

# **2019 PhotonIcs & Electromagnetics Research Symposium – Spring (PIERS-Spring 2019)**

**Rome, Italy  
17 – 20 June 2019**

**Part 1  
Pages 1-873**



**IEEE Catalog Number: CFP19C18-POD  
ISBN: 978-1-7281-3404-8**

**Copyright © 2019 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP19C18-POD
ISBN (Print-On-Demand):	978-1-7281-3404-8
ISBN (Online):	978-1-7281-3403-1

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# Contents

Electromagnetic Modeling of Canonical-target forward Scattering for Radar Applications .....	33
XPS Characterization of Materials for Photonic Applications .....	39
Design and Implementation of Microwave Circuits in 0.35 $\mu\text{m}$ SiGe BiCMOS Technology for UWB Applications .....	48
Single-ended Power Amplifier at 185 GHz with Output Power More than 12 dBm .....	53
Ultra-low Phase Noise RF Oscillator Using High-Q Quad Spiral Resonator .....	58
2D Through-the-wall Radar Imaging Using a Level Set Approach .....	63
Hybridization of the Method of Auxiliary Sources (MAS) with the Fast Multipole Method (FMM) for Scattering from Large Arrays of Cylinders .....	73
Initial Potential-based Time Domain Surface Integral Equations for Dielectric Regions .....	81
Computational Design and Analysis of Efficient Couplers for Nano-optical Links .....	91
High Frequency Diffraction by Rectangular Hole in a Thick Conducting Screen — $H$ Polarization Case	100
Learning Based Holographic Reconstruction through a Diffuser .....	105
Interaction of Transverse-magnetic Waves with Space-time Multiperiodic Filling of the Waveguide ....	110
New Infinitely Differentiable Spline-like Basis Functions .....	114
Numerical Modeling of the Parabolic Wave Equation in Lossless and Lossy Media .....	123
Spatial Prediction of Undersampled Electromagnetic Fields .....	131
On the Achievable Resolution in Inverse Source beyond the Fresnel Approximation: Numerical Results	139
Circular Trace Scanning SAR Imaging Based on Compressive Sensing .....	145
The Design of Online FPGA-based Electromagnetic Tomography System for Rail Crack Inspection ...	150
A New Field Expansion Enabling the Compressive-Sensing-based Diagnosis of Realistic Planar Arrays through Phaseless Measurements .....	155
A Dielectric-horn Integrated Resonator Antenna for Point-to-point Wireless Communications .....	161
Design of Irregularly Shaped Lens Antennas including Supershaped Feed .....	169
Dielectric Resonant Antennas via Additive Manufacturing for 5G Communications .....	174
High-gain V-band Dielectric Lens Antenna for Communication and Direction Finding Systems .....	181
A Two-arm Slot Sinuous Antenna with Improved Polarization Stability .....	185
A Novel Class of Super-elliptical Vivaldi Antennas for UWB Applications .....	190
Deterministic Synthesis of Conformal Aperiodic Antenna Arrays with Pencil-beam Radiation Pattern Characteristics .....	196
A Dual Polarized Stacked Antenna for 5G Mobile Devices .....	203
An Optimized Broadband Waveguide Magic-T for X-band Applications .....	207
A Numerical Study on the Robustness of Ultrawide Band Wearable Antennas with Respect to the Human Body Proximity .....	212
Non-invasive Optical Sensing Method Based on Random Lasing .....	219
Deployable Sensor for Trace Identification of Hazardous Chemicals in Dirty Environment, Based on FAST Gas-chromatography and Quartz Enhanced Photoacoustic Spectroscopy .....	223

Investigation of Tunnel Field Effect Transistor for Biosensing Applications .....	229
Optimized Design Procedure for Low-cost Grating-couplers in Photonics-packaging .....	234
Micro-transfer-printing of InP Photonic Devices to Silicon Photonics .....	242
Electronic-photonic Wafer-level Technologies for Fast Prototyping and Application Specific Solutions ..	249
Graphene Based Tunnel Field Effect Transistor for RF Applications .....	256
Simulation of Aperiodic Amplitude Diffraction Gratings Based on Prouhet-Thue-Morse Sequence .....	260
Large-scale Silicon Photonic Switches .....	268
Kerr Nonlinear Optical Signal Processing in Ultra-silicon-rich Nitride-based Devices .....	274
Reflective Color Filters with Enlarged Color Gamut Enabled by Stacking Silicon Nanowires on Thin-film Coatings .....	280
Constructing Millimeter-structured Surface Beams from Nondiffracting Zeroth-order Bessel Beams in Lossless Media .....	283
Design of a Wireless Link at Microwaves in the Radiative Near-field by Using RLSA Bessel Beam Launchers .....	289
Two-dimensional Quasi-Bessel Beam Synthesis and Frequency-scanning Leaky-wave Launchers .....	295
Generating and Steering of Quasi-nondiffraction Beam by Substrate Integrated Waveguide Slot Array Antenna .....	303
A Simple Method for the Design of Millimeter-structured Inclined Beams: Inclined Superpositions of Zeroth-order Bessel Beams .....	309
Modulation Schemes for Long Distance Optical Communication .....	313
Estimation of Optical Wireless Communication Link Availability Using Meteorological Visibility Data for Major Locations in South Africa .....	319
Backward Energy Flux in Sharp Focus of Beams with Linear and Circular Polarization .....	335
Tiered Structure of Maxwell's Equations .....	339
New Theory of Matter .....	345
Numerical Simulation of Magnetohydrodynamic Blood Flow through Stenosed Arteries Using the R-functions Method .....	355
Characteristics of Rain Attenuation for Microwave-to-terahertz Waveband from Raindrop Size Distribution Observation in Indonesia .....	362
The Effect of Feeding Point on Electromagnetic Emission Due to Heat Sink .....	368
Inverse Synthetic Aperture Radar Imaging of Space Debris Objects .....	372
Assessment of the Urban Three-dimensional Structural Influence on the Satellite Thermal Infrared Measurement .....	377
A Mimo Radar for Vital Signs Recording .....	387
Vortex Electromagnetic Waves Based Synthetic Aperture Radar Interferometry Technique .....	394
Iterative Data Clustering Algorithm of Doppler-associated RPM Imaging for UWB Human Body Imaging Radar .....	400
RF and Network Signature-based Machine Learning on Detection of Wireless Controlled Drone .....	408
A CNN-based Super-resolution Technique for Active Fire Detection on Sentinel-2 Data .....	418
Smartphones Reference Signal Received Power MDT Radio Measurement Statistical Analysis Reveals People Feelings during Music Events .....	427
System Level Analysis of Millimetre-wave GaN-based MIMO Radar for Detection of Micro Unmanned Aerial Vehicles .....	438
Improving Parameters of Cherry-Hooper Amplifier Using Parasitic Elements on the Layout .....	451
S Band Wideband LNA for Future GNSS Receiver with L Band Legacy .....	457

Analysis of Dispersion Characteristics of Helix Slow-wave Structures for Broadband Traveling Wave Tubes with Exact Floquet Approach .....	464
Two-stage Class F-C Power Amplifier with an Optimum 2nd Harmonic Control at the Power Stage Input .....	470
Modeling and Analysis of DC-contact RF MEMS Switch Considering Crosstalk between DC and RF Signals .....	475
Design of a Printed Yagi Array Antenna with Additional Director Element for Broadband Radar Applications .....	480
An X-band Portable 3D-printed Lens Antenna with Integrated Waveguide Feed for Microwave Imaging .....	487
Solution of the Plane Wave Diffraction by the Metamaterial Strip with the Complex Fractional Derivative Method .....	493
Application of the Family of Kravchenko-Rvachev Atomic Weight Functions (Windows) in Welch Method EEG Power Spectral Density Estimation .....	500
Electromagnetic Resonance Scattering by a Field-aligned Cylindrical Density Depletion in a Magneto-plasma .....	507
Generalized Theorem for the $G_1(c, n)$ Numbers .....	513
Analysis of Mathematical Techniques for the Calculation of the Electrostatic Field in a Dielectric-loaded Waveguide .....	519
Geometrical Interpretation of Transition Radiation in a Waveguide .....	525
Transmission Line Model Based on PCB Units and Modified $\pi$ Circuits .....	530
Phase Retrieval of Scalar Fields Radiated by Finite-dimensional Sources through Single-surface Measurements and a Crosswords-like Processing .....	540
Deep Learning for Applications to Ground Penetrating Radar and Electromagnetic Diagnostic .....	547
The “Traps” Issue in a Non Linear Inverse Problem: The Phase Retrieval in Circular Case .....	552
Orbital Angular Momentum and Virtual Experiments for Microwave Imaging .....	560
UWB Reversible Structure All-textile Antenna for Wireless Body Area Networks Applications .....	566
Assessment of Actual Maximum RF EMF Exposure from Radio Base Stations with Massive MIMO Antennas .....	570
MM-wave Patch Antenna with Embedded Photoconductive Elements for 1-bit Phase Shifting .....	578
Reconfigurable MIMO Filtenna for Spectrum Underlay Cognitive Radio .....	582
ACS-fed Electrically Small Metamaterial Inspired Dual Polarized Antenna Enabled with Staircase Radiating Strips for UMTS/WiMAX/WLAN Applications .....	587
Dual Circularly Polarized Slot Antenna with Novel Isolator .....	595
An Ultrawide-band Dual Polarization SAR Antenna for Space Applications .....	599
Dielectric Resonator Based MIMO Antenna with Circular Polarization Diversity for WiMAX Applications .....	604
Dual-band Four Port MIMO Dielectric Resonator Antenna for WLAN/WiMAX Applications .....	613
Design of Shark Fin Integrated Antenna Systems for Automotive Applications .....	620
Design of Frame Integrated Antennas for Mobile Handset .....	628
A High-speed Vertical Transition for Multi-layer AlN Carrier Boards Designed by Time-domain Reflectometry .....	637
Utilising Glycobiology for Fluorescent Nanodiamond Uptake and Imaging in the Central Nervous System .....	647
Study of Piezoelectric-mechanical Properties of III-V Nitride Based Tunnel FET .....	654
Thermo-optic Effect of 4H-silicon Carbide at Fiber-optic Communication Wavelengths .....	658
Design of a Fractal Metasurface Based Terahertz Broadband Absorber .....	663

