

Fundamentals Of Infrared And Visible Detector Operation And Testing Wiley Series In Pure And Applied Optics

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[The Encyclopedia Americana - 2002](#)

[Understanding Surveillance Technologies: Spy Devices, Privacy, History & Applications, Second Edition](#) - J. K. Peterson

Understanding Surveillance Technologies demystifies spy devices and describes how technology is used to observe and record intimate details of people's lives—often without their knowledge or consent. From historical origins to current applications, it explains how satellites, pinhole cameras, cell phone and credit card logs, DNA kits, tiny microphones (“bugs”), chemical sniffers, and implanted RF/ID chips have enabled us to create a two-edged sword—devices that promise security while, at the same time, eroding our privacy. Understanding Surveillance Technologies is profusely illustrated with extensive references and indexes, laying the groundwork for more specialized texts on specific technologies. It covers each of the major sensing devices and explains how they are used in civilian, criminal justice, scientific, national security, and military applications. It also includes recent changes in legislation and the organization of the intelligence community, and discusses how equal access to high-tech sensing devices and encryption

schemes has changed society. Understanding Surveillance Technologies is modular, so the chapters can be read in any order, and is written in an accessible, somewhat narrative style, to suit the needs of journalists/newscasters, privacy organizations, educators, civic planners, and technology centers. It is appropriate as an adjunct reference for criminal justice/law enforcement/military, and forensic trainees, and as a textbook for courses in Surveillance Studies, Sociology, Communications, and Political Science. Now in its second edition, with 1,000 pages and more than 700 diagrams, it is still the only text that comprehensively conveys the breadth of the field.

Fundamentals of Infrared and Visible Detector Operation and Testing - John David Vincent 2015-10-26

Presents a comprehensive introduction to the selection, operation, and testing of infrared devices, including a description of modern detector assemblies and their operation. This book discusses how to use and test infrared and visible detectors. The book provides a convenient reference for those entering the field of IR detector design, test or use, those who work in the peripheral areas, and those who teach and train others in the field. Chapter 1 contains introductory material. Radiometry is

covered in Chapter 2. The author examines Thermal detectors in Chapter 3; the "Classical" photon detectors - simple photoconductors and photovoltaics in Chapter 4; and "Modern Photon Detectors" in Chapter 5. Chapters 6 through 8 consider respectively individual elements and small arrays of elements, the "readouts" (ROICs) used with large imaging arrays; and Electronics for FPA Operation and Testing. The Test Set and The Testing Process are analyzed in Chapters 9 and 10, with emphasis on uncertainty and trouble shooting. Chapters 11 through 15 discuss related skills, such as Uncertainty, Cryogenics, Vacuum, Optics, and the use of Fourier Transforms in the detector business. Some highlights of this new edition are that it Discusses radiometric nomenclature and calculations, detector mechanisms, the associated electronics, how these devices are tested, and real-life effects and problems. Examines new tools in Infrared detector operations, specifically: selection and use of ROICs, electronics for FPA operation, operation of single element and very small FPAs, microbolometers, and multi-color FPAs. Contains five chapters with frequently sought-after information on related subjects, such as uncertainty, optics, cryogenics, vacuum, and the use of Fourier mathematics for detector analyses. *Fundamentals of Infrared and Visible Detector Operation and Testing, Second Edition*, provides the background and vocabulary necessary to help readers understand the selection, operation, and testing of modern infrared devices.

Fundamentals of Infrared Technology - University of Michigan.
Engineering Summer Conferences 1964

Fundamentals of Infrared and Visible Detector Operation and Testing -
John David Vincent 2015-11-09

Presents a comprehensive introduction to the selection, operation, and testing of infrared devices, including a description of modern detector assemblies and their operation. This book discusses how to use and test infrared and visible detectors. The book provides a convenient reference for those entering the field of IR detector design, test or use, those who work in the peripheral areas, and those who teach and train others in the field. Chapter 1 contains introductory material. Radiometry is covered in

