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Resonant inelastic soft x-ray scattering as a site-specific probe of electron-phonon coupling in one-dimensional edge-shared cuprates S. JOHNSTON, IFW Dresden, W.S. LEE, B. MORITZ, SLAC National Accelerator Laboratory, J. VAN DEN BRINK, IFW Dresden, Z.-X. SHEN, Stanford University, T. P. DEVEREAUX, SLAC National Accelerator Laboratory — Resonant inelastic x-ray scattering (RIXS) is a powerful probe for studying excitations in strongly correlated systems. With continued advancements of the technique the overall energy resolution has improved to the point of probing low-energy boson excitations near the elastic line. In this talk we present evidence for coupling to an optical oxygen phonon in the RIXS spectrum at the oxygen K-edge of the quasi-1D edge shared cuprate $Ca_{2+x}Y_{2-x}Cu_5O_{10}$. This mode is identified as a compressive mode polarized perpendicular to the chain direction, modulating the Cu-O charge transfer energy and setting the size exchange interaction. By comparing to small cluster calculations we extract a sizable electron-phonon coupling strength in a site-resolved manner, implying a strong integration of the lattice degrees of freedom into the electronic structure.

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