Seminarankündigung
(gem. mit Festkörpertheorie-Seminar)

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Thema: Orbital magnetoelectric effects in metals in insulators

Abstract
In ferromagnets, the orbital magnetization is typically small compared to spin. I will discuss two phenomena where orbital magnetism dominates. One is an orbital magnetoelectric effect that becomes quantized in topological insulators, and is related to a surface anomalous Hall conductivity. It can be expressed in dimensionless units as an "axion angle", and as a bulk property it is only defined modulo 2pi. This indeterminacy, reminiscent of the Berry-phase theory of polarization, can be resolved by calculating the Chern numbers on the "hybrid Wannier sheets" near the surface [1]. The other is a current-induced magnetization in gyrotropic conductors (e.g., p-doped tellurium). In the absence of spin-orbit it becomes a purely orbital effect, which in Weyl semimetals is proportional to the energy separation between Weyl nodes of opposite chirality [2]. Finally, I will discuss the occurrence of nonlinear Weyl crossings with chiral charges $C_{\pm}$ in the bands of nonmagnetic crystals with threefold or sixfold symmetry, such as trigonal tellurium and hexagonal NbSi2 [3].


Ansprechpartner: J. Fabian