

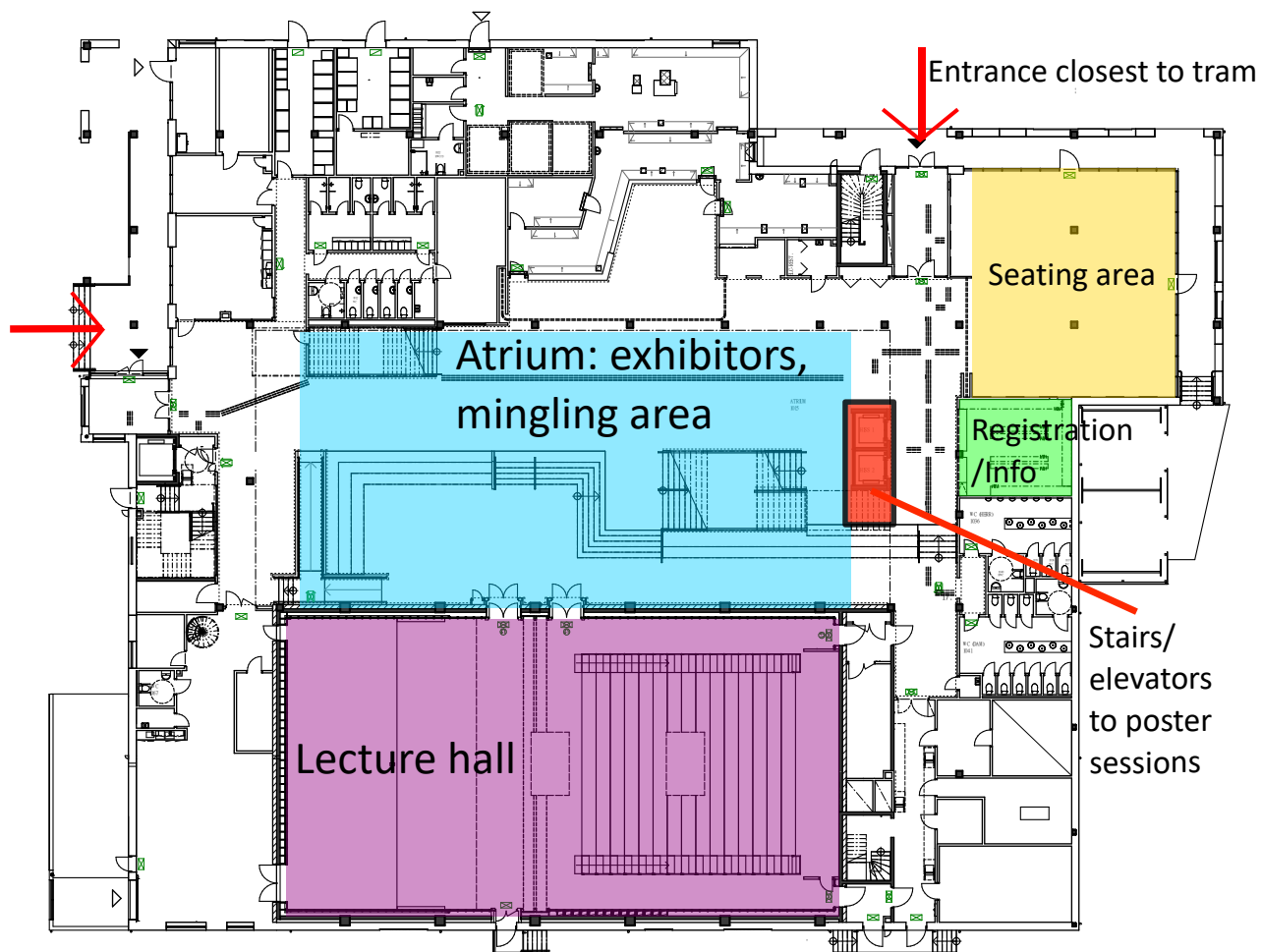
ATTO-X

10th

International Conference on Attosecond Science and Technology

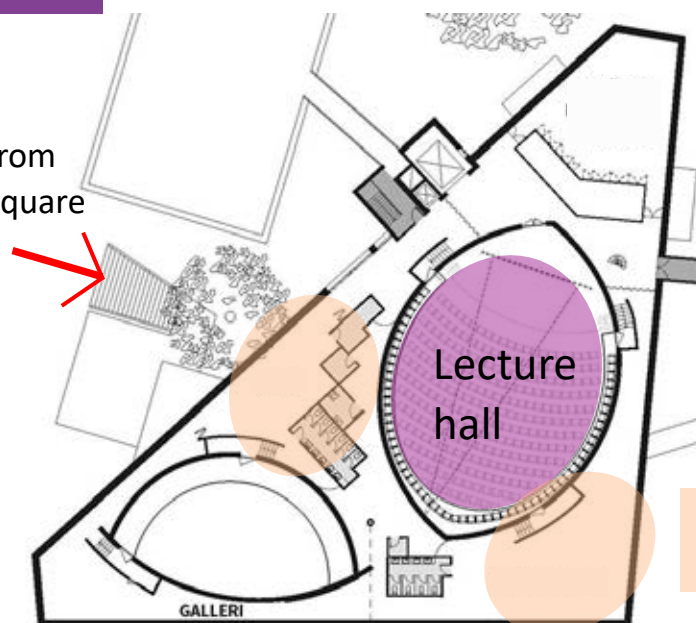
6–11 JULY 2025 | LUND, SWEDEN

FLOOR PLAN – THE LOOP



FLOOR PLAN – STADSHALLEN

Entrance from the main square



Foyer level 2 - mingling areas

ATTO-X

10th International Conference on Attosecond Science and Technology

July 6th-11th, 2025

The Loop at Science Village, Lund, Sweden

Stadshallen, Lund, Sweden

www.attox.se

PROGRAM BOOK

Program at a glance	2
Welcome message	3
10 editions of ATTO conferences	4
Committees	6
Conference information	9
Tutorial speakers	10
Conference program	11
List of posters	28
Monday	28
Tuesday	34
Wednesday	40
Notes	47
Sponsors and exhibitors	48

Hosted by



LUND
UNIVERSITY

LLC

LUND LASER CENTRE

Sponsored by



CARL TRYGGERS
STIFTELSE
FÖR VETENSKAPLIG FORSKNING

Crafoordska stiftelsen
GRUNDAD AV HOLGER CRAFOORD 1980



LTH
FACULTY OF
ENGINEERING



THE ROYAL PHYSIOGRAPHIC SOCIETY OF LUND
ACADEMY FOR THE NATURAL SCIENCES, MEDICINE AND TECHNOLOGY



LINXS INSTITUTE OF ADVANCED
NEUTRON AND X-RAY SCIENCE

WACQT

Wallenberg Centre for
Quantum Technology



CITY OF
LUND

ASML

OPTICA

PROGRAM AT A GLANCE

Sunday 6 July		Monday 7 July		Tuesday 8 July		Wednesday 9 July		Thursday 10 July		Friday 11 July	
		The Loop - Science Village						Stadshallen - City Center			
Time		Opening									
08:30											
08:45											
09:00		Tutorial: Marc Vrakking		Tutorial: Zenghu Chang		Tutorial: Morgane Vacher					Invited: Carlo Callegari
09:15		Invited: Luca Argenti		Yoann Pertot		Invited: Vincent Wanle					Invited: Robin Santra
09:30		Federico Vismarra		Laszlo Veliz		Rafael Meneses Ferreira					UIF Saalmann
09:45		Sizuo Luo		Yueal Kern		Arnab Sen					Praveen Kumar Marolju
10:00		Coffee		Martin Kretschmar		Coffee					Matthieu Guer
10:15											Coffee
10:30											
10:45											
11:00		Invited: Yann Mairesse		Invited: Christian Brahm		Invited: Alicia Palacios					Invited: James Cryan
11:15		Noa Yaffe		Gaspard Beaufort		Jia-Bao Ji					Juliette Leroux
11:30		Gergana D. Borisova		Bruno Schmidt		Jason Greenwood					Yu He
11:45		Jonathan Dubois		Nikolita Kotsina		Andrés Ordóñez					Felix Egun
12:00											Veronica Guo
12:15											Closing
12:30		Lunch (1st IPC meeting)		Lunch		Lunch (2nd IPC meeting)					Lunch to-go & transfer to the Physics Department
12:45											
13:00											
13:15											
13:30		Poster session 1		Poster session 2		Poster session 3					
13:45											
14:00											
14:15											
14:30											
14:45		Invited: Emilio Pisanty		Invited: Balázs Major		Invited: Stefanie Gräfe					
15:00		Invited: Kenichi Ishikawa		Invited: Caterina Vozzi		Invited: Mauro Nisoli					
15:15		Gabriel Granneau		Thierry Ruchon		Tristan Kopp					
15:30		Gustav Arvidsson		Rodrigo Martín-Hernández		Alexander Magunla					
15:45		Jonathan Pöllath		Melvin Redon		Coffee					
16:00											
16:15											
16:30		Coffee									
16:45		Invited: Marcus Dahlistrom		Invited: Bernd Schütte		Invited: Nir Dudovich					
17:00		Invited: Hamed Merdji		Matthias Kübel		Invited: Peter Hommelhoff					
17:15				Pamela Bastani		Giacomo Izani					
17:30		Giulio Vampa		Miguel Angel Silva-Toledo		Nicola Di Palo					
17:45		Marcelo Clappina		Eric Constant		Romain Cazali					
18:00		Matan Even Tzur		Natalia Kuzkova		Zhaoping Chen					
18:15											
18:30											
18:45											
19:00											
19:15											
19:30											
19:45											
20:00											
20:15											
20:30											
20:45											
21:00											
21:15											
21:30											
21:45											
22:00											



WELCOME MESSAGE

We welcome you to the 10th International Conference on Attosecond Science and Technology (ATTO X), held from July 6th to July 11th, 2025 in the city of Lund, Sweden.

ATTO is the largest and most prestigious international conference in the field of attosecond science and technology, traditionally held every two years. At ATTO, state-of-the-art research works are shared among scholars from academia, research institutes and industries from all over the world.

Lund is a student-filled city in the southern part of Sweden. The university was established in 1666 and is located in the heart of the city, but is now extending to the outskirts with major research facilities: MAX IV, the first 4th generation synchrotron radiation light source, and ESS, the new European Spallation Source.

We are excited to welcome you in the new scientific and innovation center, called Science Village, during the first four days (July 6th-9th) of the conference before moving to Stadshallen to enjoy the atmosphere of the historical city center (July 10th-11th).

Looking forward to meeting all of you at ATTO X!

Per Eng-Johnsson and Anne-Lise Viotti (chairs)
On behalf of the local organizing committee

10 EDITIONS OF ATTO CONFERENCES

ATTO stands as the most prestigious global conference in attosecond science, encompassing a wide range of topics including attosecond physics and spectroscopy, quantum science, laser technology, high-order harmonic generation sources, attosecond chemistry, attoscience in condensed matter and at Free Electron Lasers.

The ATTO conference series started August 1st-5th, 2007 in Dresden, Germany, under the name of "Attosecond Physics" coordinated by Paul Corkum (National Research Council of Canada, Ottawa, Canada), Ferenc Krausz (Max Planck Institute for Quantum Optics, Garching, Germany), and Jean-Michel Rost (Max Planck Institute for the Physics of Complex Systems, Dresden, Germany).

The following 9 ATTO conferences were held as follows:

2009, July 29th-August 1st

Kansas State University, Manhattan, Kansas, USA

Co-chaired by Chii-Dong Lin and Zenghu Chang

2011, July 6th-8th

Hokkaido University, Sapporo, Japan

Co-chaired by Katsumi Midorikawa and Kaoru Yamanouchi

2013, July 8th-12th

Institut Pasteur, Paris, France

Co-chaired by Pascal Salières and Eric Constant

2015, July 5th-10th

Manoir Saint-Sauveur, Saint-Sauveur, Quebec, Canada

Co-chaired by Paul Corkum and François Légaré

2017, July 2nd-7th

Shaanxi Zhangbagou Guesthouse, Xi'an, China

Co-chaired by Zhiyi Wei and Zenghu Chang

2019, July 1st-5th

University of Szeged Congress Center, Szeged, Hungary

Co-chaired by Katalin Varjú and Dimitris Charalambidis

2022, July 11th-15th

University of Central Florida, Orlando, Florida, USA

Co-chaired by Luca Argenti and Michael Chini

2023, July 9th-14th

Booyoung Hotel and Resort, Jeju Island, Jeju, Korea

Co-chaired by Chang Hee Nam and Kyung Taec Kim

This year, the 10th edition of ATTO is taking place on July 6th-11th in Lund, Sweden. The conference has two locations: The Loop at Science Village and Stadshallen in the city center. The conference format is designed to foster extensive and open discussions. Three tutorials have been arranged and the conference features 23 invited talks, 49 contributed talks and an impressive number of 300 poster presentations. In keeping with the tradition of the ATTO conferences, there are no parallel sessions. Moreover, 21 exhibitors are present to showcase technologies and strengthen collaborations with industries and large-scale facilities.

COMMITTEES

International Program Committee

The International Program Committee is responsible for the governance and the scientific program of the ATTO conference. Its members oversee the conduction of ATTO, decide the conference program sessions and the list of invited speakers, scrutinize the abstracts submitted to the conference, select the contributed speakers, and appoint the organizers of future ATTO conferences.

