Abstract Submitted
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Photoluminescence and structural characterization of InAsSb/InAs strain balanced SLS grown on GaSb for infrared detector applications[1] DAVID LACKNER, Simon Fraser University, OLIVER J. PITTS, Present address: Canadian Photonics Fabrication Centre, NRC Institute for, MICHAEL STEGER, ALBION YANG, Simon Fraser University, MICHAEL L. W. THEWALT, SIMON P. WATKINS — $InAs_{0.91}Sb_{0.09}$, epitaxially grown on GaSb, has received steady attention in the past few years for optical detectors in the 3-5micron range. Attempts to increase the detection wavelength by increasing the Sb mole fraction have been hindered by the lack of lattice-matched substrates. In this work we report the growth of strain balanced InAs/InAsSb superlattice structures (SLS) strain-balanced to GaSb for potential application in photodetectors beyond 5 microns. The strain balanced method permits the incorporation of larger Sb mole fractions in the Sb layers, considerably extending the absorption cutoff. We find the PL-energy of the InAsSb/InAs MQW stack to depend linearly on the Sb mole fraction for samples with Sb compositions ranging from 14% to 27%. For the latter composition, a PL energy corresponding to a wavelength of 10 μm is detected. This can be explained by a type II band-alignment. The optical results are compared to the expectations from energy band simulation software. The simulations take into account the band offsets according to the solid model theory, energy band shifts due to strain and quantization energies.

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