

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:

Toward Atomistic TCAD

邀请人: **崔涛 副研究员**

报告时间: **2019 年 4 月 3 日 (周三)**

下午 14:30-15:30

报告地点: **数学院南楼七层**

702 教室

Abstract:

Technology Computer Aided Design (TCAD) is the method used by industry for computer-aided design of semiconductor process technology and semiconductor device design, and is a branch of the larger electronic design automation (EDA) that models semiconductor fabrication and device operation. TCAD simulates process and device steps such as diffusion, implantation, devices physics etc. It is also used to generate compact models that capture electrical behavior of devices without computing them from complicated physical principle.

In this talk, I shall review computational modeling of carrier transport from the atomic point of view, in the framework of first principles density functional theory (DFT) and/or atomic tight-binding (TB) models, carried out within the Keldysh nonequilibrium Green's function (NEGF) formalism. The goal is to make parameter-free predictions of material and operation properties of electronic devices, realizing the atomistic-TCAD. Using NEGF-DFT and NEGF-TB methods, we shall investigate important material and device design issues concerning transistors, interconnects, quantum effects, impurity/phonon scatterings, and parameter extraction. Multi-scale modeling going up the length scale will also be discussed.

Acknowledgements. Work contributed by over 50 students, postdocs and research associates for over the past 25 years and I shall gratefully acknowledge individual contributions during the presentation.

欢迎大家参加！