2021 IEEE 4th International Conference on Electronic Information and Communication Technology

2021 ICEICT

Xi'an, China • August 18-20, 2021
http://www.iceict.org/

Conference Program

Organizers

西安交通大学 XI'AN JIAOTONG UNIVERSITY

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中国电子科技集团公司
数据链技术重点实验室

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Program at a Glance

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GMT+08:00, China Standard Time - Beijing

Morning of August 19, 2021 Click the link to join or add to the meeting list: https://meeting.tencent.com/s/BuPAuwJ0WdFW Conference ID: 553 999 874 (Password: 081920) Telephone membership: +8675536550000 (Chinese mainland)/+16507983300 to 869799 (USA)	
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Rui Lu	Xi'an Jiaotong University
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Jing Tian	University of Electronic Science and Technology of China
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Jia-Yuan Yin	Xidian University
Jing-Ya Deng	Xidian University
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Ye Yuan	Chongqing University of Posts and Telecommunications
Sanshan Sun	Sichuan Normal University
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Huanhuan Yang	Air Force Engineering University
Yueyi Yuan	Harbin Institute of Technology
Kuang Zhang	Harbin Institute of Technology
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Yunfei Cao	South China University of Technology
Jianxing Li	Xi'an Jiaotong University
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General Chair's Welcome

On behalf of the Organizing Committee of the 2021 IEEE 4th International Conference on Electronic Information and Communication Technology (ICEICT2021), it is my great honor and pleasure to welcome you to this conference, to be held in online, Aug. 18 to 20, 2021.

ICEICT 2021 is sponsored by Xi'an Jiaotong University and IEEE Harbin Section. It is also supported by IEEE Harbin AP/MTT/EMC Joint Chapter and other research institutes, including Key Laboratory of Data link Technology of China Electronics Technology Group Corporation.

The technologies in Electronics Information, Communications have been playing important roles in our modern civilization and expected to stay as main characters in the future. The ICEICT2021 intends to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in these field. The conference welcomes contributions that could enhance the collision of excellent ideas and generate sparkle of wisdom between researchers all over the world.

Xi'an Jiaotong University (XJTU) is a key university under the direct administration of the Ministry of Education of China and is one of the oldest universities in China. XJTU, as one of the first batch of the universities in China, was supported by the central Government at the seventh and eighth five-year plan, as well as China's "Project 211" and "Project 985" to develop into a world-class university. Now, Xi'an Jiaotong University is on the List of World-class Universities and First-class Disciplines (abbreviated as "Double First-class") released in 2017 by the Ministry of Education of China, as a Double First-class university in Category A, which means that the government will support it financially to develop into a world-class university, and its eight disciplines into the first-class level in the world.

This conference has received enthusiastic responses, with approximately 470 submitted papers from nearly 90 universities and regions. The Technical Program Committee consists of over 100 international specialists in the paper review and selection process. Based on careful peer review, approximately 252 papers were accepted, the conference also invited keynote speeches from renowned researchers in the field.

At last, I wish the conference a great success, and hope that you will find the conference valuable and enjoyable.

Xi'an Jiaotong University
General Chair, ICEICT2021

Keynote Speakers

Keynote Speaker I: Qi-jun Zhang

Qi-jun Zhang
Fellow of IEEE
Fellow of Canadian Academy of Engineering
Chancellor's Professor, Carleton University, Ottawa, Canada
www.doe.carleton.ca/~qjz

Speaker's bio:
Qijun Zhang received the B.Eng. degree from the Nanjing University of Science and Technology, Nanjing, China in 1982, and the Ph.D. Degree in Electrical Engineering from McMaster University, Hamilton, Canada, in 1987.

He was a research engineer with Optimization Systems Associates Inc., Dundas, Ontario, Canada during 1988-1990 developing advanced optimization software for microwave modeling and design. He joined the Department of Electronics, Carleton University, Ottawa, Canada in 1990 where he is presently a Chancellor's Professor. He has also served as the Chair of the Department of Electronics, Carleton University 2009-2011. His research interests are modeling, optimization and machine learning for high-speed/high-frequency electronic design, and has over 300 publications in the area. He is an author of the book Neural Networks for RF and Microwave Design (Boston: Artech House, 2000), a coeditor of Modeling and Simulation of High-Speed VLSI Interconnects (Boston: Kluwer, 1994), and a coeditor of Simulation-Driven Design Optimization and Modeling for Microwave Engineering (London, UK: Imperial College Press, 2013).

Dr. Zhang is a Fellow of the IEEE, and a Fellow of the Canadian Academy of Engineering. He is an Associate Editor of the IEEE Transactions on Microwave Theory and Techniques, and a Topic Editor for the IEEE Journal of Microwaves. He is the Chair of the Technical Committee on Design Automation (MTT-2) of the IEEE Microwave Theory and Techniques (MTT) Society, and Founding Chair of the Executive Committee of the IEEE MTT Society's annual international conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization (NEMO). He is the Guest Editor of the upcoming Special Issue on AI and Machine Learning for Microwaves for the IEEE MTT Transactions, scheduled for publication in 2022.

Title: Machine Learning for Microwave Modeling and Design

Abstract:
This talk describes machine learning techniques for microwave modeling and design. Artificial neural networks are trained to learn the behavior of microwave passive and active devices and circuits. The trained neural networks become fast and compact behavioral models for high-level circuits and systems design. Knowledge-based techniques combining microwave knowledge with neural networks allow us to use machine learning to modify existing models into new ones. Artificial neural networks are also trained to learn inverse problems in microwave design providing direct solutions to inverse microwave problems where direct formula is not available. Examples of artificial neural networks for parameterized modeling and optimization of electromagnetic structures, and for modeling of active microwave devices and circuits will be provided to demonstrate machine learning for microwave modeling and design.

Keynote Speaker II: Hongsheng Chen, Zhejiang University

Hongsheng Chen, Zhejiang University
Chang-Jiang Scholar Distinguished Professor
Vice Dean, College of Information Science and Electronic Engineering
Zhejiang University, Hangzhou 310027, China
Email: hansomchen@zju.edu.cn
http://person.zju.edu.cn/en/hongshengchen

Speaker's bio:

Hongsheng Chen is a Chang Jiang Scholar distinguished professor at Zhejiang University and Vice-Dean of the College of Information Science and Electronic Engineering. He received the B.S. and Ph.D. degree in electronic engineering from Zhejiang University, Hangzhou, China, in 2000 and 2005, respectively. Since 2005, he has been with Zhejiang University, where he is currently a full professor. He was a Visiting Scientist (2006-2008) and a Visiting Professor (2013-2014) with the Research Laboratory of Electronics at Massachusetts Institute of Technology, USA.

His current research interests are in the areas of metamaterials, invisibility cloaking, transformation optics, and topological electromagnetics. He is the coauthor of more than 250 international refereed journal papers. His works have been highlighted by many scientific magazines and public media, including Nature, Scientific American, MIT Technology Review, The Guardian, Physorg, and so on. He is an author of the book Metamaterials and Negative Refraction (Cambridge University Press, 2020). He serves on the Topical Editor of Journal of Optics, the Executive Editor-in-Chief of Progress in Electromagnetics Research, the Editorial Board of Nanomaterials and the Nature's Scientific Reports.

Dr. Chen received the National Excellent Doctoral Dissertation Award in China (2008), the Zhejiang Provincial Outstanding Youth Foundation (2008), the National Youth Top-notch Talent Support Program in China (2012), the New Century Excellent Talents in University of China (2012), the National Science Foundation for Excellent Young Scholars of China (2013), and the National Science Foundation for Distinguished Young Scholars of China (2016). His research work on invisibility cloak was selected in Science Development Report as one of the representative achievements of Chinese Scientists in 2007.

Title: Metamaterials for Invisibility Cloak and Super-scattering

Abstract:

Invisibility has been a topic of long-standing interest in both academia and industry, because of its potential for intriguing applications that have only appeared thus far in science fiction. The advent of metamaterials unprecedentedly ignited the enthusiasm toward pursuing invisibility cloaks. But despite two decades of research, the current technology of invisibility cloak is still facing serious bottlenecks. In this talk, I will address these challenges and review the recent experimental progress in metamaterial and invisibility cloak. In particular, I will discuss a deep-learning-enabled self-adaptive microwave cloak that exhibits a millisecond response time to an ever-changing incident wave and the surrounding environment, without any human intervention. Moreover, an optically transparent microwave cloak that simultaneously integrates longwave cloaking and shortwave transparency will be provided. Finally, I will discuss the experimental realization of super-scattering phenomenon. Instead of suppressing the scattering of an object to achieve invisibility, a super-scatterer can enable large absolute total cross section from subwavelength structures. The challenge to experimentally realize this super-scattering will also be addressed.

Keynote Speaker III: Qing-Xin Chu, South China University of Technology

Speaker's bio:

Qing-Xin Chu is the professor with the School of Electronic and Information Engineering, South China University of Technology, the vice-chair of China Electronic Institute (CEI) Antenna Society, the vice-chair of CEI Propagation Society, IEEE Fellow and CEI Fellow. He has published two books and more than 600 papers in journals and conferences with over 4000 SCI citations. He has been elected as the highly cited scholar by Elsevier in the field of Electrical and Electronic Engineering since 2013. He has authorized more than 70 invention patents of China. He was the recipient of the Science Awards by CEI in 2018 and 2016, the Science Award by Guangdong Province of China in 2013, the Science Awards by the Education Ministry of China in 2008 and 2002. His current research interests include antennas and RF techniques in 5G communication.

Title: Band-Notched Dual-polarized Electromagnetic Transparent Antennas for Cross-Band Scattering Suppression

Abstract:
The multi-band aperture-shared antennas including the 5G massive MIMO antennas and the existing 2G/3G/4G antennas with one reflector and one radome are often used in current base stations to save costs. However, a lot of antennas working in different bands in a limited space will suffer serious cross-band scattering interference. Due to its larger size, the antennas operating in the lower-band usually work as a scattering source of the antennas operating in the higher-band, resulting in the distortion of the impedance matching and radiation pattern of the higher-band antenna. In this talk, band-notched method is proposed to realize electromagnetic transparent antennas with broad-band impedance matching and cross-band scattering suppressing for multi-band aperture-shared antennas. The operation mechanism of suppressing the cross-band scattering is first introduced by using a parasitic antenna array composed of two half-wavelength dipole antennas. It tells us that cross-band scattering suppression can be achieved by etching SSRs (split-slot resonators) on the entire radiating arms of a lower-band antenna to realize the notch band in higher band. Then several dual-band and tri-band aperture-shared antennas are proposed including electromagnetic transparent antennas operating in lower band and antennas operating in higher band. The electromagnetic transparent antennas are obtained by etching folded SSRs on the radiating arms of a crossed dipole antenna. The simulation and measurement results demonstrate that the electromagnetic transparent antennas designed by band-notched method can achieve good cross-band scattering suppression and radiation pattern restoration.

Keynote Speaker IV: Douglas H. Werner

Douglas H. Werner, FIEEE, FIET, FOSA, FACES, FEMA
John L. and Genevieve H. McCain Chair Professor
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E-mail: dhw@psu.edu; CEARL Website: http://cearl.ee.psu.edu

Speaker's bio:

Douglas H. Werner received the B.S., M.S., and Ph.D. degrees in electrical engineering and the M.A. degree in mathematics from the Pennsylvania State University (Penn State), University Park, in 1983, 1985, 1989, and 1986, respectively. He holds the John L. and Genevieve H. McCain Chair Professorship in the Pennsylvania State University Department of Electrical Engineering. He is the director of the Computational Electromagnetics and Antennas Research Lab (CEARL: http://cearl.ee.psu.edu/) as well as a faculty member of the Materials Research Institute (MRI: https://www.mri.psu.edu/) at Penn State. Prof. Werner was presented with the 1993 Applied Computational Electromagnetics Society (ACES) Best Paper Award and was also the recipient of a 1993 International Union of Radio Science (URSI) Young Scientist Award. In 1994, Prof. Werner received the Pennsylvania State University Applied Research Laboratory Outstanding Publication Award. He was a co-author (with one of his graduate students) of a paper published in the IEEE Transactions on Antennas and Propagation which received the 2006 R. W. P. King Award. He received the inaugural IEEE Antennas and Propagation Society Edward E. Altshuler Prize Paper Award and the Harold A. Wheeler Applications Prize Paper Award in 2011 and 2014 respectively. In 2018, he received the DoD Ordnance Technology Consortium (DOTC) Outstanding Technical Achievement Award. He also received the 2015 ACES Technical Achievement Award, the 2019 ACES Computational Electromagnetics Award, and the IEEE Antennas and Propagation Society 2019 Chen-To Tai Distinguished Educator Award. He was the recipient of a College of Engineering PSES Outstanding Research Award and Outstanding Teaching Award in March 2000 and March 2002, respectively. He was also presented with an IEEE Central Pennsylvania Section Millennium Medal. In March 2009, he received the PSES Premier Research Award. He is a Fellow of the IEEE, the IET, the OSA, the ACES, and the PIER Electromagnetics Academy. He is also a Senior Member of the National Academy of Inventors (NAI), SPIE, and URSI.

Prof. Werner is a former Associate Editor of Radio Science, a former Editor of the IEEE Antennas and Propagation Magazine, a former Editorial Board Member of Scientific Reports (a Nature subjournal), an Editorial Board Member for EPJ Applied Metamaterials, Editor for the IEEE Press Series on Electromagnetic Wave Theory & Applications, a member of URSI Commissions B and G, Eta Kappa Nu, Tau Beta Pi and Sigma Xi. He holds 20 patents, has published over 925 technical papers and proceedings articles, and is the author of 6 books and 35 book chapters (with two books and several additional chapters currently in preparation).

His research interests include computational electromagnetics (MoM, FEM, FEBI, FDTD, DGTD, CBFM, RCWA, GO, GTD/UTD, etc.), antenna theory and design, phased arrays (including ultra-wideband arrays), high power microwave devices, wireless and personal communication systems (including on-body networks), wearable and e-textile antennas, RFID tag antennas, conformal antennas, reconfigurable antennas, frequency selective surfaces, electromagnetic wave interactions with complex media, metamaterials, electromagnetic bandgap materials, zero and negative index materials, transformation optics, nanoscale electromagnetics (including nanoantennas), fractal and

knot electrodynamics, and nature-inspired optimization techniques (genetic algorithms, clonal selection algorithms, particle swarm, wind driven optimization, and various other evolutionary programming schemes).

