

2018 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting

**Boston, Massachusetts, USA
8-13 July 2018**

Pages 1-630



**IEEE Catalog Number: CFP18APS-POD
ISBN: 978-1-5386-7103-0**

**Copyright © 2018 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

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

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

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

IEEE Catalog Number:	CFP18APS-POD
ISBN (Print-On-Demand):	978-1-5386-7103-0
ISBN (Online):	978-1-5386-7102-3
ISSN:	1522-3965

Additional Copies of This Publication Are Available From:

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

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

MO-SP.1A: INNOVATIVE PHASED ARRAY ARCHITECTURES AND BEAMFORMING TECHNOLOGY

MO-SP.1A.1: RECENT STUDIES ON 4D ANTENNA ARRAYS AND THEIR APPLICATIONS TO WIRELESS ELECTRONIC SYSTEMS 1

Jixin Guo, Shiwen Yang, University of Electronic Science and Technology of China, China

MO-SP.1A.2: MOBILE TESTBED FOR VIDEO-RATE MULTISTATIC MICROWAVE IMAGING ARRAY..... 3

William Moulder, James Krieger, Janusz Majewski, Charles Coldwell, Pierre-Francois Wolfe, Huy Nguyen, Adam Chapman, Thomas Anderson, Denise Maurais-Galejs, Jeffrey Herd, MIT Lincoln Laboratory, United States

MO-SP.1A.4: DOMINO-TILING IN PHASED ARRAYS THROUGH INNOVATIVE COMPUTATIONAL/ANALYTIC STRATEGIES 5

Nicola Anselmi, Paolo Rocca, Cristian Castlunger, Davide Marcantonio, Pietro Rosatti, Luciano Tosato, Francesco Zardi, University of Trento, Italy; Eva Rajo-Iglesias, Universidad Carlos III de Madrid, Spain; Andrea Massa, University of Trento, Italy

MO-SP.1A.5: A COMPARISON OF DIGITAL BEAMFORMING AND POWER MINIMIZATION ADAPTIVE NULLING ALGORITHMS USING A SOFTWARE DEFINED RADIO ANTENNA ARRAY 7

Payam Nayeri, Randy Haupt, Colorado School of Mines, United States

MO-SP.1A.10: ANALOG BEAMFORMING WITH SINGLE-SIDEBAND SUB-TIME-MODULATED ARRAYS 9

Roberto Maneiro-Catoira, Julio Bregains, Jose Antonio Garcia-Naya, Luis Castedo, University of A Coruña, Spain

MO-SP.2A: APPLICATIONS OF ELECTROMAGNETICS IN MEDICINE AND BIOLOGY

MO-SP.2A.1: DYNAMIC RANGE OF AN ACTIVE RADIO SENSOR FOR BIAS-SWITCHED ARRAYS FOR MICROWAVE TISSUE IMAGING11

Farzad Foroutan, Natalia K. Nikolova, McMaster University, Canada

MO-SP.2A.2: CHALLENGES IN TERAHERTZ IMAGING OF FRESHLY EXCISED HUMAN BREAST TUMORS 13

Tyler Bowman, University of Arkansas, United States; Keith Bailey, Oklahoma State University, United States; Magda El-Shenawee, University of Arkansas, United States

MO-SP.2A.3: CONTINUOUS LONG TERM PATIENT MOTION MONITORING USING ULTRA WIDE BAND RADAR 15

Aly Fathy, University of Tennessee, United States; Ozlem Kilic, Catholic University of America, United States; Lingyun Ren, University of Tennessee, United States; Nghia Tran, Toan Vo Dai, Catholic University of America, United States; Farnaz Foroughian, Farhan Quaiyum, University of Tennessee, United States

MO-SP.2A.5: A REVIEW OF ADAPTIVE MICROWAVE AND RF PHASED ARRAYS FOR THERMOTHERAPY TREATMENT OF CANCER 17

Alan Fenn, Massachusetts Institute of Technology, United States

MO-SP.2A.7: CELL MORPHOLOGY-BASED CLASSIFICATION IN RED BLOOD CELLS BY ANGLE-RESOLVED ELECTROMAGNETIC SCATTERING APPROACH 19

Polat Goktas, Bilkent University, and Harvard Medical School, United States; Ilya O. Sukharevsky, Technical University of Munich, Germany; Sun-Joo Jang, Seok-Hyun Yun, Wellman Center for Photomedicine, Massachusetts General Hospital, Harvard Medical School, United States; Ayhan Altintas, Bilkent University, Turkey

MO-SP.2A.8: EFFICIENCY ANALYZE OF CONFORMAL SCMR SYSTEM FOR WEARABLE APPLICATIONS 21

Kun Bao, Stavros Georgakopoulos, Florida International University, United States

MO-SP.2A.10: SENSING THE DEFECT RESPONSE OF CRANIAL VAULT USING RESISTIVELY LOADED DIPOLE ANTENNA	23
<i>Doojin Lee, George Shaker, University of Waterloo, Canada</i>	
MO-A5.1A: MIMO ANTENNA DESIGN	
MO-A5.1A.1: TWO ELEMENTS MIMO ANTENNA FOR TABLET SIZE GROUND PLANE WITH RECONFIGURABLE LOWER BANDS AND CONSISTENT HIGH BAND RADIATING ELEMENTS	25
<i>Satish Sharma, Anthony Wang, San Diego State University, United States</i>	
MO-A5.1A.2: A NOVEL FOUR-PORT PATTERN DIVERSITY ANTENNA FOR 4G COMMUNICATIONS	27
<i>Kumud Jha, Shri Mata Vaishno Devi University, India; Satish Sharma, San Diego State University, United States</i>	
MO-A5.1A.3: DUAL-PORT CONFORMAL PIFA DIVERSITY ANTENNA FOR SMALL CYLINDRICAL GROUNDPLANE MOUNTING	29
<i>Roshanak Zabih, Rodney Vaughan, Simon Fraser University, Canada</i>	
MO-A5.1A.4: A COMPACT MULTIBAND PLANAR MIMO ANTENNA WITH HIGH ISOLATION	31
<i>Yulin Zhao, Jiahui Fu, Kuang Zhang, Qun Wu, Harbin Institute of Technology, China; Xiangqing Yin, Fishery Supervision and Management Station, China</i>	
MO-A5.1A.5: A PRINTED WIDEBAND MIMO ANTENNA SYSTEM FOR WIRELESS APPLICATION	33
<i>Sonika Biswal, Sushrut Das, IIT(ISM) Dhanbad, India</i>	
MO-A5.1A.6: COMPACT MIMO ANTENNA ENABLED BY DGS FOR WLAN APPLICATIONS	35
<i>Soumen Pandit, Priyadip Ray, Akhilesh Mohan, Indian Institute of Technology Kharagpur, India</i>	
MO-A5.1A.7: COMPACT MIMO ANTENNA FOR 5G PORTABLE DEVICE USING SIMPLE NEUTRALIZATION LINE STRUCTURES	37
<i>Mingkai Wang, Yixin Li, Huanqing Zou, Mingzhi Peng, Guangli Yang, Shanghai Institute for Advanced Communication and Data Science Shanghai University, China</i>	
MO-A5.1A.8: AN EIGHT-PORT 5G/WLAN MIMO ANTENNA ARRAY WITH HEXA-BAND OPERATION FOR MOBILE HANDSETS	39
<i>Mingzhi Peng, Huanqing Zou, Yixin Li, Mingkai Wang, Guangli Yang, Shanghai University, China</i>	
MO-A5.1A.9: EIGHT-ANTENNA ARRAY IN THE 5G SMARTPHONE FOR THE DUAL-BAND MIMO SYSTEM	41
<i>Kuixi Yan, University of Electronic Science and Technology of China, China; Peng Yang, University of Electronic Science and Technology of China, Institute of Electronic and Information Engineering of UESTC in Guangdong, China; Feng Yang, University of Electronic Science and Technology of China, China; Shaoying Huang, Singapore University of Technology and Design (SUTD), Singapore; L.Y. Zeng, Institute of Electronic and Information Engineering of UESTC in Guangdong, China</i>	
MO-A1.1A: RECONFIGURABLE ANTENNAS FOR MODERN APPLICATIONS	
MO-A1.1A.1: HIGH-POWER AND WIDELY-TUNABLE EVANESCENT-MODE CAVITY-BACKED SLOT ANTENNA	43
<i>Abbas Semnani, Michael Sinanis, Dimitrios Peroulis, Purdue University, United States</i>	
MO-A1.1A.2: A RASPBERRY PI CONTROLLED ANTENNA SYSTEM FOR SWITCHABLE TILTED-TWIN BEAMS	45
<i>Arpan Pal, Andrew Skippins, Amit Mehta, Swansea University, United Kingdom; Hisamatsu Nakano, Hosei University, United Kingdom</i>	
MO-A1.1A.3: BEAM TILTING ANTENNA USING FSS LAYER FOR 5G APPLICATIONS	47
<i>Mehri Borhani Kakhki, Tayeb Ahmed Denidni, Institut National de la Recherche Scientifique, Canada</i>	

MO-A1.1A.4: A CIRCULARLY-POLARIZED HORN ANTENNA WITH TUNABLE HANDEDNESS USING CHIRAL METAMATERIAL LOADING	49
<i>Kathryn Smith, Ryan Adams, University of North Carolina at Charlotte, United States</i>	
MO-A1.1A.5: RADIATION CHARACTERISTICS OF A BENT UMBRELLA-SHAPED TRANSMISSION LINE ANTENNA	51
<i>Toru Kawano, National Defense Academy, Japan; Hisamatsu Nakano, Hosei University, Japan</i>	
MO-A1.1A.6: MULTI-BEAM WIDEBAND ANTENNA USEFUL IN MIMO APPLICATIONS	53
<i>Carlos Ramiro Peñafiel-Ojeda, Universidad Nacional de Chimborazo, Ecuador; Marta Cabedo-Fabrés, Eva Antonino-Daviu, Miguel Ferrando-Bataller, Universitat Politècnica de València, Spain</i>	
MO-A1.1A.7: MULTIBAND RECONFIGURABLE MIMO ANTENNA FOR GSM/GPS/GLONASS/LTE/UMTS WIRELESS TERMINALS	N/A
<i>Aqsa Ahmad, Hammad M. Cheema, NUST, Pakistan</i>	
MO-A1.1A.8: A LOW-COST BEAM-SCANNING DIELECTRIC RESONATOR ANTENNA EMPLOYING RECONFIGURABLE PARASITIC ELEMENTS	N/A
<i>Reza Movahedinia, Abdel Razik Sebak, Concordia University, Canada; Mohammad Reza Chaharmir, Communications Research Centre Canada, Canada</i>	
MO-A1.1A.9: RECONFIGURABLE QUADRIFILAR HELICAL ANTENNA	59
<i>Xuan Yi, Hang Wong, City University of Hong Kong, China</i>	
 MO-A1.2A: LOW FREQUENCY ELECTRICALLY SMALL ANTENNAS	
MO-A1.2A.1: MULTI-PHYSICS GENERATED SMALL DIPOLES IN LOSSY MEDIA	61
<i>George Pan, Sai Zhou, Arizona State University, United States</i>	
MO-A1.2A.2: A HIGH-GAIN EXTREMELY LOW-PROFILE ANTENNA FOR LOW-VHF BAND APPLICATIONS	63
<i>Menglou Rao, Kamal Sarabandi, University of Michigan, United States</i>	
MO-A1.2A.3: NOVEL MECHANICAL MAGNETIC SHUTTER ANTENNA FOR ELF/VLF RADIATION	65
<i>Mark Golkowski, Ronald Rorrer, Jaedo Park, University of Colorado Denver, United States; Zbigniew Celinski, University of Colorado Colorado Springs, United States; James Bittle, Bhanu Babiiahgari, University of Colorado Denver, United States</i>	
MO-A1.2A.4: MECHANICAL SUPER-LOW FREQUENCY (SLF) TRANSMITTER USING ELECTRICALLY-MODULATED RELUCTANCE	67
<i>Nathan Strachen, John H. Booske, Nader Behdad, University of Wisconsin-Madison, United States</i>	
MO-A1.2A.5: MEASURED AND FIELD-BASED THEORETICAL Q OF GRAVITATIONALLY-SMALL GRAVITATIONAL ANTENNAS	69
<i>Thomas Weldon, University of North Carolina at Charlotte, United States</i>	
MO-A1.2A.7: MAGNETIC PENDULUM ARRAYS FOR ULF TRANSMISSION	71
<i>Srinivas Prasad M N, Rustu Umut Tok, Yuanxun Ethan Wang, University of California, Los Angeles, United States</i>	
 MO-A4.1A: PROPAGATION IN OUTDOOR AND URBAN ENVIRONMENTS	
MO-A4.1A.1: PATH LOSS MEASUREMENTS AND MODELS AT 28 GHZ FOR 90% OUTDOOR SUBURBAN COVERAGE	73
<i>Dmitry Chizhik, Jinfeng Du, Nokia, United States; Guillermo Castro, Mauricio Rodriguez, Pontificia Universidad Católica de Valparaíso, Chile; Rodolfo Feick, Universidad Técnica Federico Santa María, Chile; Reinaldo Valenzuela, Nokia, United States</i>	
MO-A4.1A.2: COMPARISON OF ROOFTOP- AND GROUND-TO-GROUND URBAN PROPAGATION OF WIDEBAND UHF SIGNALS	75
<i>Daniel Breton, Samuel Streeter, Garrett Hoch, Cold Regions Research & Engineering Laboratory, United States</i>	

MO-A4.1A.3: HIGH-RESOLUTION DIRECTIONAL CHANNEL MEASUREMENTS AT 67 GHZ AND ADVANCED ANALYSIS OF INTERACTIONS USING GEOMETRIC INFORMATION	77
<i>Michael Peter, Wilhelm Keusgen, Fraunhofer Heinrich Hertz Institute, Germany; Taro Eichler, Kiyoshi Yanagisawa, Rohde & Schwarz, Germany; Koshiro Kitao, Tetsuro Imai, Minoru Inomata, Yukihiro Okumura, Takehiro Nakamura, NTT DOCOMO, INC., Japan</i>	
MO-A4.1A.4: PHYSICAL LAYER SECURITY BASED ON TIME REVERSAL TECHNIQUE FOR URBAN RADIO CHANNELS	79
<i>Hassan El-Sallabi, Yahia Basahl, Abdulaziz Aldosari, Qatar Armed Forces, Qatar</i>	
MO-A4.1A.5: 3D LTE COVERAGE PREDICTION FOR RESIDENTIAL DISTRICT BY RAY TRACING SIMULATION	81
<i>Wanqiao Wang, Ke Guan, Danping He, Bo Ai, Zhangdui Zhong, Beijing Jiaotong University, China; Liju Zhu, Tianyun Shui, Chenji Liu, Jiangxi Mobile Communication Company Limited, China</i>	
MO-A4.1A.6: WIRELESS CHANNEL SIMULATION USING GEOMETRICAL MODELS EXTRATED FROM POINT CLOUDS	83
<i>Juan Pascual-García, Jose-Maria Molina-Garcia-Pardo, Universidad Politécnica de Cartagena, Spain; Maria-Teresa Martinez-Ingles, Ministerio de Defensa-Universidad Politécnica de Cartagena, Spain; José-Víctor Rodríguez, Leandro Juan-Llácer, Universidad Politécnica de Cartagena, Spain</i>	
MO-A4.1A.7: HIGH ACCURACY RANGE ESTIMATION FOR ATSC DTV SIGNAL BASED POSITIONING SYSTEM	85
<i>Zhiyan Cui, Yikun Huang, Yuanxun Ethan Wang, University of California, Los Angeles, United States</i>	
MO-A4.1A.8: RF PROPAGATION MEASUREMENTS USING A MOBILE RECEIVER SYSTEM	87
<i>Brandon Yee, Lan Xu, Evangelos Petsalis, Jinyoung Jang, Valerie Lang, Hubert Chew, Steven Beck, The Aerospace Corporation, United States</i>	
MO-A4.1A.9: EMITTER LOCATION USING POWER DIFFERENCE OF ARRIVAL	89
<i>Andres Navarro, William Cruz, Yor Castano, Universidad Icesi, Colombia</i>	
MO-A4.1A.10: ANALYSIS OF EDGE DETECTION FOR THE CLUSTERS IN RADIO PROPAGATION CHANNEL	91
<i>Chen Huang, Ruisi He, Zhangdui Zhong, Beijing Jiaotong University, China; Zhimeng Zhong, Huawei Technologies, China</i>	
MO-A4.1A.11: PROPAGATION MODELS: LARGE SCALE AND SITE-SPECIFIC	93
<i>Jinyoung Jang, Lan Xu, Brandon Yee, Evangelos Petsalis, Steven Beck, Valerie Lang, Hubert Chew, The Aerospace Corporation, United States</i>	
 MO-A1.3A: ANTENNA THEORY I	
MO-A1.3A.1: MECHANICAL ANTENNAS: EMERGING SOLUTION FOR VERY-LOW FREQUENCY (VLF) COMMUNICATION	95
<i>Navid Barani, Kamal Sarabandi, University of Michigan, United States</i>	
MO-A1.3A.2: RADIATION CHARACTERISTICS OF A NEW PLANAR ARRAY	97
<i>Ahmad Safaai-Jazi, Iqtidar Khan, Warren Stutzman, Virginia Polytechnic Institute and State University, United States</i>	
MO-A1.3A.3: FAR-FIELD EQUIVALENCE THROUGH EQUIVALENT CURRENT DISTRIBUTIONS	99
<i>Leo Tchorowski, Inder Gupta, Ohio State University, United States</i>	
MO-A1.3A.4: THE CONCEPT OF RECOVERABLE ENERGY	101
<i>Guy A. E. Vandenbosch, KU Leuven, Belgium</i>	
MO-A1.3A.5: EFFECT OF ANTENNA ELEMENT PLACEMENT ON CHASSIS MODES	103
<i>Asim Ghalib, Mohammad Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia</i>	

MO-A1.3A.6: CONSTRUCTIVE ANALYTICAL PHASING (CAP) FOR ARBITRARILY ORIENTED ARRAYS OF LINEARLY POLARIZED ELEMENTS	105
<i>Hossein Mehrpour Bernety, Suresh Venkatesh, David Schurig, University of Utah, United States</i>	
MO-A1.3A.7: AVAILABLE UNIVERSE OF INPUT IMPEDANCES FOR THE PROBE-FED CIRCULARLY POLARIZED MICROSTRIP ANTENNA	107
<i>Diego Moná, Daniel Nascimento, Technological Institute of Aeronautics, Brazil</i>	
MO-A1.3A.8: CHARACTERISTICS OF A MONOPOLE ANTENNA IN THE VICINITY OF A GROUNDED CYLINDRICAL STRATIFIED MEDIA	109
<i>Dhrubajyoti Bhattacharya, Bratin Ghosh, Indian Institute of Technology Kharagpur, India; Kamal Sarabandi, University of Michigan, United States</i>	
MO-A1.3A.9: ANALYSIS OF CIRCULAR-RING ANTENNA ARRAY USING ORBITAL ANGULAR MOMENTUM ELEMENT	N/A
<i>Yu Yao, Xianling Liang, Maohua Zhu, Junping Geng, Weiren Zhu, Ronghong Jin, Shanghai Jiao Tong University, China</i>	
MO-A1.3A.10: A CYLINDRICAL LUNEBERG LENS ANTENNA WITH EXTREMELY WIDE FAN-BEAM	113
<i>Zhe Zhang, Shiwen Yang, Yikai Chen, Shiwei Qu, University of Electronic Science and Technology of China, China</i>	
 MO-A1.4A: MULTI-BAND CIRCULARLY POLARIZED ANTENNAS	
MO-A1.4A.1: A DUAL-BAND DUAL-PIN CIRCULARLY POLARIZED ANTENNA FOR 2.45 GHZ AND 5.2 GHZ WIFI OPERATION	115
<i>Stefano Maddio, Giuseppe Pelosi, Monica Righini, Stefano Selleri, University of Florence, Italy</i>	
MO-A1.4A.2: DUAL BAND DUAL CIRCULARLY POLARIZED PATCH ANTENNA WITH SMALL FREQUENCY RATIO	117
<i>Stefano Maddio, Giuseppe Pelosi, Monica Righini, Stefano Selleri, University of Florence, Italy</i>	
MO-A1.4A.3: DUAL BAND DUAL CIRCULARLY POLARIZED ANTENNA WITH A MEANDERLINE POLARIZER	119
<i>Francesco Greco, Emilio Arnieri, Giandomenico Amendola, Luigi Boccia, Università della Calabria, Italy; Francesco Voci, IDS, Ingegneria Dei Sistemi S.p.A. Pisa, Italy</i>	
MO-A1.4A.4: DESIGN OF A COMPACT TRI-BAND OMNIDIRECTIONAL CIRCULARLY POLARIZED ANTENNA	121
<i>Jian Li, Yongjun Huang, Guangjun Wen, University of Electronic Science and Technology of China, China</i>	
MO-A1.4A.5: A VERY SIMPLE DUAL-BAND DUAL-SENSE CIRCULARLY POLARIZED SQUARE SLOT ANTENNA	123
<i>Rui Xu, Jian-Ying Li, Jie Liu, Du-Juan Wei, Kun Wei, Yang-Xiao Qi, Jiang-Jun Yang, Northwestern Polytechnical University, China</i>	
 MO-A1.6A: LEAKY-WAVE ANTENNAS (I)	
MO-A1.6A.1: SIW BASED DIRAC LEAKY-WAVE ANTENNA	125
<i>Sina Rezaee, Mohammad Memarian, Sharif University of Technology, Iran; George V. Eleftheriades, University of Toronto, Canada</i>	
MO-A1.6A.2: EMPIRICAL TECHNIQUE FOR MEETING BALANCE CONDITION OF COUPLED-LINE LEAKY-WAVE ANTENNA	127
<i>Izabela Slomian, Krzysztof Wincza, Sławomir Gruszczyński, Artur Rydysz, AGH University of Science and Technology, Poland</i>	
MO-A1.6A.3: NOVEL BALANCED COUPLED-LINE LEAKY-WAVE ANTENNA WITHOUT EQUALIZATION OF PHASE VELOCITIES	129
<i>Izabela Slomian, Krzysztof Wincza, Sławomir Gruszczyński, Artur Rydysz, AGH University of Science and Technology, Poland</i>	

MO-A1.6A.4: SUBSTRATE INTEGRATED PRINTED GAP WAVEGUIDE LEAKY-WAVE ANTENNA	131
<i>Mohammad Reza Rahimi, Concordia University, Canada; Nima Bayat-Makou, Polytechnique Montréal - University of Montreal, Canada; Ahmed A. Kishk, Concordia University, Canada</i>	
MO-A1.6A.5: HIGHLY-EFFICIENT BACKWARD SCANNING LEAKY WAVE ANTENNA USING RIDGE GAP WAVEGUIDE	133
<i>Mohamed Nasr, Ahmed A. Kishk, Concordia University, Canada</i>	
MO-A1.6A.6: NOVEL ULTRA-THIN SIW ANTENNA.....	135
<i>Minu Valayil, Si2 Technologies, United States</i>	
MO-A1.6A.7: MULTI-PLANE FREQUENCY SCANNING USING A LEAKY-WAVE ANTENNA ARRAY WITH DOUBLE-END SERIES FEEDING NETWORK	137
<i>Amar Al-Bassam, Dirk Heberling, RWTH Aachen University, Germany; Christophe Caloz, Polytechnique Montréal, Canada</i>	
MO-A1.6A.8: BEAMWIDTH EVALUATION OF FINITE-LENGTH 1-D BIDIRECTIONAL LEAKY-WAVE ANTENNAS	139
<i>Walter Fuscaldo, Sapienza University of Rome, Italy; David R. Jackson, University of Houston, United States; Alessandro Galli, Sapienza University of Rome, Italy</i>	
 MO-A3.1A: HYBRID METHODS	
MO-A3.1A.1: A MULTISCALE TIME INTEGRATION METHOD FOR COUPLED NONLINEAR ELECTRICAL–THERMAL SIMULATION	141
<i>Su Yan, Jian-Ming Jin, University of Illinois at Urbana-Champaign, United States</i>	
MO-A3.1A.2: FAST SOLUTION OF VOLUME-SURFACE INTEGRAL EQUATIONS FOR THE ANALYSIS OF INTERCONNECT STRUCTURES	143
<i>Qing Xu, Zi Yuan Wang, Shang Xi Sun, Mei Song Tong, Tongji University, China</i>	
MO-A3.1A.3: HYBRID PHYSICAL OPTICS-MOM-RAY TRACING METHOD FOR THE RCS CALCULATION OF ELECTRICALLY LARGE OBJECTS COVERED WITH RADAR ABSORBING MATERIALS	145
<i>Pierpaolo Usai, Michele Borgese, Filippo Costa, Agostino Monorchio, University of Pisa, Italy</i>	
MO-A3.1A.4: TIME-DOMAIN SOLUTION OF VOLUME-SURFACE INTEGRAL EQUATIONS FOR DIELECTRIC-CONDUCTING OBJECTS	147
<i>Xiao Jia Huang, Shang Xi Sun, Zi Yuan Wang, Mei Song Tong, Tongji University, China</i>	
MO-A3.1A.5: HYBRID METHOD OF MLFMA-ACA ALGORITHM FOR ANALYSIS OF DIELECTRIC ELECTROMAGNETIC SCATTERING	149
<i>Chunbei Luo, Yong Zhang, Hai Lin, Zhejiang University, China</i>	
MO-A3.1A.6: OBLIQUE PLANE-WAVE SCATTERING AND SHIELDING ANALYSES OF CYLINDRICAL SHELL MADE OF CARBON FIBER COMPOSITES	151
<i>Kai Wang, Jean-Jacques Laurin, Ke Wu, Polytechnique Montreal, Canada</i>	
MO-A3.1A.7: TARGET DETECTION AND TRACKING ALGORITHM SIMULATION FOR AUTOMOTIVE MILLIMETERWAVE RADAR BASED ON SYSTEMATIC SOFTWARE-BASED RADAR SYSTEM	153
<i>Huan Lei Chen, Mei Song Tong, Libo Huang, Tongji University, China</i>	
MO-A3.1A.8: MEASUREMENT VALIDATION OF HYBRID ELECTROMAGNETIC FIELD ANALYSIS METHOD FOR AIRPORT SURFACE IN VHF BAND	155
<i>Yuki Abe, Satoshi Kuroda, Ryosuke Suga, Shotaro Hirai, Osamu Hashimoto, Aoyama Gakuin University, Japan; Atsushi Kezuka, National Institute of Maritime, Port and Aviation Technology, Japan</i>	

MO-A3.1A.9: WELL-CONDITIONED FEM-BEM-DDM FOR ELECTROMAGNETIC SCATTERING BY COMPOSITE OBJECTS	157
<i>Ping-Hao Jia, Jun Hu, Rongrong Zhang, Yongpin Chen, Zaiping Nie, University of Electronic Science and Technology of China, China; Qing Huo Liu, Duke University, United States</i>	
MO-A3.1A.10: RCS AT HIGH FREQUENCY BAND USING RATIONAL FUNCTIONS	159
<i>KyungEun Seol, Wonil Cho, Gyeongseon Kang, Jinhwan Koh, GyeongSang National University, Korea (South)</i>	
 MO-A2.1A: DEVICES BASED ON ELECTROMAGNETIC BANDGAP MATERIALS	
MO-A2.1A.1: A COMPACT DUAL-BAND AND DUAL-POLARIZED ELECTROMAGNETIC BAND-GAP STRUCTURE	N/A
<i>Fanji Meng, Ying Liu, University of Electronic Science and Technology of China, China; Satish Sharma, San Diego State University, United States</i>	
MO-A2.1A.2: COMPACT TRI-BAND MICROSTRIP STUB FILTER USING EMBEDDED MTM-EBGS	163
<i>Braden Smyth, Ashwin Iyer, University of Alberta, Canada</i>	
MO-A2.1A.3: TRANSFER MATRIX METHOD EXTENSION TO SPACE-TIME MODULATED ELECTROMAGNETIC CRYSTALS	165
<i>Zoé-Lise Deck-Léger, Nima Chamanara, Christophe Caloz, Polytechnique Montréal, Canada</i>	
MO-A2.1A.4: EXTREME SUPPRESSION FOR MUTUAL COUPLING BY MEANS OF MINIATURIZED UNIPLANAR ELECTROMAGNETIC BANDGAP	167
<i>Ibrahim Mohamed, Mahmoud A. Abdalla, Abdel-Azez Mitkees, Military Technical College, Egypt</i>	
 MO-A1.8A: PLANAR ANTENNA AND ARRAYS WITH CIRCULAR POLARIZATION	
MO-A1.8A.1: IMPLEMENTATION OF A NOVEL TWO PORT FOUR ELEMENT RECTANGULAR PATCH ARRAY ANTENNA WITH TUNABLE CIRCULAR POLARIZATION	169
<i>Dip Thakar, Ryan Adams, University of North Carolina at Charlotte, United States</i>	
MO-A1.8A.2: EFFECTS OF TAPERING THE NEAR-FIELD DISTRIBUTION OF CIRCULARLY POLARISED RADIAL LINE SLOT ARRAY ANTENNAS	171
<i>Mst Nishat Yasmin Koli, Muhammad Usman Afzal, Karu P. Esselle, Macquarie University, Australia; Md Zahidul Islam, Rajshahi University of Engineering and Technology, Bangladesh</i>	
MO-A1.8A.3: UNBALANCED-FED RECTANGULAR LOOP ANTENNAS FOR CIRCULAR POLARIZATION	173
<i>Kazuhide Hirose, Takuya Yoshida, Shibaura Institute of Technology, Japan; Hisamatsu Nakano, Hosei University, Japan</i>	
MO-A1.8A.4: A CIRCULARLY POLARIZED TRIPLE-FEED MULTI-BEAM ARRAY ANTENNA USING PLANAR MAGIC-TS	175
<i>Thet Paing Phyo, Eisuke Nishiyama, Ichihiko Toyoda, Saga University, Japan</i>	
MO-A1.8A.5: UNIDIRECTIONAL CIRCULARLY POLARIZED SLOT ANTENNA BACKED WITH MINIATURIZED AMC REFLECTOR	177
<i>Jianxing Li, Huimin Huo, Hongyu Shi, Anxue Zhang, Xi'an Jiaotong University, China</i>	
 MO-A1.5A: ANTENNAS BASED ON ORIGAMI GEOMETRIES	
MO-A1.5A.1: RIGID ORIGAMI BASED RECONFIGURABLE CONICAL SPIRAL ANTENNA	179
<i>Shun Yao, Yonathan Bonan, Yousuf Shafiq, Stavros Georgakopoulos, Florida International University, United States</i>	
MO-A1.5A.2: AN ORIGAMI INSPIRED CIRCULARLY-POLARIZED FOLDING PATCH ANTENNA ARRAY	181
<i>Steven R. Seiler, Giorgio Bazzan, UES Inc., United States; Edward J. Alanyak, Andrew S. Gilman, Gregory W. Reich, Alexander Cook, Philip R. Buskohl, Air Force Research Laboratory, United States; Kazudo Fuchi, University of Dayton, United States; Sumana Pallampati, Francisco A. Espinal, Deanna Sessions, Gregory H. Huff, Texas A&M University, United States</i>	

MO-A1.5A.3: A NEW CLASS OF RECONFIGURABLE ORIGAMI ANTENNAS BASED ON E-TEXTILE EMBROIDERY	183
<i>Shreyas Chaudhari, Saad Alharbi, Chengzhe Zou, Hamil Shah, Ryan Harne, Asimina Kiourti, Ohio State University, United States</i>	
MO-A1.5A.4: RECONFIGURABLE HELICAL ANTENNA BASED ON ORIGAMI NEOPRENE WITH HIGH RADIATION EFFICIENCY	185
<i>Xueli Liu, Shun Yao, Nicholas Russo, Stavros Georgakopoulos, Florida International University, United States</i>	
MO-A1.5A.5: A NOVEL DNA INSPIRED MODE AND FREQUENCY RECONFIGURABLE ORIGAMI HELICAL ANTENNA	187
<i>Syed Imran Hussain Shah, Saptarshi Ghosh, Sungjoon Lim, Chung-Ang University, Korea (South)</i>	
 MO-A1.7A: ADAPTIVE, ACTIVE, AND SMART ANTENNAS II	
MO-A1.7A.1: IMPROVING RELIABILITY IN HYBRID MESH NETWORKS WITH TRIPOLAR ANTENNAS	189
<i>Sakil Chowdhury, Marcia Golmohamadi, Jeff Frolik, University of Vermont, United States</i>	
MO-A1.7A.2: HARDWARE EFFICIENT ADAPTIVE BEAMFORMER BASED ON CYCLIC VARIABLE STEP SIZE	191
<i>Shaowei Dai, MingHui Li, Qammer H Abbasi, Muhammad Imran, University of Glasgow, Singapore</i>	
MO-A1.7A.3: KERNEL DOA ESTIMATION IN NONUNIFORM ARRAYS	193
<i>Arjun Gupta, Christos G. Christodoulou, Manel Martínez-Ramón, University of New Mexico, United States; Jose Luis Rojo-Álvarez, Universidad Rey Juan Carlos, Spain</i>	
MO-A1.7A.4: TWO-ELEMENT NON-FOSTER ANTENNA-TRANSMITTER ARRAY	195
<i>Silvio Hrabar, Igor Krois, Leo Vincelj, University of Zagreb, Croatia (Hrvatska)</i>	
MO-A1.7A.5: INTERFERENCE REJECTION WITH TIME MODULATED ARRAY FOR GPS APPLICATION	197
<i>Mohammad Hossein Mazaheri, Mohammad Fakharzadeh, Mahmood Akbari, Sharif University of Technology, Iran; George Shaker, Safiedding Safavi-Naeini, University of Waterloo, Canada</i>	
 MO-A1.9A: PLANAR PASSIVE COMPONENTS AND CIRCUITS	
MO-A1.9A.1: A DUAL-BAND QUADRATURE HYBRID COUPLER USING EMBEDDED MTM-EBGS	199
<i>Stuart Barth, Ashwin Iyer, University of Alberta, Canada</i>	
MO-A1.9A.2: HIGH-SELECTIVITY BALANCED BANDPASS FILTER USING HALF-WAVELENGTH RING RESONATOR WITH LOADED STUBS	N/A
<i>Jing Ai, Yonghong Zhang, University of Electronic Science and Technology of China, China; William Joines, Duke University, United States</i>	
MO-A1.9A.3: MINIATURIZED BAILEY POWER DIVIDER USING SRRS	203
<i>Omar Jibreel, Nihad Dib, Jordan University of Science and Technology, Jordan; Khair Al Shamaileh, Purdue University Northwest, United States</i>	
MO-A1.9A.4: A FREQUENCY TUNABLE BANDPASS FILTER WITH WIDE TUNABLE RANGE AND SIMPLE STRUCTURE	N/A
<i>Yu Fei Pan, Jia Min Wen, Shao Yong Zheng, Sun Yat-Sen University, China</i>	

MO-SP.1P: IMPLANTABLE DEVICES FOR WIRELESS BIOMEDICAL TELEMETRY

MO-SP.1P.1: LOOP ANTENNA FOR DEEP IMPLANT POWERING IN AN INTRACRANIAL PRESSURE MONITORING SYSTEM 207

Muhammad Waqas Ahmad Khan, Muhammad Rizwan, Lauri Sydänheimo, Toni Björninen, Tampere University of Technology, Finland; Yahya Rahmat-Samii, University of California, Los Angeles, United States; Leena Ukkonen, Tampere University of Technology, Finland

MO-SP.1P.2: RESONANCE SENSITIVITY AND QUALITY FACTOR OF IMPLANTABLE LOOP ANTENNA LOADED WITH INTERDIGITAL CAPACITOR IN THE CEREBRAL SPINAL FLUID 209

Mohamed Manoufali, Amin Abbosh, University of Queensland, Australia

MO-SP.1P.5: FIELD FOCUSING WITH NOVEL IMPLANTABLE LENS DESIGNS USING 3D PRINTING211

Hossein Mehrpour Bernety, David Schurig, Cynthia Furse, University of Utah, United States

MO-SP.1P.7: TRIBAND METAMATERIAL EMBEDDED IMPLANTABLE ANTENNA FOR BIOTELEMETRY APPLICATIONS 213

Omar Khan, Iqra University, Pakistan; Raed Shubair, Massachusetts Institute of Technology, United States; Qamar Ul Islam, Institute of Space Technology, Pakistan; Imran Rashid, National University of Sciences and Technology (NUST), Pakistan

MO-SP.1P.9: DESIGN OF A CAPACITIVELY LOADED IMPLANTABLE LOOP ANTENNA IN THE CEREBRAL SPINAL FLUID 215

Mohamed Manoufali, Amin Abbosh, University of Queensland, Australia

MO-SP.1P.10: AN INVESTIGATION ON PROPAGATION CHARACTERISTICS OF IN-BODY RADIO CHANNELS FOR WIRELESS IMPLANTS 217

Jingzhen Li, Zedong Nie, Yuhang Liu, Lei Wang, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China; Yang Hao, Queen Mary University of London, United Kingdom

MO-SP.2P: EMERGING APPROACHES AND FUTURE TRENDS IN ELECTROMAGNETIC INVERSE PROBLEMS

MO-SP.2P.1: COMPRESSIVE PROCESSING IN INVERSE PROBLEMS: CURRENT ADVANCES AND FUTURE TRENDS 219

Nicola Anselmi, Lorenzo Poli, Giacomo Oliveri, Andrea Massa, University of Trento, Italy

MO-SP.2P.2: IMAGING OF TWO DIMENSIONAL SCATTERERS USING DESCENT LEARNING TECHNIQUE 221

Rui Guo, Xiaoqian Song, Maokun Li, Fan Yang, Shenheng Xu, Tsinghua University, China; Aria Abubakar, Schlumberger, United States

MO-SP.2P.3: DETECTION OF BRAIN STROKES USING MICROWAVE TOMOGRAPHY 223

Vanna Lisa Coli, Università di Modena e Reggio Emilia, Italy; Pierre-Henri Tournier, Université Pierre et Marie Curie, France; Victorita Dolean, Ibtissam El Kanfoud, Christian Pichot, Claire Migliaccio, Laure Blanc-Féraud, Université Côte d'Azur, France

MO-SP.2P.4: SOURCE'S SYMMETRIES AND PRIORS: THE EFFECT ON INFORMATION CONTENT OF RADIATED FIELD 225

Maria Antonia Maisto, Raffaele Solimene, Rocco Pierri, Università degli studi della Campania Luigi Vanvitelli, Italy

MO-SP.2P.5: A STRUCTURED DETERMINISTIC SAMPLING STRATEGY FOR ARRAY DIAGNOSIS FROM FAR-FIELD MEASUREMENTS 227

Wei Li, Weibo Deng, Qiang Yang, Ying Suo, Harbin Institute of Technology, China; Marco Donald Migliore, University of Cassino and Southern Lazio, China

MO-SP.2P.7: A CAPACITY-BASED SENSING MATRIX DESIGN METHOD FOR BLOCK COMPRESSIVE IMAGING APPLICATIONS 229

Richard Obermeier, Jose Angel Martinez-Lorenzo, Northeastern University, United States

MO-SP.2P.9: AROUND THE CORNER TERAHERTZ RADAR IMAGING EXPLOITING DIFFUSION SCATTERING	231
<i>Sai Kiran Doddalla, Georgios Trichopoulos, Arizona State University, United States</i>	
MO-A5.1P: ADDITIVE MANUFACTURING FOR ANTENNA APPLICATIONS	
MO-A5.1P.1: ADDITIVE MANUFACTURING OF A CONDUCTIVE POLYMER CAVITY-BACKED METASURFACE ANTENNA FOR COMPUTATIONAL MICROWAVE IMAGING	233
<i>Okan Yurduseven, Duke University, United States; Thomas Fromenteze, University of Limoges, France; David Smith, Duke University, United States</i>	
MO-A5.1P.2: FABRICATION OF CONFORMAL LOAD BEARING ANTENNA USING 3D PRINTING	235
<i>Soumitra Biswas, University of Delaware, United States</i>	
MO-A5.1P.3: ON THE DIELECTRIC PERMITTIVITY OF 3-D PRINTED BIOCOMPOSITE CUBES USING TWO DIFFERENT COAXIAL PROBE MEASUREMENT METHODS	237
<i>Sayan Roy, University of North Dakota, United States; Muhammad Bilal Qureshi, COMSATS Institute of Information Technology, Pakistan; Benjamin D. Braaten, North Dakota State University, United States; Sima Noghianian, University of North Dakota, United States</i>	
MO-A1.1P: MILLIMETER WAVE PHASED ARRAYS	
MO-A1.1P.2: SWITCHED FOLDED SLOT PHASED ARRAY ANTENNA FOR MMWAVE 5G MOBILE IN METAL BEZEL DESIGN	239
<i>Sung Soo Kim, Sung Hoe Kim, Jang Hwan Bae, Young Joong Yoon, Yonsei University, Korea (South)</i>	
MO-A1.1P.3: PACKAGING CONSIDERATIONS FOR INTEGRATION OF MM-WAVE PHASED ARRAY ANTENNAS	241
<i>Atabak Rashidian, Mihai Tazlauanu, Peraso Technologies Inc., Canada</i>	
MO-A1.1P.4: WIDEBAND 28 GHZ GROUND REFLECTED DIPOLE ANTENNA AND ARRAY FOR 5G MOBILE HANDSET	243
<i>Shaobo Chen, Anping Zhao, Shenzhen Sunway Communication Co. Ltd, China</i>	
MO-A1.1P.5: LTCC-BASED PHASED ARRAY ANTENNA FOR 5G MILLIMETER-WAVE APPLICATION IN MOBILE DEVICE	245
<i>Mingming Peng, Anping Zhao, Shenzhen Sunway Communication Co. Ltd, China</i>	
MO-A1.1P.6: DUAL BAND CIRCULAR MIMO ANTENNA SYSTEM FOR 5G WIRELESS DEVICES	247
<i>Muhammad Ikram, Yifan Wang, University of Queensland, Australia; Mohammad Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia; Amin Abbosh, University of Queensland, Australia</i>	
MO-A1.1P.7: GAIN ENHANCEMENT OF QUASI YAGI ANTENNA USING LENS TECHNIQUE FOR 5G WIRELESS SYSTEMS	249
<i>Taieb Elkarkraoui, Mejd Laribi, Nadir Hakem, Laboratoire de Recherche Télébec en Communications Souterraines de l'UQAT, Canada</i>	
MO-A1.1P.8: A SUBSTRATE-INTEGRATED FAN-BEAM DIPOLE ANTENNA WITH VARIED FENCE SHAPE FOR MM-WAVE 5G WIRELESS	251
<i>Waleed El-Halwagy, Rashid Mirzavand, University of Alberta, Canada; Jordan Melzer, TELUS Communications, Canada; Masum Hossain, Pedram Mousavi, University of Alberta, Canada</i>	
MO-A1.1P.9: GAIN ENHANCEMENT OF DIELECTRIC RESONATOR ANTENNA USING SUPERSTRATE FOR 5G APPLICATIONS	253
<i>Mejdi Laribi, Taieb Elkarkraoui, Nadir Hakem, Laboratoire de Recherche Télébec en Communications Souterraines de l'UQAT, Canada</i>	

**MO-A1.1P.10: HIGH-GAIN HIGH-ISOLATION WIDEBAND MIMO ANTENNA FOR 5G N/A
COMMUNICATION**

Fei Wang, Zhaoyun Duan, Xin Wang, Qing Zhou, Yubin Gong, University of Electronic Science and Technology of China, China; Ching-Wen Hsue, National Taiwan University of Science and Technology, Taiwan

MO-A1.2P: TRANSMITARRAY ANTENNAS

MO-A1.2P.1: SHAPE SYNTHESIS OF 3-LAYER TRANSMITARRAY ELEMENTS..... 257

Abdullah Aljanah, Derek McNamara, University of Ottawa, Canada

MO-A1.2P.2: METAL-ONLY TRANSMITARRAY BASED ON C-SHAPED SLOT..... 259

Trung Kien Pham, Ronan Sauleau, IETR, UMR CNRS 6164 and Université de Rennes 1, 35042 Rennes Cedex, France; Erwan Fourn, IETR, UMR CNRS 6164 and INSA de Rennes, CS70839, 35708 Rennes Cedex, France; Fatimata Diaby, Antonio Clemente, Laurent Dussopt, CEA, LETI, MINATEC Campus, 38054 Grenoble and Université Grenoble-Alpes, France

MO-A1.2P.3: POLARIZATION CONTROL OF A METAL-ONLY TRANSMITARRAY UNIT-CELL..... 261

Trung Kien Pham, Ronan Sauleau, Erwan Fourn, Fatimata Diaby, Antonio Clemente, Laurent Dussopt, IETR, UMR CNRS 6164 and Université de Rennes 1, 35042 Rennes Cedex, France

**MO-A1.2P.4: A MULTILAYER UNIT-CELL FOR PERFORATED DIELECTRIC TRANSMITARRAY 263
ANTENNAS**

Andrea Massaccesi, Paola Pirinoli, Politecnico di Torino, Italy; Yiannis Vardaxoglou, Loughborough University, United Kingdom

MO-A1.2P.5: PRELIMINARY RESULTS ON CONFORMAL TRANSMITARRAY ANTENNAS..... 265

Michele Beccaria, Paola Pirinoli, Politecnico di Torino, Italy; Fan Yang, Tsinghua University, China

MO-A4.1P: PROPAGATION IN ATMOSPHERIC AND IONOSPHERIC ENVIRONMENTS

**MO-A4.1P.1: INFLUENCE OF IONOSPHERIC SCINTILLATION ON GNSS SATELLITE 267
CONSTELLATION GEOMETRY**

Felipe Zauli, EMBRAER, Brazil; Alison de O. Moraes, Instituto de Aeronáutica e Espaço-IAE, Brazil; Cesar B. A. de Oliveira, ITA, Brazil; Bruno C. Vani, Instituto Federal de Educação, Ciência e Tecnologia de São Paulo, Brazil; Jonas Sousa Santos, Waldecir J. Perrella, ITA, Brazil; João F. G. Monico, Universidade Estadual Paulista Júlio de Mesquita Filho, Brazil

**MO-A4.1P.2: RESULTS OF W/V BAND PROPAGATION STUDIES IN ALBUQUERQUE, NM, OVER 269
TWO YEARS**

David Murrell, Nicholas Tarasenko, Air Force Research Laboratory, United States; Eugene Hong, Air Force Research Laboratory, ATA Corporation, United States; Zoe Casteel, Steven Lane, Air Force Research Laboratory, United States; Christos G. Christodoulou, University of New Mexico, United States; James Nessel, National Aeronautics and Space Administration, Glenn Research Center, United States

**MO-A4.1P.3: A K-MEANS CLUSTERING BASED FREQUENCY SHIFT CORRECTION METHOD FOR 275
OTHR**

Yang Li, Yanxiao Guo, Ning Zhang, Harbin Institute of Technology, China

**MO-A4.1P.4: THE IMPEDANCE CHARACTERISTICS OF AN ELECTRICALLY LONG DIPOLE 271
IMMERSED IN A MAGNETIZED PLASMA**

Edmund Spencer, Saeed Latif, Sai Krishna Vadepu, University of South Alabama, United States

MO-A4.1P.5: HF CHANNEL MODEL AT SUNRISE WITH DOMINANT GALACTIC NOISE..... 273

Hung-Yi Lo, James Lehnert, Purdue University, United States

MO-A1.3P: FREQUENCY AGILE ANTENNAS

MO-A1.3P.1: A RECONFIGURABLE UWB MULTIPLE-INPUT MULTIPLE-OUTPUT ANTENNA..... 277

Adnan Kantemur, Jinpil Tak, Hao Xin, University of Arizona, United States

MO-A1.3P.2: A FREQUENCY-TUNABLE VARACTOR-LOADED SINGLE-LAYER SHORTED RING MICROSTRIP ANTENNA FED BY AN L-PROBE	279
<i>Toru Ikeda, Sakuyoshi Saito, Yuichi Kimura, Saitama University, Japan</i>	
MO-A1.3P.3: FLEXIBLE RECONFIGURABLE I-SHAPED FOLDED SLOT ANTENNA FOR WIRELESS DEVICES	281
<i>Khalid AlMegbel, King Abdulaziz City for Science and Technology, Saudi Arabia; Saud M. Saeed, Prince Sattam bin Abdulaziz University, Saudi Arabia; Hussein Shaman, King Abdulaziz City for Science and Technology, Saudi Arabia; Constantine Balanis, Arizona State University, United States; Waleed Alomar, King Abdulaziz City for Science and Technology, Saudi Arabia</i>	
MO-A1.3P.4: RECONFIGURABLE NOTCH-BAND UWB ANTENNA WITH RF-TO-DC RECTIFIER FOR DYNAMIC RECONFIGURABILITY	283
<i>Abdul Quddious, Muhammad Ali Babar Abbasi, Photos Vryonides, Symeon Nikolaou, Frederick University Nicosia, Cyprus; Marco A. Antoniadis, University of Cyprus, Cyprus; Baptiste Manhaval, Patrick Chan, UWINLOC, France</i>	
MO-A1.3P.5: UWB MONOPOLE ANTENNA WITH RECONFIGURABLE NOTCH BANDS BASED ON METAMATERIALS RESONATORS	285
<i>Bachir Belkadi, Zoubir Mahdjoub, Mohammed Lamine Seddiki, Djillali liabes university, Algeria; Mourad Nedil, Université du Québec en Abitibi-Témiscamingue, Canada</i>	
MO-A1.3P.6: REVERSIBLY RECONFIGURABLE LIQUID METAL PATCH ANTENNA USING A SUPERHYDROPHOBIC SPRAY-COATING	287
<i>Vivek Bharambe, Ishan D. Joshipura, Hudson R. Ayers, Michael D. Dickey, Jacob J. Adams, North Carolina State University, United States</i>	
MO-A1.3P.7: RECONFIGURABLE PATCH ANTENNA WITH LIQUID METAL TUNING SLOTS AND 3D PRINTED MICROFLUIDICS	289
<i>Lingnan Song, Yahya Rahmat-Samii, University of California, Los Angeles, United States</i>	
MO-A1.3P.8: 3D DIRECTION-OF-ARRIVAL ESTIMATION USING A WIDEBAND VECTOR ANTENNA	291
<i>Johan Duploux, Christophe Morlaas, ENAC, France; Hervé Aubert, LAAS CNRS, France; Patrick Potier, Philippe Pouliguen, Christopher Djoma, DGA, France</i>	
MO-A1.3P.9: MILLIMETER-WAVE DUAL-PLANE BEAM-SWITCHING ANTENNA BASED ON CANTILEVER ENABLED FSS	293
<i>Arun Kesavan, Mohamad Mantash, Jamal Zaid, Tayeb A. Denidni, National Institute of scientific research (INRS), Canada</i>	
MO-A1.3P.10: A MINIATURIZED RECONFIGURABLE UHF ANTENNA	295
<i>Fatima AlZahraa AsadAllah, Hussam Abdul Khalek, Bassel Abou Ali Modad, Jad Aboul Hosn, Joseph Costantine, Rouwaida Kanj, American University of Beirut, Lebanon; Youssef Tawk, Notre Dame University, Lebanon</i>	
MO-A1.4P: APPLICATIONS-ORIENTED ELECTRICALLY SMALL ANTENNAS	
MO-A1.4P.1: ULTRA-MINIATURE LOADED LOOP ANTENNA FOR VHF PAGER	297
<i>Cherif Hamouda, Jean-François Pintos, CEA-LETI, France</i>	
MO-A1.4P.2: AN ELECTRICALLY SMALL ON-CHIP ANTENNA SCALED DOWN TO ONE-TWENTYFIFTH BY ONE-FIFTIETH OF WAVELENGTH	299
<i>Takumi Fujimaki, Yuta Toeda, Mototsugu Hamada, Tadahiro Kuroda, Keio University, Japan</i>	
MO-A1.4P.3: SMALL SIZE ANTENNAS MOUNTABLE ON METTALIC GAS CYLINDERS	301
<i>Felisberto Pereira, Nuno Borges Carvalho, Pedro Pinho, Instituto de Telecomunicações, Portugal</i>	
MO-A1.4P.4: GAIN ENHANCEMENT OF THREE-QUARTER WAVELENGTH INVERTED L-SHAPED ANTENNA IN FORWARD DIRECTION OF METALLIC OBJECTS OR HUMAN BODIES	303
<i>Yasumitsu Ban, Yohei Koga, Manabu Kai, Fujitsu Laboratories Limited, Japan</i>	

