

2015 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting

**Vancouver, British Columbia, Canada
19-24 July 2015**

Pages 1-847



**IEEE Catalog Number: CFP15APS-POD
ISBN: 978-1-4799-7816-8**

TABLE OF CONTENTS

MO-SP.1A: MILLIMETER-WAVE ANTENNA ARRAYS FOR 5G WIRELESS HANDHELD DEVICES

MO-SP.1A.1: FOUR-ELEMENT DUAL-BAND PRINTED SLOT ANTENNA ARRAY FOR THE FUTURE 1 5G MOBILE COMMUNICATION NETWORKS

Osama Haraz, Mohamed Ali, Assiut University, Egypt; Ayman Elboushi, Electronic Research Institute (ERI), Egypt; Abdel-Razik Sebak, Concordia University, Canada

MO-SP.1A.2: A DIELECTRIC RESONATOR BASED MILLIMETER-WAVE MIMO ANTENNA ARRAY 3 FOR HAND-HELD DEVICES

Mohamed Hussain, Oualid Hammi, Mohammad S. Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia; Symon K. Podilchak, Yahia M.M. Antar, Royal Military College of Canada, Canada

MO-SP.1A.3: REGULARIZED TIME-REVERSAL BEAMFORMING FOR MM-WAVE MASSIVE MIMO 5 SYSTEMS

Carlos Viteri-Mera, Fernando Teixeira, Ohio State University, United States

MO-SP.1A.4: CHARACTERIZATION OF MILLIMETER WAVE PHASED ARRAY ANTENNAS IN MOBILE 7 TERMINAL FOR 5G MOBILE SYSTEM

Jakob Helander, Daniel Sjöberg, Mats Gustafsson, Lund University, Sweden; Kun Zhao, Zhinong Ying, Sony Mobile Communications, Sweden

MO-SP.1A.6: DESIGN OF HIGH-DIVERSITY GAIN MIMO ANTENNA ARRAYS THROUGH SURFACE 9 CURRENT OPTIMIZATION

Sebastien Clauzier, Said Mikki, Yahia M.M. Antar, Royal Military College of Canada, Canada

MO-SP.1A.8: LOW PROFILE LENS AND REFLECTARRAY DESIGN FOR MM WAVES 11

Shaileshachandra Pandey, Ravi Arya, Raj Mittra, Pennsylvania State University, United States

MO-SP.1A.10: 60 GHZ AGILE EBG-BASED ANTENNA WITH RECONFIGURABLE PATTERN 13

Muath Al-Hasan, INRS-University of Quebec, Canada; Abdel-Razik Sebak, Concordia University, Canada; Tayeb A. Denidni, INRS-University of Quebec, Canada

MO-SP.2A: ADVANCES IN THE DEVELOPMENT OF GNSS ANTENNAS AND CONTROLLED RADIATION PATTERN ARRAYS

MO-SP.2A.1: AN INTEROPARABLE ANTENNA FOR GPS AND GLONASS SERVICES ON A CAR 15

Iuliia Goncharova, Stefan Lindenmeier, University of the Bundeswehr, Germany

MO-SP.2A.2: DESIGN AND CHARACTERISTIC MODE ANALYSIS OF A WIDEBAND HIGH 17 PERMITTIVITY PATCH ANTENNA

Kathleen Fasenfest, TE Connectivity, United States

MO-SP.2A.4: EVOLUTION OF A PRECISION GNSS ANTENNA 19

Ronald Johnston, University of Calgary, Canada

MO-SP.2A.5: WIDEBAND DUAL-CIRCULAR POLARIZED SPIRAL ANTENNA PHASED ARRAY 21

Hongzhao, Ray Fang, Ramanan Balakrishnan, Koen Mouthaan, National University of Singapore, Singapore; Régis Guinvarc'h, SONDRRA, Supélec, France

MO-A1.1A: LEAKY-WAVE ANTENNAS

- MO-A1.1A.1: USING THE MATRIX PENCIL METHOD TO ANALYZE A 3D LEAKY WAVE ANTENNA..... 23**
Amardeep Singh, Robert Paknys, Concordia University, Canada; David R. Jackson, University of Houston, United States
- MO-A1.1A.2: UNIFORM AND NON UNIFORM OPTICAL LEAKY-WAVE ANTENNAS FOR FIELD SHAPING 25**
Caner Guclu, Ozdal Boyraz, Filippo Capolino, University of California, Irvine, United States
- MO-A1.1A.3: DUAL-POLARIZED DIRECTIONAL ANTENNA WITH APPLICATION TO POLARIMETRIC RADAR 27**
Maria García-Vigueras, Marc Esquiús-Morote, Juan R. Mosig, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland
- MO-A1.1A.4: REAL-TIME 2-D SPECTRAL-DECOMPOSITION USING A LEAKY-WAVE ANTENNA ARRAY WITH DISPERSIVE FEEDING NETWORK 29**
Shulabh Gupta, Christophe Caloz, Polytechnique de Montréal, Canada
- MO-A1.1A.5: WIDEBAND LEAKY-WAVE RADIATION FROM WIRE-MEDIUM LOADED FABRY-PEROT CAVITY ANTENNAS 31**
Davide Comite, Paolo Burghignoli, Paolo Baccarelli, Alessandro Galli, Sapienza University of Rome, Italy
- MO-A1.1A.8: PERIODIC SLOTTED LEAKY WAVE ANTENNA EXCITED BY QUASI DIPOLE N/A**
Alireza Mallahzadeh, Sajad Mohammad-Ali-Nezhad, Shahed University, Iran

MO-A1.2A: DIELECTRIC RESONATOR AND DIELECTRIC LOADED ANTENNAS

- MO-A1.2A.1: MODELING OF SUBSTRATE INTEGRATED WAVEGUIDE SERIES FED DIELECTRIC RESONATOR ANTENNA ARRAY WITH LONGITUDINAL SLOTS EXCITATION 35**
Mona Abdallah, Ying Wang, UOIT, Canada; Wael M. Abdel-Wahab, Safieddin Safavi-Naeini, University of Waterloo, Canada
- MO-A1.2A.2: WIDEBAND FABRY-PEROT RESONATOR ANTENNAS WITH DIELECTRIC EBG STRUCTURES 37**
Naizhi Wang, Northwestern Polytechnical University, China; Qingsheng Zeng, University of Quebec, Canada
- MO-A1.2A.3: IMPROVING PHASE UNIFORMITY IN THE APERTURE: A METHOD TO ENHANCE RADIATION CHARACTERISTICS OF FABRY-PEROT RESONATOR ANTENNAS 39**
Muhammad Usman Afzal, Karu P. Esselle, Macquarie University, Australia
- MO-A1.2A.4: COMPACT WIDEBAND PERFORATED RECTANGULAR DIELECTRIC RESONATOR ANTENNA 41**
Pragati Patel, IIT Bombay, India; Biswajeet Mukherjee, IIITDM, India; Jayanta Mukherjee, IIT Bombay, India
- MO-A1.2A.5: A NOVEL DUAL-BROADBAND DIELECTRIC RESONATOR ANTENNA BASED ON MODIFIED SIERPINSKI FRACTAL GEOMETRY 43**
Hu Liu, Ying Liu, Ming Wei, Shuxi Gong, Xidian University, China
- MO-A1.2A.6: CIRCULARLY POLARIZED RING DIELECTRIC RESONATOR ANTENNA EXCITED WITH CROSS-SLOT 45**
Rajkishor Kumar, Raghvendra Kumar Chaudhary, Indian School of Mines Dhanbad, India
- MO-A1.2A.7: DESIGN AND DEVELOPMENT OF A KOCH-SIERPINSKI GASKET WIDEBAND DIELECTRIC RESONATOR ANTENNA 47**
Kedar Trivedi, Dhaval Pujara, Institute of Technology, Nirma University, India
- MO-A1.2A.8: DESIGN AND DEVELOPMENT OF A PRISM-SHAPED WIDEBAND DIELECTRIC RESONATOR ANTENNA 49**
Kedar Trivedi, Dhaval Pujara, Institute of Technology, Nirma University, India

MO-A2.1A: DEVELOPMENTS IN CLOAKING

MO-A2.1A.1: MANTLE CLOAKING: ANTENNA APPLICATIONS	51
<i>Alessio Monti, Niccolò Cusano University, Italy; Jason Soric, Andrea Alù, University of Texas at Austin, United States; Alessandro Toscano, Filiberto Bilotti, University of Roma Tre, Italy</i>	
MO-A2.1A.2: RADIO-FREQUENCY TRANSPARENT DIPOLE ANTENNAS	53
<i>Jason Soric, Andrea Alù, University of Texas at Austin, United States</i>	
MO-A2.1A.3: AN INTEGRATED METASURFACE FILTERING CLOAK FOR MONOPOLE ANTENNAS	55
<i>Zhi Hao Jiang, Douglas H. Werner, Pennsylvania State University, United States</i>	
MO-A2.1A.4: DESIGN AND EXPERIMENTAL VALIDATION OF A VIRTUAL LINE SOURCE USING METAMATERIALS	57
<i>Caglar Emiroglu, Do-Hoon Kwon, University of Massachusetts Amherst, United States</i>	
MO-A2.1A.5: A SYSTEM-BY-DESIGN APPROACH FOR THE SYNTHESIS OF MULTI-LAYER MANTLE CLOAKS	59
<i>Lorenza Tenuti, Giacomo Oliveri, Federico Viani, ELEDIA Research Center, University of Trento, Italy; Alessio Monti, Filiberto Bilotti, Alessandro Toscano, University Roma Tre, Italy; Andrea Massa, ELEDIA Research Center, University of Trento, Italy</i>	
MO-A2.1A.6: CLOAKING EXPLOITING ANISOTROPIC ADJOINT SENSITIVITY ANALYSIS	61
<i>Laleh Seyyed Kalantari, Mohamed Bakr, McMaster University, Canada</i>	
MO-A2.1A.7: INVERSE SCATTERING HOMOGENIZATION METHOD FOR CONFORMAL METAMATERIAL STRUCTURES	63
<i>Giuseppe Labate, Ladislau Matekovits, Mario Orefice, Politecnico di Torino, Italy</i>	
MO-A2.1A.8: CLOAKING A CONDUCTING SPHERE WITH DISPERSIVE METAMATERIAL COATING AND AN INTERVENING AIR GAP	65
<i>Adnan Jamil, Tenneti Rao, University of Massachusetts Lowell, United States</i>	
MO-A2.1A.9: EFFECT ON SCATTERING CROSS SECTION FOR SCALED ANTI-OBJECT AND COORDINATE TRANSFORMED ANTI-OBJECT IN EXTERNAL CLOAKING	67
<i>Archana Rajput, Pravallika Vura, Kushmanda Saurav, Kumar Vaibhav Srivastava, Indian Institute of Technology Kanpur, India</i>	
MO-A2.2A: ACTIVE AND NON-FOSTER STRUCTURES	
MO-A2.2A.1: DISPERSION-REDUCED HIGH IMPEDANCE SURFACE LOADED WITH NON-FOSTER IMPEDANCES	69
<i>Jiang Long, Daniel Sievenpiper, University of California, San Diego, United States</i>	
MO-A2.2A.2: STABILITY CONDITIONS FOR A DIGITAL DISCRETE-TIME NON-FOSTER CIRCUIT ELEMENT	71
<i>Thomas Weldon, John Covington, Kathryn Smith, Ryan Adams, University of North Carolina at Charlotte, United States</i>	
MO-A2.2A.3: INFLUENCE OF TRANSMISSION LINE ON STABILITY OF NETWORKS CONTAINING IDEAL NEGATIVE CAPACITORS	73
<i>Josip Loncar, Damir Muha, Silvio Hrabar, University of Zagreb, Croatia</i>	
MO-A2.2A.4: NONLINEAR MULTICONDUCTOR TRANSMISSION LINE ANALYSIS OF BROADBAND SWITCHING METAMATERIALS	75
<i>Scott Rudolph, Walter Wall, Naval Research Laboratory, United States</i>	
MO-A2.2A.5: MILLIMETER-WAVE PHASE MODULATOR BASED ON VANADIUM DIOXIDE META-SURFACES	77
<i>Mohammad Reza Hashemi, Shang-Hua Yang, University of California, Los Angeles, United States; Tongyu Wang, Nelson Sepulveda, Michigan State University, United States; Mona Jarrahi, University of California, Los Angeles, United States</i>	

MO-A2.2A.7: TRANSIENT ANALYSIS OF NONLINEAR RIGHT-LEFT-HANDED TRANSMISSION LINES 79
Gregory Milford, University of New South Wales, Australia

MO-A4.1A: PROPAGATION CHARACTERIZATION IN VEHICULAR ENVIRONMENTS

MO-A4.1A.1: MODELING AND MEASUREMENT OF THE INFLUENCE OF ANTENNA TRANSVERSAL LOCATION ON TUNNEL PROPAGATION 81

Chenming Zhou, Ronald Jacksha, National Institute for Occupational Safety and Health, United States

MO-A4.1A.2: LARGE SCALE FADING CHARACTERISTICS IN RAIL TRAFFIC SCENARIOS 83

Ke Guan, Zhangdui Zhong, Bo Ai, Beijing Jiaotong University, China; Cesar Briso, Lei Zhang, Universidad Politécnic de Madrid, Spain

MO-A4.1A.3: COMPARISON OF UPLINK SAR VALUES IN TRAIN ENVIRONMENT FOR DIFFERENT WIRELESS TECHNOLOGIES 85

David Plets, Sam Aerts, Kris Vanhecke, Wout Joseph, Luc Martens, iMinds/UGent-WiCa, Belgium

MO-A4.1A.4: MODELING AND OPTIMIZATION OF COVERAGE IN LONDON UNDERGROUND SUBWAY TUNNELS 87

Neeraj Sood, Alon Ludwig, Xingqi Zhang, University of Toronto, Canada; Frans Bouwman, Patryk Nowicki, Colin Bantin, Joseph Siu, Thales Canada, Canada; Costas D. Sarris, University of Toronto, Canada

MO-A4.1A.5: CALIBRATION OF A 3-D RAY-TRACING MODEL IN RAILWAY ENVIRONMENTS..... 89

Xingqi Zhang, Neeraj Sood, University of Toronto, Canada; Joseph Siu, Thales Canada Transportation Solutions, Canada; Costas D. Sarris, University of Toronto, Canada

MO-A4.1A.6: EMPIRICAL CORRELATION PROPERTY OF MULTI-PATH FOR HIGH-SPEED RAILWAYS IN COMPOSITE PROPAGATION SCENARIO 91

Bei Zhang, Zhangdui Zhong, Ruisi He, Ke Guan, Jianwen Ding, Beijing Jiaotong University, China; Cesar Briso-Rodríguez, Universidad Politécnic de Madrid, Spain

MO-A4.1A.7: PATH LOSS CHARACTERIZATION FOR VEHICULAR-TO-INFRASTRUCTURE COMMUNICATIONS AT 700 MHZ AND 5.9 GHZ IN URBAN ENVIRONMENTS 93

Lorenzo Rubio, Universitat Politècnica de València, Spain; Herman Fernández, Universidad Pedagógica y Tecnológica de Colombia, Colombia; Vicent Miquel Rodrigo-Peñarrocha, Juan Reig, Universitat Politècnica de València, Spain

MO-A4.1A.8: PERFORMANCE EVALUATION OF UNDERGROUND STBC-MIMO SYSTEM UNDER IMPERFECT CHANNEL ESTIMATION ERRORS 95

Samira Boualleg, CDTA/USTHB, Algeria; Khalida Ghanem, Brahim Haraoubia, Centre de développement des technologies avancées, Algeria; Mourad Nedil, UQAT, Canada

MO-A4.1A.9: NON-STATIONARY CHANNEL CHARACTERISTICS IN HIGH-SPEED RAILWAY 97

Binghao Chen, Zhangdui Zhong, Bo Ai, Beijing Jiaotong University, China

MO-A4.1A.10: TIME-VARIANT CHARACTERISTICS FOR VEHICLE-TO-VEHICLE COMMUNICATIONS IN HIGHWAY SCENARIO 99

Qi Wang, Bo Ai, Beijing Jiaotong University, China; Xiang Cheng, Peking University, China; Yan Li, Zhangdui Zhong, Beijing Jiaotong University, China

MO-A5.2A: WIRELESS POWER TRANSMISSION

MO-A5.2A.1: DESIGN AND OPTIMIZATION OF EFFICIENT WIRELESS POWER TRANSMISSION SYSTEMS: THEORETICAL GUIDELINES AND EXPERIMENTAL VALIDATION 101

Massimo Donelli, Paolo Rocca, Federico Viani, Andrea Massa, ELEDIA Research Center, University of Trento, Italy

MO-A5.2A.2: OPTIMIZATION OF RESONANT INDUCTIVE LINKS FOR WIRELESS POWER TRANSFER N/A

Hyeonseok Hwang, Junil Moon, Byeonghak Jo, Chankeun Kwon, Soo-Won Kim, Korea University, Republic of Korea

MO-A5.2A.3: TUNABLE OPEN ENDED PLANAR SPIRAL COIL FOR WIRELESS POWER TRANSMISSION	105
<i>Telnaz Zarifi, Adam Maunder, Kambiz Moez, Pedram Mousavi, University of Alberta, Canada</i>	
MO-A5.2A.4: TUNABLE METAMATERIALS FOR OPTIMIZATION OF WIRELESS POWER TRANSFER SYSTEMS	107
<i>J. Prasad Kumara Sampath, Arokiaswami Alphones, Nanyang Technological University, Singapore; Don Mahinda Vilathgamuwa, Queensland University of Technology, Australia</i>	
MO-A5.2A.5: EFFICIENCY COMPARISON BETWEEN RESONANT COIL AND METAMATERIAL SHEET FOR WIRELESS POWER TRANSFER	109
<i>Gunbok Lee, Young Seok Noh, Pohang University of Science and Technology, Republic of Korea; Gi-bum Lee, Research Institute of Industrial Science & Technology, Republic of Korea; Wee Sang Park, Pohang University of Science and Technology, Republic of Korea</i>	
MO-A5.2A.6: DUAL-MODE WIRELESS POWER TRANSFER MODULE FOR SMARTPHONE APPLICATION	111
<i>Minseok Han, Ji-Min Kim, Hoon Sohn, Korea Advanced Institute of Science and Technology, Republic of Korea</i>	
MO-A5.2A.7: EFFECTS OF METAMATERIAL SLAB WITH NEGATIVE PERMEABILITY APPLIED TO MAGNETICALLY-COUPLED WIRELESS POWER TRANSFER SYSTEM	113
<i>Gunyoung Kim, Bomson Lee, Kyung Hee University, Republic of Korea</i>	
MO-A5.2A.8: COMPARISON OF MAGNETIC FIELD EXPOSURE FOR SISO AND MISO WIRELESS POWER TRANSFER SYSTEMS	115
<i>Tim X. Liu, Hans-Dieter Lang, Costas D. Sarris, University of Toronto, Canada</i>	
MO-A5.2A.9: MISALIGNMENT INSENSITIVE WPT WITH CONFORMAL SCMR SYSTEMS	117
<i>Hao Hu, Shun Yao, Kun Bao, Stavros V. Georgakopoulos, Florida International University, United States</i>	
MO-A5.2A.10: CONFORMAL SCMR SYSTEM WITH MULTIPLE RESONATORS	119
<i>Kun Bao, Elad Siman Tov, Stavros V. Georgakopoulos, Florida International University, United States</i>	
 MO-A5.1A: MIMO FOR 5G AND BEYOND	
MO-A5.1A.1: SECURE KEY ESTABLISHMENT IN THE PRESENCE OF A PASSIVE EAVESDROPPER: IMPACT OF ANTENNA COUPLING	121
<i>Attiya Mahmood, Michael Jensen, Brigham Young University, United States</i>	
MO-A5.1A.2: CRS PRECODING WEIGHTS FOR WIDE BEAM COVERAGE IN FD-MIMO ANTENNA ARRAYS	123
<i>Ioannis Tzanidis, Yang Li, Gary Xu, Jianzhong Zhang, Samsung Research America - Dallas, United States</i>	
MO-A5.1A.3: AN ADAPTIVE MULTI-BEAM MASSIVE ARRAY ARCHITECTURE FOR 5G WIRELESS	125
<i>Ruey-Bing Hwang, Yi-Che Tsai, Cherng-Chyi Hsiao, National Chiao Tung University, Taiwan</i>	
MO-A5.1A.4: HORIZONTALLY POLARIZED CYLINDRICAL MIMO RADAR ANTENNA ARRAY	127
<i>Danyang Huang, Xuan Hui Wu, Minnesota State University, Mankato, United States</i>	
MO-A5.1A.5: WIDEBAND SELF-INTERFERENCE CANCELLATION FILTER FOR SIMULTANEOUS TRANSMIT AND RECEIVE SYSTEMS	129
<i>Stephen Watt, Elias A. Alwan, Waleed Khalil, John L. Volakis, Ohio State University, United States</i>	
MO-A5.1A.6: DESIGN OF IMPEDANCE LOADING BOARD SUPPORTING LOAD-MODULATED BEAMSPACE MIMO SINGLE RF SYSTEM	131
<i>Kyoungtae Lee, Il-Do Choi, JuYong Lee, Korea Advanced Institute of Science and Technology, Republic of Korea</i>	
MO-A5.1A.7: ANTENNA BEAMFORMING FOR INTERFERENCE CANCELLATION IN RADAR-WIRELESS SPECTRUM SHARING	133
<i>Zhe Geng, Hai Deng, Florida International University, United States</i>	

MO-A5.1A.8: MIMO WAVEFORM DESIGN FOR MINIMIZING MULTIPATH FROM GROUND AND CEILING REFLECTIONS	135
<i>Aashish Sharma, Shobha Sundar Ram, Indraprastha Institute of Information Technology, India</i>	
MO-A5.1A.9: RESEARCH ON THE CONFIGURATION OF TIME REVERSAL MIRROR IN TIME REVERSAL BEAMFORMING SYSTEM	137
<i>Yu Yang, Bing-Zhong Wang, Zhishuang Gong, Ren Wang, Yaqing Wen, University of Electronic Science and Technology of China, China</i>	
MO-A5.1A.10: PERFORMANCE OF OFDM-IDMA AND OFDM-CDMA ARCHITECTURES OVER FREQUENCY SELECTIVE MISO CHANNELS	139
<i>Widad Belaoura, EMP, Algeria; Khalida Ghanem, Centre de développement des technologies avancées, Algeria; Mustapha Djeddou, EMP, Algeria</i>	
 MO-A5.3A: FLEXIBLE SUBSTRATES AND PASSIVES FOR UWB SYSTEMS	
MO-A5.3A.1: A NOVEL ULTRA-WIDEBAND BANDPASS FILTER WITH A NOTCHED BAND	141
<i>Jinxin Li, Tayeb A. Denidni, Institut National de la Recherche Scientifique (INRS), Canada; Jun Xu, University of Electronic Science and Technology of China, China; Qingsheng Zeng, Institut National de la Recherche Scientifique (INRS), Canada</i>	
MO-A5.3A.2: A STRUCTURE AND FAST DESIGN OF COMPACT UWB ANTENNA WITH UPPER WLAN BAND-NOTCH	143
<i>Slawomir Koziel, Adrian Bekasiewicz, Reykjavik University, Iceland</i>	
MO-A5.3A.3: INKJET PRINTED BANDPASS FILTERS AND FILTENNAS USING SILVER NANOPARTICLE INK ON FLEXIBLE SUBSTRATE	145
<i>Waqas Ahmad, University of Westminster, United Kingdom; Andrea Maric, Nikola Ivanisevic, University of Novi Sad, Serbia; Djurdj Budimir, University of Westminster, United Kingdom</i>	
MO-A5.3A.4: NOVEL FLEXIBLE ANTENNA FOR UWB APPLICATIONS	147
<i>Sherif Zahran, Arab Academy for Science and Technology, Egypt; Mahmoud Abdalla, MTC College, Egypt</i>	
 MO-A3.1A: HIGH ORDER INTEGRAL EQUATION SOLVERS	
MO-A3.1A.1: HIGHER-ORDER METHOD OF MOMENTS ANALYSIS FOR UNCONNECTED QUADRILATERAL MESHES	149
<i>Peter Meincke, Erik Jørgensen, Oscar Borries, TICRA, Denmark</i>	
MO-A3.1A.2: SUBDIVISION SURFACES FOR ELECTROMAGNETIC INTEGRAL EQUATIONS	151
<i>Daniel Dault, Jie Li, Beibei Liu, Rundong Zhao, Yiyong Tong, Balasubramaniam Shanker, Michigan State University, United States</i>	
MO-A3.1A.3: ISOGEOMETRIC ANALYSIS OF INTEGRAL EQUATIONS USING SUBDIVISION	153
<i>Jie Li, Daniel Dault, Rundong Zhao, Beibei Liu, Yiyong Tong, Balasubramaniam Shanker, Michigan State University, United States</i>	
MO-A3.1A.4: HIGH ORDER LOCALLY CORRECTED NYSTRÖM METHOD WITH NORMAL CONTINUITY	155
<i>Nastaran Hendijani, Jin Cheng, Robert J. Adams, John C. Young, University of Kentucky, United States</i>	
MO-A3.1A.5: A HIGHER-ORDER METHOD FOR ELECTROMAGNETIC SIMULATION OF CONDUCTING OBJECTS NEAR/ACROSS THE INTERFACE OF A HALF SPACE	157
<i>Wan Luo, Zaiping Nie, Yongpin Chen, University of Electronic Science and Technology of China, China</i>	

MO-A5.4A: RFID TAGS AND SYSTEMS

MO-A5.4A.1: A NOVEL CO/CROSS-POLARIZING CHIPLESS RFID TAGS FOR HIGH CODING CAPACITY AND ROBUST DETECTION 159

Maher Khaliel, Ahmed El-Awamry, Abdelfattah Fawky, Mohamed El-Hadidy, Thomas Kaiser, Duisburg-Essen University, Germany

MO-A5.4A.2: MODAL-BASED APPROACH TO TUNE AND ENHANCE THE FREQUENCY AND DIELECTRIC BANDWIDTH OF A UHF-RFID TAG ANTENNA MOUNTED ON A DIELECTRIC SUBSTRATE 161

Ezdeen Elghannai, Roberto G. Rojas, Ohio State University, United States

MO-A5.4A.3: NUMERICAL INVESTIGATION ON THE TOLERANCE OF WEARABLE UHF-RFID TAGS TO HUMAN BODY COUPLING 163

Matteo Altini, Giovanni Andrea Casula, Giuseppe Mazzarella, Università di Cagliari, Italy; Paolo Nepa, University of Pisa, Italy

MO-A5.4A.4: MULTI-AXIS SINGLE-ANCHOR VS. SINGLE-AXIS MULTI-ANCHORS IN LONG-RANGE 2D MQS POSITIONING 165

Darindra Arumugam, Jet Propulsion Laboratory, United States

MO-A5.4A.5: BACKSCATTERING MODULATION USING STRONGLY COUPLED MAGNETIC RESONANCE (SCMR) ANTENNAS 167

Elad Siman Tov, Kun Bao, Stavros V. Georgakopoulos, Florida International University, United States

MO-A5.4A.6: SPECTRAL EXTRACTION OF CHIPLESS RFID TAG USING TIME DOMAIN ANALYSIS 169

Nijas C M, Sajitha V R, Vivek R, Mohanan P, Binu Paul, Mridula S, Cochin University of Science and Technology, India

MO-A3.2A: NOVEL FINITE ELEMENT AND DOMAIN DECOMPOSITION METHODS

MO-A3.2A.1: A 2D INTERFACE-ENRICHED GENERALIZED FEM FOR EM ANALYSIS OF COMPOSITE MATERIALS 171

Kedi Zhang, Ahmad Raeisi Najafi, Philippe H. Geubelle, Jian-Ming Jin, University of Illinois at Urbana-Champaign, United States

MO-A3.2A.2: A 3D INTERFACE-ENRICHED GENERALIZED FEM FOR EM ANALYSIS OF COMPOSITE MATERIALS 173

Kedi Zhang, Philippe H. Geubelle, Jian-Ming Jin, University of Illinois at Urbana-Champaign, United States

MO-A3.2A.3: W-FETI: GLOBAL DOMAIN DECOMPOSITION PRECONDITIONING DONE RIGHT 175

Wei Wang, Marinos N. Vouvakis, University of Massachusetts Amherst, United States

MO-A3.2A.4: RANDOMIZED COMPUTATIONS IN DOMAIN DECOMPOSITION METHODS 177

Wei Wang, Marinos N. Vouvakis, University of Massachusetts Amherst, United States

MO-A3.2A.5: EB SCHEME HYBRID SPECTRAL-FINITE ELEMENT TIME DOMAIN METHOD FOR SUPER MULTISCALE SIMULATION 179

Qiang Ren, Qing Huo Liu, Duke University, United States

MO-SP.1P: INNOVATIVE ANALYTICAL AND NUMERICAL TECHNIQUES FOR THE SOLUTION OF OPEN EM PROBLEMS: COMPLEX SCATTERING PROBLEMS, SPECIAL MATERIALS, NANOSTRUCTURES

