

Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

“Majorana mode in the vortex core and single-layer FeSe on SrTiO₃ with a superconducting T_c above 100”

Jinfeng Jia
Shanghai Jiao Tong University

Abstract: In the first part, I will talk about our efforts to identify Majorana fermions in the vortex core of superconducting topological insulators. We systematically investigated the spatial profile of the Majorana mode and the bound quasiparticle states within a vortex in Bi₂Te₃/NbSe₂. While the zero bias peak in local conductance splits right off the vortex center in conventional superconductors, it splits off at a finite distance ~ 20 nm away from the vortex center in Bi₂Te₃/NbSe₂, primarily due to the Majorana fermion zero mode. While the Majorana mode is destroyed by reducing the distance between vortices, the zero bias peak splits as a conventional superconductor again. This work provides strong evidences of Majorana fermions and also suggests a possible route to manipulating them. In the second part, I will talk about a direct transport measurement of high T_c superconductivity in the FeSe/STO system. By *in situ* 4-point probe technique that can be conducted at an arbitrary position of the single-layer FeSe films on STO, we detected superconductivity transition at a temperature above 100 K.

2:00pm
Thursday, February 6, 2014
Duboc Seminar Room (4-331)