MO-A1.4P.5: ULTRA COMPACT TRUNCATED GROUND MONOPOLE ANTENNA FOR DCS 1800/ PCS 305 1900 APPLICATIONS.	305
<i>Shameena V.A, Cochin University of Science and Technology, India; Sreejith Nair, Govt. College Chittur, Palakkad, India; Manoj M, Mohanan P, CUSAT, India</i>	
MO-A1.4P.6: INVERTED-F ANTENNA RADIATION EFFICIENCY ENHANCEMENT BASED ON A 307 SLOTTED GROUND	307
<i>Giap Le, Sam Wagner, Chi Pham, J. Sebastian Gomez-Diaz, Anh-Vu Pham, University of California, Davis, United States</i>	
MO-A1.4P.7: MULTI-ARM DIPOLE FOR COMPACT WEARABLE ANTENNAS..... 309	309
<i>Simone Genovesi, Filippo Costa, University of Pisa, Italy; Antonio Gentile, Università di Pisa, Italy; Dimitris Anagnostou, Heriot-Watt University, United Kingdom; Agostino Monorchio, University of Pisa, Italy; Giuliano Manara, Università di Pisa, Italy</i>	
MO-A1.4P.8: ELETRICALLY-SMALL RECTENNA WITH HUYGENS RADIATION PATTERN FOR311 WIRELESS POWER TRANSFER APPLICATIONS	311
<i>Wei Lin, Richard Ziolkowski, University of Technology Sydney, Australia</i>	
MO-A1.4P.9: USING ELECTRICALLY-SMALL HPEM ANTENNA ARRAY ELEMENTS TO DIVIDE 313 POWER AND SHAPE APERTURE FIELDS	313
<i>Zahra Esmati, David Powell, J. Scott Tyo, University of New South Wales Canberra, Australia</i>	
MO-A1.4P.10: BROADBAND CIRCULARLY POLARIZED PRINTED ANTENNA WITH QUAD-CROSSED 315 DIPOLES	315
<i>Xiaoxiang Ding, Zhiqin Zhao, Yaohui Yang, Jinchao Ding, University of Electronic Science and Technology of China, China; Qing-Huo Liu, Duke University, United States</i>	
 MO-A5.4P: RFID ANTENNA DESIGN	
MO-A5.4P.1: NEAR-FIELD ANTENNA DESIGN FOR UHF RFID SYSTEM 317	317
<i>An-Yao Hsiao, Chen-Pang Chao, Chang-Fa Yang, National Taiwan University of Science and Technology, Taiwan; Cheng-Han Tsai, Auden Techno Corp., Taiwan</i>	
MO-A5.4P.2: MULTI-BEAM RADIATIONS FROM PHASED ARRAY OF ANTENNAS EXCITED BY 319 MODIFIED NEAR-FIELD FOCUS ROTMAN LENS BEAMFORMER FOR RFID APPLICATIONS	319
<i>Hsi-Tseng Chou, Zong-Chen Tsai, National Taiwan University, Taiwan</i>	
MO-A5.4P.3: CIRCULARY POLARIZED ANTENNA FOR RFID APPLICATIONS..... 321	321
<i>Carolina Alcaraz, Jose Felix Vega Stavro, Universidad Nacional de Colombia, Colombia; Juan Vicente Balbastre, Universitat Politècnica de València, Spain</i>	
MO-A5.4P.4: TUNABLE FOLDED-PATCH UHF RFID TAG ANTENNA DESIGN USING THEORY OF 323 CHARACTERISTIC MODES	323
<i>Abubakar Sharif, Jun Ouyang, University of Electronic Science and Technology of China, China; Hassan Tariq Chattha, Islamic University in Madinah, Saudi Arabia; Qammer Hussain Abbasi, University of Glasgow, United Kingdom</i>	
MO-A5.4P.5: A NOVEL NEARFIELD READER ANTENNA FOR UHF RFID APPLICATION..... N/A	N/A
<i>Chu Zhang, Jun Ouyang, Abubakar Sharif, University of Electronic Science and Technology of China, China</i>	
MO-A5.4P.6: A WIDEBAND ANTENNA FOR BURIED RFID APPLICATIONS 327	327
<i>Saikat Mondal, Edward Rothwell, Prem Chahal, Michigan State University, United States</i>	
MO-A5.4P.7: A SIMPLE APERTURE COUPLED CIRCULAR PATCH ANTENNA WITH CP RADIATION 329 AND FREQUENCY AGILITY	329
<i>Chow-Yen-Desmond Sim, Bo-Yu Chen, Chih-Heng Lin, Feng Chia University, Taiwan; Tuan-Yung Han, National Taitung College, Taiwan; Hsin-Lung Su, National Pingtung University, Taiwan; Guan-Long Huang, Shenzhen University, China</i>	

**MO-A5.4P.8: COMPACT CIRCULAR POLARIZATION ANTENNA BASED ON SLOT STRUCTURE FOR 331
UHF RFID HANDHELD READER**

Jinhao Guo, Jun Ouyang, Yi Yan, Shu 'nan Zhang, Lu Zhuang, University of Electronic Science and Technology of China, China

MO-A5.4P.9: A NOVEL NFC ANTENNA FOR METAL COVER SMARTPHONE APPLICATIONS..... 333

Jia-Qi Zhu, Yong-Ling Ban, Rui-Min Xu, Ji-Wei Lian, University of Electronic Science and Technology of China, China; Chow-Yen-Desmond Sim, Feng Chia University, Taiwan

MO-A1.5P: CIRCULARLY-POLARIZED MICROSTRIP ANTENNAS

**MO-A1.5P.1: CIRCULARLY POLARIZED SMALL-FOOTPRINT HYBRID RING-PATCH STACKED 335
ANTENNA FOR PICO-SATELLITES**

Sayed Sajal, Minot State University, United States; Saeed Latif, Edmund Spencer, University of South Alabama, United States

**MO-A1.5P.2: K-BAND CROSS-APERTURE COUPLED CIRCULARLY POLARIZED DUAL FREQUENCY 337
MICROSTRIP PATCH ANTENNA WITH SINGLE FEED**

Miguel Barbosa Kortright, University of Puerto Rico, Mayagüez, United States; Rainee Simons, NASA Glenn Research Center, United States

**MO-A1.5P.3: STUDY ON 12/21-GHZ DUAL-CIRCULARLY POLARIZED RECEIVING ANTENNA FOR 339
SATELLITE BROADCASTING**

Masafumi Nagasaka, Susumu Nakazawa, Shoji Tanaka, Japan Broadcasting Corporation, Japan

**MO-A1.5P.4: AN EFFECT OF VIA-HOLES BARRIERS ON CIRCULARLY POLARIZED PATCH 341
ANTENNAS FOR GETTING CURRENTS' PHASE-LAGS**

Mayumi Matsunaga, Tokyo University of Technology, Japan

**MO-A1.5P.5: A BROADBAND CIRCULAR POLARIZED MICROSTRIP ANTENNA BASED ON ARTIFICIAL 343
MAGNETIC CONDUCTOR**

Wei Li, Bowen Cai, Ying Suo, Harbin Institute of Technology, China

**MO-A1.5P.6: FEASIBILITY STUDY OF K-BAND E-SHAPED CIRCULARLY POLARIZED MICROSTRIP 345
PATCH ANTENNA ELEMENTS FOR SATCOM RECEIVE ARRAYS**

Miguel Barbosa Kortright, University of Puerto Rico, Mayagüez, United States; Rainee Simons, NASA Glenn Research Center, United States

**MO-A1.5P.7: MECHANICAL TENSION EFFECTS ON CYLINDRICAL PROBE-FED CIRCULARLY 347
POLARIZED MICROSTRIP ANTENNAS**

Diego Moná, Eduardo Sakomura, Daniel Nascimento, Technological Institute of Aeronautics, Brazil

**MO-A1.5P.8: MULTILAYER CIRCULARLY POLARIZED PLANAR APERTURE-COUPLED ANTENNA 349
FOR SATELLITE APPLICATIONS**

Hao Liu, University of Electronic Science and Technology of China, RML Technology Co., Ltd, China; Anyong Qing, University of Electronic Science and Technology of China, Southwest Jiaotong University, China; Zhuofu Ding, Cheng Zhang, University of Electronic Science and Technology of China, RML Technology Co., Ltd, China; Yujing Guan, RML Technology Co., Ltd, China

MO-A1.5P.9: A RESEARCH FOR MINIATURIZED CIRCULAR POLARIZATION ANTENNA 351

Zhou Weihua, Wu Jianqi, East China Research Institute of Electronic Engineering, China

**MO-A1.5P.10: A CIRCULARLY POLARIZED MAGNETO-ELECTRIC DIPOLE LEAKY WAVE ANTENNA 1835
WITH BROADSIDE RADIATION BASED ON SIW TECHNOLOGY**

Xingchao Dong, Hongjian Wang, Yang Liu, Lifang Zhang, University of Chinese Academy of Sciences, China

MO-A5.2P: MIMO ANTENNA CONCEPTS

MO-A5.2P.1: CELLULAR ANTENNA PERFORMANCE IMPACT ON MIMO IN VEHICLE 353

Leo Lanctot, Olutola Jonah, Ford Motor Company, United States

MO-A5.2P.2: FSS BASED RADIATION PATTERN DECORRELATOR FOR MIMO ANTENNA	355
<i>Tayyab Hassan, Muhammad Umar Khan, National University of Sciences and Technology (NUST), Pakistan; Mohammad Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia</i>	
MO-A5.2P.3: CHARACTERIZATIONS OF MIMO ANTENNAS USING MULTIPLEXING EFFICIENCY.....	357
<i>Xiaoming Chen, Jiazhi Tang, Shitao Zhu, Anxue Zhang, Xi'an Jiaotong University, China</i>	
MO-A5.2P.4: DUAL-BAND ANTENNA DECOUPLING DESIGN WITH STEPPED IMPEDANCE LOADED	359
DUAL-BAND DUMMY ELEMENT	
<i>Feng Liu, Aobo Chen, Luyu Zhao, Xidian University, China</i>	
 MO-A5.3P: ADVANCES IN ON-CHIP ANTENNAS AND ANTENNA/SYSTEM INTEGRATION TECHNIQUES	
MO-A5.3P.1: ON-CHIP ANTENNA TEST STRUCTURE DESIGN WITH REDUCED SENSITIVITY TO	361
PROBE PAD EFFECTS	
<i>Duixian Liu, Timothy Dickson, Alberto Valdes-Garcia, IBM, United States</i>	
MO-A5.3P.2: GAIN AND EFFICIENCY ENHANCEMENT OF A 77 GHZ ON-CHIP ANTENNA THROUGH	363
AMC AND SUPERSTRATE PACKAGE	
<i>Haoran Zhang, King Abdullah University of Science and Technology, Saudi Arabia; Atif Shamim, King Abdullah University of Science and Technology (KAUST), Saudi Arabia</i>	
MO-A5.3P.3: COMPARISON OF ANTENNA PATTERNS FROM ACTIVE AND PASSIVE	365
MEASUREMENTS	
<i>Abhijit Bhattacharya, Simon Fraser University, Canada; Behrouz Pourseyed, Sierra Wireless Inc., Canada; Rodney Vaughan, Simon Fraser University, Canada</i>	
MO-A5.3P.4: A 60-GHZ INTEGRATED SLOT LOOP ANTENNA IN 0.13-μM BICMOS TECHNOLOGY.....	367
<i>Hyeongseok Kim, David Wentzloff, University of Michigan, United States</i>	
MO-A5.3P.5: COMPACT 60GHZ ON-CHIP ANTENNA IN 65NM CMOS TECHNOLOGY WITH	369
CIRCULAR AND LINEAR POLARIZATION FOR MILLIMETER-WAVE APPLICATION	
<i>Arash Masrouri, Nasrin Amiri, Islamic Azad University - South Tehran Branch, Iran</i>	
 MO-A4.2P: PROPAGATION IN TRAFFIC ENVIRONMENT	
MO-A4.2P.1: ANGULAR SPREAD AND DENSITY FUNCTION OF SPHERICAL WAVES	371
<i>Maryam Dehghani Estarki, Rodney Vaughan, Simon Fraser University, Canada</i>	
MO-A4.2P.2: COHERENCE TIME AND DOPPLER SPREAD ANALYSIS OF THE V2V CHANNEL IN	373
HIGHWAY AND URBAN ENVIRONMENTS	
<i>Yousra Chakkour, Universitat Politècnica de València, Spain; Herman Antonio Fernandez Gonzalez, Universidad Pedagógica y Tecnológica de Colombia, Colombia; Vicent Miguel Rodrigo Peñarrocha, Lorenzo Rubio, Juan Reig, Universitat Politècnica de València, Spain</i>	
MO-A4.2P.3: INTEGRATION OF WIRELESS SENSOR NETWORKS IN INTELLIGENT	375
TRANSPORTATION SYSTEMS WITHIN SMART CITY CONTEXT	
<i>Fausto Granda, Leyre Azpilicueta, Cesar Vargas-Rosales, Tecnológico de Monterrey, Mexico; Peio Lopez-Iturri, Erik Aguirre, Francisco Falcone, Universidad Pública de Navarra, Spain</i>	
MO-A4.2P.4: INFLUENCE OF DIFFERENT ANTENNA LOCATIONS ON CHANNEL	377
CHARACTERIZATION FOR V2V COMMUNICATIONS	
<i>Mi Yang, Bo Ai, Ruisi He, Chen Huang, Jianzhi Li, Beijing Jiaotong University, China; Liang Chen, Xue Li, Huawei Technologies, China</i>	

MO-A4.2P.5: RAY-TRACING SIMULATION AND ANALYSIS FOR AIR-TO-GROUND CHANNEL IN RAILWAY ENVIRONMENT	379
<i>Lei Ma, Ke Guan, Danping He, Guangkai Li, Siyu Lin, Bo Ai, Zhangdui Zhong, Beijing Jiaotong University, China</i>	
TU-UK.1A: MEDICAL DEVICES AND HUMAN EFFECTS	
TU-UK.1A.6: UNWANTED RF ENERGY COUPLING DURING ELECTROCAUTERY: AN IN-VITRO TONSILLECTOMY STUDY	381
<i>Vigyanshu Mishra, Maria Koenigs, Ohio State University, United States; Tendy Chiang, Ohio State University (AND) Nationwide Children's Hospital, United States; Asimina Kiourti, Ohio State University, United States</i>	
TU-UK.1A.8: RF-BASED BREAST SURFACE ESTIMATION - REGISTRATION WITH REFERENCE IMAGING MODALITY	383
<i>Peter Lawrence, Angie Fasoula, Luc Duchesne, MVG Industries, France</i>	
TU-UK.1A.9: EFFICACY OF MAGNETIC AND CAPACITIVE HYPERTHERMIA ON HEPATOCELLULAR CARCINOMA	385
<i>Chien-Chang Chen, Jean-Fu Kiang, National Taiwan University, Taiwan</i>	
TU-A5.1A: ULTRAWIDEBAND ANTENNA SYSTEMS	
TU-A5.1A.1: HIGH-DIRECTIVITY BROADBAND SIMULTANEOUS TRANSMIT AND RECEIVE (STAR) ANTENNA SYSTEM	387
<i>Prathap Valale Prasannakumar, Mohamed Elmansouri, Dejan Filipovic, University of Colorado Boulder, United States</i>	
TU-A5.1A.2: A COMPACT, BROADBAND, TWO-PORT SLOT ANTENNA SYSTEM FOR FULL-DUPLEX APPLICATIONS	389
<i>Seyed Mohammad Amjadi, Kamal Sarabandi, University of Michigan, United States</i>	
TU-A5.1A.3: INTERFERENCE MITIGATION FOR 5G MILLIMETER-WAVE COMMUNICATIONS	391
<i>Dimitrios Sifarikas, Elias A. Alwan, John L. Volakis, Florida International University, United States</i>	
TU-A5.1A.4: UWB RADAR SENSOR DEVELOPMENT USING DRONE ARMS FOR SENSING APPLICATIONS	393
<i>Doojin Lee, George Shaker, William Melek, University of Waterloo, Canada</i>	
TU-A5.1A.5: A NEW WIDE BAND ANTENNA FOR WIRELESS COMMUNICATION	395
<i>Vladimir Veremey, Paul Butler, Qualcomm Atheros Inc, United States</i>	
TU-A5.1A.6: UPPER BOUND STUDY OF 5G RF EMF EXPOSURE	397
<i>Bo Xu, KTH Royal Institute of Technology, Sweden; Mats Gustafsson, Lund University, Sweden; Shuai Shi, KTH Royal Institute of Technology, Sweden; Zhinong Ying, Sony Mobile Communications, Sweden; Sailing He, KTH Roayl Institute of Technology, Sweden</i>	
TU-A5.1A.7: A MINIATURIZED DUAL UWB QUASI-YAGI BASED MIMO ANTENNA SYSTEM USING A DEFECTED GROUND STRUCTURE	399
<i>Syed Shahan Jehangir, Mohammad Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia</i>	
TU-A5.1A.8: DESIGN AND SIMULATION OF FIXED PHYSICAL LENGTH PLANAR SPOOF SURFACE PLASMON POLARITON-MODE DELAY LINES FOR A 3-BIT 360° PHASE SHIFTER FOR TERAHERTZ BAND	401
<i>Muhammed Abdullah Unutmaz, Mehmet Unlu, Ankara Yildirim Beyazit University, Turkey</i>	
TU-A5.1A.9: A MONOSTATIC 2-D ASYNCHRONOUS POSITIONING SYSTEM BASED ON ANGLE OF ARRIVAL ESTIMATION USING ULTRA-WIDEBAND PULSES	403
<i>Zhongtao Zhu, Xiaozhang Zhu, Yuxuan Chen, University of Electronic Science and Technology of China, China; Jiang Dai, Kunchen Technology Company, Limited, China; Zhiqin Zhao, Zaiping Nie, University of Electronic Science and Technology of China, China; Qing Huo Liu, Duke University, United States</i>	

TU-A5.1A.10: WIDEBAND TRANSCEIVER FRONT-END INTEGRATED WITH VIVALDI ARRAY	405
ANTENNA FOR 5G MILLIMETER-WAVE COMMUNICATION SYSTEMS	
<i>Xiang Wang, Xiao-Wei Zhu, Chao Yu, Chen-Feng Li, Peng-Fei Liu, Xue-Song Shi, Southeast University, China</i>	
 TU-SP.1A: ADVANCES IN COMMERCIAL ELECTROMAGNETIC SIMULATION TOOLS	
TU-SP.1A.1: CAD DATA SELECTION AND SIMPLIFICATION TECHNIQUES FOR EM AUTOMOTIVE	407
SIMULATIONS USING EMPIRE XPU	
<i>Winfried Simon, Thorsten Liebig, David Schaefer, Robin Kreß, IMST GmbH, Germany</i>	
TU-SP.1A.2: RECENT ADVANCES OF FEKO AND WINPROP	409
<i>Ulrich Jakobus, Andres Aguilar, Gerd Woelfle, Altair Engineering GmbH, Germany; Johann van Tonder, Marianne Bingle, Altair Engineering S.A. (Pty) Ltd, South Africa; Kitty Longtin, Martin Vogel, Altair Engineering Inc., United States</i>	
TU-SP.1A.4: OVERVIEW OF HYBRID SOLVER IN HFSS	411
<i>Kezhong Zhao, L. E. Rickard Petersson, ANSYS, Inc, United States</i>	
TU-SP.1A.5: NEW GENERATION OF WIPL-D IN-CORE MULTI-GPU SOLVER	413
<i>Branko Mrdakovic, Milan Kostic, WIPL-D d.o.o., Serbia; Dragan Olcan, Branko Kolundzija, University of Belgrade, Serbia</i>	
TU-SP.2A.1: TOWARDS INTEGRATED ACTIVE ANTENNAS FOR 5G MM-WAVE APPLICATIONS AT	415
GAPWAVES	
<i>Carlo Bencivenni, Gapwaves AB, Sweden; Ashraf Uz Zaman, Chalmers University of Technology, Sweden; Abolfazl Haddadi, Thomas Emanuelsson, Gapwaves AB, Sweden</i>	
TU-SP.2A.2: AMC PACKAGED – BUTLER MATRIX FOR MILLIMETER WAVE BEAMFORMING	417
<i>Nadeem Ashraf, Ahmed A. Kishk, Abdel Razik Sebak, Concordia University, Canada</i>	
TU-SP.2A.3: FLATNESS ENHANCEMENT OF GAP WAVEGUIDE SLOT ARRAYS USING A	419
RIBBED-GRID PLATE	
<i>Miguel Ferrando-Rocher, Jose Ignacio Herranz-Herruzo, Alejandro Valero-Nogueira, Mariano Baquero-Escudero, Universitat Politècnica de València, Spain</i>	
TU-SP.2A.4: RIDGE GAP WAVEGUIDE QUASI –TEM HORN ANTENNA FOR KA-BAND APPLICATIONS	421
<i>Nadeem Ashraf, Ahmed A. Kishk, Abdel Razik Sebak, Concordia University, Canada</i>	
TU-SP.2A.6: EMPIRICAL ANALYSIS FORMULAE OF MICROSTRIP RIDGE GAP WAVEGUIDE	423
<i>Abdelmoniem Hassan, Mohamed Moharram, Ahmed A. Kishk, Concordia University, Canada</i>	
TU-SP.2A.7: GENERATION OF MM-WAVE HIGHER ORDER OAM MODES USING FLAT PHASE	425
PLATES	
<i>Hemanth Gaddam, Michael Kolacki, Patanjali V. Parimi, SUNY, Oswego, United States</i>	
TU-SP.2A.8: MICROSTRIP RIDGE GAP WAVEGUIDE HYBRID COUPLER AT 60 GHZ	427
<i>Abdelmoniem Hassan, Ahmed A. Kishk, Concordia University, Canada</i>	
 TU-A2.1A: METAMATERIAL LENSES AND OTHER APPLICATIONS	
TU-A2.1A.1: ENHANCING RESOLUTION OF MICROWAVE NDE OF COMPOSITES USING	N/A
METAMATERIAL LENS	
<i>Saptarshi Mukherjee, Lalita Udpa, Satish Udpa, Antonello Tamburrino, Michigan State University, United States</i>	
TU-A2.1A.2: THREE COLOR CORRECTION WITH METASURFACE-BACKED GRADIENT-INDEX	431
LENSES	
<i>Sawyer D. Campbell, Jogender Nagar, Douglas H. Werner, Pennsylvania State University, United States</i>	
TU-A2.1A.3: SPACE-TIME FOCUSING USING A DISPERSIVE AXICON	433
<i>Nikolaos Chiotellis, Anthony Grbic, University of Michigan, United States</i>	

TU-A2.1A.4: GENERATION OF DUAL-POLARIZED DUAL-MODE OAM RADIO BEAMS THROUGH TRANSMIT-ARRAY LENS	435
<i>Xudong Bai, Yuntao Sun, Fanwei Kong, Weizhong Yan, Yanting Lv, Shanghai Scientific Instrument Factory, China; Weiren Zhu, Chong He, Xianling Liang, Junping Geng, Ronghong Jin, Shanghai Jiao Tong University, China</i>	
TU-A2.1A.5: 1-BIT RECONFIGURABLE UNIT CELL FOR PROGRAMABLE TRANSMIT-ARRAY LENS IN C-BAND	437
<i>Xudong Bai, Yuntao Sun, Fanwei Kong, Weizhong Yan, Yanting Lv, Shanghai Scientific Instrument Factory, China; Weiren Zhu, Chong He, Xianling Liang, Junping Geng, Ronghong Jin, Shanghai Jiao Tong University, China</i>	
TU-A2.1A.6: IMPEDANCE MATCHING METAMATERIALS COMPOSED OF ELC AND NB-SRR	439
<i>Quang Nguyen, Amir I. Zaghloul, U.S. Army Research Laboratory, United States</i>	
TU-A2.1A.7: A METAMATERIAL ELECTROMAGNETIC WAVE ABSORBER BASED ON RESISTIVE FILMS FOR MICRO-SATELLITE SPATIAL APPLICATIONS	441
<i>Cédric Martel, Benjamin Gabard, Fabrice Boust, Vincent Gobin, ONERA - The French Aerospace Lab, France; Kévin Elis, CNES, France</i>	
TU-A2.1A.8: ULTRA-THIN METALENS GENERATING COVERGING VORTEX BEAM IN MICROWAVE REGION	443
<i>Yueyi Yuan, Kuang Zhang, Xumin Ding, Qun Wu, Harbin Institute of Technology, China; Badreddine Ratni, Shah Nawaz Burokur, LEME, UPL, Univ Paris Nanterre, France</i>	
TU-A2.1A.9: VORTEX-BEAM EMITTER BASED ON SPOOF SURFACE PLASMON POLARITONS	N/A
<i>Jia Yuan Yin, Li-Xin Guo, Xidian University, China</i>	
TU-A2.1A.10: EXPLOITING INVERSE SCATTERING METHODOLOGIES TO DESIGN ARTIFICIAL MATERIALS	2563
<i>Roberta Palmeri, Martina Teresa Bevacqua, Andrea Francesco Morabito, Tommaso Isernia, Università Mediterranea di Reggio Calabria, Italy</i>	
 TU-A1.1A: MULTI-BAND MOBILE ANTENNAS	
TU-A1.1A.1: DESIGN OF A MULTIBAND LTE MIMO ANTENNA SYSTEM INTEGRATED IN ITS REAL ENVIRONMENT	447
<i>Lamia Sadaoui, Georges Kossiavas, Robert Staraj, Leonardo Lizzi, Université Cote d'Azur, CNRS, LEAT, France</i>	
TU-A1.1A.2: DESIGN OF A DUAL-FREQUENCY RECTANGULAR LOOP ANTENNA PLACED ON A GROUND PLANE	449
<i>Hayaki Nomura, Manabu Yamamoto, Hokkaido University, Japan</i>	
TU-A1.1A.3: COMPACT DUAL - BAND FLEXIBLE ANTENNA FOR WLAN/WI - FI APPLICATIONS	451
<i>Reshma Lakshmanan, Mridula Shanta, Mohanan Pezholil, Cochin University of Science and Technology, India</i>	
TU-A1.1A.4: RECONFIGURABLE SLOT ANTENNA DESIGN FOR 5G SMARTPHONE WITH METAL CASING	453
<i>Peng Yang, University of Electronic Science and Technology of China, Institute of Electronic and Information Engineering of UESTC in Guangdong, China; Kuixi Yan, Feng Yang, University of Electronic Science and Technology of China, China; Shaoying Huang, Singapore University of Technology and Design (SUTD), Singapore; L.Y. Zeng, Institute of Electronic and Information Engineering of UESTC in Guangdong, China</i>	
TU-A1.1A.5: DUAL-LOOP ANTENNA WITH BAND-STOP CIRCUIT FOR GPS/BLE/BLEETOOTH METAL-RIMMED SMARTWATCH APPLICATIONS	455
<i>Yi Yan, Jun Ouyang, Abubakar Sharif, Qiang Wang, Yong-Ling Ban, University of Electronic Science and Technology of China, China</i>	
TU-A1.1A.6: AN ULTRA-THIN DUAL-BAND SMART-WATCH ANTENNA COMPATIBLE WITH SEVERAL WIRELESS BANDS	457
<i>Amirreza Jalali Khalilabadi, Ata Zadehgo, University of Idaho, United States</i>	

TU-A1.1A.7: A QUAD-BAND COMPACT INVERTED-F MIMO ANTENNA FOR USB DONGLE APPLICATIONS	459
<i>M. I. Ahmed, Electronics Research Institute, Egypt; Ahmed M. Abdelwahab, Islam D. Youssef, October University for Modern Sciences and Arts (MSA), Egypt</i>	
TU-A1.1A.8: A COMPACT DUAL-BAND MIMO SLOT ANTENNA FOR WLAN APPLICATIONS	461
<i>Chong Ding, Qian Li, Yang Yang, Xia Lei, Gangxiong Wu, Minzhi Huang, Yubin Gong, Yanyu Wei, University of Electronic Science and Technology of China, China; Mingtao Tan, Hunan University of Arts and Science, China</i>	
TU-A1.1A.9: TRIPLE-BAND LOOP ANTENNA FOR 5G/WLAN UNBROKEN-METAL-RIMMED SMARTWATCH	463
<i>Huanqing Zou, Yixin Li, Mingzhi Peng, Mingkai Wang, Guangli Yang, Shanghai University, China</i>	
TU-A1.1A.10: A DUAL-BAND TRANSPARENT COPLANAR PATCH ANTENNA FOR WLAN SYSTEMS	465
<i>Yujie Zhang, Shanpu Shen, Chi-Yuk Chiu, Ross D. Murch, Hong Kong University of Science and Technology, China</i>	
TU-A1.2A: RECONFIGURABLE ARRAYS, REFLECTARRAYS, TRANSMITARRAYS AND THEIR ELEMENTS	
TU-A1.2A.1: A KA-BAND FREQUENCY RECONFIGURABLE CIRCULARLY POLARIZED ANTENNA ARRAY USING A RING RESONATOR	467
<i>Marios Patriotis, Firas Ayoub, Christos G. Christodoulou, University of New Mexico, United States</i>	
TU-A1.2A.2: 6×6 ARRAY OF FOUR-ARM SPIRAL ANTENNAS FOR HIGH-GAIN SATELLITE RECEIVER APPLICATIONS AT LOW ELEVATION	469
<i>Hengyi Zhou, Arpan Pal, Amit Mehta, Swansea University, United Kingdom; Hisamatsu Nakano, Hosei University, Japan</i>	
TU-A1.2A.3: ENHANCED GAIN TUNABLE TWO ELEMENTS ANTENNA ARRAY BASED ON GRAPHENE	471
<i>Ahmed Abdel Aziz, Mahmoud A. Abdalla, Military Technical College, Egypt; Ahmed Ibrahim, Minia University, Egypt</i>	
TU-A1.2A.4: A BEAM-SCANNING ARRAY ANTENNA FOR LPWAN BASE STATION	473
<i>Phaisan Ngamjanyaporn, Rangsit University, Thailand; Chuwong Phongcharoenpanich, Monai Krairiksh, King Mongkut's Institute of Technology Ladkrabang, Thailand</i>	
TU-A1.2A.5: LOW-LOSS COMPACT RE-CONFIGURABLE REFLECTARRAY ELEMENT	475
<i>Muhammad M. Tahseen, INRS-EMT, Quebec University, Montreal / Concordia University, Montreal, Canada; Tayeb A. Denidni, INRS-EMT, Quebec University, Montreal, Canada; Ahmed A. Kishk, Concordia University, Canada</i>	
TU-A1.2A.6: A WIDE-BAND DUAL-POLARIZED FREQUENCY-RECONFIGURABLE SLOT-RING ANTENNA ELEMENT USING A DIAGONAL FEEDING METHOD FOR ARRAY DESIGN	477
<i>Junyi Huang, Xun Gong, University of Central Florida, United States</i>	
TU-A1.2A.7: A LOW COST REFLECT ARRAY FOR NEAR-FIELD MILLIMETER-WAVE BEAM FOCUSING APPLICATIONS	479
<i>Ali Molaei, Jose Angel Martinez-Lorenzo, Northeastern University, United States</i>	
TU-A1.2A.8: DESIGN OF A 1-BIT RECONFIGURABLE TRANSMITARRAY ELEMENT USING AN EQUIVALENT MAGNETIC DIPOLE	481
<i>Yu Wang, Shenheng Xu, Fan Yang, Maokun Li, Tsinghua University, China</i>	
TU-A1.2A.9: A MULTI-BIT RECONFIGURABLE TRANSMITARRAY DESIGN APPROACH USING CASCADED SPATIAL PHASE SHIFTERS	483
<i>Yu Wang, Shenheng Xu, Fan Yang, Maokun Li, Tsinghua University, China</i>	
TU-A1.2A.10: BEAM RECONFIGURABLE ANTENNA BASED ON HOLOGRAPHIC METASURFACES	485
<i>Hao Yu, Xumin Ding, Kuang Zhang, Qun Wu, Harbin Institute of Technology, China</i>	

TU-A1.3A: ADAPTIVE, ACTIVE, AND SMART ANTENNAS I

TU-A1.3A.1: A PARAMETRIC AMPLIFIER SLOT ANTENNA..... 487
Pedram Loghmannia, Majid Manteghi, Virginia Polytechnic Institute and State University, United States

TU-A1.3A.2: DUAL-POLARIZED ANTENNA ARRAY WITH INTEGRATED LOW NOISE AMPLIFIER INTO 489
THE LIGHTWEIGHT ANTENNA COMPOSITE STRUCTURE
Pawel Kabacik, Arkadiusz Byndas, Mariusz Hofman, Tomasz Wasik, Wroclaw University of Science and Technology, Poland

TU-A1.3A.3: MANIPULATING THE RADIATION PATTERN OF PATCH ANTENNAS BY EXPLOITING 491
PHASE SINGULARITIES
Mirko Barbuto, Niccolò Cusano University, Italy; Mohammad-Ali Miri, Andrea Alù, University of Texas at Austin, United States; Filiberto Bilotti, Alessandro Toscano, Roma Tre University, Italy

TU-A1.3A.4: MODE-BASED MIMO ANTENNA WITH POLARIZATION AND PATTERN DIVERSITY FOR 493
BASE STATION APPLICATIONS
Grzegorz Wolosinski, Vincent Fusco, Queen's University Belfast, United Kingdom; Pawel Rulikowski, Nokia Bell Labs, Ireland

TU-A1.3A.6: SPECTRAL AND SPATIAL UPLINK INTERFERENCE FILTERING 495
Robert Dybdal, Chris J. Clark, Don Hinshilwood, Lan Xu, The Aerospace Corporation, United States

TU-A1.3A.7: CIRCULARLY POLARIZED PATCH ANTENNA WITH SECTOR RADIATION PATTERN 497
Mirko Barbuto, Niccolò Cusano University, Italy; Mohammad-Ali Miri, Andrea Alù, University of Texas at Austin, United States; Filiberto Bilotti, Alessandro Toscano, Roma Tre University, Italy

TU-A1.3A.8: 3D PATTERN OPTIMIZATION USING PSO FOR AN IRREGULAR DUAL-LAYER 499
CIRCULAR ARRAY
Xiao Xiao, Yilong Lu, Nanyang Technological University, Singapore

TU-A1.3A.9: ACTIVE ANTENNA..... 501
Igor Shirokov, Elena Shirokova, Sevastopol State University, Russia

TU-A1.3A.10: RADIATION PATTERN RECONFIGURABLE ANTENNA FOR MIMO SYSTEMS WITH 503
ANTENNA TUNING SWITCHES
Puming Fang, Kun Wang, Mathias Wolfmüller, Infineon Technologies, Germany; Thomas F. Eibert, Technical University of Munich, Germany

TU-A1.4A: SLOT AND SLOT-FED ARRAYS

TU-A1.4A.1: HIGH GAIN LEFT HAND CIRCULAR POLARIZED MILLIMETER-WAVE RADIAL LINE 505
SLOT ANTENNA WITH LOW SIDE LOBE LEVEL
Abdullah Attar, Abdel Razik Sebak, Concordia University, Canada

TU-A1.4A.2: CROSS-POLARIZATION REDUCTION OF A NARROW WALL SLOTTED WAVEGUIDE 507
ARRAY FOR KU-BAND
Amirhossein Ghasemi, Jean Jacques Laurin, École Polytechnique Montréal, Canada

TU-A1.4A.3: A NOVEL DUAL CIRCULARLY-POLARIZED WAVEGUIDE ANTENNA ARRAY 509
Hongtao Zhang, Wei Wang, Zhi Zheng, Mouping Jin, East China Research Institute of Electronic Engineering, China; Xianling Liang, Shanghai Jiao Tong University, China

TU-A1.4A.4: INTEGRATED VS SEPARATED RADOMES FOR SLOTTED-WAVEGUIDE ANTENNAS.....511
Stanislav Sekretarov, Dmytro Vavriv, Institute of Radio Astronomy of the National Academy of Sciences of Ukraine, Ukraine

TU-A1.4A.5: HIGH GAIN SLOTTED WAVEGUIDE FED MICROSTRIP ANTENNA ARRAY AT KA-BAND 513
FOR HIGH POWER APPLICATIONS
Pratigya Mathur, Girish Kumar, IIT Bombay, India

TU-UA.1A: ADVANCED ANTENNA TECHNOLOGIES

TU-UA.1A.2: LOW LOSS AND HIGH ELECTRICAL INSULATION NEAR FIELD ANTENNA COUPLER..... 515
Alejandro Niembro-Martin, Emmanuel Dreina, Schneider Electric, France

TU-UA.1A.3: THE EFFECT OF PHASE CONTINUITY ON SYNCHRONOUS ANTENNA TUNING..... 517
Erica Daly, Michael Daly, SPAWAR Systems Center Pacific, United States

TU-UA.1A.4: 6-10 GHZ CIRCULARLY-POLARIZED MULTISTATIC ARRAY FOR STANDOFF 519
MICROWAVE IMAGING
James Krieger, William Moulder, Adam Chapman, Cara Yang, Pierre-Francois Wolfe, MIT Lincoln Laboratory, United States

TU-UA.1A.6: LOW-PROFILE TRANSMITARRAY ANTENNA WITH SINGLE SLOT SOURCE AND 521
METASURFACE IN 80-GHZ BAND
Yoshiaki Kasahara, University of Texas at Austin, United States; Mingqi Wu, Keishi Kosaka, Hiroshi Toyao, Eiji Hankui, NEC Corporation, Japan; Andrea Alù, University of Texas at Austin, United States

TU-UA.1A.7: DUAL-POLARIZED OPEN-ENDED WAVEGUIDE WITH SQUINTED BEAM FOR X-BAND 523
MONOPULSE ANTENNA ON A SMALL DIAMETER CYLINDER
Jae Sik Kim, Dae Woong Woo, Hae-Chang Jeong, Agency for Defense Development, Korea (South)

TU-UA.1A.8: UAV-BASED ANTENNA MEASUREMENT AND DIAGNOSTICS FOR CIRCULARLY 525
POLARIZED ANTENNA ARRAYS
Maria Garcia-Fernandez, Yuri Alvarez-Lopez, Fernando Las Heras, University of Oviedo, Spain

TU-UA.1A.9: STUDY OF A WATER-IMMERSED ORBITAL ANGULAR MOMENTUM CIRCULAR 527
ANTENNA ARRAY
Yang Yang, Jin Xu, Hairong Yin, Wenfei Bo, Jingchao Tang, Jialu Ma, Jie Xie, Yubin Gong, University of Electronic Science and Technology of China, China

TU-A3.1A: ADVANCES IN ELECTROMAGNETIC OPTIMIZATION

TU-A3.1A.1: DEALING WITH COMPLEXITY IN ELECTROMAGNETICS THROUGH THE 529
SYSTEM-BY-DESIGN PARADIGM - NEW STRATEGIES AND APPLICATIONS TO THE DESIGN
OF AIRBORNE RADOMES
Andrea Massa, Marco Salucci, University of Trento, Italy

TU-A3.1A.2: A PIXEL-BASED OPTIMIZATION METHOD FOR THE DESIGN OF OPTICALLY 531
TRANSPARENT ANTENNAS AND CIRCUITS
Sameer Sharma, Degen Zhou, Andrea Lutten, Costas D. Sarris, University of Toronto, Canada

TU-A3.1A.3: LOOKING FOR THE OPTIMAL TRADE-OFF BETWEEN COMPUTATIONAL COSTS AND 533
RELIABILITY IN SYNTHESIZING HIGH-COMPLEXITY ELECTROMAGNETIC SYSTEMS - THE
CASE OF SATELLITE COMMUNICATIONS ANTENNA DESIGN
Marco Salucci, Davide Marcantonio, University of Trento, Italy; Francesco Greco, Giandomenico Amendola, Luigi Boccia, Università della Calabria, Italy; Andrea Massa, University of Trento, Italy

TU-A3.1A.4: FAST NODE COMMUNICATION ADMM-BASED IMAGING ALGORITHM WITH A 535
COMPRESSIVE REFLECTOR ANTENNA
Juan Heredia-Jueas, Ali Molaei, Luis Tirado, Jose Angel Martinez-Lorenzo, Northeastern University, United States

TU-A3.1A.5: ON THE USE OF MMCN-BBO FOR ANTENNA PROBLEMS OPTIMIZATION 537
Paola Pirinoli, Andrea Massaccesi, Michele Beccaria, Politecnico di Torino, Italy

TU-A3.1A.6: FAST SOURCE RECONSTRUCTION VIA ADMM WITH ELASTIC NET REGULARIZATION..... 539
Juan Heredia-Jueas, Luis Tirado, Jose Angel Martinez-Lorenzo, Northeastern University, United States

TU-A3.1A.7: MACHINE LEARNING FOR MULTIOBJECTIVE EVOLUTIONARY OPTIMIZATION IN PYTHON FOR EM PROBLEMS	541
<i>Anatoliy Boryszenko, AE Partnership, United States; Naftali Hercovici, Raytheon, United States</i>	
TU-A3.1A.8: FLAT BEAM OPTIMIZATION OF 1-BIT REFLECTARRAY BY MEANS OF SOCIAL NETWORK OPTIMIZATION	543
<i>Alessandro Niccolai, Politecnico di Milano, Italy; Xiaotian Pan, Tsinghua University, China; Paola Pirinoli, Politecnico di Torino, Italy; Fan Yang, Tsinghua University, China; Riccardo Zich, Politecnico di Milano, Italy; Shenheng Xu, Tsinghua University, China</i>	
TU-A3.1A.9: A PSO BASED ON SA FOR THE SPARSE LINEAR ARRAY SYNTHESIS WITH MULTIPLE CONSTRAINTS	545
<i>Ying Suo, Wei Li, Yan Liu, Shuangbin Yin, Harbin Institute of Technology, China</i>	
TU-A4.3A: PROPAGATION IN UNDERGROUND ENVIRONMENT	
TU-A4.3A.1: UNCERTAINTY QUANTIFICATION OF VECTOR PARABOLIC EQUATION BASED WIRELESS CHANNEL MODELS USING POLYNOMIAL CHAOS EXPANSION	547
<i>Xingqi Zhang, Costas D. Sarris, University of Toronto, Canada</i>	
TU-A4.3A.2: ENABLING ACCURATE MODELING OF WAVE PROPAGATION IN COMPLEX TUNNEL ENVIRONMENTS WITH THE VECTOR PARABOLIC EQUATION METHOD	549
<i>Xingqi Zhang, Costas D. Sarris, University of Toronto, Canada</i>	
TU-A4.3A.3: BIT ERROR RATE PERFORMANCE OF FD-RELAY IN OLOS MINE ENVIRONMENTS	551
<i>Kazi Mustafizur Rahman, Nadir Hakem, Université du Québec en Abitibi-Témiscamingue, Canada</i>	
TU-A4.3A.4: A NEW WAY TO INTEGRATE PHYSICS-BASED CHANNEL MODELS IN COMMUNICATION SYSTEM DESIGN	553
<i>Neeraj Sood, Xingqi Zhang, Sami Baroudi, Jorg Liebeherr, Costas D. Sarris, University of Toronto, Canada</i>	
TU-A4.3A.5: INVESTIGATION OF ROUGH SURFACES FOR PROPAGATION MODELING IN CAVES	555
<i>Qi Ping Soo, Soo Yong Lim, David Wee Gin Lim, University of Nottingham Malaysia Campus, Malaysia</i>	
TU-A4.3A.6: “ELECTROMAGNETIC VISION”: MACHINE INTELLIGENCE MODELS OF RADIOWAVE PROPAGATION IN TUNNELS	557
<i>Aidan Malone, Costas D. Sarris, University of Toronto, Canada</i>	
TU-A4.3A.7: UWB OFF-BODY CHANNEL CHARACTERIZATION IN A MINE ENVIRONMENT	559
<i>Moulay Elhassan El Azhari, Larbi Talbi, University of Quebec in Outaouais, Canada; Mourad Nedil, Université du Québec en Abitibi-Témiscamingue, Canada</i>	
TU-A4.3A.8: AN ACCELERATION ALGORITHM FOR COLLISION DETECTION IN RAY-TRACING PROPAGATION	561
<i>Jing Li, Longhe Wang, Ke Guan, Danping He, Bo Ai, Lei Lei, Beijing Jiaotong University, China</i>	
TU-A4.3A.9: PROPAGATION ANALYSIS OF WIRELESS-SIGNALS IN A SINGLE- AND MULTI-LAYER GLASS-PANELS	N/A
<i>Irfan Sohail Syed, IQRA University, Pakistan</i>	
TU-A4.1A: ADVANCES IN SENSING	
TU-A4.1A.5: OPTIMIZING THE INFORMATION-THEORETIC PARTITIONING OF SIMULTANEOUS TRANSMIT AND RECEIVE PHASED ARRAYS	565
<i>Ian Cummings, Timothy Schulz, Michigan Technological University, United States; Jonathan Doane, Massachusetts Institute of Technology - Lincoln Laboratory, United States; Timothy Havens, Michigan Technological University, United States</i>	

TU-A4.2A: SYNTHETIC APERTURE RADAR IMAGING AND SIMULATION

TU-A4.2A.1: CLUTTER-SUPPRESSED, SUBSURFACE INTERFEROMETRIC SAR IMAGING OF TARGET UNDER SLIGHTLY ROUGH SURFACE 567

Dahan Liao, Calvin Le, Traian Dogaru, Anders Sullivan, U.S. Army Research Laboratory, United States

TU-A4.2A.2: SHORT RANGE SAR IMAGING FOR 2D MICRO-DEFORMATION DETECTION 569

Zelong Shao, Xiangkun Zhang, Jiawei Ren, Yingsong Li, Chinese Academy of Sciences, China

TU-A4.2A.3: SYNTHETIC APERTURE RADAR IMAGING ON LUNAR SURFACE WITH OBSERVATORY ON EARTH 571

Po-Chih Chen, Jean-Fu Kiang, National Taiwan University, Taiwan

TU-A4.2A.4: NUMERICAL SIMULATION AND ANALYSES OF SAR IMAGES FROM MOVING SHIPS OVER A SEA SURFACE 573

Min Zhang, Wenna Fan, Jinxing Li, Xidian University, China

TU-A4.2A.5: WIDEBAND ECHO SIMULATION AND ITS APPLICATION TO SAR IMAGE OF COMPLEX TARGETS 575

Xin-Zhuo Li, Wang-Qiang Jiang, Min Zhang, Yong-Chang Jiao, Xidian University, China

TU-A5.1P: ANTENNA DESIGN FOR ABLATION AND ADVANCED BIOMEDICAL APPLICATION

TU-A5.1P.1: MULTI-TARGET FOCO FOR HEAD&NECK HYPERTHERMIA TREATMENT PLANNING: A FEASIBILITY STUDY 577

Gennaro Giovanni Bellizzi, Università Mediterranea di Reggio Calabria, Italy; Tomas Drizdal, Erasmus MC - Daniel den Hoed Cancer Center Rotterdam, Netherlands; Lorenzo Crocco, IREA, Consiglio Nazionale delle Ricerche, Napoli, Italia, Italy; Gerard C. van Rhoon, Erasmus MC - Daniel den Hoed Cancer Center Rotterdam, Netherlands; Tommaso Isernia, Università Mediterranea di Reggio Calabria, Italy; Margarethus M. Paulides, Erasmus MC - Daniel den Hoed Cancer Center Rotterdam, Netherlands

TU-A5.1P.2: PRINTED COIL ANTENNA FOR WIRELESS CAPSULE ENDOSCOPIC COMMUNICATION SYSTEM 579

YunXiao Peng, Saito Kazuyuki, Koichi Ito, Chiba University, Japan

TU-A5.1P.5: COMPACT CONFORMAL SLOT ANTENNA FOR HYPERTHERMIA APPLICATIONS N/A

Soni Singh, Dharmendra Singh, Indian Institute of Technology Roorkee, India

TU-A5.1P.6: MULTI-ANTENNA SAR ESTIMATION IN LINEAR TIME 583

Arash Ebadi-Shahrivar, Patrick Fay, Bertrand Hochwald, University of Notre Dame, United States; David Love, Purdue University, United States

TU-A5.1P.7: A CONFORMAL ANTENNA WITH POLARIZATION DIVERSITY FOR WIRELESS CAPSULE ENDOSCOPY N/A

Qiaoqin Xiao, South China University of Technology, China; Yi Fan, Guangdong Polytechnic Normal University, China; Xiongying Liu, South China University of Technology, China; Manos Tentzeris, Georgia Institute of Technology, United States

TU-A5.1P.8: A HIGHLY SENSITIVE MICROWAVE BIOSENSOR FOR SINGLE BIOLOGICAL CELL CHARACTERIZATION 587

Abdulrahman Alghamdi, Saeed Mohammadi, Purdue University, United States

TU-A5.1P.9: DESIGN OF MATCHING LAYERS FOR INCREASING THE ELECTRICAL FIELD PENETRATION INSIDE HUMAN TISSUE 589

Simone Genovesi, University of Pisa, Italy; Ian Butterworth, Luca Daniel, Massachusetts Institute of Technology, United States

TU-A5.1P.10: PERMITTIVITY AND CONDUCTIVITY ESTIMATION FOR HYPERTHERMIA TREATMENT PLANNING	591
<i>Martina Teresa Bevacqua, Università Mediterranea, Italy; Gennaro Giovanni Bellizzi, Università Mediterranea di Reggio Calabria, Italy; Lorenzo Crocco, CNR-IREA, National Research Council of Italy – Institute for Electromagnetic Sensing of the Environment, Italy; Tommaso Isernia, Università Mediterranea, Italy</i>	
TU-A5.2P: DESIGN AND IMPLEMENTATION OF ADVANCED 3D MANUFACTURING TECHNIQUE FOR MILLIMETER-WAVE ANTENNAS	
TU-A5.2P.1: A W-BAND CURVED APERTURE HORN ANTENNA WITH CONSISTENT RADIATION PATTERNS	593
<i>Jake Cazden, Muhannad Al-Tarifi, Ljubodrag Boskovic, Dejan Filipovic, University of Colorado Boulder, United States</i>	
TU-A5.2P.2: PRINTED W-BAND LUNEBURG LENS FOR BEAMFORMING APPLICATIONS	595
<i>Ahmed Bilal Numan, Jean-François Frigon, Jean-Jacques Laurin, Polytechnique Montréal, Canada</i>	
TU-A5.2P.3: HIGH-GAIN PATCH-FED 3D-PRINTING FRESNEL ZONE PLATE LENS ANTENNA FOR 60-GHZ COMMUNICATIONS	597
<i>Pei-Ling Chi, Chi-Hsien Pao, Ming-Hui Huang, Tao Yang, National Chiao Tung University, Taiwan</i>	
TU-A5.2P.4: A PRINTED CONICAL BEAM ANTENNA FOR MILLIMETER-WAVE APPLICATIONS	599
<i>Qian Zhu, Chi Hou Chan, City University of Hong Kong, China; Raj Mittra, University of Central Florida, United States</i>	
TU-A5.2P.5: WIDEBAND CIRCULARLY-POLARIZED 3D ANTENNA ARRAY FOR MILLIMETER-WAVE APPLICATIONS	601
<i>Mohamad Mantash, Jamal Zaid, Arun Kesavan, Tayeb A. Denidni, Institut National de la Recherche Scientifique, Canada</i>	
TU-A5.2P.6: HIGH GAIN DISC RESONATOR ANTENNA ARRAY WITH CPW COUPLED FOR THZ APPLICATIONS	603
<i>Kamel Sultan, Electronics Research Institute, Egypt; Mohamed Basha, Safieddin Safavi-Naeini, University of Waterloo, Canada</i>	
TU-A5.2P.7: A DUAL-CIRCULARLY POLARIZED COMPACT FEED HORN AT 5G MILLIMETER-FREQUENCY FOR REFLECTOR APPLICATION	605
<i>Xinhua Yu, Ghanshyam Mishra, Satish Sharma, San Diego State University, United States</i>	
TU-A5.2P.8: MILLIMETER-WAVE TOROIDAL LENS-ARRAY ANTENNAS EXPERIMENTAL MEASUREMENTS	607
<i>Alexander Maltsev, Artem Lomayev, Andrey Pudueyev, Ilya Bolotin, Intel Corporation, Russia; Olesya Bolkhovskaya, Valentin Seleznev, University of Nizhny Novgorod, Russia</i>	
TU-A5.2P.9: AN ULTRA-WIDEBAND FERMI TAPERED SLOT ANTENNA WITH WAVEGUIDE-MICROSTRIP TRANSITION DEVICE	609
<i>Nan-Nan Wang, Bing-Xu Zhao, Mu Fang, Jing-Hui Qiu, Li-Yi Xiao, Harbin Institute of Technology, China</i>	
TU-A5.2P.10: A WIDEBAND MILLIMETER-WAVE BIDIRECTIONAL CIRCULARLY POLARIZED ANTENNA ARRAY USING SEQUENTIAL ROTATION FEEDING	611
<i>Jun Hu, Qi Wu, Xiang Wang, State Key Laboratory of Millimeter Waves Southeast University, China</i>	
TU-SP.1P: MODERN ADVANCES IN ELECTROMAGNETIC IMAGING, COMPRESSIVE SENSING AND RADAR	
TU-SP.1P.2: MULTIVIEW IMAGING WITH REAL-TIME MICROWAVE CAMERA FROM KNOWN POSITIONS	613
<i>Jaime Laviada, Universidad de Oviedo, Spain; Mohammad T. Ghasr, Missouri University of Science and Technology, United States; Fernando Las-Heras, University of Oviedo, Spain; Reza Zoughi, Missouri University of Science and Technology, United States</i>	

