

Coplanar Waveguide Design In Hfss

Artificial intelligence has been applied to many areas of science and technology, including the power and energy sector. Renewable energy in particular has experienced the tremendous positive impact of these developments. With the recent evolution of smart energy technologies, engineers and scientists working in this sector need an exhaustive source of current knowledge to effectively cater to the energy needs of citizens of developing countries. Computational Methodologies for Electrical and Electronics Engineers is a collection of innovative research that provides a complete insight and overview of the application of intelligent computational techniques in power and energy. Featuring research on a wide range of topics such as artificial neural networks, smart grids, and soft computing, this book is ideally designed for programmers, engineers, technicians, ecologists, entrepreneurs, researchers, academicians, and students.

A comprehensive source for microwave and wireless circuit design, the Commercial Wireless Circuits and Components Handbook reviews the fundamentals of transmitters and receivers, then presents detailed chapters on individual circuit types. It also covers packaging, large and small signal characterization, and high volume testing techniques for both devices and circuits. This handbook not only provides important information for engineers working with wireless RF or microwave circuitry, it also serves as an excellent source for those requiring information outside of their area of expertise, such as managers, marketers, and technical support workers who need a better understanding of the fields driving their decisions.

This book discusses the latest developments and outlines future trends in the fields of microelectronics, electromagnetics and telecommunication. It includes original research presented at the International Conference on Microelectronics, Electromagnetics and Telecommunication (ICMEET 2019), organized by the Department of ECE, Raghu Institute of Technology, Andhra Pradesh, India. Written by scientists, research scholars and practitioners from leading universities, engineering colleges and R&D institutes around the globe, the papers share the latest breakthroughs in and promising solutions to the most important issues facing today's society.

Modeling and Design of Electromagnetic Compatibility for High-Speed Printed Circuit Boards and Packaging presents the electromagnetic modelling and design of three major electromagnetic compatibility (EMC) issues related to the high-speed printed circuit board (PCB) and electronic packages: signal integrity (SI), power integrity (PI), and electromagnetic interference (EMI). The emphasis is put on two essential passive components of PCBs and packages: the power distribution network and the signal distribution network. This book includes two parts. Part one talks about the field-circuit hybrid methods used for the EMC modeling, including the modal method, the integral equation method, the cylindrical wave expansion method and the de-embedding method. Part two illustrates EMC design methods and explores the applications of novel metamaterials and two-dimensional materials on traditional EMC problems. This book is designed to enhance worthwhile electromagnetic theory and mathematical methods for practical engineers and to train students with advanced EMC applications. These proceedings of the SAI Intelligent Systems Conference 2016 (IntelliSys 2016) offer a remarkable collection of chapters on a wide range of topics in intelligent systems, artificial intelligence and their applications to the real world. Authors hailing from 56 countries on 5 continents submitted 404 papers to the conference, attesting to the global importance of the conference's themes. After being reviewed, 222 papers were accepted for presentation, and 168 were ultimately selected for these proceedings. Each has been reviewed on the basis of its originality, novelty and rigorousness. The papers not only present state-of-the-art methods and valuable experience from researchers in the related research areas; they also outline the field's future development.

This book constitutes the proceedings of the First International Conference on Emerging Trends in Engineering (ICETE), held at University College of Engineering and organised by the Alumni Association, University College of Engineering, Osmania University, in Hyderabad, India on 22–23 March 2019. The proceedings of the ICETE are published in three volumes, covering seven areas: Biomedical, Civil, Computer Science, Electrical & Electronics, Electronics & Communication, Mechanical, and Mining Engineering. The 215 peer-reviewed papers from around the globe present the latest state-of-the-art research, and are useful to postgraduate students, researchers, academics and industry engineers working in the respective fields. Volume 2 presents papers on the theme "Advances in Decision Sciences, Image Processing, Security and Computer Vision – International Conference on Emerging Trends in Engineering (ICETE)". It includes state-of-the-art technical contributions in the areas of electronics and communication engineering and electrical and electronics engineering, discussing the latest sustainable developments in fields such as signal processing and communications; GNSS and VLSI; microwaves and antennas; signal, speech and image processing; power systems; and power electronics.

