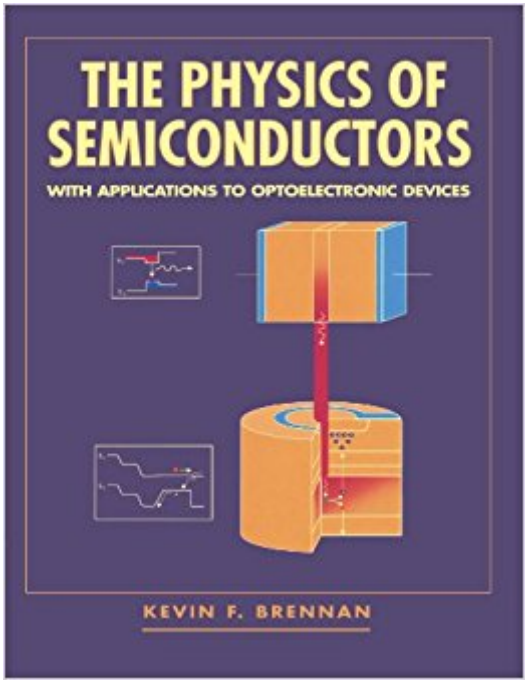
The Physics Of Semiconductors: With Applications To Optoelectronic Devices



Synopsis

Modern fabrication techniques have made it possible to produce semiconductor devices whose dimensions are so small that quantum mechanical effects dominate their behavior. This book describes the key elements of quantum mechanics, statistical mechanics, and solid-state physics that are necessary in understanding these modern semiconductor devices. The author begins with a review of elementary quantum mechanics, and then describes more advanced topics, such as multiple quantum wells. He then disusses equilibrium and nonequilibrium statistical mechanics. Following this introduction, he provides a thorough treatment of solid-state physics, covering electron motion in periodic potentials, electron-phonon interaction, and recombination processes. The final four chapters deal exclusively with real devices, such as semiconductor lasers, photodiodes, flat panel displays, and MOSFETs. The book contains many homework exercises and is suitable as a textbook for electrical engineering, materials science, or physics students taking courses in solid-state device physics. It will also be a valuable reference for practicing engineers in optoelectronics and related areas.

Book Information

Paperback: 780 pages
Publisher: Cambridge University Press (February 13, 1999)
Language: English
ISBN-10: 0521596629
ISBN-13: 978-0521596626
Product Dimensions: 7 x 1.5 x 10 inches
Shipping Weight: 3.7 pounds (View shipping rates and policies)
Average Customer Review: 4.7 out of 5 stars 4 customer reviews
Best Sellers Rank: #1,015,830 in Books (See Top 100 in Books) #68 inÃ Â Books > Engineering & Transportation > Engineering > Electrical & Electronics > Electronics > Optoelectronics #175 inÃ Â Books > Engineering & Transportation > Engineering > Electrical & Electronics > Electronics > Semiconductors #2940 inÃ Â Books > Textbooks > Science & Mathematics > Physics

Customer Reviews

"...a valuable and useful textbook on the physics of semiconductors and semiconductor devices...written professionally in a very competent and clear way. All problems are discussed correctly and presented in an interesting and comprehensive manner..this book will be recognized as a good contribution to the literature of modern semiconductor physics books." European Journal

of Physics

This book describes the key elements of quantum mechanics, statistical mechanics, and solid-state physics that are necessary in understanding these modern semiconductor devices. As well as covering theoretical results, the author describes many real devices, such as semiconductor lasers, photodiodes, flat panel displays, and MOSFETs. The book contains many homework exercises and is suitable as a textbook for electrical engineering, materials science, or physics students taking courses in solid-state device physics. It will also be a valuable reference for practicing engineers in optoelectronics and related areas.

Excellent introductory book on fundamental semiconductor physics. Includesse a self-contained review of quantum AMD statistica mechanics, quite well written

Starting with basics and going into detail about the concepts of semiconductor physics this book is really good for all device engineers.

often do i refer to this book regarding any conceptual clarification on quantum phenomena. people who do research in this field may find this book as a good reference. it is written more for the electrical engineers who like to delve more into the quantum realities. provides a very good introduction to the quantum theories that one needs to know to study different state-of-the art devices. although not that much details is covered on the devices but it creates the much needed background on theory. it starts from Schrodinger equations and then gradually builds the other related concepts. for example detail discussion is given on Boltzmann transport equations. its an easy reading.

this is a very readable book on semiconductor devices that operate on quantum principles. the book starts with Schrodinger’s equations, discusses in detail the different perspectives of the particle in a box problem, then gradually develops to other theories, for example the Boltzmann transport equations. other processes (impact ionization) are also covered in detail. ofcourse optical processes are not discussed as this is only a device-level book. suitable for electrical engineers to learn the basic underlying concepts that dominate the present day state-of-the-art devices.

The Physics of Semiconductors: With Applications to Optoelectronic Devices Quantum Confined

Laser Devices: Optical gain and recombination in semiconductors (Oxford Master Series in Physics) Conductors, Semiconductors, Superconductors: An Introduction to Solid State Physics (Undergraduate Lecture Notes in Physics) The Physics of Low-dimensional Semiconductors: An Introduction Theory of Electron Transport in Semiconductors: A Pathway from Elementary Physics to Nonequilibrium Green Functions (Springer Series in Solid-State Sciences) Three-Dimensional Integration of Semiconductors: Processing, Materials, and Applications Prostheses: Design, Types, and Complications (Biomedical Devices and Their Applications; Medical Devices and Equipment) Optoelectronic Technology and Lightwave Communications Systems Electronic and Optoelectronic Properties of Semiconductor Structures Semiconductors for Solar Cells (Artech House Optoelectronics Library) Optical Processes in Semiconductors (Prentice-Hall electrical engineering series. Solid state physical electronics series) Reliability and Radiation Effects in Compound Semiconductors Hot Carriers in Semiconductors US Army Technical Manual, ARMY DATA SHEETS FOR CARTRIDGES, CARTRIDGE ACTUATED DEVICES AND PROPELLANT ACTUATED DEVICES, FSC 1377, TM 43-0001-39, 1991 Integrated circuit devices and components (Integrated-circuit technology, analog and logic circuit design, memory and display devices) ISO 14971:2007, Medical devices - Application of risk management to medical devices ISO 14971:2000, Medical devices -- Application of risk management to medical devices The Solid State: An Introduction to the Physics of Crystals for Students of Physics, Materials Science, and Engineering (Oxford Physics Series) Head First Physics: A learner’s companion to mechanics and practical physics (AP Physics B - Advanced Placement) Physics for Scientists and Engineers with Modern Physics: Volume II (3rd Edition) (Physics for Scientists & Engineers)