Seminar

Probing Quantum Orders in high-Tc cuprate superconductors

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Time: 16:00pm, June 4, 2018 (Monday)

时间： 2018年06月04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

The origin of unconventional superconductivity (SC) remains one of the most important challenges in condensed matter physics. Despite the diversity of materials, unconventional SC emerges nearly always in proximity to another ordered state, such as spin order and charge order, suggesting a fundamental connection between SC and charge/spin fluctuations. In this talk, I will describe the resonant inelastic X-ray scattering (RIXS) technique which has huge potential to probe several kinds of excitations at a time, from charge excitations to orbital excitations, to spin waves and lattice modes. I will show our recent RIXS studies probing magnetic excitations and charge orders in cuprates. These include: (i) The relationship between the crystal structure and the extent of hopping integrals in parent compounds, and the detrimental role of apical oxygens in superconductivity. (ii) The evolution of the magnetic excitations across the entire phase diagram of cuprates. (iii) Discovery of a re-entrant charge order outside the pseudogap regime in overdoped $(Bi,Pb)_{2.12}Sr_{1.88}CuO_{6+\delta}$, showing the ubiquitous of charge order across the entire phase diagram and inviting revision of theories that posit an essential link between the charge order and pseudogap states.

About the Speaker

Yingying Peng received her BS from Wuhan University in 2008, and PhD from Institute of Physics, Chinese Academy of Sciences in 2013. From 2013 to 2017, she worked as a postdoctoral fellow in Polytechnic University of Milan, Italy. From 2015 to 2017, she was also a visitor in beamline ID32 (soft X-ray spectroscopy), ESRF, France. She was responsible for the optical design of resonant inelastic X-ray scattering (RIXS) spectrometer for European X-ray free-electron laser (XFEL), Germany. She is currently working as a Postdoctoral Research Associate in University of Illinois at Urbana-Champaign. She has published more than 30 papers, including Nature Materials, Nature Physics, Nature Communications, PNAS, Physical Review Letter, etc.