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**Magnetic Ground State Selection and B-site Disorder in the Pyrochlore Magnet  $\text{Tb}_2\text{NbScO}_7$**  CONNOR BUHARIWALLA, ALANNAH HALLAS, McMaster University , COLE MAUWS, University Of Winnipeg , QIANLI MA, McMaster University, ADAM ACZEL, Oak Ridge National Laboratory , JACOB RUFF, Cornell University , ROBERT CAVA, Princeton University, CHRIS WIEBE, University Of Winnipeg, BRUCE GAULIN, McMaster University — Tb-based cubic pyrochlores have attracted interest due to the exotic, possible quantum spin ice ground state in  $\text{Tb}_2\text{Ti}_2\text{O}_7$ . Replacing the homogenous B site of  $\text{B}=\text{Ti}^{4+}$  with a mixture of nonmagnetic ions changes the magnetic ground state and its excitations due in part to the sensitivity of the non Kramers  $\text{Tb}^{3+}$  ion. Previous results showed that a highly disordered, fluctuating ground state is obtained in isovalent B-site disordered  $\text{Tb}_2\text{Ti}_{(2-x)}\text{Sn}_x\text{O}_7$ . Our current work focuses on the mixed valence B site disordered pyrochlore  $\text{Tb}_2\text{NbScO}_7$ . In this system, the B-site is occupied by non-magnetic  $\text{Nb}^{5+}$  and  $\text{Sc}^{3+}$ , for  $\text{B}^{4+}$  on average. Surprisingly our measurements of a powder sample of  $\text{Tb}_2\text{NbScO}_7$  using time-of-flight and triple axis neutron scattering techniques show that this disordered B-site system displays an ordered antiferromagnetic ground state with Tc 1.5 K. Diffuse x-ray scattering measurements on a small single crystal reveals a rich pattern of diffuse scattering due to the underlying B-site structural disorder and concomitant oxygen displacements. We discuss these results in relation to magnetic ground state selection in the Tb pyrochlores with  $\text{B}=\text{Ti},\text{Sn}$  and  $\text{Ti}_{1-x}\text{Sn}_x$ .

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