Special Issue on
Multiscale Modeling of Photovoltaic Devices

CALL FOR PAPERS

During the last decade, multiscale approaches have seen increasing interest for application in numerical simulation of electronic devices. In particular, modeling and understanding of advanced photovoltaic devices are expected to benefit from multiscale modeling, which allows describing consistently both macroscopic device behavior and local microscopic processes governing light absorption, loss mechanisms, carrier transport, and extraction. In fact, many advanced PV concepts rely on effects or contain structural features that may be insufficiently described by standard numerical simulation approaches or semianalytic models, regarding both electronic and optical properties.

We invite authors to contribute reviews or original research articles on multiscale modeling approaches for photovoltaic devices, regarding material properties, light management, electronic transport, or combinations thereof. Contributions treating generic multiscale modeling aspects, in particular with respect to experimental model validation, are welcome too.

Potential topics include but are not limited to the following:

- Light management based on plasmonic or dielectric nanostructured layers or textures: Si nanowires, nanoparticles, and black silicon
- Multijunction solar cells including tunnel junctions, optical coupling, and so forth
- Crystalline/amorphous interfaces and heterojunction devices
- Novel bulk absorber materials: perovskites, dilute nitrides, and so forth
- Solar cells with nanostructure components: quantum dots, wires, and wells
- 3rd generation concepts: intermediate bands, multiple exciton generation, and hot carrier devices
- Disordered systems and complex morphologies: amorphous inorganic, organic, and hybrid photovoltaics and luminescent material doping
- Electrothermal modeling
- Defect modeling
- Coupling of atomistic and continuous models
- Coupling of classical and quantum modeling in optics, for example, up/down converters and mesoscopic transport
- Module simulation based on physical models at device level
- Parametrization, experimental characterization, and model validation on multiple scales based on experimental data
- Multiscale/multiphysics simulation frameworks and work flows
- Simulation and measurement data and metadata handling
- Model and simulation tool interoperability and chaining of different modeling software

Authors can submit their manuscripts through the Manuscript Tracking System at http://mts.hindawi.com/submit/journals/ijp/mmpd/.

Papers are published upon acceptance, regardless of the Special Issue publication date.

Lead Guest Editor

Matthias Auf der Maur, University of Rome Tor Vergata, Rome, Italy
auf.der.maur@ing.uniroma2.it

Guest Editors

Urs Aeberhard, Forschungszentrum Jülich, Jülich, Germany
u.aeberhard@fz-juelich.de

Christin David, Technical University of Denmark (DTU), Lyngby, Denmark
chrida@fotonik.dtu.dk

Alessio Gagliardi, Technical University of Munich (TUM), Munich, Germany
alessio.gagliardi@tum.de

Submission Deadline
Friday, 30 June 2017

Publication Date
November 2017