

## **Multi-Band Quantum Well Infrared Photodetectors**

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The GaAs/AlGaAs based Quantum Well Infrared Photodetectors (QWIPs) afford greater flexibility than the usual extrinsically doped semiconductor IR detectors because the wavelength of the peak response and cutoff can be continuously tailored over any wavelength between 6-20  $\mu\text{m}$ . The spectral band width of these detectors can be tuned from narrow ( $\Delta\lambda/\lambda \sim 10\%$ ) to wide ( $\Delta\lambda/\lambda \sim 50\%$ ) allowing various applications. Thus, QWIP offers multi-color infrared focal plane arrays (FPAs) by stacking different multi quantum well layers which are capable of acquiring images in different infrared bands. In this presentation, we will discuss the recent results of large format specially separated four band QWIP FPA based on a GaAs/AlGaAs materials system and its performance. In this application, instead of quarter wavelength groove depth grating reflectors, three-quarter wavelength groove depth reflectors were used to couple radiation to each QWIP layer. This technique allow us to optimize the light coupling to each QWIP stacks at corresponding pixels while keeping the pixel (or mesa) height at the same level which will be essential for indium bump-bonding with the multiplexer. In addition to light coupling, these gratings serve as a contact to the active stack while shorting the unwanted stacks.

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