Stuttgarter Physikalisches Kolloquium

Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme
Fachbereich Physik, Universität Stuttgart

Ansprechpartner: Andreas Schnyder
E-Mail: A.Schnyder@fkf.mpg.de
Telefon: 0711 689-1553

Dienstag, 9. April 2019 | **16.15 Uhr** | **Hörsaal 2D5**

Stuttgarter Max-Planck-Institute, Heisenbergstraße 1, 70569 Stuttgart-Büsnau

Quantum Matter seen by Quantum Oscillations

Elena Hassinger
MPI-CPfS Dresden

Abstract

Interactions between electrons in so-called quantum materials can lead to emergent ground states such as unconventional superconductivity or non-Fermi liquid behaviour. However, describing and predicting the properties of interacting electron systems is still a major challenge of solid state physics. The underlying property needed for a theoretical description is the energy eigenstate of electrons, i.e. the electronic structure.
In my talk, I will show how quantum oscillations give experimental access to the energy eigenstates of a material near the Fermi energy. The technique is used to increase our understanding of different groups of unconventional metals. As a first example, I will focus on topological Weyl semimetals, where quasi-particles can be described as relativistic Weyl fermions. These materials hence present the only realisation of Weyl fermions in nature and are used to test theoretical predictions. The second material class are metallic delafossites. These metals are interesting for their extremely high electrical conductivity, pureness and unconventional transport properties. Here, the degree of two-dimensionality is revealed in detail via de Haas - van Alphen oscillations.