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**Bipolar Resistive Switching: a Defect Driven Nonvolatile Memory** STEPHEN TSUI, NILANJAN DAS, YUYI XUE, Texas Center for Superconductivity, University of Houston, C.W. CHU, Hong Kong University of Science and Technology; Texas Center for Superconductivity, University of Houston; Lawrence Berkeley National Laboratory — The study of phenomena applicable to the development of nonvolatile memory technology has been ongoing for nearly four decades. One such research route lies in the reversible pulse-induced resistive switches reported recently across various metal-perovskite oxide-metal configurations. Several models have been proposed to attribute the observations to bulk phase-separation, changes in the interfacial defects, Schottky-like barriers, or hopping between specially arranged non-percolating metallic domains imbedded in an insulating matrix. Such different mechanisms predicate rather different optimal configurations, switch speed, retention, and device potentials. Impedance spectroscopy, I-V characterization, and the temperature dependency of the resistance, therefore, are used to compare with various models and to deduce key parameters. The data confirm that the switches mainly occur in an active interfacial layer no thicker than a few nm with a defect density that changes significantly during the switching.

Stephen Tsui
Texas Center for Superconductivity, University of Houston

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