

Free reading Radiometry and the detection of optical radiation (PDF)

Detection of Optical Signals Detection of Optical and Infrared Radiation Radiometry and the Detection of Optical Radiation Laser-Based Optical Detection of Explosives Detection of Low-Level Optical Signals Optical Sources, Detectors, and Systems Detection of Optical and Infrared Radiation Optical Detection Theory for Laser Applications Radiometry and the Detection of Optical Radiation Optical Detector and Radiometer Standards Optical Systems Design Detection Essentials Optical and Infrared Detectors Optical Detection of Cancer Single-Molecule Optical Detection, Imaging and Spectroscopy Optical Methods for Ultrasensitive Detection and Analysis Optical Chemical Sensors Detection of Light Photodetectors Optical Imaging Sensors and Systems for Homeland Security Applications Infrared Detectors and Systems Single-Photon Generation and Detection Detector-Based Reference Calibrations for Electro-Optical Instruments Optical Sensing in Power Transformers Photodetectors Optical Delay Interferometers and Their Application for Self-coherent Detection Photonic Sensing Optical Waveguiding and Applied Photonics Optical Detector Applications for Radiometric Measurements Optical Interferometry for Biology and Medicine Field Guide to Infrared Systems, Detectors, and FPAs Optical Radiation Detectors A Feasibility Study of Solid State Optical Detection of High Velocity Micro-particles Detection of Optical Water Quality Parameters for Eutrophic Waters by High Resolution Remote Sensing Diffractive Optics and Optical Microsystems Free Space Optical Systems Engineering Building Electro-Optical Systems Single Photon Detection for Data Communication and Quantum Systems Multimodal Optical Diagnostics of Cancer Speckle Phenomena in Optics Principles of Biophotonics, Volume 2: Light Emission, Detection, and Statistics

Detection of Optical Signals

2022-06-09

detection of optical signals provides a comprehensive overview of important technologies for photon detection from the x ray through ultraviolet visible infrared to far infrared spectral regions it uniquely combines perspectives from many disciplines particularly within physics and electronics which are necessary to have a complete understanding of optical receivers this interdisciplinary textbook aims to guide readers into more detailed and technical treatments of readout optical signals give a broad overview of optical signal detection including terahertz region and two dimensional material help readers further their studies by offering chapter end problems and recommended reading this is an invaluable resource for graduate students in physics and engineering as well as a helpful refresher for those already working with aerospace sensors and systems remote sensing thermal imaging military imaging optical telecommunications infrared spectroscopy and light detection

Detection of Optical and Infrared Radiation

2013-04-17

this text treats the fundamentals of optical and infrared detection in terms of the behavior of the radiation field the physical properties of the detector and the statistical behavior of the detector output both incoherent and coherent detection are treated in a unified manner after which selected applications are analyzed following an analysis of atmospheric effects and signal statistics the material was developed during a one semester course at m i t in 1975 revised and presented again in 1976 at lincoln laboratory and rewritten for publication in 1977 chapter 1 reviews the derivation of planck s thermal radiation law and also presents several fundamental concepts used throughout the text these include the three thermal distribution laws boltzmann fermi dirac bose einstein spontaneous and stimulated emission and the definition and counting of electromagnetic modes of space chapter 2 defines and analyzes the perfect photon detector and calculates the ultimate sensitivity in the presence of thermal radiation in chapter 3 we turn from incoherent or power detection to coherent or heterodyne detection and use the concept of orthogonal spatial modes to explain the antenna theorem and the mixing theorem chapters 4 through 6 then present a detailed analysis of the sensitivity of vacuum and semiconductor detectors including the effects of amplifier noise

Radiometry and the Detection of Optical Radiation

1983-05-10

presents a treatment of fundamental aspects of the generation transfer and detection of optical and infra red radiation emphasis placed on practical aspects of radiometry in detection discusses formal principles of radiometry signal to noise considerations in the detection of optical radiation and the operation of various radiation detectors includes tables and graphs of blackbody functions

Laser-Based Optical Detection of Explosives

2018-09-03

laser based optical detection of explosives offers a comprehensive review of past present and emerging laser based methods for the detection of a variety of explosives this book considers laser propagation safety and explains standard test material preparation for standoff optical based detection system evaluation explores explosives detection using deep ultraviolet native fluorescence raman spectroscopy laser induced breakdown spectroscopy reflectometry and hyperspectral imaging examines photodissociation followed by laser induced fluorescence photothermal methods cavity enhanced absorption spectrometry and short pulse laser based techniques describes the detection and recognition of explosives using terahertz frequency spectroscopic techniques each chapter is authored by a leading expert on the respective technology and is structured to supply historical perspective address current advantages and challenges and discuss novel research and applications readers are left with an in depth

understanding and appreciation of each technology's capabilities and potential for standoff hazard detection

