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

Seminar

Probing Quantum Materials by Scattering Spectroscopy: From Correlated Electrons to Topological Bands

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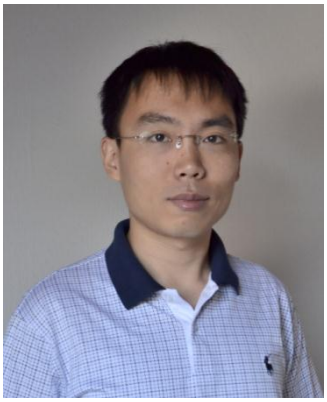

Time: 16:00pm, December 4, 2017 (Monday)
时间: 2017年12月4日 （周一）下午16:00
Venue: Room W563, Physics Building, Peking University
地点：北京大学物理楼 西563

Abstract

In this talk, I will present our group's recent research activity in addressing quantum materials' magnetic properties. Two topics will be covered after a brief introduction to our scattering spectroscopic methods. The first topic is about magnetism in Fe-based superconductors. Via a composite of polarized Raman and spin-polarized inelastic neutron scattering experiments, we find that magnetic interactions play a major role in defining the materials' so-called nematic phase behaviors. The low-energy manifestation of the magnetism is furthermore shown to be best captured by a multi-band and multi-orbital understanding of the itinerant electrons with significant spin-orbit coupling.

In the second part, I will present about an inelastic neutron scattering experiment for detecting a new type of Dirac points in the magnon bands of a 3D antiferromagnet, Cu_3TeO_6. These Dirac points are the limiting case of nodal lines with nontrivial Z_2-monopole charge recently proposed in theory, and they are new to the zoo of experimentally observed topological band crossings. The highly-interconnected spin network of Cu_3TeO_6 is essential to the success of our experimental observation, because it strongly suppresses quantum fluctuations. The implications of our results will be discussed.

About the Speaker

Dr. Yuan Li obtained his B.S. degrees from Peking University in 2004 and Ph.D. degree from Stanford University in 2010. From 2010 to 2012, he was a Humboldt Research Fellow at the Max Planck Institute for Solid State Research, Germany. He is currently a tenure-track associate professor at the International Center for Quantum Materials, Peking University. Dr. Li's research interests include phase behaviors and elementary excitations in correlated-electron materials. To determine these fundamental properties, his research group employs a broad range of scattering methods including neutron and X-ray scattering at public science facilities, as well as in-house Raman spectroscopy.