A Single TE <sub>01</sub> Mode Fiber Laser .....	667
Topological Decompositions of Single Point Spaces and Null Spaces as Photon Source: Creation Phases of Light at Early Universes .....	
Study on a Multi-channel Switchable and Environment Self-adaptive Ultrasonic Sensor in an Erbium-doped Fiber Ring Laser .....	678
Quantum Behavior in Mesoscale Lasers .....	684
Corrosion Evaluation of Steel Reinforcing Bar Using Electromagnetic Method .....	690
Magnetic Anomaly Detection of Defects in Underground Ferromagnetic Pipeline Using Variational Mode Decomposition and Scale-space Segmentation .....	694
Defect Detection of Metal Pipeline Based on Harmonic Eddy Current .....	700
Helicity of EM Pulses with Gaussian Envelope .....	705
Investigation of Fractional Cylindrical Bessel Beams .....	714
Localized Bessel Beams for Through-the-wall Communications .....	718
Numerical Optimization of Grating Coupler Parameters for InP-based Photonic Circuits .....	721
Fields and Modes in Thin Film Coated Optical Waveguides .....	725
Modelling of Quantum-confined Stark Effect in III-V Heterostructures for Electro-optic Modulator Applications .....	733
Temperature and Pump Dependent Operation of Short-cavity Erbium-doped Fiber Laser .....	741
Studying Key Principles for Design and Fabrication of Silicon Photonic-based Beamforming Networks .....	745
Optoelectronic Microwave Signal Time-retarding Device .....	752
Influence of Molecular Hydrogen Loading on Luminescent Properties of Heavily Er <sup>3+</sup> -doped Silica Optical Fibers .....	759
Tunable Wave Isolators Based on Space-time Modulated Graphene Sheets .....	763
RF Coils for Preclinical Multinuclear Imaging Based on Coupled-wire Structures Working in Resonant and Non-resonant Regime .....	771
Multiband Microwave Metamaterials Based on Optimized Arrangements of Split-Ring Resonators .....	779
Comparison of Complementary Metamaterials in Microstrip Transmission Line and Applications .....	789
Full-space Coverage Leaky-wave Antenna Based on Successive Space Harmonics .....	795
A Times-4 Frequency Multiplier from K- to W-band .....	801
A Reduced Sampling Scheme for Planar Near-field Measurements Using Pointwise Probe Correction in the Spherical Harmonics Basis .....	809
Daisy Chain MIMO Antenna: A Big Challenge to Full-azimuth 100 Gbps Capacity .....	817
Over-the-air Testing of a <b>32 × 32</b> Daisy Chain MIMO Antenna .....	824
Frequency Content of Carrier Oscillations along B-DNA Aperiodic and Periodic Polymers .....	831
A Miniaturized Design of Shared-aperture Antenna with High Aperture Reuse Ratio for 5G Applications .....	839
A Theoretical Investigation of Three-dimensional All-dielectric Dual-band Polarization Based on Multi-folds Arrow Structure .....	847
A Computational Model for Electromagnetic Characteristics of Anisotropic Composites Based on Machine Learning .....	854
Design and Analysis of Improved Performance Amorphous-silicon Thin Film Solar Panel .....	860
Optimization of Magnetics Component Performance of the Interleaved Converters .....	867
Study on the Enhancement of Diamond Fluorescence Characteristics by Multi-layer Anti-reflection Coating .....	874
A Multiscale, Multiphysics Approach to Vertical-cavity Surface-emitting Laser Simulation .....	881
Research of Magnetic Fluid in the THz Frequency Range .....	889

Investigation of Optical Signal Regeneration Impact on Power Efficiency of Single-line-rate and Mixed-line-rate Wavelength Division Multiplexing Systems .....	896
Correlation Problems in Optical Multichannel Systems in Satellite Communication .....	902
The Possibilities of Using LED Photometry and Ellipsometry Technology for Monitoring the Aquatic AnvIRONMENT .....	908
Efficient Sampling of the Near Field Radiated by a Planar Source: Numerical Results .....	915
Meter Wave Radar Cross Section Analysis: What Does “Resonance” Really Mean? .....	919
A Novel Design and Simulation of a Ku Broadband Double Ridged Guide Horn Antenna for Satellite Communications .....	923
Dual-polarized Wideband Horn Antenna with Lower Frequency Extension for Microwave Imaging Ap- plication .....	930
Evaluation of Receiver Operating Characteristic Curves in a Microwave Apparatus for Breast Lesions Detection .....	935
Microwave Imaging for Stroke Detection: Validation on Head-mimicking Phantom .....	940
Phase-weighted UWB Imaging through Huygens Principle .....	949
Modeling of Magnetolectric Effect in Multiferroic Antenna .....	953
Multiband Microstrip Antenna Using Square-shaped SRR Based Artificial Magnetic Conductors .....	957
High Gain Dual Linearly Polarized Patch Antenna Array .....	961
Electromagnetic Analysis and Performance Comparison of Fully 3D-printed Antennas .....	964
Studies on Metamaterial CRLH-TL Based Wideband/Multiband Dual Performance Circularly Polarized Conformal Antenna for Modern Wireless Applications .....	971
Triple Band Uniplanar Antenna Loaded with Multiple Radiating Elements for Compact Wireless Systems .....	981
Technical Developments for Sidelobes Suppression of Millimeter Wave Array Antennas .....	988
Multi-section Unequal Power Divider Using a Decomposition Method .....	993
Design and Fabrication of a 670 GHz Sub-harmonic Mixer with Hybrid Integration .....	999
Frequency Selective Resorber with a Wideband Transmission and Two-sided Absorption Bands .....	1003
Insulator Contamination Measurement Based on Infrared Thermal and Visible Image Information Fusion .....	1006
Design Novel Structure of High-voltage MOSFET with Double-Trench Gates .....	1012
Study on Equivalent Circuit of Wideband Microstrip Bandpass Filter Involving Defected Ground Struc- ture .....	1018
Ku-band Bandpass Filter Design with Compact Size and Broad Stopband by pHEMT Process .....	1022
Design, Fabrication, and Wireless Evaluation of a Passive 3D-printed Moisture Sensor on a Textile Substrate .....	1027
Feasibility Study on Target Detection and Localization Using Uncooperative PRI-agile Phased Array Radar .....	1031
Coherent Integration Method of High-speed Target for Random PRI and Staggered PW Radar .....	1037
The Use of Phase-shift Keyed Signals with a Zero Autocorrelation Zone in a Multi-position Radar System for Searching and Detecting of Space Debris Objects .....	1043
Improved Fingerprint Segmentation Based on Gradient and Otsu’s Method for Online Fingerprint Recog- nition .....	1050
Spectro-spatial Graph-based Deep Restricted Boltzmann Networks for Hyperspectral Image Classification .....	1055
Defocused Ion Beam Etching of the Silicon Probes for High Resolution Atomic-force Microscopy .....	1063
Electro-thermal Model of Approximated Organic Tissue for Investigation of Harmful Electrosurgical Impacts .....	1067