TU-SP.1P.4: REAL BEAM, VOLUMETRIC RADAR IMAGING AT 340 GHZ FOR SECURITY APPLICATIONS	615
<i>Duncan Robertson, David Macfarlane, Robert Hunter, University of St Andrews, United Kingdom; Erio Gandini, Nuria Llombart, Technical University of Delft, Netherlands</i>	
TU-SP.1P.5: ADAPTIVE ARRAY RADAR IMAGING OF A HUMAN BODY FOR VITAL SIGN MEASUREMENT	617
<i>Takuya Sakamoto, Kentaro Konishi, Kosuke Yamashita, University of Hyogo, Japan; Masashi Muragaki, Shigeaki Okumura, Toru Sato, Kyoto University, Japan</i>	
TU-SP.1P.6: A COMPRESSIVE MILLIMETER-WAVE INTERFEROMETRIC IMAGER FOR SECURITY APPLICATIONS	619
<i>Ettien L. Kpré, Nicolas Vellas, Christophe Gaquière, MC2 Technologies, France; Cyril Decroze, Thomas Fromentèze, Moctar Mouhamadou, XLIM, France</i>	
TU-SP.1P.8: DETERMINING THE DIELECTRIC PERMITTIVITY AND THICKNESS OF A PENETRABLE SLAB AFFIXED TO THE HUMAN BODY USING FOCUSED CW MM-WAVE SENSING	621
<i>Mahdiar Sadeghi, Elizabeth Wig, Carey Rappaport, Northeastern University, United States</i>	
TU-SP.1P.9: MM-WAVE AND THZ ACTIVE ELECTROMAGNETIC SYSTEMS ON CHIP: CIRCUITS-EM-SYSTEMS CODESIGN APPROACH	623
<i>Kaushik Sengupta, Princeton University, United States</i>	
TU-SP.1P.10: ROBUST BCS-BASED DIRECTION-OF-ARRIVAL AND BANDWIDTH ESTIMATION OF UNKNOWN SIGNALS FOR COGNITIVE RADAR	625
<i>Mohammad Hannan, Paolo Rocca, Andrea Massa, University of Trento, Italy</i>	
 TU-SP.2P: WIDEBAND ANTENNA AND PHASED ARRAYS FOR PERFORMANCE AND PHYSICAL LAYER SECURITY IN MOBILE WIRELESS 5G	
TU-SP.2P.1: PERFORMANCE CHARACTERIZATION OF MONOLITHICALLY INTEGRATED MMW PHASED ARRAYS	627
<i>Seckin Sahin, Cosan Caglayan, Niru K. Nahar, Kubilay Sertel, Ohio State University, United States</i>	
TU-SP.2P.2: DEVELOPMENT OF 28GHZ BAND MASSIVE MIMO ANTENNA RF FRONTEND MODULE FOR 5G	629
<i>Satoshi Yamaguchi, Hikaru Watanabe, Hideharu Yoshioka, Yasuo Morimoto, Hideyuki Nakamizo, Koji Tsutsumi, Shintaro Shinjo, Shigeru Uchida, Akihiro Okazaki, Toru Fukasawa, Naofumi Yoneda, Mitsubishi Electric Corporation, Japan</i>	
TU-SP.2P.4: PCB BASED UWB MM-WAVE SMART CAPPED BOWTIE ARRAY FOR 5G COMMUNICATION SYSTEMS	631
<i>Jian Yang, Sadegh Mansouri Moghaddam, Ashraf Zaman, Zhongxia Simon He, Vessen Vassilev, Chalmers University of Technology, Sweden</i>	
TU-SP.2P.5: DUAL-BAND CAVITY-BACKED DIPOLE ANTENNA FOR MILLIMETER-WAVE COMMUNICATIONS	633
<i>Bin Yu, Shanghai University, China; Xitong Wu, Xiaoyang Ma, Speed Wireless Technology Inc., United States; Guangli Yang, Shanghai University, SICS, China</i>	
TU-SP.2P.6: A TRANSPARENT DUAL-POLARIZED ANTENNA ARRAY FOR 5G SMARTPHONE APPLICATIONS	635
<i>Manoj Stanley, Yi Huang, University of Liverpool, United Kingdom; Hanyang Wang, Hai Zhou, Huawei Technology (UK), United Kingdom; Ahmed Alieldin, Sumin Joseph, University of Liverpool, United Kingdom</i>	
TU-SP.2P.7: 37-39 GHZ VERTICALLY-POLARIZED END-FIRE 5G ANTENNA ARRAY FEATURING ELECTRICALLY SMALL PROFILE	637
<i>Junho Park, Pohang University of Science and Technology, Korea (South); Dooseok Choi, Samsung Electronics, Korea (South); Wonbin Hong, Pohang University of Science and Technology, Korea (South)</i>	

TU-SP.2P.8: WIDEBAND ANTENNAS AND PHASED ARRAYS FOR ENHANCING CYBERSECURITY IN 5G MOBILE WIRELESS	639
<i>Johnson Wang, Wang Electro-Opto Corp., United States</i>	
TU-SP.2P.9: A MULTI-PORT 5G BASE-STATION ANTENNA USING SERIES-FED PATCH ANTENNA SUB-ARRAYS	641
<i>Fei-Peng Lai, National Taipei University of Technology, Taiwan; Hsueh-Jyh Li, National Taiwan University, Taiwan; Chi-Min Li, National Taiwan Ocean University, Taiwan; Pao-Jen Wang, Ming Chi University of Technology, Taiwan; Yen-Sheng Chen, National Taipei University of Technology, Taiwan</i>	
TU-A2.1P: METAMATERIALS FOR ANTENNAS	
TU-A2.1P.1: DESIGN OF A SPLIT-RING RESONATOR BASED MICROSTRIP SENSOR FOR NEAR-FIELD INSPECTION OF COMPOSITES	643
<i>Saptarshi Mukherjee, Lalita Udpa, Satish Udpa, Prem Chahal, Michigan State University, United States</i>	
TU-A2.1P.2: MINIATURIZED MICROSTRIP PATCH ANTENNA USING MAGNETO-DIELECTRIC SUBSTRATE FOR RFID APPLICATIONS	645
<i>Jamal Zaid, Mohamad Mantash, Arun Kesavan, Tayeb Denidni, Quebec University, Canada</i>	
TU-A2.1P.3: HIGH DIRECTIVE LOOP ANTENNA FOR LOW-PROFILE APPLICATIONS	647
<i>Mohammed Alharbi, Constantine Balanis, Craig Birtcher, Arizona State University, United States; Hussein Shaman, King Abdulaziz City for Science and Technology, Saudi Arabia</i>	
TU-A2.1P.4: ANALYSIS OF MICROSTRIP ANTENNAS ON METAMATERIAL SUBSTRATE USING DISCRETE MODE MATCHING METHOD	649
<i>Veenu Kamra, Achim Dreher, German Aerospace Center (DLR), Oberpfaffenhofen, Germany</i>	
TU-A2.1P.5: ANTENNA COMPOSED OF META- AND NATURAL-MATERIAL LOOPS	651
<i>Hisamatsu Nakano, Ittoku Yoshino, Junji Yamauchi, Hosei University, Japan</i>	
TU-A2.1P.6: DUAL-BAND MUSHROOM ANTENNA WITH TWO CONCENTRIC CIRCLES COMPOSITE VIAS	653
<i>Shuhei Terada, Tetsuya Ueda, Kyoto Institute of Technology, Japan; Masakazu Ikeda, Yuji Sugimoto, Soken, Inc, Japan; Shiro Koide, Denso Corporation, Japan</i>	
TU-A2.1P.7: RADIALY ARRAYED CP METAMATERIAL LINES	655
<i>Hisamatsu Nakano, Tomoki Abe, Junji Yamauchi, Hosei University, Japan</i>	
TU-A2.1P.8: A WIDEBAND HORIZONTAL POLARIZED OMNIDIRECTIONAL LOOP ANTENNA	657
<i>Junqing Xu, Qingyuan Zhang, Lingyun Zhou, Chang Chen, University of Science and Technology of China, China</i>	
TU-A2.1P.9: PARAMETRIC INVESTIGATIONS AND DEMONSTRATION OF A METASURFACE-COATED ULTRA-WIDEBAND MONOPOLE	659
<i>Zhi Hao Jiang, Wei Hong, Southeast University, China</i>	
TU-A1.1P: DUAL-BAND AND MULTI-BAND ANTENNAS (I)	
TU-A1.1P.1: A ROBUST AND SYSTEMATIC APPROACH TO MULTIBAND ANTENNA DESIGN FOR OPERATION ON COMPLEX PLATFORMS UNDER GEOMETRY MODIFICATION	661
<i>Raj Mittra, University of Central Florida, United States; Maifuz Ali, Florida International University, United States; Ashwani Kumar, Sri Aurobindo College, Delhi University, India</i>	
TU-A1.1P.2: A MULTI-BAND SRR AND STRIP LOADED SLOT ANTENNA	663
<i>Princy Paul, Krishnamoorthy Kandasamy, National Institute of Technology Karnataka, India; Mohammad Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia</i>	

TU-A1.1P.3: A TRI-BAND ANTENNA WITH BROADBAND REDUCED RCS AND ENHANCED DIRECTIVITY	665
<i>You-Feng Cheng, Southwest Jiaotong University, China; Xiao Ding, Tu-Lu Liang, Wei Shao, University of Electronic Science and Technology of China, China</i>	
TU-A1.1P.5: A MICROSTRIP GRID ARRAY ANTENNA FOR DUAL BAND APPLICATIONS	667
<i>Guanghui Xu, Huashan Luan, Hong-Li Peng, Yao-Ping Zhang, Wen-Yan Yin, Shanghai Jiao Tong University, China</i>	
TU-A1.1P.6: MULTIMODE MULTI-CONSTELLATION GNSS ANTENNA	669
<i>Olutola Jonah, Leo Lanctot, Ford Motor Company, United States</i>	
TU-A1.1P.7: DECOUPLED DUAL-BAND SLOT ANTENNA WITH BIDIRECTIONAL PATTERNS FOR WLAN APPLICATIONS	671
<i>Yaohui Yang, Xiaoxiang Ding, Jinchao Ding, Zhiqin Zhao, University of Electronic Science and Technology of China, China</i>	
TU-A1.1P.8: MULTIBAND ANTENNA DESIGN FOR AMBIENT ENERGY HARVESTING BASED ON RF FIELD INVESTIGATION	673
<i>Fatima Khalid, Muhammad Umar Khan, Nosherwan Shoaib, Warda Saeed, Hammad M. Cheema, National University of Sciences and Technology (NUST), Pakistan</i>	
TU-A1.1P.9: DESIGN OF A NOVEL QUADRUPLE BAND-NOTCHED UWB ANTENNA	675
<i>Xu Liu, Hao Jin, Guangli Yang, Shanghai University, China</i>	
TU-A1.1P.10: PRINTED QUASI YAGI ANTENNA WITH CLOSELY SPACED AND THICK DIRECTORS FOR TRIPLE ISM-BAND/WIDEBAND APPLICATIONS AT UHF	677
<i>Ceyhan Turkmen, Yigit Bakirli, Mustafa Secmen, Yasar University, Turkey; Mehmet Altuntas, ASELSAN Inc., Turkey</i>	
TU-A5.3P: RFID DESIGN AND IMPLEMENTATION ISSUES	
TU-A5.3P.1: DESIGN AND INTEGRATION OF ANTENNAS FOR LAUNCHING RF SIGNALS IN METALLIC TUBULAR STRUCTURES	679
<i>Jagannath Devkota, National Energy Technology Laboratory, United States; David W. Greve, DWGreve Consulting, United States; Paul R. Ohodnicki, National Energy Technology Laboratory, United States</i>	
TU-A5.3P.2: ON RFID TAG DETECTION INSIDE METAL PIPES	681
<i>Andrea Michel, Paolo Nepa, University of Pisa, Italy; Marcos Rodriguez Pino, Universidad de Oviedo, Spain</i>	
TU-A5.3P.3: DUAL-LAYER CIRCULARLY POLARIZED SPLIT RING RESONATOR INSPIRED ANTENNA FOR WEARABLE UHF RFID TAG	683
<i>Shubin Ma, Leena Ukkonen, Lauri Sydänheimo, Toni Björninen, Tampere University of Technology, Finland</i>	
TU-A5.3P.4: RF ENERGY HARVESTING SYSTEM INTEGRATING A PASSIVE UHF RFID TAG AS A CHARGE STORAGE INDICATOR	685
<i>Nikta Pournoori, M. Waqas. A Khan, Leena Ukkonen, Toni Björninen, Tampere University of Technology, Finland</i>	
TU-A5.3P.5: SMALL EPIDERMAL UHF RFID LOOP ANTENNA FOR PASSIVE ORAL CAVITY CONTROL APPLICATIONS AND PATIENT HEALTH MONITORING	687
<i>Paul Taylor, John Batchelor, University of Kent, United Kingdom</i>	
TU-A5.3P.6: A COMPACT AMC-BASED NOVEL MONOPOLE ANTENNA FOR RFID APPLICATIONS	689
<i>Hifa Houssein Elzuwawi, Muhammad M. Tahseen, Tayeb A. Denidni, Institut National de la Recherche Scientifique, Canada</i>	
TU-A5.3P.7: DESIGN OF A WIDEBAND WEARABLE PLANAR UHF RFID TAG ANTENNA ATTACHED TO MULTILAYERED HUMAN BODY	691
<i>Dan Wang, Yun Jing Zhang, Jia Ying Lv, Mei Song Tong, Tongji University, China</i>	
TU-A5.3P.8: LOW-COST CONFORMAL UHF RFID TAG ANTENNA FOR PLASTIC WATER BOTTLES	693
<i>Abubakar Sharif, Jun Ouyang, Yi Yan, Rui Long, University of Electronic Science and Technology of China, China; Ali Raza, Southwest Jiaotong University, China</i>	

TU-A5.3P.9: A RECTANGULAR MICROSTRIP PATCH ANTENNA USED FOR STRUCTURAL HEALTH MONITORING	695
<i>Guo Chun Wan, Ke Xue, Ruo Xing Gao, Jia Ying Lv, Mei Song Tong, Tongji University, China</i>	
TU-A5.3P.10: STUDY OF AN ACCURATE PHASE-BASED LOCALIZATION METHOD FOR SEMI-PASSIVE RFID TAGS	2007
<i>Ala Alemaryeen, University of North Dakota, United States; Mahyar Modaresi, Lunantech Inc., Canada; Sima Noghianian, University of North Dakota, United States</i>	
 TU-A4.1P: ADVANCES IN INVERSE SCATTERING TECHNIQUES	
TU-A4.1P.1: MULTI-PARAMETER MICROWAVE INVERSE SCATTERING WITH GROUP SPARSITY CONSTRAINTS	697
<i>Guanbo Chen, Pratik Shah, Mahta Moghaddam, University of Southern California, United States</i>	
TU-A4.1P.2: LEARNING NONLINEARITY OF MICROWAVE IMAGING THROUGH DEEP LEARNING	699
<i>Pratik Shah, Guanbo Chen, Mahta Moghaddam, University of Southern California, United States</i>	
TU-A4.1P.3: AN INNOVATIVE LEARNING-BY-EXAMPLES METHOD FOR REAL-TIME ELECTRICAL IMPEDANCE TOMOGRAPHY OF THE HUMAN CHEST	701
<i>Marco Salucci, Andrea Massa, University of Trento, Italy</i>	
TU-A4.1P.4: SPARSITY AND COHERENCE IN INVERSE PROBLEMS - FROM 1D TO 2D PROCESSING THROUGH MATRIX COMPLETION	703
<i>Giacomo Oliveri, Marco Salucci, University of Trento, Italy</i>	
TU-A4.1P.5: SOME CONSIDERATIONS ON THE PHYSICAL MEANING OF ORTHOGONALITY SAMPLING METHOD	705
<i>Martina Teresa Bevacqua, Roberta Palmeri, Tommaso Isernia, Università Mediterranea, Italy; Lorenzo Crocco, CNR-IREA, National Research Council of Italy – Institute for Electromagnetic Sensing of the Environment, Italy</i>	
TU-A4.1P.6: BEAM DOMAIN FORMULATION FOR TOMOGRAPHIC INVERSE SCATTERING. PART I: THE FORWARD PROBLEM	707
<i>Ram Tuvi, Ehud Heyman, Tel Aviv University, Israel; Timor Melamed, Ben-Gurion University of the Negev, Israel</i>	
TU-A4.1P.7: BEAM DOMAIN FORMULATION FOR TOMOGRAPHIC INVERSE SCATTERING. PART II: THE INVERSE PROBLEM	709
<i>Ram Tuvi, Ehud Heyman, Tel Aviv University, Israel; Timor Melamed, Ben-Gurion University of the Negev, Israel</i>	
TU-A4.1P.9: AN EQUIVALENT DISTORTED BORN ITERATIVE METHOD TO SOLVE INVERSE SCATTERING PROBLEM WITHOUT UPDATING THE GREEN'S FUNCTION	711
<i>Zijian Liu, Zaiping Nie, University of Electronic Science and Technology of China, China</i>	
 TU-A1.2P: ANTENNA FEEDS AND MATCHING CIRCUITS (I)	
TU-A1.2P.1: IMPEDANCE MATCHING OF A LARGE LOOP ANTENNA INSIDE A CIRCULAR WAVEGUIDE	713
<i>Nedime Pelin Mohamed Hassan Salem, Edip Niver, New Jersey Institute of Technology, United States; Mohamed Salem, Independent Researcher, Egypt</i>	
TU-A1.2P.2: WAVEGUIDE-FED ANTIPODAL VIVALDI ANTENNA USING AN ANTIPODAL FINLINE TRANSITION	715
<i>Ali Molaei, Jose Angel Martinez-Lorenzo, Northeastern University, United States</i>	
TU-A1.2P.3: CIRCULARLY POLARIZED COMPACT RANGE FEED WITH 30 DB POLARIZATION ISOLATION	717
<i>German Cortes-Medellin, NSI-MI Technologies, United States</i>	

TU-A1.2P.4: OVER-MODED BENT CIRCULAR WAVEGUIDE MODE CONVERTER FOR GAUSSIAN RADIATION PATTERN FROM RELATIVISTIC BWOS	719
<i>Xuyuan Pan, Hamide Faraji, Edl Schamiloglu, Christos G. Christodoulou, University of New Mexico, United States</i>	
TU-A1.2P.5: AN EFFICIENT MODE-MATCHING SOLUTION FOR OPEN-ENDED COAXIAL WAVEGUIDES VIA ANALYTIC CONTINUATION OF THE RADIAL SPACE	721
<i>Guilherme Simon da Rosa, José R. Bergmann, Pontifical Catholic University of Rio de Janeiro, Brazil</i>	
TU-A1.2P.6: DEMONSTRATION OF TM₀₁ CIRCULAR WAVEGUIDE MODE IN MATCHED FEEDS FOR SINGLE OFFSET REFLECTORS	723
<i>Michael Forum Palvig, TICRA, Denmark; Olav Breinbjerg, Technical University of Denmark, Denmark; Peter Meincke, Erik Jørgensen, TICRA, Denmark</i>	
TU-A1.2P.7: A SEPTUM POLARIZER WITH INTEGRATED SQUARE TO CIRCULAR TAPERED WAVEGUIDE TRANSITION	725
<i>Nasiha Nikolic, Andrew Weily, Ivan Kekic, Stephanie Smith, Ken Smart, CSIRO, Australia</i>	
TU-A1.2P.8: LOSS CONTRIBUTIONS IN V-BAND SUBSTRATE INTEGRATED WAVEGUIDES	727
<i>Christopher G. Hynes, Rodney Vaughan, Simon Fraser University, Canada</i>	
TU-A1.2P.9: PERFORMANCE COMPARISON OF SMOOTH WALLED AND CORRUGATED HORNS FOR DIFFERENT PROFILE OPTIONS	729
<i>Jay Gupta, Dhaval Pujara, Nirma University, India</i>	
TU-A1.2P.10: COST EFFECTIVE SMOOTH WALLED CONICAL HORN USING POLYNOMIAL INTERPOLATION	731
<i>Jay Gupta, Dhaval Pujara, Nirma University, India</i>	
 TU-A1.3P: ANTENNA THEORY II	
TU-A1.3P.1: A DUAL BAND MODIFIED SIERPINSKI ANTENNA FOR WIFI APPLICATIONS	733
<i>Tolga Zeybek, Khaled ElMahgoub, Tufts University, United States</i>	
TU-A1.3P.2: A NOVEL BROADBAND MICROSTRIP ARRAY ANTENNA WITH BEAM TILT	N/A
<i>Min Guo, Min Wang, Ming-Ming Fan, Science and Technology on Electromagnetic Scattering Laboratory, China</i>	
TU-A1.3P.3: DESIGN OF PLANAR SPARSE ANTENNA ARRAY WITH RECTANGULAR BOUNDARY BY BI-LINEAR APPROACH	737
<i>Cheng Zhang, Anyong Qing, University of Electronic Science and Technology of China, China</i>	
TU-A1.3P.4: CIRCULARLY POLARIZED ANNULAR SLOT ANTENNA DESIGN ON DEFORMED FINITE GROUND WITH TOP LOADING BY CIRCULAR PATCH USING CHARACTERISTIC MODES	N/A
<i>Arka Bhattacharyya, Bhaskar Gupta, Jadavpur University, India</i>	
TU-A1.3P.5: FUNDAMENTAL EFFICIENCY LIMIT OF PASSIVE NON-MAGNETIC SELF-INTERFERENCE SUPPRESSION IN FULL-DUPLEX RADIOS	741
<i>Adam Narbudowicz, Giuseppe Ruvio, Max Ammann, Dublin Institute of Technology, Ireland; Nicola Marchetti, Trinity College Dublin, the University of Dublin, Ireland</i>	
TU-A1.3P.6: STUDY ON DIRECTIONAL RADIATION CHARACTERISTICS OF ULTRA-WIDEBAND DIELECTRIC ROD ANTENNA BASED ON TRAVELING WAVE ANALYSIS	743
<i>Shu Lin, Jian-Lin Jiao, Yu Mao, Yu-Wei Zhang, Shou-Lan Liu, Cai-Tian Yang, Harbin Institute of Technology, China</i>	
TU-A1.3P.7: WAVEGUIDE SLOT FILTERING ANTENNA USING MUSHROOM-TYPE SURFACE	745
<i>Zhi Zheng, Wei Wang, Hong-Tao Zhang, Mou-Ping Jin, East China Research Institute of Electronic Engineering, China; Xian-Ling Liang, Shanghai Jiao Tong University, China</i>	

TU-A1.3P.8: CROSS-CORRELATION GREEN'S FUNCTION FOR INTERACTION BETWEEN ELECTRIC AND MAGNETIC CURRENT SOURCES	747
<i>Debdeep Sarkar, Indian Institute of Technology Kanpur, India; Said Mikki, University of New Haven, United States; Kumar Vaibhav Srivastava, Indian Institute of Technology Kanpur, India; Yahia M. M. Antar, Royal Military College of Canada, Canada</i>	
TU-A1.3P.9: A CPW FED TRAPEZOIDAL FRACTAL PATCH ANTENNA FOR UWB APPLICATIONS	749
<i>Shiv Charan Puri, Asansol Engineering College, India; Sushrut Das, Indian Institute of Technology (Indian School of Mines), India; Madan Gopal Tiary, Asansol Engineering College, India; Sonika Priyadarsini Biswal, Indian Institute of Technology (Indian School of Mines), India</i>	
TU-A1.3P.10: PARALLEL PLATE VLF MECHANICAL ANTENNA MECHANICAL AMPLIFICATION AND ELIMINATION OF ELECTRIC FIELD DISTORTION	751
<i>Huan Zheng, Jinbo Zhao, Bing Xiang, Qiaopo Xiong, Fangshun Deng, Wuhan Marine communication research Institute, China</i>	
TU-A4.2P: PROPAGATION IN INDOOR ENVIRONMENT	
TU-A4.2P.1: COMPARISON OF CLUSTERING EFFECT IN SPACE-DELAY DOMAIN AT 5.8 GHZ DEPENDING ON THE INDOOR SCENARIOS SIZES	753
<i>Iñigo Cuiñas, Pascual Rodríguez-Pérez, Manuel García Sánchez, Universidade de Vigo, Spain</i>	
TU-A4.2P.2: MULTIPATH MITIGATION USING WEIGHT SUPPRESSION FOR EQUALIZATION IN INDOOR POSITIONING SYSTEMS	755
<i>Ali Jishi, Yikun Huang, Yuanxun Ethan Wang, University of California, Los Angeles, United States</i>	
TU-A4.2P.3: HUMAN BODY SHADOWING AT 26.4 AND 66.5 GHZ IN AN INDOOR ENVIRONMENT	757
<i>Mitsuki Nakamura, Motoharu Sasaki, Yasushi Takatori, NTT Corporation, Japan</i>	
TU-A4.2P.4: TIME DISPERSION INDOOR CHANNEL CHARACTERIZATION IN THE 8-12 GHZ FREQUENCY BAND	759
<i>Lorenzo Rubio Arjona, Universitat Politècnica de València, Spain; Rafael Pedro Torres Jimenez, Jesus Ramon Perez Lopez, Universidad de Cantabria, Spain; Vicent Miguel Rodrigo Peñarrocha, Universitat Politècnica de València, Spain; Herman Antonio Fernandez Gonzalez, Universidad Pedagógica y Tecnológica de Colombia, Colombia; Luis Valle Lopez, Universidad de Cantabria, Spain; Juan Reig Pascual, Universitat Politècnica de València, Spain; Jose Basterrechea Verdeja, Marta Domingo Gracia, Universidad de Cantabria, Spain</i>	
TU-A4.2P.5: INDOOR LOCALIZATION METHOD USING PATHLOSS-DISTANCE RELATIONSHIP WITH HANDSET SENSOR INFORMATION	761
<i>Kazushi Naruke, Naoki Honma, Kota Kikuchi, Ryota Tazawa, Iwate University, Japan; Yusuke Sugawara, Hiroto Minamizawa, Atsushi Miura, Embedded Resource Integration, Inc., Japan</i>	
TU-A4.2P.6: DEEP-SUB-WAVELENGTH MAGNETOQUASISTATIC INDOOR NAVIGATION SENSOR - 2D MEASUREMENTS	763
<i>Darindra Arumugam, California Institute of Technology, United States</i>	
TU-A4.2P.7: BACKSCATTER MODEL FOR LOW-FREQUENCY MAGNETO-QUASISTATIC FIELDS IN INDOOR ENVIRONMENTS	765
<i>Raju Manthana, Darindra Arumugam, California Institute of Technology, United States</i>	
TU-A4.2P.8: 28 GHZ CHANNEL MEASUREMENTS IN HIGH MULTIPATH, INDOOR ENVIRONMENTS	767
<i>Marcia Golmohamadi, Sakil Chowdhury, James Jamison, Eli Kravitz, Jeff Frolik, University of Vermont, United States</i>	
WE-A2.1A: APPLICATIONS OF METASURFACES	
WE-A2.1A.1: NONLOCAL METASURFACES PERFORMING ANALOG MATHEMATICAL OPERATIONS	769
<i>Hoyeong Kwon, Dimitrios Sounas, Andrea Alù, University of Texas at Austin, United States</i>	

WE-A2.1A.2: EXTENDING THE BREWSTER EFFECT TO ARBITRARY ANGLE AND POLARIZATION USING BIANISOTROPIC METASURFACES	771
<i>Guillaume Lavigne, Christophe Caloz, Polytechnique Montréal, Canada</i>	
WE-A2.1A.3: MICROWAVE REFLECTING FOCUSING METASURFACE BASED ON WATER	773
<i>Mikhail Odit, Andrey Sayanskiy, ITMO University, Russia; Viktor Asadchy, Aalto University, Finland; Pavel Belov, ITMO University, Russia</i>	
WE-A2.1A.4: PHASE DISCRETIZATION INFLUENCE ON THE PERFORMANCE OF FOCUSING METASURFACE	775
<i>Hongjun Chu, Jiaran Qi, Jinghui Qiu, Hongmei Li, Harbin Institute of Technology, China</i>	
WE-A2.1A.5: AN ULTRA-THIN WIDEBAND LINEAR TO CIRCULAR POLARIZATION CONVERTER USING METASURFACE	777
<i>Lavesh Nama, Somak Bhattacharya, Pradeep Kumar Jain, Indian Institute of Technology (BHU), Varanasi, India</i>	
 WE-A1.2A: DUAL-BAND AND MULTI-BAND ANTENNAS (II)	
WE-A1.2A.1: A COMPACT DUAL-BAND ANTENNA BASED ON SIW TECHNOLOGY	779
<i>Taiwei Yue, Douglas H. Werner, Pennsylvania State University, United States</i>	
WE-A1.2A.2: DESIGN AND TESTING OF FLEXIBLE KOCH SNOWFLAKE DIPOLE ANTENNA	N/A
<i>Ian Madray, Ryan Kuemper, Jacob Martin, Joshua Hart, Megan Broussard, Austin Lovas, Mohammad Madani, University of Louisiana at Lafayette, United States</i>	
WE-A1.2A.3: ANALYZING PRACTICAL ISSUES IN SAR MEASUREMENTS OF MULTIPLE-ANTENNA TRANSMITTING DEVICES	783
<i>Dinh Thanh Le, Soichi Watanabe, National Institute of Information and Communications Technology, Japan</i>	
WE-A1.2A.4: CPW-FED MULTIBAND ANTENNA FOR VARIOUS WIRELESS COMMUNICATIONS APPLICATIONS	785
<i>Osama Dardeer, Hala Elsadek, Esmat A. Abdallah, Electronics Research Institute, Egypt</i>	
WE-A1.2A.5: DESIGN OF A MULTIBAND FEED ANTENNA FOR ORTHOGONAL POLARIZATION	787
<i>Enze Zhang, Chen Xue, Jinghui Qiu, Harbin Institute of Technology, China</i>	
WE-A1.2A.6: L-BAND PATCH ANTENNA WITH INTEGRATED KA-BAND SIW SLOT ARRAY	789
<i>Carlos Wah González, Rafael Rodríguez Solís, University of Puerto Rico, United States</i>	
WE-A1.2A.7: ACCELERATED DESIGN OPTIMIZATION OF ANTENNA STRUCTURES USING ADAPTIVE RESPONSE SCALING	791
<i>Slawomir Koziel, Sigmar Unnsteinsson, Reykjavik University, Iceland</i>	
WE-A1.2A.8: DUAL-MATCHING FOR SINGLE RESONANCE MINIATURIZED ANTENNA FOR IOT APPLICATIONS	793
<i>Tran Quang Khai Nguyen, Leonardo Lizzi, Fabien Ferrero, University of Cote d'Azur, CNRS LEAT, France</i>	
WE-A1.2A.9: DESIGN AND DEVELOPMENT OF A COMPACT DUAL CP EIGHT BAND PLANAR LOG PERIODIC ANTENNA FOR RF ENERGY HARVESTING THROUGH AMBIENT SOURCES	795
<i>Hafiz Saad Khaliq, Lahore University of Management Sciences, Pakistan; Ali Javed Hashmi, National University of Sciences and Technology (NUST), Pakistan; Wasif Tanveer Khan, Lahore University of Management Sciences, Pakistan</i>	
WE-A1.2A.10: DUAL-BAND NOTCHED ULTRA-WIDEBAND MICROSTRIP ANTENNA WITH INTEGRATED BLUETOOTH BAND	797
<i>Mohamed El-Gendy, Researcher at Electronics Research Institute, Egypt</i>	

WE-A5.1A: APPLICATIONS OF MILLIMETER-WAVE, TERAHERTZ AND OPTICAL ANTENNAS

WE-A5.1A.1: GRAPHENE-BASED SPIRAL NANOANTENNA FOR INTRABODY COMMUNICATION AT 799 TERAHERTZ

Hadeel Elayan, Khalifa University, United Arab Emirates; Raed Shubair, Research Laboratory of Electronics, Massachusetts Institute of Technology (MIT), United States; Josep Jornet, Buffalo State University, United States; Asimina Kiourti, Ohio State University, United States; Raj Mittra, University of Central Florida, United States

WE-A5.1A.2: ELLIPTICAL MONOPOLE ANTENNA ON INP SUBSTRATE FOR SUB-THZ RTD-BASED 801 OSCILLATORS

H. M. Santos, University of Porto / INESC TEC, Portugal; L. M. Pessoa, INESC TEC, Portugal; Pedro Pinho, Instituto de Telecomunicações / ADEETC, Instituto Superior de Engenharia de Lisboa, Portugal; H. M. Salgado, University of Porto / INESC TEC, Portugal

WE-A5.1A.4: FABRICATION AND CHARACTERIZATION OF PLASMONIC THIN-FILM TERAHERTZ 803 PHOTOCONDUCTIVE ANTENNA

Nathan Burford, Wattglass Inc., United States; Michael Evans, TeraView Ltd, United Kingdom; Magda El-Shenawee, University of Arkansas, United States

WE-A5.1A.5: ENHANCEMENT OF INTRA-CHIP TRANSMISSION BETWEEN WIRELESS 805 INTERCONNECTS USING ARTIFICIAL MAGNETIC CONDUCTORS

Rounak Singh Narde, Jayanti Venkataraman, Amlan Ganguly, Rochester Institute of Technology, United States

WE-A5.1A.6: EFFECTS OF GLOB TOP ON MMWAVE BOND WIRE ANTENNAS 807

Ivan Ndip, Max Huhn, Klaus-Dieter Lang, Fraunhofer IZM, Germany

WE-A5.1A.7: DESIGN AND CHARACTERIZATION OF ONE-SIDED DIRECTIONAL SLOT ANTENNA 809 FOR 1THZ WAVES

Yuki Miyaji, Haruichi Kanaya, Tanemasa Asano, Kyushu University, Japan

WE-A5.1A.8: DUAL POLARIZED METASURFACE BASED ABSORBER FOR SUB MILLIMETRIC / THZ811 APPLICATIONS

Ali Abdelsallam, Arab Academy for Science and Technology, Egypt; Mahmoud A. Abdalla, Military Technical College, Egypt; Abdelhamid Gaafar, Arab Academy for Science and Technology, Egypt

WE-A5.1A.9: RADIATION PATTERN CHARACTERIZATION OF TERAHERTZ PHOTOCONDUCTIVE 813 ANTENNAS USING TIME-DOMAIN SPECTROSCOPY SYSTEM

Kholoud Elmabruk, Kazim Demir, Asaf Behzat Sahin, Ankara Yildirim Beyazit University, Turkey; Hakan Altan, Middle East Technical University, Turkey; Mehmet Unlu, Ankara Yildirim Beyazit University, Turkey

WE-A5.1A.10: RECONFIGURABLE TERAHERTZ ANTENNA DESIGN USING ACTIVE METAMATERIAL N/A

Ramesh Reddy Chirrayyagari, Vijay Kumar, VIT University, India

WE-A1.3A: HIGH DIRECTIVITY BROADBAND ANTENNAS AND ARRAYS

WE-A1.3A.1: POLYSTRATA® X/KU/K/KA-BAND, DUAL-POLARIZED, TIGHTLY COUPLED DIPOLE 817 SCANNABLE FOCAL PLANE ARRAY

Jared Williams Jordan, Will Stacy, Jackson Ng, Benjamin L. Cannon, Aaron Caba, Kenneth J. Vanhille, Justin Clough, Brandon Stanton, Nuvotronics, United States; Paul E. Racette, NASA, United States

WE-A1.3A.2: NON-UNIFORMLY FED BROADBAND CTS ARRAY FOR SIDE LOBE LEVEL 819 REDUCTION IN E-PLANE

Thomas Potelon, Mauro Ettore, Ronan Sauleau, Institut d'Électronique et de Télécommunications de Rennes (IETR), France

WE-A1.3A.3: ENHANCED BANDWIDTH PERFORMANCE OF SLOTTED ANTENNA ARRAY 821 EXPLOITING THE MULTIPLE FEEDING TECHNIQUE

Anastasios Koutinos, Georgios Ioannopoulos, Michael Chrissyomallis, Georgios Kyriacou, Democritus University of Thrace, Greece

WE-A1.3A.4: MILLIMETER-WAVE BROADBAND MULTI-BEAM END-FIRE DUAL CIRCULARLY POLARIZED ANTENNA ARRAY	823
<i>Qi Wu, Haiming Wang, Wei Hong, Southeast University, China; Jiro Hirokawa, Tokyo Institute of Technology, Japan</i>	
WE-A1.3A.5: A BROADBAND DUAL-POLARIZED CAPPED BOW-TIE 2×2 ANTENNA ARRAY FOR 28 GHZ BAND IN 5G SYSTEMS	825
<i>Runqi Wu, Zhengting Liu, Youwei Zhou, Xin Wang, Jungang Yin, Hunan University, China; Jian Yang, Chalmers University of Technology, Sweden</i>	
WE-A1.3A.6: RADOME ENHANCEMENT TECHNIQUE FOR HIGH-POWER WIDEBAND MILLIMETER WAVE ANTENNAS	827
<i>Conrad Andrews, Nathan Jastram, Dejan Filipovic, University of Colorado Boulder, United States</i>	
WE-A1.3A.7: WIDEBAND DIELECTRIC-LOADED VENETIAN-BLIND POLARIZER FOR A SHORT F/D LENS ANTENNA	829
<i>Bryan Fox, MIT Lincoln Laboratory, United States; Herbert Aumann, University of Maine, United States; David Mooradd, MIT Lincoln Laboratory, United States</i>	
WE-A1.3A.8: TRANSVERSE PERMITTIVITY GRADIENT (TPG) SUPERSTRATES OR LENS: A CRITICAL PERSPECTIVE	831
<i>Raheel Hashmi, Affan Baba, Karu P. Esselle, Macquarie University, Australia</i>	
WE-A1.3A.9: HIGH-EFFICIENCY SQUARE-APERTURE HORN ANTENNA WITH A LINEAR SPLINE PROFILE	833
<i>Raynell Inojosa, Hiroyuki Deguchi, Mikio Tsuji, Doshisha University, Japan</i>	
WE-A1.3A.10: A WIDEBAND DIPOLE ANTENNA WITH VERTICAL PLATES	N/A
<i>Wanjun Yang, Yongmei Pan, Pengfei Hu, South China University of Technology, China</i>	
 WE-A1.4A: FREQUENCY INDEPENDENT ANTENNAS	
WE-A1.4A.1: EXPLOITING POLARIZATION WOBBLE IN SINUOUS ANTENNAS FOR THE DETECTION OF LINEAR SCATTERERS IN GROUND PENETRATING RADAR APPLICATIONS	837
<i>Dylan Crocker, Waymond Scott, Georgia Institute of Technology, United States</i>	
WE-A1.4A.2: OPTIMIZATION OF LPDA ANTENNAS WITH AXIAL TWIST	839
<i>M.Cristina Villalobos, Elizabeth Rodriguez Hernandez, Heinrich Foltz, University of Texas Rio Grande Valley, United States</i>	
WE-A1.4A.3: BROADBAND PRINTED LOG-PERIODIC ANTENNA WITH COAXIAL FEED	841
<i>Wolf-Stefan Benedix, Daniel Brandenburg, Xinguang Dong, Dirk Plettemeier, University of Technology Dresden, Germany</i>	
WE-A1.4A.4: A SIX-OCTAVE WIDEBAND AND LOW PROFILE LOG-PERIOD MONOPOLE ENDFIRE ANTENNA	843
<i>Jian Li, Yongjun Huang, Guangjun Wen, Liang Ma, Wei Hu, Weiwei Gu, University of Electronic Science and Technology of China, China</i>	
WE-A1.4A.5: A PLANAR COMPACT HELICAL LOG-PERIODIC ARRAY	845
<i>Qiaoyu Chen, Nanjing University of Science and Technology, China; Yunhui Di, Zhenxin Hu, Chongqing University of Posts and Telecommunications, China; Wen Wu, Nanjing University of Science and Technology, China</i>	
WE-A1.4A.6: PERFORMANCE OF A SPIRAL ANTENNA SYSTEM FOR WIDEBAND SENSING AND DIRECTION FINDING	847
<i>Nathan Jastram, Dejan Filipovic, University of Colorado Boulder, United States</i>	
WE-A1.4A.7: IMPLEMENTATION OF A SELF-MATCHED 40:1 TWO ARM ARCHIMEDEAN SPIRAL ANTENNA	849
<i>Dip Thakar, Ryan Adams, University of North Carolina at Charlotte, United States</i>	

WE-A1.4A.8: ANALYSIS OF ARCHIMEDEAN SPIRAL ANTENNA FED BY HECKEN AND EXPONENTIAL MICROSTRIP BALUNS	851
<i>Eduardo Sakomura, Daniel Ferreira, Ildefonso Bianchi, Daniel Nascimento, Technological Institute of Aeronautics, Brazil</i>	
WE-A1.4A.9: COMPACT PLANAR TWO-ARM COMPOUND SPIRAL ANTENNA FOR L-/X-BAND DIRECTION FINDING APPLICATIONS	853
<i>Eduardo Sakomura, Daniel Ferreira, Ildefonso Bianchi, Daniel Nascimento, Technological Institute of Aeronautics, Brazil</i>	
WE-A1.4A.10: A DESIGN OF THE PARACHUTE CONFORMAL ANTENNA	855
<i>Chen Xue, Enze Zhang, Jinghui Qiu, Microwave Engineering Department Harbin Institute of Technology, China</i>	
WE-A1.5A: POLARIZATION RECONFIGURABLE ANTENNAS	
WE-A1.5A.1: A PATTERN AND POLARIZATION RECONFIGURABLE LIQUID METAL HELICAL ANTENNA	857
<i>Shubham Singh, Jim Taylor, Hengyi Zhou, Arpan Pal, Amit Mehta, Swansea University, United Kingdom; Hisamatsu Nakano, Hosei University, Japan; Paul Howland, DSTL, United Kingdom</i>	
WE-A1.5A.2: A POLARIZATION-AGILE STUB-LOADED SQUARE PATCH ANTENNA WITH PROXIMITY COUPLED FEED	859
<i>Hsinju Chen, Shih-Yuan Chen, National Taiwan University, Taiwan</i>	
WE-A1.5A.3: ELECTRONICALLY POLARIZATION-RECONFIGURABLE RECTANGULAR DIELECTRIC RESONATOR ANTENNA	861
<i>Beijia Liu, Jinghui Qiu, Nannan Wang, Hua Zong, Hongjun Chu, Harbin Institute of Technology, China</i>	
WE-A1.5A.4: A QUAD-POLARIZATION RECONFIGURABLE OMNIDIRECTIONAL ANTENNA	863
<i>Changlong Qi, Yuehui Cui, RongLin Li, South China University of Technology, China</i>	
WE-A1.5A.5: FREQUENCY AND POLARIZATION CIRCULAR RECONFIGURABLE MICROSTRIP ANTENNA WITH SWITCHING FEED CONFIGURATION	N/A
<i>Suresh Kumar M, Yogesh Kumar Choukiker, VIT University, India</i>	
WE-SP.1A: FUNCTIONAL MATERIAL PLATFORMS ENABLING EXOTIC SCATTERING PHENOMENA	
WE-SP.1A.2: FUNCTIONAL ALL-DIELECTRIC METASURFACES FOR EFFICIENT MANIPULATION OF ELECTROMAGNETIC WAVES	867
<i>Polina Kapitanova, Andrey Sayanskiy, ITMO University, Russian Federation; Andrey Miroshnichenko, University of New South Wales Canberra, Australia; Pavel Belov, ITMO University, Russia</i>	
WE-SP.1A.6: UNIQUE CHARACTERISTICS AND APPLICATIONS OF SYSTEMS WITH EXCEPTIONAL POINTS OF DEGENERACY	869
<i>Mohamed Y. Nada, Mohamed Othman, Farshad Yazdi, Dmitry Oshmarin, Ahmed F. Abdelshafy, Filippo Capolino, University of California, Irvine, United States</i>	
WE-SP.1A.8: POLARIZABILITY AND LIGHT SCATTERING BY SUBWAVELENGTH GRADED-INDEX PLASMONIC SPHERES	871
<i>Dimitrios Tzarouchis, Ari Sihvola, Aalto University, Finland</i>	
WE-SP.1A.9: METAMATERIAL-INSPIRED ELECTRICALLY SMALL PLATFORMS: ENHANCED DIRECTIVITY PROPERTIES	873
<i>Richard Ziolkowski, University of Technology Sydney, Australia</i>	
WE-SP.1A.10: DESIGN AND OPTIMIZATION OF RADIATION PATTERN RECONFIGURABLE NANOLOOP ANTENNAS	875
<i>Ryan J. Chaky, Jogender Nagar, Douglas H. Werner, Pennsylvania State University, United States; Arnold F. McKinley, University College London, United Kingdom; Mario F. Pantoja, University of Granada, Spain</i>	

WE-SP.2A: EM PROPAGATION AND PREDICTION IN NON-STANDARD ATMOSPHERE SUPPORTED BY FIELD MEASUREMENTS

WE-SP.2A.1: DUCTING CONDITIONS DURING CASPER-WEST FIELD CAMPAIGN..... 877
Qing Wang, Naval Postgraduate School, United States; Denny Alappattu, Moss Landing Marine Laboratory, United States; Kyle Franklin, Ryan Yamaguchi, David Ortiz-Suslow, Naval Postgraduate School, United States; Caglar Yardim, Robert Burkholder, Ohio State University, United States

WE-SP.2A.2: ESTIMATION OF EVAPORATION DUCT AND SURFACE-BASED DUCT PARAMETERS 879 FROM A COMBINED REFRACTIVITY MODEL
Qi Wang, Robert Burkholder, Caglar Yardim, Ohio State University, United States; Qing Wang, Ryan Yamaguchi, K. Franklyn, David Ortiz-Suslow, E. Creegan, J. Fernando, Naval Postgraduate School, United States

WE-SP.2A.3: CASPER WEST EVAPORATION DUCT HEIGHT INVERSION USING LATPROP-RADAR..... 881
Joshua Compaleo, Caglar Yardim, Luyao Xu, Shanka Wijesundara, Joel Johnson, Robert Burkholder, Ohio State University, United States; Tom Hanley, Johns Hopkins Applied Physics Lab, United States; Tracy Haack, Navy Marine Meteorology Division, United States; Qing Wang, Naval Postgraduate School, United States

WE-SP.2A.4: SENSITIVITY OF NEAR-SHORE ELECTROMAGNETIC PROPAGATION TO THE 883 SPATIAL VARIABILITY OF EVAPORATIVE DUCT PROPERTIES
Kyle Franklin, Naval Postgraduate School, United States; Qing Wang, U.S. Navy, United States; Denny Alappattu, Moss Landing Marine Lab / Naval Postgraduate School, United States; Caglar Yardim, Ohio State University, United States

WE-SP.2A.5: EVALUATING THE USE OF DIFFERENT FLUX-GRADIENT FUNCTIONS IN NAVSLAM 885 DURING TWO EXPERIMENTS
Paul Frederickson, Denny Alappattu, Qing Wang, Naval Postgraduate School, United States; Adam Christman, H. J. S. Fernando, University of Notre Dame, United States; Caglar Yardim, Luyao Xu, Ohio State University, United States; Byron Blomquist, Earth System Research Laboratory, United States

WE-SP.2A.6: VARIABILITIES OF EVAPORATION DUCTS IN A NEAR-SHORE COASTAL 887 ENVIRONMENT
Denny Alappattu, San Jose State University, United States; Qing Wang, Marcela Ulate, Naval Postgraduate School, United States; Tracy Haack, Naval Research Laboratory, United States; Adam Christman, Harindra Joseph Fernando, University of Notre Dame, United States; Djamel Khelif, University of California, Irvine, United States

WE-A5.2A: BIOMEDICAL APPLICATIONS OF ANTENNAS IN IMAGING AND DETECTION

WE-A5.2A.1: A FAST METHOD TO ESTIMATE THE TOTAL DELIVERED POWER OF A 2-CHANNEL 889 MRI RADIO FREQUENCY COIL
Qi Zeng, Ji Chen, University of Houston, United States

WE-A5.2A.2: EVALUATING EFFECT OF CALIBRATION FACTOR FOR LEAD COMPUTATIONAL 891 MODEL TO ASSESS MRI RF-INDUCED HEATING
Mikhail Kozlov, Max Planck Institute for Human Cognitive and Brain Sciences, Germany; Wolfgang Kainz, U.S. FDA, CDRH, United States

WE-A5.2A.3: ON THE OPTIMIZATION OF DISTRIBUTED MAGNETIC TRAPS IN MRI COILS 893 DECOUPLING
Danilo Brizi, University of Pisa, Italy; Nunzia Fontana, Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT), Italy; Filippo Costa, University of Pisa, Italy; Gianluigi Tiberi, Fondazione Imago 7, Italy; Agostino Monorchio, University of Pisa, Italy

WE-A5.2A.4: EVALUATION OF EXPERIMENTAL MICROWAVE RADAR-BASED IMAGES: EVALUATION 895 CRITERIA
Declan O'Loughlin, Martin Glavin, Edward Jones, Martin O'Halloran, National University of Ireland Galway, Ireland

WE-A5.2A.5: DIELECTRIC PROPERTY BASED CLASSIFICATION OF HEPATIC MALIGNANCIES..... N/A
Tuba Yilmaz, Mehmet Cayoren, Ibrahim Akduman, Istanbul Technical University, Turkey

WE-A5.2A.6: EFFECT OF ELECTRODE GEOMETRY ON THE LEAD ELECTROMAGNETIC MODEL AND RF-INDUCED HEATING	899
<i>Mikhail Kozlov, Max Planck Institute for Human Cognitive and Brain Sciences, Germany; Wolfgang Kainz, U.S. FDA, CDRH, United States</i>	
WE-A5.2A.7: TERAHERTZ IMAGING OF TRANSGENIC MURINE BREAST CANCER TUMORS	901
<i>Tyler Bowman, University of Arkansas, United States; Keith Bailey, Oklahoma State University, United States; Magda El-Shenawee, University of Arkansas, United States</i>	
WE-A5.2A.8: EVALUATION OF SPECIFIC ABSORPTION RATES WITH HIGH RESOLUTION HUMAN HEAD MODELS AT 890 MHZ	903
<i>Mikhail Kozlov, Nikolaus Weiskopf, Harald Moeller; Max Planck Institute for Human Cognitive and Brain Sciences, Germany</i>	
WE-A5.2A.9: CONTRAST-ENHANCED THERMOACOUSTIC IMAGING FOR BREAST TUMOR DETECTION WITH SPARSE MEASUREMENTS	905
<i>Baosheng Wang, Lifan Xu, Xiong Wang, ShanghaiTech University, China</i>	
WE-A5.2A.10: DESIGN OF THERMOACOUSTIC MONITORING SYSTEM FOR HYPERTHERMIA	907
<i>Lifan Xu, Baosheng Wang, Xiong Wang, ShanghaiTech University, China</i>	
 WE-A2.2A: RCS MANAGEMENT AND CLOAKING	
WE-A2.2A.1: ELECTROMAGNETIC CLOAKING FOR ANTENNA ARRAYS	909
<i>Alessio Monti, Mirko Barbuto, Niccolò Cusano University, Italy; Andrea Alù, University of Texas at Austin, United States; Alessandro Toscano, Filiberto Bilotti, Roma Tre University, Italy</i>	
WE-A2.2A.2: ACTIVE SURFACE CLOAKING WITH PATCH ANTENNAS	911
<i>Paris Ang, George V. Eleftheriades, University of Toronto, Canada</i>	
WE-A2.2A.3: SCATTERING CONTROL AND CAMOUFLAGE THROUGH METASURFACES	913
<i>Stefano Vellucci, Roma Tre University, Italy; Alessio Monti, Niccolò Cusano University, Italy; Alessandro Toscano, Filiberto Bilotti, Roma Tre University, Italy</i>	
WE-A2.2A.4: LOW-OBSERVABLE REFLECTORS USING PERFECT PULSES	915
<i>Mohammad Alhassoun, Michael Varner, Gregory Durgin, Georgia Institute of Technology, United States</i>	
WE-A2.2A.6: DOPPLER CLOAKING BASED ON TIME-VARYING METAMATERIALS:THEORY AND DESIGN	917
<i>Davide Ramaccia, Filiberto Bilotti, Alessandro Toscano, Roma Tre University, Italy; Dimitrios Sounas, University of Texas at Austin, United States; Andrea Alù, Roma Tre University, Italy</i>	
WE-A2.2A.7: GRAPHENE-BASED PERFECT ABSORBERS: SYSTEMATIC DESIGN AND HIGH TUNABILITY	919
<i>Xu-Chen Wang, Sergei Tretyakov, Aalto University, Finland</i>	
WE-A2.2A.8: COMPLEX SOURCES, GAUSSIAN BEAMS, AND TRANSFORMATION OPTICS	921
<i>Hayrettin Odabasi, Eskisehir Osmangazi University, Turkey; Kamallesh Sainath, Dong-Yeop Na, Fernando Teixeira, ElectroScience Laboratory/The Ohio State University, United States</i>	
WE-A2.2A.9: METAGRATINGS FOR PERFECT ANOMALOUS REFRACTION	923
<i>Ariel Epstein, Technion - Israel Institute of Technology, Israel</i>	
WE-A2.2A.10: EXPERIMENTAL VERIFICATION OF PERFECT ANOMALOUS REFLECTION VIA SINGLE-ELEMENT METAGRATINGS	925
<i>Oshri Rabinovich, Technion - Israel Institute of Technology, Israel; Ilan Kaplon, Jochanan Reis, Rafael, Advanced Defense Systems, Ltd., Israel; Ariel Epstein, Technion - Israel Institute of Technology, Israel</i>	

WE-A5.3A: ADDITIVELY MANUFACTURED ANTENNAS AND STRUCTURES

WE-A5.3A.1: ADDITIVELY MANUFACTURED VERTICALLY INTERCONNECTED ON-PACKAGE MICROSTRIP PATCH ANTENNA 927

Ramiro Ramirez, Thomas Weller, University of South Florida, United States

WE-A5.3A.2: FOLDING, TESSELLATION, AND DEPLOYMENT OF AN ORIGAMI-INSPIRED ACTIVE-MATERIAL-ENABLED SELF-FOLDING REFLECTOR ANTENNA 929

Deanna Sessions, Sameer Jape, Edwin Peraza-Hernandez, Joshua Ruff, Texas A&M University, United States; Beatriz Borges, Pontifical Catholic University of Rio de Janeiro, Brazil; Francisco A. Espinal, Gregory H. Huff, Dimitris Lagoudas, Darren Hartl, Texas A&M University, United States

WE-A5.3A.3: ULTRA WIDEBAND DIELECTRIC ROD ANTENNA ADVANCEMENTS THROUGH ADDITIVE MANUFACTURING 931

Nicholas Wittemen, BAE Systems, United States

WE-A5.3A.4: EXPERIMENTAL RESULTS OF A COMPRESSIVE REFLECTOR ANTENNA PRODUCING SPATIAL CODING 933

Ali Molaei, Katherine Graham, Luis Tirado, Ashkan Ghanbarzadeh Dagheyan, Anthony Bisulco, Juan Heredia-Juesas, Chang Liu, Joseph Von Holten, Jose Angel Martinez-Lorenzo, Northeastern University, United States

WE-A5.3A.5: 3D MIMO DUAL-BAND ANTENNA ON PAPER SUBSTRATE FOR WLAN APPLICATIONS 935

Dominique Lo Hine Tong, Philippe Minard, Technicolor Connected Home, France; Laura Crowther-Alwyn, Damien Izoard, Pascal Borel, Centre Technique du Papier, France

