Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Anticorrelation between the parent charge transfer gap and maximum transition temperature in cuprates WEI RUAN, State Key Laboratory of Low Dimensional Quantum Physics, Department of Physics, Tsinghua University, CHENG HU, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, PENG CAI, State Key Laboratory of Low Dimensional Quantum Physics, Department of Physics, Tsinghua University, YINGYING PENG, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, XINTONG LI, ZHENQI HAO, State Key Laboratory of Low Dimensional Quantum Physics, Department of Physics, Tsinghua University, XINGJIANG ZHOU, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, ZHENG-YU WENG, Institute for Advanced Studies, Tsinghua University, YAYU WANG, State Key Laboratory of Low Dimensional Quantum Physics, Department of Physics, Tsinghua University — We use scanning tunneling spectroscopy to measure the electronic structure of the parent Mott insulator of three different types of cuprates. The charge transfer gap size exhibits pronounced variations, and more interestingly it shows an anticorrelation with the maximum superconducting transition temperature achieved at the optimal doping of each cuprate. This result suggests that the Mottness in parent cuprate plays a crucial role in determining the superconducting properties. In particular, reducing the electron correlation strength enhances superconductivity, which is consistent with the pairing mechanism based on the doped Mott insulator picture.

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Date submitted: 05 Nov 2015 Electronic form version 1.4