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DIAZ CAMACHO

Mathematical Concepts of Quantum Mechanics Springer Science & Business Media
Aimed at graduate students and researchers, this book covers the key aspects of the modern quantum theory of solids, including up-to-date ideas such as quantum fluctuations and strong electron correlations. It presents in the main concepts of the modern quantum theory of solids, as well as a general description of the essential theoretical methods required when working with these systems. Diverse topics such as general theory of phase transitions, harmonic and anharmonic lattices, Bose condensation and superfluidity, modern aspects of magnetism including resonating valence bonds, electrons in metals, and strong electron correlations are treated using unifying concepts of order and elementary excitations. The main theoretical tools used to treat these problems are introduced and explained in a simple way, and their applications are demonstrated through concrete examples.
Mathematical Methods In Classical And Quantum Physics World Scientific Publishing Company
Chapter 11 treats canonical quantization of both non-relativistic and relativistic fields; topics covered include the natural system of units, the Dyson and the Wick chronological products, normal products, Wick's theorem and the Feynman diagrams. The last Chapter (12) discusses in detail the Interpretational Problem in quantum mechanics.
Quantum Trajectories Cambridge University Press

The study of neutrinos and their interaction with matter has made many important contributions to our present knowledge of physics. This advanced text introduces neutrino physics and presents a theoretical framework for describing relativistic particles. It gives a pedagogical description of the neutrino, its properties, the standard model of electroweak interactions, and neutrino scattering from leptons and nucleons. Focusing on the role of nuclear effects, the discussion extends to various processes of quasielastic, inelastic, and deep inelastic scattering from nucleons and nuclei. Neutrino sources, detection and oscillation, along with the role of neutrinos in astrophysics and motivation for the need of physics beyond the standard model are discussed in detail. This topical book will stimulate new ideas and avenues for research, and will form a valuable resource for advanced students and researchers working in the field of neutrino physics.

An Introduction to the Mathematical Structure of Quantum Mechanics Universities Press

Taking a conceptual approach to the subject, Concepts in Quantum Mechanics provides complete coverage of both basic and advanced topics. Following in the footsteps of Dirac's classic work Principles of Quantum Mechanics, it explains all themes from first principles.The authors present alternative ways of representing the state of a physical system,

Quantum Mechanics Springer Nature

This book provides an ideal introduction to the use of Feynman path integrals in the fields of quantum mechanics and statistical physics. It is written for graduate students and researchers in physics, mathematical physics, applied mathematics as well as chemistry. The material is presented in an accessible manner for readers with little knowledge of quantum mechanics and no prior exposure to path integrals. It begins with elementary concepts and a review of quantum mechanics that gradually builds the framework for the Feynman path integrals and how they are applied to problems in quantum mechanics and statistical physics. Problem sets throughout the book allow readers to test their understanding and reinforce the explanations of the theory in real situations. Features: Comprehensive and rigorous yet, presents an easy-to-understand approach. Applicable to a wide range of disciplines. Accessible to those with little, or basic, mathematical understanding.

The Principles of Quantum Mechanics World Scientific

This book introduces mathematicians, physicists, and philosophers to a new, coherent approach to theory and interpretation of quantum physics, in which classical and quantum thinking live peacefully side by side and jointly fertilize the intuition. The formal, mathematical core of quantum physics is cleanly separated from the interpretation issues. The book demonstrates that the universe can be rationally and objectively understood from the smallest to the largest levels of modeling. The thermal interpretation featured in this book succeeds without any change in the theory. It involves one radical step, the reinterpretation of an assumption that was virtually never questioned before - the traditional eigenvalue link between theory and observation is replaced by a q-expectation link: Objective properties are given by q-expectations of products of quantum fields and what is computable from these. Averaging over macroscopic spacetime regions produces macroscopic

quantities with negligible uncertainty, and leads to classical physics. - Reflects the actual practice of quantum physics. - Models the quantum-classical interface through coherent spaces. - Interprets both quantum mechanics and quantum field theory. - Eliminates probability and measurement from the foundations. - Proposes a novel solution of the measurement problem.

