WED3 • Electron Dynamics and Plasmonics

Auditorium
14:00–15:45
WED3 • Electron Dynamics and Plasmonics
Chair: Alfred Leitenstorfer, University of Konstanz, Germany

WED3.1 • 14:00 **•Invited•**

Ultrafast photoemission electron microscopy: imaging light with electrons on femto-nano scale, •*Hrvoje Petek*[1,2] and *Atsushi Kubo*[1,3]; [1]*Department of Physics and Astronomy, University of Pittsburgh, Pittsburgh, PA 15260 USA,* [2]*Donostia International Physics Center, Donostia-San Sebastian 20018 Spain,* [3]*PRESTO, Japan Science and Technology Agency, 4-1-8 Honcho Kawaguchi, Saitama, Japan*.
Attosecond movies (330 as/frame) of surface plasmon polariton dynamics at a nanostructured silver/vacuum interface are recorded with a photoelectron emission microscope employing phase-locked pulse pair excitation. Examples of simple surface plasmon optical elements are given.

WED3.2 • 14:30
X-ray Absorption Spectroscopy on the fs Time Scale: Ultrafast Electron and Spin Dynamics in Nickel, •*Christian Stamm*[1], *Niko Pontius*[1], *Torsten Kachel*[1], *Karsten Holldack*[1], *Torsten Quast*[1], *Rolf Mitzner*[1,2], *Shaukat Khan*[1,3], *Marko Wietstruk*[1], *Hermann A. Dürr*[1], and *Wolfgang Eberhardt*[1]; [1]*BESSY, Berlin, Germany,* [2]*Universität Münster, Münster, Germany,* [3]*Universität Hamburg, Hamburg, Germany*.
We present femtosecond x-ray absorption experiments investigating the electron and spin dynamics in a thin nickel film after excitation by an optical fs laser pulse. A temporal response as fast as 120 fs is found.

WED3.3 • 14:45
Ultrafast Electron Dynamics in Quantum Well States of Pb/Si(111), *Patrick Kirchmann* and •*Uwe Bovensiepen*; *Fachbereich Physik, Freie Universitaet Berlin, Arnimallee 14, DE-14195 Berlin.*
We investigated ultrafast energy relaxation in unoccupied quantum well states of Pb/Si(111) with femtosecond time-resolved two-photon photoemission. Decay rates of $6p_z$ quantum well states are compatible with Fermi liquid theory if inter-subband scattering is considered.

WED3.4 • 15:00
Direct Visualization of Electron Emission from a Metal Surface under Intense Laser Illumination, •*Christoph T. Hebeisen, Ralph Ernstorfer, Maher Harb, Thibault Dartigalongue,* and *R. J. Dwayne Miller*; *Institute for Optical Sciences and Departments of Chemistry and Physics, University of Toronto, 80 St. George St., Toronto, ON, M5S 3H6 Canada*.
We report on a method for the direct imaging of charge distributions and transient electric fields in the early stages of femtosecond laser plasma generation from a metal surface.

WED3.5 • 15:15
Attosecond Nanoplasmonic Field Microscope, •*Mark Stockman*[1,2], *Matthias Kling*[2], *Ulf Kleineberg*[3], and *Ferenc Krausz*[2,3]; [1]*Department of Physics and Astronomy, Georgia State University, Atlanta, GA 30303, USA,* [2]*Max-Planck-Institut für Quantenoptik, Hans-Kopfermann-Straße 1, D-85748 Garching, Germany,* [3]*Ludwig-Maximilians-Universität München, Department für Physik, Am Coulombwall 1, D-85748 Garching, Germany*.
We propose an approach that will provide direct, non-invasive access to the nanoplasmonic collective dynamics, with nanometer-scale spatial resolution and ˜100 attosecond temporal resolution. It combines techniques of photoelectron emission microscopy and attosecond streaking spectroscopy.

WED3.6 • 15:30
Coherent Control of Surface Plasmon Propagation Directions, *SooBong Choi*[1], *DooJae Park*[1], *YeoChan Yoon*[1], *HyunWoo Kim*[1], *JeeHoon Kang*[2], *Q. Han Park*[2], and •*DaiSik Kim*[1]; [1]*Department of Physics and Astronomy, Seoul National University, 151-747, Seoul, Korea,* [2]*Department of Physics, School of science, Korea University, 136-71,3 Seoul, Korea*.
We demonstrate directional control of surface plasmon polariton waves via femtosecond coherent control in an asymmetric Bragg-mirror structure. Our finding paves way towards directional control of surface plasmon propagation direction and minimization of two-way loss.