

EINLADUNG zum IFP-SEMINAR

- Thema: **Quantum anomalous Hall effect in magnetic materials**
- Vortragender: **Chaoxing Liu**
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- Termin: **Dienstag, 14 Juli 2015, 10 Uhr**
- Ort: Institut für Festkörperphysik, TU Wien
Wiedner Hauptstraße 8-10, 1040 Wien
Seminarraum 138C, 9. OG (gelbe Leitfarbe)
- Host: Karsten Held
- Förderer: ERC-StG-306447 AbinitioDFA

Both the quantum Hall effect and the quantum anomalous Hall effect possess the quantized Hall conductance and zero longitudinal resistance. Different from the conventional quantum Hall effect that requires strong magnetic fields, the quantum anomalous Hall effect is induced by strong exchange coupling between electron spin and magnetic moments in magnetic materials, so it can be realized at a zero magnetic field, enabling the potential application of electronic devices with low energy consumption. A recent experiment on Cr or V doped BiSbTe thin films has observed the quantized Hall conductance at a zero magnetic field and confirmed this novel phenomenon.

In this talk, I would like to discuss our recent work on the quantum anomalous Hall effect in magnetic materials. I will first introduce two key ingredients, inverted band structures and magnetic insulators, for the quantum anomalous Hall effect in realistic magnetic materials. Then, based on these two ingredients, I will discuss different classes of realistic materials with different types of magnetic structures for the quantum anomalous Hall effect. I will also consider about spin polarization of chiral edge modes of the quantum anomalous Hall insulators and discuss the potential applications of the quantum anomalous Hall effect in spintronics.

- [1] Quantum Anomalous Hall Effect in Hg_{1-y}MnyTe Quantum Wells, Chao-Xing Liu, Xiao-Liang Qi, Xi Dai, Zhong Fang, Shou-Cheng Zhang, Phys. Rev. Lett. 101, 146802 (2008).
- [2] In-plane Magnetization Induced Quantum Anomalous Hall Effect, Xin Liu, Hsiu-Chuan Hsu, Chao-Xing Liu, Phys. Rev. Lett. 111, 086802 (2013).
- [3] Electrically tunable spin polarization of chiral edge modes in a quantum anomalous Hall insulator, Rui-Xing Zhang, Hsiu-Chuan Hsu, Chao-Xing Liu, arXiv:1506.08242 (2015)

