



# Seminarankündigung

Dienstag, 2. Mai 2017

17:15 Uhr

WSI, Seminarraum S 101

## “Simulation of mesoscopic solar cells: Challenges and solutions, towards a multiscale approach”

A common feature of many novel photovoltaic technologies is that devices present a complex internal structure and an extended interface between different materials. Organic bulk heterojunction, dye sensitized and mesoscopic perovskite solar cells all share this feature. The purpose of having a large interface is different in the different devices. In organic solar cells it is needed to allow an efficient exciton splitting, in dye sensitized to have enough molecular dye and a consequent good light absorption while in perovskite solar cells the advantage of including a mesoporous electron transport layer is still under debate, but it has been clearly demonstrated that leads to more efficient devices. Whatever is the reason this feature requires improvements in current numerical simulation approaches as the presence of the complex internal interface has a fundamental impact on device performance.

In this talk the state of the art simulation methods for mesoscopic solar cells including the internal morphology are introduced, namely kinetic Monte Carlo and drift-diffusion specifically for organic and perovskite solar cells. It is shown as in organic solar cells the interface plays in fact the major role in device efficiency and it is provided an explanation why mesoporous layers are needed in perovskite solar cells. The various advantages and drawbacks of the two methods are presented and it will be shown a way to overcome the latter using a multiscale approach between the two. This multiscale methodology opens perspectives to simulate many other devices for energy harvesting and storage.

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