MO-SP.1P.1: ELECTROMAGNETIC SCATTERING OF A COMPLEX-SOURCE BEAM BY SEMI-INFINITE SECTORS AND CONES 181

Hendrik Brüns, Ludger Klinkenbusch, Kiel University, Germany

MO-SP.1P.2: THE PROPAGATING FRAME: A NOVEL FRAMEWORK FOR WAVE TRACKING THROUGH ROUGH MEDIUM AND FOR INVERSE SCATTERING	183
<i>Matan Leibovich, Ram Tuvi, Ehud Heyman, Tel Aviv University, Israel</i>	
MO-SP.1P.4: WIENER-HOPF FORMULATION OF AN UNALIGNED PEC WEDGE OVER A STRATIFICATION	185
<i>Vito G. Daniele, Istituto Superiore Mario Boella - Politecnico di Torino, Italy; Guido Lombardi, Politecnico di Torino, Italy</i>	
MO-SP.1P.6: ANALYTICAL AND NUMERICAL MODELING OF PASSIVE AND ACTIVE COATED NANOPARTICLES	187
<i>Richard W. Ziolkowski, University of Arizona, United States</i>	
MO-SP.1P.7: ERROR-CONTROLLED BOUNDARY ELEMENT MODELING OF 3D PLASMONIC NANO-STRUCTURES VIA HIGHER-ORDER LOCALLY CORRECTED NYSTROM METHOD	189
<i>Mohammad Shafieipour, Vladimir I. Okhmatovski, University of Manitoba, Canada</i>	
MO-SP.1P.8: EFFICIENT NUMERICAL MODELLING OF A SPECIAL CLASS OF PHOTONIC CRYSTALS USING THE TIGHT BINDING APPROACH	191
<i>Nima Chamanara, Christophe Caloz, Poly-Grames Research Center, Canada</i>	
MO-SP.1P.9: IMPEDANCE MODELING OF CHESSBOARD-PATTERNED DEFLECTORS COMPOSED OF METASURFACES WITH SUBWAVELENGTH INCLUSIONS	N/A
<i>Ali Eren Culhaoglu, Andrey Osipov, German Aerospace Center (DLR), Germany</i>	
MO-SP.1P.10: A NEW FORMULATION DISCONTINUOUS GALERKIN SURFACE INTEGRAL EQUATION METHOD FOR TIME-HARMONIC WAVE SCATTERING PROBLEM	195
<i>Dongwei Li, Jiangong Wei, Jin-Fa Lee, Ohio State University, United States</i>	
 MO-SP.2P: ANTENNAS AND SENSORS FOR EPIDERMAL ELECTRONICS	
MO-SP.2P.4: ENHANCED READ RANGE TATTOO RFID TAGS	197
<i>Dumtoochukwu Oyeka, John C Batchelor, Badredin. M Turki, University of Kent, United Kingdom</i>	
MO-SP.2P.5: CHARACTERISING SKIN-BASED NANO-NETWORKS FOR HEALTHCARE MONITORING APPLICATIONS AT THZ	199
<i>Ke Yang, Nishtha Chopra, Jamie Upton, Yang Hao, Mike Philpott, Queen Mary University of London, United Kingdom; Qammer Hussain Abbasi, Khalid Qaraqe, Texas A&M University at Qatar, Qatar; Akram Alomainy, Queen Mary University of London, United Kingdom</i>	
MO-SP.2P.6: BODY-WORN ANTENNAS, SENSORS AND A NOVEL CLASS OF ELECTRONIC TEXTILES	201
<i>Asimina Kiourti, John L. Volakis, Ohio State University, United States</i>	
MO-SP.2P.7: ON-SKIN TUNABLE RFID LOOP TAG FOR EPIDERMAL APPLICATIONS	202
<i>Sara Amendola, Stefano Milici, Gaetano Marrocco, University of Roma Tor vergata, Italy; Cecilia Occhiuzzi, RADIO6ENSE S.r.l, Italy</i>	
MO-SP.2P.9: A NOVEL FLEXIBLE WEARABLE MAGNETIC ENERGY HARVESTER UTILIZING INKJET MASKING TECHNIQUES	204
<i>Jo Bito, Manos Tentzeris, Georgia Institute of Technology, United States</i>	
 MO-A1.1P: WAVEGUIDE SLOT ARRAYS I	
MO-A1.1P.1: SLOT ANTENNA ARRAY ON TRIANGULAR WAVEGUIDE	206
<i>Ying Chen, Rodney Vaughan, Simon Fraser University, Canada</i>	

**MO-A1.1P.2: X-BAND PARALLEL-PLATE SLOT ARRAY ANTENNA FOR SAR SENSOR ONBOARD 100 KG 208
SMALL SATELLITE**

Prilando Rizki Akbar, Hirobumi Saito, Institute of Space and Astronautical Science of JAXA, Japan; Miao Zang, Jiro Hirokawa, Makoto Ando, Tokyo Institute of Technology, Japan

**MO-A1.1P.3: LOCOMO SATCOM TERMINAL: A SWITCHABLE RHCP/LHCP ARRAY ANTENNA FOR 210
ON-THE-MOVE APPLICATIONS IN KA-BAND**

Jose Ignacio Herranz-Herruzo, Miguel Ferrando-Rocher, Alejandro Valero-Nogueira, Universitat Politècnica de València, Spain; Regis Lenormand, Antonin Hirsch, Jean-Luc Almeida, Mathieu Arnaud, Lyonel Barthe, Thales Alenia Space, France

**MO-A1.1P.4: WIDTH EFFECTS ON ELECTROMAGNETIC AND MECHANICAL BEHAVIOR OF 212
Z-SLOTTED WAVEGUIDE ARRAY ANTENNAS**

Qing Lan, Derek Gray, Xi'an Jiatong Liverpool University, China; Stanley Chen, University of Nottingham, China; Kunio Sakakibara, Nagoya Institute of Technology, Japan

**MO-A1.1P.5: CONTROLLABLE-SIDELOBE SLOTTED WAVEGUIDE ANTENNAS WITH 214
CORRUGATIONS FOR FREQUENCY SELECTIVITY**

Mohammed Al-Husseini, Lebanese Center for Studies and Research, Lebanon; Hilal M. El Misilmani, Karim Y. Kabalan, Ali El-Hajj, American University of Beirut, Lebanon; Xuyuan Pan, Christos Christodoulou, University of New Mexico, United States

**MO-A1.1P.6: DESIGN PROCEDURE FOR 2D SLOTTED WAVEGUIDE ANTENNA WITH 216
CONTROLLABLE SIDELOBE LEVEL**

Hilal M. El Misilmani, American University of Beirut, Lebanon; Mohammed Al-Husseini, Beirut Research and Innovation Center, Lebanon; Karim Y. Kabalan, Ali El-Hajj, American University of Beirut, Lebanon

**MO-A1.1P.7: WAVEGUIDE SLOT ARRAY ANTENNA DESIGN WITH A NOVEL COMPACT 218
ARCHITECTURE**

Wentao Zhang, Fengyun Cui, Qiang Wang, Xiaoyang He, Chun Yang, Yong Cui, China Academy of Engineering Physics, China

MO-A1.1P.8: DUAL BAND DUAL POLARIZED ANTENNA FOR SAR..... 220

Wei Wang, Hongtao Zhang, Ming Chen, Jianguo Lu, East China Research Institute of Electronic Engineering, China; Ying Liu, Xidian University, China

**MO-A1.1P.9: A HIGH GAIN-BANDWIDTH, NEARLY OMNIDIRECTIONAL WAVEGUIDE SLOT ARRAY 222
ANTENNA**

Rintu Kumar Gayen, Sushrut Das, Ashmi Chakraborty Das, Indian School of Mines, India

MO-A1.2P: BEAMFORMING STRUCTURES

**MO-A1.2P.1: X-BAND PHASE SHIFTERS AND BEAM FORMING NETWORKS USING N/A
MICROFLUIDICALLY CONTROLLED METALLIZED PLATES**

Timothy Palomo, Gokhan Mumcu, University of South Florida, United States

MO-A1.2P.2: A PLANAR FEED FOR SOTM KA-BAND LENS ANTENNAS 226

Joana Silva, Maria García-Vigueras, Marc Esquiús-Morote, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland; Jorge Costa, ISCTE – Instituto Universitário de Lisboa, Portugal; Carlos Fernandes, Instituto Superior Técnico – Universidade de Lisboa, Portugal; Juan R. Mosig, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland

MO-A1.2P.3: UNIFORM CIRCULAR ARRAY WITH INTEGRATED MICROSTRIP TAPERED BALUNS..... 228

Brad Jackson, Bruce Liao, Defence R&D Canada, Canada

MO-A1.2P.4: BROADBAND 4 X 4 BUTLER MATRIX FOR K- AND KA- BANDS 230

Abdulrahman Alaqeel, Sultan Almorqi, King Abdulaziz City for Science and Technology, Saudi Arabia; Osama Haraz, Muhammad Ashraf, Saleh Alshebeili, Abdel-Razik Sebak, King Saud University, Saudi Arabia

MO-A1.2P.5: X-BAND SUBSTARTE INTEGRATED ROTMAN LENS WITH $\pm 24^\circ$ SCANNING CAPABILITY 232

Javad Pourahmadazar, Tayeb A. Denidni, National Institute of Scientific Research (INRS) Centre for Energy, Materials and Telecommunication, Canada

MO-A1.2P.6: AN INITIAL STUDY ON USING CARBON MICROFIBER TRANSMISSION LINES IN CONFORMAL ARRAY NETWORKS	234
<i>Sajid Asif, Adnan Iftikhar, Benjamin Braaten, North Dakota State University, United States; Muhammad Khan, University of Padova, Italy</i>	
MO-A1.2P.7: PHASER-BASED FEEDING NETWORK FOR UNIFORMLY SCANNING ANTENNA ARRAYS	236
<i>Ge Zhang, Qingfeng Zhang, Fan Yang, Yifan Chen, South University of Science and Technology of China, China; Christophe Caloz, Polytechnique de Montréal, Canada; King Abdulaziz University, Saudi Arabia; Ross D. Murch, Hong Kong University of Science and Technology, Hong Kong SAR of China</i>	
MO-A1.2P.8: A PROTOTYPE OF FEED SUBSYSTEM FOR A MULTIPLE-BEAM ARRAY-FED REFLECTOR ANTENNA	238
<i>Qinghua Lai, Pei Li, Xiaopeng Lu, Chu Gao, East China Research Institute of Electronic Engineering, China</i>	
MO-A1.2P.9: A WIDE-BAND 180-DEGREE PHASE SHIFTER USING A PAIR OF COUPLED-LINE STUBS	240
<i>Yongle Wu, Lidan Yao, Weimin Wang, Yuanan Liu, Beijing University of Posts and Telecommunications, China</i>	
MO-A1.2P.10: FOCUSED ARRAY ANTENNA USING SUBARRAYS	242
<i>Peng-Fa Li, Shi-Wei Qu, Run-Liang Xia, University of Electronic Science and Technology of China, China</i>	
 MO-A2.1P: METASURFACE AND METAMATERIAL APPLICATIONS	
MO-A2.1P.1: NOVEL METAMATERIAL ABSORBER WITH FRACTAL ELEMENTS	244
<i>Te-Kao Wu, FSS, EM, and Antenna Consulting, United States</i>	
MO-A2.1P.2: PANCHARATNAM-BERRY METASURFACES WITH GIANT NONLINEAR RESPONSE	246
<i>Mykhailo Tymchenko, Andrea Alù, University of Texas at Austin, United States</i>	
MO-A2.1P.3: CYLINDRICAL NEAR-FIELD DIRECTING SHELL	248
<i>Brian Raeker, Scott Rudolph, Naval Research Laboratory, United States</i>	
MO-A2.1P.4: USING SIGNAL ESTIMATION FOR NEAR-FIELD PLATE OPTIMIZATION	250
<i>Erik Gamez Rodriguez, David Schurig, Gianluca Lazzi, University of Utah, United States</i>	
MO-A2.1P.5: ABERRATION-FREE PLANAR FOCUSING BASED ON PARITY-TIME SYMMETRIC NONLOCAL METAMATERIALS	252
<i>Francesco Monticone, Andrea Alù, University of Texas at Austin, United States; Constantinos Valagiannopoulos, Aalto University, Finland</i>	
MO-A2.1P.6: BEAMFORMING BOW-TIE ANTENNA FOR MILLIMETER-WAVE APPLICATIONS USING METAMATERIAL LENS	254
<i>Abdolmehdi Dadgarpour, Behnam Zarghooni, Tayeb A. Denidni, Institut National de la Recherche Scientifique (INRS), Canada</i>	
MO-A2.1P.7: COMPLETE TRANSMISSION THROUGH SHORT WAVEGUIDE BENDS USING CONNECTED BI-OMEGA PARTICLES	256
<i>Davide Ramaccia, “RomaTre” University, Italy; Mirko Barbuto, “Niccolò Cusano” University, Italy; Filiberto Bilotti, Alessandro Toscano, “RomaTre” University, Italy</i>	
MO-A2.1P.8: FREQUENCY SELECTIVE TRANSMISSION THROUGH WAVEGUIDES WITH ENZ SECTIONS	258
<i>Navid Pourramzan Gandji, George Semouchkin, Elena Semouchkina, Michigan Technological University, United States</i>	
MO-A2.1P.9: RING RESONANCES IN GROOVE GAP WAVEGUIDES WITH APPLICATION TO SLOT ARRAY ANTENNAS	260
<i>Alejandro Jimenez Saez, Alejandro Valero-Nogueira, Jose Ignacio Herranz-Herruzo, Vicent Miquel Rodrigo-Peñarrocha, Universitat Politècnica de València, Spain</i>	

MO-UB.1P: NANOANTENNA CONSIDERATIONS

MO-UB.1P.1: A REDUCED ORDER ADMITTANCE MODEL FOR LONGITUDINALLY LOADED PLASMONIC NANOROD ANTENNAS 262

Anastasios Panaretos, Douglas H. Werner, Pennsylvania State University, United States

MO-UB.1P.2: ANALYSIS AND DESIGN OF AN OPTICAL TRAPPED NANODIPOLE USING PLASMONIC CORE-SHELL PARTICLES 264

Anastasios Panaretos, Douglas H. Werner, Pennsylvania State University, United States

MO-UB.1P.3: STUDY ON THE LONG RANGE ACTIVE COATED NANO PARTICLES 266

Junping Geng, Ronghong Jin, Xianling Liang, Shanghai Jiao Tong University, China; Richard W. Ziolkowski, University of Arizona, United States

MO-UB.1P.10: ENHANCEMENT OF CARBON NANOTUBE ANTENNA WITH GAS SENSOR CAPABILITIES THROUGH CHEMICAL FUNCTIONALIZATION 268

Steven Keller, Jinting Liu, Amir Zaghloul, Army Research Laboratory, United States

MO-A4.1P: PROPAGATION AND SCATTERING IN COMPLEX MEDIA

MO-A4.1P.1: A STATISTICAL STUDY OF DYADIC ANGULAR SPECTRUM IN RANDOM SCATTERING ENVIRONMENTS 270

Jie Xu, Loyola Marymount University, United States

MO-A4.1P.2: EXPERIMENTAL CHARACTERIZATION OF IMPULSIVE NOISE IN A RAILWAY ENVIRONMENT 272

Bertrand Nkakanou, Gilles Y. Delisle, Université Laval, Canada; Nadir Hakem, Université du Québec en Abitibi-Témiscamingue, Canada

MO-A4.1P.3: OPPORTUNISTIC CROWD SENSING IN WIFI-ENABLED INDOOR AREAS 274

Fabrizio Robol, Federico Viani, Alessandro Polo, Enrico Giarola, Paola Garofalo, Cristian Zambiasi, Andrea Massa, ELEDIA Research Center, University of Trento, Italy

MO-A4.1P.4: WIRELESS COVERAGE OPTIMIZATION FOR ROBOTIC SWARM IN EMERGENCY SCENARIO 276

Federico Viani, Enrico Giarola, Paolo Rocca, Giacomo Oliveri, Andrea Massa, ELEDIA Research Center, University of Trento, Italy

MO-A4.1P.5: PRELIMINARY STUDY ON THE USE OF COMPLEX MEDIA FOR ANTENNA CHARACTERIZATION 278

Mouad Djedidi, Florian Monsef, Andrea Cozza, UMR 8507 – UPSud, CentraleSupélec, CNRS, UPMC, France

MO-A4.1P.6: PROPAGATION AND SCATTERING IN A MICROWAVE PLASMA CHAMBER 280

Eric Peterson, Vijay Katta, Jayanti Venkataraman, Rochester Institute of Technology, United States; Merritt Funk, Megan Doppel, Jianping Zhao, Tokyo Electron America, United States

MO-A4.1P.7: A HYBRID PERTURBATIONAL AND TRANSFORMATIONAL ELECTROMAGNETICS APPROACH FOR MODELING ROUGH SURFACE SCATTERING PROBLEMS 282

Mustafa Kuzuoglu, Middle East Technical University, Turkey; Ozlem Ozgun, Hacettepe University, Turkey

MO-A4.1P.8: MODELING ELECTROMAGNETIC SCATTERING FROM RANDOM ARRAY OF OBJECTS BY FORM INVARIANCE OF MAXWELL'S EQUATIONS 284

Ozlem Ozgun, Hacettepe University, Turkey; Mustafa Kuzuoglu, Middle East Technical University, Turkey

MO-A4.1P.9: FULL-WAVE SIMULATION OF PROPAGATION IN HUMAN CROWDS 286

Miroslav Veljovic, Dragan Olcan, Branko Kolundzija, University of Belgrade, Serbia

MO-A4.1P.10: FAST SOLUTION OF VOLUME INTEGRAL EQUATIONS WITH COMPLEX MATERIALS 288

Jie Zhang, Si Cong Yan, Chun Xia Yang, Mei Song Tong, Tongji University, China

MO-A5.1P: MIMO CHANNEL MEASUREMENTS AND PERFORMANCE EVALUATIONS

- MO-A5.1P.1: 2X2 MIMO DOWNLINK OTA MEASUREMENT BASED ON CTIA GUIDELINES 290**
Alessandro Scannavini, Lars Jacob Foged, Microwave Vision Group, Italy; John Estrada, Nicolas Gross, MVG Inc. Americas, United States
- MO-A5.1P.2: PAS CONTROL IN A RECONFIGURABLE OTA CHAMBER..... 292**
Rashid Mehmood, Jon Wallace, Michael Jensen, Brigham Young University, United States
- MO-A5.1P.3: A BASE STATION CORRELATION-CONTROLLED BILATERAL EMULATOR FOR 294**
MIMO-OTA
Kazuhiro Honda, Toshihiko Kabeya, Kento Karitani, Kun Li, Koichi Ogawa, Toyama University, Japan; Yoshio Koyanagi, Hiroshi Sato, Ritsu Miura, Panasonic System Networks Co., Ltd., Japan
- MO-A5.1P.4: MEASURED 2X2 MIMO UHF CHANNELS IN AN URBAN ENVIRONMENT..... 296**
Michael Daly, Marcos Ontiveros, Jeffery Allen, Kristopher Buchanan, Diana Arceo, Space and Naval Warfare Systems Center, Pacific, United States
- MO-A5.1P.5: VARIABILITY OF ELLIPTICITY STATISTIC OF MIMO INDOOR RADIO CHANNELS 298**
WITH ANTENNA ORIENTATION ANGLE
Hassan El-Sallabi, Mohamed Abdallah, Texas A&M University at Qatar, Qatar; Jean-Francois Chamberland, Texas A&M University, United States; Khalid Qaraqe, Texas A&M University at Qatar, Qatar
- MO-A5.1P.6: PERFORMANCE EVALUATION OF MASSIVE MIMO USING CYLINDRICAL ARRAY IN A 300**
REAL MICROCELL ENVIRONMENT
Ryochi Kataoka, Kentaro Nishimori, Niigata University, Japan; Ngochao Tran, Tetsuro Imai, NTT DOCOMO INC., Japan
- MO-A5.1P.7: CHANNEL CAPACITY UNDER MEASUREMENT-BASED MODEL FOR COOPERATIVE 302**
VEHICULAR AD HOC NETWORKS
Ruifeng Chen, Beijing Jiaotong University, China; Zhengguo Sheng, University of Sussex, United Kingdom; Minming Ni, Zhangdui Zhong, Beijing Jiaotong University, China; David Michelson, University of British Columbia, Canada
- MO-A5.1P.8: ANTENNA DECISION METHOD FOR DOWNLINK MULTIUSER MIMO SYSTEMS 304**
WITH RECEIVE ANTENNA ALLOCATION
Tomoki Murakami, Yasushi Takatori, Masato Mizoguchi, NTT Corporation, Japan; Fumiaki Maehara, Waseda university, Japan
- MO-A5.1P.9: PERFORMANCE OF LTE COMMUNICATION SYSTEM IN CORRELATED RAYLEIGH 306**
CHANNEL WITH DIFFERENT ANTENNA CONFIGURATIONS
Nessrine Smaili, EMP, Algeria; Khalida Ghanem, Centre de développement des technologies avancées, Algeria; Mustapha Djeddou, EMP, Algeria
- MO-A5.1P.10: MEASURED MIMO CHANNEL CAPACITY OF A VIRTUAL COLOCATED 308**
TRI-POLARIZED LOOP ANTENNA
Dazhi Piao, Lingyu Yang, Huaqing Zhang, Jianxun Su, Zengrui Li, Communication University of China, China
- MO-A5.2P: ANTENNAS MANUFACTURED WITH ADDITIVE TECHNOLOGIES**
- MO-A5.2P.1: CPW-FED 3D CUBIC FOLDED ANNULAR SLOT ANTENNA 310**
Souren Shamsinejad, Pedram Mousavi, University of Alberta, Canada; Franco De Flaviis, University of California, Irvine, United States
- MO-A5.2P.2: TRANSPARENT AND STRETCHABLE CHIPLESS RFID FABRICATED USING SILVER 312**
NANOWIRE AND 3D PRINTED MASK
Taehee Jang, L. Jay Guo, University of Michigan, United States
- MO-A5.2P.3: DESIGN AND IMPLEMENTATION OF A 3D PRINTED DISCONE ANTENNA FOR TV 314**
BROADCASTING SYSTEM
Ricardo Gonçalves, Pedro Pinho, Nuno Carvalho, Instituto de Telecomunicações, Portugal

MO-A5.2P.4: APPLICATION OF 3-D METAL-DIRECT-PRINTING TECHNIQUE FOR WAVEGUIDE ANTENNA FABRICATION	316
<i>Guan-Long Huang, Tan-Huat Chio, Tat-Soon Yeo, National University of Singapore, Singapore; Shi-Gang Zhou, Northwestern Polytechnical University, China</i>	
MO-A5.2P.5: AUTOMATED DESIGN OF A 3D PRINTED WAVEGUIDE SURFACE COUPLER	318
<i>Constantine Sideris, California Institute of Technology, United States; Chen Yang, Sung-Yueh Wu, Firas Sammoura, Liwei Lin, University of California, Berkeley, United States; Ali Hajimiri, California Institute of Technology, United States; Elad Alon, University of California, Berkeley, United States</i>	
MO-A5.2P.6: DEFICIENCIES IN PRINTED FSS INTENDED FOR APPLICATION IN SMART BUILDINGS	320
<i>Badredin. M Turki, Edward A Parker, University of Kent, United Kingdom; Rachel Saunders, Joseph S.R. Wheeler, Stephe G Yeates, University of Manchester, United Kingdom; John C Batchelor, University of Kent, United Kingdom</i>	
MO-A5.2P.7: DESIGN OF A WIDEBAND AND LOW-PROFILE MONOPULSE ARRAY FABRICATED BY 3-D METAL PRINTING TECHNIQUE	322
<i>Guan-Long Huang, Tan-Huat Chio, Tat-Soon Yeo, National University of Singapore, Singapore; Shi-Gang Zhou, Northwestern Polytechnical University, China</i>	
MO-A5.2P.8: A 3D PRINTED HELICAL ANTENNA WITH INTEGRATED LENS	324
<i>Muhammad Fahad Farooqui, Atif Shamim, King Abdullah University of Science and Technology, Saudi Arabia</i>	
MO-A5.2P.9: OPERATION OF 8-WAVELENGTH-RADIUS 2-LAYER LENSES	326
<i>Derek Gray, Xi'an Jiatong Liverpool University, China; Nasiha Nikolic, CSIRO, Australia; John Thornton, Antennas Research, United Kingdom</i>	
MO-A5.2P.10: A NOVEL 3-D PRINTED ELECTRMAGNETIC BANDGAP STRUCTURE FOR PARALLEL PLATE MODE SUPPRESSION IN MICROSTRIP CIRCUIT PACKAGES	328
<i>Yongrong Shi, Nanjing University of Science and Technology, China; Wanchun Tang, Jiawei Zhou, Wei Zhuang, Nanjing Normal University, China</i>	
 MO-A3.1P: FDTD METHODS	
MO-A3.1P.1: A ROTATED SUBGRID FOR 3D FDTD	330
<i>Christopher Railton, University of Bristol, United Kingdom</i>	
MO-A3.1P.2: FINITE FSS STRUCTURE ANALYSIS USING A HYBRID HIGH ORDER FDTD AND SUBGRIDDING METHOD	N/A
<i>Longjian Zhou, Feng Yang, University of Electronic Science and Technology of China, China</i>	
MO-A3.1P.3: A CONSERVATIVE FDTD M(2,4) SCHEME IN 3D WITHOUT TIME STEP REDUCTION FOR REDUCING DISPERSION	334
<i>Nicolas Bui, Christophe Guiffaut, Alain Reineix, XLIM Institute, France; Philippe Pouliguen, DGA/DS/MRIS, France</i>	
MO-A3.1P.4: CONSTRUCTING NONSTANDARD AND HIGH ORDER FDTD SCHEMES IN CYLINDRICAL COORDINATES USING SPECTRAL DOMAIN AND MODIFIED EQUATION METHODOLOGIES	336
<i>Bezalel Finkelstein, Raphael Kastner, Tel Aviv University, Israel</i>	
MO-A3.1P.5: ON THE LOW-FREQUENCY BREAKDOWN OF FDTD	338
<i>Md Gaffar, Dan Jiao, Purdue University, United States</i>	
MO-A3.1P.6: THREE-STEP LOD-FDTD METHOD INCLUDING LUMPED RESISTORS AND ITS STABILITY ANALYSIS	340
<i>Yong-Dan Kong, Qing-Xin Chu, South China University of Technology, China</i>	

MO-A3.1P.7: ACCURATE MATRIX-FREE TIME-DOMAIN METHOD WITH TRADITIONAL VECTOR BASES IN UNSTRUCTURED MESHES	342
<i>Jin Yan, Dan Jiao, Purdue University, United States</i>	
MO-A3.1P.8: A HYBRID FDTD-SIE APPROACH FOR RADAR IMAGING SYSTEM SIMULATION.....	344
<i>Traian Dogaru, DaHan Liao, Army Research Laboratory, United States</i>	
MO-A3.1P.9: A NEW EXPLICIT AND UNCONDITIONALLY STABLE FDTD METHOD FOR ANALYZING GENERAL LOSSY PROBLEMS	346
<i>Md Gaffar, Dan Jiao, Purdue University, United States</i>	
MO-A3.1P.10: A NEW SIMD-BASED FDTD MESHING ALGORITHM USED FOR FDTD SIMULATION OF AIRCRAFT PLATFORM	348
<i>Yang Guo, Xiang-Hua Wang, Jun Hu, Zhejiang University, China; Lian-Dong Wang, State Key Lab of Complex Electromagnetic Environment Effects on Electronic and Information System, China; Wen-Yan Yin, Zhejiang University, China</i>	
 MO-A5.3P: ANTENNAS FOR BIOMEDICAL APPLICATIONS	
MO-A5.3P.1: DEVELOPMENT OF COMPACT THREE-DIMENSIONAL UNIDIRECTIONAL ULTRA-WIDEBAND ANTENNAS FOR PORTABLE MICROWAVE HEAD IMAGING SYSTEMS	350
<i>Ahmed Toaha Mobashsher, Amin M. Abbosh, University of Queensland, Australia</i>	
MO-A5.3P.2: MINIATURIZED UWB ANTIPODAL VIVALDI ANTENNA FOR A MECHATRONIC BREAST CANCER IMAGING SYSTEM	352
<i>Ali Molaei, Ashkan Ghanbarzadeh Dagheyan, Juan Heredia Juesas, Jose Angel Martinez Lorenzo, Northeastern University, United States</i>	
MO-A5.3P.3: SWITCHED SENSOR ARRAY FOR NEAR-FIELD MICROWAVE IMAGING OF TISSUE.....	354
<i>Alex Beaverstone, Natalia Nikolova, McMaster University, Canada</i>	
MO-A5.3P.4: A POLYCARBONATE RFID TAG FOR BLOOD CHAIN TRACKING	356
<i>Alessandro Fanti, Roberto Secci, Gianluca Boi, Sergio Casu, Giovanni Andrea Casula, Giuseppe Mazzarella, Giorgio Montisci, University of Cagliari, Italy</i>	
MO-A5.3P.5: ENERGY HARVESTING SYSTEM INTEGRATED ON WEARABLE CONTACT LENS.....	358
<i>Luyao Chen, George Shaker, Safieddin Safavi-Naeini, University of Waterloo, Canada</i>	
 MO-A1.3P: CIRCULARLY POLARIZED ANTENNAS	
MO-A1.3P.1: INVESTIGATION OF REDUCED HEIGHT DUAL-POLARIZED ARCHIMEDEAN SPIRAL ANTENNAS WITH UNIDIRECTIONAL RADIATION PATTERNS	360
<i>A.M.Mehrabani, Lotfollah Shafai, University of Manitoba, Canada</i>	
MO-A1.3P.2: STUDY OF COUPLED SPLIT-RING RESONATOR ARRAYS FOR CIRCULAR POLARIZATION SELECTIVE SURFACE	362
<i>Wenxing Tang, George Goussetis, Heriot-Watt University, United Kingdom; Nelson J. G. Fonseca, Moltek Consultants Ltd, Netherlands; Hervé Legay, Thales Alenia Space, France; Elena Sáenz, ETH Zürich, Netherlands; Peter de Maagt, European Space Agency, Netherlands</i>	
MO-A1.3P.3: DESIGN OF A BROADBAND CIRCULARLY-POLARIZED LENS ANTENNA WITH A LINEARLY POLARIZED FEEDER	364
<i>Yujie Liu, Yuehe Ge, Yinyan Chen, Huaqiao University, China</i>	
MO-A1.3P.4: 45° SLANT-POLARIZED OMNIDIRECTIONAL ANTENNA: METAMATERIAL-BASED LOOP-DIPOLE ANTENNA	N/A
<i>Yi Zhang, Zhengzhou Information Science and Technology Institute, China; Zhijun Zhang, Zhenghe Feng, Tsinghua National Laboratory for Information Science and Technology, China</i>	

