Universität Regensburg

FAKULTÄT FÜR PHYSIK
Lehrstuhl für Experimentelle und Angewandte Physik

Prof. Dr. Rupert Huber

Collaborative Research Center 1277

**Emergent Relativistic Effects in Condensed Matter -
From Fundamental Aspects to Electronic Functionality**

Seminar offered in hybrid format

Monday, December 13, 2021, 13:00 h, PHY 9.2.01

Zoom: Meeting ID: 676 3326 0348, Kenncode 578360

https://uni-regensburg.zoom.us/j/67633260348?pwd=WGt6MzdQWGRXK1hGckQxazJHZ0xxQT09

Dr. Christian Heide

Stanford University

Light-field driven electron dynamics: from ultrafast current injection to high-harmonic generation

"How fast can one turn on a current?" This question is of fundamental importance for the speed of modern electronics. Dirac materials, such as graphene and topological materials are ideal materials for light-field driven electron dynamics. Under the influence of a strong and fast oscillating optical field, intraband motions and interband transitions are intricately coupled. In the reciprocal space, the momentum of an electron changes due to acceleration by the electric field. When the electron is driven near the Dirac point, where the dipole coupling between valence and conduction band is maximized, the wave function of the electron is split into a superposition of the two band states. After half an optical cycle, these parts of the wave function meet again and interfere. This interference produces a current flow within one femtosecond, which can be measured with an amperemeter.
In the second part of the talk, I will talk about another observable which is typically used in strong-field physics – high-harmonic generation. I will summarize the current understanding of strong-field physics in TMDCs and topological materials and present new measurement results.

Host: Rupert Huber