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Nematic state of the pnictides induced by the interplay between the spin, orbital, and lattice degrees of freedom SHUHUA LIANG, ADRIANA MOREO, ELBIO DAGOTTO, Department of Physics, University of Tennessee and Materials Science and Technology Division, ORNL — The nematic state with orthorhombic distortion observed in several iron based superconductors is stabilized in the undoped three-orbital (xz , yz , xy) spin-fermion model [1] via the addition of lattice degrees of freedom. The Monte Carlo simulations show that the electron-phonon coupling is not sufficient to stabilize the experimentally observed lattice distortion. The nematic phase is induced instead by the spin-lattice coupling. The interplay between the coupling strength of the lattice to the magnetic and charge degrees of freedom determines the separation between the structural and the magnetic transitions. Experimental results for the anisotropic behavior of the resistivity and the orbital spectral weight as a function of the temperature are also reproduced by the numerical simulations.[2] [1] S. Liang, G. Alvarez, C. Sen, A. Moreo, and E. Dagotto, Phys. Rev. Lett. 109 047001 (2012) and references therein. [2] S. Liang, A. Moreo, and E. Dagotto, submitted for publication.

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