



Seminar

Resonant Inelastic X-ray Scattering study on Charge Order and Magnetic Excitations in high- T_c cuprate superconductors

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Time: 10:00am, Dec. 7, 2017 (Thursday)

时间: 2017年12月7日 (周四) 上午10:00

Venue: Room W563, Physics building, Peking University

地点: 北京大学物理楼, 西563会议室

Abstract

Resonant Inelastic X-ray Scattering (RIXS) is a photon-in and photon-out technique which becomes popular in recent years due to the fast progress in the instrumentation and by important theoretical achievements [1]. RIXS can be used in a very effective way to study the charge and spin excitations in strongly correlated 3d transition-metal systems.

In this seminar, I will present the Cu L3 RIXS study on charge order (CO) and magnetic excitations in cuprate high- T_c superconductors. High resolution RIXS has been used to determine the relation between crystal structure and the extent of hopping integrals in parent compounds, revealing why apical oxygens are detrimental to superconductivity [2]. Resonant soft x-ray scattering has emerged as the most sensitive method that uncover CO competing with superconductivity [3]. By utilizing the high sensibility and resolution of the new RIXS beamline in ESRF, we have revealed the short-ranged CO in the optimally doped single layer $(\text{Bi,Pb})_2(\text{Sr,L a})_2\text{CuO}_{6+\delta}$ (Bi2201) [4]. More intriguingly, we have discovered a re-entrant CO with long-range correlation in overdoped Bi2201 outside the pseudogap regime [5]. The underlying origin and implication of the new results will be discussed.

References:

[1] Ament *et al.*, *Rev. Mod. Phys.* **83**, 705 (2011). [2] Peng *et al.*, *Nat. Phys.* (2017) doi:10.1038/nphys4248. [3] Ghiringhelli *et al.*, *Science* **337**, 821 (2012). [4] Peng *et al.*, *Phys. Rev. B* **94**, 184511 (2016). [5] Peng *et al.*, arXiv:1705.06165.

About the speaker

Dr. Yingying Peng (彭莹莹) received her BS degree from Wuhan University in 2008 and PhD degree from Institute of Physics, Chinese Academy of Sciences (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 visiting scientist at 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) in Hamburg, Germany. She is experienced in angle-resolved photoemission spectroscopy (ARPES) and RIXS study of strongly correlated materials. Recently, she is using high-resolution RIXS to study the charge, spin, orbital and lattice excitations and their interplay in cuprate superconductors.