

# An electronic model for solar cells taking into account active interfaces

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In the talk we discuss an electronic model for solar cells taking into account heterostructures with active interfaces and energy resolved volume and interface trap densities. The model introduced by [1] consists of continuity equations for electrons and holes with thermionic emission transfer conditions at the interface and of ODEs for the trap densities with energy level and spatial position as parameters, where the right hand sides contain generation-recombination as well as ionization reactions. This system is coupled with a Poisson equation for the electrostatic potential.

We study the thermodynamic correctness of the model and motivate a priori estimates for the solutions to the evolution system. Moreover, existence and uniqueness results of weak solutions of the problem are presented. For the existence proof regularized problems have to be solved and bounds of the corresponding solution not depending on the regularization level have to be verified, for details see [2].

## References

- [1] R. Stangl, C. Leendertz, and J. Haschke, *Numerical simulation of solar cells and solar cell characterization methods: the open-source on demand program AFORS-HET*, Solar Energy (R. D. Rugescu, ed.), INTECH, Croatia, 2010, pp. 319–352.
- [2] A. Glitzky, *An electronic model for solar cells including active interfaces and energy resolved defect densities*, SIAM J. Math. Anal., to appear, WIAS Preprint 1663.