Detection of Low-Level Optical Signals

2012-12-06

this book is addressed to designers of photodetectors and photodetecting systems designers of focal plane arrays charge coupled devices specialists in ir technologies designers of optoelectronic detecting guiding and tracking systems systems for ir direction finders lidars lightwave communication systems ir imagers all these specialists are united by one common purpose they are all striving to catch the weakest possible optical signal the most important characteristic of photosensitive devices is their detectivity which determines the lowest level of optical signal they are able to detect above the noise level these threshold characteristics define the most important tactical and technical parameters of the entire optoelectronic system such as its range resolution precision the threshold characteristics of optoelectronic system depend on many of its components all designers agree however that the critically responsible part of the system is the photodetector 1 by the end of the 1960s the physicists and the engineers were able to overcome many obstacles and to create photodetectors at least single element or few element ones which covered all the main optical bands 0.4 2 3 3.5 8 14 μm carried out the detection almost without any loss the quantum yield being as high as 0.7-0.9 and reduced the noise level to the lowest possible limit

Optical Sources, Detectors, and Systems

1995-07-06

optical sources detectors and systems presents a unified approach from the applied engineering point of view to radiometry optical devices sources and receivers one of the most important and unique features of the book is that it combines modern optics electric circuits and system analysis into a unified comprehensive treatment the text provides physical concepts together with numerous data for sources and systems and offers basic analytical tools for a host of practical applications convenient reference sources such as a glossary with explanatory text for specialized optical terminology are included also there are many illustrative examples and problems with solutions the book covers many important diverse areas such as medical thermography fiber optical communications and ccd cameras it also explains topics such as $\text{d} \cdot \text{neq} \cdot \text{f} \cdot \text{number} \cdot \text{ra}$ product ber shot noise and more this volume can be considered an essential reference for research and practical scientists working with optical and infrared systems as well as a text for graduate level courses on optoelectronics optical sources and systems and optical detection a problem solution manual for instructors who wish to adopt this text is available provides a unified treatment of optical sources detectors and applications explains $\text{d} \cdot \text{neq} \cdot \text{f} \cdot \text{number} \cdot \text{ra}$ product ber shot noise and more contains numerous illustrative examples and exercises with solutions extensively illustrated with more than 90 drawings and graphs

Detection of Optical and Infrared Radiation

1978

a comprehensive treatment of the fundamentals of optical detection theory laser system applications are becoming more numerous particularly in the fields of communications and remote sensing filling a significant gap in the literature optical detection theory for laser applications addresses the theoretical aspects of optical detection and associated phenomenologies describing the fundamental optical statistical and mathematical principles of the modern laser system the book is especially valuable for its extensive treatment of direct detection statistics which has no analog in radar detection theory and which has never before been compiled in a cohesive manner in a single book coverage includes a review of mathematical statistics and statistical decision theory performance of truncated and untruncated coherent and direct detection systems using huygens fresnel and gaussian beam theories rough surface scatter and atmospheric propagation effects single pulse detection statistics for direct and coherent detection systems multi pulse detection statistics for direct and coherent detection systems supported by additional comments providing further insights into the physics or mathematics discussed and an extensive list of classic references optical detection theory for laser applications comprises a much needed reference for the professional scientist or engineer as well as a solid textbook for advanced students

Optical Detection Theory for Laser Applications

2002-08-08

this book discusses modern user friendly radiometric practices that make it possible to convert from traditional source based optical radiation measurements to the more efficient and higher accuracy detector based applications and calibrations it considers improved performance optical detector and radiometer standards including photometers and tristimulus colorimeters and describes research based design considerations measurement of radiometric optical and electronic characteristics and comparison of absolute transfer and working standard detectors and radiometers from the ultraviolet uv to the infrared ir range the book will serve to guide the optical radiation measurement community researchers manufacturers calibration laboratories students and practicing engineers to switch from the old and limited use measurement methods to the higher performance detector based applications the radiometer standards discussed here can be used to produce wide range radiometric photometric colour and radiation temperature measurements with low uncertainty

