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Magnetic field dependence of the order parameter in weakly ordered quasi-1D antiferromagnets IGOR ZALIZNYAK, ANDREI SAVICI, Brookhaven National Laboratory, BEATRICE GRENIER, LOUIS-PIERRE REGNAULT, SERGEI PETROV — We report neutron diffraction study of the antiferromagnetic order in two isostructural quasi-one-dimensional $S=1$ Heisenberg antiferromagnets, CsNiCl_3 and RbNiCl_3 , in magnetic fields up to 15 T. These materials present model systems of Haldane spin chains with very similar in-chain exchange interaction, but coupled by the inter-chain exchange of different strengths. In both cases the inter-chain coupling is super-critical, so that the Haldane gap is suppressed and weak antiferromagnetic order appears below 4.84 K in CsNiCl_3 and 11.1 K in RbNiCl_3 . In zero field the ordered magnetic moments in CsNiCl_3 and RbNiCl_3 are approximately 0.9 and 1.2 Bohr magnetons, respectively. We find that the antiferromagnetic order is enhanced by application of the magnetic field, as it is expected both for coupled Haldane chains and from the spin-wave theory arguments. However, we show that the spin-wave theory can not reproduce the observed behavior quantitatively.

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