

数学与系统科学研究院  
计算数学所定期学术报告

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报告题目:

**Boundary treatments of quantum transport  
in non-equilibrium Green's function and  
Wigner distribution methods for  
Nano-device**

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**下午 16: 00~17: 00**

**(15: 30~16: 00 茶歇)**

报告地点: **科技综合楼三层 311**

**计算数学所报告厅**

## **Abstract:**

**Both NEGF (Non-equilibrium Green Function) method and Wigner equation method are popularly used in simulation of quantum transport for nano-device. Each approach handles the open quantum system along the transport direction in a different manner. The NEGF treats the open boundaries with boundary self-energy defined by a Dirichlet to Neumann mapping, which ensures the non-reflection at the device boundaries for electron waves leaving the quantum device active region. On the other hand, the Wigner equation method imposes an inflow boundary treatment for the Wigner distribution, which in contrast ensures the non-reflection at the boundaries for free electron waves entering the device active region. In both cases the space charge effect is accounted for by a self-consistent coupling with a Poisson equation. Our goal is to study how the ways the device boundaries are treated in both transport models affect the current calculations, and to investigate the performance of both approaches in modelling the RTD(Resonant tunnelling Diode) and DG-MOSFET(Double-gate Metal-Oxide-Semiconductor Field Effect Transistor).**

**欢迎大家参加!**