Luca Argenti, University of Central Florida, USA

Andrius Baltuška, Technical University of Vienna, Austria

Dimitris Charalambidis, University of Crete, Greece

Michael Chini, Ohio State University, USA

Oren Cohen, Technion Institute of Technology, Israel

Per Eng-Johnsson, Lund University, Sweden (not active for ATTO X)

Davide Faccialà, CNR-IFN, Italy

Mette Gaarde, Louisiana State University, USA

Meng Han, Kansas State University, USA

Jiro Itatani, University of Tokyo, Japan

Kyung Taec Kim, Gwangju Institute of Science and Technology, Korea

Matthias Kling, SLAC Stanford University, USA

François Légaré, INRS, Canada

Eva Lindroth, Stockholm University, Sweden (not active for ATTO X)

José Antonio Pérez-Hernández, CLPU, Spain

Thierry Ruchon, CEA Saclay, France

Olga Smirnova, Max Born Institute, Germany

Vasily Strelkov, Russian Academy of Sciences, Russia (not active for ATTO X)

Richard Taïeb, Sorbonne University, France

John Tisch, Imperial College London, UK

Giulio Vampa, Ottawa University, Canada

Katalin Varjú, ELI-ALPS, Hungary

Hans Jakob Wörner, ETH Zurich, Switzerland

Kun Zhao, Institute of Physics, Chinese Academy of Sciences, China

Michael Zürch, University of California, USA



International Advisory Board

The Local Organizing Committee relies on the expertise and advice of all colleagues working in attosecond science to prepare an event that meets the needs of the international attosecond community at large. A selected group of researchers, representative of the various geographic regions and scientific interests of the attosecond community, has agreed to serve in an International Advisory Board on the occasion of ATTO X. The members are asked to bring to the attention of the Local Organizing Committee, and the International Program Committee, any new and relevant research trend in their region and field of interest.

Jens Biegert, ICFO, Spain

Francesca Calegari, CFEL DESY, Germany

Paul Corkum, National Research Council, Canada

Louis DiMauro, Ohio State University, USA

Nirit Dudovich, Weizmann Institute of Science, Israel

Feng He, Shanghai Jiaotong University, China

Ursula Keller, ETH Zurich, Switzerland

Igor Litvinyuk, Griffith University, Australia

Agostino Marinelli, SLAC, USA

Chang Hee Nam, Institute of Basic Science, Korea

Alicia Palacios, Universidad Autónoma de Madrid, Spain

Thomas Pfeifer, Max Planck Institute for Nuclear Physics, Germany

Françoise Remacle, University of Liège, Belgium

Pascal Salières, CEA Saclay, France

Giuseppe Sansone, Freiburg University, Germany

Caterina Vozzi, CNR-IFN, Italy

Zhiyi Wei, Chinese Academy of Sciences, China

Amelle Zaïr, King's College London, UK

Local Organizing Committee

The Local Organizing Committee is responsible for all the activities necessary for the successful conduction of the conference, as well as for facilitating and coordinating the activities of the International Program Committee.

Per Eng-Johnsson, Lund University, Sweden (chair)

Anne-Lise Viotti, Lund University, Sweden (chair)

Cord L. Arnold, Lund University, Sweden

David Busto, Lund University, Sweden

Marcus Dahlström, Lund University, Sweden

Raimund Feifel, University of Gothenburg, Sweden

Mathieu Gisselbrecht, Lund University, Sweden

Anne L'Huillier, Lund University, Sweden

Eva Lindroth, Stockholm University, Sweden

Johan Mauritsson, Lund University, Sweden

László Veisz, Umeå University, Sweden

CONFERENCE INFORMATION

Registration hours

July 6th: 15:30 ~ 21:00

July 10th: 12:00 ~16:00

July 7th-8th: 8:00 ~ 18:30

July 11th: 08:00 ~12:00

July 9th: 8:00 ~ 16:00

Certificate of attendance

If you need a certificate of attendance, please give your name at the registration desk.

Events

Welcome reception

Sunday, July 6th, 18:30 - 21:00

The Loop Atrium, Science Village

Opening ceremony

Monday, July 7th, 8:30 - 8:45

The Loop lecture hall, Science Village

Sponsors Night: Mingling with exhibitors

Tuesday, July 8th, 18:30 - 21:00

The Loop Atrium, Science Village

Special evening session

The origins of time-dependent theory in attosecond physics: The science of Kenneth Kulander

Tuesday, July 8th, 19:15 - 20:00

The Loop lecture hall, Science Village

Excursion at Kulturen

Thursday, July 10th, 9:00 - 12:00

Kulturen, Green Gate at the crossing of Adelgatan/Tegnérplatsen

Nobel session and mingle

Thursday, July 10th, 16:45 - 18:45

Stadshallen, Lund

Closing remarks

Friday, July 11th, 12:45 - 13:00

Stadshallen, Lund

Conference dinner

Thursday, July 10th, 19:00 - 22:00

Bar and music until ~24:00

AF-borgen, Sandgatan 2, Lund

Lab visits: High-Power Laser Facility

Friday, July 11th, 13:30 - 17:00

Physics department, Professorgatan 1B, Lund



CONFERENCE PROGRAM

Tutorials



Marc Vrakking

Max Born Institute Berlin, Germany

"Attosecond science: from adolescence to adulthood"



Zenghu Chang

University of Ottawa, Canada

"Attosecond X-ray light sources driven by mid-infrared lasers"



Morgane Vacher

University of Nantes, France

"Attosecond chemistry: tutorial and theoretical perspectives"

Sunday, July 6th, The Loop

15:30 - 18:30	Registration
18:30 - 21:00	Welcome reception

Monday, July 7th, The Loop

08:30 - 08:45	Opening ceremony in the lecture hall
---------------	--------------------------------------

08:45 - 10:30 [Mo1] Attosecond Physics and Spectroscopy (I)

Session chair: Kyung Taec Kim, Institute for Basic Science, Korea

08:45 - 09:30	Attosecond science: from adolescence to adulthood [Mo1.1 tutorial] Marc Vrakking <i>Max-Born-Institute for Nonlinear Optics and Short Pulse Spectroscopy, Max-Born-Str. 2A, 12489 Berlin, Germany</i>
09:30 - 10:00	Time-dependent close coupling on the heels of attosecond electron dynamics [Mo1.2 invited] Luca Argenti <i>University of Central Florida, Department of Physics, USA</i>
10:00 - 10:15	Laser-assisted dynamical interference of photoelectrons driven by chirped extreme-ultraviolet pulses [Mo1.3] Federico Vismarra*, Mattias Bertolino, Elisa Appi, Marius Plach, Lenard Gulyas Oldal, Timea Grosz, Gian Luca Dolso, Vénus Poulain, Daniele Mocci, Giacomo Inzani, Chinmoy Biswas, Massimo De Marco, Gabriele Zeni, Fabio Frassetto, Luca Poletto, Maurizio Reduzzi, Rocío Borrego-Varillas, Hans Jakob Wörner, Zoltan Filus, Imre Seres, Peter Jojart, Balázs Major, Tamas Csizmadia, Mauro Nisoli, Per Eng-Johnsson, Jan Marcus Dahlström, Matteo Lucchini <i>*Department of Physics, Politecnico di Milano, Italy; Institute of Photonics and Nanotechnologies, IFN-CNR, Italy; Laboratorium für Physikalische Chemie, ETH Zurich, Switzerland</i>
10:15 - 10:30	Attosecond spectroscopy reveals electron correlation in the photoionization of Argon [Mo1.4] Sizuo Luo*, Mingxuan Li, Huiyong Wang, Rezvan Tahouri, Robin Weissenbilder, Jialong Li, Wentao Wang, Jiaao Cai, Xiaochun Hong, Xiaosen Shi, Liangwen Pi, David Busto, Mathieu Gisselbrecht, Philipp. V Demekhin, Kiyoshi Ueda, Anne L'Huillier, Jan Marcus Dahlström, Eva Lindroth, Dajun Ding <i>*Institute of atomic and molecular physics, Jilin University, Changchun, 130012, China.</i>

10:30 - 11:00 Coffee break in Atrium



11:00 - 12:00 [Mo2] Attosecond Physics and Spectroscopy (II)

Session chair: Igor Litvinyuk, Griffith University, Australia

11:00 - 11:30

Chiral molecules in strong laser fields [Mo2.1 invited]

Yann Mairesse

Université de Bordeaux, CNRS, CEA, CELIA, UMR5107, F33405 Talence, France

11:30 - 11:45

Vectorial attosecond transient spectroscopy [Mo2.2]

Noa Yaffe*, Omer Kneller, Chen Mor, Yann Mairesse, Nirit Dudovich

**Weizmann Institute of Science, Rehovot, 7630031, Israel*

11:45 - 12:00

Attosecond XUV pump-control spectroscopy for tracking and modification of excited neutral molecules [Mo2.3]

Gergana D. Borisova*, Paula Barber Belda, Shuyuan Hu, Paul Birk, Veit Stoo, Maximilian Hartmann, Daniel Fan, Robert Moshhammer, Alejandro Saenz, Christian Ott, Thomas Pfeifer

**Max-Planck-Institut für Kernphysik, Saupfercheckweg 1, 69117 Heidelberg, Germany*

12:00 - 12:15

Clocking the tunneling time in strong-field ionization [Mo2.4]

Jonathan Dubois*, Leonardo Rico, Letizia Fede, Camille Levêque, Jeremie Caillat, Yann Mairesse, Richard Taïeb

**Sorbonne Université, CNRS, Laboratoire de Chimie Physique - Matière et Rayonnement, LCPMR, 75005 Paris, France*

12:15 - 13:00 Lunch break

13:00 - 14:30 [MoP] Poster Session (I) - 1st floor

14:30 - 16:15 [Mo3] Attosecond Quantum Science (I)

Session chair: Daniel Finkelstein-Shapiro, Uni. Nac. Aut. de Mexico, Mexico

- 14:30 - 15:00 **Quantum-orbit dynamics in strongly-polychromatic laser fields [Mo3.1 invited]**
Emilio Pisanty
Attosecond Quantum Physics Laboratory, King's College London, London WC2 R2LS, UK
- 15:00 - 15:30 **Ion-photoelectron entanglement and coherence controlled by two-color laser pulses [Mo3.2 invited]**
Kenichi Ishikawa
Department of Nuclear Engineering and Management, The University of Tokyo, Tokyo 113-8656, Japan
- 15:30 - 15:45 **Measurement of photoelectron decoherence and attosecond dynamics of unobserved ions [Mo3.3]**
Gabriel Granveau*, Morgan Berkane, David Bresteau, Rafael Menezes-Ferreira, Gabriele Crippa, Hugo Marroux, Thierry Ruchon, Camille Levêque, Richard Taïeb, Jeremie Caillat, Pascal Salières, Charles Bourassin-Bouchet
**Université Paris-Saclay, CNRS, IOGS, Laboratoire Charles Fabry, 91127 Palaiseau, France*
- 15:45 - 16:00 **Testing quantum mechanics with photoelectron interferometry [Mo3.4]**
Gustav Arvidsson*, Edoardo Alberto Boati, Robin Weissenbilder, Mattias Ammitzböll, Christoph Dittel, Richard James Squibb, Raimund Feifel, Mathieu Gisselbrecht, Cord Louis Arnold, Anne L'Huillier, David Busto
**Department of Physics, Lund University, Box 118, 221 00 Lund, Sweden*
- 16:00 - 16:15 **Strong-field dynamics of electrons photoemitted with non-classical light [Mo3.5]**
Jonathan Pöloth*, Jonas Heimerl, Andrei Rasputnyi, Francesco Tani, Maria Chekhova, Peter Hommelhoff
**Department of Physics, Friedrich-Alexander-Universität Erlangen-Nürnberg, 91058 Erlangen, Germany*

16:15 - 16:45 Coffee break in Atrium

16:45 - 18:30 [Mo4] Attosecond Quantum Science (II)

Session chair: Richard Taïeb, LCPMR-CNRS-SU, France

- 16:45 - 17:15 **Giant counter-rotating oscillations and quantum entanglement from time-dependent strong coupling in the extreme ultraviolet [Mo4.1 invited]**
Jan Marcus Dahlström
Department of Physics, Lund University, P.O. Box 118, SE-22100, Lund, Sweden
- 17:15 - 17:45 **Experimental evidence of the quantum-optical nature of high-harmonic generation in semiconductors [Mo4.2 invited]**
Hamed Merdji
Laboratoire d'Optique Appliquée, CNRS, ENSTA, Institut Polytechnique de Paris, Palaiseau, 91120, France
- 17:45 - 18:00 **Photon bunching in high-harmonic emission controlled by quantum light [Mo4.3]**
Samuel Lemieux, Sohail A Jalil, David N Porschke, Neda Boroumand, TJ Hammond, David Villeneuve, Andrei Naumov, Thomas Brabec, Giulio Vampa*
**Joint Attosecond Science Laboratory, National Research Council of Canada and University of Ottawa, Ottawa, K1N 0R6, Canada*
- 18:00 - 18:15 **Non-classical effects drive recombination in high-harmonic generation using circularly polarized fields [Mo4.4]**
Javier Rivera-Dean, Philipp Stammer, Maciej Lewenstein, Marcelo Ciappina*
**Guangdong Technion-Israel Institute of Technology, Physics Program, China; Technion - Israel Institute of Technology, Israel*
- 18:15 - 18:30 **Measuring and controlling the birth of quantum attosecond pulses [Mo4.5]**
Chen Mor, Matan Even Tzur*, Noa Yaffe, Michael Birk, Andrei Rasputnyi, Omer Kneller, Ido Nisim, Ido Kaminer, Michael Krüger, Oren Cohen, Nirit Dudovich
**Department of Physics, Technion—Israel Institute of Technology, Israel; Solid State Institute, Technion—Israel Institute of Technology, Israel; Helen Diller Quantum Center, Technion—Israel Institute of Technology, Israel*

Tuesday, July 8th, The Loop

08:45 - 10:30 [Tu1] Laser Technology for Attoscience (I)

