

## Summery

The goal of this application is to improve the light in-coupling into organic solar cells (OSCs) by using plasmonic effects of metal nanostructures. Such an improvement of the incoupling in organic solar cells is rather important because the efficiency of the current organic solar cells is limited to a major part by the absorption of the organic layers. In our project, we want to improve this light absorption by placing the absorbing active layers in proximity to designed metal nanostructures.

In a first approach, we want to use planar evaporated organic solar cells and place metallic nanostructures near the active layers. The goal is to understand whether these hybridstructures can increase the absorption of the active organic materials while at the same time the losses can be kept low. In a second, more advanced approach, we will try to realize an organic solar cell with a spectrally tunable antenna structure based on a carpet of metal nanorods [plasmonic nano carpet (PNCs)]. Here, the challenges are to realize the deposition of an organic solar cell onto such a PNC-substrate which has very pronounced nanostructures. Macroscopic and nanoscale experimental inspections will be complemented in our approach with theoretical calculations based on the multiple-multipole programming (MMP) and the timedependent Discontinuous-Galerkin (DG) method, allowing for optimizing the PNC-OSCs.