

Abstract Submitted
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Polarization-modulated rectification at ferroelectric surfaces¹

WEIDA WU, Y. HORIBE, S. PARK, T. CHOI, S.-W. CHEONG, Rutgers Center for Emergent Materials and Department of Physics and Astronomy, Rutgers University, Piscataway, NJ, 08854, S.B. KIM, Laboratory of Pohang Emergent Materials and Department of Physics, Pohang University of Science and Technology - Pohang 790-784, South Korea, J.R. GUEST, M. BODE, Center for Nanoscale Materials, Argonne National Laboratory, Argonne, IL 60439 USA — By correlating room temperature conductive atomic force microscopy (c-AFM) with low temperature electrostatic force microscopy (EFM) images taken at different temperatures but the same location, we demonstrate that nanoscale electric conduction between a sharp tip and the surface of ferroelectric HoMnO_3 is intrinsically modulated by the polarization of ferroelectric domains. Conductance spectra reveal that the electric conduction is described by polarization-induced Schottky-like rectification at low bias, but dominated by a space-charge limited conduction mechanism at high bias. Our observation demonstrates visualization ferroelectric domain structure by electric conduction, which may be used for non-destructive read-out of nanoscale ferroelectric memories or sensors.

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Weida Wu
Rutgers University

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