Session chair: Lukas Gallmann, ETH Zurich, Switzerland

- 08:45 - 09:30 **Attosecond X-ray light sources driven by mid-infrared lasers [Tu1.1 tutorial]**
Zenghu Chang
University of Ottawa, Canada
- 09:30 - 09:45 **High power CEP stable Ti:Sa amplifier seeded by OPCPA [Tu1.2]**
Jingfeng Chen, Raman Maksimenka, Solene Favier, Philippe Demengeot, Yoann Pertot*
**Amplitude, 2-4 rue du Bois Chaland - CE 2926, 91029 Evry, France*
- 09:45 - 10:00 **Waveform-controlled near-single-cycle pulses at the 100 TW level for intense attosecond sources [Tu1.3]**
László Veisz*, Peter Fischer, Sajjad Vardast, Fritz Schnur, Alexander Muschet, Aitor De Andres, Sreehari Kaniyeri, Hang Li, Roushdey Salh, Karpat Ferencz, Gergely Norbert Nagy, Subhendu Kahaly
**Department of Physics, Umeå University, Linnaeus väg 24, 90187, Umeå, Sweden*
- 10:00 - 10:15 **Single-shot pulse retrieval of femtosecond bright squeezed vacuum [Tu1.4]**
Yuval Kern*, Ido Nisim, Michael Birk, Andrei Rasputnyi, Zhaopin Chen, Pavel Sidorenko, Ido Kaminer, Oren Cohen, Michael Krüger
**Department of Physics, Technion - Israel Institute of Technology, 32000 Haifa, Israel; Solid State Institute and Helen Diller Quantum Center, Technion - Israel Institute of Technology, 32000 Haifa, Israel*
- 10:15 - 10:30 **Characterization of sub-3-fs tunable VUV pulses [Tu1.5]**
Martin Kretschmar*, Jose Andrade, Rostyslav Danylo, Stefanos Carlström, Tobias Witting, Alexandre Mermillod-Blondin, Serguei Patchkovskii, Misha Ivanov, Marc Vrakking, Arnaud Rouzée, Tamas Nagy
**Max Born Institute, Max-Born-Str. 2A, 12489 Berlin, Germany*

10:30 - 11:00 Coffee break in Atrium

11:00 - 12:15 [Tu2] Laser Technology for Attoscience (II)

Session chair: Zhiyi Wei, Institute of Physics, CAS, China

11:00 - 11:30

New ultrafast sources and science enabled by advanced nonlinear optics in hollow-core waveguides [Tu2.1 invited]

Christian Brahms

School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh, EH14 4AS, United Kingdom

11:30 - 11:45

Multi-mirror multi-pass cells for compression of energetic narrowband laser pulses into the femtosecond regime [Tu2.2]

Gaspard Beaufort*, Nayla Jimenez, Gunnar Arisholm, Victor Hariton, Ayhan Tajalli, Ingmar Hartl, Anne-Lise Viotti, Marcus Seidel

**Deutsches Elektronen-Synchrotron DESY, Hamburg, 22607, Germany; Department of Physics, Lund University, Lund, SE-22100, Sweden*

11:45 - 12:00

Pulse compression of 300 W, 12 mJ with 83% transmission in hollow-core fiber [Tu2.3]

Maksym Ivanov, Etienne Doiron, Marco Scalia, Pedram Adbolghader, François Légaré, Carlos Trallero, Bruno Schmidt*

**few-cycle Inc, Varennes, J3X 1P7, Canada*

12:00 - 12:15

Terawatt optical attosecond pulses and 100 GW-scale far-ultraviolet pulses through extreme soliton dynamics [Tu2.4]

Nikoleta Kotsina*, Michael Heynck, Joleik Nordmann, Martin Gebhardt, Teodora Grigороva, Christian Brahms, John Travers

**School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh, EH14 4AS, United Kingdom*

12:15 - 13:00 Lunch break

13:00 - 14:30 [TuP] Poster Session (II) - 1st floor

14:30 - 16:15 [Tu3] Attosecond HHG Sources (I)

Session chair: Pascal Salières, CEA Paris-Saclay, France

- 14:30 - 15:00 **Recent developments of attosecond high-harmonic generation sources in and outside the Extreme Light Infrastructure [Tu3.1 invited]**
Balázs Major
ELI-ALPS, Hungary
- 15:00 - 15:30 **Microfluidic-based sources for efficient XUV generation and manipulation [Tu3.2 invited]**
Caterina Vozzi
Istituto di Fotonica e Nanotecnologie CNR, Italy
- 15:30 - 15:45 **High harmonic generation with two non-collinear drivers: a unique gateway to extreme nonlinear phenomena [Tu3.3]**
Martin Luttmann, Mekha Vimal, Titouan Gadeyne, Matthieu Guer, Romain Cazali, Celine Chappuis, David Breteau, Fabien Lepetit, Olivier Tcherbako, Jean-Francois Hergott, Thierry Auguste, Thierry Ruchon*
**Université Paris-Saclay, CEA, LIDYL, 91191 Gif-sur-Yvette, France*
- 15:45 - 16:00 **High-order harmonic up-conversion of spatiotemporal and spatio-spectral optical vortices into the extreme ultraviolet [Tu3.4]**
Rodrigo Martin-Hernandez*, Guan Gui, Luis Plaja, Henry K. Kapteyn, Margaret M. Murnane, Chen-Ting Liao, Miguel Angel Porras, Carlos Hernandez-Garcia
**Grupo de Investigacion en Aplicaciones del Laser y Fotonica, Universidad de Salamanca, 37008, Salamanca, Spain; Unidad de Excelencia en Luz y Materia Estructuradas (LUMES), Universidad de Salamanca, Salamanca, Spain*
- 16:00 - 16:15 **Hollow gaussian beams for low-divergence high harmonic generation and attosecond pulse optimization [Tu3.5]**
Melvin Redon*, Rodrigo Martin-Hernandez, Ann-Kathrin Raab, Luis Plaja, Anne L'Huillier, Carlos Hernandez-Garcia, Cord Arnold
**Department of Physics, Lund University, P.O. Box 118, 22100, Lund, Sweden*

16:15 - 16:45 Coffee break in Atrium

16:45 - 18:30 [Tu4] Attosecond HHG Sources (II)

Session chair: Katalin Varjú, ELI-ALPS, Szeged, Hungary

- 16:45 - 17:15 **Table-top all-attosecond transient absorption spectroscopy [Tu4.1 invited]**
Bernd Schütte
Max-Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, 12489, Germany
- 17:15 - 17:30 **Coincidence measurements of two-photon double ionization driven by a high-harmonic generation source [Tu4.2]**
Matthias Kübel*, Sebastian Hell, Julian Späthe, Robert Klas, Jan Rothhardt, Jens Limpert, Gerhard Paulus, Morten Førre, Christian Ott, Stephan Fritzsche
**Institute of Optics and Quantum Electronics, Friedrich-Schiller University, 07743 Jena, Germany; Helmholtz Institute Jena, 07743 Jena, Germany*
- 17:30 - 17:45 **Using nanostructured dielectric surfaces for the generation of nanofocused XUV radiation [Tu4.3]**
Parnia Bastani*, Aleksey Korobenko, Vedran Jelic, David N. Porschke, Shima Gholam Mirzaeimoghadar, Md Wazedur Rahman, Mathieu de Lafontaine, Andre Staudte, Paul B. Corkum, François Légaré, Giulio Vampa
**Joint Attosecond Science Laboratory, National Research Council of Canada and University of Ottawa, Ottawa, Ontario K1N 0R6, Canada; Advanced Laser Light Source (ALLS), Centre Energie Matériaux Télécommunications, Institut National de la Recherche Scientifique (INRS-EMT), 1650 Boulevard Lionel-Boulet, Varennes, Quebec J3X 1P7, Canada*
- 17:45 - 18:00 **Efficient water-window isolated attosecond pulse generation with tailored sub-cycle fields [Tu4.4]**
Miguel Angel Silva-Toledo*, Fabian Scheiba, Maximilian Kubullek, Rafael de Q. Garcia, Roland E. Mainz, Giulio Maria Rossi, Franz X. Kärtner
**Center for Free-Electron Laser Science (CFEL), Deutsches Elektronen-Synchrotron (DESY), Notkestrasse 85, Hamburg, 22607, Germany; Physics Department and The Hamburg Centre for Ultrafast Imaging (CUI), University of Hamburg, Notkestrasse 9-11, Hamburg, 22607, Germany*
- 18:00 - 18:15 **Optimizing polarization gated generation of isolated attosecond pulses without CEP stabilization [Tu4.5]**
Corentin Picot, Lucas Perez, Emilien Prost, Franck Lepine, Eric Constant*
**Université Claude Bernard Lyon 1, CNRS, Institut Lumière Matière, UMR5306, Villeurbanne 69100, France*
- 18:15 - 18:30 **Direct measurement of the dipole phase in solid-state high-harmonic generation via XUV attosecond interferometry [Tu4.6]**
Nataliia Kuzkova*, Pieter J. van Essen, Brian de Keijzer, Roy van der Linden, Alvaro Jimenez-Galan, Rui E. F. Silva, Peter M. Kraus
**Advanced Research Center for Nanolithography, the Netherlands; Department of Physics and Astronomy, and LaserLaB, Vrije Universiteit Amsterdam, the Netherlands*

18:30 - 21:00 Sponsors Night:
Mingling with exhibitors in Atrium
Including drinks and food

19:15 - 20:00 Special Evening Session

**Memorial - The origins of time-dependent theory in attosecond physics:
The science of Kenneth Kulander**

With Kenneth Schafer, Anne L'Huillier, Louis DiMauro, ...

Wednesday, July 9th, The Loop

08:45 - 10:30 [We1] Attosecond Chemistry (I)

Session chair: Hans Jakob Wörner, ETH Zurich, Switzerland

08:45 - 09:30 **Attosecond chemistry: tutorial and theoretical perspectives [We1.1 tutorial]**

Morgane Vacher

University of Nantes, France

09:30 - 10:00 **Advances in ultrafast ultraviolet spectroscopy of molecules [We1.2 invited]**

Vincent Wanie

The Hamburg Centre for Ultrafast Imaging, Universität Hamburg, Germany; Physics Department, Universität Hamburg, Germany

10:00 - 10:15 **Probing iodine chemical environment with ionization delays [We1.3]**

Rafael Menezes Ferreira*, Gabriele Crippa, Lou Barreau, Constant Schouder, Georey Carneiro, Nicolas Gueneaux, Fabien Lepetit, Jean François Hergott, Francis Penent, Jérôme Palaudoux, Pascal Salières, Hugo Marroux

**Université Paris-Saclay, CEA, LIDYL, 91190 Gif-sur-Yvette, France*

10:15 - 10:30 **Probing the ultrafast vibronic wavepacket dynamics of ethylene with sub-4fs VUV pulses [We1.4]**

Arnab Sen*, Martin Kretschmar, Martha Jouybari, Rostyslav Danylo, Jose Andrade, Phillippe Burden, Simon Neville, Marc Vrakking, Albert Stolow, Tamas Nagy, Michael Schuurman, Arnaud Rouzée

**Max-Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, 12489, Germany*

10:30 - 11:00 Coffee break in Atrium

11:00 - 12:15 [We2] Attosecond Chemistry (II)

Session chair: Francesca Calegari, CFEL DESY, Germany

11:00 - 11:30 **Ab initio attosecond chemistry: strong electron-electron-nuclei correlations in multiphoton single and double ionization [We2.1 invited]**
Alicia Palacios
Departamento de Quimica, Universidad Autonoma de Madrid, UAM, Madrid, 28049, Spain; Condensed Matter Physics Center (IFIMAC), Universidad Autonoma de Madrid, Madrid, 28049, Spain

11:30 - 11:45 **Attosecond coherent control and measurement of the photoionization dynamics of chiral molecules [We2.2]**
Meng Han, Jia-Bao Ji*, Alexander Blech, Esteban Goetz, Corbin Allison, Loren Greenman, Christiane Koch, Hans Jakob Wörner
**ETH Zürich, Laboratorium für Physikalische Chemie, Switzerland*

11:45 - 12:00 **Control of photo-ion circular dichroism using orthogonal laser beams [We2.3]**
Jason Greenwood*, Leah Donnelly
**School of Mathematics and Physics, Queen's University Belfast, Belfast, United Kingdom*

12:00 - 12:15 **All-optical coherent control of chiral electronic transitions for highly enantioselective photochemistry using femtosecond lasers [We2.4]**
Andrés Ordóñez*, Patricia Vindel-Zandbergen, David Ayuso
**Imperial College London, Department of Physics, London, SW7 2BW, UK*

12:15 - 13:00 Lunch break

13:00 - 14:30 [WeP] Poster Session (III) - 1st floor

14:30 - 16:00 [We3] Attosecond Chemistry (III)

Session chair: Fernando Martin, Uni. Aut. de Madrid & IMDEA Nano, Spain

- 14:30 - 15:00 **Attosecond time-resolved electronic and vibrational dynamics in furan [We3.1 invited]**
Stefanie Gräfe
Friedrich-Schiller University Jena, Germany
- 15:00 - 15:30 **Attosecond dynamics in molecules: probing ultrafast charge motion with EUV/IR and UV/EUV spectroscopy [We3.2 invited]**
Mauro Nisoli
Department of Physics, Politecnico di Milano, Italy; Institute of Photonics and Nanotechnologies, IFN-CNR, Italy
- 15:30 - 15:45 **Time-resolved x-ray absorption spectroscopy in thiophene covering sulfur L and carbon K edges [We3.3]**
Tristan Kopp*, Federico Vismarra, Valentina Utrio Lanfaloni, Leonardo Redaelli, Tadas Balciunas, Emir Ardali, Hans Jakob Wörner
**Laboratory of Physical Chemistry, ETH Zurich, Zurich, Switzerland*
- 15:45 - 16:00 **Time-resolving molecular dissociation with FEL-pump and HHG-probe pulses [We3.4]**
Alexander Magunia*, Elisa Appi, Christina C. Papadopoulou, Hannes Lindenblatt, Florian Trost, Severin Meister, Thomas Ding, Michael Straub, Gergana D. Borisova, Junhee Lee, Rui Jin, Alexander von der Dellen, Christian Kaiser, Markus Braune, Stefan Düsterer, Skirmantas Alisauskas, Tino Lang, Christoph M. Heyl, Bastian Manschwetus, Sören Grunewald, Ulrike Frühling, Ayhan Tajalli, Ammar bin Wahid, Laura Silletti, Francesca Calegari, Philip Mosel, Uwe Morgner, Milutin Kovacev, Uwe Thumm, Ingmar Hartl, Rolf Treusch, Robert Moshhammer, Christian Ott, Thomas Pfeifer
**Max-Planck-Institut für Kernphysik, Germany*

