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Intermediate-Energy Charge-Transfer Excitations in the Cuprate Superconductors and the Photon Energy Dependence of the RIXS process[1]

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We present a study of the charge-transfer excitations of the structurally simple high-Tc superconductor $HgBa_2CuO_4 + \delta$ and of the Mott insulator La_2CuO_4 using the burgeoning experimental technique of resonant inelastic X-ray scattering (RIXS). Our measurements address the 1-7 eV spectral range and place particular emphasis on the incident photon energy dependence of the cross section. Our results reveal clear evidence for a group of weakly-dispersing excitations [2] [3]. Collectively, these results call for the use of a multi-band theoretical approach for the description of the charge dynamics of high-Tc cuprate superconductors in this intermediate-energy regime.

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[2]L. Lu et al., *Phys. Rev. Lett.* **95**, 217003 (2005).

[3]J. N. Hancock et al., unpublished.