

Technikerstrasse 13/7
A-6020 Innsbruck
Telefon: +43 512 507 6071 oder 6097

E-Mail: mathematik@uibk.ac.at
<http://www.uibk.ac.at/mathematik/>
Fax: +43 512 507 2920

MATHEMATIKKOLLOQUIUM

Das Institut für Mathematik lädt zu folgendem Vortrag ein:

Quantum semiconductor modeling and simulation: quantum fluid and Schrödinger models

Univ.-Prof. Dr. Ansgar Jüngel

Technische Universität Wien

Numerical simulations of ultrasmall semiconductor devices are necessary to replace costly experiments and to fulfill the demands due to the technological progress in microelectronics. In view of the nanoscale of modern devices, simple correction factors in the PDE models are no longer sufficient to describe the quantum effects appropriately, and physically more precise models have to be incorporated in the device simulators. In this talk, we present two modeling approaches: quantum fluid equations and the Schrödinger equation with open boundary conditions.

A hierarchy of quantum fluid models, derived from the quantum Wigner equation, is presented and some results on their mathematical treatment and numerical discretization are given. The derivation of appropriate a priori estimates for the nonlinear partial differential equations is reformulated as a polynomial decision problem from real algebraic geometry. Furthermore, numerical simulations of a 3D quantum wave guide using the Schrödinger equation are shown.

Zeit: Freitag, den 30. April 2010 um 13⁰⁰ Uhr

Ort: Technikerstr. 25, Viktor-Franz-Hess Haus, HS E

Mechthild Thalhammer

Gäste sind herzlich willkommen!