On-site Facilities

Wireless internet is available inside the building of the conference centre with free access.
A message board around the registration area will be installed.

Lunches

Lunches are not included in the registration fees.
No food or drink is allowed inside the conference rooms.
The UNIL has two sites for lunch: Amphimax and Unithèque, with several restaurants. There are also several restaurants on the EPFL site, a few minutes walk from the conference venue. Lunches can be taken outside.
The nearby Starling hotel is also open during lunchtime (with a terrace outside the hotel).

Coffee Breaks

Morning Coffee breaks are organised on Monday, Tuesday, Wednesday, Thursday and Friday from 10:15 to 10:45
Afternoon Coffee breaks are organised on Monday, Tuesday, Wednesday and Thursday from 15:45 to 16:15.
They take place in the corridor of the Amphipôle close to the exhibition area.

Warning

Eating or drinking in the lecture rooms is strictly forbidden.

Social Programme

Sunday, July 8th, 18:30
➥ **Welcome Reception**
UNIL - Amphimax or outside in case of nice weather

Monday, July 9th, 18:00
➥ **Student Happy Hour**
Poster Area Amphipôle
Sponsored by **COHERENT Inc.** and the **OSA Foundation.**
Held in conjunction with the poster session (18:00 - 19:30).

Tuesday, July 10th, 18:00
➥ **Student Happy Hour**
Poster Area Amphipôle
Sponsored by **Newport Spectra-Physics**
Held in conjunction with the poster session (18:00 - 19:30).

Wednesday, July 11th, 19:00
➥ **Conference buffet dinner**
Lausanne Palace, Grand Chêne 7 - 9,
CH 1002 Lausanne
Phone: +41 (0) 21 331 3131
www.lausanne-palace.com/fr/index.php
There will be no shuttle, but the hotel can be easily reached by public transportation. Lausanne CFF Station or the metro station FLON are within 500 metres.
The reception will take place outside in case of nice weather.
As a rule, due to space limitations and necessary advance reservation, on site registrants will not be able to attend the conference dinner. No fee reduction can be applied.

Thursday, July 12th, 16:45
➥ **Student Happy Hour**
Held in conjunction with the poster session (16:45 - 17:45).

Registration Information

The registration fees for the meeting include:

- ✓ **Welcome reception** at the UNIL (www.unil.ch) on Sunday July 8th at 18:30 (registration desks will be open that day from 16:00 to 18:00).
- ✓ **Admission to the technical sessions** of the conference.

- ✓ **On-line digest including the two-page summaries.**
- ✓ **Hard copy and on-line publication of the proceedings.**
- ✓ **Conference buffet dinner at the Lausanne Palace** (http://lausanne-palace.com) on **Wednesday evening, July 11th at 19:00.**
- ✓ **Exhibition** running from Monday morning to Friday noon time.
- ✓ **Coffee breaks** (Monday through Friday morning) as mentioned in the programme.
- ✓ **3 Happy Hours** organised in conjunction with the poster sessions to take place on **Monday July 9th, Tuesday July 10th both from 18:00 to 19:00 and Thursday July 12th from 16:15 to 17:45.**

Lunches are not included.

As a rule, due to space limitations and necessary advance reservation, on site registrants will not be able to attend the conference dinner. No fee reduction will be applied. Also, no guest tickets for the conference dinner can be obtained on site.

Tickets for public transports are not included in the fees. However, guests staying in hotels and guesthouses in the greater Lausanne area receive the Lausanne Transportation card for free. The hotel/guesthouse will issue this card, which is personal and non-transferable, upon checking in.

The Lausanne Transportation card entitles its holder to free and unrestricted travel in second class on the network formed by zones 11, 12, 15, 16, 18 and 19 of the Communauté tarifaire vaudoise Mobilis, the passenger transport network for the canton of Vaud (see www.lausanne.ch/view.asp?DomID=64459&Language=E).

Validity period:

The travel card is valid for the entire duration of the guest's stay on condition that the fields provided for the name of the beneficiary, the name (or stamp) of the hotel or guesthouse and the arrival and departure dates are duly completed by the hotel or guesthouse staff.

The Lausanne Transport Card is valid for one person. The card must be presented upon request for inspection. A means of identification may be required. Please note in particular that a valid ticket is also required for bicycles and dogs.

Conference Registration Hours:

Sunday, July 8th 2012
➥ **16:00 - 18:00**
Monday, July 9th 2012
➥ **07:45 - 12:30 and 13:45 - 17:00**
Tuesday, July 10th 2012
➥ **08:00 - 12:30 and 13:45 - 17:00**
Wednesday, July 11th 2012
➥ **08:00 - 12:30 and 13:45 - 16:30**
Thursday, July 12th 2012
➥ **08:00 - 12:30 and 13:45 - 16:30**
Friday, July 13th 2012
➥ **closed**

Conference Hours:

Monday, July 9th 2012
➥ **08:15 - 12:30 and 14:00 - 19:30**
Tuesday, July 10th 2012
➥ **08:30 - 12:30 and 14:00 - 19:30**
Wednesday, July 11th 2012
➥ **08:30 - 12:30 and 14:00 - 18:00**
Thursday, July 12th 2012
➥ **08:30 - 12:30 and 14:00 - 21:30**
Friday, July 13th 2012
➥ **08:30 - 12:30**

Conference Management

The Conference management is provided by the **European Physical Society**, 6 rue des Frères Lumière, F-68200 Mulhouse, France

Conference Venue

The UP2012 Conference will take place at the **Université de Lausanne (UNIL) - 1015 Lausanne** (www.unil.ch/index.html) in the Amphimax and the Amphipôle buildings (quartier SORGE). There is a direct access from one building to the other. An interactive map of the UNIL can be found at http://planete.unil.ch/plan.
To reach the conference venue, see below Transportation.
The oral sessions will be held in three lecture rooms:

- Room 350/351 (Amphimax)
- Auditorium A and Auditorium B (Amphipôle)

The Poster sessions and the Exhibition take place in the Amphipôle.
Coffee breaks and Happy Hours take place in the Amphipôle.
The registration desks and the message board are located in the Amphipôle.

Transportation:

Getting around is easy thanks to the modern and punctual public transport services operated by Transports Lausannois (TL). An efficient network of buses, trains and metro links all of the town's attractions and sites from the lake shore to the heights of the city. Convenience and reliability are at the heart of one of the most compact transport systems in Switzerland and Europe.
See www.lausanne.ch/view.asp?docId=32901&domId=63702&language=E
The UNIL site can be easily reached via metro 1 from Lausanne-Flon direction Renens Gare (around 12 minutes), take exit UNIL-Sorge.
Seehttp://en.wikipedia.org/wiki/File:Lausanne_-_Public_transport_map.png

Additional information:

- There is a train every 10 minutes.
- For those without the Lausanne Transport Card, the ticket costs CHF 3.00 and is valid for one hour on all trains (metro & TSOL) and buses of the Lausanne area.
- The trip from the Lausanne train station to the UNIL-Sorge stop lasts about 25 minutes.

The conference sites (Amphimax and Amphipôle) are located in front of the stop on the left side, near the parking.
Other transportation information can be found using the link:
www.lausanne.ch/view.asp?domId=63374&language=E
or the conference web site:
www.up2012.org/venue.

Lausanne, Switzerland

Lausanne, the capital of the canton Vaud, is the result of centuries of hard work. This town is situated on the north shore of Lac Léman (Lake Geneva). It was founded by the Celts, then occupied by the Romans, and eventually destroyed by the Alemannen. This is how Lausanne's history began - from Lousonna of the Roman era to Lausanne, the modern European city. It has always been a key point on the North-South route from the North Sea to the Mediterranean. Its old town (la cité), dominated by the 13th century Gothic cathedral (4 spires and 105 stained-glass windows), was built in the Middle Ages. To this day, it remains a magnificent architectural and artistic heritage with its paved roads and period houses sporting their shop signs and housing craftsmen's workshops and cosy pubs.
The city offers vast entertainment opportunities. Steep terraces sloping down to the shores of the lake offer beautiful views of the French Alps. Down by the lakefront, parks, gardens, cafés and restaurants provide endless hours of entertainment for the visitor's pleasure. Concerts, operas and ballets are staged regularly at the many theatre and concert halls of the city, while street corners provide the setting for impromptu jazz recitals. Throughout the year, the city also hosts many exhibitions and trade fairs.
In Lausanne, the Olympic Games never end! In the middle of a magnificent park overlooking the lake, the Olympic Museum showcases the striking images, highlights and paraphernalia of the games and recalls the commitment of the IOC to foster popular as well as competitive sports.
Thanks to the City of Lausanne, wireless internet access is now available in the city center and by the lake. In fact, seven wi-fi access points have been put in place in the city's main squares - Flon, Palud, Riponne, St-François, Montbenon, Navigation, Port, Service des automobiles and aéroport de la Blécherette - allowing residents and visitors of Lausanne to have access to internet free of charge. You need a laptop equipped with a wireless network card to take advantage of this option.

Shopping

Many department stores, fashion and luxury boutiques, souvenir shops, watch and jewellery shops, local and crafts markets are located downtown.
Opening hours:
Mon-Fri: 08.00/08.45 – 18.30/19.00 hours
Saturday: 08.00/08.45 – 18.00 hours
Sunday: closed

Population

Lausanne: 128 000 inhabitants
Greater Lausanne: 250 000 inhabitants

Altitude

372 m by the lake
495 m in the city centre
852 m in the northern part of the town

Official language

French. All major languages are generally understood and spoken.

Climate

Annual average temperature 14°C
Average summer temperature 24°C

Currency

The Swiss Franc (CHF) is the official currency of Switzerland.
While Switzerland is not part of the European Union, prices are indicated in both CHF and euros for comparison. Shopkeepers often accept euros but are not obliged to do so. Change given back to the client will most likely be in Swiss francs.
Money exchange places:

- ✓ Any Swiss bank
- ✓ Airport
- ✓ Main railway stations
- ✓ Major hotels

Swiss banks offer the best exchange rates for your traveller's checks or cash for foreign currencies (only bank notes). Official exchange offices and hotels may charge a fee for their services.
Major credit cards (VISA, Mastercard/Eurocard, American Express, Diners...) are generally accepted in airports, train stations, hotels, larger shops *etc*.

For more information on Lausanne visit the following website:
www.lausanne-tourisme.ch

Conference Committees

General Chairs

- **Majed Chergui**, *École Polytechnique Fédérale de Lausanne, Switzerland*
- **Antoinette Taylor**, *Los Alamos National Laboratory, USA*

Programme Chairs

- **Steven Cundiff**, *JILA, NIST and University of Colorado, USA*
- **Kaoru Yamanouchi**, *University of Tokyo, Japan*
- **Regina de Vivie-Riedle**, *Ludwig-Maximilians University, Munich, Germany*

Ultrafast Phenomena Program Committee

- **Martin Aeschlimann**, *University of Kaiserslautern, Germany*
- **Richard Averitt**, *Boston University, USA*
- **Jens Biegert**, *ICFO, Barcelona, Spain*
- **Andrea Cavalleri**, *University of Oxford, United Kingdom*
- **Lin Chen**, *Northwestern University, USA*
- **Louis Di Mauro**, *Ohio State University, USA*
- **Thomas Feurer**, *University of Bern, Switzerland*
- **Nuh Gedik**, *Massachusetts Institute of Technology, Cambridge, USA*
- **Tony Heinz**, *Columbia University, USA*
- **Jan Helbing**, *University of Zurich, Switzerland*
- **Kevin Kubarych**, *University of Michigan, USA*
- **Alfred Leitenstorfer**, *University of Konstanz, Germany*
- **Ruxin Li**, *Shangai Institute of Optics & Fine Mechanics, China*
- **Manho Lim**, *Pusan National University, Republic of Korea*
- **Stefan Lochbrunner**, *University of Rostock, Germany*
- **Jon Marangos**, *Imperial College of London, United Kingdom*
- **Jennifer Ogilvie**, *University of Michigan, USA*
- **Greg Scholes**, *University of Toronto, USA*
- **Charles Schmuttenmaer**, *Jale University, USA*
- **Olga Smirnova**, *Max-Born-Institute, Berlin, Germany*
- **Fabrice Vallée**, *University of Lyon, France*
- **David Villeneuve**, *University of Ottawa, Canada*
- **Martin Zanni**, *University of Wisconsin, USA*

Ultrafast Phenomena Advisory Committee

- **David Auston**, *Rice University, USA*
- **Paul Corkum**, *Steacie Institute for Molecular Science, Canada*
- **Sandro De Silvestri**, *Politecnico di Milano and ULTRAS INFM-CNR, Italy*
- **Kenneth Eisenthal**, *Columbia University, USA*
- **Thomas Elsaesser**, *Max-Born-Institute, Berlin, Germany*
- **Graham Fleming**, *University of California at Berkeley, USA*
- **James G. Fujimoto**, *Massachusetts Institute of Technology, Cambridge, USA*
- **Charles Harris**, *University of California at Berkeley, USA*
- **Robin Hochstrasser**, *University of Pennsylvania, USA*
- **Erich Ippen**, *Massachusetts Institute of Technology, Cambridge, USA*
- **David Jonas**, *University of Colorado, USA*
- **Wolfgang Kaiser**, *Technical University of Munich, Germany*
- **Wayne Knox**, *University of Rochester, USA*
- **Takayoshi Kobayashi**, *University of Tokyo, Japan*
- **Jean-Louis Martin**, *LOB-ENSTA, France*
- **Arnold Migus**, *École Polytechnique, France*
- **R. J. Dwayne Miller**, *University of Toronto, Canada*
- **Gerard Mourou**, *University of Michigan, USA*
- **Shaul Mukamel**, *University of California at Irvine, USA*
- **Margaret M. Murnane**, *University of Colorado at Boulder, USA*
- **Keith Nelson**, *Massachusetts Institute of Technology, Cambridge, USA*
- **Tadashi Okada**, *Osaka University, Japan*
- **Eberhard Riedle**, *Ludwig-Maximilians University, Munich, Germany*
- **Norbert F. Scherer**, *University of Chicago, USA*
- **Robert Schoenlein**, *Lawrence Berkeley National Laboratory, USA*
- **Charles Shank**, *Lawrence Berkeley National Laboratory, USA*
- **Anthony Siegman**, *Stanford University, USA*
- **Andrew M. Weiner**, *Purdue University, USA*
- **Douwe Wiersma**, *University of Groningen, the Netherlands*
- **Tatsu Yajima**, *Nihon University, Japan*
- **Keitaro Yoshihara**, *Institute for Molecular Science, Japan*
- **Ahmed Zewail**, *Caltech, USA*
- **Wolfgang Zinth**, *Ludwig-Maximilians University, Munich, Germany*

NOTES

SUNDAY JULY 8TH 2012				
Contributions	**Session**	**Session title or Event**	**Location**	**Time**
		Begin of Registration	Amphipôle	16:00 - 18:00
		Welcome Reception	Amphimax or outside	18:30 - 20:30
MONDAY JULY 9TH 2012				
		Welcome and Opening Remarks	Room 350/351	08:15 - 08:30
Invited, Oral	MON.1	High Harmonic Spectroscopy	Room 350/351	08:30 - 10:15
Oral	MON.2A	Attosecond Dynamics	Auditorium A	10:45 - 12:30
Oral	MON.2B	X-Ray Absorption Spectroscopy	Auditorium B	10:45 - 12:30
Invited, Oral	MON.3	Water at Surfaces and Hydration Shells	Room 350/351	14:00 - 15:45
Oral	MON.4A	Vibrational Coherences	Auditorium A	16:15 - 18:00
Oral	MON.4B	Molecules in Strong Fields	Auditorium B	16:15 - 18:00
Poster	MON.PI	Poster Session I & Student Happy Hour Sponsored by Coherent and the OSA Foundation	Poster area	18:00 - 19:30
TUESDAY JULY 10TH 2012				
Contributions	**Session**	**Session title or Event**	**Location**	**Time**
Invited, Oral	TUE.1	Nonlinear Terahertz Dynamics	Room 350/351	08:30 - 10:15
Invited, Oral	TUE.2A	2D Spectroscopy of Electronic States	Auditorium A	10:45 - 12:30
Oral	TUE.2B	Ultrafast Pulse Generation	Auditorium B	10:45 - 12:30
Oral	TUE.3A	Ultrafast Spectroscopy of Semiconductors and Organic Solids	Auditorium A	14:00 - 15:45
Invited, Oral	TUE.3B	Recollision Phenomena	Auditorium B	14:00 - 15:30
Oral	TUE.4A	Ultrafast Dynamics of Biomolecules	Auditorium A	16:15 - 18:00
Oral	TUE.4B	Nonlinear Optics and Plasmonics	Auditorium B	16:15 - 18:00
Poster	TUE.PII	Poster Session II & Student Happy Hour Sponsored by Newport Spectra-Physics	Poster area	18:00 - 19:30
WEDNESDAY JULY 11TH 2012				
Contributions	**Session**	**Session title or Event**	**Location**	**Time**
Invited, Oral	WED.1	Photosynthesis	Room 350/351	08:30 - 10:15
Oral	WED.2A	Ultrafast Currents and Metamaterials and Polariton Dynamics	Auditorium A	10:45 - 12:30
Invited, Oral	WED.2B	XFEL Physics	Auditorium B	10:45 - 12:30
Oral, Invited	WED.3	Short Wavelengths and Applications	Room 350/351	14:00 - 15:45
Oral	WED.4A	Ultrafast Chemical Reactions	Auditorium A	16:15 - 18:00
Oral	WED.4B	Ultrafast Dynamics on the Nanoscale	Room 350/351	16:15 - 18:00
		Conference Buffet Dinner	Lausanne Palace	19:00 - 22:30
THURSDAY JULY 12TH 2012				
Contributions	**Session**	**Session title or Event**	**Location**	**Time**
Invited, Oral	THU.1	High Harmonic Generation	Room 350/351	08:30 - 10:15
Invited, Oral	THU.2A	Energy Transfer and Charge Generation in Organic Systems	Auditorium A	10:45 - 12:30
Oral	THU.2B	Ultrafast Dynamics in Correlated Systems	Auditorium B	10:45 - 12:30
Oral	THU.3A	Ultrafast Photobiology	Auditorium A	14:00 - 15:45
Invited, Oral	THU.3B	Spin, Charge and Lattice Dynamics	Auditorium B	14:00 - 15:45
Poster	THU.PIII	Poster Session III & Student Happy Hour	Poster area	16:15 - 17:45
Oral	THU.4	Post deadline papers	Room 350/351	20:00 - 21:30

Contributions	**Session**	**Session title or Event**	**Location**	**Time**
Oral	FRI.1A	Ultrafast Dynamics in Materials and Systems	Auditorium A	08:30 - 10:15
Oral	FRI.1B	Extreme Light Generation	Auditorium B	08:30 - 10:15
Invited, Oral	FRI.2	Electron Diffraction + Closing	Room 350/351	10:45 - 12:30

Invited Talks at a Glance

Monday July 9th 2012

08:30 Room 350/351 MON.1.1

Attosecond Electronic and Nuclear Dynamics in High-Harmonic Generation from Aligned Molecules

Pascal Salières[1], Zsolt Diveki[1], Roland Guichard[2,3], Antoine Camper[1], Jérémie Caillat[2,3], Stefan Haessler[4], Thierry Ruchon[1], Thierry Auguste[1], Alfred Maquet[2,3], Bertrand Carré[1], Richard Taieb[2,3],
[1]*CEA-Saclay, IRAMIS, Service des Photons, Atomes et Molécules, 91191 Gif-sur-Yvette, France,*
[2]*UPMC Univ. Paris 06, UMR 7614, LCPMR, 11 rue Pierre et Marie Curie, 75231 Paris Cedex 05, France,*
[3]*CNRS, UMR 7614, LCPMR F-75005 Paris, France,*
[4]*Photonics Institute, Vienna University of Technology, Gusshausstrasse 27/387, 1040, Vienna, Austria*

14:00 Room 350/351 MON.3.1

Ultrafast Dynamics of Water at the Water-air Interface Studied by Femtosecond Surface Vibrational Spectroscopy

Mischa Bonn[1,2], Cho-Shuen Hsieh[1], Lukasz Piatkowski[2], Huib Bakker[2], Zhen Zhang[1],
[1]*Max Planck Institute for Polymer Research, Ackermannweg 10, 55128 Mainz, Germany,*
[2]*FOM-Institute AMOLF, Science Park 104, 1098 XG Amsterdam, The Netherlands*

Tuesday July 10th 2012

09:00 Room 350/351 TUE.1.3

Nonlinear Terahertz Spectroscopy in Solids with Single-Cycle Terahertz Pulses

Koichiro Tanaka,
Kyoto University, Institute for Integrated Cell-Material Sciences (WPI-iCeMS), Kyoto, 606-8501, Japan

10:45 Auditorium A TUE.2A.1

Coherent Spectroscopies on Ultrashort Time and Length Scales

Tobias Brixner[1], Martin Aeschlimann[2], Alexander Fischer[2], Peter Geisler[3], Sebastian Götz[1], Bert Hecht[3], Jer-Shing Huang[3,4], Thomas Keitzl[1], Christian Kramer[1], Pascal Melchior[2], Walter Pfeiffer[5], Gary Razinskas[3], Christian Rewitz[1], Christian Schneider[2], Christian Strüber[5], Philip Tuchscherer[1], Dmitri V. Voronine[5],
[1]*Institut für Physikalische und Theoretische Chemie, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany,*
[2]*Fachbereich Physik and Research Center OPTIMAS, TU Kaiserslautern, Erwin-Schrödinger-Str. 46, 67663 Kaiserslautern, Germany,*
[3]*Nano-Optics and Biophotonics Group, Experimentelle Physik 5, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany,*
[4]*Department of Chemistry, National Tsing Hua University, Hsinchu 30013, Taiwan,*
[5]*Fakultät für Physik, Universität Bielefeld, Universitätsstr. 25, 33615 Bielefeld, Germany*

14:00 Auditorium B TUE.3B.1

Attosecond Physics at a Nanoscale Metal Tip

Peter Hommelhoff,
Max Planck Institute of Quantum Optics, Garching, Germany

Wednesday July 11th 2012

08:30 Room 350/351 WED.1.1

Persistent Quantum Coherence in Single Light-Harvesting Complexes

Richard Hildner[1,4], Daan Brinks[1], Richard J. Cogdell[3], **Niek F. van Hulst**[1,2],
[1]*ICFO - Institute of Photonic Sciences, 08860 Castelldefels (Barcelona), spain,*
[2]*ICREA - Institucio Catalana de Recerca i Estudis Avancats, 08015 Barcelona, Spain,*
[3]*University of Glasgow, Glasgow G12 8TA, United Kingdom,*
[4]*Universität Bayreuth, 95440 Bayreuth, Germany*

11:30 Auditorium B WED.2B.4

First Experimental Realization of an Atomic Inner-Shell X-ray Laser in the keV Photon-Energy Regime

Nina Rohringer,
Max Planck Advanced Study Group, Center for Free-Electron Laser Science, c/o DESY, 22607 Hamburg, Germany

14:00 Room 350/351 WED.3.1

A New Frontier in Nonlinear Optics: Bright Coherent Ultrafast Kiloelectronvolt X-rays on a Tabletop

Tenio Popmintchev[1], Ming-Chang Chen[1], Dimitar Popmintchev[1], Paul Arpin[1], Susannah Brown[1], Skirmantas Ališauskas[2], Giedrius Andriukaitis[2], Tadas Balčiunas[2], Oliver Mücke[2], Audrius Pugzlys[2], Andrius Baltuška[2], Bonggu Shim[3], Samuel Schrauth[3], Alexander Gaeta[3], Carlos Hernández-García[4], Luis Plaja[4], Andreas Becker[1], Agnieszka Jaron-Becker[1], Margaret Murnane[1], Henry Kapteyn[1],
[1]*JILA, University of Colorado at Boulder, Boulder, CO 80309 USA,*
[2]*Photonics Institute, Vienna University of Technology, Vienna 1040, Austria,*
[3]*School of Applied and Engineering Physics, Cornell University, Ithaca, NY, USA,*
[4]*Grupo de Investigación en Óptica Extrema, Universidad de Salamanca, Salamanca E-37008, Spain*

Thursday July 12th 2012

08:30 Room 350/351 THU.1.1

High Brightness XUV Frequency Combs via Intracavity High Harmonic Generation

Thomas Allison[1], Arman Cingöz[1], Craig Benko[1], Dylan Yost[1], Axel Ruehl[2], Martin Fermann[2], Ingmar Hartl[1], Jun Ye[1],
[1]*JILA, NIST and the University of Colorado, Boulder, CO, USA,*
[2]*IMRA America Inc., Ann Arbor, MI, USA*

10:45 Auditorium A THU.2A.1

Ultrafast Pump-Push Photocurrent Spectroscopy of Organic Photoconversion Systems

Artem Bakulin[1,4], Akshay Rao[1], Yana Vaynzof[1], Simon Gelinas[1], Vlad Pavelyev[2], Maxim Pshenichnikov[2], Paul van Loosdrecht[2], Dorota Niedzialek[3], Jerome Cornil[3], David Beljonne[3], Richard Friend[1],
[1]*University of Cambridge, Cambridge, UK,*
[2]*Zernike Institute for Advanced Materials, University of Groningen, Groningen, The Netherlands,*
[3]*University of Mons, Mons, Belgium,*
[4]*AMOLF, Amsterdam, The Netherlands*

14:00 Auditorium B THU.3B.1

A Direct View of the Dynamics of Lattice and Spin with Femtosecond X-ray Diffraction

Steven Johnson[1], Ekaterina Möhr-Vorobeva[2], Raquel de Souza[2], Urs Staub[2], Paul Beaud[2], Gerhard Ingold[2], Andrin Caviezel[2], Christopher Milne[3], Jure Demsar[4], Hanjo Schäfer[4], Alexander Titov[5], Valerio Scagnoli[2], William Schlotter[6], Joshua Turner[6], Oleg Krupin[6,7], Wei-Sheng Lee[8,9], Yi-De Chuang[10], Luc Patthey[2], Robert Moore[8], Donghui Li[9], Ming Yi[8], Patrick Kirchmann[8], Mariano Trigo[11], Peter Denes[10], DIonisio Doering[10], Zahid Hussain[10], Zhi-Xun Shen[8], Dharmalingam Prabhakaran[12], Andrew Boothroyd[12],
[1]*Institute for Quantum Electronics, ETH Zurich, Zurich, Switzerland,*
[2]*Swiss Light Source, Paul Scherrer Institut, Villigen, Switzerland,*
[3]*Laboratoire de Spectroscopie Ultrarapide, ISIC-FSB, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland,*
[4]*Physics Department and Center of Applied Photonics, University of Konstanz, Germany,*
[5]*Institute of Metal Physics and Institute of Metallurgy UrDRAS, Ekaterinburg, Russia,*
[6]*The Linac Coherent Light Source, SLAC National Accelerator Laboratory, Menlo Park, CA, USA,*
[7]*European XFEL GmbH, Hamburg, Germany,*
[8]*SIMES, SLAC National Accelerator Laboratory and Stanford University, Menlo Park, CA, USA,*
[9]*SSRL, SLAC National Accelerator Laboratory, Menlo Park, CA, USA,*
[10]*Lawrence Berkeley National Laboratory, Berkeley, CA, USA,*
[11]*PULSE, SLAC National Accelerator Laboratory, Menlo Park, CA, USA,*
[12]*Department of Physics, University of Oxford, Clarendon Laboratory, Oxford, UK*

Friday July 13th 2012

12:00 Room 350/351 FRI.2.6

4D Electron Microscopy: Development and Applications

Ahmed H. Zewail,
California Institute of Technology (Caltech), Pasadena, CA, USA

NOTES

Welcome and Opening Remarks

8:15–8:30

MON.1: High Harmonic Spectroscopy

Chair: Kaoru Yamanouchi, The University of Tokyo, Tokyo, Japan

8:30–10:15 Room 350/351 MON.1

8:30 Room 350/351 MON.1.1

Invited

Attosecond Electronic and Nuclear Dynamics in High-Harmonic Generation from Aligned Molecules, •*Pascal Salières*[1], *Zsolt Diveki*[1], *Roland Guichard*[2,3], *Antoine Camper*[1], *Jérémie Caillat*[2,3], *Stefan Haessler*[4], *Thierry Ruchon*[1], *Thierry Auguste*[1], *Alfred Maquet*[2,3], *Bertrand Carré*[1], and *Richard Taieb*[2,3]; [1]*CEA-Saclay, IRAMIS, Service des Photons, Atomes et Molécules, 91191 Gif-sur-Yvette, France*, [2]*UPMC Univ. Paris 06, UMR 7614, LCPMR, 11 rue Pierre et Marie Curie, 75231 Paris Cedex 05, France*, [3]*CNRS, UMR 7614, LCPMR F-75005 Paris, France*, [4]*Photonics Institute, Vienna University of Technology, Gusshausstrasse 27/387, 1040, Vienna, Austria*.

We show that the spectral phase of the attosecond emission from aligned molecules encodes a wealth of information: structure of the radiating molecular orbitals, multi-channel electron dynamics and nuclear dynamics occurring during the emission process.

9:00 Room 350/351 MON.1.2

When does an electron exit a tunneling barrier?, *Dror Shafir*[1], •*Hadas Soifer*[1], *Barry D. Bruner*[1], *Michal Dagan*[1], *Yann Mairesse*[2], *Serguei Patchkovskii*[3], *Misha Yu. Ivanov*[4,5], *Olga Smirnova*[5], and *Nirit Dudovich*[1]; [1]*Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot 76100, Israel*, [2]*CELIA, Université Bordeaux I, UMR 5107 (CNRS, Bordeaux 1, CEA), 351 Cours de la Libération, 33405 Talence Cedex, France*, [3]*National Research Council of Canada, 100 Sussex Dr., Ottawa, Ontario K1A 0R6, Canada*, [4]*Department of Physics, Imperial College London, South Kensington Campus, SW7 2AZ London, United Kingdom*, [5]*Max-Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Max-Born-Strasse 2A, D-12489 Berlin, Germany*.

We probe dynamics of tunnel ionization via high harmonic generation. We characterize the ionization dynamics in helium atoms, and apply our approach to resolve subtle differences in ionization from different orbitals of a CO_2 molecule.

9:15 Room 350/351 MON.1.3

Spectral Caustics in Attosecond Science, *Oren Raz*, •*Oren Pedatzur*, *Barry D. Bruner*, and *Nirit Dudovich*; *Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot 76100, Israel*.

By exploiting singularities of the semiclassical model that describes high harmonic generation (HHG), we are able to demonstrate a new level of control over the emitted attosecond pulse, reaching a narrow tunable spectral enhancement.

9:30 Room 350/351 MON.1.4

Inhomogeneous High Harmonic Generation in Krypton Clusters, •*Hartmut Ruf*[1], *Charles Handschin*[1], *Raluca Cireasa*[2], *Nicolas Thiré*[2], *Dominique Descamps*[1], *Eric Mével*[1], *Eric Constant*[1], *Valérie Blanchet*[2], *Baptiste Fabre*[1], and *Yann Mairesse*[1]; [1]*Université de Bordeaux, CELIA, F33405 Talence, France*, [2]*Université de Toulouse, LCAR, F31062 Toulouse, France*.

By performing high harmonic generation in a cluster and monomer mixture, we isolate the signal originating only from clusters. Surprisingly this is depolarized but shows that it is produced by a new recollisional mechanism.

9:45 Room 350/351 MON.1.5

Vibrational motion in N_2O_4 studied by high-harmonic transient grating spectroscopy, •*Alisa Rupenyan*[1], *Julien B. Bertrand*[2], *David M. Villeneuve*[2], and *Hans Jakob Wörner*[1]; [1]*Laboratorium für Physikalische Chemie, ETH Zürich,*, [2]*Joint Laboratory for Attosecond Science, National Research Council of Canada and University of Ottawa, 100 Sussex Drive, Ottawa, Canada*.

We report high-harmonic transient grating measurements of vibrational dynamics in N_2O_4. The measurement allows us to determine the phase and amplitude modulations of the high harmonics induced by the vibrational wave packet motion.

10:00 Room 350/351 MON.1.6

Scanning potential energy surfaces with attosecond precision using high-harmonic spectroscopy, •*Peter Kraus* and *Hans Jakob Wörner*; *Laboratorium für physikalische Chemie, Eidgenössische Technische Hochschule Zürich, Wolfgang-Pauli-Str. 10, 8093 Zurich, Switzerland*.

We record new types of nuclear motion using high-harmonic generation and present a novel model based on photoelectron spectroscopy, which enables us to characterize the shape of potential energy surfaces of ammonia and allene cations.

Coffee Break

10:15–10:45

MON.2A: Attosecond Dynamics

Chair: Fran cois Légaré, INRS-EMT, Varennes, Qc, Canada

10:45–12:30 Auditorium A MON.2A

10:45 Auditorium A MON.2A.1

Strong field-induced attosecond dynamics in SiO_2, *Martin Schultze*[1,3], •*Elisabeth M. Bothschafter*[1,4], *Annkatrin Sommer*[4], *Simon Holzner*[3], *Markus Fiess*[1], *Michael Hofstetter*[1], *Reinhard Kienberger*[1,4], *Vadym Apalkov*[2], *Vladislav Yakovlev*[1,3], *Mark Stockman*[2], and *Ferenc Krausz*[1,3]; [1]*Max-Planck-Institut für Quantenoptik, Hans-Kopfermann-Str. 1, 85748 Garching, Germany*, [2]*Department of Physics, Georgia State University, Atlanta, GA30340, USA*, [3]*Fakultät für Physik, Ludwig-Maximilians-Universität, Geschwister-Scholl-Platz 1, 80539 München, Germany*, [4]*Physik-Department, Technische Universität München, James-Franck-Str., 85748 Garching, Germany*.

Striking field-induced changes in the absorption near the Si L-edge of SiO_2 exposed to a near-infrared laser field of several V/Å delivered by a few-cycle pulse are observed with sub-100 attosecond extreme ultraviolet pulses.

11:00 Auditorium A MON.2A.2

Ultrafast Relaxation Dynamics of Highly-excited States in N2 Molecules Excited by Femtosecond XUV Pulses, •*Matteo Lucchini*[1], *Kyung Seung Kim*[2], *Francesca Calegari*[1], *Freek Kelkensberg*[3], *Wing Kiu Siu*[3], *Giuseppe Sansone*[1], *Marc Vrakking*[4], *Majdi Hochlaf*[5], and *Mauro Nisoli*[1]; [1]*Department of Physics, Politecnico di Milano, IFN-CNR, Piazza L. da Vinci 32, 20133 Milano,Italy*, [2]*Department of Physics and Coherent X-ray Research Center (CXRC), KAIST, Daejeon 305-701, Korea*, [3]*FOM Institute AMOLF, Science Park 104, NL-1098 XG Amsterdam, The Netherlands*, [4]*Max-Born-Institut, Max Born Strasse 2A, D-12489 Berlin, Germany*, [5]*Université Paris-Est, MSME UMR 8208 CNRS, 5 bd Descartes, 77454,*

Marne-la-Vallée, France.
We used velocity-map-imaging to measure electronic and nuclear dynamics in N2 molecules excited by extreme-ultraviolet pulses. A time-to-space mapping of autoionization channel is demonstrated; complex dynamics of highly-excited states on sub-8-femtosecond time-scale is found.

11:15 Auditorium A MON.2A.3

Attosecond Control of Strong-Field Phenomena in Helium, •*Jens Herrmann*[1], *Matthias Weger*[1], *Reto Locher*[1], *Mazyar Sabbar*[1], *Paula Rivière*[2], *Ulf Saalmann*[3], *Jan-Michael Rost*[3], *Lukas Gallmann*[1], and *Ursula Keller*[1]; [1]*Physics Department, ETH Zurich, CH-8093 Zürich, Switzerland*, [2]*Departamento de Química, Universidad Autónoma de Madrid, ES-28049 Madrid, Spain*, [3]*Max-Planck Institute for the Physics of Complex Systems, D-01187 Dresden, Germany*.
Attosecond transient absorption is used to observe electron dynamics in helium. Rapid sub-femtosecond absorption modulations are attributed to wavepacket interference whereas femtosecond absorption and re-emission structures are explained by a simple two-level model.

11:30 Auditorium A MON.2A.4

Attosecond Streaking of Shake-up and Auger Electrons in Xenon, •*Aart Verhoef*[1], *Alexander Mitrofanov*[1], *Maria Krikunova*[2,3], *Nikolay Kabachnik*[4,5], *Markus Drescher*[2], and *Andrius Baltuska*[1]; [1]*Institut für Photonik, Technische Universität Wien, Gusshausstrasse 27/387, Vienna, Austria*, [2]*Institut für Experimentalphysik, Universität Hamburg, Luruper Chaussee 149, 22761 Hamburg, Germany*, [3]*Institut für Optik und Atomare Physik, Technische Universität Berlin, Hardenbergstrasse 36, 10623 Berlin, Germany*, [4]*Institute of Nuclear Physics, Moscow State University, Moscow 119991, Russia*, [5]*European XFEL GmbH, Albert-Einstein-Ring 19, 22761 Hamburg, Germany*.
We present first results of simultaneous attosecond streaking measurements of shake-up electrons and Auger electrons emitted from xenon. The spectral overlap of the electronic wavepackets allows for reliable reconstruction of the relative phases.

11:45 Auditorium A MON.2A.5

Two-Electron Wave-Packet Observation in Helium, •*Andreas Kaldun*[1,2], *Christian Ott*[1,2], *Philipp Raith*[1,2], *Kristina Meyer*[1,2], *Martin Laux*[1,2], *Yizhu Zhang*[1,2], *Steffen Hagstotz*[1,2], *Thomas Ding*[1,2], *Robert Heck*[1,2], and *Thomas Pfeifer*[1,2]; [1]*Max-Planck-Institut für Kernphysik, Saupfercheckweg 1, 69117 Heidelberg, Germany*, [2]*Center for Quantum Dynamics, Ruprecht-Karls-Universität Heidelberg, 69120 Heidelberg, Germany*.
A two-electron wave packet among the lowest-lying doubly-excited states in helium is experimentally observed. It creates a 1-femtosecond modulation in the transient-absorption signal modified by a time-delayed coupling laser.

12:00 Auditorium A MON.2A.6

Laser-driven attosecond electron dynamics in hydrogen molecular ion, •*Andreas Becker*[1], *Norio Takemoto*[1,2], *Antonio Picon*[1,3], and *Daniel Weflen*[1]; [1]*JILA and Department of Physics, University of Colorado, Boulder, Colorado 80309, USA*, [2]*Department of Chemical Physics, Weizmann Institute of Science, 76100 Rehovot, Israel*, [3]*Argonne National Laboratory, Argonne, Illinois 60439, USA*.
We report about a complex laser driven electron dynamics inside the hydrogen molecular ion on the attosecond time scale which influences the instant of ionization of the molecule and the final electron momentum distributions.

12:15 Auditorium A MON.2A.7

Efficient Attosecond Control of Electron Dynamics in Molecules, •*Hendrike Braun*[1], *Philipp von den Hoff*[2], *Tim Bayer*[1], *Robert Siemering*[2], *Regina de Vivie-Riedle*[2], *Matthias Wollenhaupt*[1], and *Thomas Baumert*[1]; [1]*Institute of Physics and CINSaT, University of Kassel, D-34132 Kassel, Germany*, [2]*Departement Chemie, Ludwig-Maximilians-Universität München, D-81377 München, Germany*.
We demonstrate how the fast electron dynamics in molecules and hence the reaction of the system can be efficiently manipulated by controlling the temporal phase of an ultra short laser pulse with attosecond precision.

MON.2B: X-Ray Absorption Spectroscopy

Chair: Rafael Abela, Paul Scherrer Institute, Villigen PSI, Switzerland

10:45–12:30 Auditorium B MON.2B

10:45 Auditorium B MON.2B.1

Mapping chemical bonding of reaction intermediates with femtosecond X-ray laser spectroscopy, •*Philippe Wernet*[1], *Martin Beye*[1], *Frank de Groot*[2], *Stefan Düsterer*[3], *Kelly Gaffney*[4], *Sebastian Grübel*[5], *Robert Hartsock*[4], *Franz Hennies*[6], *Ida Joseffson*[7], *Brian Kennedy*[6], *Kristjan Kunnus*[1], *Torsten Leitner*[1], *Tommaso Mazza*[8], *Michael Meyer*[8], *Dennis Nordlund*[9], *Michael Odelius*[7], *Wilson Quevedo*[5], *Paul Radcliffe*[8], *Ivan Rajkovic*[5], *Bill Schlotter*[10], *Markus Scholz*[5], *Simon Schreck*[1], *Edlira Suljoti*[1], *Simone Techert*[5], *Josh Turner*[10], *Christian Weniger*[1], *Wenkai Zhang*[4], and *Alexander Föhlisch*[1]; [1]*Helmholtz-Zentrum Berlin, GmbH, Albert-Einstein-Str. 15, 12489 Berlin, Germany*, [2]*2Department of Inorganic Chemistry and Catalysis, Utrecht University, Universiteitsweg 99, 3584 CG Utrecht, Netherlands*, [3]*DESY, Notkestr. 85, 22670 Hamburg, Germany*, [4]*PULSE Institute, SLAC National Accelerator Laboratory, Menlo Park, CA 94025 USA*, [5]*Max Planck Institute for Biophysical Chemistry, Am Faßberg 11, 37077 Göttingen, Germany*, [6]*MAX IV Laboratory, Lund, Sweden*, [7]*Department of Physics, Stockholm University, AlbaNova University Center, 10691 Stockholm, Sweden*, [8]*European XFEL GmbH, Albert-Einstein-Ring 19, 22761 Hamburg, Germany*, [9]*Stanford Synchrotron Radiation Lightsource, SLAC National Accelerator Laboratory, Menlo Park, CA 94025 USA*, [10]*Linac Coherent Light Source, SLAC National Accelerator Laboratory, Menlo Park, CA 94025 USA*.
We determine the pathways in the photo-dissociation reactions of Fe(CO)5 both in the gas phase and in solution by mapping the valence electronic structure of the reaction intermediates with femtosecond X-ray laser spectroscopy.

11:00 Auditorium B MON.2B.2

An X-ray absorption spectroscopy study of the structure and bonding of halide Re-carbonyl diimine complexes, •*Thomas Penfold*[1,2,3], *Amal El Nahhas*[1], *Renske van der Veen*[1], *Ana María Blanco-Rodriguez*[4], *Frederico Lima*[1], *Rafael Abela*[3], *Stanislav Zális*[5], *Antonín Vlcek*[4,5], *Ivano Tavernelli*[2], *Ursula Rothlisberger*[2], *Christopher Milne*[1], and *Majed Chergui*[1]; [1]*Ecole Polytechnique Fédérale de Lausanne, LSU, ISIC, FSB-BSP, CH-1015 Lausanne, CH.*, [2]*Ecole Polytechnique Fédérale de Lausanne, LCBC, ISIC, FSB-BSP, CH-1015 Lausanne, CH.*, [3]*SwissFEL, Paul Scherrer Inst, CH-5232 Villigen, CH.*, [4]*School of Biological and Chemical Sciences, Queen Mary, University of London,Mile End Road, London E1 4NS,*

UK., [5]*J. Heyrovsky Institute of Physical Chemistry, Academy of Sciences of the Czech Republic, Dolejskova 3, Prague, CZE.*.
Using static and picosecond X-ray absorption spectroscopy we study the structure and excited state dynamics of [ReBr(CO)3(bpy)]. In particular the transient spectra show that the lowest triplet state contains mixing of MLCT and LLCT excitations.

11:15 Auditorium B MON.2B.3

Elucidating Charge Delocalization in the High-Spin State of aqueous Fe(II) Spin-Crossover Compounds via Time-Resolved Spectroscopy in the X-ray Water Window, •*Nils Huse*[1,2], *Benjamin E. Van Kuiken*[3], *Hana Cho*[2,4], *Matthew L. Strader*[2], *Tae Kyu Kim*[4], *Munira Khalil*[3], and *Robert W. Schoenlein*[2]; [1]*Max Planck Research Department for Structural Dynamics, University of Hamburg & Center for Free Electron Laser Science, 22607 Hamburg, Germany*, [2]*Ultrafast X-ray Science Lab, Chemical Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA 94720, USA*, [3]*Department of Chemistry, University of Washington, Seattle, Washington 98195, USA*, [4]*Department of Chemistry, Pusan National University, Geumjeong-gu, Busan 609-735, Korea*.
We report the first time-resolved spectroscopy of aqueous solution in the X-ray water window. Nitrogen K-edge spectra combined with ab initio calculations reveal distinct charge delocalization, shedding light on the origins of ultrafast spin crossover.

11:30 Auditorium B MON.2B.4

Short-Time Events, Coherence, and Structural Dynamics in Photochemistry of Aqueous Halogenated Transition Metal Dianions, •*Alexander Tarnovsky*[1], *Igor Zheldakov*[2], *Patrick El-Khoury*[3], *Suman Pal*[4], *Andrey Mereshchenko*[1], *Mikhail Ryazantsev*[5], *Evgeniia Butaeva*[1], *Pascher Pascher*[6], *Jens Uhlig*[6], *Christopher Milne*[7], and *Steven Johnson*[8]; [1]*Department of Chemistry, Center for Photochemical Sciences, Bowling Green State University, Bowling Green, OH, USA*, [2]*Department of Chemistry, University of Kansas, Lawrence, KS 66045, USA*, [3]*Department of Chemistry, University of California, Irvine, California 92697, USA*, [4]*School of Basic Sciences, Indian Institute of Technology, Mandi, Himachal Pradesh 175 001, India*, [5]*Department of Chemistry, Emory University, Atlanta, GA 30322, USA*, [6]*Department of Chemical Physics, Lund University, Lund, Sweden*, [7]*Laboratory of Ultrafast Spectroscopy, EPFL, CH-1015 Lausanne, Switzerland*, [8]*Institut für Quantenelektronik, Eidgenössische Technische Hochschule Zürich, Zürich CH-8093, Switzerland*.
Ultrafast pump-probe spectroscopy, time-resolved x-ray absorption, and computational photochemistry elucidate the photochemical pathway of hexabromoplatinate dianions that propagates through distortions of nascent penta-bromoplatinate anions caused by Jahn-Teller conical intersections and terminates at aquated product complexes.

11:45 Auditorium B MON.2B.5

Ultrafast X-ray absorption studies of the transition from hydrophilic to hydrophobic solvation, •*Christopher Milne*[1,2], *Van Thai Pham*[1], *Tom Penfold*[1,3,4], *Renske van der Veen*[1,2], *Frederico Lima*[1,2], *Amal El Nahhas*[1], *Steven Johnson*[2], *Paul Beaud*[2], *Rafael Abela*[3], *Christian Bressler*[1], *Ivano Tavernelli*[4], and *Majed Chergui*[1]; [1]*Laboratoire de Spectroscopie Ultrarapide, EPFL, Lausanne, Switzerland*, [2]*Swiss Light Source, PSI, Villigen, Switzerland*, [3]*SwissFEL, PSI, Villigen, Switzerland*, [4]*Laboratoire de Chimie Et Biochimie Computationnelles, EPFL, Lausanne, Switzerland*.
Ultrafast x-ray absorption spectroscopy is used to probe the solvent structure changes upon photoexcitation of aqueous I-. The hydrophilic to hydrophobic transition takes 4 ps during which a transient I-OH_2 species is formed.

