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Non-linear Sigma Model of Kondo Lattice in Antiferromagnetic Regime TZEN ONG, Stanford University, BARBARA JONES, IBM Almaden Research Center — We analyze the antiferromagnetic transition in heavy fermion compounds in two dimensions, which we study using the Kondo-Heisenberg model. The system is assumed to be in the antiferromagnetic regime, with a Heisenberg coupling (J_H) that is larger than the Kondo coupling (J_K). The Heisenberg terms are mapped onto a non-linear sigma model, and the fermions are then formally integrated out to obtain an effective theory for the Neel field. We then study the evolution of the Heisenberg and Kondo couplings under renormalization, and calculate the critical exponents at the phase transition. We also find that a mean field calculation of this model gives a pairing state (superconductivity) in part of the J_H /J_K phase space. By symmetry arguments, unless the transition from AFM to SC is first order, this suggests the existence of a new state in between the antiferromagnetic and SC states, and we consider the possibility of a novel new ground state in this regime.

Tzen Ong
Stanford University

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