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Nota di contenuto	A Course in Theoretical Physics; Contents; Notation; Preface; I NONRELATIVISTIC QUANTUM MECHANICS; 1 Basic Concepts of Quantum Mechanics; 1.1 Probability interpretation of the wave function; 1.2 States of definite energy and states of definite momentum; 1.3 Observables and operators; 1.4 Examples of operators; 1.5 The time-dependent Schrodinger equation; 1.6 Stationary states and the time-independent Schrodinger equation; 1.7 Eigenvalue spectra and the results of measurements; 1.8 Hermitian operators; 1.9 Expectation values of observables 1.10 Commuting observables and simultaneous observability1.11 Noncommuting observables and the uncertainty principle; 1.12 Time dependence of expectation values; 1.13 The probability-current

density; 1.14 The general form of wave functions; 1.15 Angular momentum; 1.16 Particle in a three-dimensional spherically symmetric potential; 1.17 The hydrogen-like atom; 2 Representation Theory; 2.1 Dirac representation of quantum mechanical states; 2.2 Completeness and closure; 2.3 Changes of representation; 2.4 Representation of operators; 2.5 Hermitian operators; 2.6 Products of operators
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4.8 The partial-wave scattering statesII THERMAL AND STATISTICAL PHYSICS; 5 Fundamentals of Thermodynamics; 5.1 The nature of thermodynamics; 5.2 Walls and constraints; 5.3 Energy; 5.4 Microstates; 5.5 Thermodynamic observables and thermal fluctuations; 5.6 Thermodynamic degrees of freedom; 5.7 Thermal contact and thermal equilibrium; 5.8 The zeroth law of thermodynamics; 5.9 Temperature; 5.10 The International Practical Temperature Scale; 5.11 Equations of state; 5.12 Isotherms; 5.13 Processes; 5.13.1 Nondissipative work; 5.13.2 Dissipative work; 5.13.3 Heat flow
5.14 Internal energy and heat5.14.1 Joule's experiments and internal energy; 5.14.2 Heat; 5.15 Partial derivatives; 5.16 Heat capacity and specific heat; 5.16.1 Constant-volume heat capacity; 5.16.2 Constant-pressure heat capacity; 5.17 Applications of the first law to ideal gases; 5.18 Difference of constant-pressure and constant-volume heat capacities; 5.19 Nondissipative-compression/expansion adiabat of an ideal gas; 6 Quantum States and Temperature; 6.1 Quantum states; 6.2 Effects of interactions; 6.3 Statistical meaning of temperature; 6.4 The Boltzmann distribution
7 Microstate Probabilities and Entropy

Sommario/riassunto

This book is a comprehensive account of five extended modules covering the key branches of twentieth-century theoretical physics, taught by the author over a period of three decades to students on bachelor and master university degree courses in both physics and theoretical physics. The modules cover nonrelativistic quantum mechanics, thermal and statistical physics, many-body theory, classical field theory (including special relativity and electromagnetism), and, finally, relativistic quantum mechanics and gauge theories of quark and lepton interactions, all presented in a single, se