

Next Generation Photovoltaics: The Hot Carrier Solar Cell

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To enable large-scale implementation of solar cells for utility scale energy applications improvements in power conversion efficiency and system cost reductions must be achieved. To circumvent the fundamental limitations of single energy gap solar cells, devices based on third generation (3G) processes have been proposed. In this presentation I will introduce the operational principles of the solar cell, their current limitations, and concepts to overcome losses in such devices. Finally, I will describe work we are undertaking at the University of Oklahoma in this area. Our objective is to develop hot carrier solar cells, which aim to circumvent the particularly parasitic thermalization losses in photovoltaic systems and therefore increase the power conversion efficiencies of such technologies.