Quantum Mechanics 2 Vols

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Quantum Mechanics - Claude Cohen-Tannoudji 1977
This didactically unrivalled textbook and timeless reference by Nobel Prize Laureate Claude Cohen-Tannoudji separates essential underlying principles of quantum mechanics from specific applications and practical examples and deals with each of them in a different section. Chapters emphasize principles; complementary sections supply applications. The book provides a qualitative introduction to quantum mechanical ideas; a systematic, complete and elaborate presentation of all the mathematical tools and postulates needed, including a discussion of their physical content and applications. The book is recommended on a regular basis by lecturers of undergraduate courses.
Quantum Mechanics - L D Landau 2013-10-22
Quantum Mechanics, Third Edition: Non-relativistic Theory is devoted to non-relativistic quantum mechanics. The theory of the addition of angular momenta, collision theory, and the theory of symmetry are examined, together with spin, nuclear structure, motion in a magnetic field, and diatomic and polyatomic molecules. This book is comprised of 18 chapters and begins with an introduction to the basic concepts of quantum mechanics, with emphasis on the uncertainty principle, the principle of superposition, and operators, as well as the continuous spectrum and the wave function. The following chapters explore energy and momentum; Schrödinger's equation; angular momentum; and motion in a centrally symmetric field and in a magnetic field. Perturbation theory, spin, and the properties of quasi-classical systems are also considered. The remaining chapters deal with the identity of particles, atoms, and diatomic and polyatomic molecules. The final two chapters describe elastic and inelastic collisions. This monograph will be a valuable source of information for physicists.
Structural Aspects of Quantum Field Theory and Noncommutative Geometry - Gerhard Grensing 2013-05-21
This book is devoted to the subject of quantum field theory. It is divided into two volumes. The first can serve as a textbook on the main techniques and results of quantum field theory, while the second treats more recent developments, in particular the subject of quantum groups and noncommutative geometry, and their interrelation. The first volume is directed at graduate students who want to learn the basic facts about quantum field theory. It begins with a gentle introduction to classical field theory, including the standard model of particle physics, general relativity, and also supergravity. The transition to quantized fields is performed with path integral techniques, by means of which the one-loop renormalization of a self-interacting scalar quantum field, of quantum electrodynamics, and the asymptotic freedom of quantum chromodynamics is treated. In the last part of the first volume, the application of path integral methods to systems of quantum statistical mechanics is covered. The book ends with a rather detailed investigation of the fractional quantum Hall effect, and gives a stringent derivation of Laughlin's trial ground state wave function as an exact ground state. The second volume covers more advanced themes. In particular Connes' noncommutative geometry is dealt with in some considerable detail; the presentation attempts to acquaint the physics community with the substantial achievements that have been reached by means of this approach towards the understanding of the elusive Higgs particle. The book also covers the subject of quantum groups and its application to the fractional quantum Hall effect, as it is for this paradigmatic physical system that noncommutative geometry and quantum groups can be brought together. Errata(s) Errata (78 KB) Contents:Volume 1:Classical Relativistic Field Theory: Kinematical AspectsClassical Relativistic Field Theory: Dynamical AspectsRelativistic Quantum Field Theory: Operator MethodsNonrelativistic Quantum Mechanics: Functional Integral MethodsRelativistic Quantum Field Theory: Functional Integral MethodsQuantum Field Theory at Nonzero TemperatureVolume 2:Symmetries and Canonical FormalismGauge Symmetries and Constrained SystemsWeyl QuantizationAnomalies in Quantum Field TheoryNoncommutative GeometryQuantum GroupsNoncommutative Geometry and Quantum Groups Readership: Graduate students and professionals in theoretical and mathematical physics. Keywords:Quantum Field Theory;Quantum Groups;Noncommutative Geometry;Path Integral Techniques;Quantum Electrodynamics;Quantum ChromodynamicsReviews: “This self-contained, comprehensive first volume presents a fundamental and careful introduction to quantum field theory. It will be welcomed by students as well as researchers, since it gives an overview of the origin and development of the basic ideas of modern particle physics, quantum statistical mechanics and the mathematics behind. The book provides a rich collection of modern research topics and references to important recent published work.” Zentralblatt MATH “The publication of this authoritative and comprehensively referenced two-volume set, written in somewhat condensed but eminently lucid style and explaining the principal underlying concepts and most important results of QFT, is particularly timely and useful. I am pleased to recommend most heartily this important reference source to students and physicists and to those concerned with the philosophy of science.” George B. Kauffman Professor Emeritus of Chemistry California State University, Fresno
Quantum Mechanics, Volume 3 - Claude Cohen-Tannoudji 2019-12-16
This new, third volume of Cohen-Tannoudji's groundbreaking textbook covers advanced topics of quantum mechanics such as uncorrelated and correlated identical particles, the quantum theory of the electromagnetic field, absorption, emission and scattering of photons by atoms, and quantum entanglement. Written in a didactically unrivalled manner, the textbook explains the fundamental concepts in seven chapters which are elaborated in accompanying complements that provide more detailed discussions, examples and applications. * Completing the success story: the third and final volume of the quantum mechanics textbook written by 1997 Nobel laureate Claude Cohen-Tannoudji and his colleagues Bernard Diu and Franck Laloë * As easily comprehensible as possible: all steps of the physical background and its mathematical representation are spelled out explicitly * Comprehensive: in addition to the fundamentals themselves, the books comes with a wealth of elaborately explained examples and applications Claude Cohen-Tannoudji was a researcher at the Kastler-Brossel laboratory of the Ecole Normale Supérieure in Paris where he also studied and received his PhD in 1962. In 1973 he became Professor of atomic and molecular physics at the Collège des France. His main research interests were optical pumping, quantum optics and atom-photon interactions. In 1997, Claude Cohen-Tannoudji, together with Steven Chu and William D. Phillips, was awarded the Nobel Prize in Physics for his research on laser cooling and trapping of neutral atoms. Bernard Diu was Professor at the Denis Diderot University (Paris VII). He was engaged in research at the Laboratory of Theoretical Physics and High Energy where his focus was on strong interactions

