Abstract Submitted
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Ballistic transport in InSb quantum well nano-structures[1] A.M. GILBERTSON, D.E. READ, L.F. COHEN, Imperial College, S.A. SOLIN, Washington University in St. Louis, M. FEARN, L. BUCKLE, QinetiQ, A. KORMÁNYOS, C.J. LAMBERT, Lancaster University — Electron mobilities in InSb quantum wells (QWs) have recently been reported in excess of 6 $m^2V^{-1}s^{-1}$ at 290 K translating to long mean free paths (mfp) of the order 650 nm [1]. For applications requiring high spatial resolution, device miniaturisation leads to the relevant dimensions becoming comparable to the mfp and ballistic transport becomes important. Whilst ballistic transport at 290 K has been demonstrated in a 200 nm Hall cross fabricated from GaAs QWs [2], the inherent complications in the growth of high quality InSb QWs has to-date limited this observation to 205 K in an equivalent device [3]. We report on the fabrication, modelling and measurement of devices patterned down to 50 nm on InSb QW material. The effect of device scaling and fabrication on the transport properties will be discussed. Features of ballistic transport are presented at elevated temperatures.

[2] A.M.Gilbertson, et al. PRB 79, 235333 (2009).
[3] Y.Hirayama et al., APL 63, 2366 (1993).
[4] N.Goel et al. Physica E 20,251 (2004).

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