Interplay of Composite Pairs and Magnetism in Heavy Fermion Superconductors

REBECCA FLINT, PIERS COLEMAN, Rutgers University —

Superconductivity in PuMGa₅, M = {Co,Rh} and NpPd₅Al₂ can be treated within a two channel Kondo lattice model, where the electron-spin scattering develops an Andreev component, creating a composite bound state of a spin-flip and a pair of electrons. We extend this model to CeMIn₅, where magnetism and superconductivity exist in close proximity by including antiferromagnetic interactions. Different crystal symmetries lead to composite pairing with either a g-wave gap or d-wave gap, while antiferromagnetism leads to RVB superconductivity with a d-wave gap. Within a symplectic large N limit, we examine the effects of antiferromagnetic interactions on the composite pairing. If both gaps are d-wave, they couple linearly, mutually enhancing the superconducting transition temperature.