Phase Modulated Optical Communication Systems Nikhef

Fiber-optic communication

systems have revolutionized our telecommunication infrastructures – currently, almost all telephone land-line, cellular, and internet communications must travel via some form of optical fibers. In these

transmission systems, neither the phase nor frequency of the optical signal carries information - only the intensity of the signal is used. To transmit more information in a single optical carrier, the phase

of the optical carrier must be explored. As a result, there is renewed interest in phase-modulated optical communications, mainly in direct-detection DPSK signals for long-haul optical communication

systems. When optical amplifiers are used to maintain certain signal level among the fiber link, the system is limited by amplifier noises and fiber nonlinearities. Phase-Modulated Optical

Communication Systems surveys this newly popular area, covering the following topics: - The transmitter and receiver for phase-modulated coherent lightwave systems - Method for performance analysis of

phase-modulated optical signals - Direct-detection DPSK signal with fiber nonlinearities, degraded by nonlinear phase noise and intrachannel effects - Wavel ength-division-multiplexed direct-detection DPSK

signals - Multi-level phase-modulated optical signals, such as the four-phase DQPSK signal. Graduate students, professional engineers, and researchers will all benefit from this updated treatment of an important topic in the

optical communications field.

This books aims to present fundamental aspects of optical communication techniques and advanced modulation techniques and extensive applications of

optical communications systems and networks employing single-mode optical fibers as the transmission system. New digital techqniues such as chromatic dispersion, polarization mode

dispersion, nonlinear phase distortion effects, etc. will be discussed. Practical models for practice and understanding the behavior and dynamics of the devices and systems will be included.

Semiconductor-based Ultra-Fast All-Optical Signal Processing Devices -a key technology for the next generation of ultrahigh bandwidth optical communication systems! The introduction of ultra-fast

communication systems based on all-optical signal processing is considered to be one of the most promising ways to handle the rapidly increasing global communication traffic. Such systems will enable real

time super-high definition moving pictures such as high reality TV-conference, remote diagnosis and surgery, cinema entertainment and many other applications with small power consumption. The key

issue to realize such systems is to develop ultra-fast optical devices such as light sources, all-optical gates and wavelength converters. Ultra-Fast All-Optical Signal Processing Devices discusses the state

of the art development of semiconductor-based ultrafast all-optical devices, and their various signal processing applications for bit-rates 100Gb/s to 1Tb/s. Ultra-Fast All-Optical Signal

Processing Devices: Provides a thorough and in-depth treatment of the most recent achievements in ultrafast all-optical devices Discusses future networks with applications such as HD-TV and super-high definition

moving screens as a motivating background for devices research Covers mode-locked semiconductor lasers, electro-absorption modulator based 160Gb/s signal sources, SOA based symmetric Mach-Zehnder type all-

optical gates, intersubband transition gate device, and more Explains the technical issues behind turning the ultra-fast optical devices into practical working tools Examples of above 160Gb/s transmission experiments

Discusses future prospects of the ultra-fast signal processing devices This invaluable reference will provide device researchers and engineers in industry, researchers at universities (including graduate

students, and post doctorial researchers and professors) and research institutes with a thorough understanding of ultrahigh bandwidth optical communication systems. Device and communication market watchers will also

find this book useful.

Enhanced Carrierless Amplitude and Phase Modulation for Optical Communication Systems

Advanced Optical Fiber Communication Systems

Optical Fiber and Wireless

Communications

Advanced Optical Fiber Communications Systems

Advanced Techniques and Applications in Transmission Systems and Networks

In future telecommunication

networks, a wide range of pulse durations 0.1-100 ps, duty cycles from less than 1% to 99%, and different modulation formats, such as on-off-keying (OOK) and binary or differential phase-shift-keying (BPSK or DPSK) will be selected,

depending on the network size and the bit rate. A transparent all-optical format conversion between OOK and DPSK is highly demanded to connect cost effective OOK based metropolitan area networks (MAN) to robust PSK-based long-haul

backbone networks. Moreover, for such complex optical transmission systems, the information on the phase and amplitude of the pulses is required for predicting the effects of chromatic dispersion and various optical nonlinearities. A temporal

resolution of 1 ps and a sensitivity of less than 0.1 mW are required for an ideal characterization of optical pulses used in optical communications systems.In this thesis, we simulate the simple method of pulse characterization

using ...

