

Three-dimensional critical phase diagram of a heavy-fermion Ising antiferromagnet

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Non-destructive pulsed magnetic fields permit to explore the magnetic phase diagrams of strongly-correlated electrons systems. After an introduction to the pulsed-field technique, I will present a recent work performed on a heavy-fermion antiferromagnet. Novel instrumentation, which allows combining extreme conditions of intense pulsed magnetic field up to 60T and high pressure up to 4 GPa (developed within a collaboration between the CEA-Grenoble, the University of Niigata, and the LNCMI-Toulouse), has been used to establish the three-dimensional (3D) magnetic field - pressure - temperature phase diagram of the pure stoichiometric antiferromagnet CeRh₂Si₂. This phase diagram shows a temperature- and pressure-dependent decoupling of the critical and pseudo-metamagnetic fields, at the borderlines of antiferromagnetism and strongly-correlated paramagnetism. It is representative of a class of heavy-fermion Ising antiferromagnets, where long-range magnetic ordering is decoupled from a maximum in the magnetic susceptibility.

References:

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