Title: Metadevice Realization Through Inverse Design

Abstract:
Advances in design and manufacturing (e.g., 3D printing, nanofabrication) are enabling the ability to realize transformative structures that achieve electromagnetic functionalities not possible with conventional devices. Some of the most interesting structures being developed are based on metasurfaces comprised of sub-wavelength unit cells intelligently patterned to locally manipulate an electromagnetic wavefront in a desired fashion. Designers have traditionally employed simple canonical structures (e.g., loaded-dipoles, v-antennas, split-ring resonators) to synthesize metasurfaces that realize a desired functionality. However, metadevices based on these canonical structures do not always achieve optimal performance especially when broadband and/or wide field-of-view functionality is desired. Additionally, different material combinations as well as fabrication effects and tolerances can make the unit cell topology selection difficult. Therefore, the ability to generate a diverse set of unintuitive metasurface unit cells and evaluate their electromagnetic behaviors for achieving a specific functionality is highly desirable. Moreover, doing so in an efficient and intelligent manner is extremely important in order to maintain a tractable inverse design process. In this presentation, an overview of our RF and optical metasurface inverse-design process will be presented along with a survey of our custom full-wave solvers and multi-objective optimization algorithms. Finally, some specific application examples for the inverse-design of both RF and optical metadevices will be highlighted.

Invited Talks

Invited Talk: Jiafu Wang, Air Force Engineering University

Special session 1: Metamaterial-inspired Antennas

Short Bio:
Jiafu Wang is currently an Associate Professor with the Airforce Engineering University, Xi'an, China. He received the Ph.D. degree from Airforce Engineering University, China, in 2010. He was honored as the Rising Star of Young Scientist of Shaanxi Province in 2015 and is the grantee of the San Qin Talent Subsidy of Shaanxi Province. His doctoral dissertation won the nomination of National Excellent Doctoral Dissertation in 2012, and Excellent Doctoral Dissertation of PLA in 2011. He was awarded the First Prize of Natural Science of Shaanxi Province in 2019, First Prize of Excellent Achievement in Natural Science by Ministry of Education in 2012, the Second Prize for Excellent Teaching Achievement in Military Colleges in 2015. He was also awarded the Third-Class Merit each in 2004, 2007 and 2009. He has authored or co-authored more than 390 SCI-indexed journal papers. He published 1 monograph on metamaterial stealth technologies Metamaterial Design and Its Applications to Stealth Technologies (Science Press, 2013). He is the Principal Investigator (PI) of more than 10 scientific research projects, including 3 from the Natural Science Foundation of China. His research interests include mainly electromagnetic metamaterials, metasurfaces, spoof surface plasmon polaritons (SSPP), radar stealthy materials and technologies, antennas, microwave components, etc.

Title: Dispersion Engineering of Spoof Surface Plasmon Polaritons

Abstract:
Spoof surface plasmon polaritons (SSPP) are lower-frequency analogue of surface plasmon polaritons (SPP) at optical frequencies, with similar physical properties to the latter. SSPP exhibits rich dispersion properties, which can be tailored for engineering applications, including achromatic lens, polarization converter, wideband absorber, novel antenna and others. In this presentation, recent progresses of our group on dispersion engineering of SSPP are reviewed and some application examples are given.

Invited Talk: Ming-Chun Tang, Chongqing University (online)
Special session 1: Metamaterial-inspired Antennas

Short Bio:
Ming-Chun Tang received the Ph. D. degree in radio physics from the University of Electronic Science and Technology of China (UESTC), in 2013. From August 2011 to August 2012, he was also with the Department of Electrical and Computer Engineering, The University of Arizona, Tucson, AZ, USA, as a Visiting Scholar. He is currently a full Professor in the School of Microelectronics and Communication Engineering, Chongqing University, China. His research interests include electrically small antennas, RF circuits, metamaterial designs and their applications.

Prof. Tang is the Senior Member of the Chinese Institute of Electronics. He was a recipient of the National Science Fund for Excellent Young Scholars in 2019. He was a recipient of the Best Student Paper Award in the 2010 International Symposium on Signals, Systems and Electronics (ISSSE2010) held in Nanjing, China. His Ph.D. students received Best Student Paper Awards from the IEEE 7th Asia-Pacific Conference on Antennas and Propagation (2018 IEEE APCAP) held in Auckland, New Zealand, 2019 IEEE International Applied Computational Electromagnetics Society (ACES) Symposium held in Nanjing, China, 2019 IEEE International Workshop on Electromagnetics: Applications and Student Innovation Competition held in Qingdao, China, and 2019 Cross Strait Quad-Regional Radio Science and Wireless Technology Conference held in Taiyuan, China. He is the founding Chair of the IEEE AP-S / MTT-S Joint Chongqing Chapter. He serves on the Editorial Boards of several journals, including IEEE Access, Electronics Letters and IET Microwaves, Antennas & Propagation. He has also served on the review boards of various technical journals, and many international conferences as a General Chair, TPC Member, Session Organizer, and the Session Chair.

Title: Antenna-inspired Metamaterial Absorber with Low-profile, Wideband, and Fully Improved Angle Insensitive Performances

Abstract:
The emergence of metamaterial (MM) at the end of the 20th century has significantly promoted the advances of concepts and methodologies of material, especially for artificial material. As a benefactor, MM absorber has meet the new bloom, and various design theories and methods have been developed to promote its advances. Commonly, these reported design methods, are mostly based on the effective medium theory and the equivalent circuit theory and mainly for bandwidth increasing and angle/polarization insensitivity improving. Besides, interference theory, antenna reciprocity theory, Lorentz model, global optimizations, etc., are also proposed to expand bandwidth or to increase the number of bands. However, up to date, the satisfactory realization of MM absorber simultaneously occupying low profile, wide bandwidth, particularly and large-angle stability characteristics is still full of challenge.
The field of antenna theory and engineering has been evolving for over a hundred years, providing a precious asset of complete knowledge of the mechanism and properties of wave radiation and propagation. Inspired by the reciprocity theorem of antenna theory, a new design method is proposed by treating the absorber unit-atom as induced current composite, in terms of omnidirectional radiation pattern synthesis and relative absorption pattern conversion. As a result, a light, simple, low-profile, and broadband MM absorber is achieved with near-omnidirectional TM wave absorption, as well as effective TE wave absorption is achieved. The outstanding comprehensive performance would enable the proposed absorber find great potential for engineering applications, such as, RCS reduction, absorption with angular stability.

Invited Talk: Guangcai Sun, Xidian University

Special session 5: Advanced Radar Imaging and Sensing Technologies

Title: Research on the Image-Domain Channel Mismatch Calibration Method for the MACs SAR

Abstract:
Channel mismatch calibration is a critical issue for the multiple azimuth channels (MACs) SAR to achieve high resolution and wide-swath imaging. This presentation introduces an image-domain channel error estimation algorithm based on image subspace least square (ISP-LS) method, and a post-imaging reconstruction algorithm for MACs SAR. The proposed method mainly consists of preprocessing and SAR imaging, the ISP-LS-based channel error estimation and calibration algorithm, post-imaging reconstruction and ambiguity suppression. In this method, the channel phase error and baseline error are joint-estimated by iteration after SAR imaging. Because of the difference in electromagnetic scattering capability of different targets, the SNR of the SAR image can be uneven, providing an advantage that the higher SNR regions can be chosen to achieve a more accurate estimate. We also propose a post-imaging reconstruction method for ambiguity suppression, realizing imaging for each channel data separately and combine the multichannel SAR images.

Invited Talk: Yifei Fan, Northwestern Polytechnical University

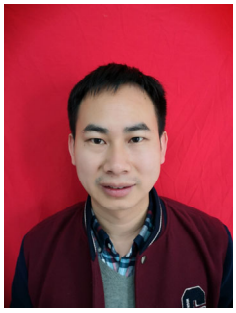
Special session 6: Advanced Technologies and Emerging Applications in Radar Signal and Image Processing

Title: A Novel Sea Clutter Suppression Method based on Neural Network

Abstract:
In order to suppress sea clutter effectively, it is necessary to estimate the center and width of the power spectrum of sea clutter accurately. Since the complex property of sea clutter, traditional methods cannot estimate the accurate parameters of power spectrum of sea clutter, which leads to the decrease of the clutter suppression performance. In this paper, a sea clutter suppression method based on neural network is proposed, where the real sea clutter datasets are taken to train the neural network. Finally, real sea clutter data is input into neural network to estimate the center and width of the power spectrum. The results show that the neural network is more accurate in estimating the spectral center and width than the traditional method. Moreover, the filter designed by the proposed method has a better clutter suppression performance.

Invited Talk: Hai-tao Wang, Guilin University of Electronic Technology

Special session 6: Advanced Technologies and Emerging Applications in Radar Signal and Image Processing

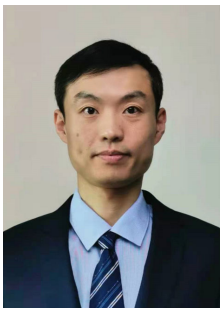


Title: A Simple Method for L_1-Regularized Least Square with Complex Variable

Abstract:
Compressed sensing or compressed sampling is widely used in radar, communication, image processing and other fields. A key problem in compressed sensing is to find an appropriate reconstruction algorithm to restore the original signal from the observed value. This problem can be cast as l1-regularized least square (LS) programs. Among the early research, to solve the l1-regularized LS, new variable vector usually should be introduced, which increase the dimension of variable vector to be solved. In this letter a simple method for l1-Regularized LS is introduced, which need not introduce new variable vector. And because a Quasi-Newton method is used, this method has lower computational complexity and memory occupation compared with traditional methods under the same signal recovery accuracy. The numerical simulation shows the effective of the method.

Invited Talk: Zhengpeng Wang, Beihang University

Special session 7: Testing Methodology for Antennas and Wireless Devices



Title: A Novel Ultra-Wideband Plane Wave Generator Antenna Array for OTA Test

Abstract:
PWG is an efficient OTA testing method, the concept of which can be dated back to 1978. The basic principle is that a plane wave can be approximated in the proximity of the PWG array via setting suitable complex coefficient excitations for the PWG elements. To determine suitable excitations, various numerical methods have been proposed in the literature at one frequency point, e.g. an iterative optimization method, least square fit, genetic algorithm, and intersection algorithm, respectively. However, the wideband performance of the PWG which is essential for real application is less attention.
An ultra-wideband one dimension plane wave generator (PWG) antenna array is developed in this paper. Ten electrical small wideband Vivaldi antenna elements are employed. Both the coupling and environment effect are involved in the proposed plane wave excitations optimization method. The theoretical bandwidth covers over 0.7GHz to 7GHz. The PWG generates plane wave whose amplitude variation is below ±1.45dB and phase variation is below ±10.5° in the working frequency band by proposed method, which is better than the traditional optimization method results.

Invited Talk: Gang Zhang, Key Laboratory of 3D Printing Equipment and Manufacturing, School of Electrical and Automation Engineering Nanjing Normal University

Special session 8: Multifunctional Planar Antennas/Filters by Using Multi-Resonant Modes

Title: Recent Advances in Multi-port Filtering Power Divider

Abstract:
A mini-review of our research on the synthesis and design approaches of multi-port filtering power divider (M-FPD) is presented in this paper. To begin with, a coupling matrix synthesis technique of M-FPD is outlined by the integrated method from analytical formulas and optimization method based on our re-ported work. Subsequently, in line with the presented synthesis method and designed topologies, three M-FPD design methods exploring electromagnetic resonant modes and the wave propagation based on our published works are summarized. The first one is the utilization of resonances along the transmission lines. Several representative M-FPDs with satisfactory performance are exhibited for validation. The second way is to exploit the TE-mode in the substrate integrated waveguide (SIW) cavity, which is demonstrated by a design of multilayer SIW three-way FPD with adjustable power division. For the third one, it is introduced with the exploitation of resonant modes in circular patches, including a balanced-to-balanced filtering power divider design.

Invited Talk: Neng-Wu Liu, Xidian University

Special session 8: Multifunctional Planar Antennas/Filters by Using Multi-Resonant Modes

Title: Low-Profile Shorted Patch Antennas with Improved Performances by Using Multimode Design Concept

Abstract:

In modern wireless communications, the microstrip patch antennas (MPAs) have been widely investigated and improved. Nowadays the requirements are becoming more and more rigorous to the low-profile and wide-bandwidth. Whereas, the traditional low-profile MPA maintains a narrow bandwidth due to its single mode radiation. In order to address this issue, the novel multimode design concept has been proposed and developed in our team. Herein, this method could not only be used for performance improvements of the linearly-polarized (LP) MPAs, but also for the circularly-polarized (CP) MPAs. Hence, in this work, we will conclude our previous works from these two aspects.

Invited Talk: Zhengrong Lai, Guangdong Communications & Networks Institute

Special session 9: Wireless Propagation, Sensing and Localization for Smart Mobility

Title: A High-order Modulation (64-QAM) Broadband THz Communication System over 100 Gbps

Abstract:
Based on the research，gave a prototype of a high-order modulation (64-QAM) terahertz (THz) communication system over 100 Gbps. To begin with, the channel capacity and spectrum efficiency of a THz link are analyzed based on Shannon's theorem and the state of the art technology.
Then, a Monolithic Microwave Integrated Circuit (MMIC) frequency multiplier and a secondary harmonics mixer are designed and manufactured. Finally, we prototype the THz communication system and realize the transmission data rate over 100 Gbps with 64-QAM in lab. The test results in our study paves the way towards the fulfillment of the broadband and large capacity required by future sixth-generation (6G) mobile communication systems.

