

DEPARTMENTS

BOOK REVIEWS

Fiber Optic Communications

Joseph C. Palais, 3rd ed., 339 pages, illus., index, bibliography. ISBN 0-13-473554-4. Prentice Hall, Englewood Cliffs, NJ, 07632 (1992) \$54 hardbound.

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Fiber optic communications developed rapidly after the advent of low-loss fibers in 1970. Operational fiber optic systems are now common, and new applications are continually being developed. Fiber optic technology has truly matured in the last 23 years and a wide variety of books at a variety of levels have been published in the area. The books seem to fall into two categories: those at a very mathematical level and those at only a descriptive level. Palais's book fills the void between these two categories. The material is very accessible to a beginning student with even a technical school educational background. The book is based on lecture notes Palais developed over several years for short courses on optical fiber communications. The mathematical level is generally algebra and trigonometry, although Palais does use concepts and some notation from calculus. The important theoretical and mathematical results are given without extensive derivations, and the results are explained in physical terms. Palais uses tables and figures extensively to help the reader understand and use the mathematical results. He also provides a large number of numerical examples that give the reader realistic values for typical device parameters.

The first chapter is simply an overview of a fiber optic system and an identification of components. Chapters 2 and 3 review basic physics and results in the areas of waves and optics. Palais uses this material to model and explain the fiber optic system. The presenta-

tion is very concise and simple. Chapter 4 covers integrated optics. The integrated-optic waveguide component is used as a simplified model to explain the basics of light propagation in a fiber waveguide. In Chaps. 5 through 9, Palais presents the main components of a fiber optic communication system: light source, light detector, fiber couplers, and distribution networks. Chapters 10 and 11 cover communication system issues including modulation schemes and noise effects. Chapter 12, the last chapter, presents examples of operational systems. Palais uses the information and concepts presented in the previous chapters to lead the reader smoothly through a system design.

Each chapter has a list of about 20 problems for the reader to solve. The problems are generally very straightforward applications of the material presented. There is a complete list of the answers to the problems at the end of the book.

There are two companion PC software design packages for the book that may be ordered: *Fiber Optic Design Software*, published by Kern International, \$85; and *Fiber Optic Network Synthesis*, published by Chad Bergstrom, fax 602/732-3046, \$75.

In summary, this book is a very good introduction to the overall technology of fiber optic communications. Palais's approach contrasts with the approach of books focused only on fiber optics components or the associated communications technology. He presents the material in a clear and concise manner. The software package, *Fiber Optic Design Software*, may be of real value in helping the reader to understand how components and systems can be designed with realistic parameter values. The book may be valuable in an undergraduate course or as a self-study guide. As a book for a graduate course, I feel that the instructor might want to embellish the material with additional mathematical development of the

results presented. In my opinion, this book is one of the best textbooks covering the general field of fiber optic communications.

BOOKS RECEIVED

Speckle Metrology, edited by Rajpal S. Sirohi. From the Optical Engineering Series. xiii + 551 pp., illus., subject index, list of contributors, references following each chapter. ISBN 0-8247-8932-6. Marcel Dekker, Inc., 270 Madison Avenue, New York, N.Y. 10016 (1993) \$175.00 hardbound. Covers theory and applications of speckle displacement and decorrelation, techniques of displacement and deformation measurements in speckle metrology, speckle methods in experimental mechanics, recent developments in video speckle interferometry, novel applications of speckle metrology, particle image velocimetry, white light speckle metrology, surface roughness evaluation, automatic fringe analysis procedures in speckle metrology, speckle metrology using hololenses, and correlation speckle interferometry in the mechanics of contact interaction.

Photodissociation Dynamics, by Reinhard Schinke, edited by A. Dalgarno, P.L. Knight, F.H. Read, R.N. Zare. xv + 417 pp., illus., subject index, references. First in the Cambridge Monographs on Atomic, Molecular and Chemical Physics Series. ISBN 0-521-38368-4. Cambridge University Press, The Pitt Building, Trumpington Street, Cambridge CB2 1RP, England (1993) \$89.95 hardbound. Covers light absorption and photodissociation, time-independent methods, time-dependent methods, diffuse structures and unstable periodic orbits, vibrational excitation, rotational excitation, dissociation of van der Waals molecules, photodissociation of vibrationally excited states, emission spectroscopy of dissociating molecules, nonadiabatic transitions in dissociating molecules.