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MBE Growth of GaAs Based THz Lasers and Detectors

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Terahertz (1-10 THz, or 4-40 meV, or 30-300 μm) frequencies are among the most underdeveloped electromagnetic spectra, even though their potential applications are promising for spectroscopy in chemistry and biology, astrophysics, plasma diagnostics, remote atmospheric sensing and imaging, noninvasive inspection of semiconductor wafers, and communications. This underdevelopment is primarily due to the lack of coherent solid-state THz sources and detectors. In this talk I will discuss the important MBE growth considerations needed to make semiconductor THz devices using the GaAs-AlGaAs material system. The influence of material growth parameters on the performance of GaAs-based THz quantum cascade lasers and quantum well detectors will be presented. Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under Contract DE-AC04-94AL85000.