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Titolo	Introductory Quantum Mechanics : A Traditional Approach Emphasizing Connections with Classical Physics / / by Paul R. Berman
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Descrizione fisica	1 online resource (XVI, 637 p. 101 illus., 82 illus. in color.)
Collana	UNITEXT for Physics, , 2198-7882
Disciplina	530
Soggetti	Quantum theory Particles (Nuclear physics) Quantum field theory Mathematical physics Mechanics Quantum Physics Elementary Particles, Quantum Field Theory Mathematical Applications in the Physical Sciences Classical Mechanics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Introduction -- Mathematical Introduction -- Free Particle Schroedinger Equation - Free-Particle Wave Packets -- Schroedinger's Equation with Potential Energy: Introduction to Operators -- Postulates and Basic Elements of Quantum Mechanics: Properties of Operators -- Problems in 1-dimension: General Considerations, Infinite Well Potential, Piecewise Constant Potentials, and Delta Function Potentials -- Simple Harmonic Oscillator - One Dimension -- Problems in 2 and 3-dimensions - General Considerations -- Central Forces and Angular Momentum -- Spherically Symmetric Potentials - Radial Equation -- Dirac Notation -- Spin -- Important Basics from Phys 453 -- Perturbation Theory -- Variational Approach -- WKB Approximation -- Scattering - 1-D -- Scattering - 3-D -- Symmetries and Transformations -- Rotations - Examples -- Addition of Angular Momentum: Clebsch-Gordan Coefficients -- Vector and Tensor

Operators: Wigner-Eckart Theorem -- Spin-Orbit Interactions - Hydrogen Atom with Spin in External Fields -- Time-Dependent Problems -- Approximation Techniques in Time-Dependent Problems -- Fermi's Golden Rule.

Sommario/riassunto

This book presents a basic introduction to quantum mechanics at the undergraduate level. Depending on the choice of topics, it can be used for a one-semester or two-semester course. An attempt has been made to anticipate the conceptual problems students encounter when they first study quantum mechanics. Wherever possible, examples are given to illustrate the underlying physics associated with the mathematical equations of quantum mechanics. To this end, connections are made with corresponding phenomena in classical mechanics and electromagnetism. The problems at the end of each chapter are intended to help students master the course material and to explore more advanced topics. Many calculations exploit the extraordinary capabilities of computer programs such as Mathematica, MatLab, and Maple. Students are urged to use these programs, just as they had been urged to use calculators in the past. The treatment of various topics is rather complete, in that most steps in derivations are included. Several of the chapters go beyond what is traditionally covered in an introductory course. The goal of the presentation is to provide the students with a solid background in quantum mechanics. .