Invited Talk: Wei Wang, Chang'an University

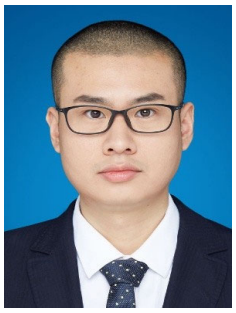
Special session 9: Wireless Propagation, Sensing and Localization for Smart Mobility

Title: The impact of small-scale fading on vehicle-to-vehicle connectivity

Abstract:
VANET introduces a promising solution to improve road safety and transportation efficiency. Network connectivity is one of the most important issues in VANETs, researches on the connectivity performance have remarkable significance on the construction of VANETs. Due to the impacts of fading, the transmission range of each vehicle is a random variable, the connectivity of V2V is also vary. This study focus on the connectivity probability analysis in the presence of small-scale fading. Firstly, we take into account the variability of channel, and build analytical models to investigate connectivity properties. Two different fading models are considered, specifically, Nakagami fading model, Weibull fading model. Secondly, the impacts of small-scale fading parameters on connectivity probability are studied. Finally, based on measurement data, we build small-scale fading model, and analyze the effects of different parameters on connectivity. In this paper, the effects of various parameters on VANETs connectivity are investigated, such as the distance between vehicles, standard deviation of shadowing fading, fading parameters (Nakagami fading and Weibull fading), the threshold value of signal to noise ratio, average vehicle density, transmit power, neighbor order.

Invited Talk: Rujiang Li, Xidian University

Special session 10: New Advances in Topological Devices



Short Bio: Dr. Rujiang Li received the Bachelor degree in Physics (National Base) in 2011 and Master degree in theoretical physics in 2014, both from Shanxi University, China. He received the PhD in Electronics Science and Technology from Zhejiang University, China, in 2018. He was a Postdoctoral Fellow at Tel Aviv University, Israel, in 2018-2019, and a Research Fellow at Nanyang Technological University, Singapore, in 2019-2020. In 2021, he joined School of Electroic Engineering, Xidian University, as an Associate Professor of "Huashan Scholars" talent program. His main research interests include topological photonics, nonlinear optics and nanophotonics.

Title: Topological circuits: topological phases in classical electrical circuits

Abstract:
The concept of topology has recently been introduced into the classical systems, such as photonics and acoustics, and various topological phases are discovered. Among the classical systems, electrical circuits are a promising platform to realize the remarkable topological phases because of the highly flexibility and controllability. In this talk, I will present our recent progress on topological circuits and introduce two kinds of topological phases in classical electrical circuits: the ideal type-II Weyl points and the quasicrystalline quadrupole topological insulators.

Invited Talk: Sen Yan, Xi'an Jiaotong University

Special session 11: Bioelectromagnetics and Wireless Body Area Networks

Title: The Mode splitting of Spoof Localized Surface Plasmons Hybridization used for Liquid Characteristic Sensing

Abstract:
A high-sensitivity planar microfluidic sensor based on coupled spoof localized surface plasmons (SLSPs) is proposed in this paper. By stacking two SLSP disks with same dimensions on the top and bottom layers to form a strong interaction and to produce mode splitting, a notch point is formed on the basis of the dipole resonant modes (ω- and ω+). The notch point can be converted into a shift of the resonant frequency, and thus the influence of the dielectric loss of the sample on the performance of the highly sensitive structure is reduced. Compared to other conventional microwave microfluidic sensors made of planar resonators, the sensitivity of the proposed sensor is greatly improved. The water-ethanol binary mixture is used for verification in the experiment.

Invited Talk: Ningning Yan, Tianjin University

Special session 12: Advanced Antennas for the Next Generation Wireless Communication

Title: Research on Antennas Based on Substrate Integrated Suspended Line

Abstract:
Based on the Substrate integrated suspended line (SISL) structure, which has the merits of low loss and self-packaged property, different kinds of SISL antennas are proposed and designed in this presentation aiming at how to improve gain, expand bandwidth, increase the number of frequency band and miniaturize size, etc. For the high gain antenna, SISL quasi-Yagi antenna and compact leaky-wave antenna are introduced. Through the multi-mode methods by introducing stacked patch, SISL wide-band and multi-band antennas are proposed. In addition, the concept of stepped impedance resonator (SIR) is also utilized to obtain multi-band property. What's more, a miniaturized high permittivity dielectric filled SISL antenna is proposed. It is very important to design high gain, wide band, multi-band and miniaturized SISL antennas, which would promote the extensive application of SISL and its related circuits and systems.

Invited Talk: Chunxu Mao, University of Surrey

Special session 13: Modelling, Optimization and Applications of Antennas and Microwave Devices

Title: Integrated Design of Filtering Antennas for Multiple Wireless Applications

Abstract:
The integration of filter and antenna has attracted intensive research interest recently. The integrated design can not only reduce insertion loss due to interface mismatching but also provide extra benefits to the antenna, such as, wideband, frequency selectivity, flat gain in-band, and out-of-band rejection. This paper first presents a brief overview of the advanced design methods of filtering antennas. Then, a couple of recent achievements done by the authors are demonstrated and discussed, including a dual-band filtering antenna, a circularly polarized filtering antenna, a duplexing filtering antenna, and a multiplexing antenna. The merits of each design are discussed and compared with traditional counterparts. Concluding remarks and future works are given at the end.

Invited Talk: Feng Feng, Tianjin University

Special session 13: Modelling, Optimization and Applications of Antennas and Microwave Devices

Title: Recent Advances in ANN for Fast Parameterized Modeling and Optimization

Abstract:
Artificial neural networks (ANN) are information processing systems with their design inspired by the studies of the ability of the human brain to learn from observations, and to generalize by abstraction. Researchers have investigated a variety of important applications utilizing the ability of ANN to perform modeling and optimization of microwave components and circuits. ANN has been a recognized vehicle for the electromagnetic (EM) parameterized modeling, i.e., modeling EM behaviors with geometrical parameters as variables. EM parameterized modeling is important for fast EM design optimization. Direct approach to EM design optimization is usually computationally expensive because it requires repetitive EM simulations due to adjustments of the values of geometrical parameters. ANN becomes an efficient method for EM parameterized modeling by learning the relationship between EM responses and geometrical parameters.
An advanced ANN parameterized modeling approach, which combines neural networks and transfer functions (neuro-transfer function or neuro-TF), has been developed to perform parameterized modeling of EM responses. The neuro-TF method is in general an efficient knowledge-based method which uses transfer functions as the prior knowledge when suitable equivalent circuit models/empirical models are not available. The trained neuro-TF models provide fast answers of EM behaviors of microwave components when geometrical parameters are repetitively changed and can be used in high-level design.

Invited Talk: Qingsheng Zeng, Nanjing University of Aeronautics and Astronautics (NUAA)

Special session 14: OAM Wave Excitation and Propagation in Microwave and Millimeter Frequency Range

Qingsheng Zeng (S'97--M'02--SM'11) received his Ph.D. from University of Ottawa, Canada, and is currently a distinguished professor and PhD advisor of Nanjing University of Aeronautics and Astronautics (NUAA), an adjunct professor and PhD advisor of University of Ottawa, Carleton University, Université du Québec an Outaouais (UQO), and Institut National de la Recherche Scientifique -- Centre Energie, Matériaux et Télécommunications (INRS-EMT), a guest professor of Harbin Engineering University (HEU), Northwestern Polytechnic University (NWPU), Beijing University of Post and Telecommunications (BUPT) and Beijing Jiaotong University (BJTU). He has been a research engineer and a senior research engineer at Communications Research Centre Canada (CRC), Government of Canada. Dr. Zeng has undertaken research and teaching in several fields, including antenna analysis and design, electromagnetic compatibility and interference (EMC/EMI), ultra wideband technology, radio wave propagation, computational electromagnetics. He has been the Chair of AP (Antennas and Propagation) / MTT (Microwave Theory and Techniques) Joint Chapter and Secretary of EMC (Electromagnetic Compatibility) Chapter of IEEE Ottawa, a Member of IEEE Canada Industry Relations Committee, and a senior member of IEEE. Dr. Zeng has been a member of the Strategic Projects Grant (SPG) Selection Panel (Information and Communications Technologies B) for the Natural Sciences and Engineering Research Council of Canada (NSERC), a member of Site Visit Committee of NSERC Industrial Research Chair (IRC), and a reviewer of NSERC Industrial R&D Fellowships.

He has published more than 150 SCI and EI indexed papers and technical reports, authored one book and co-authored two book chapters, one of which has been downloaded more than 3000 times only in one year after it was published in 2011. His work on the project "Aggregate Interference Analysis and Suitability of Some Propagation Models to Ultra-wideband Emissions in Outdoor Environments" has formed one part of Consultation Paper on the Introduction of Wireless Systems Using Ultra Wideband Technology, Spectrum Management and Telecommunications Policy, Industry Canada, and has been taken as a significant contribution to International Telecommunication Union (ITU). Dr. Zeng has been serving as an editorial board member and a reviewer for a number of technical books and scientific journals, as a conference co-chair, a session chair and organizer, a technical program committee co-chair and member and a reviewer, a short course/workshop/tutorial presenter and a keynote speaker for many international and national symposia. He has won several technical and technical service awards, was ranked as one of the researchers at Communications Research Centre Canada with the strongest impacts in 2011, and selected as a distinguished expert under the Plan of Hundreds of Talents of Shanxi Province in China during 2015 and an oversea prestigious advisor of Guangdong Province in 2016 and 2019.

Title: Millimeter Wave Signal Propagation in Indoor Environment and Underground Mine

Abstract:
With a huge spectrum of 5–7 GHz allocated as an unlicensed band worldwide, the 60-GHz millimeter

wave frequency range has become attractive for future indoor networking. Very high data rates can be reached (on the order of several Gbps) because of the large available spectrum. With low interference with neighboring networks due to the oxygen resonance around 60 GHz, it becomes feasible to control mining machinery and implement underground communications by using wireless sensors. Modelling 60 GHz millimeter wave signal propagation in indoor environment and underground mine is of vital importance for realizing the above goals. Most of published channel modeling studies in the 60 GHz still make efforts to evaluate the heuristic diffraction coefficients around corners for relaying the signal while denying surrounding deflecting obstacles (DOs) and considering them as noise sources. Few measurements of radio propagation in underground mines have been carried out for the MIMO-mmW systems, including the effect of miners' activity. In this presentation, the importance of the presence of deflecting obstacles (DOs) for indoor wireless local area network (WLAN) applications in the 60 GHz band is evaluated, the propagation characteristics of a MIMO-mmW system within an underground mine environment is discussed, with the effect of miners' activity being considered.

Invited Talk: Daotong Li, Chongqing University

Special session 17: MM-Wave and THz Technologies and its System Applications

Title: Power Combiner with High Isolation Characteristics and Its Application on Radiometer Sensitivity Enhancement

Abstract:
The microwave radiometer is a highly sensitive receiver capable of measuring very low levels of microwave radiation, such as remote sensing data like content of the soil, salinity of the oceans, and astronomical data for scientific models of the universe. MM-wave and THz passive security imaging is also a very important application for the radiometer. A higher radiometer sensitivity is the key goal of a radiometer. In general, low-noise amplifiers (LNAs) with good gain flatness can be used to improve the radiometer sensitivity. Many other methods are also proposed to improve the radiometer sensitivity for a single-channel radiometer.
In this talk, details as well as validations of the novel type of radiometer and power combiner or bandwidth synthesizer are presented. It can be composed of any type of n single-channel radiometers such as direct detection radiometers, superheterodyne radiometers, or hybrids of them. As a key component of the multi-channel radiometer, power combiner and bandwidth synthesizer play important roles in the sensitivity improvement, and the sensitivity of the radiometer can be improved greatly if the presynthesis power of the n single-channel radiometers is the same and keep in balance. In addition, the design ideas, results and advantages are also discussed.

Invited Talk: Zhongqian Niu, University of Electronic Science and Technology of China

Special session 17: MM-Wave and THz Technologies and its System Applications

Title: The Research on Terahertz Solid State Circuits and Front End for High Speed Communication System

Abstract:
Terahertz wave plays an important role in the electromagnetic spectrum. The wavelength is between infrared light and microwave. Terahertz wireless communication is very suitable for short-range high-speed wireless data transmission for ground applications, such as point to point data interaction, short distance high speed data transmission, etc. While in space applications, terahertz wave is also an ideal choice for intersatellite large capacity data transmission because attenuation in an approximate vacuum environment is smaller.
In this presentation, the THz front end for high speed communication system based on all solid state circuits is presented. This paper gives a further study on the 220GHz subharmonic mixer, 110GHz multiplier, which play an important role in the superheterodyne receiver. On the basis of the breakthrough in the research of key circuits, the terahertz communication system has been designed. The research shows the great potential of the terahertz wave for high speed wireless communication. And it lays an important theoretical and technical foundation for the development of terahertz frequency resources as a new wireless communication band in the future.

Invited Talk: Shiwen Lei, University of Electronic Science and Technology of China

Special session 18: New Methods on Array Antenna Synthesis and Gain Enhancement

Short Bio:
Shiwen Lei (M'16) received his Ph.D. degree in signal and information processing from UESTC in Jun. 2015. From Sept. 2015 to Aug. 2017, he was a Post-Doctoral Researcher with Lund University, Lund, Sweden, where he was involved in sparse signal sampling and recovering. From Nov. 2017 to Mar. 2020, he was a Post-Doctoral Researcher with the School of Electronic Science and Engineering (ESE), UESTC, where he was involved in array antenna theory and technology. He is currently work as an Associate Research Fellow with the School of ESE in UESTC. He has authored or co-authored about 40 journal and conference papers and about 20 patents. His current research interests include adaptive signal processing, array antenna theory, sparse signal processing, and so on.

Title: Research on Power Gain Enhancement with Wide-Beam Mainlobe Array Antenna

Abstract:
The wide-beam array antenna has widely been used in many fields, such as radar, sonar, and navigation to wireless communications, etc. One typical application for wide beam is the receiving of satellite (e.g., ASIASTAR satellite) multimedia signals, when antennas are installed on the roof of moving vehicles. The power of the signal of interest (SOI) for this application would greatly reduce, even to −130 ~ −110 dB, due to the large-scale fading, the multipath effect, the shading effect, and so on. To effectively recover the SOI from the noise/clutter, the power gain of the receiving array antenna should be as high as possible. In addition, considering that vehicles would maneuver on the road, wide beam is required to ensure the main lobe pointing at the satellite all the time. This requirement reversely causes the power gain for wide-beam applications would be not as high as that for narrow-beam applications. In this sense, a small increasement, even 1 dB, of the power gain in main lobe would possibly improve the array antenna receiving ability. Given a wide beam, the array antenna is expected to be capable of working in all directions in such main lobe that ensures the receiving stability along with the randomly moving of vehicles. Hence, the minimum power gain in wide main lobe should be as high as possible and how to synthesize such a power gain pattern is of interest both in theory and in practice.

