Abstract Submitted
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Electron-phonon coupling associated with charge-stripe order in cuprate superconductors[1] JOHN TRANQUADA, Brookhaven National Lab, D. REZNIK, L. PINTSCHOVIUS, Forschungszentrum Karlsruhe, M. ITO, S. IIKUBO, M. SATO, Nagoya Univ., M. FUJITA, K. YAMADA, IMR, Tohoku Univ., G. D. GU, Brookhaven National Lab — We have used inelastic neutron scattering to study the Cu-O bond-stretching phonon in $La_{1.875}Ba_{0.125}CuO_4$ and $La_{1.48}Nd_{0.4}Sr_{0.12}CuO_4$, two cuprate compounds that exhibit charge-stripe order. This is the phonon mode that one expects to be most sensitive to spatial inhomogeneity in the electronic structure of the CuO_2 planes. Besides the cosine-like downward dispersion of the mode from zone center to zone boundary, we observe a dip in the dispersion and a very large energy width (> 10 meV) at $\mathbf{q} = \mathbf{a}^*/4$. The dip and width gradually become smaller with increasing temperature. These evidences of a strong electron-phonon coupling (the dispersion dip and large energy width) have not been predicted by any conventional calculations. The nature of the connection with charge-stripe order will be discussed.

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