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**Probing electronic order via coupling to phonons in Bi2Sr2CuO6 (Bi2201)**[1] CRAIG BONNOIT, DILLON GARDNER, ROBIN CHISNELL, Massachusetts Institute of Technology, AYMAN SAID, Advanced Photon Source, Argonne National Laboratory, YOSHI OKADA, Nagoya University, TAKESHI KONDO, University of Tokyo, TSUNEHIRO TAKEUCHI, HIROSHI IKUTA, Nagoya University, DAVID MONCTON, YOUNG LEE, Massachusetts Institute of Technology — Recent work on several members of the cuprate family of high-temperature superconductors has revealed the occurrence of broken lattice translational, rotational, and time reversal symmetries in various materials at low temperatures. We report on measurements of acoustic phonons on $Bi_2(La,Sr)_2CuO_{6+\delta}$, which reveal a coupling to an underlying electronic density-wave state. Longitudinal acoustic phonons are found to be anomalously broadened at a wavevector of q $\approx$ 1/4 rlu along the Cu-O direction. At low temperatures a disparity between the scattered intensity at positive and negative energy transfer is seen. These measurements indicates a breaking of time reversal and inversion symmetry in the bulk.

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