

1. Record Nr.	UNINA9911004769003321
Autore	Fowles Grant R
Titolo	Introduction to Modern Optics
Pubbl/distr/stampa	Newburyport, : Dover Publications, 2012
ISBN	1621986403 9781621986409
Edizione	[1st ed.]
Descrizione fisica	1 online resource (539 p.)
Collana	Dover Books on Physics
Disciplina	535/.2
Soggetti	Physical optics Physics Physical Sciences & Mathematics Light & Optics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di contenuto	Title Page; Copyright Page; Preface; Table of Contents; CHAPTER 1 - The Propagation of Light; 1.1 Elementary Optical Phenomena and the Nature of Light; 1.2 Electrical Constants and the Speed of Light; 1.3 Plane Harmonic Waves. Phase Velocity; 1.4 Alternative Ways of Representing Harmonic Waves; 1.5 Group Velocity; 1.6 The Doppler Effect; CHAPTER 2 - The Vectorial Nature of Light; 2.1 General Remarks; 2.2 Energy Flow. The Poynting Vector; 2.3 Linear Polarization; 2.4 Circular and Elliptic Polarization; 2.5 Matrix Representation of Polarization. The Jones Calculus 2.6 Reflection and Refraction at a Plane Boundary 2.7 Amplitudes of Reflected and Refracted Waves.; 2.8 The Brewster Angle; 2.9 The Evanescent Wave in Total Reflection; 2.10 Phase Changes in Total Internal Reflection; 2.11 Reflection Matrix; CHAPTER 3 - Coherence and Interference; 3.1 The Principle of Linear Superposition; 3.2 Young's Experiment; 3.3 The Michelson Interferometer; 3.4 Theory of Partial Coherence. Visibility of Fringes; 3.5 Coherence Time and Coherence Length; 3.6 Spectral Resolution of a Finite Wave Train. Coherence and Line Width; 3.7 Spatial Coherence 3.8 Intensity Interferometry 3.9 Fourier Transform Spectroscopy; CHAPTER 4 - Multiple-Beam Interference; 4.1 Interference with Multiple

Beams; 4.2 The Fabry-Perot Interferometer; 4.3 Resolution of Fabry-Perot Instruments; 4.4 Theory of Multilayer Films; CHAPTER 5 - Diffraction; 5.1 General Description of Diffraction; 5.2 Fundamental Theory; 5.3 Fraunhofer and Fresnel Diffraction; 5.4 Fraunhofer Diffraction Patterns; 5.5 Fresnel Diffraction Patterns; 5.6 Applications of the Fourier Transform to Diffraction; 5.7 Reconstruction of the Wave Front by Diffraction. Holography

CHAPTER 6 - Optics of Solids 6.1 General Remarks; 6.2 Macroscopic Fields and Maxwell's Equations; 6.3 The General Wave Equation; 6.4 Propagation of Light in Isotropic Dielectrics. Dispersion; 6.5 Propagation of Light in Conducting Media; 6.6 Reflection and Refraction at the Boundary of an Absorbing Medium; 6.7 Propagation of Light in Crystals; 6.8 Double Refraction at a Boundary; 6.9 Optical Activity; 6.10 Faraday Rotation in Solids; 6.11 Other Magneto-optic and Electro-optic Effects; 6.12 Nonlinear Optics; CHAPTER 7 - Thermal Radiation and Light Quanta; 7.1 Thermal Radiation

7.2 Kirchhoff's Law. Blackbody Radiation 7.3 Modes of Electromagnetic Radiation in a Cavity; 7.4 Classical Theory of Blackbody Radiation. The Rayleigh-Jeans Formula; 7.5 Quantization of Cavity Radiation; 7.6 Photon Statistics. Planck's Formula; 7.7 The Photoelectric Effect and the Detection of Individual Photons; 7.8 Momentum of a Photon. Light Pressure; 7.9 Angular Momentum of a Photon; 7.10 Wavelength of a Material Particle. de Broglie's Hypothesis; 7.11 Heisenberg's Uncertainty Principle; CHAPTER 8 - Optical Spectra; 8.1 General Remarks; 8.2 Elementary Theory of Atomic Spectra

8.3 Quantum Mechanics

Sommario/riassunto

This incisive text provides a basic undergraduate-level course in modern optics for students in physics, technology and engineering. The first half of the book deals with classical physical optics; the second principally with the quantum nature of light. Chapters 1 and 2 treat the propagation of light waves, including the concepts of phase and group velocities, and the vectorial nature of light. Chapter 3 applies the concepts of partial coherence and coherence length to the study of interference, and Chapter 4 takes up multiple-beam interference and includes Fabry-Perot interferometry and mul