Radiometry and the Detection of Optical Radiation

1983

all optical systems have the same basic form consisting of an input source of light carrying information components and devices that modify the light propagating through the system and a method of detecting the light that produces an output from the system the purpose of this textbook is to provide the necessary science overview of optical design detection essentials but in a context of use applied to the design process application case studies are included in most chapters to illustrate one or more practical concepts of a system device or measurement each chapter contains examples and end of chapter problems part of iop series in emerging technologies in optics and photonics

Optical Detector and Radiometer Standards

2020-12-01

this volume is written for those who desire a comprehensive analysis of the latest developments in infrared detector technology and a basic insight into the fundamental processes which are important to evolving detection techniques each of the most salient infrared detector types is treated in detail by authors who are recognized as leading authorities in the specific areas addressed in order to concentrate on pertinent aspects of the present state of the detector art and the unique point of view of each author extensive tutorials of a background nature are avoided in the text but are readily available to the reader through the many references given the volume opens with a broad brush introduction to the various types of infrared detectors that have evolved since sir william herschel s discovery of infrared radiation 175 years ago the second chapter presents an overall perspective of the infrared detector art and serves as the cohesive cement for the more in depth presentation of subsequent chapters those detector types which for one reason or other have not attained wide use today are also discussed in chapter 2 the more notable and widely used infrared detectors can be divided into three basic classes which are indicative of the primary effect produced by the photon detector interaction i e thermal photoconductive photo voltaic and photoemissive chapters 3 4 and 5 offer a detailed treatment of each of these important processes

Optical Systems Design Detection Essentials

2021

ch 1 the optical detection of cancer an introduction toby steele and arlen meyers ch 2 optical coherence tomography in oral cancer shahareh sabet and petra wilder smith ch 3 optical coherence tomography in laryngeal cancer marcel kraft and christoph arens ch 4 fluorescence imaging of the upper aerodigestive tract christian stephan betz andreas leunig and christoph arens ch 5 photodynamic diagnosis and photodynamic therapy techniques zheng huang ch 6 oct detection of lung cancer s murgu and m brener ch

7 diffuse optical spectroscopy and imaging in breast cancer albert e cerussi and bruce j tromberg ch 8 oct for skin cancer gordon mckenzie and adam meekings

Optical and Infrared Detectors

2013-06-05

single molecule spectroscopy is one of the hottest topics in today s chemistry it brings us close to the the most exciting vision generations of chemists have been dreaming of to observe and examine single molecules while most of chemistry deals with myriads of molecules this books presents the latest developments for the detection and investigation of single entities written by internationally renowned authors it is a thorough and comprehensive survey of current methods and their applications

Optical Detection of Cancer

2012

this book covers optical chemical sensing by means of optical waveguides from the fundamentals to the most recent applications the book includes a historical review of the development of these sensors from the earliest laboratory prototypes to the first commercial instrumentations the book reprints a lecture by the nobel laureate charles townes on the birth of maser and laser which lucidly illustrates the development of new science and new technology

Single-Molecule Optical Detection, Imaging and Spectroscopy

2008-09-26

comprehensive accessible and physically based description of the approaches currently used to detect light from x ray to mm wave

Optical Methods for Ultrasensitive Detection and Analysis

1991

explore this comprehensive introduction to the foundations of photodetection from one of the leading voices in the field the newly revised photodetectors devices circuits and applications delivers a thoroughly updated exploration of the fundamentals of photodetection and the novel technologies and concepts that have arisen since the release of the first edition twenty years ago the book offers discussions of established and emerging photodetection technologies including photomultipliers the spad the sipm the snspd the utc the wgpd twpd the qwip and the lt gaas new examinations of correlation measurements on ultrafast pulses and single photon detectors for quantum communications and lidars have also been added each chapter includes selected problems for students to work through to aid in learning and retention a booklet of solutions is also provided the book is especially ideal for students and faculties of engineering with an emphasis on first principles design and the engineering of photodetectors issues in the book are grouped through the development of concepts as opposed to collections of technical details perfect for undergraduate students interested in the science or design of modern optoelectronics photodetectors devices circuits and applications also belongs on the bookshelves of professors teaching phd seminars in advanced courses on photodetection and noise as well as engineers and physicists seeking a guide to an optimum photodetection solution

