

Abstract Submitted
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Time-reversal symmetry breaking and anomalous Hall effect in heavy fermion metals WENXIN DING, QIMIAO SI, Department of Physics and Astronomy, Rice University — Motivated by recent experimental evidence for a possible chiral spin liquid phase in the metallic pyrochlore heavy fermion iridates ($\text{Pr}_2\text{Ir}_2\text{O}_7$) [Phys.Rev.Lett, **96**, 087204 (2006), Phys.Rev.Lett **98**, 057203 (2007), Nature **463**, 210 (2010), Phys.Rev.Lett, **106**, 217204 (2011)], we study the effect of Kondo coupling on a time-reversal symmetry breaking state of the $J_1 - J_2$ model on square lattices. We use a slave fermion representation for the f -moments which are coupled to conduction electrons, and study the mean field solution in the large-N limit. We calculate the ground state energies of various feasible states, and map out the mean field phase diagram by energetic consideration. As the probe for time-reversal symmetry breaking, we calculate the anomalous Hall response for the chiral phase. Finally we discuss the implications of our results on the pyrochlore heavy-fermion iridates.

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