This book has focussed on different aspects of smart sensors and sensing technology, i.e. intelligent measurement, information processing, adaptability, recalibration, data fusion, validation, high reliability and integration of novel and high performance sensors in the areas of magnetic, ultrasonic, vision and image sensing, wireless sensors and network, microfluidic, tactile, gyro, flow, surface acoustic wave, humidity and ultra-wide band. While future interest in this field is ensured by the constant supply of emerging modalities, techniques and engineering solutions, as well as an increasing need from aging structures, many of the basic concepts and strategies have already matured and now offer opportunities to build upon. The book has primarily been focussed for postgraduate and research students working on different aspects of design and developments of smart sensors and sensing technology.

This book constitutes the refereed proceedings of the 22st International Symposium on VLSI Design and Test, VDAT 2018, held in Madurai, India, in June 2018. The 39 full papers and 11 short papers presented together with 8 poster papers were carefully reviewed and selected from 231 submissions. The papers are organized in topical sections named: digital design; analog and mixed signal design; hardware security; micro bio-fluidics; VLSI testing; analog circuits and devices; network-on-chip; memory; quantum computing and NoC; sensors and interfaces.

This book discusses reliability applications for power systems, renewable energy and smart grids and highlights trends in reliable communication, fault-tolerant systems, VLSI system design and embedded systems. Further, it includes chapters on software reliability and other computer engineering and software management-related disciplines, and also examines areas such as big data analytics and ubiquitous computing. Outlining novel, innovative concepts in applied areas of reliability in electrical, electronics and computer engineering disciplines, it is a valuable resource for researchers and practitioners of reliability theory in circuit-based engineering domains.

This volume comprises the proceedings of the International Conference on Recent Cognizance in Wireless Communication & Image Processing. It brings together content from academicians, researchers, and industry experts in areas of Wireless Communication and Image Processing. The volume provides a snapshot of current progress in computational creativity and a glimpse of future possibilities. The proceedings include two kinds of paper submissions: (i) regular papers addressing foundation issues, describing original research on creative systems development and modeling; and (ii) position papers describing work-in-progress or research directions for computational creativity. This work will be useful to professionals and researchers working in the core areas of wireless communications and image processing.

Offers a comprehensive and practical reference guide to antenna design and engineering for portable devices. Antennas are often the most bulky components in many portable wireless devices such as mobile phones. Whilst the demand for ever smaller and more powerful wireless devices increases, as does the importance of designing and engineering smaller antennas to fit these devices. Antennas for Portable Devices provides a complete and cutting-edge guide to the design and engineering of small antennas for portable electronic devices such as mobile phone handsets, laptop computers, RFID (radio frequency identification), microwave thermal therapies devices, wearable devices, and UWB (ultra-wideband) based consumer devices. The book addresses practical engineering issues that antenna professionals have to deal with. It

explains the immediate demands for existing systems; discusses the antenna technology for the latest and emerging applications, and gives comprehensive coverage of hot topics in the wireless industry. Issues including design considerations, engineering design, measurement setup and methodology, and practical applications are all covered in depth. **Antennas for Portable Devices:** Covers antennas for all modern portable wireless devices from handsets, RFID tags, laptops, wearable sensors, UWB-based wireless USB dongles and handheld microwave treatment devices Explains how to design and engineer applications for miniaturization of antenna technology, utilising practical case studies to provide the reader with an understanding of systems and design skills Links the basic antenna theory, with design methodology, and engineering design Is amply illustrated with numerous figures and data tables of antenna designs to aid understanding Features contributions from industry and research experts in antenna technology and applications This invaluable resource will provide a comprehensive overview of miniaturizing antenna technology for antenna engineers in industry, and R&D organizations, graduate students, consultants, researchers, RF professionals, technical managers, as well as practitioners working in the area of consumer electronics, RF systems, wireless communications, or bio-medical devices.

