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Effect of Kondo Defects in Heavy Fermion Systems JEREMY FIGGINS, DIRK MORR, University of Illinois at Chicago — The effects of impurities in heavy-fermion materials, in which the competition between Kondo screening and antiferromagnetic ordering is likely the cause for the experimentally observed non-Fermi-liquid behavior, are poorly understood. We present a newly developed real-space large-N theory to demonstrate that defects, by inducing significant perturbations in the local electron and magnetic correlations of heavy-fermion systems, provide a new approach to understanding their complex properties. The real-space form of the local density of states around defects, which can take the form of missing Kondo atoms, i.e., Kondo holes, or non-magnetic atoms, reveals insight into the heavy or light character of the perturbed states, and the strong correlations between them. The strongly correlated nature of these materials leads to highly non-linear quantum interference effects between defects that can drive the system through a phase transition to a novel inhomogeneous ground state.

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