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Magneto-infrared modes in InAs-AlSb-GaSb coupled quantum wells PATRICK FOLKES, Army Research Laboratory, L.-C TUNG, National High Magnetic Field laboratory, Florida State University, GODFREY GUMBS, Hunter College, City University of New York, WEN XU, Inst. of Solid State Physics, Chinese Academy of Sciences, and Yunnan University, Y.-J WANG, National High Magnetic Field Laboratory, Florida State University — Magneto-infrared spectroscopy has been used to study the two-dimensional electron-hole system in a set of weakly-hybridized InAs-AlSb-GaSb coupled quantum well heterostructures using high magnetic fields up to 33 T and temperatures ranging from 4K to 45K in both Faraday and tilted geometries. We have observed a pair of cyclotron resonance (CR) absorption modes only at magnetic fields higher than 14 T which are insensitive to increasing temperature and parallel magnetic field. In addition, the dependence of the energy separation of the CR splittings on magnetic field is very different from that previously reported for weakly hybridized samples. The conduction-valence Landau level mixing effect or other known models for InAs/GaSb heterostructures cannot explain these unusual characteristics. We suggest that a spontaneous phase separation can account for most of the observed features.

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