12:00 Auditorium B MON.2B.6

Picosecond X-ray absorption study of the photo-induced structural changes of nitrosyl-myoglobin in physiological solutions, •*Frederico Lima*[1], *Christopher Milne*[1], *Mercedes Hannelore Rittmann-Frank*[1], *Marco Reinhard*[1], *Thomas Penfold*[1,2,3], *Maurizio Benfatto*[4], and *Majed Chergui*[1]; [1]*Ecole Polytechnique Fédérale de Lausanne, Laboratoire de Spectroscopie Ultrarapide, ISIC, FSB-BSP, CH-1015 Lausanne, Switzerland*, [2]*Ecole Polytechnique Fédérale de Lausanne, Laboratoire de Chimie et Biochimie Computationnelles, ISIC, FSB-BSP, CH-1015 Lausanne, Switzerland*, [3]*SwissFEL, Paul Scherrer Institute, CH-5232 Villigen, Switzerland*, [4]*Laboratori Nazionali di Frascati, Istituto Nazionale di Fisica Nucleare CP13, 00044 Frascati, Italy*.
Pronounced changes are observed in the XANES spectrum of MbNO 50 ps after ligand photo-detachment, which point to trapping of NO at a nearby location. This can explain the fast recombination time of 216 ± 24 ps.

12:15 Auditorium B MON.2B.7

Nucleobase photoprotection probed by soft x-rays, *Joseph P. Farrell*[1,2], *Brian K. McFarland*[1], *Nora Berrah*[3], *Christoph Bostedt*[4], *John Bozek*[4], *Philip H. Bucksbaum*[1,2], *Ryan Coffee*[4], *James Cryan*[1,2], *Li Fang*[3], *Raimund Feifel*[5], *Kelly Gaffney*[1], *James M. Glownia*[1,2], *Todd Martinez*[1,6], *Melanie Mucke*[5], *Brendan Murphy*[3], *Shungo Miyabe*[1,6], *Adi Natan*[1], *Timur Osipov*[3], *Vladimir Petrovic*[1,2], *Sebastian Schorb*[4], *Thomas Schultz*[7], *Limor Spector*[1,2], *Francesco Tarantelli*[8], *Ian Tenney*[1,2], *Song Wang*[1,2], *William White*[4], *James L. White*[1,2], and •*Markus Gühr*[1]; [1]*PULSE, SLAC National Accelerator Laboratory, Menlo Park, CA 94025*, [2]*Departments of Physics and Applied Physics, Stanford University, Stanford, CA 94305*, [3]*Physics Department, Western Michigan University, Kalamazoo, MI 49008*, [4]*LCLS, SLAC National Accelerator Laboratory, Menlo Park, CA 94025*, [5]*Department of Physics, Uppsala University, Uppsala, Sweden*, [6]*Department of Chemistry, Stanford University, Stanford, CA 94305*, [7]*Max-Born-Institut, 12489 Berlin, Germany*, [8]*Dipartimento di Chimica, Universita di Perugia, and ISTM-CNR, 06123 Perugia, Italy*.
We present our first results of a UV-pump X-ray-probe study of the photoprotection mechanism of thymine. The experiment used element specific Auger spectroscopy and was carried out at the LCLS.

Lunch Break

12:30–14:00

MON.3: Water at Surfaces and Hydration Shells

Chair: Peter Hamm, University of Zurich, Zurich, Switzerland

14:00–15:45 Room 350/351 MON.3

14:00 Room 350/351 MON.3.1

Invited

Ultrafast dynamics of water at the water-air interface studied by femtosecond surface vibrational spectroscopy, •*Mischa Bonn*[1,2], *Cho-Shuen Hsieh*[1], *Lukasz Piatkowski*[2], *Huib Bakker*[2], and *Zhen Zhang*[1]; [1]*Max Planck Institute for Polymer Research,*

Ackermannweg 10, 55128 Mainz, Germany, [2]*FOM-Institute AMOLF, Science Park 104, 1098 XG Amsterdam, The Netherlands*.
We study the dynamics of water molecules at the water-air interface, using surface-specific two-dimensional infrared sum-frequency generation (2D-SFG) spectroscopy. The data reveal the occurrence of surprisingly fast energy transfer and reorientational dynamics at aqueous interfaces.

14:30 Room 350/351 MON.3.2

Two Dimensional Heterodyne-Detected VSFG Spectroscopy of Water Molecules at Charged Interfaces, •*Satoshi Nihonyanagi*, *Prashant Singh*, *Shoichi Yamaguchi*, and *Tahei Tahara*; *RIKEN, Wako, Saitama 351-0198 Japan*.
Two-dimensional heterodyne-detected vibrational sum-frequency generation spectroscopy has been developed and used to investigate the ultrafast vibrational dynamics of water at the charged aqueous interface.

14:45 Room 350/351 MON.3.3

Excited state dynamics of liquid water near the surface, *Franziska Buchner*[1], *Hans-Hermann Ritze*[1], *Marcus Beutler*[1], *Thomas Schultz*[1], *Ingolf-Volker Hertel*[1,2], and •*Andrea Lübcke*[1]; [1]*Max-Born-Institute, Berlin, Germany*, [2]*Humboldt University, department of physics, Berlin, Germany*.
Time resolved photoelectron spectroscopy explores the excited state dynamics of liquid water in presence of cations close to the surface. A transient hydrated electron-cation complex is observed.

15:00 Room 350/351 MON.3.4

Location of water molecules in membranes probed with ultrafast vibrational Förster energy transfer, •*Huib Bakker*, *Janneke de Heij*, and *Lukasz Piatkowski*; *FOM Institute AMOLF, Science Park 104, 1098 XG Amsterdam, The Netherlands*.
We determine the location of water molecules in DOPC membranes by measuring the Förster energy transfer between the water hydroxyl groups with femtosecond nonlinear vibrational spectroscopy. We find that most water is contained in nanoclusters.

15:15 Room 350/351 MON.3.5

Ultrafast Structural and Vibrational Dynamics of the Hydration Shell around DNA, •*Thomas Elsaesser*, *Lukasz Szyc*, and *Ming Yang*; *Max-Born-Institute, Max-Born-St. 2a, Berlin, 12489, Germany*.
Two-dimensional infrared spectroscopy serves for a direct mapping of hydration dynamics around DNA. We find a slowing down of structural dynamics and resonant OH stretch energy transfer in the water shell compared to bulk water.

15:30 Room 350/351 MON.3.6

Hydrophobic Hydration of Globular Proteins Studied with 2D-IR Spectroscopy, •*John King*, *Evan J. Arthur*, *Charles Brooks III*, and *Kevin Kubarych*; *University of Michigan, Ann Arbor MI, 48109*.
The dynamical constraints placed on hydration water surrounding globular proteins is studied using two-dimensional infrared spectroscopy. By adding an amphiphilic co-solvent the liberation of constrained water observed to be site-specific.

Coffee Break

15:45–16:15

MON.4A: Vibrational Coherences

Chair: Regina de Vivie-Riedle, Ludwig-Maximilians University, Munich, Germany

16:15–18:00 Auditorium A MON.4A

16:15 Auditorium A MON.4A.1

Ultrafast-Laser-Induced Backward Stimulated Raman Scattering for Tracing Atmospheric Gases, •*Pavel Malevich*[1], *Daniil Kartashov*[1], *Zou Pu*[1], *Skirmantas Alisauskas*[1], *Audrius Pugzlys*[1], *Andrius Baltuska*[1], *Linas Giniunas*[2], *Romualdas Danielius*[2], *Aleksei Zheltikov*[3,4], *Marco Marangoni*[5], and *Giulio Cerullo*[5]; [1]*Photonics Institute, Vienna University of Technology, Gusshausstrasse 27-387, A-1040 Vienna, Austria*, [2]*Light Conversion Ltd., P/O Box 1485, Sauletekio Avenue 10, LT-10223, Lithuania*, [3]*Physics Department, International Laser Center, M.V. Lomonosov Moscow State University, 119992 Moscow, Russia*, [4]*Department of Physics and Astronomy, Texas A&M University, College Station TX, 77843-4242, USA*, [5]*IFN-CNR, Dipartimento di Fisica, Politecnico di Milano, Piazza L. da Vinci, 32, 20133 Milano, Italy*.
By combining tunable broadband pulse generation with nonlinear spectral compression, we demonstrate a prototype scheme for highly selective coherent standoff sensing of air molecules and discuss its coupling to the recently demonstrated backward atmospheric lasing.

16:30 Auditorium A MON.4A.2

Ultraviolet-Resonance Femtosecond Stimulated Raman Study of the Initial Events in Photoreceptor Chromophore, •*Satoshi Takeuchi*, *Hikaru Kuramochi*, and *Tahei Tahara*; *Molecular Spectroscopy Laboratory, RIKEN, 2-1, Wako 351-0198, Japan*.
Newly-developed ultraviolet-resonance femtosecond stimulated-Raman spectroscopy was utilized to study the initial structural evolution of photoactive yellow protein chromophore in solution. The obtained spectra changed drastically within 1 ps, demonstrating rapid in-plane deformations of the chromophore.

16:45 Auditorium A MON.4A.3

Ultrafast Measurements of Coherent Vibrations in Benzenethiol Monolayer Film, •*Ken-ichi Shudo*[1], *Kohshiro Doi*[1], *Ikufumi Katayama*[1], *Masahiro Kitajima*[2], and *Jun Takeda*[1]; [1]*Yokohama Nat'l Univ., Yokohama 240-8501 Japan*, [2]*National Defense Academy, Yokosuka 239-8686 Japan*.
Ultrafast photo-reflectance of Benzentiol molecule bonded to gold surfaces was measured with an ultrashort pulse laser. Transient response in THz region revealed coherent motion of the molecules affected by the adsorption.

17:00 Auditorium A MON.4A.4

Controlling Quantum Interferences in IR Vibrational Excitations in Metal Carbonyls, •*Satoshi Ashihara*, *Kaori Enomoto*, and *Jumpei Tayama*; *Tokyo Univ. of A&T, Tokyo, JAPAN*.
Coherent controls over vibrational excitations in metal di-carbonyls were demonstrated by using phase-shaped mid-infrared pulses. The inter-state coherence between two normal-mode excitations and the quantum interference of multiple excitation paths were successfully controlled.

17:15 Auditorium A MON.4A.5

Femtosecond 2DIR spectroscopy of synthetic hydrogen-bonded wires: From homogeneous to inhomogeneous dynamics, *Stephan Knop*, *Martin Olschewski*, and •*Peter Vöhringer*; *Institut for Physical and Theoretical Chemistry, University of Bonn, Wegelerstrasse 12, 53115 Bonn, Germany*.

The complex interrelation between vibrational line broadening and energy relaxation in H-bonded networks is dictated by the strength of the hydrogen donor-acceptor couplings and is uniquely revealed by fs-2DIR spectroscopy on stereoselectively synthesized polyalcohols.

17:30 Auditorium A MON.4A.6

Two-Dimensional Raman-THz Spectroscopy of Water, •*Janne Savolainen*, *Saima Ahmed*, and *Peter Hamm*; *Institute of Physical Chemistry, University of Zurich, Zurich, Switzerland*.
We demonstrate a hybrid 2D-Raman-THz spectroscopy that circumvents experimental problems of 2D-Raman and 2D-THz spectroscopy. This experiment paves the way towards investigating the lineshape functions and couplings concerning low-frequency intermolecular degrees of freedom of water.

17:45 Auditorium A MON.4A.7

The rotation of NO3-(aq) as a probe of molecular ion-water interactions, •*Jan Thøgersen*[1], *Jakob Brun Nielsen*[1], *Svend Knak Jensen*[1], *Søren Rud Keiding*[1], *Michael Odelius*[2], *Julien Réhault*[3], and *Jan Helbing*[3]; [1]*Department of Chemistry, Aarhus University, Langelandsgade 140, DK-8000 Aarhus C, Denmark*, [2]*Department of Physics, Albanova, Roslagstullbacken 21, Stockholm University, SE-106 91 Stockholm, Sweden*, [3]*Department of Physical Chemistry, University of Zürich, Wintherthurerstrasse 190, CH-8057, Zürich, Switzerland*.
The interaction of the nitrate anion with water is investigated by UV and IR rotational anisotropy measurements and 2D-IR spectroscopy. The experimental results are compared to molecular dynamics simulations.

MON.4B: Molecules in Strong Fields

Chair: Ursula Keller, ETH Zurich, Zurich, Switzerland

16:15–18:00 Auditorium B MON.4B

16:15 Auditorium B MON.4B.1

Highly Efficient Molecular Ionization Probed by Few-cycle Laser Pulses, *Stefan Roither*[1], •*Xinhua Xie*[1], *Markus Schöffler*[1], *Daniil Kartashov*[1], *Li Zhang*[1], *Atsushi Iwasaki*[2], *Huailiang Xu*[1,2,4], *Sergiy Bubin*[3], *Mackenzie Atkinson*[3], *Kálmán Varga*[3], *Kaoru Yamanouchi*[2], *Andrius Baltuška*[1], and *Markus Kitzler*[1]; [1]*Photonics Institute, Vienna University of Technology, A-1040 Vienna, Austria*, [2]*Department of Chemistry, School of Science, The University of Tokyo, Tokyo 113-0033, Japan*, [3]*Department of Physics and Astronomy, Vanderbilt University, Nashville, Tennessee 37235, USA*, [4]*State Key Laboratory on Integrated Optoelectronics, Jilin University, Changchun 130012, China*.
Field ionization of hydrocarbon molecules to high charge states is studied as a function of laser pulse duration and peak intensity. Results are in agreement with the recently proposed mechanism of multi-bond enhanced ionization.

16:30 Auditorium B MON.4B.2

Probing Charge Resonance Enhanced ionization of CO2 by varying the laser pulse duration, •*François Légaré*[1], *Irina Bocharova*[2], *Reza Karimi*[3], *Emmanuel F Penke*[4], *Jean-Paul Brichta*[5], *Philippe Lassonde*[1], *Xiquan Fu*[6], *Jean-Claude Kieffer*[1], *Andre D Bandrauk*[4], *Igor Litvinyuk*[7], and *Joseph Sanderson*[3]; [1]*Institut National de la Recherche Scientifique, Centre EMT, Varennes, QC Canada J3X1S2*, [2]*J.R. Macdonald Laboratory, Physics Department, Kansas State University, Manhattan, KS 66503*, [3]*Department of Physics and Astronomy University of Waterloo, Waterloo, ON Canada N2L 3G1*, [4]*Département de Chimie, Université de Sherbrooke, Sherbrooke, QC Canada J1K2R1*, [5]*Department of Physics, University of Ottawa, 150 Louis-Pasteur, Ottawa, On Canada K1N6N5*, [6]*School of Computer and Communication, Hunan Changsha 410082, China*, [7]*Centre for Quantum Dynamics, Griffith University, Nathan, Queensland 4111, Australia*.
By measuring the kinetic energy spectra of the dissociative ionization of CO2n+(n=3-6) as a function of pulse duration, we found the onset of charge resonance enhanced ionization. The results are supported with quantum numerical simulations.

16:45 Auditorium B MON.4B.3

Controlling ionisation and fragmentation processes in CO2 via inelastic electron recollisions, *Malte Oppermann*, •*Sebastien Weber*, *Leszek Frasinski*, and *Jonathan Marangos*; *Imperial College London, UK*.
For the first time, the angular dependence of nonsequential double ionisation and dissociation induced by laser driven inelastic electron rescattering was investigated experimentally in aligned CO2. A strong dependence on the recollision angle was found.

17:00 Auditorium B MON.4B.4

Femtosecond Pump-Probe Spectroscopy for Single Trapped Molecular Ions, •*Markus Kowalewski*[1], *Steffen Kahra*[2], *Günther Leschhorn*[2], *Tobias Schätz*[2], and *Regina de Vivie-Riedle*[1]; [1]*Department of Chemistry, Ludwig-Maximilian-Universität, D-81377 Munich*, [2]*Albert-Ludwigs-Universität Freiburg, Hermann-Herder-Str. 3a, 79104 Freiburg, Germany*.
The vibrational dynamics of single molecular ions confined in a coulomb crystal are followed by 4 fs ultraviolet pulses. Theoretical calculations predicted the optimal laser parameters for a successful experiment under background free conditions.

17:15 Auditorium B MON.4B.5

Orbital angular momentum transfer in multiple-order coherent Raman sideband generation, •*Miaochan Zhi*, *James Stroheber*, *Alexei Sokolov*, and *Hans Schuessler*; *Institute for quantum Science and Engineering and Department of Physics and Astronomy, Texas A&M University, College Station, Texas, 77843-4242, USA*.
We produce multiple-order Raman sidebands by focusing a pair of linearly chirped femtosecond pulses into a Raman-active crystal. We use optical vortices to study orbital angular momentum transfer in this broadband coherent Raman generation process.

17:30 Auditorium B MON.4B.6

Correlated Rotational Alignment Spectroscopy of Isolated Molecules and Clusters, •*Christian Schröter*[1], *Kyriaki Kosma*[1,2], and *Thomas Schultz*[1]; [1]*Max Born Institute, Max Born Str. 2A, 12489 Berlin, Germany*, [2]*Now at the Foundation for Research and Technology, Hellas, Post Office Box 1527, 71110 Heraklion, Greece*.
We present a novel multi-pulse spectroscopic method for the correlated analysis of molecular mass, rotational structure and electronic structure. First experiments investigate carbon disulfide and butadiene.

17:45 Auditorium B MON.4B.7

Unidirectional Molecular Rotation Measured by Rotational Doppler Effect, •*Omer Korech*[1], *Ilya Averbukh*[1], *Uri Steinitz*[1], *Robert Gordon*[2], and *Yehiam Prior*[1]; [1]*Department of Chemical Physics, Weizmann Institute of Science, Rehovot, 76100, Israel*, [2]*Department of Chemistry, University of Illinois at Chicago, Illinois 60607, United States*.

Unidirectional rotation of molecules has been observed for the first time at ambient conditions. A circularly polarized beam probes the rotating molecules and its spectrum is modified by the rotational Doppler Effect

MON.PI: Poster Session I

18:00–19:30 Poster area MON.PI

18:00 Poster area MON.PI.1

Sub-picosecond Graphene-based Harmonically Mode-locked Fiber Laser With Repetition Rates up to 2.22 GHz, •*Grzegorz Sobon*, *Jaroslaw Sotor*, and *Krzysztof Abramski*; *Wroclaw University of Technology, Wybrzeze Wyspianskiego 27, 50-370 Wroclaw, Poland*.
Erbium-doped fiber laser passively mode-locked by atomic layer graphene is presented. In harmonic mode-locking regime, the laser could operate at the 21st harmonic of the fundamental resonator frequency (2.22 GHz) with 900 fs pulses.

18:00 Poster area MON.PI.2

Optical parametric chirped pulse amplifier at 1600 nm with all-optical synchronization, •*Etienne Pelletier*[1], *R.J. Dwayne Miller*[1,2], and *Alfred Leitenstorfer*[3]; [1]*Departments of Chemistry and Physics, University of Toronto, 80 St. George Street, Toronto, Ontario M5S 3H6, Canada*, [2]*Max Planck Department for Structural Dynamics, Department of Physics, University of Hamburg Centre for Free Electron Laser Science, DESY, Notkestrasse 85, Hamburg 22607, Germany*, [3]*Department of Physics and Center for Applied Photonics, University of Konstanz, 78464 Konstanz, Germany*.
We demonstrate the amplification of 1.6 um pulses by a KTA optical parametric chirped-pulse amplifier based on an all-optical synchronization scheme as a scalable approach to generation of high power tunable mid infrared.

18:00 Poster area MON.PI.3

All-fiber ultrafast Cherenkov source, •*Xiaomin Liu*[1], *Jesper Laegsgaard*[1], *Uffe Møller*[1], *Haohua Tu*[2], *Stephen Boppart*[2], and *Dmitry Turchinovich*[1,3]; [1]*DTU Fotonik, Technical University of Denmark, DK-2800 Kgs. Lyngby*, [2]*Biophotonic Imaging Laboratory, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801, U.S.A.*, [3]*Max Planck Institute for Polymer Research, Ackermannweg 10, 55128 Mainz, Germany*.
An all-fiber ultrafast Cherenkov radiation source is demonstrated for the first time. The emitted tunable multimilliwatt ultrafast visible output can find applications in practical biophotonics such as bio-imaging and microscopy techniques.

18:00 Poster area MON.PI.4

Actively Stabilized Attosecond Interferometer, •*Martin Huppert* and *Hans Jakob Wörner*; *ETH Zurich, Wolfgang-Pauli-Strasse 10, CH-8093 Zurich, Switzerland*.
Our setup generates a controlled attosecond delay between two ultrashort infrared or ultraviolet and extreme ultraviolet pulses and represents a versatile tool to realize pump-probe measurements of electronic dynamics in polyatomic molecules or solvated systems.

18:00 Poster area MON.PI.5

2D Stimulated Resonance Raman Spectroscopy of Molecules with Broadband X-ray Pulses, •*Jason D. Biggs*, *Yu Zhang*, *Daniel Healion*, and *Shaul Mukamel*; *Department of Chemistry, University of California, Irvine*.
1D- and 2D-SXRS signals are calculated for trans-N-methyl acetamide (NMA) with broad bandwidth pulses tuned to the oxygen and nitrogen K-edges. Cross-peaks reveal electronic Frank-Condon overlaps.

18:00 Poster area MON.PI.6

Optical Nanoantennas for Nonlinear Spectroscopy of a Single Nanoobject, •*Thorsten Schumacher*[1,2], *Daniela Ullrich*[1,2], *Mario Hentschel*[1,2], *Harald Giessen*[2], and *Markus Lippitz*[1,2]; [1]*Max Planck Institute for Solid State Research, Stuttgart, Germany*, [2]*4th Physics Insitute University of Stuttgart, Germany*.
We present the realization of an optical nanoantenna to enhance the ultrafast optical response of an individual nanoobject. Our transient nonlinear signal is caused by a single vibrating gold nanodisks and single semiconductor nanocrystals.

18:00 Poster area MON.PI.7

High-power Kerr-lens mode-locked Yb:YAG thin-disk oscillator in positive and negative dispersion regimes, •*Oleg Pronin*[1], *Jonathan Brons*[2], *Fabian Lücking*[2], *Christian Grasse*[3], *Vladimir Pervak*[2], *Gerhard Boehm*[3], *Marcus-Christian Amann*[3], *Vladimir Kalashnikov*[4], *Alexander Apolonski*[1,2], and *Ferenc Krausz*[1,2]; [1]*Max-Planck Institut für Quantenoptik, Garching, Germany*, [2]*Ludwig-Maximillians-Universität München, Garching, Germany*, [3]*Walter Schottky Institut, Garching, Germany*, [4]*Institut für Photonik, TU Wien, Vienna, Austria*.
We demonstrate a power-scalable Kerr-lens mode-locked Yb:YAG thin-disk oscillator operating with 200 fs, 17 W and 270 fs, 45 W in negative dispersion regime as well as 190 fs, 17 W in positive dispersion regime

18:00 Poster area MON.PI.8

Generation of Sub-Two-Cycle Pulses Tunable around 1.8 μm with Passively Stabilized Carrier-Envelope Phase at 100 kHz Repetition Rate, •*Christian Homann*[1], *Maximilian Bradler*[1], *Michael Förster*[2], *Peter Hommelhoff*[2], and *Eberhard Riedle*[1]; [1]*LS für BioMolekulare Optik, LMU München, Germany*, [2]*Max-Planck-Institut für Quantenoptik, Garching, Germany*.
We present an efficient concept for generating carrier-envelope phase stable pulses tunable between 1.6 and 2.0 μm with durations down to 8.2 fs together with first applications on emission of electrons from nanoscale metal tips.

18:00 Poster area MON.PI.9

Generation of phase-stable half-cycle mid-infrared pulses through filamentation in gases, •*Yutaka Nomura*[1], *Takao Fuji*[1], *Hideto Shirai*[2], *Noriaki Tsurumachi*[2], *Alexander A. Voronin*[3], and *Aleksei M. Zheltikov*[3,4]; [1]*Institute for Molecular Science, 38 Nishigonaka, Myodaiji, Okazaki, 444-8585, Japan*, [2]*Faculty of Engineering, Kagawa University, 2217-20 Hayashi-cho, Takamatsu, 761-0396, Japan*, [3]*Physics Department, International Laser Center, M. V. Lomonosov Moscow State University, 119992 Moscow, Russia*, [4]*Department of Physics and Astronomy, Texas A&M University, College Station, Texas 77843-4242, USA*.
Phase-stable half-cycle mid-infrared pulses were produced through filamentation in argon. The pulse width was obtained as 7.9 fs at 4.1 μm carrier wavelength by using frequency-resolved optical gating.

18:00 Poster area MON.PI.10

Carrier-envelope Phase Drift Detection of Picosecond Pulses, •*Adam Borzsonyi*[1,2], *Peter Jojart*[1,2], *Ronic Chiche*[3], *Viktor Soskov*[3], *Fabian Zomer*[3], *Eric Cormier*[4], and *Karoly Osvay*[1];

[1]*Department of Optics and Quantum Electronics, University of Szeged, Szeged, Hungary*, [2]*CE Optics Kft., Szeged, Hungary*, [3]*LAL, CNRS-IN2P3 Universite Paris Sud, Orsay, France*, [4]*CELIA, Université de Bordeaux,Talence, France*.
Two independent measurements reveal that carrier-envelope phase drift of a picosecond pulse train can be directly obtained from by the spectrally resolved interference pattern of a stabilized multiple-beam interferometer.

18:00 Poster area MON.PI.11

Highly-Efficient 1-GHz Repetition-Frequency Femtosecond Yb3+:KY(WO4)2 Laser for Supercontinuum Generation, •*Thomas Schratwieser*, *Derryck Reid*, and *Christopher Leburn*; *Scottish Universities Physics Alliance (SUPA), Institute of Photonics and Quantum Sciences, School of Engineering and Physical Sciences, Heriot-Watt University, Riccarton, Edinburgh EH14 4AS, UK*.
We present a 1.024-GHz-repetition-rate femtosecond Yb3+:KY(WO4)2 laser with 61% optical-to-optical efficiency and 69% slope efficiency, generating a super-continuum of bandwidth 400 nm in silica photonic-crystal fibre. RIN measurements of the laser yielded values $<0.1\%$.

18:00 Poster area MON.PI.12

Third- and Fifth-Harmonic Generation by Mid-Infrared Ultrashort Pulses: Beyond the Fifth-Order Nonlinearity, •*Daniil Kartashov*[1], *Skirmantas Alisauskas*[1], *Audrius Pugzlys*[1], *Alexander Voronin*[2], *Aleksei Zheltikov*[2,3], and *Andrius Baltuska*[1]; [1]*Photonics Institute, Vienna University of Technology, Gusshaus-strasse 27-387, A-1040 Vienna, Austria*, [2]*Physics Department, International Laser Center, M.V. Lomonosov Moscow State University, 119992 Moscow, Russia*, [3]*Department of Physics and Astronomy, Texas A&M University, College Station TX, 77843-4242, USA*.
Third- and fifth-harmonic generation by ultrashort laser pulses in the mid-infrared reveals nonlinear-optical effects beyond the fifth-order nonlinearity and enables, due to an extraordinarily long coherence length, efficient multiplex frequency conversion of ultrashort mid-IR pulses.

18:00 Poster area MON.PI.13

Electron Acceleration in Vacuum by Ultrashort and Tightly Focused Radially Polarized Laser Pulses, •*Vincent Marceau* and *Michel Piché*; *Centre d'optique, photonique et laser, Université Laval, Québec, Canada*.
We study electron acceleration driven by radially polarized laser beams in the tightly focused and ultrashort pulse regime. Besides allowing for higher energy gains, such beams could be used to generate synchronized counterpropagating electron pulses.

18:00 Poster area MON.PI.14

Temporal coherence effects on coherent diffractive imaging of a binary sample by a high harmonic source, •*Aaron D. Parsons*[1], *Richard T. Chapman*[2], *Benjamin Mills*[1], *Sasa Bajt*[3], *Jeremy G. Frey*[2], and *William S. Brocklesby*[1]; [1]*Optoelectronics Research Centre, University of Southampton, Highfield, Southampton, SO171BJ, UK*, [2]*School of Chemistry, University of Southampton, Highfield, Southampton, SO171BJ, UK*, [3]*Photon Science, DESY, Notkestrasse 85, 22607 Hamburg , Germany*.
Coherent Diffractive imaging (CDI) is performed with single and multiple harmonics from an ultrafast HHG source. The effect of HHG source bandwidth on the effectiveness of the reconstruction algorithms is compared.

18:00 Poster area MON.PI.15

Sub-100 nm Structures by 3D Two-Photon Polymerization Using Few-Cycle-Laser Sources, •*Moritz Emons*[1], *Kotaro Obata*[2], *Marcel Schultze*[1], *Tino Lang*[1], *Thomas Binhammer*[3], and *Uwe Morgner*[1,2]; [1]*Institut für Quantenoptik, Leibniz Universität Hannover, Welfengarten 1, 30167 Hannover, Germany*, [2]*Laser Zentrum Hannover e.V., Hollerithallee 8, 30419 Hannover, Germany*, [3]*VENTEON Laser Technologies GmbH, Hertzstr. 1b, D-30827 Garbsen, Germany*.
Nano fabrication with fs-based two-photon polymerization (TPP) technique is discussed. The spatial resolution depends on the used polymer material and the pulse duration for fabrication. Here we show the successful creation of sub-100 nm structures.

18:00 Poster area MON.PI.16

Broadband multilayer mirror and diffractive optics for attosecond pulse shaping in the 280-500 eV photon energy range, •*Alexander Guggenmos*[1,2], *Michael Hofstetter*[1,2], *Roman Rauhut*[1], *Christian Späth*[1], *Bert Nickel*[1,4], *Sunling Yang*[3], *Eric Gullikson*[3], *Ferenc Krausz*[1,2], and *Ulf Kleineberg*[1,2]; [1]*Ludwig-Maximilians-Universität München, Fakultät für Physik, Am Coulombwall 1, D-85748 Garching, Germany*, [2]*Max-Planck-Institut für Quantenoptik, Hans-Kopfermann-Str. 1, D-85748 Garching, Germany*, [3]*Center for X-Ray Optics, Lawrence Berkeley National Lab 2-400, 1 Cyclotron Road, Berkeley, CA 94720, USA*, [4]*Center for NanoScience (CeNS), Ludwig-Maximilians-Universität München, Schellingstr. 4, D-80799 Munich, Germany*.
Broadband multilayer mirrors are key components to shape attosecond pulses in XUV range. Here, we report about the first implementation of multilayers and diffractive optics fulfilling these requirements in the "water-window" spectral range

18:00 Poster area MON.PI.17

Two-dimensional spectroscopy using dual acousto-optic pulse shapers for complete polarization, phase and amplitude control, *Pooja Tyagi*[1], *Jonathan Saari*[1], *Vincent Crozatier*[2], *Nicolas Forget*[2], and •*Patanjali Kambhampati*[1]; [1]*Department of Chemistry, McGill University, Montreal, QC, H3A 08B, Canada*, [2]*FASTLITE, Centre scientifique d'Orsay - Bât.503, Plateau du Moulon - BP 45, Orsay, France*.
We demonstrate a pulse-shaper capable of independent polarization, phase and amplitude control over each pulse. The set-up is compact and easily switchable between pump-probe and collinear geometries. 2D spectra from each geometry will be compared.

18:00 Poster area MON.PI.18

Enhancing temporal resolution in pump-probe experiments with noisy pulses, •*Kristina Meyer*, *Christian Ott*, *Philipp Raith*, *Andreas Kaldun*, *Yuhai Jiang*, *Arne Senftleben*, *Moritz Kurka*, *Robert Moshammer*, *Joachim Ullrich*, and *Thomas Pfeifer*; *Max-Planck Institute for Nuclear Physics, Heidelberg, Germany*.
We show how light fields that vary statistically in time (e.g. at FELs) enable higher temporal resolution than expected from their average pulse duration. An experimental example in deuterium molecules confirmed this general effect.

18:00 Poster area MON.PI.19

Dynamic probe concept for studying aggregation phenomena at liquid interfaces by femtosecond second harmonic generation technique, •*Marina Fedoseeva* and *Eric Vauthey*;

University of Geneva, Geneva, Switzerland.
Aggregation of organic dyes at liquid interfaces is studied by femtosecond interface-selective second harmonic generation (SHG) using the dynamic probe concept based on the SHG response to the environmental properties of the interfacial system.

18:00 Poster area MON.PI.20

Characterizing and optimizing impulsive molecular alignment by mixed gas samples, *Malte Oppermann*, •*Sebastien Weber*, and *Jonathan Marangos*; *Imperial College London*.
Optimisation and characterization of impulsive alignment is achieved by gas mixing of linear molecules with Argon atoms. Fourier Transform is used to determine accurately the rotational temperatures and systematic enhancement of the alignment is shown.

18:00 Poster area MON.PI.21

Higher-order Kerr allow quantitative modelling of laser filamentation, *Massimo Petrarca*[1], *Pierre Béjot*[1,2], •*Jérôme Kasparian*[1], and *Jean-Pierre Wolf*[1]; [1]*GAP-Biophotonics, Université de Genève, Chemin de Pinchat 22, 1211 Geneva 4, Switzerland*, [2]*Laboratoire Interdisciplinaire Carnot de Bourgogne (ICB), UMR 5209 CNRS-Université de Bourgogne, BP 47870, F-21078 Dijon Cedex, France*.
We show that the consideration of the higher-order Kerr effect allows a quantitative modelling of experimental intensity and electron density in laser filaments.

18:00 Poster area MON.PI.22

Dependence of Rydberg Yield on Ellipticity in Strong Field Ionization, •*Alexandra Landsman*; *Physics Department, ETH Zurich, CH-8093, Zurich, Switzerland*.
We obtain a probability distribution of Rydberg yield that shows very close agreement with recent experiment. Contrary to general expectations, we find that rescattering is not a significant mechanism in the creation of excited neutrals.

18:00 Poster area MON.PI.23

Towards Control of Predissociation Dynamics by Strong Ultrashort Laser Pulses, *Maria E. Corrales*[1], *Garikoitz Balerdi*[1], *Vincent Loriot*[1,2], *Luis Bañares*[1], and •*Rebeca de Nalda*[2]; [1]*Departamento de Química Física, Facultad de Ciencias Químicas, Universidad Complutense de Madrid, 28040 Madrid, Spain*, [2]*Instituto de Química Física Rocasolano, CSIC, C/ Serrano, 119, 28006 Madrid, Spain*.
Strong field control scenarios are investigated in the predissociation of CH3I in the second absorption band. Dynamic Stark control and pump-dump strategies are proposed to alter the lifetimes and product quantum yields of the reaction.

18:00 Poster area MON.PI.24

Electro-protonic wave function of CH_3OH: Time-dependent multi-configuration wave function theory for describing ultrafast hydrogen migration in intense laser fields, •*Tsuyoshi Kato* and *Kaoru Yamanouchi*; *Department of Chemistry, School of Science, The University of Tokyo, Tokyo, JAPAN*.
By treating protons in methanol (CH_3OH) as a wave function, its geometrical structure in the electro-protonic ground state was constructed for the first time beyond the Born-Oppenheimer approximation by multi-configuration wave function theory.

18:00 Poster area MON.PI.25

Optimization of high harmonic generation with 100 kHz repetition rate femtosecond fiber amplifier laser, •*Amélie Cabasse*, *Guillaume Machinet*, *Antoine Dubrouil*, *Eric Cormier*, and *Eric Constant*; *CELIA, Université de Bordeaux CNRS-CEA, UMR5107, 351 Cours de la libération, 33405 Talence Cedex, France*.
We analyse the influence of atomic gas media, gas pressure, harmonic order and the interaction gas geometry (gas jet or gas cell) on harmonic efficiency, with a 100 kHz repetition rate femtosecond fiber amplifier system.

18:00 Poster area MON.PI.26

The contribution has been withdrawn.

18:00 Poster area MON.PI.27

Time-Frequency Coupling effects in the Two-Photon Correlation of Broadband Four Wave Mixing, •*Rafi Vered*, *Michael Rosenbluh*, and *Avi Pe'er*; *Physics Department and BINA Center for Nano-technology, Bar-Ilan University, Ramat-Gan 52900, Israel*.
We precisely measure the time-energy correlation of broadband, spontaneously generated four waves mixing, and demonstrate surprising intensity dependent splitting of the correlation in both time and frequency and coupling effects between the domains.

18:00 Poster area MON.PI.28

Ultrafast phenomena and the Dynamical Casimir Effect, •*Viktor Dodonov*; *Institute of Physics, University of Brasilia, Brasilia, Brazil*.
Ultrafast processes are crucial for the observation of the Dynamical Casimir Effect: the photon creation from vacuum in cavities with time-dependent parameters. I demonstrate recent achievements in this area and problems to be resolved.

18:00 Poster area MON.PI.29

Carrier Envelope Phase Effects in Strong Field Ionization of Xenon with Few-Cycle 1800nm Laser Pulses, •*Bruno E. Schmidt*[1], *Max Möller*[2], *Max Sayler*[2], *Andrew Shiner*[3], *Giulio Vampa*[3], *François Légaré*[1], *David Villeneuve*[3], *Gerhard Paulus*[2], and *Paul Corkum*[3]; [1]*Institut National de la Recherche Scientifique Centre Énergie Matériaux et Télécommunications, 1650 Boulevard Lionel-Boulet, Varennes, QC J3X1S2, Canada*, [2]*Institut für Optik und Quantenelektronik, Max-Wien-Platz 1, 07743 Jena, Germany*, [3]*Joint Laboratory for Atto-Second Science, University of Ottawa/NRC, 100 Sussex Dive, Ottawa, K1A 0R6, Canada*.
Interferometrically CEP controlled few-cycle IR pulses revealed a strong influence on both, directly ionized and rescattered electrons in xenon for pulse durations from 2 to 5 cycles.

18:00 Poster area MON.PI.30

Quantum Resonance, Anderson Localisation and Selective Rotational Excitation in Periodically Kicked Molecules, •*Johannes Floß* and *Ilya Sh. Averbukh*; *The Weizmann Institute of Science, Rehovot, Israel*.
We show that periodically kicked molecules allow to observe effects of the kicked quantum rotor in a real rotor system and that this paves new roads to selective rotational excitations in molecules.

18:00 Poster area MON.PI.31

Toward a "Perfect-Wave" HHG Driving With a Multicolor OPA, •*Tadas Balciunas*[1], *Stefan Haessler*[1], *Guangyu Fan*[1], *Giedrius Andriukaitis*[1], *Audrius Pugzlys*[1], *Andrius Baltuska*[1], *Amelle Zair*[2], *Richard Squibb*[2], *Luke Chipperfield*[2], *Leszek Frasinski*[2], *John Tisch*[2], and *Jon Marangos*[2]; [1]*Photonics Institute, Vienne University of*

Technology, Gusshausstrasse 27/387, 1040 Vienna, Austria, [2]*Imperial College London, London SW7 2BW, UK*.
We realize a multicolor, multi-cycle combination of commonly CEP-locked waves from a single femtosecond OPA driven by a CEP -stable 6 -mJ kHz Yb laser system and report HHG driving with individual and combined colors.

18:00 Poster area MON.PI.32

Observing Molecular Reactions via Simultaneous Ultrafast X-ray Spectroscopy and Scattering, •*Andreas Galler*[1], *Wojciech Gawelda*[1], *Kristoffer Haldrup*[2], *Kaspar Skov Kjaer*[2], *Tim Brandt van Driel*[2], *Anne-Marie March*[3], *Gilles Doumy*[3], *Jens Uhlig*[4], *Sophie Canton*[4], *Grigory Smolentsev*[4], *David Fritz*[5], *Marco Cammarata*[5], *Henrik Lemke*[5], *Uwe Bergmann*[5], *Roberto Alonso Mori*[5], *Norbert Sas*[6], *Amelie Bordage*[6], *György Vanko*[6], *Dipanwita Ray*[3], *Elliot Kanter*[3], *Robert Dunford*[3], *Pieter Glatzel*[7], *Kelly Gaffney*[8], *Villy Sundström*[4], *Linda Young*[3], *Stephen Southworth*[3], *Martin M. Nielsen*[2], and *Christian Bressler*[1]; [1]*European X-ray Freee Electron Laser Facility, Hamburg, Germany*, [2]*Danish Technical University, Risø, Denmark*, [3]*APS, Advanced Photon Source, Argonne National Lab, Chicago, USA*, [4]*University of Lund, Lund, Sweden*, [5]*LCLS, Linear Coherent Light Source, Stanford, USA*, [6]*KFKI, Research Institute for Partivcle and Nuclear Physics, Budapest, Hungary*, [7]*ESRF, European Synchrotron Facility, Grenoble, France*, [8]*SLAC/PULSE, Stanford Linear Accelerator, Stanford, USA*.
We present results of benchmark experiments combining complementary structural tools such as x-ray absorption, x-ray emission spectroscopy and x-ray diffuse scattering. These experiments were performed at MHz pump-probe rates at synchrotrons, and at the LCLS.

18:00 Poster area MON.PI.33

Optical and X-ray Time Resolved Study of the Structural Transition in Mixed Valence Manganites, •*Andrin Caviezel*[1], *Urs Staub*[1], *Steven L. Johnson*[2], *Simon O. Mariager*[1], *Gerhard Ingold*[1], *Ekaterina Möhr-Vorobeva*[1], *Marios Garganourakis*[1], *Shih-Wen Huang*[1], *Chris J. Milne*[3], *Quanxi Jia*[4], *Sang-Wook Cheong*[5], and *Paul Beaud*[1]; [1]*Laboratory for Synchrotron Radiation, Swiss Light Source, Paul Scherrer Institut, 5232 Villigen PSI, Switzerland*, [2]*Institute for Quantum Electronics, Physics Department, ETH Zurich, 8093 Zurich, Switzerland*, [3]*Laboratoire de Spectroscopie Ultrarapide, Ecole Polytechnique Fédérale de Lausanne, 1015 Lausanne, Switzerland*, [4]*Los Alamos National Laboratory, Los Alamos, New Mexico 87545, USA*, [5]*Rutgers Center for Emergent Materials, Rutgers University, Piscataway, NJ, USA*.
Time resolved optical reflectivity and x-ray diffraction techniques are employed to measure the response of the order parameter in charge and orbitally ordered three-dimensional manganites over a wide range of temperatures and excitation fluences.

18:00 Poster area MON.PI.34

Time-resolved X-ray Spectroscopy in Theory: Quantum Chemical Calculations of Transient L-edge X-ray Spectra of Transition Metal Complexes, •*Michael Odelius*[1], *Ida Josefsson*[1], *Kristjan Kunnus*[2], *Simon Schreck*[2], *Frank de Groot*[3], and *Philippe Wernet*[2]; [1]*FYSIKUM, Albanova, Stockholm University,Stockholm, Sweden*, [2]*Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Berlin, Germany*, [3]*Utrecht University, Utrecht, Netherlands*.
Ab initio multi-configurational wave-function calculations enable accurate simulations of not only X-ray absorption, but the full resonant inelastic X-ray scattering process in applications to transient L-edge spectroscopy of photo-excited transition metal compounds.

18:00 Poster area MON.PI.35

Near-field terahertz imaging of a discontinuity in split ring resonator array, •*François Blanchard*[1,2], *Kazufumi Ooi*[3], *Tomoko Tanaka*[1,2], *Atsushi Doi*[4], and *Koichiro Tanaka*[1,2,3]; [1]*Institute for Integrated Cell-Material Sciences (WPI-iCeMS), Kyoto University, Sakyo-ku, Kyoto 606-8501, Japan*, [2]*CREST, Japan Science and Technology Agency, Kawaguchi, Saitama 332-0012, Japan*, [3]*Department of Physics Graduate School of Science, Kyoto University, Sakyo-ku, Kyoto 606-8502, Japan*, [4]*Olympus Corporation 2-3 Kuboyama-cho, Hachioji-shi, Tokyo 192-8512, Japan*.
We investigate the spatiotemporal evolution of single cycle terahertz pulses transmitted through split ring resonator array including a void. Using large field of view terahertz microscope, confinement and enhancement of defect mode is revealed.

18:00 Poster area MON.PI.36

Dynamically Phase Matched THz Generation in Large Area GaP Crystals, •*Daniel Dietze*, *Karl Unterrainer*, and *Juraj Darmo*; *Photonics Institute, Vienna University of Technology, 1040 Vienna, Austria*.
Dynamically phase matched generation of single-cycle THz pulses by optical rectification in GaP is demonstrated. Dynamic phase matching is achieved by the transient modification of the THz refractive index through stimulated generation of optical phonons.

18:00 Poster area MON.PI.37

Terahertz Sources Based on Polarization in InGaN Films, •*Nathaniel Woodward*, *Chad Gallinat*, *Lee Rodak*, *Grace Metcalfe*, *Hongen Shen*, and *Michael Wraback*; *U.S. Army Research Laboratory, 2800 Powder Mill Rd, Adelphi, MD 20783*.
We report on terahertz emission due to the carrier drift in polarization-induced electric fields in polar and nonpolar InGaN films.

18:00 Poster area MON.PI.38

Ultrafast Hot-electron Induced Phase Transitions in Vanadium Dioxide, •*Masaki Hada*[1], *Yusaku Hontani*[2], *Robert M. Edward*[3], *Richard F. Haglund Jr.*[3], and *Jiro Matsuo*[2]; [1]*Max Planck Research Department for Structural Dynamics, Center for Free Electron Laser Science, University of Hamburg, c/o DESY, Notkestrasse 85, Hamburg, 22607, Germany*, [2]*Quantum Science and Engineering Center, Kyoto University, Gokasho, Uji, Kyoto 611-0011, Japan*, [3]*Department of Physics and Astronomy, Vanderbilt University, Nashville TN 37235-1807 USA*.
The Au/Cr/VO2/Si system was investigated in pump-probe experiments. Hot-electrons generated in the Au were found to penetrate into the underlying VO2 and couple with its lattice inducing a semiconductor-to-metal phase transition in ˜1 picosecond.

18:00 Poster area MON.PI.39

Polarization-induced phase shift of ultrafast photocurrents, •*Shekhar Priyadarshi*, *Klaus Pierz*, and *Mark Bieler*; *Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Germany*.
Shift and injection currents are known to occur for linearly and circularly polarized optical excitations of semiconductors, respectively. Here, we show that the frequency dynamics of the coherent polarization changes this phase rule significantly.

18:00 Poster area MON.PI.40

Sub-ps-Dynamics of Polaron Gating in Lithium Niobate, •*Holger Badorreck*, *Volker Dieckmann*, *Pia Baeune*, and *Mirco Imlau*; *Department of Physics, University of Osnabrück, Barbarastr. 7, 49069 Osnabrück*.
The optical gating of bipolarons is studied in lithium niobate by means of ultrafast spectroscopy. We discover two distinct polaron dynamics ($\tau_1 = 100$ fs and $\tau_2 = 700$ fs) that affect polaron-based dynamic fs-holography.