This book analyzes novel possibilities offered to the telecommunication engineer in designing tomorrow’s optical networks. Currently, optical and optoelectronic technologies make

possible the realization of high-performance optical fiber communication systems and networks with the adoption of WDM configurations and both linear and nonlinear optical amplifications. The last step for increasing network

throughput is represented by the implementation of multidimensional modulation formats in coherent optical communication systems, which enable increasing the bit rate/channel toward 400 Gbit/s/channel and beyond.

Following this approach, the main emphasis is placed on innovative optical modulations. Multidimensional Modulations in Optical Communication Systems is an essential guide to the world of innovative optical communications

from the point of view of growing capacity and security. It guides researchers and industries with the aim to exploring future applications for optical communications.
Since the 3rd edition appeared, a fast evolution of the field has

occurred. The fourth edition of this classic work provides an up-to-date account of the nonlinear phenomena occurring inside optical fibers. The contents include such important topics as self- and cross-phase modulation, stimulated Raman and

Brillouin scattering, four-wave mixing, modulation instability, and optical solitons. Many new figures have been added to help illustrate the concepts discussed in the book. New to this edition are chapters on highly nonlinear fibers and and the

novel nonlinear effects that have been observed in these fibers since 2000. Such a chapter should be of interest to people in the field of new wavelengths generation, which has potential application in medical diagnosis and treatments,

spectroscopy, new wavelength lasers and light sources, etc. Continues to be industry bestseller providing unique source of comprehensive coverage on the subject of nonlinear fiber optics Fourth Edition is a completely up-to-date treatment of

the nonlinear phenomena occurring inside optical fibers Includes 2 NEW CHAPTERS on the properties of highly nonlinear fibers and their novel nonlinear effects Introduction to Fiber-Optic Communications

Ultrafast All-Optical Signal Processing Devices
System Modeling and Optimization in Phase-Modulated Optical Fiber Communication Systems
Optical Differential Phase

Modulation

Self-phase modulation (SPM) creates a power and fiber-length dependent spectral broadening that reduces signal-to-noise ratio in free-space laser communication systems which use a fiber to connect their transmitter's high-power optical amplifier to its telescope

optics. The effects of SPM can be mitigated by using a phase modulator to down-chirp pulses before passing through the receiver's matched filter. This thesis tests and evaluates a new SPM compensation technique- applying a phase modulation determined from a measurement of

the SPM-distorted waveform's optical intensity-and benchmarks it against sinusoidal phase modulation compensation. The spectra and throughput of the compensated signal are calculated and measured to determine the effectiveness of the new technique. It is found that the two

techniques perform within 0.2 dB of each other for fiber lengths less than three times the nonlinear length, and it is expected that the new technique will outperform sinusoidal phase modulation for greater fiber lengths. Carefully structured to provide practical knowledge on fundamental

issues, Optical Fiber Communications Systems: Theory and Practice with MATLAB® and Simulink® Models explores advanced modulation and transmission techniques of lightwave communication systems. With coverage ranging from fundamental to modern aspects, the text presents

optical communication techniques and applications, employing single mode optical fibers as the transmission medium. With MATLAB and Simulink models that illustrate methods, it supplies a deeper understanding of future development of optical systems and networks. The book begins with

an overview of the development of optical fiber communications technology over the last three decades of the 20th century. It describes the optical transmitters for direct and external modulation technique and discusses the detection of optical signals under direct coherent and

incoherent reception. The author also covers lumped Er:doped and distributed Roman optical amplifiers with extensive models for the amplification of signals and structuring the amplifiers on the Simulink platform. He outlines a design strategy for optically amplified transmission

systems coupled with MATLAB Simulink models, including dispersion and attenuation budget methodology and simulation techniques. The book concludes with coverage of advanced modulation formats for long haul optical fiber transmission systems with accompanied Simulink models.

