Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Berry phase effects in the quantum phase transitions of Kondo lattice systems[1] PALLAB GOSWAMI, QIMIAO SI, Rice University — There is considerable interest to determine the various quantum phases and phase transitions in the global phase diagram of the antiferromagnetic heavy fermion systems. Recent studies on the Kondo lattice model have used a quantum nonlinear sigma model representation. While these studies have captured the physics of the antiferromagnetic ordered phase with a Kondo destruction and, correspondingly, the small Fermi surface, how to access the phase transition from the antiferromagnetic side remains an open problem. It is to be expected that topological defects and the Berry's phase are important to the physics of Kondo singlet formation. Here, we consider the simpler case of one-dimensional Kondo-Heisenberg lattice model at and away from the half-filling. We demonstrate the crucial role that instanton configurations of the non-linear-sigma-model fields play in leading to Kondo-like properties. The case of Kondo lattice systems in higher dimensions is also briefly commented on.

[1]NSF/DMR

Pallab Goswami
Rice University

Date submitted: 23 Nov 2009 Electronic form version 1.4