Invited Talk: Jing-Ya Deng, Jia-Yuan Yin and Yin Zhang
Xidian University

Special session 19: Slow Wave Transmission Lines and Their Applications in Antennas and Microwave Devices

Short Bio:
Jing-Ya Deng received BE degree in Electronic Engineering and the PhD degree in electromagnetic field and microwave technology from Xidian University, Xi'an, China, in 2006 and 2011, respectively.
From 2011 to 2013, he was a Lecturer with School of Science, Xidian University. From 2013 to 2016, he was an Associate Professor with the School of physics and Optoelectronic Engineering, Xidian University, where he is currently a Full Professor since 2016. Dr. Deng is a recipient of the National Science Foundation for Outstanding Young Scholars of China. His current research interests include millimeter-wave antennas, devices and circuits, multibeam antennas, phased array antennas, and the high frequency/very high frequency (HF/VHF) antennas design and measurement.

Title: Miniaturized Devices and Antennas Realized by Slow wave Structures

Abstract:
The rapid development of wireless communication systems requires miniaturization of microwave and millimeter wave devices and antennas. The slow wave (SW) propagation mode was realized by the slow wave structure (SWS) reducing the phase velocity of the electromagnetic (EM) wave. For a given frequency, the guided wavelength will be decreased, so longitudinal miniaturizations of transmission lines and circuits can be realized. Slow wave structures can also reduce the electrical lateral dimensions, as the cutoff frequency can be reduced due to the increased effective permeability or / and permittivity. By loading slow wave structures, such as metalized blind via holes and meandering strips, to the traditional transmission line, the equivalent dielectric constant or permeability of the transmission line increases, resulting in lowered phase velocity and the decreased guided wavelength of electromagnetic wave. Using slow wave transmission lines to design microwave devices can effectively reduce the size of microwave devices, achieving the purpose of device miniaturization. In this paper, several kinds of slow wave structures were reviewed, including blind via holes, microstrip polylines, lumped inductors, ring mushroom, and the combination of blind via holes and shorted patches. Then, a miniaturized SIW filter realized by slow wave structure is designed, which realizes 75% area reduction compared with normal SIW filter. Thirdly, two miniaturized horns are designed based on slow wave structures. The antenna gain is increased by adjusting the phase and magnitude distributions on the radiating aperture facilitated by slow wave structures. Finally, the application of slow wave structures for eliminating the grating lobes of antenna array is reviewed.

Invited Talk: Le Chang, Xi'an Jiaotong University

Special session 22: Antennas for 5G Terminals and Base Stations

Title: Co-frequency Shared -Aperture Dual Antenna Pairs for 5G MIMO

Abstract:
Multiple Input Multiple Output (MIMO) technology can improve the channel capacity and communication rate. With the arrival of 5G era, the demand for MIMO multi-antenna technology by smart terminals is becoming more and more intense. Two major challenges exist when deploying multiple co-frequency antennas within the space-limited terminals. The first one is how to improve the antenna space usage rate and the second achieve co-frequency decoupling, or in summary, how to realize co-frequency share-aperture dual antenna pair. This report takes the development time line of 5G terminal antenna, reviews the development history of dual antenna pair, and introduces my three works in this direction, including the first antenna pair for smart terminal with metallic bezels, the first antenna pair with balanced high performance and high isolation, and a dual-band antenna pair.

Invited Talk: Kwok L. Chung, Huizhou University

Special session 23: Artistic Patch Antennas and Hidden Antennas

Short Bio: Kwok L. Chung (Senior Member, IEEE) received his Ph.D. degree in Electrical Engineering from the University of Technology Sydney, NSW, Australia, in 2004 and he subsequently joined the Faculty of Engineering, University of Technology Sydney, as a Lecturer. In 2006, he joined The Hong Kong Polytechnic University, Hong Kong. In 2012, he joined the Institute for Infrastructure Engineering, University of Western Sydney, Sydney, NSW, Australia. In 2015, he joined the Qingdao University of Technology (QUT), Qingdao, China, as a Research Professor and a supervisor of Ph.D. students leading a cross-disciplinary research team at the Civionics Research Laboratory, QUT. He is currently a Research Professor at the Huizhou University, China. He has authored and coauthored about 150 publications (SCI & EI) in various areas of electrical and civil engineering. His current research interests include passive wireless sensors for structural health monitoring, cement-based materials design and characterization, 5G/B5G microwave and millimeter-wave antennas, artistic antennas, and MU-MIMO antenna systems

Title: Recent Progress on the Design of Chinese-Character-Shaped Patch Antennas and Arrays

Abstract:
The increasing demand for microwave and millimeter wave communication systems has driven the need for multi-functional antenna research and design. One of the functions is the artistic appearance with hiding ability, which can alleviate people's allergies to the ever-increasing radio radiation, which is called electromagnetic hypersensitivity (EHS). Recently, the artistic font patch antenna has attracted much attention because of its evocative appearance and excellent performance as well as its function in mitigating EHS. In this talk, we present a series of interesting designs using Chinese-character shapes at microwave frequency such as beam-diversity, polarization-diversity, directional antennas for WiFi/WLAN IEEE 802.11ac applications. At the same time, we also introduce a couple of millimeter-wave designs for 5G FR2 n258 communications.

Invited Talk: Mengmeng Li, Nanjing University of Science and Technology

Special session 24: Advances in Multi-functional Metasurfaces and Applications

Title: Progress of Design Methods for Multi-functional Metasurface

Abstract:
Recently, metasurface has been extensively studied due to its high performance to manipulate the electromagnetic waves. In light-wave band, we propose a matrix pencil method for designing metalenses with randomly distributed meta-atoms. This method achieves much higher efficiency, while staying polarization-independent. Besides, we introduce an effective Abbe number and use lens maker equations to design a dual-layer achromatic metalens, in which we compensate the dispersion by using a plano-convex liked metalens combined with a plano-concave liked metalens. This dual-layer achromatic metalens has a small focal length difference across the visible wavelength range and an average focusing efficiency above 50%. In microwave band, a dual-band reconfigurable frequency selective surfaces (FSS) based absorber is proposed, the state of the array is optimized to generate real-time coding radar cross section (RCS). Then, an analytical design of space-time-modulated metasurface with modulation elements composed of two paths, In-phase (I) and Quadrature (Q), is proposed. Metsurface is used to perform the I/Q distributions of the analytical model.

Invited Talk: Yu Xiao, Sun Yat-sen University

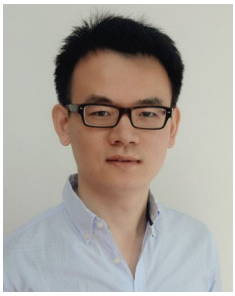
Special session 24: Advances in Multi-functional Metasurfaces and Applications

Title: Wide-angle Beam-scanning Phased Array Designs Based on the Metasurface

Abstract:
Phased arrays with wide-angle scanning capacity are strong needed in many applications, such as modern wireless communication and radar systems. However, the performance of phased arrays degrades as the beam is scanned off broadside due to the effects of mutual coupling. In this report, wide-angle beam scanning designs based on the metasurface are presented. Two different way to improve the wide-angle scanning performance have been demonstrated by using a same subwavelength cross-shaped metasurface. The first method is using the metasurface layer as the wide-angle impedance matching (WAIM) layer and loading it above the antenna array to improve the impedance matching with free space. A 16 × 16 reconfigurable transmitarray antenna has been designed to verify this design. The scan loss in the H-plane has been improved by 2 dB. The scan loss at 60◦ are better than 4 dB in both the E-plane and the H-plane. The second method is using the metasurface layer as a decoupling wall between adjacent elements. It will lead an energy cancellation with proper parameters. Two perpendicular linear arrays have also been fabricated to verify the design. The measured 3-dB beam width of the active element pattern (AEP, in the array environment) with the integrated metasurface is about 150°in the E-plane and 109°in the H-plane. The measured 3-dB gain fluctuation of the scanned beam is from -78°to 78° in the E-plane array and from -69°to 69° for the H-plane.

Invited Talk: Lei Ge, Shenzhen University

Special session 25: Multi-band Shared-Aperture Antenna and Array

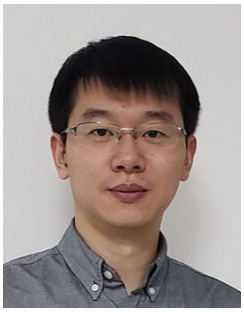


Title: Multi-Band Radiation-Differentiated Antenna

Abstract:
With the continuous development of wireless techniques, various wireless techniques will coexist in a long term to meet the requirements of various application scenes. Antennas, serving as the front-end components of wireless systems, are demanded to meet not only impedance but also radiation requirements of different wireless services in different application scenes. Thus, bands-spanned radiation-differentiated antenna (BSRDA), with the ability of offering different radiation properties (polarization direction/radiation pattern) at different frequency bands, are urgently desired for various wireless services. In this talk, two types of BSRDAs are presented. By properly exciting the operating modes of the patch antennas, these designs can exhibit different polarization and radiation properties over two bands. In addition, the design ideas, results and advantages are also discussed.

Invited Talk: Yujian Li, Beijing Jiaotong University

Special session 25: Multi-band Shared-Aperture Antenna and Array



Title: Multi-Band Mode-Composite Antennas for Millimeter-Wave and Sub-6-GHz Applications

Abstract:
In order to save the overall volume of the wireless communication systems operating in both millimeter-wave and sub-6-GHz bands, multi-band antennas with a large frequency ratio have attracted increasing attention in recent years. The mode-composite structures that support resonant modes at both millimeter-wave and microwave frequencies are employed to construct the compact multi-band antennas for millimeter-wave and sub-6-GHz applications in this talk. Both the operating mechanism and the design considerations will be analyzed. The measured and simulated results will be discussed as well. With the promising multi-band characteristics and the simple configurations, the presented antennas would be valuable to the design of future portable wireless communication devices.

Invited Talk: Zuojia Wang, Zhejiang University

Special session 27: Applications by Multi-Physically Controlled Reconfigurable Metasurfaces

Short Bio: Zuojia Wang received the B.E. degree in Electronic and Information Science in 2009, and the Ph.D. degree in Electronics Science and Technology in 2016, both from Zhejiang University, Hangzhou, China. From 2014 to 2016, he was a visiting scholar in Department of Mechanical & Industrial Engineering, Northeastern University, Boston. He has been an Associate Professor in 2017-2019, and Professor in 2019-2020, in School of Information Science and Engineering, Shandong University, China. In 2020, he joined Zhejiang University as a Professor of Hundred Talents Program. His current research interests include metamaterials, deformable electromagnetic media, chiral optics, antennas and nanophotonics.

Title: Research on Deformable Electromagnetic Metamaterials

Abstract:
Electromagnetic properties of metamaterials are determined by the geometry configuration of structures rather than the chemical constituent. Geometry deformation is one of the most direct method to achieve reconfiguration in macroscopic performance. In the talk, our recent progress on chiral light-matter interactions from meta-atom deformation is presented, including chiral absorbers, deflectors and polarizers. Deformable metamaterials based on origami techniques are also presented, including chirality switching in Miura-ori deformation, continuously tunable retroflection from metagratings and dispersion transition of origami waveguides.

Invited Talk: Lei Xing, Nanjing University of Aeronautics and Astronautics

Title: Recent Developments of Liquid Microwave Devices for Wireless Communications

Abstract:
Liquid antennas as a new type of antennas have drawn increasing attention from both academia and industry in recent years. They have advantages such as reconfigurability, conformability, flexibility, transparency and possibly, a small radar cross section. They can be alternatives to conventional antennas for many applications. In this talk, we are going to review this technology, discuss the state-of-the-art designs and current technical challenges. The scope of this talk includes two aspects: 1) An in-depth review and discussions on materials for liquid antennas are provided, important properties of selected materials as well as their potential applications are given; 2) Different types of liquid antennas are compared and major developments are reviewed. Apart from liquid antennas, new designs on liquid attenuators are explored, which offer wide bandwidth and good flatness. It is demonstrated that liquid microwave devices are versatile, efficient, and flexible. They are promising candidate for future wireless communications.