Annotation This practical "how to" book is an ideal introduction to electromagnetic field-solvers. Where most books in this area are strictly theoretical, this unique resource provides engineers with helpful advice on selecting the right tools for their RF (radio frequency) and high-speed digital circuit design work

This book presents a step-by-step discussion of the design and development of radio frequency identification (RFID) and RFID-enabled sensors on flexible low cost substrates for UHF frequency bands. Various examples of fully function building blocks (design and fabrication of antennas, integration with ICs and microcontrollers, power sources, as well as inkjet-printing techniques) demonstrate the revolutionary effect of this approach in low cost RFID and RFID-enabled sensors fields. This approach could be easily extended to other microwave and wireless applications as well. The first chapter describes the basic functionality and the physical and IT-related principles underlying RFID and sensors technology. Chapter two explains in detail inkjet-printing technology providing the characterization of the conductive ink, which consists of nano-silver-particles, while highlighting the importance of this technology as a fast and simple fabrication technique especially on flexible organic substrates such as Liquid Crystal Polymer (LCP) or paper-based substrates. Chapter three demonstrates several compact inkjet-printed UHF RFID antennas using antenna matching techniques to match IC's complex impedance as prototypes to provide the proof of concept of this technology. Chapter four discusses the benefits of using conformal magnetic material as a substrate for miniaturized high-frequency circuit applications. In addition, in Chapter five, the authors also touch up the state-of-the-art area of fully-integrated wireless sensor modules on organic substrates and show the first ever 2D sensor integration with an RFID tag module on paper, as well as the possibility of 3D multilayer paper-based RF/microwave structures. **Table of Contents:** Radio Frequency Identification Introduction / Flexible Organic Low Cost Substrates / Benchmarking RFID Prototypes on Organic Substrates / Conformal Magnetic Composite RFID Tags / Inkjet-Printed RFID-Enabled Sensors

RF and Microwave Microelectronics Packaging presents the latest developments in packaging for high-frequency electronics. It will appeal to practicing engineers in the electronic packaging and high-frequency electronics fields and to academic researchers interested in understanding leading issues in the commercial sector. It covers the latest developments in thermal management, electrical/RF/thermal-mechanical designs and simulations, packaging and processing methods as well as other RF/MW packaging-related fields.

Modelling and computations in electromagnetics is a quite fast-growing research area. The recent interest in this field is caused by the increased demand for designing complex microwave components, modeling electromagnetic materials, and rapid increase in computational power for calculation of complex electromagnetic problems. The first part of this book is devoted to the advances in the analysis techniques such as method of moments, finite-difference time-domain method, boundary perturbation theory, Fourier analysis, mode-matching method, and analysis based on circuit theory. These techniques are considered with regard to several challenging technological applications such as those related to electrically large devices, scattering in layered structures, photonic crystals, and artificial materials. The second part of the book deals with waveguides, transmission lines and transitions. This includes microstrip lines (MSL), slot waveguides, substrate integrated waveguides (SIW), vertical transmission lines in multilayer media as well as MSL to SIW and MSL to slot line transitions.

The increasing demand for extremely high-data-rate communications has urged researchers to develop new communication systems. Currently, wireless transmission with more than one Giga-bits-per-second (Gbps) data rates is becoming essential due to increased connectivity between different portable and smart devices. To realize Gbps data rates, millimeter-wave (MMW) bands around 60 GHz is attractive due to the availability of large bandwidth of 9 GHz. Recent research work in the Gbps data rates around 60 GHz band has focused on short-range indoor applications, such as uncompressed video transfer, high-speed file transfer between electronic devices, and communication to and from kiosk. Many of these applications are limited to 10 m or less, because of the huge free space path loss and oxygen absorption for 60 GHz band MMW signal. This book introduces new knowledge and novel circuit techniques to design low-power MMW circuits and systems. It also focuses on unlocking the potential applications of the 60 GHz band for high-speed outdoor applications. The innovative design application significantly improves and enables high-data-rate low-cost communication links between two access points seamlessly. The 60 GHz transceiver system-on-chip provides an alternative solution to upgrade existing networks without introducing any building renovation or external network laying works.