physics and statistical mechanics. Franck Laloë was a researcher at the Kastler-Brossel laboratory of the Ecole Normale Supérieure in Paris. His first assignment was with the University of Paris VI before he was appointed to the CNRS, the French National Research Center. His research was focused on optical pumping, statistical mechanics of quantum gases, musical acoustics and the foundations of quantum mechanics.

Studyguide for Quantum Mechanics, Vol. 2 by Cohen-Tannoudji, Claude, Isbn 9780471164357 - Cram101 Textbook Reviews 2013-01-01

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Time in Quantum Mechanics - Vol. 2 - Gonzalo Muga 2010-05-03

But all the clocks in the city Began to whirr and chime: 'O let not Time deceive you, You cannot conquer Time. W. H. Auden It is hard to think of a subject as rich, complex, and important as time. From the practical point of view it governs and organizes our lives (most of us are after all attached to a wrist watch) or it helps us to wonderfully ?nd our way in unknown territory with the global positioning system (GPS). More generally it constitutes the heartbeat of modern technology. Time is the most precisely measured quantity, so the second de?nes the meter or the volt and yet, nobody knows for sure what it is, puzzling philosophers, artists, priests, and scientists for centuries as one of the enduring enigmas of all cultures. Indeed time is full of contrasts: taken for granted in daily life, it requires sophisticated experimental and theoretical treatments to be accurately "produced. " We are trapped in its web, and it actually kills us all, but it also constitutes the stuff we need to progress and realize our objectives. There is nothing more boring and monotonous than the tick-tock of a clock, but how many fascinating challenges have physicists met to realize that monotony: Quite a number of Nobel Prize winners have been directly motivated by them or have contributed 1 signi?cantly to time measurement.

The Interpretation of Quantum Mechanics and the Measurement Process - Peter Mittelstaedt 2004-03-25

Monograph on the philosophy of quantum mechanics.

