Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Channel-like conduction in $LaAlO_3/SrTiO_3$ heterointerfaces BEENA KALISKY, Bar-Ilan University and Stanford University, ERIC SPANTON, HILARY NOAD, JOHN KIRTLEY, CHRISTOPHER BELL, HIROKI SATO, YANWU XIE, YASUYUKI HIKITA, Stanford University, CARSTEN WOLTMANN, GEORG PFANZELT, RAINER JANY, Max-Planck Institute, HAROLD HWANG, Stanford University, JOCHEN MANNHART, Max-Planck Institute, KATHRYN MOLER, Stanford University — $LaAlO_3/SrTiO_3$ (LAO/STO) heterostructures exhibit metallic conduction at the interface. Many studies of LAO/STO properties are done by transport measurements which measure conductance over macroscopic areas of the sample or device. Local information about the electronic transport is crucial to the understanding of such new materials. We use scanning SQUID microscopy to map the magnetic field locally generated by current flowing at the interface in several LAO/STO samples. We find that the conduction is non-homogeneous and channel-like on the scale of microns and that the stripes/channels are related to tetragonal domains formed in the STO below $\sim$ 105K. We will describe the details of this exciting observation and its impact on transport studies of the LAO/STO interface.

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Date submitted: 16 Nov 2012 Electronic form version 1.4