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Magnetic Order and Spin Fluctuations in the Spin-1/2 Three-Dimensional Frustrated Magnet Clinoatacamite, $Cu_2(OH)_3Cl$ JOEL HELTON, KITTIWIT MATAN, Massachusetts Institute of Technology, JAE-HO CHUNG, NIST Center for Neutron Research, MATTHEW SHORES, BART BARTLETT, EMILY NYTKO, Massachusetts Institute of Technology, YING CHEN, QINGZHEN HUANG, JEFFREY LYNN, NIST Center for Neutron Research, DANIEL NOCERA, YOUNG LEE, Massachusetts Institute of Technology
— We have performed thermodynamic and neutron scattering measurements on the S=1/2 three-dimensional antiferromagnet clinoatacamite, $Cu_2(OH)_3Cl$. The crystal lattice feature Cu^{2+} ions arranged on a distorted kagomé lattice with weak magnetic coupling between adjacent planes. Long range magnetic order with a weak ferromagnetic moment emerges at the Néel ordering temperature, $T_N = 6.2$ K. The value of Θ_{CW} is roughly 30 times larger than T_N, demonstrating that the material is highly frustrated. Magnetic Bragg peaks are not observed above background for temperatures between 6.2 and 18 K, even though previous μSR measurements observed muon oscillations in this temperature range. We present a possible model of the magnetic transitions and analyze the inelastic spectrum of the ordered state, taking into account anisotropic terms in the spin Hamiltonian.

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