THU3 • Ultrafast Condensed Phase Dynamics

Auditorium
14:00–15:45
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Chair: Thomas Elsässer, Max-Born-Institute, Berlin, Germany

THU3.1 • 14:00
THz Slow Motion of an Ultrafast Insulator-Metal Transition in VO_2: Coherent Structural Dynamics and Electronic Correlations, •*Rupert Huber*[1], *Carl Kübler*[1], *Henri Ehrke*[1], *Rene Lopez*[2], *Andrej Halabica*[3], *Richard F. Haglund*[3], and *Alfred Leitenstorfer*[1]; [1]*Department of Physics and Center for Applied Photonics, University of Konstanz, Universitätsstraße 10, 78464 Konstanz, Germany,* [2]*Department of Physics and Astronomy and Institute of Advanced Materials, Nanoscience and Technology, University of North Carolina, Chapel Hill, North Carolina 27599, USA,* [3]*Department of Physics and Astronomy and Institute for Nanoscale Science and Technology, Vanderbilt University, Nashville, Tennessee 37235, USA.*
The multi-THz conductivity of VO_2 recorded during a photoinduced insulator-metal transition directly reveals the femtosecond dynamics of V-V stretching modes and electronic correlations. We suggest a novel qualitative model for the nonthermal phase transition.

THU3.2 • 14:15
Phono-Induced Orbital Melting in La3/2Sr1/2MnO4, •*Raanan Tobey*, *Dharmalingam Prabhakaran*, *Andrew Boothroyd*, and *Andrea Cavalleri*; *Department of Physics, University of Oxford, OX1 3PU Oxford, UK*.
Resonant excitation of Mn-O stretching modes results in ultrafast melting of long range orbital order in the layered manganite La3/2Sr1/2MnO4. Our experiments clarify the microscopic mechanism underpinning the recently-discovered phono-induced phase transition in manganites.

THU3.3 • 14:30
Ultrafast Gigantic Photo-Response in Charge-Ordered Organic Salt (EDO-TTF)2PF6 on 10-fs time scales, •*Jiro Itatani*[1,2], *Matteo Rini*[1], *Andrea Cavalleri*[3], *Ken Onda*[2], *Tadahiko Ishikawa*[4], *Sho Ogihara*[4], *Shin-ya Koshihara*[2,4], *XiangFeng Shao*[2,5], *Yoshiaki Nakano*[2,5], *Hideki Yamochi*[2,5], *Gunzi Saito*[6], and *Robert W. Schoenlein*[1]; [1]*Lawrence Berkeley National Laboratory, Berkeley, CA, USA,* [2]*ERATO, Japan Science and Technology Agency, 3-5 Sanbanchou, Tokyo, Japan,* [3]*Department of Physics, Clarendon Laboratory, University of Oxford, Oxford, United Kingdom,* [4]*Department of Materials Science, Tokyo Institute of Technology, Tokyo, Japan,* [5]*Research Center for Low Temperature and Materials Scnces, Kyoto University, Kyoto, Japan,* [6]*Division of Chemistry, Graduate School of Science, Kyoto University, Kyoto, Japan.*
The initial dynamics of photo-induced phase transition in (EDO-TTF)2PF6 was investigated using 10-fs laser pulses. We observed sub-20-fs gigantic photo-responses (|DR/R|>100%) and a clear signature of a structural bottleneck (˜60 fs) for the first time.

THU3.4 • 14:45 **•Invited•**
Dynamic Metamaterials at Terahertz Frequencies, *Hou-Tong Chen*[1], *Abul Azad*[1], *John O'Hara*[1], *Antoinette Taylor*[1], *Willie Padilla*[2], and •*Richard Averitt*[3]; [1]*MPA-CINT, MS K771, Los Alamos National Laboratory, Los Alamos, New Mexico 87545, Mexico,* [2]*Department of Physics, Boston College, Chestnut Hill, Massachusetts 02467, USA,* [3]*Department of Physics and Photonics Center, Boston University, Boston, Massachusetts 02215, USA.*
Metamaterials fabricated for operation at terahertz frequencies are presented. Optical excitation enables control of the metamaterial resonance amplitude and frequency.

THU3.5 • 15:15
The Effect of Spin-Polarized Electrons on the THz Emission from Photoexcited GaAs(111), *James Schleicher*, *Shayne Harrel*, and •*Charles Schmuttenmaer*; *Yale University, Department of Chemistry, 225 Prospect St., New Haven, CT 06520, USA.*
We report the dependence of optical rectification and shift currents in unbiased GaAs(111) on the excitation beam polarization using THz emission spectroscopy. The emission when exciting slightly above bandgap is strongly influenced by spin-polarized electrons.

THU3.6 • 15:30
Nonlinear Lattice Response Observed Through Terahertz SPM, •*János Hebling*[1,2], *Matthias C. Hoffmann*[1], *Ka-Lo Yeh*[1], *György Tóth*[2], and *Keith A. Nelson*[1]; [1]*Massachusetts Instittute of Technology, 77 Massachusetts Ave., Cambridge, MA, 02139,* [2]*Department of Experimental Physics, University of Pécs, 7624 Hungary.*
Self-phase-modulation of ultrashort THz pulses was observed in lithium niobate at 100 MW/cm2 intensity level. The effect, observed in time and frequency domains, suggests 1000x larger n2 than at visible wavelengths.