Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Numerical Studies of Doped Iron Pnictides[1] CHRISTOPHER BISHOP, SHUHUA LIANG, ADRIANA MOREO, ELBIO DAGOTTO, Univ of Tennessee, Knoxville — The phase diagram of electron-doped pnictides is studied varying the temperature, electronic density, and isotropic disorder strength and dilution via numerical studies of a three-orbital spin-fermion model with lattice degrees of freedom [1]. Doping introduces disorder but in theoretical studies the effect of the randomly located dopants is difficult to address. Numerically the effects of electronic doping, regulated by a chemical potential, and impurity disorder at randomly selected sites can be independently controlled. It was found that the reduction with doping of the Neel and the structural transition temperatures, and the stabilization of a nematic state, is mainly controlled by the magnetic dilution due to the disorder. Fermi surface changes due to doping affect only slightly both critical temperatures. Our findings are compatible with neutron scattering and STM results, unveiling a patchy network of locally magnetically ordered anisotropic clusters, despite the isotropic disorder. The fragile tendency to nematicity intrinsic of translational invariant electronic systems needs to be supplemented by disorder and dilution to stabilize the robust nematic phase experimentally found in electron-doped 122 pnictides. [1] S. Liang et al., Phys. Rev. B 92, 104512 (2015).

[1]National Science Foundation Grant No. DMR-1404375

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Date submitted: 03 Nov 2015 Electronic form version 1.4