Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Tunneling Spectroscopy in Iron Pnictides to Track Orbital Splitting and Spin Density Waves NACHUM PLONKA, Stanford University, SLAC National Laboratory, Stanford Institute for Materials and Energy Sciences, ALEXANDER KEMPER, Lawrence Berkeley National Laboratory, THOMAS DEVEREAUX, Stanford University, SLAC National Laboratory, Stanford Institute for Materials and Energy Sciences, SIEGFRIED GRASER, ARNO KAMPF, Augsburg University, Augsburg, Germany — In iron-based superconductors, nematicity has been reported in transport measurements and a broad range of spectroscopies, including angle-resolved photoemission, neutron scattering, and scanning tunneling spectroscopy (STS). Several theories have attributed these observed anisotropies of broken tetragonal symmetry to either pure spin physics or unequal occupation of the iron d-electron orbitals, referred to as orbital ordering. We use realistic multi-orbital tight-binding Hamiltonians and T-matrix formalism to explore the effects of non-magnetic impurities in an orbitally split and spin density wave (SDW) state. In each of these, the local density of states around the impurity in both position space and Fourier-transformed quasiparticle interference (QPI) have very specific signatures that may be observable in STS. These allow one to identify and track the evolution of orbital splitting and SDW gaps in regimes that have not previously been explored.

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Date submitted: 15 Nov 2012 Electronic form version 1.4