YIMING XU

Materials Science Division, LBNL

ISOTROPIC SUPERCONDUCTING GAPS WITH ENHANCED PAIRING ON ELECTRON FERMI SURFACES IN $FeTe_{0.55}Se_{0.45}$

The momentum distribution of the energy gap opening at the Fermi level of superconductors is a direct fingerprint of the pairing mechanism. While the phase diagram of the iron-based superconductors promotes antiferromagnetic fluctuations as a natural candidate for electron pairing, the precise origin of the interaction is highly debated. We used angle-resolved photoemission spectroscopy to reveal directly the momentum distribution of the superconducting gap in $FeTe_{1-x}Se_x$, which has the simplest structure of all iron-based superconductors. We found isotropic superconducting gaps on all Fermi surfaces whose sizes can be fitted by a single gap function derived from a strong coupling approach, strongly suggesting local antiferromagnetic exchange interactions as the pairing origin.

In collaboration with H. Miao, P. Richard, Y. Tanaka, K. Nakayama, T. Qian, K. Umezawa, T. Sato, Y.-B. Shi, N. Xu, X.-P. Wang, P. Zhang, H.-B. Yang, Z.-J. Xu, J.-S. Wen, G.-D. Gu, X. Dai, J.-P. Hu, T. Takahashi and H. Ding