18:00 Poster area MON.PI.41

Photoinduced Femtosecond Relaxation of Antiferromagnetic Orders in the Iron Pnictides Revealed by Ultrafast Laser Ellipsometry, •*Aaron Patz*, *Tianqi Li*, *Sheng Ran*, *Sergey Bud'ko*, *Paul Canfield*, and *Jigang Wang*; *Ames Laboratory and Department of Physics and Astronomy, Iowa State University, Iowa, USA*.
Abstract: We report fs spin relaxation in photoexcited undoped and weakly Cobalt doped BaFe2As2, which represents the first evidence to identify the antiferromagnetic fluctuations as the origin for the elusive nematic phase in iron pnictides.

18:00 Poster area MON.PI.42

Thermalization of Spins and Charges in Ferromagnetic Ni Films, •*Mircea Vomir*, *Eric Beaurepaire*, and *Jean-Yves Bigot*; *Institut de Physique et Chimie des Matériaux de Strasbourg, UMR 7504, CNRS - Université de Strasbourg, 23 rue du Loess, 67034 Strasbourg, France*.
We show that the thermalization time of the spins in Nickel increases with the thickness of the films for large densities of excitation. It is due to the spins scattering at surfaces.

18:00 Poster area MON.PI.43

Coexistence of Coupled Magnetic Phases in Epitaxial $TbMnO_3$ Films Revealed by Ultrafast Optical Spectroscopy, *Jingbo Qi*[1], *Li Yan*[1], *Jian-Xin Zhu*[2], *Stuart Trugman*[1,2], *Antoinette Taylor*[1], *Quanxi Jia*[1], and •*Rohit Prasankumar*[1]; [1]*Center for Integrated Nanotechnologies, Los Alamos National Laboratory, Los Alamos, NM 87545, USA*, [2]*Theoretical Division, Los Alamos National Laboratory, Los Alamos, NM 87545, USA*.
Ultrafast optical pump-probe spectroscopy is used to reveal the coexistence of coupled antiferromagnetic (AFM)/ferroelectric (FE) and ferromagnetic (FM) orders in multiferroic $TbMnO_3$ films, which can guide researchers in creating new kinds of multiferroic materials.

18:00 Poster area MON.PI.44

Dynamics of optical phonons in a Bi2Se3 crystal studied using femtosecond time-resolved reflection measurement, •*Katsura Norimatsu*; *Materials and Structures Laboratory, Tokyo Institute of Technology*, *CREST, Japan Science and Technology Agency*.
Time evolution of optical phonons (A1g1, A1g2, and Eg2) in Bi2Se3 has been observed.The initial phases suggest that the potential surfaces transiently shift in the direction of A1g2 eigenvector by photoexcitation.

18:00 Poster area MON.PI.45

Ultrafast nonlinear dynamics in thin GaN films studied by femtosecond digital holography, *Nerijus Šiaulys*[1], *Aivaras Urniežius*[1], *Tomas Stanislauskas*[1], *Tadas Malinauskas*[2], •*Viačeslav Kudriašov*[1], and *Andrius Melninkaitis*[1]; [1]*Laser Research Center, Vilnius University, Vilnius, Lithuania*, [2]*Institute of Applied Research, Vilnius University, Vilnius, Lithuania*.
We studied nonlinear propagation dynamics and filamentation of intense NIR pulses of 300 fs duration in thin GaN films by using pulsed digital holography with 25 fs temporal resolution.

18:00 Poster area MON.PI.46

Ultrafast generation of polaron pairs in low-bandgap semiconductor copolymers, •*Enrico Da Como*, *Raphael Tautz*, and *Jochen Feldmann*; *Photonics and Optoelectronics Group, Department of Physics and CeNS Ludwig-Maximilians-Universität München, 80799, Munich, Germany*.
We study the fundamental photoexcitations in donor-acceptor conjugated copolymers by femtosecond pump-probe spectroscopy. By means of femtosecond pulses in the mid-IR we distinguish between excitonic and polaronic resonances, estimating the yield for polaron pair generation.

18:00 Poster area MON.PI.47

Spatially Inhomogeneous Coherent Phonon-Plasmon Dynamics in n-type GaAs, •*Kunie Ishioka*[1], *Amlan Basak*[2], and *Hrvoje Petek*[2]; [1]*National Institute for Materials Science, Tsukuba, Japan*, [2]*Department of Physics and Astronomy, University of Pittsburgh*.
Transient reflectivity measurements at different probing wavelengths reveal detection mechanisms of coherent phonon and phonon-plasmon coupled modes of n-doped GaAs to be strongly depth-dependent due to the carrier depletion at the surface.

18:00 Poster area MON.PI.48

Ultrafast Photo Switching in Spin Transition Molecular Crystals: Cooperative response and Nanoscale., •*Roman Bertoni*[1], *Antoine Tissot*[2], *Maciej Lorenc*[1], *Marie-Laure Boillot*[2], *Jean-François Létard*[3], *Marina Servol*[1], *Hervé Cailleau*[1], and *Eric Collet*[1]; [1]*Institut de Physique de Rennes, UMR CNRS 6251, University Rennes 1, France*, [2]*ICCMO, University Paris Sud Orsay, France*, [3]*ICMCB, Bordeaux, France*.
The Ultrafast photoinduced spin state switching in solids reveals some very interesting prospects: downsizing to nanoscale and cooperativity. We perform ultrafast absorption spectroscopy to identify the primary events involved in the resulting photo-induced spin state switching.

18:00 Poster area MON.PI.49

Ultrafast Light-Field Control of Currents in a Dielectric, •*Agustin Schiffrin*[1,2], *Tim Paasch-Colberg*[1], *Nicholas Karpowicz*[1], *Vadym Apalkov*[3], *Daniel Gerster*[4], *Sascha Mühlbrandt*[1,4], *Joachim Reichert*[4], *Johannes Barth*[4], *Reinhard Kienberger*[1,4], *Ralph Ernstorfer*[1,4,6], *Vladislav Yakovlev*[1,5], *Mark Stockman*[3], and *Ferenc Krausz*[1,5]; [1]*Max-Planck-Institut für Quantenoptik, Hans-Kopfermann-Str. 1, D-85748 Garching, Germany*, [2]*Department of Physics and Astronomy, University of British Columbia, Vancouver V6T 1Z1, Canada*, [3]*Department of Physics and Astronomy, Georgia State University, Atlanta, GA30340, USA*, [4]*Physik-Department, Technische Universität München, James-Franck-Str., D-85748 Garching, Germany*, [5]*Fakultät für Physik, Ludwig-Maximilians-Universität, Am Coulombwall 1, D-85748 Garching, Germany*, [6]*Fritz-Haber-Institut der Max-Planck-Gesellschaft, Faradayweg 4-6, 14195 Berlin, Germany*.
A well-defined few-cycle optical waveform increases reversibly and without inducing breakdown the conductivity of amorphous silicon dioxide within 1 femtosecond, allowing electric currents to be switched and directed at the frequency of visible light.

18:00 Poster area MON.PI.50

Hot Electron Mediated Ultrafast Demagnetization of Ni, •*Christian Stamm*, *Andrea Eschenlohr*, *Niko Pontius*, and *Torsten Kachel*; *Institut für Methoden und Instrumentierung der Forschung mit Synchrotronstrahlung, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Albert-Einstein-Str. 15, 12489 Berlin, Germany*.
Laser-excited hot electrons generated in a 30 nm Au layer on top of 15 nm Ni travel superdiffusively from Au into Ni and initiate a very efficient and ultrafast demagnetization of the Ni film.

18:00 Poster area MON.PI.51

Probing the Charge Transfer Dynamics in Cu-doped ZnO Nanowires, •*Tze Chien Sum*, *Guozhong Xing*, *Guichuan Xing*, *Edbert Jarvis Sie*, *Tom Wu*, and *Cheng Hon Alfred Huan*; *Division of Physics and Applied Physics, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore, 637371*.
Copper is one of the most pervasive and important impurities in ZnO. Ultrafast spectroscopy reveal an electron transfer (CT) process of \tau = 39 +/- 9 ps, between the ZnO host and the Cu dopants.

18:00 Poster area MON.PI.52

Coherent phonons in CdSe quantum dots triggered by ultrafast electron transfer reaction, •*Lars Dworak*, *Markus Braun*, and *Josef Wachtveitl*; *Johann Wolfgang Goethe-University Frankfurt, Max-von Laue Str. 7, 60438 Frankfurt am Main, Germany*.
The origin of coherent oscillations in CdSe quantum dots and in the CdSe/methylviologen electron transfer system is studied. In CdSe/methylviologen coherent phonons are triggered by the electron transfer from the quantum dot to methylviologen.

18:00 Poster area MON.PI.53

Slow propagation of photon-like polaritons generated by exciton-exciton scattering in ZnO thin films, •*Hideki Ichida*[1], *Shuji Wakaiki*[2], *Toshiki Kawase*[3], *Kohji Mizoguchi*[4], *DaeGwi Kim*[3], *Masaaki Nakayama*[3], and *Yasuo Kanematsu*[1,2]; [1]*Venture Business Laboratory, Osaka University, 2-1 Yamada-oka, Suita, Osaka 565-0871, Japan*, [2]*Department of Material Life Science, Graduate School of Engineering, Osaka University, 2-1 Yamada-oka, Suita, Osaka 558-8585, Japan*, [3]*Department of Applied Physics, Graduate School of Engineering, Osaka City University, 3-3-138 Sugimoto-cho, Sumiyoshi-ku, Osaka, Japan*, [4]*Department of Physical Science, Graduate School of Science, Osaka Prefecture University, 1-1 Gakuen, Naka-ku, Sakai, Osaka 599-8531, Japan*.
We report on the first observation of the thickness-dependent photoluminescence-decay time of exciton-exciton scattering in ZnO thin films, which demonstrates the slower propagation of photon-like polaritons compared to that in bulk by two orders magnitude.

18:00 Poster area MON.PI.54

Dynamic Interactions of CdSe/ZnS Quantum Dots with cyclic solvents probed by femtosecond Four-Wave Mixing, •*Yusuke Hirosawa*[1], *Hiroyoshi Kouzai*[1], *Hayato Miyagawa*[1], *Noriaki Tsurumachi*[1], *Shun Koshiba*[1], *Shunsuke Nakanishi*[1], *Vasudevan Biju*[2], and *Mitsuru Ishikawa*[2]; [1]*Department of Advanced Materials Science, Kagawa University, Hayashi-cho 2217-20, Takamatsu, Kagawa 761-0396, Japan*, [2]*AIST Shikoku, National Institute of Advanced Industrial Science and Technology, Takamatsu, Kagawa 761-0395, Japan*.
We studied dynamic interactions between CdSe/ZnS quantum dots (QDs) and cyclic solvents probed by femtosecond four-wave mixing. We found that the dynamic interactions of QDs strongly depend on the existence of π-bonds in solvent molecules.

18:00 Poster area MON.PI.55

Electron Dynamics of Interatomic Coulombic Decay in Quantum Dots, •*Annika Bande*, *Kirill Gokhberg*, and *Lorenz S. Cederbaum*; *Theoretische Chemie, Physikalisch-Chemisches Institut, Universität Heidelberg, Im Neuenheimer Feld 229, D-69120 Heidelberg, Germany*.
The existence of the elementary physical process of interatomic Coulombic decay in quantum dots is demonstrated by numerical real-time electron dynamics in general binding potentials. There is indication for related ultrafast phenomena in quantum dots.

18:00 Poster area MON.PI.56

Ultrafast spectroscopy of linear carbon chains: the case of dinaphthylpolyynes, •*Daniele Fazzi*[1], *Francesco Scotognella*[2], *Alberto Milani*[3], *Daniele Brida*[2], *Eugenio Cinquanta*[4], *Luca Ravagnan*[4], *Paolo Milani*[4], *Franco Cataldo*[5], *Matteo Negro*[2], *Salvatore Stagira*[2], and *Caterina Vozzi*[2]; [1]*Center for Nano Science and Technology CNST@Polimi, Istituto Italiano di Tecnologia, via Pascoli 70/3, 20133 Milano, Italy*, [2]*CNR-IFN and Dipartimento di Fisica, Politecnico di Milano, Piazza L. da Vinci 32, 20133 Milano, Italy*, [3]*Dipartimento di Chimica, Materiali e Ing. Chimica *G. Natta*, Politecnico di Milano, Piazza L. da Vinci 32, 20133 Milano, Italy*, [4]*CIMAINA and Dipartimento di Fisica, Università di Milano, via Celoria 16, 20133 Milano, Italy.*, [5]*Actinium Chemical Research s.r.l., Via Casilina 1626/A, 00133 Roma, Italy.*.
The dynamics of excited states in polyyne has been investigated by ultrafast transient absorbtion spectroscopy and DFT//TDDFT calculations. We observed the ultrafast intersystem crossing event that leads to the formation of triplet excited states.

18:00 Poster area MON.PI.57

Dynamics of Charge-Transfer Interfacial Excitons at Dye-Sensitized Donor/ Acceptor Hybrid Heterojunction, *Jan C. Brauer*, *Arianna Marchioro*, and •*Jacques-E. Moser*; *Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland*.
Formation of charge-transfer interfacial excitons upon sub-50 fs electron injection from photoexcited molecules into a wide-bandgap semiconductor was evidenced using time-resolved THz spectroscopy. Dynamics of these excitons is strongly dependent upon their direct environment.

18:00 Poster area MON.PI.58

Probing the origin of fluorescence quenching of graphene-porphyrin hybrid material through ultrafast spectroscopy, *Divya Sharma*[1], *Xiaoyan Zhang*[2], •*Ben Feringa*[2], *Wesley Browne*[2], *Jennifer Herek*[1], and *Annemarie Huijser*[1]; [1]*Optical Sciences group, MESA+ Institute for Nanotechnology, University of Twente, PO Box 217, 7500 AE Enschede, The Netherlands.*, [2]*Stratingh Institute for Chemistry, University of Groningen Nijenborgh 4, 9747 AG Groningen, The Netherlands*.
We report transient absorption spectroscopic studies on free porphyrin molecules and pure graphene suspensions which serve as reference samples for investigating the mechanism underlying fluorescence quenching reported in hybrid material composed of graphene and porphyrin.

18:00 Poster area MON.PI.59

Coherent Electron Dynamics in 10 fs Time Scale in Organic Charge Ordered and Dimer-Mott Insulators, •*Shinichiro Iwai*[1,2], *Yohei Kawakami*[1], *Yuki Ishikawa*[1], *Yohei Sakurai*[1], *Hirotake Itoh*[1,2], *Kaoru Yamamoto*[3], and *Takahiko Sasaki*[4]; [1]*Department of Physics , Tohoku University, Sendai, 980-8578, Japan*, [2]*JST-CREST, Sendai, 980-8578, Japan*, [3]*Institute for Molecular Science, Okazaki, 444-8585, Japan*, [4]*Institute for Material Research, Sendai, 980-8585, Japan*.

Coherent oscillations of correlated electrons were detected in the early dynamics of photoinduced melting and/or construction of the organic charge ordered/ferroelectric cluster and the dimer Mott insulator by using 3 optical-cycle infrared pulse.

18:00 Poster area MON.PI.60

π-Conjugated Donor-Acceptor Systems as Metal-Free Sensitizers for Dye-Sensitized Solar Cell Applications, •*Mateusz Wielopolski*, *Jacques-E. Moser*, *Magdalena Marszalek*, *Shaik M. Zakeeruddin*, and *Michael Grätzel*; *Ecole Polytechnique Fédérale de Lausanne, Institute of Chemical Sciences & Engineering, SB ISIC GR-MO, Station 6, CH-1015 Lausanne, Switzerland*.

Monitoring ultrafast charge carrier dynamics between various organic dyes of donor-π-spacer-acceptor type and TiO2 by ultrafast transient absorption spectroscopy shows that the photovoltaic performances depend on a delicate interplay between the dyes' building blocks.

18:00 Poster area MON.PI.61

Ultrafast Charge Separation in Low Band-Gap Polymer Blend for Photovoltaics, •*Margherita Maiuri*[1], *Giulia Grancini*[2], *Daniele Fazzi*[2], *Hans-J. Egelhaaf*[3], *Daniele Brida*[1], *Giulio Cerullo*[1], and *Guglielmo Lanzani*[1,2]; [1]*IFN-CNR, Dipartimento di Fisica, Politecnico di Milano, Piazza L. da Vinci, 32, 20133 Milano, Italy*, [2]*Center for Nano Science and Technology @Polimi Istituto Italiano di Tecnologia, Via Pascoli 70/3 20133 Milano, Italy*, [3]*Konarka Technologies GmbH, Landgrabenstrasse 94, 90443 Nürnberg, Germany*.

We track ultrafast charge dissociation in a particularly promising low-band-gap-polymer: fullerene blend for organic photovoltaics. Impulsive photoexcitation with excess energy leads to a 30-fs formation of an hot charge transfer state, precursor of free carriers.

18:00 Poster area MON.PI.62

Investigations of ultrafast dynamics in electronically excited alkylbenzenes, *Yuzhu Liu*[1,2], *Thomas Gerber*[1], *Peter Radi*[1], *Yaroslav Sych*[1], *Pavlo Maksyutenko*[1], and •*Gregor Knopp*[1]; [1]*Paul Scherrer Institute, Villigen 5232, Switzerland.*, [2]*Wuhan Institute of Physics and Mathematics, Chinese Academy of Sciences, Wuhan 430071, PR China*.

We investigate ultrafast dynamics in electronically excited states of some typical alkylbenzenes by time-resolved four wave mixing and velocity map imaging as complementary methods. Meanwhile an upgraded double-sided time-resolved velocity map imaging setup is proposed.

18:00 Poster area MON.PI.63

Monitoring of the ultrafast vibrationnal kinetic during formation of photo-induced linkage isomers in $Na_2[Fe(CN)_5NO]_2H_2O$ single crystals, *Galle Geoffrey*[1], *Nicoul Matthieu*[2], *Woicke Theo*[3], *Schaniel Dominik*[4], and •*Freysz Eric*[1]; [1]*University of Bordeaux, LOMA, UMR-CNRS 5798, 351 cours de la Libération, Talence 33405, France*, [2]*Fakultät für Physik, Universität Duisburg-Essen, Lotharstr. 1, 47058 Duisburg, Germany*, [3]*Institut für Strukturphysik, TU-Dresden, Zellescherweg 16, Dresden, Germany*, [4]*CRM2, Institut Jean Barriol, Nancy Université, 54506 Vandoeuvre-les-Nancy, France*.

A femtosecond visible pump-infrared probe time resolved absorption experiment makes it possible to reveal the ultrafast vibrationnal kinetic associated to formation of light-induced linkage isomers in $Na_2[Fe(CN)_5NO]_2H_2O$ single crystals

18:00 Poster area MON.PI.64

Femtosecond Coincidence Imaging of Chiral Molecules, *N. Bhargava Ram*, *C. Stefan Lehmann*, and •*Maurice H.M. Janssen*; *LaserLaB Amsterdam, VU University Amsterdam, De Boelelaan 1083, 1081 HV Amsterdam, The Netherlands*.

We report femtosecond multi-photon ionization in combination with mass-correlated photoelectron coincidence imaging of chiral molecules. We demonstrate that a table-top coincidence imaging set-up can detect mass-selected enantiomers with high chiral selectivity and sensitivity.

18:00 Poster area MON.PI.65

Ultrafast OH-Stretching Frequency Shifts of Hydrogen-Bonded 2-Naphthol Photoacid-Base Complexes in Solution, *Mirabelle Prémont-Schwarz*[1], *Dequan Xiao*[2], *Victor S. Batista*[2], and •*Erik T. J. Nibbering*[1]; [1]*Max Born Institut fuer Nichtlineare Optik und Kurzzeitspektroskopie, Max Born Strasse 2A, D-12489 Berlin*, [2]*2Department of Chemistry, Yale University, P.O. Box 208107, New Haven, CT 06520-8107, USA*.

We characterize the transient solvent-dependent OH-stretching frequency shifts of photoacid 2-naphthol hydrogen-bonded with CH3CN in the S0- and S1-states using a combined experimental and theoretical approach, and disentangle specific hydrogen-bonding contributions from nonspecific dielectric response.

18:00 Poster area MON.PI.66

Femtosecond UV-pump mid-IR probe spectroscopy of the ultrafast photodissociation of azide radicals from an azido-iron(III) complex, *Hendrik Vennekate*[1], *Dirk Schwarzer*[1], *Joel Torres-Alacan*[2], and •*Peter Vöhringer*[2]; [1]*Max-Planck-Institute for biophysical Chemistry, Am Fassberg 11, 37077 Göttingen, Germany*, [2]*Institute for Physical and Theoretical Chemistry, University of Bonn, Wegelerstrasse 12, 53115 Bonn*.

The cation complex [(cyclam-ac)FeN3]+ is a low-molecular weight photochemical precursor to super-oxidized iron - a metal center frequently implicated in heme biochemistry. Here, its ultrafast primary events are studied by femtosecond UV-pump mid-IR probe spectroscopy.

18:00 Poster area MON.PI.67

High spin <-> low spin ultrafast excitation and relaxation of an isolated iron(II) complex, *Galle Geoffrey*[1], *Tribollet Jerome*[1], *Jonusauskas Gediminas*[1], *Tondusson Marc*[1], *Mauriac Cindy*[2], *Letard Jean François*[2], and •*Freysz Eric*[1]; [1]*Universite Bordeaux 1, LOMA, UMR CNRS 5798, 351 cours de la libération, 33405 Talence Cedex, France*, [2]*ICMCB, CNRS, University of Bordeaux, 87 avenue du, Dr A. Schweitzer,Pessac, F-33608, France*.

Picosecond and femtosecond time resolved experiments make it possible to study both the low spin to high spin and high spin to low spin excitation and relaxation processes in the same isolated iron(II) complex.

18:00 Poster area MON.PI.68

Sigma* Mediated Electronic Relaxation in 200nm Photoexcited Ammonia and Heteroaromatics, •*Susanne Ullrich*, *Hui Yu*, and *Nicholas Evans*; *Department of Physics and Astronomy, The University of Georgia, Athens GA 30602, USA*.
Time-resolved photoelectron spectra of ammonia display combination bands of the umbrella and stretching modes associated with the N-H coordinate of sigma* relaxation. Time-resolved photodissociation studies determine timescales < 200fs. Similar sigma* photochemistry is found in heteroaromatics.

18:00 Poster area MON.PI.69

The Influence of Solvent on the Photochemistry of Bromoiodomethane, *Christopher Anderson*, *Kenneth G. Spears*, and •*Roseanne J. Sension*; *University of Michigan, Ann Arbor, MI 48109-1055, USA*.
Photodissociation of bromoiodomethane is found to be solvent dependent. Excitation at 266 nm in acetonitrile results in cleavage of the C-I bond. Excitation in cyclohexane results in two photoproducts, one arising from C-Br bond cleavage.

18:00 Poster area MON.PI.70

Time-Resolved Photoelectron Spectroscopy of Coupled Nuclear-Electronic Dynamics, *Mirjam Falge*[1], *Volker Engel*[1], and •*Stefanie Gräfe*[2]; [1]*1Universität Würzburg, Institut für Physikalische und Theoretische Chemie and Röntgen Research Center for Complex Material Systems, Würzburg, Germany*, [2]*2Institute for Theoretical Physics, Vienna University of Technology, Vienna, Austria*.
We study the effect of nuclear-electron coupling on time-resolved photoelectron spectra, employing a model system which allows to directly comparing spectra resulting from the adiabatic approximation with those obtained within a non-Born-Oppenheimer description.

18:00 Poster area MON.PI.71

Dynamics of a Photochromic Spiropyran under Aqueous Conditions, •*Jörg Kohl-Landgraf*[1], *Diana Goncalves*[2], *Alexander Heckel*[2], and *Josef Wachtveitl*[1]; [1]*Institut für Physikalische und Theoretische Chemie, Goethe-Universität, Max-von-Laue-Str. 7, 60438 Frankfurt am Main, Germany*, [2]*Cluster of Excellence Macromolecular Complexes, Goethe-Universität, Max-von-Laue-Str. 9, 60438 Frankfurt am Main, Germany*.
The dynamics of a water soluble spiropyran is revealed by means of femtosecond transient absorption spectroscopy in the visible and infrared range revealing an ultrafast reversible switching behavior under aqueous conditions.

18:00 Poster area MON.PI.72

Femtosecond time-resolved Photodissociation Dynamics in ClN3, •*David Staedter*[1], *Nicolas Thire*[2], *Petros Samartzis*[3], and *Valerie Blanchet*[1]; [1]*Universite de Toulouse, UPS, 118 route de Narbonne, F-31062 Toulouse, France*, [2]*Institut National de la Recherche Scientifique, Université du Québec, 1650 Blvd Lionel-Boulet, Varennes, J3X1S2, Québec, Canada*, [3]*The Institute of Electronic Structure and Laser, Foundation of Research and Technology Hellas, Iraklion 71110, Greece*.
We report the first time-resolved study of the photochemistry in ClN3 by femtosecond ultra-violet velocity-map imaging. The goal of the experiment is to elucidate ultrafast dynamics that lead to a cyclic-N3 production.

18:00 Poster area MON.PI.73

Precise and Rapid Detection of Optical Activity for Accumulative Femtosecond Spectroscopy, •*Andreas Steinbacher*, *Johannes Buback*, *Patrick Nuernberger*, and *Tobias Brixner*; *Institut für Physikalische und Theoretische Chemie, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany*.
We present a fast and sensitive polarimeter combining common-path optical heterodyne interferometry and accumulative spectroscopy to detect rotatory power. Its suitability for femtosecond studies is demonstrated in a non-resonant two-photon photodissociation experiment.

18:00 Poster area MON.PI.74

The Dynamophore: Localization of Excited State Dynamics Studied by Time Resolved Photoelectron Spectroscopy, •*Oliver Schalk*[1,2], *Andrey E. Boguslavskiy*[1], *Michael S. Schuurman*[1], and *Albert Stolow*[1]; [1]*National Research Council of Canada, 100 Sussex Drive, Ottawa, Ontario K1A 0R6, Canada*, [2]*LS für BioMolekulare Optik, LMU München, Oettingenstr. 67, D-80538 Munich, Germany*.
Photoinduced dynamics tend to localize at a confined region of a molecule, called dynamophore. Here, we show examples from time-resolved photoelectron spectroscopy.

18:00 Poster area MON.PI.75

Optimal Dynamic Discrimination in Tryptophan-Containing Dipeptides, *Svetlana Afonina*, *Ondrej Nenadl*, *Ariana Rondi*, *Denis Kiselev*, *Jerome Extermann*, *Luigi Bonacina*, and •*Jean-Pierre Wolf*; *GAP-Biophotonics, University of Geneva, 1205 Geneva (Switzerland)*.
Optimal Dynamic Discrimination based on the phase-shaping of deep ultraviolet femtosecond pulses was applied to selectively modulate the time-resolved fluorescence depletion of pairs of tryptophan-containing dipeptides.

18:00 Poster area MON.PI.76

Fluorescence Kinetics of Flavin Adenine Dinucleotide in Different Microenvironments, *Zsuzsanna Heiner*[1], *András Makai*[1], *Ferenc Sarlós*[1], *Csaba Bagyinka*[1], *András Tóth*[2], *Gábor Rákhely*[1,2], and •*Géza Groma*[1]; [1]*Institute of Biophysics, Biological Research Centre, Hungarian Academy of Sciences, H-6701 Szeged, Hungary*, [2]*Department of Biotechnology, University of Szeged, H-6726 Szeged, Hungary*.
Fluorescence kinetics of flavin adenine dinucleotide was measured in a wide time and spectral range in different media, affecting its intra- end extramolecular interactions, and analyzed by a new method based on compressed sensing.

18:00 Poster area MON.PI.77

Pulse-shaping-based two-photon FRET microscopy, *Meredith Brenner*[1], *Dawen Cai*[2], *Samuel Straight*[3], *Joel Swanson*[3], and •*Jennifer Ogilvie*[2]; [1]*Applied Physics Program, University of Michigan, 450 Church Street, Ann Arbor, MI, USA 48109*, [2]*Department of Physics and Biophysics, University of Michigan, 450 Church Street, Ann Arbor, MI, USA 48109*, [3]*Department of Microbiology and Immunology, University of Michigan Medical School, 1150 West Medical Center Drive, Ann Arbor, MI, USA 48109*.
We present quantitative pulse-shaping-based two-photon fluorescence resonance energy transfer microscopy. We tailor the spectral phase of the excitation pulses to achieve selective excitation of donor and acceptor, demonstrating the method in live cells.

18:00 Poster area MON.PI.78

Dark Excited States of Carotenoid in Light Harvesting Complex Probing

with Femtosecond Stimulated Raman Spectroscopy, *Orihiro Yoshimatsu[1]*, *Kenta Abe[1,2]*, *Shunsuke Sakai[3]*, *Tomoko Horibe[2,4]*, *Ritsuko Fujii[2,5]*, *Mamoru Nango[2,5]*, *Hideki Hashimoto[2,4,5]*, and •*Masayuki Yoshizawa[1,2]*; *[1]Department of Physics, Graduate School of Science, Tohoku University, Sendai 980-8578, Japan*, *[2]JST, CREST, Kawaguchi, Saitama, 332-0012, Japan*, *[3]Department of Life and Materials Engineering, Nagoya Institute of Technology, Nagoya 466-8555, Japan*, *[4]Department of Physics, Graduate School of Science, Osaka City University, Osaka 558-8585, Japan*, *[5]OCARINA, Osaka City University, Osaka 558-8585, Japan*.
Vibrational dynamics of dark excited states in carotenoids have been investigated. The so-called S* state in light-harvesting complex is concluded to be different from that in solution because of their different vibrational modes.

18:00 Poster area MON.PI.79

Time-Resolved Down-Conversion of 2-Aminopurine in a DNA Hairpin: Fluorescence Anisotropy and Solvent Viscosity effects, •*Patricia Tourón-Touceda*, *Thomas Gelot*, *Olivier Crégut*, *Jérémie Léonard*, and *Stefan Haacke*; *Institut de Physique et Chimie des Matériaux de Strasbourg, Université de Strasbourg-CNRS, 67034 Strasbourg, France*.
Femtosecond fluorescence anisotropy decay measured by type II difference frequency generation provides new insight into the local structural dynamics of ΔP(-)PBS fragments of the HIV-1 DNA primary binding sequence, labelled with 2-aminopurine.

18:00 Poster area MON.PI.80

Configurational changes and flavin-substrate interactions in the flavoenzyme ThyX studied by time- and spectrally resolved fluorescence, •*Sergey P. Laptenok*, *Latifa Bouzhir-Sima*, *Hannu Myllykallio*, *Ursula Liebl*, and *Marten H. Vos*; *Laboratory for Optics and Biosciences, CNRS UMR7645, INSERM U696, Ecole Polytechnique, 91128 Palaiseau, France*.
Femtosecond-resolved fluorescence studies of thymidylate synthase ThyX using a Kerr-gate based setup highlight configurational flexibility and identify a tyrosine residue involved in flavin-fluorescence quenching. Moreover, the substrate dUMP acts as a strong quencher itself.

18:00 Poster area MON.PI.81

Structural Evolution in Photoactive Yellow Protein Studied by Femtosecond Stimulated Raman Spectroscopy, •*Ryosuke Nakamura[1]*, *Norio Hamada[1]*, *Yasuo Kanematsu[1]*, *Kenta Abe[2]*, and *Masayuki Yoshizawa[2]*; *[1]Venture Business Laboratory, Osaka University, Suita 565-0871, Japan*, *[2]Department of Physics, Graduate School of Science, Tohoku University, Sendai 980-8578, Japan*.
Ultrafast structural evolution in photoactive yellow protein (PYP) is studied by femtosecond stimulated Raman spectroscopy. Rearrangement of the hydrogen-bonding network surrounding the chromophore during the photocycle is revealed by comparing wild-type PYP with E46Q mutant.

18:00 Poster area MON.PI.82

Excited state deactivation channels in epidermal eumelanin model complexes: key to phototoxicity or photoprotection?, •*Annemarie Huijser[1,4]*, *Alessandro Pezzella[2]*, *Per-Ake Malmqvist[3]*, *Alice Corani[1]*, *Marco d'Ischia[2]*, and *Villy Sundstrom[1]*; *[1]Department of Chemical Physics, Lund University, Sweden*, *[2]Department of Organic Chemistry and Biochemistry, University of Naples Frederico II, Italy*, *[3]Department of Theoretical Chemistry, Lund University, Sweden*, *[4]Optical Sciences Group, University of Twente, The Netherlands*.
The knowledge of UV-induced processes in eumelanin pigments is strongly limited due to its complex structure. We followed a bottom-up approach using model systems with increasing complexity and studied excited state processes using ultrafast fluorescence.

18:00 Poster area MON.PI.83

Ultrafast Vibrational Dynamics of Water Confined in Phospholipid Reverse Micelles, •*Rene Costard[1]*, *Christian Greve[1]*, *Nancy E. Levinger[2]*, *Erik T. J. Nibbering[1]*, and *Thomas Elsaesser[1]*; *[1]Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie, Max-Born-Str. 2 A, D-12489 Berlin, Germany*, *[2]Department of Chemistry, Colorado State University, Fort Collins, Colorado 80523-1872, USA*.
We characterize the hydration-level dependence of spectral diffusion and vibrational energy relaxation of OH stretching excitations of water inside phospholipid reverse micelles. The OH stretching mode is shown to decay via the OH bending vibration.

18:00 Poster area MON.PI.84

Proton Dynamics in Aqueous Nanochannels, •*Liyuan Liu* and *Huib Bakker*; *FOM Institute AMOLF, Science Park 104, 1098 XG Amsterdam, The Netherlands*.
We investigate the proton dynamics in hydrophilic nafion nanochannels using time-resolved femtosecond mid-infrared pump-probe spectroscopy. We observe the dynamics of Eigen complex and spectral diffusion caused by proton transfer.

18:00 Poster area MON.PI.85

Photomixing for Coherent Retrieval of THz Waveforms from a Frequency Multiplier, •*Florin Lucian Constantin*; *Laboratoire PhLAM, UMR 8523, 59655 Villeneuve d'Ascq, France*.
THz waveforms generated with an electronic frequency multiplier are sampled with a heterodyne detection technique using a LTG-GaAs photomixer and the optical beat of two near-infrared lasers.

NOTES

TUE.1: Nonlinear Terahertz Dynamics

Chair: Thomas Elsässer, Max Born Institute and Humboldt University, Berlin, Germany

8:30–10:15 Room 350/351 TUE.1

8:30 Room 350/351 TUE.1.1

Metamaterial-enhanced nonlinear terahertz spectroscopy, •*Harold Hwang[1]*, *Mengkun Liu[2]*, *Kebin Fan[2]*, *Jingdi Zhang[2]*, *Andrew Strikwerda[2]*, *Aaron Sternbach[2]*, *Nathaniel Brandt[1]*, *Bradford Perkins[1]*, *Xin Zhang[2]*, *Richard Averitt[2]*, and *Keith Nelson[1]*; *[1]Massachusetts Institute of Technology, Cambridge, MA USA*, *[2]Boston University, Boston, MA USA*.
We demonstrate large nonlinear terahertz responses in the gaps of metamaterial split ring resonators in several materials and use nonlinear THz transmission and THz-pump THz-probe spectroscopy to study the nonlinear responses and dynamics.

8:45 Room 350/351 TUE.1.2

Coherent sub-cycle magnetization dynamics in cobalt initiated by strong single cycle THz pulses, •*Carlo Vicario[1]*, *Clemens Ruchert[1]*, *Fernando Ardana-Lamas[1,2]*, *Jan Luning[3]*, and *Christoph Hauri[1,2]*; *[1]Paul Scherrer Institute, SwissFEL, 5232 Villigen PSI, Switzerland*, *[2]Ecole Polytechnique Federale de Lausanne, 1015 Lausanne, Switzerland*, *[3]Universite Pierre et Marie Curie, Paris, France*.
We present initiation of coherent femtosecond magnetization dynamics in thin-film cobalt by a strong carrier-envelope-phase-stabilized, single-cycle, 0.3 Tesla Terahertz pulse. Coherent magnetization dynamics are governed by the phase and amplitude characteristics of the THz pulse.

9:00 Room 350/351 TUE.1.3

Invited

Nonlinear Terahertz Spectroscopy in Solids with Single-Cycle Terahertz Pulses, •*Koichiro Tanaka*; *Kyoto University, Institute for Integrated Cell-Material Sciences (WPI-iCeMS), Kyoto, 606-8501, Japan*.
We present a review of the recent progress in the generation methods of intense terahertz (THz) single cycle pulses and their application to THz nonlinear spectroscopy in semiconductors and graphene.

9:30 Room 350/351 TUE.1.4

Nonlinear Ultrafast Dynamics of High Temperature Superconductors Probed with THz Pump / THz Probe Spectroscopy, •*Bradford Perkins[1]*, *Harold Hwang[1]*, *Keith Nelson[1]*, *Nathaniel Grady[2]*, *Hou-Tong Chen[2]*, and *Antoinette Taylor[2]*; *[1]Massachusetts Institute of Technology, Cambridge, MA, USA*, *[2]CINT, Los Alamos National Laboratory, Los Alamos, NM, USA*.
High power THz pulses induce non-linear transparency in superconductive YBCO thin films below the critical temperature. THz pump/THz probe measurements reveal a decay of the induced transparency on the time scale of a few picoseconds.

9:45 Room 350/351 TUE.1.5

Excitation of Spin-Waves in DyFeO3 by THz magnetic pulses, •*Alexander Reid[1]*, *Nick Hartmann[2]*, *Alexey Kimel[3]*, *Theo Rasing[3]*, *Roman Pisarev[4]*, *Hermann Durr[1]*, and *Matthias Hoffmann[2]*; *[1]SIMES, SLAC National Accelerator Laboratory, Menlo Park, CA 94025, USA*, *[2]LCLS Laser Department, SLAC National Accelerator Laboratory, Menlo Park, CA 94025, USA*, *[3]Radboud University Nijmegen, Institute for Molecules and Materials, 6525 AJ Nijmegen, Netherlands*, *[4]Ioffe Physical-Technical Institute, Russian Academy of Sciences, 194021 St. Petersburg, Russia*.
Single-cycle terahertz (THz) pulses are used to excite coherent spin waves in the canted ferrimagnet dysprosium orthoferrite. Analysis of the excitation suggests that the spin-waves couple directly to the magnetic field of the terahertz pulse.

10:00 Room 350/351 TUE.1.6

Transient Spin Density Wave Order Induced in the Normal State of $BaFe_2As_2$ by Coherent Lattice Oscillations, *Kyungwan Kim[1,2,3]*, •*Alexej Pashkin[1]*, *Hanjo Schäfer[1]*, *Markus Beyer[1]*, *Michael Porer[1,4]*, *Thomas Wolf[5]*, *Christian Bernhard[2]*, *Jure Demsar[1,6]*, *Rupert Huber[1,4]*, and *Alfred Leitenstorfer[1]*; *[1]Department of Physics and Center for Applied Photonics, University of Konstanz, Konstanz, Germany*, *[2]University of Fribourg, Department of Physics and Fribourg Center for Nanomaterials, Fribourg, Switzerland*, *[3]Department of Physics, Chungbuk National University, Cheongju, Korea*, *[4]Department of Physics, University of Regensburg, Regensburg, Germany*, *[5]Karlsruhe Institute of Technology, Institute for Solid State Physics, Karlsruhe, Germany*, *[6]Complex Matter Department, Jozef Stefan Institute, Ljubljana, Slovenia*.
We demonstrate that the spin density wave gap in $BaFe_2As_2$ can be induced in the normal state by a coherent lattice oscillation at a frequency of 5.5 THz indicating a pronounced spin-phonon coupling.

Coffee Break

10:15–10:45

TUE.2A: 2D Spectroscopy of Electronic States

Chair: Greg Scholes, University of Toronto, Toronto, Canada

10:45–12:30 Auditorium A TUE.2A

10:45 Auditorium A TUE.2A.1

Invited

Coherent Spectroscopies on Ultrashort Time and Length Scales, •*Tobias Brixner[1]*, *Martin Aeschlimann[2]*, *Alexander Fischer[2]*, *Peter Geisler[3]*, *Sebastian Götz[1]*, *Bert Hecht[3]*, *Jer-Shing Huang[3,4]*, *Thomas Keitzl[1]*, *Christian Kramer[1]*, *Pascal Melchior[2]*, *Walter Pfeiffer[5]*, *Gary Razinskas[3]*, *Christian Rewitz[1]*, *Christian Schneider[2]*, *Christian Strüber[5]*, *Philip Tuchscherer[1]*, and *Dmitri V. Voronine[5]*; *[1]Institut für Physikalische und Theoretische Chemie, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany*, *[2]Fachbereich Physik and Research Center OPTIMAS, TU Kaiserslautern, Erwin-Schrödinger-Str. 46, 67663 Kaiserslautern, Germany*, *[3]Nano-Optics and Biophotonics Group, Experimentelle Physik 5, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany*, *[4]Department of Chemistry, National Tsing Hua University, Hsinchu 30013, Taiwan*, *[5]Fakultät für Physik, Universität Bielefeld, Universitätsstr. 25, 33615 Bielefeld, Germany*.
Three spectroscopic techniques are presented that provide simultaneous spatial and temporal resolution: modified confocal microscopy with spectral interferometry detection, space-time-resolved spectroscopy using coherent control concepts, and coherent two-dimensional nano-spectroscopy. Latest experimental results are discussed.

11:15 Auditorium A TUE.2A.2

Ultrafast Charge Transfer Visualized by Two-dimensional Electronic Spectroscopy, *Oliver Bixner[1]*, *Niklas*

Christensson[1], *Vladimir Lukes[2]*, *Tomas Mancal[3]*, *Juergen Hauer[1]*, *Franz Milota[1]*, and •*Harald F. Kauffmann[1,4]*; *[1]Faculty of Physics, University of Vienna, Strudlhofgasse 4, 1090 Vienna, Austria*, *[2]Department of Chemical Physics, Slovak Technical University, Radlinského 9, 81237 Bratislava, Slovakia*, *[3]Institute of Physics, Faculty of Mathematics and Physics, Charles University, Ke Karlovu 5, Prague 121 16, Czech Republic*, *[4]Ultrafast Dynamics Group, Faculty of Physics, Vienna University of Technology, Wiedner Hauptstrasse 8-10, 1040 Vienna, Austria*.

Tow-dimensional electronic spectroscopy is used to resolve 30 fs excited-state charge transfer in a lutetium bisphthalocyanine dimer. The combination of density matrix propagation and quantum chemistry provides a molecular view of the charge transfer steps.

11:30 Auditorium A TUE.2A.3

Comparison of the Photophysics of the Dark and Light Adapted Orange Carotenoid Protein using 2D Electronic Spectroscopy, •*Eleonora De Re[1,3]*, *Gabriela Schlau-Cohen[2,3]*, *Vanessa Huxter[2,3]*, *Ryan Leverenz[2]*, *Richard Mathies[2]*, and *Graham Fleming[1,2,3]*; *[1]Applied Science and Technology Graduate Group, University of California, Berkeley, Berkeley, California 94720, USA*, *[2]Department of Chemistry, University of California, Berkeley, Berkeley, California 94720, USA*, *[3]Physical Biosciences Division, Lawrence Berkeley National Laboratory, 1 Cyclotron Road, Berkeley, California 94720, USA*.

Broadband two-dimensional electronic spectroscopy is applied to investigate the photophysics of the photoactive orange carotenoid protein. Differences in dynamics between the light and dark forms arise from the role of this protein in energy dissipation.

11:45 Auditorium A TUE.2A.4

Exploring Higher-Lying Electronic States of a Molecular Switch by Coherent Triggered-Exchange 2D Electronic Spectroscopy, •*Stefan Ruetzel*, *Martin Kullmann*, *Johannes Buback*, *Patrick Nuernberger*, and *Tobias Brixner*; *Institut für Physikalische und Theoretische Chemie, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany*.

We introduce triggered-exchange two-dimensional (TE2D) electronic spectroscopy in which pump-pump-repump-probe sequences are used to reveal photochemical reaction pathways involving higher-lying electronic excited states.

12:00 Auditorium A TUE.2A.5

Vibronic Coupling in Excited Electronic States Investigated with Resonant 2D Raman Spectroscopy, •*Tiago Buckup*, *Jan Philip Kraack*, *Marie Sophie Marek*, and *Marcus Motzkus*; *Physikalisch Chemisches Institut, Ruprecht-Karls Universität Heidelberg, D-69120, Germany*.

The coupling between molecular vibrational modes in the excited state is investigated by resonant Raman two-dimensional time resolved spectroscopy. We apply this approach to several (bio-)chromophores in solution and simulate the time-resolved signal contributions.

12:15 Auditorium A TUE.2A.6

Optical Multidimensional Spectroscopy of Atomic Vapor, •*Hebin Li[1]*, *Galan Moody[1,2]*, *Alan Bristow[1]*, *Mark Siemens[1]*, and *Steven Cundiff[1,2]*; *[1]JILA, National Institute of Standards and Technology, and University of Colorado, Boulder, CO 80309-0440, USA*, *[2]Department of Physics, University of Colorado, Boulder, CO 80309-0440, USA*.

Optical single- and double-quantum three-dimensional Fourier-transform spectra are obtained for atomic vapors. We show that three-dimensional spectra can be used to identify the Hamiltonian of complex systems and to reveal the nature of many-body interactions.

TUE.2B: Ultrafast Pulse Generation

Chair: Jens Biegert, ICFO, Barcelona, Spain

10:45–12:15 Auditorium B TUE.2B

10:45 Auditorium B TUE.2B.1

Programmable Broadband Ultra-Fine Resolution 2-D Pulse Shaping, *Andrew J Metcalf[1]*, *Victor Torres-Company[1,2]*, *V R Supradeepa[1,3]*, *Daniel E Leaird[1]*, and •*Andrew M Weiner[1]*; *[1]School of Electical and Computer Engineering, Purdue University, West Lafayette, Indiana 47906, USA*, *[2]Department of Physics, Universitat jaume I, 12071 Castello de la Plana, Spain*, *[3]OFS research labratories, New Jersey, USA*.

We demonstrate a fully programmable two dimensional pulse shaper, capable of fine resolution control over a broad bandwidth. Experimental results show line-by-line shaping of frequency combs, highlighting an application in radio frequency arbitrary waveform generation.

11:00 Auditorium B TUE.2B.2

Broadband Circulrly-Polarized THz Pulse Generation by Optical Rectification of Vector-Field Shaped Pulses, •*Masaaki Sato[1,4]*, *Natsuki Kanda[2,4]*, *Takuya Higuchi[2,4]*, *Takayuki Suzuki[1,4]*, *Kuniaki Konishi[2,4]*, *Kosuke Yoshioka[3,4]*, *Kazuhiko Misawa[1,4]*, and *Makoto Kuwata-Gonokami[3,4]*; *[1]Department of Applied Physics, Tokyo University of A and T, 2-24-16 Naka-cho, Koganei, Tokyo 184-8588, Japan*, *[2]Department of Applied Physics, University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, Japan*, *[3]Department of Physics, University of Tokyo, Hongo, Bunkyo-ku, Tokyo 113-8656, Japan*, *[4]CREST Japan Science and Technology Agency, Sanbancho Bldg., 5 Sanbancho, Chiyoda-ku, Tokyo 102-0075, Japan*.

We proposed and demonstrated a method to generate circularly-polarized broadband terahertz pulses from ZnTe(111) using vector shaped optical pulses. This method will lead to new polarimetry schemes in the THz region.

11:15 Auditorium B TUE.2B.3

Picosecond pulse generation from whispering gallery mode parametric oscillators, *Scott Papp*, *Pascal Del'Haye*, and •*Scott Diddams*; *NIST, Boulder, Colorado, USA*.

