Fiber Optical Parametric Amplifiers, Oscillators and Related Devices

Fiber optical parametric amplifiers (OPAs) show great potential for applications in high-speed optical communication systems. This is the first book to provide comprehensive coverage of the theory and practice of OPAs and related devices, including fiber optical parametric oscillators (OPOs).

Following an introduction to the field, the theory and techniques behind all types of fiber OPA are covered, starting from first principles. Topics include scalar and vector OPA theory, the nonlinear Schrödinger equation, OPO theory, and the quantum noise figure of fiber OPAs. The challenges of making fiber OPAs practical for a number of applications are discussed, and a survey of the state of the art in feasibility demonstrations and performance evaluations is provided. The capabilities and limitations of OPAs are presented, as are the potential applications for both OPAs and OPOs and the prospects for future developments in the field. The theoretical tools developed in this text can also be applied to other areas of nonlinear optics.

This book should provide a valuable resource for researchers, advanced practitioners, and graduate students in optoelectronics.

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