Nonlinear Effects in Optical Fibers. Wiley-OSA Series on Optical Communication

Description: Cutting-edge coverage of nonlinear phenomena occurring inside optical fibers

Nonlinear fiber optics is a specialized part of fiber optics dealing with optical nonlinearities and their applications. As fiber-optic communication systems have become more advanced and complex, the nonlinear effects in optical fibers have increased in importance, as they adversely affect system performance. Paradoxically, the same nonlinear phenomena also offer the promise of addressing the bandwidth bottleneck for signal processing for future ultra-high speed optical networks.

Nonlinear Effects in Optical Fibers provides a comprehensible introduction to the complex nonlinear phenomena occurring within optical fibers. It is the only book to seamlessly explore the physical and technical aspects of nonlinear effects as well as their impacts and applications, particularly for signal processing, pulse generation, and amplification. The author explores the latest and most significant research results in the field of nonlinear fiber optics, such as:

Highly nonlinear and photonic fibers

Intrachannel nonlinear effects

Dissipative and dispersion-managed solitons

Potential applications of nonlinear effects in the area of optical signal processing

Chapter coverage includes the nonlinear Schrödinger equation, nonlinear phase modulation, self- and cross-phase modulation, polarization effects, four-wave mixing, stimulated Raman scattering, and stimulated Brillouin scattering. In addition, each chapter features a set of practice problems to reinforce retention of the material.

This resource provides valuable insights for readers who have a basic understanding of electromagnetic theory, including senior undergraduate and graduate students enrolled in MS and PhD degree programs, engineers and technicians involved with the fiber-optics industry, and researchers working in nonlinear fiber optics.

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