

Abstract Submitted
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Direct Observation of Superconducting Pair States in Atomic Resolution on $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ SANG HYUN JOO, Seoul National University, INHEE LEE, CHUNG KOO KIM, Brookhaven National Laboratory, JUNG HOON YOO, MIN SEOK PARK, GYOUNG SEOK LEE, JAE-JOON KIM, Seoul National University, GENDA GU, Brookhaven National Laboratory, KYLE MCELROY, University of Colorado at Boulder, Boulder, SHIN-ICHI UCHIDA, University of Tokyo, J.C. DAVIS, Cornell University, Brookhaven National Laboratory, JINHO LEE, Seoul National University — Conventional Spectroscopic Imaging Scanning Tunneling Microscopy (SI-STM) utilizes metal tips which limits ones only to access the information of quasiparticles, not superconducting pairs. We report the first atomically resolved Scanning Josephson Tunneling Microscopy (SJTM) on $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ (Bi-2212) using Bi-2212 tips which is formed *in situ*. Conductance maps measured by Bi-2212 tips show clear Josephson I - V characteristics which can be explained by considering Josephson phase diffusion due to thermal fluctuations. Zero Bias Conductance Peaks (ZBCPs) following Ambegaokar-Baratoff (AB) theory were directly measured by lock-in technique by which we can probe SC pairs directly. We will also present studies of Zn impurities on Bi-2212 using SJTM.

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