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Infrared and Raman Spectroscopy - Peter Larkin 2017-11-13
Infrared and Raman Spectroscopy, Principles and Spectral Interpretation, Second Edition provides a solid introduction to vibrational spectroscopy with an emphasis on developing critical interpretation skills. This book fully integrates the use of both IR and Raman spectroscopy as spectral interpretation tools, enabling the user to utilize the strength of both techniques while also recognizing their weaknesses. This second edition more than doubles the amount of interpreted IR and Raman spectra standards and spectral unknowns. The chapter on characteristic group frequencies is expanded to include increased discussions of sulphur and phosphorus organics, aromatic and heteroaromatics as well as inorganic compounds. New topics include a

discussion of crystal lattice vibrations (low frequency/THz), confocal Raman microscopy, spatial resolution in IR and Raman microscopy, as well as criteria for selecting Raman excitation wavelengths. These additions accommodate the growing use of vibrational spectroscopy for process analytical monitoring, nanomaterial investigations, and structural and identity determinations to an increasing user base in both industry and academia. Integrates discussion of IR and Raman spectra Pairs generalized IR and Raman spectra of functional groups with tables and text Includes over 150 fully interpreted, high quality IR and Raman reference spectra Contains fifty-four unknown IR and Raman spectra, with a corresponding answer key

Long Wavelength Infrared Detectors - Manijeh Razeghi 2020-03-09

This timely work presents a comprehensive overview of the development of new generations of infrared detectors based on artificially synthesized quantum structures. The growth of quantum wells and superlattices is well documents in this volume, as are the principal new superlattice technologies for long wavelength infrared detection. Featuring insightful contributions from researchers working at the "cutting edge" of this exciting field, this volume is sure to become an essential reference for advanced graduate students and researchers alike.

Microbolometers - Nuggehalli Ravindra 2021-12-01

Microbolometers: Fundamentals, Materials, and Recent Developments describes the fundamentals of microbolometers, their historic evolution, operational principles and material choices. It also explains the impact of materials on the processing and development of device characteristics. Sections address various aspects of optical properties and recommend models of properties of materials of interest for the fabrication of the uncooled microbolometers. In addition, the book presents two case studies, Honeywell and Texas Instruments, that focus on the design and manufacture of microbolometers. Finally, recent developments, applications, patents and future trends are presented. The chapter on patents will summarize the strengths and weaknesses of each of the technologies. "Please note that there is an error on the Dedication page, it should read: "To my sister, Math. G.Y. Premalatha, and my brother-in-

law, the late Professor G.N. Yoganarasimhan, Professor of Water Resources Engineering and Management, for showing me the direction Describes the fundamentals of uncooled infrared detectors, operational principles and material approaches Includes case studies based on Honeywell and Texas Instruments' work on microbolometers Provides analyses of current patents with a look towards their strengths and weaknesses

Semiconductor Detector Systems - Helmuth Spieler 2005-08-25

Semiconductor sensors patterned at the micron scale combined with custom-designed integrated circuits have revolutionized semiconductor radiation detector systems. Designs covering many square meters with millions of signal channels are now commonplace in high-energy physics and the technology is finding its way into many other fields, ranging from astrophysics to experiments at synchrotron light sources and medical imaging. This book is the first to present a comprehensive discussion of the many facets of highly integrated semiconductor detector systems, covering sensors, signal processing, transistors and circuits, low-noise electronics, and radiation effects. The diversity of design approaches is illustrated in a chapter describing systems in high-energy physics, astronomy, and astrophysics. Finally a chapter "Why things don't work" discusses common pitfalls. Profusely illustrated, this book provides a unique reference in a key area of modern science.

