

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Quantum Oscillations at the $\text{LaAlO}_3/\text{SrTiO}_3$ Interface A. MCCOLLAM, V.K. GUDURU, U. ZEITLER, J.C. MAAN, High Field Magnet Laboratory, Radboud University Nijmegen, Netherlands, M.K. KRUIZE, S. WENDERICH, H. HILGENKAMP, D.H.A. BLANK, MESA+ Institute for Nanotechnology, University of Twente, Netherlands — Under certain growth and preparation conditions, the interface between the perovskite oxides LaAlO_3 and SrTiO_3 can support a 2-dimensional electron gas (2deg) with diverse and remarkable electronic properties. When the mobility of this 2deg becomes high enough, quantum oscillations appear in the magnetoresistance and provide important information about the origin of the electronic behavior. Here we present an angle-dependent magnetotransport study of a high mobility $\text{LaAlO}_3/\text{SrTiO}_3$ interface, at millikelvin temperatures and in magnetic fields of up to 30 T. Large quantum oscillations are observed, with a complex dependence on the applied magnetic field and its orientation with respect to the plane of the interface. We propose that the unusual properties of the oscillations have their origin in the multi-subband character of the 2deg, and present a simple model, based on two-dimensional conductivity, which supports the scenario that several spin-split subbands, with field and angle-dependent occupancy, are contributing to the quantum transport in this system.

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Date submitted: 19 Nov 2010

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