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Transverse magnetic focusing and spin-dependent reflection experiments in InSb- and InAs-based heterostructures HONG CHEN, J.J. HEREMANS, Department of Physics, Virginia Tech, J.A. PETERS, J.T. BEARDSLEY, Department of Physics and Astronomy, Ohio University, N. GOEL, S.J. CHUNG, M.B. SANTOS, Department of Physics and Astronomy, University of Oklahoma, W. VAN ROY, G. BORGHS, IMEC, Leuven, Belgium — We report on mesoscopic spin-dependent ballistic transport in InSb/InAlSb and InAs/AlGaSb heterostructures, characterized by strong spin-orbit interaction. Spin-orbit interaction in two-dimensional electron systems can lead to spin-splitting in semiclassical ballistic trajectories and in spin-dependent reflection of carriers. We experimentally demonstrate the spin reflection in open and closed ballistic geometries optimizing scattering off a lithographic barrier. Further, experimentally obtained transverse magnetic focusing spectra can be interpreted as demonstrating both spin-split ballistic transport and spin-dependent reflection for higher order peaks involving carrier reflection off the barrier. NSF DMR-0094055 (JJH), DMR-0080054, DMR-0209371 (MBS).

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