

Abstract Submitted
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Momentum-resolved coherent phonon oscillations in cuprate superconductors. SHUOLONG YANG, Kavli Institute at Cornell, JONATHAN SOBOTA, SLAC National Accelerator Laboratory, YU HE, Stanford University, DOMINIK LEUENBERGER, University of Zurich, HADAS SOIFER, PATRICK KIRCHMANN, SLAC National Accelerator Laboratory, ZHI-XUN SHEN, Stanford University — Using time- and angle-resolved photoemission spectroscopy, we resolve coherent phonon modes on a cuprate superconductor Bi2212. Upon optical excitation, the electronic band dispersion near the node oscillates with a dominant mode at 3.94 THz. The amplitude of this mode weakly increases as a function of momentum away from the node. Comparing with phonon frequencies extracted from Raman spectroscopy and electron energy loss spectroscopy, we identify these coherent modes as A_{1g} phonons involving the motion of Cu-O planes. Our study provides a new route to characterize the momentum-resolved electron-phonon coupling strength, which is essential to disentangle the competing interactions in cuprate superconductors.

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