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[119] InAs/AlAsSb Quantum Cascade Detector Below 3 μm

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Quantum Cascade Detectors (QCDs) utilize the conduction band offset (CBO) of materials to create quantum confined electron states in the well material. The lattice-matched InAs/AlAs_{0.16}Sb_{0.84} material system shows a large CBO of 2.1 eV at the Γ -point. This material system is therefore a candidate for the design and growth of short-wavelength mid-infrared QCDs. However, InAs has a narrow bandgap of 0.35 eV, which corresponds to an absorption in the InAs substrate for all wavelengths below 3.5 μm .

In the present study we present a lattice-matched InAs/AlAs_{0.16}Sb_{0.84} QCD grown by molecular beam epitaxy lattice-matched to an n-type InAs substrate. It features an above-bandgap absorption wavelength of 2.7 μm .

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