MAR12-2011-020358

Abstract for an Invited Paper
for the MAR12 Meeting of
the American Physical Society

**Orbital Order and Orthorhombic Anisotropy in Iron Pnictides**[1]

CHENG-CHIEN CHEN, Stanford Institute for Materials and Energy Science, SLAC National Accelerator Laboratory

Orthorhombic anisotropy has been reported in iron-pnictide superconductors by a broad range of experiments, including neutron scattering, transport measurements, and a variety of spectroscopies. We explore the idea that these observed anisotropies of broken tetragonal symmetry stem from an ordering of the partially-filled iron d-orbitals. In particular, we will consider a model Hamiltonian that couples the spin and orbital variables, and show that this spin-orbital model captures several observed behaviors in the iron-pnictide materials. We will conclude the talk by discussing x-ray absorption linear dichroism and other recent experiments supportive of theories highlighting the orbital degrees of freedom.

[1]Research supported by the U.S. Department of Energy under contract No. DE-AC02-76SF00515. Work in collaboration with the research groups of Thomas Devereaux and Rajiv Singh.