1. Record Nr. UNINA9910458661903321

Autore	Boyd Robert W. <1948->
Titolo	Nonlinear optics [[electronic resource] /] / Robert W. Boyd
Pubbl/distr/stampa	San Diego, CA, : Academic Press, c2003
ISBN	1-281-05034-2 9786611050344 0-08-047975-8
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (596 p.)
Disciplina	535/.2
Soggetti	Nonlinear optics 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	front cover; copyright; table of contents; front matter; Preface to the Second Edition; Preface to the First Edition; body; 1. The Nonlinear Optical Susceptibility; 1.1. Introduction to Nonlinear Optics; 1.2. Descriptions of Nonlinear Optical Interactions; 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 2. Wave-Equation Description of Nonlinear Optical Interactions2.1. The Wave Equation for Nonlinear Optical Media; 2.2. The Coupled-Wave Equations for Sum-Frequency Generation; 2.3. The Manley-Rowe Relations; 2.4. Sum-Frequency Generation; 2.5. Difference-Frequency Generation and Parametric Amplification; 2.6. Second-Harmonic Generation; 2.7. Phase-Matching Considerations; 2.8. Optical Parametric Oscillators; 2.9. Quasi-Phase-Matching; 2.10. Nonlinear Optical Interactions with Focused Gaussian Beams; 2.11. Nonlinear Optics at an Interface 3. Quantum-Mechanical Theory of the Nonlinear Optical Susceptibility3. 1. Introduction; 3.2. Schrodinger Equation Calculation of the Nonlinear Optical Susceptibility; 3.3. Density Matrix Formalism 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. Local-Field Corrections to the Nonlinear Optical Susceptibility; 4. The Intensity-Dependent Refractive Index
4.1. Descriptions of the Intensity-Dependent Refractive Index4.2. 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; 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 Susceptibility; 5.3. Nonlinear Optical Properties of Conjugated Polymers
5.4. Bond-Charge Model of Nonlinear Optical Properties5.5. Nonlinear Optics of Chiral Media; 5.6. Nonlinear Optics of Liquid Crystals; 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; 6.6. Optical Wave Mixing in Two-Level Systems; 7. Processes Resulting from the Intensity- Dependent Refractive Index; 7.1. Self-Focusing of Light and Other Self-Action Effects
7.2. Optical Phase Conjugation

Sommario/riassunto

The Optical Society of America (OSA) and SPIE - The International Society for Optical Engineering have awarded Robert Boyd with an honorable mention for the Joseph W. Goodman Book Writing Award for his work on Nonlinear Optics, 2nd edition.Nonlinear optics is essentially the study of the interaction of strong laser light with matter. It lies at the basis of the field of photonics, the use of light fields to control other light fields and to perform logical operations. Some of the topics of this book include the fundamentals and applications of optical systems based on the nonl