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Superconductivity and non-Fermi liquid behavior near antiferromagnetic quantum critical points in $CeRh_{1-x}Co_xIn_5$ J.R. JEFFRIES, N.A. FREDERICK, E.D. BAUER, H. KIMURA, V.S. ZAPF, K.-D. HOF, T.A. SAYLES, M.B. MAPLE, University of California, San Diego — Single crystals of $CeRh_{1-x}Co_xIn_5$ have been investigated via measurements of specific heat, $C(x,T)$, and electrical resistivity under hydrostatic pressure, $\rho(x,P,T)$, up to 28 kbar. Specific heat measurements for samples with cobalt concentrations of $x = 0.65, 0.71, 0.77, 0.87$, and 0.93 confirm the existence of antiferromagnetism (AFM) for $0 \leq x \leq 0.7$ and suggest the existence of a quantum critical point (QCP) at $x_c \sim 0.8$. Entropy vs x isotherms below $\sim$ 5 K and the normalized residual resistivity $\rho(0\text{ K})/\rho(290\text{ K})$ vs x curve both display maxima near $x_c \sim 0.8$, suggesting further evidence for the existence and location of the QCP. Electrical resistivity measurements under pressure for samples with $x = 0.1, 0.2, 0.4$, and 0.6 reveal AFM, pressure-induced superconductivity (SC), and the coexistence of AFM and SC. The $\rho(0\text{ K})/\rho(290\text{ K})$ vs P curves favor the existence of QCP's at critical pressures $P_c \sim 24$ kbar for the $x = 0.1$, and 0.2 samples and $P_c \sim 6$ kbar for the $x = 0.4$ sample. This research was supported by the U.S. DOE, NSF, and NNSA under the SSAA program.

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