

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Tuning the Quantum Anomalous Hall Effect in Magnetic Topological Insulators YANG FENG, GAOYUAN JIANG, WEIXIONG WU, Tsinghua Univ, YUNBO OU, Institute of Physics, Chinese Academy of Sciences, KE HE, XUCUN MA, QIKUN XUE, YAYU WANG, Tsinghua Univ — Quantum anomalous Hall effect (QAHE) has been experimentally realized recently in molecular beam epitaxy (MBE)-grown thin films of Cr or V doped $(\text{Bi,Sb})_2\text{Te}_3$ topological insulators in the absence of external magnetic field. However, so far the QAHE state can only be observed at very low temperature in thin films with accurately controlled chemical compositions. In order to find better QAHE materials and facilitate its applications in low energy consumption electronic and spintronic devices, it is crucial to understand the various parameters that affect the QAHE. In this talk we report recent progress on the tuning and understanding of QAHE in magnetic topological insulators. In particular, we have carried out systematic experimental studies on the effect of magnetic doping level, film thickness, and electrical gate configurations on the QAHE. We show that the competition between surface and bulk transport, as well as that between magnetism and topology, are the crucial factors that determine the parameter space for the optimization of the QAHE. These results shed new lights on searching for better QAHE materials and novel device applications.

Yang Feng
Tsinghua Univ

Date submitted: 10 Nov 2016

Electronic form version 1.4