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Title: Monolithically Integrated III-Nitride Infrared-Visible Detector-Emitter

Wide bandgap III-Nitride materials are a subject of great interest in applications for optoelectronic and power devices due to their large and tunable bandgap energy. One such optoelectronic device is a quantum well infrared photodetector (QWIP) which relies on intersubband transitions (ISBTs) of an electron (hole) in the conduction (valance) band. The III-nitride material system is particularly well suited for application in QWIP devices due to large conduction and valence band offset in Al(Ga)N/GaN heterostructures allowing for a broad range of spectral detection. For thermal imaging applications, III-nitride QWIP structures may be integrated with visible LED structures within the same material system. This reduces the need for additional read-out circuitry, decreasing the complexity, size and weight of the device. In my talk, I will introduce the design and development of an integrated III-nitride QWIP-LED device structure for detection in IR range. Simulated energy band diagram of an integrated AlGaN/GaN QWIP with InGaN/GaN green LED and experimental results on the growth and optimization of MOCVD-grown QWIP will be presented.