Mathematics and CS Seminar

The entropy method in the context of band-trapped states in semiconductor materials

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Host: Julian Fischer

This talk is concerned with a semiconductor model including trapped states in an intermediate energy band. We will introduce a recombination-drift-diffusion system and employ the entropy approach in order to obtain an entropy-entropy production (EEP) inequality. In particular, we shall focus on the derivation of such an EEP-inequality. Exponential convergence to the equilibrium is then a consequence of this EEP-estimate. An interesting feature of our results is the fact that the EEP-constant, and hence the convergence rate, is independent of the average lifetime of an electron in a trapped state.Moreover, we will also discuss the existence of global weak solutions and present some available upper and lower bounds. And as our approach is uniform with respect to the lifetime of an electron in a trapped state, we can also study the limiting case of a vanishing lifetime. This gives rise to the classical Shockley-Read-Hall model, for which we obtain exponential convergence to the equilibrium now as a side-product.

Monday, December 11, 2017 10:00am - 12:00pm
Big Seminar room Ground floor / Office Bldg West (I21.EG.101)

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