This book is dedicated to modeling and application of magnetoelectric (ME) effects in layered and bulk composites based on magnetostrictive and piezoelectric materials. Currently, numerous theoretical and experimental studies on ME composites are available but few on the development and research of instruments based on them. So far, only investigation of ME magnetic field sensors has been cited in the existing literature. However, these studies have finally resulted in the creation of low-frequency ME magnetic field sensors with parameters substantially exceeding the characteristics of Hall sensors. The book presents the authors' many years of experience gained in ME composites and through creation of device models based on their studies. It describes low-frequency ME devices, such as current and position sensors and energy harvesters, and microwave ME devices, such as antennas, attenuators, filters, gyrators, and phase shifters. Antennas are essential part of every wireless communication system. The increasing trend of applications in the radio frequency (RF) and millimeter wave frequency spectrum has reduced the antenna sizes to only a few millimeters, which makes it practical for on-chip implementations. Integrated Circuit (IC) designers who have traditionally remained isolated from antenna design now need to understand its design process and trade-offs. This comprehensive resource addresses the challenges, benefits and trade-offs of on-chip antenna implementation. It presents practical design and integration considerations of the IC and antenna combination and how both ends of the system can be utilized in a complimentary way. The book includes on-chip antenna layout considerations, layout for testability and various methods of their characterization. A look at the future trends and utilization of on-chip antennas for different applications concludes the book. This first volume in the Mosharaka for Research and Studies International Conference Proceedings series (P-MIC) contains peer-reviewed papers presented at the 1st International Congress on Engineering Technologies (EngiTek 2020). This event was held remotely on 16-18 June 2020, and hosted by the Faculty of Engineering, Jordan University of Science & Technology (Irbid, Jordan). The conference represented a major forum for professors, students, and professionals from all over the world to present their latest research results, and to exchange new ideas and practical experiences in the most cutting-edge areas of the field of engineering technologies. Topics covered include electrical engineering, computer science and electronics.

Low-temperature co-fired ceramic (LTCC) was used for a novel band-pass filter design. The filter is based on metallic strips parallel to the E-

plane and mounted in a substrate-integrated waveguide (SIW). A new iterative technique based on the Variation principle was used to obtain an inductive reactance of an equivalent T-network of the metallic strip. The design method of the filter was derived by applying the equivalent network of the metallic strip to the usual method of the filter design. This filter was designed such that it is electromagnetically isolated inside the SIW and excited using grounded coplanar waveguide (GCPW) to SIW transitions. The design steps are explained and verified by examples and results. Three-dimensional electromagnetic field modeling and simulation was carried out using High Frequency Structure Simulator (HFSS). A comparison between different types of SIW is presented showing the resulting S-parameters curves for each case. Measurement of the filter response was done to validate the simulation results. By following the design steps, similar filters for various frequency bands can be easily designed. Three examples of filters were concluded to demonstrate the idea and validate the new methodology of the design. A new idea of air-filled technology inside LTCC substrate was presented. This new technology makes the use of conventional high loss tangent LTCC material in high frequency application possible.

Along with numerous opportunities in communication and imaging applications, the design of emerging millimeter-wave (mm-wave) and terahertz (THz) electronic circuits and systems in CMOS technology faces new challenges and requires new devices. Design of CMOS Millimeter-Wave and Terahertz Integrated Circuits with Metamaterials provides alternative solutions using CMOS on-chip metamaterials. Unlike conventional metamaterial devices on printed circuit boards (PCBs), the presented CMOS metamaterials can be utilized to build many mm-wave and THz circuits and systems on chip. Leveraging the authors' extensive expertise and experience with CMOS on-chip metamaterials, this book shows that with the use of metamaterials, one can realize coherent THz signal generation, amplification, transmission, and detection of phase-arrayed CMOS transistors with significantly improved performance. Offering detailed coverage from device to system, the book hereby: Describes integrated circuit design with application of metamaterials in CMOS technology Includes real CMOS integrated circuit examples and chip demonstrations with measurement results Evaluates novel mm-wave and THz communication and imaging systems under CMOS-based system-on-chip integration Design of CMOS Millimeter-Wave and Terahertz Integrated Circuits with Metamaterials reflects the latest research progress and provides a state-of-the-art reference on CMOS-based metamaterial devices and mm-wave and THz systems.

