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Dynamic resistive switching controlled by local lateral gating in phase separated manganite wires HANGWEN GUO, JOO HYON NOH, SHUAI DONG, PHILIP RACK, The University of Tennessee, Knoxville, ZHENG GAI, Center for Nanophase Materials Sciences Division, Oak Ridge National Laboratory, XIAOSHAN XU, Oak Ridge National Laboratory, ELBIO DAGOTTO, The University of Tennessee, Knoxville, JIAN SHEN, Fudan University, THOMAS Z. WARD, Oak Ridge National Laboratory — Behaviors such as high T_c superconductivity, colossal magnetoresistivity, and the metal-insulator transition, have been tied to inherent electronic phases coexisting in a single crystal material. Here we demonstrate a novel approach to induce resistive electric field effect transitions based on the modification of the inherent electronic domain structures in single crystal materials. A phase separated manganite system confined to a scale which isolates a few electronic domains is controlled using laterally gated which give repeatable resistive changes of up to 50%. This technique also makes it possible to create multistate switching devices from a single confined transport channel. These findings provide an avenue to control inherent electronic phases in strongly correlated materials as a means of creating novel nano-electronic devices. Supported by the US DOE Office of Basic Energy Sciences, Materials Sciences and Engineering Division.

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