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Field Tuned Quantum Criticality In YFe2Al10[1] LIUSUO WU, Stony Brook University, MONIKA GAMZA, Brookhaven National Lab, KEESEONG PARK, MOOSUNG KIM, Stony Brook University, MANUEL BRANDO, Max Planck Institute for Chemical Physics of Solids, Dresden, MARKUS GARST, University of Koln, German, MEIGAN ARONSON, Brookhaven National Lab — Most studies of quantum criticality have been carried out in *f*-electron based heavy fermions, and the observation and description of the quantum critical behaviors in systems where magnetism comes from d-electrons have been very limited. YFe_2Al_{10} is a rare d-electron compound that displays pronounced non-Fermi liquid behaviors, including divergencies in the magnetic susceptibility ($\chi \sim T^{-\gamma}$, γ =1.4) and magnetic specific heat ($C_M/T \sim$ -log T). We propose a carried out a scaling analysis of χ(B,T) and C(B,T)/T that indicates YFe2Al10 is located very close to a B=0 QCP. We propose a singular free energy and a scaling function that consistently explains the critical exponents as well as the QC-Fermi liquid crossover in terms of a scaling variable $T/B^{0.6}$ Unusually, we find that the spatial dimension d is equal to the dynamical exponent z, and considering the two-dimensional anisotropy of the magnetic susceptibility, we infer that d=z=2. Hyperscaling is established by the internal consistency of our analysis, and the decidedly non-mean field exponents argue that QC fluctuations are protected since YFe2Al10 is likely a system that is below its upper critical dimension. These experimental observations suggest that YFe_2Al_{10} is a unique 3d-electron based system that is quantum critical without the need for fine tuning.

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