Mid-infrared Optoelectronics - Eric Tournié 2019-10-19

Mid-infrared Optoelectronics: Materials, Devices, and Applications addresses the new materials, devices and applications that have emerged over the last decade, along with exciting areas of research. Sections cover fundamentals, light sources, photodetectors, new approaches, and the application of mid-IR devices, with sections discussing LEDs, laser diodes, and quantum cascade lasers, mid-infrared optoelectronics, emerging research areas, dilute bismide and nitride alloys, Group-IV materials, gallium nitride heterostructures, and new nonlinear materials. Finally, the most relevant applications of mid-infrared devices are reviewed in industry, gas sensing, spectroscopy, and imaging. This book presents a key reference for materials scientists, engineers and

professionals working in R&D in the area of semiconductors and optoelectronics. Provides a comprehensive overview of mid-infrared photodetectors and light sources and the latest materials and devices Reviews emerging areas of research in the field of mid-infrared optoelectronics, including new materials, such as wide bandgap materials, chalcogenides and new approaches, like heterogeneous integration Includes information on the most relevant applications in industry, like gas sensing, spectroscopy and imaging

The Infrared Handbook - Environmental Research Institute of Michigan. Infrared Information and Analysis Center 1978

Fundamentals of Fourier Transform Infrared Spectroscopy - Brian C. Smith 2011-03-09

Reflecting the myriad changes and advancements in the technologies involved in FTIR, particularly the development of diamond ATRs, this second edition of *Fundamentals of Fourier Transform Infrared Spectroscopy* has been extensively rewritten and expanded to include new topics and figures as well as updates of existing chapters. Designed for those ne

Optical Sources, Detectors, and Systems - Robert H. Kingston 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 D^* , NEP, f number, 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 D^* , NEP, f number, RA product, BER, shot noise, and more Contains numerous illustrative examples and exercises with solutions Extensively illustrated with more than 90 drawings and graphs

Infrared Thermal Imaging - Michael Vollmer 2018-02-20

This new up-to-date edition of the successful handbook and ready reference retains the proven concept of the first, covering basic and advanced methods and applications in infrared imaging from two leading expert authors in the field. All chapters have been completely revised and expanded and a new chapter has been added to reflect recent developments in the field and report on the progress made within the last decade. In addition there is now an even stronger focus on real-life examples, with 20% more case studies taken from science and industry. For ease of comprehension the text is backed by more than 590 images which include graphic visualizations and more than 300 infrared thermography figures. The latter include many new ones depicting, for example, spectacular views of phenomena in nature, sports, and daily life.

2D Materials for Infrared and Terahertz Detectors - Antoni Rogalski 2020-10-26

2D Materials for Infrared and Terahertz Detectors provides an overview of the performance of emerging detector materials, while also offering, for the first time, a comparison with traditional materials used in the fabrication of infrared and terahertz detectors. Since the discovery of graphene, its applications to electronic and optoelectronic devices have been intensively researched. The extraordinary electronic and optical properties allow graphene and other 2D materials to be promising candidates for infrared (IR) and terahertz (THz) photodetectors, and yet it appears that the development of new detectors using these materials is

still secondary to those using traditional materials. This book explores this phenomenon, as well as the advantages and disadvantages of using 2D materials. Special attention is directed toward the identification of the most-effective hybrid 2D materials in infrared and terahertz detectors, as well as future trends. Written by one of the world's leading researchers in the field of IR optoelectronics, this book will be a must-read for researchers and graduate students in photodetectors and related fields. Features • Offers a comprehensive overview of the different types of 2D materials used in fabrication of IR and THz detectors, and includes their advantages/disadvantages • The first book to compare new detectors to a wide family of common, commercially available detectors that use traditional materials.

Seeing Photons - National Research Council 2010-09-28

The Department of Defense recently highlighted intelligence, surveillance, and reconnaissance (ISR) capabilities as a top priority for U.S. warfighters. Contributions provided by ISR assets in the operational theaters in Iraq and Afghanistan have been widely documented in press reporting. While the United States continues to increase investments in ISR capabilities, other nations not friendly to the United States will continue to seek countermeasures to U.S. capabilities. The Technology Warning Division of the Defense Intelligence Agency's (DIA) Defense Warning Office (DWO) has the critical responsibility, in collaborations with other components of the intelligence community (IC), for providing U.S. policymakers insight into technological developments that may impact future U.S. warfighting capabilities. To this end, the IC requested that the National Research Council (NRC) investigate and report on key visible and infrared detector technologies, with potential military utility, that are likely to be developed in the next 10-15 years. This study is the eighth in a series sponsored by the DWO and executed under the auspices of the NRC TIGER (Technology Insight-Gauge, Evaluate, and Review) Standing Committee.