Studyguide for Quantum Mechanics, Vol. 2 by Cohen-Tannoudji, Claude - Cram101 Textbook Reviews 2013-05

Never HIGHLIGHT a Book Again Includes all testable terms, concepts, persons, places, and events. Cram101 Just the FACTS101 studyguides gives all of the outlines, highlights, and quizzes for your textbook with optional online comprehensive practice tests. Only Cram101 is Textbook Specific. Accompanies: 9780872893795. This item is printed on demand.

Quantum Mechanics II - Rubin H. Landau 2008-07-11

Here is a readable and intuitive quantum mechanics text that covers scattering theory, relativistic quantum mechanics, and field theory. This expanded and updated Second Edition - with five new chapters - emphasizes the concrete and calculable over the abstract and pure, and helps turn students into researchers without diminishing their sense of wonder at physics and nature. As a one-year graduate-level course, Quantum Mechanics II: A Second Course in Quantum Theory leads from quantum basics to basic field theory, and lays the foundation for research-oriented specialty courses. Used selectively, the material can be tailored to create a one-semester course in advanced topics. In either case, it addresses a broad audience of students in the physical sciences, as well as independent readers - whether advanced undergraduates or practicing scientists.

The Feynman Lectures on Physics, Vol. III - Richard P. Feynman 2011-10-04

?The whole thing was basically an experiment," Richard Feynman said late in his career, looking back on the origins of his lectures. The experiment turned out to be hugely successful, spawning publications that have remained definitive and introductory to physics for decades. Ranging from the basic principles of Newtonian physics through such formidable theories as general relativity and quantum mechanics, Feynman's lectures stand as a monument of clear exposition and deep insight. Timeless and collectible, the lectures are essential reading, not just for students of physics but for anyone seeking an introduction to the field from the inimitable Feynman.

Symplectic Geometry and Quantum Mechanics - Maurice A. de Gosson 2006-08-06

This book offers a complete discussion of techniques and topics intervening in the mathematical treatment of quantum and semi-classical mechanics. It starts with a very readable introduction to symplectic geometry. Many topics are also of genuine interest for pure mathematicians working in geometry and topology.

Time in Quantum Mechanics - 2008

The Historical Development of Quantum Theory - Jagdish Mehra 1982-08-03

Quantum Theory, together with the principles of special and general relativity, constitute a scientific revolution that has profoundly influenced the way in which we think about the universe and the fundamental forces that govern it. The Historical Development of Quantum Theory is a definitive historical study of that scientific work and the human struggles that accompanied it from the beginning. Drawing upon such materials as the resources of the Archives for the History of Quantum Physics, the Niels Bohr Archives, and the archives and scientific correspondence of the principal quantum physicists, as well as Jagdish Mehra's personal discussions over many years with most of the architects of quantum theory, the authors have written a rigorous scientific history of quantum theory in a deeply human context. This multivolume work presents a rich account of an intellectual triumph: a unique analysis of the creative scientific process. The Historical Development of Quantum Theory is science, history, and biography, all wrapped in the story of a great human enterprise. Its lessons will be an aid to those working in the sciences and humanities alike.

Introduction to Quantum Mechanics - David J. Griffiths 2019-11-20

Changes and additions to the new edition of this classic textbook include a new chapter on symmetries, new problems and examples, improved explanations, more numerical problems to be worked on a computer, new applications to solid state physics, and consolidated treatment of time-dependent potentials.

Lectures on Quantum Mechanics - Steven Weinberg 2013

"Ideally suited to a one-year graduate course, this textbook is also a useful reference for researchers. Readers are introduced to the subject through a review of the history of quantum mechanics and an account of classic solutions of the Schr.

