

WUPCOM'20

**Winter School on Ultrafast Processes
in Condensed Matter**

8 – 13 March 2020,
Winklmoosalm, Reit im Winkl



Scientific Program

WUPCOM 20 Organizer

Jens Gütde

Fachbereich Physik und Zentrum für Materialwissenschaften

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Science Advisory Board

Uwe Bovensiepen, Ulrich Höfer, Martin Weinelt, Martin Wolf

Scientific program

Sunday, March 8th

16:00 – 18:00 Arrival and rental of skiing equipment

18:00 – 19:00 Registration

19:00 – 20:00 Dinner

Evening session (Chair: Jens Gütde)

20:15 – 20:45 **Martin Weinelt** (Freie Universität Berlin)

*Mechanisms to excite 4f spins in the ultrafast magnetization dynamics
of rare-earth metals*

Monday, March 9th

07:30 – 08:30 Breakfast

Morning session (Chair: Michael Bauer)

08:30 – 09:30 **Karina Morgenstern** (Ruhr-Universität Bochum)

STM investigation of laser driven processes at surfaces

09:30 – 10:00 **Uwe Bovensiepen** (Universität Duisburg-Essen)

Non-Equilibrium Energy Transfer Across Interfaces Mediated by Electrons and Phonons

10:00 – 15:30 Outdoor workshop

Afternoon session (Chair: Julian Maklar)

16:00 – 16:30 **Janek Rieger** (Friedrich-Alexander-Universität Erlangen-Nürnberg)

Surface atomic and electronic structure of CsPbBr₃

16:30 – 17:00 **Wolf Widdra** (Martin-Luther-Universität Halle-Wittenberg)

NiO thin films: From structure to electron dynamics

17:00 – 17:30 Coffee break

Afternoon session (Chair: Marcel Reutzel)

17:30 – 18:00 **Manuel Bridger** (Universität Duisburg-Essen)

Towards high power broad-band OPCPA at 3 μ m

18:00 – 18:30 **Laurenz Rettig** (Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin)

Sailing transient k-space – recent advances in time- and angle-resolved photoelectron spectroscopy

19:00 – 20:00 Dinner

20:00 – More discussions...

Tuesday, March 10th

07:30 – 08:30 Breakfast

Morning session (Chair: Martin Weinelt)

08:30 – 09:30 **Alexander Holleitner** (Walter Schottky Institut und TU München)

Femtosecond on-chip electronics

09:30 – 10:00 **Jens Güdde** (Philipps-Universität Marburg)

Ultrafast photocurrent dynamics in the topological surface state of pristine and V-doped Sb₂Te₃ observed in two-dimensional momentum space

10:00 – 15:30 Outdoor workshop

Afternoon session (Chair: Wolf Widdra)

16:00 – 16:30 **Ulrich Höfer** (Philipps-Universität Marburg)

Charge transfer dynamics and coherent phonon excitation at the buried GaP/Si(001) interface

16:30 – 17:00 **Fabian Brinks** (Universität Duisburg-Essen)

Picosecond acoustic waves in laser excited metal-semiconductor heterostructures studied by ultrafast X-ray diffraction

17:00 – 17:30 Coffee break

Afternoon session (Chair: Stefan Schlauderer)

17:30 – 18:00 **Matthijs Jansen** (Georg-August-Universität Göttingen)

Orbital imaging: phase retrieval strategies for angular-resolved photoemission spectroscopy data

18:00 – 18:30 **Michael Bauer** (Universität Kiel)

Mode-resolved Reciprocal Space Mapping of Electron-phonon Interaction in the Weyl Semimetal Candidate Td-WTe₂

19:00 – 20:00 Dinner

20:00 – More discussions...

Wednesday, March 11th

07:30 – 08:30 Breakfast

Morning session (Chair: Ulrich Höfer)

08:30 – 09:30 **Michael Sentef** (MPI für Struktur und Dynamik der Materie, Hamburg)
Light-matter coupling in quantum materials: From optical switching of Majoranas to cavity-controlled superconductivity

09:30 – 10:00 **Marcel Reutz** (Georg-August-Universität Göttingen)
Towards non-equilibrium band structure engineering probed by photoelectron spectroscopy

10:00 – 15:30 Outdoor workshop

Afternoon session (Chair: Matthijs Jansen)

16:00 – 16:30 **Suguru Ito** (Philipps-Universität Marburg)
Terahertz-induced photocurrents and band structure dynamics in a topological insulator

16:30 – 17:00 **Julian Maklar** (Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin)
Time-resolved Momentum Microscopy of an Ultrafast Charge-Density Wave-to-Metal Transition

17:00 – 17:30 Coffee break

Afternoon session (Chair: Melanie Müller)

17:30 – 18:00 **Philipp Merkl** (Universität Regensburg)
Internal structure and ultrafast dynamics of spatially indirect excitons in van der Waals bilayers

18:00 – 18:30 **Markus Plankl** (Universität Regensburg)
Mapping nanoscale charge carrier dynamics in van der Waals heterostructures by ultrafast terahertz nanoscopy

19:00 – 20:00 Dinner

20:00 – More discussions...

