



清华大学高等研究院

Institute for Advanced Study, Tsinghua University

学术报告

Title: Quenched Disorder and Vestigial Nematicity
in the Pseudo-gap Regime of Cuprates

Speaker: Laimei Nie 聂莱莓
Stanford University

Time: 4:00pm, Thursday, Dec 18, 2014

Venue: Conference Hall 322, Science Building, Tsinghua University

Abstract

The pseudo-gap regime of high- T_c cuprates phase diagram exhibits a variety of mysterious behaviors. In the last few years, evidence from NMR/NQR, STM, and X-ray scattering experiments has shown a general tendency of short-range incommensurate charge-density-wave (CDW) order “intertwined” with superconductivity (SC). Additionally, transport, STM, and neutron-scattering have indicated the existence of long-range point-group symmetry breaking with an electron-nematic character, associated with CDW fluctuations. In this talk I will first present theoretical analysis of an effective field theory model of classical incommensurate CDW in the presence of weak quenched disorder. While long-range CDW order is precluded in such systems, any discrete symmetry breaking (nematic phase in this case) can generally survive up to a non-zero critical disorder strength. Implications of such “vestigial order” in the context of cuprates experiments will be discussed. The results of a generalized model including SC will be introduced as the second part of the talk.

报告人简介:

Laimei Nie received her Bachelor degree in physics from Tsinghua University in 2011, with a focus on theoretical condensed matter in Prof. Zheng-Yu Weng's group. From 2011 to present she is a PhD student in Prof. Steven Kivelson's group at Stanford University. Her main research interests include intertwined orders in cuprates and other unconventional superconductors, renormalization group approach to non-Fermi liquid behaviors, and applications of DMRG method to strongly correlated systems.