Oral Session and Special Session

Topic I. Communications and Network Topic II. Signal Processing and Information Technology Topic III. Antennas, Propagation, and Scattering 13:30-15:00, Thursday, August 19, 2021		
Conference ID: 477 750 302 **Password: 202108** **Session chair: Sixing Yin, Beijing University of Posts and Telecommunications**		
Paper Information		
OS1-1 13:30-13:45	The Using of "Sipejar" to Support the Online Teaching-Learning Process in College Based on Gender, Year of Study, and Department *Bambang Budi Wiyono, M Ishaq, Muh Arafiq* Universitas Negeri Malang	6530
OS1-2 13:45-14:00	Optimal Multi-user Transmission based on a Single Intelligent Reflecting Surface *Yihong Liu, Lei Zhang, Paulo Valente Klaine, Muhammad Ali Imran* University of Glasgow	6313
OS1-3 14:00-14:15	A Low Energy Consumption LDPC Coding Technology Applied to the Power System Yichao Li, Xintong Liu, Shuo Cai, Lei Zhang Harbin Institude of Technology	6538
OS2-1 14:15-14:30	APE-GAN: A Novel Active Learning Based Music Generation Model With Pre-Embedding *Wenyi Su, Yixuan Fang, Zheng Li, Xin Steven* Whittle School	6557
OS2-2 14:30-14:45	Variable Variance Kalman Filter for Line of Sight Angle Jump Suppression *Yuekun Zhang, Xiaohong Jia, Weiqiang Wang, Xiaoyang Zhang* China Airborne Missile Academy	6298
OS3-1 14:45-15:00	Ultra-wideband Frequency Selective Absorber with Dual Independent Varactor-Tunable Notched Bands *Zhang Lijin, Qu Meijun* Beijing University of Posts and Telecommunications	6602
OS3-2 15:00-15:15	Frequency-Selective Absorber with Ultra-Wide Absorption Band And Adjustable Notch Band *An Qing, Jianxun Su, Meijun Qu* Communication University of China	6601

Special session 2: Radar Target Tracking and Data Fusion Topic IV. Microwave Systems, Radar, RF 13:30-15:00, Thursday, August 19, 2021		
Conference ID: 606 543 749 **Password: 202108** **Session chair:** Jing Hou (Northwestern Polytechnical University) Rui Lu (Xi'an Jiaotong University)		
Paper Information		
SS2-1 13:30-13:45	Data collection of wireless sensor network with grid structure based on compressed sensing *Yan Yang, Haoqi Liu, Jing Hou, Nan Zhang, Tingqiang Wu* Northwestern Polytechnical University	6533
OS4-1 13:45-14:00	I/Q Imbalance Joint Calibration of Transmitter and Receiver with Zero-IF Architecture *Yu Zhang, Xueya Dai, Xutao Yu, Peng Chen, Rong Zeng* State Key Laboratory of Millimeter Waves, Southeast University, Nanjing 210096, China	6432
OS4-2 14:00-14:15	High-Power Rectifier Antenna Array in X Band *Zimin Zhang, Li Deng, Shufang Li, Botao Feng* Beijing University of Posts and Telecommunications	6397
OS4-3 14:15-14:30	Design and Implementation of Broadband Satellite IF Transceiver *Dongsong Li, Xueya Dai, Peng Chen, Xutao Yu, Rong Zeng* Southeast University	6387
OS4-4 14:30-14:45	Design of Wideband Voltage Controlled Oscillator with Suspended Stripline Structure *Zhanqiang Shi, Peng Chen, Xutao Yu* Southeast University	6297
OS4-5 14:45-15:00	An I/Q amplitude-phase imbalance correction algorithm in IF receiver *Yuan Mao, Xueya Dai, Peng Chen, Xutao Yu, Rong Zeng* Southeast University	6285

Special session 1: Metamaterial-inspired Antennas Topic III. Antennas, Propagation, and Scattering 13:30-15:00, Thursday, August 19, 2021		
Conference ID: 722 343 289 **Password: 202108** **Session chair:** Jiafu Wang (Airforce Engineering University) Hongyu Shi (Xi'an Jiaotong University)		
Paper Information		
IT1-1 13:30-13:50	Invited Talk: Jiafu Wang, Air Force Engineering University Title: Dispersion Engineering of Spoof Surface Plasmon Polaritons	Invited Talk
IT1-2 13:50-14:10	Invited Talk: Ming-Chun Tang, Chongqing University (online) Title: Antenna-inspired Metamaterial Absorber with Low-profile, Wideband, and Fully Improved Angle Insensitive Performances	Invited Talk
SS1-1 14:10-14:25	Polarization Converter with Asymmetric Jones Matrix using Metasurface *Yidan Wang, Hongyu Shi, Juan Chen, Anxue Zhang, Zhuo Xu* School of Information and Communication Engineering, Xi'an Jiaotong University, Xi'an 710049, China	6587
OS3-3 14:25-14:40	Design of Miniaturized Microstrip Antenna for Smart Home Wireless Sensor *Kewei cheng, Zhixin Liang, Bin Hu* china Academy of Space Technology Xian	6462
OS3-4 14:40-14:55	A Dual-band PIFA Design Based on CMA for ISM Band Wearable Applications *Sen Yan, Kai Zhang* Xian Jiaotong University	6446

Special session 3: Advanced Passive Components and Circuits for 5G and Beyond Topic III. Antennas, Propagation, and Scattering 13:30-15:00, Thursday, August 19, 2021		
Conference ID: 460 891 900 **Password: 202108** **Session chair:** Kai-Da Xu (Xi'an Jiaotong University) Ying-Jiang Guo (China Academy of Engineering Physics)		
Paper Information		
SS3-1 13:30-13:45	Measurement of five-port power divider based on three-port vector network analyzer *Li Qin, Chengcheng Xie* Chengdu Technological University	6518
OS3-5 13:45-14:00	Left-Hand Circularly Polarized Phased Array with High Gain for Mobile Satellite Communications *Wei Li, Xutao Yu, Peng Chen* State Key Laboratory of Millimeter Waves, Southeast University, Nanjing Jiangsu 210096, China	6445
OS3-6 14:00-14:15	Orthogonal pattern design for MIMO system *Jiali Kang, Huiling Pei, Xiaoming Chen* Xian Jiaotong University	6425
OS3-7 14:15-14:30	A Dual-band Wideband High Gain Planar Antenna for Radar Applications *Kexin Dong, Li Wang, Zhensheng Shi, Anxue Zhang* Xian Jiaotong University	6319
OS3-8 14:30-14:45	A Miniaturized Wide Beamwidth Dielectric Resonator Antenna *Yeqing Yin, Qinlong Li, Xiaoming Chen* Xi’an Jiaotong University	6315
OS3-9 14:45-15:00	A Wideband Quasi-Yagi Antenna Using Four-Step Slotline with Metasurface for Sub-6G Applications *Yifu Zhang, Shaowei Wu* University of Electronic Science and Technology of China	6286

Special session 7: Testing Methodology for Antennas and Wireless Devices 13:30-15:00, Thursday, August 19, 2021		
Conference ID: 290 242 135 **Password: 202108** **Session chair:** Xiaoming Chen (Xi'an Jiaotong University) Zhengpeng Wang (Beihang University)		
Paper Information		
IT7-1 13:30-13:50	Invited Talk: Zhengpeng Wang, Beihang University Title: A Novel Ultra-Wideband Plane Wave Generator Antenna Array for OTA Test	Invited Talk
SS7-1 13:50-14:05	Antenna Radiation Pattern Reconstruction Based on Spherical Wave Decomposition in Imperfect Reverberation Chamber *Junhao Zheng, Wei Xue, Xiaobo Liu, Xiaoming Chen* Xi'an Jiaotong University	6324
SS7-2 14:05-14:20	The Analysis of Balanced Feed Low Cross-Polarization Quad-Ridged Horn Antenna for OTA Testing *Chong Pan, Zhihao Zhao, Xue Zhang, Zhengpeng Wang* China Academy of Information and Communications Technology	6248
SS7-3 14:20-14:35	Near-field Over-the-Air Calibration of Phased Array Using Plane Wave Generator *Ruihai Chen, Zhengpeng Wang, Xiaoming Chen* Xian Jiaotong University	6198
SS7-4 14:35-14:50	Analysis of TRP and TIS Tests with Different Combinations of Mechanical Stirring Samples *Wei Xue, Furong Li, Xiaoming Chen* Xian Jiaotong University	5894

Special session 5: Advanced Radar Imaging and Sensing Technologies Special session 7: Testing Methodology for Antennas and Wireless Devices 15:10-16:15, Thursday, August 19, 2021		
Conference ID: 373 205 935 **Password: 202108** **Session chair:** Gang Xu (Southeast University) Yan Huang (Southeast University)		
Paper Information		
IT5-1 15:10-15:30	Invited Talk: Guangcai Sun, Xidian University Title: Research on the Image-Domain Channel Mismatch Calibration Method for the MACs SAR	Invited Talk
SS5-1 15:30-15:45	Complicated Interference Identification via Machine Learning Methods *Yunxuan Wang, Yan Huang, Zhanye Chen, Shuchen Fan, Zhiling Liu, Huajian Xu* Southeast University	6409
SS7-5 15:45-16:00	Verification circuit for multi-function chip serial signal controller *Hongli Liu, Chengfan Fu, Chengcheng Xie, Huanpeng Wang, Zhiqiang Sun* Chengdu Technological University	6547
SS7-6 16:00-16:15	Robustness Analyses of 3D Probe Configuration for Different Channel Models in MIMO OTA Setups *Xiaoyu Huang, Furong Li, Xiaoming Chen* Xi'an Jiaotong University	6399

Special session 6: Advanced Technologies and Emerging Applications in Radar Signal and Image Processing **15:00-17:00, Thursday, August 19, 2021**		
Conference ID: 441 823 805 **Password: 202108** **Session chair:** Tao Mingliang (Northwestern Polytechnical University) Su Jia (Northwestern Polytechnical University)		
Paper Information		
IT6-1 15:00-15:20	Invited Talk: Yifei Fan, Northwestern Polytechnical University Title: A Novel Sea Clutter Suppression Method based on Neural Network	Invited Talk
IT6-2 15:20-15:40	Invited Talk: Hai-tao Wang, Guilin University of Electronic Technology Title: A Simple Method For *L*1-Regularized Least Square with Complex Variable	Invited Talk
SS6-1 15:40-16:55	Data Augmentation of Sar Sensor Image via Information Maximizing Generative Adversarial Net *Dan Xie, Jing Ma, Yibing Li* Harbin Engineering University, Harbin 150001 China	6574
SS6-2 15:55-16:10	Data Augmentation for Signal Modulation Classification using Generative Adverse Network *Zhihao Tang, Mingliang Tao, Zhang Xiang, Jia Su, Yanyun Gong, Yifei Fan* Northwestern Polytechnical University	6548
SS6-3 16:10-16:25	Automatic monitoring of water pollution based on the combination of UAV and USV *Yueyi Han, Weihao Ma* Zhejiang University	6300
SS6-4 16:25-16:40	Radar Signal Recognition based on Deep Residual Network with Attention Mechanism *Xiaolin Jin, Jing Ma, Fang Ye* Harbin Engineering University	6421
SS6-5 16:40-16:55	Performance Evaluation for UAV-based Distributed Jamming System: An Illustrative Example *Zhengyi Zhang, Mingliang Tao, Yanyun Gong, Yifei Fan, Jia Su, Tao Li* Northwestern Polytechnical University	6544

Special session 8: Multifunctional Planar Antennas/Filters by Using Multi-Resonant Modes **Special session 10: New Advances in Topological Devices** **15:10-17:10, Thursday, August 19, 2021**		
Conference ID: 329 776 722 **Password: 202108** **Session chair:** Gang Zhang (Nanjing Normal University) Neng-Wu Liu (Xidian University) Xiaoming Chen (Xi'an Jiaotong University) Jianjia Yi (Xi'an Jiaotong University) Fei Gao (Zhe Jiang University)		
Paper Information		
IT8-1 15:10-15:30	Invited Talk: Gang Zhang, Key Laboratory of 3D Printing Equipment and Manufacturing, School of Electrical and Automation Engineering Nanjing Normal University Title: Recent Advances in Multi-port Filtering Power Divider	Invited Talk
IT8-2 15:30-15:50	Invited Talk: Neng-Wu Liu, Xidian University Title: Low-Profile Shorted Patch Antennas with Improved Performances by Using Multimode Design Concept	Invited Talk
IT10-1 15:50-16:10	Invited Talk: Rujiang Li, Xidian University Title: Topological circuits: topological phases in classical electrical circuits	Invited Talk
SS8-1 16:10-16:25	Isolation Improvement of Dual-polarized Microstrip Array Antenna by Using DGS Scheme *Kang Liu, Neng-Wu Liu, Guang Fu* Xidian University	6403
SS8-2 16:25-16:40	Wide-band Filtering Power Divider Using Coupled-Line *Zhenghai Luo, Gang Zhang, Wanchun Tang* School of Electrical and Automation Engineering, Nanjing Normal University	6543
SS8-3 16:40-16:55	Flexible Bandwidth Broadening in Topological Waveguides *Zijian Zhang, Yuanzhen Li, Fei Gao* Zhejiang University	6494
SS10-1 16:55-17:10	A novel reconfigurable scheme for topological insulator *Xin Zhao, Lina Zhu, Yunqi Shi, Shixiong Wang, Jianjia Yi* Xi'an Jiaotong University	6467

Special session 11: Bioelectromagnetics and Wireless Body Area Networks 15:10-16:30, Thursday, August 19, 2021		
Conference ID: 921 307 143 **Password: 202108** **Session chair:** Jiahao Zhang (Naval University of Engineering) Fei Liang (Huazhong University of Science and Technology)		
Paper Information		
IT11-1 15:10-15:30	Invited Talk: Sen Yan, Xi'an Jiaotong University Title: The Mode splitting of Spoof Localized Surface Plasmons Hybridization used for Liquid Characteristic Sensing	Invited Talk
SS11-1 15:30-15:45	A Wideband Linear-to-Circular Polarizer based on Hexagonal FSS on PDMS Substrate for CubeSats *Hidayath Mirza, Ping Jack Soh, Rais Ahmad Sheikh, Toufiq M Hossain, Sen Yan, Jiahao Zhang, Fengy i Luo* Jazan University, Jazan, Saudi Arabia	6498
SS11-2 15:45-16:00	A Wearable Textile Antenna for LoRa Applications *Xiaoyan Wang, Lei Xing, Hailong Wang* Nanjing University of Aeronautics and Astronautics	6472
SS11-3 16:00-16:15	Effects of environmental temperature changes on electromagnetic energy absorption in rats exposed to microwave radiation *Fengyi Luo, Jiahao Zhang, Liyang Huang, Chunxiao Yang, Weiwei Yu, Jin Meng* National Key Laboratory of Science and Technology on Vessel Integrated Power System	6436
SS11-4 16:15-16:30	A Polarization Conversion Metasurface for Characterization of Dielectric Materials *Xiao Hong, Yan Sen* Xi'an Jiaotong University	6412

