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Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	to the propagation of cw radiation and solitons in quadratically nonlinear media -- Plane and guided wave effects and devices via quadratic cascading -- Control of laser light parameters by ?(2): ?(2) nonlinear optical devices -- Asymmetric quantum wells for second-order optical nonlinearities -- Experiments on quadratic spatial solitons -- Diffraction beam interaction in quadratic nonlinear media -- A lithium niobate quadratic device for wavelength multiplexing around 1.55?m -- Full vector theory of fundamental and second-harmonic cw waves -- Nonlinear phase shifts in a counterpropagating quasi-phase-matched configuration -- Generation of high power

picosecond pulses by passively mode-locked Nd:YAG laser using frequency doubling mirror -- Collision, fusion, and spiralling of interacting solitons in a bulk quadratic medium -- Quadratic ring-shaped solitary waves -- Solitary and periodic pulses for ?(2): explicit solutions in abundance -- Propagation of ring dark solitary waves in saturable self-defocusing media -- The N-soliton interactions, complex toda chain and stable propagation of NLS soliton trains -- Ray optics theory of self-matched beams mutual focusing in quadratic nonlinear media -- Resonant properties of ?2 in two-particle frequency regions -- On parametric coupled solitons with high-order dispersion -- Large self-phase modulation via simultaneous second harmonic generation and sum frequency mixing -- Pulsed beam self-focusing -- Slow and immobile solitons in quadratic media -- Fermi resonance nonlinear waves and solitons in organic superlattices -- Cascaded processes in gyrotropy media, and novel electro-optical effect on ?(2) nonlinearity -- Classical and quantum aspects of cw parametric interaction in a cavity -- Alternative media for cascading: Second order nonlinearities and cascading in plasma waveguides -- Frequency conversion with semiconductor heterostructures -- Parametric interactions in waveguides realized on periodically poled crystals -- Rb: KTP optical waveguides -- Backward parametric interactions in quasi-phase matched configurations -- Modes of TM field in nonlinear Kerr media -- Numerical simulations of self-induced plasma smoothing of spatially incoherent laser beams -- Effects of impurities on existence and propagation of intrinsic localized modes in ferromagnetic spin chains -- Optical properties and holographic recording in Pb2ScTaO6 single crystal -- Nonlinear effects in bulk semiconductor waveguide switches -- Nonlinear transmission of ultrashort light pulses by a thin semiconductor film for the case of two-photon biexciton excitation -- The optical and structural properties of HxLi1-xNbO3 phases, generated in proton exchanged LiNbO3 optical waveguides -- Optical properties of Bi12TiO20 photorefractive crystals doped with Cu and Ag -- Coherent and incoherent optical processes and phase sensitive adiabatic states -- High average power tunable deep UV generation using cascading second-order nonlinear optical conversions -- Optical filters and switches using photonic bandgap structures -- Thin layer modification of P.V.D.F. with copper sulfide -- Quadratic solitons: past, present and future.

Sommario/riassunto

Although it took some time to establish the word, photonics is both widely accepted and used throughout the world and a major area of activity concerns nonlinear materials. In these the nonlinearity mainly arises from second-order or third-order nonlinear optical processes. A restriction is that second-order processes only occur in media that do not possess a centre of symmetry. Optical fibres, on the other hand, being made of silica glass, created by fusing SiO molecules, are made of material with a centre of z-symmetry, so the bulk of all processes are governed by third-order nonlinearity. Indeed, optical fibre nonlinearities have been extensively studied for the last thirty years and can be truly hailed as a success story of nonlinear optics. In fact, the fabrication of such fibres, and the exploitation of their nonlinearity, is in an advanced stage - not least being their capacity to sustain envelope solitons. What then of second-order nonlinearity? This is also well-known for its connection to second-harmonic generation. It is an immediate concern, however, to understand how waves can mix and conserve both energy and momentum of the photons involved. The problem is that the wave vectors cannot be made to match without a great deal of effort, or at least some clever arrangement must be made - a special geometry, or crystal arrangement. The whole business is

called phase- matching and an inspection of the state-of-the-art today, reveals the subject to be in an advanced state.