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Intersubband absorption by electrons in InSb quantum wells with an in-plane magnetic field[1] M.B. SANTOS, S.D. LOWE, T.D. MISHIMA, R.E. DOEZEMA, University of Oklahoma, L.C. TUNG, Y.-J. WANG, NHMFL, Florida State University — We performed magneto-transmission experiments at 4.2K on n-type InSb multiple quantum wells (MQWs) in the Voigt geometry. The direction normal to the plane of the MQWs was perpendicular to the direction of the applied magnetic field and parallel to the propagation direction for the incident radiation. Electrons at densities of 1 to 8×10^{11}cm^{-2} were confined to InSb QWs (10 to 30 nm thick) by $Al_{0.09}In_{0.91}Sb$ barrier layers. Intersubband transitions within the conduction band were observed at magnetic fields up to B=17T and photon energies up to 100 meV. A single intersubband transition observed at low B (<7T) branches into two well-resolved transitions at high B. The in-plane magnetic field is expected to mediate the spin-conserving transitions, whereas the bulk inversion asymmetry is expected to induce spin-flip excitations. A depolarization shift is expected for the spin-conserving transitions. The large g-factor (-51 in bulk InSb) and small effective mass (0.014 m_e in bulk InSb) for electrons in InSb QWs enables the study of both spin-conserving and spin-flip intersubband transitions.

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