Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Probing the spin ice state in the cubic pyrochlore $Ho_2Ge_2O_7$ ALANNAH HALLAS, University of Manitoba, HAIDONG ZHOU, National High Magnetic Field Laboratory, STEVEN BRAMWELL, University College London, CHRIS WIEBE, University of Winnipeg, JASON GARDNER, National Institute of Standards and Technology — Spin ices are a remarkable magnetic ground state that can arise in geometrically frustrated pyrochlores, $A_2B_2O_7$, when magnetic rare earth ions are situated on the vertices of a lattice of corner sharing tetrahedra. Competing nearest-neighbor and long-range dipolar interactions result in a short-range ordered ground state for each tetrahedron in which two spins point in and two spins point out [1]. The excitations in spin ices are equally remarkable; spin ices are the only known hosts of magnetic monopoles, emergent quasiparticles with a net magnetic charge. The cubic pyrochlore $Ho_2Ge_2O_7$ was prepared with a high temperature and high pressure technique. Preliminary DC susceptibility, heat capacity and X-ray diffraction experiments confirmed that $Ho_2Ge_2O_7$ has the bulk properties of a spin ice including residual entropy equal to the Pauling value for water ice [2]. The results of a polarized neutron scattering experiment performed at ILL as well as AC susceptibility and heat capacity measurements will be presented, and compared to the canonical spin ices.

[1] S. T. Bramwell *et al.*, Phys. Rev. Lett. **87**, 047205 (2001).
[2] H. Zhou *et al.*, Nature Communications **2**, 478 (2011).

Alannah Hallas
University of Manitoba

Date submitted: 26 Oct 2011 Electronic form version 1.4