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Fermi Surface of the Kondo Lattice Antiferromagnets and Ferromagnets: A Continuum Field Theory Approach SEIJI YAMAMOTO, QIMIAO SI, Rice University — Studies in the quantum phase transitions of heavy fermion metals have raised the question about the nature of the Fermi surface in a heavy fermion antiferromagnet (AF). Related questions are relevant to their ferromagnetic (FM) counterparts. Here, we study the Kondo lattice model in the limit that the Kondo coupling is small compared to the direct (RKKY) exchange coupling. We map the spin-1/2 Heisenberg Hamiltonian for the local moment component to a quantum nonlinear sigma model. This leads to an effective coupling between a vector boson field and the conduction electrons, which is dominated by the forward-scattering channel. There is also a Berry phase term which can be ignored in the AF case, but must be included in the FM case. We establish that the Fermi surface in the AF case is small [1], and also present the results for the FM case. The implications for the global zero-temperature phase diagram of the FM/AF heavy fermions are discussed. [1] S. J. Yamamoto and Q. Si, cond-mat/0610001

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