

Abstract Submitted
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Controlling the Inherent Magnetoresistance in thin InSb epilayers on GaAs (001)¹ T. ZHANG, J.J. HARRIS, S.K. CLOWES, W.R. BRANDFORD, L.F. COHEN, Imperial College, S.A. SOLIN, Washington University in St.Louis — There is great advantage to controlling the magnetoresistance (MR) in high mobility semiconductors for a number of applications which require thin active surface layers. Previously we have produced n type thin epilayers of InSb with the highest reported mobility² and we have used these epilayers to explore novel geometries that enhance the high field MR.³ Here we show that by virtue of the inherent inhomogeneity in the growth direction, thin InSb epilayers can be designed to have significant MR without external geometric manipulation. The observations can be explained using a transport model that describes the electrical properties of the layers including contributions from conduction and impurity bands.⁴ We will explore using the model, the possibility of maximizing or minimizing the inherent MR in these layers and we show experimentally how to create thin high mobility layers where the inherent MR is significantly reduced or enhanced without compromising the layer mobility.⁵

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²T. Zhang et al. Appl. Phys Lett. **84**, 4463 (2004).

³W.R. Branford et al., Appl. Phys Lett. **86**, 202116 (2005).

⁴J.J. Harris et al., Semicond. Sci. Tech. **19**, 1406 (2004).

⁵T Zhang et al., Semicond. Sci. Tech., in press.

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