# 北京大学量子材料科学中心
## International Center for Quantum Materials, PKU

# Quantum transport of Dirac fermions in topological insulators and $MoS_2$

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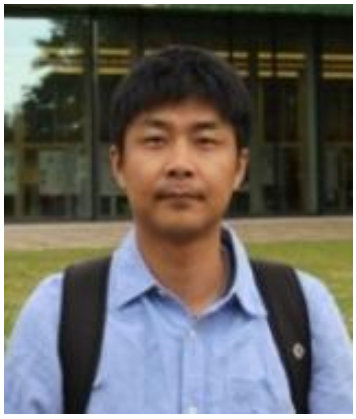

**Time: 11:00am, Jan. 9, 2014 (Thursday)**
**时间：2014年1月9日 （周四）上午11:00**
**Venue: Room 607, Conference Room A , Science Building 5**
**地点：理科五号楼607会议室**

## Abstract

In this talk, I will introduce our recent theoretical works, including: (i) The roles of the quantum interference and electron-electron interaction in the low-temperature low-field conductivity of topological insulators [1,5]. (ii) A quantum transport theory for the group-VI transition metal dichalcogenides (e.g. MoS2) [4]. (iii) The longitudinal and Hall conductances in the quantum anomalous Hall system [2,3], based on an effective model for topological insulator thin films [6].

**References**

[1] "Finite-temperature conductivity and magnetoconductivity of topological insulators", H. Z Lu and S. Q. Shen, arXiv:1312.0385.
[2] "Quantum transport in magnetic topological insulator thin films", H. Z. Lu, A. Zhao, and S. Q. Shen, PRL 111, 146802 (2013).
[3] "Extrinsic anomalous Hall conductivity of a topologically nontrivial conduction band", H. Z. Lu and S. Q. Shen, PRB 88, 081304(R) (2013).
[4] "Intervalley scattering and localization behaviors of spin-valley coupled Dirac fermions", H. Z. Lu, W. Yao, D. Xiao, and S. Q. Shen, PRL 110, 016806 (2013).
[5] "Competition between weak localization and anti-localization in topological surface states", H. Z. Lu, J. Shi, and S. Q. Shen, PRL 107, 076801 (2011).
[6] "Massive Dirac fermions and spin physics in an ultrathin film of topological insulator", H. Z. Lu, W. Y. Shan, W. Yao, Q. Niu, and S. Q. Shen, PRB 81, 115407 (2010).

## About the speaker

Haizhou Lu obtained his B.S. in Physics from Lanzhou University in 2002, and 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.