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: **Discovery of Weyl fermions in condensed matter**

Speaker: **Hong Ding** (丁洪)

Institute of Physics, Chinese Academy of Sciences

Time: **4:00pm, Wednesday, Oct 14, 2015**

(3:30~4:00pm, Tea, Coffee, and Cookie)

Venue: **Conference Hall 322, Science Building, Tsinghua University**

Abstract

Hermann Weyl proposed in 1929 that a massless solution of the Dirac equation can represent a new type of particle - Weyl fermion, which apparently breaks left-right symmetry. However, its existence in particle physics remains elusive after more than 80 years, e.g., neutrino has been regarded as a Weyl fermion until it was found to have mass. Recently, significant advances in topological materials have provided an alternative way to realize Weyl fermion in condensed matter as an emergent phenomenon. Weyl semimetals are predicted as a class of topological materials that can be regarded as three-dimensional analogs of graphene upon breaking time reversal or inversion symmetry. Electrons in a Weyl semimetal behave exactly as Weyl fermions, which have many exotic properties, such as chiral anomaly, magnetic monopoles in the crystal momentum space, and open Fermi arcs on the surface. In this talk I will report our discovery of a Weyl semimetal in TaAs by observing Fermi arcs in the surface states and Weyl nodes in the bulk states using angle-resolved photoemission spectroscopy.

Dr. Hong Ding obtained his BS degree in physics from Shanghai Jiao Tong University in 1990 and his PhD degree in physics from University of Illinois at Chicago in 1995. He was a Postdoctoral Fellow in Argonne National Laboratory from 1996 to 1998. He joined the Department of Physics at Boston College as assistant professor in 1998, and became associate professor in 2003 and full professor in 2007. He joined the Institute of Physics, Chinese Academy of Sciences in 2008. Over the past 20 years, he has made important contributions to understanding of high temperature superconductors (including cuprates and iron pnictides) by measuring their electronic structure and superconducting gap using angle-resolved photoelectron spectroscopy. He has published more than 180 papers with a total citation number over 9000, and has given more than 80 invited talks in international scientific conferences. He has received Aladdin Lamp Award from the Synchrotron Radiation Center, Wisconsin in 1995, Sloan Research Fellowship Award in 1999, Distinguished Research Award from Boston College in 2003, APS Fellow in 2011, and Thomson Reuters Highly Cited Researchers in 2014.