Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Thickness dependent metal-insulator transition of a correlated oxide heterostructure integrated directly on Si KAMYAR AHMADI MAJLAN, University of Texas at Arlington, TONGJIE CHEN, North Carolina State University, RICKY HENSLEY, PATRICK CONLIN, ZHENG HUI LIM, REZA MOGHADAM, University of Texas at Arlington, DONG SU, Brookhaven National Laboratory, DIVINE P. KUMAH, North Carolina State University, JOSEPH H. NGAI, University of Texas at Arlington — Strongly correlated oxides that exhibit metal-insulator transitions have tremendous potential for use in a variety of applications, ranging from microelectronics to sensing. Integration of such correlated oxides on a technological platform such as Si is thus important. Here we show a thickness dependent metal-insulator transition in epitaxial $LaTiO_3/SrTiO_3$ heterostructures, that have been integrated directly on Si (100) by oxide molecular beam epitaxy. Fermi-liquid behavior and enhanced electron-electron scattering is observed in the transport characteristics as the transition to the insulating state is approached. The transition occurs well below the Mott limit and the insulating state is characterized by Arrhenius or activated-type transport. We will discuss structural changes that arise as the thickness of the $LaTiO_3/SrTiO_3$ heterostructures is varied, in particular the potential role that strain gradients play in driving the metal-insulator-transition.

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Date submitted: 13 Nov 2016 Electronic form version 1.4