



清华大学高等研究院

Institute for Advanced Study, Tsinghua University

物理学术报告

Physics Seminars (biweekly)

- Title:** Chiral Majorana fermion from quantum anomalous Hall plateau transitions
- Speaker:** Jing Wang 王靖 (*Fudan University*)
- Time:** 4:00pm, Tuesday, Nov. 7, 2017
(3:30~4:00pm, Tea and Coffee)
- Venue:** Conference Hall 322, Science Building, Tsinghua University

Abstract

Topological superconductors (TSCs) are new states of quantum matter, which are characterized by a fully pairing gap in the bulk, and topologically protected gapless edge states consisting of Majorana fermions. Majorana fermion, being its own antiparticle, has potential applications in future quantum computations. Despite intensive searches, TSC and Majorana fermions are still hard to achieve.

Recently, we propose to realize a two-dimensional chiral TSC state from the quantum anomalous Hall plateau transition in a magnetic topological insulator thin film through the proximity effect to a conventional s-wave superconductor. Furthermore, we predicted the half-quantized plateau as smoking gun signature of chiral Majorana fermion. Remarkably, such half-quantized plateau has been observed in experiments as an evidence for chiral Majorana fermion edge state in the quantum anomalous Hall-superconductor system.

References:

- [1] X. L. Qi, T. L. Hughes, S. C. Zhang, Phys. Rev. B 82, 184516 (2010)
- [2] J. Wang, Q. Zhou, B. Lian, S. C. Zhang, Phys. Rev. B 92, 064520 (2015)
- [3] Q. L. He et al, Science 357, 294 (2017)
- [4] B. Lian, J. Wang, X. Sun, A. Vaezi, S. C. Zhang, arXiv: 1709.05558 (2017)