

1. Record Nr.	UNINA9910818551803321
Autore	Boyd Robert W. <1948->
Titolo	Nonlinear optics // Robert W. Boyd
Pubbl/distr/stampa	Amsterdam ; ; Boston, : Academic Press, c2008
ISBN	1-281-76369-1 9786611763695 0-08-056959-5 0-08-048596-0
Edizione	[3rd ed.]
Descrizione fisica	1 online resource (635 p.)
Disciplina	535/.2
Soggetti	Nonlinear optics
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	Front cover; Nonlinear Optics; Copyright page; Contents; Preface to the Third Edition; Preface to the Second Edition; Preface to the First Edition; Chapter 1. The Nonlinear Optical Susceptibility; 1.1. Introduction to Nonlinear Optics; 1.2. Descriptions of Nonlinear Optical Processes; 1.3. Formal Definition of the Nonlinear Susceptibility; 1.4. Nonlinear Susceptibility of a Classical Anharmonic Oscillator; 1.5. Properties of the Nonlinear Susceptibility; 1.6. Time-Domain Description of Optical Nonlinearities; 1.7. Kramers-Kronig Relations in Linear and Nonlinear Optics; Problems; References Chapter 2. Wave-Equation Description of Nonlinear Optical Interactions 2.1. The Wave Equation for Nonlinear Optical Media; 2.2. The Coupled-Wave Equations for Sum-Frequency Generation; 2.3. Phase Matching; 2.4. Quasi-Phase-Matching; 2.5. The Manley-Rowe Relations; 2.6. Sum-Frequency Generation; 2.7. Second-Harmonic Generation; 2.8. Difference-Frequency Generation and Parametric Amplification; 2.9. Optical Parametric Oscillators; 2.10. Nonlinear Optical Interactions with Focused Gaussian Beams; 2.11. Nonlinear Optics at an Interface; Problems; References Chapter 3. Quantum-Mechanical Theory of the Nonlinear Optical Susceptibility 3.1. Introduction; 3.2. Schrodinger Calculation of Nonlinear Optical Susceptibility; 3.3. Density Matrix Formulation of

Quantum Mechanics; 3.4. Perturbation Solution of the Density Matrix Equation of Motion; 3.5. Density Matrix Calculation of the Linear Susceptibility; 3.6. Density Matrix Calculation of the Second-Order Susceptibility; 3.7. Density Matrix Calculation of the Third-Order Susceptibility; 3.8. Electromagnetically Induced Transparency; 3.9. Local-Field Corrections to the Nonlinear Optical Susceptibility ProblemsReferences; Chapter 4. The Intensity-Dependent Refractive Index; 4.1. Descriptions of the Intensity-Dependent Refractive Index; 4.2. Tensor Nature of the Third-Order Susceptibility; 4.3. Nonresonant Electronic Nonlinearities; 4.4. Nonlinearities Due to Molecular Orientation; 4.5. Thermal Nonlinear Optical Effects; 4.6. Semiconductor Nonlinearities; 4.7. Concluding Remarks; References; Chapter 5. Molecular Origin of the Nonlinear Optical Response; 5.1. Nonlinear Susceptibilities Calculated Using Time-Independent Perturbation Theory
5.2. Semiempirical Models of the Nonlinear Optical SusceptibilityModel of Boling, Glass, and Owyong; 5.3. Nonlinear Optical Properties of Conjugated Polymers; 5.4. Bond-Charge Model of Nonlinear Optical Properties; 5.5. Nonlinear Optics of Chiral Media; 5.6. Nonlinear Optics of Liquid Crystals; Problems; References; Chapter 6. Nonlinear Optics in the Two-Level Approximation; 6.1. Introduction; 6.2. Density Matrix Equations of Motion for a Two-Level Atom; 6.3. Steady-State Response of a Two-Level Atom to a Monochromatic Field; 6.4. Optical Bloch Equations
6.5. Rabi Oscillations and Dressed Atomic States

Sommario/riassunto

Nonlinear optics is the study of the interaction of intense laser light with matter. The third edition of this textbook has been rewritten to conform to the standard SI system of units and includes comprehensively updated material on the latest developments in the field. The book presents an introduction to the entire field of optical physics and specifically the area of nonlinear optics, covering fundamental issues and applied aspects of this exciting area. Nonlinear Optics will have lasting appeal to a wide audience of physics, optics, and electrical engineering students, as we
