1. Record Nr. UNINA9910781028703321

Autore	Paar Hans P
Titolo	An introduction to advanced quantum physics [[electronic resource] /] / Hans P. Paar
Pubbl/distr/stampa	Hoboken, N.J., : Wiley, 2010
ISBN	1-282-68681-X 9786612686818 0-470-68675-8 0-470-66509-2
Descrizione fisica	1 online resource (225 p.)
Collana	New York Academy of Sciences
Disciplina	530.12
Soggetti	Nonlinear theories Quantum theory
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	An Introduction to Advanced Quantum Physics; Contents; Preface; PART 1 Relativistic Quantum Physics; 1 Electromagnetic Radiation and Matter; 1.1 Hamiltonian and Vector Potential; 1.2 Second Quantization; 1.2.1 Commutation Relations; 1.2.2 Energy; 1.2.3 Momentum; 1.2.4 Polarization and Spin; 1.2.5 Hamiltonian; 1.3 Time-Dependent Perturbation Theory; 1.4 Spontaneous Emission; 1.4.1 First Order Result; 1.4.2 Dipole Transition; 1.4.3 Higher Multipole Transition; 1.5 Blackbody Radiation; 1.6 Selection Rules; Problems; 2 Scattering; 2.1 Scattering Amplitude and Cross Section; 2.2 Born Approximation 2.2.1 Schrodinger Equation 2.2.2 Green's Function Formalism; 2.2.3 Solution of the Schrodinger Equation; 2.2.4 Born Approximation; 2.2.5 Electron-Atom Scattering; 2.3 Photo-Electric Effect; 2.4 Photon Scattering; 2.4.1 Amplitudes; 2.4.2 Cross Section; 2.4.3 Rayleigh Scattering; 2.4.4 Thomson Scattering; Problems; 3 Symmetries and Conservation Laws; 3.1 Symmetries and Conservation Laws; 3.1.1 Symmetries; 3.1.2 Conservation Laws; 3.2 Continuous Symmetry Operators; 3.2.1 Translations; 3.2.2 Rotations; 3.3 Discrete Symmetry Operators; 3.4 Degeneracy; 3.4.1 Example; 3.4.2 Isospin; Problems 4 Relativistic Quantum Physics 4.1 Klein-Gordon Equation; 4.2 Dirac

Equation; 4.2.1 Derivation of the Dirac Equation; 4.2.2 Probability Density and Current; 4.3 Solutions of the Dirac Equation, Anti-Particles; 4.3.1 Solutions of the Dirac Equation; 4.3.2 Anti-Particles; 4.4 Spin, Non-Relativistic Limit and Magnetic Moment; 4.4.1 Orbital Angular Momentum; 4.4.2 Spin and Total Angular Momentum; 4.4.3 Helicity; 4.4.4 Non-Relativistic Limit; 4.5 The Hydrogen Atom Re-Revisited; Problems; 5 Special Topics; 5.1 Introduction; 5.2 Measurements in Quantum Physics; 5.3 Einstein-Podolsky-Rosen Paradox
5.4 Schrodinger's Cat 5.5 The Watched Pot; 5.6 Hidden Variables and Bell's Theorem; Problems; PART 2 Introduction to Quantum Field Theory; 6 Second Quantization of Spin 1/2 and Spin 1 Fields; 6.1 Second Quantization of Spin 12 Fields; 6.1.1 Plane Wave Solutions; 6.1.2 Normalization of Spinors; 6.1.3 Energy; 6.1.4 Momentum; 6.1.5 Creation and Annihilation Operators; 6.2 Second Quantization of Spin 1 Fields; Problems; 7 Covariant Perturbation Theory and Applications; 7.1 Covariant Perturbation Theory; 7.1.1 Hamiltonian Density; 7.1.2 Interaction Representation
7.1.3 Covariant Perturbation Theory 7.2 W and Z Boson Decays; 7.2.1 Amplitude; 7.2.2 Decay Rate; 7.2.3 Summation over Spin; 7.2.4 Integration over Phase Space; 7.2.5 Interpretation; 7.3 Feynman Graphs; 7.4 Second Order Processes and Propagators; 7.4.1 Annihilation and Scattering; 7.4.2 Time-Ordered Product; Problems; 8 Quantum Electrodynamics; 8.1 Electron-Positron Annihilation; 8.2 Electron-Muon Scattering; Problems; Index

Sommario/riassunto

An Introduction to Advanced Quantum Physics presents important concepts from classical mechanics, electricity and magnetism, statistical physics, and quantum physics brought together to discuss the interaction of radiation and matter, selection rules, symmetries and conservation laws, scattering, relativistic quantum mechanics, apparent paradoxes, elementary quantum field theory, electromagnetic and weak interactions, and much more. This book consists of two parts: Part 1 comprises the material suitable for a second course in quantum physics and covers:Electroma