**DESCRIPTION**

Provides a modern introduction to semiconductor physics, presenting the basic information necessary to understand semiconductors, along with some of the latest theories and developments. Based on the author’s undergraduate course, this book bridges the gap between basic subjects such as quantum mechanics and Maxwell’s equations and the fundamental processes determining the behaviour of semiconductors. Following a quantum mechanics approach this text is predominantly aimed at scientists rather than engineers, and forms the basis for the understanding of modern mesoscopic physics in semiconductors and quantum devices like resonant tunneling diodes.

Rather than attempting to comprehensively cover all aspects of semiconductor physics, this text aims to cover the most important and interesting aspects of this subject to scientists. Starting with the development of semiconductor physics from basic quantum mechanics, the text moves on to cover band structure and effective mass theory, before covering electron-phonon coupling and charge transport. It concludes with a chapter on optical transitions. Students will need some knowledge of quantum mechanics and solid state although this is covered to some extent in the book.

**FEATURES**

* Concise introduction to the basics of semiconductor physics

* Bridges the gap between fundamental subjects such as quantum mechanics and Maxwell’s equations and the processes determining the behaviour of semiconductors
* Describes semiconductor theory from a full quantum mechanical approach. An accessible introduction, avoiding reliance on group theory.

CONTENTS: Preface; Notation Conventions; Introduction; Electrons, nuclei and Hamiltonians; Band Structure; The k - p Approximation; Effective Mass Theory; The Crystal Lattice; Electron-phonon Coupling; Charge Transport, Optical Transitions; Band Electrons in an Optical Field; Appendix A: The Hydrogen Atom; Appendix B: The Harmonic Oscillator; Appendix C: Perturbation Theory; Appendix D: Tensors in Cubic Crystals; Appendix E: The Classical Limit; Appendix F: Some Fourier Transforms; Appendix G: Exercises; Bibliography.

🔥 ABOUT THE AUTHOR

W. Tom Wenckebach is the author of Essentials of Semiconductor Physics, published by Wiley.

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