

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Nanoscale Control of an Interfacial Metal-Insulator Transition at Room Temperature¹ CHENG CEN, JEREMY LEVY, STEFAN THIEL, GERMAN HAMMERL, CHRISTOF W. SCHNEIDER, JOCHEN MANNHART, KRISTOPHER E. ANDERSON, C. STEPHEN HELLBERG — We report the creation and erasure of nanoscale conducting regions at the interface between two insulating oxides, LaAlO₃ and SrTiO₃. Using voltages applied by a conducting atomic force microscope (AFM) probe, the buried LaAlO₃/SrTiO₃ interface is locally and reversibly switched between insulating and conducting states. Persistent field effects are observed using the AFM probe as a gate. Patterning of conducting lines with widths ~ 3 nm, as well as arrays of conducting islands with densities $>10^{14}/\text{in}^2$, are demonstrated. The patterned structures are stable for >24 hours at room temperature.

¹This work was supported by NSF-0704022 (JL), DARPA DAAD-19-01-1-0650 (JL), the DFG (SFB 484) (JM), the EC (Nanoxide) (JM) and the ESF (THIOX) (JM).

Cheng Cen
University of Pittsburgh

Date submitted: 27 Nov 2007

Electronic form version 1.4