Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Kondo effect and ferromagnetic ordering at the n-type $SrTiO_3$ - $LaAlO_3$ conducting interface ALEXANDER BRINKMAN, MARK HUIJBEN, MAARTEN VAN ZALK, JEROEN HUIJBEN, WILFRED VAN DER WIEL, GUUS RIJNDERS, DAVE BLANK, HANS HILGENKAMP, Faculty of Science and Technology and MESA+ Institute for Nanotechnology, University of Twente, The Netherlands — The intriguing phenomenon of electrical conductivity at the interface between two insulators is one of the possible consequences of electronic reconstruction of materials. In analogy with interface conduction, the question arises whether or not it is possible to induce magnetism at the contact between two nonmagnetic materials. We show how a polar discontinuity at the n-type conducting interface between the nonmagnetic perovskites $SrTiO_3$ and $LaAlO_3$ can induce a local magnetic moment on the Ti site. The resulting interface magnetism manifests itself in the form of ferromagnetic ordering at 0.3 K and the scattering of conduction electrons on the magnetic local moment, which provides a large negative magnetoresistance of 30%. The scattering can be described in terms of the Kondo effect with a Kondo temperature of 50 K. Electronically reconstructed interfaces now provide another versatile class of solid state Kondo systems, next to dilute impurities in metals and artificial quantum dots.

Alexander Brinkman
Faculty of Science and Technology and MESA+ Institute for
Nanotechnology, University of Twente, The Netherlands

Date submitted: 26 Nov 2006 Electronic form version 1.4