A Genetic Algorithm for the Retrieval of Soil Multi-scale Roughness and Moisture Parameters .....	1074
Retrieval of Soil Moisture Using Sliced Regression Inversion Technique .....	1081
Polarized Bistatic Scattering from a Spatially Anisotropic Rough Surface with Inhomogeneous Dielectric Profile .....	1090
MIMO Radar with Dense or Random Pattern: Analysis of Phase and Positioning Error Sensitivity ..	1098
Application of Polarimetric Decomposition and Interferometric SAR Using ALOS-2 PALSAR-2 Data to Detect Potential of Combustible Peatland Areas .....	1106
Impact of a Spatial Decorrelation of the Noise on the Performance of Despeckling Filters for Polarimetric SAR Data .....	1113
Usage of Cellular Device for Mapping of Moving and Obscured Targets .....	1122
Inductive Double-layer Harvester with Changeable Geometry .....	1133
Antennas Design for the Characterization of an UHF Remotely Powered UWB Pulse Generator .....	1142
Design of Practical Rectennas for RF Energy Harvesting .....	1149
Self-adapting Impedance Matching Circuit for UHF RF Energy Harvester .....	1157
Effects of the Temperature on the Efficiency Degradation in Multi-stage RF Energy Harvesters .....	1161
A Multiband 150 nm CMOS Energy Harvester Architecture .....	1165
Currents and Voltages Induced by Electric Field in Two Converging Single-wire Overhead Transmission Lines .....	1171
Electromagnetic Waves Guided by a Myelinated Axon in the Optical and Infrared Ranges .....	1180
Computation of Electropulse-driven Regeneration of Magnetic Heterogeneous Materials .....	1185
Resonant Properties of Impedance of a Two-layer Cylindrical Metal-dielectric Waveguide .....	1190
Dual Circular Polarization Textile Antenna for L1 and L2 GPS Applications .....	1196
Statistical Design Centering of Microwave Circuits Using Modified Trust Region Optimization and Space Mapping Surrogates .....	1201
Single-step Phaseless Inverse Scattering Approach .....	1207
Fourier Analysis for the Reconstruction of Radiating Sources on Conic Curves .....	1212
Numerical Analysis of Electromagnetic Multiphase Fraction Sensor .....	1219
Surface Impedance Boundary Conditions under Transmit and Receive Conditions .....	1226
Analytical Formulas for Frequency-unbalanced Periodic Leaky-wave Antennas .....	1236
New Beamwidth Formulas for 1-D Leaky-wave Antennas: A Review .....	1243
Lysine Assisted Self-assembly of Silica Microspheres on Textured Polycrystalline Silicon Solar Cells for Light Trapping .....	1252
Assessment of the Modulation Transfer Function in Infrared Focal Plane Arrays .....	1258
NEGF Modeling of Carrier Transport in Antimonide-based Type-II Superlattice Absorbers .....	1265
Inter-pixel Crosstalk in Auger-Suppressed Dense Infrared Detectors .....	1269
Gap-surface Plasmon Metasurfaces for Structured Beams Generation .....	1276
Effect of Activating Agent on Electromagnetic Waves Absorption of Carbon-based Radar Absorber Material .....	1281
Making an Active Carbon from Candlenut Shell for the Application of Electromagnetic Wave Absorbers .....	1284
Pyramidal Radar Absorber Based on Coconut Shell Activated Carbon for Anechoic Chamber Application .....	1287
Raman Spectroscopy for Biomedical Applications: From Label-free Cancer Cell Sorting to Imaging ..	1292
Surface-enhanced Raman Spectroscopy in Microfluidic Chips for Directed Evolution of Enzymes and Environmental Monitoring .....	1301



Spectrally Tunable Germanium-on-silicon Photodetectors: Design and Simulations .....	1310
Statistical Characteristics of Scattered Electromagnetic Waves in the Conductive Magnetized Plasma	1318
The Propagation Characteristics of Terahertz Wave in a DBD Plasma .....	1323
The Microwave Propagation in a Dust Plasma of a DC Glow Discharge .....	1327
Analysis and Optimization of Microwave Transmission in a Magnetized Plasma-Metal Model .....	1332
Electromagnetic Wave Propagation in a DC Grid Anode Discharge Helium Plasma .....	1337
Electrical Conductivity and Dielectric Permittivity in Microwave Non-maxwellian Plasmas .....	1342
Method for Phased Antenna Array Autofocusing with Amplitude-only Measurements .....	1349
Experimental Analysis of Fully Polarimetric Radar Cross Section of Fixed-wing UAV .....	1354
Experimental Testing of a Nonredundant Spherical Spiral NFFF Transformation for Offset Mounted Quasi-planar AUTs .....	1359
Design and Implementation of External Calibration System for GF-3 Polarimetric Transponder .....	1367
Fabrication Challenges in Embedding of Components and Embroidered Conductors into 3D-printed Tex- tile Electronics Structures .....	1372
Experimental Study of a Low-profile Wideband Antenna Array Unit Cell with Integrated EBG Structure .....	1378
DC Grounded 45° Band Switchable Slant Polarized Antenna .....	1383
An Exploration of Curriculum Teaching Reform in the Electromagnetic Field Course Based on the Idea of Engineering Education Professional Certification .....	1387
The Educational Link between Technical Interpretation and 3-D Vector Field Visualization of Time- marching Electromagnetic Fields .....	1392
Einstein at a Crossroads: The Lorentz Force and Time Dependence of a Charged Particle Mass .....	1397
Resonant Half-wave Dipole and Its Odd Integral Multiples .....	1405
The Model of Equivalent Radiofrequency Electromagnetic Field Exposure for Biological Effect Assess- ment .....	1413
Hydration as Classifier of Dielectric Measurement Data from 500 MHz to 50 GHz .....	1416
3D Printed Multi-layer Molds of Human Head Tissue Phantoms for Microwave Stroke Detection .....	1424
Evaluating of Spatial and Contrast Resolution Ability of 2D Microwave Imaging System .....	1428
Multi-physic Numerical Study of Microwave Hyperthermia Treatment .....	1434
Increased Hippocampal Level of Kinases after Long-term Exposure to GSM-2100 Cell Phone Radiation	1439
Biological Effects of Power Frequency Electric Field Shielding .....	1445
Research of Biological Effects of EM Field in Microwave Frequency Band .....	1449
The Proliferation of <i>Saccharomyces Cerevisiae</i> Exposed to Pulsed Magnetic Fields of Low Intensity Suggests the Presence of a Frequency Window between 20 Hz and 77.5 Hz .....	1452
Three-dimensional Model of Gastric Pacemaking Using Finite-elements and Stochastically Coupled Os- cillators .....	1459
Accurate Nyström Solution for Electromagnetic Scattering by Sharp-corner Objects .....	1463
A Temperature Measurement Method Based on Visible Light Chromaticity Index and $k$ -nearest Neigh- bors Algorithm .....	1467
The Design of Automatic Gain Control Amplifier with Fast Response .....	1473
The UAPO Solution for the Plane Wave Diffraction by a DPS/DNG Material Coated Wedge .....	1477
Comparison of Approaches to Localization of a Wideband Pulse Signal .....	1481
Magnetic-field Induced SPP Near-field Modulation in Magnetoplasmonic Heterostructures with Ultralong- range Propagating Modes .....	1486
Complete Transfer of Terahertz Surface Plasmon-polaritons Based on STIRAP .....	1489

Inverse-design of an Ultra-compact and High-efficiency Silicon-on-insulator Mode Expander .....	1493
A Python-based Automatic Detection Method for the Performance of Vibration-temperature Composite Sensor .....	1499
Detection of Optically-generated THz Radiations by EO Sampling Using Modulator-based Optical Comb Source .....	1504
Capacitive Sensing Element with a Magnetic Fluid for Detecting of Change of Magnetic Field .....	1507
Theoretical Assessment of Plasma Current Measurement in Tokamaks in Relation with the OTDR Detector Noise .....	1511
Network Slicing in the Scope of Net Neutrality Rules .....	1516
Secrecy Performances of Wireless Relay Systems Affected by Hardware Impairments .....	1522
Silicon Photonic Resonator Design with Tunable Multimode Interference Coupling Structures .....	1530
Multi-sensor Data Mining of Single Train Braking System Based on Long Short-term Memory Network	1537
Intelligent Control of Freight Train Braking System Based on Hardware-in-the-Loop Simulation Platform .....	1542
Miniature Multiferroic Interferometer for Voltage-controlled Spin-wave Logic Gates .....	1547
The Study of P-pillar and Trench Technology in VDMOS .....	1552
Defected Ground Structure for Characteristic Enhancement of CSRR-based Substrate Integrated Waveguide BPF .....	1557
A Tunable Power Divider with Continuous Dividing Ratio and Wide Tuning Range .....	1561
Radio Astronomical Signal Preprocessing Technology in the Future .....	1565
Non-contact Pulse-based Radar with an Excited RF Pulse Generator for Vital-sign Application .....	1569
Wireless Power Transmission System for a Rotating Propulsive Shaft with Multiple Transmit and Receive Coils .....	1574
Simulation Tool for Optimization of Planar Inductors .....	1579
Output Power of the Carbon Nanotube-based Rectenna .....	1584
Estimation of the Size of Space Debris Objects by the Value of the Radar Cross Section Variations ..	1587
A Novel Sparse Deconvolution Algorithm Based on Iterative Regularization .....	1592
Regional Variability of Raindrop Size Distributions in Indonesia as Inferred from Principal Component Analysis .....	1597
Machine Vision for Obstacle Avoidance, Tripwire Detection, and Subsurface Radar Image Correction on a Robotic Vehicle for the Detection and Discrimination of Landmines .....	1602
High Resolution Magneto-optical Microscopy of Bi:YIG-thin Films with Both Domains and Topography Characterization .....	1607
Synergistic Use of Satellite Active and Passive Microwave Observations to Estimate Typhoon Intensity	1612
Global Navigational Satellite System Phase Altimetry of the Sea Level: Systematic Bias Effect Caused by Sea Surface Waves .....	1618
Ocean Target Radar Image Reconstruction from GNSS-R Delay-Doppler Map .....	1628
Accuracy of Era-Interim Re-analysis Data on Some Atmospheric Parameters over Open Oceans, Estimated with the AMSR2 Data .....	1632
Polarization-independent Tunable Optical Filter with Variable Bandwidth Based on Silicon-on-insulator Waveguides .....	1637
Giant Broadband Refraction in the Visible in a Disordered Ferroelectric Perovskite .....	1647
Photobleaching at the Surface of 1D-photonic Crystal Biochips .....	1656
Thin Film Photosensor Integrated on Planar Waveguide for Lab-on-Chip Applications .....	1662
Focusing 1D Silicon Photonic Grating Coupler in Photonic BiCMOS Technology for the Excitation of the Fundamental TM Mode .....	1667

