Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Evolution of subband structure with gate-tuning at LaAlO3/SrTiO3 interfaces LUCAS TANG, Radboud Univ Nijmegen, SANDER SMINK, University of Twente, LINDE VAN HEERINGEN, Radboud Univ Nijmegen, JAAP GEESSINCK, ABIMANUYA RANA, ANKUR RASTOGI, University of Twente, JAN KEES MAAN, Radboud Univ Nijmegen, ALEXANDER BRINKMAN, University of Twente, ULI ZEITLER, Radboud Univ Nijmegen, HANS HILGENKAMP, University of Twente, ALIX MCCOLLAM, Radboud Univ Nijmegen — The outstanding characteristic of LaAlO3/SrTiO3 heterostructures is the formation of a high mobility 2D electron gas (2DEG) at the interface. The additional presence of superconductivity, magnetism and large spin-orbit coupling in these systems suggests that strong correlations play an important role in the electronic properties, in contrast to conventional semiconductor-based 2DEGs. Knowledge of the electronic bandstructure, and the interdependence of conduction electron density and properties is therefore essential for our understanding of these materials. We present new results of low temperature transport measurements in a high mobility LaAlO3/SrTiO3-based heterostructure, in magnetic fields up to 33 T. Shubnikov de-Haas oscillations are observed, revealing several subbands with different carrier densities. By application of an electric field in the back gate geometry, the Fermi level is tuned and thus we are able to map the smooth evolution of the subbands and their properties with carrier density. These results are in good agreement with recent theoretical work, such that we can disentangle the complex band structure, and quantify aspects such as Rashba spin-splitting and the mixing of orbital character.

Lucas Tang
Radboud Univ Nijmegen

Date submitted: 10 Nov 2016 Electronic form version 1.4