

Abstract Submitted
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Anomalous Hall Effect in Frustrated Kondo Lattices and Implications for Heavy Fermion System $\text{Pr}_2\text{Ir}_2\text{O}_7$ WENXIN DING, QIMIAO SI, Physics & Astronomy Department, Rice University — $\text{Pr}_2\text{Ir}_2\text{O}_7$ is a frustrated Kondo system that has a large zero field anomalous Hall Effect, which hints for a chiral spin liquid ground state of the local moments. Recently, thermodynamic measurements reveal a divergent Grüneisen ratio, which indicates a nearby quantum critical point [1]. Motivated by these findings, we study the prototype chiral spin liquid state on the J1-J2 square lattice with Kondo coupling, and use it as a probe of the Kondo destruction quantum phase transition. For the Kondo screened phase, we study the topological properties of the hybridized heavy quasi-particle bands, and show that they yield a zero-field anomalous Hall effect. For the Kondo destroyed phase, we derived such Hall response by showing that the chiral spin liquids state mediates an effective chiral interaction among the electrons. The behavior of the Hall response on approach, and across, the quantum critical point is discussed based on these calculations.

[1] Y. Tokiwa et al, to be published (2013).

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