This book highlights technology trends and challenges that trace the evolution of antenna design, starting from 3rd generation phones and moving towards the latest release of LTE-A. The authors explore how the simple monopole and whip antenna from the GSM years have evolved towards what we have today, an antenna design that is compact, multi-band in nature and caters to multiple elements on the same patch to provide high throughput connectivity. The scope of the book targets a broad range of subjects, including the microstrip antenna, PIFA antenna, and the monopole antenna to be used for different applications over three different mobile generations. Beyond that, the authors take a step into the future and look at antenna requirements for 5G communications, which already has the 5G drive in place with prominent scenarios and use-cases emerging. They examine these, and put in place the challenges that lie ahead for antenna design, particularly in mm-Wave design. The book provides a reference for practicing engineers and under/post graduate students working in this field.

This book comprises select proceedings of the 4th International Conference on Optical and Wireless Technologies (OWT 2020). The contents of this volume focus on research carried out in the areas of Optical Communication, Optoelectronics, Optics, Wireless Communication, Wireless Networks, Sensors, Mobile Communications and Antenna and Wave Propagation. The volume also explores the combined use of various optical and wireless technologies in next generation applications, and their latest developments in applications like photonics, high speed communication systems and networks, visible light communication, nanophotonics, wireless and MIMO systems. This book will serve as a useful reference to scientists, academicians, engineers and policy-makers interested in the field of optical and wireless technologies.

This is the first comprehensive book to address the design of RF MEMS-based circuits for use in high performance wireless systems. A groundbreaking research and reference tool, the book enables you to understand the realm of applications of RF MEMS technology; become knowledgeable of the wide variety and performance levels of RF MEMS devices; and partition the architecture of wireless systems to achieve greater levels of performance. This innovative resource also guides you through the design process of RF MEMS-based circuits, and establishes a practical knowledge base for the design of high-yield RF MEMS-based circuits. The book features exercises and detailed case studies on working RF MEMS circuits that help you decide what approaches best fit your design constraints. This unified treatment of RF MEMS-based circuit technology opens up a new world of solutions for meeting the unique challenges of low power/portable wireless products.

The purpose of this workshop is to spread the vast amount of information available on semiconductor physics to every possible field throughout the scientific community. As a result, the latest findings, research and discoveries can be quickly disseminated. This workshop provides all participating research groups with an excellent platform for interaction and collaboration with other members of their respective scientific community. This workshop's technical sessions include various current and significant topics for applications and scientific developments, including • Optoelectronics • VLSI & ULSI Technology • Photovoltaics • MEMS & Sensors • Device Modeling and Simulation • High Frequency/ Power Devices • Nanotechnology and Emerging Areas • Organic Electronics • Displays and Lighting Many eminent scientists from various national and international organizations are actively participating with their latest research works and also equally supporting this mega event by joining the various organizing committees.

The Transmission Line Design Handbook consolidates and distills key design data from over 600 original sources. It features 800 equations, 220 illustrations, and 610 references.

This book presents state-of-the-art technologies, trends and applications with a focus on the healthcare domain for ultra-wideband (3.1–10.6 GHz) and 60 GHz (57–66 GHz) wireless communication systems. Due to various key features such as miniaturized antenna design, low power, high data rate, less effects on the human body, relatively less crowded spectrum, these technologies are becoming popular in various fields of biomedical applications and day-to-day life. The book highlights various aspects of these technologies related to body-centric communication, including antenna design requirements, channel modeling and characterization for WBANs, current fabrication and antenna design strategies for textile, flexible and implanted antennas. Apart from the general requirements and study related to these frequency bands, various application specific topics such as localization and tracking, physical activity recognition and assessment, vital sign monitoring and medical imaging are covered in detail. The book concludes with the glimpses of future aspects of the UWB and 60 GHz technology which includes IoT for healthcare and smart living, novel antenna materials and application of machine learning algorithms for overall performance enhancement.

