

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

ARPES lineshapes, coherent to incoherent ratios, and the waterfall self-energy of Bi2212 cuprate superconductors QIANG WANG, ZHE SUN, TANMOY DAS, ALEXANDER BALATSKY, ELI ROTENBERG, HELMUTH BERGER, HIROSHI EISAKI, YOSHIHIRO AIURA, DANIEL DESSAU — We report a detailed lineshape analysis of ARPES data on Bi2212 in which we separate out the sharp coherent peaks from the higher energy incoherent “background” portions, which includes and makes up the famous waterfall regions. We find that the ratio of the incoherent to coherent weights scales quadratically with the peak energy of the coherent portion of the spectra over a very wide energy range. We show that this behavior, including the waterfalls, can be understood with a simple model electron self-energy, giving a new and powerful experimental tool for determining self-energy effects in correlated electron systems.

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Date submitted: 05 Jan 2011

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