Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Spin dynamics in Kagomé-staircase multiferroic $Ni_3V_2O_8$ ANDREY PODLESNYAK, G. EHLERS, M. FRONTZEK, Quantum Condensed Matter Division, NScD, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA, R.S. FISHMAN, Materials Science and Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA, O. ZAHARKO, Laboratory for Neutron Scattering, Paul Scherrer Institut, CH-5232 Villigen PSI, Switzerland, M. KENZELMANN, Laboratory for Developments and Methods, Paul Scherrer Institut, CH-5232 Villigen PSI, Switzerland, S. BARILO, Institute of Solid State and Semiconductor Physics, Minsk 220072, Belarus — The coupling of magnetic and ferroelectric order has recently been drawing a lot of interest in condensed matter science given the fundamental interest and potential applications. $Ni_3V_2O_8$ (NVO) is a $S = 1$ magnet with Ni^{2+} ions arranged in a weakly coupled buckled Kagomé-staircase planes. Its complex magnetic phase diagram exhibits four different zero field incommensurate and commensurate magnetic phases below 10 K, with only one developing ferroelectric order. We present here a detailed study of low temperature magnetic dynamics in this geometrically frustrated spin system. Using single crystal inelastic neutron scattering technique we map the magnetic excitation spectra across all the magnetic phase transitions. We found that the spin-waves, well formed in the base temperature nonferroelectric phase at $T < 3$ K, are considerably damped when the system enters the low-temperature incommensurate phase with ferroelectric order ($3.9 < T < 6.3$ K). Finally, we discuss models that describe the coupling between magnetic and ferroelectric properties in the incommensurate magnets.

Andrey Podlesnyak
Quantum Condensed Matter Division, NScD,
Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA

Date submitted: 04 Nov 2011 Electronic form version 1.4