

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Spin chirality and high-field phase diagram of the kagomé lattice antiferromagnet $A\text{Fe}_3(\text{OH})_6(\text{SO}_4)_2$ K. MATAN, J. S. HELTON, Massachusetts Institute of Technology, D. GROHOL, University of Wyoming, B. M. BARTLETT, Massachusetts Institute of Technology, V. SIKOLENKO, Hahn-Meitner-Institut, D. G. NOCERA, Y. S. LEE, Massachusetts Institute of Technology — We have used neutron scattering to study spin chirality and high-field spin re-orientation in single crystal and powder samples of the antiferromagnetic kagomé lattice compounds, $A\text{Fe}_3(\text{OH})_6(\text{SO}_4)_2$ ($A = \text{K}$ and Ag). The $\frac{5}{2} \text{Fe}^{3+}$ spins on the kagomé lattice order three dimensionally for temperatures below the Néel temperature, $T_N = 65 \text{ K}$. Above the Néel temperature, we observed the spin chiral order. Neutron measurements reveal critical spin fluctuations above T_N , which indicate that the spin-rotational symmetry and the vector chiral symmetry are not broken simultaneously at T_N . Below the Néel temperature, neutron scattering measurements in high fields show a spin re-orientation transition, which appear to be first-order in nature. Details of the high field phase diagram will be discussed.

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Date submitted: 20 Nov 2006

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