MO-A1.3P.5: QUADRIFILAR HELICAL ANTENNA ANALYSIS USING CIRCULAR ARRAY CONCEPT N/A
Pooria Salami, Gholamreza Moradi, Reza Sarraf Shirazi, Amirkabir University of Technology, Iran

MO-A5.4P: ANTENNA DESIGN AND SAR REDUCTION

MO-A5.4P.1: SAR REDUCTION OF MULTI-BAND ANTENNA BY USING PARTIALLY REFLECTIVE 370
SURFACE

Jongsung Kim, Kyung Sung University, Republic of Korea; Mohamed Abdel-Mageed, Chiara Pelletti, Raj Mittra, Pennsylvania State University, United States; Long Li, Xidian University, China

MO-A5.4P.2: LOW-SAR HEXA-BAND ANTENNA FOR MOBILE APPLICATIONS 372

Guo Liu, Pennsylvania State University, United States; Xidian University, China; Chiara Pelletti, Pennsylvania State University, United States; Raj Mittra, Pennsylvania State University; University of Central Florida, United States

MO-A5.4P.3: PENTA-BAND PIFA FOR SAR REDUCTION FOR MOBILE AND WLAN APPLICATIONS 374
USING R-CARD

Mohamed Abdel-Mageed, Chiara Pelletti, Pennsylvania State University, United States; Raj Mittra, Pennsylvania State University; Central Florida University, United States

MO-A5.4P.4: A COMBO ANTENNA STRUCTURE FOR REDUCING SAR OF MOBILE HANDSET FOR 376
LTE/WLAN APPLICATIONS

Chia-Mei Peng, I-Fong Chen, Zong-Han Jiang, Heng-Yi Liao, Jinwen University of Science and Technology, Taiwan

MO-A1.4P: ANTENNA DECOUPLING TECHNIQUES

MO-A1.4P.1: LOW PROFILE DUAL BAND WLAN ANTENNA ARRAY FOR MOBILE TERMINALS..... 378

Kun Wang, Thomas Eibert, Technische Universität München, Germany

MO-A1.4P.2: ISOLATION ENHANCEMENT OF TWO PLANAR MONOPOLE ANTENNAS FOR MIMO 380
WIRELESS APPLICATIONS

Ayman Isaac, Hussain Al-Rizzo, Ali Hammoodi, Said Abushamleh, University of Arkansas at Little Rock, United States; Haider Khaleel, Sonoma State University, United States

MO-A1.4P.3: ISOLATION ENHANCEMENT OF TWO CLOSELY SPACED PLANAR MONOPOLE 382
ANTENNAS FOR INDUSTRIAL, SCIENTIFIC, AND MEDICAL APPLICATIONS

Ayman Isaac, Hussain Al-Rizzo, Ali Hammoodi, Said Abushamleh, University of Arkansas at Little Rock, United States; Haider Khaleel, Sonoma State University, United States

MO-A1.4P.4: DESIGN OF COMPACT RF CHOKE FOR SUPPRESSING GROUND EDGE CURRENT 384
IN LTE MOBILE APPLICATION

Woo Cheol Choi, Seonho Lim, Young Joong Yoon, Yonsei University, Republic of Korea

MO-A1.4P.5: ENHANCING ISOLATION BETWEEN TWO CLOSELY SPACED PATCH ANTENNAS 386
USING PARASITIC ELEMENTS

Hongye Qi, Xiaoxing Yin, Hongxin Zhao, Southeast University, China; Leilei Liu, Nanjing University of Posts and Telecommunications, China

MO-A1.4P.6: MUTUAL COUPLING REDUCTION OF DUAL-FREQUENCY PATCH ANTENNAS USING 388
A SIMPLE MICROSTRIP H-SECTION

Yantao Yu, Lijun Yi, Xiaoya Liu, Zhaokai Gu, Jinghe Li, Chongqing University, China

TU-SP.1A: COMPRESSIVE SENSING AND APPLICATIONS IN ANTENNAS AND IMAGING TECHNOLOGIES

TU-SP.1A.1: ADVANCES ON COMPRESSIVE SENSING BASED APPROACHES FOR INVERSE SCATTERING 390

Lorenzo Poli, ELEDIA Research Center, University of Trento, Italy; Toshifumi Moriyama, University of Nagasaki, Japan; Giacomo Oliveri, Federico Viani, Andrea Massa, ELEDIA Research Center, University of Trento, Italy

TU-SP.1A.2: IMAGING BREAST CANCER IN A HYBRID DBT / NRI SYSTEM USING COMPRESSIVE SENSING 392

Richard Obermeier, Juan Heredia Juesas, Jose Angel Martinez Lorenzo, Northeastern University, United States

TU-SP.1A.3: COMPRESSIVE SENSING BASED APPROACH FOR DETECTION OF HUMAN RESPIRATORY RATE 394

Vinh Dang, Tuan Phan, Ozlem Kilic, Catholic University of America, United States

TU-SP.1A.5: TOWARDS SMARTER FASTER UWB TRANSCEIVERS 396

Haofei Wang, Beijing Institute of Technology, China; Vinh Dang, Catholic University of America, United States; Linyun Ren, Aly E. Fathy, University of Tennessee, United States; Erke Mao, Beijing Institute of Technology, China; Ozlem Kilic, Catholic University of America, United States

TU-SP.1A.6: COMPARISON OF METHODS FOR REFLECTARRAY DIAGNOSTIC FROM FAR FIELD MEASUREMENTS 398

Benjamin Fuchs, Laurent Le Coq, Laurent Ferro-Famil, University of Rennes 1 - IETR, France; Marco Donald Migliore, University of Cassino, Italy

TU-SP.1A.7: FAST MULTISTATIC FOURIER-BASED FORWARD AND INVERSE OPERATORS FOR COMPRESSIVE SENSING IMAGING 400

Yolanda Rodriguez Vaqueiro, Northeastern University, United States; Yuri Álvarez, Universidad de Oviedo, Spain; Borja Gonzalez-Valdes, Northeastern University, United States; Fernando Las-Heras, Universidad de Oviedo, Spain; Jose Angel Martinez Lorenzo, Northeastern University, United States

TU-SP.1A.10: IMPROVED COMPRESSIVE SENSING WITH ANTENNA DIRECTIVITY FOR TWRI 402

Ali Muqaibel, King Fahd University of Petroleum and Minerals, Saudi Arabia

TU-SP.1A.11: UTILIZATION OF THE ARRAY FACTOR FOR NARROWBAND DIRECTION OF ARRIVAL ESTIMATION 404

Artur Nalobin, Ilona Rolfes, Ruhr-Universität Bochum, Germany

TU-SP.2A: NOVEL DESIGNS AND APPLICATIONS OF WIRELESS POWER TRANSFER

TU-SP.2A.2: OPTIMIZATION AND DESIGN SENSITIVITY OF SISO AND MISO WIRELESS POWER TRANSFER SYSTEMS 406

Hans-Dieter Lang, Alon Ludwig, Costas D. Sarris, University of Toronto, Canada

TU-SP.2A.4: STUDY ON PERFECT MATCHING RECEIVING CONDITION OF INFINITE ARRAY ANTENNA WITH HEMISPHERICAL DIELECTRIC RESONATORS 408

Takayuki Matsumuro, Yohei Ishikawa, Naoki Shinohara, Kyoto University, Japan

TU-SP.2A.7: ELECTRIC FIELD COUPLING TO SHORT DIPOLE RECEIVERS IN CAVITY MODE ENABLED WIRELESS POWER TRANSFER 410

Matthew Chabalko, Alanson Sample, Disney Research Pittsburgh, United States

TU-SP.2A.10: A DISTRIBUTED RETRO-REFLECTIVE BEAMFORMING SCHEME FOR WIRELESS POWER TRANSMISSION 412

Jinmei He, Xin Wang, Lisheng Guo, Nanjing University of Aeronautics and Astronautics, China; Shan Shen, Ayia Electronic Tech CO., LTD, China; Mingyu Lu, West Virginia University Institute of Technology, United States

TU-SP.2A.11: EXPERIMENTAL STUDY ON RESONANT WIRELESS POWER TRANSFER TO MECHANICALLY FLEXIBLE RECEIVER FOR WEARABLE ELECTRONICS	414
<i>Aruna Kumara Ranaweera, Jong-Wook Lee, Kyung Hee University, Republic of Korea</i>	
TU-A1.1A: MUTUAL COUPLING IN ANTENNA ARRAYS	
TU-A1.1A.1: MUTUAL COUPLING REDUCTION BETWEEN TWO MONOPOLE ANTENNAS USING FRACTAL BASED DGS	416
<i>Ali Hammoodi, Hussain Al-Rizzo, Ayman Isaac, University of Arkansas at Little Rock, United States</i>	
TU-A1.1A.2: MUTUAL COUPLING SUPPRESSION IN AN ARRAY OF 2-LAYER SELF-EXCITED EBG RESONATOR ANTENNAS	418
<i>Mehdi Hosseini, David M. Klymyshyn, University of Saskatchewan, Canada</i>	
TU-A1.1A.3: COUPLING REDUCTION OF TWO PLANAR MONOPOLE ANTENNAS FOR MODERN WIRELESS APPLICATIONS	420
<i>Ayman Isaac, Hussain Al-Rizzo, Ali Hammoodi, Said Abushamleh, University of Arkansas at Little Rock, United States; Haider Khaleel, Sonoma State University, United States</i>	
TU-A1.1A.4: MUTUAL-COUPLING SUPPRESSION FOR 60 GHZ MIMO ANTENNA USING METAMATERIALS	422
<i>Abdalmehdi Dadgarpour, Behnam Zarghooni, Tayeb A. Denidni, Institut National de la Recherche Scientifique (INRS), Canada</i>	
TU-A1.1A.5: A SIMPLE METHOD FOR ESTIMATION OF MUTUAL COUPLING AMONG MINIMUM SCATTERING ANTENNAS	424
<i>Branko Mrdakovic, WIPL-D d.o.o, Serbia; Branko Kolundzija, University of Belgrade, Serbia</i>	
TU-A1.1A.6: SENSITIVITY ANALYSIS OF MUTUAL COUPLING EFFECTS IN ANTENNA ARRAYS THROUGH INTERVAL ANALYSIS	426
<i>Nicola Anselmi, Lorenzo Poli, Paolo Rocca, Federico Viani, Andrea Massa, ELEDIA Research Center, University of Trento, Italy</i>	
TU-A1.1A.7: A DIPOLE ANTENNA SYSTEM FOR SIMULTANEOUS TRANSMIT AND RECEIVE	428
<i>Elie Tianang, Dejan Filipovic, University of Colorado Boulder, United States</i>	
TU-A1.1A.8: A SIMPLE OPTIMIZATION TECHNIQUE FOR REDUCING MUTUAL COUPLING BETWEEN TWO COUPLED ANTENNAS	430
<i>Mohamed Ezzat, Choon Lee, Southern Methodist University, United States</i>	
TU-A1.1A.9: MUTUAL COUPLING REDUCTION IN INTEGRATED TRANSMIT-RECEIVE ARRAY ANTENNAS USING HIGH ORDER DGS FILTER	432
<i>Mahmoud Abdalla, Ibraeem Mohamed, MTC College, Egypt</i>	
TU-A1.1A.10: AN EFFICIENT DECOUPLING NETWORK FOR MICROSTRIP PHASED ARRAY ANTENNA	434
<i>Run-Liang Xia, Shi-Wei Qu, Peng-Fa Li, University of Electronic Science and Technology of China, China</i>	
TU-A1.1A.11: MUTUAL COUPLING REDUCTION IN MICROSTRIP PHASED ARRAY USING STACKED-PATCH REDUCED SURFACE WAVE ANTENNA	436
<i>Shirin Ramezanzadeh Yazdi, Somayyeh Chamaani, Seyed Arash Ahmadi, K. N. Toosi University of Technology, Iran</i>	
TU-A1.2A: WIDEBAND AND MULTIBAND DIELECTRIC RESONATOR ANTENNAS	
TU-A1.2A.1: PARTIALLY ENCLOSED CYLINDRICAL DIELECTRIC RESONATOR (DR) FOR MULTIBAND ANTENNAS	438
<i>Konstantinos Pliakostathis, E.T.A.A., Ministry of Labor, Social Security and Welfare, Greece; Dariush Mirshekar-Syahkal, University of Essex, United Kingdom</i>	

TU-A1.2A.2: A LOW-PROFILE DIELECTRIC RESONATOR ANTENNA FOR WIDEBAND APPLICATIONS	440
<i>Shahzad Iqbal Mian, Karu P. Esselle, Macquarie University, Australia</i>	
TU-A1.2A.3: BIDIRECTIONAL DIELECTRIC RESONATOR ANTENNA	442
<i>Li Ying Feng, Kwok Wa Leung, City University of Hong Kong, Hong Kong SAR of China</i>	
TU-A1.2A.4: HIGH GAIN RECONFIGURABLE MILLIMETER-WAVE DIELECTRIC RESONATOR	444
ANTENNA	
<i>Jinxin Li, Tayeb A. Denidni, Qingsheng Zeng, Institut National de la Recherche Scientifique (INRS), Canada</i>	
TU-A1.2A.5: DESIGN OF AN ANNUAL DIELECTRIC LOADED CYLINDRICAL DIELECTRIC	446
RESONATOR ANTENNA FOR BROADBAND MONOPOLE-TYPE RADIATION	
<i>Yan He, Xiangyu Du, National University of Defense Technology, China; Changjiang Deng, Zhenghe Feng, Tsinghua University, China</i>	
TU-A1.2A.6: METAL-DIELECTRIC COMPOSITE MONOPOLE: NOVEL QUEST FOR DEVELOPING	N/A
AN IMPULSE RADIATING ANTENNA	
<i>Debarati Ganguly, Lourdes Matha College of Science and Technology, India; Sumesh George, St. George's College, India; Debatosh Guha, University of Calcutta, India; Yahia M.M. Antar, Royal Military College of Canada, Canada</i>	
TU-A1.2A.7: COMPACT AND WIDEBAND DIELECTRIC RESONATOR ANTENNA	450
<i>Mohammad Ranjbar Nikkhah, University of Montreal, Canada; Ahmed A. Kishk, Concordia University, Canada</i>	
TU-A1.2A.8: RELATION BETWEEN CHARACTERISTIC MODES AND COMPLEX NATURAL	452
RESONANCES	
<i>Tomás Bernabeu-Jiménez, Universitat Politècnica de València, Spain; Ahmed A. Kishk, Concordia University, Canada; Alejandro Valero-Nogueira, Felipe Vico-Bondia, Universitat Politècnica de València, Spain</i>	
TU-A1.2A.9: HIGH EFFICIENCY ON-CHIP DIELECTRIC RESONATOR ANTENNNA USING	454
MICROMACHINING TECHNOLOGY	
<i>Mai Sallam, Mohamed Serry, American University in Cairo, Egypt; Atif Shamim, King Abdullah University of Science and Technology, Saudi Arabia; Walter De Raedt, IMEC, Belgium; Sherif Sedky, Zewail City for Science and Technology, Egypt; Guy A. E. Vandenbosch, KU Leuven, Belgium; Ezzeldin Soliman, American University in Cairo, Egypt</i>	
TU-A1.2A.10: MULTI-OBJECTIVE DESIGN OPTIMIZATION OF COMPACT QUASI-ISOTROPIC	456
DIELECTRIC RESONATOR ANTENNA	
<i>Adrian Bekasiewicz, Gdansk University of Technology, Poland; Slawomir Koziel, Reykjavik University, Iceland</i>	
 TU-A2.1A: METAMATERIAL-INSPIRED ANTENNAS	
TU-A2.1A.1: SUPERSHAPED METAMATERIAL UNIT-CELLS USING THE GIELIS FORMULA	458
<i>Behnam Zarghooni, Abdolmehdi Dadgarpour, Javad Pourahmadazar, Tayeb A. Denidni, INRS, Canada</i>	
TU-A2.1A.2: OPTIMIZED SELF-DIPLEXED ANTENNA IN GAP WAVEGUIDE TECHNOLOGY	460
<i>Carlos Sanchez Cabello, Eva Rajo-Iglesias, University Carlos III of Madrid, Spain</i>	
TU-A2.1A.3: METALOOP ANTENNA WITH A PARASITIC LOOP	462
<i>Hisamatsu Nakano, Tomohiro Yoshida, Junji Yamauchi, Hosei University, Japan</i>	
TU-A2.1A.4: EXCITATION OF A TWO-ARM METASPIRAL ANTENNA	464
<i>Hisamatsu Nakano, Kenji Anjo, Junji Yamauchi, Hosei University, Japan</i>	
TU-A2.1A.5: WIDEBAND NEGATIVE PERMEABILITY STRUCTURES BASED ON SPLIT RING	466
RESONATORS	
<i>Takuji Arima, Yuta Aoki, Toru Uno, Yokyo University of Agriculture and Technology, Japan</i>	
TU-A2.1A.6: THE EFFECT OF PERIODICITY DISTANCE IN ELECTRIC FIELD DIRECTION ON	468
THE RESONANCE FREQUENCY BY USING EQUIVALENT CIRCUIT MODEL AND SIMULATION	
<i>Pinar Yasar Orten, ASELSAN Inc., Turkey; Gonul Turhan Sayan, Middle East Technical University, Turkey</i>	

TU-A2.1A.7: A COMPACT CPW-FED METAMATERIAL ANTENNA FOR WLAN/ WI-FI APPLICATIONS	470
<i>Ashish Gupta, Sameer Kumar Sharma, Raghvendra Kumar Chaudhary, Indian School of Mines Dhanbad, India</i>	
TU-A2.1A.8: METAMATERIAL INSPIRED DUAL-BAND ANTENNA WITH MODIFIED CSRR AND EBG	472
LOADING	
<i>Sameer Kumar Sharma, Raghvendra Kumar Chaudhary, Indian School of Mines Dhanbad, India</i>	
TU-A2.1A.9: COMPACT BROADBAND ZOR AND FOR ANTENNA WITH EPSILON NEGATIVE	474
TRANSMISSION LINE	
<i>Liang-Yuan Liu, Bing-Zhong Wang, Ya-Qing Wen, Ren Wang, University of Electronic Science and Technology of China, China</i>	
TU-A2.1A.10: A HIGH GAIN EBG BACKED SLOT ANTENNA LOADED WITH	476
ANISOTROPICMU-NEGATIVE SUPERSTRATE	
<i>Basudev Majumder, Krishnamoorthy Kandasamy, Jayanta Mukherjee, IIT Bombay, India; Kamla Prasan Ray, Society for Applied Microwave Electronic Engineering and Research, India</i>	
TU-A2.1A.11: INVESTIGATION ON SRR-LOADED METAMATERIAL ANTENNA WITH DIFFERENT	478
FEEDING METHODS	
<i>Sameer Kumar Sharma, Raghvendra Kumar Chaudhary, Indian School of Mines Dhanbad, India</i>	
 TU-A1.3A: WAVEGUIDE SLOT ARRAYS II	
TU-A1.3A.1: A SIMPLE PARALLEL-PLATE WAVE LAUNCHER IN SUBSTRATE INTEGRATED	480
WAVEGUIDE TECHNOLOGY	
<i>Jose Luis Gomez-Tornero, Alejandro Martinez-Ros, Miguel Angel Martinez Garcia, Alejandro Martinez-Sala, Technical University of Cartagena, Spain; George Goussetis, Symon K. Podilchak, Heriot-Watt University, United Kingdom</i>	
TU-A1.3A.2: 8 X 4 SIW POWER DIVIDER AND SLOTTED ARRAY ANTENNA.....	482
<i>Orcun Kiris, Ozlem Aydin Civi, Middle East Technical University, Turkey</i>	
TU-A1.3A.3: KA BAND SUBSTRATE INTEGRATED WAVEGUIDE SLOT ARRAY ANTENNA WITH HIGH	484
EFFICIENCY	
<i>Alper Ünal, Oral Dinçer, Meteksan Defence Ind. Inc, Turkey</i>	
TU-A1.3A.4: SLOTTED RIDGED WAVEGUIDE ARRAY DESIGNED WITH A REFLECTION	486
CANCELLING TECHNIQUE FOR MULTIBEAM APPLICATIONS IN V-BAND	
<i>Karim Tekkouk, Institut d'Electronique et de Télécommunications de Rennes-Université de Rennes 1, France; Jiro Hirokawa, Tokyo Institute of Technology, Japan; Ronan Sauleau, Mauro Ettorre, Institut d'Electronique et de Télécommunications de Rennes-Université de Rennes 1, France; Makoto Sano, Makoto Ando, Tokyo Institute of Technology, Japan</i>	
TU-A1.3A.5: DESIGN OF DUAL-FREQUENCY SUBSTRATE INTEGRATED WAVEGUIDE (SIW)	488
CAVITY BACKED SLOT ARRAY ANTENNA	
<i>Soumava Mukherjee, Animesh Biswas, Indian Institute of Technology Kanpur, India</i>	
 TU-A4.1A: RCS: ANALYSIS AND MEASUREMENTS	
TU-A4.1A.1: A SURFACE TREATMENT FOR NON-SPECULAR REFLECTION	490
<i>Galen Watts, National Radio Astronomy Observatory, United States</i>	
TU-A4.1A.2: FORWARD SCATTER RADAR MODELING: EFFECTS OF NEAR FIELD FOR CANONICAL	492
TARGETS	
<i>Marta Tecla Falconi, Davide Comite, Alessandro Galli, Pierfrancesco Lombardo, Frank Silvio Marzano, Sapienza University of Rome, Italy</i>	
TU-A4.1A.3: EMPIRICAL MODELS OF THE NORMALIZED RADAR CROSS SECTION OF	494
MONOSTATIC FRESHWATER CLUTTER	
<i>Panos Tzanos, William G. Stevens, Kung-Hau Ding, James Park, Saba Mudaliar, Kristopher Kim, Air Force Research Laboratory, United States</i>	

TU-A4.1A.4: SCATTERING ANALYSIS FOR PEC AND DIELECTRIC BODIES USING CHARACTERISTIC MODES	496
<i>Yikai Chen, Chao-Fu Wang, National University of Singapore, Singapore</i>	
TU-A4.1A.5: ON SCATTERING CENTERS OF CONE-SHAPED TARGETS IN BISTATIC MODE	498
<i>Quan-You Qu, Kun-Yi Guo, Xin-Qing Sheng, Beijing Institute of Technology, China; Jing Ma, Bin Shi, Cong-Jun Jin, Science and Technology on Space System Simulation Laboratory, China</i>	
TU-A4.1A.6: VERTICAL AXIS WIND TURBINE SIMULATIONS AND MEASUREMENTS	500
<i>Marcos Ontiveros, Diana Arceo, Jeffery Allen, Space and Naval Warfare Systems Center, Pacific, United States</i>	
TU-A4.1A.7: RADAR SCATTERING PROPERTIES OF BICYCLES AT 77 GHZ	502
<i>Domenic Belgiovane, Chi-Chih Chen, Ohio State University, United States</i>	
TU-A4.1A.8: UNIFORM DIFFRACTION COEFFICIENT FOR ELECTROMAGNETIC SCATTERING BY FLAT AND CURVED PLATES	504
<i>Divyabramham Kandimalla, Arijit De, Indian Institute of Technology Kharagpur, India</i>	
TU-A4.1A.9: ELECTROMAGNETIC SCATTERING FROM A BURIED SPHERE IN A TWO-LAYERED ROUGH GROUND	506
<i>Seyed Hossein Mirjahanmardi, Parisa Dehkhoda, Ahad Tavakoli, Hasan Zamani, Amirkabir University of Technology, Iran</i>	
TU-A5.1A: UWB STAR, RADAR AND SURVEILLANCE SYSTEMS AND CHARACTERIZATION THEREOF	
TU-A5.1A.1: ULTRA-WIDEBAND CIRCULARLY-POLARIZED SIMULTANEOUS TRANSMIT AND RECEIVE (STAR) ANTENNA SYSTEM	508
<i>Mohamed Elmansouri, Ehab Etellisi, Dejan Filipovic, University of Colorado, United States</i>	
TU-A5.1A.2: SHORT TIME STATE SPACE METHOD FOR HUMAN MOTION IDENTIFICATION	510
<i>Lingyun Ren, University of Tennessee, United States; Nghia Tran, Catholic University of America, United States; Haofei Wang, University of Tennessee, United States; Ozlem Kilic, Catholic University of America, United States; Aly E. Fathy, University of Tennessee, United States</i>	
TU-A5.1A.3: ANGLE OF ARRIVAL ESTIMATION ACROSS A 10:1 BANDWIDTH ARCHITECTURE USING ON-SITE CODING RECEIVER	512
<i>Satheesh Bojja Venkatakrishnan, Abe A. Akhiyat, Elias A. Alwan, Waleed Khalil, John L. Volakis, Ohio State University, United States</i>	
TU-A5.1A.4: ULTRAWIDEBAND MULTILAYER PRINTED ANTENNA ARRAYS WITH WIDE SCANNING CAPABILITY	514
<i>Benjamin Riviere, Herve Jeuland, Sylvain Bolioli, Benjamin Gabard, Vincent Gobin, ONERA The French Aerospace Lab, France</i>	
TU-A5.1A.5: STUDY OF A UWB MULTI-STATIC RADAR FOR RAILROAD CROSSING SURVEILLANCE	516
<i>Marco Govoni, Rete Ferroviaria Italiana (RFI) S.p.A, Italy; Enrico Maria Vitucci, Vittorio Degli Esposti, Francesco Guidi, Giovanni Tartarini, Davide Dardari, University of Bologna, Italy</i>	
TU-A5.1A.6: A NON-ITERATIVE SCHEME FOR SIDELobe REDUCTIONS IN RANDOM NOISE AND DETERMINISTIC SIGNALS	518
<i>Muhammad Dawood, New Mexico State University, United States; Jim Boehm, Independent Consultant, United States; Ehtesham Shareef, New Mexico State University, United States</i>	
TU-A5.1A.7: SIMULTANEOUS TRANSMIT AND RECEIVE SYSTEM ARCHITECTURE WITH FOUR STAGES OF CANCELLATION	520
<i>Kevin Scherer, Stephen Watt, Elias A. Alwan, Abe A. Akhiyat, Brian Dupaix, Waleed Khalil, John L. Volakis, Ohio State University, United States</i>	

TU-A5.1A.8: EXPERIMENTAL EVALUATION OF HIGH-FIDELITY HIGH-DATA-RATE UWB ANTENNA SYSTEM 522

Ahmed Abdelraheem, Mahmoud Abdalla, Hesham Elregaily, Abdelazez Mitkees, MTC College, Egypt

TU-A5.1A.9: DESIGN OF A ULTRA WIDEBAND REMOTE SENSING SYSTEM BASED ON SUB-HARMONIC MIXER 524

Bo Zhang, University of Electronic Science and Technology of China, China; Xiaodong Chen, Queen Mary University of London, United Kingdom; Yong Fan, Ge Liu, University of Electronic Science and Technology of China, China