We demonstrate the generation of a stable 36 GHz pulse train of 2.5 picosecond pulses from a CW-pumped whispering gallery mode parametric oscillator. The timing jitter and phase relationship among the optical modes are investigated.

11:30 Auditorium B TUE.2B.4

Ultrafast thin disk lasers: sub-100 fs pulse duration and carrier envelope offset phase detection, •*Clara Saraceno[1]*, *Selina Pekarek[1]*, *Oliver Heckl[1]*, *Cyrill Baer[1]*, *Cinia Schriber[1]*, *Matthias Golling[1]*, *Kolja Beil[2]*, *Christian Kränkel[1,2]*, *Günter Huber[2]*, *Thomas Südmeyer[1,3]*, and *Ursula Keller[1]*; *[1]Department of Physics, Institute for Quantum Electronics, ETH Zurich, 8093, Zurich, Switzerland*, *[2]Institute of Laser-Physics, University of Hamburg, Luruper Chaussee 149, 22761 Hamburg, Germany*, *[3]Department of Physics, University of Neuchâtel, 2000 Neuchâtel, Switzerland*.

We demonstrate a sub-100-fs SESAM-modelocked thin disk laser and

detect for the first time the carrier envelope offset (CEO) of a TDL, two key enabling milestones for future nonlinear experiments driven by ultrafast TDLs.

11:45 Auditorium B TUE.2B.5

Frequency-resolved optical gating with electro-optic sampling, •*Takao Fuji*[1], *Yutaka Nomura*[1], *Hideto Shirai*[2], and *Noriaki Tsurumachi*[2]; [1]*Institute for Molecular Science, Okazaki, Japan*, [2]*Kagawa University, Takamatsu, Japan*.
We have demonstrated a new pulse characterization technique, cross-correlation frequency-resolved optical gating with electro-optic sampling. Sub-single-cycle mid-infrared pulses were characterized with the absolute carrier-envelope phase values by using the method.

12:00 Auditorium B TUE.2B.6

Tunable High Harmonic Generation driven by a Visible Optical Parametric Amplifier, •*Giovanni Cirmi*[1,2], *Chien-Jen Lai*[1], *Shu-Wei Huang*[1], *Eduardo Granados*[1,3], *Jeffrey Moses*[1], *Kyung-Han Hong*[1], *Phillip Keathley*[1], *Alexander Sell*[1], and *Franz Kärtner*[1,2]; [1]*Department of Electrical Engineering and Computer Science and Research Laboratory of Electronics, Massachusetts Institute of Technology,77 Massachusetts Ave,Cambridge, MA 02139, USA*, [2]*Center for Free-Electron Laser Science, DESY, and Department of Physics, University of Hamburg, Notkestraße 85, D-22607 Hamburg, Germany*, [3]*IKERBASQUE, Basque Foundation for Science, 48011, Bilbao, Spain*.
A visible optical parametric amplifier enables tunable high harmonic generation spanning 25-100 eV, providing a source advantageous for plasma and free electron laser seeding and lithography. We study cutoff and efficiency scaling with driver wavelength.

Lunch Break

12:30–14:00

TUE.3A: Ultrafast Spectroscopy of Semiconductors and Organic Solids

Chair: Alfred Leitenstorfer, University of Konstanz, Konstanz, Germany

14:00–15:45 Auditorium A TUE.3A

14:00 Auditorium A TUE.3A.1

Quantum-Optical Spectroscopy of Semiconductors, •*Steven Cundiff*[1], *Andrew Hunter*[1], *Ryan Smith*[1], *Martin Mootz*[2], *Mackillo Kira*[2], and *Stephan Koch*[2]; [1]*JILA, University of Colorado and National Institute of Standards and Technology, Boulder, Colorado, 80309 USA*, [2]*Department of Physics, Philipps University Marburg, Renthof 5, D-35032 Marburg, Germany*.
We analyse absorption spectra of semiconductor quantum wells and use a cluster-expansion transformation to project a large set of quantitative classical measurements onto the true quantum responses. Classical and quantum responses yield significantly different results.

14:15 Auditorium A TUE.3A.2

Magneto-Optical Analysis of Electron Spin Decoherence in Bulk Germanium: Dynamics in a Multi-Valley Conduction Band, •*Christine Hautmann* and *Markus Betz*; *Experimentelle Physik 2, TU Dortmund, 44227 Dortmund, Germany*.
The effective g-tensor of L-valley electrons in germanium is deduced from time-domain magneto-optical experiments. Electron spin decoherence markedly depends on the crystallographic orientation of an external B-field and is closely related to intervalley scattering.

14:30 Auditorium A TUE.3A.3

Three-Dimensional Electronic Spectroscopy of Excitons in Asymmetric Double Quantum Wells, *Christopher Hall*[1], *Lap Van Dao*[1], *Keith Nugent*[2], *Harry Quiney*[2], *Hark Hoe Tan*[3], *Chennupatti Jagadish*[3], and •*Jeffrey Davis*[1]; [1]*Centre for Atom Optics and Ultrafast Spectroscopy, Swinburne University of Technology, Victoria 3122, Australia*, [2]*Department of Physics, The University of Melbourne, Victoria 3010, Australia*, [3]*Department of Electronic Materials Engineering, Research School of Physics and Engineering, The Australian National University, Canberra 0200, Australia*.
We reveal coherent coupling between spatially separated excitons in an asymmetric double quantum well using multidimensional spectroscopy. In the time domain Raman-like beats are seen for the first time between heavy-hole excitons in different wells

14:45 Auditorium A TUE.3A.4

The Earliest Stage of Photoinduced Phase Transition in an Organic Strongly Correlated System Using a 10-fs Pulse, •*Ken Onda*[1,2], *Yoshitaka Matsubara*[3], *Tadahiko Ishikawa*[3], *Yoichi Okimoto*[3], *Shin-ya Koshihara*[3,4], *Takaaki Hiramatsu*[5], *Yoshiaki Nakano*[5], *Hideki Yamochi*[5], and *Gunzi Saito*[6]; [1]*Depart. of Environ. Chem. and Eng., Tokyo Institute of Technology, Nagatsuta, Midori, Yokohama 226-8502, Japan*, [2]*PRESTO, Japan Science and Technology Agency (JST)*, [3]*Depart. of Chem. and Materials Science, Tokyo Institute of Technology, O-okayama, Meguro, Tokyo 152-8551, Japan*, [4]*CREST, Japan Science and Technology Agency (JST)*, [5]*Research Center for Low Temperature and Materials Sciences, Kyoto University, Sakyo-ku, Kyoto 606-8501, Japan*, [6]*Research Institute, Meijo University, Tempaku-ku, Nagoya 468-8502, Japan*.
We examined the initial excited state before photoinduced phase transition in a charge transfer complex (EDO-TTF)2PF6 and revealed the conversion process to the photoinduced phase and the electronic coherence at the excited state.

15:00 Auditorium A TUE.3A.5

Ultrafast Two-Dimensional THz Spectroscopy of Graphene, •*Pamela Bowlan*, *Elias M. Moreno*, *Klaus Reimann*, *Michael Woerner*, and *Thomas Elsaesser*; *Max-Born-Institut, 12489 Berlin, Germany*.
With two-dimensional THz spectroscopy the dynamics of low-energy carriers in graphene is determined. Both intra- and interband absorption contribute to the observed ultrafast pump-probe signals.

15:15 Auditorium A TUE.3A.6

Ultrafast Non-Thermal Electron Dynamics in Single Layer Graphene, •*Daniele Brida*[1], *Cristian Manzoni*[1], *Giulio Cerullo*[1], *Andrea Tomadin*[2], *Marco Polini*[2], *Rahul R. Nair*[3], *Andre K. Geim*[3], *Konstantin S. Novoselov*[3], *Silvia Milana*[4], *Antonio Lombardo*[4], and *Andrea C. Ferrari*[4]; [1]*IFN-CNR, Dipartimento di Fisica, Politecnico di Milano, Italy*, [2]*NEST, Istituto Nanoscienze-CNR and Scuola Normale Superiore, I-56126 Pisa, Italy*, [3]*Department of Physics and Astronomy, University of Manchester, Manchester M13 9 PL, UK*, [4]*Engineering Department, University of Cambridge, Cambridge, CB3 OFA, UK*.
We study the ultrafast dynamics of non-thermal electron relaxation in graphene upon impulsive excitation. The 10-fs resolution two color pump-probe allows us to unveil the non-equilibrium electron gas decay at early times.

15:30 Auditorium A TUE.3A.7

Time Domain Characterization of Light Trapping States in Thin Film Solar Cells, *Michael Birlo[1]*, *Dominik Differt[1]*, *Florian Lükermann[1]*, •*Walter Pfeiffer[1]*, and *Helmut Stiebig[1,2]*; *[1]Fakultät für Physik, Universität Bielefeld, Universitätsstr. 25, D-33615 Bielefeld, Germany*, *[2]Malibu GmbH & Co. KG, Böttcherstr. 7, D-33609 Bielefeld, Germany*.
Spectral interferometry of the backscattered radiation reveals coherence lifetimes of about 150 fs for nanolocalized electromagnetic modes in textured layered nanostructures as they are commonly used in thin film photovoltaics to achieve high cell efficiencies.

TUE.3B: Recollision Phenomena

Chair: Pascal Salières, CEA-Saclay, Gif-sur-Yvette, France

14:00–15:30 Auditorium B TUE.3B

14:00 Auditorium B TUE.3B.1

Invited

Attosecond physics at a nanoscale metal tip, •*Peter Hommelhoff*; *Max Planck Institute of Quantum Optics, Garching, Germany*.
In few-cycle laser-driven electron emission from a metal tip we demonstrate strong field effects, elastic rescattering, and carrier-envelope phase sensitive electronic matter wave interference – hallmarks of attosecond physics, observed at a solid.

14:30 Auditorium B TUE.3B.2

Ultrafast, Surface-Plasmon Enhanced Strong-Field Photoemission with a Mid-IR OPCPA, *Stephan Teichmann[1]*, *Alexandre Thai[1]*, *Olivier Chalus[1]*, *Philip K. Bates[1]*, *Jens Biegert[1,2]*, *Péter Rácz[3]*, *Júlia Fekete[3]*, and •*Péter Dombi[3]*; *[1]ICFO, Institut de Ciències Fotòniques, Mediterranean Technology Park, 08860 Castelldefels, Barcelona, Spain*, *[2]ICREA, Institució Catalana de Recerca i Estudis Avançats, 08010 Barcelona, Spain*, *[3]Wigner Research Centre for Physics, 1121 Budapest, Hungary*.
Surface plasmon field enhancement with a few-cycle mid-IR OPCPA achieves tunneling photoemission from a gold surface at low focused laser intensity (˜1 GW/cm2) and electron acceleration to hundreds of eV.

14:45 Auditorium B TUE.3B.3

Strong-field photoemission from nanostructures driven by few-cycle mid-infrared fields, *Georg Herink*, *Daniel R. Solli*, *Max Gulde*, and •*Claus Ropers*; *Courant Research Center Nano-Spectroscopy and X-Ray Imaging, University of Göttingen, 37077 Göttingen, Germany*.
We present strong-field photoemission from plasmonic nanotips driven by ultrashort pulses at mid-IR wavelengths, reaching Keldysh parameters down to 0.1. We identify a sub cycle acceleration regime that is exclusive to confined fields in nanostructures.

15:00 Auditorium B TUE.3B.4

Strong Field Acceleration of Attosecond Electron Pulses emitted by an Sharp Metallic Nanoprobe, •*Doojae Park*, *Slawa Schmidt*, *Björn Piglosiewicz*, and *Christoph Lienau*; *Institute of Physics, Carl von Ossietzky University, D-26129 Oldenburg, Germany*.
We report near-field acceleration of attosecond electron pulses from sharp nanometer-sized gold tips.
Angle-resolved kinetic energy spectra are explained in terms of the spatiotemporal electron dynamics in the strong field gradient at the tip apex.

15:15 Auditorium B TUE.3B.5

Shake-up and double-ionization by ultra-short pulses: ab initio calculations using t-SURFF, •*Armin Scrinzi*; *Ludwig Maximilans University, Munich, Germany*.
Shake-up and fully differential double-ionization spectra of two-electron atoms in few-cycle IR laser pulses are computed ab initio. The time-dependent surface-flux method needs simulation radii of 20-50 Bohr. Pronounced phase- and pulse-duration dependence is found.

Coffee Break

15:45–16:15

TUE.4A: Ultrafast Dynamics of Biomolecules

Chair: Jan Helbing, University of Zurich, Zurich, Switzerland

16:15–18:00 Auditorium A TUE.4A

16:15 Auditorium A TUE.4A.1

Fast Exciton Dynamics and Coherent Oscillations Revealed by Coherent 2D Spectroscopy in Chlorosomes, •*Jakub Dostal[1,2]*, *Tomas Mancal[2]*, *Frantisek Vacha[3]*, *Ramunas Augulis[1]*, *Jakub Psencik[2]*, and *Donatas Zigmantas[1]*; *[1]Department of Chemical Physics, Lund University, Sweden*, *[2]Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic*, *[3]Faculty of Science, University of South Bohemia, České Budějovice, Czech Republic*.
In this study ultrafast energy transfer dynamics in chlorosome were explored. Observed dynamics were attributed to incoherent downhill excitation diffusion between disordered domains within chlorosomes. On the longer timescale vibrational coherent oscillations were investigated.

16:30 Auditorium A TUE.4A.2

Towards Understanding Allosteric Dynamics Through Ultrafast IR Spectroscopy, •*Steven A Waldauer[1]*, *Brigitte Buchli[1]*, *Reto Walser[1]*, *Rolf Pfister[1]*, *Oliver Zerbe[2]*, and *Peter Hamm[1]*; *[1]Physical Chemistry Institute, University of Zurich, 8057 Zurich, Switzerland*, *[2]Organic Chemistry Institute, University of Zurich, 8057 Zurich, Switzerland*.
Allostery, an intra-protein property where interactions at one location affect properties at distal sites, is of great biological importance. Here we probe the kinetics of an allosteric mimic in real time using ultrafast IR spectroscopy.

16:45 Auditorium A TUE.4A.3

Nonequilibrium Active Site Dynamics of de novo Metalloenzymes Probed with 2D-IR, •*Matthew R. Ross*, *Fangting Yu*, *John T. King*, *Aaron M. White*, *Evan J. Arthur*, *Vincent L. Pecoraro*, and *Kevin J. Kubarych*; *Department of Chemistry, University of Michigan, 930 North University Avenue, Ann Arbor, MI 48109, USA*.
Ultrafast 2D-IR spectroscopy of a CO ligand bound to a copper active site of an artificial metalloenzyme is used as a sensitive probe of both the flexibility and the electrostatic environment of the engineered catalyst.

17:00 Auditorium A TUE.4A.4

Ultrafast Spectroscopy of UV-induced DNA-lesions- on the search for strategies which keep DNA alive, •*Wolfgang Zinth[1]*, *Benjamin P. Fingerhut[2]*, *Teja T. Herzog[1]*, *Gerald R. Ryseck[1,3]*, *Karin Haiser[1]*, *Franziska F. Graupner[1]*, *Korbinian Heil[4]*, *Peter Gilch[1,3]*, *Wolfgang J. Schreier[1]*, *Thomas Carell[4]*, and *Regina de Vivie-Riedle[2]*; *[1]Faculty of Physics, Ludwig Maximilians University Munich, Munich, Germany*, *[2]Department of Chemistry, Ludwig Maximilians University Munich, Munich,*

Germany, [3]*Institut für Physikalische Chemie, Heinrich-Heine-Universität Düsseldorf, Düsseldorf, Germany*, [4]*Department of Chemistry, Center for Integrative Protein Science, Ludwig Maximilians University Munich, Munich, Germany*.
UV-induced photolesions are studied in the visible and IR. While structural distortions of the DNA-backbone at the moment of light absorption are prerequisite for CPD-formation, strain from the backbone guides Dewar-formation.

17:15 Auditorium A TUE.4A.5

Probing How Initial Retinal Configuration Controls Photochemical Dynamics in Retinal Proteins, •*Amir Wand*[1], *Rinat Rozin*[2], *Tamar Eliash*[2], *Noga Friedman*[2], *Kwang-Hwan Jung*[3], *Mordechai Sheves*[2], and *Sanford Ruhman*[1]; [1]*Hebrew University of Jerusalem, Jerusalem, Israel*, [2]*The Weizmann Institute of Science, Rehovot, Israel*, [3]*Sogang University, Seoul, South Korea*.
Hyperspectral femtosecond spectroscopy shows that photochemistry starting from 13-cis retinal in both Bacteriorhodopsin and Anabaena Sensory Rhodopsin is 3-10 times faster than when started in the all-trans state. Importance and possible underlying mechanisms are discussed.

17:30 Auditorium A TUE.4A.6

Resonant Two-Photon Excitation Pathways During Retinal-Isomerization in Bacteriorhodopsin, •*Jan Philip Kraack*, *Tiago Buckup*, and *Marcus Motzkus*; *Physikalisch-Chemisches Institut, Ruprecht-Karls Universität Heidelberg, D-69120 Heidelberg, Germany*.
Resonant two-photon excitation is observed in Bacteriorhodopsin by transient absorption experiments at different excitation wavelengths. Population relaxation dynamics and various signal contributions show distinctive dependence on excitation energies and wavelengths.

17:45 Auditorium A TUE.4A.7

Transient IR study of Blue Light Sensing Proteins, •*Andras Lukacs*[1,4], *Allison Haigney*[2], *Richard Brust*[2], *RuiKun Zhao*[1], *Greg Greetham*[3], *Mike Towrie*[3], *Peter Tonge*[2], and *Stephen Meech*[1]; [1]*School of Chemistry, University of East Anglia, Norwich, UK*, [2]*Dept. of Chemistry, Stony Brook University, Stony Brook, USA*, [3]*Central Laser Facility, Rutherford Appleton Laboratory, Didcot, UK*, [4]*Department of Biophysics, Medical School, University of Pecs, Hungary*.
By the means of TRIR spectroscopy we were able to identify redox intermediates of flavin and tryptophan after photoexcitation in GOX and in Y21W AppA mutant.

TUE.4B: Nonlinear Optics and Plasmonics

Chair: Steven Cundiff, JILA, NIST and University of Colorado, USA

16:15–18:00 Auditorium B TUE.4B

16:15 Auditorium B TUE.4B.1

First measurement of the non-instantaneous response time of a $\chi^{(3)}$ nonlinear optical effect, *Susanta K. Das*[1], *M. Bock*[1], *R. Grunwald*[1], *B. Borchers*[1], *J. Hyyti*[2], *G. Steinmeyer*[1,2], *D. Ristau*[3,4], *A. Harth*[4], *T. Vockerodt*[4], *T. Nagy*[4], and •*U. Morgner*[3,4]; [1]*Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie, 12489 Berlin, Germany*, [2]*Optoelectronics Research Centre, Tampere University of Technology, 33101 Tampere, Finland*, [3]*Laser Zentrum Hannover e.V., Hollerithallee 8, 30419 Hannover, Germany*, [4]*Institut für Quantenoptik, Leibniz Universität Hannover, Welfengarten 1, 30167 Hannover, Germany*.
The third harmonic of a few-cycle pulse, generated at a dielectric surface, is investigated via IFROG. We present direct experimental evidence for a non-instantaneous nonlinear response in TiO_2.

16:30 Auditorium B TUE.4B.2

Self-Phase Modulation of a Single-Cycle THz Pulse, •*Dmitry Turchinovich*[1,2], *Jørn Hvam*[1], and *Matthias Hoffmann*[3]; [1]*DTU Fotonik, Technical University of Denmark, DK-2800 Kgs. Lyngby*, [2]*Max Planck Institute for Polymer Research, Ackermannweg 10, 55128 Mainz, Germany*, [3]*SLAC Linear Accelerator Laboratory, 2575 Sand Hill Road, Menlo Park, CA, 94025, U.S.A.*.
Self-phase modulation of a THz pulse in n-doped GaAs is observed directly in time domain. Caused by nonlinear plasma response to THz fields, it corresponds to a dramatic modification of semiconductor dielectric function.

16:45 Auditorium B TUE.4B.3

Self-Seeded Stimulated Amplification in Adaptively Controlled Femtosecond Filaments, •*Giedrius Andriukaitis*[1], *Jens Möhring*[2], *Daniil Kartashov*[1], *Audrius Pugžlys*[1], *Aleksei Zheltikov*[3,4], *Marcus Motzkus*[2], and *Andrius Baltuška*[1]; [1]*Photonics Institute, Vienna University of Technology, Gusshausstraße 27-387, A-1040 Vienna, Austria*, [2]*Physikalisch-Chemisches Institut University Heidelberg, Neuenheimer Feld 229, D-69120 Heidelberg, Germany*, [3]*Department of Physics and Astronomy, Texas A&M University, College Station TX, 77843-4242 USA*, [4]*Physics Department, International Laser Center, M.V. Lomonosov Moscow State University, 119992 Moscow, Russia*.
Through adaptive pulse control we achieve efficient alignment, selective ionization and excitation of molecular nitrogen ions in a femtosecond filament. Stimulated amplification of UV emission seeded by the filament continuum is demonstrated.

17:00 Auditorium B TUE.4B.4

Laser Filament Induced Water Condensation, *Stefano Henin*[1], *Kamil Stelmaszczyk*[2], *Massimo Petrarca*[1], *Philipp Rohwetter*[2], *ZuoQuang Hao*[2], *Johannes Lüder*[2], *Yannick Petit*[1], *Andreas Vogel*[3], *Konradin Weber*[3], *Jerome Kasparian*[1], *Ludger Woeste*[2], and •*Jean-Pierre Wolf*[1]; [1]*GAP, Université de Genève, rue de l Ecole de Médecine 20, CH 1211 Genève 4, Switzerland*, [2]*Institut für Experimentalphysik, Freie Universität Berlin, Arnimallee 14, D 14195 Berlin, Germany*, [3]*University of Applied Sciences, Düsseldorf, Josef-Gockeln-Str. 9, D-40474 Dusseldorf, Germany*.
At relative humidities above 70%, femtosecond laser filaments generate aerosol particles and water droplets in the atmosphere. The water vapour condensation and droplet stabilization are assured by soluble species produced in the laser plasma.

17:15 Auditorium B TUE.4B.5

Coherent Transfer of Angular Momentum through Impulsive Stimulated Raman Scattering: the Role of Envelope Helicity, •*Takuya Higuchi*, *Hiroharu Tamaru*, and *Makoto Kuwata-Gonokami*; *The University of Tokyo, Tokyo, Japan*.
We propose a method to selectively transfer optical angular momentum to media via impulsive stimulated Raman scattering by shaping femtosecond laser pulses so that the envelope functions of their electromagnetic vectors exhibit helical trajectories.

17:30 Auditorium B TUE.4B.6

Non-perturbative Four-wave Mixing in InSb with Intense Off-resonant Multi-THz Pulses, •*Bernhard Mayer*[1], *Friederike Junginger*[1], *Christian Schmidt*[1], *Sebastian Mährlein*[1], *Olaf Schubert*[1,2], *Alexej Pashkin*[1], *Rupert Huber*[1,2], and *Alfred Leitenstorfer*[1]; [1]*Department of Physics and Center for Applied Photonics, University of Konstanz, Universitätsstraße 10, 78464 Konstanz, Germany*, [2]*Department of Physics, University of Regensburg, Universitätsstraße 31, 93053 Regensburg, Germany*.
High-field multi-THz pulses are employed to analyze the nonlinear response of InSb driven off-resonantly. Field-resolved four-wave mixing signals manifest the onset of a non-perturbative regime of Rabi flopping in agreement with numerical simulations.

17:45 Auditorium B TUE.4B.7

Influencing the ultrafast plasmon damping time with Fano resonances for nonlinear plasmonics, •*Krishnan Thyagarajan*, *Benjamin Gallinet*, and *Olivier Martin*; *Nanophotonics and Metrology Laboratory (NAM), Swiss Federal Institute of Technology Lausanne (EPFL), 1015 Lausanne, Switzerland*.
We explore the possibility of strongly influencing the plasmon damping time in nanostructures for efficient SHG, using the tunability of the narrow linewidth feature in the scattering cross-section of Fano resonances.

TUE.PII: Poster Session II

18:00–19:30 Poster area TUE.PII

18:00 Poster area TUE.PII.1

Control of High Harmonic Generation using an off-axis beam, •*Khuong Dinh*, *Peter Hannaford*, and *Lap Dao*; *ARC Centre of Excellence for Coherent X-Ray Science and Centre for Atom Optics and Ultrafast Spectroscopy, Swinburne University of Technology, Hawthorn Vic 3122, Australia*.
An off-axis beam is used to control the phase matching condition in the high harmonic generation process in a semi-infinite gas cell leading to suppression or enhancement of the harmonic emission.

18:00 Poster area TUE.PII.2

Optimization of ultrafast Yb-doped fiber amplifiers to achieve high-quality compressed-pulses, •*Jinkang Lim*[1], *Hung-Wen Chen*[1], *Anne-Laure Calendron*[2], *Guoqing Chang*[1], and *Franz Kartner*[1,2]; [1]*Department of Electrical Engineering and Computer Science and Research Laboratory of Electronics, Massachusetts Institute of Technology, 77 Massachusetts Ave, Cambridge MA 02139*, [2]*2Center for Free-Electron Laser Science, DESY and Dept. of Physics, University of Hamburg, Notkestraße 85, D-22607 Hamburg, Germany*.
We both theoretically and experimentally study the performance of nonlinear Yb-doped fiber amplifiers, and demonstrate that there exists an optimum negative pre-chirp that produces the best-quality compressed pulses.

18:00 Poster area TUE.PII.3

Generation of a train of an arbitrary waveform and its repeated revival, •*Masayuki Katsuragawa*, *Takayuki Suzuki*, and *Kanaka Raju Pandiri*; *1-5-1, Chofugaoka, Chofui, Tokyo,182-8585, Japan*.
We report on manipulation and characterization of highly-discrete coherent spectrum. It is shown that trains of arbitrary optical waveforms are generated and furthermore they revive repeatedly by adding material positive dispersions.

18:00 Poster area TUE.PII.4

Spectral high-speed sweeping of high power fs-pulses from a Non-collinear Optical Parametric Oscillator (NOPO), •*Tino Lang*[2], *Thomas Binhammer*[3], *Stefan Rausch*[2], *Guido Palmer*[1], *Moritz Emons*[1], *Marcel Schultze*[1], *Anne Harth*[1], and *Uwe Morgner*[1]; [1]*Institute of Quantum Optics, Leibniz Universität Hannover, Welfengarten 1, D-30167 Hannover, Germany, Tel: +49 511 | 762 - 17294*, [2]*Center for Quantum Engineering and Space-Time Research (QUEST), Welfengarten 1, 30167 Hannover, Germany*, [3]*VENTEON Laser Technologies GmbH, Hertzstr. 1b, D-30827 Garbsen, Germany*.
We demonstrate the potential of an ultra-broadband fs-optical parametric oscillator for high-speed spectral tuning with ramping frequencies up to 1 kHz and an output power of more than 2 W.

18:00 Poster area TUE.PII.5

Femtosecond X-Ray Diffraction Using the Rotating Crystal Method, •*Benjamin Freyer*, *Johannes Stingl*, *Flavio Zamponi*, *Michael Woerner*, and *Thomas Elsaesser*; *Max-Born-Institut für Nichtlineare Optik und Kurzzeit-spektroskopie, Berlin, Germany*.
We demonstrate the rotating-crystal method in femtosecond x-ray diffraction. Structural dynamics of a photoexcited bismuth crystal is mapped in a pump-probe scheme by measuring intensity changes of many Bragg reflections simultaneously.

18:00 Poster area TUE.PII.6

Adaptive attosecond pulse control with synthesized light, *Balázs Bódi*[1,2], *Emeric Balogh*[2], *Elefterios Goulielmakis*[3], *Katalin Varjú*[2], and •*Péter Dombi*[1]; [1]*Wigner Research Centre for Physics*, [2]*Dept. for Optics and Quantum Electronics, University of Szeged*, [3]*Max-Planck-Institut für Quantenoptik*.
We demonstrate robust control over attosecond pulse generation and shaping by optimizing the synthesis of few-cycle to sub-cycle driver waveforms in an ultrabroad spectral band covering the ultraviolet-infrared domain.

18:00 Poster area TUE.PII.7

Fully coherent spectral broadening of femtosecond pulses from an Er:fiber system, •*Sören Kumkar*, *Günther Krauss*, *Daniele Brida*, and *Alfred Leitenstorfer*; *Department of Physics and Center for Applied Photonics, University of Konstanz, D-78457 Konstanz, Germany*.
Coherence properties of the ultrabroadband output from a highly nonlinear germanosilicate fiber pumped by a femtosecond Er:fiber source are investigated. Conditions necessary to achieve full spectral coherence are demonstrated experimentally and analyzed theoretically.

18:00 Poster area TUE.PII.8

Generation of single-cycle THz pulses with MV/cm field strength by highly efficient frequency conversion in organic crystals, •*Clemens Ruchert*[1,2], *Carlo Vicario*[1], *Fernando Ardana*[1,3], and *Christoph P. Hauri*[1,3]; [1]*Paul Scherrer Institute, 5232 Villigen PSI, Switzerland*, [2]*University of Berne, 3012 Bern, Switzerland*, [3]*Ecole Polytechnique Federale de Lausanne, 1015 Lausanne, Switzerland*.
We present the generation of high-power single-cycle THz pulses in organic salt crystals. Broadband THz radiation with MV/cm electric field strength is produced by optical rectification driven with a powerful femtosecond optical parametric amplifier.

18:00 Poster area TUE.PII.9

Ultra-broadband mid-IR source based on non-collinear optical parametric amplification with a spatially dispersed signal, •*Shu-Wei Huang*[1] and *Franz X. Kärtner*[1,2]; [1]*Department of Electrical Engineering and Computer Science and Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, USA*, [2]*Center for Free-Electron Laser Science, DESY, and Department of Physics, University of Hamburg, Notkestraβe 85, D-22607 Hamburg, Germany*.
A scheme for the generation of an ultra-broadband 2-μm pulse is demonstrated with the aim to seed a high-energy OPCPA for long-wavelength-driven high-harmonic-generation. The concept can be generalized for ultra-broadband mid-IR generation.

18:00 Poster area TUE.PII.10

Towards optical attosecond pulses: broadband phase coherence between an ultrafast laser and OPO using lock-to-zero CEO stabilization, •*Richard A. McCracken*[1], *Jinghua Sun*[1,2], *Christopher G. Leburn*[1], and *Derryck T. Reid*[1]; [1]*Scottish Universities Physics Alliance (SUPA), Institute of Photonics and Quantum Sciences, School of Engineering and Physical Sciences, Heriot Watt University, Riccarton, Edinburgh EH14 4AS, UK*, [2]*School of Physics, Huazhong University of Science and Technology, Wuhan, Hubei 430074, China*.
The carrier-envelope-offset frequencies of the pump, signal, idler and related sum-frequency mixing pulses have been locked to 0 Hz in a 20-fs-Ti:sapphire-pumped optical parametric oscillator, satisfying a critical prerequisite for optical attosecond pulse synthesis.

18:00 Poster area TUE.PII.11

Femtosecond pulse generation at 50 W average powers from an Yb:KYW-Yb:YAG planar-waveguide MOPA., •*Cristtel Yoloxochitl Ramirez Corral*[1,2], *Ian James Thomson*[2], *Christopher Gilmour Leburn*[1], *Denis R. Hall*[2], *Derryck Telford Reid*[1], and *Howard J. Baker*[2]; [1]*Scottish Universities Physics Alliance (SUPA), Institute of Photonics and Quantum Sciences, School of Engineering and Physical Sciences, Heriot-Watt University, Riccarton, Edinburgh, EH14 4AS, UK.*, [2]*James Watt Institute for High Value Manufacturing, School of Engineering and Physical Sciences, Heriot-Watt University, Riccarton, Edinburgh, EH14 4AS, UK.*.
An Yb:YAG planar-waveguide power amplifier seeded by an Yb:KYW master oscillator is reported. The system produced 700-fs pulses at 1032 nm at average output powers of 50 W and a frequency of 53 MHz.

18:00 Poster area TUE.PII.12

Second harmonic generation in NLO polymers excited by Surface Plasmon enhanced electric field induced by femtosecond optical pulses, •*Atsushi Sugita*, *Kaname Suto*, *Atsushi Ono*, *Wataru Inami*, and *Yoshimasa Kawata*; *Shizuoka University, Hamamatsu, Shizuoka, 432-8561 Japan*.
We report second-order nonlinearity of NLO polymer-coated silver films at surface plasmon (SP) resonance. The nonlinearity in the polymer was greatly enlarged under the SP-enhanced fields and it has ultrafast response shorter than 150 fs.

18:00 Poster area TUE.PII.13

Low Frequency Region Mid-Infrared Spectroscopy by Chirped Pulse Up-Conversion, •*Jingyi Zhu*, *Tilo Mathes*, *Andreas D. Stahl*, and *Marie Louise Groot*; *Department of Physics and Astronomy, Faculty of Sciences, Vrije Universiteit, De Boelelaan 1081, 1081 HV Amsterdam, The Netherlands*.
UV-vis pump, mid-IR probe measurements based on the chirped upconversion method were expanded to the frequency region below 1800cm*1. We demonstrate experiments on GaAs and the photoreceptor protein Slr1694.

18:00 Poster area TUE.PII.14

Polarization Dependence of Nanograting in Fused Silica Irradiated by Ultrashort Pulse Laser with Tilted Intensity Front, •*Ye Dai*[1,2], *Guorui Wu*[1], and *Xian Lin*[1,2]; [1]*Department of Physics, Shanghai University, Shanghai, 200444, China*, [2]*Laboratory for Microstructures, Shanghai University, Shanghai, 200444, China*.
Femtosecond laser writing nanograting in fused silica shows strong dependence on the mutual orientation of polarization plane azimuth and intensity front tilt of light pulses. This phenomenon is in terms with intrinsic anisotropy of modification.

18:00 Poster area TUE.PII.15

Mid-IR ultra-short pulse characterization with, •*Alexandre Trisorio*[1], *Stephanie Grabielle*[2], *Marta Divall*[1], *Nicolas Forget*[2], and *Christoph Peter Hauri*[1,3]; [1]*Paul Scherrer Institute, Villigen, Switzerland*, [2]*Fastlite, Orsay, France*, [3]*Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland*.
We demonstrate a novel measurement device for ultra-short broadband mid-IR pulses characterization based on Self-Referenced Spectral Interferometry. The achromatic temporal filter based on XPW allows broadband operation in the 1.4-2 μm spectral range.

18:00 Poster area TUE.PII.16

Coherent electronic and vibronic processes in 2D molecular spectroscopy, •*Vytautas Butkus*[1,2], *Donatas Zigmantas*[3], *Leonas Valkunas*[1,2], and *Darius Abramavicius*[1,4]; [1]*Department of Theoretical Physics, Faculty of Physics, Vilnius University, Sauletekio 9-III, LT-10222 Vilnius, Lithuania*, [2]*Center for Physical Sciences and Technology, Gostauto 9, LT-01108 Vilnius, Lithuania*, [3]*Department of Chemical Physics, Lund University, P.O. Box 124, 22100 Lund, Sweden*, [4]*State Key Laboratory of Supramolecular Complexes, Jilin University, 2699 Qianjin Street, Changchun 130012, PR China*.
Simulations of vibrational and electronic coherences in two-dimensional spectra using two different models are considered. Oscillatory behaviour of peaks suggests a method of unravelling the mechanisms of quantum beats.

18:00 Poster area TUE.PII.17

Ultrafast CARS with Improved Spectral Resolution, •*Matthias Lütgens*, *Susana Chatzipapadopoulos*, and *Stefan Lochbrunner*; *Institut für Physik, Universität Rostock, Universitätsplatz 3, 18051 Rostock, Germany*.
Molecular vibrations are investigated by time and frequency resolved CARS applying ultrafast excitation and picosecond probing for high spectral resolution. Enhanced spectral structure and beating phenomena are demonstrated for coalescing Raman bands.

18:00 Poster area TUE.PII.18

Transient Phase Matching during High-Order Harmonic Generation in Water Droplets, •*Heiko G. Kurz*[1,2], *Daniel S. Steingrube*[1,2], *Detlev Ristau*[2,3], *Manfred Lein*[2,4], *Uwe Morgner*[1,2,3], and *Milutin Kovačev*[1,2]; [1]*Leibniz Universität Hannover, Institut für Quantenoptik*, [2]*QUEST - Centre for Quantum Engineering and Space-Time Research*, [3]*Laser Zentrum Hannover e.V.*, [4]*Leibniz Universität Hannover, Institut für theoretische Physik*.

We report on high-order harmonic generation in micrometer-sized water droplets. Spectral broadening, splitting and blueshift of the harmonic radiation are observed and attributed to phase-matching effects and spatiotemporal behaviour of the target.

18:00 Poster area TUE.PII.19

Control of Electron Localization in Dissociating Hydrogen and Deuterium Molecules, •*Igor Litvinyuk*[1], *Xu Han*[1], *Jean-Philippe Maclean*[1,2], *Xiaoxu Guan*[3], *Klaus Bartschat*[3], *Dave Kielpinski*[1], and *Robert Sang*[1]; [1]*Centre for Quantum Dynamics, Griffith University, Nathan, Queensland, Australia 4111*, [2]*McGill University, Montreal, Quebec, Canada*, [3]*Physics Department, Drake University, Des Moines, Iowa, USA*.
We study the effects of pulse intensity, duration and carrier-envelope phase (CEP) on asymmetry in hydrogen and deuterium molecular ions dissociated by intense few-cycle near-infrared laser pulses. We compare experimental results with model calculations.

18:00 Poster area TUE.PII.20

Generation of a Train of Attosecond Pulses with the Simplest Method, •*Kazumichi Yoshii*, *John Kiran A.*, and *Masayuki Katsuragawa*; *Department of Engineering Science, University of Electro-Communications, 1-5-1 Chofugaoka, Chofu-shi, Tokyo, Japan*.
We report an extremely simple approach to generate an attosecond pulse train from more than octave-spanning discrete spectrum by only positioning transparent materials into the optical path without spatially dispersing the frequency components.

18:00 Poster area TUE.PII.21

Electron acceleration produced by tight focusing of a radially polarized ultrashort laser pulse, •*Christopher Tchervenkov*[1], *Jean-Philippe MacLean*[1], *Stéphane Payeur*[1], *Sylvain Fourmaux*[1], *Bruno Schmidt*[1], *François Légaré*[1], *Michel Piché*[2], and *Jean-Claude Kieffer*[1]; [1]*INRS-EMT, Varennes (Québec), Canada*, [2]*COPL, Université Laval, Québec, Canada*.
We generated a longitudinal field by tightly focusing a radially polarised ultrashort laser pulse. The created field was intense enough to ionise and accelerate electrons to 25 keV using a low density oxygen gas target.

18:00 Poster area TUE.PII.22

Pulse Duration Dependence of Ethylene Fragmentation in Strong Laser Fields, •*Xinhua Xie*[1], *Stefan Roither*[1], *Markus Schöffler*[1], *Daniil Kartashov*[1], *Li Zhang*[1], *Erik Lötstedt*[2], *Atsushi Iwasaki*[2], *Kaoru Yamanouchi*[2], *Andrius Baltuška*[1], and *Markus Kitzler*[1]; [1]*Photonics Institute, Vienna University of Technology, Gusshausstrasse 27, A-1040 Vienna, Austria*, [2]*Department of Chemistry, School of Science, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan*.
With Coulomb explosion imaging technique, we experimentally demonstrated the dependence of three-body Coulomb explosion of ethylene molecules on the pulse duration of a strong laser field. Both concerted and sequential fragmentation processes were observed.

18:00 Poster area TUE.PII.23

Mid-Infrared Femtosecond Filament and Three Octaves Continuum Generation in Gases, •*Skirmantas Ališauskas*[1], *Daniil Kartashov*[1], *Audrius Pugžlys*[1], *Aleksandr Voronin*[2], *Aleksei Zheltikov*[2,3], *Massimo Petrarca*[4], *Pierre Béjot*[4], *Jérôme Kasparian*[4], and *Andrius Baltuška*[1]; [1]*Photonics Institute, Vienna University of Technology, Gusshausstrasse 27-387, A-1040 Vienna, Austria*, [2]*Physics Department, International Laser Center, M.V. Lomonosov Moscow State University, 119992 Moscow, Russia*, [3]*Department of Physics and Astronomy, Texas A&M University, College Station TX, 77843-4242, USA*, [4]*Université de Genève, Rue de l'École de Médecine 20, 1211 Genève, Switzerland*.
We report experimental and theoretical results on mid-infrared femtosecond pulse filamentation in different gases. Highly efficient generation of a three-octave-wide spectral continuum in argon, covering the main atmospheric transparency windows, is demonstrated and explained.

18:00 Poster area TUE.PII.24

Elongation of C-O Distance in Methanol in Ultrashort Intense Laser Fields by Time-dependent Adiabatic Molecular Dynamics Simulation, *Yoshihiro Nishiguchi*, •*Katsunori Nakai*, and *Kaoru Yamanouchi*; *Department of Chemistry, School of Science, The University of Tokyo, Japan*.
Chemical-bond elongation necessary for the enhancement of ionization of molecules in an intense ultrashort-pulsed laser field was found theoretically to be achieved when the first ionization proceeds at the leading edge of the laser pulse.

18:00 Poster area TUE.PII.25

High-harmonic generation from oriented OCS molecules, •*Peter Kraus*, *Stefan Vlajkovic*, *Alisa Rupenyan*, and *Hans Jakob Wörner*; *Laboratorium für physikalische Chemie, Eidgenössische Technische Hochschule Zürich, Wolfgang-Pauli-Str. 10, 8093 Zurich, Switzerland*.
We report even-order high-harmonic generation from OCS, which was oriented by a femtosecond laser-pulse superimposed with its second harmonic. We show full coherent control over the even-harmonic intensity through the relative phase of the two-color-field.

18:00 Poster area TUE.PII.26

Sub-Cycle Switching of a Photonic Bandstructure via Ultrastrong Light-Matter Coupling, •*Jean-Michel Ménard*[1,2], *Michael Porer*[1,2], *Alfred Leitenstorfer*[1], *Rupert Huber*[1,2], *Riccardo Degl'Innocenti*[3], *Simone Zanotto*[3], *Giorgio Biasiol*[4], *Lucia Sorba*[3], and *Alessandro Tredicucci*[3]; [1]*Department of Physics, University of Konstanz, 78457 Konstanz, Germany*, [2]*Department of Physics, University of Regensburg, 93040 Regensburg, Germany*, [3]*NEST, Istituto Nanoscienze-CNR and Scuola Normale Superiore, 56127 Pisa, Italy*, [4]*Laboratorio TASC, CNR-IOM, Area Science Park, 34149 Trieste, Italy*.
Phase-locked multi-terahertz transients map out the full photonic bandstructure of a plasmonic crystal while ultrastrong coupling with quantized electronic transitions in semiconductor quantum wells is optically switched on within less than a cycle of light.

18:00 Poster area TUE.PII.27

Low-Energy Peak Structure in Strong-Field Ionization by Mid-Infrared Laser Pulses: Two-Dimensional Focusing by the Atomic Potential, *Christoph Lemell*[1], *Konstantinos Dimitriou*[2,3], *Xiao-Min Tong*[4], *Joachim Burgdörfer*[1], and •*Stefanie Gräfe*[1]; [1]*Institute for Theoretical Physics, Vienna University of Technology, Vienna, Austria*, [2]*Department of Physical Science and Applications, Hellenic Army Academy, Vari, Greece*, [3]3*National Hellenic Research Foundation, Inst. of Theoretical and Physical Chemistry, Athens, Greece*, [4]*of Materials Science, University of*

Tsukuba, Ibaraki, Japan.
We analyze the formation of the low-energy structure in above-threshold ionization spectra by strong-field midinfrared laser pulses by using both quasiclassical and quantum approaches.

18:00 Poster area TUE.PII.28

Probing the longitudinal momentum spread of the electron wave packet at the tunnel exit, •*Claudio Cirelli*[1], *Adrian N. Pfeiffer*[1], *Alexandra S. Landsman*[1], *Mathias Smolarski*[1], *Darko Dimitrovski*[2], *Lars B. Madsen*[2], and *Ursula Keller*[1]; [1]*Physics Departement, ETH Zurich, CH-8093 Zurich, Switzerland*, [2]*Lundbeck Foundation Theoretical Center for Quantum System Research, Department of Physics and Astronomy, Aarhus University, 8000 Aarhus C, Denmark*.
We present an ellipticity resolved study of momentum distributions arising from tunnel ionization of Helium. The presence of a longitudinal momentum spread of the electron at the tunnel exit can explain the features observed experimentally.

18:00 Poster area TUE.PII.29

Harmonic Generation with Single-Cycle Light Pulses, *Arkadiy Drozdov*[1], •*Sergey Kozlov*[1], *Andrey Sukhorukov*[2], and *Yuri Kivshar*[1,2]; [1]*National Research University of Information Technologies, Mechanics and Optics, St. Petersburg 197101, Russia*, [2]*Australian National University, Canberra ACT 0200, Australia*.
We study spatiotemporal pulse dynamics in cubic nonlinear media with normal dispersion and reveal new features of harmonic generation when the pulse duration is reduced, including the suppression of third-harmonic generation for single-cycle optical pulses.

18:00 Poster area TUE.PII.30

High energy post compression to Terawatt level 10 fs pulses, •*Ondřej Hort*, *Antoine Dubrouil*, *Coralie Fourcade-Dutin*, *Stéphane Petit*, *Eric Mével*, *Dominique Descamps*, and *Eric Constant*; *Centre Lasers Intenses et Applications (Université de bordeaux, CNRS, CEA), Université de Bordeaux, 33405 Talence, France*.
By using postcompression by gas ionization we compress 45 fs pulses down to 10 fs limit while keeping the pulse energy above 10 mJ. Pulses below 10 fs were obtained with TW peak power.

18:00 Poster area TUE.PII.31

The Dynamics of Desorbing CO Probed with an X-ray Free-electron Laser, •*Martin Beye*[1,2], *Toyli Anniyev*[2], *Ryan Coffee*[2], *Martina Dell'Angela*[3], *Alexander Föhlisch*[1], *Jörgen Gladh*[4], *Tetsuo Katayama*[2], *Sarp Kaya*[2], *Oleg Krupin*[2], *Andreas Mogelhoj*[2], *Anders Nilsson*[2], *Dennis Nordlund*[2], *Jens Norskov*[2], *Henrik Öberg*[4], *Hirohito Ogasawara*[2], *Henrik Öström*[4], *Lars G. M. Pettersson*[4], *William F. Schlotter*[2], *Jonas Sellberg*[2], *Florian Sorgenfrei*[3], *Joshua J. Turner*[2], *Martin Wolf*[5], and *Wilfried Wurth*[4]; [1]*Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Berlin, Germany*, [2]*SLAC National Accelerator Laboratory, Menlo Park, USA*, [3]*Universität Hamburg, Hamburg, Germany*, [4]*Stockholm University, Stockholm, Sweden*, [5]*Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin, Germany*.
Through fs-laser excitation, we induce a transition of adsorbed CO on Ru through vibrationally hot states into a long-lived transient. We follow the electronic structure with soft X-ray absorption and emission spectroscopy.

