



Festkörperkolloquium und Sonderseminar TRR 80 Kolloquium

am Donnerstag, 14.06.2012

um 17:15 Uhr

spricht

PD Dr. Markus Garst

Universität zu Köln

über das Thema

Fluctuation-driven first order transition in the chiral magnet MnSi

The chiral magnetic metal MnSi possesses various peculiar phases as a function of pressure and magnetic field. At high pressures, there is an extended phase that defies Fermi-liquid theory, and at a finite magnetic field a Skyrmion crystal phase -- a regular arrangement of topologically protected magnetic whirls -- was recently identified. In this talk, we concentrate on the temperature range close to the magnetic transition temperature T_c at ambient pressure, and we demonstrate that a series of unusual features can be explained in terms of strongly interacting chiral fluctuations. We discuss theoretically and experimentally that interactions lead to strong renormalization effects resulting in a characteristic crossover temperature $T^* > T_c$ where the susceptibility shows a turning point and the specific heat a crossing point, also known as Vollhardt invariance. More importantly, the singular interactions drive the chiral transition first-order in agreement with Brazovskii-theory. Experimentally this is reflected in a sharp peak in the specific heat and small discontinuous jump in the temperature dependence of the helimagnetic Bragg peak as measured in small angle neutron scattering. Our theoretical considerations are based on basic symmetry principles, and we expect them to be applicable to a wider range of chiral magnets including $\text{Fe}_{1-x}\text{Co}_x\text{Si}$, MnGe or FeGe.

im HS 3 im Physik Department

ab 17:00 Uhr Kaffee vor dem Hörsaal

Einführung: C. Pfleiderer