Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Temperature dependence of spin-resolved transverse magnetic focusing in InSb- and InAs heterostructures J.J. HEREMANS, R.L. KALLAHER, R.B. LILLIANFELD, Virginia Tech, HONG CHEN, University of North Florida, N. GOEL, S.J. CHUNG, M.B. SANTOS, University of Oklahoma, W. VAN ROY, G. BORGHS, IMEC (Belgium) — Spin-orbit interaction in InSb/InAlSb and InAs/AlGaSb heterostructures leads to spin-split orbital motion. The spatial separation of semiclassical cyclotron orbits is experimentally detected by measuring the magnetoresistance of lithographically patterned mesoscopic ballistic transverse magnetic focusing geometries. The 1st and 2nd focusing maxima show multiplet structure, consistent with spin-split ballistic orbits and spin-dependent reflection off the focusing barrier. In InSb, the transverse magnetic focusing effect is observable up to 150 K, while the multiplet structure in the maxima shows a more pronounced temperature dependence and fades by 80 K. In InAs, the transverse magnetic focusing effect persists to 60 K, and the multiplet structure is visible up to 20 K. The difference in temperature dependence between maxima and multiplet structure indicates that a length scale separate from the mean-free-path governs the observation of splitting, pointing to the use of transverse magnetic focusing for quantifying the temperature dependence of spin coherence. (NSF DMR-0618235, DMR-0080054, DMR-0209371)

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Date submitted: 19 Dec 2007 Electronic form version 1.4