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A Study of Dresselhaus and Rashba Effects in InSb/InAlSb Heterostructures via Anti-Weak Localization Measurements ARUNA DEDIGAMA, DILHANI JAYATHILAKA, SHEENA MURPHY, MADHAVIE EDIRISOORIYA, NITI GOEL, TETSUYA MISHIMA, MICHAEL SANTOS, University of Oklahoma, C-SPIN COLLABORATION — The InSb/InAlSb system has both the largest Dresselhaus effect (due to bulk inversion asymmetry) and Rashba effect (due to structural inversion asymmetry) of the III-V semiconductor family. Both mechanisms contribute to electronic spin splitting, even in zero applied field. While the Dresselhaus effect is purely materials specific, the Rashba interaction is less well understood with both the electric field at the interface and the discontinuity due to the barrier predicted to play significant roles. Standard measurements of the zero field spin splitting however, are usually performed at high field where Zeeman effects and higher subband occupancy become problematic. In this talk we will present our results in extremely low fields using anti-weak localization (AWL) measurements where these complications are absent. We report on systematic measurements of the Dresselhaus and Rashba interactions on a series of InSb/InAlSb heterostructures, where carrier density, dopant density and the Al concentration in the barrier have all been varied to extract the role of each in the strength of the spin-orbit coupling.

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