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Effective masses of Quasi-2D electrons in InGaAs/GaAsSb modulation-doped heterostructures[1] IMTIAZ TANVEER, BRUCE MCCOMBE, University at Buffalo, The State University of New York, HERMANN DETZ, GOTTFRIED STRASSER, Vienna University of Technology, Vienna, Austria — The electronic properties of $In_{0.53}Ga_{0.47}As/GaAs_{0.51}Sb_{0.49}$ 2D electron gas (2DEG) systems, in spite of their use in high power electronics, have not been extensively investigated. Recently, they have been suggested as potential materials for IR quantum devices such as quantum cascade lasers (QCL), and they also show a strong Rashba effect[1,2]. Here accurate values of the effective masses are important. Two remotely donor (Si)-doped samples grown by MBE with a 2DEG at the single heterostructure interface were studied by FIR magneto-transmission spectroscopy with a BOMEM FTIR spectrometer. The maximum mobilities (near 70 K) are 43,000 cm^2/Vs and 36,000 cm^2/Vs with corresponding carrier densities of 1.07 x 10^{12} cm^{-2} and 2.13 x 10^{12} cm^{-2}, respectively. Cyclotron resonance measurements between 4T and 9T yielded $m^* = 0.0495m_0$ for the more heavily doped sample. Individual transmission profiles in this case showed broadening toward high-energy, which may be due to contributions to the overall absorption profile from higher occupied subbands. The lower density sample shows an energy vs B dependence that does not extrapolate to zero at B = 0. The origin of this behavior will be discussed.

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