Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Inelastic light scattering measurements of structural phase coexistence in ferrimagnetic spinel Mn_3O_4[1] SAMUEL GLEASON, TAYLOR BYRUM, ALEXANDER THALER, GREGORY MACDOUGALL, S. LANCE COOPER, Univ of Illinois - Urbana — The ferrimagnetic spinel Mn_3O_4 has a number of functional properties, e.g., magnetodielectricity, that are ascribed to a coupling between the spins and lattice of this material. Such a coupling is manifested in the symmetry-lowering structural distortion that occurs when Mn_3O_4 magnetically orders at $T = 33$ K. A recent x-ray diffraction study[2] of polycrystalline Mn_3O_4 found that this distortion is not fully realized, i.e., the high-symmetry and low-symmetry structures coexist below $T = 33$ K due to strains from lattice mismatch. To extend this work, we use variable-pressure and variable-magnetic-field inelastic light scattering spectroscopy to study structural phase coexistence in single crystals of Mn_3O_4. We confirm the coexistence of tetragonal (high-symmetry) and orthorhombic (low-symmetry) phases below $T = 33$ K. Furthermore, we demonstrate that the application of hydrostatic pressure suppresses the remnant tetragonal phase, while the application of magnetic field can bolster this phase. These results indicate that microscopic descriptions of functional behavior in Mn_3O_4 should consider effects due to structural phase coexistence. [2] M. C. Kemei, *et al.*, *Phys. Rev. B* **89**, 174410 (2014).

[1]Research was supported by the U.S. Department of Energy under Award DE-FG02-07ER46453. T. Byrum was partially supported by the National Science Foundation under Grant Number DGE-1144245.

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Date submitted: 14 Nov 2014 Electronic form version 1.4