16:00 - 16:30 Coffee break in Atrium

16:30 - 18:30 [We4] Attosecond Science in Condensed Materials (I)

Session chair: Amelle Zaïr, King's College London, UK

- 16:30 - 17:00 **Observation of the Berry phase via attosecond interferometry [We4.1 invited]**
Nirit Dudovich
Weizmann Institute, Israel
- 17:00 - 17:30 **Strong-field physics inside of (light-dressed) graphene and at the surface of metal needle tips [We4.2 invited]**
Peter Hommelhoff
Department of Physics, Friedrich-Alexander-Universität Erlangen-Nürnberg, 91058 Erlangen, Germany
- 17:30 - 17:45 **Subcycle band-structure videography of lightwave-driven graphene [We4.3]**
Giacomo Inzani*, Vincent Eggers, Manuel Meierhofer, Jakob Helml, Lasse Münster, Robert Wallauer, Sarah Zajusch, Suguru Ito, Leon Machtl, Hao Yin, Christian Kumpf, Francois C Bocquet, Changhua Bao, Jens Güdde, F Stefan Tautz, Rupert Huber, Ulrich Höfer
**Department of Physics and Regensburg Center for Ultrafast Nanoscopy (RUN), University of Regensburg, Regensburg, 93040, Germany*
- 17:45 - 18:00 **Discovery of a hybrid exciton state by attosecond spectroscopy [We4.4]**
Simone Bonetti, Nicola Di Palo*, Giacomo Inzani, Gian Luca Dolso, Matteo Talarico, Martin Zakerstein, Giacomo Fiorentini, Rocío Borrego-Varillas, Mauro Nisoli, Marco D'Alessandro, Nicolas Tancogne-Dejean, Umberto De Giovannini, Davide Sangalli, Matteo Lucchini
**Department of Physics, Politecnico di Milano, Milano, 20133, Italy*
- 18:00 - 18:15 **Correlations drive the attosecond response of strongly-correlated insulators [We4.5]**
Romain Cazali*, Amina Alic, Matthieu Guer, Christopher Kaplan, Fabien Lepetit, Olivier Tcherbako, Stephane Guizard, Angel Rubio, Nicolas Tancogne-Dejean, Gheorghe Chiuzbaian, Romain Geneaux
**Université Paris-Saclay, CEA, LIDYL, France*
- 18:15 - 18:30 **Excitonic high harmonics and attosecond time delays in GaN [We4.6]**
Zhaopin Chen*, You Wu, Christopher Ayala, Mark Levit, Ido Nisim, Yuanpeng Wu, Zetian Mi, Steven Cundiff, Mackillo Kira, Michael Krüger
**Department of Physics and Solid State Institute, Technion - Israel Institute of Technology, Haifa 3200003, Israel*

Thursday, July 10th, Stadshallen

09:00 - 12:00 Excursion at Kulturen

12:00 - 13:00 Lunch at Stadshallen

13:00 - 14:45 [Th1] Attosecond Science in Condensed Materials (II)

Session chair: Jan Vogelsang, Universität Oldenburg, Germany

13:00 - 13:30 **Probing ultra-fast electron dynamics in liquids and solutions using high-harmonic spectroscopy [Th1.1 invited]**

Angana Mondal

Laboratory of Physical Chemistry, ETH Zürich, Zürich, Switzerland

13:30 - 14:00 **Attomicroscopy imaging and control of electron motion in solid-state [Th1.2 invited]**

Mohammed Hassan

Arizona University, USA

14:00 - 14:15 **Attosecond spectroscopy of virtual charge dynamics [Th1.3]**

Gian Luca Dolso, ShunSuke A Sato, Giacomo Inzani, Nicola Di Palo, Bruno Moio, Rocío Borrego-Varillas, Mauro Nisoli, Matteo Lucchini*

**Department of Physics, Politecnico di Milano, Piazza Leonardo da Vinci, 20133 Milano, Italy*

14:15 - 14:30 **Two-color control of attosecond scanning tunneling microscopy [Th1.4]**

Boyang Ma*, Daniel Davidovich, Adi Goldner, Michael Krüger

**Physics Department and Solid State Institute and Helen Diller Quantum Center, Technion-Israel Institute of Technology, Israel*

14:30 - 14:45 **Attosecond electron pulses with chiral mass and charge [Th1.5]**

Yiqi Fang*, Joel Kuttru, David Nabben, Peter Baum

**Universität Konstanz, Fachbereich Physik, 78464 Konstanz, Germany*

14:45 - 15:15 Coffee break in Foyer

15:15 - 16:45 [Th2] Attosecond Science in Condensed Materials (III)

Session chair: Michael Krüger, Technion, Israel

15:15 - 15:45 **High-harmonic spectroscopy probes lattice dynamics: extension to bandgap dynamics and structural phase transitions [Th2.1 invited]**

Tran Trung Luu

Hong Kong University, Hong Kong

15:45 - 16:15 **Ultrafast control of valley physics in 2D materials [Th2.2 invited]**

Álvaro Jiménez-Galán

Instituto de Ciencia de Materiales de Madrid, Spain

16:15 - 16:30 **High harmonic generation from solutions [Th2.3]**

Mette Gaarde*, Eric Moore, Sucharita Giri, Andreas Koutsogiannis, Tahereh Alavi, Greg Mc-Cracken, Kenneth Lopata, John Herbert, Louis DiMauro

**Louisiana State University, Department of Physics and Astronomy, USA*

16:30 - 16:45 **Enhancement of harmonic generation in liquid water jet by resonant excitation in the mid-infrared pulses [Th2.4]**

Tianqi Yang, Yangyang Hua, Tomoya Mizuno, Teruto Kanai, Satoshi Ashihara, Yoshihisa Harada, Jiro Itatani*

**The Institute for Solid State Physics, The University of Tokyo, Japan*

16:45 - 17:45 Mingle with drinks in Foyer

17:45 - 18:45 Nobel Session

Moderator: Mikhail Ivanov

Max-Born-Institut, Berlin, Germany

Panelists: Anne L'Huillier and Pierre Agostini

Lund University, Sweden and Ohio State University, USA

Live Q&A - Ask your question(s)!

19:00 - 22:00 Conference Dinner at AF-borgen

Bar and Music from 22:00!

Friday, July 11th, Stadshallen

09:00 - 10:45 [Fr1] Attosecond Science at FELs (I)

Session chair: Louis DiMauro, Ohio State University, USA

- 09:00 - 09:30 **Nonlinear science with multi-harmonic FEL at sub-femtosecond resolution [Fr1.1 invited]**
Carlo Callegari
FERMI ELETTRA, Italy
- 09:30 - 10:00 **Dephasing in attosecond science and the collective nature of structural quantum fluctuations [Fr1.2 invited]**
Robin Santra
Center for Free-Electron Laser Science, Deutsches Elektronen-Synchrotron DESY, Hamburg, Germany
- 10:00 - 10:15 **Coherent control with two photons at a seeded free-electron laser [Fr1.3]**
Ulf Saalmann
Max-Planck-Institut für Physik komplexer Systeme, Nöthnitzer Str. 38, 01187 Dresden, Germany
- 10:15 - 10:30 **Complex attosecond waveform synthesis using regular- and irregularly-spaced harmonic combs at seeded free-electron laser FERMI [Fr1.4]**
Praveen Kumar Maroju*, Miguel Benito de Lama, Michele Di Fraia, Oksana Plekan, Matteo Bonanomi, Barbara Merzuk, David Busto, Ioannis Makos, Marvin Schmoll, Ronak Shah, Primož R Ribič, Luca Giannessi, Enrico Allaria, Giovanni De Ninno, Carlo Spezzani, Giuseppe Penco, Alexander Demidovich, Miltcho Danailov, Marcello Coreno, Marco Zangrando, Alberto Simoncig, Michele Manfredda, Richard J Squibb, Raimund Feifel, Samuel Bengtsson, Emma R Simpson, Tamás Csizmadia, Mathieu Dumergue, Sergei Kühn, Kiyoshi Ueda, Jianxiong Li, Kenneth J Schafer, Fabio Frassetto, Luca Poletto, Kevin C Prince, Johan Mauritsson, Johannes Feist, Alicia Palacios, Carlo Callegari, Giuseppe Sansone
**Physikalisches Institut, University of Freiburg, Hermann-Herder-Straße 3, 79104 Freiburg, Germany; Department of Physics, Lund University, PO Box 118, SE-221 00 Lund, Sweden*
- 10:30 - 10:45 **Magnetization dynamics probed with helicoidal dichroism [Fr1.5]**
Mauro Fanciulli, Matteo Pancaldi, Anda-Elena Stanciu, Matthieu Guer*, Emanuele Pedersoli, Dario De Angelis, Primož Rebernic-Ribic, David Breteau, Martin Luttmann, Pietro Carrara, Arun Ravindran, Benedikt Rösner, Christian David, Carlo Spezzani, Michele Manfredda, Ricardo Sousa, Laurent Vila, Ioan Lucian Prejbeanu, Liliana D. Buda-Prejbeanu, Bernard Dieny, Giovanni De Ninno, Flavio Capotondi, Thierry Ruchon, Maurizio Sacchi
**Université Paris-Saclay, CEA, LIDYL, Gif-sur-Yvette, 91191, France*

10:45 - 11:15 Coffee break in Foyer

11:15 - 12:45 [Fr2] Attosecond Science at FELs (II)

Session chair: Arnaud Rouzée, Max Born Institute, Germany

11:15 - 11:45 **Ultrafast electron motion probed with attosecond X-ray Free Electron Lasers [Fr2.1 invited]**

James Cryan

SLAC National Accelerator Laboratory, USA

11:45 - 12:00 **Characterization of polarized attosecond soft X-ray pulses at Eu-XFEL [Fr2.2]**

Juliette Leroux*, Sadia Bari, Thomas Baumann, Rebecca Boll, Francesca Calegari, Alberto De Fanis, Filippa Dudda, Danilo Enoque Ferreira de Lima, Lars Funke, Andreas Galler, Gianluca Geloni, Wolfram Helml, Akhila Jose, Alice Judt, Tommaso Mazza, Moritz Mogilowski, Terry Mullins, Thorsten Otto, Yevheniy Ovcharenko, Gunnar Peterson, Dirk Raiser, Johan Ribbing, Matthew Robinson, Sara Savio, Philipp Schmidt, Bjorn Senftleben, Svitozar Serkez, Sergey Usenko, Vincent Wanie, Niclas Wieland, Lasse Wulng, Michael Meyer, Markus Ilchen

**Department of Physics, University of Hamburg, 22607 Hamburg, Germany*

12:00 - 12:15 **Redirection and reshaping of intense extreme-ultraviolet radiation [Fr2.3]**

Yu He*, Alexander Magunia, Harijyoti Mandal, Muwaffaq Ali Mourtada, Carlo Kleine, Arikta Saha, Marc Rebholz, Gergana D. Borisova, Lina Hedewig, Hannes Lindenblatt, Florian Trost, Ulrike Frühling, Christina C. Papadopoulou, Elisa Appi, Stefan Düsterer, Tino Lang, Skirmantas Alisaukas, Christoph M. Heyl, Steffen Palutke, Markus Braune, Christina Bömer, Dietrich Krebs, Doriana Vinci, Philip Mosel, Peer Biesterfeld, Ingmar Hartl, Robert Moshhammer, Milutin Kovacev, Kiyoshi Ueda, Mette B. Gaarde, Christian Ott, Thomas Pfeifer

**Max Planck Institute for Nuclear Physics, Germany*

12:15 - 12:30 **Impulsive stimulated X-ray Raman scattering in the condensed phase with attosecond X-ray Free Electron Laser pulses [Fr2.4]**

Felix Egun*, Oliver Alexander, Laura Rego, Ana M Gutierrez, Douglas Garratt, Stefan Moeller, Ming-Fu Lin, Georgi Dakovski, James P Cryan, Agostino Marinelli, Antonio Picón, Jonathan P Marangos and the LX52 Collaboration

**Department of Physics, Imperial College London, South Kensington, SW7 2AZ, United Kingdom*

12:30 - 12:45 **Single-shot measurements of soft x-ray attosecond pulses at kilohertz repetition rate [Fr2.5]**

Veronica Guo*, Kurtis Borne, Mat Britton, David Cesar, James Cryan, Taran Driver, Paris Franz, Erik Isele, Xiang Li, Ming-Fu Lin, Agostino Marinelli, Razib Obaid, River Robles, Nicholas Sudar, Emily Thierstein, Jun Wang

**Stanford University, USA; SLAC National Accelerator Laboratory, USA*

12:45 - 13:00 Closing Remarks

13:00 - 13:30 Lunch to-go & transfer to the Physics Department

13:30 - 17:00 Lab Visits - Lund High Power Laser Facility



Poster Sessions

13:00 - 14:30 [MoP] Poster Session (I) - Monday, July 7th

Poster Session sponsored by:



[MoP.1] Characterizing and controlling lifetimes of doubly-excited states directly in the time domain

Rupprecht, Patrick

[MoP.2] RABBITT-HOP: RABBITT with higher-order processes

Brown, Andrew

[MoP.3] Ultrathin liquid flat jet system for attosecond spectroscopy of solvated molecules

Rockenstein, Sabine

[MoP.4] Conditions for Mollow triplets in ultrafast absorption and dynamical fluorescence

Stenquist, Axel

[MoP.5] Absolute photoemission timing and asymmetry parameter of the I4d giant resonance of the Iodoalkanes