Although many books have been written on this topic over the last two decades, most of them present only the theory and practice of devices and subsystems of the optical fiber communications systems in the fields, but do not illustrate any computer models to represent the true practical

aspects of engineering practice. This book fills the need for a text that emphasizes practical computing models that shed light on the behavior and dynamics of the devices.
The main objective of this book is to make respective graduate students understand the nonlinear effects inside

SOI waveguide and possible applications of SOI waveguides in this emerging research area of optical fibre communication. This book focuses on achieving successful optical frequency shifting by Four Wave Mixing (FWM) in silicon-on-insulator (SOI) waveguide by exploiting a nonlinear phenomenon.

Digital Optical Communications
Theory and Applications
Phase Information and Phase Modulated Signals in Fibre Optical Communications
High-order Compensation of Self-phase Modulation in Laser Communication Systems

Optical Fiber Communications Systems

Throughout the years, the expanded search and flow of information led to an expansion of traffic intensity in today's optical communication systems. Coherent

communications, using the amplitude and phase of the optical wave, resurface as one of the transmission methods to increase the effective bandwidth of optical channels. In this framework, this chapter presents a study on all-

optical format conversion of modulated signals, using exclusively interferometric techniques through wavelength conversion, based on Mach-Zehnder interferometers with semiconductor optical amplifiers

(MZI-SOA). This technique, when applied in interconnection nodes between optical networks with different bit rates and modulation formats, allows a better efficiency and scalability of the network. The chapter presents an experimental

characterization of the static and dynamic properties of the MZI-SOA and explores all-optical techniques for the conversion from amplitude modulation to phase modulation. Finally, it briefly presents the potential of

MZI-SOAs for the conversion of amplitude signals to more advanced modulation formats, such as quadrature phase shift keying (QPSK) and quadrature amplitude modulation (QAM) signals.

In this two-part study, the conclusions drawn from optimization of interferometer incoherent detection carried out by examining the effect of pre-emphasis within the electrical signal-driving path are examined

first. This is an expansion upon a widespread industry standard as realized by the Oclaro group. System performance in tight optical filtering conditions can be improved with concurrent adjustments to the level of pre-

emphasis and breadth of the delay-line interferometer free-spectral range. In the second study, we implement a dual-polarization quadrature phase-shift keyed modulation format with a digital signal processing block based

upon the constant modulus algorithm realized via a feed-forward equalizer with and without the moving average method. Ultimately, the purpose of both studies is to study the efficacy of new modulation

formats to enhance gains in spectral efficiency and improve robustness against chromatic dispersion within the optical fiber. There has recently been a renewed effort to develop coherent optical communication

systems. In particular, differential phase-shift keying (DPSK), which does not require a local oscillator to perform decoding, is the focus of the attention and is perceived to be the promising candidate for future optical communication

systems updates. This motivates us to exploit DPSK in wavelength-division multiplexed systems. First, modulation formats based on phase show an increased robustness to nonlinear impairments such as cross-phase

modulation (XPM) and nonlinear polarization rotation, primarily because the time dependence of the optical power is deterministic and periodic. Second, coherent formats allow a higher spectral efficiency since both in-phase and

quadrature dimensions of the signal space are available to encode information. Optical phase is also used in intensity-modulated direct detection systems as an extra degree of freedom, for example to provide better

resistance to intrachannel four-wave mixing (FWM) or to increase spectral efficiency in duobinary modulation. Finally, phase modulation outperforms its intensity counterpart in terms of sensitivity since a 3 dB