Special session 12: Advanced Antennas for the Next Generation Wireless Communication 15:10-16:30, Thursday, August 19, 2021		
Conference ID: 364 262 285 **Password: 202108** **Session chair:** Yu Luo (Tianjin University) Ningning Yan (Tianjin University) You-Feng Cheng (Southwest Jiaotong University)		
Paper Information		
IT12-1 15:10-15:30	Invited Talk: Ningning Yan, Tianjin University Title: Research on Antennas Based on Substrate Integrated Suspended Line	Invited Talk
SS12-1 15:30-15:45	A Repairing Work on Antenna Radiation Pattern Measurement Based on Artificial Neural Network *Ni Zhang, Yu Luo, Ningning Yan* Tianjin University	6510
SS12-2 15:45-16:00	An FR4-based Dual-Mode Stacked Patch Antenna with Upper Out-of-Band Suppression Using SISL Technology *Tong Wang, Ningning Yan, Yu Luo, Kaixue Ma* Tianjin University	6358
SS12-3 16:00-16:15	A Compact Dual-Band Patch Antenna Based on SISL for 5G Application *Mi Tian, Ningning Yan, Yu Luo, Kaixue Ma* Tianjin University	6331
SS12-4 16:15-16:30	Wideband Millimeter-Wave Endfire Antenna with Vertical Polarization for Next Generation Mobile Communication Systems *Zhi-Heng Gao, You-Feng Cheng, Lin Yang, Cheng Liao* Institute of Electromagnetics, Southwest Jiaotong University	6329

Special session 9: Wireless Propagation, Sensing and Localization for Smart Mobility 08:30-10:20, Friday, August 20, 2021		
Conference ID: 222 667 694 **Password：202108** **Session chair:** Ke Guan (Beijing Jiaotong University) Wei Wang (Chang'an University) Zhengrong Lai (Guangdong Communications & Networks Institute)		
Paper Information		
IT9-1 08:30-08:50	Invited Talk: Wei Wang, Chang'an University Title: The impact of small-scale fading on vehicle-to-vehicle connectivity	Invited Talk
SS9-1 08:50-09:05	D2D Communication Relay Selection Strategy Based on Two-hop Social Relationship *Jinling Wang, Jing Ma, Yibing Li* Harbin Engineering University, Harbin 150001 China	6575
SS9-2 09:05-09:20	RF Scarcity for Maritime Communication and Navigation Systems *Ronald Raulefs, Wei Wang* DLR	6526
SS9-3 09:20-09:35	Measurement and Ray-Tracing Simulation for Millimeter-Wave Automotive Radar *Luoyan Zhu, Danping He, Bo Ai, Zhangdui Zhong, Fusheng Zhu, Wang Zhigang* Beijing Jiaotong University	6482
SS9-4 09:35-09:50	Vehicle-to-Vehicle Radio Channel Characteristics for a Long-Distance Urban Congestion Scenario at 5.9 GHz *Kun Yang, Zhou Ning, zhang Haoyu, Peng Tong, Yu Junyi, Li Changzhen, Chen Wei* Zhejiang Ocean University	6455
SS9-5 09:50-10:05	The Impact of Obstruction by Vehicle on in-Tunnel Wireless Propagation Channel *JiTing Song, Wei Wang, Ibrahim Rashdan* Chang'an University	6442
SS9-6 10:05-10:20	Identification of NLOS Condition in Different Scenarios Based on Wireless Propagation Features *Jingli Xie, Wei Wang, Zhilin Xu* Chang'an University	6440

Special session 9: Wireless Propagation, Sensing and Localization for Smart Mobility 10:30-12:05, Friday, August 20, 2021		
Conference ID: 332 604 348 **Password: 202108** **Session chair:** Ke Guan (Beijing Jiaotong University) Wei Wang (Chang'an University) Zhengrong Lai (Guangdong Communications & Networks Institute)		
Paper Information		
IT9-2 10:30-10:50	Invited Talk: Zhengrong Lai, Guangdong Communications & Networks Institute Title: A High-order Modulation (64-QAM) Broadband THz Communication System over 100 Gbps	Invited Talk
SS9-7 10:50-11:05	Compensation Method of GPS Signal Delay Based on Factor Graph *Hangyu Chen, Jing Ma, Fang Ye* Harbin Engineering University	6420
SS9-8 11:05-11:20	Oblique Aerial Photography High-resolution Environment Models for High-speed Railway Ray-Tracing Simulations *Jinhan Li, Lihai Liu, Ke Guan* 1. Beijing Jiaotong University 2. China Railway Siyuan Survey and Design Group Co., Ltd.	6364
SS9-9 11:20-11:35	Random Forest Assisted RF Fingerprinting Positioning for Cellular Network *Chu Xin, Lin Panyue, Zou Yufei, Zhai Menglin, Zhang Lei* Donghua University	6361
SS9-10 11:35-11:50	A Wi-Fi Harvesting Enabled Energy Optimization Scheme for Smart Clothing *Lin Panyue, Wang Luyao, Huang Gan, Chu Xin, Zhang Lei* Donghua University	6341
SS9-11 11:50-12:05	Research on 5G Wireless Signal Propagation and Coverage Capability for Marine Environment *Gang Sun, Jun Wu, Junwei Peng* Wuhan Maritime Communication Research Institute	6249

Special session 13: Modelling, Optimization and Applications of Antennas and Microwave Devices 08:30-09:35, Friday, August 20, 2021		
Conference ID: 106 661 034 **Password: 202108** **Session chair:** Jian Dong (Central South University) Feng Feng (Tianjin University) Long Zhang (Shenzhen University)		
Paper Information		
IT13-1 08:30-08:50	Invited Talk: Chunxu Mao, University of Surrey Title: Integrated Design of Filtering Antennas for Multiple Wireless Applications	Invited Talk
SS13-1 08:50-09:05	Nonlinear Device Modeling Based on Dynamic Neural Networks： A Review of Methods *Wenyuan Liu, Yi Su, Lin Zhu* Shaanxi University of Science and Technology	6517
SS13-2 09:05-09:20	Single-Feed Reflectarray Antenna with Eight Beams for Satellite Communications *Zhenqin Zheng, Long Zhang, Xianting Xie, Qingwei Ji, Hui Chen, Chunxu Mao* Shenzhen University	6480
SS13-3 09:20-09:35	Design of Traveling-Wave Electrode for Silicon Mach-Zehnder Electro-Optic Modulator *Linjie Yang, Fanmin Kong, Shiquan Wang, Kang Li, Liuge Du* Shandong University	6456

Special session 13: Modelling, Optimization and Applications of Antennas and Microwave Devices 09:45-11:05, Friday, August 20, 2021		
Conference ID: 678 675 500 **Password: 202108** **Session chair:** Jian Dong (Central South University) Feng Feng (Tianjin University) Long Zhang (Shenzhen University)		
Paper Information		
IT13-2 09:45-10:05	Invited Talk: Feng Feng, Tianjin University Title: Recent Advances in ANN for Fast Parameterized Modeling and Optimization	Invited Talk
SS13-4 10:05-10:20	Ultra-thin and Heat Resistant Absorber with Multi-sized Through-holes *Yicheng Liu, Juan Chen* Xian Jiaotong University	6354
SS13-5 10:20-10:35	Antenna Topology Optimization Using BMOGWO Based on Competition and Teaching *Xia Yuan, Xin Hou, Meng Wang, Jian Dong* Central South University	6273
SS13-6 10:35-10:50	Design and Analysis of Low-frequency Microwave Resonator for Signal Accumulation and Amplification *Zikun Xu, Xiangyuan Sang, Jin Tan, Wenjing Xu, Juan Chen* Xian Jiaotong University	6242
SS13-7 10:50-11:05	Recent advances in surrogate based optimization with feature assistance for microwave filter design *Jinyuan Cui, Feng Feng, Weicong Na, Wenyuan Liu, Shuxia Yan, Qi-Jun Zhang* Tianjin University	6320

Special session 14: OAM Wave Excitation and Propagation in Microwave and Millimeter Frequency Range 08:30-10:35, Friday, August 20, 2021		
Conference ID: 998 533 087 Password: 202108 Session chair: Li Deng (Beijing University of Posts and Telecommunications) Linghui Kong (Soochow University)		
Paper Information		
IT14-1 08:30-08:50	Invited Talk: Qingsheng Zeng, Nanjing University of Aeronautics and Astronautics (NUAA) Title: Millimeter Wave Signal Propagation in Indoor Environment and Underground Mine	Invited Talk
SS14-1 08:50-09:05	A ±45° Dual-Polarized Flat-Topped Radiation Antenna Array for 5G Applications *Abiao Li, Botao Feng, Deng Li* Shenzhen University	6566
SS14-2 09:05-09:20	A Broadband Miniaturized Log-periodic Dipole Antenna *Gang Zhuang, Botao Feng, Sanshan Sun, Li Deng* Shenzhen University	6565
SS14-3 09:20-09:35	Design of Tri-band Unidirectional Printed Antenna *Wende Zha, Botao Feng, Kwok L. Chung, Li Deng* Shenzhen University	6563
SS14-4 09:35-09:50	Single-Layer Reflective Metasurface for Dual-Band OAM Multiplexing *He Xiaoyuan, Deng Li* Beijing University of Posts and Telecommunications	6549
SS14-5 09:50-10:05	Restriction on the Purity of OAM Modes Generated by Digital and Coding Metasurfaces *Sizhe Zhang, Li Deng, Chen Zhang, Shufang Li, Botao Feng* Beijing University of Posts and Telecommunications	6398
SS14-6 10:05-10:20	High transmittance and broadband group delay metasurface element in Ka band *Wenqing Liu, Li Deng, Shufang Li, Botao Feng, Lijie Chen* Beijing University of Posts and Telecommunications	6396
SS14-7 10:20-10:35	A recognition method of OAM based on diffraction neural network *Yan Li, Li Deng, Shufang Li, Botao Feng* Beijing University of Posts and Telecommunications	6395

Special session 17: MM-Wave and THz Technologies and its System Applications 08:30-09:35, Friday, August 20, 2021		
Conference ID: 998 510 587 **Password: 202108** **Session chair:** Daotong Li (Chongqing University) Zhongqian Niu (University of Electronic Science and Technology of China)		
Paper Information		
IT17-1 08:30-08:50	Invited Talk: Daotong Li, Chongqing University Title: Power Combiner with High Isolation Characteristics and Its Application on Radiometer Sensitivity Enhancement	Invited Talk
SS17-1 08:50-09:05	Design of waveguide to suspended substrate microstrip line transition based on quartz substrate at 330GHz *Hegang Deng, Bo Zhang* University of Electronic Science and Technology of China	6534
SS17-2 09:05-09:20	Terahertz Channel Measurement and Characterization on a Desktop from 75 to 400 GHz *Haofan Yi, Ke Guan, Danping He, Bo Ai, Jianwu Dou, Zhengrong Lai, Zhangdui Zhong* Beijing Jiaotong University	6495
SS17-3 09:20-09:35	A new differential dual-polarized filtering microstrip patch antenna without extra circuit *Zhirui Zheng, Daotong Li, Xiaoheng Tan, Ying Liu, Yi Deng, Zhen Chen* Chongqing University	6460

Special session 17: MM-Wave and THz Technologies and its System Applications Special session 26: Electric Energy Conversion and Intelligent Control 09:45-11:05, Friday, August 20, 2021		
Conference ID: 518 922 466 **Password: 202108** **Session chair:** Daotong Li (Chongqing University) Zhongqian Niu (University of Electronic Science and Technology of China) Tian Gao (School of Electronic and Information, Northwestern Polytechnical University)		
Paper Information		
IT17-2 09:45-10:05	Invited Talk: Zhongqian Niu, University of Electronic Science and Technology of China Title: The Research on Terahertz Solid State Circuits and Front End for High Speed Communication System	Invited Talk
SS17-4 10:05-10:20	Multilayer LCP Millimeter-Wave Broadband Reflectionless Bandpass Filter Based on Broside Coupling *Xiaofang Li, Jiankang Xiao* Xidian University	6438
SS17-5 10:20-10:35	Wideband Millimeter-wave OFDM Uplink with Hybrid Receiving *Yang Li, Anzhong Hu* Hangzhou Dianzi University	6348
SS26-1 10:35-10:50	Stability analysis and control based on discrete model of Dual Active Bridge Converter *Lei Jia, Xueqin Bi, Qi Wang, Xiyuan Zhang* Xi'an Technological University	6578
SS26-2 10:50-11:05	Evaluation of SiC-based MOSFET in Electronic Power Technology *Tianhao Tan, Linrui Jiang, Yangyang Pan, Yan Yang, Jing Hou, Tian Gao* Northwestern Polytechnical University	6423

Special session 20: Artificial Intelligence and Information Security 08:30-10:00, Friday, August 20, 2021		
Conference ID: 773 422 100 **Password: 202108** **Session chair:** Ye Yuan (Chongqing University of Posts and Telecommunications) Sanshan Sun (Sichuan Normal University)		
Paper Information		
SS20-1 08:30-08:45	Energy-Efficient Resource Allocation for Multi-carrier NOMA Systems with Imperfect CSI *Xiaoyu Wan, Ershun Li, Zhengqiang Wang, Zifu Fan* Chongqing University of Posts and Telecommunications	6608
SS20-2 08:45-09:00	Siamese Network-Based Few-Shot Learning for Classification of Human Peripheral Blood Leukocyte *Zerong Guo, Yuqin Wang, Li Liu, Sanshan Sun, Botao Feng, Xiaolan Zhao* Sichuan Normal University	6597
SS20-3 09:00-09:15	Research on the Development Trend of China's Key Core Technologies of Artificial Intelligence Based on the Technology Life Cycle *Ye Yuan, Chaonan Wu, Jingying Li, Yuxiang Tao* Chongqing University of Post and Telecommunications	6576
SS20-4 09:15-09:30	A Wideband Vertically Polarized Omnidirectional Antenna for Indoor 2G/3G/LTE/5G Applications *Zixuan Liu, Botao Feng, Li Deng* Shenzhen University	6571
SS20-5 09:30-09:45	A Dual-Band Dual-Polarized Antenna For 5G Micro Basestation Applications *Zhenqiang Chen, Botao Feng, Qingsheng Zeng, Li Deng* Shenzhen University	6569
SS20-6 09:45-10:00	A Wide-Beamwidth Differentially-Fed Filter Antenna for Ultra-wideband Applications *Siyuan Qi, Botao Feng, Li Deng* Shenzhen University	6568

