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Direct Imaging of Current Flow at the interface of Strained LaAlO3/SrTiO3 AARON J. ROSENBERG, ERIC M. SPANTON, JOHN R. KIRTLEY, CHRISTOPHER BELL, YANWU XIE, HIROKI SATO, MASAYUKI HOSODA, YASUYUKI HIKITA, HAROLD Y. HWANG, KATHRYN A. MOLER, Stanford University — At the interface of band insulators LaAlO3 and SrTiO3, recent scanning SQUID and scanning SET studies show that conductivity and charge carrier density are influenced by the tetragonal domain structure of SrTiO3. SQUID imaging shows that transport current flows along more conductive narrow paths within a less conductive background, but the microscopic mechanism of the enhanced conductivity is still under investigation. We propose to apply tunable stress to the LaAlO3/SrTiO3 interface by while the sample is mounted in a scanning SQUID microscope, and observe how strain changes both the configuration of the more conducting paths and the magnitude of their conductivity enhancement. These studies may shed light on the relationship between strain, conductivity, and electronic structure in this system.

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