18:00 Poster area TUE.PII.32

Ultrafast dynamics of the photo-induced metal-insulator transition (MIT) of single VO2 micro-crystals, •*Andrew Jones*[2], *Jae Park*[1], *David Cobden*[1], and *Markus Raschke*[2]; [1]*Department of Physics, University of Washington, Seattle, WA 98195, USA*, [2]*Department of Physics, Department of Chemistry, and JILA, University of Colorado, Boulder, CO 80309*.
We study the photoinduced MIT in homogeneous single VO2 microcrystals and compare with thin-film studies. An anisotropic coherent phonon response and MIT transition time scale of 67+-5 fs is observed suggesting strong lattice contributions.

18:00 Poster area TUE.PII.33

Ultrafast Time Resolved Reflection High Energy Electron Diffraction with Tilted Pump Pulse Fronts, •*Ping Zhou*, *Carla Streubühr*, *Annika Kalus*, *Tim Frigge*, *Anja Hanisch-Blicharski*, *Simone Wall*, *Martin Kammler*, *Manuel Ligges*, *Uwe Bovensiepen*, *Dietrich von der Linde*, and *Michael Horn-von Hoegen*; *Department of Physics & Center for Nanointegration CeNIDE, University of Duisburg-Essen, Lotharstr. 1, 47048 Duisburg, Germany*.
We present time-resolved RHEED from a Pb(111) surface using an optical setup capable of matching the laser and electron pulse fronts. The response of the surface lattice upon excitation was observed to be 3 ps.

18:00 Poster area TUE.PII.34

Recovery of ultra-broadband terahertz pulses from sum-frequency spectrograms using a generalized deconvolution method, •*Mark D. Thomson*, *Volker Blank*, and *Hartmut G. Roskos*; *Physikalisches Institut, Johann Wolfgang Goethe-Universität, Frankfurt, Germany*.
A method to recover the intensity and phase of ultra-broadband THz pulses exceeding 100 THz bandwidth is presented, using a generalized deconvolution algorithm which incorporates an arbitrary phase-matching and non-linear response.

18:00 Poster area TUE.PII.35

Ultrafast Electron Dynamics in Graphene under an Ultrashort Intense Terahertz Pulse, •*Kenichi L. Ishikawa*; *Photon Science Center, The University of Tokyo, Tokyo, Japan*.
We describe the optical response of graphene to an ultrashort intense terahertz pulse by extended optical Bloch equations, stressing the importance of the interplay of intraband and interband dynamics in the ultrafast graphene electron dynamics.

18:00 Poster area TUE.PII.36

Terahertz emission from GaAs nanotips, •*Tsong-Ru Tsai*[1], *Da-Yang Huang*[1], and *Chao-Kuei Lee*[2]; [1]*Institute of Optoelectronic Sciences, National Taiwan Ocean University, Keelung 20224, Taiwan, R.O.C.*, [2]*Department of Photonics, National Sun Yat-Sen University, Kaohsiung 80424, Taiwan, R.O.C.*.
Terahertz emission from GaAs nanotips was studied. We found that the terahertz power from GaAs nanotips can be one- or two-orders of magnitude higher than from GaAs and depends on the length of the nanotips.

18:00 Poster area TUE.PII.37

The contribution has been withdrawn.

18:00 Poster area TUE.PII.38

Photoinduced Growth of Ferroelectric Charge Order in Organic Dimer-Mott Insulator, *Keisuke Itoh*[1], *Hirotake Itoh*[1,2], •*Shinichiro Iwai*[1,2], *Makoto*

Naka[1], *Sumio Ishihara*[1,2], *Shingo Saito*[3], *Naoki Yoneyama*[4], and *Takahiko Sasaki*[4]; [1]*Department of Physics, Tohoku University, Sendai, 980-8578, Japan*, [2]*JST-CREST, Sendai, 980-8578, Japan*, [3]*National Institute of Information and Communications Technology, Koganei, 185-8795, Japan*, [4]*Institute for material Research, Sendai, 980-8577, Japan*.
Optical pump and THz probe measurement showed that the the photoinduced growth of the electric dipole glass or the polar nano region, as a result of the photoinduced collapse of the dimer-Mott insulator.

18:00 Poster area TUE.PII.39

Surface Carrier dynamics on Semiconductor Studied with Femtosecond Core-Level Photoelectron Spectroscopy Using Extreme Ultraviolet High-Order Harmonic Source, •*Katsuya Oguri*, *Takanobu Tsunoi*, *Keiko Kato*, *Hidetoshi Nakano*, *Tadashi Nishikawa*, *Hideki Gotoh*, *Kouta Tateno*, and *Tetsuomi Sogawa*; *NTT Basic Research Laboratories, Nippon Telegraph and Telephone Corporation, 3-1, Wakamiya, Morinosato, Atsugi-shi, Kanagawa 243-0198, Japan*.
We investigated surface photovoltage dynamics on GaAs with a femtosecond core-level photoelectron spectroscopy based on 92-eV high-order harmonic source. Sub-picosecond separation of photo-generated carriers and a subsequent slow relaxation due to recombination were clearly measured.

18:00 Poster area TUE.PII.40

Squeezed Thermal Phonons below the Melting Fluence in Silicon, •*Eeuwe S. Zijlstra*[1,2], *Alan Kalitsov*[1,3], *Tobias Zier*[1,2], and *Martin E. Garcia*[1,2]; [1]*Theoretical Physics, University of Kassel, Heinrich-Plett-Str. 40, 34132 Kassel, Germany*, [2]*Center for Interdisciplinary Nanostructure Science and Technology (CINSaT), Heinrich-Plett-Str. 40, 34132 Kassel, Germany*, [3]*Department of Physics, University of Puerto Rico, San Juan, PR 00931, USA*.
We show that thermal phonon squeezing - an ultrafast phenomenon that has not been reported before - precurses ultrafast melting of solids as a function of fluence.

18:00 Poster area TUE.PII.41

Competition between inverse piezoelectric effect and deformation potential mechanism in undoped GaAs revealed by ultrafast acoustics, •*Gwenaelle Vaudel*, *Thomas Pezeril*, *Pascal Ruello*, and *Vitalyi Gusev*; *Institut des Molécules et Matériaux du Mans (IMMM), CNRS UMR 6283, avenue Olivier Messiaen, 72085 Le Mans cedex 9 France*.
We experimentally demonstrate that piezoelectric generation of sound can dominate in <111> GaAs material over the deformation potential mechanism even in the absence of static externally applied or built-in electric fields in the semiconductor.

18:00 Poster area TUE.PII.42

Ultrafast Optical and Terahertz Spectroscopy of YBCO and YBCO/LSMO Films, •*J. Lee*[1], *J. Xiong*[1], *D. Talbayev*[2], *J.-X. Zhu*[3], *S. A. Trugman*[1,3], *Q. X. Jia*[1], *D. A. Yarotski*[1], *A. J. Taylor*[1], and *R. P. Prasankumar*[1]; [1]*Center for Integrated Nanotechnologies, Los Alamos National Laboratory, Los Alamos, NM 87545*, [2]*Department of Physics and Engineering Physics, Tulane University, New Orleans, LA 70118*, [3]*Theoretical Division, Los Alamos National Laboratory, Los Alamos, NM, 87545*.
Ultrafast optical and terahertz spectroscopy is used to explore the coupling between superconducting and ferromagnetic materials in a layered heterostructure, revealing that the proximal ferromagnetic order influences the pseudogap in the superconductor.

18:00 Poster area TUE.PII.43

Ultrafast Carrier Relaxation and Recombination in Multiferroic $BiFeO_3$, •*Yu-Miin Sheu*[1], *S.A. Trugman*[1], *Y.-S. Park*[1], *S. Lee*[2], *H.T. Yi*[2], *S.-W. Cheong*[2], *Q.X. Jia*[1], *A.J. Taylor*[1], and *R.P. Prasankumar*[1]; [1]*Los Alamos National Lab, NM, USA*, [2]*Rutgers University, NJ, USA*.
We study carrier dynamics in multiferroic bismuth ferrite using optical pump-probe and photoluminescence spectroscopy. Our results indicate that, despite the presence of antiferromagnetic and ferroelectric order, carrier relaxation is similar to that in bulk semiconductors.

18:00 Poster area TUE.PII.44

Manipulation of Squeezed Two-Phonon Bound States using Femtosecond Laser Pulses, •*Jianbo Hu*[1,2], *Oleg Misochko*[3], and *Kazutaka Nakamura*[1,2]; [1]*Materials and Structures Laboratory, Tokyo Institute of Technology*, [2]*CREST, Japan Science and Technology Agency*, [3]*Institute of Solid State Physics, Russian Academy of Sciences*.
Coherent control technique using femtosecond laser pulses is employed to manipulate squeezed two-phonon bound states in ZnTe(110), such that quantum fluctuations of the atomic displacements can be either suppressed or enhanced.

18:00 Poster area TUE.PII.45

The contribution has been withdrawn.

18:00 Poster area TUE.PII.46

Ultrafast Electronic Dynamics in Laser-Excited Crystalline Bismuth, •*Alexey Melnikov*[1], *Oleg Misochko*[2], and *Sergey Chekalin*[1]; [1]*Institute of Spectroscopy Russian Academy of Sciences, Troitsk, Moscow Region, 142190, Russia*, [2]*Institute of Solid State Physics Russian Academy of Sciences, Chernogolovka, Moscow Region, 142432, Russia*.
Femtosecond spectroscopy was applied to capture complex dynamics of nonequilibrium electrons in bismuth. Data analysis reveals significant wavevector dependence of electron-hole and electron-phonon coupling strength along the trigonal direction of the Brillouin zone.

18:00 Poster area TUE.PII.47

All-optical subnanosecond coherent spin switching in thin ferromagnetic layers, •*Christian Piovera*[1], *Ettore Carpene*[2], *Claudia Dallera*[1], and *Ezio Puppin*[3]; [1]*Dipartimento di Fisica, Politecnico di Milano, Piazza Leonardo da Vinci 32, I-20133 Milano, Italy*, [2]*C.N.R.-I.F.N., Dipartimento di Fisica, Politecnico di Milano, Piazza Leonardo da Vinci 32, I-20133 Milano, Italy*, [3]*C.N.I.S.M., Dipartimento di Fisica, Politecnico di Milano, Piazza Leonardo da Vinci 32, I-20133 Milano, Italy*.
Ultrashort laser pulses have been used to reversibly switch the magnetization in ferromagnetic iron films. The measured process takes place in one hundred picoseconds. These results open new interesting prospects for ultrafast magneto-optical recording.

18:00 Poster area TUE.PII.48

The contribution has been withdrawn.

18:00 Poster area TUE.PII.49

Ultrafast Magneto Optical Four Wave Mixing in Garnets, •*Marie Barthelemy*, *Mircea Vomir*, *Monica Sanches Piaia*, *Helene Vonesh*, and *Jean-Yves Bigot*; *CNRS Université de Strasbourg IPCMS 23 rue du Loess BP 43, 67034, Strasbourg, France*.

We report on magnetic field dependent four wave mixing signals emitted from a Garnet thin film. The coherent and population contributions to the magneto optical response are separately measured in a three beams configuration.

18:00 Poster area TUE.PII.50

Coherent phonon frequency comb generated by few-cycle femtosecond pulses in Si, •*Muneaki Hase*[1,2], *Masayuki Katsuragawa*[3], *Anca Monia Constantinescu*[1], and *Hrvoje Petek*[1]; [1]*Department of Physics and Astronomy, University of Pittsburgh, 3941 O'Hara Street, Pittsburgh, PA 15260, USA*, [2]*Institute of Applied Physics, University of Tsukuba, 1-1-1 Tennodai, Tsukuba 305-8573, Japan*, [3]*Department of Engineering Science, University of Electro-Communications, 1-5-1 Chofugaoka, Chofu, Tokyo 182-8585, Japan*.
Using few-cycle femtosecond pulses in near-resonance with the direct band-gap, we demonstrate ultrafast phononic modulation of the optical index of Si, generating a frequency comb up to 7th-order (109.2 THz) of the LO phonon frequency.

18:00 Poster area TUE.PII.51

Spatiotemporal Ultrafast Plasmon Control Based on Response Functions of Nanostructures Measured by Interferometric Cross-Correlation Microscopy, •*Fumihiko Kannari*, *Shutarou Onishi*, *Miyuki Kusaba*, and *Jun Oi*; *Department of Electronics and Electrical Engineering, Keio University, 3-14-1, Hiyoshi, Kohoku-ku, Yokohama 223-8522, Japan*.
Deterministic spatiotemporal control of localized plasmon excited by ultrashort laser pulses at gold nanostructures is demonstrated based on plasmon response function measured by interferometric cross-correlation using a dark-field microscope or a near-field optical microscope.

18:00 Poster area TUE.PII.52

Ultrafast laser pulses for mapping local field enhancements in artificially structured plasmonic nanomaterials, •*Ventsislav Valev*[1], *Victor Moshchalkov*[2], and *Thierry Verbiest*[1]; [1]*Molecular Electronics and Photonics, INPAC, K.U. Leuven, Leuven, Belgium*, [2]*Superconductivity and Magnetism & Pulsed Fields Group, INPAC, K.U. Leuven, Belgium*.
Based on the use of ultrafast laser pulses, we have developed new methods for mapping the localized field-enhancements in artificially structured plasmonic nano materials. These methods combine speed, user-friendliness and high resolution.

18:00 Poster area TUE.PII.53

Multiexciton Absorption Cross Sections of CdSe Nanocrystals at Band-Edge Energy, •*Nils Lenngren*, *Tommy Garting*, *Kaibo Zheng*, *Noëlle Lascoux*, *Fei Ma*, *Arkady Yartsev*, *Karel Žídek*, and *Tõnu Pullerits*; *Lund University, Lund, Sweden*.
Picosecond transient absorption spectra of cadmium selenide quantum dots were measured at various excitation intensities. Exciton and multiexciton absorption cross sections were determined and analyzed in terms of the electronic states of the quantum dots.

18:00 Poster area TUE.PII.54

Carrier Multiplication Dynamics Studied by Single-Cycle Terahertz Pulses with Amplitudes Exceeding 1 MV/cm, •*Hideki Hirori*[1,2], *Keisuke Shinokita*[3], *Masanobu Shirai*[1], *Shuntaro Tani*[3], *Yutaka Kadoya*[2,4], and *Koichiro Tanaka*[1,2]; [1]*Institute for Integrated Cell-Material Sciences, Kyoto University, Kyoto, Japan*, [2]*Core Research for Evolutional Science and Technology, Japan Science and Technology Agency, Kawaguchi, Japan*, [3]*Department of Physics, Graduate School of Science, Kyoto University, Kyoto, Japan*, [4]*Department of Quantum Matter, Hiroshima University, Higashihiroshima, Japan*.
We demonstrate that a 1-MV/cm terahertz pulse can generate a substantial number of electron-hole pairs forming excitons in GaAs multiple quantum wells that emit near-infrared luminescence without any band-to-band photo-excitations.

18:00 Poster area TUE.PII.55

Ultrafast Low-Energy Dynamics of Graphite Studied by Nonlinear Multi-THz Spectroscopy, •*Christian Schmidt*[1], *Bernhard Mayer*[1], *Friederike Junginger*[1], *Marc Rebholz*[1], *Alexander Grupp*[1], *Daniele Brida*[1], *Alexej Pashkin*[1], *Rupert Huber*[1,2], and *Alfred Leitenstorfer*[1]; [1]*Department of Physics and Center for Applied Photonics, University of Konstanz, Universitätsstraße 10, 78464 Konstanz, Germany*, [2]*address: Department of Physics, University of Regensburg, Universitätsstraße 31, 93053 Regensburg, Germany*.
Ultraintense few-cycle THz pulses are employed to study the nonlinear response of graphite. Strong pump-probe signals provide insight into ultrafast dynamics and spectral response of the low energy charge carriers.

18:00 Poster area TUE.PII.56

Effect of Bridge on Energy Transfer and Photoinduced Charge Separation in Perylene-Diimide-Napthalene-Diimide-Hexathiophene Based Donor-Bridge-Acceptor Triads, •*Julia Zaks*[1,4], *Jibin Sun*[2,3], *Saar Kirmayer*[3,5], *Jeffrey Urban*[5], *Don Tilley*[2], *Rachel Segalman*[1,3,5], and *Graham Fleming*[1,2,4]; [1]*Applied Science and Technology Graduate Group, University of California, Berkeley, Berkeley, California, 94720, USA*, [2]*Department of Chemistry, University of California, Berkeley, Berkeley, California, 94720, USA*, [3]*Department of Chemical and Biomolecular Engineering, University of California, Berkeley, Berkeley, California, 94720, USA*, [4]*Physical Biosciences Division, Lawrence Berkeley National Laboratory, 1 Cyclotron Road, Berkeley, California, 94720, USA*, [5]*The Molecular Foundry and Materials Science Division, Lawrence Berkeley National Laboratory, 1 Cyclotron Road, Berkeley, California, 94720, USA*.
Femtosecond transient absorption spectroscopy is performed to assess bridge effects on energy transfer and charge separation in molecular junctions. The chemical structure of bridge has a strong effect on yields and rates of relaxation pathways.

18:00 Poster area TUE.PII.57

Photoinduced charge transfer between Indoline D149 and porous ZnO detected in transient absorption, •*Egmont Rohwer*[1], *Christian Litwinski*[2], *Kerstin Strauch*[3], *Christoph Richter*[3], *Tebello Nyokong*[2], *Derck Schlettwein*[3], and *Heinrich Schwoerer*[1]; [1]*Stellenbosch University, Stellenbosch, South Africa*, [2]*Rhodes University, Grahamstown, South Africa*, [3]*Justus-Liebig-Universitaet, Giessen, Germany*.
The photophysics of charge transfer between electron donating, surface adsorbed D149 dye and electron accepting ZnO, for systematic variations of the production scheme, was investigated by measuring excited state lifetimes using ultrafast transient absorption spectroscopy.

18:00 Poster area TUE.PII.58

Multi-carrier complexes in single-walled carbon nanotubes: generation mechanisms and dynamics, *Bertrand Yuma[1]*, *Stéphane Berciaud[1]*, *Jean Besbas[1]*, *Sylvia Santos[2]*, *Jonah Shaver[2]*, *Laurent Cognet[2]*, *Mathieu Gallart[1]*, *Bernd Hönerlage[1]*, *Brahim Lounis[1]*, and •*Pierre Gilliot[1]*; [1]*IPCMS, UMR 7504, CNRS and Université de Strasbourg, 23, rue du Loess, F-67034 Strasbourg, France*, [2]*LP2N, UMR 5298, Université de Bordeaux, Institut d'Optique - Graduate School and CNRS, 351, cours de la Libération, F-33405 Talence, France*.

We observe induced absorption signal on single-wall carbon nanotubes that we attribute to trion generation. The dynamics of the charge carrier gas generation and of the multiple carrier complex formation are described.

18:00 Poster area TUE.PII.59

Dynamics of Ultrafast Interfacial Electron Injection on Phase-Transition Mechanism, •*Kannatassen Appavoo[1,2]*, *Nathaniel Brady[3]*, *Minah Seo[4]*, *Joyeeta Nag[5]*, *Rohit Prasankumar[4]*, *David Hilton[3]*, and *Richard Haglund[1,2,5]*; [1]*Interdisciplinary Materials Science, Vanderbilt University, Nashville, TN 37235-0106, USA*, [2]*Institute for Nanoscale Science and Engineering, Vanderbilt University, Nashville, TN 37235-0106, USA*, [3]*Department of Physics, University of Alabama at Birmingham, Birmingham AL 35294 USA*, [4]*Center for Integrated Nanotechnologies, Los Alamos National Laboratory, Los Alamos, NM 87545 USA*, [5]*Department of Physics and Astronomy, Vanderbilt University, Nashville, TN 37235-1807, USA*.

A novel all-optical method of triggering phase-transition in vanadium dioxide using the "hot-electron" effect is discussed. By performing non-degenerate pump-probe transmission spectroscopy on such hybrid plasmonic/phase-changing nanomaterial, structural and electronic lifetimes are retrieved.

18:00 Poster area TUE.PII.60

Ultrafast time-resolved photoelectron spectroscopy of solvated systems, •*Inga Jordan[1]*, *Matthew A. Brown[2]*, *Jeroen A. van Bokhoven[2,3]*, and *Hans Jakob Wörner[1]*; [1]*Laboratorium für Physikalische Chemie, ETH Zürich, Wolfgang-Pauli-Strasse 10, CH-8093 Zurich, Switzerland*, [2]*Institut für Chemie- und Bioingenieurwissenschaften, ETH Zürich, Wolfgang-Pauli-Strasse 10, CH-8093 Zurich, Switzerland*, [3]*Laboratory for Catalysis and Sustainable Chemistry, Paul Scherrer Institute, CH-5232 Villigen, Switzerland*.

Our ultrafast pump-probe experiment combines the liquid microjet technique with a high harmonic photoionization source and an attosecond interferometer. This enables the investigation of electron dynamics and electronically excited states of solvated complexes and nanoparticles.

18:00 Poster area TUE.PII.61

Transient Anisotropy in Degenerate Systems: Experimental Observation in a Cd-porphyrin, •*Yu Liang[1]*, *Oliver Schalk[2]*, and *Andreas-Neil Unterreiner[1]*; [1]*Karlsruhe Institute of Technology, Institute for Physical Chemistry and Center for Functional Nanostructures, 76128 Karlsruhe, Germany*, [2]*Ludwig-Maximilians-Universität, Institut für Biomolekulare Optik, Oetinngenstraße 67, 80539 München, Germany*.

Unusual high transient anisotropy up to 0.65 in cadmium meso-tetraphenyl porphyrin in tetrahydrofuran was recorded by transient anisotropy on a femto- and picosecond timescale. This value depends on probe wavelength due to dark state involvement.

18:00 Poster area TUE.PII.62

Ultrafast dynamics of biomimetic porphyrins in the gas phase, •*Minh-Huong Ha-Thi[1]*, *Niloufar Shafizadeh[1]*, *Lionel Poisson[2]*, and *Benoit Soep[2]*; [1]*Institut des Sciences Moléculaires d*Orsay UMR 8214, CNRS, Université Paris Sud 11, Bat 210, 91405 Orsay Cedex, France*, [2]*Laboratoire Francis Perrin CEA/DSM/IRAMIS/SPAM * CNRS URA 2453, CEA Saclay, 91191 Gif-sur-Yvette Cedex, France*.

The ultrafast dynamic behavior of a family of iron porphyrins, has been investigated by femtosecond pump-probe spectroscopy in the gas phase. A simple relaxation mechanism is proposed in order to explain the multistep deactivation observed.

18:00 Poster area TUE.PII.63

Microscopic origin of higher-order Kerr effect in gases, •*Pierre Béjot[1]*, *Eric Cormier[2]*, *Edouard Hertz[1]*, *Bruno Lavorel[1]*, *Jérome Kasparian[3]*, *Jean-Pierre Wolf[3]*, and *Olivier Faucher[1]*; [1]*Laboratoire Interdisciplinaire Carnot de Bourgogne (ICB), UMR 5209 CNRS-Université de Bourgogne, BP 47870, F-21078 Dijon Cedex France*, [2]*Centre Lasers Intenses et Applications, Université de Bordeaux-CNRS-CEA, UMR 5107, 351 Cours de la Libération F-33405 Talence, France*, [3]*GAP-Biophotonics, Université de Genève, 20 rue de l'École de Médecine, 1211 Geneva 4, Switzerland*.

The microscopic origin of the higher-order Kerr effect is numerically studied in atomic hydrogen by solving the full 3D time-dependent Schrödinger equation describing the interaction between the laser field and the atom.

18:00 Poster area TUE.PII.64

The contribution has been withdrawn.

18:00 Poster area TUE.PII.65

Intra-cluster Dynamics Induced in Molecular Clusters by Femtosecond UV Radiation, •*Sergey Chekalin[1]*, *Victor Kompanets[1]*, *Valentin Apatin[1]*, *Danil Ogurok[1]*, *Valery Lokhman[1]*, *Denis Poydashev[1,2]*, and *Evgeny Ryabov[1]*; [1]*Institute for Spectroscopy RAS, 142190, Troitsk, Moscow Region, Russia*, [2]*Moscow Institute of Physics and Technology (MIPT), 141700, Dolgoprudny, Moscow Region, Russia*.

Dynamics of intra-cluster processes induced by femtosecond UV laser radiation is studied. The measured time constants of the observed reactions are within the range from 1 ps to dozens of picoseconds.

18:00 Poster area TUE.PII.66

Enhancement of Ultrashort Laser Induced Au Nanoparticle Formation through Tunning of Femtosecond Pulse Train Period., *Paulo Henrique Dias Ferreira*, •*Jonathas de Paula Siqueira*, *Ismael André Heisler*, *Lino Misoguti*, and *Cleber Renato Mendonça*; *Instituto de Física de São Carlos, Universidade de São Paulo, São Carlos, SP, Brazil*.

The influence of femtosecond pulse train period inducing Au nanoparticles formation was studied. Using a pulse shaping technique, the period was tunned in order to match Raman resonances that enhance the Au nanoparticle formation process.

18:00 Poster area TUE.PII.67

Model-free Investigation of Ultrafast Bimolecular Chemical Reactions: Bimolecular Photo Induced Electron Transfer, •*Bernhard Lang*, *Arnulf Rosspeintner*, and *Eric Vauthey*; *Department of Physical Chemistry, University of Geneva, Switzerland*.

Using photo induced bimolecular electron transfer reactions as example, we demonstrate how diffusion controlled bimolecular chemical reactions can be studied in a model-free manner by quantitatively combining different ultrafast spectroscopical tools.

18:00 Poster area TUE.PII.68

Ultrafast Ring-Opening Reactions: A Comparison of a-Terpinene, a-Phellandrene, and 7-Dehydrocholesterol with 1,3-Cyclohexadiene, *Brenden Arruda*, *Edwin Nájera*, *Broc Smith*, *Kenneth G. Spears*, and •*Roseanne J. Sension*; *Department of Chemistry, Department of Physics, and Program in Biophysics, University of Michigan,*.
Broadband ultrafast transient absorption spectroscopy was used to study excited state dynamics and ground state relaxation following excitation of the 1,3-cyclohexadiene chromophore in four related compounds. Two distinct classes of behaviour were observed.

18:00 Poster area TUE.PII.69

Time-resolved predissociation of the first Rydberg state of CH3I, •*Nicolas Thiré*[1,2], *Raluca Cireasa*[1], *David Staedter*[1], *Stephen T. Pratt*[3], and *Valérie Blanchet*[1]; [1]*Laboratoire Collisions Agrégats Réactivité - IRSAMC - Université de Toulouse III, 118 route de Narbonne, Toulouse, France*, [2]*Institut National de la Recherche Scientifique, Université du Québec, 1650 Blvd Lionel-Boulet, Varennes, J3X1S2, Québec, Canada*, [3]*Argonne National Laboratory, 9700 S. Cass Avenue, Lemont, IL 60439, USA*.
Predissociation dynamics of the first Rydberg state of CH3I has been studied by femtosecond-resolved VMI. Particularly, the angular distributions and rise times of fragments differ significantly because of an alignment effect of methyl.

18:00 Poster area TUE.PII.70

Coherent Nuclear Wave Packet Dynamics of Laurdan Launched by Intramolecular Charge Transfer, •*So Young Kim* and *Taiha Joo*; *Department of Chemistry, Pohang University of Science and Technology (POSTECH), Pohang 790-784, South Korea*.
Coherent nuclear wave packets in the product launched by the ultrafast intramolecular charge transfer are observed by time-resolved fluorescence with 40 fs time resolution. Direct information on reaction coordinates and structural changes can be obtained.

18:00 Poster area TUE.PII.71

Femtosecond two-photon ionization of fluid ammonia at 9.3 eV, *Janus Urbanek*, *Annika Dahmen*, *Joel Torres-Alacan*, and •*Peter Vöhringer*; *Institut for Physical and Theoretical Chemistry, University of Bonn, Wegelerstrasse 12, 53115 Bonn, Germany*.
Solvated electrons are generated in liquid-to-supercritical ammonia by two-photon ionization with 266-nm, 100-fs pulses via the conduction band of the solvent. Their ion-pair mediated recombination dynamics is observed in the time-domain through femtosecond near-infrared spectroscopy.

18:00 Poster area TUE.PII.72

Ultrafast One-Photon (232 vs 266 nm) Bond-Selective Photochemistry of Bromoiodomethane (CH_2BrI) in Solution, •*Evgeniia Butaeva*, *Andrey Mereshenko*, *Maxim Panov*, and *Alexander Tarnovsky*; *Department of Chemistry, Center for Photochemical Sciences, Bowling Green State University, Bowling Green, Ohio 43403, USA*.
Ultrafast broadband transient absorption spectra measured from the deep-ultraviolet to the near-infrared region following single-photon excitation of bromoiodomethane in acetonitrile at different wavelengths manifest chromophore-selective structural rearrangement and carbon-halogen bond dissociation in solution.

18:00 Poster area TUE.PII.73

Shedding Light on Ultrafast Dynamics and Excited States with Real-Time Time-Dependent Density Functional Theory, •*Kenneth Lopata* and *Niranjan Govind*; *Environmental Molecular Sciences Laboratory, Pacific Northwest National Laboratory, Richland, WA USA*.
We discuss real-time time-dependent density functional theory, a powerful first principles computational tool for modelling femtosecond-scale electron dynamics. We then demonstrate its utility for describing and visualizing excitations (linear, nonlinear, valence, core, singlet-triplet, spin-orbit)

18:00 Poster area TUE.PII.74

Measuring Enzyme Binding Using Shaped Ultrafast Laser Pulses, •*Brett J Pearson*[1], *Chien-hung Tseng*[2], and *Thomas C Weinacht*[2]; [1]*Department of Physics and Astronomy, Dickinson College, Carlisle, PA 17013, USA*, [2]*Department of Physics and Astronomy, Stony Brook University, Stony Brook, NY, 11794, USA*.
We use multiphoton quantum-control spectroscopy to discriminate between unbound and enzyme-bound reduced nicotinamide adenine dinucleotide molecules in solution. Pulse-shape dependent fluorescence allows us to measure enzyme binding without spectrally resolving the emitted light.

18:00 Poster area TUE.PII.75

Do triplet states contribute to the formation of Cyclobutane Pyrimidine Dimers in DNA ?, •*Bert Pilles*[1], *Dominik Bucher*[1], *Julia Kubon*[1], *Peter Gilch*[2], *Wolfgang Zinth*[1], and *Wolfgang Schreier*[1]; [1]*Lehrstuhl für BioMolekulare Optik, Ludwig-Maximilians-Universität München, Oettingenstr. 67, 80538 München, Germany*, [2]*Institut für Physikalische Chemie, Heinrich-Heine-Universität Düsseldorf, Universitätsstr. 1, 40225 Düsseldorf, Germany*.
Cyclobutane pyrimidine dimers are the major photoproducts in DNA exposed to UV radiation. Time-resolved vibrational spectroscopy shows that CPD lesions are formed ultrafast while triplet states are quenched without contributing to the overall CPD yield.

18:00 Poster area TUE.PII.76

Quantum coherence controls the charge separation in a prototypical artificial light harvesting system, •*Sarah M. Falke*[1], *Carlo A. Rozzi*[2], *Nicola Spallanzani*[2], *Angel Rubio*[3], *Elisa Molinari*[2], *Daniele Brida*[4], *Margherita Maiuri*[4], *Giulio Cerullo*[4], *Heiko Schramm*[1], *Jens Christoffers*[1], and *Christoph Lienau*[1]; [1]*Carl von Ossietzky Universität Oldenburg, 26129 Oldenburg, Germany*, [2]*CNR, Centro S3, Centro S3, via Campi 213a, I-41125 Modena, Italy*, [3]*Fritz-Haber-Institut der Max-Planck-Gesellschaft, 14195 Berlin, Germany*, [4]*IFN-CNR, Politecnico di Milano, Piazza L. da Vinci 32, I-20133 Milano, Italy*.
Ultrafast spectroscopy and quantum-dynamics simulations of an artificial supramolecular light-harvesting system provide strong evidence that the quantum-correlated wavelike motion of electrons and nuclei governs the ultrafast electronic charge transfer.

18:00 Poster area TUE.PII.77

Excited State Dynamics of Green Fluorescence Protein Chromophore Derivatives Investigated with Time-Resolved Fluorescence and Transient Infrared Absorption,

Chi-Wen Cheng[1], *Hung-Yu Hsu*[1], *Guan-Jhih Huang*[2], *Eric Wei-Guang Diau*[1], *Jye-Shane Yang*[2], and •*Yuan-Pern Lee*[1,3]; [1]*Department of Applied Chemistry and Institute of Molecular Science, National Chiao Tung University, 1001, Ta-Hsueth Road, Hsinchu 30010, Taiwan*, [2]*Department of Chemistry, National Taiwan University, No. 1, Sec. 4, Roosevelt Road, Taipei 10617, Taiwan*, [3]*Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei 10617, Taiwan*.

A non-radiative decay mechanism involving hydrogen-bonding was established according to observed cis-trans isomerization yield, transient infrared absorption, and visible fluorescence decay dynamics of p-ABDI and m-ABDI in protic (CH3OH and CD3OD) and aprotic (CD3CN) solvents.

18:00 Poster area TUE.PII.78

Photophysical Processes of the spectroscopic RNA probe 2-(1-Ethynylpyrene)-Adenosine (PyA), •*Peter Trojanowski*[1], *Andreas Reuss*[1], *Christian Grünewald*[2], *Joachim Engels*[2], and *Josef Wachtveitl*[1]; [1]*Institut für Physikalische und Theoretische Chemie, Johann Wolfgang Goethe-Universität, Max-von-Laue-Str. 7, 60438 Frankfurt am Main, Germany*, [2]*Institut für Organische Chemie, Johann Wolfgang Goethe-Universität, Max-von-Laue-Str. 7, 60438 Frankfurt am Main, Germany*.

We examine the photoinduced excited state dynamics of pyrene modified adenosine (PyA), a versatile probe for RNA folding and hybridization in different solvents with respect to excimer formation and charge transfer character.

18:00 Poster area TUE.PII.79

Mixed Potential Energy Surfaces of the Ultrafast Isomerization of Retinal in Bacteriorhodopsin, •*Philip J. M. Johnson*[1], *Alexei Halpin*[1], *Takefumi Morizumi*[2], *Valentyn I. Prokhorenko*[3], *Oliver P. Ernst*[2,4], and *R. J. Dwayne Miller*[1,3]; [1]*Institute for Optical Sciences and Departments of Chemistry and Physics, University of Toronto, 80 St. George Street, Toronto, Ontario M5S 3H6, Canada*, [2]*Department of Biochemistry, University of Toronto, 1 King's College Circle, Toronto, Ontario M5S 1A8, Canada*, [3]*Max Planck Research Department for Structural Dynamics, Department of Physics, University of Hamburg, Centre for Free Electron Laser Science, DESY, Notkestrasse 85, D-22607 Hamburg, Germany*, [4]*Department of Medical Genetics, University of Toronto, 1 King's College Circle, Toronto, Ontario M5S 1A8, Canada*.

We observe, using electronic two-dimensional photon echo spectroscopy, that the cis and trans potential energy surfaces of the ultrafast isomerization of retinal in bacteriorhodopsin are mixed via the hydrogen out of plane (HOOP) mode.

18:00 Poster area TUE.PII.80

Electronic Excited State and Vibrational Dynamics of Water Solution of Cytosine Observed by Time-resolved Transient Absorption Spectroscopy with Sub-10fs Deep Ultraviolet Laser Pulse, •*Jun Miyazaki*[1,2], *Yuichiro Kida*[1,2], and *Takayoshi Kobayashi*[1,2,3,4]; [1]*Advanced Ultrafast Laser Research Center, University of Electro-communications, 1-5-1 Chofugaoka, Chofu, Tokyo 182-8585-Japan*, [2]*JST, CREST, 5 Sanboncho, Chiyoda-ku, Tokyo 102-0075 Japan*, [3]*Department of Electrophysics, National Chiao-Tung University, 1001 Ta Hsueh Rd., Hsinchu 300 Taiwan*, [4]*Institute of Laser Engineering, Osaka University, 2-6 Yamada-oka, Uuita, Osaka 565-0971 Japan*.

Time-resolved transient absorption spectroscopy for a water solution of cytosine with sub-10fs deep ultraviolet laser pulse is reported. Ultrafast electronic excited state dynamics and coherent molecular vibrational dynamics are simultaneously observed.

18:00 Poster area TUE.PII.81

Photoexcitation dynamics of nitric oxide bound ferric myoglobin probed by femtosecond IR spectroscopy, •*Jaeheung Park*[1], *Taegon Lee*[1], *Jaehun Park*[2], and *Manho Lim*[1]; [1]*Department of Chemistry and Chemistry Institute for Functional Materials, Pusan National University, Busan 609-735 Korea*, [2]*Pohang Accelerator Laboratory, Pohang 790-784 Korea*.

Time-resolved vibrational spectra show that photolysis quantum yield of NO bound ferric myoglobin is smaller than 0.86, the deligated NO geminately rebinds with subnanosecond time scale, and the rebinding kinetics depends on protein conformation.

18:00 Poster area TUE.PII.82

Ultrafast Slaving Dynamics at the Protein-Water Interface Studied with 2DIR Spectroscopy, •*John King* and *Kevin Kubarych*; *University of Michigan, Ann Arbor MI, 48109*.

The dynamics of hen egg white lysozyme in D2O/glycerol mixtures is studied using two-dimensional infrared spectroscopy. The hydration dynamics and the protein dynamics are studied simultaneously through vibrational probes attached to the protein surface.

18:00 Poster area TUE.PII.83

Different structural motifs driving coherent energy migration in light-harvesting antenna complexes, •*Elisabetta Collini*; *Dipartimento di Scienze Chimiche, Università di Padova, via Marzolo 1, 35131 Padova, Italy*.

Evidences for coherent energy transport under biological relevant conditions are reported for the light harvesting antenna phycoerythrin PE555 from the marine cryptophyte Hemiselmis refuscens CCMP644, using two-dimensional photon echo spectroscopy.

NOTES

WED.1: Photosynthesis

Chair: Graham Fleming, University of California at Berkeley, CA, USA

8:30–10:15 Room 350/351 WED.1

8:30 Room 350/351 WED.1.1

Invited

Persistent Quantum Coherence in Single Light-Harvesting Complexes, *Richard Hildner[1,4]*, *Daan Brinks[1]*, *Richard J. Cogdell[3]*, and •*Niek F. van Hulst[1,2]*; *[1]ICFO - Institute of Photonic Sciences, 08860 Castelldefels (Barcelona), spain*, *[2]ICREA - Institucio Catalana de Recerca i Estudis Avancats, 08015 Barcelona, Spain*, *[3]University of Glasgow, Glasgow G12 8TA, United Kingdom*, *[4]Universität Bayreuth, 95440 Bayreuth, Germany*.

We demonstrate ultrafast quantum coherent energy transfer within single light-harvesting complexes (LH2) under physiological conditions: The quantum coherence persists at least 400 fs. Strikingly, changing transfer pathways in individual complexes are revealed on second timescale.

9:00 Room 350/351 WED.1.2

Broadband 2D Electronic Spectroscopy Reveals Coupling Between Dark 1Bu- State of Carotenoid and Qx State of Bacteriochlorophyll, •*Evgeny Ostroumov[1]*, *Rachel Mulvaney[2]*, *Richard Cogdell[2]*, and *Gregory Scholes[1]*; *[1]Department of Chemistry, University of Toronto, 80 St. George St., Toronto, ON, M5S 3H6, Canada*, *[2]Glasgow Biomedical Research Centre, IBLS, University of Glasgow, 126 Place, Glasgow G12 8TA, Scotland, UK*.

The study of LH2 protein of purple bacteria by broadband 2D electronic spectroscopy is presented. The dark 1Bu-carotenoid state is directly observed in 2D spectra and its role in carotenoid-bacteriochlorophyll interaction is discussed.

9:15 Room 350/351 WED.1.3

Oscillatory Dynamics in Bacterial Reaction Centres Studied by Electronic 2D Spectroscopy, *David Palecek[1]*, *Sebastian Westenhoff[2]*, *Petra Edlund[2]*, *Philip Smith[2]*, and •*Donatas Zigmantas[1]*; *[1]Department of Chemical Physics, Lund University, P.O. Box 124, 221 00 Lund, Sweden*, *[2]Department of Chemistry, University of Gothenburg, Medicinaregatan 9C, 40530 Gothenburg, Sweden.*

Coherent dynamics in bacterial reaction centres were studied by electronic 2D spectroscopy at 80 K temperature. Polarization measurements allowed assignment of observed beatings at different frequencies to electronic and vibrational coherences.

9:30 Room 350/351 WED.1.4

Continuum probe two-dimensional electronic spectroscopy of the photosystem II reaction center, *Franklin Fuller[1]* and •*Jennifer Ogilvie[1,2]*; *[1]Department of Biophysics, University of Michigan, Ann Arbor, Michigan 48109*, *[2]Department of Physics, University of Michigan, Ann Arbor, Michigan 48109*.

We report two-dimensional electronic spectroscopy of the photosystem II reaction center, collected in the pump-probe geometry employing a continuum probe. This enables observation of ion bands that report on intermediates in the charge separation process.

9:45 Room 350/351 WED.1.5

Two-Dimensional Electronic Spectroscopy of a Model Dimer System, •*Alexei Halpin[1]*, *Philip J.M. Johnson[1]*, *R. Scott Murphy[2]*, *Valentyn I. Prokhorenko[3]*, and *R.J. Dwayne Miller[1,3]*; *[1]Institute for Optical Sciences and Departments of Chemistry and Physics,University of Toronto, 80 St. George Street, Toronto, Ontario M5S 3H6, Canada*, *[2]Department of Chemistry and Biochemistry, University of Regina, 3737 Wascana Parkway, Regina, SK, S4S 0A2, Canada*, *[3]Max Planck Research Department for Structural Dynamics, Department of Physics, University of Hamburg, Centre for Free Electron Laser Science, DESY, Notkestrasse 85, D-22607 Hamburg, Germany*.

Two-dimensional spectra of a dimer were measured to determine the timescale for electronic decoherence at room temperature. Anti-correlated beats in the crosspeaks were observed only during the period corresponding to the measured homogeneous lifetime.

10:00 Room 350/351 WED.1.6

Quantitative Analysis of Quantum-Coherent Dynamics from Algal Light-Harvesting Proteins, •*Daniel Turner* and *Gregory Scholes*; *University of Toronto, Toronto Ontario, Canada*.

We present broadband two-dimensional electronic spectra of light-harvesting proteins from photosynthetic algae. We describe methods used to distinguish electronic from vibrational contributions to the quantum coherence using quantitative analysis.

Coffee Break

10:15–10:45

WED.2A: Ultrafast Currents and Metamaterials and Polariton Dynamics

Chair: Eberhard Riedle, Ludwig-Maximilians-University, Munich, Germany

10:45–12:30 Auditorium A WED.2A

10:45 Auditorium A WED.2A.1

Doppler Velocimetry of Spin and Charge Currents in the 2D Fermi Gas, •*Jake Koralek[1]*, *Luyi Yang[1,2]*, *D.R. Tibbetts[3]*, *J.L Reno[3]*, *M.P. Lilly[3]*, and *Joe Orenstein[1,2]*; *[1]Materials Science Division, Lawrence Berkeley National Laboratory, Berkeley, California 94720, USA*, *[2]Department of Physics, University of California, Berkeley, California 94720, USA*, *[3]Sandia National Laboratories, Albuquerque, New Mexico 87123, USA*.

Phase-sensitive transient grating spectroscopy is used to measure the Doppler shift of light diffracted off moving spin and charge density waves, allowing complete characterization of spin and charge transport in the 2D Fermi gas.

11:00 Auditorium A WED.2A.2

Ultrabroadband Field-Resolved Spectroscopy Utilizing Femtosecond Quantum Interference Control of Electrical Currents, •*Claudia Ruppert*, *Jan Lohrenz*, *Sebastian Thunich*, *Elmar Sternemann*, and *Markus Betz*; *Experimentelle Physik 2, TU Dortmund, 44227 Dortmund, Germany*.

w/2w pulse pairs induce phase-sensitive electrical currents in a time-integrating semiconductor detector. Fourier analysis of the current interferogram reveals amplitude and phase of the driving fields. Pump-probe experiments combine femtosecond temporal and ˜mrad phase resolution.

11:15 Auditorium A WED.2A.3

Two-pulse space-time photocurrent correlations at graphene p-n junctions reveal hot carrier cooling dynamics near the Fermi level, •*Matt Graham[1,2]*, *Su-Fei Shi[1,2]*, *Daniel Ralph[1,2]*, *Jiwoong Park[1,3]*, and *Paul McEuen[1,2]*; *[1]Kavli Institute at Cornell for Nanoscale Science, Ithaca, NY ,USA*, *[2]Laboratory for Atomic and Solid State Physics, Cornell University, Ithaca, NY, USA*, *[3]Department of Chemistry and Chemical Biology, Cornell Univ., Ithaca, NY, USA*.

Two-pulse excitation at graphene p-n junctions results in strong temporal and spatial pulse correlations in photocurrent generation. We show this transient photocurrent response measures graphene hot carrier cooling that is dominated by acoustic phonon super-collisions.

11:30 Auditorium A WED.2A.4

Ultrafast nonlinearities of metallic 3D metamaterials, •*Petros Farah*, *Stefano Salvatore*, *Silvia Vignolini*, *Ulli Steiner*, and *Jeremy Baumberg*; *Nanophotonics Centre, Cavendish Laboratory, University of Cambridge, United Kingdom*.

Block-copolymer-based self-assembly is used to produce highly anisotropic 3D gyroidal metamaterials exhibiting novel optical properties. Ultrafast electron dynamics investigated by pump-probe spectroscopy shows the strong influence of their ultrahigh high surface area and plasmonic birefringence.

11:45 Auditorium A WED.2A.5

Ultrafast polariton dynamics in an organic semiconductor microcavity, •*Tersilla Virgili*[1], *David Coles*[2], *Ali M. Adawi*[5], *Casper Clark*[3], *Paolo Michetti*[4], *Sai Kiran Rajendran*[1], *Daniele Brida*[1], *Dario Polli*[1], *Giulio Cerullo*[1], and *David G. Lidzey*[2]; [1]*IFN, CNR Dipartimento di Fisica, Politecnico di Milano, P.zza Leonardo Da vinci 32, 20132 Milano Italy*, [2]*Department of Physics and Astronomy,University of Sheffield, Hicks Building Hounsfield Road Sheffield S37RH UK*, [3]*Helia Photonics Ltd. Rosebank Park, Livingston West Lothian EH547EJ UK*, [4]*Institute of Theoretical Physics and Astrophysics, University Of wurzburg, D-97074 Wurzburg Germany*, [5]*Department of Physics University of Hull, Cottingham Road Hull, HU6 7RX, UK*.

We study an organic semiconductor microcavity operating in the strong coupling regime using femtosecond pump-probe spectrscopy. By probing the photo-induced absorption bands, we characterize the time-dependent population densities of states in the two polariton branches.

