Problems In Quantum Mechanics Dover Books On Physics

Introductory text for graduate students in physics taking a year-long course in quantum mechanics in which the third quarter is devoted to relativistic wave equations and field theory. Answers to selected problems. 1972 edition.

Classic undergraduate text explores wave functions for the hydrogen atom, perturbation theory, the Pauli exclusion principle, and the structure of simple and complex molecules. Numerous tables and figures.

International Series in Natural Philosophy, Volume 30: Problems in Quantum Mechanics focuses on the processes, principles, reactions, and methodologies involved in quantum mechanics. The publication first elaborates on the mathematical formalism of quantum mechanics, simple quantum systems, and mean values and uncertainty relations. Discussions focus on mean values of dynamical variables, uncertainty relations, eigenfunctions and the energy spectrum, motion in a central field, matrix representation of vectors and operators, Hubert spaces, and operators in Hilbert space. The text then takes a look at mean values and uncertainty relations, semi-classical approximation, and pictures and representations. The book takes a look at orbital angular momentum and spin, systems of identical particles, and perturbation theory. Topics include variational method, stationary state perturbation theory, isotopic spin, second quantization, properties of angular momentum operators, and angular momentum and rotations of coordinate axes. The manuscript also ponders on functions used in quantum mechanics, relativistic quantum mechanics, and radiation theory. The publication is a dependable reference for researchers interested in quantum mechanics.

Nobel Laureate discusses quantum theory, uncertainty, wave mechanics, work of Dirac, Schroedinger, Compton, Einstein, others. "An authoritative statement of Heisenberg's views on this aspect of the quantum theory." — Nature.

A Guide to Feynman Diagrams in the Many-Body Problem

Second Edition

Problems and Solutions in Nonrelativistic Quantum Mechanics

Modern Quantum Chemistry

This volume focuses on the formulas of quantum mechanics rather than on applications. Topics include the dual nature of matter and radiation, state functions, linear momentum, motion of a free particle, and more. 1968 edition.

The & Nobel Laureate discusses the foundations of quantum theory in two lectures, & one on the structure of the atom, the other on the lattice theory of rigid bodies.

This text introduces techniques related to physical theory. Entire book is devoted to a particle moving in a straight line; students develop techniques by answering questions about the particle. 1981 edition.

This graduate-level text is based on a course in advanced quantum mechanics, taught many times at the University of Massachusetts, Amherst. Topics include propagator methods, scattering theory, charged particle interactions, alternate approximate methods, and Klein-Gordon and Dirac equations. Problems appear in the flow of the discussion, rather than at the end of chapters. 1992 edition.

Problems in Quantum Mechanics

Quantum Theory of Many-Particle Systems

A Collection of 700+ Solved Problems for Students, Lecturers, and Researchers

Lectures on Quantum Mechanics

Graduate-level text offers unified treatment of mathematics applicable to many branches of physics. Theory of vector spaces, analytic function theory, theory of integral equations, group theory, and more. Many problems. Bibliography.

Unusually varied problems, with detailed solutions, cover quantum mechanics, wave mechanics, angular momentum, molecular spectroscopy, scattering theory, more. 280 problems, plus 139 supplementary exercises.

The Old Quantum Theory explains how the classical laws were modified by Planck, Einstein, Rutherford, Bohr, and other contributors to account for atomic phenomena, comprising the development of quantum theory from its start at the very end of the 19th century until the beginning of the 20th century. This book begins by discussing Planck's discovery of his radiation law, followed by Einstein's introduction to quanta. Next is a description of the Rutherford model of the atom and Bohr's postulates, which are confirmed by the Franck-Hertz experiment. This selection concludes with a description of how Bohr's theory could explain the main features of the atomic spectra. A brief summary of other important developments in the period are also elaborated. This publication is beneficial to students and researchers conducting work on the history of quantum mechanics from the 1900s to the development of wave mechanics.

Single-volume account of methods used in dealing with the many-body problem and the resulting physics. Single-particle approximations, second quantization, many-body perturbation theory, Fermi fluids, superconductivity, many-boson systems, more. Each chapter contains well-chosen problems. Only prerequisite is basic understanding of elementary quantum mechanics. 1967 edition.

Mathematics of Classical and Quantum Physics

Introduction to Quantum Mechanics with Applications to Chemistry

Two Series of Lectures On: I. The Structure of the Atom (20 Lectures) II. The Lattice Theory of Rigid Bodies. (10 Lectures)

Mathematics for Quantum Chemistry

Subjects include formalism and its interpretation, analysis of simple systems, symmetries and invariance, methods of approximation, elements of relativistic quantum mechanics, much more. "Strongly recommended." -- "American Journal of Physics."

