



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: Interface enhanced superconductivity at 2D limit and potential to topological superconductivity in 3D Dirac semimetal

Speaker: Jian Wang (王健)
International Center for Quantum Materials, School of Physics, Peking University

Time: 4:00pm, Wednesday, May 6, 2015
(3:30~4:00pm, Tea, Coffee, and Cookie)

Venue: Conference Hall 322, Science Building, Tsinghua University

Abstract

By direct transport and magnetic measurements, we provide first direct evidence for high temperature superconductivity in the one unit cell (1-UC) FeSe films on insulating STO substrates with the onset T_c and critical current density much higher than those for bulk FeSe. This work may pave the way to enhancing and tailoring superconductivity by interface engineering. [1-3] Furthermore, by both *in situ* scanning tunneling microscopy/spectroscopy and *ex situ* transport and magnetization measurements, we find that the two-atomic-layer Ga film with graphene-like structure on wide band-gap semiconductor GaN is superconducting with T_c up to 5.4 K. This work offers a new platform to study two-dimensional (2D) superconductivity in metal-semiconductor heterostructures. [4] In addition, we firstly observe the superconductivity in crystalline 3D Dirac semimetal Cd₃As₂ with some signatures showing the possibility of topological superconductivity. [5,6]

References

- [1] Chin. Phys. Lett. 31, 017401 (2014); [2] Science 343, 230 (2014);
[3] Scientific Reports 4, 6040 (2014);
[4] Physical Review Letters 114, 107003(2015) (Editors' Suggestion);
[5] arXiv:1412.0330 [6] arXiv:1501.00418.