Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Orbital-dependent electronic correlations in iron chalcogenide superconductors M. YI, Stanford Univ, Z.K. LIU, Stanford University, Y. ZHANG, SLAC National Accelerator Laboratory, R. YU, Rice University, J.J. LEE, Stanford University, R.G. MOORE, F.T. SCHMITT, W. LI, S.C. RIGGS, SLAC National Accelerator Laboratory, J.-H. CHU, Stanford University, B. LV, University of Houston, J. HU, T.J. LIU, Tulane University, M. HASHIMOTO, SLAC National Accelerator Laboratory, S.K. MO, Z. HUSSAIN, Advanced Light Source, Lawrence Berkeley National Lab, Z.Q. MAO, Tulane University, C.W. CHU, University of Houston, I.R. FISHER, Stanford University, Q. SI, Rice University, Z.X. SHEN, Stanford University, D.H. LU, SLAC National Accelerator Laboratory — The strength of electronic correlations is a fundamental question that has not been fully settled for the iron-based superconductors. There appears to be a systematic trend among the various families of FeSC, from relatively weak correlation in the iron phosphides, to moderate in iron arsenides, to relatively strong in iron chalcogenides. In this study using angle-resolved photoemission spectroscopy, we find a generic behavior in the three families of iron chalcogenides: KxFe2-ySe2, Fe(Te,Se), and FeSe thin films, in which there is an orbital-dependent correlation effect with the dxy orbital strongly renormalized. Moreover, with raised temperature, we find that the dxy orbital-dominated bands in all three materials lose spectral weight while the other orbitals remain metallic. Hence we find this crossover from a metallic superconducting state at low temperatures to an orbital-selective Mott phase at high temperatures to be universal for iron-chalcogenide superconductors.

M. Yi
Stanford Univ

Date submitted: 14 Nov 2013 Electronic form version 1.4