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Magnetic Excitations in the Orbitally Degenerate Triangular Lattice LiVO_2 Studied by Inelastic Neutron Scattering W. TIAN, The University Of Tennessee, Oak Ridge National Laboratory, M.B. STONE, D.G. MANDRUS, B.C. SALES, R. JIN, Oak Ridge National Laboratory, D.T. ADROJA, T. PERRING, ISIS Facility, Rutherford Appleton Laboratory, S.E. NAGLER, Oak Ridge National Laboratory — Inelastic neutron scattering experiments were performed to study a two dimensional triangular lattice material LiVO_2 ($S=1$, V^{3+} ions) with orbital ordering involving threefold degenerate t_{2g} orbitals. At $T_t \approx 500$ K, LiVO_2 undergoes a first order phase transition, accompanied by a large reduction in the magnetic susceptibility in the low temperature phase. It has been proposed that this phase transition is associated with the formation of trimers of V^{3+} ions yielding a spin-singlet ground state. We report inelastic neutron scattering measurements on powder and single crystal samples of LiVO_2 carried out using the HET and MAPS spectrometers at ISIS. At low temperature, several magnetic excitations with energy transfers as large as several hundred meV were observed. We propose that the observed multiple magnetic excitations arise from the orbital ordering. Model calculations for trimers including an orbital-ordering term showing qualitatively similar spectra suggesting that localized orbiton excitations have been observed in LiVO_2 .

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