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Observation of an orbital selective electron-mode coupling in Fe-based high-Tc superconductors PIERRE RICHARD, WPI, Tohoku University, T. SATO, K. NAKAYAMA, Dep. Physics, Tohoku University, S. SOUMA, WPI, Tohoku University, Y.-M. XU, Boston College, G.F. CHEN, J.L. LUO, N.L. WANG, H. DING, Chinese Academy of Sciences, T. TAKAHASHI, WPI and Dep. Physics, Tohoku University — The recent discovery of Fe-based superconductors with critical temperatures up to 56 K raises the prospect of unconventional superconducting pairing mechanism. While the electronic pairing in conventional superconductors is mediated by phonons, its nature in the Fe-based high-T_c superconductors is unknown. A direct signature of an electron-mode coupling is an anomaly in the electronic energy dispersion (kink). For example, previous angle-resolved photoelectron spectroscopy (ARPES) studies revealed a kink in cuprates, which is believed to be linked to the pairing. We report an ARPES observation of a kink around 25 meV in the dispersion of superconducting $Ba_{0.6}K_{0.4}Fe_2As_2$ that nearly vanishes above T_c. The energy scale of the related mode (13$\pm$2 meV) and its strong dependence on orbital and temperature indicates that it is unlikely related to phonons. Moreover, the momentum locations of the kink can be connected by the antiferromagnetic wavevector. Our results point towards an electronic origin of the mode and the superconducting pairing in the Fe-based superconductors, and strongly support the anti-phase s-wave pairing symmetry.

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