Written by a pair of distinguished Soviet mathematicians, this compilation presents 160 lucidly expressed problems in nonrelativistic quantum mechanics plus completely worked-out solutions. Some were drawn from the authors' courses at the Moscow Institute of Engineering, but most were prepared especially for this book. A high-level supplement rather than a primary text, it constitutes a masterful complement to advanced undergraduate and graduate texts and courses in quantum mechanics. The mathematics employed in the proofs of the problems—asymptotic expansions of functions, Green's functions, use of different representation spaces, and simple limiting cases—are detailed and

comprehensive. Virtually no space is devoted to the physical statements underlying the problems, since this is usually covered in books on quantum mechanics. Teachers and students will find this volume particularly valuable in terms of its advanced mathematics and detailed presentations, its coverage of scattering theory, and its helpful graphs and explanatory figures.

This challenging book contains a comprehensive collection of problems in nonrelativistic quantum mechanics of varying degrees of difficulty. It features answers and completely worked-out solutions to each problem. Geared toward advanced undergraduates and graduate students, it provides an ideal adjunct to any textbook in quantum mechanics. 1961 edition.

This wide-ranging collection of problems and solutions covers one-dimensional motion, tunnel effect, angular momentum, central field of force, motion of particles in a magnetic field, scattering, relativistic wave equations, and much more. 1975 edition.

Problems of Atomic Dynamics

Elementary Quantum Mechanics

Quantum Mechanics; New Approaches to Selected Topics

Quantum Mechanics in Simple Matrix Form

With this text, basic quantum mechanics becomes accessible to undergraduates with no background in mathematics beyond algebra. Includes more than 100 problems and 38 figures. 1986 edition.

Suitable for advanced undergraduates and graduate students, this compact treatment examines linear space, functionals, and operators; diagonalizing operators; operator algebras; and equations of motion. 1969 edition.

This graduate-level text develops the aspects of group theory most relevant to physics and chemistry (such as the theory of representations) and illustrates their applications to quantum mechanics. The first five chapters focus chiefly on the introduction of methods, illustrated by physical examples, and the final three chapters offer a systematic treatment of the quantum theory of atoms, molecules, and solids. The formal theory of finite groups and their representation is developed in Chapters 1 through 4 and illustrated by examples from the crystallographic point groups basic to solid-state and molecular theory. Chapter 5 is devoted to the theory of systems with full rotational symmetry, Chapter 6 to the systematic presentation of atomic structure, and Chapter 7 to molecular quantum mechanics. Chapter 8, which deals with solid-state physics, treats electronic energy band theory and magnetic crystal symmetry. A compact and worthwhile compilation of the scattered material on standard methods, this volume presumes a basic understanding of quantum theory.

"This volume serves as a text for advanced undergraduates and graduate students of physics as well as a reference for professionals. Clear in its presentation and scrupulous in its attention to detail, the treatment orginally appeared in a two-volume French edition."--Back cover.

Operator Methods in Quantum Mechanics

The Physical Principles of the Quantum Theory

Problems And Solutions On Quantum Mechanics

Topics in Advanced Quantum Mechanics

Based on a Cal Tech course, this is an outstanding introduction to formal quantum mechanics for advanced undergraduates in applied physics. The treatment's exploration of a wide range of topics culminates in two eminently practical subjects, the semiconductor transistor and the laser. Each chapter concludes with a set of problems. 1982 edition.

Four concise, brilliant lectures on mathematical methods in quantum mechanics from Nobel Prize–winning quantum pioneer build on idea of visualizing quantum theory through the use of classical mechanics.

This graduate-level text explains the modern in-depth approaches to the calculation of electronic structure and the properties of molecules. Largely self-contained, it features more than 150 exercises. 1989 edition.

Introduction to problems of molecular structure and motion covers calculus of orthogonal functions, algebra of vector spaces, and Lagrangian and Hamiltonian formulation of classical mechanics. Answers to problems. 1966 edition.

The Commonwealth and International Library: Selected Readings in Physics

An Introduction to Theory and Applications of Quantum Mechanics

Solution of Certain Problems in Quantum Mechanics

The Principles of Quantum Mechanics

This graduate-level text introduces fundamentals of classical mechanics; surveys basics of quantum mechanics; and concludes with a look at group theory and quantum mechanics of the atom. 1963 edition.

Superb introduction for nonspecialists covers Feynman diagrams, quasi particles, Fermi systems at finite temperature, superconductivity, vacuum amplitude, Dyson's equation, ladder approximation, and more. "A great delight." — Physics Today. 1974 edition.

