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The evaluation and simulated performance of the potential current produce from Multi-junction cells.

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Abstract content
   (Max 300 words)
Formatting &
Special chars

Concentrator photovoltaic (CPV) devices comprise of a number of semiconductor materials, with multiple series-connected junctions monolithically integrated. These devices offer a higher absorption of energy from a wider spectral range than that of conventional photovoltaic (PV) cells. This is achieved by means of the monolithically stacked junctions having there own specific spectral response absorbing in different wavelength regions. However, due to a CPV device consisting of series-connected junctions, it can become current limited by the underperformance of any of the junctions. Under standardized operating conditions, most of the device's junctions current densities are well matched. However, under operation in the field, the influence of the optical system as well as the dynamic change of the solar spectrum can result in varying amounts of current mismatch due to different junctions producing uneven currents. In this paper, the influence of the optical components used in a High Concentrator Photovoltaic (HCPV) module employing a commercial Concentrator Triple Junction (CTJ) cell while operation under outdoor conditions will be discussed. From the performance analysis of the CTJ cells, recommendations will be made to offset the loss mechanisms and to optimize the performance of a multi-junction cell. Additionally, simulations preformed on other multi-junction devices will also be discussed and shown how the CTJ device's performance can be improved.

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phd

Main supervisor (name and email)
and his / her institution

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