Magnetism of the frustrated spin-2 triangular systems $NaMnO_2$

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Although numerical studies speak in favor of a non-collinear long-range magnetic order (LRO) on an isotropic spin-1/2 Heisenberg antiferromagnetic triangular lattice, for spatially anisotropic exchange, the ground-state phase diagram becomes considerably richer. LRO on two or three sublattices, incommensurate magnetic order, or various spin-liquid phases can be realized. Much less is known about about the case of integer spins.

We have investigated the spatially anisotropic spin-2 triangular system α-$NaMnO_2$ by means of local-probe techniques. Muon spin relaxation (μ^+SR) has provided the first evidence for a transition to a magnetically ordered state. Neutron diffraction confirmed that collinear AFM LRO order appears at T_N= 45 K [1]. The character of spin correlations above T_N is 1D despite the underlined 2D lattice [2]. From electron-spin-resonance (ESR) measurements we have determined the dominant magnetic anisotropy term, which assists in stabilizing the 3D order by suppressing spin fluctuations [3]. We have further investigated the development of spin correlations as well as the dynamics of spin excitations and the symmetry of LRO below T_N through ^{23}Na nuclear magnetic resonance (NMR). We shall compare our results obtaint for two polymorphs; α-$NaMnO_2$ and β-$NaMnO_2$.

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