Fiber-optic Temperature Sensing Scheme by Using Stimulated Brillouin Scattering Effect in a Recirculating Fiber Ring .....	1674
A Novel Integrated RESM-CESM Antenna for Naval Platforms .....	1678
Wideband Reflectometer Design Using Complex Ratio Measuring Unit and Broadband Directional Coupler .....	1683
Robust GaN Limiting LNA for C-Ku Band T/R Modules .....	1688
Spurious-free Ultra-wideband Downconverter in 3U Size for EW System .....	1695
40 nm-CMOS W-band Phase Shifter for Millimeter-wave Phased Array .....	1700
Synthesis of an Impedance Plane Which Reflects Several Incident Plane Waves in a Given Direction ..	1706
Analysis of the Scattering Characteristics of Single-mode Van Atta Waveguide Arrays on a Perfectly Conducting Cylinder .....	1714
Novel High-sensitivity Non-destructive Technique for the Measurement of Permittivity of a Low-loss Dielectric Slab in Free Space .....	1723
Stability of Least Squares for the Solution of an Ill-posed Inverse Problem of Reconstructing Real Value of the Permittivity of a Dielectric Layer in a Rectangular Waveguide .....	1732
Electromagnetic Scattering from Truncated Thin Cylinders: An Approach Based on the Incomplete Hankel Functions and Surface Impedance Boundary Conditions .....	1739
Reduction of the RCS of Metal Cylinder Using Conformal Anisotropic Metasurface and Linear Tightly Coupled Dipole Array .....	1743
Extended Maxwell's Diamond Equations to Unify Electromagnetism, Weak Gravitation, and Classical and Quantum Mechanics and Their Application for Semiconductor Devices .....	1749
Hybrid Waves in a Cylindrical Anisotropic Inhomogeneous Metal-dielectric Waveguide .....	1757
Introduction to TTs Guided by Null-to-Wave-to-Particle Deformations: Inflective Wave Functions of a Single Point Space .....	
Simulator of Hydroacoustic Signals for a Complex System of Underwater Environment .....	1774
Topological Ingredients of Single Point Spaces: The Phases of Nonexistence to Existence Passages for Null Space to Thing Space .....	
Joint Sparsity and Inverse Source for Three-dimensional Shape Estimation of Unknown Targets .....	1787
Terahertz Fabry-Perot Cavity Leaky-wave Antennas .....	1792
A Binary-switch Controlled Periodic Half-width Leaky-wave Antenna for Fixed Frequency Beam Steering near the Endfire Region .....	1799
Releasable Micro-waveplates .....	1804
Bend Loss Properties of the Octagonal-core and Nodeless Large-mode-area Anti-resonant Hollow-core Fibers .....	1807
Investigation of 100 GHz Output Power Performance in Uni-travelling Carrier Photodetector under Zero-bias Condition .....	1813
Automated Prototype of Photonics-based RF Receiver with Extended Bandwidth and Increased Tuning Speed .....	1817
Beamforming with Photonic Integrated Circuits for Millimeter Wave Communications and Phased Arrays .....	1821
GMM Estimation and BER of Bursty Impulsive Noise in Low-voltage PLC Networks .....	1828
The Features and Improvements of the Topside Ionospheric Data Extraction from the Irkutsk Incoherent Scatter Radar .....	1835
Features of Longitudinal Variations of Geomagnetic and Ionospheric Parameters during Severe Magnetic Storms in 2015 .....	1840
Possibilities of Satellite Radio Tomography and Related Products for Studying the Ionospheric Structures in Various Geophysical Conditions .....	1849

Dispersion Properties of a Backward Wave Oscillator with Modified Rectangular Corrugations .....	1856
Use of Software Defined Radio Receivers for Antenna Measurements .....	1862
Design and Electrical Characteristics of a Microwave Multiband Single Slotted Antenna with Different Dielectric Substrate Materials .....	1870
The Radar Detection Method Based on Detecting Signal to Clutter Ratio (SCR) in the Spectrum ....	1876
On the Influence of Probe Positioning Errors due to Mechanical Uncertainties in Spherical Near-field Measurements at Terahertz Frequencies in Modern Positioner Systems .....	1883
Wideband Spiral Antenna with Superstrate Designs for Radio Altimeter .....	1889
Calibration of a Reverberation Chamber for Radiated Emission Measurements by Wall Mounted Antennas .....	1893
Transient Simulation of the Pulse Excitation of Transmission Line Networks with Linear and Nonlinear Loads in Reverberation Chambers .....	1900
Statistical Analysis of Interference in a Real LTE Access Network by Massive Collection of MDT Radio Measurement Data from Smartphones .....	1906
Quasi Monte Carlo Methods for Uncertainty Quantification of Partial Element Equivalent Circuit Models .....	1917
Cyclostationary Source Separation Based on Electromagnetic Measurements in the Near-field of PCB	1922
A Novel Approach to Radiated Emissions Modeling of Low Voltage Differential Signal on SpaceWire Cable Employing Differential Evolution .....	1929
New Clinical Indications for Microwave Thermal Ablation and Corresponding Challenges in the Applicator Design .....	1937
Microwave Ablation Antenna for Functional Adenomas in the Adrenal Gland .....	1943
Non-linear Microwave Imaging Using Fast Iterative Shrinkage Thresholding .....	1949
A Nyström Method with Lagrange’s Interpolation for Solving Electromagnetic Scattering by Dielectric Objects .....	1957
Research of Time-domain Model of Microwave Radiation Field Measurement System Based on Scatter Parameters Transient Analysis .....	1961
Combining Parabolic Equation Method with Surface Integral Equations .....	1967
The Use of Electronic Terrain Maps for Solving the Problem of Calculating the Propagation of Radio Waves above the Earth’s Surface .....	1971
Accurate Image Recognition in Convolutional Neural Networks Based on Two-dimensional Discrete Fourier Transform .....	1975
Experimental X and Gamma Ray Measurement of Nanoparticles and Nanolayers .....	1979
Multi-chip Communication System of VLBI Hardware Correlator .....	1984
Design Analysis of Omnidirectional Single Reflector Antennas Synthesized for a Cosecant Squared Coverage in Elevation Plane .....	1989
NDF and PSF Numeric Results of Elliptical Sources .....	1994
Comparing Planar Resonant Periodic Structures .....	2000
Subwavelength Diffraction Grating with Continuous Ridges for Inverse Energy Flux Generation .....	2005
Modeling of Distorted Optical Signals in Long-haul Transmission Systems .....	2011
General Theory of the Resonant Spectrum of Multi-ring Resonators .....	2018
Differentiation of the Laser Pulse in a Waveguide with a Bragg Grating .....	2025
Heat-induced Active Centers in Bismuth-doped Optical Fibers for 1.7- $\mu$ m-region Laser Applications ..	2032
Evaluation of the Impact of MZM Frequency Response on BER Performance of PAM-4 Modulated WDM-PON .....	2037
The Influence of Temperature on Pulse Duration and Spectrum of Laser Diode Matrixes Used for Range-gate Vision Systems .....	2043

Development of a Robotic Surgical System of Thermal Ablation and Microwave Coagulation .....	2047
Image Reconstruction Based on Compressive Sensing Using Total Variation Spatial Regulation for Microwave Imaging .....	2052
A Compact UHF Planar Monopole Antenna Using Magnetodielectric Ferrite Substrate .....	2058
An 150 GHz Waveguide Bandpass Filter Based on Micro-satellite Platform .....	2062
Manufacturing Process Development of the Multi Steps Optical Filter for Narrow Spectral Selection ..	2066
A GaAs Integrated Power Divider Based on Microstrip and <i>LC</i> Structure with Optimized Capacitance	2070
Fourth-order Electrical Tunable Microstrip LC Cross-coupled Bandpass Filter .....	2076
A 3-Bit Passive Wireless Strain Sensor Design Based on Backscattering Principle .....	2080
Novel Distance Measurement Method Using Inband-RFID-Technology .....	2085
Measurement of Electromagnetic Characteristics Materials in a Rectangular Waveguide .....	2088
A Wireless Charging Station for Multipurpose Electronic Systems .....	2093
Design and Optimization of High-efficiency Rectenna for RF Energy Harvesting .....	2098
Reducing the Noise Level in a Gaussmeter with a Hall Probe for Reliable Magnetic Impedance Tomography .....	2106
A New Method for Estimation of Baseline Incline Angle for Double-side Looking Interferometric Imaging Radar Altimeter .....	2112
High-vidid Uniformly-moving Target Deception Jamming Method against SAR-GMTI Based on Inverse Omega-K Algorithm .....	2116
Effect of Earthquake Intensity to Land Deformation Observed from Space .....	2123
Researches on Wavenumber Domain Stolt Interpolation Algorithm for Highly-squint Wide Swath FMCW SAR .....	2129
A Distributed Cooperative SAR Three-dimensional Imaging Method .....	2139
Ionospheric Response to the Atmospheric Waves Generated during First Launches from the Vostochny Space Center .....	2147
Analytic MTF Expression for a Turbid Medium .....	2157
Dielectric Relaxation in Wet Soils at Frequencies from 10 kHz to 10 MHz .....	2160
Dielectric Relaxation in Clays in a Wide Range of Frequencies at Temperatures from $-15^{\circ}\text{C}$ to $25^{\circ}\text{C}$ ..	2167
An Optimized Calibration Method for Integrated Nephelometer: A Case Study in Winter Shanghai ..	2173
Relation of Traveling Ionospheric Disturbances Characteristics with Planetary Waves in the Middle Atmosphere .....	2176
$^{14}\text{N}$ NQR Study of Tetrazole Derivatives for Potential Applications in Security, Detection of Counterfeit Drugs and Pharmaceuticals .....	2183
Experimental Demonstration of a Horseshoe-shaped 16-channel Arrayed Waveguide Grating (De)multiplexer .....	2189
Geocalibrating Millimeter-wave Spaceborne Radiometers for Global-scale Cloud Retrieval .....	2193
Applications of the Scheimpflug Lidar Technique in Atmospheric Remote Sensing .....	2198
Comparison of Satellite Products on Total Atmospheric Water Vapor Content over the Arctic Sea Ice ..	2204
Atmospheric Retrievals in Hurricane Based on MWHTS Aboard FY-3C Satellite .....	2210
A Design of High Speed and Broadband Hyperspectral Microwave Receiver Subsystem for Sounding Atmosphere .....	2215
Improved Spatial Collocation and Parallax Correction Approaches for Intercalibration among Different Sensors in Thermal Infrared Band under the Framework of GSICS .....	2220
Model of Information Logistics in EMF RATEL System for Long-term EMF Monitoring .....	2226
An Air Quality Monitoring System with Enhanced Coverage Capabilities by Using the Modulated Scattering Technique (MST) .....	2235

