Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Spin Waves in Stacked Triangular Antiferromagnetic Thin Films
E. MELOCHE, M. L. PLUMER, Department of Physics and Physical Oceanography, Memorial University of Newfoundland, St Johns, NL, CAN A1B 3X7, C. M. PINCIUC, Edward S. Rogers Sr. Department of Electrical and Computer Engineering, University of Toronto, ON, CAN M5S 3G4 — A theory is presented for surface and bulk spin waves (SW) in stacked triangular antiferromagnetic thin films. The model uses a microscopic Heisenberg Hamiltonian which includes the dominant exchange interactions with either easy-plane [1] or easy-axis single-ion anisotropy. The equilibrium spin configurations in the frustrated thin films are obtained using a local field alignment approach. The effects of modified surface exchange and anisotropy parameters on the equilibrium spin configurations and the SW dispersion relations are discussed. Numerical results show that the presence of surfaces can give rise to several localized excitations that are characterized with decaying amplitudes into the bulk. The energy of the localized SW modes are found to be extremely sensitive to the boundary conditions. The spin-correlation functions are obtained using a Green's function formalism and used to evaluate the mean-squared amplitude of spin precession as a function of the distance away from the surfaces. Comparisons are made between the properties of SW excitations in frustrated magnetic systems that are quasi one- and two-dimensional in character. [1] E. Meloche, C. M. Pinciuc, M. L. Plumer, Phys. Rev. B **74** (2006) 94424.

Eric Meloche

Date submitted: 20 Nov 2006 Electronic form version 1.4