WE-A5.3A.6: A SUBMILLIMETER WAVE PARABOLIC REFLECTOR BY ADDITIVE MANUFACTURING 937

Jordi Romeu, Albert Aguasca, Sebastian Blanch, Joan O'Callaghan, Lluís Jofre, Santiago Buitrago, Universitat Politècnica de Catalunya, Spain

WE-A5.3A.7: ADDITIVE-MANUFACTURING-ENABLED AIR-FILLED SUBSTRATE INTEGRATED WAVEGUIDE MICROWAVE COMPONENTS 939

Kamil Yavuz Kapusuz, Sam Lemey, Piet Demeester, Hendrik Rogier, Ghent University/IMEC, Belgium

WE-A5.3A.8: IMPROVING THE RADIATION EFFICIENCY OF LIQUID METAL ANTENNA WITH POLARIZATION AGILITY 941

Cong Wang, Yong-xin Guo, National University of Singapore, Singapore; Joo Chuan Yeo, Singapore Institute of Manufacturing Technology, Singapore; Chwee Teck Lim, National University of Singapore, Singapore

WE-A5.3A.9: SPACE TRANSFORMATION FOR VORTEX BEAM GENERATION 943

Rui Feng, Lina Zhu, Jianjia Yi, Hailin Zhang, State Key Laboratory of Integrated Services Networks, Xidian University, China; Shah Nawaz Burokur, LEME UPL, Univ Paris Nanterre, France; Douglas H. Werner, Pennsylvania State University, United States

WE-A1.7A: ANTENNA FEEDS AND MATCHING CIRCUITS (II)

WE-A1.7A.1: BILINEAR TRANSFORM APPROACH FOR WIDEBAND DIGITAL NON-FOSTER MATCHING OF ELECTRICALLY-SMALL ANTENNAS 945

Thomas Weldon, University of North Carolina at Charlotte, United States; Patrick Kehoe, Killian Steer, Formerly with University of North Carolina at Charlotte, United States

WE-A1.7A.2: BALANCED LOADED TRANSMISSION LINES APPLIED TO HYBRID COUPLERS DESIGN 947

Stefano Maddio, Giuseppe Pelosi, Monica Righini, Stefano Selleri, University of Florence, Italy

WE-A1.7A.3: INTEGRATED GPS ANTENNA WITH CIRCULAR POLARIZATION FOR METAL-RIMMED SMARTWATCH APPLICATIONS 949

Longyue Qu, Haiyan Piao, Hanyang University, Korea (South); Hyung-Hoon Kim, Kwangju Women's University, Korea (South); Hyeongdong Kim, Hanyang University, Korea (South)

WE-A1.7A.4: SERIES FEED NETWORK FOR POWER DISTRIBUTION CONTROL IN THE MILLIMETER-WAVE BAND	951
<i>Eonsu Noh, Kangwook Kim, Gwangju Institute of Science and Technology, Korea (South)</i>	
WE-A1.7A.5: PRINTED DIPOLE INTEGRATED WITH MINIMAL BALUN	953
<i>Tzyh-Ghuang Ma, Yi-Lung Wu, Huy Nam Chu, Chang-An Lin, National Taiwan University of Science and Technology, Taiwan</i>	
WE-A1.7A.6: A MULTI-OBJECTIVE INVASIVE WEED OPTIMIZATION FOR BROAD BAND SEQUENTIAL ROTATION NETWORKS	955
<i>Stefano Maddio, Giuseppe Pelosi, Monica Righini, Stefano Selleri, University of Florence, Italy</i>	
WE-A1.7A.7: A UNI-PLANAR FEEDING NETWORK FOR MONOPULSE TRACKING RADAR	957
<i>Hanxiang Zhang, Bayaner Arigong, Washington State University, United States</i>	
WE-A1.7A.8: BANDWIDTH ENHANCEMENT FOR PARALLEL FEEDING NETWORKS BY REGULATING TRANSMISSION LINE LENGTHS	959
<i>Kejia Ding, Ahmed A. Kishk, Concordia University, Canada</i>	
WE-A1.7A.9: A RECONFIGURABLE FEEDER FOR COMBINATIONAL SWITCHED-BEAM NETWORK	961
<i>Ghoo Kim, Jin-Woo Kim, Soo-Chang Chae, Jong-Won Yu, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)</i>	
WE-A1.7A.10: DESIGN OF A WIDEBAND UNEQUAL FILTERING POWER DIVIDER USING RING RESONATOR	963
<i>Yun Liu, Sheng Sun, University of Electronic Science and Technology of China, China</i>	
WE-A1.1A: METASURFACE AND METAMATERIAL ANTENNAS	
WE-A1.1A.1: POLARIZATION RECONFIGURABLE HOLOGRAPHIC ARTIFICIAL IMPEDANCE SURFACES	965
<i>Subramanian Ramalingam, Constantine Balanis, Craig Birtcher, Arizona State University, United States</i>	
WE-A1.1A.2: MULTILAYERED AXIALLY MODULATED CYLINDRICAL METASURFACES	967
<i>Subramanian Ramalingam, Constantine Balanis, Craig Birtcher, Arizona State University, United States; Hussein Shaman, King Abdulaziz City for Science and Technology, Saudi Arabia</i>	
WE-A1.1A.3: SIDELobe SUPPRESSION IN MODULATED SURFACE REACTANCE ANTENNAS	969
<i>Xavier Artiga, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC/CERCA), Spain</i>	
WE-A1.1A.4: MODULATED METASURFACE ANTENNAS DESIGN BASED ON GENERALIZED BOUNDARY CONDITIONS	971
<i>Xiao Liu, Fan Yang, Tsinghua University, China</i>	
WE-A1.1A.5: A METAMATERIAL BROADWALL WAVEGUIDE SLOT FILTERING ANTENNA FOR SAR APPLICATIONS	973
<i>Wei Wang, Zhi Zheng, Hongtao Zhang, East China Research Institute of Electronic Engineering, China; Xiaochuan Fang, University of Electronic Science and Technology of China, China; Xianling Liang, Shanghai Jiao Tong University, China</i>	
WE-A1.6A: PATTERN RECONFIGURABLE ANTENNAS	
WE-A1.6A.1: PATTERN RECONFIGURABLE ANTENNA LOADED WITH FREQUENCY SELECTIVE SURFACE AND ARTIFICIAL DIELECTRIC MEDIUM	975
<i>Jinxin Li, National Institute for Scientific Research(INRS), Canada; Qingsheng Zeng, Nanjing University of Aeronautics and Astronautics, China; Tayeb A. Denidni, Institut National de la Recherche Scientifique, Canada</i>	
WE-A1.6A.2: RADIATION PATTERN AGILE ANTENNA FOR SMART IOT GATEWAYS	977
<i>Luca Santamaria, Fabien Ferrero, Leonardo Lizzi, University Côte d'Azur, CNRS, LEAT, France</i>	

WE-A1.6A.3: BACK-TO-BACK MAGNETIC DIPOLE ANTENNAS WITH PATTERN RECONFIGURABILITY	979
<i>Hye-Won Jo, Ghoo Kim, Jong-Sang Yoo, Jong-Won Yu, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)</i>	
WE-A1.6A.4: PLANAR WIDE-ANGLE SCANNING PERIODIC SPARSE PHASED ARRAY USING PATTERN RECONFIGURABLE ANTENNA	981
<i>Fei Yan, Runliang Xia, The 38th Research Institute of China Electronics Technology Group Corporation, China</i>	
WE-A1.6A.5: SPOOF SURFACE PLASMON POLARITONS PATTERN RECONFIGURABLE ANTENNA FOR WIDE-ANGLE COVERAGE	983
<i>Kaijie Zhuang, Junping Geng, Xianling Liang, Weiren Zhu, Chong He, Yuliang Liang, Maohua Zhu, Ronghong Jin, Shanghai Jiao Tong University, China</i>	
 WE-A2.1P: WAVE AND POLARIZATION CONTROL WITH METASTRUCTURES	
WE-A2.1P.1: MANIPULATING OPTICAL CHIRALITY IN THE NEAR-FIELD OF PLASMONIC METAMATERIALS WITH SUPERCHIRAL LIGHT	985
<i>Lei Kang, Qiang Ren, Sawyer D. Campbell, Taiwei Yue, Douglas H. Werner, Pennsylvania State University, United States</i>	
WE-A2.1P.2: A CHIRAL META-MIRROR ENABLED LINEAR AND NONLINEAR CHIROPTICAL RESPONSES	987
<i>Lei Kang, Pennsylvania State University, United States; Sean Rodrigues, Mohammad Taghinejad, Shoufeng Lan, Kyu-Tae Lee, Georgia Institute of Technology, United States; Taiwei Yue, Sawyer D. Campbell, Pennsylvania State University, United States; Yongmin Liu, Northeastern University, United States; Augustine Urbas, Air Force Research Laboratory, United States; Wenshan Cai, Georgia Institute of Technology, United States; Douglas H. Werner, Pennsylvania State University, United States</i>	
WE-A2.1P.3: HIGH GAIN OFF-BODY LINEAR TO CIRCULAR POLARIZATION BASED ON DIELECTRIC MEANDER-LINE FOR UNDERGROUND MINING COMMUNICATIONS	989
<i>Amine Habani, Mourad Nedit, Université du Québec en Abitibi-Témiscamingue, Canada; Tayeb A. Denidni, Institut National de la Recherche Scientifique, Canada; Larbi Talbi, Université du Québec en Outaouais, Canada</i>	
WE-A2.1P.4: TOPOLOGICALLY-PROTECTED ONE-WAY LEAKY WAVES	991
<i>Francesco Monticone, Seyyed Ali Hassani Gangaraj, Cornell University, United States</i>	
WE-A2.1P.5: CREATING A SYNTHETIC SENSE OF LENGTH BY ELECTROMECHANICAL METAMOLECULES	993
<i>Leonid Goltzman, Yakir Hadad, Tel Aviv University, Israel</i>	
WE-A2.1P.6: METASURFACE PARTICLE WITH INDEPENDENT TRANSMISSION AND REFLECTION FULL PHASE COVERAGE	995
<i>Ashutosh Patri, Guillaume Lavigne, Christophe Caloz, Polytechnique Montréal, Canada</i>	
WE-A2.1P.7: INTERFERENCE IN ROTATING STRUCTURES AND METAMATERIALS	997
<i>Ben Steinberg, Tel Aviv University, Israel</i>	
WE-A2.1P.8: NEGATIVE REFRACTION BASED ON GUIDED-MODE ASSISTED META-GRATINGS	999
<i>Mohammad Haghtalab, Harvard University and University of Waterloo, Canada; Michele Tamagnone, Harvard University, United States; Safeddin Safavi-Naeini, University of Waterloo, Canada; Federico Capasso, Harvard University, United States</i>	
WE-A2.1P.9: MINIATURIZATION OF WAVEGUIDE STRUCTURES BY COUPLED TRANSMISSION LINES	1001
<i>Maifuz Ali, Shubhendu Bhardwaj, John L. Volakis, Florida International University, United States</i>	
WE-A2.1P.10: CHARACTERIZATION OF MULTIPLE-LAYER ANISOTROPIC METASURFACES BASED ON GENERALIZED BOUNDARY CONDITIONS	1003
<i>Xiao Liu, Fan Yang, Maokun Li, Shenheng Xu, Tsinghua University, China</i>	

WE-A1.1P: MULTI-BAND PLANAR ANTENNAS AND ARRAYS

WE-A1.1P.1: OPTIMIZATION OF A DUAL-BAND MICROSTRIP ANTENNA ARRAY USING GENETIC ALGORITHMS 1005

Abdelbaki Zeghdoud, Mohammed Cherif Derbal, Mourad Nedil, Université du Québec en Abitibi-Témiscamingue, Canada

WE-A1.1P.2: TOWARDS THE IMPLEMENTATION OF A DUAL-FREQUENCY DUAL-POLARIZATION STACKED PATCH ARRAY 1007

Dustin Isleifson, Lotfollah Shafai, University of Manitoba, Canada

WE-A1.1P.3: A NOVEL DUAL BAND ANTENNA DESIGN FOR WIFI APPLICATIONS USING GENETIC ALGORITHMS 1009

Mohammed Cherif Derbal, Abdelbaki Zeghdoud, Mourad Nedil, Université du Québec en Abitibi-Témiscamingue, Canada

WE-A1.1P.4: A DUAL-BAND DUAL-POLARIZED MICROSTRIP ANTENNA ARRAY WITH WIDEBAND AND HIGH ISOLATION FOR KU-BAND1011

Jing Wang, Wei Wang, Aimeng Liu, Meng Guo, Harbin Engineering University, China

WE-A1.1P.5: A SIMPLE TRI-BAND PROXIMITY COUPLING FED COMPACT ANTENNA FOR 2.7GHZ, WLAN AND SUB-6GHZ COMMUNICATION APPLICATIONS 1013

Xiaojun Mao, Yong Zhu, The 38th Research Institute of China Electronics Technology Group Corporation, China; Yingsong Li, Harbin Engineering University & Chinese Academy of Science, China

WE-A1.1P.6: QUAD BAND MONOPOLE ANTENNA FOR IOT APPLICATIONS..... 1015

Hesham A. Mohamed, Kamel S. Sultan, Electronics Research Institute, Egypt

WE-A1.1P.7: A DUAL-BAND METAMATERIAL SUPERSTRATE FOR ANTENNA GAIN ENHANCEMENT..... 1017

Zain Haider, Muhammad Umar Khan, Hammad M. Cheema, National University of Sciences and Technology (NUST), Pakistan

WE-A1.1P.8: ENHANCED GAIN MULTIPORT SHARED APERTURE ANTENNA FOR S/X-BAND APPLICATIONS N/A

Vijay Kumar, VIT University, India; Venkata Kishore Kothapudi, Koneru Lakshmaiah Education Foundation, India

WE-A1.1P.9: COPLANAR WAVEGUIDE (CPW)-FED COMPACT DUAL BAND ANTENNA FOR WIRELESS APPLICATIONS 1021

Vivek R, Manoj M, Mohanan P, Vasudevan K, Cochin University of Science and Technology, India

WE-A1.1P.10: TWO ELEMENT LOOP-LOADED PRINTED DIPOLE ARRAY FOR DUAL-BAND OPERATION WITH PATTERN DIVERSITY 1023

Debdeep Sarkar, Kumar Vaibhav Srivastava, Indian Institute of Technology Kanpur, India

WE-A5.1P: MULTI-LAYER FABRICATION AND DESIGN TECHNIQUES FOR MILLIMETER-WAVE ANTENNAS

WE-A5.1P.1: CIRCULARLY-POLARIZED SUBSTRATE-INTEGRATED DISCRETE LENS USING SEQUENTIAL ROTATION SCHEMES AND LINEARLY POLARIZED UNIT-CELLS 1025

Kossaila Medrar, Loic Marnat, Laurent Dussopt, Commissariat à l'énergie atomique et aux énergies alternatives - Laboratoire d'électronique et de technologie de l'information, France

WE-A5.1P.2: EMPTY SUBSTRATE INTEGRATED WAVEGUIDE ANTENNA ARRAY 1027

Christopher G. Hynes, Rodney Vaughan, Simon Fraser University, Canada

WE-A5.1P.3: PLANAR SIW HORN ANTENNA WITH IMPROVED MATCHING AT 94 GHZ..... 1029

Nosherwan Shoaib, Ahmed Shafqat, Sana Ilyas, National University of Sciences and Technology (NUST), Pakistan; Sultan Shoaib, HITEC University, Pakistan

WE-A5.1P.4: MINIATURIZED MULTIBEAM ARRAY ANTENNA BASED ON E-PLANE BUTLER MATRIX..... 1031

Ji-Wei Lian, Yong-Ling Ban, You-Quan Wu, Le-Hao Zhong, University of Electronic Science and Technology of China, China

WE-A5.1P.5: A 94 GHZ ARRAY ANTENNA FOR 45° LINEAR POLARIZATION IN LTCC TECHNOLOGY	1033
<i>Zi-Jian Shao, Yao-Ping Zhang, Jun-Fa Mao, Shanghai Jiao Tong University, China</i>	
WE-A5.1P.6: A 120 GHZ STEP-PROFILED HORN ANTENNA IN LTCC	1035
<i>Jiawei Qian, Min Tang, Yueping Zhang, Jun-Fa Mao, Shanghai Jiao Tong University, China</i>	
WE-A5.1P.7: A 300-GHZ STEP-PROFILED CORRUGATED HORN ANTENNA ARRAY	1037
<i>Zi-Yang Zheng, Zi-Jian Shao, Jun-Fa Mao, Shanghai Jiao Tong University, China</i>	
WE-A5.1P.8: W-BAND HIGH-PERFORMANCE CAVITY-BACKED SLOT ANTENNA ARRAY WITH	1039
INVERTED MICROSTRIP GAP WAVEGUIDE	
<i>Jianyin Cao, Hao Wang, Shanxiang Mou, Nanjing University of Science and Technology, China; Shuang Liu, University of Electronic Science and Technology of China, China</i>	
 WE-A1.2P: OMNIDIRECTIONAL UWB ANTENNAS - I	
WE-A1.2P.1: ULTRA-WIDEBAND MONOPOLE WITH STACKED FSS REFLECTORS FOR	1041
ENHANCED GAIN	
<i>Gregory Mitchell, U.S. Army Research Laboratory, United States</i>	
WE-A1.2P.2: A NEW GOSPER ISLAND FRACTAL UWB MONOPOLE ANTENNA WITH ENHANCED	1043
BANDWIDTH CHARACTERISTICS	
<i>Ousama Abu Safia, George V. Eleftheriades, University of Toronto, Canada</i>	
WE-A1.2P.3: CPW-FED HEXAGONAL MODIFIED SIERPINSKI CARPET FRACTAL ANTENNA FOR	1045
UWB APPLICATIONS	
<i>Youcef Braham Chaouche, Mourad Nedil, Laboratoire de Recherche Télébec en Communications Souterraines, Algeria; Idris Messaoudene, École Nationale Supérieure d'Informatique ESI (Ex. INI), Algeria; Farid Bouttout, Laboratoire de Génie Electrique, M'sila, Université de Bordj Bou Arréridj, Algeria</i>	
WE-A1.2P.4: A NOVEL WIDEBAND ANTENNA WITH ADDED BOTTOM RECTANGULAR SLABS FOR	1047
GAIN IMPROVEMENT	
<i>Sherif R. Zahran, Arab Academy for Science and Technology, Egypt; Mahmoud A. Abdalla, Military Technical College, Egypt; John L. Volakis, Florida International University, United States</i>	
WE-A1.2P.5: NOVEL COMPACT HYBRID MONOPOLE ASA ANTENNA	1049
<i>Abdullah Haskou, Anthony Pesin, Jean-Yves Le Naour, Ali Louzir, Technicolor Research and Innovation, France</i>	
WE-A1.2P.6: OPTIMIZATION OF STEPPED PATCH ANTENNA FOR ULTRA-WIDEBAND	1051
APPLICATIONS	
<i>Ali Al-Azza, University of Basrah, Iraq; Nuhad Malalla, Iraq University, Iraq; Mohamed Morsy, Texas A&M University - Texarkana, United States; Hemachandra Gorla, Frances Harackiewicz, Southern Illinois University Carbondale, United States</i>	
WE-A1.2P.7: A MINIATURIZED PLANAR ULTRA-WIDEBAND ANTENNA.....	1053
<i>Lu Guo, Wenquan Che, Wanchen Yang, Nanjing University of Science and Technology, China</i>	
WE-A1.2P.8: BROADBAND MODIFIED ELLIPTICAL RING QUASI-ISOTROPIC ANTENNA.....	1055
<i>Mahima Arrawatia, IIT Guwahati, India; Maryam Shojaei Baghini, Girish Kumar, IIT Bombay, India</i>	
 WE-A2.2P: MEASUREMENT OF ELECTROMAGNETIC MATERIAL PROPERTIES	
WE-A2.2P.1: ULTRA-WIDE BAND (10 MHZ- 26 GHZ) PERMEABILITY MEASUREMENTS OF	1057
MAGNETIC FILMS	
<i>Yunpeng Chen, Yuan Gao, Winchester Technologies, United States; Xinjun Wang, Huaihao Chen, Nian Sun, Northeastern University, United States</i>	

WE-A2.2P.2: MEASUREMENT OF PCB SURFACE FINISHES FOR SUBSTRATE CHARACTERIZATION UP TO 67 GHZ	1059
<i>Patrick Seiler, Dirk Plettemeier, Technische Universität Dresden, Germany</i>	
WE-A2.2P.3: MICROSTRIP TIME DOMAIN TRANSMISSION (TDT) APPLICATION FOR MOISTURE SOIL MEASUREMENTS	1061
<i>Manuel Ricardo Pérez Cerquera, Diego Mendez Chaves, Pontificia Universidad Javeriana, Colombia</i>	
WE-A2.2P.4: SINGLE-FREQUENCY MATERIAL CHARACTERIZATION USING A MICROWAVE ADAPTIVE REFLECT-ARRAY	1063
<i>Weite Zhang, Jose Angel Martinez-Lorenzo, Northeastern University, United States</i>	
WE-A2.2P.5: NON-CONTACT RF CHARACTERIZATION OF REINFORCED CARBON FIBER COMPOSITE MATERIALS	1065
<i>Chiara Ciampalini, Pierpaolo Usai, Free Space srl, Italy; Guido Nenna, Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT), Italy; Filippo Costa, Agostino Monorchio, University of Pisa, Italy</i>	
WE-A2.2P.6: TERAHERTZ TIME-DOMAIN PULSED SPECTROSCOPY OF HUMAN BREAST CANCER TISSUES	1067
<i>Tyler Bowman, University of Arkansas, United States; Keith Bailey, Oklahoma State University, United States; Magda El-Shenawee, University of Arkansas, United States</i>	
WE-A2.2P.7: MEASUREMENT OF NONLINEAR DIELECTRIC BEHAVIOUR OF SEMICONDUCTOR MATERIAL UNDER MICROWAVE FIELD	1069
<i>Yong Gao, En Li, Gaofeng Guo, University of Electronic Science and Technology of China, China</i>	
WE-A2.2P.8: A MICROWAVE REFLECTION METHOD TO DETERMINE THE COMPLEX PERMITTIVITY OF TIME-VARYING PLASMA	1071
<i>Lutong Li, Haoquan Hu, Pu Tang, Bo Chen, Ziyuan He, University of Electronic Science and Technology of China, China</i>	
WE-A2.2P.9: A CORRECTION FOR FREE-SPACE METHOD BY CONSIDERING DISPERSION OF GAUSSIAN BEAM	1073
<i>Yunpeng Zhang, En Li, Chong Gao, Yong Gao, University of Electronic Science and Technology of China, China</i>	
WE-A2.2P.10: ATTENUATION MEASUREMENT OF THE DIELECTRIC ROD USING PARALLEL STRIPS WITH A REASONABLE FIELD ENVIRONMENT	1075
<i>Chong Gao, En Li, University of Electronic Science and Technology of China, China</i>	
 WE-A1.3P: ANTENNA THEORY III	
WE-A1.3P.1: STANDING WAVE CONSIDERATIONS IN THE LINK MODEL OF 60 GHZ DIRECTIONAL SURFACE WAVE ARRAYS	1077
<i>Prabhat Baniya, Kathleen Melde, University of Arizona, United States</i>	
WE-A1.3P.2: ANALYSIS OF AN ULTRA-WIDEBAND RIDGED HORN ANTENNA BASED ON TRAVELING WAVE CURRENT MODEL	1079
<i>Shu Lin, Shou-Lan Liu, Shang Yu, Yu-Wei Zhang, Jian-Lin Jiao, Cai-Tian Yang, Harbin Institute of Technology, China</i>	
WE-A1.3P.3: A METHOD FOR REDUCING THE INFLUENCE OF THE LIMITED GROUND AND COAXIAL FEEDER ON MONOPOLE RADIATION	1081
<i>Zhi-Yuan Sun, Shu Lin, Jia-Yi Wang, Shou-Lan Liu, Cai-Tian Yang, Alexander Denisov, Harbin Institute of Technology, China</i>	
WE-A1.3P.4: EXACT CHARACTERIZATION OF SPATIAL CORRELATION WITH ARBITRARY Q-POWER VALUES OF COSINE DISTRIBUTION	N/A
<i>Affum Emmanuel Ampoma, Guangjun Wen, Yongjun Huang, Oteng G. Kwame, Obour Agyekum K. O.-B, University of Electronic Science and Technology of China, China</i>	

WE-A1.3P.5: BOW TIE ANTENNA WITH METAMATERIAL LOADING FOR SELECTIVE DIRECTIVITY AND IMPROVED GAIN	1085
<i>Ajay Naik, Ryan Adams, University of North Carolina at Charlotte, United States</i>	
WE-A1.3P.6: SIMULATION DESIGN OF A BROADBAND DUAL-POLARIZED MINKOWSKI FRACTAL MICROSTRIP ANTENNA FOR S-BAND	1087
<i>Yu-Wei Zhang, Shu Lin, Shang Yu, Ling Liu, Wei-Yuan Zhang, Cai-Tian Yang, Alexander Denisov, Harbin Institute of Technology, China</i>	
WE-A1.3P.7: THE DESIGN AND ANALYSIS OF A COMPACT DIRECTIONAL ANTENNA COMPOSED OF THE DISCRETE MONOPOLES	1089
<i>Shang Yu, Shu Lin, Yu-Wei Zhang, Ang Chen, Wei-Yuan Zhang, Cai-Tian Yang, Harbin Institute of Technology, China</i>	
WE-A1.3P.8: A CAVITY-INTEGRATED SELF-POLARIZING METHOD FOR CIRCULARLY POLARIZED FABRY-PEROT ANTENNA DESIGN	1091
<i>Fan Wu, Kwai Man Luk, City University of Hong Kong, China</i>	
WE-A1.3P.9: DRIFT-FREE RANGE, VELOCITY, AND ACCELERATION SENSING VIA MAGNETOQUASISTATIC FIELD COUPLINGS	1093
<i>Darindra Arumugam, California Institute of Technology, United States</i>	
 WE-SP.1P: GAP WAVEGUIDE TECHNOLOGY FOR MILLIMETER WAVE ANTENNA DESIGN	
WE-SP.1P.1: TEM H-PLANE HORN ANTENNA BASED ON TEM PRINTED GAP WAVEGUIDE CONFIGURATION	1095
<i>Nima Bayat-Makou, Polytechnique Montréal - University of Montreal, Canada; Ahmed A. Kishk, Concordia University, Canada</i>	
WE-SP.1P.2: SINGLE-LAYER DUAL-BAND SUBARRAY FOR 20/30 GHZ USING GAP WAVEGUIDE TECHNOLOGY	1097
<i>Miguel Ferrando-Rocher, Alejandro Valero-Nogueira, Jose Ignacio Herranz-Herruzo, Daniel Sánchez-Escuderos, Universitat Politècnica de València, Spain</i>	
WE-SP.1P.3: DESIGN OF A LOW OUTPUT-PHASE ERROR RIDGE-GAP COUPLER FOR ANTENNA ARRAYS APPLICATIONS	1099
<i>Mohammadmahdi Farahani, Tayeb A. Denidni, Energy, Material, and Telecommunications, Canada; Mourad Nedil, Université du Québec en Abitibi-Témiscamingue, Canada</i>	
WE-SP.1P.5: SIMPLE AND BROADBAND TRANSITION BETWEEN RECTANGULAR WAVEGUIDE AND GROOVE GAP WAVEGUIDE FOR MM-WAVE APPLICATIONS	1101
<i>Abbas Vosoogh, Ashraf Uz Zaman, Jian Yang, Chalmers University of Technology, Sweden</i>	
WE-SP.1P.6: E-BAND HIGH GAIN GAP WAVEGUIDE SLOT ARRAY ANTENNA WITH ETSI CLASS-III RADIATION PATTERN SUITABLE FOR MASS PRODUCTION	1103
<i>Abolfazl Haddadi, Esperanza Alfonso, Carlo Bencivenni, Thomas Emanuelsson, Gapwaves AB, Sweden</i>	
WE-SP.1P.8: SPACE MAPPING DESIGN OF GAP WAVEGUIDE FILTERS	1105
<i>Dirk De Villiers, Clifford Sibanda, Stellenbosch University, South Africa</i>	
WE-SP.1P.9: MILLIMETER-WAVE COMPONENTS BASED ON GAP WAVEGUIDE USING ADDITIVE MANUFACTURING	1107
<i>Adrián Tamayo-Domínguez, José-Manuel Fernández-González, Manuel Sierra-Castañer, Universidad Politécnica de Madrid, Spain</i>	
WE-SP.1P.10: INVESTIGATION ON BALANCED DOUBLE-SIDED GAP WAVEGUIDE FOR W-BAND APPLICATIONS	1109
<i>Hao Wang, Yu Quan, Yan Wang, Jianyin Cao, Nanjing University of Science and Technology, China; Shuang Liu, University of Electronic Science and Technology of China, China</i>	

WE-SP.2P: CHARACTERISTIC MODES 2.0 -- FROM FUNDAMENTAL LIMITS TO 5G ANTENNA SYSTEMS

WE-SP.2P.1: DESIGN OF HIGH-GAIN ANTENNAS FOR 5G SYSTEMS USING CHARACTERISTIC MODES 1111

Daniel Santillán-Haro, Eva Antonino-Daviu, Daniel Sánchez-Escuderos, Miguel Ferrando-Bataller, Universitat Politècnica de València, Spain

WE-SP.2P.2: BEAMFORMING CONCEPT FOR MULTI-BEAM ANTENNAS BASED ON CHARACTERISTIC MODES1113

Nikolai Peitzmeier, Dirk Manteuffel, Leibniz University of Hannover, Germany

WE-SP.2P.3: DETERMINING CHARACTERISTIC MODE METRICS OF INTEREST FOR ELECTRICALLY LARGE ANTENNA ARRAYS1115

John Outwater, Jennifer Bernhard, University of Illinois at Urbana-Champaign, United States

WE-SP.2P.4: DESIGN OF A TRIPLE-MODE WIDEBAND ANTENNA USING THEORY OF CHARACTERISTIC MODES1117

Dingliang Wen, Yang Hao, Queen Mary University of London, United Kingdom; Hanyang Wang, Hai Zhou, Huawei Technologies, United Kingdom

WE-SP.2P.5: SMART ANTENNAS MOUNTED ON COMPLEX PLATFORMS BY USING PHASE-SHIFTED CHARACTERISTIC MODES1119

Francesco Alessio Dicandia, GreenWaves, Italy; Agostino Monorchio, Simone Genovesi, University of Pisa, Italy

WE-SP.2P.7: METHODOLOGY FOR QUANTIFYING METAMATERIAL STORED ENERGY USING THEORY OF CHARACTERISTIC MODE1121

Ozuem Chukwuka, Divitha Seetharamdoo, M. Hassanein Rabah, Hedi Sakli, IFSTTAR, University of Lille Nord de France, France

WE-SP.2P.8: INTERPRETATION OF ANTENNA SCATTERING PHENOMENA WITH THE AID OF CHARACTERISTIC MODE THEORY1123

Ezdeen A. Elghannai, Starkey Hearing Technologies, United States; Roberto G. Rojas, MIT Lincoln Laboratory / Ohio State University, United States

WE-SP.2P.9: CHARACTERISTIC MODE ANALYSIS OF THIN DIELECTRIC OBJECTS USING THE IMPEDANCE BOUNDARY CONDITION1125

Qi Wu, Beihang University, China

WE-SP.2P.10: SCATTERING CONTROL USING ADVANCED CHARACTERISTIC MODE THEORIES1127

Liwen Guo, Jiacheng Zhao, Chenghui Wang, Yikai Chen, Shiwen Yang, University of Electronic Science and Technology of China, China

WE-A5.2P: ANTENNA AND SYSTEM DESIGN FOR BRAIN IMAGING AND NEUROLOGICAL MONITORING

WE-A5.2P.1: IMPROVED PROBES FOR FULLY-PASSIVE WIRELESS RECORDING OF NEURAL ACTIVATION1129

Carolina Moncion, Satheesh Bojja-Venkatakrishnan, Jorge Riera Diaz, John L. Volakis, Florida International University, United States

WE-A5.2P.2: A QUANTITATIVE STUDY OF A NEW RF-COIL FOR 7 TESLA SMALL-ANIMAL IMAGING1131

Anna Hurshkainen, Anton Nikulin, Irina Melchakova, Pavel Belov, ITMO University, Russia; Stefan Enoch, Redha Abdeddaim, Aix-Marseille University, France; Stanislav Glybovski, ITMO University, Russia

WE-A5.2P.3: A PASSIVE MULTI-CHANNEL BRAIN IMPLANT FOR WIRELESS NEUROPOTENTIAL MONITORING	1133
<i>Wei-Chuan Chen, Kiourti Asimina, Ohio State University, United States; John L. Volakis, Florida International University, United States</i>	
WE-A5.2P.4: INFLUENCE OF RADIATION PATTERN IN THE PERFORMANCE OF BIO-RADAR	1135
<i>Carolina Gouveia, Daniel Malafaia, José Vieira, Instituto de Telecomunicações, Portugal; Pedro Pinho, Instituto Superior de Engenharia de Lisboa, Portugal</i>	
WE-A5.2P.5: SUBJECT-SPECIFIC, HELMET-RESTRAINT, RF COILS FOR AWAKE, NON-HUMAN PRIMATE MR IMAGING	1137
<i>Bahareh Behzadnezhad, Luis Populin, Nader Behdad, Alan McMillan, University of Wisconsin-Madison, United States</i>	
WE-A5.2P.6: ONGOING DEVELOPMENTS TOWARDS THE REALIZATION OF A MICROWAVE DEVICE FOR BRAIN STROKE MONITORING	1139
<i>Jorge A. Tobon Vasquez, Giovanna Turvani, Gianluca Dassano, Mario R. Casu, Francesca Vipiana, Politecnico di Torino, Italy; Rosa Scapatucci, Lorenzo Crocco, CNR-IREA, Italy; Nadine Joachimowicz, Bernard Duchêne, CNRS, CentraleSupélec, Univ. Paris-Sud, France</i>	
WE-A5.2P.7: COMPACT AND LOW-COST MICROWAVE HELMET BRAIN SCANNER FOR MONITORING PARKINSON'S DISEASE	1141
<i>Eugene Ngai, Hann-Jann, United States</i>	
WE-A5.2P.8: WIDEBAND ANTENNAS FOR MICROWAVE BRAIN STROKE IMAGING	1143
<i>Tuba Yilmaz, Mehmet Cayoren, Metin Acar, Ibrahim Akduman, İstanbul Technical University, Turkey</i>	
WE-A5.2P.9: FLEXIBLE ANTENNA ON HIGH PERMEABILITY SUBSTRATE FOR ELECTROMAGNETIC HEAD IMAGING SYSTEMS	1145
<i>Abdulrahman Alqadami, Konstanty Bialkowski, Amin Abbosh, University of Queensland, Australia</i>	
 WE-A4.1P: MICROWAVE REMOTE SENSING	
WE-A4.1P.1: AN EXPERIMENTAL PILOT STUDY OF CRANBERRY CROP YIELD ESTIMATION USING NEAR-FIELD MICROWAVE SENSING	1147
<i>Alex Haufler, John H. Booske, Susan C Hagness, University of Wisconsin-Madison, United States; Benjamin Tilberg, Ocean Spray, United States</i>	
WE-A4.1P.2: WIDEBAND AUTOCORRELATION RADIOMETER RECEIVER FOR RAPID THICKNESS MEASUREMENT OF DRY SNOWPACK AND LAKE ICEPACK	1149
<i>Seyedmohammad Mousavi, Roger De Roo, Kamal Sarabandi, University of Michigan, Ann Arbor, United States; Anthony W. England, University of Michigan, Dearborn, United States</i>	
WE-A4.1P.3: EFFECT OF THE SURFACE ROUGHNESS OF THE WATER AND ICE BOUNDARY ON LAKE ICEPACK THICKNESS MEASUREMENT USING WIDEBAND AUTOCORRELATION RADIOMETRY	1151
<i>Seyedmohammad Mousavi, Roger De Roo, Kamal Sarabandi, University of Michigan, Ann Arbor, United States; Anthony W. England, University of Michigan, Dearborn, United States</i>	
WE-A4.1P.4: KA-BAND RADIOMETER SYSTEM DESIGN INCORPORATED WITH SIW SLOT ANTENNA FOR SOIL MOISTURE SENSING	1153
<i>Shahriar Hasan Shehab, Jiewei Feng, Nemai Karmakar, Monash University, Australia</i>	
WE-A4.1P.5: ATMOSPHERIC INTEGRATED WATER VAPOR ESTIMATION THROUGH MICROWAVE PROPAGATION MEASUREMENTS ALONG GROUND-TO-AIR RADIO LINKS	N/A
<i>Alberto Toccafondi, Federico Puggelli, Matteo Albani, University of Siena, Italy; Luca Facheris, Fabrizio Cuccoli, University of Florence, Italy; Giovanni Macelloni, Francesco Montomoli, National Research Council, Italy; Alessio Cucini, Francesco Mariottini, Wavecomm srl, Italy; Luigi Volpi, Ride The Wave srl, Italy; Devis Dei, Florence Engineering srl, Italy; Marco Gai, Laboratori Victoria srl, Italy</i>	

WE-A3.1P: FINITE DIFFERENCE TIME DOMAIN METHODS

WE-A3.1P.1: FAST FDTD METHOD FOR LARGE-SCALE LAYOUT EXTRACTION AND ANALYSIS OF INTEGRATED CIRCUITS1157

Li Xue, Dan Jiao, Purdue University, United States

WE-A3.1P.2: QUALITY FACTOR COMPUTATION IN TIME DOMAIN FOR CYLINDRICAL OPTICAL CAVITIES1159

Lilli Kuen, Rolf Schuhmann, Technische Universitaet Berlin, Germany

WE-A3.1P.3: ANALYSIS OF THE PML PERFORMANCE ON SPHERICAL FDTD GRIDS1161

Wentao Bao, Dong-Yeop Na, Fernando Teixeira, ElectroScience Laboratory/The Ohio State University, United States

WE-A3.1P.4: EXPLICIT AND UNCONDITIONALLY STABLE FDTD WITH ANALYTICAL METHOD FOR IDENTIFYING UNSTABLE MODES1163

Kaiyuan Zeng, Dan Jiao, Purdue University, United States

WE-A3.1P.5: NOVEL UNCONDITIONALLY STABLE ADI-FDTD METHOD WITH LOW NUMERICAL DISPERSION1165

Jinchao Ding, Zhiqin Zhao, Yaohui Yang, Xiaoxiang Ding, University of Electronic Science and Technology of China, China; Qing Huo Liu, Duke University, United States

WE-A3.1P.6: REFLECTION ANALYSIS OF SPHERICAL FDTD ABSORBING BOUNDARY CONDITIONS1167

Mohammed Hadi, Atef Elsherbeni, Colorado School of Mines, United States; Ravi Bollimuntha, Melinda Picket-May, University of Colorado Boulder, United States

WE-A3.1P.7: MULTIPHYSICS SIMULATION OF HIGH-SPEED GRAPHENE-BASED INTERCONNECTS IN TIME DOMAIN1169

Shuzhan Sun, Dan Jiao, Purdue University, United States

WE-A3.1P.8: ANALYSIS OF WAVES PROPAGATION ON MAGNETIZED GRAPHENES USING SURFACE BOUNDARY CONDITION FDTD1171

Kai Wang, Wei Shao, Tu-Lu Liang, Bing-Zhong Wang, University of Electronic Science and Technology of China, China

WE-A3.1P.9: A HYBRID SUB-GRIDDING FDTD METHOD ANALYZING WAVE PROPAGATION IN DISPERSIVE METALLIC GRATINGS1173

Tu-Lu Liang, Wei Shao, Kai Wang, Bing-Zhong Wang, University of Electronic Science and Technology of China, China

WE-A3.1P.10: FEATURE EXTRACTION AND CLASSIFICATION OF BURIED LANDMINE SIGNALS1175

Mohammad Khalaf, Fatma El-Hefnawi, National Authority for Remote Sensing and Space Science, Egypt; Atef Elsherbeni, Colorado School of Mines, United States; Hany Harb, Misr University for science & Technology, Egypt; Marwa Bannis, Egyptian Russian University, Egypt

WE-A1.4P: NOVEL REFLECTARRAY DESIGN APPROACHES

WE-A1.4P.1: VIRTUAL SOURCE MODEL FOR RAY-BASED ANALYSIS OF FOCUSED WAVE SCATTERING OF A PENETRABLE SLAB ON PEC GROUND PLANE1177

Mahdiar Sadeghi, Carey Rappaport, Northeastern University, United States

WE-A1.4P.2: OVERCOMING FEASIBILITY CONSTRAINTS IN REFLECTARRAY DESIGN BY EXPLOITING NON-RADIATING CURRENTS1179

Marco Salucci, Giacomo Oliveri, Angelo Gelmini, Andrea Massa, University of Trento, Italy

WE-A1.4P.3: ITERATIVE PHASE CORRECTION TECHNIQUE FOR DESIGN OF NON-CONVENTIONAL REFLECTARRAY ANTENNAS1181

Aman Samaiyar, Ahmed Abdelrahman, Dejan Filipovic, University of Colorado Boulder, United States

WE-A1.4P.4: DIRECT OPTIMIZATION OF QUASI-PERIODIC SURFACES IN MULTI-REFLECTOR SYSTEMS	1183
<i>Min Zhou, Erik Jørgensen, Oscar Borries, Niels Vesterdal, Michael Forum Palvig, TICRA, Denmark</i>	
WE-A1.4P.6: DESIGN OF FLAT DIELECTRIC REFLECTARRAYS USING STATE-OF-THE-ART ADDITIVE MANUFACTURING	1185
<i>Payam Nayeri, Geoff Brennecka, Colorado School of Mines, United States</i>	
WE-A1.4P.7: SIMPLE FREQUENCY CHARACTERISTIC EVALUATION OF SHAPED-BEAM DESIGN FOR REFLECTARRAY ANTENNA	1187
<i>Yoshimi Sunaga, Kento Takeshima, Shigeru Makino, Kanazawa Institute of Technology, Japan; Hiromasa Nakajima, Michio Takikawa, Mitsubishi Electric Corporation, Japan</i>	
WE-A1.4P.8: A W-BAND SINGLE-LAYER METAL-ONLY ARRAY ANTENNA WITH TWO FOCAL PLANES	1189
<i>Yu Dang, Jiaran Qi, Hongmei Li, Harbin Institute of Technology, China</i>	
WE-A1.4P.9: DESIGN OF A DOUBLE-LAYER DIELECTRIC-ONLY TRANSMITARRAY ANTENNA FOR THZ APPLICATION	1191
<i>Yang Liu, Hongjian Wang, Xingchao Dong, National Space Science Center, Chinese Academy of Sciences, China</i>	
 WE-A5.3P: WEARABLE AND IMPLANTABLE ANTENNAS AND RADIATING SYSTEMS	
WE-A5.3P.1: A DEEPLY IMPLANTABLE CONFORMAL ANTENNA FOR LEADLESS PACING APPLICATIONS	1193
<i>Sajid Asif, University of Sheffield, United Kingdom; Adnan Iftikhar, COMSATS Institute of Information Technology, Pakistan; Benjamin D. Braaten, Dan Ewert, North Dakota State University, United States; Keith Maile, Boston Scientific Inc, United States</i>	
WE-A5.3P.2: CIRCULAR-POLARIZED TEXTILE BASED ANTENNA FOR WEARABLE BODY AREA NETWORKS	1195
<i>Idellyse Martinez, Douglas H. Werner, Pennsylvania State University, United States</i>	
WE-A5.3P.3: FAST ESTIMATION OF WIRELESS CHARGING SYSTEM IN A LARGE TISSUE	1197
<i>Nathan Jeong, Qualcomm, United States; Elias Wilken-Resman, University of Illinois, United States; Bill Von Novak, Qualcomm, United States</i>	
WE-A5.3P.4: A BIOLOGICAL TESTBED FOR IMPLANTED ANTENNAS USING LAYERED PORCINE TISSUE	1199
<i>Zachary Deneris, Cynthia Furse, University of Utah, United States</i>	
WE-A5.3P.5: DESIGN AND HUMAN TRIALS OF MICROWAVE NONINVASIVE BLOOD GLUCOSE DETECTION SENSOR	1201
<i>Enze Zhang, Chen Xue, Jinghui Qiu, Harbin Institute of Technology, China</i>	
 TH-A5.1A: APPLICATIONS OF MILLIMETER-WAVE AND 5G ANTENNA SYSTEMS	
TH-A5.1A.1: MILLIMETER-WAVE WIDEBAND ARRAY FOR VEHICLE TO VEHICLE COMMUNICATION	1203
<i>Sandhiya Reddy Govindarajulu, Satheesh Bojja Venkatakrishnan, Elias A. Alwan, Florida International University, United States</i>	
TH-A5.1A.2: MMWAVE ANTENNA GAIN SWITCHING TO MITIGATE INDOOR BLOCKAGE	1205
<i>Oday Bshara, Yuqiao Liu, Drexel University, United States; Ibrahim Tekin, Sabanci University, Turkey; Baris Taskin, Kapil R. Dandekar, Drexel University, United States</i>	
TH-A5.1A.3: 60-GHZ ARRAY ANTENNA FOR MM-WAVE 5G WEARABLE APPLICATIONS	1207
<i>Youngtaek Hong, Jaehoon Choi, Hanyang University, Korea (South)</i>	

TH-A5.1A.4: HIGH PERFORMANCE DUAL POLARIZED NEAR-FIELD PROBE AT V-BAND FOR SPHERICAL NEAR-FIELD MEASUREMENTS	1209
<i>Andrea Giacomini, Vincenzo Schirosi, Lars Jacob Foged, Microwave Vision Italy (MVI), Italy; Ed Szpindor, Wenji Zhang, Per Iversen, Orbit/FR Inc., United States</i>	
TH-A5.1A.5: A WEARABLE ANTENNA FOR MMWAVE IOT APPLICATIONS	1211
<i>Masood Ur-Rehman, University of Bedfordshire, United Kingdom; Tahera Kalsoom, University of West of Scotland, United Kingdom; Nabeel Ahmed Malik, Ghazanfar Ali Safdar, University of Bedfordshire, United Kingdom; Hasan Tariq Chatha, Islamic University, Saudi Arabia; Naeem Ramzan, University of West of Scotland, United Kingdom; Qammer Hussain Abbasi, University of Glasgow, United Kingdom</i>	
TH-A5.1A.6: PLANAR QUASI-YAGI ANTENNA FOR FUTURE 5G AND WIGIG APPLICATIONS	1213
<i>Pei-Ling Chi, Yi-Chieh Chou, National Chiao Tung University, Taiwan</i>	
TH-A5.1A.7: A DUAL-BAND HEXAGON MONOPOLE ANTENNA FOR 28 AND 38 GHZ MILLIMETER-WAVE COMMUNICATIONS	1215
<i>Hidayat Ullah, Farooq A. Tahir, Zunnurain Ahmad, Research Institute of Microwave and Millimeter Wave Studies, National University of Sciences and Technology (NUST), Pakistan</i>	
TH-A5.1A.8: APPLICATION OF CONVOLUTIONAL NEURAL NETWORK IN TARGET DETECTION OF MILLIMETER WAVE IMAGING	1217
<i>Hua Zong, Lifei Bao, Beijia Liu, Jinghui Qiu, Harbin Institute of Technology, China</i>	
TH-A5.1A.9: AN ELECTRICALLY SMALL SEMI-CIRCULAR MONOPOLE ANTENNA FOR BROADBAND 5G COMMUNICATIONS	1219
<i>Hidayat Ullah, Farooq A. Tahir, Research Institute of Microwave and Millimeter Wave Studies, National University of Sciences and Technology (NUST), Pakistan</i>	
TH-A5.1A.10: VIVALDI-INSPIRED LOGARITHMIC SPIRAL ANTENNA FOR 28 GHZ 5G COMMUNICATION BAND	1221
<i>Hidayat Ullah, Farooq A. Tahir, Research Institute of Microwave and Millimeter Wave Studies, National University of Sciences and Technology (NUST), Pakistan</i>	
TH-SP.1A: NEXT GENERATION SPACE ANTENNAS	
TH-SP.1A.1: ANTENNAS FOR DEEP SPACE: DESIGN AND TECHNOLOGY CHALLENGES	1223
<i>Paolo Noschese, Thales Alenia Space Italia SpA, Italy</i>	
TH-SP.1A.2: ALL-METAL DUAL-FREQUENCY CIRCULARLY POLARIZED HIGH GAIN ANTENNA FOR POTENTIAL EUROPA LANDER	1225
<i>Nacer Chahat, Brant Cook, Polly Estabrook, NASA-JPL/Caltech, United States</i>	
TH-SP.1A.3: EFFICIENT HIGH POWER MICROWAVE ABSORBER BOXES	1227
<i>Philip Venezia, Clency Lee Yow, Aidan Hamm, Custom Microwave INC, United States</i>	
TH-SP.1A.4: ANALYSIS OF AIRBORNE ANTENNAS USING HYBRID COMPUTATIONAL TECHNIQUES	1229
<i>C.J. Reddy, Altair Engineering Inc., United States</i>	
TH-SP.1A.5: TRI-BAND RECONFIGURABLE ORIGAMI HELICAL ARRAY	1231
<i>Xueli Liu, Shun Yao, Nicholas Russo, Stavros Georgakopoulos, Florida International University, United States</i>	
TH-SP.1A.8: A ULTRA-LIGHT HIGH GAIN CIRCULARLY-POLARIZED ANTENNA ARRAY FOR MOBILE SATELLITE TERMINALS	1233
<i>Jianquan Huang, Xiangnan University, China; Wei Lin, Jay Guo, University of Technology Sydney, Australia</i>	

- TH-SP.1A.9: SIDE LAUNCHED DUAL CIRCULARLY POLARIZED MONOPULSE TRACKING FEED 1235
ELEMENT FOR LEO SATELLITES**
Sandip Sankar Roy, Sandesh Bhimrao Mane, T Nagasekhar Nagasejhar, M Naresh Kumar, National Remote Sensing Centre, India; Chinmoy Saha, Indian Institute of Space Science and Technology, India; Yahia M. M. Antar, Royal Military College of Canada, Canada
- TH-SP.2A.2: RF MEMS SWITCH FOR RECONFIGURABLE RF-FRONT END WITH IMPROVED 1237
HOT-SWITCHING CAPABILITIES**
Yuhao Liu, University of California, Davis, United States; Jiansong Liu, Skyworks Solutions, Inc., United States; Bo Yu, M. Naimul Hasan, Xiaoguang Liu, University of California, Davis, United States
- TH-SP.2A.5: POWER-DEPENDENT BANDSTOP FILTERS FOR WIDE-BANDWIDTH, HIGH-SPEED 1239
INTERFERENCE SUPPRESSION**
Eric Naglich, Sanghoon Shin, Naval Research Laboratory, United States
- TH-SP.2A.6: SIMULTANEOUS TRANSMIT AND RECEIVE SYSTEM WITH 1 GHZ RF 1241
CANCELLATION BANDWIDTH**
Satheesh Bojja Venkatakrishnan, Elias A. Alwan, John L. Volakis, Florida International University, United States
- TH-SP.2A.7: UWB TO C AND WLAN BAND RECONFIGURABLE YAGI-YUDA ANTENA 1243**
Mohamed Lamine Seddiki, Mourad Nedil, Université du Québec en Abitibi-Témiscamingue, Canada; Farid Ghanem, Brandt Group, Cevital Industry, Canada
- TH-SP.2A.8: EXTREME APERTURE ANTENNAS: RADIATING AND ELECTRICAL PERFORMANCE 1245
ENHANCED BY METAMATERIALS**
Davide Ramaccia, Filiberto Bilotti, Alessandro Toscano, Roma Tre University, Italy; Mirko Barbuto, Niccolò Cusano University, Italy; Silvio Hrabar, University of Zagreb, Croatia (Hrvatska); Dimitrios Sounas, Andrea Alù, University of Texas at Austin, United States
- TH-SP.2A.9: CONSIDERING A COMPACT SIW FILTER FOR THE LIGHTER CUBE-SATELLITE 1247
REFLECTARRAY ANTENNA**
Changhyeong Lee, Heejun Park, Muhammad Salman Khattak, Abdul Rehman, Sungterk Kahng, Incheon National University, Korea (South); Joongpyo Kim, Korea Aerospace Research Institute, Korea (South)
- TH-SP.2A.10: PLANAR KA-BAND SATCOM TX-ANTENNA COMPOSED OF VACUUM CASTED PLASTIC 1249
SUB-ARRAY MODULES**
Pia Bergholdt, Roman Gieron, Simona Bruni, IMST GmbH, Germany; Juergen Letschnik, Technical University of Munich, Germany; Simon Otto, IMST GmbH, Germany
- TH-A2.1A: ANALYSIS OF METAMATERIALS AND METASURFACES**
- TH-A2.1A.1: FIRST-PRINCIPLE VERSUS NRW RETRIEVAL OF METAMATERIAL-INSERT 1251
CONSTITUTIVE PARAMETERS USING MEASURED SCATTERING MATRIX**
Amir I. Zaghloul, Quang Nguyen, Theodore K. Anthony, Steven J. Weiss, Eric D. Adler, U.S. Army Research Laboratory, United States
- TH-A2.1A.2: EFFECTIVE CONSTITUTIVE PARAMETERS EVALUATION FOR META-MATERIALS WITH 1253
HIGHLY INTERACTION FIELDS**
Chen Firestein, Reuven Shavit, Ben-Gurion University of the Negev, Israel
- TH-A2.1A.3: STUDY OF THE ANGULAR SPECTRUM OF A BIANISOTROPIC REFRACTIVE 1255
METASURFACE AT A DIELECTRIC INTERFACE**
Guillaume Lavigne, Polytechnique Montréal, Canada; Karim Achouri, École Polytechnique Fédérale de Lausanne, Switzerland; Christophe Caloz, Polytechnique Montréal, Canada
- TH-A2.1A.5: EXPLICIT EXTRACTION OF EFFECTIVE POLARIZABILITIES OF BIANISOTROPIC N/A
DIPOLE SCATTERERS**
Yasser Bigdeli, Mojtaba Dehmollaian, University of Tehran, Iran