TU-UC.1A: IMAGING AND LOCALIZATION

TU-UC.1A.9: HEXAGONAL SHAPED RECIPROCAL EXTERNAL CLOAK WITH HOMOGENEOUS MATERIAL PROPERTIES 526

Pravallika Vura, Archana Rajput, Kushmanda Saurav, Kumar Vaibhav Srivastava, Indian Institute of Technology Kanpur, India

TU-UC.1A.10: RECONSTRUCTION OF DIELECTRIC OBJECTS BY CONTRAST SOURCE INVERSION METHOD UNDER A LIMITED OBSERVATION 528

Si Cong Yan, Chun Xia Yang, Peng Zhao, Xin Zhou Zhao, Mei Song Tong, Tongji University, China

TU-A5.2A: BIOMEDICAL IMAGING AND DETECTION

TU-A5.2A.1: CONFOCAL IMAGING OF BREAST TUMOR PHANTOM USING 3-D-PRINTED BREAST PHANTOM 530

Hayato Kono, Takumi Sugitani, Hiroshima University, Japan; Xia Xiao, Tianjin University, China; Katsuhiro Aritome, Hiroshima University, Japan; Ryo Miyake, University of Tokyo, Japan; Takamaro Kikkawa, Hiroshima University, Japan

TU-A5.2A.2: 3D FAN-BEAM MODEL IMPLEMENTATION IN A HYBRID DIGITAL-BREAST-TOMOSYNTHESIS MICROWAVE RADAR IMAGING BREAST CANCER DETECTION ALGORITHM 532

Matthew Tivnan, Ann Morgenthaler, Carey Rappaport, Northeastern University, United States

TU-A5.2A.3: TRACKING A BIOPSY NEEDLE INSIDE A BREAST USING UWB CIRCULAR-SAR..... 534

Daniel Oloumi, Rambabu Karumudi, Pierre Boulanger, University of Alberta, Canada

TU-A5.2A.4: FAST MULTI-STATIC TECHNIQUE FOR MICROWAVE BRAIN IMAGING 536

Ali Zamani, Amin M. Abbosh, University of Queensland, Australia

TU-A5.2A.5: RECENT DEVELOPMENTS IN ANTENNA DESIGN FOR MICROWAVE BASED CONGESTIVE HEART FAILURE DETECTION SYSTEMS 538

Sasan Ahdi Rezaeieh, Amin M. Abbosh, University of Queensland, Australia

TU-A5.2A.6: EFFECT OF CHEST WALL ON BREAST TUMOR DETECTION USING PRONY'S METHOD 540

Marwa Bannis, 6th October University, Egypt; Fatma Elhefnawi, Electronic Research Institute and NARSS, Egypt; Hala Abd El Kader, Banha University, Egypt; Khaled ElMahgoub, Trimble Navigation / MIT, United States; Atef Elsherbeni, Colorado School of Mines, United States

TU-A5.2A.8: BIOMEDICAL IMAGING SYSTEM USING SOFTWARE DEFINED RADIO..... 542

Konstanty Bialkowski, Jayaseelan Marimuthu, Amin M. Abbosh, University of Queensland, Australia

TU-A5.2A.9: UWB MICROWAVE BREAST CANCER DETECTION WITH MRI-DERIVED 3-D REALISTIC NUMERICAL BREAST MODEL 544

Hang Song, Xia Xiao, Zongjie Wang, Tianjin University, China; Takamaro Kikkawa, Hiroshima University, Japan

TU-A5.2A.10: DESIGN OF AN IMAGING CHAMBER FOR BIOMEDICAL APPLICATIONS USING BOWTIE ANTENNAS 546

Muhammad Hassan Khalil, Tsinghua University, China; Xu Jiadong, Northwestern Polytechnical University, China; Maokun Li, Fan Yang, Shenheng Xu, Tsinghua University, China

TU-A3.1A: ADVANCES IN INTEGRAL EQUATION MODELING

TU-A3.1A.1: EFFICIENT ANALYSIS OF EM SCATTERING FROM 3D COMPLEX CONDUCTING OBJECTS BURIED UNDER GROUND 548

Min Meng, Yongpin Chen, Wan Luo, Zaiping Nie, Jun Hu, University of Electronic Science and Technology of China, China

TU-A3.1A.2: INVESTIGATION OF ERROR SOURCE IN EQUIVALENCE PRINCIPLE ALGORITHM (EPA) 550

Mojtaba Fallahpour, Weng Cho Chew, University of Illinois at Urbana-Champaign, United States

TU-A3.1A.3: A NEW FAMILY OF RADIAL ANGULAR TRANSFORMATIONS FOR THE NEAR-SINGULARITY CANCELLATION TECHNIQUE 552

Li Li, Kun Wang, Thomas Eibert, Technische Universität München, Germany

TU-A3.1A.4: MAGNETOQUASISTATIC POSITION MEASUREMENT ABOVE EARTH USING THE EXACT INTEGRAL SOLUTIONS 554

Darindra Arumugam, Jet Propulsion Laboratory, United States

TU-A3.1A.5: EFFICIENT INTERPOLATION SCHEME FOR MULTILEVEL FAST MULTIPOLE ALGORITHM 556

Chunbei Luo, Yong Zhang, Hai Lin, State Key Lab of CAD&CG, Zhejiang University, China

TU-A3.1A.6: HADAMARD-FINITE-PART SIMULTANEOUS INFRARED AND ULTRAVIOLET SELF-REGULARIZATION OF UNIVERSAL FUNCTIONS IN ELECTRODYNAMICS 558

Alireza Baghai-Wadji, University of Cape Town, South Africa

TU-A3.1A.7: HADAMARD-FINITE-PART SIMULTANEOUS INFRARED AND ULTRAVIOLET SELF-REGULARIZATION OF UNIVERSAL FUNCTIONS IN ELECTROSTATIC LIMIT 560

Alireza Baghai-Wadji, University of Cape Town, South Africa

TU-A3.1A.8: PERFORMANCE OF PARALLEL OUT-OF-CORE MOM ACCELERATED BY SSD 562

Xunwang Zhao, Zhongchao Lin, Yu Zhang, Xidian University, China

TU-A3.1A.9: EFFICIENT ANALYSIS OF ANTENNAS ON AN ELECTRICALLY LARGE PLATFORM 564

Wei-Jiang Zhao, Institute of High Performance Computing, Singapore

TU-A3.1A.10: FULL-WAVE AND APPROXIMATE SOLUTIONS OF LARGE ELECTROMAGNETIC SCATTERING PROBLEMS 566

Mert Hidayetoglu, Levent Gurel, ABAKUS Computing Technologies, Turkey

TU-A4.2A: SCATTERING FROM ROUGH SURFACES

TU-A4.2A.1: SURFACE WAVE PROPAGATION OVER A ROUGH TALUS SLOPE AT 160 MHZ 568

Steven Arcone, Daniel Breton, Seth Campbell, Benjamin Barrowes, Nathan Lamie, Cold Regions Research and Engineering Laboratory, United States

TU-A4.2A.2: SCATTERING FROM A TARGET ABOVE A 1-D OCEAN-LIKE SURFACE FROM A FAST RIGOROUS METHOD 570

Gildas Kubické, DGA Information Superiority, France; Christophe Bourlier, Sami Bellez, IETR - Institut d'Electronique et de Télécommunications de Rennes, France

TU-A4.2A.3: AN EFFICIENT SUB-DOMAIN DECOMPOSITION ITERATIVE METHOD FOR THE SCATTERING FROM A LARGE HIGHLY-CONDUCTING ROUGH SEA SURFACE 572

Christophe Bourlier, Sami Bellez, IETR - Institut d'Electronique et de Télécommunications de Rennes, France; Gildas Kubické, DGA/DT/MI, France

TU-A4.2A.4: BACKSCATTERING FROM 3-D TIME-EVOLVING SEA SURFACE AND DOPPLER SPECTRAL ANALYSIS N/A

Conghui Qi, Zhiqin Zhao, Wei Yang, University of Electronic Science and Technology of China, China; Qing Huo Liu, Duke University, United States

TU-A4.2A.5: A NOVEL METHOD OF SIMULATING SEA SURFACE OF CONTROLLING REFLECTIVITY BASING ON THE BRAGG STRUCTURE 576

Li Li, Zichang Liang, Shanghai Radio Equipment Institute, China; Wei Gao, Xiaobing Wang, Science and Technology on Electromagnetic Scattering Laboratory, China

TU-A1.4A: NOVEL AND BROADBAND SLOT ANTENNAS

TU-A1.4A.1: COMPACT SIZE ANNULAR-RING SLOT ANTENNA WITH BROAD CIRCULARLY POLARIZED BANDWIDTH 578

Chow-Yen-Desmond Sim, Chin Ku, Feng Chia University, Taiwan; Horng-Dean Chen, National Kaohsiung Normal University, Taiwan; Tuan-Yung Han, National Taitung College, Taiwan; Hua-Ming Chen, National Kaohsiung University of Applied Sciences, Taiwan

TU-A1.4A.2: TAPERED SLOT WAVEGUIDE ANTENNA FOR KU-BAND PHASED ARRAY APPLICATIONS 580

Jia-Chi Chieh, Mike Civerolo, Anna Leese de Escobar, Space and Naval Warfare Systems Center, Pacific, United States

TU-A1.4A.3: A CIRCULARLY POLARIZED MONOPOLE SLOT ANTENNA FOR MULTI-SYSTEM APPLICATIONS 582

Yen-Ting Lin, Wen-Bin Tsai, Meng-Hong Shih, Chien-Jen Wang, National University of Tainan, Taiwan

TU-A1.4A.4: CAPACITIVELY-FED MODIFIED FOLDED SLOT ANTENNA FOR BODY AREA NETWORK APPLICATIONS 584

Emmanuel Valentín, Rafael Rodríguez Solís, University of Puerto Rico, Puerto Rico

TU-A1.4A.5: AN OCTAVE BANDWIDTH CIRCULARLY POLARIZED PRINTED MONOPOLE SLOT ANTENNA 586

Reza Pazoki, Iran University of Science and Technology, Iran; Ali Kiaee, Pedram Mousavi, University of Alberta, Canada

TU-A1.4A.6: DESIGN OF A THREE-DIMENSIONAL FOLDED SLOT ANTENNA WITH QUASI-ISOTROPIC RADIATION PATTERN 588

Changjiang Deng, Yue Li, Zhijun Zhang, Zhenghe Feng, Tsinghua University, China

TU-A4.3A: PROPAGATION THROUGH VEGETATION

TU-A4.3A.1: UNCERTAINTY DISTRIBUTION OF VARIATION OF RECEIVED SIGNAL STRENGTH DUE TO SEASONAL EFFECT ON CONIFEROUS TREES 590

Hassan El-Sallabi, Polaris Wireless Inc., United States

TU-A4.3A.2: LARGE-SCALE, FULL-WAVE SCATTERING PHENOMENOLOGY CHARACTERIZATION OF REALISTIC TREES 592

DaHan Liao, Traian Dogaru, Army Research Laboratory, United States

TU-A4.3A.3: MODELING INDOOR VEGETATION RE-RADIATION PATTERN WITH DYNAMIC MULTIVARIATE POLYNOMIAL REGRESSIONS 594

Paula Gómez-Pérez, Centro Universitario de la Defensa, Spain; Marcos Crego-García, Iñigo Cuiñas, Universidade de Vigo, Spain

TU-A4.3A.4: EVOLUTION OF RECEIVED POWER TIME-VARIABILITY RANGE WITH DISTANCE AT DECIDUOUS FORESTS 596

Iñigo Cuiñas, Universidade de Vigo, Spain; José Antonio Gay-Fernández, Monet Tecnología e Innovación, Spain

TU-A4.3A.5: AN INNOVATIVE APPROACH FOR MEDIA-BASED MODULATION BASED ON 598
TIME-VARYING PLASMA

Min Yang, Xiaoping Li, Kai Xie, Yanming Liu, Xidian University, China

TU-SP.1P: PASSIVE AND ACTIVE NANO-ANTENNAS

TU-SP.1P.5: NANOANTENNAS FROM THE VISIBLE TO THE MID-INFRARED: MATERIALS 600
CONSIDERATIONS AND APPLICATIONS

Stefan Maier, Imperial College London, United Kingdom

TU-SP.1P.6: ALL-DIELECTRIC OPTICAL NANOANTENNAS 601

Andrey Miroshnichenko, Australian National University, Australia

TU-SP.1P.7: NANO-SCALE DIELECTRIC RESONATOR ANTENNAS AS BUILDING BLOCKS FOR 603
EFFICIENT MANIPULATION OF LIGHT

Christophe Fumeaux, Chengjun Zou, Withawat Withayachumnankul, University of Adelaide, Australia; Longfang Zou, Imperial College London, United Kingdom; Madhu Bhaskaran, Sharath Sriram, RMIT University, Australia

TU-SP.2P: ADDITIVE MANUFACTURING OF ANTENNAS AND ELECTROMAGNETIC STRUCTURES

TU-SP.2P.1: THREE-DIMENSIONAL GRADIENT-INDEX OPTICS VIA INKJET-AIDED ADDITIVE 605
MANUFACTURING TECHNIQUES

Sawyer D. Campbell, Donovan E. Brocker, Douglas H. Werner, Pennsylvania State University, United States; Charles Dupuy, Sang-Ki Park, Paul Harmon, Voxel Inc., United States

TU-SP.2P.2: POST-PROCESS FABRICATION OF MULTILAYER MM-WAVE ON-PACKAGE ANTENNAS 607
WITH INKJET PRINTING

Bijan Tehrani, Benjamin Cook, Manos Tentzeris, Georgia Institute of Technology, United States

TU-SP.2P.3: FABRICATION OF AN X-BAND CONFORMAL ANTENNA ARRAY ON AN ADDITIVELY 609
MANUFACTURED SUBSTRATE

Isaac Ehrenberg, Sanjay Sarma, Massachusetts Institute of Technology, United States; Thomas Steffen, Bae-Ian Wu, Air Force Research Laboratory, United States

TU-SP.2P.4: INCORPORATION OF ACTIVE RF CIRCUIT ELEMENTS INTO ADDITIVELY 611
MANUFACTURED SUBSTRATES

Isaac Ehrenberg, Sanjay Sarma, Massachusetts Institute of Technology, United States; Thomas Steffen, Bae-Ian Wu, Air Force Research Laboratory, United States

TU-SP.2P.9: CONFORMAL DIRECT WRITTEN ANTENNA ON STRUCTURAL COMPOSITES..... 613

Michael Wright, Mohammad Ali, University of South Carolina, United States; William Baron, Jason Miller, James Tuss, David Zeppetella, Air Force Research Laboratory, United States

TU-SP.2P.10: MICROFABRICATED DUAL-POLARIZED, W-BAND ANTENNA ARCHITECTURE FOR 615
SCALABLE LINE ARRAY FEED

Benjamin Cannon, Kenneth Vanhille, Nuvotronics, United States; Gregory Sadowy, Jet Propulsion Laboratory, United States

TU-A1.1P: MULTI-BAND ANTENNAS FOR WIRELESS COMMUNICATIONS

TU-A1.1P.1: A COMPACT MULTIBAND MICROSTRIP PATCH ANTENNA WITH U-SHAPED PARASITIC 617
ELEMENTS

Sajid Asif, Adnan Iftikhar, Muhammad Rafiq, Benjamin Braaten, North Dakota State University, United States; Muhammad Khan, University of Padova, Italy; Dimitris E. Anagnostou, Tarron Teeslink, South Dakota School of Mines and Technology, Italy

TU-A1.1P.2: DUAL-BAND WLAN ANTENNA ARRAY WITH INTEGRATED BANDPASS FILTERS FOR HARMONIC SUPPRESSION	619
<i>Waqas Ahmad, Djuradj Budimir, University of Westminster, United Kingdom</i>	
TU-A1.1P.3: A TUNABLE DUAL-BAND SQUARE SLOT ANTENNA WITH STUB FOR DCS, ISM, AND WIMAX APPLICATIONS	621
<i>Ali Hammoodi, Hussain Al-Rizzo, Ayman Isaac, University of Arkansas at Little Rock, United States; Haider Khaleel, Sonoma State University, United States</i>	
TU-A1.1P.4: HIGH GAIN ANTENNA BY COMBINATION WITH DIELECTRIC BICONVEX LENS AND SPIRAL RADIATOR	623
<i>Kyeong-Sik Min, Korea Maritime and Ocean University, Republic of Korea</i>	
TU-A1.1P.5: A MINIATURIZED DUAL-BAND ANTENNA WITH SPIRAL AND MEANDER LINES FOR WLAN APPLICATIONS	625
<i>Xinbo Liu, Yingsong Li, Harbin Engineering University, China; Wenhua Yu, Harbin Engineering University, China; 2COMU, Inc., United States</i>	
TU-A1.1P.6: DUAL BAND HYBRID BASE STATION ANTENNAS	627
<i>Lin-Ping Shen, Nasrin Hojjat, Hua Wang, Jacco Van Beek, Minya Gavrilovic, Communication Components Antenna, Inc., Canada</i>	
TU-A1.1P.7: ENHANCING CIRCULAR POLARIZATION CHARACTERISTICS OF A DIPOLE-FED CROSS SPIRAL ANTENNA	629
<i>Mayumi Matsunaga, Ehime University, Japan</i>	
TU-A1.1P.8: MULTI-BAND META-MATERIAL ANTENNA WITH ASYMMETRIC COPLANAR STRIP-FED STRUCTURE	631
<i>Mahmoud Abdalla, MTC College, Egypt; Ahmed Ibrahim, El Minia University, Egypt</i>	
TU-A1.1P.9: TRIPLE BAND PLANAR INVERTED-F ANTENNA LOADED WITH LC RESONATOR	633
<i>Kushmanda Saurav, Sanampudi Venkatrami Reddy, Debdeep Sarkar, Archana Rajput, Kumar Vaibhav Srivastava, Indian Institute of Technology Kanpur, India</i>	
TU-A1.1P.10: BROADBAND FOLDED PRINTED QUADRIFILAR HELICAL ANTENNA PERFORMANCE IMPROVEMENT	N/A
<i>Pooria Salami, Gholamreza Moradi, Reza Sarraf Shirazi, Amirkabir University of Technology, Iran</i>	
 TU-A1.2P: ANTENNA DESIGN	
TU-A1.2P.1: PRINTED HIGH GAIN BEAM STEERABLE PATCH ANTENNA USING PARASITIC PIXEL ELEMENTS	637
<i>Parisa Lotfi Poshtgol, Saber Soltani, Ross D. Murch, Hong Kong University of Science and Technology, Hong Kong SAR of China</i>	
TU-A1.2P.2: SPACE-TIME MODULATED NONRECIPROCAL MIXING, AMPLIFYING AND SCANNING LEAKY-WAVE ANTENNA SYSTEM	639
<i>Sajjad Taravati, Christophe Caloz, Polytechnique de Montréal, Canada</i>	
TU-A1.2P.3: DUAL-POLARIZED TURN-STYLE PATCH ANTENNA FOR WEARABLE APPLICATIONS	641
<i>Kun Li, Yuta Ishisaka, Kazuhiro Honda, Koichi Ogawa, Toyama University, Japan</i>	
TU-A1.2P.4: A SUPERCELL BASED DUAL BEAM DIELECTRIC GRATING ANTENNA FOR 60 GHZ APPLICATION	643
<i>Zi Long Ma, University of Hong Kong, Hong Kong SAR of China; Chi Hou Chan, Kung Bo Ng, City University of Hong Kong, Hong Kong SAR of China; Li Jun Jiang, University of Hong Kong, Hong Kong SAR of China</i>	
TU-A1.2P.5: A NEW APPROACH FOR NEAR-FIELD SYNTHESIS	645
<i>Sebastien Clauzier, Said Mikki, Yahia M.M. Antar, Royal Military College of Canada, Canada</i>	

TU-A1.2P.6: SELF-MIXING ANTENNA ARRAYS WITH WIDE RECEIVING ANGULAR RANGE	647
<i>Kun Wang, Thomas Wächter, Hyazinth Hartmuth, Hong Fei, Gerhard Hamberger, Thomas Eibert, Technische Universität München, Germany</i>	
TU-A1.2P.7: ARRAYS OF 1-DIMENSIONAL ANTENNAS	649
<i>Steven Weiss, Army Research Laboratory, United States; Walter Kahn, George Washington University, United States</i>	
TU-A1.2P.8: NOVEL MINIATURIZATION BROADBAND CIRCULAR POLARIZATION ANTENNA USING SINGLE PLATE	651
<i>Haiyan Tian, Jinchun Gao, Ming Su, Yuanan Liu, Beijing University of Posts and Telecommunications, China</i>	
TU-A1.2P.9: ANALYSIS OF RECTANGULAR PATCH ANTENNA WITH TRAPEZOIDAL SLOT AS A WIDEBAND ANTENNA	N/A
<i>Zahra Manzoor, Gholamreza Moradi, Amirkabir University of Technology, Iran</i>	
 TU-A2.1P: WAVE GUIDANCE PHENOMENA IN METAMATERIALS	
TU-A2.1P.1: DEGENERATE BAND EDGE IN PERIODICALLY-LOADED CIRCULAR WAVEGUIDES	655
<i>Mohamed Othman, Filippo Capolino, University of California, Irvine, United States</i>	
TU-A2.1P.3: REAL-K-SPACE ANALYSIS OF ELECTROMAGNETIC WAVES IN A PLASMONIC WAVEGUIDE METAMATERIAL	657
<i>Iman Aghanejad, Kenneth Chau, Loic Markley, University of British Columbia, Canada</i>	
TU-A2.1P.4: SURFACE WAVE POLARIZATION CONVERTER.....	659
<i>Ryan Quarfoth, Amit Patel, HRL Laboratories, LLC, United States</i>	
TU-A2.1P.5: EFFECTIVE PERMITTIVITY AND PERMEABILITY OF DIELECTRIC RESONATOR ARRAYS IN RECTANGULAR WAVEGUIDE FOR METAMATERIAL APPLICATIONS	661
<i>Gizem Kalender, Yasar University, Turkey; Yesim Zoral, Dokuz Eylul University, Turkey; Mustafa Secmen, Yasar University, Turkey</i>	
TU-A2.1P.6: LATERALLY ASYMMETRIC PARTICLE ARRAYS FOR ONE-WAY GUIDING	663
<i>Yarden Mazor, Yakir Hadad, Ben Steinberg, Tel Aviv University, Israel</i>	
TU-A2.1P.7: RAPID SURFACE-WAVE ANALYSIS OF CORRUGATED RODS USING ASYMPTOTIC CORRUGATIONS BOUNDARY CONDITIONS	665
<i>Iustyna Shevchenko, Malcolm Ng Mou Kehn, National Chiao Tung University, Taiwan</i>	
TU-A2.1P.8: A PARAMETRIC STUDY ON A 2D LUNEBURG'S LENS MADE OF THIN DIELECTRIC CYLINDERS	667
<i>Eran Falek, Reuven Shavit, Ben Gurion University of the Negev, Israel</i>	
TU-A2.1P.9: MEASUREMENT, SIMULATION, AND THEORY OF A NON-FOSTER UNIT CELL WITH PARASITIC RESISTANCE	669
<i>Kathryn Smith, Thomas Weldon, Ryan Adams, University of North Carolina at Charlotte, United States</i>	
 TU-A1.3P: NOVEL SLOT AND APERTURE ARRAY ANTENNAS	
TU-A1.3P.1: A COMPACT AND HIGH-GAIN KA-BAND MULTIBEAM CONTINUOUS TRANSVERSE STUB ANTENNA	671
<i>Mauro Ettore, Francesco Foglia Manzillo, Institut d'Electronique et de Télécommunications de Rennes (IETR), UMR CNRS 6164, Université de Rennes 1, France; Massimiliano Casaletti, Laboratoire d'Electronique et Electromagnétisme (L2E), Pierre and Marie Curie University - Paris 6, France; Ronan Sauleau, Institut d'Electronique et de Télécommunications de Rennes (IETR), UMR CNRS 6164, Université de Rennes 1, France; Nicolas Capet, Centre national d'études spatiales (CNES), France</i>	

TU-A1.3P.2: PILLBOX ANTENNA WITH MONOPULSE TECHNIQUE AND WIDE SCANNING CAPABILITIES FOR TRACKING APPLICATIONS	673
<i>Karim Tekkouk, Mauro Ettorre, Ronan Sauleau, Institut d'Electronique et de Télécommunications de Rennes-Université de Rennes 1, France</i>	
TU-A1.3P.3: A COMPACT S-BAND NARROW-WALL COMPLEMENTARY-SPLIT-RING SLOTTED WAVEGUIDE ANTENNA FOR HIGH POWER APPLICATIONS	675
<i>Xuyuan Pan, Christos Christodoulou, University of New Mexico, United States</i>	
TU-A1.3P.4: SINGLE-FED HIGH-GAIN CIRCULARLY POLARIZED SLOTTED CAVITY ANTENNA USING TE₃₃₀ MODE	677
<i>Wangwang Han, Feng Yang, Jun Ouyang, Peng Yang, University of Electronic Science and Technology of China, China</i>	
TU-A1.3P.5: L-SHAPED SLOT ANTENNA DESIGN FOR LOAD-MODULATED BEAMSPACE-MIMO SYSTEM	679
<i>Il-Do Choi, Kyoungtae Lee, JuYong Lee, Korea Advanced Institute of Science and Technology, Republic of Korea</i>	
 TU-A4.1P: RADAR IMAGING	
TU-A4.1P.1: IMAGING EFFECTIVENESS OF MULTISTATIC RADAR FOR HUMAN BODY IMAGING	681
<i>Borja Gonzalez-Valdes, Carey Rappaport, Jose Angel Martinez Lorenzo, Northeastern University, United States; Yuri Álvarez, Fernando Las-Heras, University of Oviedo, Spain</i>	
TU-A4.1P.2: IDENTIFYING WEAK DIELECTRIC OBJECTS ON CONDUCTIVE SURFACES IN MILLIMETER-WAVE IMAGING	683
<i>Thurston Brevett, Borja Gonzalez-Valdes, Carey Rappaport, Northeastern University, United States</i>	
TU-A4.1P.3: SYNTHETIC APERTURE RADAR IMAGING USING A SMALL CONSUMER DRONE	685
<i>Chenchen Li, Hao Ling, University of Texas at Austin, United States</i>	
TU-A4.1P.4: FAST QUANTITATIVE MICROWAVE IMAGING BASED ON MEASURED POINT SPREAD FUNCTIONS AND INVERSION IN REAL SPACE	687
<i>Denys Shumakov, Sheng Tu, Natalia Nikolova, McMaster University, Canada</i>	
TU-A4.1P.5: IMPLEMENTATION OF AN ADVANCED TOMOGRAPHIC ALGORITHM FOR GPR REALISTIC SOUNDING	689
<i>Davide Comite, Alessandro Galli, Sapienza University of Rome, Italy; Ilaria Catapano, Francesco Soldovieri, IREA - CNR, Italy; Elena Pettinelli, Roma Tre University, Italy</i>	
TU-A4.1P.6: INVESTIGATION OF GAPS BETWEEN BLOCKS IN MICROWAVE IMAGES OF MULTILAYERED WALLS	691
<i>Kai Ren, Robert Burkholder, Ohio State University, United States; Jie Chen, Chinese Academy of Sciences Institute of Electronics, China</i>	
TU-A4.1P.7: FAST RADAR IMAGING ALGORITHM FOR THE DETECTION OF OBJECTS EMBEDDED IN A STRATIFIED MEDIUM	693
<i>Jie Chen, Chinese Academy of Sciences Institute of Electronics, China; Kai Ren, Robert Burkholder, Ohio State University, United States</i>	
TU-A4.1P.8: ALL-DIRECTIONS THROUGH THE WALL RADAR IMAGING ENHANCEMENT USING ORTHOGONAL POLARIZATIONS AND GENERALIZED PENCIL OF FUNCTION METHOD	695
<i>Behzad Yektakhah, Kamal Sarabandi, University of Michigan, United States</i>	
TU-A4.1P.9: GENERALIZED THREE-DIMENSIONAL HARMONIC IMAGING OF BURIED NONLINEARLY LOADED SCATTERERS	697
<i>DaHan Liao, Army Research Laboratory, United States</i>	

TU-A4.1P.10: AN IMPROVED 3-D NEAR-FIELD ISAR IMAGING TECHNIQUE WITH EXTENDED FAR-FIELD RCS EXTRACTION 699

Thomas Vaupel, Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR, Germany

TU-A5.1P: MIMO ANTENNAS

TU-A5.1P.1: A SPHERICAL MULTIPLE ELEMENT ANTENNA CONCEPT 701

Jane Yun, TE Connectivity, United States; Rodney Vaughan, Simon Fraser University, Canada

TU-A5.1P.2: PLANAR DUAL-MODE MIMO ANTENNA WITH ENHANCED BANDWIDTH 703

Adam Narbudowicz, RWTH Aachen University, Germany; Slawomir Koziel, Reykjavik University, Iceland; Max Ammann, Dublin Institute of Technology, Ireland; Dirk Heberling, RWTH Aachen University, Germany

