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Antilocalization in quasi-1D InAs wires R. L. KALLAHER, J. J. HEREMANS, Virginia Tech, W. VAN ROY, G. BORGHS, IMEC (Belgium) — The influence of mesoscopic confinement on spin and phase coherence of carriers can be investigated through measurements of antilocalization. Antilocalization results in a decrease in the resistance at low magnetic field, from which spin and phase coherence lengths can be extracted. We present low temperature magnetotransport measurements performed on quasi-1D (Q1D) wires fabricated from InAs/AlGaSb two dimensional electron systems (2DESs). Shubnikov-de Haas oscillations indicate strong spin-orbit coupling for such 2DESs. Measurements of antilocalization in the unpatterned 2DESs with different electron mobilities (30 vs 10 m^2/Vs) and associated Q1D wires of widths ranging from 0.1 - 1 μm are compared. The effect of antilocalization on magnetoresistance is more readily observed in the narrow wires as compared to the unpatterned 2DESs where little, or no, antilocalization was detected. We discuss the enhancement of antilocalization, and the wire width dependence of extracted spin and phase coherence lengths obtained by fitting the magnetoresistance curves to localization theory. Support by DOE DE-FG02-08ER46532 is acknowledged.

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