Optical Chemical Sensors

2006-04-19

optical and photonic systems and devices have significant potential for homeland security optical imaging sensors and systems for homeland security applications presents

original and significant technical contributions from leaders of industry government and academia in the field of optical and photonic sensors systems and devices for detection identification prevention sensing security verification and anti counterfeiting the chapters have recent and technically significant results ample illustrations figures and key references this book is intended for engineers and scientists in the relevant fields graduate students industry managers university professors government managers and policy makers

Detection of Light

2021-05-13

infrared detectors and systems offers a deep and detailed examination of the optical detection process and the electronics of mimicking the eye it further explores recent research in new detector materials and the latest advances in optical detectors this text covers the range of subjects necessary for the understanding of modern infrared imaging systems at a level appropriate for seniors or first year graduate students in physics or electrical engineering the first six chapters focus on fundamental background issues of radiation detection beginning with the basics of geometrical optics and finishing with a discussion of the figures of merit used for describing the signal to noise performance of a detector system other topics include radiometry and flux transfer issues basic radiation detector mechanisms and random process mathematics the book concludes with a close look at infrared detection systems and related issues in the discussion of infrared search systems the range equation is developed in terms of the optical and detector parameters of the system a separate chapter is devoted to modulation transfer function a spatial frequency domain description of image quality the final chapter describes the design equations for thermal imager systems in terms of noise equivalent temperature difference and minimum resolvable temperature supported and clarified by 470 illustrations and accompanied by an extensive glossary of the nomenclature this is an excellent text for graduate and senior level courses in radiometry and infrared detectors it is also a valuable reference for practicing engineers involved in the use design analysis and testing of infrared detector based systems

Photodetectors

2021-01-07

single photon generation and detection is at the forefront of modern optical physics research this book is intended to provide a comprehensive overview of the current status of single photon techniques and research methods in the spectral region from the visible to the infrared the use of single photons produced on demand with well defined quantum properties offers an unprecedented set of capabilities that are central to the new area of quantum information and are of revolutionary importance in areas that range from the traditional such as high sensitivity detection for astronomy remote sensing and medical diagnostics to the exotic such as secretive surveillance and very long communication links for data transmission on interplanetary missions the goal of this volume is to provide researchers with a comprehensive overview of the technology and techniques that are available to enable them to better design an experimental plan for its intended purpose the book will be broken into chapters focused specifically on the development and capabilities of the available detectors and sources to allow a comparative understanding to be developed by the reader along with an idea of how the field is progressing and what can be expected in the near future along with this technology we will include chapters devoted to the applications of this technology which is in fact much of the driver for its development this is set to become the go to reference for this field covers all the basic aspects needed to perform single photon experiments and serves as the first reference to any newcomer who would like to produce an experimental design that incorporates the latest techniques provides a comprehensive overview of the current status of single photon techniques and research methods in the spectral region from the visible to the infrared thus giving broad background that should enable newcomers to the field to make rapid progress in gaining proficiency written by leading experts in the field among which the leading editor is recognized as having laid down the roadmap thus providing the reader with an authenticated and reliable source

Optical Imaging Sensors and Systems for Homeland Security Applications

2006-05-16

a cutting edge advanced level exploration of optical sensing application in power transformers optical sensing in power transformers is filled with the critical information and knowledge on the optical techniques applied in power transformers which are important and expensive components in the electric power system effective monitoring of systems has proven to decrease the transformer lifecycle cost and increase a high level of availability and reliability it is commonly held that optical sensing techniques will play an increasingly significant role in online monitoring of power transformers in this comprehensive text the authors noted experts on the topic present a scholarly review of the various cutting edge optical principles and methodologies adopted for online monitoring of power transformers grounded in the authors extensive research the book examines optical techniques and high voltage equipment testing and provides the foundation for further application prototype and manufacturing the book explores the principles installation operation condition detection monitoring and fault diagnosis of power transformers this important text provides a current exploration of optical sensing application in power transformers examines the critical balance and pros and cons of cost and quality of various optical condition monitoring techniques presents a wide selection of techniques with appropriate technical background extends the vision of condition monitoring testing and analysis treats condition monitoring testing and analysis tools together in a coherent framework written for researchers technical research and development personnel manufacturers and frontline engineers optical sensing in power transformers offers an up to date review of the most recent developments of optical sensing application in power transformers

