

1. Record Nr.	UNINA9910616361503321
Titolo	Terahertz devices, circuits and systems : materials, methods and applications // edited by Sudipta Das, Anveshkumar Nella, and Shobhit K. Patel
Pubbl/distr/stampa	Singapore : , : Springer, , [2022] ©2022
ISBN	981-19-4105-X
Descrizione fisica	1 online resource (316 pages)
Disciplina	621.3813
Soggetti	Terahertz technology
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Preface -- Contents -- High-Efficiency Hexagonal-Shaped Quad Element MIMO Antenna for Terahertz Applications -- 1 Introduction -- 2 Antenna Design Layout -- 2.1 Quad Element Antenna Design -- 3 Parametric Analysis -- 4 Results and Discussion -- 5 MIMO Diversity Performance -- 6 Losses and Terahertz Channel Capacity -- 6.1 Channel Capacity -- 7 Conclusion -- References -- An Ultra-Thin Octad-Band THz Metamaterial Absorber with Polarization-Insensitivity for Sensor Applications -- 1 Introduction -- 2 Electromagnetic Metamaterial Absorber -- 2.1 Proposed Terahertz Absorber Design -- 2.2 Numerically Simulated Results -- 2.3 Effective Material Parameters -- 3 Surface-Current Distributions and Electric Field Distributions -- 4 Equivalent Circuit Diagram -- 5 Effects of Geometrical Parameters Variations -- 6 Sensor Applications -- 7 Conclusions -- References -- A Terahertz-Based Graphene Metasurface Sensor for Hemoglobin Detection with High Q Factor and Low Figure of Merit -- 1 Introduction -- 2 Design and Modeling -- 2.1 Graphene Conductivity Analysis -- 2.2 Performance-Defining Parameters for Proposed Sensor -- 3 Results and Discussion -- 4 Conclusion -- References -- Design and Analysis of a CPW-Fed Fractal MIMO THz Antenna Using an Array of Parasitic Elements -- 1 Introduction -- 2 Antenna Geometry and Analysis -- 3 Results Analysis -- 4 MIMO Analysis -- 5 Conclusions -- References -- Generation and Detection of Free-Space Terahertz Waveforms -- 1

Introduction -- 2 The Generation and Detection System -- 3 GaAs Photoconductive Terahertz Emitters -- 3.1 Theoretical Framework -- 3.2 Experimental Framework -- 4 ZnSe Photoconductive Terahertz Emitters -- 4.1 Theoretical Framework -- 4.2 Experimental Framework -- 5 ZnSe Electro-optic Terahertz Detectors -- 5.1 Theoretical Framework -- 5.2 Experimental Framework -- 6 Conclusions -- References.

Design of a Frequency Reconfigurable Low Noise Amplifier for the Terahertz Band -- 1 Introduction -- 2 The RF Receiver -- 3 The LNA Design Characteristics: Technical Background -- 4 LNA Design -- 4.1 Transistor Technology and Characteristics -- 4.2 The Proposed LNA -- 4.3 Case Study: Airport Ground Traffic Management -- 5 Simulation Results -- 5.1 DC Characteristics -- 5.2 S\_Parameters -- 5.3 Noise Figure -- 5.4 Stability -- 5.5 Linearity -- 6 Conclusion -- References -- SIMO Array Characterized THz Antenna Resonating at Multiband

Ultra High Frequency Range for 6G Wireless Applications -- 1 Introduction -- 2 Proposed Antenna Design and Analysis -- 2.1 Single Antenna Element -- 2.2 Proposed Single Element Antenna with Ground Structure -- 3 Antenna Array Structure Simulated for Various Substrate -- 3.1 Development of Array from Single Antenna -- 3.2 Substrate Selection for Array Based on Performance -- 4 Conclusion -- References -- Design and Analysis of a Tri-band Dielectric Resonator

Antenna for Terahertz Applications -- 1 Introduction -- 2 Dielectric Resonator Antenna Design -- 2.1 Antenna Geometry -- 2.2 Parametric Study -- 3 Dielectric Resonator Antenna Design -- 4 Conclusion -- References -- III-Nitride HEMTs for THz Applications -- 1 Introduction -- 2 Operation Principle of HEMT -- 2.1 Origin of 2DEG -- 2.2 RF and THz Parameters -- 3 State-of-the-Art Research on III-Nitride

HEMTs for THz Applications -- 3.1 Self-Mixing in GaN-Based HEMT for THz Detector -- 3.2 THz Amplification in GaN-Based HEMTs -- 3.3 THz Generation in GaN-Based HEMT -- 4 Conclusion -- References -- An Analysis on Wireless Communication in 6G THz Network and Their Challenges -- 1 Introduction -- 2 Building Block of 6G and THz

Communication -- 2.1 Structure of Het-Cloud -- 2.2 Information Transmission Middle Networks: High Quick Discovery and Transmission Based Infrastructure. 2.3 Acceleration of Hardware -- 3 Technical Requirements and Consideration Towards 6G THz Mobile Communication -- 3.1