Rigorous Integral-equation Modeling of Wave Scattering and Guiding by All-dielectric Grating-assisted Metasurfaces .....	2241
Gradient Methods in the Minimization of Quartic Functionals: Phase Retrieval in Circular Case .....	2247
Physics-based Analysis to Address Critical Aspects of FinFET Mm-wave Applications: Variability and Thermal Management .....	2255
Theory and Experiment of a Compact Waveguide Polarization Diplexer .....	2263
Electromagnetic Characterization and Design Note of a Sub-THz SiGe Voltage-controlled Oscillator ..	2268
An Air-filled Circularly Polarized Monochromatic Multimode Helical Beam Antenna .....	2274
3-D Beamforming Wideband Antenna for 5G Application .....	2279
Design and Implementation of a Multi-gigabaud, mm-wave Communication System .....	2286
Design and Modeling of a Microstrip Patch Antenna by Using Finite Difference Time Domain (FDTD) Method and Computer Aided Simulations .....	2291
Interpolation Type Schemes Application to Analysis of Electromagnetic Field Propagation .....	2298
A Mechanism of Simultaneous Switching Noise in Multiple Plane Conductors Using Two Dimensional Transport Theory .....	2303
Development of Mode-matching Techniques to Efficiently Model Multi-mode Horns with Non-PEC Walls .....	2308
Performance Comparison of Learned vs. Engineered Features for Polarimetric SAR Terrain Classification .....	2317
Single-input Multiple-output Multi-carrier Wireless Indoor Direction Finding in a Compact Multipath Scenario Using 2.4 GHz ISM Band2 .....	2325
Adaptive Beamforming Algorithm in Real Numbers Arithmetic .....	2331
Triangulation Positioning by Means of Wi-Fi Signals in Indoor Conditions .....	2339
Comparison of Phase-less Direction of Arrival Estimation Methods for Switched Beam Antennas .....	2346
Performance Evaluation of Low-complexity Receivers for MIMO Underwater Spatially Correlated Channels .....	2355
A Multi-antenna Iterative Frequency-domain Detection for Power-efficient NOMA Schemes .....	2361
Multi-beam Physical Security Scheme: Security Assessment and Impact of Array Impairments on Security and Quality of Service .....	2368
Low Complexity Millimeter Wave Point-to-point Communication: Interference Assessment of BPSK vs QPSK Decomposition .....	2376
Repetition Rate Adjustable Dual-wavelength Solitons Fiber Laser Based on Highly Nonlinear Fiber ..	2385
Dynamics of High Peak Power Pulses near 1.9 $\mu\text{m}$ in a Standard Single-mode Telecom Fiber .....	2391
High Power Multi-soliton and Noise-like Pulse Generation Regimes in a Passively Mode-locked Thulium-doped All-fiber Ring Oscillator .....	2399
Bismuth and Bismuth Telluride Thin Films Deposited by MOCVD upon Tapered Fiber Sections as Q-switches for Fiber Lasers .....	2405
Four-wave Mixing with Orbital Angular Momentum Light in a Ring-core Fiber .....	2413
Efficient Simulation of Symmetric Field Propagation in Parabolic-index Fibers .....	2416
Design of a Broadband Omnidirectional Metasurface Antenna Using Characteristic Mode Analysis ...	2424
Rigorous Modal Analysis of Resonators with Dispersive Materials .....	2430
Development of a SERS-based Diagnostic Method for Coronary Heart Disease with Urine .....	2434
Annealing Effect on the Nano-meter Scale Titania/Silica Multi-layers for Mirror Coatings of the Laser Interferometer Gravitational Waves Detector .....	2437
High-frequency Analysis of Diffraction from Baffles in Gravitational Wave Interferometers .....	2443

Double-gate Tri-active Layer Channel Amorphous-IGZO Thin Film Transistor for AMLCD Pixel Circuit .....	2448
Repulsive Casimir Force, and Magnetodielectric Casimir Friction .....	2454
Terahertz Modal Analysis of a Grounded Liquid-crystal Cell and Its Application as a Tunable Cavity Antenna .....	2460
THz Applications: From Acceleration to Laser Pulse and Plasma Diagnostic .....	2465
Computational Multi-term Time-space Fractional Bloch-Torrey Models in Three-dimensions .....	2474
On Fractional Viscoelastic Fluids Flowing over a Permeable Surface .....	2485
Heat Transfer of Fractional Maxwell Fluid over a Moving Plate with Cattaneo-Christov Flux .....	2488
Unsteady Mixed Convection Heat Transfer of Fractional Viscoelastic Nanofluids over an Inclined Plate	2504
Spatial Magnetless Nonreciprocity .....	2512
Drift-induced Nonreciprocal Graphene Plasmonics .....	2515
Sensitivity and Sensing Depth Analysis of Open-ended Contact Probes for Cancer Diagnosis .....	2523
Dielectric-loaded 5.8 GHz Interstitial Monopole Antenna for Spherically-shaped Hepatic Tumors Ablation .....	2529
Non-contact Monitoring of Respiration and Heart Activity of Infants Using UWB Signals .....	2534
Improving SAR Homogeneity in a Layered Spherical Model of Head for Hyperthermia Treatments with RF Phased Array Systems .....	2538
Lens Applicator for Deep-local Treatment of Cancer by Microwave Hyperthermia .....	2547
The Progress of Mark6 Usage in Chinese Radio Astronomy Observatory .....	2554
Tow-tone Radar Sensor Based Target Detection and Classification Scheme .....	2559
Properties of Axial Caustic under Autofocusing of Airy-like and Chirped Beams .....	2563
A Plasma Chamber: Electromagnetic Modeling and Experiments .....	2570
Numeric Simulations on the Choice of Curve Parameters for ED and SVD Analysis of Radiating Sources .....	2574
Synthesis of Microwave Concave Semitransparent Screen for Reduction of Radiation in the Shadow Domain .....	2581
Magnetoelectric Current Sensor Based on MEMS Technology .....	2587
Interpretation on Electromagnetic Interference between Open Cable Trays .....	2593
Calculation of Electron Beam Properties under the Presence of an Axially Varying Magnetostatic Field by Using the FDTD Code COCHLEA .....	2598
Performance Analysis of High- $k$ Dielectric Based Double-gate Carbon Nanotube MOSFET .....	2603
Photonic Jets Arrays Produced by Triangular Dielectric Prisms for Mid-IR Imaging .....	2610
Realization of Moirè Pattern Photonic Crystal for Electromagnetic Wave Propagation Applications ..	2615
Analysis of the Errors in Polarimetry with Full Poincaré Beams .....	2621
Measuring the Orbital Angular Momentum of Asymmetric Light Beams by Two Cylindrical Lenses ..	2628
High Cyclotron Harmonics Excitation in Multi-beam Terahertz Range Gyrotrons .....	2636
Frequency Doubling of Gyrotron Radiation at 263 GHz in A3B5 Semiconductors .....	2640
Theoretical Analysis of Sub-THz Gyro-Klystrons for Spectroscopic Applications .....	2643
Modeling Multilayered Samples of Inorganic and Organic Speckle Structures .....	2646
Radiation-based Near-field Thermal Rectification via Asymmetric Nanostructures of the Single Material .....	2652



