Evidence of Strong Coupling in Antiferromagnetic Ordered Iron Chalcogenide Fe_{1.02}Te Observed by Photoemission

ZHONGKAI LIU, Stanford University, RUIHUA HE, Lawrence Berkeley National Laboratory, DONGHUI LU, SLAC National Accelerator Laboratory, MING YI, Stanford University, YULIN CHEN, MAKOTO HASHIMOTO, ROB MOORE, SLAC National Accelerator Laboratory, SUNGKWAN MO, Lawrence Berkeley National Laboratory, JIN HU, TIJIANG LIU, ZHIQIANG MAO, Tulane University, THOMAS DEVEREAUX, SLAC National Accelerator Laboratory, ZAHID HUSSAIN, Lawrence Berkeley National Laboratory, ZHI-XUN SHEN, Stanford University, STANFORD UNIVERSITY TEAM, SLAC NATIONAL ACCELERATOR LABORATORY TEAM, TULANE UNIVERSITY COLLABORATION, LAWRENCE BERKELEY NATIONAL LABORATORY COLLABORATION — The role of many-body effects is one of the central questions for unconventional superconductivity. For the recently discovered iron-based superconductors, the strength of electronic correlations is still an unsettled issue. For one of them, iron chalcogenides, a strong correlation scenario has both been proposed by theory and suggested by experiments. However, the metallic behavior in the antiferromagnetic ordered state in Fe_{1.02}Te seems to deviate from such scenario. Our discovery of evidence of strong coupling in electronic band-structure probed by angle resolved photoemission (ARPES) reconciles this contrast. Our finding also highlights the non-trivial enrichment of many-body effects when multiple ingredients of interactions reinforce each other.

Zhongkai Liu
Stanford University

Date submitted: 11 Nov 2011