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Reconstructed electronic structure from orbital ordering and antiferromagnetism in the iron pnictides WEICHENG LV, PHILIP PHILLIPS, Department of Physics, University of Illinois — Recent experimental developments have unambiguously demonstrated the in-plane electronic and magnetic anisotropy of the iron-based superconductors. It has been argued that this nematic state can arise from orbital ordering physics. Including an energy splitting term that breaks the degeneracy of the Fe d_{xz} and d_{yz} orbitals, we solve the multi-orbital Hubbard model within a mean-field approximation. Despite sensitivity of the resulting state to the input parameters, we find that a weak orbital order that places the d_{yz} orbital slightly higher in energy than the d_{xz} orbital, along with the interactions U and J being of intermediate strength, is compatible with current experimental results. In this regime, the stripe antiferromagnetism is further stabilized and the existence of the Dirac cones is preserved. Furthermore, this anisotropic electronic state leads to the observed resistivity anisotropy and STM interference patterns. Finally the relation between orbital order and superconductivity is discussed.

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