Quantum Mechanics I - Alberto Galindo 2012-12-06

The first edition of this book was published in 1978 and a new Spanish e(,tition in 1989. When the first edition appeared, Professor A. Martin suggested that an English translation would meet with interest. Together with Professor A. S. Wightman, he tried to convince an American publisher to translate the book. Financial problems made this impossible. Later on, Professors E. H. Lieband W. Thirring proposed to entrust Springer-Verlag with the translation of our book, and Professor W. BeiglbOck accepted the plan. We are deeply grateful to all of them, since without their interest and enthusiasm this book would not have been translated. In the twelve years that have passed since the first edition was published, beautiful experiments confirming some of the basic principles of quantum me chanics have been carried out, and the theory has been enriched with new, im portant developments. Due reference to all of this has been paid in this English edition, which implies that modifications have been made to several parts of the book. Instances of these modifications are, on the one hand, the neutron interfer ometry experiments on wave-particle duality and the 27r rotation for fermions, and the crucial experiments of Aspect et al. with laser technology on Bell's inequalities, and, on the other hand, some recent results on level ordering in central potentials, new techniques in the analysis of anharmonic oscillators, and perturbative expansions for the Stark and Zeeman effects.

Practical Quantum Mechanics II - Siegfried Flügge 2012-12-06

E-Study Guide For: Quantum Mechanics, Vol. 2 by Claude Cohen-Tannoudji, ISBN 9780471164357 - Cram101 Textbook Reviews 2013-01-01
Never Highlight a Book Again! Just the FACTS101 study guides give the student the textbook outlines, highlights, practice quizzes and optional access to the full practice tests for their textbook.
Constructing Quantum Mechanics - Anthony Duncan 2019
This is the first of two volumes on the genesis of quantum mechanics, based on the latest scholarship in the field. This first volume covers the key developments in the field in the period between 1900-1923, which provided the scaffold on which modern quantum mechanics was built on.
Quantum Physics, 2 Volume Set - Vladimir Zelevinsky 2010-12-28
This two-volume set can be naturally divided into two semester courses, and contains a full modern graduate course in quantum physics. The idea is to teach graduate students how to practically use quantum physics and theory, presenting the fundamental knowledge, and gradually moving on to applications, including atomic, nuclear and solid state physics, as well as modern subfields, such as quantum chaos and quantum entanglement. The book starts with basic quantum problems, which do not require full quantum formalism but allow the student to gain the necessary experience and elements of quantum thinking. Only then does the fundamental Schrï¿1⁄2dinger equation appear. The author has included topics that are not usually covered in standard textbooks and has written the book in such a way that every topic contains varying layers of difficulty, so that the instructor can decide where to stop. Although supplementary sources are not required, "Further reading" is given for each chapter, including references to scientific journals and publications, and a glossary is also provided. Problems and solutions are integrated throughout the text.
Simple systems - Berthold-Georg Englert 2006
Note: The three volumes are not sequential but rather independent of each other and largely self-contained.Basic Matters is a first introduction to quantum mechanics that does not assume any prior knowledge of the subject. The emphasis is on the general structure as the necessary foundation of any understanding. Starting from the simplest quantum phenomenon, the Stern-Gerlach experiment with its choice between two discrete outcomes, and ending with one-dimensional continuous systems, the physical concepts and notions as well as the mathematical formalism of quantum mechanics are developed in successive, manageable steps. The presentation is modern inasmuch as the natural language of the trade - Dirac's kets and bras and so on - is introduced early, and the temporal evolution is dealt with in a picture-free manner, with Schrodinger's and Heisenberg's equations of motion side by side and on equal footing.The reader of Simple Systems is not expected to be familiar with the material in Basic Matters, but should have the minimal knowledge of a standard brief introduction to quantum mechanics with its typical emphasis on one-dimensional position wave functions. The step to Dirac's more abstract and much more powerful formalism is taken immediately, followed by reviews of quantum kinematics and quantum dynamics. The important standard examples (force-free motion, constant force, harmonic oscillator, hydrogen-like atoms) are then treated in considerable detail, whereby a nonstandard perspective is offered wherever it is deemed feasible and useful. A final chapter is devoted to approximation methods, from the Hellmann-Feynman theorem