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Collana	Wiley series in lasers and applications
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Nota di contenuto	Cavity Quantum Electrodynamics; Contents; Preface; Acknowledgments; 1 Introduction; 1.1 What is light?; 1.1.1 Geometrical optics; 1.1.2 Wave optics; 1.1.3 Classical electrodynamics and relativity; 1.1.4 Quantum mechanics and quantum electrodynamics; 1.2 A brief history of cavity QED; 1.3 A map of the book; 1.4 How to read this book; 2 Fiat Lux!; 2.1 How to quantize a theory; 2.2 Why the radiation field is special; 2.3 What is a cavity?; 2.3.1 What is resonance?; 2.3.2 Confinement is the key; 2.4 Canonical quantization of the radiation field; 2.4.1 Quantization in a cavity 2.4.2 Quantization in free space2.5 The Casimir force; 2.5.1 Zero-point potential energy; 2.5.2 Maxwell stress tensor; 2.5.3 The vacuum catastrophe; Recommended reading; Problems; 3 The photon's wavefunction; 3.1 Position in relativistic quantum mechanics; 3.2 Extreme quantum theory of light with a twist; 3.3 The configuration

space problem; 3.4 Back to vector notation; 3.5 The limit of vanishing rest mass; 3.6 Second quantization; Recommended reading; Problems; 4 A box of photons; 4.1 The classical limit; 4.1.1 Coherent states; 4.1.2 The density matrix  
 4.1.3 The diagonal coherent-state representation 4.2 Squeezed states; 4.2.1 The squeezing operator; 4.2.2 Generating squeezed states; 4.2.3 Geometrical picture; 4.2.4 Homodyne detection; Recommended reading; Problems; 5 Let matter be!; 5.1 A single point dipole; 5.2 An arbitrary charge distribution; 5.3 Matter-radiation coupling and gauge invariance; Recommended reading; 6 Spontaneous emission; 6.1 Emission in free space; 6.2 Emission in a cavity; Recommended reading; 7 Macroscopic QED; 7.1 The dielectric JCM; 7.2 Polariton-photon dressed excitations  
 7.3 Quantum noise of matter and macroscopic averages 7.4 How a macroscopic description is possible; 7.5 The Kramers-Kronig dispersion relation; 7.6 Including absorption in the dielectric JCM; 7.7 Dielectric permittivity; 7.8 Huttner-Barnett theory; 7.8.1 The matter Hamiltonian; 7.8.2 Diagonalization of the total Hamiltonian; Recommended reading; Problems; 8 The maser; the laser; and their cavity QED cousins; 8.1 The ASER idea; 8.2 How to add noise; 8.2.1 Einstein's approach to Brownian motion; 8.2.2 Langevin's approach to Brownian motion; 8.2.3 The modern form of Langevin's equation 8.2.4 Ito's and Stratonovich's stochastic calculus 8.3 Rate equations with noise; 8.4 Ideal laser light; 8.5 The single-atom maser; 8.6 The thresholdless laser; 8.7 The one-and-the-same atom laser; Recommended reading; Problems; 9 Open cavities; 9.1 The Gardiner-Collett Hamiltonian; 9.2 The radiation condition; 9.3 Natural modes; 9.4 Completeness in general; 9.4.1 Whittaker's scalar potentials; 9.4.2 General formulation of the problem; Recommended reading; Problems; Appendix A Perfect cavity modes; Appendix B Perfect cavity boundary conditions; Appendix C Quaternions and special relativity  
 C.1 What are quaternions?

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Sommario/riassunto

What happens to light when it is trapped in a box? Cavity Quantum Electrodynamics addresses a fascinating question in physics: what happens to light, and in particular to its interaction with matter, when it is trapped inside a box? With the aid of a model-building approach, readers discover the answer to this question and come to appreciate its important applications in computing, cryptography, quantum teleportation, and opto-electronics. Instead of taking a traditional approach that requires readers to first master a series of seemingly unconnected mathematical techniques, this book engag

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2. Record Nr.	UNINA9910557436603321
Autore	Tolnai Domonkos
Titolo	Processing and Characterization of Magnesium-Based Materials
Pubbl/distr/stampa	Basel, Switzerland, : MDPI - Multidisciplinary Digital Publishing Institute, 2021
Descrizione fisica	1 online resource (118 p.)
Soggetti	Technology: general issues
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Sommario/riassunto	<p>Due to their lightweight and high specific strength, Mg-based alloys are considered as substitutes to their heavier counterparts in applications in which corrosion is non-relevant and weight saving is of importance. Furthermore, due to the biocompatibility of Mg, some alloys with controlled corrosion rates are used as degradable implant materials in the medical sector. The typical processing route of Mg parts incorporates a casting step and, subsequently, a thermo-mechanical treatment. In order to achieve the desired macroscopic properties and thus fulfill the service requirements, thorough knowledge of the relationship between the microstructure, the processing steps, and the resulting property profile is necessary. This Special Issue covers in situ and ex situ experimental and computational investigations of the behavior under thermo-mechanical load of Mg-based alloys utilizing modern characterization and simulation techniques. The papers cover investigations on the effect of rare earth additions on the mechanical properties of different Mg alloys, including the effect of long-period stacking-ordered (LPSO) structures, and the experimental and computational investigation of the effect of different processing routes.</p>