Towards 6th Generation Terahertz Full Stack End-End Network -- 3.2 Enabled Wireless Communication in 6G Terahertz -- 3.3 Revolution of 6G Terahertz -- 4 Terahertz Frequency Challenges -- 5 Advantages of Terahertz Communication -- 6 Disadvantages of Terahertz Communication -- 7 Comparing Performance of Mobile Network -- 8 Conclusion -- References -- Antennas for THz Communication: Fundamentals, Design Structures, and Current Trends -- 1 Motivation for THz Communication -- 2 Different Terahertz Antenna Structures for the Communication -- 2.1 On-chip THz Antenna -- 2.2 Ceramic-Composite THz Lens Antenna -- 2.3 Dipole Antenna with Integrated Balun for Broadband THz On-chip Transition -- 2.4 THz Planner

Antenna Using Photonic Crystal -- 2.5 Leaky Wave Antenna for Sub-Terahertz -- 2.6 Metamaterial-Based Diffracted Ground-Based MPA with Mender Line Approach -- 2.7 Graphene-Based THz Holographic Antenna -- 3 Proposed THz MIMO Antenna Structure -- 3.1 Introduction of Proposed Design -- 3.2 Design and Modelling -- 3.3 Discussion About Results -- 3.4 Conclusion -- 4 Current Trends and Different Applications in THz Communication -- 4.1 Water Dynamics Are Sensing by THz Waves -- 4.2 Detections of Protein -- 4.3 Plasma Wave-Based THz Camera -- 5 Future Trends -- 6

Antenna -- 3 Proposed THz MIMO Antenna Structure -- 3.1 Introduction of Proposed Design -- 3.2 Design and Modelling -- 3.3 Discussion About Results -- 3.4 Conclusion -- 4 Current Trends and Different Applications in THz Communication -- 4.1 Water Dynamics Are Sensing by THz Waves -- 4.2 Detections of Protein -- 4.3 Plasma Wave-Based THz Camera -- 5 Future Trends -- 6

Conclusion -- References -- Compact Photonic Crystal Fiber for Sensing Applications in the THz Regime -- 1 Introduction -- 2 Conventional Optical Fiber Versus PCFs -- 3 Classifications of PCF -- 3.1 High Index Guiding PCF -- 3.2 Hollow Core PCF -- 4 Classifications of Fiber Optical Sensor -- 5 Different Structure of PCF Chemical Sensors in THz Regime -- 6 Different Structure of PCF Biosensors in THz Regime -- 6.1 Blood Components Sensor -- 6.2 Cancer Cells Sensor -- 6.3 Protein Sensor. 6.4 Malaria Sensor -- 7 Milk Sensor -- 8 Gas Sensors -- 9 Environment Sensor -- 10 Conclusions -- References -- Study and Design of the Terahertz Antenna Array -- 1 Introduction -- 2 THz Components -- 2.1 THz sources -- 2.2 THz Detectors -- 2.3 THz Transmission Spectra -- 3 Antennas Adapted to Terahertz Frequencies -- 3.1 The Methodology to Follow to Design a Microstrip Patch Antenna -- 3.2 Results of the Simulations and Discussions -- 3.3 The Comparison of the Results Obtained with Those Available in the Scientific Publications -- 4 Conclusion -- References -- Micromachined Terahertz Metamaterials -- 1 Introduction -- 1.1 Introduction to Metamaterials -- 2 Metamaterials Absorber -- 3 Laser Based Micromachining -- 4 Terahertz Spectroscopy for Characterization -- 5 Conclusion and Future Scope -- References -- THz Design Variable Estimation by Deep Optimization Prior -- 1 Introduction -- 2 THz Scanning System -- 3 Literature Review -- 4 Proposed Methodology -- 4.1 Deep-Optimization -- 4.2 Autoencoder: 3D Model -- 4.3 Architecture of Network -- 5 Result and Analysis -- 5.1 Loss -- 5.2 Accuracy -- 6 Conclusion -- References -- Terahertz Imaging: Timeline and Future Prospects -- 1 Introduction -- 2 A General-Purpose Terahertz Imaging System -- 3 Timeline of Work Done in This Field -- 4 Current Status, Challenges, and Limitations -- 5 Conclusion -- References -- Advances in Signal and Communication Processing for Ultra-High-Speed Terahertz Communications -- 1 Introduction -- 2 Pulse-Based Modulations -- 2.1 Time Spread On-Off Keying -- 2.2 Rate Division Time Spread On-Off Keying -- 2.3 Symbol Rate Hopping TS-OOK -- 2.4 Other Pulse-Based Modulation Schemes -- 3 Single Carrier Versus Multicarrier -- 4 Channel Coding for Terahertz Nanocommunications -- 4.1 Low-Weight Codes -- 4.2 Minimum Energy Channel Code -- 4.3 Nanonetwork Minimum Energy Code. 4.4 Minimum Energy Coding -- 4.5 Low-Weight Channel Code -- 5 Non-coherent Terahertz Receivers -- 6 Conclusion -- References -- Terahertz Antennas - Review and Design -- 1 Introduction -- 2 Development of THz Antennas -- 3 Primary Terahertz Antennas -- 4 Process Technology of Terahertz Antennas -- 5 Challenges in Terahertz Antennas -- 6 Future Advancement in Terahertz Antennas -- 7 Conclusion -- References.

---