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Soggetti	Quantum physics Elementary particles (Physics) Quantum field theory Quantum statistics Condensed matter Quantum Physics Elementary Particles, Quantum Field Theory Quantum Gases and Condensates Condensed Matter Physics
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Nota di contenuto	1 The Origins of Modern Physics -- 2 Second Quantization of Light -- 3 Electromagnetic Transitions -- 4 The Spin of the Electron -- 5 Energy Splitting and Shift due to External Fields -- 6 Many-Body Systems -- 7 Second Quantization of Matter -- 8 Functional Integration for the Bosonic Field -- 9 Functional Integration for the Fermionic Field -- Appendix A Dirac Delta Function -- Appendix B Fourier Transform -- Appendix C Laplace Transform -- Bibliography.
Sommario/riassunto	This compact but exhaustive textbook, now in its significantly revised and expanded second edition, provides an essential introduction to the field quantization of light and matter with applications to atomic physics and strongly correlated systems. Following an initial review of the origins of special relativity and quantum mechanics, individual chapters are devoted to the second quantization of the electromagnetic field and the consequences of light field quantization for the

description of electromagnetic transitions. The spin of the electron is then analyzed, with particular attention to its derivation from the Dirac equation. Subsequent topics include the effects of external electric and magnetic fields on the atomic spectra and the properties of systems composed of many interacting identical particles. The book also provides a detailed explanation of the second quantization of the non-relativistic matter field, i.e., the Schrödinger field, which offers a powerful tool for the investigation of many-body problems, and of atomic quantum optics and entanglement. Finally, two new chapters introduce the finite-temperature functional integration of bosonic and fermionic fields for the study of macroscopic quantum phenomena: superfluidity and superconductivity. Several solved problems are included at the end of each chapter, helping readers put into practice all that they have learned.

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