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Triplet state and in-gap scattering from the spin-$^1/_2$ quantum antiferromagnet Ba_2YMoO_6 J.P. CARLO, Villanova University, J.P. CLANCY, University of Toronto, T. AHAREN, University of Ottawa, Z. YAMANI, National Research Council Canada, J.P.C. RUFF, Argonne National Laboratory, J.J. WAGMAN, G.J. VAN GASTEL, H.M.L. NOAD, McMaster University, G.E. GRANROTH, Oak Ridge National Laboratory, J.E. GREEDAN, H.A. DABKOWSKA, B.D. GAULIN, McMaster University — The double perovskite material Ba_2YMoO_6 is known to exhibit an absence of long-range and short-range magnetic order down to at least 2K, indicating a high degree of geometric frustration of its tetrahedrally-coordinated spin-$^1/_2$ Mo^{5+} moments, and NMR results have implied the existence of a spin-singlet ground state. Though geometric frustration in both 3D and quasi-2D systems has been of intense interest in recent years, comparatively little attention has been given to FCC systems, which may exhibit geometric frustration as the FCC lattice can be viewed as a network of edge-sharing tetrahedra. We have conducted inelastic neutron scattering measurements using triple-axis and time-of-flight instruments, revealing a band of scattering at 28 meV which disappears above ∼125K; we identify this scattering band as the triplet excitation out of a singlet ground state. We also identify a weaker population of in-gap states which are reminiscent of spin-polaron states induced by weak disorder.

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