

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Orbital-selective Correlation Effects in Alkali Metal Iron Pnictides WEICHENG LV, Rice University, RONG YU, Renmin University of China, JIAN-XIN ZHU, Los Alamos National Laboratory, QIMIAO SI, Rice University — There is growing evidence for the substantial electronic correlations in the iron based superconductors. In particular, recent experiments have revealed strong orbital-selective correlation effects in the series of alkali metal iron pnictides AFe_2As_2 ($\text{A} = \text{K}, \text{Rb}, \text{Cs}$). Among the important questions is how these systems, with a 3d-electron filling $n = 5.5$ per site, differs from the parent iron pnictides, which has $n = 6$. Here, we address these issues in a five-orbital Hubbard model with filling $n = 5.5$, using the $U(1)$ slave-spin method. As the lattice parameters increase from K to Rb, then to Cs, we are able to identify the systematics in the orbital-selective Mott behavior as the correlation effects are enhanced due to the reduced bandwidth. We discuss the implications of our results for the quasiparticle mass as well as for the spin spectral weight.

Weicheng Lv
Rice University

Date submitted: 14 Nov 2014

Electronic form version 1.4