12:00 Auditorium A WED.2A.6

Efficient ultrafast optical switching of surface plasmon polaritons, *Pohl Martin*[1], *Belotelov Vladimir*[2,3], •*Akimov Ilya*[1,4], *Kasture Sachin*[5], *Vengurlekar Arvind*[5], *Gopal Achanta*[5], *Zvezdin Anatoly*[3], *Yakovlev Dmitri*[1,4], and *Bayer Manfred*[1]; [1]*Experimentelle Physik 2, Technische Universitat Dortmund, 44221 Dortmund, Germany*, [2]*M.V. Lomonosov Moscow State University, 119991 Moscow, Russia*, [3]*A.M. Prokhorov General Physics Institute, Russian Academy of Sciences, 119992 Moscow, Russi*, [4]*A.F. Ioffe Physical-Technical Institute, Russian Academy of Sciences, 194021 St. Petersburg, Russia*, [5]*Tata Institute of Fundamental Research, 400005 Mumbai, India*.

We demonstrate that the dispersion of surface plasmon polaritons in a periodically perforated gold film can be efficiently manipulated on a sub-ps timescale in spectral regions far from the intrinsic gold resonances.

12:15 Auditorium A WED.2A.7

Exciton-Polariton Ultrafast Stark Effect, •*Christoph Lange*[1], *Alex Hayat*[1], *Lee Rozema*[1], *Ardavan Darabi*[1], *Henry van Driel*[1], *Aephraim Steinberg*[1], *Bryan Nelson*[2], *David Snoke*[2], *Loren Pfeiffer*[3], and *Kenneth West*[3]; [1]*Department of Physics, Centre for Quantum Information and Quantum Control, and Institute for Optical Sciences, University of Toronto, Toronto, Ontario M5S 1A7, Canada*, [2]*Department of Physics and Astronomy, University of Pittsburgh, Pittsburgh, Pennsylvania 15260, USA*, [3]*Department of Electrical Engineering, Princeton University, Princeton, New Jersey 08544, USA*.

We demonstrate ultrafast phase control of exciton-polaritons in a GaAs/AlGaAs strongly coupled microcavity exploiting the AC Stark effect. Radian-scale phase shifts are achieved without carrier generation, providing a powerful tool towards control of polariton BECs.

WED.2B: XFEL Physics

Chair: Markus Guehr, Stanford University, Stanford, CA, USA

10:45–12:30 Auditorium B WED.2B

10:45 Auditorium B WED.2B.1

Chirped Auger electron emission due to field-assisted post-collision interaction, •*Bernd Schütte*[1,3], *Sebastian Bauch*[2], *Ulrike Frühling*[1], *Marek Wieland*[1], *Michael Gensch*[4,5], *Elke Plönjes*[4], *Thomas Gaumnitz*[1], *Armin Azima*[1], *Michael Bonitz*[2], and *Markus Drescher*[1]; [1]*Universität Hamburg, Germany*, [2]*Christian-Albrechts-Universität Kiel, Germany*, [3]*Max-Born-Institut Berlin, Germany*, [4]*Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany*, [5]*Helmholtz-Zentrum Dresden-Rossendorf, Germany*.

We have investigated the Auger decay in xenon and krypton atoms in a terahertz streaking field. Linewidth asymmetries suggest a chirped Auger electron emission which can be understood by field-assisted post-collision interaction.

11:00 Auditorium B WED.2B.2

Ultrafast Nonlinear Double Excitations of He in Intense EUV FEL Fields, •*Mizuho Fushitani*[1], *Yasumasa Hikosaka*[2], *Akitaka Matsuda*[1], *Toru Morishita*[3], *C.-N. Liu*[4], *Eiji Shigemasa*[5], and *Akiyoshi Hishikawa*[1]; [1]*Nagoya University, Nagoya, Japan*, [2]*Niigata university, Niigata, Japan*, [3]*University of Electro-Communications, Chofu, Japan*, [4]*Fu-Jen Catholic University, Taipei, Taiwan*, [5]*Institute for Molecular Science, Okazaki, Japan*.

Three-photon double excitation of He in intense EUV FEL fields is studied by the shot-by-shot photoelectron spectroscopy, revealing the enhancement by resonances to the doubly excited states converging to the He+ N=3 level.

11:15 Auditorium B WED.2B.3

Synchronization of FEL and high-order harmonics of ultrashort-pulsed laser for generating intense full-coherent EUV light pulses, •*Atsushi Iwasaki*[1,2], *Takahiro Sato*[2], *Shigeki Owada*[1,2], *Tadashi Togashi*[3], *Eiji J. Takahashi*[4], *Katumi Midorikawa*[4], *Makoto Aoyama*[5], *Koichi Yamakawa*[5], *Shinichi Matsubara*[3], *Yuichi Okayasu*[3], *Hiromitsu Tomizawa*[3], *Takahiro Watanabe*[2], *Mitsuru Nagasono*[2], *Makina Yabashi*[2], *Tetsuya Ishikawa*[2], and *Kaoru Yamanouchi*[1,2]; [1]*Department of Chemistry, Graduate School of Science, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan*, [2]*RIKEN Harima Institute, RIKEN SPring-8 Center, 1-1-1, Kouto, Sayo-cho, Sayo-gun, Hyogo 679-5148, Japan*, [3]*Spring-8/Japan Synchrotron Radiation Research Institute, 1-1-1, Kouto, Sayo-cho, Sayo-gun, Hyogo 679-5198, Japan*, [4]*RIKEN Advanced Science Institute, Hirosawa 2-1, Wako, Saitama 351-0198, Japan*, [5]*Kansai Photon Science Institute (Kizu), Japan Atomic Energy Agency, 8-1-7 Umemidai, Kizukawa-shi, Kyoto 619-0215, Japan*.

Seeding of free-electron laser by the 13th harmonic of ultrashort-pulsed 800 nm laser light was achieved and a new EO-type synchronization technique to generate intense full-coherent pulsers in the extreme ultraviolet wavelength region was developed.

11:30 Auditorium B WED.2B.4

Invited

First experimental realization of an atomic inner-shell x-ray laser in the keV photon-energy regime, •*Nina Rohringer*; *Max Planck Advanced Study Group, Center for Free-Electron Laser Science, c/o DESY, 22607 Hamburg, Germany*.

Using ultra short, high-intensity pulses from an x-ray free-electron laser, we achieved saturated amplification of spontaneous emission of an inner-shell transition in atomic Neon at 849 eV photon energy, thereby realizing the first atomic x-ray laser.

12:00 Auditorium B WED.2B.5

Full Temporal Characterization of X-ray Pulses at Free-Electron Lasers, •*Matthias Hoffmann*[1], *Ivanka Grguras*[2], *Hubertus Bromberger*[2], *Sebastian Huber*[2], *Gilles Doumy*[3], *John Costello*[4], *Thomas Kelly*[4], *Christopher Behrens*[5], *Stefan Duesterer*[5], *Holger Schlarb*[5], *Nikolay Kabachnik*[6], *Andrey Kazansky*[7], *Tommaso Mazza*[6], *Michael Meyer*[6], *Paul Radcliffe*[6], *Thomas Tschentscher*[6], *Wolfram Helml*[8], *Reinhard Kienberger*[8], *Andreas Maier*[8], *Wolfgang Schweinberger*[8], *Louis DiMauro*[9], *Christoph Bostedt*[1], *John Bozek*[1], *Ryan Coffee*[1], *Yuantao Ding*[1], *Jerome Hastings*[1], *Sebastian Schorb*[1], *Marc Messerschmidt*[1], and *Adrian Cavalieri*[2]; [1]*Linac Coherent Light Source, SLAC National Accelerator Laboratory, Menlo Park, CA 94025, USA*, [2]*Max-Planck Research Department for Structural Dynamics, University of Hamburg, CFEL, Notkestrasse 85, 22607 Hamburg, Germany*, [3]*Argonne National Laboratory, Argonne, IL 60439, USA*, [4]*School of Physical Sciences and NCPST, Dublin City University, Dublin 9, Ireland*, [5]*DESY, Notkestrasse 85, 22607 Hamburg, Germany*, [6]*European XFEL, Albert-Einstein-Ring 19, 22761 Hamburg, Germany*, [7]*IKERBASQUE, Basque Foundation for Science, E-48011, Bilbao, Spain; DIPC, E-20018 SanSebastian/Donostia, Spain*, [8]*Max Planck Institute of Quantum Optics, Hans-Kopfermann-Str. 1, 85748 Garching, Germany*, [9]*Department of Physics, The Ohio State University, Columbus, OH 43210, USA*.

We have achieved temporal profile and time-of-arrival characterization of ultrafast x-rays at free electron lasers by using strong-field single-cycle terahertz pulses, extending the techniques of photoelectron streaking originally developed in the field of attosecond metrology.

12:15 Auditorium B WED.2B.6

Coherent Lensless Imaging with Ultra-Broadband Light Sources, •*Stefan Witte*, *Daniël Noom*, and *Kjeld S. E. Eikema*; *LaserLaB Amsterdam, VU University, De Boelelaan 1081, 1081 HV Amsterdam, The Netherlands*.

We demonstrate high-resolution coherent lensless imaging using an octave-spanning laser. The use of two time-delayed pulses removes all spectral bandwidth limitations, enabling efficient lensless imaging with the full spectrum of ultra-broadband sources.

Lunch Break

12:30–14:00

WED.3: Short Wavelengths and Applications

Chair: Nina Rohringer, Center for Free-Electron Laser Science (CFEL), Hamburg, Germany

14:00–15:45 Room 350/351 WED.3

14:00 Room 350/351 WED.3.1

Invited

A New Frontier in Nonlinear Optics: Bright Coherent Ultrafast Kiloelectronvolt X-rays on a Tabletop, •*Tenio Popmintchev*[1], *Ming-Chang Chen*[1], *Dimitar Popmintchev*[1], *Paul Arpin*[1], *Susannah Brown*[1], *Skirmantas Ališauskas*[2], *Giedrius Andriukaitis*[2], *Tadas Balčiunas*[2], *Oliver Mücke*[2], *Audrius Pugzlys*[2], *Andrius Baltuška*[2], *Bonggu Shim*[3], *Samuel Schrauth*[3], *Alexander Gaeta*[3], *Carlos Hernández-García*[4], *Luis Plaja*[4], *Andreas Becker*[1], *Agnieszka Jaron-Becker*[1], *Margaret Murnane*[1], and *Henry Kapteyn*[1]; [1]*JILA, University of Colorado at Boulder, Boulder, CO 80309 USA*, [2]*Photonics Institute, Vienna University of Technology, Vienna 1040, Austria*, [3]*School of Applied and Engineering Physics, Cornell University, Ithaca, NY, USA*, [4]*Grupo de Investigación en Óptica Extrema, Universidad de Salamanca, Salamanca E37008, Spain*.

We demonstrate the most extreme phase-matched nonlinear upconversion process to date, coherently combining >5001 mid-infrared femtosecond laser photons to generate bright ultra high harmonics spanning the electromagnetic spectrum from the UV to >1.6 keV.

14:30 Room 350/351 WED.3.2

Resonant Soft X-ray Diffraction probes the Verwey Transition in Magnetite ultrafast, •*N. Pontius*[1], *C. Trabant*[1,3], *T. Kachel*[1], *C. F. Chang*[3], *Martin Beye*[1], *W. F. Schlotter*[2], *F. Sorgenfrei*[4], *S. De Jong*[2], *M. Döhler*[3], *D. Zhu*[2], *R. Kukreja*[2], *S. Hossain*[2], *Y.-D. Chuang*[2], *M. Buchholz*[3], *O. Krupin*[2], *W.-S. Lee*[2], *J. Turner*[2], *P. Metcalf*[6], *W. Wurth*[4], *A. Föhlisch*[1,5], *H. A. Dürr*[2], and *C. Schüßler-Langeheine*[1]; [1]*Helmholtz-Zentrum Berlin für Materialien und Energie, 12489 Berlin, Germany*, [2]*SLAC National Accelerator Laboratory, Menlo Park, CA 94025, USA*, [3]*II. Physikalisches Institut, Universität zu Köln, 50937 Köln, Germany*, [4]*Department of Physics and Center for Free-Electron Laser Science, Universität Hamburg, 2276 Hamburg, Germany*, [5]*Institut für Physik und Astronomie, Universität Potsdam, 14476 Potsdam, Germany*, [6]*School of Materials Engineering, Purdue University, West Lafayette, Indiana 47907, USA*.

We studied the Verwey-transition of magnetite apart from equilibrium using time-resolved soft x-ray diffraction at the free-electron-laser LCLS. We get direct insight into the ”melting” of charge and orbital order and the lattice response.

14:45 Room 350/351 WED.3.3

A direct view onto the carrier dynamics in graphite at the K point, *Ankatrin Stange*, *Christian Sohrt*, *Timm Rohwer*, *Stefan Hellmann*, *Gerald Rohde*, *Lutz Kipp*, *Kai Rossnagel*, and •*Michael Bauer*; *Institut für Experimentelle und Angewandte Physik, Christian-Albrechts Universität zu Kiel, D-24098 Kiel, Germany*.

Time-resolved XUV photoemission spectroscopy is employed to monitor the dynamics of excited photo-carriers in graphite at the Brillouin zone boundary. The experiment provides direct access to the momentum region relevant for optical excitation and relaxation.

15:00 Room 350/351 WED.3.4

Single shot characterization of magnetic nano-domains using table-top femtosecond laser harmonics, •*Mathieu Ducousso*[1], *Xunyou Ge*[1], *Willem Boutu*[1], *David Gauthier*[1], *Benjamin Barbrel*[1], *Fan Wang*[1], *Ana Borta*[1], *Aura Gonzales*[1], *Boris Vobundgo*[2], *Julien Gautier*[2], *Philippe Zeitoun*[2], *Ranjit Hawaldar*[3], *Bharati Tudu*[3], *Renaud Delaunay*[3], *Marina Tortarolo*[3], *Jan Luning*[3], and *Hamed Merdji*[1]; [1]*CEA-Saclay, IRAMIS, Service des Photons, Atomes et Molécules, 91191 Gif-sur-Yvette, France*, [2]*Laboratoire d Optique Appliquée, ENSTA ParisTech CNRS Ecole Polytechnique, Chemin de la*

Hunière, 91761 Palaiseau, France, *[3]Laboratoire de Chimie Physique, Université Pierre et Marie Curie, UMR du CNRS (7614), 11 Rue Pierre et Marie Curie, 75005 Paris, France*.
We report investigations of magnetic nanodomains properties using single 20 fs laser shots from a XUV tabletop laser source. These experiments pave the way for nanoscale investigation of irreversible ultrafast phenomena with femtosecond time resolution.

15:15 Room 350/351 WED.3.5

Dynamic evolution of spin ordering across the insulator-metal transition in a correlated manganite, •*Shuyun Zhou[1,2,3]*, *Yi Zhu[1]*, *Matthew Langner[1]*, *Yi-De Chuang[2]*, *Thorn Glover[2]*, *Marcus Hertlein[2]*, *Yasuhide Tomioka[4]*, *Yoshi Tokura[5,6]*, *Dung-Hai Lee[1]*, *Zahid Hussain[2]*, and *Robert Schoenlein[1]*; *[1]Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA 94720, USA*, *[2]Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, CA 94720, USA*, *[3]Department of Physics, Tsinghua University, Beijing 100084, China*, *[4]Electronics and Photonics Research Institute (ESPRIT), National Institute of Advanced Industrial Science and Technology (AIST) Tsukuba Central 4, 1-1-1 Higashi Tsukuba 305-8562, Japan*, *[5]Department of Applied Physics, University of Tokyo, Bunkyo-ku, Tokyo 113-8656, Japan*, *[6]Cross-Correlated Materials Research Group (CMRG) and Correlated Electron Research Group (CERG), Advanced Science Institute, RIKEN, Wako 351-0198, Japan*.
We report direct experimental results on the dynamic evolution of CE-type spin ordering covering a temporal window from ∼100 fs to tens of seconds and reveal novel physics involved in the insulator-metal transition in $Pr_{0.7}Ca_{0.3}MnO_3$.

15:30 Room 350/351 WED.3.6

Probing the timescale of the exchange interaction in a ferromagnetic alloy, •*Stefan Mathias[1,2]*, *Chan La-o-vorakiat[2]*, *Patrik Grychtol[1,3]*, *Patrick Granitzka[1,2]*, *Emrah Turgut[1]*, *Justin Shaw[4]*, *Roman Adam[3]*, *Hans Nembach[4]*, *Mark Siemens[1]*, *Steffen Eich[2]*, *Claus Schneider[3]*, *Thomas Silva[4]*, *Martin Aeschlimann[2]*, *Margaret Murnane[1]*, and *Henry Kapteyn[1]*; *[1]Department of Physics and JILA, University of Colorado, Boulder, Colorado 80309-0440, USA*, *[2]University of Kaiserslautern and Research Center OPTIMAS, 67663, Kaiserslautern, Germany*, *[3]Peter Grünberg Institute, PGI-6, Research Center Jülich, 52425, Jülich, Germany*, *[4]Electromagnetics Division, National Institute of Standards and Technology, Boulder, Colorado 80305-3328, USA*.
We use broadband high-harmonics as element-specific probes of ultrafast demagnetization in Permalloy. Distinct demagnetization dynamics are observed for the constituting elements: Ni demagnetizes 10-80fs after Fe, depending on the strength of the exchange interaction energy.

Coffee Break

15:45–16:15

WED.4A: Ultrafast Chemical Reactions

Chair: Stefan Lochbrunner, University of Rostock, Rostock, Germany

16:15–18:00 Auditorium A WED.4A

16:15 Auditorium A WED.4A.1

Wavepacket Splitting in the First 100 fs Determines the Products from the Bond Cleavage of Diphenylmethylchloride, •*Christian Sailer[1]*, *Nils Krebs[1]*, *Benjamin Fingerhut[2]*, *Regina de Vivie-Riedle[2]*, and *Eberhard Riedle[1]*; *[1]für BioMolekulare Optik, Ludwig-Maximilians-Universität München, Oettingenstrasse 67, 80538 München, Germany*, *[2]Department für Chemie, Ludwig-Maximilians-Universität München, Butenandt-Strasse 5-13, 81377 München, Germany*.
An elementary chemical reaction proceeds through two distinct conical intersections. Benzhydryl radicals are formed with a delay of 80 fs, cations after 125 fs. The optical signal increases more slowly due to planarization and solvation.

16:30 Auditorium A WED.4A.2

Molecular Wave Packet Dynamics Decelerated by Solvent Environment: A Theoretical Approach, •*Sebastian Thallmair[1,2]*, *Markus Kowalewski[1]*, *Benjamin P. Fingerhut[1]*, *Christian F. Sailer[2]*, and *Regina de Vivie-Riedle[1]*; *[1]Department Chemie, LMU München, Munich, Germany*, *[2]LS für BioMolekulare Optik, LMU München, Munich, Germany*.
We present a new dynamic continuum ansatz to describe the frictional force exerted on moving wave packets in a solvent cage. The solvent interferes on the femtosecond time scale, but decides the reaction outcome.

16:45 Auditorium A WED.4A.3

Femtosecond Mid-Infrared Study of the Aqueous Solution Photochemistry of a CO-Releasing Molecule (CORM), *Philipp Rudolf[1]*, *Florian Kanal[1]*, *Dominik Gehrig[1]*, *Johanna Niesel[2]*, *Tobias Brixner[1]*, *Ulrich Schatzschneider[2]*, and •*Patrick Nuernberger[1]*; *[1]Institut für Physikalische und Theoretische Chemie, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany*, *[2]Institut für Anorganische Chemie, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany*.
Ultraviolet irradiation of CO-releasing molecules (CORMs) in water leads to the loss of several CO ligands. We show that only one ligand is photolyzed on an ultrafast timescale and that some molecules undergo geminate recombination.

17:00 Auditorium A WED.4A.4

Internal Conversion vs. Ultrafast Intersystem Crossing: What Drives the Dynamics of Cyclic α,βEnones?, •*Oliver Schalk[1,2]*, *Peter Lang[1]*, *Michael S. Schuurman[2]*, *Guorong Wu[2]*, *Maximilian Bradler[1]*, *Igor Pugliesi[1]*, *Eberhard Riedle[1]*, and *Albert Stolow[2]*; *[1]LS für BioMolekulare Optik, LMU München, Oettingenstr. 67, D-80538 Munich, Germany*, *[2]National Research Council of Canada, Ottawa, Ontario K1A 0R6, Canada*.
Sub-100 fs transient absorption and photoelectron spectroscopy, and ab initio calculations demonstrate effective few-ps intersystem crossing in cyclic α,β-enones. The environment, its polarity and chemical substitutions control the rate by a factor of four.

17:15 Auditorium A WED.4A.5

Influence of the Chemical Design on the Coherent Photoisomerization of Biomimetic Molecular Switches, •*Jérémie Léonard[1]*, *Dario Polli[2]*, *Giulio Cerullo[2]*, *Massimo Olivucci[3]*, and *Stefan Haacke[1]*; *[1]Institut de Physique et Chimie des Matériaux de Strasbourg, CNRS * Université de Strasbourg, France*, *[2]IFN*CNR, Dipartimento di Fisica, Politecnico di Milano, Piazza L. da Vinci, 32, 20133 Milano, Italy*, *[3]Chemistry Department, Bowling Green State University, Bowling Green, United States & Dipartimento di Chimica, Università degli Studi di Siena, Italy*.
Ultrafast transient absorption spectroscopy reveals the effect of chemical substitutions on the photoreaction kinetics of biomimetic

photoswitches displaying coherent dynamics. Ground state vibrational coherences are no longer observed when the excited state lifetime exceeds 300fs.

17:30 Auditorium A WED.4A.6

Ultrafast ignition of a uni-directional molecular motor, •*Stephen Meech*[1], *Jamie Conyard*[1], *Kiri Addison*[1], *Ismael Heisler*[1], *Arjen Cnossen*[2], *Wesley Brown*[2], and *Ben Feringa*[2]; [1]*School of Chemistry, University of East Anglia, Norwich NR4 7TJ, UK*, [2]*Stratingh Institute for Chemistry, University of Groningen, Nijenborgh 4, 9747AG Groningen, The Netherlands*.
Light-driven molecular motors convert light into mechanical energy via excited state reactions. In this work we follow sub-picosecond primary events in the cycle of a two-stroke unidirectional motor by fluorescence up-conversion and transient absorption.

17:45 Auditorium A WED.4A.7

Ultrafast Proton Coupled Electron Transfer (PCET) Dynamics in 9-Anthranol-Aliphatic Amine System, •*Hirendra Ghosh*[1,2], *Katrin Adamczyk*[2], *Sandeep Verma*[1], *Jens Dreyer*[2], and *Erik T. J. Nibbering*[2]; [1]*Bhabha Atomic Research Centre, Trombay, Mumbai * 400 085, INDIA,*, [2]*Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Max Born Strasse 2A, D-12489, Berlin, Germany*.
Femtosecond infrared absorption studies strongly suggest that photoexcited 9-anthranol takes part in an ultrafast electron transfer (ET) reaction in electron-donating triethylamine solvent, but that ultrafast proton coupled electron transfer (PCET) occurs in diethylamine solvent.

WED.4B: Ultrafast Dynamics on the Nanoscale

Chair: Walter Pfeiffer, University of Bielefeld, Bielefeld, Germany

16:15–18:00 Room 350/351 WED.4B

16:15 Room 350/351 WED.4B.1

Femtosecond Optical Control on the Nanoscale, •*Samuel Berweger*, *Joanna M. Atkin*, *Xiaoji G. Xu*, and *Markus B. Raschke*; *Department of Physics, and JILA, University of Colorado, Boulder, CO, 80305*.
We demonstrate a generalized route to generate nanometer spatially confined ultrafast optical pulses with arbitrary deterministic femtosecond waveform control using surface plasmon polarition nanofocusing in 3D tapered noble metal tips.

16:30 Room 350/351 WED.4B.2

Tracking Ultrafast Carrier Dynamics in Single Semiconductor Nanowire Heterostructures, •*Min Ah Seo*, *Jinkyoung Yoo*, *Daniel E. Perea*, *Shadi A. Dayeh*, *Tom Picraux*, *Antoinette J. Taylor*, and *Rohit P. Prasankumar*; *Center for Integrated Nanotechnologies, Los Alamos National Laboratory, Los Alamos, New Mexico 87545*.
We map space-and-time-dependent carrier dynamics in single nanowires for the first time using ultrafast optical microscopy. This enables us to reveal the influence of radial and axial interfaces on charge transport in these quasi-one-dimensional nanosystems.

16:45 Room 350/351 WED.4B.3

Ultrafast Spectroscopy of a Single Metal Nanoparticle, *Hatim Baida*, *Denis Mongin*, *Dimitris Christofilos*, *Aurélien Crut*, •*Paolo Maioli*, *Natalia Del Fatti*, and *Fabrice Vallée*; *LASIM, Université Lyon 1 and CNRS, Villeurbanne, France*.
The ultrafast response of a single metal nano-object is investigated around its surface plasmon resonance. Simultaneous measurement of its linear absorption spectrum permits quantitative comparison to theoretical predictions and elucidation of the involved physical mechanisms.

17:00 Room 350/351 WED.4B.4

Ultrafast infrared near-field molecular nano-spectroscopy, •*Xiaoji Xu* and *Markus Raschke*; *Department of Physics, University of Colorado, Boulder, CO 80309, USA*.
We demonstrate molecular radiative infrared vibrational free-induction decay on the nano-scale and its control via near-field coupling between the transient molecular polarization and optical antenna properties of the metallic scanning near-field probe tip.

17:15 Room 350/351 WED.4B.5

Broadband Microwave emission from the Tunnelling Junction Irradiated by the Ultrafast Laser Pulses, •*Dmitry Yarotski*[1], *Anatoly Efimov*[1], *Antoinette Taylor*[1], and *Mark Hagmann*[2]; [1]*Center for Integrated Nanotechnologies, Los Alamos National Laboratory, Los Alamos, New Mexico 87545, USA*, [2]*NewPath Research L.L.C., 2880 S. Main St. #214, Salt Lake City, Utah 84115, U.S.A.*.
We use a nonlinear mixing of the ultrafast laser pulses in the tunneling junction to generate a microwave frequency comb from semiconducting and metal surfaces, with harmonics up to n=200 of the pulse repetition rate.

17:30 Room 350/351 WED.4B.6

Spectroscopy of unoccupied states of NiO(001) ultrathin films: A combined two-photon photoemission and scanning tunneling spectroscopy study, •*Mario Kiel*[1], *Stephan Großer*[1], *Klaus Duncker*[1], and *Wolf Widdra*[1,2]; [1]*Martin-Luther-Universität Halle-Wittenberg, Halle, Germany*, [2]*Max-Planck-Institut für Mikrostrukturphysik, Halle, Germany*.
The electronic structure of NiO(001) ultrathin films has been investigated by two-photon photoelectron spectroscopy and scanning tunneling spectroscopy. These techniques allow for a combination of atomic spatial and femtosecond temporal resolution.

17:45 Room 350/351 WED.4B.7

Hyperspectral Probing of Exciton Dynamics and Multiplication in PbSe Nanocrystals, •*Itay Gdor*[1], *Hanan Sachs*[1], *Avishy Roitblat*[1], *David Strasfeld*[2], *Moungi Bawendi*[2], and *Sanford Ruhman*[1]; [1]*Institute of Chemistry and the Farkas Center for Light Induced Processes, the Hebrew University, Jerusalem 91904, Israel*, [2]*Department of Chemistry, Massachusetts Institute of Technology, 77 Massachusetts Avenue, Cambridge, Massachusetts 02139, USA*.
Broadband NIR probing records exciton dynamics in PbSe nanocrystals. New aspects of hot carrier cooling are uncovered, while contrary to many reports, MEG is not detected up to photon energy 3.7 times the band gap.

THU.1: High Harmonic Generation

Chair: Tenio Popmintchev, JILA and University of Colorado at Boulder and NIST, Boulder, CO, USA

8:30–10:15 Room 350/351 THU.1

8:30 Room 350/351 THU.1.1

Invited

High Brightness XUV Frequency Combs via Intracavity High Harmonic Generation, •*Thomas Allison*[1], *Arman Cingöz*[1], *Craig Benko*[1], *Dylan Yost*[1], *Axel Ruehl*[2], *Martin Fermann*[2], *Ingmar Hartl*[2], and *Jun Ye*[1]; [1]*JILA, NIST and the University of Colorado, Boulder, CO, USA*, [2]*IMRA America Inc., Ann Arbor, MI, USA*.

We report the generation of high power extreme ultraviolet frequency combs at 154 MHz repetition rate. The XUV combs are characterized by conducting high resolution spectroscopy and observing the heterodyne beats between two independent systems.

9:00 Room 350/351 THU.1.2

Few-Cycle High-Contrast Light Pulses for Isolated Attosecond Pulses from Relativistic Plasmas, •*Julia Mikhailova*[1], *Patrick Heissler*[1], *Rainer Hoerlein*[1], *Alexander Buck*[1], *Antonin Borot*[2], *Karl Schmid*[1], *Chris Sears*[1], *Paris Tzallas*[3], *Matthew Zepf*[4], *Ferenc Krausz*[1], *Laszlo Veisz*[1], and *George Tsakiris*[1]; [1]*Max Planck Institute of Quantum Optics, Garching, Germany*, [2]*Ecole Polytechnique,Palaiseau, France*, [3]*Institute of Electronic Structure and Laser, Heraklion, Greece*, [4]*Queens University Belfast, Belfast, United Kingdom*.

Conditions required for isolated attosecond pulse emission from relativistic plasmas are investigated numerically and experimentally. Irradiating solid targets with few-cycle high-contrast pulses, we obtained significantly broadened relativistic high-order harmonics of up to 70-eV photon energy.

9:15 Room 350/351 THU.1.3

Quasi-phasing-matching of high harmonic generation using counterpropagating pulses, •*Kevin O'Keeffe* and *Simon Hooker*; *Department of Physics, University of Oxford, Clarendon Laboratory, Parks Road, Oxford, OX1 3PU, United Kingdom*.

We investigate quasi-phase-matching over a range of harmonic orders using trains of up to 8 uniformly-spaced counter-propagating pulses, and investigate the pressure dependence of this scheme.

9:30 Room 350/351 THU.1.4

Plasmonic enhancement of High Harmonic Generation revisited: Predominance of Atomic Line Emission, •*Murat Sivis*[1], *Matthias Duwe*[1], *Bernd Abel*[2,3], and *Claus Ropers*[1]; [1]*Courant Research Center Nano-Spectroscopy and X-Ray Imaging, University of Göttingen, 37077 Göttingen, Germany*, [2]*Institute for Physical Chemistry, University of Göttingen, 37077 Göttingen, Germany*, [3]*Ostwald-Institute for Physical and Theoretical Chemistry, University of Leipzig, 04103 Leipzig, Germany*.

We demonstrate nanostructure-enhanced extreme ultraviolet fluorescence from noble gases driven by low-energy, few-cycle light pulses. Despite sufficient local intensities, plasmon-enhanced high harmonic generation is not observed, which follows from the small, nanometer-size coherent source volume.

9:45 Room 350/351 THU.1.5

Fractional High-harmonic Combs by Attosecond-precision Split-Spectrum Pulse Control, •*Philipp Raith*, *Christian Ott*, *Christopher Anderson*, *Andreas Kaldun*, *Kristina Meyer*, *Martin Laux*, *Yizhu Zhang*, and *Thomas Pfeifer*; *Max-Planck-Institut für Kernphysik, Saupfercheckweg 1, D-69117 Heidelberg, Germany*.

Combs of fractional high-order harmonics are generated by split-spectrum field synthesis and explained by the controlled interference of two attosecond pulse trains. Interference-controlled modulation of the instantaneous driver frequency tunes the harmonics' energies.

10:00 Room 350/351 THU.1.6

Direct High Harmonics Shaping in the XUV, *Denis Kiselev*[1], *Stefan Vlajkovic*[2], *Peter Kraus*[2], *Hans-Jakob Wörner*[2], and •*Jean-Pierre Wolf*[1]; [1]*Group of Applied Physics, University of Geneva, 1205 Geneva (Switzerland)*, [2]*Laboratorium für Physikalische Chemie, ETH Zürich, 8093 Zürich, Switzerland*.

Direct high harmonics pulse shaping in the XUV is demonstrated, using a reflective MEMS modulator. These first experiments open the way to the coherent manipulation of core and valence electrons on attosecond timescales

Coffee Break

10:15–10:45

THU.2A: Energy Transfer and Charge Generation in Organic Systems

Chair: Harald F. Kauffmann, University of Vienna, Vienna, Austria

10:45–12:30 Auditorium A THU.2A

10:45 Auditorium A THU.2A.1

Invited

Ultrafast Pump-Push Photocurrent Spectroscopy of Organic Photoconversion Systems, •*Artem Bakulin*[1,4], *Akshay Rao*[1], *Yana Vaynzof*[1], *Simon Gelinas*[1], *Vlad Pavelyev*[2], *Maxim Pshenichnikov*[2], *Paul van Loosdrecht*[2], *Dorota Niedzialek*[3], *Jerome Cornil*[3], *David Beljonne*[3], and *Richard Friend*[1]; [1]*University of Cambridge, Cambridge, UK*, [2]*Zernike Institute for Advanced Materials, University of Groningen, Groningen, The Netherlands*, [3]*University of Mons, Mons, Belgium*, [4]*AMOLF, Amsterdam, The Netherlands*.

Novel ultrafast-spectroscopy experiments on organic photoconversion systems show that excessive excitation energy in such systems is not lost but used to reach delocalised states that act as the gateway for long-range charge separation.

11:15 Auditorium A THU.2A.2

Acceptor Electron Affinity Manages Ultrafast Dynamics in Polymer Bulk Heterojunctions, •*Vlad G. Pavelyev*[1], *Olga D. Parashchuk*[2], *Tatyana V. Artyomova*[3], *Igor F. Perepichka*[4], *Dmitry Yu. Paraschuk*[2], *Paul H. M. van Loosdrecht*[1], and *Maxim S. Pshenichnikov*[1]; [1]*Zernike Institute for Advanced Materials, Groningen, The Netherlands*, [2]*Faculty of Physics and International Laser Center, Moscow, Russia*, [3]*L. M. Litvinenko Institute of Physical Organic and Coal Chemistry, national Academy of Sciences of Ukraine, Donetsk, Ukraine*, [4]*School of Chemistry, Bangor, United Kingdom*.

Ultrafast dynamics in charge-transfer complexes (CTCs) formed between a conjugated polymer and fluorene-type electron acceptors are studied. We demonstrate how increasing the acceptor electron affinity accelerates the recombination rate of the photoexcited CTCs.

11:30 Auditorium A THU.2A.3

Ballistic energy transport in PEG oligomers., *Zhiwei Lin*, *Natalia*

Rubtsova, *Victor Kireev*, and •*Igor Rubtsov*; *Tulane University, New Orleans, USA*.
A ballistic energy transport to distances up to 60A in azido-PEG-succinimide ester compounds with a number of repeating PEG units of 0, 4, 8, and 12 was found using relaxation-assisted two-dimensional infrared spectroscopy.

11:45 Auditorium A THU.2A.4

Ultrafast Energy Transfer in an Artificial Photosynthetic Antenna, •*Margherita Maiuri*[1], *Joris Snellenburg*[2], *Ivo van Stokkum*[2], *Smitha Pillai*[3], *Devens Gust*[3], *Thomas Moore*[3], *Ana Moore*[3], *Rienk van Grondelle*[2], *Giulio Cerullo*[1], and *Dario Polli*[1]; [1]*IFN-CNR, Dipartimento di Fisica, Politecnico di Milano, Piazza L. da Vinci, 32, 20133 Milano, Italy*, [2]*Department of Physics and Astronomy, VU University Amsterdam, De Boelelaan 1081, 1081HV Amsterdam, The Netherlands*, [3]*Department of Chemistry & Biochemistry and The Center for Bioenergy and Photosynthesis, Arizona State UniversitDepartment of Chemistry & Biochemistry and The Center for Bioenergy and Photosynthesis, Arizona State University, Tempe, Arizona 85287-1605, United States*.
We temporally resolved energy transfer kinetics in an artificial light-harvesting dyad composed of a phthalocyanine covalently linked to a carotenoid. Upon carotenoid photo-excitation, energy transfers within ~100fs (~52% efficiency) to the phthalocyanine.

12:00 Auditorium A THU.2A.5

New perspectives on ultrafast Förster Resonant Energy Transfer, •*Igor Pugliesi*[1], *Heinz Langhals*[2], *Harald Kauffmann*[3], and *Eberhard Riedle*[1]; [1]*LS für BioMolekulare Optik, Ludwig-Maximilians-Universität München, Oettingenstrasse 67, 80538 München, Germany*, [2]*Department für Chemie, Ludwig-Maximilians-Universität München, Butenandt-Strasse 11, 81377 München, Germany*, [3]*Faculty of Physics, University of Vienna, Strudlhofgasse 4, 1090 Vienna, Austria*.
We show that perylene diimide dyads based on a donor-spacer-acceptor motif violate Förster's dipole-dipole interaction picture for energy transfer in the low picosecond to sub-100 femtosecond regime. First theoretical explanations are presented.

12:15 Auditorium A THU.2A.6

Observation of Two-Exciton States in Perylene Bisimide Aggregates, •*Steffen Wolter*[1], *Marcus Seidel*[1], *Frank Würthner*[2], and *Stefan Lochbrunner*[1]; [1]*Institut für Physik, Universität Rostock, Universitätsplatz 3, 18051 Rostock, Germany*, [2]*Institut für Organische Chemie and Röntgen Research Center for Complex Material Systems, Universität Würzburg, Würzburg, Germany*.
The behavior of excitons on perylene bisimide aggregates is investigated at high excitation densities by femtosecond absorption spectroscopy. Indications for a significant population of the two-exciton manifold are found.

THU.2B: Ultrafast Dynamics in Correlated Systems

Chair: Rohit P. Prasankumar, Los Alamos National Laboratory, Los Alamos, NM, USA

10:45–12:30 Auditorium B THU.2B

10:45 Auditorium B THU.2B.1

Photoinduced Femtosecond Formation of Ferromagnetism in a Strongly Correlated Antiferromagentic Manganite, *Tianqi Li*[1,2], •*Aaron Patz*[1,2], *Jiaqiang Yan*[2], *Thomas Lograsso*[2], *Ilias Perakis*[3], and *Jigang Wang*[1,2]; [1]*Department of Physics and Astronomy, Iowa State University, Ames, Iowa, U.S.A.*, [2]*Ames Laboratory - USDOE, Ames, Iowa, U.S.A.*, [3]*Department of Physics, University of Crete, Crete, Greece*.
We report a pump threshold behavior in fs photoinduced magnetization in a strongly correlated manganite, which indicates the establishment of thermally-inaccessible ferromagnetic ground state and build-up of new magnetic order parameters at fs time scales.

11:00 Auditorium B THU.2B.2

Measuring 3D magnetic correlations during the photo-induced melting of electronic order in La0.5Sr1.5MnO4, •*Ra'anan Tobey*[1,2], *Simon Wall*[3], *Michael Foerst*[4], *Hubertus Bromberger*[4], *Vikaran Khanna*[4,5,6], *Joshua Turner*[7], *William Schlotter*[7], *Mariano Trigo*[8], *Oleg Krupin*[7,9], *Wei-Sheng Lee*[10], *Yi-De Chuang*[11], *Robert Moore*[10], *Adrian Cavalieri*[4], *Stuart Wilkins*[2], *Hong Zheng*[12], *John Mitchell*[12], *Sarnjeet Dhesi*[5], *Andrea Cavalleri*[4,6], and *John Hill*[2]; [1]*Zernike Institute for Advanced Materials, University of Groningen, 9747AG Groningen, The Netherlands*, [2]*Condensed Matter and Materials Sciences Department, Brookhaven National Laboratory, Upton, NY 11973, USA*, [3]*Fritz-Haber Institute of the Max Planck Society, Berlin, Germany*, [4]*Max Planck Department for Structural Dynamics, Center for Free Electron Laser Science, University of Hamburg, Germany*, [5]*Diamond Light Source, Chilton, Didcot, Oxfordshire OX11 0DE, United Kingdom*, [6]*Department of Physics, Clarendon Laboratory, Oxford University, United Kingdom*, [7]*Linac Coherent Light Source, SLAC National Accelerator Laboratory, Menlo Park, CA 94025, USA*, [8]*PULSE Institute, SLAC National Accelerator Laboratory, Menlo Park, CA 94025, USA*, [9]*European XFEL GmbH, Hamburg, Germany*, [10]*The Stanford Institute for Materials and Energy Sciences (SIMES), SLAC National Accelerator Laboratory, Menlo Park, CA 94025, USA*, [11]*Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, CA 94720, USA*, [12]*Material Sciences Department, Argonne National Laboratory, Argonne, Illinois 69439, USA*.
Time-resolved x-ray diffraction measures the dynamics of antiferromagnetic correlations by reconstructing the reciprocal-space scattering volume for the magnetic Bragg peak. Modifications in the scattering line shape along the three principal reciprocal lattice directions are measured.

11:15 Auditorium B THU.2B.3

Photoinduced Coherent Spin Fluctuation in Primary Dynamics of Insulator to Metal Transition in Perovskite Co Oxide, *Yuki Ishikawa*[1], *Hirotake Itoh*[1,2], •*Shinichiro Iwai*[1,2], *Takahisa Arima*[3], *Shigeki Yamada*[4], and *Takahiko Sasaki*[5]; [1]*Department of Physics, Tohoku University, Sendai, 980-8578, Japan*, [2]*JST-CREST, Sendai, 980-8578, Japan*, [3]*Department of Advanced material Science, Univ. Tokyo, 277-8561, Japan*, [4]*International College of Art and Science, Yokohama City Univ., Yokohama, 236-0027, japan*, [5]*Institute for Material Research. Sendai, 980-8577, Japan*.
Coherent spin fluctuation was detected in the photoinduced Mott insulator-metal transition in perovskite cobalt oxide by using 3 optical-cycle infrared pulse. Such coherent spin fluctuation is driven by the perovskite distortion changing orbital gap.

11:30 Auditorium B THU.2B.4

Charge Density Wave Dynamics From Ultrafast XUV ARPES, •*Jesse Petersen*[1,2], *Stefan Kaiser*[1], *Nicky Dean*[2], *Alberto Simoncig*[1], *Haiyun Liu*[1], *Adrian Cavalieri*[1], *Cephise Cacho*[3], *Edmond*

Turcu[3], *Emma Springate*[3], *Fabio Frassetto*[4], *Luca Poletto*[4], *Sarnjeet Dhesi*[5], *Helmuth Berger*[6], and *Andrea Cavalleri*[1,2]; [1]*Max Planck Dept. for Structural Dynamics, Centre for Free-Electron Laser Science, University Of Hamburg, Hamburg, Germany*, [2]*Clarendon Laboratory, Oxford University, Parks Road, Oxford, UK*, [3]*Central Laser Facility, STFC Rutherford Appleton Laboratory, Harwell, United Kingdom*, [4]*LUXOR, CNR-INFM, Padova, Italy*, [5]*Diamond Light Source Ltd., Harwell, United Kingdom*, [6]*Institute of Physics of Complex Matter, EPFL, Lausanne, Switzerland*.

Ultrafast angle-resolved XUV photoemission reveals the time- and momentum-dependent electronic structure of 1T-TaS2, a hybrid Mott and charge-density-wave insulator. Both electronic orderings melt well before the lattice responds, suggesting that correlations influence CDW order.

11:45 Auditorium B THU.2B.5

Time-domain evidence for an excitonic insulator, *Stefan Hellmann*[1], *Timm Rohwer*[1], *Matthias Kalläne*[1], *Kerstin Hanff*[1], *Adra Carr*[2], *Margaret Murnane*[2], *Henry Kapteyn*[2], *Lutz Kipp*[1], *Michael Bauer*[1], and •*Kai Rossnagel*[1]; [1]*Institute of Experimental and Applied Physics, University of Kiel, D-24098 Kiel, Germany*, [2]*JILA and Department of Physics, University of Colorado and NIST, Boulder, Colorado 80309-0440, USA*.

Time- and angle-resolved photoemission spectroscopy using a high-harmonic-generation source is employed to classify the potential excitonic insulator 1T-$TiSe_2$ and the reference Peierls-Mott insulator 1T-TaS_2 on the basis of their melting times.

12:00 Auditorium B THU.2B.6

Time-resolved Fermi surface mapping of the charge density wave material $DyTe_3$, •*L. Rettig*[1,2], *R. Cortés*[1,3], *J.-H. Chu*[4], *I.R. Fisher*[4], *F. Schmitt*[4], *P.S. Kirchmann*[3,5], *R.G. Moore*[4], *Z.-X. Shen*[4,5], *M. Wolf*[3], and *U. Bovensiepen*[2]; [1]*Fachbereich Physik, Freie Universität Berlin, Arnimallee 14, D-14195 Berlin, Germany*, [2]*Fakultät für Physik, Universität Duisburg-Essen, Lotharstr. 1, D-47048 Duisburg, Germany*, [3]*Abt. Physikalische Chemie, Fritz-Haber-Institut d. MPG, Faradayweg 4-6, D-14195 Berlin, Germany*, [4]*Department of Applied Physics, Via Pueblo Mall, Stanford, CA 94305, USA*, [5]*Stanford Institute for Materials and Energy Science, 476 Lomita Mall, Stanford, CA 94305, USA*.

The femtosecond dynamics of the Fermi surface of $DyTe_3$ and its band structure are investigated by time- and angle-resolved photoemission spectroscopy. An ultrafast collapse of the charge density wave gap within 200 fs is discussed.

12:15 Auditorium B THU.2B.7

Evidence for a Peierls phase-transition in a three-dimensional multiple-charge density wave solid., •*Barbara Mansart*[1,2], *Mathieu Cottet*[1], *Thomas J. Penfold*[2,3,4], *Stephen B. Dugdale*[5], *Riccardo Tediosi*[6], *Majed Chergui*[2], and *Fabrizio Carbone*[1]; [1]*Laboratory for Ultrafast Microscopy and Electron Scattering, ICMP, Ecole Polytechnique Federale de Lausanne, CH-1015 Lausanne Switzerland*, [2]*Laboratory of Ultrafast Spectroscopy, ISIC, Ecole Polytechnique Federale de Lausanne, CH-1015 Lausanne Switzerland*, [3]*Laboratory of Computational Chemistry and Biochemistry, ISIC, Ecole Polytechnique Federale de Lausanne, CH-1015 Lausanne Switzerland*, [4]*SwissFEL, PSI, CH-5232 Villigen, Switzerland*, [5]*H.H.Wills Physics Laboratory, University of Bristol, Tyndall Avenue, Bristol BS8 1TL, United Kingdom*, [6]*Département de Physique de la Matière Condensée, Université de Genève, CH-1211 Genève, Switzerland*.

We performed a combined experimental and theoretical study of a complex three-dimensional solid. Melting the charge order and monitoring the consequent charge redistribution via ultrafast optical spectroscopy, we evidenced the charge density waves' Peierls origin.

Lunch Break

12:30–14:00

THU.3A: Ultrafast Photobiology

Chair: Kevin Kubarych, University of Michigan, Ann Arbor, MI, USA

14:00–15:45 Auditorium A THU.3A

14:00 Auditorium A THU.3A.1

Broadband UV 2D Transient Absorption Spectroscopy of Ferric Myoglobins, •*Cristina Consani*, *Gerald Auböck*, *Frank van Mourik*, and *Majed Chergui*; *Laboratory of Ultrafast Spectroscopy, EPFL, Lausanne, Switzerland*.

