

Theory of Condensed Matter: Hard Condensed Matter

July 9, 2014 at 10 a.m. c.t.
Seminar Room K, Staudinger Weg 9

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Transport investigations on a magnetic topological insulator - A work in progress

The reports on observing the quantum anomalous Hall effect (AHE) in Cr-doped $(\text{Bi,Sb})_2\text{Te}_3$ has focused significant interest onto this material system for its potential as a magnetic topological insulator. In this talk I will report on our on-going efforts in growing and characterizing of this material system.

In particular, I will discuss several experimental issues which make this material challenging to work with in transport studies, and show how these must be treated with extreme care in order to get reliable transport results. While we do not observe any quantization of the effect in our samples, a strong AHE is nevertheless seen, which combined with SQUID investigations can be used to extract information about the nature of the magnetic states in our layers.

Our observations are consistent with that of a magnetically viscous magnetic state, which tends to stabilize into a true ferromagnetic state in thick layers, but take on more of a superparamagnetic character in the thin films we use in the transport studies. Whether such a state is representative of a homogenous layer, or results from inhomogeneity in the distribution and/or phase of the included Cr atoms is a topic of on-going investigations.