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Competing orders/fluctuations in high-temperature superconductors probed by ARPES

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Abstract Competition between magnetism, charge order, and superconductivity observed in various high-temperature superconductors has been the subject of extensive research. Through the observation of band folding signature caused by such orders or fluctuations, ARPES yields deep insights into the nature of competing orders whose fluctuations might enhance the superconductivity. In this talk, two dramatic observations are presented and discussed: (i) In electron-doped cuprates after “protect annealing”, the band folding due to short-range antiferromagnetic order is suppressed while the signature of charge fluctuations remains as strong as the hole-doped cuprates [1]. (ii) In a parent compound BaFe2As2 of iron-based superconductors, the band folding signature of the antiferromagnetic order persists well above the Neel temperature, i.e., into the so-called “nematic phase”, which we attribute to the existence of antiferro-orbital component in the latter phase.

Reference [1] M. Hiroi et al., arXiv:1502.03395.

C.V. Prof. Fujimori received his B.S., M.S. and Ph.D. degree from the Department of Physics, University of Tokyo. He has been in the faculty of the University of Tokyo since 1988. His research focuses on photoemission spectroscopy of correlated materials, in particular, high-temperature superconductors, transition-metal oxides and magnetic semiconductors and their nano-structures. Currently, his research group study the electronic structures of strongly correlated systems using high-energy spectroscopic techniques such as photoemission spectroscopy, x-ray absorption spectroscopy and x-ray magnetic circular dichroism using synchrotron radiation. Prof. Atsushi Fujimori was awarded many prizes including Toray Science and Technology Award, Sumitomo Foundation Basic Science Award, IBM Japan Science Prize and Superconductivity Science and Technology Prize.