We use broadband ultraviolet two-dimensional spectroscopy and transient absorption spectroscopy to characterize the tryptophan and haem photocycles in ferric myoglobins. A new relaxation channel for Tryptophan(14), yielding ferrous myoglobin formation, is also reported.

14:15 Auditorium A THU.3A.2

Tracing of Backward Energy Transfer from LH1 to LH2 in Photosynthetic Membranes Grown under High and Low Irradiation, •*Larry Lüer*[1], *Vladimira Moulisová*[2], *Sarah Henry*[3], *Dario Polli*[4,5], *Tatas H. P. Brotosudarmo*[3,6], *Sajjad Hoseinkhani*[7], *Daniele Brida*[4], *Guglielmo Lanzani*[5], *Giulio Cerullo*[4], and *Richard J. Cogdell*[3]; [1]*IMDEA Nanoscience, 28049 Cantoblanco, Spain*, [2]*Faculty of Medicine, University of Glasgow, Glasgow G12 8QQ, United Kingdom*, [3]*Institute for Molecular Biology, University of Glasgow, Glasgow G12 8TA, United Kingdom*, [4]*CNR-IFN, Dipartimento di Fisica, Politecnico di Milano, 20133 Milan, Italy*, [5]*Italian Institute of Technology, Center forNanoScience and Technology at Politecnico di Milano, 20133 Milan, Italy*, [6]*Ma Chung Research Center for Photosynthetic Pigments, Ma ChungUniversity, Malang 65151, Indonesia*, [7]*Department of Material Science, Università di Milano Bicocca, 20125 Milan, Italy*.

By introducing derivative transient absorption spectroscopy, we obtain rate constants for backward and forward energy transfer between LH1 and LH2 complexes in purple bacterial membranes. The method is generally applicable to excitonically coupled systems.

14:30 Auditorium A THU.3A.3

Selective Assignment of Energy Transfer and Charge Separation Pathways in Reaction Centers by Pulse Polarized 2-D Photon Echo Spectroscopy, •*Benjamin Fingerhut*, *Kochise Bennet*, *Oleksiy Roslyak*, and *Shaul Mukamel*; *Chemistry Department, University of California, Irvine, California 92697-2025, USA*.

We present theoretical modelling of the nonlinear optical response of the bacterial reaction center incorporating electron and energy transfer on equal footing. Orthogonal polarized pulse sequences allow to dissect the kinetic components in real space.

14:45 Auditorium A THU.3A.4

Femtosecond Transient Absorption Spectroscopy on the Light-Adaptation of Living Plants, •*Marc G. Müller*[1], *Peter Jahns*[2], and *Alfred R. Holzwarth*[1]; [1]*Max-Planck-Institute for Bioinorganic Chemistry, Stiftstr. 34-36, D-45470 Mülheim/Ruhr, Germany*, [2]*University of Düsseldorf, Institute of Plant Biochemistry, Universitätsstr. 1, D-40225 Düsseldorf, Germany*.

The photoprotection reaction of the photosynthetic system under harsh sun light is for the first time resolved by femtosecond absorption spectroscopy from the visible to near-infrared in intact leaves. The non-photochemical quenching mechanisms are discussed.

15:00 Auditorium A THU.3A.5

B-side Electron Transfer in Bacterial Photosynthetic Reaction Centers Revealed by a Few-Cycle Pulse Laser, •*Juan Du*[1,2], *Takayoshi Kobayashi*[1,2,3,4], *Kazuyuki Watanabe*[5], and *Hitoshi Tamiaki*[5]; [1]*Advanced Ultrafast Laser Research Center, University of Electro-Communications, 1-5-1 Chofugaoka, Chofu, Tokyo 182-8585 Japan*, [2]*JST, CREST, 5 Sanbancho, Chiyoda-ku, Tokyo 102-0075 Japan*, [3]*Department of Electrophysics, National Chiao-Tung University, 1001 Ta Hsueh Rd., Hsinchu 300 Taiwan*, [4]*Institute of Laser Engineering, Osaka University, 2-6 Yamada-oka, Suita, Osaka 565-0971 Japan*, [5]*Department of Pharmacy, Ritsumeikan University, Kusatsu, Shiga 525-8577 Japan*.

B-side electron transfer in reaction centers was investigated by broadband real-time vibrational spectroscopy. Surprisingly BB was found to be the initial electron donor rather than P, and possible energy transfer, BB to carotenoid, was observed.

15:15 Auditorium A THU.3A.6

Photoreaction Dynamics of Photoactive Yellow Protein Investigated in the near-IR spectral Region, •*Jingyi Zhu*[1], *Laura Paparelli*[1], *Ivo van Stokkum*[1], *Marijke Hospes*[2], *Jos Arents*[2], *Klaas Hellingwerf*[2], *John T. M. Kennis*[1], and *Marie Louise Groot*[1]; [1]*Department of Physics and Astronomy, Faculty of Sciences, Vrije Universiteit, De Boelelaan 1081, 1081 HV Amsterdam, The Netherlands*, [2]*Laboratory for Microbiology, Swammerdam Institute for Life Sciences, University of Amsterdam, Nieuwe Achtergracht 166, 1010 WV Amsterdam, The Netherlands*.

Ionization in photoactive yellow protein was investigated by ultrafast spectroscopy in the near-infrared spectral region. Kinetic and diffusion models were applied to extract the dynamic properties of the ionized electron.

15:30 Auditorium A THU.3A.7

Vibrational dynamics resolved with sub-10-fs deep-ultraviolet pulses, •*Takayoshi Kobayashi*[1,2,3,4] and *Yuichiro Kida*[1,2,5]; [1]*Advanced Ultrafast Laser Research Center, University of Electro-Communications, 1-5-1 Chofugaoka, Chofu, Tokyo 182-8585 Japan*, [2]*JST, CREST, 5 Sanbancho, Chiyoda-ku, Tokyo 102-0075 Japan*, [3]*Department of Electrophysics, National Chiao-Tung University, 1001 Ta Hsueh Rd., Hsinchu 300 Taiwan*, [4]*Institute of Laser Engineering, Osaka University, 2-6 Yamada-oka, Suita, Osaka 565-0971 Japan*, [5]*Currently with Max-Planck-Institut für Quantenoptik, Hans-Kopfermann-Strasse 1, D-85748 Garching, Germany*.

Time-resolved ultrafast spectroscopy with sub-10-fs deep ultraviolet pulses was demonstrated for the first time. The real-time vibrational and electronic excited state dynamics in a thymine molecule were probed with a sub-10-fs time resolution.

THU.3B: Spin, Charge and Lattice Dynamics

Chair: Fabrizio Carbone, Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland

14:00–15:45 Auditorium B THU.3B

14:00 Auditorium B THU.3B.1

Invited

A direct view of the dynamics of lattice and spin with femtosecond x-ray diffraction, •*Steven Johnson*[1], *Ekaterina Möhr-Vorobeva*[2], *Raquel de Souza*[2], *Urs Staub*[2], *Paul Beaud*[2], *Gerhard Ingold*[2], *Andrin Caviezel*[2], *Christopher Milne*[3], *Jure Demsar*[4], *Hanjo Schäfer*[4], *Alexander Titov*[5], *Valerio Scagnoli*[2], *William Schlotter*[6], *Joshua Turner*[6], *Oleg Krupin*[6,7], *Wei-Sheng Lee*[8,9], *Yi-De Chuang*[10], *Luc Patthey*[2], *Robert Moore*[8], *Donghui Li*[9], *Ming Yi*[8], *Patrick Kirchmann*[8], *Mariano Trigo*[11], *Peter Denes*[10], *DIonisio Doering*[10], *Zahid Hussain*[10], *Zhi-Xun Shen*[8], *Dharmalingam Prabhakaran*[12], and *Andrew Boothroyd*[12]; [1]*Institute for Quantum Electronics, ETH Zurich, Zurich, Switzerland*, [2]*Swiss Light Source, Paul Scherrer Institut, Villigen, Switzerland*, [3]*Laboratoire de Spectroscopie Ultrarapide, ISIC-FSB, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland*, [4]*Physics Department and Center of Applied Photonics, University of Konstanz, Germany*, [5]*Institute of Metal Physics and Institute of Metallurgy UrDRAS, Ekaterinburg, Russia*, [6]*The Linac Coherent Light Source, SLAC National Accelerator Laboratory, Menlo Park, CA, USA*, [7]*European XFEL GmbH, Hamburg, Germany*, [8]*SIMES, SLAC National Accelerator Laboratory and Stanford University, Menlo Park, CA, USA*, [9]*SSRL, SLAC National Accelerator Laboratory, Menlo Park, CA, USA*, [10]*Lawrence Berkeley National Laboratory, Berkeley, CA, USA*, [11]*PULSE, SLAC National Accelerator Laboratory, Menlo Park, CA, USA*, [12]*Department of Physics, University of Oxford, Clarendon Laboratory, Oxford, UK*.

Pump-probe femtosecond x-ray diffraction is a powerful method for extracting direct information on long-range order dynamics, exposing new avenues for stimulated, impulsive control over the state of strongly correlated materials. Here we present recent examples.

14:30 Auditorium B THU.3B.2

Non-retarded pairing interaction in a high-Tc cuprate from coherent charge fluctuation spectroscopy., •*Barbara Mansart*[1,2], *José Lorenzana*[3], *Mariateresa Scarongella*[2], *Majed Chergui*[2], and *Fabrizio Carbone*[1]; [1]*Laboratory for Ultrafast Microscopy and Electron Scattering, ICMP, Ecole Polytechnique Federale de Lausanne, CH-1015 Lausanne Switzerland*, [2]*Laboratory of Ultrafast Spectroscopy, ISIC, Ecole Polytechnique Federale de Lausanne, CH-1015 Lausanne Switzerland*, [3]*Institute for Complex Systems-CNR and Physics Department, Sapienza, University of Rome, Piazzale Aldo Moro 5 I-00185 Italy*.

Charge fluctuations in a high-Tc cuprate are coherently generated and detected in real-time via ultrafast broadband optical spectroscopy. These results imply a substantial contribution of non-retarded interactions to the pairing mechanism, as in unconventional theories.

14:45 Auditorium B THU.3B.3

Ultrafast Mid-infrared Spectroscopy of the Charge- and Spin-Ordered Nickelate La1.75Sr0.25NiO4, •*Giacomo Coslovich*[1], *Bernhard Huber*[1], *Wei-Sheng Lee*[2], *Yi-De Chuang*[3], *Yi Zhu*[1],

Takao Sasagawa[4], Zahid Hussain[3], Hans A. Bechtel[3], Michael C. Martin[3], Robert W. Schoenlein[1], Zhi-Xun Shen[2], and Robert A. Kaindl[1]; [1]Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, USA, [2]SIMES, SLAC National Accelerator Laboratory and Stanford University, Menlo Park, USA, [3]Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, USA, [4]Materials and Structures Laboratory, Tokyo Institute of Technology, Kanagawa, Japan.
We present the first ultrafast mid-infrared study of charge and spin-ordered nickelates. A sub-picosecond modulation of the optical conductivity is observed, indicating the filling and subsequent re-establishment of the pseudogap in the time-domain.

15:00 Auditorium B THU.3B.4

Electron spin dynamics in Fe3O4(100)/MgO(100) thin layers investigated by spin-resolved photoemission, •*Cephise Cacho[1], Weimin Wang[2], Waly Ndiaye[2], Christine Richter[2], Olivier Heckmann[2], Jean-Michel Mariot[3], Juraj Krempaský[4], Peter Blaha[5], Fulvio Parmigiani[6,7], and Karol Hricovini[2]; [1]Laser Facility, RAL, Didcot OX11 0QX, United Kingdom, [2]Laboratoire de Physique des Matériaux et des Surfaces, Université de Cergy-Pontoise, 5 mail Gay-Lussac, 95031 Cergy-Pontoise, France, [3]Laboratoire de Chimie Physique-Matière et Rayonnement (UMR 7614), Universit e Pierre et Marie Curie, 11 rue Pierre et Marie Curie, 75231 Paris Cedex 05, France, [4]Paul Scherrer Institut, 5232 Villigen PSI, Switzerland, [5]TU Wien, Institut für Materialchemie, Getreidemarkt 9/165, 1060 Wien, Austria, [6]CNR, Laboratorio TASC INFM, S.S. 14, Km 163.5 in Area Science Park, 34012 Trieste, Italy, [7]Department of Physics, Università degli Studi di Trieste, Trieste 34127, Italy.*
We are investigating the electron spin dynamics in Fe3O4 by means of time-spin- resolved photoemission. Using single photon photoemission, we are able to monitor the dynamics exactly at the Fermi level.

15:15 Auditorium B THU.3B.5

Ultrafast Electron Spin Dynamics in ZnO and ZnCoO Sol-gel Thin Films, *Maxim Raskin[1,3], Kelly Whitaker[2], Gillian Kiliani[3], Katja Beha[3], Stefan Ochsenbein[2], Nils Janßen[2,3], Torsten Stiehm[1], Mikhail Fonin[3], Ulrich Rüdiger[3], Alfred Leitenstorfer[3], Daniel Gamelin[2], and •Rudolf Bratschitsch[1,3]; [1]Institute of Physics, Chemnitz University of Technology, D-09107 Chemnitz, Germany, [2]Department of Chemistry, University of Washington, Seattle, WA 98195-1700, USA, [3]Department of Physics and Center for Applied Photonics, D-78464 Konstanz, Germany.*
We observe dephasing times T2* on the order of nanoseconds at room temperature in sol-gel ZnO films due to charge-separated states. In ZnCoO the mean-field electron-Co2+ exchange energy N0α is determined to be +0.25+-0.02 eV.

15:30 Auditorium B THU.3B.6

Vibrationally Mediated Ultrafast Relaxation in Nitrogen-Vacancy Diamond, •*Vanessa M. Huxter[1], Thomas A. A. Oliver[1], Dmitry Budker[2], and Graham R. Fleming[1]; [1]Department of Chemistry, University of California, Berkeley and Physical Bioscience Division, Lawrence Berkeley National Laboratory, Berkeley, CA, USA 94720, [2]Department of Physics, University of California, Berkeley and Nuclear Science Division, Lawrence Berkeley National Laboratory, Berkeley, CA, USA 94720.*
Two dimensional electronic spectroscopy and transient grating measurements were performed for the first time on nitrogen-vacancy centers in diamond. These measurements reveal energy transfer and vibrational pathways with consequences for spin coherence.

Coffee Break

15:45–16:15

THU.PIII: Poster Session III

16:15–17:45 Poster area THU.PIII

16:15 Poster area THU.PIII.1

Air-clad Chirally-coupled-core Yb-fiber Femtosecond Oscillator with >10W Average Power, •*Hung-Wen Chen[1], Guoqing Chang[1], Cheng Zhu[2], Xiuquan Ma[2], Almantas Galvanauskas[2], and Franz X. Kärtner[1,3]; [1]Department of Electrical Engineering and Computer Science and Research Laboratory of Electronics, Massachusetts Institute of Technology, 77 Massachusetts Ave, Cambridge MA 02139, [2]Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, Michigan 48109-2099, [3]Center for Free-Electron Laser Science, DESY, and Dept. of Physics, University of Hamburg, Notkestraße 85, D-22607 Hamburg, Germany.*
We demonstrate high-power (> 10 W), 300-fs mode-locked oscillators at 83-MHz repetition rate using air-clad Chirally-Coupled-Core Yb-fiber with 37-μm central-core diameter, corresponding to a 30-μm mode-field-diameter.

16:15 Poster area THU.PIII.2

Shaper-Based Approach to Real-Time Monitoring and Correction of Ultrashort Pulse Phase Drifts, *Dmitry Pestov[1], Igor Pastirk[1], Shreya Nad[2], Nathan Butcher[2], and •Marcos Dantus[1,2]; [1]Biophotonic Solutions, Inc., 1401 East Lansing Dr., Suite 112, East Lansing, Michigan 48823, USA, [2]Department of Chemistry, Michigan State University, East Lansing, Michigan 48824, USA.*
We demonstrate an active phase-and-amplitude monitoring and correction routine that retrieves phase distortion of femtosecond pulses from changes in the SHG spectrum shape. We implement this scheme experimentally for the second- and third-order dispersion compensation.

16:15 Poster area THU.PIII.3

Pulse Compression of Phase-matched High Harmonic Pulses from a Time-delay Compensated Monochromator, •*Hironori Igarashi, Ayumu Makida, Motohiko Ito*, and *Taro Sekikawa*; *Hokkaido University, Sapporo, Japan.*
Pulse compression of single 32.6-eV high harmonic pulses from a time-delay compensated monochromator was demonstrated down to 11 fs by compensating the pulse front tilt. The photon flux was intensified to 5.7×10^9 photons/s on target.

16:15 Poster area THU.PIII.4

Dual Wavelength, Cryogenically-Cooled Yb:YLF Chirped-Pulse Regenerative Amplifier, •*Eduardo Granados[1,2], Kyung-Han Hong[1], Xing Fu[1,3], Luis E. Zapata[1], Hung-Wen Chen[1], Guoqing Chang[1]*, and *Franz X. Kärtner[1,4]; [1]Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts 02139, USA, [2]IKERBASQUE, Basque Foundation for Science, Bilbao, Spain, [3]Center for Photonics and Electronics, Department of Precision Instruments and mechanology, Tsinghua University, Beijing 100084, China, [4]Center for Free-Electron Laser Science, DESY and Department of Physics, University of Hamburg, Hamburg, Germany.*
We report on a dual wavelength cryogenic Yb:YLF chirped-pulse regenerative amplifier which is designed

to produce sub-ps >5 mJ pulses at 1-kHz repetition rate, serving as a powerful driving source for high harmonic generation experiments.

16:15 Poster area THU.PIII.5

Interband Excitation and Carrier Relaxation as Displacive Driving Force for Coherent Phonons, •*Alexander Paarmann[1,2]*, *Elisabeth M. Bothschafter[2,3]*, *Nicholas Karpowicz[2]*, *Eeuwe S. Zijlstra[4]*, *Martin E. Garcia[4]*, *Ferenc Krausz[2,5]*, *Reinhard Kienberger[2,3]*, and *Ralph Ernstorfer[1,2,3]*; *[1]Fritz Haber Institute of the Max Planck Society, Berlin, Germany*, *[2]Max Planck Institute for Quantum Optics, Garching, Germany*, *[3]Technichal University Munich, Garching, Germany*, *[4]University Kassel, Kassel, Germany*, *[5]Ludwig Maximilian University, Garching, Germany*.

We report on large amplitude coherent lattice motions in TiO2 after resonant excitation with sub-6-femtosecond UV pulses. Calculations of non-equilibrium potential energy surfaces reveal a new displacive mechanism, both due to carrier excitation and relaxation.

16:15 Poster area THU.PIII.6

MEMS Reflective Pulse Shaper for Spectral Phase, Amplitude, and Spatial Modulation with No Wavelength Restrictions, •*Denis Kiselev[1]*, *Jérôme Extermann[1]*, *Stéfan Weber[1,2]*, *Fabio Jutzi[2]*, *Sebastien Lani[2]*, *Luigi Bonacina[1]*, *Wilfried Noell[2]*, *Nico F. de Roij[2]*, and *Jean-Pierre Wolf[1]*; *[1]GAP-Biophotonics Group, University of Geneva, Geneva, Switzerland*, *[2]EPFL/STI/IMT-NE/SAMLAB, Rue Jaquet-Droz 1, 2002 Neuchâtel, Switzerland*.

We present a new optical microelectromechanical systems device that we specifically developed for broadband femtosecond pulse shaping. Because of the device reflectivity, surface flatness, stroke, and stroke resolution, phase-shaping over an unprecedented bandwidth is attainable.

16:15 Poster area THU.PIII.7

Continuum Generation in bulk Materials from the deep UV to the Infrared with Pump Pulse Durations over the entire Femtosecond Regime, •*Maximilian Bradler* and *Eberhard Riedle*; *LS für BioMolekulare Optik, Ludwig-Maximilians-Universität München, Oettingenstraße 67, 80538 München, Germany*.

We demonstrate continuum generation with pulses from femto- to picoseconds. Microjoule energies are sufficient for stable continua with smooth, plateau-like spectra from the deep ultraviolet to the infrared. We visualize the processes of the generation.

16:15 Poster area THU.PIII.8

High repetition rate two-color pumped OPCPA system with a spectral bandwidth of 1.5 octaves from VIS to NIR, •*Anne Harth[1,2]*, *Marcel Schultze[1]*, *Tino Lang[1,2]*, *Stefan Rausch[1,2]*, *Thomas Binhammer[3]*, and *Uwe Morgner[1,2,4]*; *[1]Institut für Quantenoptik, Leibniz Universität Hannover, Hannover, Germany*, *[2]Centre for Quantum Engineering and Space-Time Research (Quest), Hannover, Germany*, *[3]VENTEON Laser Technologies GmbH, Garbsen, Germany*, *[4]Laser Zentrum Hannover e.V., Hannover, Germany*.

We present a 200 kHz double-stage OPCPA system, pumped with two different wavelengths. The μJ output spectrum supports pulse durations of sub-3 fs, a SPIDER measurement of the inner spectral part confirms sub-5 fs.

16:15 Poster area THU.PIII.9

A Direct Diode-Pumped 15 fs Ti:Sapphire Laser and its Application to Multi-Photon Microscopy, •*Sterling Backus[1,3]*, *Michael Young[2]*, *Tristan Storz[2]*, *Jonathan Garlick[1,2]*, *Steven Hill[2]*, *Matt Kirchner[1]*, *Greg Taft[1]*, *Kevin Shea[1]*, *Henry Kapteyn[1,4]*, *Margaret Murnane[1,4]*, *Charles Durfee[2]*, and *Jeff Squier[2]*; *[1]KMLabs Inc., Research and Development Department, 1855 S 57th Ct, Boulder, CO 80301, USA*, *[2]Colorado School of Mines, Department of Physics, Golden, CO, 80401, USA*, *[3]Colorado State University, Department of Electrical and Computer Engineering, Ft. Collins, CO, 80523, USA*, *[4]JILA, and Department of Physics, University of Colorado, Boulder, CO 80309*.

We have demonstrated the first direct-diode-pumped kerr-lens-modelocked Ti:sapphire laser, pumped directly by two 445nm laser diodes, and generating 30 mW output in 15fs pulses. This laser has been successfully used for multi-photon microscopy.

16:15 Poster area THU.PIII.10

Generating Few-cycle Energetic Mid-IR Pulses with Soliton Compression by Cascaded Quadratic Nonlinearities, •*Morten Bache[1]*, *Binbin Zhou[1]*, and *Frank W. Wise[2]*; *[1]Technical University of Denmark, DTU Fotonik, Department of Photonics Engineering, DK-2800 Kgs. Lyngby, Denmark*, *[2]Cornell University, Dep. Applied and Engineering Physics, Ithaca (NY) 14853, USA*.

We study nonlinear mid-IR crystals and assess their potential for ultrafast cascaded nonlinearities in the type 0 phase-matching interaction. Few-cycle, broadband energetic mid-IR pulses can be generated from compressing multi-cycle mid-IR pulses with self-defocusing solitons.

16:15 Poster area THU.PIII.11

Asynchronous mid-infrared broadband optical parametric oscillator for dual-comb spectroscopy, *Zhaowei Zhang[1]*, *Chenglin Gu[1,2]*, *Jinghua Sun[1,4]*, *Chingyue Wang[2]*, *Tom Gardiner[3]*, and •*Derryck Reid[1]*; *[1]Scottish Universities Physics Alliance (SUPA), Institute of Photonics and Quantum Sciences, School of Engineering and Physical Sciences, Heriot-Watt University, Riccarton, Edinburgh EH14 4AS, UK*, *[2]School of Precision Instruments and Optoelectronics Engineering, Tianjin University, Tianjin 300072, China*, *[3]National Physical Laboratory, Hampton Road, Teddington, London TW11 0LW, UK*, *[4]School of Physics, Huazhong University of Science and Technology, 1037, Luoyu Road, Wuhan, 430074, China*.

Two asynchronous, broadband 3.3-um pulse trains with a stabilized repetition-rate difference of up to 5-kHz were generated from a single optical parametric oscillator. With additional carrier-envelope-offset stabilization, it could be applied to coherent dual-frequency-comb spectroscopy

16:15 Poster area THU.PIII.12

Direct Imaging of Morphology Dependent Charge Dynamics in Organic Photovoltaics by Transient Absorption Microscopy, *Chris Wong*, *Hongyan Shi*, and •*Libai Huang*; *Notre Dame Radiation Laboratory, University of Notre Dame, Notre Dame, IN, USA*.

Charge generation and recombination was directly imaged in photovoltaic polymer blends with simultaneously high spatial and temporal resolution by a femtosecond transient absorption microscope. Morphology dependent charge dynamics were revealed on the microscopic level.

16:15 Poster area THU.PIII.13

Femtosecond laser ablation dynamics of platinum, •*Takuro Tomita[1]*, *Masaharu Nishikino[2]*, *Masahiko Ishino[2]*, *Takeshi Kaihori[2]*, *Yoshihiro Ochi[2]*, *Tetsuya Kawachi[2]*, *Mitsuru Yamagiwa[2]*,

Ryota Takei[3], *Yasuo Minami[3]*, *Kota Terakawa[3]*, and *Tohru Suemoto[3]*; *[1]Department of Ecosystem Engineering, The University of Tokushima, Tokushima 770-8506, Japan*, *[2]Quantum Beam Science Directorate, Japan Atomic Energy Agency, 8-1-7 Umemi-dai, Kizugawa, Kyoto 619-0215, Japan*, *[3]The Institute for Solid State Physics, The University of Tokyo, 5-1-5 Kashiwanoha, Kashiwa, Chiba 277-8581, Japan*.
Time-resolved soft x-ray reflective imaging was applied to the observation of laser ablation process. Despite the continuous intensity profile of the pump beam, a discontinuity is found, reflecting a crossover of the ablation scheme.

16:15 Poster area THU.PIII.14

Stimulated Raman Scattering via integrated optical waveguides in microfluidic structures, •*Claudia Hoffmann[1]*, *Matthias Pospiech[1]*, *Moritz Emons[1]*, *Günter Rinke[2]*, and *Uwe Morgner[1,3,4]*; *[1]Institut für Quanten Optik, Leibniz Universität Hannover, Welfengarten 1, D-30167 Hannover, Germany*, *[2]Karlsruher Institut für Technologie, Institut für Mikroverfahrenstechnik, Hermann-von-Helmholtz-Platz 1, D-76344 Eggenstein-Leopoldshafen, Germany*, *[3]Center for Quantum Engineering and Space-Time Research, Welfengarten 1, D-30167 Hannover, Germany*, *[4]Laser Zentrum Hannover, Hollerithallee 8, D-30419 Hannover, Germany*.
We report on Stimulated Raman Scattering (SRS) to distinguish fluids in a microfluidic channel with integrated waveguides. The excitation pulses are delivered by a non-collinear optical parametric amplifier driven by an amplified Yb:KYW oscillator.

16:15 Poster area THU.PIII.15

The contribution has been moved to Monday.

16:15 Poster area THU.PIII.16

Pump-Probe Intracavity Phase Spectroscopy, •*R. Jason Jones* and *David R. Carlson*; *College of Optical Sciences, University of Arizona, Tucson, AZ, USA*.
Pump-probe intracavity phase spectroscopy utilizes a femtosecond enhancement cavity to enable precision measurements of high-field ultrafast nonlinearites. We demonstrate this new approach measuring the pump-induced plasma evolution of a xenon target with a time-delayed probe.

16:15 Poster area THU.PIII.17

HfO2/SiO2 chirped multilayer mirrors for broadband dispersion management in the ultraviolet spectral range, •*Olga Razskazovskaya[1]*, *Mohammed T. Hassan[1]*, *Eleftherios Goulielmakis[1]*, *Ferenc Krausz[1,2]*, and *Vladimir Pervak[2]*; *[1]Max-Planck-Institute of Quantum Optics, Hans-Kopfermann-Strasse 1, D-85748 , Garching, Germany*, *[2]Ludwig-Maximilians-Universitaet Muenchen, Am Coulombwall 1, D-85748, Garching, Germany*.
Newly developed dispersive dielectric multilayer mirror covering near ultraviolet wavelength range competes to be one of the most advanced and user-friendly technology for pulse compression and generation of sub-6 fs pulses in UV spectral region.

16:15 Poster area THU.PIII.18

Exploring the Polarisation Degrees of freedom in Collinear Two Dimensional Infrared Spectroscopy., •*Julien Réhault* and *Jan Helbing*; *Physikalisch-Chemisches Institut, Universität Zürich, Winterthurerstrasse 190, 8057 Zürich, Switzerland*.
We fully exploit polarisation in a 2D-IR set-up in the pump-probe geometry to amplify signals, eliminate scattering and measure absorptive and dispersive spectra.

16:15 Poster area THU.PIII.19

Sub-1.5-cycle pulses from a single filament, •*Martin Kretschmar[1]*, *Daniel Steingrube[1,2]*, *Emilia Schulz[1,2]*, *Thomas Binhammer[3]*, *Dominik Hoff[4]*, *Peter Hansinger[4]*, *Gerhard G. Paulus[4]*, *Uwe Morgner[1,2]*, and *Milutin Kovacev[1,2]*; *[1]Leibniz Universität Hannover, Institut für Quantenoptik, Welfengarten 1, D-30167 Hannover, Germany*, *[2]QUEST, Centre for Quantum Engineering and Space-Time Research, Welfengarten 1, D-30167 Hannover, Germany*, *[3]VENTEON Laser Technologies GmbH, D-30827 Garbsen, Germany*, *[4]Friedrich-Schiller-Universität Jena, Institut für Optik und Quantenelektronik, Max-Wien-Platz 1, D-07743 Jena, Germany*.
We report on the measurement of sub-1.5-cycle laser pulses directly from a single femtosecond filament. A stereo-ATI setup is used to determine the pulse duration as well as CEO phase contributions along the filament.

16:15 Poster area THU.PIII.20

Optimal Control of High-Order Harmonic Generation, *Arnau Pou* and •*Carles Serrat*; *UPC-Universitat Politècnica de Catalunya, Colom 11, 08222-Terrassa, Spain*.
A static electric field added at each spot of the interaction region controls high-order harmonic generation. The method is all-optical and susceptible to feedback-loop control schemes.

16:15 Poster area THU.PIII.21

Vectorial Phase Retrieval for Linear Characterization of Attosecond Pulses, •*Oren Raz[1]*, *Nirit Dudovich[1]*, and *Ian Walmsley[2]*; *[1]Weizmann Inst. of Science*, *[2]Department of Physics,University of Oxford, Clarendon Laboratory, Oxford, UK*.
We propose a new linear and all-optical method for attosecond pulses characterization. Our scheme is based only on spectral and polarization measurements. We demonstrate this method numerically on attosecond pulses generated from aligned CO_2 molecules.

16:15 Poster area THU.PIII.22

Time-resolved Four-body Coulomb Explosion Imaging of Correlated Dynamics of Hydrogen Atoms in Acetylene Dication, •*Akitaka Matsuda[1,2]*, *Mizuho Fushitani[1]*, *Eiji Takahashi[3]*, and *Akiyoshi Hishikawa[1,2]*; *[1]Nagoya University, Nagoya, Japan*, *[2]Institute for Molecular Science, Okazaki, Japan*, *[3]RIKEN, Wako, Japan*.
The correlated motion of the two deuterium atoms associated with the hydrogen migration and structural deformation to non-planar geometry are identified in acetylene dication by the time-resolved four-body Coulomb explosion imaging.

16:15 Poster area THU.PIII.23

High Order Harmonic Generation in Three Pulse Scattering Geometry, *Caterina Vozzi[1]*, *Matteo Negro[2]*, *Luca Poletto[1]*, *Sandro De Silvestri[2]*, and •*Salvatore Stagira[2]*; *[1]Istituto di Fotonica e Nanotecnologie - CNR, piazza L. da Vinci 32, 20133 Milano, Italy*, *[2]Dipartimento di Fisica - Politecnico di Milano, piazza L. da Vinci 32, 20133 Milano, Italy*.
We study the generation of high order harmonics produced by the interaction of three intense and ultrafast noncollinear laser pulses. Scattered harmonic radiation, not overlapped to the direction of the incident pulses, is observed.

16:15 Poster area THU.PIII.24

Hydrogen scrambling in H3+ generation from ethane molecules induced by ultrashort intense laser

fields, •*Reika Kanya*[1], *Tatsuya Kudou*[1], *Nora Schirmel*[2], *Shun Miura*[1], *Karl-Michael Weitzel*[2], *Kennosuke Hoshina*[3], and *Kaoru Yamanouchi*[1,4]; [1]*Department of Chemistry, School of Science, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan*, [2]*Fachbereich Chemie, Physikalische Chemie, Philipps-Universität Marburg, Hans-Meerwein-Straße, D-35032 Marburg, Germany*, [3]*Fuculty of Pharmaceutical Science, Niigata University of Pharmacy and Applied Life Sciences, 265-1 Higashijima, Akiha-ku, Niigata-city 956-8603, Japan*, [4]*Institute for Nano Quantum Information Electronics, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan*.
From the yield ratios of H3+, H2D+, HD2+, and D3+ ejected from CH3CD3+ induced by an ultrashort-pulsed intense laser field, nearly statistical randomization of H and D atoms called hydrogen atom scrambling was identified.

16:15 Poster area THU.PIII.25

Electron rescattering at metal nanotips, •*Michael Krüger*[1], *Markus Schenk*[1], *Michael Förster*[1], *Sebastian Thomas*[1], *Peter Hommelhoff*[1], *Georg Wachter*[2], *Christoph Lemell*[2], and *Joachim Burgdörfer*[2]; [1]*Max Planck Institute of Quantum Optics, Hans-Kopfermann-Str. 1, D-85748 Garching, Germany, EU*, [2]*Institute for Theoretical Physics, Vienna University of Technology, Wiedner Hauptstr. 8-10, A-1040 Vienna, Austria, EU*.
We report on experimental and theoretical studies of photoelectron rescattering taking place at the surface of metal nanotips. This effort bears the prospect to extend attosecond science to solid surfaces.

16:15 Poster area THU.PIII.26

Quantum Interferometry of Doubly-Excited States in Helium, •*Christian Ott*[1,2], *Andreas Kaldun*[1,2], *Philipp Raith*[1,2], *Kristina Meyer*[1,2], *Martin Laux*[1,2], *Yizhu Zhang*[1,2], *Steffen Hagstotz*[1,2], *Thomas Ding*[1,2], *Robert Heck*[1,2], and *Thomas Pfeifer*[1,2]; [1]*Max-Planck-Institut für Kernphysik, Saupfercheckweg 1, 69117 Heidelberg, Germany*, [2]*Center for Quantum Dynamics, Ruprecht-Karls-Universität Heidelberg, 69120 Heidelberg, Germany*.
We laser-dress several doubly-excited states in helium. Tuning the coupling-laser intensity from perturbative to the strong-coupling regime, we are able to measure phases imprinted on the two-electron wavefunctions, and observe a new continuum coupling mechanism.

16:15 Poster area THU.PIII.27

Quasi-phase-matching of high harmonic generation using polarization beating in optical waveguides, •*Lewis Z. Liu*, *Kevin O'Keeffe*, and *Simon M. Hooker*; *University of Oxford, Oxford, UK*.
A new scheme for quasi-phase matching high-harmonic generation is proposed in which polarization beating within a hollow-core birefringent waveguide modulates harmonic generation. The performance of this scheme as a function of experimental parameters is investigated

16:15 Poster area THU.PIII.28

Fragmentation Control of a Polyatomic Molecule by fully determined Laser-Fields, •*Xinhua Xie*[1], *Stefan Roither*[1], *Markus Schöffler*[1], *Daniil Kartashov*[1], *Huailiang Xu*[1,6], *Li Zhang*[1], *Tim Rathje*[2], *Gerhard G. Paulus*[2], *Katharina Doblhoff-Dier*[3], *Stefanie Gräfe*[3], *Sergiy Bubin*[4], *Mackenzie Atkinson*[4], *Kálmán Varga*[4], *Kaoru Yamanouchi*[5], *Andrius Baltuška*[1], and *Markus Kitzler*[1]; [1]*Photonics Institute, Vienna University of Technology, A-1040 Vienna, Austria*, [2]*Institute of Optics and Quantum Electronics, D-07743 Jena, Germany*, [3]*Institute of Theoretical Physics, Vienna University of Technology, A-1040 Vienna, Austria*, [4]*Department of Physics and Astronomy, Vanderbilt University, Nashville, Tennessee 37235, USA*, [5]*Department of Chemistry, School of Science, The University of Tokyo, Tokyo 113-0033, Japan*, [6]*State Key Laboratory on Integrated Optoelectronics, Changchun 130012, China*.
Strong-field control of acetylene fragmentation by fully determined few-cycle laser pulses is demonstrated. The control mechanism is shown to be based on electron recollision and inelastic ionization from inner-valence molecular orbitals.

16:15 Poster area THU.PIII.29

Attosecond X-ray Free electron Laser, •*Dong Eon Kim*[1,2], *Sandeeep Kumar*[1,2], and *Heung Sik Kang*[3]; [1]*Department of Physics, Pohang University of Science and Technology (POTECH), Pohang, 790-784, South Korea*, [2]*Center for Attosecond Science and Technology (CASTECH), Pohang University of Science and Technology (POTECH), Pohang, 790-784, South Korea*, [3]*Pohang Accelerator Laboratory, San 31, Hyoja-dong, Pohang, Kyungbuk, 790-784, South Korea*.
The interaction of10GeV electron beam with a few-cycle laser and its radiation through undulator was simulated. An isolated 146 as, 58 GW pulse at 0.1 nm is expected for 1200 nm and 0.2 mJ laser.

16:15 Poster area THU.PIII.30

Resonant Formation of a Single Attosecond Pulse in Hydrogenlike Medium, •*Vladimir Polovinkin*[1], *Yevgeny Radeonychev*[1], and *Olga Kocharovskaya*[2,1]; [1]*Institute of Applied Physics of the Russian Academy of Science, 46, Ulyanov str., Nizhny Novgorod, 603950 Russia*, [2]*Department of Physics of Texas A&M University, College Station, 77843-4242 TX, USA*.
We show the possibility to produce single nearly bandwidth-limited few-cycle attosecond pulses without external synchronization of spectral components based on time-dependent resonant interaction of an incident radiation with the bound states of hydrogenlike atoms.

16:15 Poster area THU.PIII.31

Femtosecond Electron Diffraction Study of the Cyclization Reaction in Crystalline Diarylethene, •*Hubert Jean-Ruel*[1], *Meng Gao*[1], *Ryan R. Cooney*[1], *Cheng Lu*[1], *Michal A. Kochman*[2], *Carole A. Morrison*[2], and *R. J. Dwayne Miller*[1,3]; [1]*Departments of Chemistry and Physics, 80 St. George Street, University of Toronto, Toronto, Ontario, M5S 3H6, Canada*, [2]*School of Chemistry and EaStCHEM Research School, University of Edinburgh, West Mains Road, Edinburgh, UK, EH9 3JJ*, [3]*Max Planck Department for Structural Dynamics, Department of Physics, University of Hamburg, Centre for Free Electron Laser Science, DESY, Notkestrasse 85, Hamburg 22607*.
Femtosecond electron diffraction is used to directly resolve the atomic motions involved in the ring closing reaction induced in a photochromic single crystal.

16:15 Poster area THU.PIII.32

Ultrafast laser-induced melting and ablation studied by time-resolved diffuse X-ray scattering, •*Matthieu Nicoul*[1], *Florian Quirin*[1], *Aaron Lindenberg*[2], *Anton Barty*[3], *David Fritz*[4], *Diling Zhu*[4], *Henrik Lemke*[4], *David Reis*[2], *Jian Chen*[2], *Shambhu Ghimire*[2], *Mariano Trigo*[2], *Matthias Fuchs*[2], *Kelly Gaffney*[2], *Jorgen Larsson*[5], *Tim Becker*[1], *Sven Meyer*[1], *Thomas Payer*[1], *Frank Meyer zu Heringdorf*[1], *Michael Horn von*

Hoegen[1], *Martin Jerman*[1], and *Klaus Sokolowski-Tinten*[1]; [1]*Faculty of Physics and Center for Nanointegration Duisburg-Essen (CENDIDE), University of Duisburg-Essen, 47048 Duisburg, Germany*, [2]*Stanford PULSE Institute, SLAC National Accelerator Laboratory, 2575 Sand Hill Rd., CA 94025 Menlo Park, USA*, [3]*Centre for Free Electron Laser Science (CFEL) Notkestrasse 85, 22607 Hamburg, Germany*, [4]*SLAC National Accelerator Laboratory, 2575 Sand Hill Rd., CA 94025 Menlo Park, USA*, [5]*Department of Physics, Lund University, 22100 Lund, Sweden.*.
Time-resolved diffuse X-ray scattering with 50 fs, 9.5 keV X-ray pulses from the Linear Coherent Light Source was used to study the structural dynamics in materials undergoing rapid melting and ablation after fs laser excitation.

16:15 Poster area THU.PIII.33

Out of equilibrium multi-phonon dynamics of the photoinduced transformation in the 1D molecular material (EDO-TTF)2SbF6, •*Marina Servol*[1], *Nicolas Moisan*[1], *Maciej Lorenc*[1], *Wawrzyniec Kaszub*[1,2], *Hervé Cailleau*[1], *Shin-ya Koshihara*[3], *Mitsuhiko Maesato*[4], *Xiangfeng Shao*[5], *Yoshiaki Nakano*[5], *Hideki Yamochi*[5], *Gunzi Saito*[4,5], and *Eric Collet*[1]; [1]*Institut de Physique de Rennes, UMR CNRS-University Rennes 1 campus Beaulieu, Rennes, 35042, France*, [2]*Quantum Electronics Laboratory, Faculty of Physics, Poznan, Poland*, [3]*Department of Materials Science, Tokyo Inst. of Technology, 2-12-1, Oh-okayama, Meguro, Tokyo, 152-8551, Japan*, [4]*Division of Chemistry, Graduate School of Science, Kyoto University, Sakyo-ku, Kyoto, 606-8501, Japan*, [5]*Research Center for Low Temperature and Materials Sciences, Kyoto University, Sakyo-ku, Kyoto, 606-8502, Japan*.
(EDO-TTF)2SbF6 is a 1D molecular crystal exhibiting an insulator to metal phase transition. Its ultrafast photoinduced transformation is investigated; we particularly study the new metastable state generated, the electronic excitation mechanism and the phonon dynamics.

16:15 Poster area THU.PIII.34

Coherent Electron Source for Ultrafast Electron Diffraction and Imaging, •*Melanie Müller*[1], *Alexander Paarmann*[1], *Canhua Xu*[1,2], and *Ralph Ernstorfer*[1]; [1]*Fritz-Haber-Institut der Max-Planck-Gesellschaft, D-14195 Berlin, Germany*, [2]*Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai 201800, China*.
We numerically investigate the suitability of photoexcited nanotips as source of coherent femtosecond single electron wave packets for ultrafast low-energy electron diffraction and imaging. The experimental parameters for realizing hundred femtosecond time resolution are identified.

16:15 Poster area THU.PIII.35

Nonlinear atomic response: high-order optical harmonics and terahertz emission, •*Sergey Stremoukhov*, *Anatoly Andreev*, and *Olga Shoutova*; *M.V. Lomonosov Moscow State University, physical department, 119991 Leninskie Gory, 1, build. 2, Moscow, Russia*.
We present the result of theoretical investigations of both terahertz and high order harmonic generation in a multicolor laser field. Variation of the laser field parameters provides a promising method of the effective generation control.

16:15 Poster area THU.PIII.36

Coherent Control of Terahertz Metamaterials, •*Florian Enderli* and *Thomas Feurer*; *Institute of Applied Physics, University of Bern, Bern, Switzerland*.
We present the first coherent control experiments of a metamaterial. The metamaterial can be seen as analogue to a quantum system with two resonances and is studied by THz near field spectroscopy.

16:15 Poster area THU.PIII.37

Temperature and fluence dependence of electron-phonon energy coupling in bismuth, •*Eugene Gamaly* and *Andrei Rode*; *Laser Physics Centre, Research School of Physics and Engineering, Australian National University, Canberra, ACT 0200 Australia*.
Ultra-fast and equilibrium experiments and kinetic theory, all demonstrate that electron-phonon coupling is temperature-dependent, it shortens with increasing laser fluence. This allows interpretation of all observed ultra-fast transformations of bismuth without controversies of *non-thermal melting*.

16:15 Poster area THU.PIII.38

Ultrafast quasiparticle dynamics of FeTe0.75Se0.25 superconductor, •*Yuki Kabasawa*; *Materials and Structures Laboratory,Tokyo Institute of Technology*, *CREST, Japan Science and Technolgy Agency*.
The electron-phonon coupling constant (λ=0.18) obtained from femtosecond pump-probe reflection measurements suggests that a phonon-mediated process cannot be the dominant mechanism for superconductivity of FeTe0.75Se0.25.

16:15 Poster area THU.PIII.39

Near-Field Second-Harmonic Nano-imaging of Coupled Ferroic Order in Complex Oxides, •*Joanna M. Atkin*, *Molly May*, and *Markus Raschke*; *Department of Physics, Department of Chemistry, and JILA, University of Colorado, Boulder, CO 80309*.
Second-harmonic generation in combination with tip-enhanced microscopy allows for nano-crystallography and ferroic domain imaging in strongly correlated materials. The near-field selection rules provide simultaneous access to ferroelectric and (anti)-ferromagnetic order on nanometer length scales.

16:15 Poster area THU.PIII.40

Surface Enhanced 2D-IR spectroscopy of gold nanoparticle capping layers, •*Paul M Donaldson* and *Peter Hamm*; *Institute of Physical Chemistry, The University of Zurich, Winterthurerstrasse 190 CH-8057 Zurich, Switzerland*.
2D-IR spectroscopy is used to quantify gold nanoparticle infrared surface enhancement. Changes in 2D lineshapes and the appearance of surface group cross peaks demonstrate that 2D-IR offers a unique sensitivity to nanoparticle cappant structure/dynamics.

16:15 Poster area THU.PIII.41

Substrate Effects on the Ultrafast Dynamics of the Vanadium Dioxide Insulator-to-Metal Transition Observed by Nondegenerate Pump-Probe Spectroscopy, *Nathaniel Brady*[1], *Krishen Appavoo*[2], *Minah Seo*[3], *Joyeeta Nag*[2], *Rohit Prasankumar*[3], *Richard Haglund*[2], and •*David Hilton*[1]; [1]*University of Alabama at Birmingham, Birmingham, Alabama*, [2]*Vanderbilt University, Nashville, Tennessee*, [3]*Los Alamos National Laboratory, Center for Integrated Nanotechnologies, Los Alamos, New Mexico*.
Non-degenerate pump (1.5 eV)-probe (0.4 eV) transmission spectroscopy on vanadium dioxide films grown on glass and three different sapphire substrates shows systematic variations with substrate that correlate with vanadium dioxide grain size and laser fluence.

