



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:** Quantum transport in topological insulators:
weak anti-localization and electron-electron interaction
- Speaker:** Hai-Zhou Lu (卢海舟)
(*The University of Hong Kong*)
- Time:** 3:15pm, Wednesday, March 26, 2014
(2:45~3:15pm, Tea, Coffee, and Cookie)
- Venue:** Conference Hall 322, Science Building, Tsinghua University

Abstract

Topological insulators are band insulators in their bulk but have “topologically protected” metallic states on their surface. In electronic transport experiments, one of few signatures of the topological surface states is the so-called weak anti-localization effect. It has been observed by many experiments, as a negative magnetoconductivity at low temperatures. Meanwhile, the weak anti-localization is also expected to enhance conductivity with decreasing temperature. However, an opposite temperature dependence was observed in most experiments. In this talk, I will clarify these contradictory observations. We show that the “opposite” temperature dependence in conductivity is due to the electron-electron interaction, while the weak anti-localization in magnetoconductivity is mainly contributed by the quantum interference.

About the speaker:

Haizhou Lu obtained his Ph.D. in Physics from IAS, Tsinghua University in 2007. From 2007 to present, he worked as a postdoc then research assistant professor at Department of Physics, The University of Hong Kong. His research interest is theoretical condensed matter physics, particularly, electronic and transport properties of mesoscopic systems, topological states of matter, and spintronics. His recent focus is to apply the quantum field theoretical methods to the transport and quantum phases in new materials, such as, topological insulators, the quantum anomalous Hall systems, MoS2 family, and other Dirac fermion systems.