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Quantum Criticality in the strongly correlated 3d electron system $\mathbf{YFe_2Al_{10}}$ LIUSUO WU, KEESEONG PARK, Stony Brook University, MONIKA GAMZA, Brookhaven National Lab, MOOSUNG KIM, Stony Brook University, MEIGAN ARONSON, Brookhaven National Lab & Stony Brook University — A remarkable behavior in quantum critical systems is the critical scaling near the quantum critical point (QCP), where Fermi liquid (FL) physics usually breaks down. This kind of behavior has been observed in many f electron based heavy fermion (HF) systems. We have measured the magnetization and specific heat of the $3d$-electron metal YFe_2Al_{10}. non-FL behavior with strong divergence in magnetic susceptibility ($\chi \sim T^{-\gamma}$, γ =1.4) and specific heat ($C_M/T\sim$ -log T) were observed, and this suggested YFe_2Al_{10} may locate close to a ferromagnetic QCP. What attracts us most is the unusual scaling of magnetic susceptibility ($d\chi/dT=B^{-\gamma}\varphi(T/B^{\beta})$) and specific heat ($\Delta C_M/T= \psi(T/B^{\beta})$), which was observed over a range more than three decades in T/B^{β}. The overall scaling behaviors mapped well with the assumption that a FL phase was resumed as the system was tuned far from the QCP, where all the critical fluctuation was suppressed. Based on the scaling analysis, a possible form of the critical free energy will also be discussed.

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