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The Effect of Global Solar Variations on the Performance of n- AlGaAs/ p-GaAs Solar Cells

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Abstract : This study investigates how AlGaAs/GaAs thin film solar cells perform under varying global solar spectrum due to the changes of environmental parameters such as the air mass and the atmospheric turbidity. The solar irradiance striking the solar cell is simulated using the spectral irradiance model SMARTS2 (Simple Model of the Atmospheric Radiative Transfer of Sunshine) for clear skies on the site of Setif (Algeria). The results show a reduction in the short circuit current due to increasing atmospheric turbidity, it is 63.09% under global radiation. However increasing air mass leads to a reduction in the short circuit current of 81.73%.The efficiency decrease with increasing atmospheric turbidity and air mass.

Keywords : AlGaAs/GaAs, solar cells, environmental parameters, spectral variation, SMARTS
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