- TH-A2.1A.6: WIENER-HOPF ANALYSIS OF THE SCATTERING BY A TWO DIMENSIONAL PERIODIC SEMI-INFINITE ARRAY OF DIPOLES 1259**
Miguel Camacho, Alastair P. Hibbins, University of Exeter, United Kingdom; Filippo Capolino, University of California, Irvine, United States; Matteo Albani, University of Siena, Italy
- TH-A2.1A.7: PARAMETRIC ANALYSIS OF VERTICALLY ORIENTED METAMATERIALS FOR WIDEBAND OMNIDIRECTIONAL PERFECT ABSORPTION 1261**
Aaron Pung, Michael Goldflam, D. Bruce Burckel, Igal Brener, Michael Sinclair, Salvatore Campione, Sandia National Laboratories, United States
- TH-A2.1A.8: CHARACTERIZATION OF GRAPHENE-BASED WAVEGUIDE CAPACITANCE FOR SWITCHING APPLICATIONS N/A**
Ramin Emadi, Reza Safian, Abolghasem Zeidaabadi Nezhad, Isfahan University of Technology, Iran; Navid Barani, University of Michigan, United States
- TH-A2.1A.9: WAVE-MATTER INTERACTION ANALYSIS OF METAMATERIAL UNIT IMMERGED IN LIQUID MEDIA 1265**
Yongjun Huang, Jian Li, Zhihao Wu, Wenran Lv, Liang Ma, Fuzhen Xie, Guangjun Wen, University of Electronic Science and Technology of China, China
- TH-A2.1A.10: SIW BASED SPLIT RING RESONATOR EVALUATION USING CHARACTERISTIC MODE ANALYSIS N/A**
Maryam Shahbakhsh, Javad Ahmadi-Shokouh, University of Sistan and Baluchestan, Iran
- TH-A1.1A: WIDEBAND SLOT ANTENNAS**
- TH-A1.1A.1: COUPLED HALF-MODE CAVITY-BACKED SLOT ANTENNA FOR IR-UWB IN AIR-FILLED SIW TECHNOLOGY 1269**
Quinten Van den Brande, Sam Lemey, Hendrik Rogier, Jan Vanfleteren, Ghent University, Belgium
- TH-A1.1A.2: MINIATURIZED STEPPED OPEN SLOT ANTENNA FOR UWB APPLICATIONS 1271**
Junho Yeo, Daegu University, Korea (South); Jong-Ig Lee, Dongseo University, Korea (South); Young-Ki Cho, Kyungpook National University, Korea (South)
- TH-A1.1A.3: WIDEBAND COMPACT SLOT ANTENNA BASED ON TRIPLE-RESONANCE SUBSTRATE INTEGRATED WAVEGUIDE CAVITY 1273**
Chun-Mei Liu, Shaoqiu Xiao, University of Electronic Science and Technology of China, China; Ke Wu, Polytechnique Montréal, Canada
- TH-A1.1A.4: TAPERED LOW PROFILE UWB DIRECTIVE ANTENNA FOR RADAR AND SENSING APPLICATIONS 1275**
Jeffrey Chiu, Kamal Sarabandi, Univeristy of Michigan - Ann Arbor, United States
- TH-A1.1A.5: BROADBAND CPW-FED SLOT ANTENNA USING SUPERFORMULA 1277**
Vignesh Shanmugam Bhaskar, Eng Leong Tan, King Ho Holden Li, Man Siu Tse, Nanyang Technological University, Singapore
- TH-A1.1A.6: A FLEXIBLE HIGH GAIN WIDE-BAND ANTENNA FOR WIRELESS AND WEARABLE APPLICATIONS 1279**
Omar F. Abdalgail, Mohamed El Atrash, October University for Modern Sciences and Arts (MSA), Egypt; Mahmoud A. Abdalla, Military Technical College, Egypt
- TH-A1.1A.7: COMPACT AND WIDEBAND CP SLOT ANTENNA WITH RECTANGULAR SLOTS AND INVERTED-F FEEDLINE N/A**
Kwame Oteng Gyasi, Guangjun Wen, Daniele Inserra, Jian Li, Emmanuel Ampoma Affum, Yongjun Huang, University of Electronic Science and Technology of China, China

TH-A1.1A.8: A WIDEBAND DOUBLE CIRCULARLY POLARIZED SLOT ANTENNA WITH UNIDIRECTIONAL PATTERNS	1283
<i>Jie Liu, Jian-Ying Li, Rui Xu, Du-Juan Wei, Kun Wei, Yang-Xiao Qi, Jiang-Jun Yang, Northwestern Polytechnical University, China</i>	
TH-A1.1A.9: A MINIATURIZED LOW PROFILE LINEAR-POLARIZED UWB ANTENNA WITH UNIDIRECTIONAL RADIATION	1285
<i>Juelin Liu, Junping Geng, Xianling Liang, Weiren Zhu, Chong He, Kun Wang, Yunxiao Xu, Ronghong Jin, Shanghai Jiao Tong University, China</i>	
TH-A1.1A.10: A SUBSTRATE INTEGRATED WAVEGUIDE TAPERED SLOT ANTENNA FOR MILLIMETER-WAVE APPLICATIONS	1287
<i>Jinping Zhang, Zhipeng Zhou, Fuguo Zhu, NRIET, China</i>	
 TH-A1.2A: PLANAR ANTENNAS FOR WIRELESS APPLICATIONS	
TH-A1.2A.1: DESIGN OF SMALL GPS ANTI-JAM ANTENNA	1289
<i>Yue Zheng, Yikun Huang, Yuanxun Ethan Wang, University of California, Los Angeles, United States</i>	
TH-A1.2A.2: COMPACT DUAL POLARIZATION 4X4 MIMO MULTI-BEAM BASE STATION ANTENNAS	1291
<i>Lin-Ping Shen, Hua Wang, Willi Lotz, Hamid Jamali, CCAI, Canada</i>	
TH-A1.2A.3: DESIGN AND PERFORMANCE ANALYSIS OF A PURELY TEXTILE PROXIMITY FED MICROSTRIP PATCH ANTENNA FOR ON-BODY WIRELESS COMMUNICATIONS	1293
<i>Ruben Del-Rio-Ruiz, Juan-Manuel Lopez-Garde, Jon Legarda Macon, University of Deusto, Spain</i>	
TH-A1.2A.4: 5.2 GHZ TEXTILE ANTENNA FOR BIOLOGICAL MONITORING SYSTEM	1295
<i>Daisuke Yamanaka, Masaharu Takahashi, Chiba University, Japan</i>	
TH-A1.2A.5: A NOVEL MEANDER LINE RFID READER ANTENNA FOR UHF NEAR-FIELD APPLICATIONS	1297
<i>Shu'nan Zhang, Jun Ouyang, Yi Yan, Lu Zhuang, Jinhao Guo, University of Electronic Science and Technology of China, China</i>	
TH-A1.2A.6: A V-BAND PATCH ARRAY FOR DRONE RADAR	1299
<i>Qiang Xu, AxEnd Inc., United States; Yikun Huang, Yuanxun Ethan Wang, University of California, Los Angeles, United States; Yuexing Li, AxEnd Inc., United States</i>	
TH-A1.2A.7: LOSS-CHARACTERIZATION AND GUIDELINES FOR EMBROIDERY OF CONDUCTIVE TEXTILES	1301
<i>Dieff Vital, Jingni Zhong, Shubhendu Bhardwaj, John L. Volakis, Florida International University, United States</i>	
TH-A1.2A.8: COMPACT PLANAR ANTENNA SYSTEM FOR FULL-DUPLEX WIRELESS APPLICATIONS	1303
<i>Tanner Douglas, Kamal Sarabandi, University of Michigan, United States</i>	
TH-A1.2A.9: A COPRIME ARRAY OF PATCH ANTENNAS FOR DOA ESTIMATION IN MOBILE HANDHELD DEVICES	1305
<i>Ahmad Oweis, Saleh Alawsh, Ali Muqaibel, Mohammad Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia</i>	
TH-A1.2A.10: A WIDEBAND DIRECTIONAL MM-WAVE ANTENNA FOR MICRO-DEFORMATION MONITORING RADAR APPLICATIONS	1307
<i>Yingsong Li, Chinese Academy of Science & Harbin Engineering University, China; Yue Dong, Harbin Engineering University, China; Xiangkun Zhang, Chinese Academy of Science, China; Jingshan Jiang, Zelong Shao, University of Chinese Academy of Sciences, China</i>	

TH-A3.1A: RECENT ADVANCES IN THE FINITE ELEMENT METHOD

TH-A3.1A.1: NUMERICAL CHERENKOV RADIATION EFFECTS FROM GRID DISPERSION IN 1309 FINITE ELEMENT PARTICLE-IN-CELL SIMULATIONS OF RELATIVISTIC ELECTRON BEAMS

Dong-Yeop Na, Fernando Teixeira, ElectroScience Laboratory/The Ohio State University, United States; Yuri Omelchenko, Trinum Research Inc., United States

TH-A3.1A.2: DIRECT METHODS FOR UNSYMMETRIC BLOCKWISE SPARSE MATRICES:1311 APPLICATION TO DOMAIN DECOMPOSITION GLOBAL PRECONDITIONING

Dimitrios G. Makris, Marinos N. Vouvakis, University of Massachusetts Amherst, United States

TH-A3.1A.3: LARGE-SCALE SCATTERING ANALYSIS OF ARBITRARY OBJECTS IN A STRATIFIED 1313 MEDIUM

Kedi Zhang, Lynford Goddard, Jian-Ming Jin, University of Illinois at Urbana-Champaign, United States

TH-A3.1A.4: GEOMETRIC MULTIGRID PRECONDITIONING IN VOXEL-BASED FINITE ELEMENT 1315 ANALYSIS OF SCATTERING

Nizamuddin Hussain, Jon Webb, McGill University, Canada

TH-A3.1A.5: BROADBAND AND SPARSE FINITE-ELEMENT FORMULATION FREE OF 1317 LOW-FREQUENCY BREAKDOWN

Li Xue, Dan Jiao, Purdue University, United States

TH-A3.1A.6: A POSTERIORI ELEMENT-WISE ERROR QUANTIFICATION FOR FEM SOLVERS 1319 USING HIGHER ORDER BASIS FUNCTIONS

Cam Key, Aaron Smull, Donald Estep, Colorado State University, United States; Troy Butler, University of Colorado Denver, United States; Branislav Notaros, Colorado State University, United States

TH-A3.1A.7: AN EFFICIENT TRANSIENT EM SOLVER WITH DYNAMIC P-ADAPTATION AND 1321 MULTIRATE TIME INTEGRATION

Su Yan, Jian-Ming Jin, University of Illinois at Urbana-Champaign, United States

TH-A3.1A.8: THE MULTIOBJECTIVE DELAUNAY TESSELLATION OPTIMIZATION ALGORITHM AND 1323 ITS APPLICATIONS IN ELECTROMAGNETICS

Ronald Jenkins, Douglas H. Werner, Pennsylvania State University, United States

TH-A3.1A.9: DISPERSION ANALYSIS OF ELECTRON BERNSTEIN WAVES IN MAGNETIZED WARM 1325 PLASMAS BY FINITE ELEMENT PARTICLE-IN-CELL MODELING

Dong-Yeop Na, Fernando Teixeira, ElectroScience Laboratory/The Ohio State University, United States; Yuri Omelchenko, Trinum Research Inc., United States

TH-A3.1A.10: ON THE TREATMENT OF STRONGLY SINGULAR INTEGRALS OVER FLAT 1327 TRIANGULAR DOMAINS

Zhi Guo Zhou, Ruo Xing Gao, Zhi Cheng Su, Mei Song Tong, Tongji University, China

TH-A4.1A: PROPAGATION

TH-A4.1A.1: SIMPLE TRANSMISSION LINE MODEL FROM RET RESULTS FOR PROPAGATION 1329 THROUGH VEGETATION

Roshanak Zabihi, Rodney Vaughan, Simon Fraser University, Canada

TH-A4.1A.2: EXTENDING WAVEGUIDE MODE THEORY BASED PROPAGATION MODELS TO 1331 ARCHED ROUGH WALL TUNNELS

Xingqi Zhang, Costas D. Sarris, University of Toronto, Canada

TH-A4.1A.3: COMPARATIVE STUDY OF THREE DETERMINISTIC RADIO PROPAGATION MODELS 1333 IN A COMPLEX MEDIA

Vincent Adelphe Fono, Larbi Talbi, Moulay Elhassan El Azhari, Université du Québec en Outaouais, Canada

TH-A4.1A.4: MODELING FOCUSED RAY SCATTERING BY A PENETRABLE DIELECTRIC SLAB OVER SKIN SURFACE WITH A FINITE AIR GAP FOR MILLIMETER-WAVE PERSON SCANNING	1335
<i>Elizabeth Wig, Carey Rappaport, Northeastern University, United States</i>	
TH-A4.1A.5: ELECTROMAGNETIC SCATTERING FROM MULTI-LAYER DIELECTRIC MEDIA WITH 3D RANDOM ROUGH INTERFACES USING TRANSLATION MATRIX APPROACH	1337
<i>Mohammadreza Sanamzadeh, Leung Tsang, The University of Michigan, United States; Joe Johnson, Ohio State University, United States</i>	
TH-A4.1A.6: ESTIMATION OF SCATTERING AND ATTENUATION OF A RANDOM DISTRIBUTION OF METALLIC WIRES USING RADIATIVE TRANSFER	1341
<i>David Geroski, Kamal Sarabandi, University of Michigan, United States</i>	
TH-A4.1A.7: COMPARISON OF MEASURED GROUND PENETRATING RADAR RESPONSE OF SOIL SURFACE TO FDTD MODEL	1343
<i>Brian Burns, U.S. Army RDECOM CERDEC Night Vision and Electronic Sensors Directorate, United States</i>	
TH-A4.1A.8: ANALYSIS OF SCATTERING ON ARCTIC SEA ICE IN C-BAND WITH LAYERED MEDIUM FORMULATION OF SURFACE VOLUME SURFACE ELECTRIC FIELD INTEGRAL EQUATION	1345
<i>Shucheng Zheng, Reza Gholami, Dustin Isleifson, David Barber, Vladimir Okhmatovski, University of Manitoba, Canada</i>	
TH-A4.1A.9: SPREADING AND WANDER OF PARTIALLY COHERENT BEAMS PROPAGATING IN THE TURBULENT ATMOSPHERE	1347
<i>Mingjian Cheng, Lixin Guo, Jiangting Li, School of Physics and Optoelectronic Engineering, China</i>	
TH-A4.1A.10: HOURLY VARIATION OF GASEOUS ATTENUATION IN TROPICAL STATION	1349
<i>Iyanu Oluwa Ogunrinola, Covenant university, Nigeria; Temidayo Victor Omotosho, Covenant University, Nigeria; Sayo Akinloye Akinwumi, Covenant university, Nigeria; Oluwafumilayo Oluwayemisi Ometan, Covenant University, Nigeria</i>	
TH-A4.1A.11: PROPAGATION CHARACTERISTICS OF HIGH POWER MICROWAVE IN RECTANGULAR WAVEGUIDE FILLED WITH TIME-VARYING PLASMA	1339
<i>Xiaoyu Han, Junhong Wang, Meie Chen, Zhan Zhang, Zheng Li, Yujian Li, Beijing Jiaotong University, China</i>	
 TH-A1.3A: OMNIDIRECTIONAL UWB ANTENNAS - II	
TH-A1.3A.1: A WIDE BANDWIDTH LOW-PROFILE TOP-LOADED PYRAMIDAL ANTENNA	1351
<i>Brad Jackson, California State University, Northridge, United States; Eric Merkley, Queen's University, Canada</i>	
TH-A1.3A.2: DESIGN OF A WIDEBAND RESISTIVELY LOADED VEE DIPOLE FED BY AN EVEN-MODE MATCHED MARCHAND BALUN	1353
<i>Samuel Wagner, Anh-Vu Pham, University of California, Davis, United States; Steven Bond, Jae Jeon, Lawrence Livermore National Laboratory, United States</i>	
TH-A1.3A.3: A ULTRA-WIDEBAND MONOCONE ANTENNA WITH CERAMIC LOADING	1355
<i>Ankang Liu, Yilong Lu, Nanyang Technological University, Singapore</i>	
TH-A1.3A.4: LOG-PERIODIC DIPOLE ANTENNAS USING WIRELESS LAN -CHARACTERISTICS-	1357
<i>Haruo Kawakami, Former Sophia University, Japan</i>	
TH-A1.3A.5: NEW AMC GROUND PLANE FOR 28 GHZ BROADBAND ANTENNA	1359
<i>Muamba Mukendi Leingthone, Hakem Nadir, Université de Québec en Abitibi-Témiscamingue and underground communications research laboratory (LRTCS), Canada</i>	
TH-A1.3A.6: A NOVEL CPW-FED PATCH ANTENNA FOR ULTRA WIDE BAND RADAR	1361
<i>Hao Jin, Lijia Zhu, Xu Liu, Guangli Yang, Shanghai University, China</i>	
TH-A1.3A.7: DESIGN OF AN UHF RFID TAG ANTENNA WITH A PAPER SUBSTRATE	1363
<i>Xiao Jia Huang, Shi Cong Wang, Feng Xie, Mei Song Tong, Tongji University, China</i>	

TH-A1.3A.8: DESIGN OF A COMPACT WIDEBAND DUAL-POLARIZED BASE-STATION ANTENNA WITH STABLE RADIATION PATTERNS 1365

Chenghui Wang, Yikai Chen, Shiwen Yang, University of Electronic Science and Technology of China, China

TH-A1.4A: MITIGATION AND CONTROL OF MUTUAL COUPLING IN ANTENNA ARRAYS

TH-A1.4A.1: MUTUAL COUPLING REDUCTION BETWEEN TWO CLOSELY SPACED PIFAS 1367

Ali Hammoodi, University of Arkansas at Little Rock, United States; Ayman Isaac, Molex LLC, United States; Haider Raad, Xavier University, United States; Mariofanna Milanova, University of Arkansas at Little Rock, United States

TH-A1.4A.2: ULTRA-WIDEBAND COMPACT CIRCULARLY POLARIZED ANTENNA USING COUPLED DIPOLES 1369

Dushyant Kumar Sharma, Gopi S. Reddy, Patanjali V. Parimi, SUNY, Oswego, United States

TH-A1.4A.3: MUTUAL COUPLING REDUCTION BETWEEN TWO CIRCULAR PATCHES USING H-SHAPE DGS 1371

Ali Hammoodi, University of Arkansas at Little Rock, United States; Haider Raad, Xavier University, United States; Mariofanna Milanova, University of Arkansas at Little Rock, United States

TH-A1.4A.4: TWO ELEMENTS SELF-COMPLEMENTARY MIMO ANTENNAS FOR WIDEBAND MUTUAL COUPLING REDUCTION 1373

Kareem Salem, Donya Nazif, October University for Modern Sciences and Arts (MSA), Egypt; Mahmoud A. Abdalla, Military Technical College, Egypt

TH-A1.4A.5: MUTUAL COUPLING REDUCTION OF A PRINTED DUAL ELEMENT ANTENNA SYSTEM USING A PARASITIC SCATTER 1375

Sonika Biswal, Sushrut Das, IIT(ISM) Dhanbad, India

TH-A1.4A.6: SYNTHESIS OF DIPOLE ANTENNA ARRAY FOR PERFORMANCE ENHANCEMENT USING FLOWER POLLINATION ALGORITHM N/A

Hemant Patidar, Gautam Kumar Mahanti, National Institute of Technology, Durgapur, India

TH-A1.4A.7: A PARASITIC DECOUPLING TECHNIQUE FOR TWO ANTENNAS 1379

Min Li, University of Hong Kong, China

TH-A1.4A.8: MUTUAL COUPLING REDUCTION IN A T/R ARRAY WITH T-RESONATE CAVITY EBG (TRC-EBG) 1381

Tianqi Jiao, Harbin Engineering University, China; Zhengyu Peng, Texas Tech University, United States; Shengyuan Luo, Harbin Engineering University, China; Yingsong Li, Harbin Engineering University & Chinese Academy of Science, China; Changzhi Li, Texas Tech University, United States

TH-A1.4A.9: QUAD-IFA MIMO ANTENNAS USING SELF-CURING DECOUPLING TECHNIQUE 1383

Jiangwei Sui, Ke-Li Wu, Chinese University of Hong Kong, China

TH-A1.4A.10: A DUAL-FREQUENCY ANTENNA ARRAY WITH MUTUAL COUPLING REDUCTION VIA METAMATERIAL STRUCTURES 1385

Shengyuan Luo, Harbin Engineering University, China; Yingsong Li, Harbin Engineering University & Chinese Academy of Science, China; Wanlu Shi, Harbin Engineering University, China

TH-A2.2A: TECHNIQUES AND MODELS FOR ELECTROMAGNETIC FIELD MEASUREMENTS

TH-A2.2A.1: A HIGH-RESOLUTION APPROACH TO EXTRACT THE THE EMISSIONS FROM A CIRCUIT BOARD USING THE MAGNITUDE-ONLY NEAR-FIELD MEASUREMENT 1387

Rezvan Rafiee Alavi, Ali Kiaee, Rashid Mirzavand, University of Alberta, Canada; Ruska Patton, EMSCAN COOPERATION, Canada; Pedram Mousavi, University of Alberta, Canada

- TH-A2.2A.2: RECONSTRUCTION OF FIELD INSIDE DIELECTRIC OBJECTS FOR NONINVASIVE SAR MEASUREMENT 1389**
Shuntaro Omi, Toru Uno, Takuji Arima, Tokyo University of Agriculture and Technology, Japan; Joe Wiart, Telecom ParisTech, France
- TH-A2.2A.3: LOW FREQUENCY SURFACE PLASMON WAVES ON METAL STRUCTURED SURFACE WITH A VARIABLE EFFECTIVE PERIOD SUBWAVELENGTH RECTANGULAR GROOVE GRATING USING PERIODICALLY PHOTOINDUCED SEMICONDUCTOR PLASMA 1391**
Kazuo Nishimura, Ryukoku University, Japan
- TH-A2.2A.4: ANALYSIS OF ELECTROMAGNETIC INTERFERENCE IN ELECTRIC VEHICLE CABLES..... 1393**
Priscilla Melo, Glauco Fontgalland, Federal University of Campina Grande, Brazil; Adaildo D'assuno, Federal Institute of Science and Technology of Paraiba (IFPB), Brazil; Raymundo de A. Junior, Federal University of Campina Grande, Brazil; Euler Macedo, Federal University of Paraiba (UFPB), Brazil
- TH-A2.2A.5: MULTIMODE POSITIONING USING COMMON AND DIFFERENCE MODE LOOP ANTENNAS 1395**
Foad Fereidoony, Srinivas Prasad Mysore Nagaraja, Jean Paul Santos, Yuanxun Ethan Wang, University of California, Los Angeles, United States
- TH-A2.2A.6: DEVELOPMENT OF TUNABLE BREAST TISSUE PHANTOMS FOR TERAHERTZ IMAGING 1397**
Christopher Oldfield, Tyler Bowman, Magda El-Shenawee, University of Arkansas, Fayetteville, United States
- TH-A2.2A.7: ON THE DESIGN OF GRAPHENE SURFACE PLASMON RESONANCE SENSORS FOR MEDICAL APPLICATIONS 1399**
Mariam Moussilli, Abdul Rahman El Falou, Beirut Arab University, Lebanon; Raed Shubair, Massachusetts Institute of Technology, United States
- TH-A2.2A.9: THIN METALLIC COATINGS ON CARBON FIBER FOR ENHANCED MM-WAVE ABSORPTION 1401**
Scott Rudolph, Thomas Petelik, Tammie Confer, Naval Research Laboratory, United States
- TH-A2.2A.10: ACCURATE METHOD FOR MEASURING THE CHARACTERISTIC PARAMETERS AND THE PHASE CENTER OF THE CIRCULARLY POLARIZED ANTENNAS 1403**
Junping Shang, Chaoyang Fan, Xidian University, China
- TH-A1.5A: REFLECTARRAY ANTENNAS FOR ADVANCED SYSTEM APPLICATIONS**
- TH-A1.5A.1: SIW-BASED REFLECTARRAY ANTENNAS WITH SHARP GAIN SELECTIVITY AND LARGE BANDWIDTH 1405**
Jiawei Zang, University of California, Davis, United States; Eduardo Carrasco, Universidad Politécnica de Madrid, Spain; Xuetian Wang, Beijing Institute of Technology, China; José A. Encinar, Universidad Politécnica de Madrid, Spain; Alejandro Alvarez-Melcon, Universidad Politécnica de Cartagena, Spain; J. Sebastian Gomez-Diaz, University of California, Davis, United States
- TH-A1.5A.2: DESIGN OF A BIFOCAL DUAL REFLECTARRAY SYSTEM WITH PARABOLIC MAIN SURFACE FOR A MULTIFED SPACE ANTENNA 1407**
Antonio Pino, Yolanda Rodriguez-Vaqueiro, Borja Gonzalez-Valdes, Oscar Rubiños, Universidade de Vigo, Spain; Eduardo Martinez-de-Rioja, José A. Encinar, Universidad Politécnica de Madrid, Spain; Giovanni Toso, European Space Agency, Netherlands
- TH-A1.5A.3: A MULTIBEAM PARABOLIC REFLECTARRAY FOR ONBOARD TX AND RX SATELLITE ANTENNAS AT THE KA BAND 1409**
Antonio Pino, Yolanda Rodriguez-Vaqueiro, Borja Gonzalez-Valdes, Marcos Arias, Universidade de Vigo, Spain; Daniel Martinez-de-Rioja, José A. Encinar, Universidad Politécnica de Madrid, Spain; Giovanni Toso, European Space Agency, Netherlands

TH-A1.5A.4: CASSEGRAIN REFLECTARRAY ANTENNAS USING HIGHER ORDER ORBITAL ANGULAR MOMENTUM MODES COMBINED AND CANCELLED IN NEAR FIELD1411
<i>Woo Jin Byun, ETRI, Korea (South); Yong Heui Cho, Mokwon University, Korea (South)</i>	
TH-A1.5A.5: A REFLECTIVE METASURFACE FOR GENERATING ORBITAL ANGULAR MOMENTUM VORTEX WAVE ACROSS WIDE BANDWIDTH 1413
<i>Lina Ma, Qingyuan Zhang, Lingyun Zhou, Chang Chen, University of Science and Technology of China, China</i>	
TH-A1.5A.6: THZ NEAR FIELD FOCUSING USING CASSEGRANIAN CONFIGURATION FOR EM SIDE-CHANNEL DETECTION 1415
<i>Prateek Juyal, Sinan Adibelli, Alenka Zajic, Georgia Institute of Technology, United States</i>	
TH-A1.5A.7: TIGHTLY-PACKED CROSSED-DIPOLE ARRAY FOR L-BAND SATELLITE COMMUNICATIONS 1417
<i>Lawrence Lee, Ivan Frasure, Trevor Narker, Ronald Marhefka., Joseph Sugrue, Andrew Terzuoli, Raymond Wasky, IEEE, United States</i>	
TH-A1.5A.8: ARRAY ELEMENT NUMBER EFFECTS ON SYSTEM G/T FOR SINGLE PLANE SCANNING PHASED ARRAY FEEDS 1419
<i>Malan Ruppert, Ryno Beyers, Dirk de Villiers, Stellenbosch University, South Africa</i>	
TH-A1.5A.9: IMPROVING A MONOSTATIC RADAR SYSTEM FOR 3D STANDOFF HUMAN BODY IMAGING 1421
<i>Lorena Perez-Eijo, Borja Gonzalez-Valdes, Yolanda Rodriguez-Vaqueiro, Marcos Arias, Oscar Rubiños Lopez, Antonio Pino, Universidade de Vigo, Spain</i>	
TH-A1.5A.10: AN ULTRA-WIDEBAND MODIFIED APERTURE-COUPLED MILLIMETER-WAVE REFLECTARRAY ANTENNA 1423
<i>Hussam Al-Saedi, Wael Abdel-Wahab, Mohsen Raeis-Zadeh, Suren Gigoyan, Safieddin Safavi-Naeini, University of Waterloo, Canada</i>	
 TH-A5.1P: 3D PRINTED ANTENNAS AND STRUCTURES	
TH-A5.1P.1: 3D PRINTED HYBRID RIGID-FLEX COAXIAL-LIKE TRANSMISSION LINE STRUCTURES 1425
<i>Vincens Gjakaj, Premjeet Chahal, Michigan State University, United States</i>	
TH-A5.1P.2: DESIGN OF A NOVEL ISOTROPIC 3D DIPOLE 1427
<i>Arseni Yalouskikh, Yikun Huang, Yuanxun Ethan Wang, University of California, Los Angeles, United States</i>	
TH-A5.1P.3: 3D PRINTED LOW COST FOLDED REFLECTARRAY 1429
<i>Agnese Mazzinghi, Lorenzo Blaschi, Angelo Freni, University of Florence, Italy</i>	
TH-A5.1P.4: 3D PRINTED ANTENNA-ON-PACKAGE WITH NEAR-ISOTROPIC RADIATION PATTERN FOR IOT (WIFI BASED) APPLICATIONS 1431
<i>Zhen Su, Kirill Klionovski, Rana Bilal, Atif Shamim, King Abdullah University of Science and Technology (KAUST), Saudi Arabia</i>	
TH-A5.1P.5: A 3D PRINTED TUNABLE PHASE SHIFTER 1433
<i>Grant Heilman, Youssef Tawk, Derek Doyle, Christos G. Christodoulou, University of New Mexico, United States</i>	
TH-A5.1P.6: A 3D PRINTED CAVITY BACKED 2X4 SLOTTED WAVEGUIDE ANTENNA ARRAY 1435
<i>Mohd Ifwat Mohd Ghazali, Premjeet Chahal, Michigan State University, United States</i>	
TH-A5.1P.7: THE EFFECT OF LOCATIONS ON THE 3-D PRINTING BED SURFACE FOR DESIGNING PC-ABS BASED RF CIRCUITS 1437
<i>Sayan Roy, Brian Young, University of North Dakota, United States; Yi-Hsiang Chang, Illinois State University, United States; Benjamin D. Braaten, North Dakota State University, United States; Sima Noghianian, University of North Dakota, United States</i>	

TH-A5.1P.8: A KU-BAND WIDEBAND 3-D PRINTED INTERDIGITAL BANDPASS FILTER FREE OF POST FABRICATION TUNING	1439
<i>Jin Li, Guanlong Huang, Tao Yuan, Shenzhen University, China; Jun Xu, University of Electronic Science and Technology of China, China; Hongjun Li, The 13th Research Institute of China Electronics Technology Group Corporation, China</i>	
TH-A5.1P.9: MONOLITHIC 3-D PRINTED SPHERICAL-RESONATOR-BASED OLYMPIC-TOPOLOGY BANDPASS FILTERS	1441
<i>Jin Li, Guanlong Huang, Tao Yuan, Shenzhen University, China</i>	
 TH-SP.1P: ADVANCES IN STEERING THE BEAM OF HIGH GAIN ANTENNAS	
TH-SP.1P.1: BEAM SCANNING METASURFACE ANTENNAS	1443
<i>Santi Conchetto Pavone, University of Siena, Italy; Enrica Martini, Francesco Caminita, Wave Up S.r.l., Italy; Matteo Albani, Stefano Maci, University of Siena, Italy</i>	
TH-SP.1P.2: WIDE-ANGLE MECHANICAL SCANNING TRANSMIT-ARRAYS FOR SATELLITE KA-BAND USER TERMINALS	1445
<i>Sérgio A. Matos, Instituto de Telecomunicações, IST, Instituto Universitário de Lisboa, (ISCTE-IUL), Portugal; Jorge R. Costa, Instituto de Telecomunicações, Portugal; Eduardo Lima, Parinaz Naseri, Carlos A. Fernandes, Instituto de Telecomunicações, IST Universidade de Lisboa, Portugal; Nelson Fonseca, ESA Antenna and Sub-Millimeter Wave Section, Portugal</i>	
TH-SP.1P.3: HIGH-GAIN BEAM STEERING BY NEAR-FIELD PHASE TRANSFORMATION - AN OVERVIEW	1447
<i>Muhammad Usman Afzal, Karu P. Esselle, Macquarie University, Australia</i>	
TH-SP.1P.4: LOW SCAN LOSS BIFOCAL KA-BAND TRANSPARENT TRANSMITARRAY ANTENNA	1449
<i>Guang Liu, CAS Key Laboratory of Microwave Remote Sensing, National Space Science Center, Chinese Academy of Sciences, China; Kien Pham, IETR, UMR CNRS 6164, Université de Rennes 1, France; Eduardo Motta Cruz, IETR, UMR CNRS 6164, Université de Nantes, Polytech Nantes, France; David González Ovejero, Ronan Sauleau, IETR, UMR CNRS 6164, Université de Rennes 1, France</i>	
TH-SP.1P.5: INNOVATIVE CTS ANTENNA ARCHITECTURE FOR BEAM RECONFIGURATION IN E-PLANE	1451
<i>Thomas Potelon, Mauro Ettore, Institut d'Électronique et de Télécommunications de Rennes (IETR), France; Terry Bateman, Jim Francey, Optiprint AG, Switzerland; Ronan Sauleau, Institut d'Électronique et de Télécommunications de Rennes (IETR), France</i>	
TH-SP.1P.6: THE LOSSLESS, RESONANT, MINIMUM SCATTERING APPROXIMATION FOR FAST PHASED ARRAY DESIGN	1453
<i>Karl Warnick, Brigham Young University, United States</i>	
TH-SP.1P.7: A SILICON-BASED BEAM-STEERING TAPERED ANTENNA ARRAY FOR W-BAND APPLICATIONS	1455
<i>Aidin Taeb, Hussam Al-Saedi, Suren Gigoyan, Mohamed Basha, Gholamreza Z. Rafi, Sujeet Chaudhuri, Safieddin Safavi-Naeini, University of Waterloo, Canada</i>	
TH-SP.1P.8: UNDERSTANDING THE ELEMENT-GAIN PARADOX FOR RECEIVING ARRAYS USING POYNTING STREAMLINES	1457
<i>Junming Diao, University of California, Los Angeles, United States; Lu Liu, University of Electronic Science and Technology of China, China; Karl Warnick, Brigham Young University, United States</i>	
TH-SP.1P.10: A MAGNETO-ELECTRIC DIPOLE HIGH-EFFICIENCY 60GHZ RIDGE GAP WAVEGUIDE SLOT ARRAY ANTENNA	1459
<i>Xingchao Dong, University of Chinese Academy of Sciences, China; Hongjian Wang, National Space Science Center, University of Chinese Academy of Sciences, China; Xingwei Zhang, Yang Liu, University of Chinese Academy of Sciences, China</i>	

TH-SP.2P: MILLIMETER AND SUBMILLIMETER WAVE METASURFACES FOR RADAR AND COMMUNICATION SYSTEMS

TH-SP.2P.1: COMPUTATIONAL MILLIMETER-WAVE SPOTLIGHT IMAGING USING HOLOGRAPHIC METASURFACE ANTENNAS 1461

Okan Yurduseven, Duke University, United States; Thomas Fromenteze, University of Limoges, France; David Smith, Duke University, United States

TH-SP.2P.2: ASTERISK METASURFACE AT 193 THZ 1463

Mitchell Semple, Aaron C. Hryciw, Ashwin Iyer, University of Alberta, Canada

TH-SP.2P.3: PLANAR DUAL-BAND LINEAR TO CIRCULAR POLARIZATION CONVERTER USING RADIAL-SHAPE MULTI-LAYER FSS 1465

Youngno Youn, Wonbin Hong, Pohang University of Science and Technology, Korea (South)

TH-SP.2P.4: RECONFIGURABLE REFLECTIVE METASURFACE FOR LINEAR TO CIRCULAR POLARIZATION CONVERSION 1467

Badreddine Ratni, Shah Nawaz Burokur, LEME, UPL, Univ Paris Nanterre, France; Gérard-Pascal Piau, AIRBUS, France; André de Lustrac, C2N, CNRS, Univ. Paris-Sud, Université Paris-Saclay, France

TH-SP.2P.5: TUNABLE PIEZO-ACTUATED METASURFACES FOR MILLIMETER-WAVE AND THZ ANTENNAS 1469

Alexandros Feresidis, Muhammad Rabbani, James Churm, University of Birmingham, United Kingdom

TH-SP.2P.9: A NOVEL FSS STRUCTURE WITH GREAT INSENSITIVITY TO INCIDENT ANGLES FOR HIGH PERFORMANCE MILLIMETER WAVE COMMUNICATION RADOME 1471

Tian-Wu Li, Da Li, Li-Ming Zhou, Qi-Xuan Sun, Er-Ping Li, Zhejiang University, China

TH-SP.2P.10: SOURCE EFFECT ON NEAR-FIELD MULTI-BEAM-SPLITTING IN FABRY-PEROT CAVITY ANTENNA SYSTEM 1473

Chanjoon Lee, Aditya Dave, Robert Sainati, Rhonda Franklin, University of Minnesota, United States

TH-A2.1P: DESIGN OF METAMATERIALS AND METASURFACES

TH-A2.1P.1: A UNIT CELL FOR BIANISOTROPIC HUYGENS' METASURFACE DESIGNS..... 1475

Michael Chen, Ayman Dorrah, George V. Eleftheriades, University of Toronto, Canada

TH-A2.1P.2: TIME-DOMAIN RESPONSES OF WAVEFORM-SELECTIVE METASURFACES 1477

Kosei Asano, Hiroki Wakatsuchi, Nagoya Institute of Technology, Japan

TH-A2.1P.3: PAIRED METASURFACES FOR AMPLITUDE AND PHASE CONTROL OF WAVEFRONTS 1479

Brian Raeker, Anthony Grbic, University of Michigan, United States

TH-A2.1P.4: FOCAL INTENSITY DISTRIBUTION MANIPULATION WITH HUYGENS METAMIRROR 1481

Xumin Ding, Zhuochao Wang, Kuang Zhang, Xuemai Gu, Wu Qun, Harbin Institute of Technology, China

TH-A2.1P.5: FIELD OPTIMIZATION FOR SCALAR METASURFACE DESIGNS FOR ANOMALOUS PLANE-WAVE REFLECTION 1483

Do-Hoon Kwon, University of Massachusetts Amherst, United States

TH-A2.1P.6: MULTIFUNCTIONAL ALL-DIELECTRIC METASURFACES 1485

Amin Ranjbar, Anthony Grbic, University of Michigan, United States

TH-A2.1P.7: DIPOLAR MODEL FOR METAMATERIAL IMAGING SYSTEMS..... 1487

Laura Pulido-Mancera, Mohammadreza F. Imani, David Smith, Duke University, United States

TH-A2.1P.8: EXCEPTIONAL POINTS OF DEGENERACY IN A LINEAR ARRAY OSCILLATOR WITH GAIN AND LOSS BALANCE	1489
<i>Ahmed F. Abdelshafy, Mohamed Othman, Dmitry Oshmarin, Mohamed Y. Nada, Filippo Capolino, University of California, Irvine, United States</i>	
TH-A2.1P.9: A GRAPHENE BASED BANDWIDTH ENHANCED METAMATERIAL ABSORBER USING CIRCULAR RING	1491
<i>Sambit Kumar Ghosh, Vinit Singh Yadav, Somak Bhattacharyya, Santanu Das, Indian Institute of Technology (BHU), Varanasi, India</i>	
TH-A5.2P: CHIPLESS RFID	
TH-A5.2P.1: APPLICATION-ADAPTABLE CHIPLESS RFID TAG	1493
<i>Katelyn Brinker, Reza Zoughi, Missouri University of Science and Technology, United States</i>	
TH-A5.2P.2: CHIPLESS RFID TAGS' IDENTIFICATION ALGORITHM BY USING AN EIGENMODE APPROACH COMBINED WITH SIGNAL-PROCESSING TECHNIQUE	1495
<i>Donia Oueslati, Universite Catholique de Louvain, Belgium; Raj Mittra, University of Central Florida, United States; Hatem Rmili, King Abdulaziz University, Saudi Arabia; Christophe Craeye, Universite Catholique de Louvain, Belgium</i>	
TH-A5.2P.3: NON-CONTACT MATERIAL MONITORING BY USING DEPOLARIZING CHIPLESS RFID TAGS	1497
<i>Filippo Costa, Antonio Gentile, Simone Genovesi, Luca Buoncristiani, University of Pisa, Italy; Antonio Lazaro, Ramon Villarino, David Girbau, Rovira i Virgili University, Spain</i>	
TH-A5.2P.4: LOW COST FOLDED CHIPLESS TAG FOR MILLIMETER-WAVE APPLICATIONS	1499
<i>Raymundo de A. Junior, Glauco Fontgalland, Raquel Aline Araújo Rodrigues, Federal University of Campina Grande, Brazil</i>	
TH-A5.2P.5: HIGH CAPACITY ENCODED H-SHAPED RESONATOR FOR UWB CHIPLESS RFID TAG	N/A
<i>Thanh Huong Nguyen, Viet Son Nguyen, Hanoi University of Science and Technology, Viet Nam; Huy Hoang Nguyen, Le Quy Don University, Viet Nam; Tan Phu Vuong, University of Grenoble, France</i>	
TH-A1.2P: RADIATION PATTERN ENHANCEMENT FOR PLANAR ANTENNAS AND ARRAYS	
TH-A1.2P.1: MINIATURIZED ANTENNA WITH HIGH GAIN AND LOW SIDE-LOBE FOR AUTOMOTIVE ANTI-COLLISION RADAR	1507
<i>Wei Wang, Meng Guo, Jing Wang, Zhuang Li, Harbin Engineering University, China</i>	
TH-A1.2P.2: 4D ANTENNA ARRAY OF UWB VIVALDI ELEMENTS WITH LOW SIDE LOBES AND HARMONIC SUPPRESSION	1505
<i>Alberto Reyna, Autonomous University of Tamaulipas, Mexico; Marco Antonio Panduro, CICESE Research Center, Mexico; Luz Idalia Balderas, Autonomous University of Tamaulipas, Mexico</i>	
TH-A1.2P.3: GAIN AND SIDE LOBE LEVEL ENHANCEMENT OF ARRAY ANTENNAS USING METASURFACE SUPERSTRATES	1503
<i>Ashwani Kumar, Delhi University, India; Raj Mittra, University of Central Florida, United States</i>	
TH-A1.2P.4: LOW CROSS POLARIZATION TRIANGLE MAGNETIC DIPOLE ANTENNA FOR WIDE-ANGLE BEAM SCANNING	1509
<i>Tae-Dong Yeo, Jong-Sang Yoo, Hye-Won Jo, Jong-Won Yu, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)</i>	
TH-A1.2P.5: SIDELobe LEVEL IMPROVEMENT IN A FREQUENCY SCANNING ANTENNA AT KA-BAND	1511
<i>Mohammadreza Ranjbar Naeini, University of Wisconsin-Madison, United States; Mohammad Fakharzadeh, Sharif University of Technology, Iran</i>	

TH-A1.2P.6: MILLIMETER WAVE MICROSTRIP FED SLOT ARRAY ANTENNA WITH PMC 1513
PACKAGING FOR FUTURE 5G SYSTEMS

Ashraf Uz Zaman, Chalmers University of Technology, Sweden; Eva Rajo Iglesias, University of Carlos III de Madrid, Spain

TH-A1.2P.7: AN ANGLED-DIPOLE ANTENNA WITH ANGLED DIRECTORS FOR WIDE-ANGLE 1515
SCANNING

Ju-Ik Oh, In-June Hwang, Ghoo Kim, Jong-Won Yu, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)

TH-A1.2P.8: CROSS POLARIZATION REDUCTION IN PATCH ANTENNA USING DGS N/A

Husna Khouser G, Yogesh Kumar Choukiker, VIT University, India

TH-A1.2P.9: BROADBAND AND HIGH GAIN LOW-PROFILE ANTENNA WITH METASURFACE 1519

Zhen-Zhong Yang, Feng Liang, University of Electronic Science and Technology of China, China

TH-A1.2P.10: MICROSTRIP-TO-PROBE FED MICROSTRIP ANTENNA TRANSITION 1521

Diego Moná, Eduardo Sakomura, Daniel Nascimento, Technological Institute of Aeronautics, Brazil

TH-A5.3P: CHARACTERISTIC MODE ANALYSIS AND APPLICATIONS

TH-A5.3P.1: CHARACTERISTIC MODE ANALYSIS OF SLOT LOADING IN MICROSTRIP PATCH 1523
ANTENNA

Sandip Ghosal, Arijit De, Ajay Chakrabarty, Indian Institute of Technology, India; Raed Shubair, Massachusetts Institute of Technology, United States

TH-A5.3P.2: MULTILEVEL FAST MULTIPOLE ALGORITHM ENHANCED CHARACTERISTIC MODE 1525
SOLVER FOR LARGE-SCALE OBJECTS

Guang Shang Cheng, Chao-Fu Wang, National University of Singapore, Singapore

TH-A5.3P.3: CHARACTERISTIC MODE SIMULATION OF GENERAL COMPOSITE MATERIAL BODIES 1527

Chao-Fu Wang, National University of Singapore, Singapore

TH-A5.3P.4: MIMO ANTENNA ELEMENTS EFFECT ON CHASSIS MODES 1529

Asim Ghaleb, Mohammad Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia

TH-A5.3P.5: CHASSIS DIVERSITY ANTENNA COMPARISON 1531

Maryam Razmhosseini, Abhijit Bhattacharya, Rodney Vaughan, Simon Fraser University, Canada

TH-A5.3P.6: WIDEBAND ANTENNA-ISOLATION IMPROVEMENT USING PHOTONICS FOR STAR 1533
APPLICATIONS

Kenneth E. Kolodziej, Siva Yegnanarayanan, Bradley T. Perry, MIT Lincoln Laboratory, United States

TH-A5.3P.7: ISOLATION ENHANCEMENT OF MIMO ANTENNAS USING BILATERAL CEBG 1535
STRUCTURES

Mohamed El-Sewedy, TRC Center, Egypt; Mahmoud A. Abdalla, Military Technical College, Egypt; Ahmed Abdelraheem, Purdue University, United States

TH-A5.3P.8: INVESTIGATING THE EFFECT OF MUTUAL COUPLING ON SPATIAL CORRELATION N/A
FOR A CELLULAR MIMO SYSTEM

Mehmet Akif Bakirli, Vestel Electronics Inc., Turkey; Ozgur Ozdemir, Istanbul Technical University, Turkey

TH-A5.3P.9: DESIGN OF WEARABLE DUAL-ANTENNA SYSTEM BASED ON THEORY OF 1539
CHARACTERISTIC MODE

Hui Li, Sining Sun, Baoyi Wang, Dalian University of Technology, China

TH-A4.2P: PROPAGATION II

TH-A4.2P.1: ON THE DESIGN OF CONFORMAL RADOMES FOR BEAM-SHAPING OF ANTENNAS 1541

Pengfei Zhang, Pan Li, Xidian University, China; Raj Mittra, University of Central Florida, United States

TH-A4.2P.2: ROUGH SURFACE ANALYSIS FOR SHORT-RANGE ULTRA-BROADBAND THZ COMMUNICATIONS	1543
<i>Fawad Sheikh, Thomas Kaiser, University of Duisburg-Essen, Germany</i>	
TH-A4.2P.3: A STOCHASTIC VOLUME SCATTERING APPROACH BASED ON SHOOTING-AND-BOUNCING-RAYS (SBR)	1545
<i>Frank Weinmann, Fraunhofer FHR, Germany</i>	
TH-A4.2P.4: CHANNEL MEASUREMENT IN SEAWATER BY USING 2.4 GHZ-LOW-POWER ELECTRONICS	N/A
<i>José Carlos Reyes Guerrero, University of Bergen, Norway; Ismail Ben Mabrouk, Mu'ath Al-Hasan, Al Ain University of Science and Technology, United Arab Emirates; Tomasz Ciamulski, WiSub, Norway</i>	
TH-A4.2P.5: DESIGN OF WIDEBAND CIRCUIT ANALOG ABSORBER WITH IMPROVED OBLIQUE INCIDENCE PERFORMANCE	1549
<i>Zhixin Yao, Shaoqiu Xiao, Bingzhong Wang, University of Electronic Science and Technology of China, China</i>	
TH-A4.2P.6: PSEUDO-CYCLIC ENHANCEMENT MECHANISMS IN A DISCRETE RANDOM HALFSpace	1551
<i>Reid McCargar, Roger Lang, George Washington University, United States</i>	
TH-A4.2P.7: STUDY OF DIFFRACTION AT 30 GHZ, 140 GHZ, AND 300 GHZ	1553
<i>Chia-Lin Cheng, Seunghwan Kim, Alenka Zajic, Georgia Institute of Technology, United States</i>	
TH-A4.2P.8: SAR IMAGING OF HYPERSONIC PLATFORM BASED ON PHASE SCREEN METHOD	1555
<i>Jiangting Li, Teng Gong, Lixin Guo, Xidian University, China</i>	
TH-A4.2P.9: EARTH-SPACE PATH CLOUD ATTENUATION DISTRIBUTION STUDY	1557
<i>Mustapha Adewusi, Lagos state University, Nigeria; Temidayo Victor Omotosho, Marvel Akinyemi, Sayo Akinloye Akinwumi, Oluwafunmilayo Ometan, Covenant University, Nigeria</i>	
TH-A4.2P.10: TOTAL ATTENUATION OF SATELLITE SIGNAL ON EARTH-SPACE LINK IN WEST AFRICA	1559
<i>Temidayo Victor Omotosho, Covenant University, Nigeria; Sayo Akinloye Akinwumi, Mojisola Racheal Usikalu, Covenant university, Nigeria; Oluwafunmilayo Oluwayemisi Ometan, Covenant University, Nigeria</i>	
 TH-A1.3P: INNOVATIVE MODELING AND ADVANCED ANALYSIS TECHNIQUES OF MUTUAL COUPLING EFFECTS	
TH-A1.3P.1: SIMULTANEOUSLY MATCHING A N-PORT NETWORK	1561
<i>Majid Manteghi, Virginia Polytechnic Institute and State University, United States</i>	
TH-A1.3P.2: EFFECTS OF ELECTROMAGNETIC MODELING METHODS ON COVERAGE PREDICTION OF ANTI-JAM GPS ANTENNA	1563
<i>Jeffrey Maloney, University of Massachusetts Amherst, United States; Steven Keller, U.S. Army Research Laboratory, United States; Do-Hoon Kwon, Ramakrishna Janaswamy, University of Massachusetts Amherst, United States</i>	
TH-A1.3P.3: ON THE MODELING OF ANTENNA ARRAYS FOR MASSIVE MIMO SYSTEMS	1565
<i>Abbas Al-Wahhamy, Hussain Al-Rizzo, University of Arkansas at Little Rock, United States; Nicholas Buris, Shanghai University, China</i>	
TH-A1.3P.4: TRIPLE-LAYER COMPLEMENTARY FSS FOR THE MUTUAL COUPLING REDUCTION OF RELAY ANTENNA ARRAYS	1567
<i>Jinxin Li, Zhu Xiao, Hunan University, China; Feng Yang, Qiangming Cai, University of Electronic Science and Technology of China, China; Daotong Li, Chongqing University, China</i>	

TH-A1.3P.5: RIGOROUS MODAL ANALYSIS OF ELECTROMAGNETIC COUPLING BETWEEN CIRCULAR HORNS	1569
<i>Jiaran Qi, Rui Wang, Jinghui Qiu, Harbin Institute of Technology, China; Lantu Guo, China Research Institute of Radiowave Propagation, China</i>	
TH-A1.3P.6: TX/RX ANTENNA SYSTEM FOR FULL-DUPLEX APPLICATION	1571
<i>Koffi Gbafa, Aliou Diallo, Robert Staraj, Philippe Lethuc, Université Côte d'Azur, France</i>	
TH-A1.3P.7: SPARSE DIRECTION-OF-ARRIVAL ESTIMATION WITH DIRECTIVE COPRIME ARRAYS	1573
<i>Saleh Alawsh, Ahmed Oweis, Ali Muqaibel, Mohammed Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia</i>	
TH-A1.3P.8: A SIMPLE DIRECTION FINDING COMPENSATION METHOD OF SURFACE-MOUNTED PATCH ANTENNAS	1575
<i>Dae Woong Woo, Jae Sik Kim, Ji-In Jung, Hae-Chang Jeong, Jin Sung Park, Hyeon Gyu Park, Deok Kyu Kong, Agency for Defense Development, Korea (South)</i>	
TH-A1.3P.9: A NEW DECOUPLING METHOD FOR MASSIVE MIMO ANTENNAS	1577
<i>Yue Qin, Yuehui Cui, Ronglin Li, South China University of Technology, China</i>	
TH-A1.3P.10: HOW LOW DOES MUTUAL COUPLING NEED TO BE FOR MIMO ANTENNAS	1579
<i>Xide Mei, Ke-Li Wu, Chinese University of Hong Kong, China</i>	
 TH-A3.1P: OPTIMIZATION METHODS IN ANTENNA DESIGNS	
TH-A3.1P.1: COMPARISON OF OPTIMIZATION APPROACHES FOR DESIGNING NONUNIFORM HELICAL ANTENNAS	1581
<i>Jelena Dinkić, Dragan Olćan, Antonije Djordjević, University of Belgrade, Serbia; Alenka Zajić, Georgia Institute of Technology, United States</i>	
TH-A3.1P.2: OPTIMIZATION OF THIN MULTILAYER MAGNETIC RADAR ABSORBERS	1583
<i>Francesco Scarano, Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT), Italy; Filippo Costa, Agostino Monorchio, University of Pisa, Italy; Raj Mitra, University of Central Florida, United States</i>	
TH-A3.1P.3: SURROGATE-ASSISTED MULTI-OBJECTIVE ANTENNA DESIGN WITH EQUAL-COMPARTMENT-SIZE SEGMENTATION	1585
<i>Slawomir Koziel, Reykjavik University, Iceland; Adrian Bekasiewicz, Gdansk University of Technology, Poland</i>	
TH-A3.1P.4: EFFECT OF INTRODUCTION OF HYPOTHESES IN ANTENNA OPTIMIZATION: THINNED ARRAY TEST CASE	1587
<i>Francesco Grimaccia, Marco Mussetta, Alessandro Niccolai, Politecnico di Milano, Italy; Paola Pirinoli, Politecnico di Torino, Italy; Riccardo Zich, Politecnico di Milano, Italy</i>	
TH-A3.1P.5: MULTI-OBJECTIVE DESIGN OF ANTENNAS USING VARIABLE-FIDELITY EM MODELS AND CONSTRAINED SURROGATES	1589
<i>Slawomir Koziel, Ari Sigurdsson, Reykjavik University, Iceland</i>	
TH-A3.1P.6: PSO-DRIVEN SYNTHESIS OF REALISTIC TIME MODULATED ARRAYS WITH OPTIMAL INSTANTANEOUS DIRECTIVITY THROUGH A SYSTEM-BY-DESIGN IMPLEMENTATION	1591
<i>Marco Salucci, Lorenzo Poli, University of Trento, Italy; Diego Masotti, Alessandra Costanzo, University of Bologna, Italy; Paolo Rocca, University of Trento, Italy</i>	
TH-A3.1P.7: OPTIMIZATION OF REACTIVELY LOADED REFLECTARRAYS VIA SEMIDEFINITE RELAXATION	1593
<i>Hans-Dieter Lang, HSR Hochschule für Technik Rapperswil, Switzerland; Sean V. Hum, Costas D. Sarris, University of Toronto, Canada</i>	