16:15 Poster area THU.PIII.42

Ultrafast Surface-Plasmon Enhancement of Exciton and Defect

Luminescence in ZnO Thin Films, •*Richard Haglund*[1], *Benjamin Lawrie*[1], and *Richard Mu*[2]; [1]*Vanderbilt University, Nashville TN, USA*, [2]*Fisk University, Nashville TN, USA*.
Femtosecond pump-probe and photoluminescence measurements in transmission and reflection show that ultraviolet band-edge and visible defect luminescence in ZnO films can be selectively enhanced by coupling to Ag surface-plasmon polaritons or localized surface plasmon resonances.

16:15 Poster area THU.PIII.43

Charge Dynamics and Spin Polarization in the Double-perovskite Multiferroic Bi2FeMnO6, •*Guohong Ma*; *Department of Physics, Shanghai University*.
The electron charge dynamics and ultrafast spin relaxation in a double-perovskite multiferroic Bi2FeMnO6 film are investigated using time-resolved spectroscopy. Temperature dependence of couplings among the photon, phonon and spin degrees of freedom is clarified.

16:15 Poster area THU.PIII.44

Electronic phase control in oxide heterostructures via ultrafast strain engineering, •*Andrea Caviglia*[1], *Raoul Scherwitzl*[3], *Paul Popovich*[1], *Wanzheng Hu*[1], *Hubertus Bromberger*[1], *Rashmi Singla*[1], *Matteo Mitrano*[1], *Matthias Hoffmann*[1], *Stefan Kaiser*[1], *Pavlo Zubko*[3], *Stefano Gariglio*[3], *Jean-Marc Triscone*[3], *Micheal Först*[1], and *Andrea Cavalleri*[1,2]; [1]*Max-Planck Department for Structural Dynamics, Center for Free Electron Laser Science, University of Hamburg, Germany*, [2]*Department of Physics, Clarendon Laboratory, University of Oxford, United Kingdom*, [3]*Département de Physique de la Matière Condensée, University of Geneva, 24 Quai Ernest-Ansermet, 1211 Genève 4, Switzerland*.
Using femtosecond mid-infrared pulses, a NdNiO3 epitaxial thin film is switched between its insulating and metallic states by selectively exciting the lattice of a LaAlO3 or NdGaO3 substrate.

16:15 Poster area THU.PIII.45

Ultrafast Optical Manipulation of Atomic Motions in Multilayer Ge-Sb-Te Phase Change Materials, •*Kotaro Makino*[1], *Junji Tominaga*[2], *Alexander Kolobov*[2], *Paul Fons*[2], and *Muneaki Hase*[1]; [1]*Institute of Applied Physics, University of Tsukuba, Tsukuba, Japan*, [2]*Nanoelectronics Research Institute, National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan*.
We demonstrate ultrafast phase change in a multilayered Ge-Se-Te structure with linearly-polarized pulse. Selective excitation along the superlattice direction results in reversible and irreversible phonon softening, corresponding to the phase change, depending on pump fluence.

16:15 Poster area THU.PIII.46

Transition from Ballistic to Drift Motion in High-Field Transport in GaAs, •*Pamela Bowlan*[1], *Wilhelm Kuehn*[1], *Klaus Reimann*[1], *Michael Woerner*[1], *Thomas Elsaesser*[1], *Rudolf Hey*[2], and *Christos Flytzanis*[3]; [1]*Max-Born-Institut, 12489 Berlin, Germany*, [2]*Paul-Drude-Institut, 10117 Berlin, Germany*, [3]*École Normale Supérieure, 75231 Paris, France*.
With strong THz pulses, we measure ultrafast transport of electrons, holes, and an electron-hole plasma in GaAs. The transition from ballistic to drift-like transport is strongly influenced by electron-hole scattering.

16:15 Poster area THU.PIII.47

Nonlinear lattice control in La0.7Sr0.3MnO3 probed by femtosecond hard X-ray diffraction, •*Michael Först*[1], *Roman Mankowsky*[1], *Hubertus Bromberger*[1], *Stefan Kaiser*[1], *Cristian Manzoni*[2], *David M. Fritz*[3], *Henrik Lemke*[3], *Diling Zhu*[3], *Matthieu Chollet*[3], *Andrin Caviezel*[4], *Yasuhide Tomioka*[5], *Yoshinori Tokura*[6], *Roberto Merlin*[7], *John P. Hill*[8], *Steven L. Johnson*[9], and *Andrea Cavalleri*[1]; [1]*Max-Planck Department for Structural Dynamics, Center for Free Electron Laser Science, University of Hamburg,*, [2]*CNR-IFN Dipartimento di Fisica, Politecnico di Milano, 20133 Milan, Italy*, [3]*Linac Coherent Light Source, SLAC National Accelerator Laboratory, Menlo Park, CA94025, USA*, [4]*Laboratory for Synchrotron Radiation, Swiss Light Source, Paul Scherrer Institut, 5232 Villigen PSI, Switzerland*, [5]*Correlated Electron Engineering Group, AIST, Tsukuba, Ibaraki, 305-8562 Japan*, [6]*Department of Applied Physics, University of Tokyo, Tokyo, 113-8656 Japan*, [7]*Department of Physics, University of Michigan, Ann Arbor, MI-48109, USA*, [8]*Condensed Matter Physics and Materials Science Department, Brookhaven National Laboratory, Upton, NY11973, USA*, [9]*Institute for Quantum Electronics, Physics Department, ETH Zurich, 8093 Zurich, Switzerland*.
We use femtosecond x-ray diffraction to capture time-resolved distortions of a perovskite lattice resonantly excited in the mid-infrared. Ionic Raman scattering rectifies the oscillating vibrational field via lattice anharmonicities, observed through instantaneous displacive atomic motion.

16:15 Poster area THU.PIII.48

Time and momentum resolved resonant magnetic x-ray scattering on EuTe, •*Christoph Trabant*[1,2], *Nikolaus Pontius*[1], *Enrico Schierle*[1], *Eugen Weschke*[1], *Torsten Kachel*[1], *Christian Schüßler-Langeheine*[1], *Günter Springholz*[3], and *Karsten Holldack*[1]; [1]*G-I2 / M-I1, Helmholtz-Zentrum Berlin, Germany*, [2]*II. Physikalisches Institut, Universität zu Köln, Germany*, [3]*Institut für Halbleitertechnik, Johannes Kepler Universität, Linz, Austria*.
EuTe is an AF semiconductor in which AFM order is detectable by tr-RMXS. We measured fs- and ps time-resolved q-scans with surprising information about the magnetic profile at different pump-probe delays and pump fluencies

16:15 Poster area THU.PIII.49

The contribution has been withdrawn.

16:15 Poster area THU.PIII.50

Measurement of Decoherence Lifetimes in a High Mobility Two-Dimensional Electron Gas, •*Jeremy Curtis*, *Bagvanth Sangala*, and *David Hilton*; *The University of Alabama at Birmingham , Birmingham, Alabama, USA*.
We have studied the dynamics of a high mobility two-dimensional electron gas as a function of temperature. The presence of satellite reflections in the sample and magnet can be modeled in the time-domain.

16:15 Poster area THU.PIII.51

Absolute Femtosecond Measurements of Auger Recombination Dynamics in Lead Sulfide Quantum Dots, •*Byungmoon Cho*, *William Peters*, *Vivek Tiwari*, *Rob Hill*, *Austin Spencer*, and *David Jonas*; *Department of Chemistry and Biochemistry, University of Colorado at Boulder, Colorado, USA*.
Multiphoton excitation of hot carriers generates multiexcitons that are probed as a function of the absolute number of photons absorbed. Standard assumptions of Auger recombination analyses fail for an average of 2 excitations.

16:15 Poster area THU.PIII.52

CdTe Nanowires studied by Transient Absorption Microscopy, •*Shun S. Lo*[1], *Todd Major*[1], *Nattasamon Petchsang*[1], *Libai Huang*[2], *Masaru Kuno*[1], and *Gregory V. Hartland*[1]; [1]*Dept. of Chemistry and Biochemistry, University of Notre Dame, Notre Dame, Indiana 46556-5670, USA*, [2]*Notre Dame Radiation Laboratory, University of Notre Dame, Notre Dame, Indiana 16556-5670, USA*.
Single CdTe nanowires were studied. The results suggest a trap-filling mechanism for charge carrier relaxation. Acoustic phonon modes were observed and the measured dephasing times gave vibrational quality factors similar to those for metal nanostructures.

16:15 Poster area THU.PIII.53

Excitons, Biexcitons, and Trions in an InAs Quantum Dot Ensemble Studied with Optical Two-Dimensional Fourier-Transform Spectroscopy, •*Galan Moody*[1,2], *Rohan Singh*[1,2], *Hebin Li*[1], *Ilya Akimov*[3,4], *Manfred Bayer*[3], *Dirk Reuter*[5], *Andreas Wieck*[5], and *Steven Cundiff*[1,2]; [1]*JILA, National Institute of Standards and Technology and the University of Colorado*, [2]*Department of Physics, University of Colorado*, [3]*Experimentelle Physik 2, Technische Universität Dortmund*, [4]*A. F. Ioffe Physical-Technical Institute, Russian Academy of Sciences*, [5]*Lehrstuhl fuer Angewandte Festkoerphysik, Ruhr-Universitaet Bochum*.
Multi-particle correlations are investigated in an InAs quantum dot ensemble using two-dimensional Fourier-transform spectroscopy. This technique enables us to measure excitation polarization and density dependence of excitons, biexcitons, and trions within the ensemble.

16:15 Poster area THU.PIII.54

Long-lived Image Potential Electrons on Alkanethiol Self-assembled Monolayer Studied by Two-photon Photoemission Spectroscopy, •*Masahiro Shibuta*[1,2], *Naoyuki Hirata*[1,2], *Ryo Matsui*[2], *Masato Nakaya*[1,2], *Toyoaki Eguchi*[1,2], and *Atsushi Nakajima*[1,2]; [1]*JST, ERATO, Nakajima Designer Nanocluster Assembly Project, Kawasaki, Japan*, [2]*Depertment of Chemistry Faculty of Science and Technology, Keio University, Yokohama, Japan*.
The image potential state on alkanethiol self-assembled monolayer has been investigated by two-photon photoemission spectroscopy. The electron lifetime ranging from 10 to 100 ps can be controlled by changing the length of alkyl chain.

16:15 Poster area THU.PIII.55

Time resolved diffuse reflectance spectroscopy study of the dynamics of carriers in dye sensitized solar cells, •*Elham Ghadiri* and *Jacques-E. Moser*; *Institute of chemical sciences & engineering, Ecole polytechnique federale de Lausanne, Lausanne , Switzerland*.
Femtosecond time resolved diffuse reflectance spectroscopy is developed to study the charge carrier dynamic, namely electron injection rate on the photoanode of a dye sensitized solar cell in the situation close to the operational condition.

16:15 Poster area THU.PIII.56

Resonant Enhancement of Coherent Phonons in Carbon Nanotubes Observed with Sub-10fs Time Resolution, •*Ikufumi Katayama*[1], *Keisuke Tahara*[1], *Jun Takeda*[1], *Kazuhiro Yanagi*[2], *Jie Tang*[3], and *Masahiro Kitajima*[4]; [1]*Yokohama National University, Yokohama, Japan*, [2]*Tokyo Metropolitan University, Hachioji, Japan*, [3]*National Institute of Materials Science, Tsukuba, Japan*, [4]*National Defense Academy, Yokosuka, Japan*.
Using wavelength-resolved pump-probe spectroscopy with a sub-10-fs laser, we investigated resonant enhancement of radial breathing mode and G-mode coherent phonons in carbon nanotubes (CNTs), and successfully distinguished the electronic states of CNTs with different chiralities.

16:15 Poster area THU.PIII.57

Exciton and Hole-Transfer Dynamics in Polymer:Fullerene Blends, •*Almis Serbenta*, *Vlad G. Pavelyev*, *Jan C. Hummelen*, *Paul H. M. Loosdrecht*, and *Maxim S. Pshenichnikov*; *Zernike Institute for Advanced Materials, University of Groningen, The Netherlands*.
We study ultrafast hole transfer dynamics from fullerene derivative to polymer in bulk heterojunction blends implementing visible-pump for selective fullerene excitation, and IR-probe to detect charge appearance on polymer.

16:15 Poster area THU.PIII.58

Ultrafast Charge Separation Dynamics of Twisted Intramolecular Charge Transfer State (TICT) in Coumarin Dye Sensitized TiO2 Film: A New Route to Achieve Higher Efficient Dye-Sensitized Solar Cell, *Hirendra Ghosh* and •*Sandeep Verma*; *Radiation & Photochemistry Division, Bhabha Atomic Research Centre, Trombay, Mumbai * 400 085, INDIA,*.
Ultrafast transient spectroscopy of 7-diethyl amino coumarin 3-carboxylic acid (D-1421) sensitized TiO2 film reveals that TICT states facilitate higher charge separation and slow recombination and proved to be new route to design higher efficient solar cell.

16:15 Poster area THU.PIII.59

Quantum-dynamical Modeling of the Rydberg to Valence Excited State Internal Conversion in Cyclobutanone and Cyclopentanone, •*Thomas S. Kuhlman*[1], *Stephan P. A. Sauer*[2], *Theis I. Sølling*[2], and *Klaus B. Møller*[1]; [1]*Department of Chemistry, Technical University of Denmark, Kgs. Lyngby, Denmark*, [2]*Department of Chemistry, University of Copenhagen, Copenhagen, Denmark*.
The excited state internal conversion in cycloketones is governed by coherent ring-puckering motion affecting the timescale of this process. Using a vibronic coupling Hamiltonian we model this internal conversion using wave packet dynamics.

16:15 Poster area THU.PIII.60

Intramolecular Charge Transfer Dynamics of a Planarized Analogue of 4-(dimethylamino)benzonitrile (DMABN) by Time-Resolved Fluorescence, •*Myeongkee Park*[1], *So Young Kim*[1], *Donghong Im*[2], *Young Ho Rhee*[2], and *Taiha Joo*[1]; [1]*Ultrafast Dynamics Laboratory, Department of Chemistry, Pohang University of Science and Technology (POSTECH), Pohangsi,Kyungbuk, Korea*, [2]*Synthetic Organic Chemistry Laboratory, Department of Chemistry, Pohang University of Science and Technology (POSTECH), Pohangsi,Kyungbuk, Korea*.
Intramolecular charge transfer (ICT) of confined 1-tert-butyl-6-cyano-1, 2, 3, 4-tetrahydroquinoline (NTC6) is determined with a single time constant of ~1 ps regardless of solvents, although ICT of 4-(dimethylamino)benzonitrile (DMABN) shows dispersive dynamics in solvents.

16:15 Poster area THU.PIII.61

Monitoring molecular chirality exchange by photon echo, •*Frantisek Sanda*[1] and *Shaul Mukamel*[2]; [1]*Charles University, Faculty of Mathematics and*

Physics, Ke Karlovu 5, Prague, 121 16 Czech Republic, [2]*Department of Chemistry, University of California, Irvine, CA 92697-2025, USA*.
Ultrafast exchange of optical isomers is hard to detect, since it cannot be monitored by circular dichroism in bulk. We propose pulse polarization configurations for monitoring exchange between enantiomers with axial chirality in photon-echo experiment.

16:15 Poster area THU.PIII.62

Competition of Resonant and Nonresonant Paths in Resonance-Enhanced Two-Photon Ionization of He by an Ultrashort Extreme-Ultraviolet Pulse, •*Kenichi L. Ishikawa*[1] and *Kiyoshi Ueda*[2]; [1]*Photon Science Center, The University of Tokyo, Tokyo, Japan*, [2]*IMRAM, Tohoku University, Sendai, Japan*.
The photoelectron angular distribution from the resonant two-photon ionization of He by femtosecond extreme-ultraviolet pulses dramatically varies with pulse width, due to changing competition between resonant and nonresonant ionization paths.

16:15 Poster area THU.PIII.63

Azide–water Intermolecular Coupling Measured by 2D–IR Spectroscopy, •*Joanna Borek*, *Fivos Perakis*, and *Peter Hamm*; *Physical Chemistry Institute, Univeristy of Zurich, Winterthurerstrasse 190, 8057 Zurich, Switzerland*.
We present 2–color 2D–IR spectra of aqueous azide solutions to extract intermolecular coupling between the ion and surrounding water molecules. We show the hydrogen bond strength is of the same order as in ice Ih.

16:15 Poster area THU.PIII.64

Coherent Electronic Spectroscopy on Molecular Systems with a Non Collinear Four-Wave Mixing Set-Up Fully Based on Femtosecond Pulse Shaping, •*Andrea Cannizzo*, *Franziska Frei*, and *Thomas Feurer*; *Institute of Applied Physics, University of Bern, Sidlerstasse 5 CH-3012 Bern - Switzerland*.
Herein we present a non collinear set-up for four wave mixing experiments in the Vis and IR, fully based on femtosecond pulse shaping. Several examples from different molecular systems are shown.

16:15 Poster area THU.PIII.65

The contribution has been withdrawn.

16:15 Poster area THU.PIII.66

Towards Controlling Photochemical Reactivity in Small Polyatomic Molecules in Solution: Difluorodiiodomethane, *Patrick El-Khoury*[1], *Suman Pal*[2], *Andrey Mereshchenko*[3], and •*Alexander Tarnovsky*[3]; [1]*Department of Chemistry, University of California, Irvine, California 92697, USA*, [2]*School of Basic Sciences, Indian Institute of Technology, Mandi, Himachal Pradesh 175 001, India*, [3]*Department of Chemistry, Center for Photochemical Sciences, Bowling Green State University, Bowling Green, Ohio 43403, USA*.
Ultrafast transient absorption and tools of computational photochemistry monitor the efficient formation of molecular iodine from difluorodiiodomethane promoted to the lowest excited state in inert solvents: this requires significantly larger photon energies in the gas-phase.

16:15 Poster area THU.PIII.67

Local Control Theory in Trajectory-based Nonadiabatic Dynamics, •*Basile F. E. Curchod*[1], *Thomas J. Penfold*[1,2,3], *Ursula Rothlisberger*[1], and *Ivano Tavernelli*[1]; [1]*Laboratory of Computational Chemistry and Biochemistry, Ecole Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland*, [2]*Laboratoire de Spectroscopie Ultrarapide, Ecole Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland*, [3]*SwissFEL, Paul Scherrer Inst., CH-5232 Villigen, Switzerland*.
We present a pulse shaping method coupled with ab initio nonadiabatic molecular dynamics based on linear-response time-dependent density functional theory. We apply this to study state specific photoexcitations and consequent photochemical reactions of molecular systems.

16:15 Poster area THU.PIII.68

Early Optical Response of Fluorescent Molecules Studied by Synthetic Laser Pulses, •*Arkaprabha Konar*[1], *Jay Shah*[1], *Vadim V Lozovoy*[1], and *Marcos Dantus*[1,2]; [1]*Department of Chemistry, Michigan State University, East Lansing, MI 48824 USA*, [2]*Department of Physics and Astronomy, Michigan State University, East Lansing, MI 48824 USA*.
The early optical response of fluorescent molecules in solution is probed by pair of collinear pulse replicas. Two approaches are followed where pulse replicas are delayed with attosecond resolution to study IR 144 in solution.

16:15 Poster area THU.PIII.69

Electron Dynamics in photo-excited Sodium Iodide in the gas phase, •*Torsten Leitner*[1], *Franziska Buchner*[2], *Andrea Luebcke*[2], *Arnaud Rouzée*[2], *Linnea Rading*[3], *Per Johnsson*[3], *Michael Odelius*[4], *Hans Karlsson*[5], *Marc Vrakking*[2], and *Philippe Wernet*[1]; [1]*Institute for Methods and Instrumentation for Synchrotron Radiation Research, Helmholtz-Zentrum Berlin GmbH, Albert-Einstein-Str. 15, 12489 Berlin, Germany*, [2]*Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Max-Born-Strasse 2A, 12489 Berlin, Germany*, [3]*Department of Physics, Lund University, PO Box 118, 221 00 Lund, Sweden*, [4]*FYSIKUM, Stockholm University, AlbaNova, 10691 Stockholm, Sweden*, [5]*Theoretical Chemistry, Department of Chemistry – Ångström Laboratory, Uppsala University, PO Box 518, 751 20 Uppsala, Sweden*.
Time, energy and angular resolved photoelectron distributions of photo-excited NaI are presented. A splitting in the photo-excited state suggested by calculations of the intra-molecular potential energy surfaces could be confirmed experimentally for the first time.

16:15 Poster area THU.PIII.70

Photoinduced Processes in Cobalt Complexes: Condensed Phase and Gas-Phase, *Fabian Rupp*[1], *Katharina Chevalier*[1], *Matthias Wolf*[1], *Hans Jörg Krüger*[2], *Yevgeniy Nosenko*[2], *Christoph Riehn*[2], and •*Rolf Diller*[1]; [1]*Dept of Physics, Univ. Kaiserslautern, 67663 Kaiserslautern, Germany*, [2]*Dept. of Chemistry, Univ. Kaiserslautern, 67663 Kaiserslautern, Germany*.
Femtosecond time-resolved and steady-state spectroscopic methods are employed to study ultrafast photoinduced processes in Co-complexes and to characterise the transient redox- and spin-states in both condensed and gas-phase.

16:15 Poster area THU.PIII.71

The interplay of different relaxation channels in the excited state dynamics of photoinitiators, •*Thomas J. A. Wolf*[1,2], *Joachim Fischer*[2,3], *Dominik Voll*[2,5], *Martin Wegener*[2,3,4], *Christopher Barner-Kowollik*[2,5], and *Andreas-Neil Unterreiner*[1,2]; [1]*Institut für Physikalische Chemie, Karlsruhe Institute of Technology (KIT), 76128 Karlsruhe, Germany*, [2]*DFG Center for Functional Nanostructures (CFN), KIT, 76128*

Karlsruhe, Germany, [3]*Institut für Angewandte Physik, KIT, Wolfgang-Gaede-Strasse 1, D-76131 Karlsruhe, Germany*, [4]*Institut für Nanotechnologie, KIT, D-76021 Karlsruhe, Germany*, [5]*Preparative Macromolecular Chemistry, Institut für Technische Chemie und Polymerchemie KIT, Engesserstr. 18, 76128 Karlsruhe, Germany*.
Different photoinitiators are investigated by femtosecond transient absorption spectroscopy and DFT calculations. Their initiation properties are critically governed by competition between intersystem crossing, fluorescence and internal conversion partly taking place on comparable time scales.

16:15 Poster area THU.PIII.72

Multi-scale exciton relaxation dynamics in photosynthetic pigment-protein complexes, •*Darius Abramavicius*[1,2], *Olga Rancova*[1], *Andrius Gelzinis*[1,3], *Vytautas Butkus*[1,3], and *Leonas Valkunas*[1,3]; [1]*Department of Theoretical Physics, Vilnius University, Sauletekio al. 9-III, LT-10222, Vilnius Lithuania*, [2]*State Key Laboratory of Supramolecular Structure and Materials, Jilin University, 2699 Qianjin Street, Changchun 130012, PR China*, [3]*Center for Physical Sciences and Technology, Gostauto 9, LT-01108 Vilnius, Lithuania*.
Dynamics of molecular excitons in excitonic pigment-protein aggregates show coherent quantum beats as well as incoherent energy decay during the molecular exciton lifetime. Using simulations we show how excitons reach polaronically entangled system-bath configurations.

16:15 Poster area THU.PIII.73

Coherent Exciton Dynamics in Light-Harvesting Complexes with Two-Colour Spectroscopy, •*Gethin Richards*[1], *Krystyna Wilk*[2], *Paul Curmi*[2], *Harry Quiney*[3], and *Jeffrey Davis*[1]; [1]*Swinburne University of Technology, Melbourne, Australia*, [2]*University of New South Wales, Sydney, Australia*, [3]*University of Melbourne, Melbourne, Australia*.
We investigate coherent superpositions of excitons in the light-harvesting complex PC645 using two-colour spectroscopy. We measured a decoherence time of 500fs for the superposition and evidence for strong coupling to phonon modes.

16:15 Poster area THU.PIII.74

Ultrafast IR Pump-Probe and 2D-IR Photon Echo Spectroscopy of Adenosine-Thymidine Base Pairs, •*Christian Greve*[1], *Nicholas K. Preketes*[2], *Rene Costard*[1], *Benjamin Koeppe*[1], *Henk Fidder*[1], *Erik T. J. Nibbering*[1], *Friedrich Temps*[3], *Shaul Mukamel*[2], and *Thomas Elsaesser*[1]; [1]*Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie, Max-Born-Str. 2 A, D-12489 Berlin, Germany*, [2]*Department of Chemistry, University of California, Irvine, California 92697-2025, USA*, [3]*Institut für Physikalische Chemie, Christian-Albrechts-Universität zu Kiel, Olshausenstr. 40, 24098 Kiel, Germany*.
We characterize diagonal and off-diagonal anharmonicities of N-H stretching vibrations in adenosine and thymidine monomers and in AT-base pairs in chloroform solution, showing the important role of coupling between vibrationally excited N-H stretching states.

16:15 Poster area THU.PIII.75

Real-time tracking of phytochrome's ring D orientational changes during Pr photoisomerization: Two Pr isoforms with different photoisomerization yields, *Yang Yang*[1], *Martin Linke*[1], *Theodore von Haimberger*[1], •*Karsten Heyne*[1], *Janina Hahn*[2], *Peter Schmieder*[2], *Ricardo Matute*[4], and *Leticia Gonzalez*[3]; [1]*Freie Universität Berlin, Department of Physics, Arnimallee 14, 14195 Berlin, Germany*, [2]*Leibniz-Institut für Molekulare Pharmakologie, Robert-Rössle Str. 10, 13125 Berlin, Germany*, [3]*Universität Wien, Institut für Theoretische Chemie, Währinger Str. 17, 1090 Wien, Austria*, [4]*University of California, Department of Chemistry and Biochemistry, 607 Charles E. Young Drive East, CA 90095-1569, USA*.
Phytochromes' ring D orientational changes are tracked during Z-to-E photoisomerization by polarization resolved femtosecond visible pump-infrared probe spectroscopy. Two distinct Pr isoforms Pr-I and Pr-II exhibit photoisomerization yields of 3% and 29%, respectively.

16:15 Poster area THU.PIII.76

Ultrafast Absorption Kinetics of NADH in Folded and Unfolded Conformations, •*Zsuzsanna Heiner*[1], *Thomas Roland*[2], *Stefan Haacke*[2], and *Geza I. Groma*[1]; [1]*Institute of Biophysics, Biological Research Centre, Hungarian Academy of Sciences, P.O.Box 521, 6701 Szeged, Hungary*, [2]*Institut de Physique et Chimie des Matériaux de Strasbourg, University of Strasbourg - CNRS, 23 rue du Loess, F-67034 Strasbourg, France*.
The two conformation states of reduced nicotinamide adenine dinucleotide, exhibiting different fluorescence properties are characterized by markedly different femtosecond time-resolved absorption kinetics.

16:15 Poster area THU.PIII.77

Comparing Ultrafast Dynamics of Algal Light-Harvesting Proteins, •*Scott McClure*, *Daniel Turner*, and *Gregory Scholes*; *University of Toronto, Toronto, Canada*.
We investigate the ultrafast dynamics of light-harvesting proteins sourced from cryptophyte algae using two-dimensional electronic spectroscopy. A comparison of coherence effects between two similar light-harvesting proteins is presented.

16:15 Poster area THU.PIII.78

Two-dimensional electronic femtosecond stimulated Raman spectroscopy, *Daniel Wilcox* and •*Jennifer Ogilvie*; *Department of Physics and Biophysics, University of Michigan, 450 Church Street, Ann Arbor, MI, USA 4810*.
We report two-dimensional electronic spectroscopy with a femtosecond stimulated Raman scattering probe. The method reveals correlations between excitation energy and excited state vibrational structure following photoexcitation. We demonstrate the method in rhodamine 6G.

16:15 Poster area THU.PIII.79

pH Jump induced alpha-helix folding., •*Mateusz Donten* and *Peter Hamm*; *University of Zurich, Institute of Physical Chemistry, Winterthurerstrasse 190, CH-8057 Zurich, Switzerland*.
With pH jump experiments a wide group of peptides and proteins can be studied in terms of their folding dynamics and biological function. Poly-l-glutamic acid alpha-helix formation was investigated with time resolved infrared spectroscopy.

16:15 Poster area THU.PIII.80

Initial Processes of Proton Transfer in Salicylideneaniline Studied by Time-resolved Photoelectron Spectroscopy, •*Taro Sekikawa*[1,2], *Oliver Schalk*[2], *Guorong Wu*[2], *Andrey E. Boguslavskiy*[2], and *Albert Stolow*[2]; [1]*Hokkaido University, Sapporo, Japan*, [2]*National Research Council Canada, Ottawa, Canada*.
The initial processes of excited state intramolecular proton transfer (ESIPT) in salicylideneaniline were investigated by time-resolved photoelectron spectroscopy. The planarity of the

molecule was found to be a key parameter to describe ESIPT.

16:15 Poster area THU.PIII.81

Ultrafast dynamics and Raman imaging of metal complexes of tetrasulphonated phthalocyanines in human cancerous and noncancerous breast tissues, •*Halina Abramczyk*[1], *Arkadiusz Jarota*[1], *Beata Brozek-Pluska*[1], *Eric Freysz*[2], *Marc Tondusson*[2], *Jacek Musiał*[3], and *Radzislaw Kordek*[3]; [1]*Technical University of Lodz, Institute of Applied Radiation Chemistry, Laboratory of Laser Molecular Spectroscopy, Wroblewskiego 15, 93-590 Lodz, Poland*, [2]*Université Bordeaux 1, Laboratoire Ondes et Matière d'Aquitaine (LOMA), UMR-CNRS 5798, 351 cours de la libération 33405 Talence Cedex, France*, [3]*cMedical University of Lodz, Department of Pathology, Chair of Oncology, Paderewskiego 4, 93-509 Lodz, Poland. E-mail: abramczy@mitr.p.lodz.pl*.
We will discuss the medical applications of femtosecond spectroscopy and Raman imaging techniques (SERS, TERS, SERRS, non-linear femtosecond stimulated Raman imaging FSRS, CARS). The role of nanoparticles and bioconjugates as Raman reporters will be reviewed.

Postdeadline session

20:00–21:30

NOTES

FRI.1A: Ultrafast Dynamics in Materials and Systems

Chair: Koichiro Tanaka, Kyoto University, Kyoto, Japan

8:30–10:15 Auditorium A FRI.1A

8:30 Auditorium A FRI.1A.1

Real-time observation of ultrafast Rabi oscillations between excitons and plasmons in metal-molecular aggregate hybrid nanostructures, •*Parinda Vasa*[1,2], *Wei Wang*[2], *Robert Pomraeneke*[2], *Melanie Lammers*[2], *Margherita Maiuri*[3], *Cristian Manzoni*[3], *Giulio Cerullo*[3], and *Christoph Lienau*[2]; [1]*Department of Physics, Indian Institute of Technology Bombay, 400076 Mumbai, India*, [2]*Institut für Physik, Carl von Ossietzky Universität, 26111 Oldenburg, Germany*, [3]*IFN-CNR, Dipartimento di Fisica, Politecnico di Milano, Milano, Italy*.
We demonstrate ultrafast coherent manipulation of the normal mode splitting in metal/molecular-aggregate nanostructures by real-time observation of Rabi oscillations between excitons and surface-plasmon-polaritons. Oscillations in exciton density on a 10-fs timescale control the Rabi splitting.

8:45 Auditorium A FRI.1A.2

Plasmon Enhanced Photo-Induced Ultrafast Demagnetization in Ag-Co Hybrid Nanoparticles, •*Kuniaki Konishi*[1,2], *Katsura Ikemiya*[3,4], *Eiko Fujii*[5], *Toshihiro Kogure*[5], *Tetsuya Hasegawa*[3,4], and *Makoto Kuwata-Gonokami*[1,2,6]; [1]*Photon Science Center, The University of Tokyo, Tokyo, Japan*, [2]*CREST (JST), The University of Tokyo, Tokyo, Japan*, [3]*Department of Chemistry, The University of Tokyo, Tokyo, Japan*, [4]*Kanagawa Academy of Science and Technology, Kanagawa, Japan*, [5]*Department of Earth and Planetary Science, The University of Tokyo, Tokyo, Japan*, [6]*Department of Physics, The University of Tokyo, Tokyo, Japan*.
We investigated ultrafast photo-induced magnetization dynamics of Ag-Co hybrid nanoparticles in epitaxial TiO2 films. Ag nanoparticles with localized surface plasmon resonance enhance light-matter coupling and carrier relaxation resulting in strong demagnetization and few-picoseconds fast recovery.

9:00 Auditorium A FRI.1A.3

Calibrated detection of nonlinearly propagating strain waves, •*Andre Bojahr*[1], *Daniel Schick*[1], *Marc Herzog*[1], and *Matias Bargheer*[1,2]; [1]*Institut fuer Physik und Astronomie, Universitaet Potsdam, Karl-Liebknecht-Str. 24-25, 14476 Potsdam, Germany*, [2]*Helmholtz-Zentrum Berlin fuer Materialien und Energie GmbH, Wilhelm-Conrad-Roentgen Campus, BESSY II, Albert-Einstein-Str. 15, 12489 Berlin, Germany*.
We show ultrafast all-optical reflectivity measurements on nonlinear propagating strain pulses for different fluences calibrated by ultrafast X-ray diffraction (UXRD) to the corresponding induced strain amplitudes.

9:15 Auditorium A FRI.1A.4

Ultrafast pump-probe spectroscopy of high-frequency mechanical modes in a singlemicrodisk resonator, *Timo Krüger*, *Oliver Ristow*, *Mike Hettich*, *Elaine Barretto*, •*Martin Schubert*, *Elke Scheer*, and *Thomas Dekorsy*; *Department of Physics and Center for Applied Photonics, University of Konstanz, Konstanz, Germany*.
Single microdisk resonators with a diameter of one micron are characterized using an ultrafast pump-probe spectroscopy method. Frequencies on the order of tens of GHz are detected.

9:30 Auditorium A FRI.1A.5

Superatom molecular orbitals of gas-phase fullerenes, •*Olof Johansson*[1], *Gordon G. Henderson*[1], *Françoise Remacle*[2], and *Eleanor E.B. Campbell*[1]; [1]*The Edinburgh and St Andrews Research School of Chemistry, University of Edinburgh, West Mains Road, EH9 3JJ, Scotland*, [2]*Département de Chimie, B6c, Université de Liège, B4000 Liège, Belgium*.
Angular-resolved photoelectron spectroscopy is used to characterise and study the fs/ps dynamics of the superatom molecular orbitals of gas-phase fullerenes, which are hydrogen-like orbitals centred on the hollow core of the carbon cage.

9:45 Auditorium A FRI.1A.6

Tunable ultrafast nonlinear optofluidic coupler, •*Marius Vieweg*[1], *Sebastian Pricking*[1], *Timo Gissibl*[1], *Yaroslav Kartashov*[2], *Lluis Torner*[2], and *Harald Giessen*[1]; [1]*4th Physics Institute and Research Center Scope, University of Stuttgart, Stuttgart, Germany*, [2]*ICFO - Institut de Ciencies Fotoniques, and Universitat Politecnica de Catalunya, Castelldefels, Spain*.
We present an ultrafast nonlinear coupler fabricated by selective filling of two strands of a PCF with the liquid CCl4 which exhibits a large Kerr nonlinearity. We demonstrate power dependent switching in this optofluidic device.

10:00 Auditorium A FRI.1A.7

Heterodyne Detection of Electronic Optical Activity in Time-Domain: Single-Shot Chiroptical Spectroscopy, •*Intae Eom*[1], *Sung-Hyun Ahn*[1], *Hanju Rhee*[1,2], and *Minhaeng Cho*[1,3]; [1]*Korea Basic Science Institute, Seoul 136-713, Korea*, [2]*Graduated School of Analytical Science and Technology, Chungnam National University, Daejeon 305-764, Korea*, [3]*Department of Chemistry, Korea University, Seoul 136-701, Korea*.
We demonstrate that an ultimately sensitive chiroptical measurement at single femtosecond pulse level can be achieved using heterodyne-detection techniques. These methods will be of use to observe molecular chirality changes in ultrafast time domain.

FRI.1B: Extreme Light Generation

Chair: Louis Franklin DiMauro, The Ohio State University, Columbus, USA

8:30–10:15 Auditorium B FRI.1B

8:30 Auditorium B FRI.1B.1

Synthesis and Applications of Subcycle Light Transients, *Mohammed Hassan*[1], *Adrian Wirth*[1], *Ivanka Grguras*[1], *Antoine Moulet*[1], *Tran Trung Luu*[1], *Justin Gagnon*[1], *Olga Razskazovskaya*[2], *Stefan Pabst*[3,4], *Robin Santra*[3,4], *Zeyad Alahmed*[5], *Abdallah Azzeer*[5], *Vladislav Yakovlev*[2], *Vladimir Pervak*[2], *Ferenc krausz*[1,2], and •*Eleftherios Goulielmakis*[1]; [1]*Max-Planck-Institut für Quantenoptik, Hans-Kopfermann-Str. 1, D-85748 Garching, Germany*, [2]*Department für Physik, Ludwig-Maximilians-Universität, Am Coulombwall 1, D-85748 Garching, Germany*, [3]*Center for Free-Electron Laser Science, DESY, Notkestrasse 85, 22607 Hamburg, Germany*, [4]*Department of Physics, University of Hamburg, Jungiusstrasse 9, 20355 Hamburg, Germany*, [5]*Physics and Astronomy Department, King Saud University, Riyadh, 11451, Kingdom of Saudi Arabia*.
We demonstrate synthesis of superoctave, intense, subcycle transients of light and their application to attosecond control of matter.

8:45 Auditorium B FRI.1B.2

Multi-octave high-energy supercontinuum from mid-IR filamentation in YAG, *Francisco Silva*[1],

Matthias Baudisch[1], *Dane R. Austin[1]*, *Alexandre Thai[1]*, *Michael Hemmer[1]*, *Daniele Faccio[2]*, *Arnaud Couairon[3]*, and •*Jens Biegert[1,4]*; *[1]ICFO-Institut de Ciencies Fotoniques, Av. Carl Friedrich Gauss, 3, 08860 Castelldefels, Barcelona, Spain*, *[2]School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh, UK*, *[3]Centre de Physique Theorique, Ecole Polytechnique, CNRS, F-91128 Palaiseau, France*, *[4]Institució Catalana de Recerca i Estudis Avançats, 08010 Barcelona, Spain*.
A coherent, carrier-envelope phase stable supercontinuum over more than three octaves extending from the ultraviolet into the mid-infrared is demonstrated, driven by mid-infrared femtosecond pulses. Tenfold self-compression is predicted numerically.

9:00 Auditorium B FRI.1B.3

Complete Spatiotemporal Measurement of Bessel-X Pulses and Other Ultrafast Diffraction Phenomena, •*Peeter Saari[1]*, *Pamela Bowlan[2]*, *Heli Valtna-Lukner[1]*, *Madis Lõhmus[1]*, *Peeter Piksarv[1]*, and *Rick Trebino[2]*; *[1]Institute of Physics, University of Tartu, 142 Riia St, Tartu, 51014, Estonia*, *[2]School of Physics, Georgia Institute of Technology, 837 State St NW, Atlanta, GA 30332, USA*.
Ultrashort pulses exhibit complex diffraction effects in both space and time. We modeled and measured the complete spatiotemporal electric field of a variety of diffracted pulses with femtosecond-range temporal and micron-range spatial resolutions.

9:15 Auditorium B FRI.1B.4

Coherent Synthesis of ultra-broadband Optical Parametric Amplifiers, •*Cristian Manzoni[1]*, *Shu-Wei Huang[2]*, *Giovanni Cirmi[3]*, *Paolo Farinello[1]*, *Jeffrey Moses[2]*, *Franz Kärtner[2,3]*, *Giulio Cerullo[1]*, and *Sandro De Silvestri[1]*; *[1]IFN-CNR, Dipartimento di Fisica, Politecnico di Milano, Piazza L. Da Vinci 32, 20133 Milano, Italy*, *[2]Department of Electrical Engineering and Computer Science and Research Laboratory of Electronics, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, USA*, *[3]Center for Free-Electron Laser Science, DESY and University of Hamburg, Notkestraße 85, D-22607Hamburg, Germany*.
We report on coherent synthesis of outputs from two ultra-broadband optical parametric amplifiers; their timing is locked to sub-30-as by a balanced cross-correlator. Synthesised pulses have octave-spanning (500-1000 nm) spectra and nearly single-cycle 3.8-fs duration.

9:30 Auditorium B FRI.1B.5

Pulse Shaping of On-Chip Microresonator Frequency Combs: Investigation of Temporal Coherence, *Fahmida Ferdous[1]*, *Houxun Miao[2,3]*, *Daniel Leaird[1]*, *Kartik Srinivasan[2]*, *Lei Chen[2]*, *Vladimir Aksyuk[2]*, and •*Andrew Weiner[1,4]*; *[1]School of Electrical and Computer Engineering, Purdue University,465 Northwestern Avenue, West Lafayette, IN 47907-2035, USA*, *[2]Center for Nanoscale Science and Technology, National Institute of Standards and Technology, 100 Bureau Dr, Gaithersburg, MD 20899, USA*, *[3]Nanocenter, University of Maryland, College Park, MD 20742, USA*, *[4]Birck Nanotechnology Center, Purdue University, 1205 West State Street, West Lafayette, Indiana 47907, USA*.
We use pulse shaping to investigate the temporal coherence of frequency combs generated in microresonators pumped by a strong CW laser. We observe that different groups of comb lines have different mutual coherence.

9:45 Auditorium B FRI.1B.6

Spatial and Spectral Coherent Control over Direct Frequency Comb Excitation, *Itan Barmes*, •*Stefan Witte*, and *Kjeld S. E. Eikema*; *LaserLaB Amsterdam, VU University, De Boelelaan 1081, 1081 HV Amsterdam, The Netherlands*.
We demonstrate a principle for coherent control in both space and frequency, using counter-propagating frequency comb pulse trains. Precise control over two-photon excitation is observed, enabling significant improvements to direct frequency comb spectroscopy.

10:00 Auditorium B FRI.1B.7

Generation and detection of ultrabroadband infrared wave exceeding 200 THz, •*Eiichi Matsubara*, *Masaya Nagai*, and *Masaaki Ashida*; *Osaka university, Osaka, Japan*.
Focusing an intense sub-10-fs pulse together with its second harmonics in air, we generate ultrabroadband coherent infrared wave with 200 THz bandwidth. Electric field profile is observed up to 100 THz by electro-optic sampling

Coffee Break

10:15–10:45

FRI.2: Electron Diffraction

Chair: Majed Chergui, École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland

10:45–12:30 Room 350/351 FRI.2

10:45 Room 350/351 FRI.2.1

Spatio-temporal characterization and control of ultrashort pulses through a multiply scattering medium, •*Ayhan Tajalli[1]*, *David Mccabe[1]*, *Dane R. Austin[2,3]*, *Sylvain Gigan[4]*, *Ian Walmsley[2]*, and *Béatrice Chatel[1]*; *[1]Laboratoire Collisions, Agrégats Réactivité, Université de Toulouse, Centre national de la recherche scientifique, F-31062 Toulouse, France*, *[2]Clarendon Laboratory, Department of Physics, University of Oxford, OX1 3PU, Oxford, United Kingdom*, *[3]Institut de Ciencies Fotoniques, Mediterranean Technology Park, 08860 Castelldefels (Barcelona), Spain*, *[4]Institut Langevin, Universités Paris 6 & 7, ParisTech, Centre national de la recherche scientifique, 10 rue Vauquelin, Paris 75005, France*.
Propagation of ultrashort broadband pulses through a multiply scattering media result in complex spatio-temporal speckle pattern. Using spectral pulse shaping, we demonstrate the spatially localized temporal recompression of the output speckle to the Fourier-limit duration.

11:00 Room 350/351 FRI.2.2

Ultrafast Charge Relocation in an Ionic Crystal Probed by Femtosecond X-Ray Powder Diffraction, •*Michael Woerner[1]*, *Flavio Zamponi[1]*, *Philip Rothhardt[2]*, *Johannes Stingl[1]*, and *Thomas Elsaesser[1]*; *[1]Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie, 12489 Berlin, Germany*, *[2]Fraunhofer-Institut für Solare Energiesysteme Heidenhofstr. 2 79110 Freiburg Germany*.
Femtosecond x-ray diffraction from a powder of potassium dihydrogen phosphate demonstrates a relocation of electronic charge over the length of a chemical bond, much larger than the amplitude of the driving lattice soft mode.

11:15 Room 350/351 FRI.2.3

Photoinduced Dynamics in the Charge Density Wave Compound TaSe2, *Nicolas Erasmus[1]*, *Maximilian Eichberger[2]*, *Kerstin Haupt[1]*, *Ilana Boshoff[1]*, *Günther Kassier[1]*, *Reinhard Bimurske[2]*, *Helmuth Berger[3]*, *Jure Demsar[2]*, and •*Heinrich Schwoerer[1]*;

[1]*Laser Research Institute, Stellenbosch University, Stellenbosch, South Africa*, [2]*Department of Physics, University of Konstanz, Konstanz, Germany*, [3]*Physics Department EPFL, Lausanne, Switzerland*.
Ultrafast charge density wave and periodic lattice distortion dynamics in TaSe2 are studied with ultrafast electron diffraction. Fluence dependence of the lattice superstructure suppression indicates a phase transition from the commensurate and incommensurate phase.

11:30 Room 350/351 FRI.2.4

High Density, Phase Stable RF Compressed Femtosecond Electron Diffraction System Characterized by Grating Enhanced Ponderomotive Scattering, •*Meng Gao*[1,2], *Hubert Jean-Ruel*[1,2], *Ryan R Cooney*[1,2], *Jonathan Stampe*[3], *Mark De Jong*[3], *German Sciaini*[1,2], *Gustavo Moriena*[1,2], and *RJ Dwayne Miller*[1,2]; [1]*Departments of Chemistry and Physics, 80 St. George Street, University of Toronto, Toronto, Ontario, M5S 3H6, Canada*, [2]*Max Planck Department for Structural Dynamics, Department of Physics, University of Hamburg, Centre for Free Electron Laser Science, DESY, Notkestrasse 85, Hamburg 22607*, [3]*Canadian Light Source Inc., 101 Perimeter Road, Saskatoon, SK, S7N 0X4, Canada*.
A RF cavity rebuncher is used to produce ultrashort electron pulses with up to 400fC charges. We report the temporal resolution of the system to be currently 430fs FWHM, measured by ponderomotive scattering.

11:45 Room 350/351 FRI.2.5

RF Photoinjector Based Femtosecond Relativistic Electron Diffraction, •*Pietro Musumeci*, *Renkai Li*, and *Cheyne Scoby*; *UCLA Department of Physics and Astronomy, Los Angeles, CA, USA*.
We present progress and outlook of rf photoinjector based electron diffraction. The use of this technique to study martensitic phase transition in Cobalt and laser driven shock waves in thick Al targets is discussed.

12:00 Room 350/351 FRI.2.6

Invited

4D Electron Microscopy: Development and Applications, •*Ahmed H. Zewail*; *California Institute of Technology (Caltech), Pasadena, CA, USA*.
In recent years it has become possible to unite the time domain with the spatial one, thereby creating four-dimensional (4D) electron microscopy. In this talk, we will present an overview of the development and advances made in this field, including recent extensions to 4D tomography, nanoscale plasmonics and near-field biological imaging.

NOTES