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High binding energy band structure of Bi-2212 as measured by ARPES K. MCELROY, J. GRAF, MSD, Lawrence Berkeley National Laboratory, California, G.-H. GWEON, S.Y. ZHOU, Department of Physics, UC Berkeley, California, S. SAHRAKORPI, M. LINDROOS, R.S. MARKIEWICZ, A. BANSIL, Physics Department, Northeastern University, Boston MA, H. EISAKI, AIST, Tsukuba, Japan, T. SASAGAWA, H. TAKAGI, Department of Advanced Materials Science, U of Tokyo, Japan, S. UCHIDA, Department of Physics, U of Tokyo, Tokyo, Japan, A. LANZARA, Department of Physics, UC Berkeley, California — The study of the electronic structure of high temperature superconductors by angle resolved photoemission spectroscopy (ARPES) has so far focused on the states near the Fermi level, believed to be fundamental for most of the properties of cuprates. However, it is well known that in doped Mott insulators the low and high energy physics are strongly coupled one to the other. Therefore, to gain insight on the real physics of cuprates a full characterization of the electronic band structure up to energies of the order of the lower Hubbard band and beyond is needed. Here we report a detailed, doping dependent study of the band structure of Bi2212 superconductors at energies of the order of 1-2 eV. The experimental results are interpreted in terms of local density approximation (LDA) based computations, where the presence of the "spaghetti" of Cu-O and O-bands is predicted. Comparison between computed and measured bands provides insight into many-body renormalization effects.

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