Special session 20: Artificial Intelligence and Information Security Special session 27: Applications by Multi-physically Controlled Reconfigurable Metasurfaces 10:10-12:20, Friday, August 20, 2021		
Conference ID: 411 985 544 **Password: 202108** **Session chair:** Zuojia Wang (Zhe Jiang University) Jianjia Yi (Xi'an Jiaotong University)		
Paper Information		
Invited Talk 10:10-10:30	Invited Talk: Zuojia Wang, Zhejiang University Title: Research on Deformable Electromagnetic Metamaterials	Invited Talk
Invited Talk 10:30-10:50	Invited Talk: Lei Xing, Nanjing University of Aeronautics and Astronautics Title: Recent Developments of Liquid Microwave Devices for Wireless Communications	Invited Talk
SS20-7 10:50-11:05	Broadband Phase Prediction of Electromagnetic Metamaterials Based on Deep Neural Network *Yifei Feng, Puchu Li, Ruiqing Xi, Yiting Yun, Jian Ren, Yingzeng Yin* National Key Laboratory of Antenna Technology, Xidian University	6513
SS20-8 11:05-11:20	Joint Placement and Power Allocation Optimization for Sum Rate Maximization in NOMA-based UAV Networks *Zhengqiang Wang, Hao Zhang, Yang Liu, Yongjun Xu, Xiaoyu Wan, Zifu Fan* Chongqing University of Posts and Telecommunications	6496
SS20-9 11:20-11:35	Forecasting of Provincial Tourist Population based on Grey Neural Network *Rongxin Li, Laxmisha Rai, Hongfei Wang, Fasheng Liu* Shandong University of Science and Technology	6427
SS27-1 11:35-11:50	Reconfigurable Waveguide Mode Converter Based on Deformable All-Dielectric Material *Yilin Zhang, Bingbo Xu, Menglan Lin, Lina Zhu, Jianjia Yi* Xi'an Jiaotong University	6507
SS27-2 11:50-12:05	Adjustable Terahertz Metamaterial Absorber Based on Perovskite *Yunqi Shi, Bingbo Xu, Xin Zhao, Lina Zhu, Jianjia Yi* Xi'an Jiaotong University	6476
SS27-3 12:05-12:20	Arbitrary Splicing Lens like Lego Based on All-Dielectric Metamaterials *Liu Yang, Wang Zengtao, Zhu Lina, Yi Jianjia* Xi'an Jiaotong University	6466

Special session 24: Advances in Multi-functional Metasurfaces and Applications 08:30-10:55, Friday, August 20, 2021		
Conference ID: 338 860 125 (Password: 202108) **Session chair:** Huanhuan Yang (Air Force Engineering University) Yueyi Yuan (Harbin Institute of Technology) Kuang Zhang (Harbin Institute of Technology)		
Paper Information		
IT24-1 08:30-08:50	Invited Talk: Mengmeng Li, Nanjing University of Science and Technology Title: Progress of Design Methods for Multi-functional Metasurface	Invited Talk
IT24-2 08:50-09:10	Invited Talk: Yu Xiao, Sun Yat-sen University Title: Wide-angle Beam-scanning Phased Array Designs Based on the Metasurface	Invited Talk
SS24-1 09:10-09:25	A Multi-functional Ultra-thin Metasurface with Closely Separated Polarization-Conversion and Tunable-Absorption Band *Huanhuan Yang, Tong Li, Zhao Liu, Junhui Wu, Lili Cong, Xiangyu Cao* Air Force Engineering University	6515
SS24-2 09:25-09:40	Multi-Band Resonant Metasurface and Sensing Applications *Yue Wang, Xiaoju Zhang, Zijian Cui, Lisha Yue, Xinmei Wang, Kuang Zhang* Key Laboratory of Ultrafast Photoelectric Technology and Terahertz Science in Shaanxi, Xi'an University of Technology Xi'an, China	6514
SS24-3 09:40-09:55	Design of Broadband and Large Incident Angle Transparent Absorber *Mian Gao, Dunwei Liao, Qiang Chen, Yunqi Fu, Yuejun Zheng* National University of Defense Technology	6490
SS24-4 09:55-10:10	Low-profile Wideband Microstrip Antenna Integrated with Solar Cells *Hui Wang, Wenxing An, Yu Luo* Tianjin University	6461
SS24-5 10:10-10:25	Wide-angle Beam-scanning Phased Array Designs Based on the Metasurface *Bin Xi, Yu Xiao, Hongwei Dong, zengping Chen* Sun Yat-sen University	6454
IT24-6 10:25-10:40	A Dual-Layer Circular Polarized Transmitarray Element with Double Hexagon-Spilt Ring *Aming Zhao, Min Wang, Yuxin Mo* Chongqing University of Posts and Telecommunications	6382
SS24-7 10:40-10:55	Generating X band Bessel Beam Carrying OAM mode Utilizing Metasurface Integrated With SIW Source *Desheng Yang, Guohui Yang, Yueyi Yuan, Qun Wu, Kuang Zhang* Harbin Institude of Technology	6378

Special session 16: Advanced Manufactured RF devices for 5G and beyond Special session 21: Properties and Applications of Novel Electromagnetic Materials 10:00-11:30, Friday, August 20, 2021		
Conference ID: 400 544 623 **Password: 202108** **Session chair:** Jianfeng Zhu (University of Technology Sydney) Bian Wu (Xidian University) Zhenguo Liu (Southeast University)		
Paper Information		
SS16-1 10:00-10:15	A Compact Log-Period Dipole Antenna with High Gain for 5G Applications *Bin Pan, Botao Feng, Li Deng, Sanshan Sun* Shenzhen University	6573
SS16-2 10:15-10:30	Circularly Polarized Antenna with Simple Structure for 5G Millimeter-Wave Applications *Yiping Huang, Yiling Sun, Botao Feng, Li Deng* Shenzhen University	6567
SS16-3 10:30-10:45	A High-Gain Yagi Antenna for 5G-C Band *Haoming Li, Wenhua Cao, Botao Feng, Deng Li* Shenzhen University	6562
SS16-4 10:45-11:00	Additively Manufactured All-Dielectric Mm-Wave Reflectarray Antenna *Jianfeng Zhu* University of Technology Sydney	6464
SS21-1 11:00-11:15	Controllable design of filtering attenuator based on graphene integrated dual-mode microstrip resonator *Chi Fan, Bian Wu, Shining Sun* Xidian University	6453
SS21-2 11:15-11:30	A Frequency Reconfigurable Circularly Polarized Antenna Based on Liquid Metal *Li Junfeng, Wu Bian, Fan Chi* Xidian University	6370

Special session 15: Cognitive Confrontation and Intelligent Decision Making 13:30-15:00, Friday, August 20, 2021		
Conference ID: 190 408 292 **Password: 202108** **Session chair:** Fang YE (Harbin Engineering University) Tao JIANG (Harbin Engineering University)		
Paper Information		
SS15-1 13:30-13:45	Smart Vest Design for Vessel Based on Artificial Magnetic Conductors *Yuan QU, Yutong WU, Peijun ZHANG, Hui ZHANG, Hanyu SHAN, Tao JIANG* Systems Engineering Research Institute	6529
SS15-2 13:45-14:00	Dynamic collaborative interference decision based on improved contract network algorithm *Xiangning Hao, Tong Zhao, Yifei Wu, Penghui Shi* Dalian Airforce Communication NCO Academy	6419
SS15-3 14:00-14:15	Cooperative interference decision based on directed mutation search artificial bee colony algorithm *Ming Liu, Tong Zhao, Bo Wang, Wenqiang Li, Lei Luan* Dalian Airforce Communication NCO Academy	6418
SS15-4 14:15-14:30	Cooperative Jamming Resource Allocation Based on Integer-Encoded Directed Mutation Artificial Bee Colony Algorithm *Jiechen Xia, Jing Ma, Yibing Li* Harbin Engineering University	6406
SS15-5 14:30-14:45	Ship Motion Attitude Prediction Based on Empirical Mode Decomposition and Gaussian Process Regression *Zhong Tang, Qian Sun, Yibing Li* Harbin Engineering University	6405
SS15-6 14:45-15:00	Research on Anti-range False Target Jamming Technique based on Quasi KLT Basis *Lexin Yu, Hui Zhang, Linshu Gong, Yutong Wu, Yuan Qu, Tao Jiang* Harbin Engineering University	6369

Special session 18: New Methods on Array Antenna Synthesis and Gain Enhancement
Special session 19: Slow Wave Transmission Lines and Their Applications in Antennas and Microwave Devices
13:30-15:25, Friday, August 20, 2021

Conference ID: 940 154 156
Password: 202108
Session chair:
Shiwen Lei (University of Electronic Science and Technology of China)
Jing Tian (University of Electronic Science and Technology of China)
Jia-Yuan Yin (Xidian University)
Jing-Ya Deng (Xidian University)

Paper Information

IT18-1 13:30-13:50	Invited Talk: Shiwen Lei, University of Electronic Science and Technology of China Title: Research on Power Gain Enhancement with Wide-Beam Mainlobe Array Antenna	Invited Talk
IT19-1 13:50-14:10	Invited Talk: Jing-Ya Deng, Xidian University, China Title: Miniaturized Devices and Antennas Realized by Slow wave Structures	Invited Talk
SS18-1 14:10-14:25	Synthesis of Linear Sub-array based on Hybrid Method *Zhipeng Lin, Haoquan Hu, Shiwen Lei, Bixiao Jiang, Bo Chen, Xie Qi* UESTC	6523
SS18-2 14:25-14:40	Synthesis of Sparse Circular-Arc Arrays with Wide Angle Scanning Based on Iterative Convex Optimization *Zhenfang Gu, Shiwen Lei, Ziyuan He, Zhipeng Lin, Bo Chen, Xie Qi* University of Electronic Science and Technology of China	6452
SS18-3 14:40-14:55	Sidelobe Level Suppression of Nulling Synthesis With Wide-beam Array Antenna *Shiwen Lei, Jing Tian, Zhipeng Lin, Bo Chen, Haoquan Hu* University of Electronic Science and Technology of China	6407
SS19-1 14:55-15:10	Frequency Controlled Beam Scanning Characteristic Realized using Compact Slow Wave Transmission Line *Jia-Yuan Yin, Xiao Yu Du, Jing-Ya Deng* Xidian University	6342
SS19-2 15:10-15:25	Design of a Dual-band Shared-Aperture Leaky-wave Antenna utilizing Slow Wave Transmission Line and SIW *Xiaoyu Du, Chenghao Zhang, Jiayuan Yin, Jian Ren, Yingzeng Yin* National Key Laboratory of Antennas and Microwave Technology	6276

Special session 22: Antennas for 5G Terminals and Base Stations 13:30-15:05, Friday, August 20, 2021		
Conference ID: 366 461 324 **Password: 202108** **Session chair:** Hui Li (Dalian University of Technology) Xiaoming Chen (Xi'an Jiaotong University) Le Chang (Xi'an Jiaotong University)		
Paper Information		
IT22-1 13:30-13:50	Invited Talk: Le Chang, Xi'an Jiaotong University Title: Co-frequency Shared -Aperture Dual Antenna Pairs for 5G MIMO	Invited Talk
SS22-1 13:50-14:05	Automatic Design of Uncorrelated Antennas Using Theory of Characteristic Mode *Hui Li, Yunze Diao* Dalian University of Technology	6424
SS22-2 14:05-14:20	Compact and Dual-Band Antenna for Smartwatch Application *Yonghua Kong, Baoyi Wang, Hui Li* Dalian University of Technology	6391
SS22-3 14:20-14:35	Miniaturization of Patch Antenna with Double Torsion Coil Feeding Structure *Shuxin Zheng, Zhenyuan Zhang, Jiazhi Tang, Xiaoming Chen* Xi'an Jiaotong University	6376
SS22-4 14:35-14:50	A Novel Miniaturized Broadband Base Station Antenna *Hanxiao He, Miaomiao Zuo, Jian Ren, Yingzeng Yin* XIDIAN UNIVERSITY	6306
SS22-5 14:50-15:05	Antenna Miniaturization Using Dielectric Cavity *Yiran Da, Xiaoming Chen* Xian Jiaotong Universty	6251

Special session 23: Artistic Patch Antennas and Hidden Antennas 13:30-14:35, Friday, August 20, 2021		
Conference ID: 356 887 158 **Password: 202108** **Session chair:** Kwok L. CHUNG (Huizhou University) Botao Feng (Shenzhen University)		
Paper Information		
IT23-1 13:30-13:50	Invited Talk: Kwok L. Chung, Huizhou University Title: Recent Progress on the Design of Chinese-Character-Shaped Patch Antennas and Arrays	Invited Talk
SS23-1 13:50-14:05	Correlation Study of Two-Element CP-MIMO Array of Chinese-Character-Shaped Patch Antennas *Hao Wang, Song Gao, Sibo Huang, Hui Hu, Kwok CHUNG* Qingdao University of Technology	6603
SS23-2 14:05-14:20	A 30° Gain Suppression Omnidirectional Magneto-Electric Dipole Antenna MIMO System for Indoor Sub-6 GHz 5G Applications *Yi Fang, Botao Feng, Sanshan Sun, Li Deng* Shenzhen University	6572
SS23-3 14:20-14:35	A Dual-Polarized Zhe-Shaped Conformal Patch Antenna for 5G Millimeter-Wave Applications *Baifa Yang, Haixuan Huang, Botao Feng* Shenzhen University	6559

Special session 25: Multi-band Shared-Aperture Antenna and Array 13:30-14:40, Friday, August 20, 2021		
Conference ID: 574 104 171 **Password: 202108** **Session chair:** Yunfei Cao (South China University of Technology) Jianxing Li (Xi'an Jiaotong University)		
Paper Information		
IT25-1 13:30-13:50	Invited Talk: Lei Ge, Shenzhen University Title: Multi-Band Radiation-Differentiated Antenna	Invited Talk
IT25-2 13:50-14:10	Invited Talk: Yujian Li, Beijing Jiaotong University Title: Multi-Band Mode-Composite Antennas for Millimeter-Wave and Sub-6-GHz Applications	Invited Talk
SS25-1 14:10-14:25	Shared-Aperture Dual-Band Antenna Array With Dual Polarization Using Filtering Full-Wavelength Slot Antenna *Yun Fei Cao, Yi Yang Liu, Xiaobing Liu* South China University of Technology	6522
SS25-2 14:25-14:40	A Singly-Fed Dual-Band Antenna for Microwave and Millimeter-wave Applications *Miaomiao Zuo, Hanxiao He, Jian Ren, Yingzeng Yin* XIDIAN UNIVERSITY	6305

