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Superconductivity, Superfluids and Condensates
The Physics of Nanoelectronics
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Concepts of Elementary Particle Physics
Band Theory and Electronic Properties of Solids
Modern Classical Optics
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A Commentary on Lucretius De Rerum Natura
Theoretical Microfluidics
Relativity, Gravitation and Cosmology
Current Trends in Atomic Physics
Quantum Confined Laser Devices
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Exploring the Quantum
Quantum Information
Structure and Dynamics
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Relativistic Quantum Theory of Atoms and Molecules
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RACHAEL GRAHAM

Superconductivity, Superfluids and Condensates Oxford University Press

Quantum information is an area of science, which brings together physics, information theory, computer science & mathematics. This book, which is based on two successful lecture courses, is intended to introduce readers to the ideas behind new developments including quantum cryptography, teleportation & quantum computing.

The Physics of Nanoelectronics Springer Science & Business Media

This book is intended for physicists and chemists who need to understand the theory of atomic and molecular structure and processes, and who wish to apply the theory to practical problems. As far as practicable, the book provides a self-contained account of the theory of relativistic atomic and molecular structure, based on the accepted formalism of bound-state Quantum Electrodynamics. The author was elected a Fellow of the Royal Society of London in 1992.

Quantum Optics Oxford University Press

This is a first undergraduate textbook in Solid State Physics or Condensed Matter Physics. While most textbooks on the subject are extremely dry, this book is written to be much more exciting, inspiring, and entertaining.

Concepts of Elementary Particle Physics John Wiley & Sons

The close relation between particle interactions and large scale development of the cosmos is a constant theme in the text, with emphasis on the interplay between experiment and theory."-- Jacket.

Band Theory and Electronic Properties of Solids Oxford University Press

Introduces the fundamentals of particle physics with a focus on modern developments and an intuitive physical interpretation of results.

Modern Classical Optics OUP Oxford

An introduction to Einstein's general theory of relativity, this work is structured so that interesting applications, such as gravitational lensing, black holes and cosmology, can be presented without the readers having to first learn the difficult mathematics of tensor calculus.

Statistical Mechanics Cambridge University Press

This textbook attempts to reveal in a quantitative and fairly rigorous fashion how band theory leads to the everyday properties of materials.

A Commentary on Lucretius De Rerum Natura Oxford University Press

This particle physics textbook for senior undergraduates and early graduates explains the Standard Model of particle physics, both the theory and its experimental basis. The point of view is thoroughly modern. Theory relevant to the experiments is developed in detail but in a simplified way without needing full knowledge of quantum field theory.

Theoretical Microfluidics Oxford University Press

An up-to-date perspective on laser technology for students at advanced undergraduate or introductory graduate level. The principles of operation and applications of modern laser systems are analysed in detail. The text has over 300 diagrams and each chapter is accompanied with questions (solutions available on application).

Relativity, Gravitation and Cosmology OUP Oxford

This book provides an introduction to band theory and the electronic properties of materials at a level suitable for final-year undergraduates or first-year graduate students. It sets out to provide the vocabulary and quantum-mechanical training necessary to understand the electronic, optical and structural properties of the materials met in science and technology and describes some of the experimental techniques which are used to study band structure today. In order to leave space for recent developments, the Drude model and the introduction of quantum statistics are treated synoptically. However, Bloch's theorem and two tractable limits, a very weak periodic potential and the tight-binding model, are developed rigorously and in three dimensions. Having introduced the ideas of bands, effective masses and holes, semiconductor and metals are treated in some detail, along with the newer ideas of artificial structures such as super-lattices and quantum wells, layered organic substances and oxides. Some recent 'hot topics' in research are covered, e.g. the fractional Quantum Hall Effect and nano-devices, which can be understood using the techniques developed in the book. In illustrating examples of e.g. the de Haas-van Alphen effect, the book focuses on recent experimental data, showing that the field is a vibrant and exciting one. References to many recent review articles are provided, so that the student can conduct research into a chosen topic at a deeper level. Several appendices treating topics such as phonons and crystal structure make the book self-contained introduction to the fundamentals of band theory and electronic properties in condensed matter physics today.