Antenna Fundamentals for Legacy Mobile Applications and BeyondSpringer

The main objective of this thesis is to design a coplanar waveguide circulator (CPW circulator) and propose a method that replaces the ferrite in a CPW circulator with ferromagnetic nanowire (FMNW) material. A circulator with a coplanar waveguide structure, whose shape is in the form of hexagon, was designed and simulated in ANSYS HFSS software. The simulated CPW circulator operates at 1.6 GHz with an insertion loss of 1.27 dB, isolation of 38 dB, and bandwidth of 200 MHz. A ferromagnetic nanowire (FMNW) material was fabricated using electrode position of nickel into 20 nm diameter pores of a commercially available nanoporous alumina membrane to replace the ferrite on the device. In order to engineer the response of FMNW metamaterials for microwave applications the permittivity is to be known. To determine the permittivity of the FMNW material a microstrip ring resonator was designed in ANSYS HFSS software and fabricated on a Rogers 4350B substrate.

The book is a compilation of best papers presented at International Conference on Recent Advancement in Computer and Communication (ICRAC 2017) organized by IMPLab Research and Innovation Foundation, Bhopal, India. The book covers all aspects of computers and communication techniques including pervasive computing, distributed computing, cloud computing, sensor and adhoc network, image, text and speech processing, pattern recognition and pattern analysis, digital signal processing, digital electronics, telecommunication technologies, robotics, VLSI technologies, embedded system, satellite communication, digital signal processing, and digital communication. The papers included are original research works of experts from industry, government centers and academic institutions; experienced in engineering, design and research.

This book covers recent trends in the field of devices, wireless communication and networking. It gathers selected papers presented at the International Conference on Communication, Devices and Networking (ICCDN 2019), which was organized by the Department of Electronics and Communication Engineering, Sikkim Manipal Institute of Technology, Sikkim, India, on 9–10 December 2019. Gathering cutting-edge research papers prepared by researchers, engineers and industry professionals, it will help young and experienced scientists and developers alike to explore new perspectives, and offer them inspirations on how to address real-world problems in the areas of electronics, communication, devices and networking.

The volume contains 94 best selected research papers presented at the Third International Conference on Micro Electronics, Electromagnetics and Telecommunications (ICMEET 2017) The conference was held during 09-10, September, 2017 at Department of Electronics and Communication Engineering, BVRIT Hyderabad College of Engineering for Women, Hyderabad, Telangana, India. The volume includes original and application based research papers on microelectronics, electromagnetics, telecommunications, wireless communications, signal/speech/video processing and embedded systems.

This book explains one of the hottest topics in wireless and electronic devices community, namely the wireless communication at mmWave frequencies, especially at the 60 GHz ISM band. It provides the reader with knowledge and techniques for mmWave antenna design, evaluation, antenna and chip packaging. Addresses practical engineering issues such as RF material evaluation and selection, antenna and packaging requirements, manufacturing tolerances, antenna and system interconnections, and antenna One of the first books to discuss the emerging research and application areas, particularly chip packages with integrated antennas, wafer scale mmWave phased arrays and imaging Contains a good number of case studies to aid understanding Provides the antenna and packaging technologies for the latest and emerging applications with the emphases on antenna integrations for practical applications such as wireless USB, wireless video, phase array, automobile collision avoidance radar, and imaging