Forster, Maximilian

[MoP.6] Attosecond resonant Auger spectroscopy

Kimberg, Victor

[MoP.7] Attosecond partial wave meter and its application in resolving the photoemission time delays in atoms and molecules

Gong, Xiaochun

[MoP.8] Nonlocal resonance theory for electron–nuclear dynamics in molecules

Bertolino, Mattias

[MoP.9] Ultrafast time-varying nonlinearity at epsilon-near-zero

Li, Yan

[MoP.10] Symmetries, dominance and quantum interference in below-threshold nonsequential double ionization with linearly polarized two-color fields

Hashim, Sufia

[MoP.11] Attosecond Fourier transform spectroscopy

Kneller, Omer

[MoP.12] Electronic-vibrational dynamics in x-ray transient absorption of N₂⁺ induced by strong-field ionization

Zhao, Jing

[MoP.13] Photoemission timing of surface-oriented Iodoalkanes on Pt(111)

Paul, Sven-Joachim

[MoP.14] Attosecond ionization delay arising from Feshbach-resonance of N₂

Wang, W

[MoP.15] Quantifying centrifugal-potential effects: channel-resolved attosecond time delays in nondipole photoionization

Liao, Yijie

[MoP.16] Phase measurements beyond strong-field approximation in non-perturbative single-color high-harmonic spectroscopy

Avnery, Keren

[MoP.17] Analytical expression for continuum-continuum transition amplitude of Hydrogen-like atoms

Ji, Jia-Bao

[MoP.18] HHG-based all-attosecond transient absorption spectroscopy

Svirplys, Evaldas

[MoP.19] Hole alignment in noble gas atoms using RTDCIS method

Tahouri, Rezvan

[MoP.20] Modelling sequential ionisation within time-dependent R-Matrix Theory

Lavery, Holly

[MoP.21] SoftMeter: Ultrafast molecular imaging driven by a tunable two-color field

Ghaffari, Fatemehsadat

[MoP.22] Core ionization of positronium chloride: a numerical study

Camper, Antoine

[MoP.23] Attosecond transient absorption spectroscopy of laser-dressed dense helium: Spectral lineshape modification and weak transitions brought to light

He, Yu

[MoP.24] Observation of Bloch oscillation phenomena via high harmonic generation spectroscopy

Cahana, Noa

[MoP.25] Electron recollisional excitation on dissociative ionization of OCS in phaselocked two-color intense laser fields

Endo, Tomoyuki

[MoP.26] Ro-vibronic coupling in vibrational resolved attosecond photoelectron spectroscopy of acetylene

Li, Jialong

[MoP.27] Attosecond dynamics of direct electrons in optical near-fields

Heimerl, Jonas

[MoP.28] Influence of catastrophes and hidden dynamical symmetries on ultrafast photoelectron physics

Rook, Thomas

[MoP.29] Interference of direct and resonant two-photon ionization in helium

Weissenbilder, Robin

[MoP.30] Estimation of ZnO thickness from high harmonic spectrum using machine learning algorithms

Nagyillés, Balázs

[MoP.31] Anisotropy induced electronic coherence signal in attosecond transient absorption spectroscopy

Yuen, CH Isaac

[MoP.32] Probing the attosecond dynamics of high-energy-radiation-induced collisional ionization cascades in condensed-phase samples

Ferté, Anthony

[MoP.33] Modeling angularly resolved phase-jumps in heavy atoms

Mankov, Elisei

[MoP.34] Neural network assisted denoising in attosecond transient spectroscopy beyond correlated source noise

Hollm, Marko

[MoP.35] Multi-photon and strong-field ionization with a twist

Rajak, Debabrata

[MoP.36] From megabarns to attoseconds: How to relate the cross-section with the time delay

Kheifets, Anatoli

[MoP.37] Quantum trajectory selector: a novel method to clock attosecond dynamics within recollision physics

Raab, Ann-Kathrin

[MoP.38] Orientation-dependent production of electron spirals from multi-orbital heteronuclear diatomic molecules

Ngoko Djiokap, Jean Marcel

[MoP.39] Guiding synthetic chiral light

Loehr, Alexander

[MoP.40] Attosecond transient absorption in the water-window regime driven by self-compressed light-transient pulses

Vismarra, Federico

[MoP.41] Tuning the Fano resonance line shape in hundred zeptosecond timescale by using two attosecond pulses

Jin, Cheng

[MoP.42] Heterodyne analysis of high-order partial waves in attosecond photoionization of Helium

Han, Lulu

[MoP.43] Exciting autoionizing states with multiple photons

Majety, Vinay Pramod

[MoP.44] Imaging ultrafast structural rearrangement in ammonia molecule with high harmonic spectroscopy

He, Lixin

[MoP.45] New 1D atomic model potential for more accurate HHG spectra

Sallai, Krisztina

[MoP.46] Attosecond electron dynamics in two-color multiphoton processes in helium

Benito De Lama, Miguel

[MoP.47] Retrieving the density matrix from experimental KRAKEN data

Evensen, Andreas



[MoP.48] Partial-wave transitions in attosecond time delays

Mašín, Zdeněk

[MoP.49] Wigner vs. Smith: Time delays in anisotropic systems

Saalmann, Ulf

[MoP.50] Extreme-ultraviolet optical response of atomically thin MoS2 crystals

Di Palo, Nicola

[MoP.51] Effect of attosecond electronic coherences on conical-intersection dynamics in core-excited states

Rodriguez Cuenca, Emilio

[MoP.52] Cross-process interference in strong-field ionization: insights from CEP-dependent photoelectron spectra

Herzig, Anne

[MoP.53] All-attosecond transient absorption spectroscopy of gas-phase molecules

Chiang, Kuo-Yang

[MoP.54] Attosecond Raman time-delay in resonant transitions of ions

Zhao, Zengxiu

[MoP.55] Imaging in the water window with coherence tomography using high-harmonic generation

Fuchs, Silvio

[MoP.56] Attosecond optical orientation

Drescher, Lauren B

[MoP.57] Simulation of transient-grating high-harmonic spectroscopy from dissociating molecules

Trieu, Doan-An

[MoP.58] Probing of ultrafast nuclear vibrational and rotational dynamics with X-ray

Liu, Ji-Cai

[MoP.59] Unifying two manifestations of multielectron polarization in high harmonic generation: peak's frequency shift and odd-even intensity modulation

Phan, Ngoc-Loan

[MoP.60] State-resolved femtosecond phase control in dense-gas laser-atom interaction enabled by attosecond XUV interferometry

Hedewig, Lina

[MoP.61] Controlling the orbital angular momentum of electron in neutral atom

Hu, Hongtao

[MoP.62] Chiral Optical Tweezers - efficient enantioseparation of molecules

Jones, Robert Michael

[MoP.63] Time delays in photodetachment of atomic and molecular anions at low energies

Dvořák, Jan

[MoP.64] Ultrafast atomic physics between the perturbative and strong-field regimes

Marshallsay, Sean

[MoP.65] Multidimensional spectroscopy protocols with attosecond pulses

Finkelstein-Shapiro, Daniel



- [MoP.66] Enhancing chiral recognition in gas-phase molecules using chiral topological light**
Haram, Nida
- [MoP.67] Chiral topological light for detection of robust enantiosensitive observables**
Mayer, Nicola
- [MoP.68] Complete retrieval of photoelectron dynamics from partially-coherent measurements in entangled photoemission**
Caillat, Jérémie
- [MoP.69] Photoelectron momentum distributions using crossed linearly polarized attosecond pulses**
Kjærdsdam Telléus, Emilia M
- [MoP.70] Ultrafast photoionization dynamics in the vicinity of CO autoionizing states**
Faria, Felipe
- [MoP.71] Time-resolved Auger decay of an O₂ intruder-state**
Short, Andrew
- [MoP.72] Probing attosecond dynamics of chiral bound wave packets with an attoclock**
Ge, Peipei
- [MoP.73] Extended RPAE method solves the Argon delay-puzzle**
Lindroth, Eva
- [MoP.74] Signature of nuclear wavepacket interference in high-order harmonic generation during HCN/HNC isomerization process**
Le, Van-Hoang
- [MoP.75] Quantum path interference in high harmonic generation driven by highly bichromatic fields**
Zou, Xiaozhou
- [MoP.76] Decoherence phenomena of electron dynamics in liquid water**
Crippa, Gabriele
- [MoP.77] A general approximator for strong-field ionization rates**
Agarwal, Manoram
- [MoP.78] State- and phase-resolved vibrational wavepacket dynamics in N₂ studied using all-attosecond transient absorption spectroscopy**
Vibudh, Vibudh
- [MoP.79] Chiral measures make chiral moments**
Khokhlova, Margarita
- [MoP.80] Observing the Jahn-Teller dynamics of the propadiene cation using interferometric strong-field ionization**
Brupbacher, Katherine
- [MoP.81] Photon momentum transfer and partitioning: from one to many**
Ni, Hongcheng
- [MoP.82] Subcycle conservation law in strong-field ionization**
Ni, Hongcheng
- [MoP.83] Ultrafast spin migration in the argon dimer cation**
Carlström, Stefanos

[MoP.84] Attosecond coincidence spectroscopy in small molecules

Makos, Ioannis

[MoP.85] Investigating photoionization delays using an attosecond source synchronized with an infrared non-collinear optical parametric amplifier

Jahanzeb, Muhammad

[MoP.86] Nonlinear spectroscopic studies using intense gas high-order harmonics at the SYLOS COMPACT beam line, ELI-ALPS

Mukhopadhyay, Sourin

[MoP.87] Rotational pseudo-Doppler effect in solid-state high harmonic generation

Zuo, Zitan

[MoP.88] Quantum beating and cyclic structures in the phase-space dynamics of the Kramers-Henneberg atom

Aynul, Anika

[MoP.89] Transient extreme ultraviolet scatterometry for nanostructure morphology re-construction and probing material dynamics

Kechaoglou, Emmanouil

[MoP.90] Attosecond ionic photoionization spectroscopy

Xu, Yidan

[MoP.91] Interplay of locally chiral rotational and electronic currents in chiral molecules

Mirahmadi, Marjan

[MoP.92] Ultrafast TACOS

Terentjevas, Justas

[MoP.93] Strong-field theory for attosecond scanning tunneling microscopy

Davidovich, Daniel

[MoP.94] Ultrafast and topological chiral sensing with vector beams

Rodriguez, Aude

[MoP.95] Theoretical study of photoemission time delay for two-photon transition via Multiple Scattering approach

Miura, Yugo

[MoP.96] Ultrafast dissociation dynamics of alkyl iodides induced by few-fs UV pulses

Ryabchuk, Sergey

[MoP.97] Reconstruction of the ionization and recombination times from the spectral phase of the emitted HHG radiation

Laurent, Guillaume

[MoP.98] Spin-orbit delays in argon: tracking ionization delays across an autoionizing Rydberg resonance

Berglitsch, Thomas

[MoP.99] A highly accurate semiclassical method for atoms and molecules in ultrafast intense laser pulses

Le, Anh-Thu

Poster Session sponsored by:



[TuP.1] Laser-driven high-flux source of coherent quasi-monochromatic XUV radiation for coincidence spectroscopy

Späthe, Julian

[TuP.2] Ionization-induced blue-shift of the driving pulse leads to increased harmonic yield and single attosecond pulse

Schütte, Bernd

[TuP.3] Polarization anisotropy of high harmonic generation in silicon controlled by coherent combination of ω - 3ω fields

Gindl, Adam

[TuP.4] Complete polarization measurements on broadband high-harmonic radiation

Gulyás Oldal, Lénárd

[TuP.5] Beamline development optimized for STARPES : a highly tunable extreme ultraviolet lightsource

Nonnon, Pierre

[TuP.6] Enhancement of vacuum-ultraviolet laser generation through near-threshold harmonics driven by a few-cycle two-color laser field

Wang, Bincheng

[TuP.7] High-power and high-energy post-pulse-compression of a thin-disk laser

Gong, Xiaochun

[TuP.8] Generating visible-ultraviolet sub-femtosecond pulses in a single fiber and sampling their fields

Dassie, Marco

[TuP.9] 200-kHz laser system delivering few-cycle near-infrared pulses for attosecond strong-field experiments

Meier, Katrin

[TuP.10] Intensity-control of few-cycle pulses

Broughton, Joseph

[TuP.11] Spectral modulation and double attosecond pulse emission from relativistic laser-plasma interactions

Liu, Aihua

[TuP.12] High-intensity attosecond beamline for XUV pump-XUV probe investigations

Vardast, Sajjad

[TuP.13] High-harmonic spectroscopy probes the directional charge-density-wavestrengths of TiSe₂

Tyulnev, Igor

[TuP.14] XUV yield optimization of two-color high-order harmonic generation in gases

Redon, Melvin



[TuP.15] Tracing electronic coherences at conical intersections with heterodyned attosecond four-wave-mixing spectroscopy

Rupprecht, Patrick

[TuP.16] High power sub-20-fs laser based on gas multi-pass cell

Li, Pinbin

[TuP.17] Filamentation-assisted isolated attosecond pulse generation

Chien, Yu-En

[TuP.18] Attosecond X-ray core-level chronoscopy of aromatic molecules

Ji, Jia-Bao

[TuP.19] Double-blind holography of ultrashort free-electron laser pulses

Azzolin, Agata

[TuP.20] Attosecond plasma lens

Svirplys, Evaldas

[TuP.21] Resolving attosecond time-delay in strong-field ultrafast process of valence-shell electrons of argon

Han, Lin

[TuP.22] Exploring the effects of pulse duration on high-order harmonic generation with tunable pulse post-compression

Westerberg, Saga

[TuP.23] Ultrafast bright non-Gaussian state of light

Rasputnyi, Andrei

[TuP.24] Enhancement of extreme ultraviolet pulse generation by orthogonally polarized laser-controlled spontaneous emission of Ar atoms

Wang, Zhi-Bin

[TuP.25] High harmonic generation from a solid-gas dual-target configuration

Xie, Baichuan

[TuP.26] Laser-assisted X-ray second harmonic generation

Xie, Xinhua

[TuP.27] High repetition rate, high average power XUV sources based on high harmonic generation

