

# Coupling Plasmonic and Photonic Effects for Amplification of Solar Energy Conversion in Third Generation Solar Cells

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**Abstract:** *We propose to explore light trapping effects in plasmonic (metal nanoparticle) arrays coupled to periodic (3D photonic crystal) or to highly disordered semiconductor films to enhance the efficiency of dye-sensitized solar cells (DSSC) and quantum dot solar cells (QDSC). Coupling plasmonic and photonic effects will be explored in different designs with the aim of investigating synergistic effects to amplify energy conversion. Gained knowledge is foreseen to have broad impact on photovoltaics, photocatalysis, and solar fuel generation. The findings can have broad impact on designing other thin film electrodes for energy conversion, solar fuel production, sensing, and light emitting diodes.*