to the WKB quantization rule.Perturbed Evolution has a closer link to Simple Systems than that volume has to Basic Matters, but any reader familiar with the subject matter of a solid introduction to quantum mechanics - such as Dirac's formalism of kets and bras, Schrodinger's and Heisenberg's equations of motion, and the standard examples that can be treated exactly, with harmonic oscillators and hydrogen-like atoms among them - can cope with the somewhat advanced material of this volume. The basics of kinematics and dynamics are reviewed at the outset, including discussions of Bohr's principle of complementarity and Schwinger's quantum action principle. The Born series, the Lippmann-Schwinger equation, and Fermi's golden rule are recurring themes in the treatment of the central subject matter - the evolution in the presence of perturbing interactions for which there are no exact solutions as one has them for the standard examples in Simple Systems. The scattering by a localized potential is regarded as a perturbed evolution of a particular kind and is dealt with accordingly. The unique features of the scattering of indistinguishable quantum objects illustrate the nonclassical properties of bosons and fermions and prepare the groundwork for a discussion of multi-electron atoms."
Fundamentals of Physics II - R. Shankar 2016-01-01
Explains the fundamental concepts of Newtonian mechanics, special relativity, waves, fluids, thermodynamics, and statistical mechanics. Provides an introduction for college-level students of physics, chemistry, and engineering, for AP Physics students, and for general readers interested in advances in the sciences. In volume II, Shankar explains essential concepts, including electromagnetism, optics, and quantum mechanics. The book begins at the simplest level, develops the basics, and reinforces fundamentals, ensuring a solid foundation in the principles and methods of physics.
Quantum Mechanics - Kurt Gottfried 2018-03-09
This book contains discussions of radiation theory, quantum statistics and the many-body problem, and more advanced topics in collision theory. It is intended as a text for a first-year graduate quantum mechanics course.
Quantum Theory for Mathematicians - Brian C. Hall 2013-06-19
Although ideas from quantum physics play an important role in many parts of modern mathematics, there are few books about quantum mechanics aimed at mathematicians. This book introduces the main ideas of quantum mechanics in language familiar to mathematicians. Readers with little prior exposure to physics will enjoy the book's conversational tone as they delve into such topics as the Hilbert space approach to quantum theory; the Schrödinger equation in one space dimension; the Spectral Theorem for bounded and unbounded self-adjoint operators; the Stone-von Neumann Theorem; the Wentzel-Kramers-Brillouin approximation; the role of Lie groups and Lie algebras in quantum mechanics; and the path-integral approach to quantum mechanics. The numerous exercises at the end of each chapter make the book suitable for both graduate courses and independent study. Most of the text is accessible to graduate students in mathematics who have had a first course in real analysis, covering the basics of L2 spaces and Hilbert spaces. The final chapters introduce readers who are familiar with the theory of manifolds to more advanced topics, including geometric quantization.
Non-Hermitian Quantum Mechanics - Nimrod Moiseyev 2011-02-17
Non-Hermitian quantum mechanics (NHQM) is an important alternative to the standard (Hermitian) formalism of quantum mechanics, enabling the solution of otherwise difficult problems. The first book to present this theory, it is useful to advanced graduate students and researchers in physics, chemistry and engineering. NHQM provides powerful numerical and analytical tools for the study of resonance phenomena - perhaps one of the most striking events in nature. It is especially useful for problems whose solutions cause extreme difficulties within the structure of a conventional Hermitian framework. NHQM has applications in a variety of fields, including optics, where the refractive index is complex; quantum field theory, where the parity-time (PT) symmetry properties of the Hamiltonian are investigated; and atomic and molecular physics and electrical engineering, where complex potentials are introduced to simplify numerical calculations.
Studyguide for Quantum Mechanics, Vol. 2 by Claude Cohen-Tannoudji, ISBN 9780471164357 - Cram101 Textbook Reviews 2013-01-01
Never HIGHLIGHT a Book Again! Virtually all of the testable terms, concepts, persons, places, and events from the textbook are included. Cram101 Just the FACTS101 studyguides give all of the outlines, highlights, notes, and quizzes for your textbook with optional online comprehensive practice tests. Only Cram101 is Textbook Specific. Accompanys: 9780471164357 9780471164357 .
Mastering Quantum Mechanics - Barton Zwiebach 2022-04-12
A complete overview of quantum mechanics, covering essential concepts and results, theoretical foundations, and applications. This undergraduate textbook offers a

