TECHNISCHE UNIVERSITÄT DRESDEN

IFMP Institut für Festkörper- & Materialphysik

IFMP Seminar

Date: Tuesday, April 27, 2021, at 14:50
BigBlueButton:
https://selfservice.zih.tu-dresden.de/l/link.php?m=89814&p=9345f682 (TUD)
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Speaker: **Lei Shu**
Fudan University (Shanghai)

Title: **Discovery of an ultra-quantum spin liquid**

Abstract: Quantum fluctuations are expected to lead to highly entangled spin-liquid states in some two-dimensional spin-½ compounds. We have synthesized and measured thermodynamic properties and muon relaxation rates in two related such compounds, one of which is the least disordered of this kind synthesized hitherto and reveals intrinsic properties of a class of spin liquids. Its measured properties can all be simply characterized by scale invariant time-dependent fluctuations with a single parameter. The specific heat divided by temperature and muon relaxation rates are both temperature independent at low temperatures, followed by a logarithmic decrease with increasing temperature. Even more remarkably, ~57% of the magnetic entropy is missing down to temperatures of $O(10^{-3})$ the exchange energy, independent of magnetic field up to $g\mu_B H > k_B T$. This is evidence that quantum fluctuations lead either to a gigantic specific heat peak from topological singlet excitations below such temperatures, or to an extensively degenerate topological singlet ground state. These results reveal an ultra-quantum state of matter.

Host: D. Peets