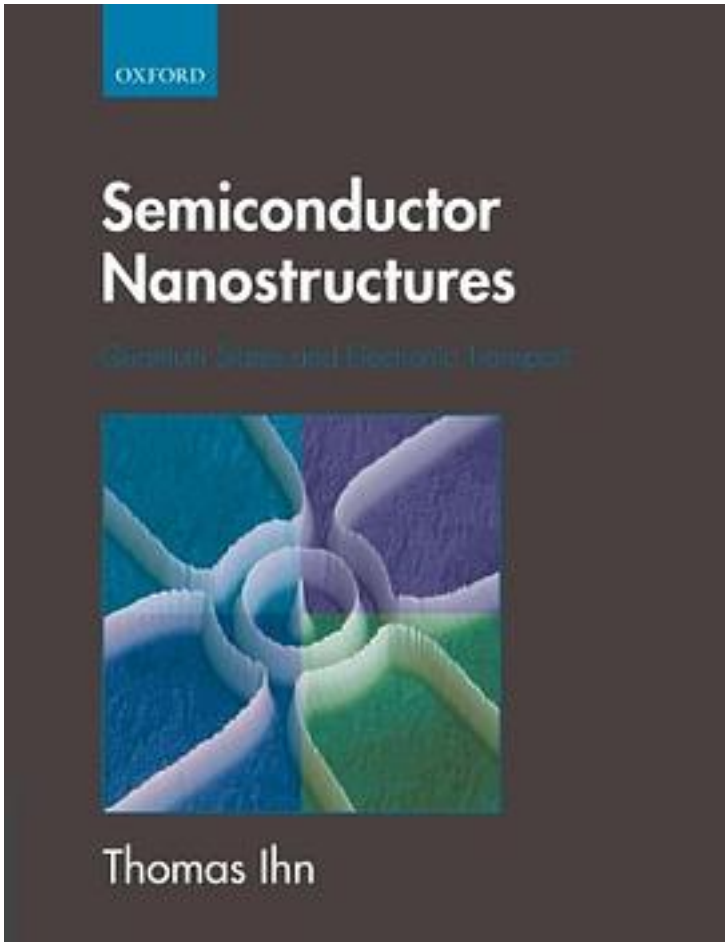
Semiconductor Nanostructures



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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.

作者介绍:

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