

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Imaging the Vortex Liquid State in $\text{Bi}_2\text{Sr}_2\text{CuO}_{6+\delta}$ ¹ T.L. WILLIAMS, M. ZECH, YI YIN, Harvard University, T. KONDO, Ames Laboratory, Iowa State University, T. TAKEUCHI, H. IKUTA, Nagoya University, J.E. HOFFMAN, Harvard University — We use a low temperature scanning tunneling microscope (STM) to study the vortex state of the high- T_c superconductor $\text{Bi}_2\text{Sr}_2\text{CuO}_{6+\delta}$ in magnetic fields up to 9 T. At a temperature of 6 Kelvin, we find no localized vortices down to $H = 0.25$ T. However, the gap depth from the spatially averaged dI/dV spectrum decreases with increasing magnetic field, which indicates a vortex liquid state. By tracking atomically resolved locations at different magnetic fields, we apply a normalization technique to remove inhomogeneities in the underlying density of states, revealing a more homogeneous superconducting state.

¹We acknowledge support from NSF grant DMR-0508812 and AFOSR grant FA9550-05-1-0371.

Yi Yin
Harvard University

Date submitted: 22 Jan 2009

Electronic form version 1.4