TH-A3.1P.8: APPLICATION OF THE CROSS-ENTROPY METHOD TO ELECTROMAGNETIC OPTIMISATION PROBLEMS	1595
<i>Maria Kovaleva, David Bulger, Rajas Khokle, Karu P. Esselle, Macquarie University, Australia</i>	
TH-A3.1P.9: A STATISTICAL METHOD FOR THE PROJECT AND ANALYSIS OF A YAGI ANTENNA USING THE HFSS AND THE UNSCENTED TRANSFORM	1597
<i>Alcyone César Silva, Leonardo Menezes, University of Brasilia, Brazil</i>	
 TH-A1.4P: MICROSTRIP ANTENNAS, CIRCUITS, ANALYSIS, DESIGN	
TH-A1.4P.1: STRUCTURAL ANALYSIS OF U-SLOT LOADED MICROSTRIP PATCH USING THEORY OF CHARACTERISTIC MODES	1599
<i>Mahrukh Khan, Deb Chatterjee, University of Missouri at Kansas City, United States</i>	
TH-A1.4P.2: STRIPLINE-FED PATCH ANTENNA WITH LONG-TERM RELIABLE CONDUCTIVE VIAS.	1601
<i>Koh Hashimoto, Makoto Higaki, Toshiba Corporation, Japan</i>	
TH-A1.4P.3: MULTI-PORT DUAL POLARIZED INTEGRATED PATCH ANTENNA FOR RF DETECTION AT 5.8 GHZ	1603
<i>Jonathan Lee, Ramesh Abhari, Santa Clara University, United States</i>	
TH-A1.4P.4: NEW APPROACH OF TE/TM MODE BASED RECTANGULAR MICROSTRIP PATCH DESIGN FOR PATTERN DIVERSITY	1605
<i>Chandreyee Sarkar, Debatosh Guha, University of Calcutta, India; Yahia M. M. Antar, Royal Military College of Canada, Canada</i>	
TH-A1.4P.5: A COMPACT SINGLE LAYER ORTHOGONAL POLARIZED YAGI-LIKE DIRECTIONAL ANTENNA	1607
<i>Syed Jehangir, Mohammad Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia</i>	
TH-A1.4P.6: TOWARDS EMBROIDERED TEXTILE ANTENNA SYSTEMATIC DESIGN AND ACCURATE MODELING: RECTANGULAR PATCH ANTENNA CASE STUDIES	1609
<i>Lingnan Song, Daisong Zhang, Yahya Rahmat-Samii, University of California, Los Angeles, United States</i>	
TH-A1.4P.7: COMPACT MEANDER MAGNETIC DIPOLE ANTENNA FOR WIDE-ANGLE SCANNING.	1611
<i>Jong-Sang Yoo, Seung-Tae Khang, Tae-Dong Yeo, Jong-Won Yu, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)</i>	
TH-A1.4P.8: LEAKY WAVE ANTENNA ARRAY USING COMPLEMENTARY DUAL-STUB RADIATING ELEMENTS FOR CONSISTENT GAIN	1613
<i>Ravi Shaw, Sanchita Basak, Joydeb Mandal, Mrinal Kanti Mandal, Indian Institute of Technology Kharagpur, India</i>	
TH-A1.4P.9: DUAL-CIRCULAR POLARIZED ANTENNA LATTICE WITH ODD NUMBER OF RADIATING ELEMENTS AND INTEGRATED FEEDING NETWORK	1615
<i>Izabela Slomian, Slawomir Gruszczynski, Artur Rydosz, Krzysztof Wincza, AGH University of Science and Technology, Poland</i>	
TH-A1.4P.10: DIELECTRIC RESONATOR ANTENNA WITH AMC FOR LONG RANGE AUTOMOTIVE RADAR APPLICATIONS AT 77 GHZ	1617
<i>Kamel Sultan, Haythem Abdullah, Electronics Research Institute, Egypt; Mohamed Basha, University of Waterloo, Canada; Esmat A. Abdallah, Electronics Research Institute, Egypt; Hadia El-Hennawy, Ain Shams University, Egypt</i>	
 TH-A5.4P: ANTENNA THEORY AND DESIGN FOR BIOMEDICAL APPLICATIONS	
TH-A5.4P.1: UWB ANTENNA FOR MEDICAL IMAGE	1619
<i>Vitor Cruz, João Nuno Matos, Instituto de Telecomunicações, Portugal; Pedro Pinho, M. P. M. Pato, Instituto Superior de Engenharia de Lisboa, Portugal</i>	

TH-A5.4P.2: HARMONICS-BASED RFID SENSOR BASED ON GRAPHENE FREQUENCY MULTIPLIER AND MACHINE LEARNING	1621
<i>Mehdi Hajizadegan, Pai-Yen Chen, Wayne State University, United States</i>	
TH-A5.4P.3: DUAL-BAND TAPERED SLOT ANTENNA FOR INTEGRATED BIOMEDICAL SYSTEM	1623
<i>Seonho Lim, Woo Cheol Choi, Young Joong Yoon, Yonsei University, Korea (South)</i>	
TH-A5.4P.4: THIN SUBSTRATE NARROW SLOT WITH LESS BACK RADIATION	1625
<i>Yiyang Wang, Guilin University of Electronic Technology, China; Yinghua Lu, Beijing University of Posts and Telecommunications, China; Weiping Cao, Guilin University of Electronic Technology, China; Ahmed A. Kishk, Concordia University, Canada</i>	
TH-A5.4P.5: COMPACT ANTENNA FOR LOW FREQUENCY APPLICATIONS	N/A
<i>Basil Paul, Mridula Shanta, Anju Pradeep, Mohanan Pezholil, Cochin University of Science and Technology, India</i>	
 TH-A1.5P: REFLECTARRAY ANTENNAS WITH NOVEL ELEMENTS	
TH-A1.5P.1: OFFSET-FED METAL-ONLY REFLECTARRAY ANTENNA DESIGN USING 3D-CROSS ELEMENTS	1629
<i>Shaileshachandra Pandey, Ravi Kumar Arya, Pennsylvania State University, United States; Raj Mittra, University of Central Florida, United States; Shiyu Zhang, Darren Cadman, William Whittow, Yiannis Vardaxoglou, Loughborough University, United Kingdom</i>	
TH-A1.5P.2: EFFICIENT AND ACCURATE MODELING OF REFLECTARRAY UNIT CELLS USING SVMS	1631
<i>Daniel R. Prado, Heriot-Watt University, United Kingdom; Jesús A. López-Fernández, Manuel Arrebola, Universidad de Oviedo, Spain; Fernando Las-Heras, University of Oviedo, Spain</i>	
TH-A1.5P.3: METAL ONLY SPIRAL SLOT REFLECTARRAY ELEMENT OPERATING AT 66 GHZ	1633
<i>Kendrick Henderson, Nima Ghalichechian, Ohio State University, United States</i>	
TH-A1.5P.4: A METAL-ONLY REFLECTARRAY ANTENNA ELEMENT WITH WIDE ANGULAR RESPONSE BASED ON SPIRAL SLOTS	1635
<i>Hussam Al-Saedi, Wael Abdel-Wahab, Suren Gigoyan, Safieddin Safavi-Naeini, University of Waterloo, Canada; Raj Mittra, University of Central Florida, United States</i>	
TH-A1.5P.5: LOW-LOSS REFLECTARRAY ANTENNA COMPOSED OF SINGLE-LAYER SLOTS BACKED BY SUBSTRATE INTEGRATED WAVEGUIDE CAVITIES	1637
<i>Daniel Lawrence, Technology Service Corporation, United States</i>	
TH-A1.5P.6: REFLECTARRAY ANTENNA DESIGN USING HEXAGONAL SHAPE UNIT CELLS FOR 5G APPLICATION	1639
<i>Abdennour Ben Terki, Mourad Nedil, Université du Québec en Abitibi-Témiscamingue, Canada; Khelifa Hettak, Jafar Shaker, Communications Research Centre Canada, Canada</i>	
TH-A1.5P.7: GA-PRODUCED REFLECTARRAY ELEMENTS HAVING ARBITRARY PHASE-DIFFERENCE BETWEEN TWO ORTHOGONAL LINEAR-POLARIZATIONS	1641
<i>Daichi Higashi, Hiroyuki Deguchi, Mikio Tsuji, Doshisha University, Japan</i>	
TH-A1.5P.8: SINGLE LAYER DUAL-BAND ‘PHOENIX’ REFLECTARRAY UNIT CELL WITH DUAL-LINEAR POLARIZATION	1643
<i>Tony Makdissy, TICKET Lab., Antonine University, Lebanon; Raphaël Gillard, IETR, INSA of Rennes UMR CNRS 6164, France</i>	
TH-A1.5P.9: ANALYSIS OF NESTED DOUBLE SPLIT RING RESONATOR FOR LINEARLY POLARIZED DUAL BAND REFLECTARRAY	1645
<i>Tugba Simsek, Gulay Ozsahin, Ankara Yildirim Beyazit University, Turkey; Orcun Kiris, Suleyman Kose, Volkan Akan, Kagan Topalli, TUBITAK Space Technologies Research Institute, Turkey; Mehmet Unlu, Ankara Yildirim Beyazit University, Turkey</i>	

TH-A1.5P.10: NEW TECHNIQUES FOR THE EVALUATION OF ANTENNA PERFORMANCES IN GROUND STATIONS FOR SATELLITE COMMUNICATIONS 1647
Gianluca Dassano, Mario Orefice, Politecnico di Torino, Italy; Fulvio Fresia, F2satconsulting, France; Fritz Schurig, Eutelsat, France

TH-A4.1P: SATELLITE COMMUNICATION TECHNOLOGY

TH-A4.1P.1: WHEN DEPLOYABLE SPACECRAFT ANTENNAS DON'T 1649
Vaughn Cable, Caltech Jet Propulsion Laboratory, United States

TH-A4.1P.2: IMPROVED MEASURED SOURCE ANTENNA REPRESENTATION IN SATELLITE ANTENNA PLACEMENT ANALYSIS WITH NUMERICAL SIMULATION 1651
Maria Alberica Saporetti, Lucia Scialacqua, Francesco Saccardi, Lars Jacob Foged, Microwave Vision Italy (MVI), Italy; Jan Zackrisson, RUAG Space AB, Sweden; Danilo Trenta, Luca Salghetti Drioli, European Space Agency, ESTEC, Netherlands

TH-A4.1P.3: A MILLIMETER-WAVE PERFORATED FRESNEL ZONE PLATE LENS USING ADDITIVE MANUFACTURING PROCESS N/A
Javad Pourahmadazar, INRS-EMT, Canada

TH-A1.1P: SMALL ANTENNA THEORY

TH-A1.1P.1: GENERALIZED QUASI-STATIC ELECTROMAGNETIC FIELDS..... 1655
Arthur Yaghjian, Electromagnetics Research, United States

TH-A1.1P.2: FURTHER OBSERVATIONS ON THE SHAPE SYNTHESIS OF CLOSELY-SPACED ANTENNAS USING SUB-STRUCTURE CHARACTERISTIC MODES 1657
Anas Alakhras, Derek McNamara, University of Ottawa, Canada

TH-A1.1P.3: DEMONSTRATION OF RADIATION EFFICIENCY IMPROVEMENT OF A MINIATURE NARROW BAND ANTENNA 1659
Francois Sarrazin, Université Paris Est Marne la Vallée, France; Sylvain Pflaum, CEA, France; Christophe Delaveaud, CEA-LETI, France

TH-A1.1P.4: STUDY OF THE RESONANT FREQUENCIES OF AN ELECTRICALLY SMALL BROADSIDE-COUPLED SPLIT-RING RESONATOR ANTENNA 1661
Makoto Sano, Keiju Yamada, Makoto Higaki, Toshiba Corporation, Japan

TH-A1.1P.5: CUTTING THE CORD: A BUTTON-SIZED RECTENNA FOR WIRELESS PATIENT MONITORING USING RADIATED NEAR-FIELD SIGNALS AT 2.4 GHZ 1663
Brock DeLong, Asimina Kiourti, Ohio State University, United States; John L. Volakis, Florida International University, United States

TH-A5.5P: VEHICULAR ANTENNAS AND ELECTROMAGNETICS

TH-A5.5P.1: VIRTUAL DRIVE TEST FOR VEHICLE ANTENNA EVALUATION..... 1665
Aseim Elfrgani, C.J. Reddy, Altair Engineering Inc., United States

TH-A5.5P.2: THE CONCEPT OF AN AIRBORNE VLF TRANSMITTER WITH VERTICAL ELECTRIC DIPOLE ANTENNA 1667
Tomasz Miś, Warsaw University of Technology, Poland

TH-A5.5P.3: RIME-DIPOLE ACCOMMODATION ABOARD JUICE..... 1669
Ronny Hahnel, Dirk Plettemeier, University of Technology Dresden, Germany; Lorenzo Bruzzone, University of Trento, Italy

TH-A5.5P.4: ROLL-TO-ROLL PRINTED TRANSPARENT APPLIQUE ANTENNAS..... 1671
Hyok J. Song, James H. Schaffner, Arthur Bekaryan, HRL Laboratories, LLC, United States; Kevin O'Connor, Tom Tombs, Eastman Kodak Company, United States; Timothy Talty, Duane Carper, Eray Yasan, General Motors, LLC., United States

TH-A5.5P.5: ANTENNA PLACEMENT OPTIMIZATION FOR VEHICLE-TO-VEHICLE COMMUNICATIONS 1673

Eamon Whalen, Aseim Elfrgani, C.J. Reddy, Rejeesh Rajan, Altair Engineering Inc., United States

FR-SP.1A: 3-D PRINTED ANTENNAS AND COMPONENTS FOR PRACTICAL RF APPLICATIONS

FR-SP.1A.1: CO-DESIGN OF ANTENNA AND ILLUMINATION SYSTEMS 1675

Chi-Yuk Chiu, Yujie Zhang, Shanpu Shen, Ross D. Murch, Hong Kong University of Science and Technology, China

FR-SP.1A.2: AN INKJET-PRINTED ORIGAMI-BASED FREQUENCY SELECTIVE SURFACE WITH WIDE FREQUENCY AND BANDWIDTH TUNABILITY 1677

Syed Abdullah Nauroze, Bijan Tehrani, Manos Tentzeris, Georgia Institute of Technology, United States

FR-SP.1A.3: DEVELOPMENT OF A TEXTILE ANTENNA USING A CONTINUOUS SUBSTRATE INTEGRATING THE GROUND PLANE 1679

Caroline Loss, Rita Salvado, Universidade da Beira Interior, Portugal; Ricardo Gonçalves, Pedro Pinho, Instituto de Telecomunicações - Aveiro, Portugal

FR-SP.1A.4: A COMPACT WIDEBAND MONOPULSE FEED CLUSTER IMPLEMENTED VIA 3-D METAL PRINTING 1681

Guan-Long Huang, Shenzhen University, China; Chow-Yen-Desmond Sim, Feng Chia University, Taiwan; Tao Yuan, Shenzhen University, China

FR-SP.1A.5: FULLY PRINTED VO2 SWITCH BASED RECONFIGURABLE PIFA ANTENNA 1683

Zhen Su, Mohammad Vaseem, Shuai Yang, Kirill Klionovski, Atif Shamim, King Abdullah University of Science and Technology (KAUST), Saudi Arabia

FR-SP.1A.6: 3D-PRINTED PHASE CONTROLLED FOCUSING METALENS AT 1550 NM WAVELENGTH 1685

Jude Coomson, Min Liang, Chad Auginash, Adley Gin, Mingwei Yang, Zhen Qu, Ivan Djordjevic, Hao Xin, University of Arizona, United States

FR-SP.1A.7: COMPACT WAVEGUIDE-TO-MICROSTRIP TRANSITION WITH EMBEDDED POWER DIVIDER FOR MMWAVE ANTENNA ARRAY APPLICATIONS 1687

Hesheng Lin, Yaowen Hsu, Yicheng Lin, National Taiwan University, Taiwan

FR-SP.1A.9: MONOLITHIC STEREOLITHOGRAPHY 3-D PRINTED MICROWAVE PASSIVE WAVEGUIDE DEVICES 1689

Jin Li, Guanlong Huang, Tao Yuan, Shenzhen University, China

FR-A5.1A: MILLIMETER-WAVE BEAMFORMING SYSTEMS AND PHASED ARRAYS FOR 5G

FR-A5.1A.1: LOW-COST WIDE-BAND V-BAND PATCH ANTENNA ON FR4 PCB 1691

Nour Nachabe, Cyril Luxey, Diane Titz, Université côte d'azur, France; Frederic Ganesello, STMicroelectronics, France; Jorge Rodrigues Costa, Sérgio A. Matos, Instituto Universitário de Lisboa, Portugal; Carlos A. Fernandes, Universidade de Lisboa, Portugal

FR-A5.1A.2: SIMPLE HIGH GAIN 60 GHZ ANTENNA 1693

Yazan Al-Alem, Ahmed A. Kishk, Concordia University, Canada

FR-A5.1A.3: DEVELOPMENT OF APERTURE-COUPLED PATCH ARRAY ANTENNAS AT 60 GHZ FOR 5G APPLICATIONS 1695

Xiaoliang Sun, José-Manuel Fernández-González, Manuel Sierra-Pérez, Universidad Politécnica de Madrid, Spain

FR-A5.1A.4: A LENSING CASE FOR THE 5G HANDSET ANTENNAS 1697

Heejun Park, Changhyeong Lee, Abdul Rehman, Muhammad Salman Khattak, Sungtek Kahng, Incheon National University, Korea (South); Muhammad Kamran Khattak, Zoliton, Germany

FR-A5.1A.5: A 60-GHZ YAGI-UDA CIRCULAR ARRAY ANTENNA WITH OMNI-DIRECITIONAL PATTERN	1699
FOR MILLIMETER-WAVE WBAN APPLICATIONS	
<i>Seongkyu Lee, Jaehoon Choi, Hanyang University, Korea (South)</i>	
FR-A5.1A.6: A HIGH-GAIN LARGE-SCANNING 60 GHZ VIA-FED PATCH PHASED ARRAY ANTENNA.....	1701
<i>Jiantong Li, Nima Ghalichechian, Ohio State University, United States</i>	
FR-A5.1A.7: EFFICIENT 60 GHZ ANTENNA BASED ON OPEN-END MICROSTRIP LINE FRINGING	1703
FIELDS	
<i>Yazan Al-Alem, Ahmed A. Kishk, Concordia University, Canada</i>	
FR-A5.1A.8: 60-GHZ POLARIZATION-DIVERSITY COMPACT PHASED ARRAY ANTENNA	1705
<i>Armaghan Eshaghi, Marc Supinski, Mihai Tazlauanu, Peraso Technologies Inc., Canada</i>	
 FR-A2.1A: METASURFACES FOR ANTENNAS	
FR-A2.1A.1: DESIGN OF A RECONFIGURABLE METASURFACE ANTENNA FOR DYNAMIC	1707
NEAR-FIELD FOCUSING	
<i>Okan Yurduseven, Duke University, United States; Thomas Fromenteze, University of Limoges, France; David Smith, Duke University, United States</i>	
FR-A2.1A.2: MULTIPLE BEAM FORMING USING SPHERICAL METASURFACES.....	1709
<i>Xiao Jia, Fan Yang, Tsinghua University, China; Yousef Vahabzadeh, Christophe Caloz, Polytechnique Montréal, Canada</i>	
FR-A2.1A.3: DEMONSTRATION OF 3D PRINTED HEXAGONAL HIGH GAIN SHORT BACKFIRE	1711
ANTENNA WITH HARD EM WALLS	
<i>Erik Lier, Thomas Hand, Edward Pierson, Lockheed Martin, United States; Daniel Binion, Douglas H. Werner, Pennsylvania State University, United States</i>	
FR-A2.1A.4: HIGH APERTURE EFFICIENCY 2D CENTER-FED TRANSMISSION-LINE-GRID	1713
ANTENNA	
<i>Ayman Dorrah, George V. Eleftheriades, University of Toronto, Canada</i>	
FR-A2.1A.5: WIDEBAND POLARIZATION RECONFIGURABLE ANTENNA WITH METASURFACE	1715
<i>Changfei Zhou, Min Li, SingWai Cheung, University of Hong Kong, China</i>	
 FR-A1.1A: REFLECTOR ANTENNAS	
FR-A1.1A.1: A KA-BAND DUAL-POL MONOPULSE SHAPED REFLECTOR ANTENNA.....	1717
<i>Pierre Dufilie, MIT Lincoln Laboratory, United States</i>	
FR-A1.1A.2: HIGH-PERFORMANCE REFLECTOR ANTENNA DESIGN FOR THE TROPICS MISSION.....	1719
<i>Idahosa Osaretin, William Blackwell, MIT Lincoln Laboratory, United States; Richard Wylde, Soe Min Tun, Graham Smith, Thomas Keating Ltd, United Kingdom</i>	
FR-A1.1A.3: OFFSET-FED REFLECTOR ANTENNA WITH LATERAL FEED DISPLACEMENT FOR THE	1721
MIRATA SATELLITE	
<i>Idahosa Osaretin, William Blackwell, R. Vincent Leslie, MIT Lincoln Laboratory, United States; Philip Langlois, Smiths Interconnect, United States</i>	
FR-A1.1A.4: REALIZATION OF LOW-RCS PARABOLIC REFLECTOR ANTENNA USING CURVED 3-D	1723
FREQUENCY-SELECTIVE STRUCTURE	
<i>Hao Huang, Zhongxiang Shen, Nanyang Technological University, Singapore</i>	
FR-A1.1A.6: NOVEL METAL ONLY, LOW PROFILE, HIGH GAIN STEPPED REFLECTOR ANTENNAS	1725
FOR FUTURE 5G MMWAVE AND CUBESAT APPLICATIONS	
<i>Vignesh Manohar, Joshua Kovitz, Yahya Rahmat-Samii, University of California, Los Angeles, United States</i>	

FR-A1.1A.7: DUAL POLARIZATION, DUAL RESONANT REFLECTARRAY ELEMENT FOR BEAMSTEERING APPLICATIONS AT X BAND	1727
<i>Michael Trampler, Xun Gong, University of Central Florida, United States</i>	
FR-A1.1A.8: INNOVATIVE MULTI-FEED-PER-BEAM REFLECTOR ANTENNA FOR SPACE-BORNE CONICAL-SCAN RADIOMETERS	1729
<i>Jakob R. de Lasson, Cecilia Cappellin, Knud Pontoppidan, TICRA, Denmark; Oleg Iupikov, Marianna Ivashina, Chalmers University of Technology, Sweden; Niels Skou, DTU Space, Denmark; Benedetta Fiorelli, ESA-ESTEC, Netherlands</i>	
FR-A1.1A.10: DESIGN OF THE EARTH STATION ANTENNA FOR KOREA AUGMENTATION SATELLITE SYSTEM	1731
<i>Sohyeun Yun, Cheonsig Sin, ETRI, Korea (South)</i>	
 FR-A1.2A: BANDWIDTH ENHANCEMENT FOR PLANAR ANTENNAS AND ARRAYS	
FR-A1.2A.1: BROADBAND LOW-PROFILE DIPOLE ANTENNA WITH PARASITIC PATCHES AND FOLDED STRIPS	1733
<i>Kam Eucharist Kedze, Heesu Wang, Ikmo Park, Ajou University, Korea (South)</i>	
FR-A1.2A.2: BROADBAND PATCH ANTENNA WITH NARROW WIDTH GROUND PLANE	1735
<i>Yiyang Wang, Guilin University of Electronic Technology, China; Yinghua Lu, Beijing University of Posts and Telecommunications, China; Guizhen Lu, Communication University of China, China; Weiping Cao, Guilin University of Electronic Technology, China; Ahmed A. Kishk, Concordia University, Canada</i>	
FR-A1.2A.3: A SINGLE-LAYER SERIES-FED MICROSTRIP ARRAY WITH ENHANCED BANDWIDTH FOR AUTOMOTIVE RADAR SYSTEMS	1737
<i>Aimeng Liu, Wei Wang, Jing Wang, Meng Guo, Lin Zhao, Harbin Engineering University, China</i>	
FR-A1.2A.4: A HEART-LIKE UNIDIRECTIONAL MILLIMETER-WAVE ANTENNA	1739
<i>Yue Dong, Harbin Engineering University, China; Yingsong Li, Harbin Engineering University & Chinese Academy of Science, China; Shengyuan Luo, Harbin Engineering University, China</i>	
FR-A1.2A.5: A BROADBAND RHCP/LHCP SIW-INTEGRATED PATCH ARRAY ANTENNA FOR MM-WAVE APPLICATIONS	1741
<i>Wael Abdel-Wahab, University of Waterloo, Canada; Ying Wang, University of Ontario Institute and Technology, Canada; Hussam Al-Saedi, University of Waterloo, Canada; Hesham A. Mohamed, Electronics Research Institute, Egypt; Safieddin Safavi-Naeini, University of Waterloo, Canada</i>	
FR-A1.2A.6: DUAL-STUB LOADED MICROSTRIP LINE-FED MULTI-SLOT PRINTED ANTENNA FOR LTE BAND	1743
<i>Kendrick Henderson, Ohio State University, United States; Saeed Latif, Georgios Lazarou, University of South Alabama, United States; Satish Sharma, Azzam Tabbal, San Diego State University, United States; Sayeed Sajal, Minot State University, United States</i>	
FR-A1.2A.8: LOW PROFILE, RESONANCE FREE UWB UHF DIPOLE ARRAY WITH INTEGRATED BENT MICROSTRIP BALUN	1745
<i>Linfeng Li, Jie-Bang Yan, University of Alabama, United States</i>	
FR-A1.2A.9: STEPPED IMPEDANCE RESONATOR BASED UNIPLANAR DIPOLE ANTENNA WITH HARMONIC SUPPRESSION	1747
<i>Manoj M, Remsha M, Vinisha C V, Mohanan P, Cochin University of Science and Technology, India</i>	
 FR-UB.2A: RADIO WAVE PROPAGATION AND SCATTERING EFFECTS	
FR-UB.2A.8: EXTRACTION OF TARGET SCATTERING CENTERS USING ROBUST-FFAST	1749
<i>Ismail Jouny, Lafayette College, United States</i>	

FR-UB.2A.9: RIGOROUS STATISTICAL MODELING OF PROPAGATION IN TUNNELS WITH 1751
ROUGH SURFACE WALLS

Xingqi Zhang, Costas D. Sarris, University of Toronto, Canada

FR-UB.2A.10: FULL WAVE SOLUTIONS OF MULTIPLE SCATTERING USING VECTOR 1753
SPHEROIDAL WAVES AND ADDITION THEOREM

Huanting Huang, Leung Tsang, University of Michigan, Ann Arbor, United States; Kung-Hau Ding, Air Force Research Laboratory, United States

FR-A1.3A: DIRECTIONAL UWB ANTENNAS I

FR-A1.3A.1: EXPONENTIALLY TAPERED TEM HORN ANTENNA WITH DIELECTRIC SUPPORT FOR 1755
MONOPOLAR INPUT PULSES

Vignesh Shanmugam Bhaskar, Eng Leong Tan, King Ho Holden Li, Man Siu Tse, Nanyang Technological University, Singapore

FR-A1.3A.2: ANTIPODAL UWB VIVALDI ANTENNA WITH PSEUDOELEMENT AND NOTCHED 1757
FLARES FOR 2.5-57 GHZ APPLICATIONS

Jack Eichenberger, Ohio State University, United States; Ersin Yetisir, SpaceX, United States; Nima Ghalichechian, Ohio State University, United States

FR-A1.3A.3: BEAM PATTERN MEASUREMENT ON OFFSET GREGORIAN REFLECTOR MOUNTED 1759
WITH A WIDEBAND ROOM TEMPERATURE RECEIVER FOR THE SQUARE KILOMETRE
ARRAY

Jonas Flygare, Bhushan Billade, Magnus Dahlgren, Miroslav Pantaleev, Jens Dahlström, Bo Wästberg, Onsala Space Observatory, Chalmers University of Technology, Sweden; Gary Hovey, Richard Hellyer, Rob Messing, Bruce Veidt, Gordon Lacy, Mohammad Islam, DRAO, NRC-CNRC, Canada

FR-A1.3A.4: MODIFIED BALANCED ANTIPODAL VIVALDI ANTENNAS WITH 1761
SUBSTRATE-INTEGRATED LENSES FOR 2-18 GHZ APPLICATION

Ming Huang, Southwest China Institute of Electronic Technology, China

FR-A1.3A.6: MULTIPLE DIRECTIONAL RADIATION PATTERNS, INTEGRATED ANTENNA FOR 1763
ATSC-TV INDOOR RECEPTION

Abdullah Haskou, Anthony Pesin, Jean-Yves Le Naour, Ali Louzir, Technicolor Research and Innovation, France

FR-A1.3A.7: A BROADBAND CIRULARLY POLARIZED DIRECTIONAL ANTENNA APPLIED ON 1765
SATELLITE COMMUNICATION

Lu Zhuang, Jun Ouyang, Yi Yan, Jinhao Guo, Shu'nan Zhang, University of Electronic Science and Technology of China, China

FR-A1.3A.8: A NOVEL THREE-LAYER LINEARLY POLARIZED WIDEBAND TRANSMITARRAY 1767
ANTENNA

Peng-Yu Feng, Shi-Wei Qu, University of Electronic Science and Technology of China, China

FR-A1.3A.9: A LOW PROFILE HIGH GAIN METASURFACE BACKED DIRECTIONAL N/A
ULTRA-WIDEBAND ANTENNA

Janani T, Vigneshram R, Sri Krishna College of Technology, India; Chinmoy Saha, Indian Institute of Space Science and Technology, India; Yahia M. M. Antar, Royal Military College of Canada, Canada

FR-A1.3A.10: WIDEBAND DUAL POLARIZATIONS FEED FOR RADIOMETER..... 2559

hongjian wang, NSSC, China

FR-A5.2A: RECENT ADVANCES IN MOBILE ANTENNAS

FR-A5.2A.1: COMPACT CIRCULARLY-POLARIZED SIW EDGE-RADIATING ANTENNA FOR 1771
BEAMSTEERING IN 5G MOBILE DEVICES

Khaled Al-Amoodi, Rashid Mirzavand, Mohammad Mahdi Honari, University of Alberta, Canada; Jordan Melzer, TELUS Communications, Canada; Duncan Elliott, Pedram Mousavi, University of Alberta, Canada

FR-A5.2A.2: DIFFERENTIAL FED BILATERAL SLOTLINE DIPOLE ON FLEXIBLE PCB FOR MM-WAVE 5G MOBILE TERMINAL	1773
<i>In-June Hwang, Ju-Ik Oh, Jin-Woo Kim, Jong-Won Yu, Korea Advanced Institute of Science and Technology (KAIST), Korea (South); Won-Woo Lee, LG Electronics, Korea (South)</i>	
FR-A5.2A.3: INTERNAL DUAL-RESONANCE HIGH-GAIN 1.5 WAVELENGTH LOOP ANTENNA FOR FDD SATELLITE PHONE APPLICATIONS	1775
<i>Wei-Yu Li, Wei Chung, Industrial Technology Research Institute, Taiwan; Amane Miura, Hiroyuki Tsuji, National Institute of Information and Communications Technology, Japan</i>	
FR-A5.2A.4: SINGLE-FEED DUAL-EXCITATION SLOT ANTENNA FOR THE LTE TABLET DEVICE	1777
<i>Chien-Hung Chen, R.O.C. Air Force Academy, Taiwan; Hua-Ming Chen, National Kaohsiung University of Applied Sciences, Taiwan; Chow-Yen-Desmond Sim, Feng Chia University, Taiwan; Chia-Te Liao, R.O.C. Air Force Institute of Technology, Taiwan</i>	
FR-A5.2A.5: BROADBAND, WIDE-BEAM ANTENNA FOR BASE STATION APPLICATIONS	1779
<i>Joshua Shehan, Amphenol Antenna Solutions, United States; Ryan Adams, University of North Carolina at Charlotte, United States</i>	
FR-A5.2A.6: A COMPACT ANTENNA FOR IOT APPLICATIONS OPERABLE EVEN IN CLOSE PROXIMITY TO A METAL	1781
<i>Yohei Koga, Manabu Kai, Fujitsu Laboratories Limited, Japan</i>	
FR-A5.2A.7: SAMSUNG SMART ANTENNA TECHNOLOGY(SSAT) USING THE CLOSED-LOOP AUTO FREQUENCY TUNING ALGORITHM FOR PORTABLE HANDSET	1783
<i>Young Hoon Suh, Younseop Kim, Samsung Electronics, Korea (South)</i>	
FR-A5.2A.8: A NOBEL 4G AND 5G ANTENNA SOLUTION FOR FUTURE SMARTPHONES	1785
<i>Takashi Yamagajo, Yohei Koga, Manabu Kai, Fujitsu Laboratories Limited, Japan; Tabito Tonooka, Hirotake Sumi, Mitsuharu Hoshino, Fujitsu Connected Technologies Limited, Japan</i>	
FR-A5.2A.9: WIDEBAND EQUIVALENT CIRCUIT MODEL FOR SMARTPHONE ANTENNAS BASED ON CHARACTERISTIC MODES	1787
<i>Henning Hartmann, Nikolai Peitzmeier, Dirk Manteuffel, Leibniz University of Hannover, Germany</i>	
FR-A5.2A.10: DIRECTION FINDING OF ULTRA-WIDEBAND SIGNALS USING DIRECT RF SAMPLING	1789
<i>Dimitrios Sifarikas, John L. Volakis, Florida International University, United States</i>	
 FR-A4.1A: ADVANCES IN MICROWAVE IMAGING TECHNIQUES	
FR-A4.1A.1: A NOVEL GLOBAL OPTIMIZATION TECHNIQUE FOR MICROWAVE IMAGING BASED ON THE SIMULATED ANNEALING AND MULTI-DIRECTIONAL SEARCH	1791
<i>Aslan Etminan, Mahta Moghaddam, University of Southern California, United States</i>	
FR-A4.1A.2: MILLIMETER-WAVE SYNTHETIC APERTURE FOCUSING FOR PACKAGING INSPECTION SYSTEM	1793
<i>Shahed Shahir, Mohsen Raeis-Zadeh, Safieddin Safavi-Naeini, University of Waterloo, Canada</i>	
FR-A4.1A.3: SYNTHETIC APERTURE RADAR IMAGING OF THE INTERIOR OF COMETS USING TIME-DOMAIN BACK-PROJECTION	1795
<i>Darindra Arumugam, Yonggyu Gim, California Institute of Technology, United States; Essam Heggy, University of Southern California, United States; Xiaoqing Wu, California Institute of Technology, United States</i>	
FR-A4.1A.4: PHASE RETRIEVAL IN FREQUENCY-DIVERSE IMAGING	1797
<i>Okan Yurduseven, Duke University, United States; Thomas Fromenteze, University of Limoges, France; David Smith, Duke University, United States</i>	

FR-A4.1A.5: MICROWAVE-INDUCED THERMOACOUSTIC IMAGING USING COMPRESSIVE SENSING AND A HOLEY CAVITY	1799
<i>Chang Liu, Ashkan Ghanbarzadeh Dagheyan, Juan Heredia-Juesas, Ali Molaei, Jose Angel Martinez-Lorenzo, Northeastern University, United States</i>	
FR-A4.1A.6: PHYSICAL OPTICS SIMULATION OF A THZ STANDOFF IMAGING SYSTEM	1801
<i>Borja Gonzalez-Valdes, Marcos Arias, Yolanda Rodriguez-Vaqueiro, Lorena Perez, Oscar Rubiños, Antonio Pino, Universidade de Vigo, Spain</i>	
FR-A4.1A.7: ACHIEVING RANGE RESOLUTION IN HOLOGRAPHIC IMAGING USING SINGLE FREQUENCY MICROWAVE DATA	1803
<i>Smit Baua, Reza K. Amineh, New York Institute of Technology, United States</i>	
FR-A4.1A.8: ROBUST IMAGE RETRIEVAL FROM PHASELESS DATA	1805
<i>Zhun Wei, Xudong Chen, National University of Singapore, Singapore</i>	
FR-A4.1A.9: BLOCK-DIVISION BASED EXTRAPOLATION FOR RESOLUTION ENHANCED RADAR IMAGING OF COMPLEX TARGETS	1807
<i>Saisai Yuan, Xiaojian Xu, Beihang University, China</i>	
FR-A4.1A.10: MICROWAVE IMAGING USING FREQUENCY-DIVERSE SCATTERING OF A RANDOM ROUGH SURFACE	N/A
<i>Ehsan Rashidi-Ranjbar, Mojtaba Dehmollaian, University of Tehran, Iran</i>	
FR-A5.3A: THEORETICAL CHANNEL MODELS AND VERIFICATIONS	
FR-A5.3A.1: A FUNCTIONAL UNDERSTANDING OF THE ROTAC USING THE CAVITY GREEN'S FUNCTION	1811
<i>Benjamin Arnold, Michael Jensen, Brigham Young University, United States</i>	
FR-A5.3A.2: PLANE WAVE SYNTHESIS IN A RECONFIGURABLE OVER-THE-AIR CHAMBER	1813
<i>Matthew Arnold, Rashid Mehmood, Brigham Young University, United States; Jon Wallace, Lafayette College, United States; Michael Jensen, Brigham Young University, United States</i>	
FR-A5.3A.3: WAVEFRONT SHAPING OF FADING RAYLEIGH CHANNELS ENABLES PERFECT ORTHOGONALITY AND OPTIMAL CAPACITY	N/A
<i>Philipp del Hougne, Mathias Fink, Institut Langevin, ESPCI Paris & CNRS, France; Geoffroy Lerosey, Greenerwave, France</i>	
FR-A5.3A.4: NON-COOPERATIVE, NON-LINE OF SIGHT GEOLOCATION OF RADIO EMITTERS	1817
<i>Benjamin Gear, Defence Science and Technology Laboratory (Dstl), United Kingdom; Evangelos Mellios, Andrew Nix, Joe McGeehan, University of Bristol, United Kingdom</i>	
FR-A5.5A: ADVANCES IN MILLIMETER-WAVE ANTENNAS AND RADIATING SYSTEMS	
FR-A5.5A.1: ISOLATION ENHANCEMENT IN WIFI DUAL-BAND TWO PIFAS FOR COMPACT SIZE ANTENNA MODULE APPLICATIONS	1819
<i>I-Fong Chen, Chia-Mei Peng, Han-Lin Zhan, Jinwen University of Science and Technology, Taiwan</i>	
FR-A5.5A.2: A 60-GHZ GAIN ENHANCED VIVALDI ANTENNA ON-CHIP	1821
<i>Kamel Sultan, Electronics Research Institute, Egypt; Mohamed Basha, University of Waterloo, Canada; Haythem Abdullah, Esmat A. Abdallah, Electronics Research Institute, Egypt; Hadia El-Hennawy, Ain Shams University, Egypt</i>	
FR-A5.5A.3: BEAM STEERING OF SERIES-FED PATCH ARRAY USING FREQUENCY AND PHASE VARIATION NEAR 76.5 GHZ	1823
<i>Yunsu Kang, Kangwook Kim, Gwangju Institute of Science and Technology, Korea (South)</i>	

FR-A5.5A.4: SUB-ARRAY DESIGN OF A CAVITY-LOADED E-BAND PARTIALLY-CORPORATE FED WAVEGUIDE SLOT ARRAY	1825
<i>Congda Hu, Miao Zhang, Xiamen University, China; Jiro Hirokawa, Tokyo Institute of Technology, Japan; Qing Huo Liu, Duke University, United States</i>	
FR-A5.5A.5: A DESIGN OF DUAL-BAND CIRCULARLY POLARIZED MILLIMETER-WAVE MICROSTRIP ANTENNA	1827
<i>Huakang Chen, Zhizhong Zhang, Fang Lei, Chongqing University of Posts and Telecommunications, China</i>	
FR-A1.4A: LEAKY-WAVE ANTENNAS BASED ON SIW	
FR-A1.4A.1: CONFORMAL CONTINUOUS TRANSVERSE STUB ANTENNA BASED ON SIW TECHNOLOGY FOR 5G APPLICATIONS	1829
<i>Abdessalem Talbi, Mourad Nedil, Université du Québec en Abitibi-Témiscamingue, Canada; Khelifa Hettak, Senior Researcher/ Communications Research Centre, Canada</i>	
FR-A1.4A.2: LEAKY-WAVE ANTENNA BASED ON MODIFIED APERTURE HALF-MODE SUBSTRATE INTEGRATED WAVEGUIDE	1831
<i>Nima Javanbakht, Barry Syrett, Rony Amaya, Carleton University, Canada</i>	
FR-A1.4A.3: BACKWARD TO FORWARD BEAM SCANNING LEAKY-WAVE ANTENNA BASE ON CORRUGATED SUBSTRATE INTEGRATED WAVEGUIDE	1833
<i>Ke Chen, Yunhua Zhang, Si-Yuan He, Guoqiang Zhu, Wuhan University, China</i>	
FR-A3.1A: PARALLEL AND HARDWARE ACCELERATION METHODS	
FR-A3.1A.1: PARALLEL NON-UNIFORM MLFMA FOR MULTISCALE ELECTROMAGNETIC SIMULATION	1837
<i>Stephen Hughey, Hasan Metin Aktulga, Vikram Melapudi, Balasubramaniam Shanker, Michigan State University, United States; Mingyu Lu, West Virginia University Institute of Technology, United States; Eric Michielssen, University of Michigan, United States</i>	
FR-A3.1A.2: BRUTE-FORCE GPU ACCELERATED EVALUATION OF DIPOLE-DIPOLE INTERACTIONS	1839
<i>Alexander Paulus, Thomas F. Eibert, Technical University of Munich, Germany</i>	
FR-A3.1A.3: SUPERCOMPUTING FOR FULL-WAVE TOMOGRAPHIC IMAGE RECONSTRUCTION IN NEAR-REAL TIME	1841
<i>Mert Hidayetoglu, Wen-Mei Hwu, Weng Cho Chew, University of Illinois at Urbana-Champaign, United States</i>	
FR-A3.1A.4: MODELLING THE INTERACTION OF THZ WAVES WITH BREAST CANCER TISSUES	1843
<i>Amir Shariffar, Tyler Bowman, Chenggang Lai, Miaoqing Huang, University of Arkansas, United States; Keith Bailey, Oklahoma State University, United States; Magda El-Shenawee, University of Arkansas, United States</i>	
FR-UB.4A: LOW NOISE AND PERIODIC DEVICES	
FR-UB.4A.4: PHASED ANTENNA ARRAY DESIGN USING SHUFFLED FROG-LEAPING ALGORITHM	1845
<i>Achilles Boursianis, Kostas Patakakis, Sotirios Goudos, Aristotle University of Thessaloniki, Greece; Marco Salucci, Andrea Massa, University of Trento, Italy</i>	
FR-UB.4A.5: FREQUENCY-RECONFIGURABLE QUASI-YAGI ANTENNA	1847
<i>Abdurahman Hmouda, Tayeb Denidni, INRS-EMT, Québec Université, Canada</i>	
FR-UB.4A.6: MAXIMUM-BANDWIDTH SYNTHESIS OF MONOPULSE ARRAY ANTENNAS WITH FIXED GEOMETRY THROUGH CONVEX OPTIMIZATION	1849
<i>Phuoc Bui, Lorenzo Poli, Paolo Rocca, Andrea Massa, University of Trento, Italy</i>	

**FR-UB.4A.7: RECONFIGURABLE SWITCHED-BEAM ANTENNA USING CYLINDRICAL BOW TIE 1851
FSS WINDOW**

Muamba Mukendi Leingthone, Hakem Nadir, Université de Québec en Abitibi-Témiscamingue and underground communications research laboratory (LRTCS), Canada

**FR-UB.4A.8: WIDE-ANGLE SCANNING PHASED ARRAY BASED ON A MICROSTRIP MAGNETIC 1853
DIPOLE FOR K BAND RADAR SYSTEMS**

Lijia Zhu, Hao Jin, Xu Liu, Guangli Yang, Shanghai University, China

FR-A2.2A: CLOAKING STRUCTURES

**FR-A2.2A.1: TIME-VARYING METAMATERIAL DOPPLER CLOAK: APPLICATIONS TO INVISIBILITY 1855
AND ANTENNAS**

Davide Ramaccia, Filiberto Bilotti, Alessandro Toscano, Roma Tre University, Italy; Dimitrios Sounas, Andrea Alù, University of Texas at Austin, United States

**FR-A2.2A.2: EXPLOITING ELECTROMAGNETIC CLOAKING TO DESIGN COMPACT 1857
NANOSATELLITE SYSTEMS**

Stefano Vellucci, Roma Tre University, Italy; Alessio Monti, Mirko Barbuto, Niccolò Cusano University, Italy; Alessandro Toscano, Filiberto Bilotti, Roma Tre University, Italy

**FR-A2.2A.3: EFFECT OF GEOMETRICAL PARAMETERS OF A WIDTH MODULATED MICROSTRIP 1859
LINE BASED MANTLE-CLOAK**

Barbara Cappello, Ladislau Matekovits, Politecnico di Torino, Italy

**FR-A2.2A.4: TOWARDS WAVEFORM-SELECTIVE CLOAKING DEVICES EXPLOITING 1861
CIRCUIT-LOADED METASURFACES**

Stefano Vellucci, Roma Tre University, Italy; Alessio Monti, Mirko Barbuto, Niccolò Cusano University, Italy; Alessandro Toscano, Filiberto Bilotti, Roma Tre University, Italy

FR-A5.4A: COMMUNICATION TECHNOLOGY

FR-A5.4A.1: A NOVEL PASSIVE RFID TEMPERATURE SENSOR 1863

Yousuf Shafiq, John Gibson, Stavros Georgakopoulos, Florida International University, United States; Hyun Kim, Cedric Ambulo, Taylor Ware, University of Texas at Austin, United States

**FR-A5.4A.2: ISOLATION IMPROVEMENT OF CYLINDRICAL MILLIMETER-WAVE REPEATERS 1865
USING A REACTIVE IMPEDANCE SURFACE**

Bradley Allen, Jaegeun Ha, Nathan Jastram, Dejan Filipovic, University of Colorado Boulder, United States; Scott Rudolph, U.S. Naval Research Laboratory, United States

**FR-A5.4A.3: A NOVEL L-CRLH BASED COMPACT WIDE BAND FILTERED POWER DIVIDER FOR 1867
WLAN APPLICATIONS**

Norhan Abdelhady, Ahmed Hussien, Ahmed Daw, MSA University, Egypt; Mahmoud A. Abdalla, Military Technical College, Egypt

FR-A5.4A.4: MULTIBAND PIFA ANTENNA FOR MOBILE HANDHELD DEVICES N/A

Shruthi G, Yogesh Kumar Choukiker, VIT University, India

FR-A1.5A: LEAKY WAVE ANTENNAS BASED ON FABRY-PEROT STRUCTURES

**FR-A1.5A.1: REFRACTIVE INDEX ENGINEERING IN 3D PRINTED DIELECTRIC SUBSTRATES FOR 1871
BEAM STEERING**

Badreddine Ratni, Shah Nawaz Burokur, LEME, UPL, Univ Paris Nanterre, France; Gérard-Pascal Piau, AIRBUS, France; André de Lustrac, C2N, CNRS, Univ. Paris-Sud, Université Paris-Saclay, France

FR-A1.5A.2: ARRAY-FED FABRY-PEROT CAVITY ANTENNA FOR TWO-DIMENSIONAL BEAM STEERING	1873
<i>Davide Comite, Sapienza University, Italy; Victoria Gòmez-Guillamòn Buendìa, Heriot-Watt University, United Kingdom; Paolo Burghignoli, Sapienza University, Italy; Paolo Baccarelli, Roma Tre University, Italy; Symon Podilchak, Heriot-Watt University, United Kingdom; Alessandro Galli, Sapienza University, Italy</i>	
FR-A1.5A.3: SINGLE-LAYER DUAL-BAND LEAKY WAVE ANTENNAS DESIGN METHODOLOGY WITH DIRECTIVITY CONTROL	1875
<i>Nausika Memeletzoglou, Eva Rajo-Iglesias, University Carlos III of Madrid, Spain; Darwin Blanco, Delft University of Technology, Netherlands</i>	
 FR-SP.1P: ADDITIVE MANUFACTURING IN ANTENNAS AND RF SYSTEMS	
FR-SP.1P.1: ADDITIVE MANUFACTURED 60 GHZ SLOT ARRAY ANTENNA	1877
<i>Kyle Byers, Louis Brown, DOE's Kansas City National Security Campus, United States</i>	
FR-SP.1P.3: DESIGN, FABRICATION AND MEASUREMENT OF A MILLIMETER WAVE FRESNEL LENS USING ADDITIVE MANUFACTURING	1879
<i>Kyoung Ho Jeong, Nima Ghalichechian, Ohio State University, United States</i>	
FR-SP.1P.4: ADDITIVE MANUFACTURING TECHNOLOGY FOR HIGH PERFORMANCES FEED HORN	1881
<i>Giuseppe Addamo, Oscar Antonio Peverini, Fabio Paonessa, Giuseppe Virone, Riccardo Tascone, CNR-IEIIT, Italy; Diego Manfredi, IIT-Center for Sustainable Future Technologies, Italy; Flaviana Calignano, DIGEP-Politecnico di Torino, Italy; Gianluca Dassano, DET-Politecnico di Torino, Italy</i>	
FR-SP.1P.5: ADDITIVELY MANUFACTURED RF DEVICES AND SYSTEMS	1883
<i>Mark Mirotznik, Zachary Larimore, Paul Parsons, Austin Good, University of Delaware, United States</i>	
FR-SP.1P.6: A FULLY-3D-PRINTED COMPLEMENTARY RIGHT/LEFT-HANDED TRANSMISSION LINE	1885
<i>Jimmy Hester, Evan Nguyen, Reid Shishido, Jesse Tice, Vesna Radisic, Northrop Grumman Corporation, United States</i>	
FR-SP.1P.7: A FLEXIBLE COMPACT RECTENNA FOR 2.4GHZ ISM ENERGY HARVESTING APPLICATIONS	1887
<i>Aline Eid, Jimmy Hester, Abdullah Nauroze, Tong-Hong Lin, Georgia Institute of Technology, United States; Joseph Costantine, American University of Beirut, United States; Youssef Tawk, Notre Dame University, United States; Ali Ramadan, Fahad Bin Sultan University, United States; Manos Tentzeris, Georgia Institute of Technology, United States</i>	
FR-SP.1P.8: KU BAND METAL-STRIP-LOADED DIELECTRIC ROD ANTENNA WITH NARROWBAND GAIN ENHANCEMENT	1889
<i>Denise Lugo, Ramiro Ramirez, Jing Wang, Thomas Weller, University of South Florida, United States</i>	
 FR-A2.1P: ACTIVE AND RECONFIGURABLE METAMATERIALS AND METASURFACES	
FR-A2.1P.2: METASURFACES TO CONTROL DIRECTION OF WAVE PROPAGATION AT THE SAME FREQUENCY	1891
<i>Daiju Ushikoshi, Hiroki Wakatsuchi, Nagoya Institute of Technology, Japan</i>	
FR-A2.1P.3: EXPERIMENTAL DEMONSTRATION OF THE HUYGENS' BOX: ARBITRARY WAVEFORM GENERATION IN A METALLIC CAVITY	1893
<i>Alex M. H. Wong, City University of Hong Kong, China; George V. Eleftheriades, University of Toronto, Canada</i>	
FR-A2.1P.4: ABSORBER/REFLECTOR SWITCHABLE METAMATERIAL WITH POLARIZATION-SELECTIVITY	1895
<i>Saptarshi Ghosh, Daecheon Lim, Sungjoon Lim, Chung-Ang University, Korea (South)</i>	

