Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Electronic structure of the ingredient planes of Bi2Sr2CaCu2O8+δ and Bi2Sr2CuO6+δ superconductors[1]

XUCUN MA, Department of Physics, Tsinghua University — Understanding the mechanism of high transition temperature superconductivity in cuprates has been hindered by the apparent complexity of their multilayered crystal structure. Using a cryogenic scanning tunneling microscopy (STM), we report on layer-by-layer probing of the electronic structures of the ingredient planes (BiO, SrO, CuO2) of Bi2Sr2CaCu2O8+δ (Bi-2212) and Bi2Sr2CuO6+δ (Bi-2201) superconductors prepared by argon-ion bombardment and annealing (IBA) technique. We show that the well-known pseudogap (PG) feature observed by STM is inherently a property of the charge reservoir planes and thus irrelevant directly to Cooper pairing. The CuO2 planes are exclusively characterized by a small gap inside the PG. The small gap becomes invisible near Tc, which we identify as the superconducting gap. The results constitute severe constraints on any microscopic model for high Tc superconductivity in cuprates. Contributors: Yan-Feng Lv, Wen-Lin Wang, Hao Ding, Yang Wang, Yong Zhong, Ying Ding, Ruidan Zhong, John Schneeloch, Gen-Da Gu, Lili Wang, Ke He, Shuai-Hua Ji, Lin Zhao, Xing-Jiang Zhou Can-Li Song, and Qi-Kun Xue.

[1]NSF and MOST of China

XUCUN MA
Department of Physics, Tsinghua University

Date submitted: 05 Nov 2016 Electronic form version 1.4