

数学与系统科学研究院

计算数学所学术报告

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报告题目:

**Improved High-Order Moment
Models and Multigrid Solver for
Silicon Device Simulation**

邀请人: 邸亚娜 副研究员

报告时间: 2016 年 8 月 23 日 (周二)

下午 14:00~15:00

报告地点: 科技综合楼三层

311 报告厅

Abstract:

A series of high-order moment models for carrier transport are derived from the semiconductor Boltzmann equation with relaxation time approximation of the scattering term, by using the globally hyperbolic moment method. These models are improved by using the moment-dependent relaxation time for each moment equation or the filtered moment method, such that higher moments damp faster. In comparison to the original moment models with the same order, the resulting models appear more stable and would give more satisfactory results of macroscopic quantities of interest with a high-order convergence to those of the underlying Boltzmann equation as the order of the model increase. In order to simulate the steady states efficiently, a multigrid solver is developed for the derived moment models. Numerical simulations of an $n^+n^-n^+$ silicon diode are carried out to demonstrate the validation of the presented moment models, and the robustness and efficiency of the designed multigrid solver. As a preliminary attempt in applying the proposed method in semiconductor device simulation, the well performance of the models and the corresponding multigrid solver encourages us to consider more realistic device simulation in the future.

欢迎大家参加！