SFB 608

Einladung zum Kolloquium

Ort: Universität zu Köln
II. Physikalisches Institut, Seminarraum 201

Zeit: Mittwoch, 15.12.04, 15 Uhr c.t.

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Thema: Bose-Einstein condensation in quantum magnets

I discuss quantum phase transitions in cubic lattices of dimers with antiferromagnetic Heisenberg interactions. Using stochastic series expansion quantum Monte Carlo simulations, we have obtained thermodynamic response functions down to ultra-low temperatures. A zero-temperature phase diagram is constructed, featuring a non-magnetic phase, a partially polarized phase with long-range antiferromagnetic order, and a fully polarized regime. The critical scaling exponents which dictate the power-law dependence of the transition temperature on the applied magnetic field are extracted from the numerical data. I will show that these exponents are independent of the coupling ratios, and converge to the value of Bose-Einstein condensation of magnons obtained in mean-field theory. The scaling results are of direct relevance to the spin-dimer systems $TlCuCl_3$ and $KCuCl_3$, and explain the broad range of exponents reported for field-induced ordering transitions.

Gez. Priv.-Doz. G. Uhrig