Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

**Anisotropic transport properties of the paramagnetic state of iron-based superconductors** JOERG SCHMALIAN, Institut fur Theorie der Kondensierten Materie, Karlsruher Institut fur Technologie, ELIHU ABRAHAMS, University of California Los Angeles, RAFAEL FERNANDES, Columbia University and Los Alamos National Lab — Recent experiments in detwinned iron-pnictide samples have revealed strong anisotropies in the in-plane transport properties of the paramagnetic state. Since these anisotropies cannot be attributed solely to the small orthorhombic distortion of the lattice, it has been proposed that an underlying anisotropic electronic order is at play. One of the candidates is the Ising-nematic order that emerges due to the degeneracy of the magnetic ground state. Here we present a microscopic model for the transport properties of this nematic phase, considering both the elastic scattering by impurities as well as the inelastic scattering by anisotropic spin fluctuations. We show that the interference between these two scattering channels give rise to anisotropic non-Fermi liquid transport properties. In particular, we explain the observed sign of the resistivity anisotropy in electron-doped samples and predict a sign-change for sufficiently hole-doped samples. We also address the suppression of the resistivity anisotropy with sample annealing, as well as its dependence on alkaline-earth substitution. Finally, we discuss the predictions of our model to the thermopower anisotropy.

Joerg Schmalian
Karlsruher Institut fur Technologie

Date submitted: 11 Nov 2011 Electronic form version 1.4