comprehensive overview of quantum mechanics, beginning with essential concepts and results, proceeding through the theoretical foundations that provide the field's conceptual framework, and concluding with the tools and applications students will need for advanced studies and for research. Drawn from lectures created for MIT undergraduates and for the popular MITx online course, "Mastering Quantum Mechanics," the text presents the material in a modern and approachable manner while still including the traditional topics necessary for a well-rounded understanding of the subject. As the book progresses, the treatment gradually increases in difficulty, matching students' increasingly sophisticated understanding of the material. • Part 1 covers states and probability amplitudes, the Schrödinger equation, energy eigenstates of particles in potentials, the hydrogen atom, and spin one-half particles • Part 2 covers mathematical tools, the pictures of quantum mechanics and the axioms of quantum mechanics, entanglement and tensor products, angular momentum, and identical particles. • Part 3 introduces tools and techniques that help students master the theoretical concepts with a focus on approximation methods. • 236 exercises and 286 end-of-chapter problems • 248 figures

The Structure and Interpretation of Quantum Mechanics - R. I. G. Hughes 1989

This important work provides an account of the philosophical foundations of quantum theory that should become a classic text for scientists and nonscientists alike. Hughes offers the first detailed and accessible analysis of the Hilbert-space models used in quantum theory and explains why they are so successful. He goes on to show how the very suitability of Hilbert spaces for modeling the quantum world gives rise to deep problems of interpretation, and makes suggestions about how they can be overcome.

Time in Quantum Mechanics - Gonzalo Muga 2007-11-30

The treatment of time in quantum mechanics is still an important and challenging open question in the foundation of the quantum theory. This multi-authored book, written as an introductory guide for newcomers to the subject, as well as a useful source of information for the expert, covers many of the open questions. The book describes the problems, and the attempts and achievements in defining, formalizing and measuring different time quantities in quantum theory.

Mathematics of Classical and Quantum Physics - Frederick W. Byron 2012-04-26

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.

Do We Really Understand Quantum Mechanics? - Franck Laloë 2012-08-30

Quantum mechanics is a very successful theory that has impacted on many areas of physics, from pure theory to applications. However, it is difficult to interpret, and philosophical contradictions and counterintuitive results are apparent at a fundamental level. In this book, Laloë presents our current understanding of the theory. The book explores the basic questions and difficulties that arise with the theory of quantum mechanics. It examines the various interpretations that have been proposed, describing and comparing them and discussing their success and difficulties. The book is ideal for researchers in physics and mathematics who want to know more about the problems faced in quantum mechanics but who do not have specialist knowledge in the subject. It will also interest philosophers of science, as well as all scientists who are curious about quantum physics and its peculiarities.

Understanding Quantum Physics - Michael A. Morrison 1990

Written in an informal yet substantive style that is a joy to read, this book provides a uniquely engaging, in-depth introduction to the concepts of quantum physics and their practical implementation, and is filled with clear, thorough explanations that help readers develop insight into physical ideas and master techniques of problem-solving using quantum mechanics. Fully explores the concepts and strategies of quantum mechanics, showing the connections among the physical concepts that govern the atomic and sub-atomic domain of matter, and examining how these concepts manifest themselves in the mathematical machinery of quantum mechanics. Focuses on the explanations and motivations of the postulates that underlie the machinery of quantum mechanics, and applies simple, single-particle systems in one dimension. Illuminates discussions of ideas and techniques with a multitude of examples that show not just the answers but also the reasoning behind them, and adds dimension to the subject with historical, biographical and philosophical references throughout. Designed for a wide range of readers interested in various branches of physics and engineering physics.

