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Spin glass freezing in the disorder-free pyrochlores $A_2Sb_2O_7$(A = Mn, Co, Ni) HAIDONG ZHOU, B.W. VOGT, J.A. JANIK, C.R. WIEBE, Department of Physics and National High Magnetic Field Laboratory, Florida State University, Tallahassee, FL 32306, USA, A. HARTER, N.S. DALAL, Department o f Chemistry and Biochemistry and National High Magnetic Field Laboratory, Florida State University, Tallahassee, FL 32306, USA, J.S. GARDNER, NIST Center for Neutron Research, NIST, Gaithersburg, Maryland 20899-8562, USA — The pyrochlores in the series $A_2Sb_2O_7$ (A = Mn, Co, Ni) have been synthesized and characterized as exhibiting spin glass transitions at T_G= 41, 4.5 and 2.6 K (for A = Mn^{2+} S = 5/2, Co^{2+} S = 3/2, and Ni^{2+} S= 1 respectively) despite the lack of chemical disorder. Since the Curie-Weiss temperature remains essentially constant for all members in the series (θ = -40 K), the frustration index for these materials increases significantly as the moment size is reduced from f = 1.1 (Mn) to 9.3 (Co) to 14.6 (Ni). There is also a corresponding change in the spin dynamics measured by the shift in the AC susceptibility signal as a function of frequency. These new materials provide an avenue to investigate the effect of quantum fluctuations on the Heisenburg pyrochlore lattice in the low spin limit, and show that there is a dramatic change in the spin dynamics as the quantum regime is approached

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