Infrared Detectors - Antonio Rogalski 2000-04-17

Infrared Detectors provides comprehensive coverage of this important aspect of infrared technology, including details of recent research efforts

directed toward improving the performance of single element devices, large electronically scanned arrays, and higher operating temperatures. Discussions include HgCdTe detectors, Schottky barrier photoemissive devices, silicon, germanium, and InSb detectors, and quantum well infrared photodetectors. The author also considers IR thermal detectors, including details on pyroelectric detectors, micromachined silicon bolometers, and high T_c superconductor detectors.

Optical and Infrared Detectors for Astronomy - James David Garnett 2004

Proceedings of SPIE present the original research papers presented at SPIE conferences and other high-quality conferences in the broad-ranging fields of optics and photonics. These books provide prompt access to the latest innovations in research and technology in their respective fields. Proceedings of SPIE are among the most cited references in patent literature.

Handbook of Modern Sensors - Jacob Fraden 2006-04-29

Seven years have passed since the publication of the previous edition of this book. During that time, sensor technologies have made a remarkable leap forward. The sensitivity of the sensors became higher, the dimensions became smaller, the selectivity became better, and the prices became lower. What have not changed are the fundamental principles of the sensor design. They are still governed by the laws of Nature.

Arguably one of the greatest geniuses who ever lived, Leonardo Da Vinci, had his own peculiar way of praying. He was saying, "Oh Lord, thanks for Thou do not violate your own laws." It is comforting indeed that the laws of Nature do not change as time goes by; it is just our appreciation of them that is being renewed. Thus, this new edition examines the same good old laws of Nature that are employed in the designs of various sensors. This has not changed much since the previous edition. Yet, the sections that describe the practical designs are revised substantially. Recent ideas and developments have been added, and less important and nonessential designs were dropped. Probably the most dramatic recent progress in the sensor technologies relates to wide use of MEMS and MEOMS (micro-electro-mechanical systems and micro-electro-opto-

mechanical systems). These are examined in this new edition with greater detail. This book is about devices commonly called sensors. The invention of a microprocessor has brought highly sophisticated instruments into our everyday lives.

Infrared and Terahertz Detectors, Third Edition - Antoni Rogalski
2019-01-10

This new edition of Infrared and Terahertz Detectors provides a comprehensive overview of infrared and terahertz detector technology, from fundamental science to materials and fabrication techniques. It contains a complete overhaul of the contents including several new chapters and a new section on terahertz detectors and systems. It includes a new tutorial introduction to technical aspects that are fundamental for basic understanding. The other dedicated sections focus on thermal detectors, photon detectors, and focal plane arrays.

High-operating-temperature Infrared Photodetectors - Jozef Piotrowski
2007

This book presents approaches, materials, and devices that eliminate the cooling requirements of IR photodetectors operating in the middle- and long-wavelength ranges of the IR spectrum. It is based mainly on the authors' experiences in developing and fabricating near room temperature HgCdTe detectors at Vigo Systems Ltd. and at the Institute of Applied Physics Military University of Technology (both in Warsaw, Poland). The text also discusses solutions to other specific problems of high-temperature detection, such as poor collection efficiency due to a short diffusion length, the Johnson-Nyquist noise of parasitic impedances, and interfacing of very low resistance devices to electronics. Suitable for graduate students in physics and engineering who have received a basic preparation in modern solid state physics and electronic circuits, this book will also be of interest to individuals who work with aerospace sensors and systems, remote sensing, thermal imaging, military imaging, optical telecommunications, IR spectroscopy, and lidar.

Infrared Detectors - Antonio Rogalski 2010-11-15

Completely revised and reorganized while retaining the approachable style of the first edition, Infrared Detectors, Second Edition addresses

the latest developments in the science and technology of infrared (IR) detection. Antoni Rogalski, an internationally recognized pioneer in the field, covers the comprehensive range of subjects necessary to understand the fundamentals of light microscopy and electronic imaging.

