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The Pressure Dependence of Quantum Criticality in $CeCoIn_5$

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We report resistivity measurements in the normal state of $CeCoIn_5$ down to 40 mK and simultaneously in magnetic fields up to 9 T in the [001] crystallographic direction and under pressures up to 1.3 GPa. At ambient pressure the data are consistent with a field tuned quantum critical point coincident with the superconducting upper critical field H_{c2}, as observed previously. We find that with increasing pressure the quantum critical point moves inside the superconducting dome to lower fields. This is in contrast to Sn doping and field anisotropy studies which were unable to separate H_{QCP} from H_{c2}. Thus, we can now rule out that superconductivity is directly responsible for the non-Fermi liquid behavior in $CeCoIn_5$. Instead, the combined available data point toward an antiferromagnetic quantum critical point scenario.

Keywords : CeCoIn5, quantum criticality