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Resistivity and magnetoresistance studies of quantum critical alloy $Ce_{0.93}Yb_{0.07}CoIn_5$ under pressure[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 experimental and theoretical studies of the effect of pressure on the heavy fermion quantum critical alloy $Ce_{0.93}Yb_{0.07}CoIn_5$. Our resistivity measurement shows that $Ce_{1-x}Yb_xCoIn_5$ system exhibits non-Fermi liquid behavior with two distinct contributions to resistivity (linear-in-T and square-root-in-T). Resistivity measurements under pressure show that linear in T resistivity is governed by heavy/large Fermi surface and is suppressed with pressure. Quantum fluctuations with pressure are also shown to be suppressed in $Ce_{0.93}Yb_{0.07}CoIn_5$. The square-root-in-T dependence originates from two different physics: (i) the $\sqrt{T}$ dependence just above T_c is suppressed with the application of pressure, and is a result of superconducting fluctuations; (ii) the higher temperature $\sqrt{T}$ contribution to resistivity remains insensitive to pressure, indicating that the scattering processes in this T range are governed by the scattering of light electrons from the small Fermi surface. We further demonstrate that the growth of the coherence temperature with pressure, as well as the decrease of the residual resistivity, can be accurately described by employing the coherent potential approximation for a disordered Kondo lattice.

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