Poster Session I

13:30-15:00, Thursday, August 19, 2021 **Session chair: *Yingsong Li*, *Xiaoming Chen***	
An Overview on Mission-Driven Networking Technologies in Data Link *Yongqiong Yuan, Junfeng Hu, Liang Zhang* Key Laboratory of Technology on Datalink, China Electronics Technology Group Corporation CETC, 20th Institute	6585
Conformance Testing of Link 16 Message Standard based on ATC-Gen *Wanyong Tian, Chilian Chen, Lulu Zhao* Key Laboratory of Technology on Data link China Electronics Technology Group Corporation CETC, 20th Institute	6584
AoI optimal dynamic power control for IoT networks：A DRDPG Approach *Kai Chi, Mengjie Wu, Yiqing Chen, Chao Xu* CETC Key Laboratory of Data Link Technology	6582
Information Value Measurement Distribution Model Based On Improved Information Entropy *Liang Chen, Chilian Chen, Lulu Zhao* CETC20	6580
Optimization of the Receiver in Visible Light Communications *Shengfa Xu, Xiangyang Zhang, Jing Dong, Xiaodong Yang* Beijing Orient Institute of Metrology and Test	6555
Design of Wearable Health Monitoring System Integrating Wireless Technology Based on 3D Graphene Foam Sensor *Zhaoliang Zhou, Jiankang Xiao, Yanwei Wang, Xiaozhou Lü* Xidian University	6546
Performance Analysis of Spread Spectrum Communication System Based on C-T Coupling Cascade Chaotic Mapping *Rongxin Hu, Liyong Bao, Hongwei Ding, Zheng Guan* School of Information, Yunnan University	6491
Performance Analysis of the First-order Characteristics of Two-level Priority Polling System Based on Parallel Gated and Exhaustive Services Mode *Ge Junyang, Bao Liyong, Ding Hongwei, Ding Xinyu* School of Information, Yunnan University	6429
Improved mapping optimization algorithm based on Generative Adversarial Networks (IMOAG) *Qiuxuan He, Yiou Chen, Xia Yu* University of Electronic Science and Technology of China	6343
Joint Placement Design and Beamforming in Intelligent Reflecting Surface Assisted Wireless Network *Yuguang Tian, Ji Li, Sixing Yin* Beijing University of Posts and Telecommunications	6474
Research of Occupancy-Based Skyline Pattern Mining *Kai Zhang, Kun Hu* Key Laboratory of Technology on Data link；China Electronics Technology Group Corporation CETC, 20th Institute	6604
Improvement and Implementation of Genetic Algorithm for Location Scheme in Location-Routing Problem *Hanlin Yu, Yabo Luo* Wuhan University of Technology	6552

Geometric estimation on manifolds based training data selection *xixi Chen, hao Wu, yongqiang Cheng, hongqiang Wang* National University of Defense Technology	6528
A Ground-penetrating Radar Object Detection Method Based on Deep Learning *Siyu Chen, Li Wang, Zheng Fang, Zhensheng Shi, Anxue Zhang* Xi'an Jiaotong University	6470
Impacts of Phase Noise on the Performance of Adaptive Side-lobe Cancellation System *Minglei Zhou, Qing Wang, Fangmin He, Yunshuo Zhang, Kang Luo, Jin Meng* Naval University of Engineering	6402
Robust Beamforming Method for Coprime Array with Accurate Covariance Matrix Reconstruction *Zhangqiang Xu, Wenxin Li, Yahui Wang* Harbin Engineering University	6389
Wnet++: A Nested W-shaped network with multiscale input and adaptive deep supervision for osteosarcoma segmentation *Limei Shuai, Xin Gao, Jiajun Wang* Soochow University	6330
Recognition of Underground Target Material Based on Average Phase Difference and Radial Basis Function Neural Network *Kunzhe Li, Shufang Liu, Xiaowei Shi, Dalin Zhang, Yuan Xue* Xidian University	6326
Research on BDS/GPS High-precision Long-period Ephemeris Extrapolation Technology *Jun Fu, Teng Lv* Naval University of Engineering	6203
Recognition of MFR Based Motif Discovery *Pengcheng Wang, Weisong Liu, Chao Wang, Pengyu Zhang, Tailai Wen, Zheng Liu* College of Electronic Science and Technology National University of Defense Technology	6200
The Nyström Kernel Adagrad Least Mean Square Algorithm Using k-means Sampling *Xuewei Huang, Daili Wang, Letian Qi, Shiyuan Wang* Southwest University	6023
A novel dual polarized rectenna for Ambient RF Energy Harvesting *Ziyue Li, Yihang Fan, Qian Yang* Xi'an Jiaotong University	6512
Microwave Penetration Depth Measurements of Plant Materials in Reverberation Chamber *Jinfeng Huang, Dandan Yan, Qian Xu* Nanjing University of Aeronautics and Astronautics	6500
A Novel Impedance Matching Approach with Oblique Waveguide for Arbitary Rectangular Waveguide Devices *Qinghe Zhuang, Zhicheng Luo, Min Liu, Guang Yang, Yunling Miao, Meng Yang* Northwest Institute of Nuclear Technology	6449
Modified Generalized Memory Polynomial Model of RF Power Amplifiers *Du Chen, Yongjiu Zhao, Yonggang Zhou, Qinmeng Ji, Zehui Chen, Feng Tian* Nanjing University of Aeronautics and Astronautics College of Electronic and Information Engineering	6426
A Novel Picosecond-Pulse Circuit Based on Marx Structure and SRD *Wenjing Xu, Juan Chen, Zhensheng Shi, Anxue Zhang* Xi'an Jiaotong University	6390

Design of Six-cavity Ceramic Waveguide Filter with Four Transmission Zeros *Shunliang Meng, Fei Liang, Zihang Lin, Wenzhong Lu, Xiaochuan Wang* School of Optical and Electronic Information, Huazhong University of Science and Technology	6373
A New compact UWB Filtering Power Divider With Quasi-Chebyshev Equal-Ripple Response *Zehui Chen, Yongjiu Zhao, Chao Liu, Du Chen, Qinmeng Ji* College of Electronic and Information Engineering, Nanjing University of Aeronautics and Astronautics	6302
A 68% PAE, 800-W, L-Band Internally Matched GaN Amplifier *Ji Qinmeng, Yongjiu Zhao, Feng Tian, Pengpeng Liu* Nanjing University of Aeronautics and Astronautics	6293
A New Wide Dynamic Range Rectifier Circuit for Ambient RF Energy Harvesting *Cheng Jiang, Bin Wei, Xiaokang Wu, Ziyue Li, Qian Yang, Jianxing Li, Ersong Chen* China Electric Power Research Institute	6275
A High Gain Si-shaped Circularly Polarized Patch Antenna for 5G Applications *Wei Zhou, Chuan Yue, Yingsong Li, Yinfeng Xia, Bosong Qiu* Harbin Engineering University	6167

Poster Session II

15:10-16:40, Thursday, August 19, 2021 **Session chair: *Yingsong Li*, *Xiaoming Chen***	
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A novel algorithm based on two-step CN-FDTD *Yaxiu Sun, Ranran Gu, Junyan Wang, Fanyun Kong, Xiaomin Zhang, Qiuyuan Qiao* Harbin Engineering University	6511
An Ultra-Wideband Circularly Polarized Probe Based on Vivaldi Antenna *Dalin Zhang, Shufang Liu, Yuan Xue, Kunzhe Li, Qian Cheng* Xidian University	6509
Analysis of Channel Characteristics for Congested Scene in the Tunnel *Kai Zhai, Menglin Zhai, Demin Li, Lei Zhang* College of Information Science and Technology, Donghua University,Shanghai,China	6505
A Novel Miniaturized Mutil-Mode Pattern Diversity Antenna for Wearable Wireless Communications *Xiuqing Geng, ZeHong Yan, XiYu Wang, DanDan Yang* Xidian University	6497
Study on Extracting Method of Distributed Parameters for Non-uniform Transmisson Lines *Li Yang, Guizhen Lu* Communication University of China	6487
A searching algorithm for antenna phase center *Yu Wang, Ye Chen, Qitao Zhang* Institute of Space Radio Technology of Xi'an	6486
Error Analysis of Planar Near Field for Antenna Phase Center Measurement *Ye Chen, Qitao Zhang, Yu Wang* Institute of Space Radio Technology of Xi'an	6485
Fast Filling Algorithm of EDM-RACA Matrix Based on Centroid Segmentation Moment Method *Jianning Zhang, Yun Wang, Guangyu Zhang, Junyan Wang, Qiuming Ai, Yaxiu Sun* Harbin Engineering University	6484
An Ultra-wideband Circularly Polarized Hemispherical Helical Antenna *Haomin Yang, Yonggang Zhou, Huaizhen Wang, Houzhi Jiang* Nanjing University of Aeronautics and Astronautics	6441
Pattern and Polarization Diversity Antenna for Indoor Wireless Communications *Ling Sun, Rui-Qi Wang, Wen-Yuan Liu* School of Electronic Information and Artificial Intelligence, Shaanxi University of Science and Technology	6435
An Ultra-wideband Omnidirectional diople Antenna for Borehole Radar Application *Qi Yuan* Xi'an Jiaotong University	6413
Wideband Dual-Polarized Vortex Beams Reflectarray Antenna with Independently Controllable Dual modes *Yingchao Chen, Yonggang Zhou, Houzhi Jiang, Haomin Yang, Huaizhen Wang* Nanjing University of Aeronautics and Astronautics	6385

Super-directive Scattering of Optimized Multi-layered Dielectric Cylinder by Differential Evolution Algorithm *Yongli Zhang, Wan Chen, Bo Lv, Lei Gao, Mingyue Zhang* China Academy of Civil Aviation Science and Technology	6381
Improvement of the MIMO Performance of a Antanna Array Using Dielectric Substrates *Yipeng Wang, Xiaoming Chen* Xi'an Jiaotong University	6380
A Low-RCS Antenna Design with Polarization Conversion Metasurfaces *Yan Deng, Yan Chen, Hengyan Hu, Yang Yang, Xiaoxiang He, Haikang Ji* Nanjing University of Aeronautics and Astronautics	6356
Design of mm-Wave Dielectric Lens Antenna for Liquid Level Gauge Radar *chaojie Guo, jianzhong Chen, liang Li, jia Chen* National Key Laboratory of Antenna and Microwave Technology Xidian University	6322
Transparent Wideband Absorber Based on Narrow Pattern *Wen-Yuan Feng, Jian-Zhong Chen, Yu-Tong Zhao, Chao-Jie Guo, Lei Lin* National Key Laboratory of Antennas and Microwave Technology Xidian University	6321
Path Loss Modeling and Analysis for Low Antenna Height over Grass Environment *Jiawei Zang, Shouyuan Wang* China Academy of Information and Communications Technology	6316
Diffraction Loss Modeling for V2V Wireless Channel in Viaduct Scenarios at 5.9 GHz Band *Changzhen Li, Wei Chen, Luyao Du, Junyi Yu, Shoufeng Wang, Kun Yang* Wuhan University of Technology	6309
A Broadband Pyramidal Horn Antenna Applied to Multi-mode Multiplexing *Wei Han, Hong-Wei Deng, Yong-Jiu Zhao, Yang-Kun Han* College of Electronic and Information Engineering, Nanjing University of Aeronautics and Astronautics	6307
2.5-Dimensional Switchable Frequency Selective Surface Based on Reed Switch *Fukang Li, Yan Chen, Hengyan Hu, Xiaoxiang He, Yang Yang* Nanjing University of Aeronautics and Astronautics	6303
Compact Broadband and Dual-Polarized Cylindrical Dielectric Resonant Antenna *Bingdou Li, Anxue Zhang, Xiaobo Liu* School of Electronic and Information Engineering Xi'an Jiaotong University	6301
Research on Optimized Design of Antenna Based on Improved Whale Optimization Algorithm *Wenmin Fan, Zhixin Wang, Weijun Hong* Beijing University of Posts and Telecommunications	6299
Design of W-band Substrate Integrated Waveguide Horn Antenna for Active Phased Array *Ye Deng, Tianye Ma, Jinping Zhang, Lei Sun, Zhipeng Zhou* Nanjing Research Institute of Electronics Technology	6272
A Polarization-Insensitive Coding Metasurface with Wideband RCS Reduction *Chengwei Zhang, Jianzhong Chen, Lei Lin, Yu-Tong Zhao, Tao Su* National Key Laboratory of Antennas and Microwave Technology Xidian University	6269
Optically Transparent Diffusion Metasurface Using Metallic Mesh *Ya-Qi Wei, Jian-Zhong Chen, Lei Lin, Yu-Tong Zhao, Jia Chen* National Key Laboratory of Antennas and Microwave Technology Xidian University	6267
A Multi-layer Tunable Frequency Selective Surface with Highly Selective Response Based on Varactor Diodes *XiaoHui Yu, FuKang Li, ShuaiHeng Wang, XiaoXiang He, Yang Yang* Nanjing University of Aeronautics and Astronautics	6240

Near-Field Analysis of Broadband Scattering *Mao Mao, Yan Chen, Fukang Li, Yang Yang, Xiaoxiang He, Zhenyu Shen* Nanjing University of Aeronautics and Astronautics	6232
Dual Polarization Common Aperture Transceiver Antenna with High Radiation Performance *Bingdou Li, Anxue Zhang, Xiaobo Liu* School of Electronic and Information Engineering Xi'an Jiaotong University	6192

Poster Session III

08:30-10:00, Friday, August 20, 2021 **Session chair: *Yingsong Li*, *Xiaoming Chen***	
Design of a Wideband Stack Array Antenna For Ka-band Satellite Communication Application *Weiwei Liu, Wenchao Chen, Anxue Zhang* The 54th Research Institute of China Electronics Technology Group Corporation	6457
Decoupling patch antenna array using magnetic metamaterials *hong Zhang, Jiafu Wang, Xinmin Fu, Zuntian Chu, Tonghao Liu, Shaobo Qu* Air Force Engineering University	6277
A VLF Resonant Antenna Based on Piezoelectric Ceramics *Xueqin Ma* Xidian University	6246
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