Manschwet, Bastian

[TuP.28] Apparatus for attosecond spectroscopy driven by dual-color few-cycle lasers

Zhong, Shiyang

[TuP.29] Stimulated Raman transitions below and above the ionization threshold of neon using a free-electron laser

Carlström, Stefanos

[TuP.30] Attosecond pulses produced by a few-cycle laser

Ouahioune, Nedjma

[TuP.31] High harmonic generation from a high-repetition-rate liquid plasma mirror

Park, Seong Cheol

[TuP.32] Carrier-envelope phase-stabilized sub-10-fs multiple-plate compression for MHz isolated attosecond pulses

Okamoto, Takuya



[TuP.33] Improving absorption measurements in attosecond XFEL experiments using machine learning

Hu, Kaiyu

[TuP.34] Using AttosecondRayTracing to design a beam transport setup for attosecond pulses from surface plasma relativistic HHG

Kalouguine, Andre

[TuP.35] The effect of driving laser properties on the coherent extreme-ultraviolet wave-front from high harmonic generation

Körmöcz, Andor

[TuP.36] Continuous relativistic high-harmonic generation from a liquid-leaf plasma mirror at kHz repetition rate

Haessler, Stefan

[TuP.37] High harmonic polarization shaping around a Cooper minimum

Chen, Ming-Chang

[TuP.38] Asymmetric polarization gating for spectral tuning and temporal confinement of high-order harmonics

Vábek, Jan

[TuP.39] Isolation of bright soft x-ray attosecond pulses in a highly ionized medium using two-color synthesized driving laser

Jin, Cheng

[TuP.40] The generation of photoelectron vortices by chirped attosecond pulses

Zhang, Bingshuang

[TuP.41] Compact attosecond XUV source for the investigation of Raman-induced attosecond electronic coherences

Danylo, Rostyslav

[TuP.42] Single-stage multipass cell spectral broadening and compression of 90 fs, 300 μ J laser down to 8.5 fs

Pronin, Oleg

[TuP.43] Few-cycle isolated attosecond pulses generation with NIR driving fields

Wang, Xiaowei

[TuP.44] Few-femtosecond soft X-ray transient absorption spectroscopy with tuneable deep ultraviolet-visible pump pulses

Lee, Jacob

[TuP.45] A high repetition HHG source of ultrafast XUV pulses for the SXP instrument at the European XFEL

Grychtol, Patrik

[TuP.46] Tuneable few-femtosecond far-ultraviolet laser pulses generated by Yb-laser-driven resonant dispersive wave emission

Satpathy, Deepjyoti

[TuP.47] Few-cycle optical vortices for strong field physics

Guer, Matthieu

[TuP.48] Towards a new HHG driver laser platform: bridging Q-switched and mode-locked laser technology via multi-pass cell post-compression

Seitz, Marc

[TuP.49] Batch Bayesian optimization of attosecond betatron pulses from laser wakefield acceleration

Maslarova, Dominika

[TuP.50] High repetition rate deep ultraviolet and infrared beamline for time-resolved experiments on the few-femtosecond timescale

Oliveira e Silva, Ana

[TuP.51] Soft X-rays beyond 600 eV from a 45 W average-power, few-cycle, short-wave infrared driver

Walke, Daniel

[TuP.52] Shaping attosecond pulses using the minimum in high-order harmonic generation spectrum of argon atoms

Li, XiaoYong

[TuP.53] Nonlinear spin-orbit coupling of light in harmonic generation at solid surfaces

Nagai, Kohei

[TuP.54] High-power, few-cycle, short-wave infrared source for high-flux, soft X-ray generation at 200 kHz repetition rate

Juliano, Caroline

[TuP.55] Dark pulse interferometry for attosecond pulse characterization

Garcia-Hernandez, Mario

[TuP.56] A beamline with efficient isolated attosecond pulse generation and detection for time-resolved spectroscopy driven by synthesized sub-cycle pulses

Kubullek, Maximilian

[TuP.57] Efficient high-order harmonic generation in the overdriven regime in a sub-mm glass chip

Cannelli, Oliviero

[TuP.58] Hyper Spectral Ultrafast Source - HYPUS

Schmidt, Bruno

[TuP.59] Attosecond electron beams for XFEL and MeV-UED

Wang, Xijie

[TuP.60] Bright isolated XUV attopulse generation through high-order frequency mixing and ellipticity gating techniques

Batelić Janković, Mateja

[TuP.61] Towards 300 mJ, 1 kHz, < 1 ps thin-disk regenerative amplifiers

Osolodkov, Mikhail

[TuP.62] An in-line setup for the generation of a cross-polarized double attosecond pulse with controllable delay

Díaz Rivas, Daniel

[TuP.63] Control of attosecond XUV pulses using an intermediate-field spatial filtering

Valentin, Constance

- [TuP.64] Attosecond metrology of vacuum-ultraviolet high-order harmonics generated in semiconductors via laser-dressed photoionization of alkali metals**
Farkas, Balazs
- [TuP.65] XUV-pump IR-probe resonant shake-up ionization of helium**
Lewis, Nicholas
- [TuP.66] SNAIL: A library for fast SFA calculation for HHG in gas targets**
Benitez, Alex
- [TuP.67] Xenon photoionization in the vicinity of 4d giant resonance and Cooper minimum using an XUV-NIR pump-probe experiment at FLASH**
Litvinyuk, Igor
- [TuP.68] First principles simulation of attosecond XUV pump-XUV probe spectra for small organic molecules**
Martin, Fernando
- [TuP.69] Optical parametric MPC: a hybrid approach for high-power few-cycle laser pulse generation**
Rupp, Nikolas
- [TuP.70] High-order harmonic generation driven by vector necklace beams**
Oakley, Séraphine
- [TuP.71] Direct optical characterisation of a driving field with a time-dependent ellipticity for high harmonic generation**
Miller, Benjamin
- [TuP.72] Attosecond pulse trains generation in hollow core waveguides**
Vozzi, Caterina
- [TuP.73] XUV chromatic aberrations in high order harmonic generation controlled by flat-top spatial shaping of the laser driver**
Constant, Eric
- [TuP.74] Tailoring XUV sources for ultrafast science: advances at ELI Beamlines**
Hort, Ondřej
- [TuP.75] High harmonic generation control by sub-cycle multi-color waveform synthesis of an ultraviolet to near-infrared driver**
van der Linden, Roy
- [TuP.76] Generation and characterisation of optical attosecond pulses with terawatt peak power**
Nordmann, Joleik
- [TuP.77] Generation of ultra-broadband millijoule-level radial vector beams**
Heynck, Michael
- [TuP.78] Commercial table-top beamline for attosecond science**
Reiger, Simon
- [TuP.79] High-power and ultrashort IR-driver platform for industrial XUV metrology**
Guichard, Florent
- [TuP.80] Post-compression of an Yb laser in two steps for attosecond transient absorption spectroscopy**
Lericheux, Nicolas

[TuP.81] The effect of laser pulse duration on the yield of high harmonic generation

Nagyilles, Balazs

[TuP.82] Single-shot carrier-envelope phase measurement at 586 kHz using optical Fourier-Transform interferometry

Guo, Chen

[TuP.83] Over-barrier ionization dynamics studied by backpropagation

Ni, Hongcheng

[TuP.84] Optimizing harmonic generation yield and refocusing conditions

Poulain, Vénus

[TuP.85] KeV attosecond pulse generation driven by MIR lasers through waveform control and phase matching

Shim, Bonggu

[TuP.86] Spatial features of high-order harmonic generation from liquids

Tao, Wan Chen

[TuP.87] Driving the high harmonic process using a multi-pass cell

Steiner, Benjamin

[TuP.88] Short attosecond pulse trains for the time-slit experiments

Maroju, Praveen Kumar

[TuP.89] Dispersion-scan (re)meets neural networks

Canhota, Miguel

[TuP.90] Angular asymmetry of double ionization of Helium by ultrashort extreme ultraviolet laser pulses

Yang, Yugang

[TuP.91] Cumulative effect on extreme ultraviolet high harmonics generated by high repetition rate Yb-based amplifier

Yamada, Hotaka

[TuP.92] Highly efficient enantiosensitive low-order harmonic generation

Heilemann, Rico

[TuP.93] Time-resolved X-ray absorption spectroscopy of strong-field ionized water

Thierstein, Emily

[TuP.94] Synthesis of Tesla-scale attosecond magnetic pulses with ring-current gating

de las Heras, Alba

[TuP.95] Probing many-body effects in strongly correlated materials via reflectivity using infrared laser fields

Brown, Graham Gardiner

[TuP.96] Orbital angular momentum control in attosecond pulses of light

de las Heras, Alba

[TuP.97] Combining tunable few cycle UV and soft x-ray pulses at the European XFEL

Mullins, Terry

[TuP.98] In-situ waveform sampling in a reaction microscope

Gholam-Mirzaei, Shima

[TuP.99] Attohallen - A new attosecond science facility in Sweden

Zaki, Masume



Poster Session sponsored by:

WACQT | Wallenberg Centre for
Quantum Technology

[WeP.1] Rydberg states generation driven by quantum light

Liu, Jinlei

[WeP.2] Probing coherent phonon in BaF₂ through time-resolved high harmonic generation spectroscopy

Tran, Tien-Dat

[WeP.3] Observation of an evanescent field-induced harmonic generation in preionized liquid water

Mizuno, Tomoya

[WeP.4] Tracking bandgap dynamics in solids with extreme ultraviolet high harmonic interferometry

Juergens, Peter

[WeP.5] Decoding the ring currents in organic molecules using tr-ARPES

Chordiya, Kalyani

[WeP.6] Phase evolution of strong-field ionization

Brown, Andrew

[WeP.7] Dynamical study of the competition between rotamerization and tautomerization of O-Hydroxybenzaldehyde

Vigneau, Jean-Nicolas

[WeP.8] Predicting ultrastrong coupling effects in extreme ultraviolet fields with combined Floquet and effective Hamiltonian theory

Bruhnke, Jakob Nicolai

[WeP.9] Linear dichroism of core excitons in LiF

Gannan, Kylie

[WeP.10] Rise and demise of entanglement in strongly coupled photoionization via quantum relay to spontaneous emission

Stenquist, Axel

[WeP.11] Non-classical bright states of light generated via light-matter entanglement in strong laser fields

Yi, Sili

[WeP.12] Semiconductor Wannier equations: a real-time, real-space approach to the nonlinear optical response in crystals

Ferreira Da Silva, Rui Emanuel

[WeP.13] Ultrafast imaging below the diffraction limit with high harmonic deactivation microscopy

Murzyn, Kevin

[WeP.14] Origin of sub-optical-cycle dephasing in high-order harmonic generation in crystalline solids

Kartashov, Daniil

[WeP.15] High harmonic generation from localized electronic states in solids

Liang, Shiqi

[WeP.16] Theoretical description of attosecond momentum-resolved resonant x-ray scattering of photo-excited molecules

Radionov, Maksim

[WeP.17] Quantitative characterization and manipulation of quantum entanglement in multiphoton ionization

Mao, Yi-Jia

[WeP.18] Ultrafast optical control of multi-valley states in 2D SnS

Hashmi, Arqum

[WeP.19] Sub-cycle switchable light-induced Floquet topological flat bands in Dirac system and its dynamics

Li, Gefei

[WeP.20] Pseudospin-driven polarimetric singularities in high harmonic generation of black phosphorus

Choi, Youngchan

[WeP.21] Revealing the Berry phase under the tunneling barrier

Faeyrman, Lior

[WeP.22] Polarization-dependent high-harmonic generation in organic molecular crystals

Schöpa, Samuel

[WeP.23] Impact of solvation on the ultrafast ring-opening dynamics of Furfural

Trester, Joel

[WeP.24] All-attosecond transient reflection spectroscopy

Drescher, Lauren B

[WeP.25] Efficient quantum state tomography of photoelectrons via polychromatic infrared pulses

Boati, Edoardo Alberto

[WeP.26] Quantum tomography of nonperturbative harmonic light from solids

Nisim, Ido

[WeP.27] Photoelectron emission from silver clusters on substrates

Bednov, Mikhail

[WeP.28] Element-specific phonon dynamics in Molybdenum Dioxide revealed by transient absorption spectroscopy

Burri, Florence

[WeP.29] Excitation and deexcitation dynamics in high harmonic generation of correlated electron systems

Bae, Gimin

[WeP.30] First-principles simulation for subcycle reciprocal image of electron density

Shinohara, Yasushi

[WeP.31] Novel quantum states of exciton-Floquet composites: electron-hole entanglement and information

Park, Hyosub

[WeP.32] Diatomic molecular vibrations in intense laser fields: an analytical perspective

Hack, Szabolcs

[WeP.33] Probing band structure properties through HHG in MgO: the role of ellipticity and Bloch confinement

Weiss, Roni

[WeP.34] Beyond electric-dipole treatment of light-matter interactions in materials: nondipole harmonic generation in bulk Si

Jensen, Simon Vendelbo Bylling

[WeP.35] Attosecond-resolved non-dipole photoionization dynamics

Ji, Jia-Bao

[WeP.36] Rabi oscillations, photo-emission and entanglement: A time-resolved picture

Rico, Leonardo

[WeP.37] Strong-field control over valley polarization and topology

Tyulnev, Igor

[WeP.38] Reduction of chromatic aberration in high order harmonic XUV beams using a temporal flat top

Miller, Benjamin

[WeP.39] Progress towards revealing attosecond dynamics in strongly correlated systems

Klingner, Jan Maximilian

[WeP.40] Electron trajectory analysis through carrier-envelope phase effects in high harmonic generation from ZnO

Allegre, Hortense

[WeP.41] Phase transitions induced by quantum vacuum

Klimkin, Nikolai

[WeP.42] Time-resolved coupled electron-nuclear dynamics of Methane cation upon photoionization using an XUV attopulse