Infrared Detectors and Systems

1996

photodetectors materials devices and applications discusses the devices that convert light to electrical signals key components in communication computation and imaging systems in recent years there has been significant improvement in photodetector performance and this important book reviews some of the key advances in the field part one covers materials detector types and devices and includes discussion of silicon photonics detectors based on reduced dimensional charge systems carbon nanotubes graphene nanowires low temperature grown gallium arsenide plasmonic si photomultiplier tubes and organic photodetectors while part two focuses on important applications of photodetectors including microwave photonics communications high speed single photon detection thz detection resonant cavity enhanced photodetection photo capacitors and imaging reviews materials detector types and devices addresses fabrication techniques and the advantages and limitations and different types of photodetector considers a range of application for this important technology includes discussions of silicon photonics detectors based on reduced dimensional charge systems carbon nanotubes graphene nanowires and more

Single-Photon Generation and Detection

2013-11-29

self coherent receivers are promising candidates for reception of 100 gbit s data rates in optical networks self coherent receivers consist of multiple optical delay interferometers di with high speed photodiodes attached to the outputs by dsp of the photo currents it becomes possible to receive coherently modulated optical signals especially promising for 100 gbit s networks is the polmux dqpsk format the self coherent reception of which is described in detail

Detector-Based Reference Calibrations for Electro-Optical Instruments

2021-02-22

photonic sensing a cutting edge look at safety and security applications of photonic sensors with its many superior qualities photonic sensing technology is increasingly used in early detection and early warning systems for biological hazards structural flaws and security threats photonic sensing provides for the first time a comprehensive review of this exciting and rapidly evolving field focusing on the development of cutting edge applications in diverse areas of safety and security from biodetection to biometrics the book brings together contributions from leading experts in the field fostering effective solutions for the development of specialized materials novel optical devices and networking algorithms and platforms a number of specific areas of safety and security monitoring are covered including background information operation principles analytical techniques and applications topics include document security and structural integrity monitoring as well as the detection of

food pathogens and bacteria surface plasmon sensors micro based cytometry optofluidic techniques and optical coherence tomography optic fiber sensors for explosive detection and photonic liquid crystal fiber sensors for security monitoring photonics assisted frequency measurement with promising electronic warfare applications an invaluable multidisciplinary resource for researchers and professionals in photonic sensing as well as safety and security monitoring this book will help readers jump start their own research and development in areas of physics chemistry biology medicine mechanics electronics and defense

Optical Sensing in Power Transformers

2020-12-02

optoelectronics technology based on applications light such as micro nano quantum electronics photonic devices laser for measurements and detection has become an important field of research many applications and physical problems concerning optoelectronics are analyzed in optical waveguiding and applied photonics the book is organized in order to explain how to implement innovative sensors starting from basic physical principles applications such as cavity resonance filtering tactile sensors robotic sensor oil spill detection small antennas and experimental setups using lasers are analyzed innovative materials such as nanocomposites are characterized designed and applied in order to provide new ideas about detection principles as with many electric circuitries light applications and architectures suffer from noising due to physical and transmission connections the book illustrates some examples for practical issues the theory and the nanotechnology facilities provide important tools for researchers working with sensing applications

Photodetectors

2015-10-24

the recently developed optical radiation detectors need well designed radiometers to perform improved radiometric photometric colorimetric and radiation temperature measurements they can produce higher performance than traditionally used blackbody sources and lamps in wider application areas this book presents research based material in this field that has been implemented realized tested verified and evaluated it can be used as a reference source for students practicing scientists engineers technicians instrument manufacturers and measurement calibration people to learn design build select and use new generation radiometers the book describes a number of design issues and applications to implement the correct input geometry for detectors to measure radiometric power irradiance and radiance quantities and dc ac and pulsed electrical output signals

Optical Delay Interferometers and Their Application for Self-coherent Detection

2014-07-31

this book presents the fundamental physics of optical interferometry as applied to biophysical biological and medical research interference is at the core of many types of optical detection and is a powerful probe of cellular and tissue structure in interference microscopy and in optical coherence tomography it is also the root cause of speckle and other imaging artefacts that limit range and resolution for biosensor applications the inherent sensitivity of interferometry enables ultrasensitive detection of molecules in biological samples for medical diagnostics in this book emphasis is placed on the physics of light scattering beginning with the molecular origins of refraction as light propagates through matter and then treating the stochastic nature of random fields that ultimately dominate optical imaging in cells and tissue the physics of partial coherence plays a central role in the text with a focus on coherence detection techniques that allow information to be selectively detected out of incoherent and heterogeneous backgrounds optical interferometry for biology and medicine is divided into four sections the first covers fundamental principles and the next three move up successive scales beginning with molecular interferometry biosensors moving to cellular interferometry microscopy and ending with tissue interferometry biomedical an outstanding feature of the book is the clear presentation of the physics with easy derivations of the appropriate equations while emphasizing rules of thumb that can be applied by experimental researchers to give semi quantitative predictions

