北京大学 Peking University

量子材料科学中心
International Center for Quantum Materials
Weekly Seminar

Heavy-Fermion: an ideal platform to study superconductivity and other quantum states

LU Xin

浙江大学理学部关联物质中心

- Time: 4:00pm, Oct. 9, 2013(Wednesday)
- 时间：2013年10月9日（周三）下午4:00
- Venue: Conference Room 607, Science Building 5
- 地点：理科5号楼607

Abstract

Heavy-Fermion materials have displayed rich physics ever since their discovery and unconventional superconductivity usually emerge as the system is tuned to a magnetic quantum critical point, suggesting magnetic spin fluctuations as the pairing glue. Superconductivity in CeIrIn5, sometimes considered as the unique member in the CeMIn5 family, is proposed to be related to a valence-instability. However, we demonstrate a unified pairing picture among CeMIn5 with field-rotating heat capacity measurements. The salient textured superconductivity in CeIrIn5 is also commonly observed in other heavy-Fermion materials in the presence of competing orders such as magnetism in CeRhIn5. For CeCoIn5, Cd doping and pressure act as reversible tuning parameters between magnetism and superconductivity. In contrast, a local droplet model is more consistent with the absence of quantum criticality as observed in the experiment, indicating an inhomogeneous electronic state in the Cd-doped CeCoIn5. If time permits, I will also discuss the application of point-contact spectroscopy in heavy fermion systems.

About the Speaker

LU Xin (路欣) has joined the center for correlated center at Zhejiang University since early 2013 as a Special Researcher. He received his bachelor's degree in physics from Peking University in 2003 and his Ph. D in condensed matter physics from University of Illinois at Urbana-Champaign in 2009. He has worked in Dr. Joe Thompson's group in Los Alamos National Laboratory as a postdoc researcher. His research focus now is on heavy-Fermion systems to study their quantum criticality and superconducting behaviors under extreme conditions (high pressure and low temperature…) through novel transport and thermodynamic measurements such as ac calorimeity and point-contact spectroscopy under pressure.