Graphene-like Si <sub>3</sub> N <sub>3</sub> and Si <sub>3</sub> N <sub>4</sub> Nanolayers on Silicon Surface .....	2659
Degenerate Energy Exchange between Optical TE <sub>2</sub> -modes of the Planar Waveguide Based on a Thin Left-handed Film and a Nonlinear Substrate .....	2663
Performance Analysis of Cost-efficient High-speed up to 32 Gbit/s WDM-PON Next-generation Access Network with Dispersion Compensation .....	2671
Analog Radio-over-fiber WDM-PON Architecture for 5G Millimeter-wave Interface .....	2679
Enhancement of Monopole Antenna Gain with Additional Vertical Wire Medium Structure .....	2687
Reconstruction of Equivalent Human Heart Dipole Parameters for the Torso Model Represented by Elliptical Conducting Cylinder of a Finite Length .....	2691
Calculation and Physical Modeling of Electric Potentials Generated by a Dipole Source in the Conducting Cylinder of a Finite Length .....	2698
A Compact Octa-band Antenna for Handsets Application .....	2706
Bias Analysis and Correction for Wideband Polarimetric Phased Array Radar .....	2711
A Compact HAT Shaped Uniplanar Printed Antenna for Portable Wireless Systems .....	2721
MIMO Performance Evaluation of 5G Antennas for Virtual Reality Applications .....	2728
Characterization of Wideband Gain RF Amplifier for L-Band Frequency Application .....	2735
Coupling Effects Cancellation on the Channel Capacity of MIMO Systems Operating at 2.4 GHz .....	2739
Performances Evaluation of an Enhanced Modulation Technique for UWB Direct Chaotic Communication .....	2744
Contact Device with Tunable Strip Matching Circuits for Measuring Parameters of Microwave Transistors .....	2752
Design and Optimization of Multi-coil Wireless Charging System for Charging Area Expansion .....	2756
Detection and Tracking of Moving UAVs .....	2759
Modification of the IRI Electron Density Profile from an Observation Ionogram Using the Full Wave Method in the Lower Ionosphere .....	2764
Data Assimilation and Application Based on MWHTS for Typical Tropical Cyclone .....	2768
Differential Phase Processing and Data Quality Control for Polarimetric Weather Radar in Southern China .....	2772
Near-surface Plasma Formation in Air under Action of Two Laser Pulses at Two Wavelengths on Titanium in the Air .....	2777
Remote Sensing of Coastal Water-quality Parameters from Sentinel-2 Satellite Data in the Tyrrhenian and Adriatic Seas .....	2783
Skew Detection and Ortho-rectification for System Corrected Landsat TM Images .....	2789
Effect of Finite Terms on the Truncation Error of Addition Theorems for Spherical Vector Wave Function .....	2795
Numerical Results in Subsurface Near Zone Inverse Source .....	2802
Electromagnetic Analysis for Multi-constellation GNSS Satellite Visibility Determination in Urban Areas .....	2809
Theoretical Analysis of a Volume Holographic Lens Using Matlab .....	2814
Improved Design Techniques for High Performance Planar Waveguide Slot Arrays .....	2819
The Scattering Characteristics of the Dual-element Vivaldi Antenna Arrays, Which Located on the Cylindrical Surface .....	2830
Regularization Techniques for the Evaluation of the Induced Currents on a Thin Disk .....	2835
On the Efficient Evaluation of Improper Integrals Involving Oscillating and Slowly Decaying Functions	2840
Complex Resonances of a Circular Patch in a Multi-layered Medium: A Regularized Analysis .....	2845
Validation of Hertzian Electromagnetism in a Rectangular Waveguide with Rotating PEC Termination	2850



Tensor-Newton Reconstruction Scheme for Fluorescence Optical Tomography .....	2857
Mathematical Foundations of a Geometric Theory of Diffraction for Light Scattering from a 3D Topographic Photomask .....	2867
Disruption Prediction Approaches Using Machine Learning Tools in Tokamaks .....	2880
A Machine-learning and Compressive-sensing Inspired Approach to the Optimal Array Pattern Synthesis .....	2891
Decentralized Prediction of Electrical Time Series in Smart Grids Using Long Short-Term Memory Neural Networks .....	2899
Smart Distributed Sensing for Photovoltaic Applications .....	2908
Application of Machine Learning to Synthesis of Maximally Sparse Linear Arrays .....	2917
Performance Estimate of Range Profile Feature Extraction for the Case of Defined Viewing Aspect by Means of Fisher Score .....	2922
A Fuzzy Neural Network Approach to Quality Assessment of Water Reservoirs .....	2927
Performance Estimate of Range Profile Feature Extraction by Means of Interclass Metric Histograms Analysis .....	2933
Multi-fed 2-D Leaky-wave Antennas: Beam Steering and Polarization Reconfigurability .....	2938
Random Lasing in Multicore and Multimode Fibers .....	2947
Design and Implementation of Fiber-embedded Plasmonic Structures in Microwires .....	2951
Brillouin Optical Time Domain Analysis with Wavelength-locked Low-noise Pump-probe Laser Scheme	2958
Narrow Linewidth Fiber Brillouin Ring Laser for Sensing Applications .....	2964
2D Non-radiating Sources in Mie Scattering and Inverse Problems .....	2970
Calcium Electroporation: An Overview of an Innovative Cancer Treatment Approach .....	2979
Relevance of the Cell Membrane Modelling for Accurate Analysis of the Pulsed Electric Field-induced Electroporation .....	2985
Multiphysics Modelling of Membrane Electroporation in Irregularly Shaped Cells .....	2992
Non-Huygens Invisible Metasurfaces .....	2999
A Novel and Fast Method to Design Metamaterial Absorbers Based on RBF-PSO Algorithm .....	3006
Electromagnetic Frequency Characteristics of Periodically Graded Wires .....	3012
Drone Characterization Approach for Radio Telescopes .....	3016
Functionalized Materials for Integrated Photonics: Hybrid Integration of Organic Materials in Silicon-based Photonic Integrated Circuits for Advanced Optical Modulators and Light-sources .....	3019
All-fiber Orbital Angular Momentum Mode Oscillator Based on Mode-selective Coupler .....	3028
All-fiber Cylindrical Vector Beam Laser Based on Ring-core Yb-doped Fiber .....	3031
ALD Assisted 2D Monolayer Transition Metal Dichalcogenides and Their Applications in Optoelectronics .....	3034
VIS-NIR GeSi Photodetector with Voltage Tunable Spectral Response .....	3038
Multispectral Photodetectors Based on PbS Colloidal Quantum Dots .....	3044
Measurement and Research of Liquid Transmission Spectrum Based on Continuous-wave Terahertz Spectroscopy .....	3058
High Power Terahertz Source Based on Planar Antenna Integrated Vacuum Photodiode .....	3064
Improvement of Output Performance in G-band Extended Interaction Klystron with Narrow Coupling Cavity .....	3068
Elimination of Mode Competition in $TE_{0n}$ Mode Gyrotron .....	3073

A Heuristic Approach Applied to Time Reversal MUSIC Method for Soft Fault Location in Noisy Transmission Line Networks .....	3077
Wired Network Distributed Diagnosis and Sensors Fusion by Multi-carrier Time Domain Reflectometry and Graph Theory .....	3086
Shielding Damage Characterization in Twisted Pair Cables Using OMTDR-based Reflectometry and Inverse Problems .....	3093
Software Correction of Defective Lossy Transmission Line Networks .....	3102
Vertically Stacked Binomial-arrays of Resonant Dipoles for Mobile Wireless Communication and Scavenging Applications .....	3109
The Software Concept Used to HPM Pulse Measure .....	3117
D-dot Probes Used in HPM Pulse Measurements .....	3126
The Configuration of Laboratory Stands for Shielding Effectiveness Measurements .....	3135
Multimedia Projector in the Process of Electromagnetic Infiltration .....	3140
Electromagnetic Compatibility of LED Lamps .....	3147
Immunity of LED Lamps to HPM Pulses .....	3153
Logo Spiral Microstrip Antenna with Rotating Polarity to the Pulsar Clock .....	3157
Application of Microstrip Antennas in Energy Harvesting Systems .....	3167
Co-channel Interference in Multi-beam Receiving Antenna for 28 GHz .....	3174
The Dynamic Range Maximisation of Shielding Effectiveness Measurements .....	3180
Method of Transmitter and Electric Field Strength Meter Synchronization during Shielding Effectiveness Measurement .....	3186
Spatial Multiplexing of Channels by Using Multi-beam Antenna System for 60 GHz .....	3192
Influence of Spatial Selection of Antennas on Radio Link Attenuation in Multipath Propagation Environment for 73 GHz .....	3198
Rectenna Modeling Based on Hybrid MoM-GEC and the Auxiliary Sources Method for Wireless Power Transmission .....	3205
Investigation of Biophysical Parameters of Forests Using Experimental Data and Results of Forest Environment Simulation .....	3212
Semantic Web-based System for Light Scattering Using the Generalized Lorenz-Mie Theory .....	3217
Normalization Reading and Writing for Radio Baseband Data .....	3225
Multi-channel Complex for Non-contact Aggressive Movement Detection .....	3229
The Fine Structure Constant and Graphene .....	3235
Computation of Forces Exerted by Plain Magnetic Stray Fields .....	3244
Tight Focusing of a Second-order Cylindrical Vector Beam .....	3254
The Local Weighting Algorithm Is Used to Model and Predict the Pressure Change of the Train Air Chamber .....	3258
An Analog of Optical Rabi Oscillation in Superconducting Josephson Circuits .....	3261
Thermochemical High-ordered Surface Structure Formation with an Astigmatic Gaussian Beam on Metal Thin Films .....	3269
The UAPO Diffraction Contribution in the IPO Method for RCS Evaluations .....	3273
Computer Simulation of Magnetoelectric Microwave Isolator .....	3278
A Design of the Silicon-based Race Track Microcavity Resonator with Defined HPBW and FSR Using FDTD Method .....	3283
Delay Time Characteristics of a Three-dimensional Terahertz Chiral Metamaterial for Asymmetric Transmission of Circularly Polarized Electromagnetic Waves .....	3287
The Backflow of Energy in a Optical Vortex Formed by Silver Spiral Zone Plate .....	3292