improvement can be achieved when balanced detection is used. Nevertheless, DPSK-based formats show a different behavior to noise accumulated along the propagation. Noise-induced power fluctuations are converted into

phase fluctuations by the Kerr effect and become a penalty source that limits the transmission system reach. In this context, there have been intense research activities for evaluating phase uncertainties, but the previous

studies assume an analytically determined pulse shape and a constant-dispersion optical link that is far from reflecting the actual and future structures of transmission lines. The objective of the proposed research is to

investigate new and more efficient techniques in numerical evaluation and experimental measurement of phase jitter impact on more general communication systems, including dispersion management, filtering,

and spectral inversion schemes.

Modulation in Electronics and Telecommunications

Nonlinear Effects in Optical Fibers

Vergiftungen : Erste-Hilfe-Maßnahmen

Multidimensional Modulations in Optical Communication Systems

Applications of Phase Modulation in Coherent Optical Communication Systems

Coherent optical communication systems have potential

application possibilities which make them a very interesting research area. Compared to present optical communication systems operating at 1.3 micron or 1.55 micron they can operate with 20 dB's increase in receiver sensitivity which allows around

100 km increase in repeater separation for point to transmission systems. In addition fully developed coherent systems will allow multiplexing and demultiplexing of several hundreds of information channels all transmitted via just one single

mode fiber. Keyworkds include: Coherent optical communications systems, Semiconductor lasers, Frequency stabilisation, Modulation of amplitude-frequency and phase, Injection locking, Single mode optical fibers, Polarisation properties

and Dispersion properties. Phase-Modulated Optical Communication SystemsSpringer Science & Business Media Transmitting information over optical fibers requires a high degree of signal integrity due to noise levels existing in optical

systems. Proper methods and techniques for noise evaluations are critical in achieving high-performance. This book provides a fundamental understanding of noise generation processes in optical communications and photonic signals. It discusses

techniques for noise evaluation in optical communication systems, especially digital optical systems, as well as transmission systems performance and noise impacts in photonic processing systems

Enabling Technologies for Direct

Detection Optical Phase Modulation Formats
System Modeling and Performance
Interferometry Applications in All-Optical Communications Networks
Optimization of Wavelength

Division Multiplexed Optical Communication Systems at 100 Gb/s Using Multilevel Phase Modulation and Direct Detection Optical Signal Processing by Silicon Photonics

Introduction to Fiber-Optic

Communications provides students with the most up-to-date, comprehensive coverage of modern optical fiber communications and applications, striking a fine balance between theory and

practice that avoids excessive mathematics and derivations. Unlike other textbooks currently available, this book covers all of the important recent technologies and

developments in the field, including electro-optic modulators, coherent optical systems, and silicon integrated photonic circuits. Filled with practical, relevant worked examples

and exercise problems, the book presents complete coverage of the topics that optical and communications engineering students need to be successful. From principles of optical and

optoelectronic components, to optical transmission system design, and from conventional optical fiber links, to more useful optical communication systems with advanced modulation

formats and high-speed DSP, this book covers the necessities on the topic, even including today's important application areas of passive optical networks, datacenters and optical

interconnections. Covers fiber-optic communication system fundamentals, design rules and terminologies Provides students with an understanding of the physical principles and

characteristics of passive and active fiber-optic components Teaches students how to perform fiber-optic system design, performance evaluation and troubleshooting Includes

modern advances in modulation and decoding strategies

A self-contained discussion of fiber optics - unlike any others available. The intent of this book is to provide the

reader with an overall background in fiber optic sensors. The primary focus is on the optical sensing mechanisms and various optical configurations associated with a broad

range of sensing functions that include switches, counters, displacement, temperature, pressure, flow, liquid level, chemical analysis, rotation (gyroscopes), electric and

magnetic field measurements, distributive sensing, and smart skins. This edition includes three new chapters, and eight others have been updated to give the reader an overall

background in fiber optic sensors and information on new market opportunities. This third edition is a must have for product design engineers, system design engineers, plant

engineering/maintenance staff, and anyone involved in measurement, testing, quality and standards.Contents: Fiber Optic Fundamentals Intensity-Modulated Sensors

