Electronic structure of iron chalcogenides

D. L. Feng

State Key Laboratory of Surface Physics, Department of Physics, and Advanced Materials Laboratory, Fudan University, Shanghai, China

In the newly discovered $A_xFe_{2-y}Se_2$ (A=K,Cs) with a superconducting transition temperature of about 30 K, large electron Fermi surfaces are observed around the zone corners with an almost isotropic superconducting gap of ∼10.3 meV, while there is no hole Fermi surface near the zone center, which demonstrate the inter-band scattering or Fermi surface nesting is not a necessary ingredient for the unconventional superconductivity in iron-based superconductors. Thus, the sign change in the $s^{\pm}$ pairing symmetry driven by the inter-band scattering as suggested in many weak coupling theories becomes irrelevant in describing the superconducting state here. A more conventional s-wave pairing is likely a better description.[1]
The electronic structure of other iron chalcogenides will be discussed as well.[2]

[1]Y. Zhang et al. Nature. Materials **10**, 273 (2011).
[2]Work done in collaboration with Jiangping Hu, Xianhui Chen, Y. Zhang, Z. R. Ye, Q. Q. Ge, M. Xu, L. X. Yang, F. Chen, C. He, D. H. Lu, M. Shi, M. Matsunami, and S. Kimura

INVITED PAPER