Coded Metasurface with Optical Activity Based on Broadband Asymmetric Transmission of Linearly Polarized Electromagnetic Waves .....	3298
Transmission Properties of TE Surface Wave Mode in Asymmetric Metal Stripe Arrays on Low-index Substrate Coating with High-index Dielectric Layers .....	3302
Peculiarities of the Faraday Effect in Gold Nanoantenna Gratings in Iron-garnet Films .....	3305
Elliptical Form-invariant Gaussian Beams with a Phase Singularity .....	3309
Diffusive Electron-phonon Interaction for Terahertz Radiation .....	3316
Investigation of Stimulated Raman Scattering Impact on Dual-pump FOPA Performance in WDM Transmission Systems .....	3322
Unified Multi-channel Spectrum-sliced WDM-PON Transmission System with Embedded FBG Sensors Network .....	3327
Simulation Study of Released Silicon-on-insulator Slot Waveguides in a Photonic Integrated Circuit Technology .....	3334
Compression and Analysis of Ultrasonic Doppler Blood Flow Meter Data by the Discrete Chebyshev Transform .....	3338
A Design of Geometry and Antennas Layout of 3D Microwave Imaging System for Brain Stroke Monitoring .....	3342
Evaluation on Compressive Sensing-based Image Reconstruction Method for Microwave Imaging .....	3348
Design, Fabrication and Measurement of Multiband Rectangular Slot ACS Fed Uniplanar Antenna for 2.4/2.5/5.5 GHz Wireless Applications .....	3353
Compact Millimeter-wave Triband Quasi-Yagi Antenna for 5G and WiGig Applications .....	3359
Substrate Integrated Circularly Polarized Horn Antenna Based on LTCC Technology .....	3365
Differentially Proximity-coupled Circular Ring-shaped Array Antenna with Improved Radiation Characteristic .....	3368
The Influence of Base Width on Breakdown Voltage in Transistors .....	3372
Influence of Different Ion Implantation and Diffusion Models on UMOS Threshold Voltage .....	3376
High Gain 2-stage Class-E RF Power Amplifier for Wireless Power Transfer .....	3380
Tropospheric Ducts Measurement with Using Weather Sensors .....	3385
Measurement of Yangtze River's Water Level by Tiangong-2 Interferometric Imaging Radar Altimeter .....	3388
About Capabilities of GIMS-technology to the Study of the Marine Ecosystems .....	3393
About Optimal Algorithms for Making Statistical Decisions for Small Volume Samples and with Apriori Parametric Uncertainty .....	3398
Microwave Tropospheric Scintillation and Excess Attenuation Prediction for Satellite to Earth Links Using 3D High-resolution Meteorological Forecast Models: Data Validation and Case Study .....	3405
Modeling and Predicting Down-link Tropospheric Channel above Ku Band for Interplanetary Exploration .....	3412
Web Portal for a Databank of Microwave Radiometric Measurements of the Atmosphere in Resonant Band of Water Vapor 18–27 GHz .....	3421
Cloud Attenuation Stochastic Characterization from Ground-based Microwave Radiometric Data at Ka-band .....	3428
Practical Relationships between Propagation and Meteorological Variables Derived from Videodistrometer Measurement and Its Ambiguity Discussion — Examples from Prague (CZ) .....	3434
Evaluation of FSO-technology as a Candidate for Reliable Long-distance Communication Links for Deep Space Applications .....	3441
Performance and Application of the MWHTS on Chinese FY-3C Meteorological Satellite .....	3449
Sun-induced Chlorophyll Fluorescence Retrieval from Chinese TanSat in Southeast China .....	3455
Study of Phase Calibration for GEOSAR Based on Chinese Area Positioning System .....	3460

Effect of Internal Pore Sizes of the Silica Gel on the Dielectric Permittivity in the Frequency Range from 100 Hz to 8 GHz .....	3464
Influence of Solar Rotation Influence on Ionospheric/Thermospheric Parameters: Modeling and Observations for Case Studies .....	3469
Dynamical Effects in the Middle Atmosphere Energy Balance .....	3474
Comparison of Optical Quality of Some Passive Laser Ranged Satellites .....	3483
Telecommunication Satellite Technical Solutions for Geo-localisation of Interfering Sources: An Innovative Approach .....	3490
Low-cost Stellar Sensor for Attitude Control of Small Satellites .....	3500
Tunable Defected Ground Structure Band Pass Filter for Cognitive Radio Applications .....	3507
Quadband Microstrip Slot Antenna Combined with U- and L-shape Strips for Multiband Body-centric Wireless Applications .....	3514
Design of a Novel Microwave Antenna .....	3520
A Wideband Low Noise Flat Gain Amplifier for Interferometric Passive Microwave Imaging System ..	3526
A Tool: Coverage Mapping with Direct and Reflected Rays from Lossy and Lossless Surfaces .....	3530
A Tool: Finding Optimum Base Station Location with S-UTD Model .....	3534
Simulation of the Forest Environment Using the Model of Individual Trees for Real-time Prediction of Radio Wave Propagation .....	3539
Flexible Tunable Silicon on Insulator Multimode Interference Coupler Using Multi-heater Design .....	3545
Non-contact Sleep Disorders Detection Framework for Smart Home .....	3553
Real-time Operating UWB Sensor System for Static Person Localization .....	3558
Low-cost Portable Bioradar System for Fall Detection .....	3566
A Novel Lotus Shaped Multiband Patch Antenna with Improved Performance .....	3571
SIW-fed Multilayer High-gain Antenna for Q-band Applications .....	3578
Statistical Study of the Matching Properties of a Set of Dipoles .....	3584
Multi-standard Reader Antenna for Active and Passive RFID Applications .....	3588
Dual-band Quasi-Yagi Antenna Gain Enhancement by Using a Reflector Plate .....	3594
Mitigation of RF Radiation and Electromagnetic Interference from a Lithium-ion Battery Pack Used in Wearable Safety and Health Devices in the Mining Industry .....	3601
Efficiency Improvement of Patch Antenna with Metamaterial Technique for Modern Wireless Communication Applications .....	3609
A Low Profile Pentagonal Shape Zeroth Order Resonator Antenna for $K_a$ Band Applications .....	3614
Beam-switched ESPAR Antenna with Embedded Matching Network for V2X Communications .....	3619
Improved Nano-optical Traps for Single-particle Sensing Applications .....	3626
First Order Optical Interference between Distinguishable Photon Paths .....	3634
Graphene Tunability for Transmission Type Terahertz Chiral Metamaterial .....	3643
Photo-excited Switchable Terahertz Multi-band-pass Filter .....	3649
Design of a Simple Inter-connected U-shaped Circular Polarized Monopole Antenna for THz Communication Applications .....	3652
Multi-band Terahertz Transmission Using Frequency-selective Surfaces Based on ‘F’ Shapes Arranged in Odd-symmetry .....	3656
Design of Arm Asymmetry Structure Based on Metamaterial for THz Sensor .....	3661
Technological Features of Graphene-based RF NEMS Capacitive Switches on a Semi-insulating Substrate .....	3666
High Sensitivity Quadrupole Fano Resonances Using Terahertz Metamaterials with Its Application as Biosensor .....	3673

Design and Optimization of pn Junctions in Silicon Microdisk Modulators .....	3679
Effect of Germanium Doping on the Performance of a Silicon Optical Modulator .....	3683
Design of a 3-channel Mode-division Multiplexer Based on Grating Assisted Couplers .....	3686
10.525 GHz Backscattering RFID System Based on Doppler Radar Technology for 5G Applications and Telemedicine .....	3689
New Hardware Components for M-sequence UWB Channel Sounder .....	3696
Investigation of Noise Characteristics for SBS-Based Optical Spectrum Analysis .....	3704
On Channel Estimation in Universal Filtered Multi-Carrier (UFMC) System .....	3708
Non-reciprocity and Doppler Effect Control by Using Time-varying Metamaterials and Metasurfaces ..	3714
Stress Tester and Network Emulator in Apache JMeter .....	3722
Parallel Processing of Genetic Algorithms in Python Language .....	3727
The Smart Home — PLC High Speed Communication .....	3732
Speed of Light in Vacuum in the Case of Various Linear and Nonlinear Systems .....	3737
A Non-destructive Impedance Method to Measure Semi-periodic Structures .....	3745
A Fast and Low-cost Measuring System for Electrical Impedance Tomography .....	3751
A Numerical Analysis of a Planar Inverse Nano-resonant Structure .....	3756
Comparison of Different Methods for Determining the Air Ion Mobility Spectrum .....	3761
Using an Electromagnetic Flowmeter for Ultra-low Velocity Measurement .....	3767
Novel SIE Implementations for Efficient and Accurate Electromagnetic Simulations of Zero-index Mate- rials .....	3772
An Anti-fake Bitmap Graphic Encoding and Decoding Method for Commodity Packaging .....	3781
A Real-time Lossless Data Compression Method for Intelligent Train Monitoring System .....	3784
Interaction between Microwave and Mesoscopic Circuits in Cavity-circuit Quantum Electrodynamics ..	3789
Wavelet Codes and Their Implementation for Protection of NAND Flash Memory .....	3797
Analysis of a 8-strap Plasma-facing Launcher with Load-tolerant External Matching Units for the ICRH System of DTT .....	3805
Bimodal Operation of High-contrast Gratings: The Generalized Fabry-Pérot Perspective .....	3812
Enhanced Anti-stokes Luminescence via Acoustic to Optical Phonon Conversion in Pyramid Arrays ..	3817
Photon Counting OTDR Based on Infinite Backscatter .....	3823
Multi-parameter Sensor Based on Long Period Grating in Polarization-maintaining Panda Fiber .....	3827
Nematic Liquid Crystal Waveguides for Spatial Control of Linearly Polarized Light Waves .....	3832
The Range-gate Vision System Based on a CO <sub>2</sub> Laser Tunable in the Middle Infrared Range .....	3836
Spatial CT/MRI of Children's Spine Processing and Modeling of Mechanical Forces .....	3840
Calculation of Electric Potentials Generated by a Dipole Source in an Elliptical Conducting Cylinder of a Finite Length .....	3845
Design of a 26 GHz FMCW Antenna .....	3854
Omnidirectional Ultra-wideband Superellipse Patch Antenna for mm-Waves Applications .....	3858
Design of a Microwave Cavity Resonator for Catalyzing Chemical Reactions Using Artificial Magnetic Conductors .....	3863
Low Phase Imbalance D-Band Balun Using 130-nm SiGe BiCMOS Process Suitable for Broadband Differential Circuits .....	3869
A Reconfigurable RF Front-end System for GPS Anti-jamming .....	3874
Compact Triple-band Microstrip BPF Utilizing Interdigital-coupled Lines Feeding Structure .....	3878
Multi-stage Ku-band Waveguide BPF Using CSRR-based Dielectric Frequency Selective Structure ...	3883

