Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Standing-wave photoemission study of the high-Tc superconductor Bi2Sr2CaCu2O8+d CHENG-TAI KUO, SHIH-CHIEH LIN, GIUSEPPINA CONTI, SHU-TING PI, UC Davis, LUCA MORESCHINI, AARON BOSTWICK, JULIA MEYER-ILSE, ERIC GULLIKSON, Advanced Light Source, JEFFREY KORTRIGHT, Lawrence Berkeley National Laboratory, TIEN-LIN LEE, Diamond Light Source, SLAVOMIR NEMSAK, Peter Gruenberg Institute, ANDRES F. SANTANDER-SYRO, Universit Paris-Sud, IVAN A. VARTANIANTS, Deutsches Elektronen-Synchrotron, WARREN PICKETT, CHARLES S. FADLEY, UC Davis
— It is believed that the key element of superconductivity in the high-Tc cuprates is the electron- or hole- doping of the CuO2 planes within their layered structures with large c-axis lattice parameters. An important challenge remaining is the unambiguous differentiation of the electronic structure of these CuO2 layers and those of the intermediate layers. Conventional angle-resolved photoemission spectroscopy (ARPES) with energies of 6 to 150 eV has provided much information, but collects photoelectrons from only the topmost surface layers rather than the full unit cell for the typical cuprate Bi2Sr2CaCu2O8+d (Bi-2212) Here we present a soft x-ray standing-wave photoemission study of Bi-2212, providing depth resolution of the different atomic planes (CuO2, Ca, SrO, and BiO). Rocking curves of core-level and valence spectra were used to derive layer-resolved densities of states (DOSs) within Bi-2212. DFT calculations incorporating the Bi-2212 supermodulation structures are compared to the layer-specific DOSs. Our work thus supplies new insights into the electronic structure of the cuprates.

Cheng-Tai Kuo
Univ of California - Davis

Date submitted: 12 Nov 2016 Electronic form version 1.4