Bohmian Mechanics and Quantum Theory: An Appraisal Springer Science & Business Media

The application of quantum mechanics to many-particle systems has been an active area of research in recent years as researchers have looked for ways to tackle difficult problems in this area. The quantum trajectory method provides an efficient computational technique for solving both stationary and time-evolving states, encompassing a large area of quantum mechanics. Quantum Trajectories brings the expertise of an international panel of experts who focus on the epistemological significance of quantum mechanics through the quantum theory of motion. Emphasizing a classical interpretation of quantum mechanics as developed by de Bröglie and Bohm, this volume: Introduces the concept of the quantum theory of motion Explains the connection with conventional quantum mechanics Presents various numerical techniques generated from the Bohmian approach Describes the epistemological significance of quantum trajectories Provides an authoritative account of the foundations of quantum mechanics vis-à-vis that of the Bohmian mechanics The popularity of using the quantum trajectory as a computational tool has exploded over the last decade, finally bringing this methodology to the level of practical applications. Many of the experts in the field who have either developed the methodology or have improved upon it have contributed chapters to this volume, making it a state-of-the-art expression of the field as it exists today and providing insight into the future of this technology.

Quantum Mechanics: Fundamentals Springer Science & Business Media

The book gives a streamlined introduction to quantum mechanics, while describing the basic mathematical structures underpinning this discipline. Starting with an overview of the key physical experiments illustrating the origin of the physical foundations, the book proceeds to a description of the basic notions of quantum mechanics and their mathematical content. It then makes its way to topics of current interest, specifically those in which mathematics plays an important role. The topics presented include spectral theory, many-body theory, positive temperatures, path integrals and quasiclassical asymptotics, the theory of resonances, an introduction to quantum field theory and the theory of radiation. The book can serve as a text for an intermediate course in quantum mechanics, or a more advanced topics course.

Quantum Mechanics: A Modern Development (2nd Edition) Springer Science & Business Media

Statistical Mechanics discusses the fundamental concepts involved in understanding the physical properties of matter in bulk on the basis of the dynamical behavior of its microscopic constituents. The book emphasizes the equilibrium states of physical systems. The text first details the statistical basis of thermodynamics, and then proceeds to discussing the elements of ensemble theory. The next two chapters cover the canonical

and grand canonical ensemble. Chapter 5 deals with the formulation of quantum statistics, while Chapter 6 talks about the theory of simple gases. Chapters 7 and 8 examine the ideal Bose and Fermi systems. In the next three chapters, the book covers the statistical mechanics of interacting systems, which includes the method of cluster expansions, pseudopotentials, and quantized fields. Chapter 12 discusses the theory of phase transitions, while Chapter 13 discusses fluctuations. The book will be of great use to researchers and practitioners from wide array of disciplines, such as physics, chemistry, and engineering.

An Axiomatic Basis for Quantum Mechanics Springer Science & Business Media

This is a book about representing symmetry in quantum mechanics. The book is on a graduate and/or researcher level and it is written with an attempt to be concise, to respect conceptual clarity and mathematical rigor. The basic structures of quantum mechanics are used to identify the automorphism group of quantum mechanics. The main concept of a symmetry action is defined as a group homomorphism from a given group, the group of symmetries, to the automorphism group of quantum mechanics. The structure of symmetry actions is determined under the assumption that the symmetry group is a Lie group. The Galilei invariance is used to illustrate the general theory by giving a systematic presentation of a Galilei invariant elementary particle. A brief description of the Galilei invariant wave equations is also given.

Classical Systems in Quantum Mechanics Cambridge University Press

This book provides a comprehensive exposition of the theory of equilibrium thermodynamics and statistical mechanics at a level suitable for well-prepared undergraduate students. The fundamental message of the book is that all results in equilibrium thermodynamics and statistical mechanics follow from a single unprovable axiom — namely, the principle of equal a priori probabilities — combined with elementary probability theory, elementary classical mechanics, and elementary quantum mechanics.

Quantum Mechanics Cambridge University Press

This book is intended to provide an adequate background for various theortical physics courses, especially those in classical mechanics, electrodynamics, quatum mechanics and statistical physics. Each topic is dealt with in a generally self-contained manner and the text is interspersed with a number of solved examples ad a large number of exercise problems.

