

Abstract Submitted  
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**Magnetotransport properties and weak localisation in thin n-GaAs films**<sup>1</sup> A.M. GILBERTSON, L.F. COHEN, Imperial College, A.K.M. NEWAZ, S.A. SOLIN, Washington University in St. Louis — A number of applications require nanoscale devices that retain diffusive transport for application e.g. devices based on the geometrical enhancement of classical properties for high resolution magnetic and electric field sensing [2,3], and the non-ballistic spin transistor. We recently reported on the properties of a 90nm thick GaAs film suitable for such high resolution sensing applications [4]. A dimensional crossover with respect to both WL and electron-electron interactions was observed in the temperature dependence of the conductivity and phase coherence length, respectively [4,5]. We extend this work by studying a further three GaAs films (70 nm, 110 nm and 200 nm) with equal doping density to the original 90nm film. It is demonstrated that proximity of the layer to the surface makes the film thickness an important parameter in determining the transport properties at high and low temperatures.

[2] S.A.Solin et al., APL 80, 4012 (2002).

[3] Y.Wang et al., APL 92, 262106 (2008).

[4] A.M.Gilbertson et al. APL 95, 012113 (2009).

[5] D.J.Newson et al.,Phil. Mag. B 52, 437 (1985).

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