Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Magnetic ordering in SrEr$_2$O$_4$ and SrHo$_2$O$_4$ O.A. PETRENKO, T.J. HAYES, O. YOUNG, G. BALAKRISHNAN, University of Warwick, UK, L.C. CHAPON, A. WILDES, ILL, Grenoble, France, P. MANUEL, ISIS, RAL, UK, P.P. DEEN, ESS, Lund, Sweden — Single crystal neutron diffraction reveals two distinct components to the magnetic ordering in geometrically frustrated compounds SrEr$_2$O$_4$ and SrHo$_2$O$_4$. One component, a long-range ordered $\mathbf{k} = 0$ structure, is associated with the appearance of resolution limited Bragg peaks below the ordering temperature. Another component is a quasi 1D short-range structure which manifests itself by the presence of a strong diffuse scattering signal forming planes in reciprocal space. On cooling from higher temperatures down to 0.06 K, the partially ordered component develops gradually and does not undergo a pronounced phase transition. The magnetic moments in the long-range structure are pointing along the [001] axes in both compounds. In the short-range structure (which is incommensurate in SrEr$_2$O$_4$ and $\mathbf{k} \approx 1/2$ in SrHo$_2$O$_4$) the moments are predominantly pointing along the [001] and [010] axes in these two compounds respectively. The unusual coexistence of two magnetic structures is probed using XYZ-polarised neutron scattering techniques [1,2]. [1] T.J. Hayes et al., to appear in Phys. Rev. B (2011). [2] O. Young et al., in preparation (2011).

Oleg Petrenko
University of Warwick

Date submitted: 11 Nov 2011

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