TU-A5.1P.3: AN INTEGRATED TWO MIMO ANTENNA SYSTEM BASED ON DIRECTIVE PRINTED DIPOLES 705

Youssef Tawk, Christos Christodoulou, Joseph Costantine, University of New Mexico, United States

TU-A5.1P.4: A LOW PROFILE DUAL-BAND DRA-BASED MIMO ANTENNA SYSTEM FOR WIRELESS ACCESS POINTS 707

Mohammad S. Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia; Symon K. Podilchak, Queens University at Kingston, Canada; Yahia M.M. Antar, Royal Military College of Canada, Canada

TU-A5.1P.5: DISK-LOADED MONOPOLE STACKED WITH PATCH ANTENNA..... 709

Kohei Omote, Toyama University, Japan; Hiroshi Sato, Panasonic System Networks Co., Ltd., Japan; Kun Li, Kazuhiro Honda, Toyama University, Japan; Yoshio Koyanagi, Panasonic System Networks Co., Ltd., Japan; Koichi Ogawa, Toyama University, Japan

TU-A5.1P.6: A NOVEL DUAL-BAND AND DUAL-POLARIZED SLOT ANTENNA FOR WLAN APPLICATIONS 711

Hesheng Lin, Yi-Cheng Lin, National Taiwan University, Taiwan

TU-A5.1P.7: MUTUAL COUPLING EFFECTS ON THE MIMO CAPACITY USING DUAL BAND WI-FI DOUBLE-T PRINTED ANTENNAS 713

Christos Kalialakis, Aristotle University of Thessaloniki, Greece; Dimitris E. Anagnostou, Michael Chryssomallis, Democritus University of Thrace, Greece

TU-A5.1P.8: S- AND C-BAND OMNI-DIRECTIONAL ANTENNAS IN MIMO ARRANGEMENT ON BENT GROUND PLANE FOR A CONDUCTING CYLINDRICAL SURFACE 715

Tavis Hall, Satish Sharma, San Diego State University, United States

TU-A5.1P.9: 4-ELEMENT PLANAR MIMO RECONFIGURABLE ANTENNA SYSTEM FOR COGNITIVE RADIO APPLICATIONS 717

Rifaqat Hussain, Mohammad S. Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia

TU-A5.1P.10: ANTENNA ARRAY CONFIGURATIONS FOR 3D MIMO SYSTEM IN HIGH SPEED RAILWAY SCENARIO 719

Yiru Liu, Bo Ai, Ke Guan, Binghao Chen, Beijing Jiaotong University, China

TU-A5.2P: ADVANCES IN RF AND MICROWAVE MEDICAL DEVICES

TU-A5.2P.1: UWB BABY AND SLEEP APNEA MONITOR 721

Lingyun Ren, Md Sakib Hasan, University of Tennessee, United States; Ramzie A. Fathy, Farragut High School, United States; Syed Islam, Aly E. Fathy, University of Tennessee, United States

TU-A5.2P.2: DEVELOPMENT OF TISSUE COAGULATION FORCEPS BY MICROWAVE ENERGY 723

Naoyuki Ogasawara, Yuta Endo, Kazuyuki Saito, Koichi Ito, Chiba University, Japan

TU-A5.2P.3: CONFORMAL SENSOR ACCURACY FOR DEEP TISSUE BIOMEDICAL IMAGING	725
<i>Md Asiful Islam, Asimina Kiourti, John L. Volakis, Ohio State University, United States</i>	
TU-A5.2P.4: NUMERICAL SIMULATION OF THZ REFLECTION IMAGING OF BREAST CANCER	727
TISSUE	
<i>Abayomi Omolewu, Tyler Bowman, Magda El-Shenawee, University of Arkansas, United States</i>	
TU-A5.2P.5: RUDIMENTARY DEEP TISSUE IMAGING THROUGH A WEARABLE REAL-TIME	729
MONITORING SYSTEM	
<i>Safa Salman, Asimina Kiourti, John L. Volakis, The ElectroScience Lab at OSU, United States</i>	
TU-A5.2P.6: POLARIMETRIC TERAHERTZ PROBE FOR ENDOSCOPIC ASSESSMENT OF	730
MALIGNANCIES	
<i>Georgios C. Trichopoulos, Kubilay Sertel, Ohio State University, United States</i>	
TU-A5.2P.7: A WEARABLE DUAL-BAND SQUARE SLOT ANTENNA WITH STUB FOR ISM AND WIMAX	732
APPLICATIONS	
<i>Ali Hammoodi, Hussain Al-Rizzo, Ayman Isaac, University of Arkansas at Little Rock, United States</i>	
TU-A5.2P.8: MODIFIED RECTANGULAR PATCH ANTENNA FOR IMPROVING HEATING	734
UNIFORMITY IN HYPERTHERMIA APPLICATION	
<i>Seonho Lim, Woo Cheol Choi, Yonsei University, Republic of Korea; Hyungrak Kim, Daelim University College, Republic of Korea; Young Joong Yoon, Yonsei University, Republic of Korea</i>	
TU-A5.2P.9: HIGHLY SENSITIVE MINIATURIZED BIO-SENSOR USING 2-LAYER DOUBLE SPLIT	736
RING RESONATORS	
<i>Mohammad Abdolrazzaghi, University of Alberta, Canada; Ali Abdolali, Iran University of Science and Technology, Iran; Mojgan Daneshmand, University of Alberta, Canada</i>	
 TU-A3.1P: FAST AND WELL-CONDITIONED INTEGRAL EQUATION SOLVERS	
TU-A3.1P.1: FAST DIRECT SOLUTION OF 3-D DYNAMIC ELECTROMAGNETIC PROBLEMS BY	738
METHOD OF MOMENTS	
<i>Yan-Nan Liu, Ming-Ming Xu, Beijing Institute of Technology, China; Cong-Jun Jin, Science and Technology on Space System Simulation Laboratory, China; Xiao-Min Pan, Xin-Qing Sheng, Beijing Institute of Technology, China</i>	
TU-A3.1P.2: MINIMAL-RANK H²-MATRIX-BASED ITERATIVE AND DIRECT VOLUME INTEGRAL	740
EQUATION SOLVERS FOR LARGE-SCALE SCATTERING ANALYSIS	
<i>Dan Jiao, Saad Omar, Purdue University, United States</i>	
TU-A3.1P.3: A HERMITIAN AND WELL-CONDITIONED EFIE FOR FAST ITERATIVE AND DIRECT	742
SOLVERS	
<i>Simon Adrian, Institut Mines-Télécom / Télécom Bretagne, Germany; Francesco P. Andriulli, Télécom Bretagne / Institut Mines-Télécom, France; Thomas Eibert, Technische Universität München, France</i>	
TU-A3.1P.4: AN INTEGRAL EQUATION METHOD BASED ON VECTOR AND SCALAR POTENTIAL	744
FORMULATIONS	
<i>Qin Liu, Sheng Sun, University of Hong Kong, Hong Kong SAR of China; Weng Cho Chew, University of Illinois at Urbana-Champaign, United States</i>	
TU-A3.1P.5: DECOUPLED POTENTIAL INTEGRAL EQUATION APPLIED TO COMPLEX	746
GEOMETRIES	
<i>Felipe Vico, Miguel Ferrando-Bataller, Tomás Bernabeu-Jiménez, Antonio Berenguer, UPV, Spain</i>	
TU-A3.1P.6: EFFICIENT PRECONDITIONING BASED ON ORTHOGONALIZATION OF METHOD OF	748
MOMENTS EQUATIONS	
<i>Milan Kostic, WIPL-D d.o.o., Serbia; Branko Kolundzija, University of Belgrade, Serbia</i>	

TU-A3.1P.7: IMPROVING THE PERFORMANCE OF NULL-FIELD GENERATION BASED PRECONDITIONER WITH APPROXIMATE MLFMA TECHNIQUE	750
<i>Yong Zhang, Hai Lin, State Key Lab of CAD&CG, Zhejiang University, China</i>	
TU-A3.1P.8: SKELETON BASED FAST SOLUTION OF MOM SYSTEM WITH MANY RIGHT HAND SIDES	752
<i>Kai-Jiang Xu, Si-Lu Huang, Xiao-Min Pan, Xin-Qing Sheng, Beijing Institute of Technology, China</i>	
TU-A3.1P.9: FAST SPATIAL FREQUENCY BASED ANALYSIS TECHNIQUE FOR ELECTROMAGNETIC SCATTERING	754
<i>Dayalan Kasilingam, Anthony Fascia, Mohammad Ahmad, John Summerfield, University of Massachusetts Dartmouth, United States</i>	
TU-A3.1P.10: MIC ACCELERATED LU DECOMPOSITION FOR METHOD OF MOMENTS	756
<i>Guanghui Zhang, Yan Chen, Yu Zhang, Shugang Jiang, Xunwang Zhao, Xidian University, China</i>	
 TU-A4.2P: RCS AND SCATTERING	
TU-A4.2P.1: ON BEAMWIDTH EFFECTS ON RCS OF OBJECTS IN RANDOM MEDIA FOR E-WAVE POLARIZATION	758
<i>Hosam El-Ocla, Lakehead University, Canada</i>	
TU-A4.2P.2: ELECTROMAGNETIC SCATTERING FROM LARGE RAIN DROPS VERSUS MELTING HAIL	760
<i>Elene Chobanyan, Merhala Thurai, V. N. Bringi, Branislav M. Notaros, Colorado State University, United States</i>	
TU-A4.2P.3: ESTIMATING IMPULSE RESPONSE USING ONLY MAGNITUDE OF RADAR BACKSCATTER	762
<i>Ismail Jouny, Lafayette College, United States</i>	
TU-A4.2P.4: A 3D MODEL TO CHARACTERIZE HIGH-FREQUENCY SCATTERING: APPLIED TO SYNTHESIZE SAR DATA	764
<i>N. T. Minh Nguyen, International University, Vietnam National University Ho Chi Minh City, Viet Nam</i>	
TU-A4.2P.5: AN EFFECTIVE RCS CALCULATION TECHNIQUE FOR COMPOSITE COATED TARGETS	766
<i>Caiyun Wang, Yong Wang, Shuxia Wu, Nanjing University of Aeronautics and Astronautics, China; Xiaochun Liu, Shining Sun, Aviation Key Laboratory of Science and Technology on High Performance Electromagnetic Windows, China</i>	
 TU-A1.4P: SMALL ANTENNAS: DESIGN CHALLENGES AND APPLICATIONS	
TU-A1.4P.1: ELECTRICALLY SMALL ANTENNAS DESIGN CHALLENGES	768
<i>Mohammad Abdallah, Walid Dyab, Tapan Sarkar, Syracuse University, United States; Magdalena Salazar-Palma, Universidad Carlos III de Madrid, Spain</i>	
TU-A1.4P.2: FUNDAMENTAL DESIGN ANALYSIS OF SMALL IMPLANTABLE DIPOLE ANTENNAS	770
<i>Sofia Bakogianni, Stavros Koulouridis, University of Patras, Greece</i>	
TU-A1.4P.3: DESIGN OF A MINIATURIZED ANTENNA FOR BLUETOOTH-ENABLED HEARING AID DEVICES	772
<i>Zhichao Li, George Shaker, University of Waterloo, Canada; Mohammad-Reza Nezhad-Ahmadi, ON-Semiconductors, Canada; Safieddin Safavi-Naeini, University of Waterloo, Canada</i>	
TU-A1.4P.4: A NOVEL PRINTED STUB-LOADED SQUARE HELICAL ANTENNA	774
<i>Syed Abdullah Nauroze, Manos Tentzeris, Georgia Institute of Technology, United States</i>	

TU-A1.4P.5: FEASIBILITY OF AN ULTRA NARROW BAND ANTENNA FOR THE INTERNET OF THINGS	776
<i>Fabien Ferrero, Leonardo Lizzi, University of Nice Sophia, France</i>	
 TU-A4.3P: THEORY AND APPLICATIONS OF COMPRESSIVE SENSING	
TU-A4.3P.1: SAMPLING OF SPARSE INFORMATION IN ELECTROMAGNETISM	778
<i>Marco Donald Migliore, University of Cassino and Southern Lazio, Italy</i>	
TU-A4.3P.2: RECONSTRUCTION OF MISSING SECTIONS OF RADIATION PATTERNS USING COMPRESSIVE SENSING	780
<i>Berenice Verdin, Patrick Debroux, Army Research Laboratory, United States</i>	
TU-A4.3P.4: DEMONSTRATION OF THE DIRECT MAPPING METHOD FOR LOCATING MULTIPLE EMITTERS	782
<i>Andrew Kintz, Inder Gupta, Ohio State University, United States</i>	
TU-A4.3P.5: THROUGH-THE-WALL IMAGING OF 3D OBJECTS	784
<i>George Cheng, Yong Zhu, Jan Grzesik, Allwave Corporation, United States</i>	
 TU-A2.2P: SURFACE MODES, DISPERSION AND ABSORPTION IN MATERIALS	
TU-A2.2P.1: CHARACTERIZATION OF A PERFECT ABSORBER	786
<i>Michael Kreiczler, Raphael Kastner, Tel Aviv University, Israel</i>	
TU-A2.2P.2: COLOR-CORRECTING GRADIENT-INDEX INFRARED SINGLET BASED ON SILICON AND GERMANIUM MIXING	788
<i>Donovan E. Brocker, Sawyer D. Campbell, Douglas H. Werner, Pennsylvania State University, United States</i>	
TU-A2.2P.3: SURFACE-PLASMON-LIKE MODES ON STRUCTURED METAL SURFACE WITH PERIODIC SUBWAVELENGTH RECTANGULAR GROOVES PARTIALLY FILLED WITH DIELECTRIC	790
<i>Kazuo Nishimura, Ryukoku University, Japan</i>	
TU-A2.2P.4: SURFACE-PLASMON-LIKE MODES ON A PERIODIC SUBWAVELENGTH SLOT ARRAY WITH VERY SHORT PERIOD ON AN OPTICALLY PLASMA INDUCED SEMICONDUCTOR SLAB	792
<i>Kazuo Nishimura, Ryukoku University, Japan</i>	
 WE-SP.1A: MEMORIAL SESSION FOR JULIEN PERRUISSEAU-CARRIER	
WE-SP.1A.2: FULL-DIMENSION MIMO ARRAYS WITH LARGE SPACINGS BETWEEN ELEMENTS	794
<i>Xavier Artiga, Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), Spain</i>	
WE-SP.1A.4: FAST CONSTRUCTION OF THE MOM MATRIX FOR REFLECTARRAYS THROUGH A SMART TABULATION	796
<i>Erdinc Ercil, Lale Alatan, Ozlem Civi, Middle East Technical University, Turkey</i>	
WE-SP.1A.5: BROADBAND FABRY-PÉROT ANTENNA WITH NON-FOSTER METASURFACE - HOW TO TEST THE BASIC IDEA ?	798
<i>Silvio Hrabar, University of Zagreb, Croatia; Tomislav Debogovic, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland</i>	
WE-SP.1A.6: GRAPHENE PLASMONICS: THEORY AND EXPERIMENTS	800
<i>Juan Sebastian Gomez-Diaz, Andrea Alù, University of Texas at Austin, United States</i>	

WE-SP.1A.7: PLASMONIC DEVICES AND SPATIAL DISPERSION EFFECTS IN GRAPHENE TECHNOLOGY FOR TERAHERTZ APPLICATIONS	802
<i>Diego Correas-Serrano, Universidad Politécnica de Cartagena, Spain; Juan Sebastian Gomez-Diaz, University of Texas at Austin, United States; Alejandro Alvarez-Melcon, Universidad Politécnica de Cartagena, Spain</i>	
 WE-SP.2A: 4D ANTENNA ARRAYS: THEORY, TECHNIQUES AND APPLICATIONS	
WE-SP.2A.1: A DUAL CHANNEL AM RECEIVER STRUCTURE IN 4D ARRAYS	804
<i>Yasin Yavuz, Mert Karahan, Ertugrul Aksoy, Gazi University, Turkey</i>	
WE-SP.2A.2: TIME MODULATED ARRAY FOR DUAL FUNCTION RADAR AND COMMUNICATION	806
<i>Jérôme Euzière, Régis Guinvarc'h, Israel Hinojosa, Supelec, France; Bernard Uguen, University of Rennes 1, France; Raphael Gillard, INSA Rennes, France</i>	
WE-SP.2A.3: DYNAMIC WIRELESS POWER TRANSFER BY TIME-MODULATED ARRAYS	808
<i>Roman Marchukov, Diego Masotti, Alessandra Costanzo, University of Bologna, Italy</i>	
WE-SP.2A.4: NONSINUSOIDAL TMA BASIS FUNCTIONS AND THE DVOR	810
<i>William Barott, Embry-Riddle Aeronautical University, United States</i>	
WE-SP.2A.5: ADVANCED HARMONIC RADIATIONS DESIGN IN TIME-MODULATED ANTENNA ARRAYS	812
<i>Lorenzo Poli, Paolo Rocca, Federico Viani, Andrea Massa, ELEDIA Research Center, University of Trento, Italy</i>	
WE-SP.2A.6: TIME-DOMAIN ANTENNA ARRAYS FOR FUTURE PHASED ARRAY APPLICATIONS	814
<i>Chong He, Xianling Liang, Xudong Bai, Junping Geng, Ronghong Jin, Shanghai Jiao Tong University, China</i>	
WE-SP.2A.7: TIME-MODULATED ARRAYS FOR DIGITAL COMMUNICATIONS IN MULTIPATH SCENARIOS	816
<i>Roberto Maneiro-Catoira, Julio Bregains, Jose A. Garcia-Naya, Luis Castedo, Universidade da Coruña, Spain</i>	
WE-SP.2A.8: BASIC MULTIPATH ANALYSIS OF LFM CW-FDA	N/A
<i>Cagri Cetintepe, Simsek Demir, Middle East Technical University, Turkey</i>	
WE-SP.2A.9: 4D ANTENNA ARRAYS FOR LFM SIGNAL TRANSMISSION	820
<i>Jixin Guo, Shiwen Yang, Quanjiang Zhu, Zaiping Nie, University of Electronic Science and Technology of China, China</i>	
 WE-A1.1A: SMALL MULTI-BAND ANTENNAS	
WE-A1.1A.1: DUAL BAND METAMATERIAL-STRUCTURED ANTENNA WITH COPLANAR WAVEGUIDES AND RADIAL FEED STUB	822
<i>Miroslav Pajovic, Zlatko Potocnik, MP RF-Antenna-EMC Consulting, United States; Velimir Djerić, Milara, Inc., United States</i>	
WE-A1.1A.2: DESIGN FOR SUPPRESSING UNDESIRE REFLECTIONS FROM FREQUENCY-SELECTIVE SURFACES EMPLOYED IN MULTIBAND SECTOR ANTENNA	824
<i>Hideya So, Atsuya Ando, Takatoshi Sugiyama, NTT Corporation, Japan; Keizo Cho, Chiba Institute of Technology, Japan</i>	
WE-A1.1A.3: INCORPORATION OF SQUARE PATCH AND SRR METAMATERIALS FOR DUAL-BAND PRINTED ANTENNA	826
<i>Mohammad Arif Harfianto, Suprayogi Suprayogi, Telkom University, Indonesia; Achmad Munir, Institut Teknologi Bandung, Indonesia</i>	
WE-A1.1A.4: AN ULTRA WIDEBAND (UWB) PRINTED SLOTTED MONOPOLE ANTENNA WITH MULTI-FUNCTIONAL CHARACTERISTICS	828
<i>Chinmoy Saha, Indian Institute of Space Science and Technology, India; Jawad Y. Siddiqui, University of Calcutta, India; Latheef Ahmed Shaik, Indian Institute of Space Science and Technology, India; Yahia M.M. Antar, Royal Military College of Canada, Canada</i>	

WE-A1.1A.5: UWB PRINTED MONOPOLE ANTENNA WITH CONTROLLABLE MULTI NOTCH FUNCTION USING ROTATIONAL CIRCULAR SRRS	830
<i>Chinmoy Saha, Latheef Ahmed Shaik, Indian Institute of Space Science and Technology, India; Jawad Y. Siddiqui, University of Calcutta, India; Yahia M.M. Antar, Royal Military College of Canada, Canada</i>	
WE-A1.1A.6: SIR DOUBLE PERIODIC CRLH LOADED DIPOLE ANTENNA	832
<i>Mahmoud Abdalla, MTC College, Egypt; Mohamed Abo El-Dahab, Mohamed Ghouz, Arab Academy for Science, Technology, and Maritime Transport, Egypt</i>	
WE-A1.1A.7: COMAPCT AND TUNABLE ACS-FED MONOPOLE ANTENNA	834
<i>Ahmed Ibrahim, El Minia University, Egypt; Mahmoud Abdalla, MTC College, Egypt; Xianjun Huang, Zhirun Hu, Manchester University, United Kingdom</i>	
WE-A1.1A.8: SINGLE FEED DUAL-FREQUENCY ORTHOGONAL LINEAR-POLARIZATION MICROSTRIP PATCH ANTENNA WITH LARGE FREQUENCY RATIO	836
<i>Fanji Meng, University of Electronic Science and Technology of China, China; Sharma Satish, San Diego State University, United States</i>	
WE-A1.1A.9: A METAMATERIAL-INSPIRED TRIPLE BAND DUAL POLARIZED MONOPOLE ANTENNA	838
<i>Debdeep Sarkar, Kushmanda Saurav, Archana Rajput, Kumar Vaibhav Srivastava, Indian Institute of Technology Kanpur, India</i>	
WE-A1.1A.10: A HEXAGONAL MULTIBAND FRACTAL PATCH ANTENNA	840
<i>Mukh Ram Rajbhar, Sushrut Das, Indian School of Mines, India; Ram Lal Yadava, Galgotias College of Engineering & Technology, India</i>	
 WE-A1.2A: ANTENNA THEORY I	
WE-A1.2A.1: WHY CURRENT DECAY ON A WIRE CAUSES RADIATION	842
<i>Edmund Miller, Los Alamos National Laboratory (retired), United States</i>	
WE-A1.2A.2: SCATTERING PROPERTIES OF THE IDEAL ANTENNA IN RECEIVE MODE	844
<i>Michael Kreiczler, Raphael Kastner, Tel Aviv University, Israel</i>	
WE-A1.2A.3: METHODS OF TRANSMITTING A WIDEBAND SIGNAL THROUGH AN ELECTRICALLY SMALL ANTENNA	846
<i>Majid Manteghi, Virginia Polytechnic Institute and State University, United States</i>	
WE-A1.2A.4: EQUIVALENT CIRCUIT MODELING OF PLANAR MOBILE PHONE INTENNA	848
<i>Bum-Kyum Kim, Taeyeop Lee, Kwyro Lee, Korea Advanced Institute of Science and Technology, Republic of Korea</i>	
WE-A1.2A.5: CAVITY MATCHING OF HIGH DIELECTRIC CONSTANT SIW H-PLANE HORN ANTENNA	850
<i>Nima Bayat-Makou, Ahmed A. Kishk, Concordia University, Canada</i>	
WE-A1.2A.6: PHYSICS-BASED CIRCUIT MODELS FOR MIMO ANTENNAS USING CHARACTERISTIC MODES	852
<i>Jacob Adams, Binbin Yang, North Carolina State University, United States</i>	
WE-A1.2A.7: A MODIFICATION OF THE TWO-ANTENNA METHOD TO DETERMINE THE PHASE CENTER LOCATION AS WELL AS THE GAIN OF A WIDEBAND ANTENNA	854
<i>Herbert Aumann, University of Maine, United States; Tyler Schmitt, University of Lowell, United States; David Mooradd, MIT Lincoln Laboratory, United States</i>	
WE-A1.2A.8: PATTERN RIPPLE IN NEAR-TO-FAR-FIELD RECONSTRUCTION	856
<i>Jan Grzesik, Allwave Corporation, United States</i>	
WE-A1.2A.9: THE RELATION BETWEEN FRACTIONAL BANDWIDTH AND Q FACTOR	858
<i>Miloslav Capek, Lukas Jelinek, Czech Technical University in Prague, Czech Republic</i>	

WE-A1.2A.10: THE BEAM WIDENING FACTOR OF LINEAR DOLPH-CHEBYSHEV END-FIRE ARRAYS 860

Jia Cao, Zheng-Hui Xue, Weiming Li, Wu Ren, Beijing Institute of Technology, China

WE-A2.1A: METASURFACE INNOVATIONS I

WE-A2.1A.1: LOW PROFILE LENS ANTENNAS: COLLIMATING LEAKY-WAVE RADIATION WITH METASURFACES 862

Carl Pfeiffer, Anthony Grbic, University of Michigan, United States

WE-A2.1A.2: USING SMALL METASURFACE LENS FOR ANTENNA GAIN ENHANCEMENT..... 864

Hailiang Zhu, S.W. Cheung, T.I. Yuk, University of Hong Kong, Hong Kong SAR of China

WE-A2.1A.3: COUPLING LOCALIZED SOURCES TO CONTROLLED POLARIZED BROADSIDE RADIATION USING HUYGENS METASURFACES 866

Ariel Epstein, George V. Eleftheriades, University of Toronto, Canada

WE-A2.1A.4: A HIGH-GAIN LENS ANTENNA BASED ON GRADIENT-INDEX METAMATERIAL..... 868

Elham Erfani, Institut National de la Recherche Scientifique (INRS), Canada; Mahmoud Niroo-jazi, Concordia University, Canada; Tayeb A. Denidni, Serioja Ovidiu Tatu, Institut National de la Recherche Scientifique (INRS), Canada

WE-A2.1A.5: HOMOGENIZED DYADIC GREEN'S FUNCTIONS FOR ELECTRIC DIPOLE EXCITATION OVER METASURFACES 870

Feng Liang, University of Electronic Science and Technology of China, China; George W. Hanson, University of Wisconsin-Milwaukee, United States; Giampiero Lovat, Rodolfo Araneo, Paolo Burghignoli, La Sapienza University of Rome, Italy; Alexander B. Yakovlev, University of Mississippi, United States

WE-A2.1A.6: VARIABLE REFLECTION ANGLE META-SURFACE USING DOUBLE LAYERED FSS 872

Ryuji Kuse, Toshikazu Hori, Mitoshi Fujimoto, University of Fukui, Japan

WE-A2.1A.7: ANGULARLY-INDEPENDENT HUYGENS' METASURFACES..... 874

Younes Ra'di, Sergej Tretyakov, Aalto University, Finland

WE-A2.1A.8: HYPERBOLIC METASURFACES 876

Juan Sebastian Gomez-Diaz, Mykhailo Tymchenko, Andrea Alù, University of Texas at Austin, United States

WE-A2.1A.9: BIREFRINGENT "GENERALIZED REFRACTIVE" METASURFACE..... 878

Karim Achouri, Mohamed A. Salem, Christophe Caloz, Polytechnique de Montréal, Canada

WE-A2.1A.10: A NOVEL CIRCULARLY POLARIZED / DUAL BAND DUAL POLARIZED ANTENNA USING METASURFACE 880

Basudev Majumder, Krishnamoorthy Kandasamy, Jayanta Mukherjee, IIT Bombay, India; Kamla Prasan Ray, Society for Applied Microwave Electronic Engineering and Research, India

WE-A2.2A: FREQUENCY SELECTIVE SURFACES: RECONFIGURABLE

WE-A2.2A.1: ACTIVE FREQUENCY SELECTIVE SURFACES USING CANTILEVER SWITCHES FOR 60-GHZ APPLICATIONS 882

Arun Kesavan, Bybi P. Chacko, Tayeb A. Denidni, National Institute of Scientific Research, Canada

WE-A2.2A.2: ELECTRONICALLY TUNABLE FREQUENCY SELECTIVE SURFACE AT 60 GHZ FOR BEAM - STEERING APPLICATIONS 884

Gijo Augustin, Bybi P. Chacko, Tayeb A Denidni, National Institute of Scientific Research (INRS), Canada

WE-A2.2A.3: MILLIMETER-WAVE ACTIVE FSS STRUCTURE WITH CANTILEVER SWITCHES FOR BEAM-SWITCHING ANTENNA APPLICATIONS 886

Bybi P Chacko, Gijo Augustin, Tayeb A Denidni, National Institute of Scientific Research (INRS), Canada