Quantum Mechanics Via Lie Algebras World Scientific

This volume brings together leading quantum physicists to expound on the meaning and future directions of quantum mechanics. It offers new insights from different vantage points to tackle essential questions in quantum mechanics and its interpretation. All the authors have written for a broad readership, and the resulting volume will appeal to everyone wishing to keep abreast of new developments in quantum mechanics, as well as its history and philosophy.

Introduction to Statistical Mechanics CRC Press

"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

Modern Quantum Mechanics CRC Press

Quantum mechanics and the Schrodinger equation are the basis for the de scription of the properties of atoms, molecules, and nuclei. The development of reliable, meaningful solutions for the energy eigenfunctions of these many is a formidable problem. The usual approach for obtaining particle systems the eigenfunctions is based on their variational extremum property of the expectation values of the energy. However the complexity of these variational solutions does not allow a transparent, compact description of the physical structure. There are some properties of the wave functions in some specific, spatial domains, which depend on the general structure of the Schrodinger equation and the electromagnetic potential. These properties provide very useful guidelines in developing simple and accurate solutions for the wave functions of these systems, and provide significant insight into their physical structure. This point, though of considerable importance, has not received adequate attention. Here we present a description of the local properties of the wave functions of a collection of particles, in particular the asymptotic properties when one of the particles is far away from the others. The asymptotic behaviour of this wave function depends primarily on the separation energy of the outmost particle. The universal significance of the asymptotic behaviour of the wave functions should be appreciated at both research and pedagogic levels. This is the main aim of our presentation here.

Concepts in Quantum Mechanics Cambridge University Press

This open access textbook takes the reader step-by-step through the concepts of mechanics in a clear and detailed manner. Mechanics is considered to be the core of physics, where a deep understanding of the concepts is essential in understanding all branches of physics. Many proofs and examples are included to help the reader grasp the fundamentals fully, paving the way to deal with more advanced topics. After solving all of the examples, the reader will have gained a solid foundation in mechanics and the skills to apply the concepts in a variety of situations. The book is useful for undergraduate students majoring in physics and other science and engineering disciplines. It can also be used as a reference for more advanced levels.

Principles of Mechanics S. Chand Publishing

Specifically designed to introduce graduate students to the functional integration method in contemporary physics as painlessly as possible, the book concentrates on the conceptual problems inherent in the path integral formalism. Throughout, the striking interplay between stochastic processes, statistical physics and quantum mechanics comes to the fore, and all the methods of fundamental interest are generously illustrated by important physical examples.

The Physics of Neutrino Interactions Springer

Differential geometry and topology have become essential tools for many theoretical physicists. In particular, they are indispensable in theoretical studies of condensed matter physics, gravity, and particle physics. Geometry, Topology and Physics, Second Edition introduces the ideas and techniques of differential geometry and topology at a level suitable for postgraduate students and researchers in these fields. The second edition of this popular and established text incorporates a number of

changes designed to meet the needs of the reader and reflect the development of the subject. The book features a considerably expanded first chapter, reviewing aspects of path integral quantization and gauge theories. Chapter 2 introduces the mathematical concepts of maps, vector spaces, and topology. The following chapters focus on more elaborate concepts in geometry and topology and discuss the application of these concepts to liquid crystals, superfluid helium, general relativity, and bosonic string theory. Later chapters unify geometry and topology, exploring fiber bundles, characteristic classes, and index theorems. New to this second edition is the proof of the index theorem in terms of supersymmetric quantum mechanics. The final two chapters are devoted to the most fascinating applications of geometry and topology in contemporary physics, namely the study of anomalies in gauge field theories and the analysis of Polakov's bosonic string theory from the geometrical point of view. Geometry, Topology and Physics, Second Edition is an ideal introduction to differential geometry and topology for postgraduate students and researchers in theoretical and mathematical physics.

Modern Quantum Mechanics Walter de Gruyter GmbH & Co KG

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.

Asymptotic Methods in Quantum Mechanics Taylor & Francis

Discusses the basic law of statistical physics and their applications to a range of interesting problems. In this title, the basic principles of equilibrium statistical mechanics are clearly formulated and applied to specific examples of ideal gases and interacting systems to bring out their strength and scope.