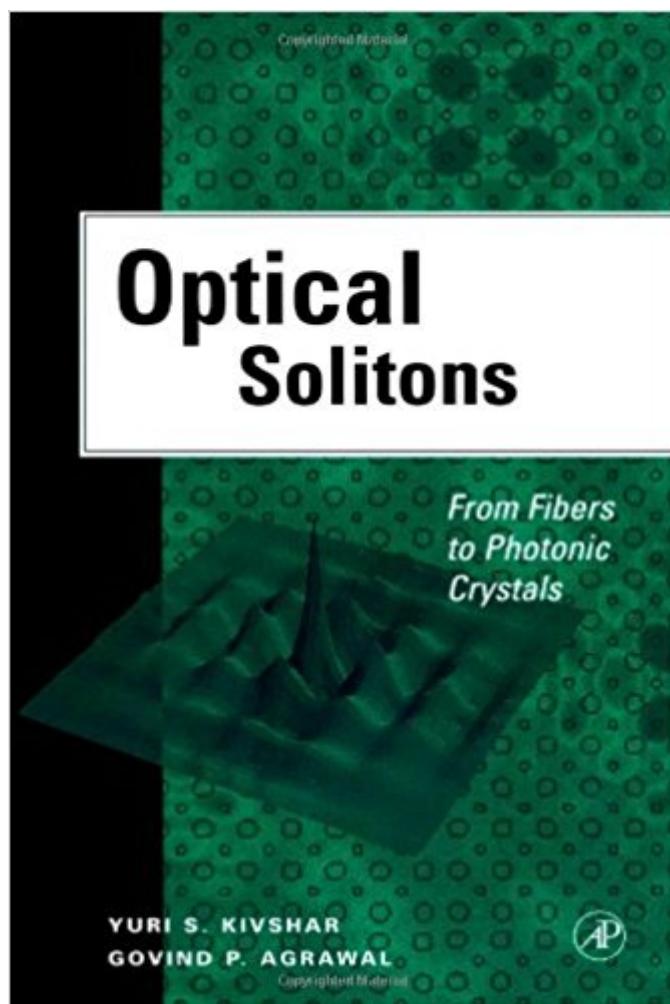


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# Optical Solitons: From Fibers To Photonic Crystals



## Synopsis

The current research into solitons and their use in fiber optic communications is very important to the future of communications. Since the advent of computer networking and high speed data transmission technology people have been striving to develop faster and more reliable communications media. Optical pulses tend to broaden over relatively short distances due to dispersion, but solitons on the other hand are not as susceptible to the effects of dispersion, and although they are subject to losses due to attenuation they can be amplified without being received and re-transmitted. This book is the first to provide a thorough overview of optical solitons. The main purpose of this book is to present the rapidly developing field of Spatial Optical Solitons starting from the basic concepts of light self-focusing and self-trapping. It will introduce the fundamental concepts of the theory of nonlinear waves and solitons in non-integrated but physically realistic models of nonlinear optics including their stability and dynamics. Also, it will summarize a number of important experimental verification 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 solitons, vortex solitons, and soliton interaction & spiraling. \* Introduces the fundamental concepts of the theory of nonlinear waves and solitons through realistic models \* Material is based on authors' years of experience actively working in and researching the field\* 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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Here, readers can obtain all the important and theoretical and experimental information pertaining to optical solitons in a single, well-organized book that offers complete coverage of every variety of soliton wave. For the benefit of prospective readers, the book presents detailed experimental and theoretical information on vortex, vector, parametric, discrete, incoherent and magnetic solutions, as well as on various categories of solitons contained within these general categories...A good table of contents is supported by a complete index. There are hundreds of references at the end of each chapter. There are also many useful graphs and figures in each chapter. Although there are no problems for the reader to solve, this volume could certainly serve as a textbook. The target readership of electrical engineers, optical engineers, and physicists interested in the area of optical solitons have a useful new book from two authors who continue to be at the leading edge of their field. - Optics and Photonics News, Dec. 2004

The first book to provide a thorough overview of optical solitons--light pulses that maintain their shape over long distances.

The book provides both an introduction to the basic principles and a comprehensive analysis of the current state-of-the-art in the rapidly developing field of optical solitons, including temporal, spatial, and spatiotemporal solitons. This is a very well-written, pedagogical book that goes through many aspects of the soliton theory and experiment that are not covered in other books. There is a good balance between qualitative and mathematical analysis in the book, as well as between the theory and experiment. To facilitate understanding of the material, the authors provide readers with many illustrative examples. The reader will find one of the most extensive lists of bibliography at the end of each chapter. The index is complete and useful. I recommend this book to anyone interested in the soliton theory and its applications.

I am working in the Quantum Optics Research Lab at San Francisco State University. And I meet with many difficulties to find book or any material in Internet which could explain basic ideas about different optical solitons in photonic crystals. This book is great, a specially for someone who have no idea what is a spatial, dark, or vortex soliton. This book has many chapters in which authors discuss step by step not only theory of formation of all kinds of solitons, but also give experimental

results. I enjoy to read this book, when I have some questions about solitons, and I recomend it for anyone who wants to understand what is an optical soliton.

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