Thursday, March 12th

07:30 – 08:30 Breakfast

Morning session (Chair: Uwe Bovensiepen)

08:30 – 09:30 **Sebastian Loth** (Universität Stuttgart)

Ultrafast Scanning Tunneling Microscopy

09:30 – 10:00 **Melanie Müller** (Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin)

Ultra-broadband THz pulses in a Scanning Tunneling Microscope Junction probed with sub-cycle resolution

10:00 – 15:30 Outdoor workshop

Afternoon session (Chair: Laurenz Rettig)

16:00 – 16:30 **Daniela Zahn** (Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin)

Lattice dynamics of 3d ferromagnets

16:30 – 17:00 **Alexey Melnikov** (Martin-Luther-Universität Halle-Wittenberg)

Terahertz standing spin waves in metallic multilayers: excitation, damping, dispersion

17:00 – 17:30 Coffee break

Afternoon session (Chair: Alexey Melnikov)

17:30 – 18:00 **Dominic Lawrenz** (Freie Universität Berlin)

Magnetization dynamics of MBE grown Fe/Gd bilayers on W(110) investigated with XMCD-R

18:00 – 18:30 **Stefan Schlauderer** (Universität Regensburg)

Subcycle observation of terahertz-driven all-coherent spin switching in an antiferromagnet

19:00 – 20:00 Dinner

20:00 – More discussions...

Friday, March 13th

08:00 – 09:00 Breakfast

09:00 – 09:30 Departure and return of skiing equipment

WUPCOM 20 Schedule

| | Sunday, March 8 th | Monday, March 9 th | Tuesday, March 10 th | Wednesday, March 11 th | Thursday, March 12 th | Friday, March 13 th |
|-------|---|---|--|---|--|---|
| 07:30 | | | | Breakfast | | |
| 08:30 | | Karina Morgenstern STM investigation of laser driven processes at surfaces | Alexander Holleitner Femtosecond on-chip electronics | Michael Sentef Light-matter coupling in quantum materials: From optical switching of Majoranas to cavity-controlled superconductivity | Sebastian Loth Ultrafast Scanning Tunneling Microscopy | |
| 09:30 | | Uwe Bovensiepen Non-Equilibrium Energy Transfer Across Interfaces Mediated by Electrons and Phonons | Jens Güdde Ultrafast photocurrent dynamics in the topological surface state of pristine and V-doped Sb ₂ Te ₃ observed in two-dimensional momentum space | Marcel Reutzel Towards non-equilibrium band structure engineering probed by photoelectron spectroscopy | Melanie Müller Ultra-broadband THz pulses in a Scanning Tunneling Microscope Junction probed with sub-cycle resolution | |
| 10:00 | | | Breakout session & lunch break | | | |
| 16:00 | | Janek Rieger Surface atomic and electronic structure of CsPbBr ₃ | Ulrich Höfer Charge transfer dynamics and coherent phonon excitation at the buried GaP/Si(001) interface | Suguru Ito Terahertz-induced photocurrents and band structure dynamics in a topological insulator | Daniela Zahn Lattice dynamics of 3d ferromagnets | Departure |
| 16:30 | | Wolf Widdra NIO thin films: From structure to electron dynamics | Fabian Brinks Picosecond acoustic waves in laser excited metal-semiconductor heterostructures studied by ultrafast X-ray diffraction | Julian Maklar Time-resolved Momentum Microscopy of an Ultrafast Charge-Density-Wave-to-Metal Transition | Alexey Melnikov Terahertz standing spin waves in metallic multilayers: excitation, damping, dispersion | |
| 17:00 | Arrival & Registration | | | | | |
| 17:30 | | Manuel Bridger Towards high power broad-band OPCPA at 3 μm | Matthijs Jansen Orbital imaging: phase retrieval strategies for angular-resolved photoemission spectroscopy data | Coffee break | | Dominic Lawrenz Magnetization dynamics of MBE grown Fe/Gd bilayers on W(110) investigated with XMCD-R |
| 18:00 | | Laurenz Rettig Sailing transient k-space – recent advances in time- and angle-resolved photoelectron spectroscopy | Michael Bauer Mode-resolved Reciprocal Space Mapping of Electron-phonon Interaction in the Weyl Semimetal Candidate Td-WTe ₂ | Markus Plankl Mapping nanoscale charge carrier dynamics in van der Waals heterostructures by ultrafast terahertz nanoscopy | Stefan Schlauderer Subcycle observation of terahertz-driven all-coherent spin switching in an antiferromagnet | |
| 19:00 | Dinner | | | | | |
| 20:15 | Martin Weinelt Mechanisms to excite 4f spins in the ultrafast magnetization dynamics of rare-earth metals | | | | | |