Abstract Submitted
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**Magnetic Phase Transition and Spin Dynamics in Magnetoelectric Effect $LiMnPO_4$**[1] J. LI, W. TAIN, J.L. ZARESTKY, D. VAKNIN, Ames Lab Dept. Phys. and Astronomy, Iowa State University, Y. CHEN, NCNR, NIST, Dept. Mater. Sci., University of Maryland, J.W. LYNN, NCNR, NIST — Elastic and inelastic neutron scattering techniques were used to study the magnetic phase transition and spin dynamics in single crystal $LiMnPO_4$. In this mulitiferroic, antiferromagnetism coexists with induced ferroelectricity below the Neel temperature. Elastic neutron scattering technique confirmed that $LiMnPO_4$ has a collinear antiferromagnetic ground state with magnetic moments oriented along the $a$-axis. The temperature dependent order parameter, calculated from the integrated intensity of the (010) magnetic reflection, was fit to a power law equation, yielding a transition temperature $T_N = 33.7$ K and a critical exponent of $\beta = 0.114$. Above the Neel temperature, in the paramagnetic phase, unusually strong magnetic fluctuations were observed to temperatures as high as 60 K. The correlation lengths in the MnO layer and between the layers were also determined. The spin-wave dispersion curves along $a-$ and $b-$axis were measured in the antiferromagnetic state at 4.5 K and the system was shown to be quasi-2D by analyzing the dispersion curves using a 3D Heisenberg model from linear spin wave theory.

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