Fundamentals of Light Microscopy and Electronic Imaging - Douglas B. Murphy 2012-08-22

Fundamentals of Light Microscopy and Electronic Imaging, Second Edition provides a coherent introduction to the principles and applications of the integrated optical microscope system, covering both theoretical and practical considerations. It expands and updates discussions of multi-spectral imaging, intensified digital cameras, signal colocalization, and uses of objectives, and offers guidance in the selection of microscopes and electronic cameras, as well as appropriate auxiliary optical systems and fluorescent tags. The book is divided into three sections covering optical principles in diffraction and image formation, basic modes of light microscopy, and components of modern electronic imaging systems and image processing operations. Each chapter introduces relevant theory, followed by descriptions of instrument alignment and image interpretation. This revision includes new chapters on live cell imaging, measurement of protein dynamics, deconvolution microscopy, and interference microscopy. PowerPoint slides of the figures as well as other supplementary materials for instructors are available at a companion website:

www.wiley.com/go/murphy/lightmicroscopy

Infrared Spectroscopy - Barbara H. Stuart 2004-08-20

Provides an introduction to those needing to use infrared spectroscopy for the first time, explaining the fundamental aspects of this technique, how to obtain a spectrum and how to analyse infrared data covering a wide range of applications. Includes instrumental and sampling techniques. Covers biological and industrial applications. Includes suitable questions and problems in each chapter to assist in the analysis and interpretation of representative infrared spectra. Part of the ANTS (Analytical Techniques in the Sciences) Series.

Detection of Light - George H. Rieke 2021-05-13

Comprehensive, accessible, and physically based description of the

approaches currently used to detect light, from X-ray to mm-wave.
The Encyclopedia Americana: Indian to Jeffers - 2000

Detection of Optical Signals - Antoni Rogalski 2022-06-06

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.

Remote Sensing Physics - Rick Chapman 2022-03-15

An introduction to the physical principles underlying Earth remote sensing. The development of spaceborne remote sensing technology has led to a new understanding of the complexity of our planet by allowing us to observe Earth and its environments on spatial and temporal scales that are unavailable to terrestrial sensors. Remote Sensing Physics: An Introduction to Observing Earth from Space is a graduate-level text that examines the underlying physical principles and techniques used to make remote measurements, along with the algorithms used to extract geophysical information from those measurements. Volume highlights include: Basis for Earth remote sensing including ocean, land, and atmosphere Description of satellite orbits relevant for Earth observations Physics of passive sensing, including infrared, optical and microwave imagers Physics of active sensing, including radars and lidars Overview of current and future Earth observation missions Compendium of

resources including an extensive bibliography Sample problem sets and answers available to instructors The American Geophysical Union promotes discovery in Earth and space science for the benefit of humanity. Its publications disseminate scientific knowledge and provide resources for researchers, students, and professionals.

Statistical Optics - Joseph W. Goodman 2015-05-06

This book discusses statistical methods that are useful for treating problems in modern optics, and the application of these methods to solving a variety of such problems This book covers a variety of statistical problems in optics, including both theory and applications. The text covers the necessary background in statistics, statistical properties of light waves of various types, the theory of partial coherence and its applications, imaging with partially coherent light, atmospheric degradations of images, and noise limitations in the detection of light. New topics have been introduced in the second edition, including: Analysis of the Vander Pol oscillator model of laser light Coverage on coherence tomography and coherence multiplexing of fiber sensors An expansion of the chapter on imaging with partially coherent light, including several new examples An expanded section on speckle and its properties New sections on the cross-spectrum and bispectrum techniques for obtaining images free from atmospheric distortions A new section on imaging through atmospheric turbulence using coherent light The addition of the effects of "read noise" to the discussions of limitations encountered in detecting very weak optical signals A number of new problems and many new references have been added Statistical Optics, Second Edition is written for researchers and engineering students interested in optics, physicists and chemists, as well as graduate level courses in a University Engineering or Physics Department.