WE-A2.2A.4: EXPLOITING MECHANICAL FLEXURE TO DESIGN TUNABLE PERIODIC STRUCTURES	888
<i>Seyed Mohamad Amin Momeni Hasan Abadi, John H. Booske, Nader Behdad, University of Wisconsin-Madison, United States</i>	
WE-A2.2A.5: RECONFIGURABLE BAND REJECTION AND BAND-PASS FREQUENCY SELECTIVE STRUCTURES	890
<i>Jeffrey Kula, Prabhakar H. Pathak, John L. Volakis, Ohio State University, United States</i>	
WE-A2.2A.6: MAGNETICALLY TUNABLE GRAPHENE PATCH FREQUENCY SELECTIVE SURFACE (FSS)	892
<i>Lin Lin, Lin-Sheng Wu, Shanghai Jiao Tong University, China; Wen-Yan Yin, Zhejiang University, China; Jun-Fa Mao, Shanghai Jiao Tong University, China</i>	
 WE-A4.1A: INVERSE PROBLEMS IN ELECTROMAGNETICS	
WE-A4.1A.1: QUASI-BORN APPROXIMATION PREFILTERING FOR NONITERATIVE INVERSE SCATTERING	894
<i>Edwin Marengo, Jing Tu, Northeastern University, United States</i>	
WE-A4.1A.2: FAST 3D NONLINEAR INVERSION METHOD FOR AIRBORNE ELECTROMAGNETIC EXPLORATION	896
<i>Yu Jia, Qing Huo Liu, Duke University, United States</i>	
WE-A4.1A.3: SUBSPACE-BASED OPTIMIZATION METHOD COUPLED WITH MULTIPLICATIVE REGULARIZATION FOR EDGE-PRESERVING INVERSION	898
<i>Xudong Chen, National University of Singapore, Singapore; Kuiwen Xu, Fazhong Shen, Lixin Ran, Zhejiang University, China; Yu Zhong, Institute of High Performance Computing, Singapore</i>	
WE-A4.1A.4: A LEARNING-BY-EXAMPLES APPROACH FOR NON-DESTRUCTIVE LOCALIZATION AND CHARACTERIZATION OF DEFECTS THROUGH EDDY CURRENT MEASUREMENTS	900
<i>Marco Salucci, Giacomo Oliveri, Federico Viani, ELEDIA Research Center, University of Trento, Italy; Roberto Miorelli, Christophe Reboud, Pierre Calmon, CEA LIST, France; Andrea Massa, ELEDIA Research Center, University of Trento, Italy</i>	
WE-A4.1A.5: INVASION PATTERNS DERIVED FROM INVERSION OF LOGGING-WHILE-DRILLING MEASUREMENTS	902
<i>Zhong Zhang, Zhejiang University, China; Jun Cai, CNOOC, China</i>	
WE-A4.1A.6: INVERSION FOR TILTED TRIAXIAL CONDUCTIVITY IN DIPPING LAYERED FORMATIONS	904
<i>Yu Jia, Duke University, United States; Gong Li Wang, Aria Abubakar, Schlumberger, United States</i>	
WE-A4.1A.7: TWO-DIMENSIONAL INVERSION OF TRIAXIAL INDUCTION LOGGING DATA IN TRANSVERSELY ISOTROPIC FORMATION	906
<i>Su Yan, University of Illinois at Urbana-Champaign, United States; Gong Li Wang, Aria Abubakar, Schlumberger, United States</i>	
WE-A4.1A.8: USING A CONTRACTION MAPPING METHOD TO DETERMINE COMPLEX PERMITTIVITY FROM ELECTROMAGNETIC PROPAGATION MEASUREMENTS	908
<i>Tianxia Zhao, Gong Li Wang, Keli Sun, Aria Abubakar, Fernando Garcia-Osuna, Schlumberger, United States</i>	
WE-A4.1A.9: NUMERICAL STUDY OF RESOLUTION IN NEAR FIELD MICROSCOPY FOR DIELECTRIC SAMPLES	910
<i>Zhun Wei, Xudong Chen, National University of Singapore, Singapore</i>	
WE-A4.1A.10: A FAST ALGEBRAIC RECONSTRUCTION METHOD FOR INVERSE PROBLEM	912
<i>Chuan Lin, Jiefeng Zang, Anyong Qing, University of Electronic Science and Technology of China, China</i>	

WE-A4.2A: PROPAGATION CHARACTERIZATION IN TERRESTRIAL ENVIRONMENT

WE-A4.2A.1: STRATOSPHERIC PLATFORM FOR TELECOMMUNICATION MISSIONS..... 914

Fabien Baurreau, Robert Staraj, Fabien Ferrero, Leonardo Lizzi, Jean-Marc Ribero, Laboratoire d'Electronique, Antennes et Télécommunications, France; Jean-Philippe Chessel, Thales Alenia Space, France

WE-A4.2A.2: X-BAND BEACON-RECEIVER ARRAY EVAPORATION DUCT HEIGHT ESTIMATION 916

Jonathan Pozderac, Joel Johnson, Caglar Yardim, Ohio State University, United States

WE-A4.2A.3: MULTIPATH FADING EFFECT ON TERRESTRIAL MICROWAVE LOS RADIO LINKS 918

Polat Goktas, Satilmis Topcu, Ezhan Karasan, Ayhan Altintas, Bilkent University, Turkey

WE-A4.2A.4: PROPAGATION EXPERIMENT IN THE LITTORAL AT 94 GHZ..... 920

Andreas Danklmayer, Stefan Sieger, Fraunhofer FHR, Germany

WE-A4.2A.5: SHADOW FADING CORRELATIONS IN A EUROPEAN FOREST ENVIRONMENT 922

Alexandros Palaios, Janne Riihijärvi, Petri Mähönen, RWTH Aachen University, Germany

WE-A5.1A: ADVANCES IN MOBILE ANTENNA DESIGN

WE-A5.1A.1: DESIGN OF COMPACT DUAL-BAND DUAL-PORT WLAN MIMO ANTENNAS USING 924 SLOTS

Saber Soltani, Parisa Lotfi Poshtgol, Ross D. Murch, Hong Kong University of Science and Technology, Hong Kong SAR of China

WE-A5.1A.2: DESIGNING ANTENNA BOOSTER CASES FOR MOBILE PHONES USING CAPACITIVE 926 COUPLING TECHNIQUES

Jungyub Lee, Junsig Kum, Dohyuk Ha, Youngju Lee, Samsung Electronics, Republic of Korea

WE-A5.1A.3: HIGH PERFORMANCE MULTIBAND RADIO ANTENNA 928

Yu-Jiun Ren, Jessie Ren, Nokia, United States; Huan-Sheng Hwang, Intel Corporation, United States

WE-A5.1A.4: A FLEXIBLE AND TRANSPARENT ANTENNA ON A POLYIMIDE SUBSTRATE FOR 930 LAPTOP COMPUTERS

Seungman Hong, Youngsung Kim, Changmin Lee, Chang Won Jung, Seoul National University of Science and Technology, Republic of Korea

WE-A5.1A.5: VERY SMALL CHIP ANTENNA SUPPORTING MULTIPLE RADIO PROTOCOLS 932

Jessie Ren, Yu-Jiun Ren, Nokia, United States

WE-A5.1A.6: A DUAL-POLARIZED TRIPLE-BAND MIMO ANTENNA FOR WLAN/WIMAX APPLICATIONS 934

Yan Pan, Yuehui Cui, RongLin Li, South China University of Technology, China; Manos Tentzeris, Georgia Institute of Technology, United States

WE-A5.1A.7: A DUAL-BAND PRINTED ANTENNA WITH METAL BACK-COVER FOR WBAN 936 APPLICATIONS

Wonseok Lee, Jaehoon Choi, Hanyang University, Republic of Korea

WE-A5.1A.8: WEARABLE ANTENNA DESIGN ON FINITE-SIZE HIGH IMPEDANCE SURFACES FOR 938 SMART-WATCH APPLICATIONS

Ting-Yu Ku, Yen-Sheng Chen, National Taipei University of Technology, Taiwan

WE-A5.1A.9: EFFECTIVE MISMATCH LOSSES IN HANDHELD ANTENNAS..... 940

Pedro Luis Carro, Jesus de Mingo, Nerea González-Vázquez, Paloma García-Dúcar, Antonio Valdovinos, University of Zaragoza, Spain

WE-A5.2A: WIRELESS SYSTEMS FOR BIOMEDICAL APPLICATIONS

WE-A5.2A.1: SUB-1 GHZ FAR-FIELD POWERING OF IMPLANTABLE MEDICAL DEVICES: DESIGN 942 AND SAFETY CONSIDERATIONS

Sofia Bakogianni, Stavros Koulouridis, University of Patras, Greece

WE-A5.2A.2: EVALUATION AND OPTIMIZATION OF NEAR-FIELD INDUCTIVE COUPLED 944 WIRELESS POWER LINKS IN RAT MODEL

Kush Agarwal, National University of Singapore, Singapore; Rangarajan Jegadeesan, Singapore Institute for Neurotechnology, Singapore; Yongxin Guo, National University of Singapore, Singapore; Nitish Thakor, Singapore Institute for Neurotechnology, Singapore

WE-A5.2A.3: WIRELESS BIOMEDICAL TELEMETRY USING A FULLY-PASSIVE BRAIN IMPLANT 946

Cedric Lee, Asimina Kiourti, John L. Volakis, Ohio State University, United States

WE-A5.2A.4: NOVEL IMPLANTABLE MINIATURIZED CIRCULAR MICROSTRIP ANTENNA FOR 947 BIOMEDICAL TELEMETRY

Raed Shubair, Amer Salah, Alaa Abbas, Khalifa University, United Arab Emirates

WE-A5.2A.5: STUB-LOADED COMPACT DUAL-BAND IMPLANTABLE ANTENNA FOR BIOTELEMETRY 949

Yijun Liu, Yifan Chen, South University of Science and Technology of China, China; Haili Lin, Jinghong Commu. Tech. Co., Ltd., China

WE-UB.1A: METAMATERIAL LENSES AND LENS ANTENNAS

WE-UB.1A.7: SPLINE-ENHANCED SYNTHESIS OF METAMATERIAL LENSES FOR LINEAR ARRAY 951 MINIATURIZATION BY THE SBD-QCTO

Lorenza Tenuti, Giacomo Oliveri, Federico Viani, Andrea Massa, ELEDIA Research Center, University of Trento, Italy

WE-UB.1A.8: DESIGN OF THE SPOT-FOCUSING METAL PLATE LENS ANTENNA FOR 953 HIGH-TEMPERATURE MEASUREMENT

Gaofeng Guo, Yunpeng Zhang, En Li, University of Electronic Science and Technology of China, China

WE-UB.1A.9: TOWARDS CIRCULARLY POLARIZED RECONFIGURABLE HUYGENS SOURCE..... 955

Adam Narbudowicz, RWTH Aachen University, Germany; Max Ammann, Dublin Institute of Technology, Ireland; Dirk Heberling, RWTH Aachen University, Germany

WE-A3.1A: INTEGRAL EQUATION METHODS FOR ADVANCED APPLICATIONS

WE-A3.1A.1: CHARACTERISTICS MODE ANALYSIS OF A DIPOLE ANTENNA LOADED WITH DNG 957 MATERIAL

David Zeppettella, Air Force Research Laboratory, United States; Mohammad Ali, University of South Carolina, United States

WE-A3.1A.2: FAST MBF ANALYSIS OF PRINTED FSS STRUCTURES..... 959

Shambhu Nath Jha, ICOMS Detections S.A., Belgium; Ha Bui Van, Christophe Craeye, Université Catholique de Louvain, Belgium

WE-A3.1A.3: EQUIVALENCE PRINCIPLE ALGORITHM FOR ANALYSIS OF METAMATERIALS AND 961 RECONFIGURABLE PIXELLED ANTENNAS

Mojtaba Fallahpour, Weng Cho Chew, University of Illinois at Urbana-Champaign, United States

WE-A3.1A.4: A NEW APPROACH FOR THE ANALYSIS OF THICK WIRE ANTENNAS 963

Yigit Haykir, Adnan Köksal, Hacettepe University, Turkey

WE-A3.1A.5: A DELTA GAP SOURCE FOR LOCALLY CORRECTED NYSTRÖM DISCRETIZED 965 INTEGRAL EQUATIONS

John C. Young, University of Kentucky, United States; Stephen Gedney, University of Colorado Denver, United States

**WE-A3.1A.6: BOUNDARY ELEMENT METHOD FOR THE ELECTROMAGNETIC ANALYSIS OF 967
METAMATERIALS**

Diego Martínez Solís, Marta Gómez Araújo, José Luis Rodríguez Rodríguez, Fernando Obelleiro Basteiro, Universidade de Vigo, Spain; José Manuel Taboada Varela, Luis Landesa Porras, Universidad de Extremadura, Spain

WE-A3.1A.7: A FAST FULL-WAVE ANALYSIS SCHEME OF HIGH-GAIN SUPERSTRATE ANTENNAS 969

Ha Bui Van, Université Catholique de Louvain, Belgium; Shambhu Nath Jha, ICOMS Detections S.A., Belgium; Christophe Craeye, Université Catholique de Louvain, Belgium

**WE-A3.1A.8: FULL-WAVE FREQUENCY-DOMAIN ELECTROMAGNETIC MODELLING OF RF 971
FIELDS IN MRI APPLICATIONS**

Milan Ilic, Ivana Perovic, University of Belgrade, Serbia; Pranav Athalye, Nada Sekeljic, Colorado State University, United States; Alexey Tonyushkin, Massachusetts General Hospital, United States; Branislav M. Notaros, Colorado State University, United States

**WE-A3.1A.9: EFFICIENT MODELLING OF ANTENNAS CONFORMAL TO CYLINDRICAL MEDIUM 973
USING CYLINDRICAL GREEN'S FUNCTIONS**

Jun Wu, Chao-Fu Wang, National University of Singapore, Singapore

**WE-A3.1A.10: ANALYSIS OF ELECTRICALLY LARGE SLOTTED WAVEGUIDE ARRAY USING 975
HIGH-ORDER MOM**

Yong Wang, Yanyan Li, Xunwang Zhao, Yu Zhang, Yan Chen, Xidian University, China

WE-A4.3A: RADAR METROLOGY AND CLUTTER MODELING

**WE-A4.3A.1: WAVEFORMS AND SIGNAL PROCESSING FOR HIGH-ACCURACY MICROWAVE 977
METROLOGY**

Kojo Zilevu, Jason Hodkin, Matthew Sharp, Thomas Comberiate, Jeffrey Nanzer, Johns Hopkins University Applied Physics Laboratory, United States

**WE-A4.3A.2: MEASUREMENT AND CHARACTERIZATION OF WINTER PRECIPITATION AT MASCRAD 979
SNOW FIELD SITE**

Branislav M. Notaros, V. N. Bringi, Cameron Kleinkort, Gwo-Jong Huang, Elene Chobanyan, Merhala Thurai, Olivera Notaros, Ana Manic, Patrick Kennedy, Milan Ilic, Colorado State University, United States; Andrew Newman, John Hubbert, Timothy Lim, William Brown, National Center for Atmospheric Research, United States

**WE-A4.3A.3: PRELIMINARY EXPERIMENTAL RESULT OF AIRCRAFT POSITIONING BY USING 981
ISDB-T DELAY SIGNAL**

Junichi Honda, Takuya Otsuyama, Electronic Navigation Research Institute, Japan

**WE-A4.3A.4: LOW-CHARGED BATTERY COMPATIBLE HARMONIC REFLECTOR INTEGRATED IN A 983
MOBILE DEVICE FOR DETECTION OF TRAPPED VICTIMS**

Dohyuk Ha, Junsig Kum, Jungyub Lee, Youngju Lee, Samsung Electronics, Republic of Korea

**WE-A4.3A.5: SIMULATION OF TARGET TO CLUTTER RATIO FOR PASSIVE PHASE-CONJUGATION 985
RADAR IN TIME-VARYING ENVIRONMENTS**

Joonsuk Kim, Yonsei University, Republic of Korea; Il-Suek Koh, Inha University, Republic of Korea; Yongshik Lee, Yonsei University, Republic of Korea

WE-A2.3A: FREQUENCY SELECTIVE SURFACES: APPLICATIONS

WE-A2.3A.1: FREQUENCY SELECTIVE SURFACES FOR UHF RFID APPLICATIONS 987

Khaled ElMahgoub, Trimble Navigation / MIT, United States

**WE-A2.3A.2: DOUBLE-FED MULTILEVEL FREQUENCY SELECTIVE SURFACE FOR 989
LOW-PROFILE PLANAR LENS**

Daniel Sánchez-Escuderos, Marta Cabedo-Fabrés, Eva Antonino-Daviu, Miguel Ferrando-Bataller, Universitat Politècnica de València, Spain

WE-A2.3A.3: APPROXIMATION OF EFFECTIVE DIELECTRIC CONSTANT FOR FSS IN LAYERED DIELECTRICS USING CONFORMAL MAPPING 991

Dustin Pieper, Kristen Donnell, Missouri University of Science and Technology, United States

WE-A2.3A.4: A CYLINDRICAL THIN LENS FOR 79GHZ APPLICATIONS..... N/A

Hadi Amarloo, Mohammad-Reza Nezhad-Ahmadi, Safieddin Safavi-Naeini, University of Waterloo, Canada

WE-A2.3A.5: A NOVEL FRACTAL FSS FOR ENERGY SAVING GLASS..... N/A

Ghaffer Kiani, Rabah W. Aldhaheer, King Abdulaziz University, Saudi Arabia

WE-A4.4A: OUTDOOR PROPAGATION

WE-A4.4A.1: RADIOFREQUENCY SPECKLE IN MOUNTAINOUS TERRAIN 997

Daniel Breton, Steven Arcone, Cold Regions Research and Engineering Laboratory, United States

WE-A4.4A.2: A VERTICAL REFLECTION IONOSPHERIC CLUTTER MODEL FOR HIGH FREQUENCY SURFACE WAVE RADAR 999

Shuyan Chen, Weimin Huang, Eric Gill, Memorial University, Canada

WE-A4.4A.3: IMPACT OF WINDMILLS ON THE AM PROPAGATION OVER THE GROUND..... 1001

Shambhu Nath Jha, ICOMS Detections S.A., Belgium; Christophe Craeye, Université Catholique de Louvain, Belgium; Pierre-Antoine Mali, GreenPlug Sprl, Belgium

WE-A4.4A.4: LONG-TERM TRENDS IN SPACE-GROUND ATMOSPHERIC PROPAGATION MEASUREMENTS 1003

Michael Zemba, Jacquelynne Morse, James Nessel, NASA Glenn Research Center, United States

WE-A4.4A.5: ON TERRAIN EFFECTS ON PATH LOSS MODELS N/A

Oluwaseun Kolawole, Nasir Faruk, University of Ilorin, Nigeria

WE-A4.5A: PROPAGATION FOR MILLIMETER-WAVE COMMUNICATIONS

WE-A4.5A.1: HIGH SPEED TRANSMISSION AT 60 GHZ FOR 5G COMMUNICATIONS..... 1007

Edgar Lemos Cid, Manuel García Sanchez, Ana Vazquez Alejos, University of Vigo, Spain

WE-A4.5A.2: IMPACT OF CLUSTERING AT MMW BAND FREQUENCIES..... 1009

Maria-Teresa Martinez-Ingles, Universidad Politécnic de Cartagena, Spain; Davy P. Gaillot, University of Lille 1, France; Juan Pascual-Garcia, Jose-Maria Molina-Garcia-Pardo, Universidad Politécnic de Cartagena, Spain; Martine Lienard, University Lille 1, France; Jose-Víctor Rodríguez, Leandro Juan-Llácer, Universidad Politécnic de Cartagena, Spain

WE-A4.5A.3: IMPLEMENTATION AND PERFORMANCE EVALUATION OF MMWAVE CHANNEL SOUNDING SYSTEM 1011

Heon-Kook Kwon, Myung-Don Kim, Young-jun Chong, Electronics and Telecommunications Research Institute (ETRI), Republic of Korea

WE-A4.5A.4: INITIAL 75-110 GHZ INDOOR PROPAGATION MEASUREMENTS..... 1013

Maria-Teresa Martinez-Ingles, Universidad Politécnic de Cartagena, Spain; Davy P. Gaillot, University Lille 1, France; Juan Pascual-Garcia, Jose-Maria Molina-Garcia-Pardo, Jose-Víctor Rodríguez, Universidad Politécnic de Cartagena, Spain; Lorenzo Rubio, Universitat Politècnica de València, Spain; Leandro Juan-Llácer, Universidad Politécnic de Cartagena, Spain

WE-A4.5A.5: BIT-ERROR-RATE (BER) PERFORMANCE IN DISPERSION CODE MULTIPLE ACCESS (DCMA) 1015

Shulabh Gupta, Lianfeng Zou, Mohamed Ahmed Salem, Christophe Caloz, Polytechnique de Montréal, Canada

WE-SP.1P: EXPLORING INNOVATIVE WAYS TO REVITALIZE EM EDUCATION GLOBALLY

WE-SP.1P.1: GLOBALIZATION OF ELECTROMAGNETIC EDUCATION INITIATIVE..... 1017

Parveen Wahid, University of Central Florida, United States; Krishnaswamy Selvan, SSN College of Engineering, India

WE-SP.1P.2: TECHNOLOGY-BASED GLOBAL REVITALIZATION OF ELECTROMAGNETIC EDUCATION 1019

Magdy F. Iskander, University of Hawaii, United States

WE-SP.1P.3: TEACHING ELECTROMAGNETICS VIA VIRTUAL TOOLS..... 1021

Levent Sevgi, Okan University, Turkey

WE-SP.1P.4: EUROPEAN SCHOOL OF ANTENNAS: TEN YEARS OF TEACHING..... 1023

Stefano Maci, University of Siena, Italy

WE-SP.1P.5: SAVE AND IEMPT: THE EM REVITALIZATION PROGRAM IN TAIWAN 1025

Tzyh-Ghuang Ma, Wen-Jiao Liao, National Taiwan University of Science and Technology, Taiwan; Zuo-Min Tsai, National Chung Cheng University, Taiwan; Shih-Yuan Chen, Tzong-Lin Wu, Reey-Beei Wu, National Taiwan University, Taiwan; Yi-Hsin Pang, National University of Kaohsiung, Taiwan; Heng-Tung Hsu, Song Tsuen Peng, Yuan Ze University, Taiwan; Hui-Hung Yu, Juo-Ming Tu, His-Ching Lin, National Center for High-Performance Computing, Taiwan

WE-SP.1P.7: CO-FLIPPED TEACHING: EXPERIENCES SHARING THE FLIPPED CLASS 1027

Cynthia Furse, Donna Ziegenfuss, University of Utah, United States

WE-SP.1P.9: EM EDUCATION FOR NON-EE UNDERGRADUATE STUDENTS 1029

Koichi Ito, Chiba University, Japan

WE-SP.2P: METATRONICS: THEORY, METHODS AND APPLICATIONS

WE-SP.2P.4: HIGH NUMERICAL APERTURE ALL-DIELECTRIC METASURFACE MICRO-LENSES 1030

Fabrizio Silvestri, Giampiero Gerini, Netherlands Organization for Applied Scientific Research, TNO - Eindhoven University of Technology, TU/e, Netherlands; Elvira Pisano, Vincenzo Galdi, University of Sannio, Italy

WE-SP.2P.5: A SYSTEM-BY-DESIGN APPROACH FOR THE SYNTHESIS OF METAMATERIAL PRINTED WAIMS 1032

Francesca Apolloni, Giacomo Oliveri, Federico Viani, Andrea Massa, ELEDIA Research Center, University of Trento, Italy

WE-SP.2P.7: RECIPROCAL AND NON-RECIPROCAL SIGNAL MANIPULATION THROUGH HORN ANTENNAS LOADED WITH METAMATERIAL-INSPIRED PARTICLES 1034

Davide Ramaccia, Filiberto Bilotti, Alessandro Toscano, "RomaTre" University, Italy; Mirko Barbuto, "Niccolò Cusano" University, Italy; Dimitrios Souнас, Andrea Alù, University of Texas at Austin, United States

WE-SP.2P.8: A BROADBAND WIDE-ANGLE POLARIZER THROUGH FIELD TRANSFORMATION 1036

Junming Zhao, Nanjing University, China; Lianhong Zhang, Yang Hao, Queen Mary University of London, United Kingdom; Yijun Feng, Nanjing University, China

WE-SP.2P.9: CLOSED-FORM SOLUTIONS FOR THE ANALYSIS OF ARTIFICIAL DIELECTRIC LAYERS UNDER GENERIC FIELD INCIDENCE 1038

Daniele Cavallo, Waqas H. Syed, Andrea Neto, Delft University of Technology, Netherlands

WE-A1.1P: WAVEGUIDE ANTENNAS AND FEEDING STRUCTURES

WE-A1.1P.1: DESIGN OF A X/KU MULTIBAND FEED ANTENNA FOR SATELLITE COMMUNICATIONS 1040

Stephen Targonski, MIT Lincoln Laboratory, United States

WE-A1.1P.2: A DIPLEXING ANTENNA SYSTEM IN SUBSTRATE INTEGRATED WAVEGUIDE TECHNOLOGY	1042
<i>Zamzam Kordiboroujeni, Lisa Locke, Jens Bornemann, University of Victoria, Canada</i>	
WE-A1.1P.3: MINIATURIZED MULTI-SECTION CROSSOVER WITH OPEN STUB	1044
<i>Taewon Kim, Jaehoon Choi, Hanyang University, Republic of Korea</i>	
WE-A1.1P.4: THREE-WAY DUAL-BAND PLANAR SERIES-TYPE POWER DIVIDER FOR DIFFERENT TERMINATED IMPEDANCES	1046
<i>Yongle Wu, Yangyang Guan, Weimin Wang, Yuanan Liu, Beijing University of Posts and Telecommunications, China</i>	
WE-A1.1P.5: A NOVEL MULTIPACTOR SUPPRESSION METHOD TOWARDS HIGH-POWER MICROWAVE SWITCH	1048
<i>Wanzhao Cui, Yun Li, Rui Wang, China Academy of Space Technology (Xi'an), China</i>	
WE-A1.1P.6: TRANSMISSION CHARACTERISTICS OF CIRCULAR WAVEGUIDE WITH COAXIAL-TO-CIRCULAR WAVEGUIDE TRANSITIONS	1050
<i>Tetsuya Yamamoto, Kei Urabe, Hiroshi Tsuda, National Institute of Advanced Industrial Science and Technology (AIST), Japan</i>	
WE-A1.1P.7: IMPLEMENTATION OF HIGH PERFORMANCE AND BROADBAND CROSSOVER JUNCTION IN BUTLER MATRIX DESIGN	1052
<i>Gui Chao Huang, Magdy F. Iskander, University of Hawaii, United States; Mahbub Hoque, Steven R. Goodal, Timothy Bocskor, Space and Terrestrial Communications, CERDEC, APG, United States</i>	
WE-A1.1P.8: NOVEL QUADPLEXER SYNTHESIS PROCEDURE	1054
<i>Jaakko Juntunen, Jussi Rahola, Optenni Ltd., Finland; Edgar Schmidhammer, EPCOS AG, Germany</i>	
WE-A1.1P.9: DESIGN OF COAXIAL WAVEGUIDE FEED HORN	1056
<i>Sohyeun Yun, Manseok Uhm, Inbok Yom, Electronics and Telecommunications Research Institute (ETRI), Republic of Korea</i>	
WE-A1.1P.10: CORRUGATED MATCHED HORN WITH LOW SIDE-LOBES FOR HIGH PERFORMANCE OFFSET REFLECTOR SYSTEMS	1058
<i>Cheng Yang, Junsheng Yu, Yuan Yao, Xiaoming Liu, Beijing University of Posts and Telecommunications, China; Liang Xu, Xiaodong Chen, Queen Mary University of London, United Kingdom</i>	
 WE-A1.2P: ANTENNA THEORY II	
WE-A1.2P.1: AN APPLICATION OF HEISENBERG'S UNCERTAINTY PRINCIPLE TO LINE SOURCE RADIATION	1060
<i>Jeffrey Young, Christopher Wilson, University of Idaho, United States</i>	
WE-A1.2P.2: IDENTIFYING RADIATION MECHANISMS ON SMALL CONDUCTING OBJECTS USING RADIATION MODES	1062
<i>Kurt Schab, Jennifer Bernhard, University of Illinois at Urbana-Champaign, United States</i>	
WE-A1.2P.3: THE QUALITY FACTOR QZ OF THE COMBINED TE₁₀ / TM₁₀ SPHERICAL MODE	1064
<i>Lukas Jelinek, Miloslav Capek, Czech Technical University in Prague, Czech Republic</i>	
WE-A1.2P.4: LAUNCHING OAM-CARRYING WAVES BY A LEAKY CIRCULAR CURRENT LOOP	1066
<i>Mohamed A. Salem, Christophe Caloz, Polytechnique de Montréal, Canada</i>	
WE-A1.2P.5: ON-BODY FAR FIELD DESCRIPTION BY TWO EQUIVALENT ELECTRIC SOURCES	1068
<i>Markus Grimm, Dirk Manteuffel, University of Kiel, Germany</i>	
WE-A1.2P.6: BROADBAND ARRAY ANTENNA DESIGN BY COUPLING TECHNIQUE USING 180 DEGREE PHASE SHIFTER	1070
<i>Mohammad Mahdi Honari, Pedram Mousavi, University of Alberta, Canada</i>	

