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Evidence for Field-Induced Quantum Criticality in an Overdoped Cuprate TAKASADA SHIBAUCHI, Department of Physics, Kyoto University, LIA KRUSIN-ELBAUM, IBM T. J. Watson Research Center, MASASHI HASEGAWA, Department of Materials Science and Engineering, Nagoya University, YUICHI KASAHARA, RYUJI OKAZAKI, Department of Physics, Kyoto University, YUJI MATSUDA, Department of Physics, Kyoto University, and ISSP, University of Tokyo — In current views, the putative quantum phase transitions in high-T_c superconductors are deemed driven by charge doping. Here we uncover an unanticipated transition from a non-Fermi- to a Fermi-liquid state driven by magnetic field in a highly overdoped $Tl_2Ba_2CuO_{6+x}$ with $T_c \approx 15$ K. From the c-axis resistivity measured up to 45 T, we show that the Fermi-liquid $\rho_c = \rho_c(0) + AT^2$ features, accompanied by a (quantum) field-linear magnetoresistance, appear above a temperature-dependent field H_{FL}, which decreases linearly with decreasing temperature and points to a quantum critical point near the upper critical field $H_{c2}(0)$. The observed field-induced quantum criticality with a power-law diverging $A(H)$ bears a striking resemblance to that of heavy-fermion superconductor $CeCoIn_5$, suggesting a common underlying physics in these strongly correlated electron systems.

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