

Plasmon-mediated organic photovoltaics

The goal of this project application is to improve the light incoupling into organic solar cells (OSCs) by using plasmonic effects of metal nanostructures. The key approach in our project is to improve light absorption by placing the absorbing active layers in proximity of metal nano-structures. In a first approach, we successfully used planar evaporated organic solar cells and deposited metallic nano- 1 structures near the active layers. The experiments showed an enhancement in absorbtion in good agreement with theory. We could also successfully show that the organic solar cells can maintain good electrical performance, despite the incorporation of the nano-particles. However, so far we could not achieve an increase of the efficiency. The goal of the further project is to optimize the fabrication process and use the achieved optical improvement to also improve the overall efficiency of the solar cells. Furthermore, we want to explore novel approaches to deposit metallic nano-particles, such as the deposition using orthogonal solvents. Furthermore, we will address other metallic nano-structures such as longrange surface plasmon polariton (LRSPP) waveguides and plasmonic nano carpets (PNCs) which were already described in the previous project phase but could not be addressed due to lack of time.