

A semiconductor quantum dot for spectral sensitive detection of THz radiation

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Spectral sensitive detection of THz radiation can be performed using a quantum dot formed in a two dimensional electron gas of GaAs/AlGaAs heterostructure. Different types of quantum dot sensors have been fabricated and studied. The most sensitive sensor, which is able to detect individual terahertz photons, consists of a quantum dot coupled to a metallic single electron transistor. This sensor however requires state of the art nanofabrication, delicate operation and temperatures below 1K. A more robust but less sensitive sensor is a quantum dot coupled to the point contact. It has reasonable nanofabrication demands and relaxed operation at $T \sim 1.5\text{K}$. We compare two types of detectors, and suggest optimisation of the design aiming at improvement of quantum efficiency.