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Supersymmetric SP(N) spin representation for heavy fermion systems[1] ALINE RAMIRES, PIERS COLEMAN, Rutgers University — In heavy fermion materials, the character of the spin correlations change radically between the antiferromagnetic and fermi liquid region of the phase diagram. In the latter, the spin behaves as a bosonic object, condensing into magnetic order, which we traditionally describe using a Holstein-Primakoff or Schwinger bosons, whereas in the the fermi liquid phase, the spin binds to the conduction electrons to form a composite heavy fermion, usually described by Abriskosov fermions. Past work [1] developed a supersymmetric representation of SU(N) spin operators. Here we analyze the supersymmetry of SP(N) symplectic spin operators, which provides us with the capability of studying antiferromagnetic and superconducting order. As a warm up problem, we show how this formalism can be applied to a two site Kondo model, coupled via a Heisenberg coupling. [1] P. Coleman, C. Pepin and A. Tsvelik, Phys. Rev. B 62, 3852 (2000).

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