On the large-time behavior of a class of semiconductor equations

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This talk will be concerned with the exponential convergence to equilibrium of solutions to some semiconductor models arising from different modeling perspectives. The resulting PDE systems typically include drift-diffusion terms for electrons and holes as well as reaction terms describing the underlying electron-hole recombination mechanism. Including also the self-consistent electrostatic potential is often desired from a physical point of view.

The main goal of the talk is the derivation of functional entropy-entropy dissipation inequalities in a constructive way for a set of semiconductor equations with and without potential and including different reaction processes. To this end, we will revisit nowadays classical calculations for prototype systems, and we shall also investigate more elaborate strategies necessary to deal with more complex models.

Some parts of the talk are based on joint work with Klemens Fellner.