WED4P • Nanooptics and Microscopy

Panoramica
16:15–18:00
WED4P • Nanooptics and Microscopy
Chair: Hrvoje Petek, University of Pittsburgh, PA, USA

WED4P.1 • 16:15
Simultaneous Spatial and Temporal Control of Nanooptical Fields, *Martin Aeschlimann[1], Michael Bauer[2], Daniela Bayer[1], Tobias Brixner[3,4], Stefan Cunovic[5], Frank Dimler[3,4], Alexander Fischer[1],* •*Walter Pfeiffer[5], Martin Rohmer[1], Christian Schneider[1], Felix Steeb[1], Christian Strüber[5],* and *Dimitri V. Voronine[3,4]*; *[1]Fachbereich Physik, TU Kaiserslautern, Erwin-Schrödinger Str. 46, 67663 Kaiserslautern, Germany, [2]Institut für Experimentelle und Angewandte Physik, Universität Kiel, Leibnizstr. 19, 24118 Kiel, Germany, [3]Institut für Physikalische Chemie, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany, [4]Physikalisches Institut, Universität Würzburg, Am Hubland, 97074 Würzburg, Germany, [5]Fakultät für Physik, Universität Bielefeld, Universitätsstr. 25, 33516 Bielefeld, Germany*.
Using time-resolved two-photon photoemission electron microscopy we demonstrate simultaneous spatial and temporal control of nanooptical fields. Cross correlation measurements reveal the ultrafast spatial switching of the local excitation on a subdiffraction length scale.

WED4P.2 • 16:30
Nano-Confined Light and Electron Sources Driven by Few-Cycle Optical Pulses, •*Catalin C. Neacsu[1,2], Claus Ropers[1], Thomas Elsaesser[1], Martin Albrecht[3], Rob Olmon[2], Markus B. Raschke[2],* and *Christoph Lielnau[4]*; *[1]Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie, D-12489 Berlin, Germany, [2]Department of Chemistry, University of Washington, Seattle, Washington 98195-1700, USA, [3]Institut für Kristallzüchtung, D-12489 Berlin, Germany, [4]Institut für Physik, Carl von Ossietzky Universität Oldenburg, D-26129 Oldenburg, Germany*.
Flat and nanostructured metal nano-tips driven by sub-10 fs pulses at an 80-MHz repetition rate serve for nano-confined light and electron generation. We demonstrate control of spatial emission properties and analyze nonlinear generation processes.

WED4P.3 • 16:45
Attosecond Free Electron Pulses for Diffraction and Microscopy, •*Peter Baum[1,2]* and *Ahmed H. Zewail[1]*; *[1]California Institute of Technology, 1200 E. California Bld, Pasadena CA 91125, USA, [2]Ludwig-Maximilians-Universität München, Oettingenstr. 67, 80538 München, Germany*.
In synthesized gratings of optical fields, free non-relativistic electrons compress to pulses of 15 attosecond duration. Such pulses have potential to advance ultrafast electron diffraction and microscopy to the domain of attosecond electron dynamics.

WED4P.4 • 17:00
Ultrafast Wide-Field Fluorescence Microscopy, •*Lars Gundlach* and *Piotr Piotrowiak*; *Department of Chemistry, Rutgers University Newark, 73 Warren St, Newark, NJ 07102, USA*.
We present an ultrafast Kerr-gated microscope capable of collecting diffraction limited 2D fluorescence images with sub 100 fs resolution. The ultrafast fluorescence dynamics of gold nanoparticles is presented to exemplify the capabilities of the instrument.

WED4P.5 • 17:15
Nanoscale Optical Microscopy in the Vectorial Focusing Regime, •*Keith Serrels, Euan Ramsay, Richard Warburton*, and *Derryck Reid*; *Heriot-Watt University, School of Engineering and Physical Sciences, Edinburgh, EH14 4AS, UK*.
By using extreme numerical-aperture solid-immersion microscopy at 1553 nm we demonstrate, under certain circumstances, polarisation-sensitive imaging with resolution values approaching 100 nm which substantially surpass the classical scalar diffraction-limit embodied by Sparrow's resolution criterion.

WED4P.6 • 17:30
Fiber-optical analogue of the event horizon, •*Friedrich Koenig[1], Thomas Philbin[1,2], Christopher Kuklewicz[1], Scott Robertson[1], Stephen Hill[1],* and *Ulf Leonhardt[1]*; *[1]School of Physics and Astronomy, University of St. Andrews, North Haugh, St. Andrews, KY168QR, UK, [2]Max Planck Research Group of Optics, Information and Photonics, Guenther-Scharowsky-Str. 1, Bau 24, D-91058 Erlangen, Germany*.
We present a realistic scheme for an artifcial event horizon in optics with ultrashort pulses in microstructured fibers that can probe the quantum effects of horizons, particularly Hawking radiation. We also show experimental progress.

WED4P.7 • 17:45
Factoring numbers with interfering random waves, •*Sébastien Weber, Béatrice Chatel,* and *Bertrand Girard*; *Laboratoire Collisions, Agrégats, Réactivité, IRSAMC (CNRS, Université de Toulouse, UPS), France*.
Factorisation of numbers using Gauss sums is improved by choosing randomly the terms in the sum. Ghost factors are so eliminated and the required number of terms of the truncated sum varies as ln N.