



## **Festkörper-Kolloquium und Sonderseminar TRR 80**

**am Donnerstag, 10.01.2013**

**um 17:15 Uhr**

**spricht**

**Prof. Bruce Normand**

**Renmin University of China, Beijing**

**im HS 3 im Physik-Department**

**über das Thema**

### **The Magnetic Quantum Phase Transition Encyclopaedia: $\text{TiCuCl}_3$**

$\text{TiCuCl}_3$  is a dimer-based quantum spin system with a gapped, magnetically disordered ground state at ambient pressure and zero field. Quite remarkably, it undergoes quantum phase transitions to different types of magnetic order in an applied field of 5.6 T or under a pressure of only 1.07 kbar. Both the static properties of the ground states and their contrasting magnetic excitations can be measured systematically as functions of field, pressure and temperature, spanning two entire quantum critical phase diagrams.

This colloquium reviews the topic of quantum criticality through the lens of  $\text{TiCuCl}_3$ . While the emphasis is on the wide range of qualitative phenomena this material reveals -- including "magnon Bose-Einstein condensation" at high fields, the "Higgs boson" (a critically damped longitudinal magnon) at high pressures, the exclusion statistics of hardcore bosons at high temperatures, the quantum critical ( $\omega/T$ ) scaling regime and the recovery of classical critical behaviour around the phase boundary -- the physical insight is based on a fully quantitative theoretical description obtained within a bond-operator formulation.

**im HS 3 im Physik Department**

**ab 17:00 Uhr Kaffee vor dem Hörsaal**

**Einführung: C. Pfeleiderer**