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Nota di contenuto	1. The Quantization of Physical Quantities -- 1.1 Light Quanta -- 1.2 The Photoelectric Effect -- 1.3 The Compton Effect -- 1.4 The Ritz Combination Principle -- 1.5 The Franck-Hertz Experiment -- 1.6 The Stern-Gerlach Experiment -- 1.7 Biographical Notes -- 2. The Radiation Laws -- 2.1 A Preview of the Radiation of Bodies -- 2.2 What is Cavity Radiation? -- 2.3 The Rayleigh-Jeans Radiation Law - The Electromagnetic Eigenmodes of a Cavity -- 2.4 Planck's Radiation Law -- 2.5 Biographical Notes -- 3. Wave Aspects of Matter -- 3.1 De Broglie Waves -- 3.2 The Diffraction of Matter Waves -- 3.3 The Statistical Interpretation of Matter Waves -- 3.4 Mean (Expectation) Values in Quantum Mechanics -- 3.5 Three Quantum Mechanical Operators -- 3.6 The Superposition Principle in Quantum Mechanics -- 3.7 The Heisenberg Uncertainty Principle -- 3.8 Biographical Notes -- 4. Mathematical Foundations of Quantum Mechanics I -- 4.1 Properties of Operators -- 4.2 Combining Two Operators -- 4.3 Bra and Ket Notation -- 4.4 Eigenvalues and Eigenfunctions -- 4.5 Measurability of Different Observables at Equal Times ... -- 4.6 Position and Momentum Operators -- 4.7 Heisenberg's Uncertainty Relations for Arbitrary

Observables -- 4.8 Angular-Momentum Operators -- 4.9 Kinetic Energy -- 4.10 Total Energy -- 4.11 Biographical Notes -- 5. Mathematical Supplement -- 5.1 Eigendifferentials and the Normalization of Eigenfunctions for Continuous Spectra -- 5.2 Expansion into Eigenfunctions -- 6. The Schrödinger Equation -- 6.1 The Conservation of Particle Number in Quantum Mechanics -- 6.2 Stationary States -- 6.3 Properties of Stationary States -- 6.4 Biographical Notes -- 7. The Harmonic Oscillator -- 7.1 The Solution of the Oscillator Equation -- 7.2 The Description of the Harmonic Oscillator by Creation and Annihilation Operators -- 7.3 Properties of the Operators â and â+ -- 7.4 Representation of the Oscillator Hamiltonian in Terms of â and â+ -- 7.5 Interpretation of â and â+ -- 7.6 Biographical Notes -- 8. The Transition from Classical to Quantum Mechanics -- 8.1 Motion of the Mean Values -- 8.2 Ehrenfest's Theorem -- 8.3 Constants of Motion, Laws of Conservation -- 8.4 Quantization in Curvilinear Coordinates -- 8.5 Biographical Notes -- 9. Charged Particles in Magnetic Fields -- 9.1 Coupling to the Electromagnetic Field -- 9.2 The Hydrogen Atom -- 9.3 Three-Dimensional Electron Densities -- 9.4 The Spectrum of Hydrogen Atoms -- 9.5 Currents in the Hydrogen Atom -- 9.6 The Magnetic Moment -- 9.7 Hydrogen-like Atoms -- 9.8 Biographical Notes -- 10. The Mathematical Foundations of Quantum Mechanics II -- 10.1 Representation Theory -- 10.2 Representation of Operators -- 10.3 The Eigenvalue Problem -- 10.4 Unitary Transformations -- 10.5 The S Matrix -- 10.6 The Schrödinger Equation in Matrix Form -- 10.7 The Schrödinger Representation -- 10.8 The Heisenberg Representation -- 10.9 The Interaction Representation -- 10.10 Biographical Notes -- 11. Perturbation Theory -- 11.1 Stationary Perturbation Theory -- 11.2 Degeneracy -- 11.3 The Ritz Variational Method -- 11.4 Time-Dependent Perturbation Theory -- 11.5 Time-Independent Perturbation -- 11.6 Transitions Between Continuum States -- 11.7 Biographical Notes -- 12. Spin -- 12.1 Doublet Splitting -- 12.2 The Einstein-de Haas Experiment -- 12.3 The Mathematical Description of Spin -- 12.4 Wave Functions with Spin -- 12.5 The Pauli Equation -- 12.6 Biographical Notes -- 13. A Nonrelativistic Wave Equation with Spin -- 13.1 The Linearization of the Schrödinger Equation -- 13.2 Particles in an External Field and the Magnetic Moment . -- 14. Elementary Aspects of the Quantum-Mechanical Many-Body Problem -- 14.1 The Conservation of the Total Momentum of a Particle System -- 14.2 Centre-of-Mass Motion of a System of Particles in Quantum Mechanics -- 14.3 Conservation of Total Angular Momentum in a Quantum-Mechanical Many-Particle System -- 14.4 Small Oscillations in a Many-Particle System -- 14.5 Biographical Notes -- 15. Identical Particles -- 15.1 The Pauli Principle -- 15.2 Exchange Degeneracy -- 15.3 The Slater Determinant -- 15.4 Biographical Notes -- 16. The Formal Framework of Quantum Mechanics -- 16.1 The Mathematical Foundation of Quantum Mechanics - Hilbert Space -- 16.2 Operators in Hilbert Space -- 16.3 Eigenvalues and Eigenvectors -- 16.4 Operators with Continuous or Discrete-Continuous (Mixed) Spectra -- 16.5 Operator Functions -- 16.6 Unitary Transformations -- 16.7 The Direct-Product Space -- 16.8 The Axioms of Quantum Mechanics -- 16.9 Free Particles -- 16.10 A Summary of Perturbation Theory -- 17. Conceptual and Philosophical Problems of Quantum Mechanics -- 17.1 Determinism -- 17.2 Locality -- 17.3 Hidden-Variable Theories -- 17.4 Bell's Theorem -- 17.5 Measurement Theory -- 17.6 Schrödinger's Cat -- 17.7 Subjective Theories -- 17.8 Classical Measurements -- 17.9 The Copenhagen Interpretation -- 17.10 Indelible Recording -- 17.11 The Splitting Universe -- 17.12 The Problem of Reality.

Sommario/riassunto	The text Quantum Mechanics - An Introduction has found many friends among physics students and researchers so that the need for a third edition has arisen. There was no need for a major revision of the text but I have taken the opportunity to make several amendments and improvements. A number of misprints and minor errors have been corrected and a few clarifying remarks have been added at various places. A few figures have been added or revised, in particular the three-dimensional density plots in Chap. 9. I am grateful to several colleagues for helpful comments, in particular to Prof. R.A. King (Calgary) who supplied a comprehensive list of corrections. I also thank Dr. A. Scherdin for help with the figures and Dr. R. Mattiello who has supervised the preparation of the third edition of the book. Furthermore I acknowledge the agreeable collaboration with Dr. H. 1. Kolsch and his team at Springer-Verlag, Heidelberg.

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