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Incoherent Non-Fermi Liquid Scattering in a Kondo Lattice[1]
JOHNPIERRE PAGLIONE, T.A. SAYLES, P. -C. HO, M.B. MAPLE, Department of Physics, University of California, San Diego — The effect of Kondo lattice dilution was investigated in the heavy-fermion superconductor $CeCoIn_5$ to study the evolution of unconventional superconductivity and non-Fermi liquid properties. A systematic substitution of both non-magnetic (full or empty f-shell) and large, stable f-moment rare earth impurities into high-quality single-crystal specimens of $Ce_{1-x}R_xCoIn_5$ (where R=Y, Pr, Gd, Er and Lu) has revealed two contrasting features. First, both superconducting electron pair-breaking and the suppression of Kondo coherence proceed in a manner which is insensitive to the magnetic state of the dopant atom, suggesting spin-independent disorder is the dominant perturbation in both phenomena. In contrast, the evolution of the non-Fermi liquid properties with substitution shows a striking sensitivity to the dopant atom's f-moment configuration.

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