Phase-Modulated Sensors Wavelength-Modulated Sensors Digital Switches and Counters Displacement Sensors Temperature Sensors Pressure Sensors Flow Sensors Level Sensors

Magnetic and Electric Field Sensors Chemical Analysis Rotation Rate Sensors (Gyroscopes) Distributed Sensing Systems Smart Skins and Structures Market Opportunities.

Advances in Communication Systems: Theory and Applications, Volume 2 focuses on laser transmission, stochastic approximation, optical techniques, adaptive

compression, and synchronous satellite and manned space-flight communication systems. The selection first offers information on a study of multiple scattering of optical

radiation with applications to laser communication and a recursive method for solving regression problems. Discussions focus on the mathematical model of the optical communication

system; numerical characterization of transmission channel; computational aspects of the equation of radiative transfer; and applications to communications problems.

The text then examines the optical techniques in communication systems, as well as optics fundamentals and applications to communications. The manuscript takes a look at

synchronous satellite communication systems and the theory of adaptive data compression. Topics include system compression ratio, open-loop mean square error, synchronous

satellites, anticipated developments in synchronous satellite technology, and closed-loop mean square error. The text also elaborates on manned spaceflight communications

systems and the orbiting geophysical observatory communication system. The text is a valuable reference for researchers interested in laser transmission, synchronous satellite and

manned space-flight communication systems, and adaptive compression. Phase-Modulated Optical Communication Systems Components and Systems : Analysis--design--optimizatio

n--application Fundamentals and Applications Nonlinear Fiber Optics Coherent Optical Fiber Communications Our research is focused

on theoretical investigations of advanced optical fiber communication systems and can be grouped into three broad areas: WDM networks, coherent

analog links, and optical fiber nonlinearities. In the area of WDM networks, we proposed and investigated a novel WDM network architecture

(STARNET), a novel combined phase/amplitude modulation format, and a high-speed optics-to-computer interface for STARNET. In the area of coherent analog links,

we investigated angle and amplitude modulated systems for linewidth-insensitive analog applications and direct-frequency-modulated subcarrier-multiplexed

systems. In the area of fiber nonlinearities, we investigated four-wave mixing, thermally induced parasitic phase modulation, and a new type of soliton.

This book will provide insight into the principles and applications of nonlinear effects in fibers for students, researchers, and

developers who have a basic understanding of electromagnetic theory under their belts. It will explore the physics, limitations, applications, and

research results surrounding nonlinear effects in fiber optics. In addition to communications, optical fibers are already used in medical procedures,

automobiles, and aircraft and are expected to have many other applications. This will expand the range of industry workers who will find a book of this

type useful.

Contents: Phase Delay between Intensity and Frequency Modulation of a Semiconductor Laser (Including a New Measurement Method);

Spectral Behaviour of a Directly Current-Modulated CSP Laser; A Theoretical and Experimental Analysis of Modulated Laser Fields and Power Spectra; Curre

nt/Frequency-Modulation Characteristics for Directly Optical Frequency-Modulated Injection Lasers at 830 nm and 1.3 micrometers; Optical Phase Modulation

and Homodyne Detection using an Injection Locked Laser Transmitter; Frequency Stabilization of Singlemode Semiconductor Lasers at 830 nm and 1.3

micrometers; Light Intensity Pulsations in an Injection Locked Semiconductor Laser; The Influence of Asymmetric Locking Characteristics on the Coherent

Modulation Behaviour of an Injection Locked Semiconductor Laser; New Approach towards Frequency Stabilisation of Linewidth-Narrowed Semiconductor Lasers;

