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Transport properties of MBE grown $LaAlO_3/SrTiO_3$ interfaces and the effect of stoichiometry A.A. PAWLICKI, M.P. WARUSAWITHANA, Department of Physics and NHMFL, Florida State University, T. HEEG, D.G. SCHLOM, Department of Materials Science and Engineering, Cornell University, C. RICHTER, S. PAETEL, J. MANNHART, Experimentalphysik VI, University of Augsburg, M. ZHENG, B. MULCAHY, J.N. ECKSTEIN, Department of Physics, University of Illinois at Urbana-Champaign, W. ZANDER, J. SCHUBERT, Inst. of Bio and Nanosystems IBN1-IT and JARA-FIT, Research Centre Jülich — We report on electronic transport properties on MBE grown $LaAlO_3/SrTiO_3$ 2-dimensional electron gas samples measured at cryogenic temperatures in perpendicular magnetic fields. We find that the electronic properties of this system are strongly dependent on the stoichiometry of the $LaAlO_3$ layer: A 2-dimensional electron gas is observed only when the La/Al ratio is less than 1. Hall measurements at low-temperatures reveal that the mobility and the carrier concentration in these samples are $\sim$250 $cm^2V^{-1}s^{-1}$ and $10^{13}cm^{-2}$ respectively. The 2-dimensional electron gas superconducts at around 200 mK. We will discuss how the low-temperature electronic properties of this oxide-oxide interface are affected by the $LaAlO_3$ stoichiometry.

A. A. Pawlicki
Department of Physics and NHMFL, Florida State University

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