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TITLE: **Investigating the efficiency of the Intermediate Band Solar Cell**

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Quantum dots can be used to enhance the efficiency of a solar cell through the development of an intermediate band (IB) which is located within the forbidden gap between the conduction band and the valence band. This intermediate band solar cell (IBSC) increases the photocurrent generated by absorbing below bandgap energy photons and at the same time preserving the cell output voltage. Through the two-step absorption of sub-bandgap photons there is the extra generation of electron hole pairs in the intermediate band. The property of quantum dots to offer a true zero-density of states between the confined states and the conduction band helps to improve the operation of the intermediate band solar cell. The intermediate band results from the confined electron states in an array of quantum dots. The performance of the Intermediate Band Solar Cell using quantum dot models which have been fabricated from InAs quantum dots inserted in GaAs barrier material and developed by molecular beam epitaxy has been analyzed. Previous studies have shown that the limiting efficiency of the intermediate band solar cell can be as high as 63.2% compared to that of the conventional single gap solar cell having 40.7% efficiency.