WE-A1.2P.7: FAST DESIGN OF ROTMAN LENS AND ITS APPLICATION IN ROTMAN-DRA PHASED ARRAY	1072
<i>Mohammad Ranjbar Nikkhah, University of Montreal, Canada; Manish Hiranandani, Intel Corporation, United States; Ahmed A. Kishk, Concordia University, Canada; Ke Wu, University of Montreal, Canada</i>	
WE-A1.2P.8: MULTI-RESOLUTION BCS-BASED APPROACH FOR DOA ESTIMATION	1074
<i>Matteo Carlin, Paolo Rocca, Federico Viani, Giacomo Oliveri, Andrea Massa, ELEDIA Research Center, University of Trento, Italy</i>	
WE-A1.2P.9: NOVEL VORTEX BEAM ANTENNAS WITH ORBITAL ANGULAR MOMENTUM IN THE RADIO FREQUENCY DOMAIN	N/A
<i>Yi Zhang, Zhengzhou Information Science and Technology Institute, China; Zhijun Zhang, Zhenghe Feng, Tsinghua National Laboratory for Information Science and Technology, China</i>	
WE-A1.2P.10: STATISTICAL CHARACTERIZATION OF PHYSICALLY TRANSIENT ANTENNAS	1078
<i>Yifan Chen, Qingfeng Zhang, South University of Science and Technology of China, China; Akram Alomainy, Queen Mary University of London, United Kingdom; Putri Santi Anwar, Limin Huang, South University of Science and Technology of China, China</i>	
WE-A1.2P.11: EFFICIENT MODELING OF A SMALL CIRCULAR LOOP COUPLING TO A SINGLE WIRE ABOVE A LOSSY HALF-SPACE	1080
<i>Yifeng Qin, Donovan E. Brocker, Pinjuan Werner, Douglas H. Werner, Pennsylvania State University, United States; Chenming Zhou, Joseph Waynert, National Institute for Occupational Safety and Health, United States</i>	
WE-A2.1P: METASURFACE INNOVATIONS II	
WE-A2.1P.1: EFFICIENT ANALYSIS OF METASURFACES IN A PLANAR LAYERED MEDIUM	1082
<i>David González Ovejero, Goutam Chattopadhyay, California Institute of Technology, United States; Stefano Maci, University of Siena, Italy</i>	
WE-A2.1P.2: GIANT NONLINEAR PROCESSES IN PLASMONIC METASURFACES	1084
<i>Juan Sebastian Gomez-Diaz, Jongwon Lee, Tymchenko Mykhailo, Mikhail A. Belkin, Andrea Alù, University of Texas at Austin, United States</i>	
WE-A2.1P.3: GENETIC ALGORITHM SYNTHESIS OF METASURFACES WITH IMPROVED SIMILARITY AND ROBUSTNESS FOR HIGH-POWER REFLECTOR ANTENNA APPLICATIONS	1086
<i>Jeremy A. Bossard, Clinton P. Scarborough, Micah D. Gregory, Cooper S. Cicero, Douglas H. Werner, Pennsylvania State University, United States; Scott F. Griffiths, Matthew L. Ketner, Joint Non-Lethal Weapons Directorate, United States</i>	
WE-A2.1P.4: ARBITRARY LEAKY-WAVE ANTENNA PATTERNS WITH STACKED METASURFACES	1088
<i>Brian Tierney, Anthony Grbic, University of Michigan, United States</i>	
WE-A2.1P.5: LEAKY-WAVE EXPLANATION OF GAIN-BANDWIDTH-ENHANCED FABRY-PÉROT CAVITY ANTENNAS FORMED BY A THICK MULTILAYER PARTIALLY-REFLECTIVE SURFACE	1090
<i>Alister Hosseini, Filippo Capolino, University of California, Irvine, United States; David R. Jackson, University of Houston, United States</i>	
WE-A2.1P.6: A SIMPLE ACTIVE HUYGENS SOURCE FOR STUDYING WAVEFORM SYNTHESIS WITH HUYGENS METASURFACES AND ANTENNA ARRAYS	1092
<i>Alex Wong, George V. Eleftheriades, University of Toronto, Canada</i>	
WE-A2.1P.7: TOWARDS THE ANALYTICAL DESIGN OF TENSOR METASURFACES	1094
<i>Nikolaos Chiotellis, Anthony Grbic, University of Michigan, United States</i>	
WE-A2.1P.8: A WIDE-ANGLE SCANNING LEAKY-WAVE ANTENNA LOADED WITH A WIDEBAND METASURFACE	1096
<i>Trevor Cameron, Aidin Mehdipour, George V. Eleftheriades, University of Toronto, Canada</i>	

WE-A2.1P.9: RECONFIGURABLE METASURFACE COMPRISED OF DOGBONE SHAPED CONDUCTOR PAIRS 1098

Andrea Vallecchi, University of Sheffield, United Kingdom; Alexander Schuchinsky, Queen's University of Belfast, United Kingdom; Filippo Capolino, University of California, Irvine, United States

WE-A2.1P.10: MULTI-OCTAVE OPTICAL SPLITTER SYNTHESISED VIA BÉZIER SURFACES 1100

Peter Sieber, Douglas H. Werner, Pennsylvania State University, United States

WE-A2.2P: ELECTROMAGNETIC BANDGAP SUBSTRATES FOR EFFICIENT PLANAR ANTENNAS

WE-A2.2P.1: MICROWAVE BAND GAPS PRODUCED BY VARYING NUMBERS OF MUSHROOM METAMATERIAL CELLS 1102

Anne Mackenzie, NASA Langley Research Center, United States

WE-A2.2P.2: SPIRAL ANTENNA ON BROADBAND UNIFORM-HEIGHT PROGRESSIVE EBG STRUCTURE WITHOUT VIAS 1104

Sandeep Palreddy, Virginia Polytechnic Institute and State University, United States; Amir Zaghoul, Theodore Anthony, Army Research Laboratory, United States

WE-A2.2P.3: LOW-PERMITTIVITY EBG MATERIALS FOR ANTENNA SUPERSTRATES 1106

Silvio Ceccuzzi, Cristina Ponti, Giuseppe Schettini, Roma Tre University, Italy

WE-A2.2P.4: COMPARISON OF WIDEBAND HIGH-IMPEDANCE SURFACES FOR LOW-PROFILE HIGH-GAIN UHF ANTENNA DESIGN 1108

Nora Mohamed Mohamed-Hicho, Eva Antonino-Daviu, Marta Cabedo-Fabrés, Miguel Ferrando-Bataller, Daniel Sánchez-Escuderos, Universitat Politècnica de València, Spain

WE-A2.2P.5: A NOVEL BROADBAND AMC SURFACE FOR LOWERING THE HEIGHT OF PLANAR ANTENNAS 1110

Fuyun Li, Yuihui Cui, RongLin Li, South China University of Technology, China

WE-A4.1P: PROPAGATION AND SCATTERING IN COMPLEX STRUCTURES AND RANDOM MEDIA

WE-A4.1P.1: SHORTCUT WAVES IN RADially UNIAxIAL SPHERE..... 1112

Mohsen Yazdani, Jay Lee, Joseph Mautz, Ercument Arvas, Kepei Sun, Syracuse University, United States

WE-A4.1P.2: PORCINE SKIN AS HUMAN BODY PHANTOM AT 60 GHZ 1114

Luca Petrillo, Theodoros Mavridis, Université Libre de Bruxelles, Belgium; Julien Sarrazin, Aziz Benlarbi-Delai, UPMC, France; Philippe De Doncker, Université Libre de Bruxelles, Belgium

WE-A4.1P.3: RECTANGULAR WAVEGUIDE CONTAINING UNIAxIAL MEDIUM WITH TILTED OPTIC AXIS IN SIDEWALL PLANE 1116

Kepei Sun, Jay Lee, Syracuse University, United States; Jennifer Graham, Syracuse Research Company, United States

WE-A4.1P.4: SIMILARITY AND DISSIMILARITY MEASURES FOR COMPARISON OF PROPAGATION PATTERNS 1118

H. Erin Rickard, J. T. Saeger, Erin E. Hackett, Coastal Carolina University, United States

WE-A4.1P.5: X WAVE TRANSFORMATION UNDER TIME DISCONTINUITY 1120

Zoe-Lise Deck-Leger, Mohamed A. Salem, Christophe Caloz, Polytechnique de Montréal, Canada

WE-A4.1P.6: VISUAL HULL METHOD BASED SHAPE RECONSTRUCTION OF SNOWFLAKES FROM MASC PHOTOGRAPHS 1122

Cameron Kleinkort, Gwo-Jong Huang, Elene Chobanyan, Ana Manic, Milan Ilic, Ali Pezeshki, V. N. Bringi, Branislav M. Notaros, Colorado State University, United States

**WE-A4.1P.7: A THREE DIMENSIONAL GAUSSIAN BEAM DIFFRACTION APPROACH TO ANALYSIS OF 1124
REFLECTOR ANTENNAS**

Liang Xu, Xiaodong Chen, Queen Mary University of London, United Kingdom; Hui Feng, Hao Tu, D. Xiao, S. Wu, East China Research Institute of Electronic Engineering, China

**WE-A4.1P.8: AN EFFICIENT HIGH FREQUENCY METHOD TO COMPUTE ELECTROMAGNETIC 1126
SCATTERING OF LARGE 3D TARGET ON ROUGH SURFACE**

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

WE-A4.1P.9: CONFORMAL CIRCULAR PATCH ANTENNA ARRAY DESIGN FOR USE IN JET ENGINES 1128

Aparna Krishna, Tamer Khattab, Qatar University, Qatar; Aya Abdelaziz, Cairo University, Egypt; Mohzen Guizani, Qatar University, Qatar

**WE-A4.1P.10: ANALYSIS AND MEASUREMENT OF RADIANT WAVELENGTH OF MICROWAVE 1130
FOCUSED LENSES**

Yunpeng Zhang, En Li, Chao Wang, University of Electronic Science and Technology of China, China

WE-UB.3P: ANTENNA MEASUREMENT CONCEPTS AND TECHNIQUES

WE-UB.3P.9: VERY-NEAR-FIELD TESTING OF LARGE ANTENNAS IN LAB ENVIRONMENT..... 1132

Kasra Payandehjoo, Ruska Patton, EMSCAN, Canada

WE-A5.1P: ANTENNA DESIGN FOR 4G COMMUNICATION

**WE-A5.1P.1: FREQUENCY TUNABLE ANTENNA FOR LTE (4G) HANDSETS OPERATING IN THE 1134
2.3-2.7GHZ GLOBAL ROAMING BAND**

Tayfun Ozdemir, Yuriy Goykhman, Monarch Antenna, Inc., United States; Andrew Brown, A. Brown Design, United States; Benjamin Crowgey, Edward Rothwell, Prem Chahal, Michigan State University, United States

**WE-A5.1P.2: INFLUENCE OF COMPONENT ESR ON A 4G FREQUENCY RECONFIGURABLE 1136
ANTENNA**

Le Huy Trinh, Fabien Ferrero, Robert Staraj, Jean-Marc Ribero, Université Nice-Sophia Antipolis, CNRS, LEAT-Laboratoire d'Electronique, d'Antennes et Telecommunications, UMR 7248, France

WE-A5.1P.3: COMPACT AND PRINTED MULTIBAND ANTENNAS FOR 2G/3G/4G SMARTPHONES..... 1138

Sultan Shoaib, Imran Shoaib, Xiaodong Chen, Clive Parini, Queen Mary University of London, United Kingdom

WE-A5.1P.4: ANTENNA DESIGN CONSIDERATIONS FOR LTE ENABLED TABLETS 1140

Derek Campbell, C.J. Reddy, Altair Engineering, Inc., United States

WE-A5.1P.5: PLANAR LTE/WWAN MONOPOLE ANTENNA FOR 4G TABLET COMPUTER..... 1142

Jui-Han Lu, Yu-Ming Yan, National Kaohsiung Marine University, Taiwan

WE-A5.1P.6: A PRINTED MULTI-BAND SLOT ANTENNA FOR LTE/WLAN APPLICATIONS 1144

Min-Chi Chang, Wei-Chung Weng, National Chi Nan University, Taiwan

WE-A5.1P.7: MINIATURIZED ANTENNA FOR LTE WIRELESS USB DONGLE APPLICATIONS..... 1146

Wen-Shan Chen, Ching-Yu Huang, Southern Taiwan University of Science and Technology, Taiwan

WE-A5.1P.8: COMPACT DESIGN OF MIMO ANTENNAS FOR LTE 700 APPLICATION..... 1148

Wen-Shan Chen, Kuan-Hsun Lai, Southern Taiwan University of Science and Technology, Taiwan

**WE-A5.1P.9: A COMPACT MULTIBAND ANTENNA USING THREE MONOPOLES FOR MOBILE 1150
PHONE APPLCATIONS**

Min Li, S.W. Cheung, Y.F. Cao, T.I. Yuk, University of Hong Kong, China

WE-A5.1P.10: A COMPACT MULTI-BAND TUNABLE LTE ANTENNA FOR MOBILE APPLICATIONS..... 1152

Hanyue Xia, Hao Wang, Lingqin Meng, Guangli Yang, Shanghai University, China

WE-A3.1P: NOVEL INTEGRAL EQUATION FORMULATIONS

WE-A3.1P.1: FREQUENCY INTERPOLATION IN THE METHOD OF MOMENTS USING THE DISCRETE EMPIRICAL INTERPOLATION METHOD 1154

Matteo Alessandro Francavilla, Giorgio Giordanengo, Marco Righero, Istituto Superiore Mario Boella, Italy; Giuseppe Vecchi, Francesca Vipiana, Politecnico di Torino, Italy

WE-A3.1P.2: NONCONFORMING DISCRETIZATION OF THE COMBINED-FIELD INTEGRAL EQUATION WITH VOLUMETRIC TESTING 1156

Eduard Ubada, Juan M. Rius, Alex Heldring, Universitat Politècnica de Catalunya, Spain

WE-A3.1P.3: TIME DOMAIN AUGMENTED EFIE BASED ON NUMERICAL CONVOLUTION TECHNIQUE 1158

Miao Miao Jia, Yan Wen Zhao, University of Electronic Science and Technology of China, China; Sheng Sun, University of Hong Kong, Hong Kong SAR of China

WE-A3.1P.4: HYBRID SURFACE INTEGRAL EQUATIONS FOR OPTIMAL ANALYSIS OF PERFECTLY CONDUCTING BODIES 1160

Bariscan Karaosmanoglu, Ozgur Ergul, Middle East Technical University, Turkey

WE-A3.1P.5: RECENT ADVANCES IN THE METHOD OF MOMENTS TO MODEL SURFACE JUNCTIONS 1162

Guido Lombardi, Roberto D. Graglia, Politecnico di Torino, Italy

WE-A3.1P.6: CHARACTERISTIC MODE THEORY BASED ON COMBINED FIELD INTEGRAL EQUATION 1164

Qi I. Dai, Hui Gan, Weng Cho Chew, University of Illinois, United States; Qin Liu, Sheng Sun, University of Hong Kong, Hong Kong SAR of China

WE-A3.1P.7: POWER SERIES/MOM SOLUTION TO EM SCATTERING BY ELECTRICALLY LARGE PEC OBJECTS 1166

Sadasiva Rao, Naval Research Laboratory, United States

WE-A3.1P.8: HIERARCHICAL EQUIVALENT SOURCE ALGORITHM BASED ON RELAXED SPHERICAL EQUIVALENCE SURFACE 1168

Xin Fu, Li Jun Jiang, University of Hong Kong, Hong Kong SAR of China; Hong Tat Ewe, Universiti Tunku Abdul Rahman, Malaysia

WE-A3.1P.9: TESTING OVER THE BOUNDARY INTERFACE FOR THE NONCONFORMING DISCRETIZATION OF THE ELECTRIC-FIELD INTEGRAL EQUATION 1170

Eduard Ubada, Ivan Sekulic, Juan M. Rius, Alex Heldring, Universitat Politècnica de Catalunya, Spain

WE-A3.1P.10: ACCURATE ELECTROMAGNETIC ANALYSIS OF TRANSMISSION LINE STRUCTURES WITH FINITE-THICKNESS CONDUCTORS 1172

Chao Nan Xu, Jian Zhang, Peng Zhao, Xin Zhou Zhao, Mei Song Tong, Tongji University, China

WE-A2.3P: MEASUREMENT OF MATERIAL AND RADIATION PROPERTIES

WE-A2.3P.1: A DIFFERENTIAL FORM OF THE KRAMERS-KRONIG RELATION FOR DETERMINING A LORENTZ-TYPE OF REFRACTIVE INDEX 1174

Sung Kim, David Novotny, Joshua Gordon, Jeffrey Guerrieri, National Institute of Standards and Technology, United States

WE-A2.3P.2: USING 3D FIELD SENSOR FOR MEASURING THE SPECTRUM OF GLASS INSULATORS N/A

Haslan Pedro, Glauco Fontgalland, University of Campina Grande, Brazil

WE-A2.3P.3: MEASURE THE RADIATION EFFICIENCY OF ANTENNAS IN A REVERBERATION CHAMBER WITHOUT CALIBRATION 1178

Qian Xu, Yi Huang, Xu Zhu, Lei Xing, Zhihao Tian, University of Liverpool, United Kingdom

WE-A2.3P.4: NON-CONTACT SURFACE WAVE SENSING OF WIRE FAULT PRECURSORS 1180
Nazmul Alam, David Coats, Roger Dougal, University of South Carolina, United States; Yong-June Shin, Yonsei University, Republic of Korea; Mohammad Ali, University of South Carolina, United States

WE-A2.3P.5: USING SPHERICAL NEAR FIELD MEASUREMENTS IN COMPUTATIONAL EMC 1182
Lars Jacob Foged, Lucia Scialacqua, Francesco Saccardi, Francesca Mioc, Microwave Vision Group, Italy; Morten Sørensen, Bang & Olufsen A/S, Denmark; David Tallini, CST, Germany

WE-A2.3P.6: A SHIELDING EFFECTIVENESS TEST SYSTEM BASED ON MICROSTRIP LINE 1184
Likun Chang, Gaofeng Guo, Minhui Zeng, En Li, University of Electronic Science and Technology of China, China

WE-A1.5P: METAMATERIAL-BASED ANTENNAS AND ARRAYS

WE-A1.5P.2: DESIGN TECHNIQUES FOR LOSS MITIGATION IN METAMATERIAL REFLECTOR 1186
ANTENNAS
Zachary C.P.O. Morgan, Kenneth L. Morgan, Jeremy A. Bossard, Cooper S. Cicero, Micah D. Gregory, Pingjuan L. Werner, Douglas H. Werner, Pennsylvania State University, United States; Scott F. Griffiths, Matthew L. Ketner, Joint Non-Lethal Weapons Directorate, United States

WE-A1.5P.3: HYBRID TERMINATION OF METAMATERIAL CRLH ANTENNAS 1188
Mahmoud Abdalla, MTC College, Egypt; Fady Sadek, MSA University, Egypt

WE-A1.5P.4: ULTRAT COMPACT TRIPLE BAND D-CRLH METAMATERIAL ANTENNA 1190
Mahmoud Abdalla, Ahmed Fouad, MTC College, Egypt

WE-A1.5P.5: DESIGN OF SRR LOADED RECONFIGURABLE ANTENNA FOR UWB AND NARROW 1192
BAND APPLICATIONS
Krishnamoorthy Kandasamy, Basudev Majumder, Jayanta Mukherjee, Indian Institute of Technology Bombay, India; Kamla Prasan Ray, Society for Applied Microwave Electronic Engineering and Research, India

WE-A2.4P: MEASURED ELECTROMAGNETIC PROPERTIES OF MATERIALS

WE-A2.4P.1: HIGH-ACCURACY CONDUCTIVE TEXTILES FOR EMBROIDERED ANTENNAS AND 1194
CIRCUITS
Asimina Kiourti, John L. Volakis, Ohio State University, United States

WE-A2.4P.2: ACCURATE RF PERFORMANCE OF THERMOPLASTICS AT SUB-MILLIMETRE WAVE 1195
FREQUENCIES
Elena Sáenz, Luis Rolo, European Space Agency, Netherlands

WE-A2.4P.3: ANALYSIS OF FREE SPACE MATERIAL CHARACTERIZATION USING GENETIC 1197
ALGORITHMS
Raenita Fenner, Loyola University Maryland, United States

WE-A2.4P.4: PERMITTIVITY MEASUREMENT OF COMMON SOLVENTS USING THE CSRR 1199
BASED SENSOR
Md. Arif Ansari, Abhishek Jha, Jaleel Akhtar, Indian Institute of Technology Kanpur, India

TH-SP.1A: POWER-EFFICIENT, WEARABLE AND WIRELESS BIOMEDICAL SENSORS

TH-SP.1A.1: EVALUATION OF AN IMPLANTABLE PASSIVE SENSOR FOR WIRELESS INTRACRANIAL 1201
PRESSURE MONITORING
Mohammadhossein Behfar, Elham Moradi, Toni Björninen, Lauri Sydänheimo, Leena Ukkonen, Tampere University of Technology, Finland

TH-SP.1A.2: ELECTRO-TEXTILES - THE ENABLING TECHNOLOGY FOR WEARABLE ANTENNAS 1203 IN WIRELESS BODY-CENTRIC SYSTEMS	<i>Karoliina Koski, Elham Moradi, Masoumeh Hasani, Johanna Virkki, Toni Björminen, Leena Ukkonen, Tampere University of Technology, Finland; Yahya Rahmat-Samii, University of California, Los Angeles, United States</i>
TH-SP.1A.3: APPLYING QMSIW TECHNIQUE IN TEXTILE FOR COMPACT WEARABLE DESIGN 1205 AND HIGH BODY-ANTENNA ISOLATION	<i>Sam Agneessens, Sam Lemey, Hendrik Rogier, Thomas Vervust, Jan Vanfleteren, Ghent University, Belgium</i>
TH-SP.1A.4: WIRELESS POWERING OF BIOMEDICAL IMPLANTS BY COMFORMAL STRONGLY 1207 COUPLED MAGNETIC RESONATORS	<i>Hao Hu, Stavros V. Georgakopoulos, Florida International University, United States</i>
TH-SP.1A.5: EBG INTEGRATED TEXTILE MONOPOLE ANTENNA FOR SPACE HEALTH 1209 MONITORING APPLICATION	<i>Ala Alemaryeen, Sima Noghianian, Reza Fazel-Rezai, University of North Dakota, United States</i>
TH-SP.1A.7: WEARABLE FABRIC RECONFIGURABLE BEAM STEERING ANTENNA FOR 1211 ON/OFF-BODY COMMUNICATION SYSTEM	<i>Seonghun Kang, Chang Won Jung, Seoul National University of Technology, Republic of Korea</i>
TH-SP.1A.8: WIRELESS ENERGY HARVESTING FOR MEDICAL APPLICATIONS..... 1213	<i>Brock DeLong, Chi-Chih Chen, John L. Volakis, Ohio State University, United States</i>
TH-SP.1A.9: FLEXIBLE ANTENNA FOR WIRELESS BODY AREA NETWORK..... 1214	<i>Patrick Froehle, Tyler Przybylski, Christopher McDonald, Milad Mirzaee, Sima Noghianian, Reza Fazel-Rezai, University of North Dakota, United States</i>
TH-SP.1A.10: WEARABLE ANTENNA DESIGN FOR SPACESUIT 1216	<i>Tahmid Rashid, Sima Noghianian, Reza Fazel-Rezai, Pablo de León, University of North Dakota, United States</i>
 TH-A5.1A: MIMO ANTENNAS FOR PORTABLE DEVICES	
TH-A5.1A.1: DAUGHTER BOARD ANTENNA FOR COMPACT POLARIZATION DIVERSITY ON MIMO 1218 DEVICES	<i>Abhijit Bhattacharya, Rodney Vaughan, Simon Fraser University, Canada</i>
TH-A5.1A.2: 10-ANTENNA ARRAY IN THE SMARTPHONE FOR THE 3.6-GHZ MIMO OPERATION..... 1220	<i>Jun-Yu Lu, Hsuan-Jui Chang, Kin-Lu Wong, National Sun Yat-sen University, Taiwan</i>
TH-A5.1A.3: DESIGN OF MULTI-BAND UNIPLANAR MIMO ANTENNA FOR MOBILE DEVICES WITH 1222 LTE/WLAN OPERATION	<i>Christopher Arnold, Magda El-Shenawee, University of Arkansas, United States</i>
TH-A5.1A.4: IMPROVEMENT OF OUTAGE BY RETROFIT OF ANTENNA DIVERSITY FOR MIMO 1224 ON A PCB M2M SYSTEM	<i>Maryam Dehghani Estarki, Maryam Razmhosseini, Abhijit Bhattacharya, Ying Chen, Simon Fraser University, Canada; Chris Tumpach, Rainforest Automation Inc., Canada; Lee Vishlof, Tech-Knows Services Inc., Canada; Rodney Vaughan, Simon Fraser University, Canada</i>
TH-A5.1A.5: A WIDE BAND MIMO SLOT ANTENNA FOR 5G WI-FI..... 1226	<i>Sema Dumanli, David R. Gibbins, Ian J. Craddock, Toshiba Research Europe Ltd, United Kingdom</i>
TH-A5.1A.6: SIMPLE ASSESSMENT OF SPECIFIC ABSORPTION RATE (SAR) FOR MIMO 1228 TERMINALS	<i>Hui Li, Buon Kiong Lau, Lund University, Sweden</i>
TH-A5.1A.7: ACCURACY OF MODELING FOR EVALUATION OF AN INTEGRATED DIVERSITY 1230 WIRELESS SYSTEM ON A SMALL PCB	<i>Maryam Razmhosseini, Rodney Vaughan, Simon Fraser University, Canada</i>

**TH-A5.1A.8: NOVEL PHASE SHIFTERS USING SHORT-CIRCUITED CROSS-SLOTTED PATCH 1232
RESONATOR**

Xianshi Jing, Sheng Sun, University of Hong Kong, China

**TH-A5.1A.9: A POLARIZATION-CONTROLLED MIMO ANTENNA WITH AN OPTIMUM PHASE SHIFT 1234
IN ACCORDANCE WITH VARIOUS USE SCENARIOS**

Kazuhiro Honda, Toshihiko Kabeya, Kento Karitani, Kun Li, Koichi Ogawa, Toyama University, Japan; Yoshio Koyanagi, Hiroshi Sato, Ritsu Miura, Panasonic System Networks Co., Ltd., Japan

TH-A1.1A: SMALL ANTENNAS: MINIATURIZATION AND BANDWIDTH

**TH-A1.1A.1: ELECTRICALLY SMALL ANTENNAS WITH DIMENSIONS DOWN TO ONE-FIFTEENTH 1236
AND ONE-THIRTIETH OF WAVELENGTH**

Mai Sallam, American University in Cairo, Egypt; Guy A. E. Vandenbosch, KU Leuven, Belgium; Walter De Raedt, IMEC, Belgium; Ezzeldin Soliman, American University in Cairo, Egypt

TH-A1.1A.2: SUPER-MINIATURIZED DIELECTRIC-METALLIC RESONATOR ANTENNAS 1238

Atabak Rashidian, Lotfollah Shafai, University of Manitoba, Canada

**TH-A1.1A.3: MINIATURIZED UHF ANTENNA USING A MAGNETO-DIELECTRIC SUPERSTRATE FOR 1240
M2M COMMUNICATIONS**

Qianyun Zhang, Yue Gao, Clive Parini, Queen Mary University of London, United Kingdom

TH-A1.1A.4: ELECTRICALLY SMALL FRACTAL ANTENNAS..... 1242

James Baker, Marine Corps Tactical Systems Support Activity, United States; Magdy F. Iskander, University of Hawaii at Manoa, United States

TH-A1.1A.5: EVALUATION OF MINIATURIZING FACTOR FOR FOLDED INVERTED-L ANTENNAS..... 1244

Akihiro Tanaka, Keisuke Noguchi, Shigeru Makino, Tetsuo Hirota, Kenji Itoh, Kanazawa Institute of Technology, Japan

TH-A1.1A.6: ELECTRICALLY SMALL ANTENNAS UNDER MATCHED CONDITIONS 1246

Mohammad Abdallah, Walid Dyab, Tapan Sarkar, Syracuse University, United States; Magdalena Salazar-Palma, Universidad Carlos III de Madrid, Spain

TH-A1.1A.7: NONLINEAR EFFECTS OF NON-FOSTER MATCHING NETWORKS..... 1248

Minu Jacob, Jiang Long, Daniel Sievenpiper, University of California, San Diego, United States

**TH-A1.1A.8: NON-FOSTER MATCHING OF ELECTRICALLY SMALL BOWTIE ANTENNA COVERING 1250
600 MHZ TO 1100 MHZ**

Ghanshyam Mishra, Satish Sharma, San Diego State University, United States; Gabriel Rebeiz, University of California, San Diego, United States

**TH-A1.1A.9: EFFECT OF ELECTRONIC COMPONENTS ON THE CHARACTERISTICS OF SMALL 1252
ANTENNAS**

Abdul Razzaq, Mario Orefice, Politecnico di Torino, Italy

TH-A1.1A.10: COMPACT ANTENNA DESIGN WITH BANDWIDTH ENHANCEMENT..... 1254

Chichang Hung, Hungchen Chen, Tayeh Lin, Tsenchieh Chiu, National Central University, Taiwan