Photonics Applications in Astronomy, Communications, Industry, and High-energy Physics Experiments - Ryszard S. Romaniuk 2003

Fundamentals of Infrared Technology - Marvin R. Holter 1962

Atoms, Molecules and Photons - Wolfgang Demtröder 2019-02-09

This introduction to Atomic and Molecular Physics explains how our present model of atoms and molecules has been developed over the last two centuries both by many experimental discoveries and, from the theoretical side, by the introduction of quantum physics to the adequate description of micro-particles. It illustrates the wave model of particles by many examples and shows the limits of classical description. The interaction of electromagnetic radiation with atoms and molecules and its potential for spectroscopy is outlined in more detail and in particular lasers as modern spectroscopic tools are discussed more thoroughly. Many examples and problems with solutions are offered to encourage readers to actively engage in applying and adapting the fundamental physics presented in this textbook to specific situations. Completely revised third edition with new sections covering all actual developments, like photonics, ultrashort lasers, ultraprecise frequency combs, free electron lasers, cooling and trapping of atoms, quantum optics and quantum information.

Infrared Detectors and Emitters: Materials and Devices - Peter Capper 2013-11-27

An up-to-date view of the various detector/emitter materials systems currently in use or being actively researched. The book is aimed at newcomers and those already working in the IR industry. It provides both an introductory text and a valuable overview of the entire field.

Free Space Optical Systems Engineering - Larry B. Stotts 2017-04-10

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, ADP, 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.

Infrared Detectors and Systems - E. L. Dereniak 1996

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.

Infrared Thermography - Raghu Prakash 2012-03-14

Infrared Thermography (IRT) is commonly as a NDE tool to identify damages and provide remedial action. The fields of application are vast, such as, materials science, life sciences and applied engineering. This book offers a collection of ten chapters with three major sections - relating to application of infrared thermography to study problems in materials science, agriculture, veterinary and sports fields as well as in engineering applications. Both mathematical modeling and experimental aspects of IRT are evenly discussed in this book. It is our sincere hope that the book meets the requirements of researchers in the domain and

inspires more researchers to study IRT.

Understanding Surveillance Technologies - J.K. Petersen 2007-02-05

Understanding Surveillance Technologies demystifies spy devices and describes how technology is used to observe and record intimate details of people's lives often without their knowledge or consent. From historical origins to current applications, it explains how satellites, pinhole cameras, cell phone and credit card logs, DNA kits, tiny m
Fundamentals of Infrared Detector Operation and Testing - John David Vincent 1990-03-01

A comprehensive text/reference for the operation and testing of infrared (IR) detectors. Includes formulas and examples for most laboratory applications. Covers detector types, radiometric concepts, test equipment, measurements and error analysis.

Antimonide-based Infrared Detectors - Antoni Rogalski 2018

"Among the many materials investigated in the infrared (IR) field, narrow-gap semiconductors are the most important in IR photon detector family. Although the first widely used narrow-gap materials were lead salts (during the 1950s, IR detectors were built using single-element-cooled PbS and PbSe photoconductive detectors, primary for anti-missile seekers), this semiconductor family was not well distinguished. This situation seems to have resulted from two reasons: the preparation process of lead salt photoconductive polycrystalline detectors was not well understood and could only be reproduced with well-tried recipes; and the theory of narrow-gap semiconductor bandgap structure was not well known for correct interpretation of the measured transport and photoelectrical properties of these materials"--

Modern Semiconductor Physics and Device Applications - Vitalii K Dugaev 2021-11-22

This textbook provides a theoretical background for contemporary trends in solid-state theory and semiconductor device physics. It discusses advanced methods of quantum mechanics and field theory and is therefore primarily intended for graduate students in theoretical and experimental physics who have already studied electrodynamics, statistical physics, and quantum mechanics. It also relates solid-state

physics fundamentals to semiconductor device applications and includes auxiliary results from mathematics and quantum mechanics, making the book useful also for graduate students in electrical engineering and material science. Key Features: Explores concepts common in textbooks

on semiconductors, in addition to topics not included in similar books currently available on the market, such as the topology of Hilbert space in crystals Contains the latest research and developments in the field Written in an accessible yet rigorous manner