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Inelastic X-ray scattering measurement of electronic order in Bi2212 CRAIG BONNOIT, DILLONG GARDNER, Massachusetts Institute of Technology, AYMAN SAID, Advanced Photon Source, Argonne National Laboratory, GENDA GU, JOHN TRANQUADA, Brookhaven National Laboratory, YOUNG LEE, Massachusetts Institute of Technology — We present inelastic x-ray scattering measurements on superconducting Bi2212, showing evidence for a phonon anomaly associated with an underlying electronic density-wave state. We observe an broadening of the longitudinal acoustic phonon at a wavevector comparable to the antinodal nesting wavevector, near (1/4,1/4,0) in orthorhombic notation. An observed asymmetry between phonon creation and annihilation processes indicates breaking of time reversal and inversion symmetry as temperature is lowered. These measurements are consistent with prior work on single layer Bi2201, indicating universality of these features in the family of Bi-based high-Tc materials.

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