Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Are Spinwaves Glue for Cooper Pairs in Iron-Pnictide High-T_c Superconductors?[1] JOSE RODRIGUEZ, California State University at Los Angeles — We study the 2-orbital t-J model over the square lattice via Schwinger-boson-slave-fermion mean-field theory and by exact numerical diagonalization of two holes over a 4×4 grid. The two orbitals in question are the degenerate $d\pm = 3d_{(x\pm iy)z}$ ones, which maximize the Hund's Rule coupling. The mean-field theory predicts the existence of a quantum critical point (QCP) that separates a commensurate spin-density-wave (cSDW) metal at strong Hund's Rule coupling from a hidden half metal at weak Hund's Rule coupling. Holes in the hidden half metal hop through a $\nwarrow_{d+}\searrow_{d-}$ spin background without much hopping across orbitals. Mean-field theory further predicts a critical spin-wave spectrum that shows hidden low-energy excitations at zero momentum, and that shows observable low-energy excitations at cSDW momenta. We find that the virtual exchange of such spin-waves by mobile holes can be attractive, and that it can result in the formation of hole pairs. We seek to corroborate this by exact diagonalization of two holes in the 2-orbital t-J model.

[1]Research supported in part by the AFOSR under grant FA9550-09-1-0660.

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Date submitted: 11 Nov 2011 Electronic form version 1.4