

Optical Engineering/Communication

Optical Solitons

From Fibers to Photonic Crystals

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Since the advent of computer networking and high-speed data transmission technology, people have been striving to develop faster and more reliable communications media. In recent years optical soliton technologies have attracted much interest in the academic and industrial worlds. Today the potential of soliton engineering is recognized worldwide with research groups actively working on this topic in every part of the globe. *Optical Solitons* is the first book to provide a thorough overview of different types of optical solitons and their applications. The main purpose of this book is to present the rapidly developing field of Optical Solitons starting from the basic concepts of light self-focusing and self-trapping. It introduces the fundamental concepts in the theory of nonlinear waves and solitons using non-integrable but physically realistic models of nonlinear optics while also focusing on their stability and dynamics. Also, it summarizes a number of important experimental verifications of the basic theoretical predictions and concepts covering the observation of self-focusing in the earlier days of nonlinear optics and the most recent experimental results on spatial and temporal solitons, gap solitons, vortex solitons, discrete solitons, incoherent solitons, and solitons forming in photonic crystals.

- Introduces the fundamental concepts in the theory of optical solitons through realistic physical models. Material is based on authors' years of experience actively working in and researching the field.
- Provides links with other fields such as the nonlinear dynamics of spin waves and nonlinear matter-waves in the Bose-Einstein condensates.
- Summarizes the most important experimental verification of the basic theories, predictions and concepts of this ever evolving field from the earliest studies to the most recent.

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