

Boosting solar cell efficiencies using plasmonic nanostructures

Martin M. Greve¹, Mirjam D. Fjell¹, Bodil Holst¹ and Mali H. Rosnes²

¹University of Bergen, Department of physics and technology,

² University of Bergen, Department of chemistry

martin.greve@uib.no

Simultaneously as we face an acute need to decrease greenhouse gas emissions, the world's demand for energy continues to increase. This leads to an urgent need for electrification, and a further employment of renewable energy sources. Photovoltaic cells are one of the most promising renewable energy technologies. Despite recent advancements, the efficiency of photovoltaic cells are still inherently limited. At UiB we enhance the efficiencies of solar cells using tailored plasmonic nanostructures. For a standard silicon solar cell, we have through simulations and theoretical predictions demonstrated a light in-coupling enhancement of over 3% yielding an efficiency increase of more than 1%. We also demonstrate promising results for thin film solar cell technologies.