High Pressure Measurements on the Itinerant Ferromagnet $ZrZn_2$

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We present a high pressure, low temperature study of the weak itinerant ferromagnet $ZrZn_2$. The low Curie temperature and small ordered moment make it an ideal candidate to tune the ferromagnetic transition to low temperatures, with pressures less than 2GPa. Using a Diamond Anvil Cell, with a low noise four terminal resistivity set up, we observe the suppression of the ferromagnetic transition, and formation of a Quantum Critical Point at 2GPa. Previous measurements show deviations from the Fermi Liquid description of matter at low temperatures below the critical pressure (evidenced by a $T^{5/3}$ form of the resistivity) which can most likely be explained in the framework of a marginal Fermi Liquid. Above the critical pressure a new phase was previously observed (as evidenced by a $T^{3/2}$ form of the resistivity). The exact nature of this new phase is as yet unknown. In our resistivity measurements we have confirmed the existence of this new phase and investigated its extent to higher pressures. X-ray Powder Diffraction measurements, performed at the European Synchrotron Radiation Facility to high pressures are also presented contributing to our understanding of the structural nature of the phase transition.