

# Large Format, Multi-Band QWIP FPAs for Hyperspectral Infrared Imaging Applications

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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 bandwidth ( $\sim 10\%$ ) to wide bandwidth ( $\sim 50\%$ ) 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 640x512 format, four-band QWIP FPA based on a GaAs/AlGaAs materials system. This FPA covers 4-15.4 micron wavelength range in four different bands. One of the unique features of the array is that the four IR bands are spatially separated and independently readable on a single FPA chip. In addition, we are developing a 640x512 format, dual broad-band, quantum well infrared photodetector (QWIP) focal plane array (FPA) for an imaging interferometer. This is a new type of imaging interferometer based on special Fourier transform spectroscopy, which scans interferograms digitally without moving any optical components. These static interferometers require large format FPAs with high uniformity and operability. QWIP is ideal candidate for this instrument because the technology has shown remarkable success in advancing highly uniform, highly-operability, and large format multi-color focal plane arrays. The FPA utilizing in the interferometer covers the wavelength from 6 -10  $\mu\text{m}$  and 10 -15  $\mu\text{m}$  in alternative rows.