

Abstract Submitted
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Interaction and distortion driven topological phases in multi-band lattices¹ JUN WEN, MEHDI KARGARIAN, GREGORY FIETE, University of Texas at Austin — In this work we investigate the phase diagram of $5d$ transition metal oxides on the pyrochlore lattice. In particular, the competition between Coulomb interaction, spin-orbit coupling and distortion are discussed. Spin-orbit coupling entangles the spin and t_{2g} orbitals giving rise to doublet $j = 1/2$ and quadruplet $j = 3/2$ states. While most previous works discussed the doublet manifold, we focus on the quadruplet manifold which is relevant for several perovskites. Coulomb interaction is taken into account using the slave-rotor mean field theory and we obtain a phase diagram for this model, which includes exotic phases. We extend the model by including lattice distortion which further splits the quadruplet $j = 3/2$ manifold. Under a variety of distortions a topological phase is stabilized, and we discuss how the overall phase diagram is altered with lattice distortions.

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