

Quantum fluid models for semiconductor devices: derivation, analysis, simulation

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Abstract: Quantum hydrodynamic and quantum diffusion equations allow for the macroscopic modeling of semiconductor devices and may be computationally cheap alternatives to Schrödinger-type or kinetic models. In this talk, the derivation of macroscopic quantum models from the Wigner-BGK equation via moment methods and quantum entropy maximization is reviewed. Furthermore, some analytical results and numerical simulations of simple resonant tunneling diodes are presented.