

InAs/GaSb Superlattice Infrared Detectors

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Within the last decade type-II (T2) superlattice (SL) infrared (IR) detector technology for the mid- (3-5 μm , MWIR) and long-wavelength (8-12 μm , LWIR) transmission window of the atmosphere has progressed from lab demonstration to first commercial applications. For MWIR threat warning sensors for airborne platforms, we have set up a mature production process for InAs/GaSb SL dual-color detector arrays with simultaneous, co-located detection at 3-4 μm and 4-5 μm , respectively. Over the last few years, detailed root cause analysis and the continuous improvement of various front- and backside processes have resulted in an increase of the pixel operability well above 99% and a drastic reduction of noisy elements. Efforts for the LWIR focus on heterojunction device concepts with reduced dark current for higher operation temperatures. To guide the device design, we have refined our theoretical modelling of the band gap and the band offsets in InAs/GaSb SLs. Furthermore, relevant design input parameters, as, background doping level, Shockley-Read-Hall lifetime, or trap density, are extracted by fitting CV- and IV-data. The talk will provide an up-to-date overview of the status of T2SL IR detector technology at Fraunhofer IAF.