FR-A2.1P.5: A NESTED-SPRING METAMATERIAL UNIT CELL FOR BROADBAND MECHANICALLY-TUNABLE EFFECTIVE E	1897
<i>Kathryn Smith, Ryan Adams, University of North Carolina at Charlotte, United States</i>	
FR-A2.1P.6: 1-BIT, 2-BIT POLARIZATION INSENSITIVE REFLECTION PROGRAMABLE METASURFACE	1899
<i>Fuheng Zhang, Yasir Saifullah, Guo-Min Yang, Ya-Qiu Jin, Fudan University, China</i>	
FR-A2.1P.7: IMPROVING STABILITY OF NEGATIVE CAPACITORS FOR USE IN ACTIVE METAMATERIALS AND ANTENNAS	1901
<i>Silvio Hrbar, Igor Krois, Dominik Zanic, University of Zagreb, Croatia (Hrvatska)</i>	
FR-A2.1P.8: RECONFIGURABLE MULTIBAND FARIR NOTCH FILTER EMPLOYING PHASE CHANGE MATERIAL	1903
<i>Lucas Newton, Ohio State University, United States; Varittha Sanphuang, Ford Motor Company, United States; Niru K Nahar, Ohio State University, United States</i>	
FR-A2.1P.9: DESIGN OF A WIDEBAND RECONFIGURABLE HUYGENS METASURFACE	1905
<i>Min Yin Xu, Sean V. Hum, University of Toronto, Canada</i>	
FR-A2.1P.10: A VOLTAGE TUNABLE METAMATERIAL FOR PHASE SHIFTING AT U-BAND BASED ON LIQUID CRYSTAL	1907
<i>Yizhe Zhao, Anyong Qing, University of Electronic Science and Technology of China, China</i>	
 FR-UB.3P: MILLIMETER WAVE AND TERAHERTZ ANTENNAS	
FR-UB.3P.3: A NEW BUTTERFLY RADIATING ELEMENT FOR CIRCULAR POLARIZED SERIES FED PHASED ARRAY WITH WIDE AXIAL RATIO BEAMWIDTH AT MILLIMETER WAVE BAND	1909
<i>Ghanshyam Mishra, Satish Sharma, San Diego State University, United States; Jia-Chi S. Chieh, SPAWAR Systems Center Pacific, United States</i>	
FR-UB.3P.4: CAVITY-BACKED SLOT ARRAY FOR MULTILAYER PCB IMPLEMENTATION	1911
<i>Christopher G. Hynes, Rodney Vaughan, Simon Fraser University, Canada</i>	
FR-UB.3P.5: AN OPTICAL LEAKY WAVEGUIDE EXCITATION BY OFFSET PRABOLIC REFLECTOR USING PHOTONIC BANDGAP	1913
<i>Hiroshi Hashiguchi, Toshihiko Baba, Hiroyuki Arai, Yokohama National University, Japan</i>	
FR-UB.3P.6: WIDEBAND BEAM STEERING USING A 4-ARM SPIRAL ARRAY FOR SIMULTANEOUS TRANSMIT AND RECEIVE (STAR) OPERATION	1915
<i>Alexander Hovsepian, Satheesh Bojja Venkatakrishnan, Elias A. Alwan, John L. Volakis, Florida International University, United States</i>	
FR-UB.3P.7: A FREQUENCY-RECONFIGURABLE CAVITY-BACKED SLOT ANTENNA ESPAR IN H PLANE	1917
<i>Wei Ouyang, Xun Gong, University of Central Florida, United States</i>	
FR-UB.3P.9: COAXIAL FED SUBSTRATE INTEGRATED WAVEGUIDE H-PLANE HORN ANTENNA WITH AIR-FILLED CONCAVE STRUCTURE	1919
<i>Hemant Kumar, Girish Kumar, IIT Bombay, India</i>	
 FR-A5.2P: SOFTWARE DEFINED/COGNITIVE RADIO APPLICATIONS	
FR-A5.2P.1: USE OF A DIGITAL NON-FOSTER RADIO ARCHITECTURE FOR CONVENTIONAL TUNING OF ELECTRICALLY-SMALL ANTENNAS	1921
<i>Thomas Weldon, University of North Carolina at Charlotte, United States</i>	

- FR-A5.2P.2: DISCOVERY OF BLOCKING TERRAIN IN A MILLIMETER-WAVE NETWORK BY ON-THE-FLY INCOHERENT TOMOGRAPHY** 1923
Steven Ellingson, Aaron Marinkovich, Virginia Polytechnic Institute and State University, United States
- FR-A5.2P.4: BANDWIDTH ENHANCED LOW-VHF COMMUNICATIONS WITH A MINIATURE NON-FOSTER ANTENNA** 1925
Jihun Choi, Fikadu Dagefu, Brian Sadler, U.S. Army Research Laboratory, United States; Kamal Sarabandi, University of Michigan, United States
- FR-A4.1P: EM PROPAGATION ANALYSIS AND PREDICTION IN NON-STANDARD ATMOSPHERE**
- FR-A4.1P.3: PREDICTING RF PROPAGATION WITH NUMERICAL MODELS** 1927
Andrew Kammerer, Tracy Haack, Naval Research Laboratory - Monterey, United States; Hedley Hansen, Andrew Kulesa, Defense Science and Technology Organization, Australia; Amalia Barrios, SPAWAR Systems Center Pacific, United States; Rachel Norris, Naval Research Laboratory - Monterey, United States
- FR-A4.1P.4: IMPACT OF DATA SELECTION ON THE ACCURACY OF ATMOSPHERIC REFRACTIVITY EVAPORATIVE DUCT INVERSIONS USING GENETIC ALGORITHMS** 1929
Ian J. Matsko, Erin E. Hackett, Coastal Carolina University, United States
- FR-A1.1P: DIRECTIONAL UWB ANTENNAS II**
- FR-A1.1P.1: SUPERSHAPED CPW-FED MONOPOLE ANTENNA WITH PARASITIC STRIPS FOR UNIDIRECTIONAL PATTERN** 1931
Vignesh Shanmugam Bhaskar, Eng Leong Tan, King Ho Holden Li, Man Siu Tse, Nanyang Technological University, Singapore
- FR-A1.1P.2: A LOOP-LINE ANTENNA WITH WIDEBAND CIRCULAR POLARIZATION** 1933
Kazuhide Hirose, Kyosuke Okiyama, Shibaura Institute of Technology, Japan; Hisamatsu Nakano, Hosei University, Japan
- FR-A1.1P.3: A DUAL-POLARIZED BROADBAND RESONANT CAVITY ANTENNA** N/A
Fanji Meng, Ying Liu, University of Electronic Science and Technology of China, China; Satish Sharma, San Diego State University, United States
- FR-A1.1P.4: UWB WITH GAIN ENHANCEMENT ARCHIMEDEAN SPIRAL MICROSTRIP ANTENNAS FOR ON-BOARD SATELLITE COMMUNICATIONS** 1937
Mahmoud Rajab, Fatma El-Hefnawi, National Authority for Remote Sensing and Space Science, Egypt; Salwa Elramly, Misr University for science & Technology, Egypt; Marwa Bannis, Egyptian Russian University, Egypt
- FR-A1.1P.5: A COMPACT ULTRA-WIDEBAND SINGLE ELEMENT PLANAR YAGI ANTENNA** 1939
Muhammad Awais, Muhammad Hamza, Wasif Tanveer Khan, Lahore University of Management Sciences, Pakistan
- FR-A1.1P.6: SIW STRUCTURE EXPLORED AS A LOW-PROFILE WIDEBAND ANTENNA BEARING USER-FRIENDLY CHARACTERISTICS FOR WIRELESS TRANSCEIVERS** 1941
Suvadeep Choudhury, Akhilesh Mohan, Indian Institute of Technology Kharagpur, India; Debatosh Guha, University of Calcutta, India
- FR-A1.1P.7: MILLIMETER-WAVE BROADBAND PLANAR CAVITY-BACKED ANTENNA WITH APPROXIMATELY SYMMETRICAL RADIATION PATTERN** 1943
Jiexi Yin, Qi Wu, Chen Yu, Haiming Wang, Wei Hong, Southeast University, China
- FR-A1.1P.8: REDUCED COUPLING FOR THROUGH WALL RADARS USING ORTHOGONAL CIRCULAR POLARIZED ANTENNAS** 1945
Guntaas Kaur, Shobha Sundar Ram, IIIT-Delhi, India
- FR-A1.1P.10: PLANAR BI-BLADE ANTENNA INTEGRATED WITH BALUN FOR GPR APPLICATIONS** 1947
Ranadhir Chatterjee, Arijit De, Indian Institute of Technology Kharagpur, India

FR-A1.2P: DUAL-BAND AND MULTI-BAND ANTENNAS (III)

FR-A1.2P.1: DESIGN OF AN ULTRA-THIN COMPACT FLEXIBLE DUAL-BAND ANTENNA FOR WEARABLE APPLICATIONS 1949

Mohamed Kadry, Mohamed El Atrash, October University for Modern Sciences and Arts (MSA), Egypt; Mahmoud A. Abdalla, Military Technical College, Egypt

FR-A1.2P.2: COMPACT TRI-BAND SLOTTED PRINTED MONOPOLE ANTENNA FOR WLAN AND WIMAX APPLICATIONS N/A

Wajid Zaman, Hamza Ahmad, Muhammad U. Khan, Farooq A. Tahir, National University of Sciences and Technology (NUST), Pakistan

FR-A1.2P.3: A QUAD-BAND EIGHT-ANTENNA ARRAY FOR 5G/WLAN MIMO IN MICRO WIRELESS ACCESS POINTS 1953

Yixin Li, Huanqing Zou, Mingkai Wang, Mingzhi Peng, Guangli Yang, Shanghai University, China

FR-A1.2P.4: DUAL-BAND SINGLE/DUAL-BEAM SLOT PATCH ANTENNA 1955

Guangwei Yang, Jian-Ying Li, Rui Xu, Jiangjun Yang, Yangxiao Qi, Northwestern Polytechnical University, China

FR-A1.2P.5: MULTIBAND SPLIT-MONOPOLE ANTENNA DESIGN RULES 1957

John Doroshewitz, Jeffrey A. Nanzer, Michigan State University, United States

FR-A4.3P: ADVANCED MICROWAVE IMAGING APPLICATIONS

FR-A4.3P.1: TOWARDS THREE-DIMENSIONAL MILLIMETER-WAVE RADAR IMAGING OF ON-THE-MOVE TARGETS 1959

Luis E. Tirado, Weite Zhang, Anthony Bisulco, Northeastern University, United States; Hipolito Gomez-Sousa, University of Toronto, United States; Jose Angel Martinez-Lorenzo, Northeastern University, United States

FR-A4.3P.2: ARRAY OPTIMIZATION FOR AN ON-THE-MOVE 3D IMAGING SYSTEM DEMONSTRATOR 1961

Borja Gonzalez-Valdes, Jose Vázquez-Cabo, Yolanda Rodriguez-Vaqueiro, Universidade de Vigo, Spain; Yuri Álvarez, Maria Garcia-Fernandez, Universidad de Oviedo, Spain; Ana Arboleya, Universidad Rey Juan Carlos, Spain

FR-A4.3P.3: ALL-DIRECTIONS THOROUGH-THE-WALL IMAGING USING OMNIDIRECTIONAL BI-STATIC FMCW TRANSCIEVERS: IMAGING TECHNIQUE AND PERFORMANCE EVALUATION 1963

Behzad Yektakhah, Kamal Sarabandi, University of Michigan, Ann Arbor, United States

FR-A4.3P.4: HIGH RESOLUTION SUBSURFACE IMAGING OF BURIED TARGETS USING DISTRIBUTED ROBOTIC SENSORS 1965

Behzad Yektakhah, Kamal Sarabandi, University of Michigan, Ann Arbor, United States; Hatim Bukhari, King Abdulaziz City for Science and Technology, Saudi Arabia

FR-A4.3P.5: GPR SYSTEM ONBOARD A UAV FOR NON-INVASIVE DETECTION OF BURIED OBJECTS 1967

Maria Garcia-Fernandez, Yuri Alvarez-Lopez, University of Oviedo, Spain; Borja Gonzalez-Valdes, Yolanda Rodriguez-Vaqueiro, University of Vigo, Spain; Ana Arboleya-Arboleya, University Rey Juan Carlos, Spain; Fernando Las Heras, University of Oviedo, Spain; Antonio Pino, University of Vigo, Spain

FR-A4.3P.7: NEAR-FIELD MICROWAVE IMAGING OF EMBEDDED OBJECTS IN A DENSE SLAB WITH NORMAL DIPOLE ILLUMINATION 1969

Kai Ren, Robert Burkholder, Ohio State University, United States

FR-A4.3P.8: SUBSURFACE CYLINDRICAL CAVITY DETECTION VIA TE AND TM MODE MISMATCH ANALYSIS 1971

Raju Manthana, Darindra Arumugam, California Institute of Technology, United States

FR-A4.3P.9: DCGAN-BASED SCHEME FOR RADAR SPECTROGRAM AUGMENTATION IN HUMAN ACTIVITY CLASSIFICATION 1973

Ye Mi, Xiaojun Jing, Junsheng Mu, Xinyu Li, Yuan He, Beijing University of Posts and Telecommunications, China

FR-A4.3P.10: THROUGH THE WALL HUMAN SIGNATURE DETECTION USING PRINCIPLE COMPONENT ANALYSIS (PCA) 1975

Vineet Singh, Somak Bhattacharyya, Pradeep Kumar Jain, Indian Institute of Technology (BHU), Varanasi, India

FR-A1.3P: ANTENNA FEEDS AND MATCHING CIRCUITS (III)

FR-A1.3P.1: A COMPACT BEAM-FORMING NETWORK FOR SWITCHED-BEAM ARRAYS..... 1977

Matthew Young, Sandia National Laboratories, United States

FR-A1.3P.2: ON THE DESIGN OF WIDEBAND MONOSTATIC STAR SYSTEMS WITH SPHERICALLY STRATIFIED LENSES 1979

Carlos Mulero Hernandez, Maxim Ignatenko, Dejan Filipovic, University of Colorado Boulder, United States

FR-A1.3P.3: CURRENT REJECTION CHARACTERISTICS OF CHOKE STRUCTURE COMPOSED OF COMPOSITE RIGHT/LEFT-HANDED COAXIAL LINE 1981

Takatsugu Fukushima, Naobumi Michishita, Hisashi Morishita, National Defense Academy, Japan; Naoya Fujimoto, Hitachi Kokusai Electric Inc., Japan

FR-A1.3P.4: DESIGN OF A HIGH EFFICIENCY LOW SIDELOBE DUAL-POLARIZATION CAVITY ANTENNA ARRAY AT KU-BAND 1983

Shan Jiang, Qingyuan Zhang, Chang Chen, Zhiping Yin, Weidong Chen, University of Science and Technology of China, China

FR-A1.3P.5: A COMPACT SLOTTED-CAVITY ANTENNA FOR HPM REFLECTOR FEED 1985

Xiao Ma, Feng Yang, Rui Wong, Min Gao, Xuewu Cui, University of Electronic Science and Technology of China, China

FR-A1.3P.6: TIGHTLY COUPLED DIPOLE ARRAY WITH WIDEBAND DIFFERENTIAL FEEDING NETWORK 1987

Alexander Johnson, Jingni Zhong, Matilda Livadaru, Elias A. Alwan, John L. Volakis, Florida International University, United States

FR-A1.3P.7: EXPERIMENTAL INVESTIGATION OF PROBE IMMUNITY TO ABSORBER PLATE POSITION 1989

Andrea Giacomini, Vincenzo Schirosi, Roberto Morbidini, Lars Jacob Foged, Lucia Scialacqua, Microwave Vision Italy (MVI), Italy; John Estrada, Jim Acree, MVG Inc., United States

FR-A1.3P.8: A RADIAL MULTI-MODE FILTERING POWER DIVIDER FOR ANTENNA ARRAY APPLICATIONS 1991

Ricardo Lovato, Xun Gong, University of Central Florida, United States

FR-A1.3P.9: A HIGH-GAIN DUAL-FREQUENCY DUAL-POLARIZATION FEED SYSTEM FOR 5G COMMUNICATION 1993

Nan-Nan Wang, Bing-Xu Zhao, Mu Fang, Jing-Hui Qiu, Li-Yi Xiao, Harbin Institute of Technology, China

FR-A1.3P.10: MIXED TUNING METHODS FOR HF SMALL LOOP ANTENNA..... N/A

Daihui Mo, Tsinghua University, China; Liang Xu, Xidian University, China

FR-A4.4P: MILLIMETER-WAVE PROPAGATION

FR-A4.4P.1: SIMULATING ENGINEERED ELECTROMAGNETIC SURFACES IN RAY-TRACING SOFTWARE 1997

Reza Chaharmir, Cesar Amaya, Ming Zhang, Yvo De Jong, Jonathan Ethier, Communications Research Centre Canada, Canada

- FR-A4.4P.2: CALCULATION OF MUTUAL COUPLING BETWEEN TWO ANTENNAS OF DIVERSE DISPLACEMENTS AND POLARIZATIONS** 1999
Ilkyu Kim, Defense Agency for Technology and Quality, Korea (South); Yahya Rahmat-Samii, University of California, Los Angeles, United States
- FR-A4.4P.3: CHANNEL ANALYSIS AND PERFORMANCE EVALUATION OF WIRELESS BACKHAUL AT 5G FREQUENCY BANDS** 2001
Ruonan Shi, Bo Ai, Danping He, Ke Guan, Beijing Jiaotong University, China; Ning Wang, Zhengzhou University, China; Yajun Zhao, ZET, China
- FR-A4.4P.4: COMPLEX PERMITTIVITY OF TYPICAL CONSTRUCTION MATERIALS OVER 40-50 GHZ** 2003
Yu Shao, Xi Liao, Yang Wang, Chongqing University of Posts and Telecommunications, China
- FR-A4.4P.5: DOPPLER SHIFT AND COHERENCE TIME OF 5G VEHICULAR CHANNELS AT 3.5 GHZ**..... 2005
Shaoshi Wang, Ke Guan, Danping He, Guangkai Li, Xue Lin, Bo Ai, Zhangdui Zhong, State Key Laboratory of Rail Traffic Control and Safety, Beijing Jiaotong University, China
- FR-A5.1P: RFID AND REMOTE SENSING**
- FR-A5.1P.2: EMBROIDERED UHF RFID MOISTURE SENSOR TAG ON DISHCLOTH SUBSTRATE** 2009
Xiaochen Chen, Han He, Leena Ukkonen, Johanna Virkki, BioMediTech Institute and Faculty of Biomedical Sciences and Engineering, Finland
- FR-A5.1P.3: HIGH-ORDER PT-SYMMETRIC TELEMETRIC SENSORS WITH SINGULARITY-ENHANCED SENSITIVITY**2011
Pai-Yen Chen, Maryam Sakhdari, Wayne State University, United States
- FR-A5.1P.4: A NOVEL PASSIVE RFID TEMPERATURE SENSOR USING LIQUID CRYSTAL ELASTOMERS** 2013
Yousuf Shafiq, John Gibson, Stavros Georgakopoulos, Florida International University, United States; Hyun Kim, Cedric Ambulo, Taylor Ware, University of Texas at Austin, United States
- FR-A5.1P.5: ARRAY STRATEGIES FOR IMPROVING THE PERFORMANCES OF CHIPLESS RFID TAGS** 2015
Elif Cetin, ASELSAN Inc., Turkey; Baris Sahin, Özgür Ergül, Middle East Technical University, Turkey
- TUP-A2.3P: FREQUENCY SELECTIVE SURFACE APPLICATIONS**
- TUP-A2.3P.1: AN I-SLAB SYSTEM FOR TILTED BEAM FORMATION** 2017
Hisamatsu Nakano, Yuhei Kameta, Junji Yamauchi, Hosei University, Japan
- TUP-A2.3P.2: DESIGN OF FREQUENCY SELECTIVE PAPER FOR CRACK DETECTION OF CONCRETE BUILDING STRUCTURE** 2019
Sang-Hwa Lee, Ic-Pyo Hong, Kongju National University, Korea (South)
- TUP-A2.3P.3: FREQUENCY SELECTIVE PROPERTIES OF METAL MESH OPTICALLY TRANSPARENT TOUCH SENSOR PANELS** 2021
Sameer Sharma, Andrea Luttgen, Degen Zhou, Costas D. Sarris, University of Toronto, Canada
- TUP-A2.3P.4: A FLEXIBLE FREQUENCY SELECTIVE SURFACE FOR BEAM-SWITCHING APPLICATIONS** 2023
Traii Moubarek, Riyadh College of Technology, Saudi Arabia; Bouslama Moufida Bouslama, Ali Gharsallah, Faculty of Sciences of Tunis (FST), Tunisia; Mourad Nedil, Université de Québec en Abitibi-Témiscamingue, Canada
- TUP-A2.3P.5: DUAL-BAND FILTENNA DESIGN FOR X-BAND APPLICATIONS**..... N/A
Sultan Can, A. Egemen Yilmaz, Ankara University, Turkey

- TUP-A2.3P.6: CODING AMC STRUCTURE FOR PATTERN SCATTERING N/A**
Fereshteh Samadi, Mohammad Akbari Choubar, Mohammad Reza Chaharmir, Abdel Razik Sebak, Concordia University, Canada
- TUP-A2.3P.7: ELECTROMAGNETIC RESPONSE FROM A TWO-DIMENSIONAL ARRAY OF 2029**
CONDUCTING STRIPS INTER-CONNECTED WITH COLUMNS OF SILVER-COATED MICRON-SIZED PARTICLES
Jerika Cleveland, Benjamin D. Braaten, North Dakota State University, United States; Jeffery Allen, Monica Allen, Brett Wenner, Air Force Research Laboratory, United States
- TUP-A2.3P.9: OFF-BODY ANTENNA DUAL-BEAM LINEAR TO CIRCULAR POLARISATION 2031**
CONVERTER BASED ON QUARTER-WAVE CROSS-SLOT FREQUENCY SELECTIVE SURFACE
Amine Habani, Mourad Nedil, Université du Québec en Abitibi-Témiscamingue, Canada; Tayeb A. Denidni, Institut National de la Recherche Scientifique, Canada; Larbi Talbi, Université du Québec en Outaouais, Canada
- TUP-A2.1P: ADVANCES IN FREQUENCY SELECTIVE SURFACES**
- TUP-A2.1P.1: IMPROVED BROADBAND BANDPASS FSS FILTERS FOR 5G APPLICATIONS 2033**
Te-Kao Wu, FSS and Antenna Consulting, United States
- TUP-A2.1P.2: MULTI-OBJECTIVE LAZY ANT COLONY OPTIMIZATION FOR FREQUENCY 2035**
SELECTIVE SURFACE DESIGN
Danny Zhu, Pingjuan Werner, Douglas H. Werner, Pennsylvania State University, United States
- TUP-A2.1P.3: COMPACT THIRD-ORDER BANDPASS FREQUENCY SELECTIVE SURFACE WITH 2037**
WIDE SPURIOUS-SUPPRESSION BANDWIDTH
Komlan Payne, Jay K. Lee, Syracuse University, United States; Kevin Xu, Jun H. Choi, University at Buffalo, United States
- TUP-A2.1P.4: A NOVEL WIDEBAND FREQUENCY SELECTIVE SURFACE DESIGN BASED ON 2039**
CASCADED PATCH RESONATORS WITH A SLOTTED GROUND
Cheng Jin, Qihao Lv, Beijing Institute of Technology, China; Raj Mittra, University of Central Florida, United States
- TUP-A2.1P.5: POLARIZATION INDEPENDENT FREQUENCY SELECTIVE SURFACE DESIGN 2041**
USING ROTATED UNIT CELLS
Li Gu, Yanwen Zhao, Lifeng Wu, Zhipeng Zhang, Qiangming Cai, University of Electronic Science and Technology of China, China
- TUP-A2.1P.6: SANDWICHED PRS FABRY-PEROT STRUCTURE FOR ACHIEVING COMPACTNESS 2043**
AND IMPROVED APERTURE EFFICIENCY
PranavBalaChandran MohanKumar, Bowen Zheng, Sensong An, Hong Tang, Hang Li, Hualiang Zhang, University of Massachusetts Lowell, United States
- TUP-A2.1P.7: BISTATE FREQUENCY SELECTIVE SURFACE BASED ON MICROFLUIDIC 2045**
TECHNOLOGY
Saptarshi Ghosh, Syed Imran Hussain Shah, Sungjoon Lim, Chung-Ang University, Korea (South)
- TUP-A2.1P.8: ACTIVE FREQUENCY SELECTIVE SURFACE WITH TWO INDEPENDENT 2047**
ELECTROMAGNETIC FUNCTIONS
Huangyan Li, Nanjing University of Aeronautics and Astronautics, China; Agostino Monorchio, Filippo Costa, University of Pisa, Italy; Qunsheng Cao, Yi Wang, Nanjing University of Aeronautics and Astronautics, China
- TUP-A2.1P.9: 2.5 DIMENSIONAL MINIATURIZED DUAL-BAND FREQUENCY SELECTIVE SURFACE 2049**
DESIGN
Wei Li, Ying Suo, Bowen Cai, Harbin Institute of Technology, China
- TUP-A2.1P.10: RECONFIGURABLE FREQUENCY SELECTIVE SURFACE FOR DUAL BAND FILTER 2051**
APPLICATIONS
Ke Peng, Wenxing Li, Yuanyuan Li, Harbin Engineering University, China

TUP-A2.4P: FREQUENCY SELECTIVE SURFACES: POLARIZERS AND ABSORBERS

TUP-A2.4P.1: LINEAR TO CIRCULAR FSS TRANSFORMER FOR DUAL-POLARIZED APPLICATIONS 2053

Daniel Sánchez-Escuderos, Miguel Ferrando-Rocher, Jose Ignacio Herranz-Herruzo, Alejandro Valero-Nogueira, Universitat Politècnica de València, Spain

TUP-A2.4P.2: TX-RX K/KA BAND POLARIZER BASED ON A SIW POLARIZATION TWISTER 2055

Emilio Arneri, Giandomenico Amendola, Luigi Boccia, Università della Calabria, Italy; Francesco Voci, IDS, Ingegneria Dei Sistemi S.p.A. Pisa, Italy

TUP-A2.4P.3: DUAL-FREQUENCY TUNABLE WAVE ABSORBING STRUCTURE BASED ON 2057 FREQUENCY SELECTIVE SURFACE

Wei Zhang, Jian-Ying Li, Jian Xie, Northwestern Polytechnical University, China

TUP-A2.4P.4: DESIGN OF A CO TO CROSS POLARIZATION CONVERTER WITH WIDEBAND PCR N/A PERFORMANCE

Marjan Jalali Moghadam, Mohammad Akbari Choubar, Fereshteh Samadi, Saman Zarbakhsh, Abdel Razik Sebak, Concordia University, Canada

TUP-A2.4P.5: WIDEBAND MULTI-LOOP FSS ABSORBER DESIGN BASED ON Q-FACTOR APPROACH 2061

Mahboobeh Mahmoodi, Kristen Donnell, Missouri university of Science and Technology, United States

TUP-A2.4P.6: TUNABLE ABSORPTIVE FREQUENCY-SELECTIVE TRANSMISSION STRUCTURE 2063

Ahmed Omar, Zhongxiang Shen, Nanyang Technological University, Singapore

TUP-A2.4P.7: LOW-PROFILE PLASMA-BASED TUNABLE ABSORBER..... 2065

Komlan Payne, Jay K. Lee, Syracuse University, United States; Kevin Xu, Jun H. Choi, University at Buffalo, United States

TUP-A2.4P.8: A PROPOSED LONG WAVELENGTH INFRA-RED METAMATERIAL ABSORBER FOR 2067 THZ DETECTION

Nilotpal Nilotpal, Abhishek Kumar Singh, Indian Institute of Technology (BHU), Varanasi, India; Mamta Upadhyay, Rashmi Lata, Birla Institute of Technology, Mesra, India; Somak Bhattacharyya, P Chakrabarti, Indian Institute of Technology (BHU), Varanasi, India

TUP-A2.4P.9: NEAR-FIELD MULTI-BEAM-SPLITTING FOR FABRY-PEROT CAVITY ANTENNA 2069 SYSTEM

Chanjoon Lee, Aditya Dave, Robert Sainati, Rhonda Franklin, University of Minnesota, United States

TUP-A2.5P: NANOSCALE ELECTROMAGNETICS

TUP-A2.5P.1: THE ELECTROMAGNETIC FRAMEWORK OF “NANOARCHITECTONICS” 2071

Jouni Ahopelto, VIT University, Finland; Alice Benini, University of Siena, Italy; Filiberto Bilotti, UNIROMA3, Italy; Bruno Casali, IDS, Italy; Jean Chazelas, THALES S.A., France; Giampiero Gerini, TNO, Netherlands; Yang Hao, Queen Mary University of London, United Kingdom; Kai Herbertz, Fraunhofer, Germany; Stefano Maci, University of Siena, Italy; Andrea Massa, UNITN, Italy; Luca Pierantoni, UNIVPM, Italy; Clivia Sotomayor, ICN2, Spain; Sergei Tretyakov, Aalto University, Finland; Charlotte Tripon-Canseliet, UPMC, France; Yiannis Vardaxoglou, Loughborough University, United Kingdom; Giuseppe Vecchi, Politecnico di Torino, Italy; Anatoly Zayats, Kings College London, United Kingdom

TUP-A2.5P.2: USE OF DIELECTRIC NANOPARTICLES FOR DESIGNING HIGH-REFLECTION 2073 COATINGS AND DIELECTRIC MIRRORS

Alessio Monti, Niccolò Cusano University, Italy; Alessandro Toscano, Filiberto Bilotti, Roma Tre University, Italy

TUP-A2.5P.3: OPTICAL ABSORBERS WITH NPS-BASED LOSSY METASURFACES 2075

Alessio Monti, Niccolò Cusano University, Italy; Andrea Alù, University of Texas at Austin, United States; Alessandro Toscano, Filiberto Bilotti, Roma Tre University, Italy

- TUP-A2.5P.4: ON A BOUNDARY ELEMENT METHOD (BEM) FOR THE NONLOCAL 2077**
HYDRODYNAMIC RESPONSE OF A NANOANTENNA
Xuezhi Zheng, Mario Kupresak, Guy A. E. Vandenbosch, KU Leuven, Belgium; Raj Mittra, University of Central Florida, United States
- TUP-A2.5P.5: DIRECTIONAL ENHANCEMENT ANALYSIS OF ALL-DIELECTRIC OPTICAL 2079**
NANOANTENNAS BASED ON MODIFIED SIE
Xin Qi, Zaiping Nie, Yongpin Chen, Xiaofeng Que, Jun Hu, Yue Wang, University of Electronic Science and Technology of China, China
- TUP-A1.6P: DIELECTRIC RESONATOR ANTENNAS**
- TUP-A1.6P.1: WIDEBAND 3D-PRINTED DIELECTRIC RESONATOR ANTENNAS 2081**
Payam Nayeri, Geoff Brennecke, Colorado School of Mines, United States
- TUP-A1.6P.2: DESIGN OF HYBRID SLOT-FED DIELECTRIC RESONATOR ANTENNA ARRAYS FOR N/A**
5G WIRELESS COMMUNICATIONS IN K BAND
A. Al-Rawi, Bart Smolders, Eindhoven University of Technology, Netherlands; S. Keyrouz, D. Caratelli, The Antenna Company, Netherlands
- TUP-A1.6P.3: A WIDEBAND CIRCULARLY POLARIZED DIELECTRIC RESONATOR ANTENNA OVER 2085**
A METASURFACE
*Arslan Kiyani, Macquarie University, Australia; Nasimuddin Nasimuddin, Institute for Infocomm Research, A*STAR, Singapore; Karu P. Esselle, Macquarie University, Australia*
- TUP-A1.6P.4: CIRCULARLY POLARIZED HIGH GAIN SPHERICAL DIELECTRIC RESONATOR 2087**
ANTENNA OPERATING ON HIGHER-ORDER MODE
ByungKuon Ahn, Soo-Chang Chae, Ju-Ik Oh, Jong-Won Yu, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)
- TUP-A1.6P.5: DESIGN AND DEVELOPMENT OF UWB MODIFIED MALTESE SHAPED DIELECTRIC 2089**
RESONATOR ANTENNA
Kedar Trivedi, Dhaval Pujara, Institute of Technology, Nirma University, India
- TUP-A1.6P.6: BANDWIDTH ENHANCEMENT BY POSITION PERTURBATIONS IN STACKED 2091**
DIELECTRIC RESONATOR ANTENNA
Mohamed Sedigh Bizan, Ghada Hussain Elzwawi, Muhammad M. Tahseen, Tayeb A. Denidni, Institut National de la Recherche Scientifique, Canada
- TUP-A1.6P.7: MULTI-FREQUENCY CYLINDRICAL DRA WITH IDENTICAL RADIATIONS USING 2093**
HEM11A/HEM12A/HEM111 MODES
Poulomi Gupta, Debatosh Guha, University of Calcutta, India; Chandrakanta Kumar, ISRO Satellite Centre, India; Yahia M. M. Antar, Royal Military College of Canada, Canada
- TUP-A1.6P.8: STRIPLINE FED HOLLOW DIELECTRIC RESONATOR ANTENNA-IN-PACKAGE 2095**
WITH/WITHOUT METAL SHIELDING
Sheng-Jie Guo, Lin-Sheng Wu, Min Tang, Jun-Fa Mao, Shanghai Jiao Tong University, China
- TUP-A1.6P.9: BANDWIDTH RECONFIGURABLE CYLINDRICAL DIELECTRIC RESONATOR 2097**
ANTENNA EXCITED BY DOUBLE-RING SLOT
Beijia Liu, Jinghui Qiu, Shengchang Lan, Nannan Wang, Hao Liu, Harbin Institute of Technology, China
- TUP-A1.6P.10: A MINIATURIZED BROADBAND RECTANGULAR DIELECTRIC RESONANT ANTENNA N/A**
ARRAY FED BY RSIW
Xing Jiang, Quan Li, Lin Peng, Xiaofeng Li, Guilin University of Electronic Technology, China

TUP-A1.1P: ARRAY PATTERN SYNTHESIS AND OPTIMIZATION TECHNIQUES

TUP-A1.1P.1: SIMPLE PHASE-MODE COEFFICIENTS FOR EQUI RIPPLE SIDELobe REDUCTION 2101 FROM A UNIFORM CIRCULAR ARRAY

W. Mark Dorsey, Anna Stumme, U.S. Naval Research Laboratory, United States

TUP-A1.1P.2: SYNTHESIS OF NON-BROADSIDE LINEAR ARRAY WITH SPARSE BAYESIAN 2103 LEARNING

Hua Bai, Ramakrishna Janaswamy, University of Massachusetts Amherst, United States

TUP-A1.1P.3: A GRAPHICAL METHOD FOR THE PRELIMINARY DESIGN OF PHASED ARRAY 2105 ANTENNA

Stefano Maddio, Giuseppe Pelosi, Monica Righini, Stefano Selleri, University of Florence, Italy; Giorgio Giunta, Chiara Novi, Rheinmetall, Italy

TUP-A1.1P.4: INNOVATIVE METHOD FOR DESIGNING MULTIBEAM-ON-RECEIVE SCANNING 2107 ARRAYS WITH OPTIMIZED SUB-ARRAY CONFIGURATION AND ANALYTIC PHASE SYNTHESIS

Nicola Anselmi, Paolo Rocca, Lorenzo Poli, Andrea Massa, University of Trento, Italy

TUP-A1.1P.5: A GENERAL APPROACH TO THE OPTIMAL SYNTHESIS OF SHAPED-BEAMS 2109 THROUGH FIXED GEOMETRY ARRAYS

Andrea Francesco Morabito, Università Mediterranea di Reggio Calabria, Italy; Giada M. Battaglia, University 'Mediterranea' of Reggio Calabria, Italy; Gennaro Giovanni Bellizzi, Università Mediterranea di Reggio Calabria, Italy; Tommaso Isernia, University 'Mediterranea' of Reggio Calabria, Italy

TUP-A1.1P.6: TWO-STEP OPTIMIZATION OF LINEAR DISTRIBUTED ARRAYS 2111

Sean Ellison, Jeffrey A. Nanzer, Michigan State University, United States

TUP-A1.1P.7: PHASE-ONLY SHAPED BEAM TRANSMIT-ARRAY 2113

Catarina C. Cruz, Carlos A. Fernandes, Sérgio A. Matos, Jorge R. Costa, Instituto de Telecomunicações, Portugal

TUP-A1.1P.8: FAST 3D SYNTHESIS OF APERIODIC RECTANGULAR ARRAYS 2115

Giulia Buttazzoni, Roberto Vescovo, University of Trieste, Italy

TUP-A1.1P.9: THINNED ARRAY DESIGN VIA AUTOCORRELATION MATCHING STRATEGY 2117

Giacomo Oliveri, Lorenzo Poli, Andrea Massa, University of Trento, Italy

TUP-A1.1P.10: SYNTHESIS OF 4D LINEAR ANTENNA ARRAYS USING AN ITERATIVE CONVEX 2119 OPTIMIZATION ALGORITHM

Feng Yang, Shiwen Yang, Yikai Chen, University of Electronic Science and Technology of China, China

TUP-A1.7P: LOW COST ARRAYS FOR SCANNING AND FIXED BEAMS

TUP-A1.7P.1: REALIZATION OF LOW-COST WIDE SCANNING ARRAYS 2121

Matilda Livadaru, John L. Volakis, Florida International University, United States

TUP-A1.7P.2: A SUBSTRATE INTEGRATED WAVEGUIDE SLOT ARRAY WITH 2123 VOLTAGE-CONTROLLED LIQUID CRYSTAL PHASE SHIFTER

Omid Manoochchri, Farhad Farzami, University of Illinois at Chicago, United States; Mohammad Ali Salari, University of Cologne, Germany; Danilo Erricolo, University of Illinois at Chicago, United States

TUP-A1.7P.3: LOW COST BROADBAND PHASED ARRAY SYSTEM 2125

Dongjin Jung, Hanseung Lee, Skyworks Solutions, Inc., United States

TUP-A1.7P.4: NOVEL LOW-COST PHASE SHIFTERS FOR MILLIMETER WAVE APPLICATIONS 2127

Raj Mitra, University of Central Florida, United States; Abdelkhalek Nasri, National Engineering School of Carthage, Tunisia; Donia Oueslati, Université catholique de Louvain, ICTEAM Institut, Louvain-la-Neuve, Belgium; Hatem Rmili, King Abdulaziz University, Saudi Arabia

TUP-A1.7P.5: PHASE SHIFTERS DESIGN FOR SCAN RANGE EXTENSION OF ROTMAN LENS BEAMFORMING BASED ANTENNA ARRAYS	2129
<i>Enrico Tolin, Francesca Vipiana, Politecnico di Torino, Germany; Oliver Litschke, Simona Bruni, IMST GmbH, Germany</i>	
TUP-A1.7P.6: MICROWAVE IMAGING USING FOCUSED ARRAY ANTENNA	2131
<i>Peng-Fa Li, Shi-Wei Qu, University of Electronic Science and Technology of China, China</i>	
TUP-A1.7P.7: ANALYSIS AND DESIGN OF A CIRCULARLY-POLARIZED PLANAR LEAKY-WAVE ANTENNA	2133
<i>Davide Comite, Sapienza University, Italy; Symon Podilchak, Heriot-Watt University, United Kingdom; Paolo Baccarelli, Roma Tre University, Italy; Paolo Burghignoli, Alessandro Galli, Sapienza University, Italy; Al Freundorfer, Yahia M. M. Antar, Royal Military College of Canada, Italy</i>	
TUP-A1.7P.8: DESIGN OF A 3-FACET LINEARLY-POLARIZED TRANSMITARRAY ANTENNA AT KA-BAND	2135
<i>Fatimata Diaby, Antonio Clemente, Laurent Dussopt, CEA, France; Ronan Sauleau, Kien Pham, IETR, France; Erwan Fourn, INSA Lyon, France</i>	
TUP-A1.7P.9: COMPACT OVERLAPPING ANNULAR SLOT ARRAY	2137
<i>Eric Robinson, Ian McMichael, Jeffrey Chalas, Frank Kolak, MITRE Corporation, United States</i>	
 TUP-A1.3P: ARRAYS FOR RADAR: WEATHER, MULTIFUNCTION, AND OTH	
TUP-A1.3P.1: ORCHESTRA: OPTIMIZABLE RF CONVERGED HARDWARE EXPRESSION OF A SCALABLE TRANSMIT/RECEIVE ARCHITECTURE	2139
<i>Benjamin McMahon, Randall Lapierre, Andrew MacCabe, Nicholas Campbell, Timothy Dresser, Daniel Fontaine, Kunaal Boal, Jeffrey Bryant, BAE Systems, United States</i>	
TUP-A1.3P.4: DUAL-POLARIZED APERTURE-COUPLED HYBRID-FED MICROSTRIP PATCH ANTENNA FOR MPAR APPLICATION	2141
<i>Hadi Saeidi-Manesh, Guifu Zhang, University of Oklahoma, United States</i>	
TUP-A1.3P.5: A HIGHLY ISOLATED DUAL-POLARIZED CROSSED DIPOLE ARRAY ANTENNA FOR MULTI-MISSION APPLICATIONS	2143
<i>Mirhamed Mirmozafari, Shahrokh Saeedi, Guifu Zhang, University of Oklahoma, United States</i>	
TUP-A1.3P.6: EFFECTS OF ANTENNA PATTERN ASYMMETRY ON RADAR ANGLE RATE ESTIMATION	2145
<i>Stavros Vakalis, Jeffrey A. Nanzer, Michigan State University, United States</i>	
TUP-A1.3P.7: SUBSTRATE INTEGRATED WAVEGUIDE ANTENNA ARRAY FOR MODERN BEAMFORMING RADARS	2147
<i>Tiago Varum, Instituto de Telecomunicações, Portugal; João Matos, Instituto de Telecomunicações, Universidade de Aveiro, Portugal</i>	
TUP-A1.3P.8: NULL-STEERING SENSITIVITY TO GROUND PROPERTIES IN OVER-THE-HORIZON RADAR WITH PLANAR MONOPOLE ARRAY ON FINITE RADIAL GROUND PLANE	2149
<i>Simon Henault, Gilbert A. Morin, Defence Research and Development Canada, Canada</i>	
TUP-A1.3P.9: CROSS-POLARIZED NULL-STEERING IN OVER-THE-HORIZON RADAR WITH PLANAR MONOPOLE ARRAY ON FINITE RADIAL GROUND PLANE	2151
<i>Simon Henault, Gilbert A. Morin, Defence Research and Development Canada, Canada</i>	
TUP-A1.3P.10: SYNTHESIS OF STEERABLE MAXIMALLY SPARSE ARRAY VIA MODIFIED PERTURBED COMPRESSIVE SAMPLING	2153
<i>Fei Yan, Runliang Xia, The 38th Research Institute of China Electronics Technology Group Corporation, China</i>	

TUP-A1.9P: WIDEBAND AND UWB ARRAY RADIATORS

TUP-A1.9P.1: 6-15 GHZ WIDE SCANNING CONNECTED ARRAY 2155
Daniele Cavallo, Waqas Syed, Andrea Neto, Delft University of Technology, Netherlands

TUP-A1.9P.2: WIDE SCAN, WIDEBAND ARRAYS WITH SELF-DUAL POINT-LIKE ELEMENTS 2157
Nasim Mohammadi Estakhri, Nader Engheta, Raphael Kastner, University of Pennsylvania, United States

TUP-A1.9P.3: INVESTIGATION OF ACTIVE LOAD PULLING EFFECT ON RADIATED POWER OF 2159
THE ANTENNA ELEMENTS IN A FINITE PHASED ARRAY TRANSMITTER FOR SATELLITE COMMUNICATION
Soroush Rasti Boroujeni, Hussam Al-Saedi, Mohammad-Reza Nezhad-Ahmadi, Safieddin Safavi-Naeini, University of Waterloo, Canada

TUP-A1.9P.4: COMPARISON OF TOPOLOGY MODIFICATION FOR SIZE-REDUCTION-ORIENTED 2161
WIDEBAND ANTENNA DESIGN
Muhammad Ul Haq, Slawomir Koziel, Reykjavik University, Iceland

TUP-A1.9P.5: A 12.5:1 BANDWIDTH DUAL-POLARIZED TIGHTLY COUPLED DIPOLE PHASED ARRAY 2163
WITH COMPACT BALUN
Wenyang Zhou, Yikai Chen, Shiwen Yang, University of Electronic Science and Technology of China, China

TUP-A1.9P.6: A 6:1 BANDWIDTH DUAL-POLARIZED LINEAR PHASED ARRAY OF TAPERED SLOT 2165
ANTENNAS
Ming Huang, Li Wang, Wensheng Qiao, Kaizhi Zhang, Longjian Zhou, Southwest China Institute of Electronic Technology, China

TUP-A1.9P.7: WIDEBAND TIGHTLY COUPLED ARRAY WITH APERTURE-COUPLED EXCITATIONN/A
Xuewu Cui, Feng Yang, Min Gao, Xiao Ma, Peng Yang, University of Electronic Science and Technology of China, China

TUP-A1.9P.8: A LOW PROFILE DUAL-POLARIZED TIGHTLY COUPLED DIPOLE ARRAY WITH 2169
RESISTANCE RING
Kaizhi Zhang, Wensheng Qiao, Li Wang, Ming Huang, Longjian Zhou, CETC Key Laboratory of Avionic Information System Technology, China

TUP-A1.9P.9: AN X-BAND OBLIQUE POLARIZED ANTENNA ARRAY N/A
Jia Fang, Mouping Jin, Feng Yu, ECRIEEE, East China Research Institute of Electronic Engineering, China

TUP-A1.9P.10: A NOVEL DUAL-POLARIZED CAVITY-BACKED ELEMENT FOR WIDEBAND 2173
WIDE-SCANNING PHASED ARRAY
Run-Liang Xia, Fei Yan, The 38th Research Institute of China Electronics Technology Group Corporation, China

TUP-A1.2P: ARRAYS FOR 5G AND MILLIMETER WAVE

TUP-A1.2P.1: DESIGNING NEW GENERATION ANTENNAS FOR 5G MIMO SYSTEMS - A NEW 2175
PERSPECTIVE IN ARRAY SYNTHESIS
Giorgio Gottardi, Giacomo Oliveri, Davide Cunial, Andrea Massa, University of Trento, Italy

TUP-A1.2P.2: 28 GHZ MULTI-BEAM ANTENNA ARRAY BASED ON A COMPACT WIDEBAND 8X8 2177
BUTLER MATRIX
Xiaozhou Wang, Martin Laabs, Dirk Plettemeier, Hsiao-Lan Chiang, Mostafa Khalili Marandi, Gerhard P. Fettweis, Technische Universität Dresden, Germany; Keishi Kosaka, Yasuhiko Matsunaga, NEC Corporation, Japan

TUP-A1.2P.4: A CLASS OF CAVITY-BASED UWB MULTI-BEAMFORMERS WITH APPLICATIONS TO 2179
SUB-6 GHZ 5G
Christopher Merola, University of Massachusetts, United States; Marinos N. Vouvakis, University of Massachusetts Amherst, United States

TUP-A1.2P.5: HEAT DISSIPATION ANTENNA ARRAY FOR COMPACT MASSIVE MIMO RADIO UNIT 2181
Keishi Kosaka, Hiroshi Toyao, Eiji Hankui, NEC Corporation, Japan

TUP-A1.2P.6: APERTURE COUPLED BEAMFORMING ANTENNA ARRAY.....	2183
<i>Shailendra Kaushal, Ryuta Yamamoto, Kiyoshi Kobayashi, Ning Guan, Fujikura Ltd., Japan</i>	
TUP-A1.2P.7: A NOVEL DUAL-POLARIZED PLANAR ANTENNA.....	2185
<i>Haihan Sun, Can Ding, Yingjie Guo, University of Technology, Sydney, Australia</i>	
TUP-A1.2P.8: BEAM STEERING CAPABILITIES OF A FULLY DIELECTRIC ANTENNA ARRAY.....	2187
<i>Roland Reese, Matthias Jost, Ersin Polat, Matthias Nickel, Rolf Jakoby, Holger Maune, TU Darmstadt, Germany</i>	
TUP-A1.5P: DIELECTRIC RESONATOR AND SIW ANTENNAS	
TUP-A1.5P.1: NOVEL ACOUSTICALLY ACTUATED MAGNETOELECTRIC ANTENNAS.....	2189
<i>Xianfeng Liang, Huaihao Chen, Neville Sun, Hwaider Lin, NianXiang Sun, Northeastern University, United States</i>	
TUP-A1.5P.3: HIGH GAIN AND DUAL CIRCULARLY POLARIZED SIW SLOTTED ANTENNA.....	2191
<i>D. J Wei, Jian-Ying Li, R. Xu, Y. X. Qi, J. Liu, Jiang-Jun Yang, Northwestern Polytechnical University, China</i>	
TUP-A1.5P.4: HEM12D MODE BASED ADVANCED CYLINDRICAL DRA USING A NEW FEEDING WITH NON-METALLIC BASE	2193
<i>Chandreyee Sarkar, Debatosh Guha, University of Calcutta, India</i>	
TUP-A1.5P.5: SLOT-LOADED SIW-FED WIDE-BAND YAGI ANTENNA HAVING END-FIRE / BROADSIDE SCANNING FEATURES	2195
<i>Debdeep Sarkar, Kumar Vaibhav Srivastava, Indian Institute of Technology Kanpur, India</i>	
TUP-A1.8P: PATTERN SYNTHESIS, DOA, AND CALIBRATION WITH NON-IDEAL ARRAYS	
TUP-A1.8P.1: PENCIL BEAM CONSTRAINED SYNTHESIS OF LINEAR SPARSE ARRAYS IN PRESENCE OF COUPLING EFFECTS	2197
<i>Giulia Buttazoni, Roberto Vescovo, University of Trieste, Italy</i>	
TUP-A1.8P.2: OPTIMAL CP-BASED SYNTHESIS OF REAL LINEAR ARRAYS.....	2199
<i>Nicola Anselmi, Lorenzo Poli, Paolo Rocca, Andrea Massa, University of Trento, Italy</i>	
TUP-A1.8P.3: SYNTHESIS OF SHAPED BEAMS USING ACTIVE ELEMENT PATTERNS AND SPECTRAL FACTORIZATION	2201
<i>Tommaso Isernia, Andrea Francesco Morabito, Università Mediterranea di Reggio Calabria, Italy; Calogero Alessio Di Carlo, Loreto Di Donato, Gino Sorbello, Università degli Studi di Catania, Italy</i>	
TUP-A1.8P.4: APPLICATION OF SOCIAL NETWORK OPTIMIZATION TO SHAPED BEAM TRANSMITARRAY ANTENNAS	2203
<i>Michele Beccaria, Politecnico di Torino, Italy; Alessandro Niccolai, Politecnico di Milano, Italy; Paola Pirinoli, Politecnico di Torino, Italy; Riccardo Zich, Politecnico di Milano, Italy</i>	
TUP-A1.8P.5: COMPARISON BETWEEN NU-CNLMS AND GA FOR ANTENNA ARRAY FAILURE CORRECTION	2205
<i>Xiaochao Jiang, Peng Xu, Tao Jiang, Harbin Engineering University, China</i>	
TUP-A1.8P.6: ADAPTIVE ANTENNA ARRAY BEAMFORMING BASED ON NORM PENALIZED NLMS ALGORITHM	2207
<i>Wanlu Shi, Harbin Engineering University, China; Yingsong Li, Harbin Engineering University & Chinese Academy of Science, China; Shengyuan Luo, Harbin Engineering University, China</i>	
TUP-A1.8P.7: COMPUTATIONALLY EFFICIENT ESPRIT APPROACH FOR 2D DOA ESTIMATION BASED ON NYSTROM APPROXIMATION	N/A
<i>Lingwen Zhang, Siliang Wu, Beijing Jiaotong University, China; Guanze Peng, New York University, United States; Wenkao Yang, Beijing Jiaotong University, United States</i>	