Quantum Mechanics - Robert J. Russell 2001

Quantum Mechanics, a collection of fifteen essays, explores the creative interaction among quantum physics, philosophy, and theology. This fine collection presents the results of the fifth international research conference co-sponsored by the Vatican Observatory, Rome, and the Center for Theology and the Natural Sciences, Berkeley. The overarching goal of these conferences is to support the engagement of constructive theology with the natural sciences and to investigate the philosophical and theological elements in ongoing theoretical research in the natural sciences. In the first section of this collection, contributors examine scientific and historical context. Section two features essays covering a wide range of philosophical interpretations of quantum mechanics. The final set of essays explores the theological implications of quantum theory. Abner Shimony, Raymond Y. Chiao, Michael Berry, Ernan McMullin, William R. Stoeger, S.J., James T. Cushing, Jeremy Butterfield, Michael Redhead, Chris Clarke, John Polkinghorne, Michael Heller, Philip Clayton, Thomas F. Tracy, George F.R. Ellis, and Robert John Russell all contributed essays to this volume.

The Quantum Theory of Fields: Volume 1, Foundations - Steven Weinberg 2005-06-02

Available for the first time in paperback, The Quantum Theory of Fields is a self-contained, comprehensive, and up-to-date introduction to quantum field theory from Nobel Laureate Steven Weinberg. Volume I introduces the foundations of quantum field theory. The development is fresh and logical throughout, with each step carefully motivated by what has gone before. After a brief historical outline, the book begins with the principles of relativity and quantum mechanics, and the properties of particles that follow. Quantum field theory emerges from this as a natural consequence. The classic calculations of quantum electrodynamics are presented in a thoroughly modern way, showing the use of path integrals and dimensional regularization. It contains much original material, and is peppered with examples and insights drawn from the author's experience as a leader of elementary particle research. Exercises are included at the end of each chapter.

Quantum Mechanics, Volume 1 - Claude Cohen-Tannoudji 2019-12-04

This new edition of the unrivalled textbook introduces the fundamental concepts of quantum mechanics such as waves, particles and probability before explaining the postulates of quantum mechanics in detail. In the proven didactic manner, the textbook then covers the classical scope of introductory quantum mechanics, namely simple two-level systems, the one-dimensional harmonic oscillator, the quantized angular momentum and particles in a central potential. The entire book has been revised to take into account new developments in quantum mechanics curricula. The textbook retains its typical style also in the new edition: it explains the fundamental concepts in chapters which are elaborated in accompanying complements that provide more detailed discussions, examples and applications. * The quantum mechanics classic in a new edition: written by 1997 Nobel laureate Claude Cohen-Tannoudji and his colleagues Bernard Diu and Franck Laloë * As easily comprehensible as possible: all steps of the physical background and its mathematical representation are spelled out explicitly * Comprehensive: in addition to the fundamentals themselves, the book contains more than 350 worked examples plus exercises Claude Cohen-Tannoudji was a researcher at the Kastler-Brossel laboratory of the Ecole Normale Supérieure in Paris where he also studied and received his PhD in 1962. In 1973 he became Professor of atomic and molecular physics at the Collège des France. His main research interests were optical pumping, quantum optics and atom-photon interactions. In 1997, Claude Cohen-Tannoudji, together with Steven Chu and William D. Phillips, was awarded the Nobel Prize in Physics for his research on laser cooling and trapping of neutral atoms. Bernard Diu was Professor at the Denis Diderot University (Paris VII). He was

engaged in research at the Laboratory of Theoretical Physics and High Energy where his focus was on strong interactions physics and statistical mechanics. Franck Laloë was a researcher at the Kastler-Brossel laboratory of the Ecole Normale Supérieure in Paris. His first assignment was with the University of Paris VI before he was appointed to the CNRS, the French National Research Center. His research was focused on optical pumping, statistical mechanics of quantum gases, musical acoustics and the foundations of quantum mechanics.

