



# Erbium-Doped Fiber Amplifiers: Principles and Applications

*Emmanuel Desurvire*

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How is light amplified in the doped fiber? How much spontaneous emission noise is generated at the output? Do detectors with optical preamplifiers outperform avalanche photodiodes? What are the current types and architectures of amplifier-based systems? Erbium-Doped Fiber Amplifiers Principles and Applications These are just a handful of the essential questions answered in Erbium-Doped Fiber Amplifiers-the first book to integrate the most influential current papers on this breakthrough in fiber-optics technology. Written by one of the pioneers in the field, this unique reference provides researchers, engineers, and system designers with detailed, interdisciplinary coverage of the theoretical underpinnings, main characteristics, and primary applications of EDFAs. Packed with information on important system experiments and the best experimental results to date as well as over 1,400 references to the expanding literature, Erbium-Doped Fiber Amplifiers illuminates such key areas as:

- Modeling light amplification in Er-doped single-mode fibers
- Fundamentals of noise in optical fiber amplifiers
- Photodetection of optically amplified signals
- Spectroscopic properties of erbium glass fibers
- Gain, saturation, and noise characteristics of EDFAs
- Device and system applications of EDFAs

In so doing, the book sheds light on many new frontiers of knowledge, such as inhomogeneous modeling and nonlinear photon statistics, and demonstrates the many broadening benefits of EDFAs, including their polarization insensitivity, temperature stability, quantum-limited noise figure, and immunity to interchannel crosstalk. With the demand for transoceanic and terrestrial communications growing at a steady rate of 25% a year, the arrival of Erbium-Doped Fiber Amplifiers-destined to significantly expand the capabilities of today's hard-pressed lightwave technology-couldn't be more timely.

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