Current Trends in Atomic Physics Oxford University Press

An understanding of the quantum mechanical nature of magnetism has led to the development of new magnetic materials which are used as permanent magnets, sensors, and information storage. Behind these practical applications lie a range of fundamental ideas, including symmetry breaking, order parameters, excitations, frustration, and reduced dimensionality. This superb new textbook presents a logical account of these ideas, starting from basic concepts in electromagnetism and quantum mechanics. It outlines the origin of magnetic moments in atoms and how these moments can be affected by their local environment inside a crystal. The different types of interactions which can be present between magnetic moments are described. The final chapters of the book are devoted to the magnetic properties of metals, and to the complex behaviour which can occur when competing magnetic interactions are present and/or the system has a reduced dimensionality. Throughout the text, the theoretical principles are applied to real systems. There is substantial discussion of experimental techniques and current research topics. The book is copiously illustrated and contains detailed appendices which cover the fundamental principles.

Quantum Confined Laser Devices Springer Science & Business Media

This book provides a comprehensive description of the physics of Rydberg atoms, highlighting their remarkable properties by reference to their behavior in a wide range of physical situations. Following an overview of the basic properties of Rydberg atoms, their interactions with electric and magnetic fields are analyzed in detail. The collisions of Rydberg atoms with neutral and charged species are described, and the use of multichannel quantum defect theory in the study of Rydberg atomic systems is discussed.

Band Theory and Electronic Properties of Solids John Wiley & Sons

The Fundamentals of Atomic and Molecular Physics is intended as an introduction to the field for advanced undergraduates who have taken quantum mechanics. Each chapter builds upon the previous, using the same tools and methods throughout. As the students progress through the book, their ability to use these tools will steadily increase, along with their confidence in their efficacy. The book treats the two-electron atom as the simplest example of the many-electron atom—as opposed to using techniques that are not applicable to many-electron atoms—so that it is unnecessary to develop additional equations when turning to multielectron atoms, such as carbon. External fields are treated using both perturbation theory and direct diagonalization and spontaneous emission is developed from first principles. Only diatomic molecules are considered with the hydrogen molecular ion and neutral molecule treated in some detail. This comprehensive coverage of the quantum mechanics of complex atoms and simple diatomic molecules, developed from the very basic components, is extremely useful for students considering graduate studies in any area of physics.

Exploring the Quantum Cambridge University Press

This book describes how the arrangement and movement of atoms in a solid are related to the forces between atoms, and how they affect the behaviour and properties of materials. The book is intended for final year undergraduate students and graduate students in physics and materials science.

Quantum Information Courier Corporation

The counter-intuitive aspects of quantum physics have been long illustrated by thought experiments, from Einstein's photon box to Schrödinger's cat. These experiments have now become real, with single particles - electrons, atoms, or photons - directly unveiling the strange features of the quantum. State superpositions, entanglement and complementarity define a novel quantum

logic which can be harnessed for information processing, raising great hopes for applications. This book describes a class of such thought experiments made real. Juggling with atoms and photons confined in cavities, ions or cold atoms in traps, is here an incentive to shed a new light on the basic concepts of quantum physics. Measurement processes and decoherence at the quantum-classical boundary are highlighted. This volume, which combines theory and experiments, will be of interest to students in quantum physics, teachers seeking illustrations for their lectures and new problem sets, researchers in quantum optics and quantum information.

Structure and Dynamics Oxford University Press

For final year undergraduates and graduate students in physics, this book offers an up-to-date treatment of the optical properties of solid state materials.

Atomic Physics Oxford University Press

Focusing on atom-light interactions and containing numerous exercises, this in-depth textbook prepares students for research in a fast-growing field.

Bose-Einstein Condensation Cambridge University Press

The book describes classical (non-quantum) optical phenomena and the instruments and technology based on them. It includes many cutting-edge areas of modern physics and its applications which are not covered in many larger and more expensive books.

Relativistic Quantum Theory of Atoms and Molecules World Scientific

Written as a collection of problems, hints and solutions, this book should provide help in learning about both fundamental and applied aspects of this vast field of knowledge, where rapid and exciting developments are taking place.

Condensed Matter Physics Oxford University Press

This book gathers the lecture notes of courses given at Session CVII of the summer school in physics, entitled "Current Trends in Atomic Physics" and held in July, 2016 in Les Houches, France. Atomic physics provides a paradigm for exploring few-body quantum systems with unparalleled control. In recent years, this ability has been applied in diverse areas including condensed matter physics, high energy physics, chemistry and ultra-fast phenomena as well as foundational aspects of quantum physics. This book addresses these topics by presenting developments and current trends via a series of tutorials and lectures presented by international leading investigators.

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