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Neutron Depolarization Measurements of Quantum Critical Ferromagnets

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In ferromagnetic quantum critical systems it is possible to suppress the Curie temperature to 0 K by changing an external control parameter such as a magnetic field or hydrostatic pressure. Recent theories suggest a generic phase diagram for clean quantum critical ferromagnets featuring a tricritical point where the order of the phase transition changes from 2nd to 1st. This behavior has already been observed e.g. in $ZrZn_2$ and MnSi, and is also discussed for $SrRuO_3$. An exception to this behavior could be the ferromagnetic Kondo lattice CePt as no tricritical point was observed, yet. The neutron depolarization technique offers new insight into ferromagnetic quantum critical systems as it enables us to directly probe ferromagnetism in challenging sample environments, such as magnetic fields, low temperatures, and high pressures. We present two neutron depolarization studies of the compounds $SrRuO_3$ and CePt up to hydrostatic pressures of 17 GPa and 12 GPa, respectively.

Primary authors: SEIFERT, Marc (Physik-Department E51, Technische Universität München, D-85748 Garching, Germany); SCHULZ, Michael; JORBA, Pau (Physik-Department E51, Technische Universität München, D-85748 Garching, Germany); BAUER, Andreas (Physik-Department E51, Technische Universität München, D-85748 Garching, Germany); SCHILLING, James (Physik-Department E51, Technische Universität München, D-85748 Garching, Germany); Prof. PFLEIDERER, Christian (Physik Department, Technische Universität München, D-85748 Garching, Germany)

Presenter: SEIFERT, Marc (Physik-Department E51, Technische Universität München, D-85748 Garching, Germany)

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