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Optically Induced Lattice Dynamics of hexagonal manganite using Ultrafast X-ray Diffraction HAE JA LEE, Los Alamos National Laboratory, J.B. WORKMAN, J.S. WARK, R.D. AVERITT, A.J. TAYLOR, J.P. ROBERTS, Q. MCCULLOCH, D.E. HOF, D.J. FUNK, Los Alamos National Laboratory, N. HUR, S.-W. CHEONG, Rutgers University — We have studied the picosecond lattice dynamics of optically pumped hexagonal manganite LuMnO3 using ultrafast x-ray diffraction. The results show a shift and broadening of the diffraction curve due to the stimulated lattice expansion. To understand the transient response of the lattice, the measured time- and angle-resolved diffraction curves are compared with a theoretical calculation based on dynamical diffraction theory modified for the hexagonal crystal structure of LuMnO3. Our simulations reveal that a large coupling coefficient between the a-b plane and the c-axis (c13) is required to the data. We compare this result to our previous coherent phonon studies of LuMnO3 using optical pump-probe spectroscopy.

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