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Spin-orbit interaction in InAs/GaSb heterostructures FANMING QU, ARJAN J. A. BEUKMAN, FOKKO K. DE VRIES, JASPER VAN VEEN, STEVAN NADJ-PERGE, MICHAEL WIMMER, RAFAL J. SKOLASINSKI, DAVID DE VRIES, Delft University of Technology, BINH-MINH NGUYEN, WEI YI, JACOB THORP, MARKO SOKOLICH, HRL Laboratories, MICHAEL J. MANFRA, Purdue University, CHARLES M. MARCUS, University of Copenhagen, LEO P. KOUWENHOVEN, Delft University of Technology — We investigated spin-orbit interaction (SOI) in InAs/GaSb double quantum wells. A combination of dual-gating and spatially separated electron and hole gases allows for in situ engineering of the band structure. In both the trivial and inverted band alignment regimes, zero-field spin splitting due to SOI was extracted from the beating of the Shubnikov-de Haas oscillations. Deep in the electron regime, we observed anomalous magnetoresistance that points to a highly anisotropic Fermi surface as a result of the intermixing of Dresselhaus and Rashba SOI. In the inverted regime close to the hybridization gap, we obtained an oscillating spin-splitting as a function of electron density, as expected from the band structure calculation.

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