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Soggetti	Quantum optics Optoelectronic devices Materials Photonics Quantum theory Telecommunication Quantum computers Quantum Optics Optoelectronic Devices Photonic Devices Quantum Imaging and Sensing Microwaves, RF Engineering and Optical Communications Quantum Computing
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Chapter 1. Canonical Quantization -- Chapter 2. Quantum Harmonic Oscillator -- Chapter 3. Canonical Quantization of Light -- Chapter 4. Fock States and the Vacuum -- Chapter 5. Single Photon State -- Chapter 6. Single Photon on a Beam Splitter -- Chapter 7. Single Photon in an Interferometer -- Chapter 8. Entanglement -- Chapter 9. Multimode Quantized Radiation -- Chapter 10. Coherent State -- Chapter 11. Coherent State on a Beam Splitter -- Chapter 12. Incoherent State -- Chapter 13. Homodyne and Heterodyne Detection -- Chapter 14. Coherent State in an Interferometer -- Chapter 15.

Squeezed Light -- Chapter 16. Squeezed Light in an Interferometer --
Chapter 17. Heisenberg Limit -- Chapter 18. Quantum Imaging --
Chapter 19. Light-matter Interaction -- Chapter 20. Atomic Clock --
Chapter 21. Atom Cooling and Trapping.

Sommario/riassunto

This book, based on classroom-tested lecture notes, provides a self-contained one semester undergraduate course on quantum optics, accessible to students (and other readers) who have completed an introductory quantum mechanics course and are familiar with Dirac notation and the concept of entanglement. The book covers canonical quantization, the harmonic oscillator, vacuum fluctuations, Fock states, the single photon state, quantum optical treatment of the beam splitter and the interferometer, multimode quantized light, and coherent and incoherent states. Metrology is a particular area of emphasis, with the book culminating in a treatment of squeezed light and its use in the laser interferometer gravitational-wave observatory (LIGO). The Heisenberg limit is described, along with NOON states and their application in super-sensitivity, super-resolution and quantum lithography. Applications of entanglement and coincidence measurements are described including ghost imaging, quantum illumination, absolute photodetector calibration, and interaction-free measurement. With quantum optics playing a central role in the so-called "second quantum revolution," this book, equipped with plenty of exercises and worked examples, will leave students well prepared to enter graduate study or industry.