Pandey, Gaurav

[WeP.43] Loss of contrast in attosecond temporal double slit interferometry from atomic photoionization

Ngoko Djiokap, Jean Marcel

[WeP.44] Ultrafast charge migration in solvated molecules

Giri, Sucharita

[WeP.45] Update on the Modular Multiscale Approach (MMA) to simulate high harmonic generation in gases

Vábek, Jan

[WeP.46] Proposal for high-energy cutoff extension of optical harmonics of solid materials using the example of a one-dimensional ZnO crystal

Lang, Yue

- [WeP.47] Primary events of the MLCT dynamics of photoexcited Iron(II)-Tris(2,2'-Bipyridine) in solution probed by transient soft X-ray absorption spectroscopy**
Rouzée, Arnaud
- [WeP.48] Coherent phonon-driven modifications of orbital-specific local fields**
Neb, Sergej
- [WeP.49] Photoionization time delays in H₂O**
Pranjal, Prateek
- [WeP.50] First-principles calculations of high-harmonic generation in amorphous Si and SiO**
Gushiken, Eiyu
- [WeP.51] Ultrafast correlation dynamics during high-harmonic generation in multielectron atoms**
Buczolich, Katharina
- [WeP.52] Electron-nuclear energy sharing through low-energy inelastic recollisions in dissociative strong-field ionization of deuterium**
Hell, Sebastian
- [WeP.53] Experimental realisation of synthetic chiral light**
Picciuto, Rose
- [WeP.54] Ab initio calculation of real-space light-driven current in graphene under strong laser fields**
Li, Siyuan
- [WeP.55] Photoionization of chiral molecules by sub-cycle shaped laser fields**
Fede, Letizia
- [WeP.56] Ga3d and Se3d spin orbit delays in GaSe solids**
Schabbehard, Tillmann
- [WeP.57] High-order harmonic generation in Pentacene**
Wiechmann, Falk-Erik
- [WeP.58] A universal approach to saddle-point methods in attosecond science**
Weber, Anne
- [WeP.59] Relativistic calculations of electron-parent ion entanglement using the KRAKEN protocol**
Petersson, Leon
- [WeP.60] Probing the final state continuum on atomic length scales by attosecond time-resolved photoelectron spectroscopy**
Gebauer, Andreas
- [WeP.61] Ultrafast charge carrier dynamics in semiconductor nanostructures resolved in time, space and energy**
K. Jensen, Thomas
- [WeP.62] Scaling of the fractional angular momenta of a light polarization Möbius strip in extreme nonlinear optics**
Ruchon, Thierry
- [WeP.63] Calculations of impulsive stimulated X-ray Raman scattering in liquid Water**
Rego, Laura

[WeP.64] On the use of a self-homodyning experiment to study the quantum nature of high harmonics generated in solids

Cotte, Viviane

[WeP.65] Spatial mode transformations of high-order harmonic generation in transition metal dichalcogenides

Schlemmer, Leon

[WeP.66] Attosecond transient reflectivity and absorption from an Ytterbium laser driven high harmonic generation source

Tyagi, Akansha

[WeP.67] Two-color high harmonic spectroscopy of ultrafast Dirac electron dynamics

Krüger, Michael

[WeP.68] Electron-ion covariance spectrometry for molecular dynamics

Månsson, Erik

[WeP.69] Control of Graphene by two-colour laser fields

Boyt Archibald, Elliott

[WeP.70] A nonlinear optical chirality for high-harmonic generation

Pisanty, Emilio

[WeP.71] Enantiosensitive exceptional points of open chiral systems

Mayer, Nicola

[WeP.72] Topological valley control of graphene by tailored two-colour fields using a light and fast SBE solver

Tomaselli, Anna

[WeP.73] Competition between proton transfer and resonant intermolecular Coulombic decay in water dimers

Calzolari, Alessandro

[WeP.74] Reconstruction and characterization of single particle entanglement dynamics in photoionization

Berkane, Morgan

[WeP.75] Attosecond resolved intramolecular charge transfer in neutral donor-acceptor organic molecules

Martin, Fernando

[WeP.76] Relativistic core-level molecular photoionization in heavy molecules

Zapata, Felipe

[WeP.77] Observation of nonadiabatic coupling induced by Floquet-Bloch states in high harmonic generation from large-bandgap materials

Zhao, Cong

[WeP.78] Towards attosecond photoemission electron microscopy: spatially-resolved strong-field electron acceleration from a nanostructure

Vogelsang, Jan

[WeP.79] Ultrafast ethylene dication formation through resonant enhanced multiphoton ionization

Marante, Carlos

[WeP.80] Adapting polarization gating for generation of isolated attosecond pulses after multiple mirror reflexions

Constant, Eric

[WeP.81] High-order frequency mixing: harvesting bright XUV from propagation

Khokhlova, Margarita

[WeP.82] Observing coherent electronic wavepackets in molecules using attosecond transient absorption spectroscopy

Bredehoeft, Jona

[WeP.83] eTraj.jl: Trajectory-based simulation for strong-field ionization

Ni, Hongcheng

[WeP.84] Self-consistent extraction of photoabsorption time delays in attosecond streak camera

Ni, Hongcheng

[WeP.85] Analysis of low-energy electron interferences in Helium

Eriksson, Samuel

[WeP.86] Probing laser dressing-induced dynamics in Acetonitrile with soft X-ray attosecond transient absorption spectroscopy

Ardali, Emir

[WeP.87] Generation of high-order harmonics with hybrid spin and transverse orbital angular momentum from a crystalline solid

Zhang, Jianing

[WeP.88] Ultrafast light-induced spin and orbital magnetization in two-dimensional semiconductors

Muraleedharan, Mrudul

[WeP.89] Manipulating molecular dynamics with polarization-shaped laser pulses

Pan, Shengzhe

[WeP.90] Non-cascade random walk in solid high harmonic generation

Wang, Yiwon

[WeP.91] Robust discrimination between solid-state high harmonic generation mechanisms based on real-space dynamics

Brown, Graham Gardiner

[WeP.92] Electronic dynamics created at conical intersections and its dephasing in aqueous solution

Chang, Yi-Ping

[WeP.93] In search of lost tunneling time

Maier, Pablo Martin

[WeP.94] Enantiosensitive geometric phases in multi-photoexcitation processes

Roos, Aycke

[WeP.95] Ultra-fast nonlinear optical response of chiral molecules with a focus on conformer sensitivity

Christou, Elena Aethra

[WeP.96] Spin and orientation locking in photoionization of chiral molecules

Flores, Philip Caesar

[WeP.97] An entanglement perspective on molecular Auger decay

Östberg, E

[WeP.98] Photoelectron spectra calculated from absorption

Steinsvåg Dalen, Bendik

[WeP.99] Non-adiabatic dynamics investigation of $\text{Cr}(\text{CO})_4(2,2'\text{-bipyridine})$

Ciborowski, Bartosz

NOTES

[illegible]

SPONSORS & EXHIBITORS

Host of the Conference



Sponsors



CARL TRYGGERS
STIFTELSE
FÖR VETENSKAPLIG FORSKNING



Crafoordska stiftelsen
GRUNDAD AV HOLGER CRAFOORD 1980

WACQT | Wallenberg Centre for
Quantum Technology



CITY OF
LUND



LINXS INSTITUTE OF ADVANCED
NEUTRON AND X-RAY SCIENCE



LTH
FACULTY OF
ENGINEERING

Poster Sessions Sponsors

ASML



LLC
LUND LASER CENTRE

WACQT | Wallenberg Centre for
Quantum Technology

Poster Prizes Sponsors



Platinum Exhibitor



ATTO-X

10th International Conference on Attosecond Science and Technology

Gold Exhibitors



Silver Exhibitors



Bronze Exhibitors





LIGHT CONVERSION



lightcon.com

Spectral-temporal
pulse shaping options

Exceptional CEP and pulse energy stability

High pre-pulse
contrast

Multi-TW peak-power
pulses at up to 1 kHz

Few-cycle
pulse duration

800 nm, 1600 nm,
or 2000 nm output

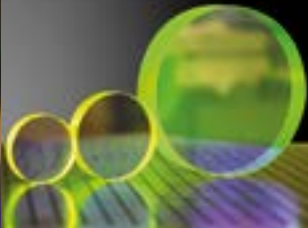
OPCPA | HE

Optical Parametric Chirped-Pulse
Amplification Systems



YOUR KEY to innovation and success.

Optical Components



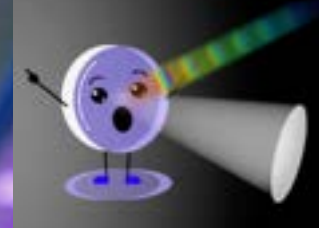
Optical Devices



Customized Solutions



Your partner for the ultrafast



www.ultrafast-innovations.com

Dira Series

Ultrafast thin-disk lasers

*Intense and legendary
just like the Oktoberfest!*



www.trumpf-scientific-lasers.com



TRUMPF Scientific Lasers

LASERS FOR INNOVATORS

Ultrafast lasers empowering your groundbreaking discoveries

We develop innovative laser systems using advanced non-linear technologies, including mid-infrared (MIR) optical parametric chirped pulse amplifiers (OPCPA), high-power femtosecond lasers from Yb-based lasers with non-linear spectral broadening, and high-brilliance extreme ultraviolet (EUV) high-harmonic generation (HHG) sources.

FEW-CYCLE OPCPA SYSTEMS

- 800 nm - 2000 nm
- CEP-stable
- Up to 1 mJ



White Dwarf Attodriver

Supernova OPCPA

XUV HHG SOURCES

- 10 – 60 nm
- Up to 1 MHz
- Up to 60 μ W



Moonlander HHG

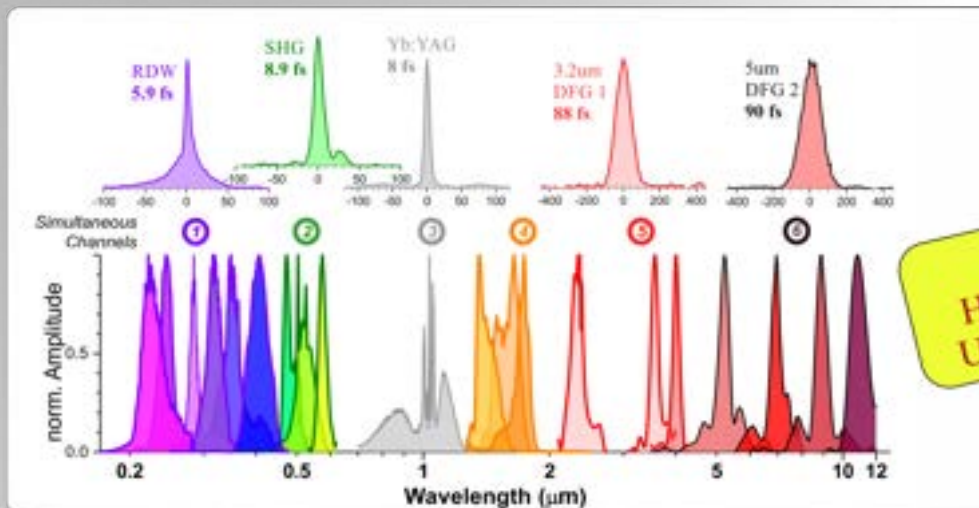
Attosecond Beamlines



Learn more at class5photonics.com

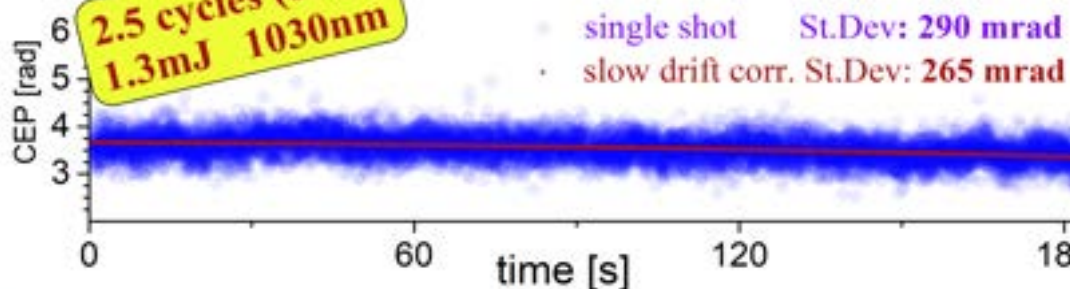


few-cycle™



HYPUS
Hyper-spectral
Ultrafast Source

2.5 cycles (8.5fs)
1.3mJ 1030nm





NextGen Lasers for Attoscience

Two World-Class Technologies



PATENTED CEP-STABLE OPCPA SEEDER

Built for unmatched robustness, precision, & reliability



ARCO - HIGH-ENERGY TI:SAPPHIRE AMPLIFIERS

Ultra-stable, 20+ years of proven performance

/ Up to 20 mJ, 1kHz

/ Down to 20 fs

/ CEP feedback with Dazzler

/ Proven day-to-day CEP stability

www.amplitude-laser.com

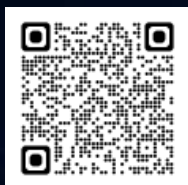
EUV OPTICS

For attosecond applications



PRODUCT LINEUP

- Multilayer mirror
- Multilayer polarizer
- Dichroic mirror
- Half mirror
- Beam separator
- Thin film sample
- Resolution test chart



HIGH-ENERGY RESEARCH MEETS NANOMETER ACCURACY



At SmarAct, we support leading research institutions worldwide with advanced positioning and metrology systems designed for particle accelerators, synchrotrons, free-electron lasers, and crystallography.

Our solutions deliver sub-micrometer accuracy, ultra-low eccentricity, and robust performance in extreme environments — from ultra-high vacuum to strong magnetic fields and cryogenic conditions.

From single-axis stages to custom multi-axis systems like the compact, low self-shadowing SMARGON, we offer scalable, high-performance tools for demanding scientific setups.

