

数学与系统科学研究院

计算数学所定期网络学术报告

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报告题目:

**A positivity-preserving stabilized
finite element method for quantum
drift-diffusion model**

报告时间: **2021 年 11 月 25 日 (周四)**

下午 16:00-17:00

报告工具: **腾讯会议 (ID: 605 4978 9293)**

会议链接:

<https://meeting.tencent.com/dm/qw8QMyFVg88p>

Abstract:

As the size of modern semiconductor devices goes to sub-nanometers, quantum mechanical phenomena become prominent and must be considered in numerical simulations. In 1989, Ancona and Iafrate derived a macroscopic model, called quantum drift-diffusion (QDD) model, which generalizes the classical DD model by incorporating a quantum correction to the electric potential. We derive an equivalent QDD model by expressing carrier densities with potential functions. The finite element method for the new model is positivity-preserving in the sense that discrete carrier densities are always positive. We propose a modified Newton iterative method to solve the nonlinear discrete problem. Numerical experiments for a FinFet device show that the iterative method is convergent for the source-drain bias voltage up to 15V and the source-gate bias voltage up to 5V.

欢迎大家参加！