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Nota di contenuto	Contents; 1 Unveiling the quantum; 1.1 One century of quantum physics; 1.2 Emergence of the microscopic world; 1.3 Thought experiments coming of age; 1.4 Aims and outline of this book; 2 Strangeness and power of the quantum; 2.1 The superposition principle and the wave function; 2.2 Quantum interference and complementarity; 2.3 Identical particles; 2.4 Entanglement and non-locality; 2.5 The quantum-classical boundary; 2.6 Taming the quantum to process information; 3 Of spins and springs; 3.1 The field oscillator; 3.2 Coupled field modes; 3.3 The spin system 3.4 Coupling a spin and a spring: the Jaynes-Cummings model 4 The environment is watching; 4.1 Quantum description of open systems; 4.2 Quantum maps: the Kraus sum representation; 4.3 The Lindblad master equation; 4.4 Quantum Monte Carlo trajectories; 4.5 Damped spin-spring system: from Rabi to Purcell; 4.6 Kicking a spring with spins: the micromaser; 4.7 Collective coupling of N spins to a spring: superradiance; 5 Photons in a box; 5.1 A short history of cavity QED; 5.2 Giant atom in a cavity: an ideal cavity QED situation; 5.3 Two experiments unveiling the quantum in a cavity 5.4 An atom-photon entangling machine 6 Seeing light in subtle ways;

6.1 Complementarity at quantum-classical boundary; 6.2 Non-destructive photon number measurement; 6.3 A quantum gate for multi-particle entanglement engineering; 6.4 The quantum analogue/digital converter; 6.5 Photon number parity and Wigner function measurements; 7 Taming Schrodinger's cat; 7.1 Representations of photonic cats; 7.2 A thought experiment to generate optical cats; 7.3 Dispersive cats in cavity QED; 7.4 Resonant cats in cavity QED; 7.5 Decoherence of cavity cats; 7.6 Non-local cats; 8 Atoms in a box
8.1 Ion trap physics 8.2 Engineering ionic states of motion; 8.3 Ion relaxation and engineered environments; 8.4 Quantum logic with trapped ions: individual qubit addressing; 8.5 Quantum logic with trapped ions: collective qubit addressing; 8.6 Perspectives of ion traps for quantum information; 9 Entangling matter waves; 9.1 Second quantization of matter waves; 9.2 Main features of Bose-Einstein condensation; 9.3 The phase in Bose-Einstein condensate interference; 9.4 Coherent collisions and cat-state generation; 9.5 Matter waves in periodical lattices
9.6 Entangling collisions in a Bose-Einstein condensate 10 Conclusion; Appendix; A.1 Characteristic functions; A.2 The Wigner distribution; A.3 The Husimi-Q distribution; A.4 Phase-space representations of relaxation; Bibliography; Index; A; B; C; D; E; F; G; H; I; J; K; L; M; N; O; P; Q; R; S; T; V; W; Y

Sommario/riassunto

The quantum world obeys logic at odds with our common sense intuition. This weirdness is directly displayed in recent experiments juggling with isolated atoms and photons. They are reviewed in this book, combining theoretical insight and experimental description, and providing useful illustrations for learning and teaching of quantum mechanics. - ;The counter-intuitive aspects of quantum physics have been for long illustrated by thought experiments, from Einstein's photon box to Schr--ouml--;dinger's cat. These experiments have now become real, with single particles - electrons, atoms or photo
