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Light Intensity Influence on the Effective Schottky Barrier Height in Extraordinary Optoconductance (EOC) Structures[1] F.M. WERNER, L.C. TRAN, S.A. SOLIN, Washington University in St. Louis — Novel micro to nanoscale metal-semiconductor-hybrid (MSH) structures capable of room temperature light detection have been previously reported and classified as Extraordinary Optoconductance (EOC) devices. The devices are square stacked structures, with a Au-Ti shunt forming a Schottky-Interface with an n-doped Ga-As mesa. Resistance measurements were taken by a 4-point van-der Pauw method to remove contact and lead resistance and eliminate DC offsets. The device's resistance changes as light incident on the surface of the structure modifies the charge density within the body of the device. The change in charge density changes the effective Schottky Barrier height and shifts the measured 4 point resistance of the heterogeneous structure. We investigate the dependence of the effective Schottky Barrier height on the incident intensity of light by measuring the open circuit voltage under various intensities of optical perturbation at room temperature. The barrier height is negligible and the interface ohmic under HeNe laser 632.8 nm illumination at a power density of 636 mW/cm^2, allowing the flow of current through the shunt. This device performance will be contrasted with that of an FET, where current does not propagate through the gate.

[1]SAS has a financial interest in PixelEXX, a start-up company whose mission is to market imaging arrays.

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