Photonic Sensing

2012-10-02

field guide to infrared systems detectors and fpas third edition is devoted to fundamental background issues for optical detection processes it compares the characteristics of cooled and uncooled detectors with an emphasis on spectral and blackbody responsivity detectivity as well as the noise mechanisms related to optical detection it introduces the concepts of barrier infrared detector technologies and encompasses the capabilities and challenges of third generation infrared focal plane arrays as well as the advantages of using dual band technology the book combines numerous engineering disciplines necessary for the development of an infrared system it considers the development of search infrared systems and specifies the main descriptors used to characterize thermal imaging systems furthermore this guide clarifies identifies and evaluates the engineering tradeoffs in the design of an infrared system

Optical Waveguiding and Applied Photonics

2014-01-18

optical radiation detectors eustace l dereniak and devon g crowe offers a comprehensive integrated treatment of optical radiation detectors discussing their capabilities and limitations background material on radiometry noise sources and detector physics is introduced followed by more detailed discussions of photon detectors thermal detectors and charge transfer arrays of detectors

Optical Detector Applications for Radiometric Measurements

2020-12

a method of detecting high velocity micro particles optically is studied the particles pass through a narrow beam of light and scatter light into a photomultiplier tube this thesis studies the feasibility of replacing the photo multiplier with a photodiode and associated solid state electronics the potential advantages of this method are discussed calculations are made showing it is theoretically possible to detect the micro particles in the present charging system using a photodiode a solid state optical detection system is designed and tested tests with the micro particle charger indicate that the amount of useful scattered light received by the solid state optical detector is very much below that calculated there are indications that very large micro particles are detected however it is concluded that further major changes of the optical detection system are required to provide reliable detection of all sizes of micro particles of interest

Optical Interferometry for Biology and Medicine

2011-12-08

proceedings of a november 1996 conference with sections on theory and design materials and processes components and mems fiber sensors measurements and microsystems and applications specific topics include diffractive optics theory holographic optical elements materials and fabrication technologies of diffractive optical elements micromechanical measurements and the use of cerenkov radiation to characterize optical waveguides final papers survey practical applications of diffractive optics and microoptics in fields including chemical detection optical measurement spectral analysis velocimetry and medicine annotation copyrighted by book news inc portland or

Field Guide to Infrared Systems, Detectors, and FPAs

2018

gets you quickly up to speed with the theoretical and practical aspects of free space optical systems engineering design and analysis one of today's fastest growing system design and analysis disciplines is free space optical systems engineering for communications and remote sensing applications it is concerned with creating a light signal with certain characteristics how this signal is affected and changed by the medium it traverses how these effects can be mitigated both pre and post detection and if after detection it can be differentiated from noise under a certain standard e.g. receiver operating characteristic free space optical systems engineering is a complex process to design against and analyze while there are several good introductory texts devoted to key aspects of optics such as lens design lasers detectors fiber and free space optical communications and remote sensing until now there were none offering comprehensive coverage of the basics needed for optical systems engineering if you're an upper division undergraduate or first year graduate student looking to acquire a practical understanding of electro-optical engineering basics this book is intended for you topics and tools are covered that will prepare you for graduate research and engineering in either an academic or commercial environment if you are an engineer or scientist considering making the move into the opportunity-rich field of optics this all in one guide brings you up to speed with everything you need to know to hit the ground running leveraging your experience and expertise acquired previously in alternate fields following an overview of the mathematical fundamentals this book provides a concise yet thorough coverage of among other crucial topics Maxwell equations geometrical optics Fourier optics partial coherence theory linear algebra basic probability theory statistics detection and estimation theory replacement model detection theory LADAR/LIDAR detection theory optical communications theory critical aspects of atmospheric propagation in real environments including commonly used models for characterizing beam and spherical and plane wave propagation through free space turbulent and particulate channels lasers blackbodies graybodies sources and photodetectors e.g. PIN, APD, PMT and their inherent internal noise sources the book provides clear detailed discussions of the basics for free space optical systems design and analysis along with a wealth of worked examples and practice problems found throughout the book and on a companion website their intent is to help you test and hone your skill set and assess your comprehension of this important area free space optical systems engineering is an indispensable introduction for students and professionals alike

