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**Excitations in the quantum paramagnetic phase of the quasi-one-dimensional Ising magnet $CoNb_2O_6$ in a transverse field: Geometric frustration and quantum renormalization effects**[1] IVELISSE CABRERA, Clarendon Laboratory, University of Oxford/NIST Center for Neutron Research , J. D. THOMPSON, R. COLDEA, D. PRABHAKARAN, Clarendon Laboratory, University of Oxford, R. I. BEWLEY, T. GUIDI, ISIS Facility, Rutherford Appleton Laboratory, J. A. RODRIGUEZ-RIVERA, NIST Center for Neutron Research, C. STOCK, NIST Center for Neutron Research/The University of Edinburgh — We report extensive single-crystal inelastic neutron scattering measurements of the magnetic excitations in the quasi 1D Ising ferromagnet $CoNb_2O_6$ in the quantum paramagnetic phase to characterize the effects of the finite interchain couplings. In this phase, we observe that excitations have a sharp, resolution-limited line shape at low energies and over most of the dispersion bandwidth, as expected for spin-flip quasiparticles. We map the full bandwidth along the strongly dispersive chain direction and resolve clear modulations of the dispersions in the plane normal to the chains, characteristic of frustrated interchain couplings in an antiferromagnetic isosceles triangular lattice. The dispersions can be well parametrized using a linear spin-wave model that includes interchain couplings and further neighbor exchanges. The observed dispersion bandwidth along the chain direction is smaller than that predicted by a linear spin-wave model using exchange values determined at zero field. We attribute this effect to quantum renormalization of the dispersion beyond the spin-wave approximation in fields slightly above the critical field, where quantum fluctuations are still significant.

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