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Role of Degeneracy, Hybridization, and Nesting in the Properties of Multi-Orbital Systems ANDREW NICHOLSON, QINGLONG LUO, WEIHAO GE, University of Tennessee and Oak Ridge National Laboratory, JOSE RIERA, Universidad Nacional de Rosario, MARIA DAGHOFER, IFW Dresden, GEORGE MARTINS, Oakland University, ADRIANA MOREO, ELBIO DAGOTTO, University of Tennessee and Oak Ridge National Laboratory — To understand the role that degeneracy, hybridization, and nesting play in the magnetic and pairing properties of multiorbital Hubbard models we here study numerically two types of two-orbital models, both with hole-like and electron-like Fermi surfaces (FS's) that are related by nesting vectors (π, 0) and (0, π) [1]. In one case the bands that determine the FS's arise from strongly hybridized degenerate dxz and dyz orbitals, while in the other the two bands are determined by non-degenerate and non-hybridized s-like orbitals. In the weak coupling regime it is shown that only the model with hybridized bands develops metallic magnetic order, while the other model exhibits an ordered excitonic orbital-transverse spin state that is insulating and does not have a local magnetization. Thus this state would be observed by ARPES experiments, but not by neutron scattering. However, both models display similar insulating magnetic stripe ordering in the strong coupling limit when Coulomb interactions create strong hybridization of the orbitals.

[1] A. Nicholson, et al., Phys. Rev. B 84, 094519 (2011).

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