Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Magnetic Ordering In $SrHo_2O_4$[1] JIAJIA WEN, SEYED KOOHPAYEH, TYREL MCQUEEN, Institute for Quantum Matter, Johns Hopkins University, WEI TIAN, Neutron Sciences Directorate, Oak Ridge National Laboratory, HAIFENG LI, Ames Laboratory, JIAQIANG YAN, Joint Institute for Neutron Sciences, Oak Ridge National Laborator, OVIDIU GARLEA, Neutron Sciences Directorate, Oak Ridge National Laboratory, COLLIN BROHOLM, Institute for Quantum Matter, Johns Hopkins University — We report the experimental observation of unusual magnetic ordering in a frustrated magnet $SrHo_2O_4$. The Ho^{3+} ions in this material form a lattice consisting of edge-sharing triangles making chains extending along the c direction. The chains in turn form a honeycomb-like structure in the a-b plane. Despite a Curie Weiss temperature of -16.9 K, magnetic long range ordering (LRO) occurs at the much lower Neél temperature (T_N) of 0.7 K. Above T_N, single crystal neutron scattering experiments carried out on MACS(NCNR) shows diffusive patterns of elastic scattering in momentum space, revealing anisotropic short-range correlation with extended correlations along the chain direction. Single crystal diffraction measurement down to 0.3 K at HB1A(ORNL) shows coexistance of a long range ordering component and a short range ordering one below T_N . A proper partition of the magnetic lattice allows excellent modeling of the experimental data, and show that an interplay of frustration, crystal field effects, and low dimensionality lay behind the deeply suppressed and unusual partial order in this system.

[1]Supported by the U.S. DOE, Office of Basic Energy Science, Division of Materials Sciences and Engineering under Award DE-FG02-08ER46544.

Jiajia Wen
Johns Hopkins University

Date submitted: 15 Nov 2013 Electronic form version 1.4