

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Electronic properties of the conducting interface in LaAlO₃/SrTiO₃ heterostructures - the view from x-ray spectroscopies M. SING, G. BERNER, A. MULLER, J. WALDE, F. PFAFF, R. CLAESSEN, Wurzburg University, Germany, H. HOLLMARK, L.-C. DUDA, Uppsala University, Sweden, S. PAETEL, C. RICHTER, J. MANNHART, Augsburg University, Germany, S. THIESS, W. DRUBE, HASYLAB, Hamburg, Germany, S.A. PAULI, C.W. SCHNEIDER, P.R. WILLMOTT, Paul Scherrer Institut, Villigen, Switzerland — Novel phases with often unexpected electronic and magnetic properties may form at the interfaces of epitaxial heterostructures composed out of complex oxides. A case in point is LaAlO₃ (LAO) on TiO₂-terminated SrTiO₃ (STO), for which a conducting interface has been found if the LAO thickness exceeds 3 unit cells. Although there is growing evidence that the origin is intrinsic and involves a transfer of charge to the interface to compensate the electric potential due to the polar nature of LAO there are a number of open issues. These refer, e.g., to the LAO thickness dependence of the charge carrier concentration, the potential gradient and the role of defects in LAO, the band alignment and bending at the interface, the lateral mobility or confinement of the interface charge carriers etc. We address these questions from the viewpoint of high-energy spectroscopies, i.e. hard x-ray photoelectron spectroscopy and resonant inelastic soft x-ray scattering, both of which we applied for the first time to these materials.

Michael Sing
Wurzburg University

Date submitted: 06 Dec 2010

Electronic form version 1.4