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| **Abstract:** |  |
| The main purpose of this research is to analyze the light absorption in metal-semiconductor-metal-photo-detectors (MSM-PDs) that are assisted with different nano-grating/ nano-corrugated structures. These types of photo-detectors are useful in applications where faster optical fibre communication is required. Also, these MSM-PDs are suitable candidates for high-speed chip-to-chip interconnects as well as high-speed sampling. The modeling of these nano-structured MSM-PDs was done by simulating them in the Optiwave simulation tool, using the finite difference time domain (FDTD) method. The corresponding light absorption enhancement factor (LAEF) of each model was then calculated. In this study, a new type of nano-grating shape, hemispherical nano-structure, is introduced. Based on the simulation results, found from the modeling of different nano-structured MSM-PDs, a comparative analysis was made between the newly developed hemispherical nano-structured MSM-PD with trapezoidal nano-structured, triangular nano-structured, and rectangular nano-structured MSM-PDs. The proposed hemispherical shaped nano-structured MSM-PD was able to achieve 19-times higher light absorption enhancement factor when compared to conventional MSM-PDs which are not assisted by nano-grating structures. | |