Optical Radiation Detectors

1984

building electro-optical systems in the newly revised third edition of building electro-optical systems making it all work renowned Dr. Philip C. D. Hobbs delivers a bird's eye view of all the topics you'll need to understand for successful optical instrument design and construction the author draws on his own work as an applied physicist and consultant with over a decade of experience in designing and constructing electro-optical systems from beginning to end the book's topics are chosen to allow readers in a variety of disciplines and fields to quickly and confidently decide whether a given device or technique is appropriate for their needs using accessible prose and intuitive organization building electro-optical systems remains one of the most practical and solution-oriented resources available to graduate students and professionals the newest edition includes comprehensive revisions that reflect progress in the field of electro-optical instrument design and construction since the second edition was published it also offers approximately 350 illustrations for visually oriented learners readers will also enjoy a thorough introduction to basic optical calculations including wave propagation detection coherent detection and interferometers practical discussions of sources and illuminators including radiometry continuum sources incoherent line sources lasers laser noise and diode laser coherence control explorations of optical detection including photodetection in semiconductors and signal to noise ratios full treatments of lenses prisms and mirrors as well as coatings filters and surface finishes and polarization perfect for graduate students in physics electrical engineering optics and optical engineering building electro-optical systems is also an ideal resource for professional designers working in optics electro-optics analog electronics and photonics

A Feasibility Study of Solid State Optical Detection of High Velocity Micro-particles

1965

many single-photon detection systems are based on the technology of superconducting nanowires but despite their high detection efficiency the need of cooling them to cryogenic temperatures prohibits their widespread usage this book shows the progress of integrated thick CMOS SPADs towards high-photon detection probabilities and applications such as in low-cost consumer data communication and high-end single-photon counting for quantum applications newest research results are introduced and comprehensively detailed key features the topic is covered from basics to applications the properties of discrete SPADs and of integrated SPADs are compared in compact

form dedicated circuits to exploit discrete and integrated spads are introduced and explained in detail microelectronics and optoelectronics are combined in an easily understandable way numerous elaborate illustrations and tables facilitate and enhance comprehension

Detection of Optical Water Quality Parameters for Eutrophic Waters by High Resolution Remote Sensing

1993*

this book provides an in depth description and discussion of different multi modal diagnostic techniques for cancer detection and treatment using exact optical methods their comparison and combination coverage includes detailed descriptions of modern state of design for novel methods of optical non invasive cancer diagnostics multi modal methods for earlier cancer diagnostic enhancing the probability of effective cancer treatment modern clinical trials with novel methods of clinical cancer diagnostics medical and technical aspects of clinical cancer diagnostics and long term monitoring biomedical engineers cancer researchers and scientists will find the book to be an invaluable resource introduces optical imaging strategies focuses on multimodal optical diagnostics as a fundamental approach discusses novel methods of optical non invasive cancer diagnostics

Diffractive Optics and Optical Microsystems

1997-11-30

speckle phenomena in optics provides a comprehensive discussion of the statistical properties of speckle as well as detailed coverage of its role in applications some of the applications discussed include speckle in astronomy speckle in the eye speckle in projection displays speckle in coherence tomography speckle in lithography speckle in waveguides modal noise speckle in optical radar detection and speckle in metrology this book is aimed at graduate students and professionals working in a wide variety of fields

Free Space Optical Systems Engineering

2017-04-10

principles of biophotonics volume two describes detection and statistical representation of optical fields beginning by placing the visible spectrum in the context of the electromagnetic frequency range this presentation stresses how thin of a sliver is normally called the optical spectrum in addition to describing properties of light with technical accuracy the most common radiometric quantities are introduced and conversion to photon based quantities is explicitly presented for completeness an analogy to the photometric quantities is also made and the three fundamental mechanisms for generating light blackbody radiation fluorescence and laser emission are covered each chapter contains a set of practice problems and additional references and this book aims to build the foundation for further study in subsequent volumes

Building Electro-Optical Systems

2022-01-05

Single Photon Detection for Data Communication and Quantum Systems

2021-12-29

Multimodal Optical Diagnostics of Cancer

2020-10-23

Speckle Phenomena in Optics

2007

Principles of Biophotonics, Volume 2: Light Emission, Detection, and Statistics

2019-11-18

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