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Demonstration of interface-scattering-limited electron mobilities in InAs/GaSb superlattices[1] F. SZMULOWICZ, University of Dayton Research Institute, S. ELHAMRI, Department of Physics, University of Dayton, H. HAUGAN, Universal Technology Corporation, G. BROWN, W. MITCHEL, Air Force Research Laboratory, Materials & Manufacturing Directorate — In-plane transport in InAs/GaSb type-II superlattices (SLs) is a sensitive indicator of SL growth quality and of the eventual performance of devices made from these materials. The in-plane mobility of electrons that move predominantly in the InAs layer is affected by a number of intrinsic and extrinsic scattering mechanisms, including interface roughness scattering (IRS). The hallmark of classic IRS-limited transport in SLs and quantum wells is the sixth power dependence of mobility on layer width. While IRS-limited transport was demonstrated in a number of SL and quantum well systems, it has never been demonstrated in the important InAs/GaSb SL material. We performed temperature dependent Hall effect measurements on a series of InAs/GaSb SLs with a fixed GaSb layer width and a variable InAs layer width, d. The low temperature (10K) in-plane electron mobilities, μ, as a function d behave as $\mu \propto d^{6.20}$, which follows the classic sixth power dependence expected from theory.

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F. Szmulowicz
University of Dayton Research Institute

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