Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Magnetism dependent phonon anomaly in LaFeAsO observed via inelastic x-ray scattering[1] STEVEN HAHN, GREGORY TUCKER, The Ames Laboratory and Iowa State University, JIAQIANG YAN, Oak Ridge National Laboratory and The University of Tennessee, AYMAN SAID, BOGDAN LEU, Advanced Photon Source, Argonne National Laboratory, R.W. MCCALLUM, The Ames Laboratory, ERCAN ALP, Advanced Photon Source, Argonne National Laboratory, THOMAS LOGRASSO, ROBERT MCQUEENEY, BRUCE HARMON, The Ames Laboratory and Iowa State University — The phonon dispersion was measured at room temperature (above T_N) along (0,0,L) in the tetragonal phase of LaFeAsO using inelastic x-ray scattering. Magnetostructural effects are well documented in the AFe_2As_2-based (A=Ca,Sr,Ba,Eu) systems. Only recently have single crystals of RFeAsO (R=La,Ce,Pr,Nd,Sm,Gd)-based compounds become available. The experimentally observed splitting between two A_{1g} phonon modes at 22 and 26 meV is only produced in spin-polarized first-principles calculations imposing various types of antiferromagnetic order. Magnetostructural effects similar to those observed in the AFe_2As_2 materials are confirmed present in LaFeAsO. This is discussed in terms of the strong antiferromagnetic correlations that are known to persist above T_N and into the tetragonal phase.

[1]Work at the Ames Laboratory was supported by the Department of Energy-Basic Energy Sciences under Contract No. DE-AC02-07CH11358.

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Date submitted: 18 Dec 2012 Electronic form version 1.4