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Autore	Jüngel Ansgar
Titolo	Transport Equations for Semiconductors [[electronic resource] /] / by Ansgar Jüngel
Pubbl/distr/stampa	Berlin, Heidelberg : , : Springer Berlin Heidelberg : , : Imprint : Springer, , 2009
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Collana	Lecture Notes in Physics, , 0075-8450 ; ; 773
Disciplina	537.622
Soggetti	Solid state physics Spectroscopy Microscopy Optical materials Electronic materials Physics Solid State Physics Spectroscopy and Microscopy Optical and Electronic Materials Mathematical Methods in Physics
Lingua di pubblicazione	Inglese
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Livello bibliografico	Monografia
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Basic Semiconductor Physics -- Microscopic Semi-Classical Models -- Derivation of Macroscopic Equations -- Collisionless Models -- Scattering Models -- Macroscopic Semi-Classical Models -- Drift-Diffusion Equations -- Energy-Transport Equations -- Spherical Harmonics Expansion Equations -- Diffusive Higher-Order Moment Equations -- Hydrodynamic Equations -- Microscopic Quantum Models -- The Schrödinger Equation -- The Wigner Equation -- Macroscopic Quantum Models -- Quantum Drift-Diffusion Equations -- Quantum Diffusive Higher-Order Moment Equations -- Quantum Hydrodynamic Equations.
Sommario/riassunto	Semiconductor devices are ubiquitous in the modern computer and telecommunications industry. A precise knowledge of the transport equations for electron flow in semiconductors when a voltage is applied

is therefore of paramount importance for further technological breakthroughs. In the present work, the author tackles their derivation in a systematic and rigorous way, depending on certain key parameters such as the number of free electrons in the device, the mean free path of the carriers, the device dimensions and the ambient temperature. Accordingly a hierarchy of models is examined which is reflected in the structure of the book: first the microscopic and macroscopic semi-classical approaches followed by their quantum-mechanical counterparts.

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