



清华大学高等研究院

Institute for Advanced Study, Tsinghua University

学术报告

- Title:** Observation of topological superconductivity and Majorana bound state in iron-based superconductor
- Speaker:** Hong Ding 丁洪
Institute of Physics, Chinese Academy of Sciences
- Time:** 3:30pm, Wednesday, Oct. 11, 2017
- Venue:** Conference Hall 322, Science Building, Tsinghua University

Abstract

The search for Majorana bound state (MBS) has recently emerged as one of most active research areas in condensed matter physics, due to its non-Abelian statistics which can be used for robust quantum computation. Currently, most experimental platforms for searching for MBS use the idea of topological insulator in proximity to BCS superconductor or similar ideas. Recently we discovered a new platform of Fe-based superconductor Fe(Te,Se) single crystal. By using spin-resolved and angle-resolved photoelectron spectroscopy, we observe that the iron-based superconductor $\text{FeTe}_{1-x}\text{Se}_x$ ($x = 0.45$, $T_c = 14.5$ K) hosts Dirac-cone type spin-helical surface states at Fermi level, which open an s-wave SC gap below T_c . By using scanning tunneling microscope on the same material, we clearly observe a pristine MBS inside a vortex core, well separated from non-topological bound states. These observations offer a robust platform for realizing and manipulating Majorana bound states at a relatively high temperature.