Locking Conditions and Stability Properties for a Semiconductor Laser with External Light Injection; Simple theory of Optical Dual-Filter Heterodyne FSK Receivers

with Non-Negligible (Semiconductor) Laser Linewidths; Error-rate Floor in Optical ASK Heterodyne Systems Caused by Nonzero (Semiconductor) Laser

Linewidth; Influence of (Semiconductor) Laser Linewidth on the Error-Rate Floor in Dual-Filter Optical FSK Receivers; Overview of Coherent Communications

- Applications and Perspectives.
Digital Phase Modulated Fiber Optical Communication System
Optical Communications Theory and Practice with

MATLAB® and Simulink® Models

Deviation Modulation with Applications in Optical Communications

Optical Modulation

This thesis presents a large scale

numerical investigation of heterogeneous terrestrial optical communications systems and the upgrade of fourth generation terrestrial core to metro legacy interconnects to fifth generation transmission system technologies.

Retrofitting (without changing infrastructure) is considered for commercial applications. ROADM are crucial enabling components for future core network developments however their re-routing ability means signals can be switched mid-

link onto sub-optimally configured paths which raises new challenges in network management. System performance is determined by a trade-off between nonlinear impairments and noise, where the nonlinear signal distortions depend

critically on deployed dispersion maps. This thesis presents a comprehensive numerical investigation into the implementation of phase modulated signals in transparent reconfigurable wavelength division multiplexed

fibre optic communication terrestrial heterogeneous networks. A key issue during system upgrades is whether differential phase encoded modulation formats are compatible with the cost optimised dispersion schemes employed in current 10

Gb/s systems. We explore how robust transmission is to inevitable variations in the dispersion mapping and how large the margins are when suboptimal dispersion management is applied. We show that a DPSK transmission system is not

drastically affected by reconfiguration from periodic dispersion management to lumped dispersion mapping. A novel DPSK dispersion map optimisation methodology which reduces drastically the optimisation

parameter space and the many ways to deploy dispersion maps is also presented. This alleviates strenuous computing requirements in optimisation calculations. This thesis provides a very efficient and robust way to identify high

performing lumped dispersion compensating schemes for use in heterogeneous RZ-DPSK terrestrial meshed networks with ROADMs. A modified search algorithm which further reduces this number of configuration combinations is also

presented. The results of an investigation of the feasibility of detouring signals locally in multi-path heterogeneous ring networks is also presented.

Advanced optical modulation and multiplexing techniques have

become a key ingredient to the design of modern WDM optically routed networks. This book, reviews the generation and detection of multigigabit/second intensity- and phase modulated formats and highlights their resilience to key

impairments found in optical networking, such as optical amplifier noise, chromatic dispersion, WDM crosstalk and fiber nonlinearity. A novel multiplexing technique, namely Absolute Polar Duty Cycle Division

Multiplexing (AP-DCDM) which is based on the polar signaling and different return to zero (RZ) duty cycles is reported for high speed optical fiber communication systems. Unlike all the other techniques, in AP-DCDM different

users share the communication medium to transmit in the same time period and at the same carrier wavelength, but with different duty cycles. The unique duty cycle for each channel helps to regenerate data at the receiver

The book presents new results of research advancing the field and applications of modulation. The information contained herein is important for improving the performance of modern and future wireless communication systems

(CS) and networks. Chapters cover such topics as amplitude modulation, orthogonal frequency-division multiplexing (OFDM) signals, electro-optic lithium niobate (LiNbO3) modulators for optical communications, radio frequency

signals, and more.

