



Seminar

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Critical scaling and the crossover phase diagram of a quantum antiferromagnet

The concept of the quantum critical point (QCP) was introduced to unify apparently similar quantum mechanical phenomena observed in very different areas of physics. In the vicinity of a QCP, quantum fluctuations dominate and universal behaviours arise that are independent of the microscopic details of the system. Despite its great potential to explain diverse phenomena, the boundaries of the regime where the physics is dominated by a QCP have not been established in real materials. Here we consider the magnetic material, KCuF_3 , which is in the vicinity of the one-dimensional Luttinger Liquid QCP, and use neutron scattering to collect the complete data set of the magnetic excitations as a function of energy, momentum and temperature. We show quantitatively, that the behaviour of KCuF_3 is dominated by this QCP over an extended range of temperatures and energies, and determine the borders of this regime. Departures from criticality are readily understandable and allow construction of the magnetic crossover diagram of the system.

Wann? Mittwoch, 22.03.2006, 13:00 Uhr

Wo? Universität Stuttgart, Raum 3.531