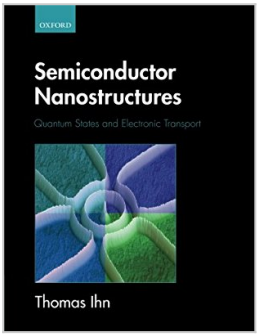

Semiconductor Nanostructures: Quantum states and electronic transport

By Thomas Ihn

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This textbook describes the physics of semiconductor nanostructures with emphasis on their electronic transport properties. At its heart are five fundamental transport phenomena: quantized conductance, tunnelling transport, the Aharonov-Bohm effect, the quantum Hall effect, and the Coulomb blockade effect.

The book starts out with the basics of solid state and semiconductor physics, such as crystal structure, band structure, and effective mass approximation, including spin-orbit interaction effects important for research in semiconductor spintronics. It contains material aspects such as band engineering, doping, gating, and a selection of nanostructure fabrication techniques. The book discusses the Drude-Boltzmann-Sommerfeld transport theory as well as conductance quantization and the Landauer-Buttiker theory. These concepts are extended to mesoscopic interference phenomena and decoherence, magnetotransport, and interaction effects in quantum-confined systems, guiding the reader from fundamental effects to specialized state-of-the-art experiments.

The book will provide a thorough introduction into the topic for graduate and PhD students, and will be a useful reference for lecturers and researchers working in the field.

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Editorial Review

Review
"Very helpful for graduate and doctoral students in the field."

--Jorg P. Kotthaus, Center for NanoScience, Ludwig-Maximilians-University, Munich

"A good book on quantum transport in semiconductor nanostructures, which fills an existing niche in the market. Highly topical and very nicely illustrated."

--Laurence Eaves, Nottingham University

About the Author

Professor **Thomas Ihn** took his PhD in Physics in 1994 at TU Munich, Germany, then did post-doctoral work at the School of Physics and Astronomy, University of Nottingham. He began work as a Research Assistant at the Solid State Physics Laboratory, ETH Zurich, in 1998, and is now Professor of Physics there.

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