Noises in Optical Communications and Photonic Systems

Transparent Heterogeneous Terrestrial Optical Communication Networks with Phase Modulated Signals

High Capacity Phase/Amplitude Modulated Optical Communication Systems and Nonlinear Inter-Channel Impairments

Fiber Optic Sensors

Advances in Communication Systems

The need for advanced transmission techniques over long haul optically amplified communications has prompted a convergence of digital and optical communications. Digital Optical Communications

explores the practical applications of this union and applies digital modulation techniques to optical communications systems.After reviewing the fundamental Carefully structured to instill

practical knowledge of fundamental issues, Optical Fiber Communication Systems with MATLAB® and Simulink® Models describes the modeling of optically amplified fiber communications systems using

MATLAB® and Simulink®. This lecture-based book focuses on concepts and interpretation, mathematical procedures, and engineering applications, shedding light on device behavior and dynamics through

computer modeling. Supplying a deeper understanding of the current and future state of optical systems and networks, this Second Edition: Reflects the latest developments in optical fiber communications

technology Includes new and updated case studies, examples, end-of-chapter problems, and MATLAB® and Simulink® models Emphasizes DSP-based coherent reception techniques essential to advancement in

short- and long-term optical transmission networks Optical Fiber Communication Systems with MATLAB® and Simulink® Models, Second Edition is intended for use in university and professional training

courses in the specialized field of optical communications. This text should also appeal to students of engineering and science who have already taken courses in electromagnetic theory, signal processing, and

digital communications, as well as to optical engineers, designers, and practitioners in industry.

The advantages of optical communications are many: ultra-high speed, highly reliable

information transmission, and cost-effective modulation and transmission links to name but a few. It is no surprise that optical fiber communications systems are now in extensive use all over the world. Along with software

and microelectronics, optical communication represents a key technology of modern telecommunication systems. Optical Communications: Components and Systems provides the basic material

required for advanced study in theory and applications of optical fiber and space communication systems. After a review of some fundamental background material, component-based chapters discuss all

relevant passive and active optical and optoelectronic components used in point-to-point links and in networks. Systems chapters address the analysis and optimization of both incoherent and coherent

systems, introduce fiber optic link design, and discuss physical limits. The authors also provide an overview of applications such as optical networks and optical free-space communications. The advanced interactive multimedia

communications of today and the future rely on optical fiber and space communication techniques. Optical Communications: Components and Systems offers engineers and physicists a working

reference for the selection and design of optical communication systems and provides engineering students with a valuable text that prepares them for work in this essential and rapidly growing field.

Optical Fiber Communication Systems with MATLAB® and Simulink® Models, Second Edition

Advance Modulation and Multiplexing in Optical Communication Systems

Optical Phase-modulated Systems: Numerical Estimation and Experimental Measurement of Phase Jitter

An Optical Fiber Communication System Based on Coherent Modulation

The book Optical Fiber and Wireless Communications provides a platform for practicing researchers, academics, PhD students, and other scientists to review, plan, design, analyze, evaluate, intend, process, and

implement diversiform issues of optical fiber and wireless systems and networks, optical technology components, optical signal processing, and security. The 17 chapters of the book demonstrate capabilities and

potentialities of optical communication to solve scientific and engineering problems with varied degrees of complexity. Part 1 describes our work on high dynamic range optical analog links. Within Part 1,

Chapter 1 covers linewidth-insensitive coherent amplitude-modulated links and Chapter 2 covers coherent angle-modulated links and linewidth-insensitive interferometric links. Part 2 describes our work on

dynamic wavelength division multiplexing (WDM) networks. Within Part 2, Chapter 3 covers the physical layer of STARNET, a coherent WDM communication network built at Stanford. Chapter 4 addresses the impact

of semiconductor laser linewidth on STARNET physical layer performance. Chapter 5 covers the electronic interface architecture of STARNET. Part 3 describes our work with nonlinear effects in fiber. Within

Part 3, Chapter 6 covers the impact of fiber nonlinearities such as four-wave mixing (FWM), cross-phase modulation (XPM), stimulated Brillouin scattering (SBS), and fiber-induced parasitic phase

modulation on optical communication systems. This report ends with conclusions and a list of publications generated during this project.