The Formation and Logic of Quantum Mechanics - Mituo Taketani 2001-11-23

This book analyzes the intricate logical process through which the quantum theory was developed, and shows that the quantum mechanics thus established is governed by stereo-structural logic. The method of analysis is based on Mituo Taketani's three-stage theory of scientific cognition, which was presented and developed in close connection with Yukawa's theory of the meson. According to the three-stage theory, scientific cognition proceeds through a series of coiling turns of the phenomenological, substantialistic and essentialistic stages. The old quantum mechanics is shown to be in a substantialistic stage, followed by the quantum mechanics in the corresponding essentialistic stage. Contents: Volume I:Quantum of RadiationThe Formation of Atomic ModelsVolume II:Difficulties in Radiation TheoryThe Quantum of Action and Atomic ModelsThe Quantum Condition, Transition Probability and Correspondence PrincipleTheory of Atomic Structure and Spin of ElectronThe Interconnection of Wave- and Particle-NaturesVolume III:The Proposal and Formulation of Matrix MechanicsFrom the Proposal of Wave Mechanics to Quantum MechanicsThe Establishment of Quantum MechanicsThe Logic of Quantum Mechanics Readership: Undergraduates and researchers in quantum and theoretical physics. Keywords:Formation;Logic;Quantum Mechanics;Transition Probability;CorrespondenceReviews: “… these volumes provide precise chronology and interesting interpretations … there is much of interest to be found and these chapter-by-chapter guides make Taketani and Nagasaki's work accessible …”Contemporary Physics “The various chapters are preceded by helpful summaries of the main themes to be treated and contain flowchart-like diagrams showing the interconnections between the papers discussed in the text.” Mathematical Reviews “This book is very readable and can be recommended to physicists interested in the history of their science as well as to philosophers and historians.”Zentralblatt MATH “It is as thoroughly written as the first volume and it is fascinating to read in it.” Zentralblatt MATH “This work in three volumes presents the early history of cognition in quantum physics just describing the physical facts, their interpretation and formalization in a very readable form for physicists thereby justifying the realistic philosophical principles adopted by the authors for scientific cognition. It can especially be recommended to lecturers of quantum physics who like to include some history into their lecture.” Zentralblatt MATH

Quantum Mechanics - Claude Cohen-Tannoudji 1977

This didactically unrivalled textbook and timeless reference by Nobel Prize Laureate Claude Cohen-Tannoudji separates essential underlying principles of quantum mechanics from specific applications and practical examples and deals with each of them in a different section. Chapters emphasize principles; complementary sections supply applications. The book provides a qualitative introduction to quantum mechanical ideas; a systematic, complete and elaborate presentation of all the mathematical tools and postulates needed, including a discussion of their physical content and applications. The book is recommended on a regular basis by lecturers of undergraduate courses.

The Theoretical Minimum - Leonard Susskind 2014-04-22

A master teacher presents the ultimate introduction to classical mechanics for people who are serious about learning physics "Beautifully clear explanations of famously 'difficult' things," -- Wall Street Journal If you ever regretted not taking physics in college -- or simply want to know how to think like a physicist -- this is the book for you. In this bestselling introduction to classical mechanics, physicist Leonard Susskind and hacker-scientist George Hrabovsky offer a first course in physics and associated math for the ardent amateur. Challenging, lucid, and concise, The Theoretical Minimum provides a tool kit for amateur scientists to learn physics at their own pace.

Quantum Mechanics - Gennaro Auletta 2009-04-16

The important changes quantum mechanics has undergone in recent years are reflected in this approach for students. A strong narrative and over 300 worked problems lead the student from experiment, through general principles of the theory, to modern applications. Stepping through results allows students to gain a thorough understanding. Starting with basic quantum mechanics, the book moves on to more advanced theory, followed by applications, perturbation methods and special fields, and ending with developments in the field. Historical, mathematical and philosophical boxes guide the student through the theory. Unique to this textbook are chapters on measurement and quantum optics, both at the forefront of current research. Advanced undergraduate and graduate students will benefit from this perspective on the fundamental physical paradigm and its applications. Online resources including solutions to selected problems, and 200 figures, with colour versions of some figures, are available at www.cambridge.org/Auletta.

Quantum Mechanics - Albert Messiah 1961

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."