

## Numerical Simulation of the Effect of 1 MeV Electron Beam on the Performance of a Solar Cell of Type n+/p GaAs

**Authors :** Waleed Alsaidy, Mourad Mbarki

**Abstract :** In this work, it have investigated the effect of electron irradiation on the output characteristics of n+/p GaAs solar cell. The studied solar cell is exposed to an electron beam with kinetic energy of 1 MeV under AM0 illumination. In this work, it have used our own software to calculate the damage caused by these energetic particles. Indeed, these particles produce severe degradation on the performances of the solar cells. The aim of this work is to investigate the effect of electronic irradiation on the J(V) characteristics upon the fluence of particles  $\phi$  (electron/cm<sup>2</sup>). Thereafter, we have evaluated the degradation of its performances such as the short circuit current  $J_{sc}$ , the open circuit voltage  $V_{oc}$  the efficiency  $\eta$  with respect to the fluence  $\phi$  of electrons. it have shown that the variation of these parameters decrease linearly with the logarithm of the fluence  $\phi$ , and their degradation begins from a threshold value  $\phi_m$ . To validate our calculation, we have compared our results with other theoretical and experimental results available in the literature and we have found a good agreement between them.

**Keywords :** solar cells, GaAs, short circuit current, open circuit voltage, fluence, degradation

**Conference Title :** ICEPES 2025 : International Conference on Electrical Power and Energy Systems

**Conference Location :** Istanbul, Türkiye

**Conference Dates :** January 30-31, 2025