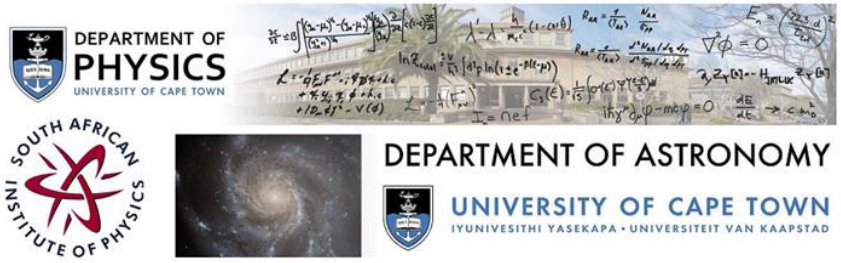

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Qualitative comparison of advanced characterisation techniques of Photovoltaic cells

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Abstract content
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Electroluminescence (EL), infrared (IR) thermography, light beam induced current (LBIC) measurements and their associated techniques provide powerful non-destructive characterisation tools for photovoltaic (PV) cells. In this study, EL, IR thermography, and LBIC are compared as to determine the interdependence of the results obtained from each technique. The combination of these techniques are used to successfully identify and characterise performance limiting defects in PV cells. The LBIC measurement technique is used to perform localized cell characterization of PV cells using a focussed light beam as probe. The technique allows the determination of local photo-response and current-voltage (I-V) characteristics of a cell, the extraction of device parameters and identification of performance degrading defects present in a solar cell. EL is essentially the reverse of the photovoltaic effect. When a PV device is forward biased, luminescence is emitted from active areas of the device. This then enables defects to be observed, with different defects reacting differently to varying bias levels. IR thermography also renders defects and low performing device areas to be observed. In the paper an LBIC system will be used to measure point-by-point photo-response and I-V characteristics. The performance and device parameter mapping across a PV cell will be correlated with EL and thermography on a point-by-point basis. All three system configurations were designed and constructed in accordance to requirements of the project. The initial results will be discussed in this paper.

Key words: Electroluminescence, infrared thermography, LBIC, photovoltaic, I-V

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