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Neutron scattering studies of ferromagnetic superconductor UGe_2 under pressure D.A. SOKOLOV, The University of Edinburgh, A.D. HUXLEY, R. RITZ, C. PFLEIDERER, T. KELLER — Observation of an unconventional superconductivity in ferromagnetic UGe_2 when ferromagnetism is suppressed by pressure indicates a dramatic modification of its electronic structure near the Quantum Critical Point [1]. We present high resolution measurements of the lattice constants of ferromagnetic superconductor UGe_2 under pressure probed by a novel technique, which utilizes Larmor precession of polarized neutrons and surpasses the resolution of conventional scattering methods by an order of magnitude. We have observed sharp anomalies at the Curie temperature, T_C and at T_X, which marks the crossover regime. Our studies under pressure of 10, and 12 kbar indicate that the sharp anomaly corresponding to T_C shifted to lower temperature in agreement with a phase diagram. At the pressure corresponding to an onset of superconductivity, 10kbar, the lattice expansion corresponding to ferromagnetic transition undergoes a first order transition and increases by a factor of 3. The results indicate a complex response of the electronic structure of UGe_2 to external pressure and suggest a strong magnetoelastic coupling as one of multiple energy scales that stabilize superconductivity in UGe_2. [1] S. S. Saxena, et al., Nature 406, 587 (2000)

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