



TRR 80 Sonderseminar

Am Dienstag, den 8. Oktober um 16:00 Uhr

spricht

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über das Thema

Quantum spin ice physics in $\text{Nd}_2\text{Zr}_2\text{O}_7$

Quantum spin ice is a type of spin liquid which was predicted to show in pyrochlore compounds with Ising-anisotropic light rare-earth elements. In this talk, I will present our study on a quantum spin ice candidate material $\text{Nd}_2\text{Zr}_2\text{O}_7$ using thermodynamic and neutron scattering measurements combined with several analytical and numerical calculations. Nd^{3+} ion has a novel dipolar-octupolar doublet crystal field ground state in $\text{Nd}_2\text{Zr}_2\text{O}_7$. Although a long-range all-in-all-out magnetic order was found below $T_N \sim 0.4\text{K}$, gaped flat spin ice modes and gapless spin ice correlations were observed below and above T_N , respectively, which relates the ordering transition to Higgs mechanism. In (110) fields, the system is decoupled into parallel and perpendicular chains with respect to the field, where the perpendicular chains are effectively isolated, regardless an anisotropic Hamiltonian on the three-dimensional lattice, and behave as quantum XYZ spin-1/2 chains. In (111) field, it shows dynamical kagome ice modes and strong hystereses caused by domain inversion. Our findings provide the first evidence for the rich and complex phenomena in pyrochlores with dipolar-octupolar doublets.

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Gäste sind herzlich willkommen.

Der Vortrag findet im Seminarraum S-288, Institut für Physik, Universität Augsburg statt.

Gastgeber: Prof. Dr. Philipp Gegenwart

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