Unconventional Magnetic Scaling Exponents near a $T = 0$ Transition in $\text{URu}_2-x\text{Re}_x\text{Si}_2$$^1$ NICHOLAS P. BUTCH, BENJAMIN T. YUKICH, M. BRIAN MAPLE, Department of Physics and Institute for Pure and Applied Physical Sciences, University of California, San Diego — Substituting Re for Ru in the heavy fermion compound URu$_2$Si$_2$ suppresses the hidden order and superconducting transitions and gives rise to long range ferromagnetism. From electrical transport, specific heat, and magnetic susceptibility studies of single crystals of URu$_{2-x}$Re$_x$Si$_2$, $0 \leq x \leq 0.6$, it is apparent that the non-Fermi liquid behavior first observed in polycrystalline samples is indeed a robust phenomenon intrinsic to the bulk material. We present a recent investigation of the magnetization of URu$_{2-x}$Re$_x$Si$_2$ single crystals, wherein it is demonstrated that a scaled Arrott analysis can be performed to extract scaling exponents describing the magnetic transition from well into the ferromagnetic phase down to its onset. The variation of the exponents with $x$ is discussed within the context of the observed non-Fermi liquid behavior.

$^1$This research was supported by the US National Science Foundation and US Department of Energy.

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Date submitted: 30 Nov 2007
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