With in-house development and real-time correction via PICOscale interferometry, SmarAct ensures unmatched adaptability.



PRODUCTS

- » Tailor-made optical solutions for VUV, EUV & SXR
- » Spectrometers, monochromators, reflectometers, interferometers & imaging systems
- » Exclusive EUV metrology & inspection capabilities with picometer accuracy
- » Many more!

APPLICATIONS

- » Time-resolved (attosecond) experiments
- » Transient absorption & reflection
- » Non-destructive EUV inspection
- » Reflectometry & scatterometry
- » Coherent (lensless) imaging
- » Spectroscopy / NEXAFS

LIGHT SOURCES

- » High-harmonic generation
- » Plasma-based sources
- » Free-electron lasers
- » Synchrotrons

CONTACT

sales@indigo-optics.com

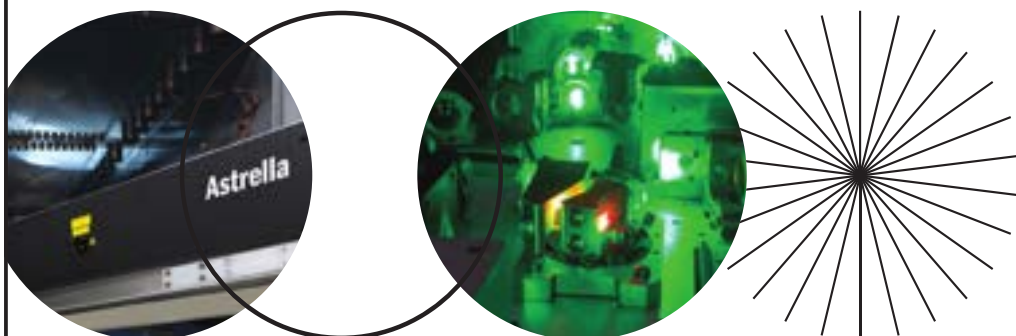
PARTNERS



Copyright © 2025 Indigo Optical Systems GmbH - Moritz-von-Rohr-Str. 1a - 07745 Jena, Germany - CEO: Dr. Martin Wünsche - All rights reserved.

VAT No.: DE 313 714 342 - Commercial register (Germany): Jena, HRB 513590 - Bank: Commerzbank - IBAN: DE03 8204 0000 0770 0750 00 - BIC: COBADEFFXXX

UNLOCK PRECISION IN YOUR MULTIDIMENSIONAL SPECTROSCOPY



The Astrella kHz amplifier delivers superior stability, high energy, low drift, and unmatched reliability. Boost your multidimensional spectroscopy experiments with >9 mJ, <35 fs pulses, and HASS-certified ruggedness for years of enhanced productivity and cost-effective research.

More uptime = more results.

See for yourself at: <https://www.coherent.com/lasers/amplifiers/astrella>

COHERENT

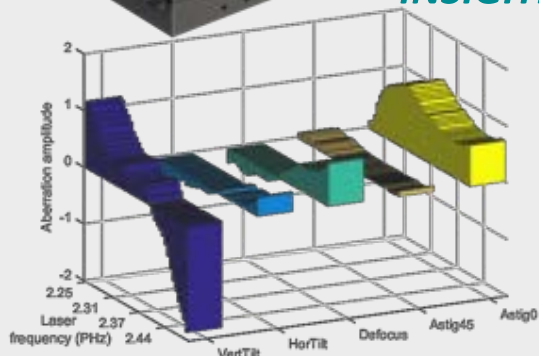


[coherent.com](https://www.coherent.com)

Advanced short pulse metrology by SourceLAB



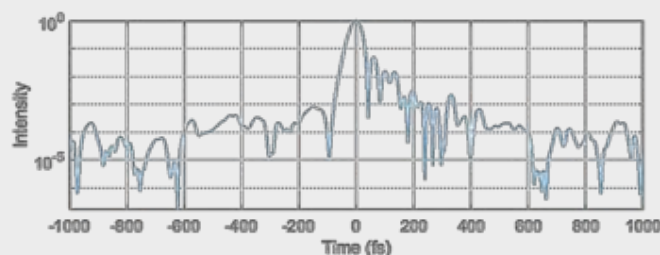
INSIGHT



Resolving spatio-temporal couplings over 400-1100 nm



TIPTOE



Plotting short pulses from visible to mid-IR range

Join the ELI
User Community!

Advancing Science with Cutting- Edge Laser Technology

EXTREME LIGHT
INFRASTRUCTURE



Springer is part of Springer Nature, a global publisher that serves and supports the research community. Springer Nature aims to advance discovery by publishing robust and insightful science, supporting the development of new areas of research and making ideas and knowledge accessible around the world.

Work with us for expert guidance throughout the publishing process. Our goal is to help you create impactful textbooks, handbooks, and reference works—available in multiple formats to maximize discoverability, downloads, and citations. With Springer, your work reaches a global audience and contributes meaningfully to the scientific community.

Do you have an idea for a book? We'd love to hear from you!
Please feel free to contact:

Dr. Daniela Guzmán-Angel
Physics Books Editor

daniela.guzman.angel@springernature.com



Or visit the Springer booth at the exhibition area.



NEW PRODUCTS & TECHNOLOGIES



CCT10

Compact CMOS Spectrometers

- Models for Broadband, Visible, and NIR Spectral Ranges
- Amplitude Corrected and Wavelength Calibrated

Ø1/2" Kinematic Mirror Mount

- Machined from Aluminum for Exceptional Tensile Strength, Stiffness, Surface Toughness, and Dimensional Stability

KA05B



DSC1

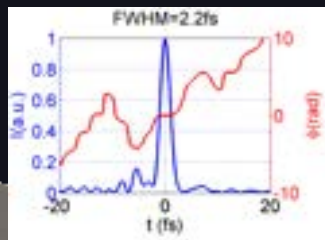
Compact Digital Servo Controller

- High-Speed PID Control with up to 100 kHz Bandwidth
- Laser Lock Box Capable of Frequency Stabilizing Lasers

+49 (0) 8131-5956-0 | sales.de@thorlabs.com



Sphere's d-scan is the technology of choice for handling ultrashort laser pulses - down to true **single-cycle durations** - for cutting edge attoscience in gases and in solids. Get a d-scan now and **boost your attosecond experiments and applications.**



www.sphere-photonics.com



Beyond the state of the art



Ultrafast laser up to 20mJ | 2kW | 250fs | 1030 nm / 1950 nm
Post-compression down to few-cycle
OPA/MIR



High-power XUV beamlines
Photon energy 12eV...150eV
Flux/harmonic up to $10^{15}/s$



Ultrafast laser diagnostics

Autocorrelator
FROG
2D spectrometer
Beam profiler

Frequency conversion

OPA
 $2\omega - 3\omega - 4\omega$



software user friendly
easy powerful accurate

femtoeasy.eu

We are ready to engineer it

Eclipse is a team of industry experts with over 100 years of combined experience across all areas of optics. We offer deep knowledge - from a wide area of expertise. Challenge us and we will help you develop the optics and technology needed to bring light to your specific purpose.

Design & Simulation

Concept & Prototyping

Lab & Test

Optics Team Resource

Optics & Camera Lab

Offices in Malmö & Stockholm

>800 projects

Reach out to find out how we can support your next optical challenge!



ECLIPSE



info@eclipseoptics.com | www.eclipseoptics.com





OPTIMAN

APPLICATION-OPTIMISED IBS-COATED
LASER OPTICS THAT ENABLE HIGHER
LASER POWER AND PREVENT
DOWNTIME

LEARN MORE



Electron Time-of-Flight Spectrometers

photonion
Powered by
STEFAN KAESDORF



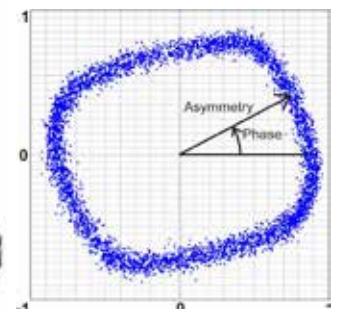
Features:

- Minimum electron energy ca. 20 eV (depending on the magnetic fields of the environment)
- Time-of-flight resolution $T/\Delta T = \text{ca. } 100$
- Fieldfree drift tube with 350 mm standard length
- Drift tube region can be floated to positive or negative potentials
- Post-acceleration stage in front of the detector to get a uniform sensitivity for all electrons irrespective of their kinetic energy
- Conical entrance aperture with 3 mm diameter



SCI Φ
SINGLE CYCLE INSTRUMENTS

Provider of
Stereo-ATI Few-cycle Pulse Meters



Asymmetry graph

Capabilities:

- Access to Carrier-Envelope Phase (CEP) *and* laser pulse asymmetry (i.e. duration)
- Simultaneously, continuously, for every single shot in real time @ up to 1 MHz repetition rate
- Allows for phase tagging and CEP / asymmetry-stabilization of Laser amplifiers and oscillators
- Robust and efficient Laser tuning and diagnostics tool
- Even in-line of the laser beam to characterize the same pulses applied down stream

n₂ Photonics

We offer multipass pulse compression modules to spectrally broaden and temporally shorten the pulses from your femtosecond laser. The modules are compatible with nearly all commercial ultrafast lasers. Pulse shortening factors of 5x to 10x are easily reachable in a single stage with over 90% transmission. The core of our technology is nonlinear spectral broadening in multipass cells. For example, the MIKS1_S module shortens input pulses with a 200–400 fs pulse duration and 1–200 μJ energy to less than 50 fs or MIKS1_L which can shorten pulses with up to 500 μJ down to <10 fs, achieving an extremely high transmission of over 90%. This module can be shipped to you and easily installed remotely.

<https://www.n2-photonics.de/>

single cycle instruments UG (haftungsbeschränkt) & Co. KG,
Hans-Knöll-Straße 6, 07745 Jena, Germany, info@sci-phi.de



THE LOOP – SCIENCE VILLAGE									
Sunday 6 July			Monday 7 July			Tuesday 8 July			Wednesday 9 July
Time									Time
08:30			OPENING						08:30
08:45			Tutorial: Marc Vrakking		Tutorial: Zenghu Chang		Tutorial: Morgane Vacher		08:45
09:00									09:00
09:15			Invited: Luca Argenti		Yoann Pertot		Invited: Vincent Wanie		09:15
09:30			Federico Vismarra		Laszlo Velsz		Rafael Menezes Ferreira		09:30
09:45			Sizuo Luo		Martin Kretschmar		Arnab Sen		09:45
10:00					Coffee		Coffee		10:00
10:15									10:15
10:30									10:30
10:45									10:45
11:00			Invited: Yann Mairesse		Invited: Christian Brahm		Invited: Alicia Palacios		11:00
11:15									11:15
11:30			Noa Yaffe		Gaspard Beaufort		Jia-Bao Ji		11:30
11:45			Gergana D. Borisova		Bruno Schmidt		Jason Greenwood		11:45
12:00			Jonathan Dubois		Nikoleta Kotsina		Andrés Ordóñez		12:00
12:15							Lunch (2nd IPC meeting)		12:15
12:30			Lunch (1st IPC meeting)		Lunch				12:30
12:45									12:45
13:00									13:00
13:15									13:15
13:30			Poster session 1		Poster session 2		Poster session 3		13:30
13:45									13:45
14:00									14:00
14:15									14:15
14:30			Invited: Emilio Pisanty		Invited: Balazs Major		Invited: Stefanie Gräfe		14:30
14:45									14:45
15:00			Invited: Kenichi Ishikawa		Invited: Caterina Vozzi		Invited: Mauro Nisoli		15:00
15:15									15:15
15:30			Gabriel Granvau		Thierry Ruchon		Tristan Kopp		15:30
15:45			Gustav Arvidsson		Rodrigo Martin-Hernandez		Alexander Magunia		15:45
16:00			Jonathan Polloth		Melvin Redon		Coffee		16:00
16:15									16:15
16:30			Coffee		Coffee		Invited: Nirit Dudovich		16:30
16:45			Invited: Marcus Dahlström		Invited: Bernd Schütte		Invited: Peter Hommelhoff		16:45
17:00									17:00
17:15			Invited: Hamed Merdji		Mathias Kübel		Giacomo Inzani		17:15
17:30					Parnia Bastani		Nicola Di Palo		17:30
17:45			Giulio Vampa		Miguel Angel Silva-Toledo		Romain Cazali		17:45
18:00			Marcelo Ciappina		Eric Constant		Zhaopin Chen		18:00
18:15			Matan Even Tzur		Natalia Kuzkova				18:15
18:30									18:30
18:45					Sponsor Night				18:45
19:00									19:00
19:15									19:15
19:30									19:30
19:45									19:45
20:00									20:00
20:15									20:15
20:30									20:30
20:45									20:45
21:00									21:00
21:15									21:15
21:30									21:30
21:45									21:45
22:00									22:00

STADSHALLEN – CITY CENTER									
Time		Thursday 10 July			Friday 11 July				
08:30									
08:45									
09:00								Invited: Carlo Callegari	
09:15								Invited: Robin Santra	
09:30								Ulf Saalmann	
09:45								Praveen Kumar Maroju	
10:00								Matthieu Guer	
10:15								Coffee	
10:30								Invited: James Cryan	
10:45								Juliette Leroux	
11:00								Yu He	
11:15								Felix Egun	
11:30								Veronica Guo	
11:45								CLOSING	
12:00								Lunch to-go & transfer to the Physics Department	
12:15									
12:30									
12:45									
13:00									
13:15									
13:30									
13:45									
14:00									
14:15									
14:30									
14:45									
15:00									
15:15									
15:30									
15:45									
16:00									
16:15									
16:30									
16:45									
17:00									
17:15									
17:30									
17:45									
18:00									
18:15									
18:30									
18:45									
19:00									
19:15									
19:30									
19:45									
20:00									
20:15									
20:30									
20:45									
21:00									
21:15									
21:30									
21:45									
22:00									