



## Invitation

### LMU-Seminar

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**Title:** Zero-field phase transitions in gapped quantum magnets  
**Speaker:** Dr. Alexandra Mannig  
Department of Physics, ETH Zürich

**Time:** Monday, November 27<sup>th</sup> 2017, 14:00

**Place:** WWHB/106

#### **Abstract:**

Quantum magnets with a spin gap in their excitation spectrum are ideal experimental models for the study of quantum phase transitions and quantum critical points. Research in these systems has focused on field-induced quantum phase transitions. A qualitatively different class of quantum phase transitions can be induced by the application of external pressure or the introduction of chemical disorder in zero-magnetic fields.

In this talk I will present  $\mu$ SR, neutron scattering and thermodynamic studies on magnetic ordering in zero-magnetic fields in selected gapped quantum magnets at low-temperatures and high pressures. I will also compare the results to existing theoretical predictions.

First, the pressure-induced ordering close to a  $z=1$  quantum critical point in the presence of bond disorder in  $(C_4H_{12}N_2)Cu_2Cl_6$  (PHCC) will be discussed. Second, it will be demonstrated that it is not possible to induce a quantum phase transition with dynamical critical exponent  $z=1$  by application of hydrostatic pressure in the gapped  $S=1$  quantum paramagnet  $NiCl_2 \cdot 4SC(NH_2)_2$  (DTN). Finally, the disorder-induced quantum phase transition in bond-disordered DTN will be presented. The transition is qualitatively similar to a  $z=1$  quantum critical point. However, the determined critical scaling of thermodynamic and magnetic properties showed unexpected critical exponents.