

MON2A • Attosecond Spectroscopy

Auditorium

10:45–12:30

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Chair: Marc Vrakking, AMOLF, Amsterdam, The Netherlands

MON2A.1 • 10:45

Attosecond angular streaking: an ideal technique to measure electron tunneling time?, •Petriša Eckle¹, Adrian Peiffer¹,Claudio Cirelli¹, Ursula Keller¹, Reinhard Dörner², André Staudte³, Harm-Geert Muller⁴, and Markus Büttiker⁵; ¹Physics Department, ETH Zurich, CH-8093 Zurich, Switzerland,²Institut für Kernphysik, Johann Wolfgang Goethe Universität, Max-von-Laue-Str. 1, 60438 Frankfurt am Main, Germany,³Stacie Institute for Molecular Sciences, National Research Council of Canada, 100 Sussex Drive, Ottawa, Ontario K1A 0R6, Canada, ⁴FOM-Institute for Atomic and Molecular

Physics, Kruislaan 407, 1098 SJ Amsterdam, The Netherlands,

⁵Physics Department, University of Geneva, CH-1211 Geneva, Switzerland.

We explore the possibility to measure tunneling time and provide initial experimental results using attosecond angular streaking that demonstrated a temporal localization accuracy of 24 as rms and an estimated resolution of ~200 as.

MON2A.2 • 11:00

Attosecond excitation of electron wave packets, •Marko Swoboda¹, Giuseppe Sansone², Thomas Remetter¹, Johan Mauritsson¹, Kathrin Klünder¹, Per Johnsson³, Matthias F. Kling⁴, Freek Kelkensberg³, Wing-Kiu Siu³, Omair Ghafur³, Sergey Zherebtsov⁴, Irina Znakovskaya⁴, Thorsten Uphues⁴, Enrico Benedetti², Federico Ferrari², Franck Lépine⁵, Marc J. J. Vrakking³, Kenneth J. Schafer⁶, Anne L'Huillier¹, and Mauro Nisoli²; ¹Department of Physics, Lund Institute of Technology, P.O. Box 118, SE-221 00 Lund, Sweden, ²National Laboratory for Ultrafast and Ultraintense Optical Science CNR Istituto Nazionale per la Fisica della Materia, Department of Physics, Politecnico, Piazza Leonardo da Vinci 32, 20133, Italy,

³FOM-Institute AMOLF, Kruislaan 407, 1098 SJ Amsterdam, The Netherlands, ⁴Max-Planck Institut für Quantenoptik, Hans-Kopfermann Strasse 1, D-85748 Garching, Germany, ⁵Université Lyon 1; CNRS; LASIM, UMR 5579, 43 bd. du 11 novembre 1918, F-69622 Villeurbanne, France, ⁶Department of Physics and Astronomy, Louisiana State University, Baton Rouge, Louisiana.

We present experiments, supported by time-dependent calculations, on the dynamics of helium bound states after coherent attosecond excitation in the presence of a strong infrared laser field.

MON2A.3 • 11:15

Strong Field Coherent Control Using 2D Spatio-Temporal Mapping, •Barry D. Bruner, Haim Suchowski, Adi Natan, and Yaron Silberberg; Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot 76100, Israel.

Multiphoton excitation in Rubidium can be effectively controlled using simple pulse shaping parameters. Interplay between ionization and dynamic Stark shifts is revealed by mapping onto 2D landscapes using a recently developed spatio-temporal coherent control technique.

MON2A.4 • 11:30

Femtosecond Buildup of Ultrastrong Light-Matter

Interaction, Georg Günter¹, •Aji A. Anappara², Jakob Hees¹, Silvan Leinß¹, Lucia Sorba², Giorgio Biasiol^{2,3}, Alessandro Tredicucci², Alfred Leitenstorfer¹, and Rupert Huber¹;

¹Department of Physics and Center for Applied Photonics, University of Konstanz, Universitätsstraße 10, 78464 Konstanz, Germany, ²NEST CNR-INFN and Scuola Normale Superiore, Piazza dei Cavalieri 7, I-56126 Pisa, Italy, ³Lab. Nazionale TASC CNR-INFN, Area Science Park, I-34012 Trieste, Italy. An intersubband transition in a GaAs/AlGaAs quantum well waveguide structure is optically switched on by 12-fs pulses. Multi-THz field transients resonantly trace the non-adiabatic formation of a squeezed quantum vacuum of ultrastrongly coupled cavity polaritons.

MON2A.5 • 11:45

Attosecond control of electron localization in one- and two-color dissociative ionization of H₂ and D₂, •Giuseppe Sansone¹, Freek Kelkensberg², Matthias Kling³, Wing Kiu Siu², Omair Ghafur², Per Johnsson², Sergey Zherebtsov³, Irina Znakovskaya³, Thorsten Uphues³, Enrico Benedetti¹, Federico Ferrari¹, Franck Lépine⁴, Marko Swoboda⁵, Thomas Remetter⁵, Anne L'Huillier⁵, Mauro Nisoli¹, and Marc Vrakking²;

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We report experiments where an attosecond pulse launches a wavepacket on the dissociative state of D₂⁺, and a few-cycle IR pulse localizes the electron on one ionic fragment with attosecond sensitivity to the XUV-IR delay.

MON2A.6 • 12:00

Simultaneous Description of Electron and Nuclear Dynamics: A Quantum Approach for Multi-Electron Systems, Philipp von den Hoff, Dorothee Geppert, and •Regina de Vivie-Riedle; Department Chemie und Biochemie, LMU München, Butenandtstr. 11, 81377 München, Germany.

A new and efficient approach to describe molecular electron and nuclear dynamics simultaneously is presented. The method is tested for the photodissociation of D₂⁺ and allows for a successive extension to multi-electron systems.

MON2A.7 • 12:15

Attosecond Photoelectron Spectroscopy of Electron Tunneling in Dissociating Hydrogen Molecular Ion, •Stefanie Gräfe¹, Volker Engel², and Misha Yu. Ivanov¹; ¹Stacie Institute of Molecular Sciences, National Research Council Canada, 100 Sussex Drive, Ottawa ON K1A 0R6 Canada, ²Institute for Physical Chemistry, Würzburg University, Am Hubland, 97074 Würzburg, Germany.

We demonstrate the potential of intense-field pump-probe (attosecond XUV) photoelectron spectroscopy to monitor coupled nuclear-electronic tunneling dynamics between the two protons during dissociative ionization of the hydrogen molecular ion.