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ARPES studies of the electronic structure of Fe-based superconductors[1]

DONGHUI LU, Stanford University

The recent discovery of superconductivity in Fe-based layered compounds has created renewed interest in high temperature superconductivity. With a superconducting transition temperature as high as 55 K, this discovery provides a new direction to understand the essential ingredients for achieving a high superconducting transition temperature. In this talk, I will present our recent angle-resolved photoemission spectroscopy (ARPES) studies on LaOFeP and (Ba,K)Fe_2As_2 systems, with special emphasis on the basic electronic structure of the parent compounds. For LaOFeP, quantitative agreement can be found between our ARPES data and the LDA band structure calculations, suggesting that a weak coupling approach based on an itinerant ground state may be more appropriate for understanding this new superconducting compound [1]. On the other hand, the picture for (Ba,K)Fe_2As_2 system is more complicated. I will discuss two important issues in these FeAs compounds: 1) the unexpected Fermi surface topology in both undoped and doped compounds; 2) the peculiar signature of the SDW transition in ARPES spectra for the parent compound.

[1] D. H. Lu, M. Yi, S.-K. Mo, A. S. Erickson, J. Analytis, J.-H. Chu, D. J. Singh, Z. Hussain, T. H. Geballe, I. R. Fisher & Z.-X. Shen, Nature 455, 81 (2008).

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