Abstract Submitted
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Electronic Excitations in the Resonant X-Ray Scattering Spectra of La_2CuO_4[1] DAVID ELLIS, Department of Physics, University of Toronto, JOHN HILL, Department of Physics, Brookhaven National Laboratory, SHUICHI WAKIMOTO[2], Department of Physics, University of Toronto, DIEGO CASA, CMC-CAT, Advanced Photon Source, Argonne National Laboratory, THOMAS GOG, CMC-CAT, Advanced Photon Source, Argonne National Laboratory, YOUNG-JUNE KIM, University of Toronto — Resonant inelastic X-Ray scattering (RIXS) experiments were done on the insulating cuprate La_2CuO_4 (LCO), tuning the incident energy to the copper k-edge at 8.99 keV to probe excitations on the order of an eV. With an energy resolution of 130 meV, a number of new features in the electronic excitations could be resolved. The momentum dependence of these features was studied in detail. In LCO, distinct peaks were seen above 2 eV, the first of which is associated with the charge-transfer excitation between the copper and the neighboring oxygen atoms. The amplitude of this peak decreased with increasing momentum transfer q, and energy increased with an observed dispersion of at least 0.2 eV. These results were interpreted using a 1-band model calculation. Also seen was a non-dispersive feature at 1.8 eV thought to be an orbital d-d excitation.

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