## Abstract Submitted for the MAR07 Meeting of The American Physical Society

Effect of Charge Ordering on Phonon Spectra of La<sub>1/3</sub>Sr<sub>2/3</sub>FeO<sub>3- $\sigma$ </sub> JIE MA, S. CHANG , J.-Q. YAN, Ames Lab., Dept. of Phys. & Astro., Iowa State U, Ames, IA, 50011, F. TROUW, M. HEHLEN, LANL , R. J. MC-QUEENEY, Ames Lab., Dept. of Phys. & Astro., Iowa State U, Ames, IA, 50011, AMES LAB., DEPT. OF PHYS. & ASTRO., IOWA STATE U, AMES, IA, 50011 TEAM, LANL COLLABORATION — La<sub>1/3</sub>Sr<sub>2/3</sub>FeO<sub>3- $\delta$ </sub> (LSFO) compounds are reported to have an unusual magneto-structural transition at low temperatures. Below ~210K, it is proposed that charge disproportionation occurs according to  $3\text{Fe}^{3.67+} = > 2\text{Fe}^{3+} + \text{Fe}^{5+}$ , and the different iron valences order in the pattern 3+, 3+, 5+ along the body diagonal [111] $_c$ .Simultaneously, LSFO undergoes antiferromagnetic ordering and a slight distortion in crystal structure from cubic to rhombohedral. Inelastic neutron scattering was used to determine the effect of the charge ordering on the phonon spectra. We find that the high frequency oxygen phonons (~80 meV) soften above the transition by several meV. The result and relationship between the charge ordering and the phonon softening are discussed.

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