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Revealing quantum Griffiths singularities inside the ferromagnetic phase ADANE GEBRETSADIK, RUIZHE WANG, SARA UBAID-KASSIS[1], ALMUT SCHROEDER, Kent State Univ - Kent, OH, THOMAS VOJTA, Missouri Univ. of S & T, Rolla, MO, P. J. BAKER, F. L. PRATT, STFC Rutherford Appleton Lab. UK, S. J. BLUNDELL, T. LANCASTER[2], I. FRANKE, J. S. MÖLLER[3], Oxford University, UK — We present low-temperature inhomogeneous magnetic properties of the d-metal alloy $Ni_{1-x}V_x$ close to the quantum critical concentration $x_c \approx 11.6\%$ where the ferromagnetic transition temperature is suppressed to zero. The magnetization M displays a singular dependence on the magnetic field H not just in the paramagnetic phase ($x > x_c$) but also in the ferromagnetic phase ($x < x_c$). It is well described by a nonuniversal power law, $M - M_0 \sim H^\alpha$ with M_0 being the spontaneous magnetization. The exponent α is strongly x-dependent, approximately symmetric in $x - x_c$, and decreases to zero at x_c. Muon spin rotation experiments in longitudinal magnetic fields and zero fields in the ferromagnetic phase demonstrate inhomogeneous magnetic order and indicate the presence of dynamic fluctuating magnetic clusters. A similar cluster fraction can be estimated by both bulk of local probes that becomes significant close to x_c. These results provide strong evidence for a quantum Griffiths phase on the ferromagnetic side of the quantum phase transition.

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