Originally published: Amsterdam: North-Holland Pub. Co., 1967.

Self-contained treatment of nonrelativistic many-particle systems discusses both formalism and applications in terms of ground-state (zero-temperature) formalism, finite-temperature formalism, canonical transformations, and applications to physical systems. 1971 edition.

Exploring Quantum Mechanics

Introduction to Advanced Electronic Structure Theory

Sources of Quantum Mechanics

Group Theory and Its Application to Physical Problems

"The standard work in the fundamental principles of quantum mechanics, indispensable both to the advanced student and to the mature research worker, who will always find it a fresh source of knowledge and stimulation." --Nature "This is the classic text on quantum mechanics. No graduate student of quantum theory should leave it unread"--W.C Schieve, University of Texas

Intended for advanced undergraduates and graduate students in mathematics, physics, and chemistry, this concise treatment demonstrates the theory of special functions' use and application to problems in atomic and molecular physics. 2017 edition.

Suitable for advanced undergraduates, this thorough text focuses on the role of symmetry operations and the essentially algebraic structure of quantum-mechanical theory. Based on courses in quantum mechanics taught by the authors, the treatment provides numerous problems that require applications of theory and serve to supplement the textual material. Starting with a historical introduction to the origins of quantum theory, the book advances to discussions of the foundations of wave mechanics, wave packets and the uncertainty principle, and an examination of the Schr ö dinger equation that includes a selection of one-dimensional problems. Subsequent topics include operators and eigenfunctions, scattering theory, matrix mechanics, angular momentum and spin, and perturbation theory. The text concludes with a brief treatment of identical particles and a helpful Appendix.

A comprehensive collection of problems of varying degrees of difficulty in nonrelativistic quantum mechanics, with answers and completely worked-out solutions. An ideal adjunct to any textbook in quantum mechanics.

Quantum Mechanics

A Pedestrian Approach to Quantum Field Theory

The Many-Body Problem in Quantum Mechanics

Quantum Mechanics in Chemistry

The material for these volumes has been selected from the past twenty years' examination questions for graduate students at the University of California at Berkeley, Columbia University, the University of Chicago, MIT, the State University of New York at Buffalo, Princeton University and the University of Wisconsin.

A series of seminal technological revolutions has led to a new generation of electronic devices miniaturized to such tiny scales where the strange laws of quantum physics come into play. There is no doubt that, unlike scientists and engineers of the past, technology leaders of the future will have to rely on quantum mechanics in their everyday work. This makes teaching and learning the subject of paramount importance for further progress. Mastering quantum physics is a very non-trivial task and its deep understanding can only be achieved through working out real-life problems and examples. It is notoriously difficult to come up with new quantum-mechanical problems that would be solvable with a pencil and paper, and within a finite amount of time. This book remarkably presents some 700+ original problems in quantum mechanics together with detailed solutions covering nearly 1000 pages on all aspects of quantum science. The material is largely new to the English-speaking audience. The problems have been collected over about 60 years, first by the lead author, the late Prof. Victor Galitski, Sr. Over the years, new problems were added and the material polished by Prof. Boris Karnakov. Finally, Prof. Victor Galitski, Jr., has extended the material with new problems particularly relevant to modern science.

This invaluable book consists of problems in nonrelativistic quantum mechanics together with their solutions. Most of the problems have been tested in class. The degree of difficulty varies from very simple to research-level. The problems illustrate certain aspects of quantum mechanics and enable the students to learn new concepts, as well as providing practice in problem solving. The book may be used as an adjunct to any of the numerous books on quantum mechanics and should provide students with a means of testing themselves on problems of varying degrees of difficulty. It will be useful to students in an introductory course if they attempt the simpler problems. The more difficult problems should prove challenging to graduate students and may enable them to enjoy problems at the forefront of quantum mechanics.

Advanced graduate-level text looks at symmetry, rotations, and angular momentum addition; occupation number representations; and scattering theory. Uses concepts to develop basic theories of chemical reaction rates. Problems and answers.

Group Theory and Quantum Mechanics

Third Edition

The Old Quantum Theory

Mathematical Foundations of Quantum Mechanics

"Suitable for advanced undergraduates, this thorough text explores the origins of quantum theory and foundations of wave mechanics as well as wave packets and the uncertainty principle, the Schrèodinger equation, and one-dimensional problems. Additional topics include operators and eigenfunctions, scattering theory, matrix mechanics, angular momentum and spin, perturbation theory, and identical particles"--

Problems and Solutions in Quantum Chemistry and Physics

Linear Operators for Quantum Mechanics