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Electron correlation and spin density wave order in iron pnictides

SEN ZHOU, Rutgers University, ZIQIANG WANG, Boston College — We study the correlation effects on the electronic structure and spin density wave order in Fe-pnictides. Using the multiorbital Hubbard model and Gutzwiller projection, we show that nonperturbative correlation effects are essential to stabilize the metallic spin density wave phase for the intermediate correlation strengths appropriate for pnictides. We find that the ordered moments depend sensitively on the Hund's rule coupling J but weakly on the intraorbital Coulomb repulsion U, varying from $0.3\mu_B$ to $1.5\mu_B$ in the range $J = 0.3 \sim 0.8$ eV for $U = 3 \sim 4$ eV. We obtain the phase diagram and discuss the effects of orbital order and electron doping, the evolution of the Fermi surface topology with the ordered moment, and compare to recent experiments.

Sen Zhou
Rutgers University

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