Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Quantum spin liquid in frustrated one dimensional $LiCuSbO_4$[1]

MARTIN MOURIGAL, Johns Hopkins University, SIAN E. DUTTON, MANORANJAN KUMAR, ZOLTAN G. ZOOS, Princeton University, JIAJIA WEN, COLLIN L. BROHOLM, Johns Hopkins University, NIELS H. ANDERSEN, Risø-DTU, QING HUANG, NIST Center for Neutron Research, MOHAMED ZBIRI, Institut Laue Langevin, RASMUS TOFT-PETERSEN, Risø-DTU, ROBERT J. CAVA, Princeton University — A quantum magnet, $LiCuSbO_4$, with chains of edge-sharing $S=1/2$ CuO_6 octahedra is reported. Short-range ordering is observed while no phase transition or spin freezing occurs down to 100 mK in zero magnetic field. Specific heat indicates a distinct low-temperature high-field phase near the 12 T saturation field. Neutron scattering shows incommensurate spin correlations with $q = 0.47 \pm 0.01$ π/a and places an upper limit of 70 μeV on a potential spin gap. Exact diagonalization of easy plane $S = 1/2$ chains with competing nearest neighbor ferro- and next-nearest neighbor antiferromagnetic interactions ($J_1 = -75$ K, $J_2 = 34$ K) accounts for the $T > 2$ K bulk and neutron data. Close to a quantum critical point, free from long-range order and with an achievable saturation field, $LiCuSbO_4$ is a promising candidate material to test long-standing predictions for chiral and nematic states in quantum spin chains

[1]This research was supported by the U.S. Department of Energy, Office of Basic Energy Sciences, Division of Materials Sciences and Engineering under Award DE-FG02- 08ER46544

Martin Mourigal
Johns Hopkins University

Date submitted: 12 Jan 2012 Electronic form version 1.4