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A Tunable Terahertz Detector Based On Self Assembled Plasmonic Structure on a GaAs 2DEG CHEJIN BAE, DEEPU GEORGE, ROHIT SINGH, ANDREA MARKELZ, University at Buffalo(SUNY) Department of Physics — The use of tunable gated gratings on 2DEG structure has been well known methods for compact frequency sensitive THz detection based on the resonant absorption of the 2D Plasmon. The resonant frequency is dependent on system dimension and the tunability of that dimension by depletion gating. Here we attempt to improve detector sensitivity, tunability and remove polarization dependence through the development of a gated grid design. To satisfy the requirement for imaging applications of device dimensions on the order of < 1 micron over a detector area of 4 mm^2, we have fabricated gated grid plasmonic structure on 2DEG material by using nanosphere self-assembly lithography. This fabrication method has not been widely developed for III-V processing but allows us to achieve large area sensitive detectors with tunability in the 1-4 THz range. In this paper we will discuss the characterization of the devices as a function of gate bias, magnetic field, and temperature using FTIR and THz time domain measurements.

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