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Characteristics of Au nanowire arrays on GaAs photodetectors for optimal optical enhancement at near-infrared wavelengths[1] ZACHARY BRAWLEY, Univ of Central Arkansas, STEPHEN BAUMAN, GRANT ABBEY, AHMAD DARWEESH, AHMAD NUSIR, OMAR MANASREH, JOSEPH HERZOG, University of Arkansas, HERZOG GROUP TEAM — This research explores how the properties of Au plasmonic nanostructures on the plane of a GaAs semiconductor improve the total optical enhancement in GaAs photodetectors. All modeling was performed computationally to study these properties. Varying the electrode spacing, Au width, and Au thickness were shown to drastically affect the amount of enhancement in the GaAs. Peaks in enhancement were observed at specific Au widths and thicknesses resonant with the incident wavelength of 875 nm. The intensity of these peaks decayed as the widths and thicknesses increased. In addition, a simulation was run with a Ti adhesion layer between the Au and the GaAs. It was shown that as the Ti thickness increased, the optical enhancement in the semiconductor decreased. Increasing the thickness of the Au proved to shift the peak values in optical enhancement. It was also shown that electrode spacing and width of the structures played a more significant role than the period of the grating.

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