Towards a unification of local moment magnetism and the Kondo lattice JEROME RECH, Rutgers University, CEA Saclay, PIERS COLEMAN, Rutgers University, GERGELY ZARAND, Budapest University of Technology and Economics, OLIVIER PARCOLLET, SPhT CEA Saclay — We apply the Schwinger boson scheme to the fully screened Kondo model and generalize the method to include antiferromagnetic interactions between ions. Our approach unifies the Kondo impurity approach of Parcollet and Georges with the Schwinger boson description of antiferromagnetism of Arovas and Auerbach, enabling the formalism to describe magnetically correlated and magnetically ordered heavy electron phases. For the single impurity, our approach captures the Kondo crossover from local moment behavior to a Fermi liquid with a non-trivial Wilson ratio. When applied to the two impurity model, the mean-field theory describes the "Varma Jones" quantum phase transition between a valence bond state and a heavy Fermi liquid. We will extend the method to the Kondo lattice, and explore the nature of the phase diagram connecting the heavy electron phase, the magnetic phase and the spin-liquid phase.

Jerome Rech
Rutgers University, CEA Saclay

Date submitted: 06 Dec 2005   Electronic form version 1.4