Focusing on novel materials and techniques, this pioneering volume provides engineers with a solid understanding of the design and fabrication of smart RF passive components. Professionals find comprehensive details on LCP, metal materials, ferrite materials, nanomaterials, high aspect ratio enabled materials, green materials for RFID, and on-chip silicon techniques. Moreover, this practical book offers expert guidance on how to apply these materials and techniques to design a wide range of cutting-edge RF passive components, from MEMS switch-based tunable passives and 3D passives, to metamaterial-based passives and on-chip passives. Supported with over 145 illustrations, this forward-looking resource summarizes the growing trend of smart RF passive component design and serves as a guide to the performance-improving and cost-down solutions this technology offers the next generation of wireless communications. This book discusses the revolution of cycles and rhythms that is expected to take place in different branches of science and engineering in the 21st century, with a focus on communication and information processing. It presents high-quality papers in vibration sciences, rhythms and oscillations, neurosciences, mathematical sciences, and communication. It includes major topics in engineering and structural mechanics, computer sciences, biophysics and biomathematics, as well as other related fields. Offering valuable insights, it also inspires researchers to work in these fields. The papers included in this book were presented at the 1st International Conference on Engineering Vibration, Communication and Information Processing (ICoEVCI-2018), India.

The past few years have seen an upsurge in the numbers of known Neolithic settlements in Ireland. Many of these sites have been excavated by archaeologists based in field units, but few are well-known to the wider archaeological community. The papers in this volume were presented at a conference held at Queen's University, Belfast in 2001, which provided a forum for a discussion of the new Neolithic material from Ireland in its wider geographical context. Although the bulk of the emerging Irish settlement evidence relates to substantial houses, many of these papers consider wider themes, including issues of contact and communication along the sea routes and coastal margins of north-west Europe, questions of diversity and regional patterns of sedentism and mobility, and variations in regional food production strategies.

The book discusses the latest developments and outlines future trends in the fields of microelectronics, electromagnetics

and telecommunication. It contains original research works presented at the International Conference on Microelectronics, Electromagnetics and Telecommunication (ICMEET 2018), organised by GVP College of Engineering (A), Andhra Pradesh, India. The respective papers were written by scientists, research scholars and practitioners from leading universities, engineering colleges and R&D institutes from all over the world, and share the latest breakthroughs in and promising solutions to the most important issues facing today's society.

The microwave and millimeter wave frequency range is nowadays widely exploited in a large variety of fields including (wireless) communications, security, radar, spectroscopy, but also astronomy and biomedical, to name a few. This Special Issue focuses on the interaction between the nanoscale dimensions and centimeter to millimeter wavelengths. This interaction has been proven to be efficient for the design and fabrication of devices showing enhanced performance. Novel contributions are welcome in the field of devices based on nanoscaled geometries and materials. Applications cover, but not are limited to, electronics, sensors, signal processing, imaging and metrology, all exploiting nanoscale/nanotechnology at microwave and millimeter waves. Contributions can take the form of short communications, regular or review papers.

This book comprises select peer-reviewed papers from the International Conference on VLSI, Communication and Signal processing (VCAS) 2019, held at Motilal Nehru National Institute of Technology (MNNIT) Allahabad, Prayagraj, India. The contents focus on latest research in different domains of electronics and communication engineering, in particular microelectronics and VLSI design, communication systems and networks, and signal and image processing. The book also discusses the emerging applications of novel tools and techniques in image, video and multimedia signal processing. This book will be useful to students, researchers and professionals working in the electronics and communication domain.

The thesis describes the development of receiver technologies for sub-millimetre astronomy instruments, focusing on high performance coherent cryogenic detectors operating close to the superconductor gap frequency. The mixer chip which comprises the SIS devices, fed by a unilateral finline and matching planar circuits was fabricated on 15 micron silicon substrate using the recently developed Silicon-On-Insulator (SOI) technology. This offered broadband IF and RF performance, with fully integrated on-chip planar circuits resulting in an easily reproducible mixer chip and a simple mixer block. An important consequence of this design is that it can be extended to the supra-THz region and making the fabrication of multi-pixel heterodyne arrays feasible. The extension of the operation of major telescopes such as ALMA, APEX and the GLT from single pixel to large format arrays is the subject of extensive research at present time since it will allow fast mapping combined with high resolution of the submillimetre sky. The technology described in this thesis makes a major contribution to this effort.

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