

1. Record Nr.	UNINA9910451629503321
Autore	Grimes Dale M
Titolo	Photon creation-annihilation [[electronic resource] ] : continuum electromagnetic theory // Dale M. Grimes, Craig A. Grimes
Pubbl/distr/stampa	Singapore, : World Scientific Pub. Co., 2012
ISBN	1-280-66986-1 9786613646798 981-4383-37-6
Descrizione fisica	1 online resource (432 p.)
Altri autori (Persone)	GrimesCraig A
Disciplina	539.7217
Soggetti	Photons Electromagnetic theory Photon emission Photon-photon interactions Quantum theory Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Prelude; Acknowledgments; Contents; Introduction; References; Chapter 1 Classical Electrodynamics; 1.1 Introductory Comments; 1.2 Space and Time Dependence upon Speed; 1.3 Four-Dimensional Space-Time; 1.4 Newton's Laws; 1.5 Electrodynamics; 1.6 The Field Equations; 1.7 Accelerating Charges; 1.8 The Electromagnetic Stress Tensor; 1.9 Kinematic Properties of Fields; 1.10 Wave Equations, Potential Gauges, and Uniqueness; 1.11 A Lemma for Field Calculation; 1.12 The Scalar Differential Equation; 1.13 Radiation Fields in Spherical Coordinates; References; Chapter 2 Properties of Radiation Fields 2.1 Dipoles in Continuous Media Electric Dipole Sources; Magnetic Dipole Sources; Maxwell Source Equations; Boundary Conditions; 2.2 Electromagnetic Fields in Continuous Media; Constitutive Relationships; 2.3 Boxed, Discrete Electromagnetic Fields; 2.4 Q of Time Varying Systems; 2.5 Instantaneous and Complex Power in Fields; 2.6 Time Varying Power in Actual Radiation Fields; 2.7 Comparison of Complex and Instantaneous Powers; 2.8 Traveling Waves; 2.9 Scattering by a

Sphere, General Aspects; 2.10 Scattering Spheres, Specific Examples; References; Chapter 3 Transmitting Biconical Antennas 3.1 Transmitting Biconical Antennas 3.2 Fields; The Exterior Region; The Interior Region; 3.3 TEM Mode; 3.4 Boundary Conditions; 3.5 Defining Integral Equations; 3.6 Solution of the Biconical Antenna Problem; 3.7 Power; References; Chapter 4 Receiving Biconical Antennas; 4.1 Receiving Biconical Antennas; 4.2 Incoming TE Fields; 4.3 Incoming TM Fields; 4.4 Exterior Fields, Powers, and Forces; 4.5 The Cross Sections; 4.6 General Comments; 4.7 Fields of Receiving Antennas; 4.8 Boundary Conditions; 4.9 Zero Degree Solution; 4.10 Non-Zero Degree Solutions; 4.11 Surface Current Densities; 4.12 Power References Chapter 5 Classical-Based Quantum Theory; 5.1 Electrons; 5.2 The Time-Independent Schrodinger Equation; 5.3 The Uncertainty Principle; 5.4 The Time-Dependent Schrodinger Equation; 5.5 Quantum Operators; 5.6 Wave Function Orthogonality; 5.7 Electron Spin; 5.8 Harmonic Oscillators; 5.9 Angular Momentum, Central Force Fields; References; Chapter 6 Quantized Energy Exchanges; 6.1 Blackbody Radiation, Long Wavelength Limit; 6.2 Blackbody Radiation Law Using Energy; 6.3 Blackbody Radiation Law Using Momentum; Damping Product  $Rv$ ; Momentum Transfer  $2$ ; 6.4 The Zero-Point Field 6.5 Coulomb Potential Well 6.6 Hydrogen Atom Eigenfunctions; 6.7 Perturbation Analysis; 6.8 Non-Ionizing Transitions; 6.9 Absorption and Emission of Radiation; 6.10 Dipole Radiation Selection Rules; 6.11 Many-Electron Systems; References; Chapter 7 Matched Multipolar Sources; 7.1 Radiating Electric Dipole; Radiation  $Q$ ; 7.2 Radiation Reaction Force; Real and Reactive Radiation Reaction Forces; The Dipole Case; 7.3 Stress in a Dipole Radiation Field; 7.4 Pairs of Radiating Multipoles; Directivity; Field Energy; Radiation  $Q$ ; Linear Momentum; Radiated Angular Momentum 7.5 Characterization of Sums over Matched Modes

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Sommario/riassunto

This book provides a classical physics-based explanation of quantum physics, including a full description of photon creation and annihilation, and successful working models of both photons and electrons. Classical field theory, known to fully describe macroscopic scale events, is shown to fully describe atomic scale events, including photon emission and annihilation. As such the book provides a 'top-down' unification of electromagnetic and quantum theories.

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