

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Magnetic Excitations in LiCoPO₄ WEI TIAN, Ames laboratory and Dept. of Physics and Astronomy, Iowa State University, Ames, IA 50011, JIY-ING LI, JEFF LYNN, NCNR, National Institute of Standards and Technology, Gaithersburg, MD 20899, JEREL ZARESTKY, DAVID VAKNIN, Ames laboratory and Dept. of Physics and Astronomy, Iowa State University, Ames, IA 50011 — LiCoPO₄ continues to attract much attention due to its exceptionally large magnetoelectric (ME) effect coefficient and the observed weak ferromagnetism and ME “butterfly loop” anomaly. To gain insight into the microscopic magnetic interactions in LiCoPO₄, inelastic neutron scattering experiments were performed in the antiferromagnetic phase at $T = 8$ K ($T_N \approx 21.8$ K). Weak dispersion was detected in the magnetic excitation spectra along the three crystallographic axes measured around the (0 1 0) magnetic reflection. A gap of ~ 4.7 meV was observed below T_N that vanished above T_N . We analyze the data within a linear spin-wave approximation by explicitly including single-ion anisotropy terms in the Heisenberg spin Hamiltonian. The magnitude of the single-ion anisotropy is found to be comparable to the strongest nearest-neighbor magnetic interaction suggesting that the Co²⁺ single ion anisotropy plays an important role in the spin dynamics of LiCoPO₄.

Wei Tian
Ames laboratory

Date submitted: 15 Nov 2007

Electronic form version 1.4