Quality of Service and Signal Evaluation Parameter Comparison between Different Mobile Network Operators in Urban Area .....	3887
Efficient Algorithm for Reliable Routing of Wireless Sensor Networks Considering Propagation Losses	3895
Comparison Design of the Feeding Method of a $4 \times 4$ Microstrip Array Antenna .....	3902
Estimation of the Maximum Transmission Rate for the Silicon-based Racetrack MicroResonator .....	3907
Performance of Operational AMSR2 Based Sea Ice Concentration Retrieval Algorithms under Extreme Weather Conditions .....	3910
The Effects of Source Impedance on the Time-domain Performance of UWB Bowtie Antennas .....	3915
A Novel Parameter Estimation Method for MIMO-SAR Signal .....	3921
The EUMETSAT Polar System — Second Generation (EPS-SG) Passive Microwave and Sub-mm Wave Missions .....	3926
Enhancement of Temperature-humidity Retrieval Algorithms of Satellite MW Data Processing .....	3934
High-resolution Satellite Image Based Aerosol Optical Depth Retrieval Method: Validation through EARLINET and NASA MPLNET Lidar Measurements and NASA AERONET Sunphotometer Data	3943
Scintillation Effects in the Ionosphere .....	3948
Upper Atmosphere Wind Pattern during St. Patrick’s Day Geomagnetic Storm: Fabry-Perot Interferometer Measurements and Modeling .....	3952
Solar Activity Influence on the Mesopause Temperature and F2 Peak Electron Density .....	3958
Background Removal for the Processing of Scans Acquired with the “UGO-1 <sup>st</sup> ” Landmine Detection Platform .....	3965
Development of Multifrequency MW Detection Device to Scan Liquids in Security Checkpoints .....	3974
Multi-sensor Fusion Applied to the Detection of Person-Borne Improvised Explosive Devices (PB-IEDs)	3978
Design of Small Sized SFCW Radar for Landmine Detection .....	3983
Smart Radar Sensors for Critical Sites Protection .....	3987
Magnetic Resonance and Microwave Techniques for Security Applications .....	3997
Remote Sensing for the Detection of Explosives and Energetic Materials by $^{14}\text{N}$ NQR and $^{14}\text{N}$ NMR	4001
Transmission Lines Modeling Approach Based on the Approximation of Pade .....	4009
Measurement of Parameters of Objects in Non-standard Guiding Systems and in Free Space .....	4018
Comparative Study of Multipactor Effect in Rectangular and Parallel-plate Waveguides Partially Loaded with Dielectric .....	4027
Wideband Phase Shifter Using 3 Types of LC Resonant Circuits for Phase Slope Alignment .....	4034
A High-efficiency DC-to-RF/RF-to-DC Conversion Module with Zero-threshold FET for Bidirectional Wireless Power Transfer .....	4040
A Hybrid Implicit-explicit FDTD Method for Simulation of Ultra-wideband Bandpass Filter .....	4047
Proposal on Propagation Prediction Method Based on Dynamic Channel Properties for High Frequency Bands in Urban NLOS Environment .....	4052
Phased Array Antenna Adaptation in Tropospheric Duct above Sea Surface .....	4058
Applicability of the Geometrical Optics Approximation in Radio Occultation Experiments: Numerical Simulations .....	4063
Time-domain Coupled Full Maxwell- and Drift-diffusion-solver for Simulating Scanning Microwave Microscopy of Semiconductors .....	4071
Open Area Concealed Weapon Detection (CWD) Sensor System and Algorithm Development .....	4078
An Operational High Resolution Soil Moisture Retrieval Algorithm Using Sentinel-1 Images .....	4086
About the Image Feature of Parabolic Antennas in High-resolution SAR Image .....	4093
Chiba University Small Circularly-polarized-SAR Satellite Remote Sensing .....	4098

A Singular Value Decomposition Based Approach for Classifying Concealed Objects in Short Range Polarimetric Radar Imaging .....	4109
Analysis of Parasitic Patch for Axial Ratio Bandwidth Enhancement in Circularly-polarized-slotted Microstrip Antenna .....	4116
Design Method for Bi-band Circularly Polarized Antenna. Application to GNSS Antenna .....	4121
Efficient Three-element Binomial Array Antenna .....	4127
Performance Analysis of Power Weighted Linear Array Antennas Based on Blackman Function .....	4132
Multi-antenna Array Topologies Optimization for Future Wireless Networks by Employing Particle Swarm Optimization .....	4138
Synthesis of Linear Array Antenna Using Hybrid IWO/WDO Algorithm .....	4144
An Inverted F with Dual Frequency for Radar & 5G Applications above 85 GHz .....	4152
A Multi Band Dual Loop Antenna in Millimetric Wave Implementation for 5G Applications .....	4161
A Compact 3 Port Integrated Wide Band Sensing Antenna and Narrow Band Antennas for Cognitive Radio Applications .....	4168
Exponential Compadding Transform to Mitigate PAPR in SC-FDMA Systems .....	4174
Characterization of Plasmonic Effects in AuNP+rGO Composite as a Sensing Layer for a Low-cost Lab-on-chip Biosensor .....	4180
Design and Fabrication of Lab-on-chip for Fluorescence Detection of Ruthenium Complex .....	4187
A Configurable Microwave Microfluidic Sensor for Medical Diagnosis and Chemical Analysis .....	4194
<b>Author Index</b> .....	4198

# **2019 PhotonIcs & Electromagnetics Research Symposium – Spring (PIERS-Spring 2019)**

**Rome, Italy  
17 – 20 June 2019**

**Part 2  
Pages 4212-4393**



**IEEE Catalog Number: CFP19C18-POD  
ISBN: 978-1-7281-3404-8**



# Contents

Resonant Production of an Ultrarelativistic Electron-positron Pair by a Gamma Quantum in the Field of a Nucleus and a Laser Wave .....	4214
Resonance of the Annihilation Channel of a Laser-assisted Electron-positron Scattering .....	4220
Resonant Spontaneous Bremsstrahlung of Ultrarelativistic Electrons in the Field of a Nucleus and a Laser Wave .....	4226
Optical Diagnostics of Swirling Flame by Simultaneous Planar Laser-induced Fluorescence and High-speed Chemiluminescence Imaging of OH Radical .....	4233
High-enthalpy Flow Investigations by UV Laser-induced Fluorescence .....	4242
Sector Metalens for Sharp Focusing of Laser Light .....	4248
Design of a Printed Launcher for Topologically Protected Metawaveguides .....	4252
Investigation of Magnetically Near-field Metamaterials in Wireless Power Transfer System .....	4256
Analysis of the Topological Photonic Crystals Using Finite-difference Supercell Approach .....	4263
Low-cost Medical Diagnostics Exploiting Different Kinds of Receptors on Plasmonic Plastic Optical Fiber Sensors .....	4268
Coherent Phase-OTDR Operating at 850 nm Wavelength for Enhancing SNR .....	4273
Fiber Bragg Grating Sensors for Temperature Measurements during Radiofrequency Ablation of Solid Tumors .....	4279
Spectral and Angular Responses of High Sensitivity Refractive Index Sensors Based on Titanium Nitride .....	4285
Nano-antennas Using Single and Double Isolated Graphene for Mid-infrared Applications .....	4292
Fluorescent Microresonator Biochemical Sensors: Applications, Limitations and Perspectives .....	4300
RF Characterization of Self-interference Cancellation Using Phase Modulation and Optical Sideband Filtering .....	4305
Time Lens with Improved Aperture to Resolution Ratio Based on a Phase Modulator .....	4311
Topology Communication Photoconverters Matrix of High-power Coherent Monochromatic Radiation	4315
Fresnel Zone Plate in Thin Aluminum Film .....	4333
Luminescence Property of Ce <sup>3+</sup> /Yb <sup>3+</sup> Co-doped Silica Material Prepared by Sol-gel Method .....	4339
Relationship between Human Glucose Level and Optical De/Polarization Information in 600 nm–800 nm Wavelength Region .....	4343
Reduction of IC Heatsink Radiation by Optimization of Absorbing Material Geometry .....	4348
Analysis and Measurement of the Electromagnetic Shielding Efficiency of the Multi-layered Carbon Fiber Composite Fabrics .....	4354
Multilayer X-band Wave Absorber with Enhanced Absorption Bandwidth .....	4361
A Miniaturized Low-profile Dual-polarization Frequency-selective Resorber with Swastika Structure and Interdigital Resonator .....	4367
Improved PMC Packaging Design by Using Novel Pin Geometries .....	4371
60 GHz Rectangular Patch Antenna with Cavity Resonator for 5G Applications .....	4377

<a href="#">Solution-processed Electrodes for Flexible Organic and Perovskite Solar Cells</a> .....	4385
<a href="#">Author Index</a> .....	4393