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Evidence of a quantum critical point in $Ce_{1-x}Yb_xCoIn_5$ alloys at high Yb doping[1] Y.P. SINGH, D.J. HANEY, X.Y. HUANG, Kent State University, B.D. WHITE, M.B. MAPLE, University of California, San Diego, M. DZERO, C.C. ALMASAN, Kent State University — We performed this study on single crystals of $Ce_{1-x}Yb_xCoIn_5$ alloys with the motivation to further explore some of the previously reported unusual behaviors such as robust coherence and superconductivity, non-Fermi liquid (NFL) behavior, and the possibility of quantum criticality in higher Yb doping. Our specific heat and electronic magneto-transport measurements on the alloy with x = 0.75 nominal doping down to temperatures (T) as low as 0.5 K and magnetic fields (H) as high as 14 T. Our analysis of both specific heat and resistivity data unveils the presence of a crossover from NFL behavior at high temperatures to Fermi-liquid (FL) behavior at lower temperatures. Our analysis also indicates that the origin of the NFL behavior is a result of quantum fluctuations of unknown origin. The H-T phase diagram extracted from resistivity and specific heat shows that the crossover from NFL to FL behavior at zero temperature occurs at H = 0. This implies that the alloy with x = 0.75 Yb concentration is quantum critical, i.e., $x_c = 0.75$. This result of zero field quantum critical point at x = 0.75 is also confirmed from our analysis of magneto-resistance data.

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C. C. Almasan
Kent State University

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