

Abstract Submitted
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Acoustic phonon instabilities in $\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$ Y.H. REN, R. MERLIN, FOCUS Center and Department of Physics, University of Michigan, Ann Arbor, MI 48109-1120, C.S. HONG, N.H. HUR, Center for CMR Materials, KRIS, Yusong, Daejeon, 305-600, Republic of Korea, Y.F. HU, QI LI, Department of Physics, Pennsylvania State University, University Park, PA 16802, G. LUEPKE, Applied Science, College of William and Mary, Williamsburg, VA 23187 — We report on time-resolved ultrafast optical measurements on a $\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$ (LCMO) single crystal ($x=0.3$) and thin film ($x=0.33$). The differential reflectivity shows coherent GHz oscillations due to the excitation of longitudinal acoustic phonons. The wavelength dependence of the period of such oscillations allow us to determine the sound velocity. The measured GHz sound velocity is 30% - 40% larger than the sound velocity in the MHz range as determined by resonant ultrasound measurements [Jin et al., PRL 90, 036103 (2003)]. Temperature-dependent data show that the sound velocity anomaly disappears at $T \sim 350$ K, a value that is close to the temperature for which charge-ordered clusters form.

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