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Quantum Criticality In Layered YFe_2Al_{10}[1] L.S. WU, W.J. GANNON, K. PARK, M.S. KIM, Stony Brook University, I.A. ZALIZNYAK, Brookhaven National Laboratory, J.A. RODRIGUEZ-RIVERA, National Institute of Standards and Technology, C. BROHOLM, The Johns Hopkins University, A.M. TSVELIK, Brookhaven National Laboratory, M.C. ARONSON, Stony Brook University and Brookhaven National Laboratory — Most evidence for quantum criticality has been established in f-electron based heavy fermions. The observation and description of the quantum critical behaviors in magnetic systems driven by d electrons has been very limited. YFe_2Al_{10} is a rare d-electron compound where strong divergencies in magnetic susceptibility and specific heat were observed in zero field, although there is no evidence for long range order above 0.02 K We show that χ and C_M/T exhibit $T/B^{0.6}$ scaling, and a scaling function of the singular part of the free energy was proposed that explains all the measured thermal and magnetic properties in a self-consistent way. Scaling analysis indicates that the spatial dimension d in $YFe_2Al_{10}$is equal to the dynamical exponent z. The validation of hyperscaling suggests the effective dimension may be in the range of $1<d_{eff}=d+z\leq 4$, which is in agreement with the observed anisotropy between the ac plane and the b axis Neutron scattering results on single crystals will be discussed. Our experiments suggest that YFe_2Al_{10} is a novel 3d-electron system that is close to a T=0, B=0 ferromagnetic transition without the additional tuning.

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