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Magnetic state of $K_{0.8}Fe_{1.6}Se_2$ from a five-orbital Hubbard model in the Hartree-Fock approximation[1] QINLONG LUO, ANDREW NICHOLSON, ADRIANA MOREO, ELBIO DAGOTTO, Univ. of Tennessee/ORNL, JOSÉ RIERA, Universidad Nacional de Rosario, DAO-XIN YAO, Sun Yat-Sen Univ. — The five-orbital Hubbard model (without lattice distortions) is investigated to study theoretically the recently discovered Fe-based superconductors $K_{0.8}Fe_{1.6}Se_2$, by using the real-space Hartree-Fock approximation and employing a 10×10 Fe cluster with Fe vacancies in a $\sqrt{5}\times\sqrt{5}$ pattern[1]. The phase diagram contains an insulating state with the same spin pattern as observed experimentally, involving 2×2 ferromagnetic plaquettes coupled with one another antiferromagnetically. The magnetic moment $\sim3\mu_B$/Fe is in good agreement with experiments. Several other competing phases are also stabilized in the phase diagram, in agreement with recent calculations using phenomenological models. [1] Qinlong Luo *et al.*, Phys. Rev. B **84**, 140506(R) (2011), and references therein.

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