TUP-A1.8P.8: DOA ESTIMATION WITH TRIPLY PRIMED ARRAYS BASED ON FOURTH-ORDER STATISTICS	2211
<i>Kai-Chieh Hsu, Jean-Fu Kiang, National Taiwan University, Taiwan</i>	
TUP-A1.8P.9: PHASED ANTENNA ARRAY CALIBRATION BASED ON COMPRESSED SENSING THEORY	2213
<i>Galina Babur, Tomsk State University of Control Systems and Radioelectronics, Russia; Diego Caratelli, The Antenna Company, Netherlands; Arman Mirmanov, Saken Seifullin Kazakh Agrotechnical University, Kazakhstan</i>	
TUP-A1.4P: COMMUNICATIONS ARRAYS: MODULATIONS AND APERTURES	
TUP-A1.4P.1: PULSE SEQUENCE OPTIMIZATION FOR HARMONIC-DIVERSITY EXPLOITATION OF TIME-MODULATED ARRAYS IN COGNITIVE RADIO APPLICATIONS	2215
<i>Lorenzo Poli, Paolo Rocca, Andrea Massa, University of Trento, Italy</i>	
TUP-A1.4P.2: FULL-DIVERSITY OAM MULTIPLEXING BY ANTENNA ARRAY	2217
<i>Jie Xu, Loyola Marymount University, United States</i>	
TUP-A1.4P.3: DUAL CHANNEL BROADCAST USING PHASE-ONLY DIRECTIONAL MODULATION SYSTEM	2219
<i>Saad Mufti, University of Sheffield, United Kingdom; Josep Parrón, Universitat Autònoma de Barcelona, Spain; Alan Tennant, University of Sheffield, United Kingdom</i>	
TUP-A1.4P.4: GAIN IMPROVEMENT OF PHASED ARRAY USING SUB-ARRAYED MICROSTRIP PATCH ANTENNAS FOR SATELLITE COMMUNICATION APPLICATIONS	2221
<i>Soo-Chang Chae, ByungKuon Ahn, Seung-Tae Khang, Jong-Won Yu, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)</i>	
TUP-A1.4P.5: EXPERIMENTAL DEMONSTRATION AND SYSTEM EVALUATION OF OAM-LIKE SPATIAL DIVERISTY FROM TWO LINEAR ANTENNA ARRAYS	2223
<i>Baiyang Liu, Ronglin Li, South China University of Technology, China</i>	
TUP-A1.4P.6: DUAL-POLARIZED WIDEBAND REMOTE ELECTRICAL TILT MULTI-BEAM ANTENNAS	2225
<i>Lin-Ping Shen, Hua Wang, Nasrin Hojjat, Willi Lotz, Hamid Jamali, CCAI, Canada</i>	
TUP-A1.4P.7: DESIGN AND OPTIMIZATION OF A CIRCULAR POLARIZED LINEAR ARRAY IN SIW FOR LAST-MILE APPLICATION	N/A
<i>Santi Conchetto Pavone, University of Siena, Italy; Massimiliano Casaletti, University Pierre and Marie Curie, Paris 6, France; Matteo Albani, University of Siena, Italy</i>	
TUP-A1.4P.8: INTEGRATING THE SMALL WIND TURBINE WITH ITS POWER GENERATOR AND THE CYLINDRICAL ANTENNA ARRAY GENERATING MULTIBEAM SECTORIAL RADIATION PATTERN	2229
<i>Pawel Kabacik, Arkadiusz Byndas, Mariusz Hofman, Wroclaw University of Science and Technology, Poland</i>	
TUP-A1.4P.9: DESIGN AND DEVELOPMENT OF ULTRA-BROADBAND CIRCULARLY POLARIZED X-BAND 8X8 ARRAY WITH MULTI-LEVEL SEQUENTIAL PHASE ROTATION USEFUL FOR PAYLOAD OF MICRO AND NANO-SATELLITE LINKS	N/A
<i>Dhananjay Jahagirdar, Sambasiva Rao Kumbha, Research Center Imarat, India</i>	
TUP-A1.4P.10: A 28GHZ DUAL-POLARIZED PLANAR ANTENNA ARRAY	N/A
<i>Milad Rezaie, Mohammad Memarian, Mohammad Fakharzadeh, Sharif University of Technology, Iran</i>	
TUP-A1.4P.11: FAST DESIGN TUNING OF LINEAR MICROSTRIP ANTENNA ARRAY APERTURES BY MEANS OF RESPONSE FEATURES	2235
<i>Slawomir Koziel, Stanislav Ogurtsov, Reykjavik University, Iceland</i>	

TUP-A2.2P: ELECTROMAGNETIC THEORY

TUP-A2.2P.1: TOWARD THE SOLUTION OF THE TWO WEDGE PROBLEM BY USING THE 2237
GENERALIZED WIENER HOPF TECHNIQUE

Vito Daniele, Guido Lombardi, Rodolfo S. Zich, Politecnico di Torino-ISMB, Italy

TUP-A2.2P.2: NEW PERSPECTIVES FOR THE LONGITUDINAL SPECTRAL SOLUTION OF 2239
SOMMERFELD HALF-SPACE PROBLEM

Arun Bhattacharyya, Lockheed Martin Space Systems, United States

TUP-A2.2P.3: HIGH FREQUENCY WEDGE DIFFRACTION ANALYSIS VIA SURFACE EQUIVALENCE 2241
THEOREM

Hieu Ngoc Quang, Hiroshi Shirai, Chuo University, Japan

TUP-A2.2P.4: APPLICATION OF THE DISCRETE HANKEL TRANSFORM TO CYLINDRICAL 2243
WAVEGUIDES STRUCTURES

Faris Alsolamy, Anthony Grbic, University of Michigan, United States

TUP-A2.2P.5: PERTURBATIVE RECIPROCAL FORMULATION FOR MAXWELL'S EQUATIONS: A 2245
FIRST APPROACH

Simon Loillier, Bertrand Etchessahar, Geneviève Mazé-Merceur, CEA, France; Stephane Meric, Renaud Loison, IETR, France

TUP-A2.2P.6: GENERAL BOUNDARY CONDITIONS IN ELECTROMAGNETICS 2247

Ismo Lindell, Ari Sihvola, Aalto University, Finland

TUP-A2.2P.7: REALIZATION OF FOURTH ORDER EXCEPTIONAL POINTS OF DEGENERACY IN 2249
UNIFORM COUPLED-WAVEGUIDES

Tarek Mealy, Mohamed Y. Nada, Filippo Capolino, University of California, Irvine, United States

TUP-A2.2P.8: SCALED PT-SYMMETRIC COHERENT PERFECT ABSORBER (CPA)-LASER..... 2251

Maryam Sakhdari, Pai-Yen Chen, Wayne State University, United States

TUP-A2.2P.9: TIME REFLECTION AND REFRACTION IN TEMPORAL PERIODIC STRUCTURES 2253

Lizhen Lu, Xikui Ma, Tianyu Dong, Xi'an Jiaotong University, China; Qi Liu, Xi'an XD Power Systems Co. Ltd., China

TUP-A2.2P.10: A COMPLETE SET OF BOUNDARY CONDITIONS ON PEC - A WAY TO INCREASE 2255
THE PHYSICAL INSIGHT OF UNDERGRADUATE STUDENTS

Rajarshi Bhattacharya, National Institute of Technology Patna, India

TUP-A2.2P.11: THE SCATTERING BY TWO INVERTED STAGGERED PEC HALF-PLANES LOADED 2257
BY A DIELECTRIC LAYER

Vito Daniele, Guido Lombardi, Rodolfo S. Zich, Politecnico di Torino-ISMB, Italy

THP-A3.5P: HIGH FREQUENCY AND ASYMPTOTIC METHODS

THP-A3.5P.1: TIP DIFFRACTION OF WIDE-ANGLE CONES 2259

Michael Katsav, Ehud Heyman, Tel Aviv University, Israel

THP-A3.5P.2: DEVELOPMENT AND APPLICATION OF ITERATIVE PO TO THE CHARACTERIZATION 2261
OF EMI/EMC GROUND TEST FACILITY FOR ELECTRIC PROPULSION THRUSTERS

Matteo Albani, Federico Puggelli, Alberto Toccafondi, University of Siena, Italy; Gianfranco Meniconi, Fabrizio Scortecci, Aerospazio Tecnologie, Italy

THP-A3.5P.3: GEODESIC RAY TRACING ON FACETED CONVEX SURFACES FOR CO-SITE 2263
INTERFERENCE PREDICTION

Cagatay Tokgoz, Lamar University, United States; Daniel Dault, Bradley Kramer, Air Force Research Laboratory, United States

THP-A3.5P.4: RADIATION PATTERN OF A MONOPOLE ANTENNA ON AN ELECTRICALLY LARGE CONDUCTING CONVEX SURFACE	2265
<i>Babajide Salau, Cagatay Tokgoz, Lamar University, United States</i>	
THP-A3.5P.5: STUDIES ON NUMERICAL EVALUATION OF SOMMERFELD INTEGRALS FOR MULTILAYER TOPOLOGIES	2267
<i>Kalyan Durbhakula, Deb Chatterjee, Ahmed M. Hassan, University of Missouri at Kansas City, United States</i>	
THP-A3.5P.6: PO-BASED SHAPED REFLECTOR DESIGN FOR SECTORAL PATTERN RADAR ANTENNA	2269
<i>Santi Conchetto Pavone, University of Siena, Italy; Agnese Mazzinghi, University of Florence, Italy; Matteo Albani, University of Siena, Italy</i>	
THP-A3.5P.7: ANALYSIS OF STRIP-GRATED CONDUCTING ROD USING ASYMPTOTIC STRIP BOUNDARY CONDITIONS	2271
<i>Yueh-Chieh Yang, Malcolm Ng Mou Kehn, National Chiao Tung University, Taiwan</i>	
THP-A3.5P.8: COMPARISON OF THREE SAMPLING METHODS FOR SHOOTING-BOUNCING RAY TRACING USING A SIMPLE WAVEGUIDE MODEL	2273
<i>Cam Key, Blake Troksa, Forest Kunkel, Slobodan Savic, Milan Ilic, Branislav Notaros, Colorado State University, United States</i>	
THP-A3.5P.9: CURVATURE AND SLOPE CORRECTION IN HIGH-FREQUENCY DIFFRACTION AT THIN DIELECTRIC LAYERS	2275
<i>Ilya Sukharevsky, Technical University of Munich, Germany</i>	
THP-A3.5P.10: RAY MODEL ANALYSIS WITH ANTENNA FOR PREDICTING INDOOR WIRELESS COMMUNICATION	2277
<i>Min Gao, Feng Yang, Xuewu Cui, Xiao Ma, Yi Yan, University of Electronic Science and Technology of China, China</i>	
 THP-A4.2P: RCS	
THP-A4.2P.1: PHASOR REPRESENTATION METHOD FOR SYNTHESIZING RCS-REDUCTION METASURFACES	2279
<i>Anuj Modi, Constantine Balanis, Craig Birtcher, Arizona State University, United States; Hussein Shaman, King Abdulaziz City for Science and Technology, Saudi Arabia</i>	
THP-A4.2P.2: LUNEBURG LENS FROM HYPERUNIFORM DISORDERED COMPOSITE MATERIALS	2281
<i>Haoyang Zhang, Queen Mary University of London, China; Wen Wu, Nanjing University of Science and Technology, China; Yang Hao, Queen Mary University of London, United Kingdom</i>	
THP-A4.2P.3: ANTENNA-BASED CARPET DEVICE FOR EXTREMELY LARGE OBSTACLES: EXPERIMENTAL VERIFICATION	2283
<i>Davide Ramaccia, Antonino Tobia, Alessandro Toscano, Filiberto Bilotti, Roma Tre University, Italy</i>	
THP-A4.2P.4: RCS INVESTIGATION OF TETRAHEDRAL ALIGNED SPHERE TARGETS FOR RADAR POSITIONING	2285
<i>Christian Schulz, KROHNE Innovation GmbH, Germany; Michael Gerding, KROHNE Messtechnik GmbH, Germany; Timo Jaeschke, Alexander Golkowski, Nils Pohl, Ruhr-University Bochum, Germany</i>	
THP-A4.2P.5: REFINEMENT AND UNIFICATION OF CHECKERBOARD AND GRADIENT INDEX RCS-REDUCTION METASURFACES	2287
<i>Anuj Modi, Constantine Balanis, Craig Birtcher, Arizona State University, United States</i>	
THP-A4.2P.6: PATH-LOSS COMPENSATION AND TARGET DESIGN FOR DIELECTRIC WAVEGUIDE BASED RADAR TARGET GENERATORS	2289
<i>Christoph Baer, Ruhr-University Bochum, Germany</i>	
THP-A4.2P.7: A MULTIPURPOSE CALIBRATOR IN RADAR CROSS SECTION MEASUREMENT	2291
<i>Liya Liang, Xiaojian Xu, Beihang University, China</i>	

THP-A4.2P.8: THE SCATTERING OF VORTEX ELECTROMAGNETIC WAVES BY A COATED SPHERE	2293
<i>Lixin Guo, Qingqing Huang, Mingjian Cheng, Jiangting Li, Songhua Liu, School of Physics and Optoelectronic Engineering, China</i>	
 THP-A3.3P: FAST ALGORITHMS IN COMPUTATIONAL ELECTROMAGNETICS	
THP-A3.3P.1: INTEGRATING THE DISCRETE DIPOLE APPROXIMATION FORWARD SOLVER WITH A MICROWAVE TOMOGRAPHY ALGORITHM	2295
<i>Samar Hosseinzadegan, Andreas Fhager, Mikael Persson, Chalmers University of Technology, Sweden; Paul Meaney, Dartmouth college, United States</i>	
THP-A3.3P.2: FAST CALCULATION OF DIPOLE PROBE RECEIVING PATTERN BASED ON THE LORENTZ RECIPROCITY THEOREM	2297
<i>Sihong Tao, Huapeng Zhao, University of Electronic Science and Technology of China, China; Zhizhang Chen, Dalhousie University, Canada</i>	
THP-A3.3P.3: ERROR CONTROL OF MLFMA WITHIN A MULTIPLE-PRECISION ARITHMETIC FRAMEWORK	2299
<i>Mert Kalfa, Bilkent University, Turkey; Özgür Ergül, Middle East Technical University, Turkey; Vakur Behcet Ertürk, Bilkent University, Turkey</i>	
THP-A3.3P.4: PRUNED NUFFT-3 FOR FAR-FIELD CALCULATIONS	2301
<i>Amedeo Capozzoli, Claudio Curcio, Angelo Liseno, Jonas Piccinotti, Università di Napoli Federico II, Italy</i>	
THP-A3.3P.5: FAST ALGORITHM FOR BROADBAND ELECTROMAGNETIC SCATTERING FORM CONDUCTING OBJECTS USING REDUCED BASIS METHOD	2303
<i>Li-Feng Wu, Yan-Wen Zhao, Qiang-Ming Cai, Li Gu, Zhi-Peng Zhang, University of Electronic Science and Technology of China, China</i>	
THP-A3.3P.6: A HYBRID BROADBAND FAST MULTIPOLE ALGORITHM	2305
<i>Tian Xia, Lingling Meng, Qin Liu, Hui Gan, University of Illinois at Urbana-Champaign, United States; Weng Chew, Purdue University, United States</i>	
THP-A3.3P.7: SOLUTION OF POTENTIAL INTEGRAL EQUATIONS WITH NSPWMLFMA	2307
<i>Bahram Khalichi, Bilkent University, Turkey; Özgür Ergül, Middle East Technical University, Turkey; Manouchehr Takrimi, Islamic Azad University, Iran; Vakur Behcet Erturk, Bilkent University, Turkey</i>	
THP-A3.3P.8: A FAST AND BROADBAND SURFACE METHOD FOR SKIN EFFECT MODELING IN MULTISCALE LOSSY CONDUCTORS	2309
<i>Shashwat Sharma, Piero Triverio, University of Toronto, Canada</i>	
THP-A3.3P.9: MACHINE LEARNING BASED MULTILEVEL FAST MULTIPOLE ALGORITHM	2311
<i>Jia-Jing Sun, Sheng Sun, Yongpin Chen, University of Electronic Science and Technology of China, China; Li Jun Jiang, University of Hong Kong, China</i>	
THP-A3.3P.10: SINGULAR INTEGRATION IN BEM BY INTERPOLATION: THE EFIE CASE	2313
<i>Ioannis Kyriakou, Constantine Zekios, Marinos N. Vouvakis, University of Massachusetts Amherst, United States</i>	
 THP-A3.11P: TIME DOMAIN APPROACH IN COMPUTATIONAL ELECTROMAGNETICS	
THP-A3.11P.1: STOCHASTIC FINITE DIFFERENCE FREQUENCY DOMAIN METHOD	2315
<i>Khadijeh Masumnia-Bisheh, Keyvan Forooraghi, Mohsen Ghaffari-Miab, Tarbiat Modares University, Iran</i>	
THP-A3.11P.2: NUMERICAL DISPERSION AND STABILITY OF THE TIME DOMAIN PROPAGATOR NUMERICAL ALGORITHM	2317
<i>Jongchul Shin, Robert Nevels, Texas A&M University, United States</i>	

- THP-A3.11P.3: BREAKING THE SCALING LIMIT: A PARALLEL-IN-SPACE-AND-TIME METHOD FOR 2319**
TRANSIENT ELECTROMAGNETIC PROBLEMS
Shu Wang, Zhen Peng, University of New Mexico, United States
- THP-A3.11P.4: MACHINE LEARNING BASED NEURAL NETWORK SOLVING METHODS FOR THE 2321**
FDTD METHOD
Heming Yao, Lijun Jiang, University of Hong Kong, China
- THP-A3.11P.5: SYMMETRIC POSITIVE SEMI-DEFINITE FDTD SUBGRIDDING ALGORITHM IN 2323**
BOTH SPACE AND TIME
Kaiyuan Zeng, Dan Jiao, Purdue University, United States
- THP-UB.2P: HIGH FREQUENCY TECHNIQUES AND METAMATERIALS**
- THP-UB.2P.3: BROADBAND FREQUENCY RECONFIGURABLE METAMATERIAL ABSORBER USING 2325**
SWITCHABLE GROUND PLANE
Heijun Jeong, Sungjoon Lim, Chung-Ang University, Korea (South)
- THP-UB.2P.4: SECOND-MODE SPOOF SURFACE PLASMON POLARITONS BASED ON 2327**
COMPLEMENTARY PLASMONIC METAMATERIALS
Dawei Zhang, Qun Wu, Kuang Zhang, Guohui Yang, Xuejun Sha, Harbin Institute of Technology, China
- THP-A4.3P: RCS II**
- THP-A4.3P.1: INVESTIGATION OF CHECKERBOARD METASURFACES ON FLEXIBLE CURVILINEAR 2329**
STRUCTURE FOR RCS REDUCTION
Anuj Modi, Constantine Balanis, Craig Birtcher, Arizona State University, United States
- THP-A4.3P.2: IMPACT ON REFLECTION PHASE BY DIFFERENT GEOMETRICAL STRUCTURES OF 2331**
AMCS FOR RCS REDUCTION
Meshaal Alyahya, Constantine Balanis, Craig Birtcher, Arizona State University, United States; Hussein Shaman, Waleed Alomar, King Abdulaziz City for Science and Technology, Saudi Arabia
- THP-A4.3P.3: EFFECTS OF LOCALIZED DEFECTS / SOURCES IN A PERIODIC LATTICE USING 2333**
GREEN'S FUNCTION OF PERIODIC SCATTERERS
Shurun Tan, Leung Tsang, University of Michigan, United States
- THP-A4.3P.4: ANALYSIS FOR CONTRIBUTION OF ENGINE INLET STRUCTURE TO MONOSTATIC 2335**
RCS OF AIRCRAFT IN THE VHF BAND
Yeong-Hoon Noh, Chan-Sun Park, Jong-Gwan Yook, Yonsei University, Australia; Won-Yong Choi, Hanwha Systems, Australia; Youn-Hui Jang, Agency for Defense Development, Australia
- THP-A4.3P.5: ON THE STUDY OF THE EFFECT OF FREQUENCY DEVIATION ON ELECTRIC 2337**
FIELD CHARACTERISTICS INSIDE JET ENGINES
Aparna Krishna, Qatar University, Qatar; Aya Abdelaziz, Cairo University, Egypt; Tamer Khattab, Qatar University, Qatar
- THP-A4.3P.7: A PLANAR ULTRA-WIDEBAND PHASED ARRAY ANTENNA WITH LOW 2339**
ELECTROMAGNETIC SCATTERING
Shiwei Xiao, Shiwen Yang, Yikai Chen, Shiwei Qu, University of Electronic Science and Technology of China, China
- THP-A4.3P.8: AN INTEGRATED RADIATION AND SCATTERING DESIGN OF LOW-RCS PATCH ARRAY N/A**
WITH DIFFERENT ANTENNA ELEMENTS
Yongtao Jia, Ying Liu, Shuxi Gong, Xidian University, China
- THP-A4.3P.9: A HYBRID MICROSTRIP ARRAY OF TWO TYPES OF ANTENNA UNITS FOR 2343**
SCATTERING CANCELLATION
Longjian Zhou, Wensheng Qiao, Li Wang, Yatao Wang, Kaizhi Zhang, China Electronics Technology Group Corporation, China

THP-A3.6P: INTEGRAL EQUATION APPROACH AND BASIS FUNCTIONS

THP-A3.6P.1: FORMULATION OF SURFACE-VOLUME-SURFACE-EFIE FOR SOLUTION OF 2D SCATTERING PROBLEMS ON COMPOSITE DIELECTRIC OBJECTS UNDER TM POLARIZATION 2345

Zhuotong Chen, Reza Gholami, Vladimir Okhmatovski, University of Manitoba, Canada

THP-A3.6P.2: SCATTERING ANALYSIS OF BI-ISOTROPIC OBJECTS BY CURRENT-BASED VOLUME INTEGRAL EQUATIONS 2347

Zhi-Peng Zhang, Yan-Wen Zhao, University of Electronic Science and Technology of China, China; Qiang-Ming Cai, Southwest University of Science and Technology, China; Li Gu, Li-Feng Wu, Zai-Ping Nie, University of Electronic Science and Technology of China, China

THP-A3.6P.3: ON A CONFORMING IMPEDANCE BOUNDARY CONDITION EFIE 2349

Alexandre Dély, IMT Atlantique, France; Francesco P. Andriulli, Politecnico di Torino, Italy; Kristof Cools, University of Nottingham, United Kingdom

THP-A3.6P.4: A STABLE LOW FREQUENCY TIME DOMAIN EFIE WITH WEIGHTED CONTINUITY EQUATION 2351

Thomas Roth, Sandia National Laboratories, United States; Weng Chew, Purdue University, United States

THP-A3.6P.5: CHARACTERISTIC BASIS FUNCTION METHOD FOR THE ANALYSIS OF COMPOSITE OBJECTS EMBEDDED IN LAYERED MEDIA 2353

Yang Su, University of Waterloo, Canada; Raj Mittra, University of Central Florida, King Abdulaziz University, United States

THP-A3.6P.6: A SINGLE SOURCE VOLUME INTEGRAL EQUATION FOR THE INHOMOGENEOUS MAXWELL SCATTERING PROBLEM 2355

Felipe Vico, Miguel Ferrando-Bataller, Eva Antonino-Daviu, Marta Cabedo-Fabres, Universitat Politècnica de València, Spain

THP-A3.6P.7: COMPARISON OF MACRO BASIS FUNCTION SETS FOR ANTENNA ARRAY ANALYSIS WITH THE MOM 2357

Keshav Sewraj, Matthys M. Botha, Stellenbosch University, South Africa

THP-A3.6P.8: ACCELERATION OF REDUCED MATRIX FILLING IN NEAR FIELD REGION FOR M-CBFM USING 2-LEVEL CBFS 2359

Chan-Sun Park, Jong-Gwan Yook, Yonsei university, Korea (South); Yi-Ru Jeong, University of Texas at Austin, United States; Ic-Pyo Hong, Kongju National University, Korea (South); Hong-Ryeol Song, Samjin Elex Co., Ltd, Korea (South)

THP-A3.6P.9: ENTIRE-DOMAIN SPECTRAL BASIS FUNCTIONS FOR THE EFFICIENT DESIGN OF METASURFACE ANTENNAS OF CIRCULAR SHAPE 2361

Francesco Verni, Giuseppe Vecchi, Politecnico di Torino, Italy; Marco Righero, Istituto Superiore Mario Boella, Italy

THP-A3.6P.10: A BROADBAND SIW ANTENNA FOR 5G APPLICATIONS 2363

Muhammad R. Wali, Farooq A. Tahir, Research Institute of Microwave and Millimeter Wave Studies, National University of Sciences and Technology (NUST), Pakistan; Muhammad Umar Khan, National University of Sciences and Technology (NUST), Pakistan; Rifaqat Hussain, King Fahd University of Petroleum and Minerals, Saudi Arabia

THP-A3.6P.11: FSS BASED HEXO-FRACTAL DUAL PASSBAND FILTER FOR 28 AND 38 GHZ 5G MILLIMETER-WAVE COMMUNICATIONS 2365

Hidayat Ullah, Farooq A. Tahir, Mohamed El-Hadidy, Research Institute of Microwave and Millimeter Wave Studies, National University of Sciences and Technology (NUST), Pakistan

THP-A3.8P: MODELING OF WAVE PROPAGATION

THP-A3.8P.1: A RESEARCH ON BROADBAND DOA TECHNOLOGY BASED ON VIRTUAL-STAGGER BASELINE 2367

Rui Du, Weijian Si, Jiawei Wang, Harbin Engineering University, China

THP-A3.8P.2: MODELING OF A DIRECT TRANSITION FROM IC-PACKAGE TO WAVEGUIDE.....	2369
<i>Sander Jacobus Geluk, Bastiaan de Hon, Bart Smolders, Eindhoven University of Technology, Netherlands</i>	
THP-A3.8P.4: ANALYTICAL SOLUTION TO THE INCIDENT POWER OF THE TAPERED WAVE IN 3-D SCATTERING PROBLEMS	2371
<i>Lisha Zhang, George Pan, Arizona State University, United States</i>	
 THP-A3.2P: APPLICATIONS OF COMPUTATIONAL ELECTROMAGNETICS	
THP-A3.2P.1: ELECTROMAGNETIC SCATTERING OF ARBITRARY-SHAPED BURIED OBJECTS USING AN EIGENMODE PROJECTION APPROACH	N/A
<i>Mamdouh Nasr, Stanford University, United States; Islam Eshrah, Tamer Abuelfadl, Cairo University, Egypt</i>	
THP-A3.2P.2: COORDINATE TRANSFORMATION BASED FIELD TAPERING DEVICE	2375
<i>Yingfan Meng, Xueqi Cao, Jianjia Yi, Lina Zhu, State Key Laboratory of Integrated Services Networks, Xidian University, China; Shah Nawaz Burokur, LEME UPL, Univ Paris Nanterre, France; Douglas H. Werner, Pennsylvania State University, United States</i>	
THP-A3.2P.3: CAUSALITY VERIFICATION USING A FIRST-ORDER CHEBYSHEV FILTER.....	2377
<i>Amirreza Jalali Khalilabadi, Ata Zadehgo, University of Idaho, United States</i>	
THP-A3.2P.4: COMPACT 2-D FDFD ANALYSIS OF WAVEGUIDE STRUCTURES WITH ARPACK	2379
<i>Xiaoliang Gu, Xiaolin Jin, Jinxin Li, Bin Li, University of Electronic Science and Technology of China, China</i>	
THP-A3.2P.5: MULTI-PARAMETER MODELING WITH ANN FOR ANTENNA DESIGN	2381
<i>Zhuochun Wu, Yang Yang, Zhixin Yao, University of Electronic Science and Technology of China, China</i>	
THP-A3.2P.6: IMPACTS OF TIP STRUCTURE ON RF-INDUCED HEATING OF AN IMPLANTABLE NEUROSTIMULATOR UNDER 1.5 T MRI	2383
<i>Rui Yang, Jianfeng Zheng, Ji Chen, University of Houston, United States</i>	
THP-A3.2P.7: FREQUENCY SELECTIVE SURFACE ANALYSIS USING THE EIGENMODE PROJECTION TECHNIQUE	N/A
<i>Tarek Mealy, Islam Eshrah, Tamer Abuelfadl, Cairo University, United States</i>	
THP-A3.2P.9: INDUCTANCE MATRIX CALCULATION FOR SHIELDED MULTICONDUCTOR SYSTEMS USING AN EIGENMODE PROJECTION TECHNIQUE	2387
<i>Hady Saied, Analog Devices, Inc., Egypt; Islam Eshrah, Cairo University, Egypt</i>	
THP-A3.2P.10: CIRCULARLY POLARIZED C-SHAPED MONOPOLE ANTENNA FOR C-BAND APPLICATIONS	2389
<i>M. Ahsan Ashraf, Farooq A. Tahir, Research Institute of Microwave and Millimeter Wave Studies, National University of Sciences and Technology (NUST), Pakistan; Qammer H. Abbasi, University of Glasgow, United Kingdom</i>	
THP-A3.2P.11: OPTIMAL CHOICE OF MEASUREMENT POINTS IN NEAR FIELD: NUMERICAL RESULTS	2561
<i>Maria Antonia Maisto, Raffaele Solimene, Rocco Pierri, Università degli studi della Campania Luigi Vanvitelli, Italy</i>	
 THP-A3.9P: NEW INTEGRAL EQUATION FORMULATIONS	
THP-A3.9P.1: IMPROVED REDUCED-ORDER MODEL WITH EQUIVALENT SURFACE FOR SCATTERING PROBLEMS	2391
<i>Hui Gan, Qi Dai, Tian Xia, Qin Liu, University of Illinois at Urbana-Champaign, United States; Weng Chew, Purdue University, United States</i>	
THP-A3.9P.2: A RIGOROUS MACROMODELING APPROACH TO EFFICIENTLY SIMULATE LARGE ARRAYS OF COMPLEX SCATTERERS	2393
<i>Utkarsh Patel, Piero Triverio, Sean V. Hum, University of Toronto, Canada</i>	

THP-A3.9P.3: A HYBRID INTEGRAL EQUATION APPROACH TO SOLVE THE ANISOTROPIC FORWARD PROBLEM IN ELECTROENCEPHALOGRAPHY	2395
<i>Maxime Monin, Politecnico di Torino, Italy; Lyes Rahmouni, IMT Atlantique, France; Francesco P. Andriulli, Politecnico di Torino, Italy</i>	
THP-A3.9P.4: ELECTROMAGNETIC FIELD SCATTERING FROM A THIN SHEET	2397
<i>Hasan Abbas, University of Engineering & Technology, Pakistan; Robert Nevels, Texas A&M University, United States</i>	
THP-A3.9P.5: A DOMAIN DECOMPOSITION METHOD BASED ON SIMPLIFIED VOLUME-SURFACE INTEGRAL EQUATION	2399
<i>Xianjin Li, Jun Hu, Yongpin Chen, Ming Jiang, Zaiping Nie, University of Electronic Science and Technology of China, China</i>	
 THP-A3.7P: INTEGRAL EQUATION STRATEGIES AND APPLICATIONS	
THP-A3.7P.1: AN ALTERNATE APPROACH TO USE SOMMERFELD INTEGRALS CODES FOR ELECTRIC CURRENT TO DERIVE VOLTAGE VECTOR FOR MAGNETIC FRILL CURRENT IN THE CONTEXT OF MOM	2401
<i>Maifuz Ali, Florida International Univeristy, United States</i>	
THP-A3.7P.2: DEEP THINNING OF MOM MATRICES WITH THE BALANCED ELECTROMAGNETIC ABSORBER METHOD IN 3 DIMENSIONS	2403
<i>Raphael Kastner, Tel Aviv University, Israel; Daniel S. Weile, University of Delaware, United States</i>	
THP-A3.7P.3: NUMERICAL IMPLEMENTATION OF EQUIVALENCE PRINCIPLE ALGORITHM FOR POTENTIALS	2405
<i>Ali Farshkaran, Özgür Ergül, Middle East Technical University, Turkey</i>	
THP-A3.7P.4: ANALYSIS OF THE POSITION OF ANTENNA ON A SCALED VEHICLE BY USING CHARACTERISTIC MODES THEORY	2407
<i>Jiangjun Yang, Jian-Ying Li, Shigang Zhou, Jie Liu, Rui Xu, Northwestern Polytechnical University, China</i>	
THP-A3.7P.5: AN EXPLICIT MARCHING-ON-IN-TIME SCHEME FOR SOLVING THE KIRCHHOFF INTEGRAL EQUATION	2409
<i>Rui Chen, Sadeed Sayed, Hakan Bagci, King Abdullah University of Science and Technology (KAUST), Saudi Arabia</i>	
 THP-A4.5P: SCATTERING, DIFFRACTION, AND RCS	
THP-A4.5P.1: PLANEWAVE SCATTERING BY TOPOLOGICALLY INSULATING SURFACE STATES ON A SPHERICAL SURFACE	2411
<i>Muhammad Faryad, Lahore University of Management Sciences, Pakistan; Akhlesh Lakhtakia, Pennsylvania State University, United States</i>	
THP-A4.5P.2: PLANE WAVE SCATTERING BY A PEC WEDGE IN RELATIVISTIC TRANSLATIONAL MOTION: EXACT AND UNIFORM ASYMPTOTIC SOLUTIONS	2413
<i>Guilherme Simon Da Rosa, Flavio Hasselmann, Pontifical Catholic University of Rio de Janeiro, Brazil; Julio Nicolini, Ohio State University, United States</i>	
THP-A4.5P.3: GAUSSIAN BEAM DIFFRACTION BY THE INVERSE PRISM	2415
<i>Alireza Akbarzadeh, Christophe Caloz, Polytechnique Montréal, Canada</i>	
THP-A4.5P.4: THE PHYSICS OF ANGLE GLINT: USING THE POYNTING VECTOR	N/A
<i>Peter Kajenski, BAE Systems, United States</i>	
THP-A4.5P.5: FORWARD DERIVATION AND ANALYSIS FOR 3-D SCATTERING CENTER POSITION OF RADAR TARGET	2419
<i>Lei Zhang, Si-Yuan He, Guo-Qiang Zhu, Yun-Hua Zhang, Wuhan University, China; Hong-Cheng Yin, Hua Yan, National Electromagnetic Scattering Laboratory, China</i>	

THP-A4.5P.6: RADAR BACKSCATTER MEASUREMENTS OF ROAD SURFACES AT 77 GHZ	2421
<i>Michael Giallorenzo, Xiuzhang Cai, Adib Nashashibi, Kamal Sarabandi, University of Michigan, United States</i>	
THP-A4.5P.7: ELECTROMAGNETIC WAVE REFLECTION FROM SHOCKED DIELECTRIC MATERIALS	2423
<i>Benoit Rougier, Hervé Aubert, LAAS CNRS, France; Alexandre Lefrançois, CEA, France</i>	
THP-A4.5P.8: CHARACTERIZATION OF DIFFUSE SCATTERING BASED ON DIELECTRIC PROPERTIES OF CONSTRUCTION MATERIALS	2425
<i>Xi Liao, Yu Shao, Haikuo Tian, Yang Wang, Chongqing University of Posts and Telecommunications, China</i>	
THP-A4.5P.9: A FORWARD APPROACH TO ESTABLISH PARAMETRIC SCATTERING CENTER MODELS FOR COMPLEX DIELECTRIC TARGETS	2427
<i>Yan Zhu, Si-Yuan He, Guo-Qiang Zhu, Yun-Hua Zhang, Wuhan University, China; Hong-Cheng Yin, Hua Yan, National Electromagnetic Scattering Laboratory, China</i>	
THP-A4.5P.10: DOPPLER SPECTRUM OF ELECTROMAGNETIC SCATTERING FROM OCEAN SURFACE WITH FOAM DISTRIBUTION	2429
<i>Wei Liu, Zeming Liang, Keke Li, Lixin Guo, Xidian University, China</i>	
 THP-A3.1P: ACCURATE AND STABLE INTEGRAL EQUATIONS	
THP-A3.1P.2: AN IMPROVED QUADRATURE ERROR ESTIMATE FOR NEARLY-SINGULAR MOM INTEGRALS	2431
<i>Matthys M. Botha, Stellenbosch University, South Africa; Thomas Rylander, Chalmers University of Technology, Sweden</i>	
THP-A3.1P.3: THE IMPACT OF INTEGRATION ORDER AND ACCURACY ON THE STABILITY OF TIME DOMAIN INTEGRAL EQUATIONS	2433
<i>Jielin Li, Daniel S. Weile, University of Delaware, United States; David Hopkins, Army Research Laboratory, APG, United States</i>	
THP-A3.1P.4: ACCURACY OF SURFACE CURRENT APPROXIMATION USING LEGENDRE POLYNOMIALS FOR 2-D TM SCATTERING	2435
<i>Dragan Olcan, Jovana Perovic, Aleksandra Krneta, Branko Kolundzija, University of Belgrade, Serbia</i>	
THP-A3.1P.5: ACCURATE IDENTITY OPERATOR DISCRETIZATION FOR THE COMBINED FIELD INTEGRAL EQUATION	2437
<i>Jonas Kornprobst, Thomas F. Eibert, Technical University of Munich, Germany</i>	
THP-A3.1P.6: ACCURATE SOLUTION OF MULLER EQUATIONS FOR ELECTROMAGNETIC ANALYSIS OF DIELECTRIC OBJECTS	2439
<i>Hong Qin Zheng, Ruo Xing Gao, Jia Ying Lv, Mei Song Tong, Tongji University, China</i>	
THP-A3.1P.7: ULTRA HIGH ORDER BASIS FUNCTIONS IN ANALYSIS OF SCATTERING FROM LARGE METALLIC STRUCTURES	2441
<i>Branko Kolundzija, Aleksandra Krneta, Dragan Olcan, University of Belgrade, Serbia; Milan Kostic, WIPL-D d.o.o., Serbia</i>	
THP-A3.1P.8: AN EXPLICIT MOT SCHEME FOR SOLVING THE NYSTROM-DISCRETIZED TD-MFIE	2443
<i>Rui Chen, Hakan Bagci, King Abdullah University of Science and Technology (KAUST), Saudi Arabia</i>	
THP-A3.1P.9: DISCONTINUOUS GALERKIN TIME DOMAIN ELECTRIC FIELD INTEGRAL EQUATION METHOD FOR SOLVING NON-CONFORMAL STRUCTURES	2445
<i>Li Huang, Hao-Xuan Zhang, Liang Zhou, Shanghai Jiao Tong University, China; Yi Liao, Radio Equipment Research Institute, China; Zheng Huang, Xi'an Institute of Electro-Mechanical Information Technology, China; Wen-Yan Yin, Zhejiang University, China</i>	

THP-A3.10P: NEW WELL-CONDITIONED INTEGRAL EQUATIONS

THP-A3.10P.1: ON THE SPECTRAL BEHAVIOR AND NORMALIZATION OF A RESONANCE-FREE AND 2447 HIGH-FREQUENCY STABLE INTEGRAL EQUATION

Tiffany L. Chhim, Politecnico di Torino, Italy; Simon B. Adrian, Technical University of Munich, Germany; Francesco P. Andriulli, Politecnico di Torino, Italy

THP-A3.10P.2: REDUCING UNKNOWN ON OVERLY DENSE MESHES IN COMPUTATIONAL N/A ELECTROMAGNETICS

Shao-Xin Peng, Jin-Fa Lee, Ohio State University, United States

THP-A3.10P.3: A REFINEMENT-FREE CALDERÓN PRECONDITIONER FOR THE ELECTRIC FIELD 2451 INTEGRAL EQUATION ON GEOMETRIES WITH JUNCTIONS

Simon B. Adrian, Technical University of Munich, Germany; Francesco P. Andriulli, Politecnico di Torino, Italy; Thomas F. Eibert, Technical University of Munich, Germany

THP-A3.10P.5: SPURIOUS-FREE SURFACE INTEGRAL EQUATION CHARACTERISTIC MODE 2453 FORMULATION FOR DIELECTRIC BODIES

Pasi Ylä-Oijala, Dimitrios Tzarouchis, Henrik Wallén, Ari Sihvola, Aalto University, Finland

THP-A4.1P: INVERSE SCATTERING AND IMAGING

THP-A4.1P.1: MODEL-BASED INVERSION OF 3D ANISOTROPIC OBJECTS AND SENSITIVITY 2455 ANALYSIS

Lin Sun, Youngstown State University, United States; Feng Xie, Mei Song Tong, Tongji University, China

THP-A4.1P.2: FAST ANALYSIS OF THREE-DIMENSIONAL SCATTERING FROM A BURIED OBJECT 2457 UNDER A DIELECTRIC ROUGH SURFACE USING THE CHARACTERISTIC BASIS FUNCTION METHOD

Chao Li, University of Jinan, China; Raj Mitra, University of Central Florida, United States

THP-A4.1P.3: TARGET RECOGNITION USING SPARSE REPRESENTATION: A PERFORMANCE 2459 COMPARISON

Ismail Jouny, Lafayette College, United States

THP-A4.1P.5: A NEW DIHEDRAL REFLECTOR FOR SIMULTANEOUS POLARIMETRIC 2461 CALIBRATION AND BACKGROUND CLUTTER EXTRACTION

Lingyu Kong, Xiaojian Xu, Beihang University, China

THP-A4.1P.6: A NOVEL FINGERPRINT SCANNING METHOD USING TERAHERTZ IMAGING 2463

Panagiotis Theofanopoulos, Georgios Trichopoulos, Arizona State University, United States

THP-A4.1P.7: IDENTIFICATION AND SEPARATION OF MULTIPLE SCATTERING FROM COMPLEX 2465 CAVITIES

Penghui Chen, Xiaojian Xu, Beihang University, China

THP-A4.1P.8: COMBINATION OF GO/PO AND PTD METHOD FOR EM SCATTERING AND SAR 2467 IMAGE SIMULATION FROM COMPLEX TARGETS

Jinxing Li, Min Zhang, Pengbo Wei, Xidian University, China

THP-A4.1P.9: A DEPOLARIZING CHIPLESS RFID TAG WITH HUMIDITY SENSING CAPABILITY 2469

ShangBin Fan, South China University of Technology, China; Yi Fan, Guangdong Polytechnic Normal University, China; TianHai Chang, XiongYing Liu, South China University of Technology, China; Manos Tentzeris, Georgia Institute of Technology, United States

THP-A4.1P.10: UWB IMAGING USING COMPUTATIONAL FDTD TR AND TRO METHODS 2471

Hao Li, Lijia Chen, Jinghui Qiu, Shengchang Lan, Caitian Yang, Harbin Institute of Technology, China

THP-A4.4P: SCATTERING II

THP-A4.4P.1: ON THE MODELING OF THE BISTATIC COHERENT SCATTERING FROM A ROUGH SURFACE 2473

Davide Comite, Sapienza University, Italy; Francesca Ticconi, Eumetsat, Germany; Leila Guerriero, Tor Vergata University, Italy; Nazzareno Pierdicca, Sapienza University, Italy

THP-A4.4P.2: VALIDATING MODELS OF BISTATIC SCATTERING FROM DIELECTRIC SURFACES WITH SMALL ROUGHNESS 2475

Traian Dogaru, DaHan Liao, U.S. Army Research Laboratory, United States

THP-A4.4P.3: RADIATION BY AN APERTURE IN A PLANAR SCREEN ILLUMINATED BY A GAUSSIAN BEAM AT OPTICAL FREQUENCIES FOR STUDYING BAFFLE SCATTERING IN INTERFEROMETRIC DETECTORS OF GRAVITATIONAL WAVES 2477

Giuseppe Pelosi, Leonardo Possenti, Stefano Selleri, University of Florence, Italy; Innocenzo M. Pinto, University of Sannio, Italy

THP-A4.4P.4: FORWARD SCATTERING BASED APPROACH FOR REMOTE IMPEDANCE MEASUREMENT OF ANTENNA 2479

Rajveer Singh Brar, Rodney Vaughan, Simon Fraser University, Canada

THP-A4.4P.5: FAST CALCULATION OF ELECTROMAGNETIC SCATTERING FROM OBJECTS ABOVE COMPLEX ROUGH SURFACE ENVIRONMENT 2481

Yiwen Wei, Chao-Fu Wang, Chun Yun Kee, Tse Tong Chia, National University of Singapore, Singapore

THP-A4.4P.6: 4-40 GHZ TRANSMISSION MEASUREMENT OF INDOOR BUILDING MATERIALS AT NORMAL INCIDENCE 2483

Jon Wallace, Lafayette College, United States; Rashid Mehmood, Michael Jensen, Brigham Young University, United States

THP-A4.4P.7: EFFECTS OF COMPLEX WALL STRUCTURES ON ANTENNA RADIATION CHARACTERISTICS 2485

Yuen Zhuang Goh, Michael J. Neve, Gerard B. Rowe, University of Auckland, New Zealand

THP-A4.4P.8: IMPACT OF TROPOSPHERIC SCINTILLATION ON EARTH-SPACE LINK IN WEST AFRICA 2487

Sayo Akinloye Akinwumi, Covenant university, Nigeria; Temidayo Victor Omotosho, Covenant University, Nigeria; Mojisola Racheal Usikalu, Covenant university, Nigeria; Ohuwafumilayo Oluwayemisi Ometan, Covenant University, Nigeria

THP-A4.4P.9: IMPACT OF RAIN ON EARTH-SPACE COMMUNICATION LINK IN WEST-AFRICA..... 2489

Oluwafumilayo Oluwayemisi Ometan, Temidayo Victor Omotosho, Covenant University, Nigeria; Sayo Akinloye Akinwumi, Covenant university, Nigeria; Adenike Boyo, Lagos state University, Nigeria

THP-A3.4P: FAST INTEGRAL EQUATION SOLVERS

THP-A3.4P.1: FAST DIRECT EQUIVALENCE PRINCIPLE ALGORITHM FOR MULTI-SCALE ELECTROMAGNETIC PROBLEMS 2491

Qin Liu, University of Hong Kong, China; Qi Dai, Tian Xia, Ting Wan, University of Illinois at Urbana-Champaign, United States; Li Jun Jiang, University of Hong Kong, China; Sheng Sun, University of Electronic Science and Technology of China, China; Weng Cho Chew, Purdue University, United States

THP-A3.4P.2: FAST SOLUTIONS OF DYADIC GREEN'S FUNCTION FOR MULTILAYERED ISOTROPIC MEDIUM 2493

Ping-Ping Ding, Ya-Qiu Jin, Fudan University, China

THP-A3.4P.3: A LOG-SCALE INTERPOLATION METHOD FOR LAYERED MEDIUM GREEN'S FUNCTIONS 2495

Hongfeng Yang, Ali E. Yilmaz, University of Texas at Austin, United States

THP-A3.4P.4: ON THE RANDOMIZED CROSS APPROXIMATION OF EFIE METHOD OF MOMENTS..... 2497

Constantinos Zekios, Marinos N. Vouvakis, University of Massachusetts Amherst, United States

THP-A3.4P.5: ACCURACY CONTROLLED H2-MATRIX-MATRIX PRODUCT IN LINEAR COMPLEXITY AND ITS APPLICATIONS	2499
<i>Miaomiao Ma, Dan Jiao, Purdue University, United States</i>	
THP-A3.4P.6: ON RAPID ESTIMATION OF IMPEDANCE-MATRIX RANKS VIA GRID-BASED TECHNIQUES	2501
<i>Jon T. Kelley, University of Texas at Austin, United States; Yaniv Brick, Ben-Gurion University of the Negev, United States; Ali E. Yilmaz, University of Texas at Austin, United States</i>	
THP-A3.4P.7: METHOD FOR GENERATING A MINIMAL-RANK H2-MATRIX FROM FMM FOR ELECTRICALLY LARGE ANALYSIS	2503
<i>Chang Yang, Dan Jiao, Purdue University, United States</i>	
THP-A3.4P.8: BEM BASED ADAPTIVE CROSS APPROXIMATION ALGORITHM FOR SOLVING LOW FREQUENCY PROBLEMS	2505
<i>Yang Bao, Jiming Song, Iowa State University, United States; Zhiwei Liu, East China Jiaotong University, China</i>	
THP-A3.4P.9: 3D CROSS-TUCKER APPROXIMATION IN FFT-BASED VOLUME INTEGRAL EQUATION METHODS	2507
<i>Ilias Giannakopoulos, Mikhail Litsarev, Athanasios Polimeridis, Skolkovo Institute of Science and Technology, Russian Federation</i>	
THP-A3.4P.10: A HIGHER-ORDER NYSTROM DISCRETIZATION OF SURFACE INTEGRAL EQUATIONS FOR ELECTROMAGNETIC SCATTERING BY PENETRABLE OBJECTS	2509
<i>Zhi Guo Zhou, Yun Jing Zhang, Ruo Xing Gao, Mei Song Tong, Tongji University, China</i>	
 THP-A5.2P: WIRELESS POWER HARVESTING	
THP-A5.2P.1: COMPACT FLAT DIPOLE RECTENNA FOR ENERGY HARVESTING OR WIRELESS POWER TRANSMISSION APPLICATIONS	2511
<i>Abderrahim Okba, Alexandru Takacs, Hervé Aubert, LAAS CNRS, France</i>	
THP-A5.2P.2: MULTI-LAYER DIPOLE ARRAY FOR MULTI-POLARIZATION ELECTROMAGNETIC ENERGY HARVESTING	N/A
<i>Ahmed Ashoor, Omar Ramahi, University of Waterloo, Canada</i>	
THP-A5.2P.3: HIGH EFFICIENCY VOLTAGE DOUBLER RECTIFIER DESIGN FOR HARVESTING AMBIENT RF ENERGY	2515
<i>Alex Mouapi, Nadir Hakem, Nahi Kandil, Université du Québec en Abitibi-Témiscamingue, Canada</i>	
THP-A5.2P.4: A HYBRID INDUCTIVE AND RESONANT TRANSMITTER FOR DUAL-MODE WIRELESS CHARGING	2517
<i>Nathan Jeong, Qualcomm, United States</i>	
THP-A5.2P.5: A HIGH-EFFICIENCY DUAL-BAND WIRELESS ENERGY HARVESTING CIRCUIT	2519
<i>Jian Li, Guangjun Wen, Zhenbing Li, Yongjun Huang, Jie Zhou, University of Electronic Science and Technology of China, China</i>	
THP-A5.2P.6: ELECTROMAGNETIC ENERGY HARVESTING USING FREQUENCY SELECTIVE SURFACES	N/A
<i>Faruk Erkmen, Thamer Almoneef, Omar Ramahi, University of Waterloo, Canada</i>	
THP-A5.2P.7: A SELECTIVE RECTIFIER FOR RF ENERGY HARVESTING FOR IOT APPLICATIONS	2523
<i>Alex Mouapi, Nadir Hakem, Université du Québec en Abitibi-Témiscamingue, Canada</i>	
THP-A5.2P.8: RECTENNA ARRAY ON FLEXIBLE SUBSTRATE	2525
<i>Anatoliy Boryszenko, Elen Boryszenko, AE Partnership, United States</i>	
THP-A5.2P.9: DUAL-POLARIZED AND MULTI-BEAM CROSS-MESH ARRAY ANTENNA FOR RF ENERGY HARVESTING APPLICATIONS	2527
<i>Yi-Yao Hu, Sheng Sun, University of Electronic Science and Technology of China, China</i>	

THP-A5.2P.10: TRI-BAND COMPACT CPW-FED PIFA ANTENNA FOR ENERGY HARVESTING N/A
Nermeen A. Eltresy, Dalia Elsheakh, Esmat A. Abdallah, Electronics Research Institute, Egypt; Hadia Elhenawy, Ain Shams University, Egypt

THP-A5.3P: WIRELESS POWER TRANSMISSION

THP-A5.3P.1: IMPACT OF INTRINSIC LOSSES IN WIRELESS POWER TRANSFER USING DR LOADED SPLIT CAVITY RESONATOR N/A
Chinmoy Saha, Sameh Elnaggar, Yahia M. M. Antar, Royal Military College of Canada, Canada

THP-A5.3P.3: SELF-OSCILLATING CAPACITIVE WIRELESS POWER TRANSFER WITH ROBUST OPERATION 2533
Fu Liu, Bhakti Chowkwale, Sergei Tretyakov, Aalto University, Finland

THP-A5.3P.4: SIMULTANEOUS WIRELESS POWER AND DATA TRANSFER THROUGH BROADBAND CSCMR 2535
Daerhan Liu, Kun Bao, Yousuf Shafiq, Stavros Georgakopoulos, Florida International University, United States

THP-A5.3P.5: FUSED HELICO-SPIRAL COIL DESIGN USING BOTH NEURAL NETWORK AND GENERIC ALGORITHMS 2537
Chin-Lung Yang, Shao Ping Cheng, Chung-En Yu, National Cheng Kung University, Taiwan

THP-A5.3P.6: POWER TRANSFER BY ELECTRIC COUPLING BETWEEN ROTATING BODIES WITH AXIS-SYMMETRICAL LONG STRUCTURES 2539
Tadashi Takano, Mitsuhiro Shiono, Nihon University, Japan; Hiroyuki Oosaki, Takehiro Imura, University of Tokyo, Japan

THP-A5.3P.7: HIGHER-ORDER BESSEL BEAMS LAUNCHERS COMPARISON 2541
Agnese Mazzinghi, Angelo Freni, University of Florence, Italy

THP-A5.3P.8: 1 GHZ CHARGE PUMP WITH ULTRA-LOW POWER BOOST CONVERTER FOR INCREASED OUTPUT VOLTAGE 2543
Hoseon Lee, Rohit Nadgauda, Walter Thain, Bill Diong, Kennesaw State University, United States

THP-A5.3P.9: A DESIGN OF OPTIMAL RECTENNA ARRAY FOR RETRODIRECTIVE MPT SYSTEM 2545
Seung-Tae Khang, Hye-Won Jo, In-June Hwang, Jong-Won Yu, Korea Advanced Institute of Science and Technology (KAIST), Korea (South)

THP-A5.3P.10: A NOVEL LOW-COST BEAM STEERING METHOD USING DISPERSIVE SUPERSTRATE 2547
Ahmet Kurt, Antalya Bilim University, Turkey; Muhammed Boybay, University of Waterloo, Canada

THP-A5.1P: WEARABLE, IMPLANTABLE WIRELESS POWER

THP-A5.1P.1: 2.45 GHZ WEARABLE RF-HARVESTER FOR LARGE AREA TEXTILE HARVESTER (LATH) INTEGRATION 2549
Jingni Zhong, Dieff Vital, Shubhendu Bhardwaj, John L. Volakis, Florida International University, United States

THP-A5.1P.2: RADIATION PATTERNS OF AN RF ENERGY HARVESTING NECKLACE ON HUMAN BODY PHANTOM 2551
Son Nguyen, University of California, Davis, United States; Kelvin Yuk, Echoic Engineering LLC, United States; Rajeevan Amirtharajah, George Branner, University of California, Davis, United States

THP-A5.1P.3: STUDY OF MISALIGNMENT EFFECTS ON HYBRID POWER TRANSFER AND WIRELESS ANTENNA SYSTEM FOR IMPLANTED DEVICES 2553
Reem Shadid, Sima Noghianian, University of North Dakota, United States

THP-A5.1P.4: AN ULTRA-THIN LOW-FREQUENCY METAMATERIAL FOR WIRELESS POWER 2555
TRANSFER APPLICATIONS

Danilo Brizi, Agostino Monorchio, University of Pisa, Italy; Gianluca Lazzi, University of Southern California, United States

THP-A5.1P.5: WIRELESS POWER TRANSFER USING RESONANCE COUPLING METHOD FOR 2557
IMPLANTABLE APPLICATIONS

Jingchen Wang, Mark Leach, Eng Gee Lim, Zhao Wang, Xi'an-jiaotong Liverpool University, China; Yi Huang, University of Liverpool, United Kingdom