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Low temperature magnetic ordering in the frustrated zigzag ladder system $BaNd_2O_4$ A.A. ACZEL, Oak Ridge National Lab, L. LI, University of Tennessee, J.-Q. YAN, University of Tennessee and Oak Ridge National Laboratory, F. WEICKERT, V.S. ZAPF, M. JAIME, L. CIVALE, R. MOVSHOVICH, Los Alamos National Laboratory, V. KEPPENS, University of Tennessee, D. MANDRUS, University of Tennessee and Oak Ridge National Laboratory — The AR_2O_4 family (R = rare earth) have recently been attracting interest as a new series of frustrated magnets, with the magnetic R atoms forming zigzag chains running along the c-axis. We have investigated polycrystalline $BaNd_2O_4$ with a combination of low temperature magnetization, heat capacity, and neutron diffraction measurements. This material has a Curie-Weiss temperature of -24 K, while our zero field heat capacity measurements indicate a magnetic transition of only 1.7 K, indicative of a high magnetic frustration index. Combined magnetization and neutron diffraction data show evidence for a complex, canted antiferromagnetic ground state with a propagation vector of (0 0.5 0.5) and the spins lying in the ac-plane. Furthermore, low temperature magnetization and heat capacity measurements as a function of applied field reveal that the order can be completely suppressed in an applied field of only 3.5 T. Direct comparison of these results to previous work on SrR_2O_4 shows that there is a rich diversity of magnetic behavior in this family of frustrated magnets, likely due to a competition between single ion anisotropy, dipole-dipole interactions, and exchange interactions.

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