Lecture No. 64

**Czech Society for Mechanics
and Institute of Thermomechanics, CAS**

invite you to a lecture and discussion within
the lecture series **Institute of Thermomechanics Seminar**

Thermodynamical modeling via GENERIC:
from quantum mechanics to semiconductor devices

given by

Prof. Alexander Mielke

Weierstrass Institute for Applied Analysis and Stochastics,
and Humboldt University Berlin

We discuss the thermodynamically consistent modeling of semiconductor devices from the mathematical point of view. The task lies in coupling of several physical effects that occur on different temporal or spatial scales, namely optics via the Maxwell equations, charge transport via drift-diffusion models and quantum mechanical processes in embedded quantum dots, wires or layers.

Using the framework of GENERIC, which is an acronym for General Equations for Non-Equilibrium Reversible Irreversible Coupling, we construct suitable hybrid models that are thermodynamically consistent in the sense that for the isolated system we have energy conservation and positive entropy production. The conservative dynamics is driven by a Hamiltonian structure involving the energy, whereas the dissipative dynamics is driven by an entropic gradient system.

**The lecture will be held on Thursday, March 21, 2019 at 11:00 in the building
of the Institute of Thermomechanics (lecture room B), Dolejškova 5, 182 00 Prague 8**

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