TH-A2.1A: FREQUENCY SELECTIVE SURFACES: MULTI-LAYER AND 3D

**TH-A2.1A.1: A NOVEL THREE-DIMENSIONAL WIDEBAND ACTIVE FREQUENCY SELECTIVE 1256
SURFACE UNIT-CELL**

Suhair Mahmood, Tayeb A. Denidni, Institut National de la Recherche Scientifique (INRS), Canada

TH-A2.1A.2: SQUARE LOOP COMPLEMENTARY FREQUENCY SELECTIVE SURFACES..... 1258

Syed Sheheryar Bukhari, William Whittow, Yiannis Vardaxoglou, Loughborough Univeristy, United Kingdom; Stefano Maci, University of Siena, United Kingdom

TH-A2.1A.3: MULTI-BAND SECOND-ORDER BANDSTOP FREQUENCY SELECTIVE STRUCTURE WITH CONTROLLABLE BAND RATIOS	1260
<i>Ahmed Abdelmottaleb Omar, Zhongxiang Shen, Nanyang Technological University, Singapore</i>	
TH-A2.1A.4: A VIA-BASED METHODOLOGY FOR FREQUENCY SELECTIVE SURFACE MINIMIZATION	1262
<i>Yi-Min Yu, Tzong-Lin Wu, National Taiwan University, Taiwan</i>	
TH-A2.1A.5: RECONFIGURABLE DUAL-BAND 3D FREQUENCY SELECTIVE SURFACE UNIT-CELL	1264
<i>Moufida Bouzlama, Moncef Traii, Ali Gharsallah, Faculty of Science of Tunis, Tunisia; Tayeb A. Denidni, University of Quebec, INRS-EMT, Canada</i>	
TH-A2.1A.6: DESIGN OF WIDEBAND ABSORBERS USING SIMPLE CLOSEDFORM SOLUTIONS	1266
<i>Jun-Ho Lee, Bomson Lee, Kyung Hee University, Republic of Korea</i>	
TH-A2.1A.7: IMPLEMENTATION OF THREE-DIMENSIONAL BANDPASS FREQUENCY SELECTIVE STRUCTURE USING MULTILAYER PCB TECHNOLOGY	1268
<i>Bo Li, Yiming Tang, Nanjing University of Posts and Telecommunications, China; Ali Qasim, Zhongxiang Shen, Nanyang Technological University, Singapore</i>	
TH-A2.1A.8: DUAL-LAYER FREQUENCY SELECTIVE SURFACE FOR WIDE STOP-BAND APPLICATIONS	1270
<i>Irfan Sohail Syed, Mohd Zarar Mohd Jenu, Universiti Tun Hussein Onn Malaysia, Malaysia</i>	
TH-A2.1A.9: DESIGN OF MULTIPLE DUAL-BAND FSS REFLECTOR PLATE APPLIED TO REFLECTOR ANTENNA	1272
<i>Wen Jiang, Xidian University, China; Tao Dong, Space Star Technology Co., Ltd, China; Shuxi Gong, Xidian University, China</i>	
TH-A2.1A.10: A NOVEL DUAL-LAYER FREQUENCY SELECTIVE SURFACE WITH GRATING LOBES SUPPRESSION	1274
<i>Bingyuan Liang, Beihang University, China; Zheng-Hui Xue, Beijing Institute of Technology, China; Jungang Miao, Ming Bai, Beihang University, China</i>	
TH-A2.1A.11: EQUIVALENT CIRCUIT MODEL OF MULTILAYER DOUBLE SQUARE LOOP FSS USING VECTOR-FITTING	1276
<i>Payal Majumdar, Zhiya Zhao, Chunlin Ji, Ruopeng Liu, Kuang-Chi Institute of Advanced Technology, China</i>	
 TH-A5.2A: ANTENNAS AND CIRCUITS FOR ENERGY HARVESTING	
TH-A5.2A.1: AN ARRAY OF INVERTED-F ANTENNAS FOR RF ENERGY HARVESTING	1278
<i>Youssef Tawk, Firas Ayoub, Christos Christodoulou, Joseph Costantine, University of New Mexico, United States</i>	
TH-A5.2A.2: DESIGN OPTIMIZATION OF AN ENERGY HARVESTING RF-DC CONVERSION CIRCUIT OPERATING AT 2.45GHZ	1280
<i>Jung Hun Kim, Jo Bito, Manos Tentzeris, Georgia Institute of Technology, United States</i>	
TH-A5.2A.3: DESIGN OF A TRANSPARENT SPIRAL ANTENNA FOR ENERGY HARVESTING	1282
<i>Maria Zamudio, Youssef Tawk, Joseph Costantine, Firas Ayoub, Christos Christodoulou, University of New Mexico, United States</i>	
TH-A5.2A.4: A 2.45-GHZ HIGH-EFFICIENCY LOOP-SHAPED PIFA RECTENNA FOR PORTABLE DEVICES AND WIRELESS SENSORS	1284
<i>Jiunn-Kai Huang, Wan-Ting Hung, Tzu-Heng Cheng, Shih-Yuan Chen, National Taiwan University, Taiwan</i>	
TH-A5.2A.5: DESIGNING DUAL-PORT PIXEL ANTENNA FOR AMBIENT RF ENERGY HARVESTING USING GENETIC ALGORITHM	1286
<i>Shanpu Shen, Ross D. Murch, Hong Kong University of Science and Technology, Hong Kong SAR of China</i>	

TH-A5.2A.6: A DUAL-MODE ANTENNA FOR WIRELESS CHARGING AND NEAR FIELD COMMUNICATION 1288

Ming-An Chung, Yu-Lun Chien, Liang Cho, Pao-Hsin Hsu, Chang-Fa Yang, National Taiwan University of Science and Technology, Taiwan

TH-A5.2A.7: THREE-BAND RF-DC CONVERTERS FOR AMBIENT WIRELESS ENERGY HARVESTING N/A

Yong Zhou, University of Texas at Brownsville, United States; Cesar Huerta, Jaime Hinojosa, CEMEX, United States

TH-A5.2A.8: EM/LIGHT HYBRID ENERGY HARVESTING WITH DIRECTIONAL DIPOLE ANTENNA FOR IOT SENSOR 1292

In-June Hwang, DukSoo Kwon, Dong-Jin Lee, Jong-Won Yu, Korea Advanced Institute of Science and Technology, Republic of Korea; Wang-Sang Lee, Gyeongsang National University, Republic of Korea

TH-A5.2A.10: A HIGH-IMPEDANCE WIDEBAND CARD-TYPE FOLDED DIPOLE ANTENNA 1294

Nao Nambo, Keisuke Noguchi, Kenji Itoh, Jiro Ida, Kanazawa Institute of Technology, Japan

TH-A5.2A.11: WIDE POWER RANGE RF ENERGY HARVESTING CIRCUIT 1296

Mahmoud Abdallah, American University of Beirut, Lebanon; Joseph Costantine, American University of Beirut, Lebanon; The University of New Mexico, United States; Ali Ramadan, American University of Beirut, Lebanon; Youssef Tawk, University of New Mexico; Notre Dame University Louaize, United States; Firas Ayoub, Christos Christodoulou, University of New Mexico, United States; Karim Y. Kabalan, American University of Beirut, Lebanon

TH-A4.1A: MICROWAVE AND THZ 2-D AND 3-D IMAGING

TH-A4.1A.1: THREE-DIMENSIONAL MICROWAVE IMAGING THROUGH A MULTI-ZOOMING INEXACT-NEWTON APPROACH 1298

Marco Salucci, Giacomo Oliveri, ELEDIA Research Center, University of Trento, Italy; Andrea Randazzo, Matteo Pastorino, University of Genoa, Italy; Federico Viani, Andrea Massa, ELEDIA Research Center, University of Trento, Italy

TH-A4.1A.2: ENHANCEMENT OF TERAHERTZ IMAGING OF PACKAGED POWER ELECTRONIC DEVICES 1300

Nathan Burford, Magda El-Shenawee, University of Arkansas, United States

TH-A4.1A.3: SUPERRESOLUTION IMAGING BY COMPUTATIONAL TIME REVERSAL IN SCATTERING MEDIA 1302

Wolfgang J. R. Hoefer, University of Victoria, Canada

TH-A4.1A.4: CONSENSUS-BASED IMAGING USING ADMM FOR A COMPRESSIVE REFLECTOR ANTENNA 1304

Juan Heredia Juesas, Gregory Allan, Ali Molaei, Luis Tirado, Northeastern University, United States; William Blackwell, Massachusetts Institute of Technology, United States; Jose Angel Martinez Lorenzo, Northeastern University, United States

TH-A4.1A.5: IMAGING THE PEC SCATTERER VIA T-MATRIX BASED INVERSION METHOD 1306

Xiuzhu Ye, Beihang University, China

TH-A5.3A: NOVEL MATERIALS AND CONDUCTIVE INKS FOR ADDITIVE MANUFACTURING OF ANTENNAS

TH-A5.3A.1: DEVELOPING FLEXIBLE 3D PRINTED ANTENNA USING CONDUCTIVE ABS MATERIALS 1308

Milad Mirzaee, Sima Noghianian, Lindsey Wiest, Isaac Chang, University of North Dakota, United States

TH-A5.3A.2: HIGH FREQUENCY CHARACTERIZATION OF CONDUCTIVE INKS EMBEDDED WITHIN A STRUCTURAL COMPOSITE 1310

Peter Pa, Mark Mirotznik, Shridhar Yarlagadda, University of Delaware, United States

TH-A5.3A.3: INKJET-PRINTED MONOPOLE ANTENNA AND VOLTAGE DOUBLER ON CARDBOARD FOR RF ENERGY HARVESTING	1312
<i>Zahra Khonsari, Toni Björninen, Lauri Sydänheimo, Tampere University of Technology, Finland; Manos Tentzeris, Georgia Institute of Technology, United States; Leena Ukkonen, Tampere University of Technology, Finland</i>	
TH-A5.3A.4: BRUSH-PAINTED SILVER UHF RFID TAGS ON ENVIRONMENTAL-FRIENDLY AND FLEXIBLE SUBSTRATES	1314
<i>Yanan Ren, Johanna Virkki, Lauri Sydänheimo, Leena Ukkonen, Tampere University of Technology, China; Yan-Cheong Chan, City University of Hong Kong, Hong Kong SAR of China</i>	
TH-A5.3A.5: POSSIBILITIES OF 3D DIRECT WRITE DISPENSING FOR TEXTILE UHF RFID TAG MANUFACTURING	1316
<i>Toni Björninen, Johanna Virkki, Lauri Sydänheimo, Leena Ukkonen, Tampere University of Technology, Finland</i>	
TH-A5.3A.6: IN-PLANE CHARACTERIZATION OF GRADED DIELECTRICS FABRICATED THROUGH ADDITIVE MANUFACTURING	1318
<i>Austin Good, David Roper, Mark Mirotznik, University of Delaware, United States</i>	
TH-A5.3A.8: ULTRAWIDEBAND BALLISTIC RADOME WITH SOLID DYNEEMA® CORE	1320
<i>Mark Mirotznik, Shridhar Yarlagadda, University of Delaware, United States; Lewis Kolak, DSM, United States</i>	
TH-A5.3A.10: LIGHTWEIGHT 3D PRINTED MICROWAVE WAVEGUIDES AND WAVEGUIDE SLOT ANTENNA	1322
<i>Garret McKerricher, Ahmed Nafe, Atif Shamim, King Abdullah University of Science and Technology, Saudi Arabia</i>	
TH-A3.1A: ELECTROMAGNETIC DESIGN OPTIMIZATION METHODS	
TH-A3.1A.1: COMPLEX RADOME DESIGN THROUGH THE SYSTEMS-BY-DESIGN APPROACH	1324
<i>Matteo Carlin, Marco Salucci, Lorenza Tenuti, Paolo Rocca, Federico Viani, Andrea Massa, ELEDIA Research Center, University of Trento, Italy</i>	
TH-A3.1A.2: MULTI-OBJECTIVE OPTIMIZATION FOR GRIN LENS DESIGN	1326
<i>Jogender Nagar, Sawyer D. Campbell, Douglas H. Werner, Pennsylvania State University, United States</i>	
TH-A3.1A.3: OPTIMIZATION OF PIXELATED ANTENNAS	1328
<i>Gregory Kiesel, Kevin Cook, Georgia Tech Research Institute, United States</i>	
TH-A3.1A.4: ANTENNA ARRAY OPTIMIZATION USING SURROGATE-MODEL AWARE EVOLUTIONARY ALGORITHM WITH LOCAL SEARCH	1330
<i>Bo Liu, Glyndwr University, United Kingdom; Slawomir Koziel, Reykjavik University, Iceland</i>	
TH-A3.1A.5: A COMPARISON OF MULTI-OBJECTIVE OPTIMIZERS USING A MICROSTRIP PATCH ANTENNA TEST PROBLEM	1332
<i>Jogender Nagar, Douglas H. Werner, Pennsylvania State University, United States</i>	
TH-A3.1A.6: HYBRID GENETIC PROGRAMMING WITH ACCELERATING OPTIMIZER FOR 3D METAMATERIAL DESIGN	1334
<i>Jennifer Rayno, Magdy F. Iskander, University of Hawaii at Manoa, United States</i>	
TH-A3.1A.7: SPARSE ARRAY DESIGN BY MEANS OF SOCIAL NETWORK OPTIMIZATION	1336
<i>Alessandro Niccolai, Carlo Andrea Gonano, Francesco Grimaccia, Marco Mussetta, Riccardo Enrico Zich, Politecnico di Milano, Italy; Paola Pirinoli, Politecnico di Torino, Italy</i>	
TH-A3.1A.8: ANTENNA SWITCH OPTIMIZATIONS USING GENETIC ALGORITHMS ACCELERATED WITH THE MULTILEVEL FAST MULTIPOLE ALGORITHM	1338
<i>Can Onol, Bariscan Karaosmanoglu, Ozgur Ergul, Middle East Technical University, Turkey</i>	
TH-A3.1A.9: ARRAY OPTIMIZATION BY MEANS OF BLACK-HOLE PSO	1340
<i>Matteo Ruello, Carlo Andrea Gonano, Francesco Grimaccia, Marco Mussetta, Riccardo Enrico Zich, Politecnico di Milano, Italy; Paola Pirinoli, Politecnico di Torino, Italy</i>	

TH-A3.1A.10: FAST MULTI-OBJECTIVE OPTIMIZATION OF SHAPED OFFSET GREGORIAN REFLECTOR SYSTEMS 1342

Dirk De Villiers, Stellenbosch University, South Africa; Slawomir Koziel, Reykjavik University, Iceland

TH-A3.1A.11: A LINEAR OPTIMIZATION METHOD TO SOLVE 2D INVERSE SCATTERING PROBLEM WITH MASKED DOMAIN 1344

Giuseppe Labate, Paola Pirinoli, Ladislau Matekovits, Politecnico di Torino, Italy

TH-A5.4A: APPLICATIONS IN MAGNETIC RESONANCE IMAGING

TH-A5.4A.1: RF EXCITATION IN 7 TESLA MRI SYSTEMS USING MONOFILAR AXIAL-MODE HELICAL ANTENNA 1346

Milan Ilic, University of Belgrade, Serbia; Alexey Tonyushkin, Massachusetts General Hospital, United States; Nada Sekeljic, Pranav Athalye, Branislav M. Notaros, Colorado State University, United States

TH-A5.4A.2: MRI COILS USING METAMATERIALS..... 1348

Xianming Qing, Zhi Ning Chen, Siew Bee Yeap, Mei Sun, Chean Khan Goh, Xinyi Tang, Institute for Infocomm Research (I²R), Singapore

TH-A5.4A.3: ANALYSIS OF TEMPERATURE RISE GENERATED BY A TITANIUM IMPLANT INSIDE 1.5T MRI RF WHOLE BODY COIL 1350

Mikhail Kozlov, Gregor Schaefer, MR:comp GmbH Services for MR Safety & Compatibility, Germany

TH-A5.4A.4: SAFETY EXCITATION EFFICIENCY OF MRI 300MHZ DUAL-ROW TRANSMIT ARRAYS..... 1352

Mikhail Kozlov, Harald Möller, Max Planck Institute for Human Cognitive and Brain Sciences, Germany

TH-A5.4A.5: MODIFIED DESIGN OF THE COIL PROBE FOR HIGH FIELD MRI 1354

Bahram Seifi, Elena Semouchkina, Warren Perger, Michigan Technological University, United States; Gang Chea Lee, Thomas Neuberger, Michael Lanagan, Pennsylvania State University, United States

TH-A4.2A: INVERSE SCATTERING AND SENSING

TH-A4.2A.1: MONTE CARLO BASED NON-RADIATING OBJECTIVE FUNCTION MINIMIZATION FOR PERMITTIVITY PROFILE ESTIMATION 1356

Shahed Shahir, Jeff Orchard, Safieddin Safavi-Naeini, University of Waterloo, Canada

TH-A4.2A.2: NOVEL ETHANOL CHEMICAL SENSOR USING MICROFLUIDIC METAMATERIAL..... 1358

Hyung Ki Kim, Minyeong Yoo, Sungjoon Lim, Chung-Ang University, Republic of Korea

TH-A4.2A.3: FULL-WAVE EM MODELING IN TILTED CYLINDRICALLY-LAYERED MEDIA 1360

Kamalesh Sainath, Haksu Moon, Fernando Teixeira, Ohio State University, United States

TH-A4.2A.4: AN OBLIQUE-ANGLE INFRARED CIRCULAR POLARIZATION FILTER USING A BEZIER SURFACE REPRESENTATION 1362

Jason Ashbach, Douglas H. Werner, Pennsylvania State University, United States

TH-A4.2A.5: ENHANCED RESOLUTION OF SLOTS BASED ON TIME REVERSAL METHOD 1364

Zhi-Min Zhang, Bing-Zhong Wang, Ren Wang, Ya-Qing Wen, University of Electronic Science and Technology of China, China

TH-A4.2A.6: HUMIDITY SENSOR DEVICES USING PEDOT:PSS..... 1366

M. Ali Babar Abbasi, Photos Vryonides, Symeon Nikolaou, Frederick University, Cyprus

TH-SP.1P: INTERNATIONAL COLLABORATIONS ON NEXT-GENERATION RADIO ASTRONOMICAL INSTRUMENTATION I

TH-SP.1P.2: SKA LOW FREQUENCY APERTURE ARRAY 1368

Andrew Faulkner, University of Cambridge, United Kingdom; Jan Geralt Bij de Vaate, ASTRON, Netherlands

TH-SP.1P.3: DERIVING AN OPTIMUM SHAPED REFLECTOR SYSTEM FOR THE SKA SINGLE PIXEL FEEDS	1370
<i>Robert Lehmensiek, Isak Theron, EMSS Antennas (Pty) Ltd, South Africa; Dirk de Villiers, University of Stellenbosch, South Africa</i>	
TH-SP.1P.4: UAV-BASED PATTERN MEASUREMENT OF THE SKALA	1372
<i>Fabio Paonessa, Giuseppe Virone, Giuseppe Addamo, Oscar Antonio Peverini, Riccardo Tascone, Istituto di Elettronica e di Ingegneria dell'Informazione e delle Telecomunicazioni (IEIIT) - Consiglio Nazionale delle Ricerche (CNR), Italy; Pietro Bolli, Osservatorio Astrofisico di Arcetri (OAA) - Istituto Nazionale di Astrofisica (INAF), Italy; Eloy de Lera Acedo, Edgar Colin-Beltran, Nima Razavi-Ghods, University of Cambridge, United Kingdom; Giuseppe Pupillo, Giovanni Naldi, Jader Monari, Istituto di RadioAstronomia (IRA) - Istituto Nazionale di Astrofisica (INAF), Italy; Andrea Maria Lingua, Marco Piras, Irene Aicardi, Paolo Maschio, Politecnico di Torino, Italy</i>	
TH-SP.1P.6: EFFICIENT WIDEBAND GAIN MODELING FOR INTERFEROMETRIC IMAGING ARRAYS IN RADIO ASTRONOMY	1374
<i>Andre Young, David Davidson, Stellenbosch University, South Africa; Stefan Wijnholds, Netherlands Institute for Radio Astronomy, Netherlands; T. D. Carozzi, Rob Maaskant, Marianna Valerievna Ivashina, Chalmers University of Technology, Sweden</i>	
TH-SP.1P.8: A 19 ELEMENT CRYOGENIC PHASED ARRAY FEED FOR THE GREEN BANK TELESCOPE	1376
<i>D. Anish Roshi, National Radio Astronomy Observatory, United States; Karl F. Warnick, Brigham Young University, United States; Joe Brandt, J. Richard Fisher, Pam Ford, National Radio Astronomy Observatory, United States; Brian D. Jeffs, Brigham Young University, United States; Paul Marganian, Morgan McLeod, Melinda Mello, Matthew Morgan, Roger Norrod, William Shillue, Robert Simon, Steven White, National Radio Astronomy Observatory, United States</i>	
TH-SP.1P.9: UNIVERSITY OF CALGARY PARTICIPATION IN CCAT CHAI DEVELOPMENT	1378
<i>Eugene Zailer, Hao Xie, Nan Zhang, Rene Plume, Leonid Belostotski, Michal Okoniewski, University of Calgary, Canada</i>	
TH-SP.2P: SPECIAL SESSION TO HONOUR THE CAREER OF PROF. P.L.E. USLENGHI	
TH-SP.2P.3: DIFFRACTION BY TWO WEDGES	1380
<i>Vito G. Daniele, Istituto Superiore Mario Boella - Politecnico di Torino, Italy; Rodolfo S. Zich, Istituto Superiore Mario Boella-Politecnico di Torino, Italy</i>	
TH-SP.2P.5: ISOREFRACTIVITY: TEACHING AND RESEARCH PERSPECTIVES	1382
<i>Danilo Erricolo, University of Illinois at Chicago, United States</i>	
TH-A1.1P: BROADBAND ANTENNA FEEDS AND NON-FOSTER MATCHING TECHNIQUES	
TH-A1.1P.1: WIDEBAND TWO-PORT INJECTION MATCHED ANTENNA	1384
<i>Yasin Kabiri, Peter Gardner, Costas Constantinou, University of Birmingham, United Kingdom</i>	
TH-A1.1P.2: STABLE BAND-PASS NON-FOSTER CIRCUITS	1386
<i>Stephen D. Stearns, Northrop Grumman Corporation, United States</i>	
TH-A1.1P.3: A TAPPED STUB-BASED COMPACT BALUN	1388
<i>Mi Zhou, Jin Shao, Bayaner Arigong, Han Ren, Jun Ding, Hualiang Zhang, University of North Texas, United States</i>	
TH-A1.1P.4: AN ULTRA WIDEBAND, 1 - 20 GHZ BALUN IN AN ELECTRICALLY SMALL CONDUCTING ENCLOSURE	1390
<i>Sean Sengele, Brad Baker, Jonathan Holmes, Glenn Hopkins, Jared Walker, Georgia Tech Research Institute, United States; Kenneth Reigle, Exelis, Inc., United States</i>	
TH-A1.1P.5: COMPACT NARROWBAND AND WIDEBAND CIRCULARLY-POLARIZED FILTERING ANTENNAS	1392
<i>Zhi Hao Jiang, Douglas H. Werner, Pennsylvania State University, United States</i>	

TH-A1.1P.6: BANDWIDTH UPPER BOUNDS FOR MATCHING COUPLED LOADS.....	1394
<i>Ding Nie, Bertrand Hochwald, University of Notre Dame, United States</i>	
TH-A1.1P.7: NON-FOSTER MATCHING NETWORK FOR A SMALL, BLADE-TYPE MONOPOLE IN THE VHF BAND	1396
<i>Fernando Albarracin Vargas, Daniel Segovia Vargas, Universidad Carlos III in Madrid, Spain; Vicente Gonzalez Posadas, Politecnico University of Madrid, Spain</i>	
TH-A1.1P.8: A NEW IMPEDANCE-MATCHING TECHNIQUE FOR DUAL-BAND RF CIRCUITS AND ANTENNAS	1398
<i>Cuong Huynh, Ho Chi Minh City University of Technology, Viet Nam; Kyoungwoon Kim, Cam Nguyen, Texas A&M University, United States</i>	
TH-A1.1P.9: A BROADBAND WAVEGUIDE TO MICROSTRIP-LINE TRANSITION ON MULTI-LAYERED LCP SUBSTRATE	1400
<i>Ryohei Hosono, Yusuke Uemichi, Xu Han, Ning Guan, Yusuke Nakatani, Fujikura Ltd., Japan</i>	
TH-A1.1P.10: DESIGN OF BROADBAND PLANAR SUBSTRATE INTEGRATED WAVEGUIDE (SIW) TRANSVAR COUPLER	1402
<i>Ritvik Srivastava, Soumava Mukherjee, Animesh Biswas, Indian Institute of Technology Kanpur, India</i>	
TH-A1.2P: SMALL ANTENNAS: IMPROVED PERFORMANCE AND APPLICATIONS	
TH-A1.2P.1: SPECTRAL-DOMAIN RADIATION Q ANALYSIS OF A PLANAR DIPOLE OVER A CONDUCTING GROUND PLANE	1404
<i>Do-Hoon Kwon, David M. Pozar, University of Massachusetts Amherst, United States</i>	
TH-A1.2P.2: A METHOD TO OBTAIN CURRENT DISTRIBUTIONS ON SMALL ANTENNAS WITH OPTIMUM DIRECTIVITY	1406
<i>Sebastien Clauzier, Said Mikki, Yahia M.M. Antar, Royal Military College of Canada, Canada; Ala Sharaiha, IETR University of Rennes 1, France; Philippe Pouliguen, DGA-DS/MRIS, France</i>	
TH-A1.2P.3: PROPOSAL OF A DIPOLE ANTENNA UNIFIED WITH AN AMC SUBSTRATE	1408
<i>Tetsuo Moroya, Masaki Kotaka, Shigeru Makino, Hideyuki Hayashi, Keisuke Noguchi, Tetsuo Hirota, Kenji Itoh, Kanazawa Institute of Technology, Japan</i>	
TH-A1.2P.4: A COMPACT HIGH-EFFICIENCY CIRCULARLY POLARIZED ANTENNA WITH THICK EBG CELLS AND INTEGRATED POWER DIVIDER/PHASE SHIFTER	1410
<i>Mehdi Hosseini, David M. Klymyshyn, University of Saskatchewan, Canada</i>	
TH-A1.2P.5: A LOW-PROFILE VHF DUAL BAND PRINTED ANTENNA	1412
<i>Anatoliy Boryssenko, Elen Boryssenko, A&E Partnership, United States; Naftali Herscovici, Michelle Champion, Air Force Research Laboratory, United States</i>	
TH-A1.2P.6: BIFILAR TRANSVERSE BILATERAL HELICAL ANTENNA FOR BANDWIDTH ENHANCEMENT	1414
<i>Adem Celebi, Illinois Institute of Technology, United States; Mark Kenkel, Shure Incorporated, United States; Thomas Wong, Illinois Institute of Technology, United States</i>	
TH-A1.2P.7: MODELING, DESIGN AND EXPERIMENTATION OF A UHF RFID TAG ANTENNA EMBEDDED IN RAILWAY TICKETS	1416
<i>Wei He, Yejun He, Shenzhen University, China; Manos Tentzeris, Georgia Institute of Technology, United States</i>	
TH-A1.2P.8: CIRCULAR CO-PLANAR INVERTED-F ANTENNA FOR UHF MACHINE-TO-MACHINE COMMUNICATIONS	1418
<i>Runbo Ma, Yue Gao, Yapeng Wang, Clive Parini, Queen Mary University of London, United Kingdom</i>	

TH-A1.2P.9: LOW SAR SHORTED DIPOLE ANTENNA FOR IMPLANTATION APPLICATIONS..... 1420
*Shun-Yun Lin Lin, Cheng Shiu University, Taiwan; Yu-Chih Lin, Metal Industries Research & Development Center, Taiwan;
Jian-Hua Chen, Cheng Shiu University, Taiwan*

TH-UB.1P: FREQUENCY SELECTIVE SURFACES AND EXTRAORDINARY TRANSMISSION

TH-UB.1P.4: PARAMETRIC ANALYSIS OF ELECTROMAGNETICALLY INDUCED TRANSPARENCY 1422
(EIT) IN CHIRAL METAMATERIALS
Lei Kang, Zhi Hao Jiang, Taiwei Yue, Douglas H. Werner, Pennsylvania State University, United States

TH-A5.1P: ANTENNAS ON AERIAL VEHICLES

TH-A5.1P.1: CIRCULARLY POLARIZED UHF UP- AND DOWNLINK ANTENNAS INTEGRATED WITH 1424
CUBESAT SOLAR PANELS
Salahuddin Tariq, Reyhan Baktur, Utah State University, United States

TH-A5.1P.2: A NEW UHF DEPLOYABLE ANTENNA FOR CUBESATS 1426
*Joseph Costantine, Youssef Tawk, Christos Christodoulou, University of New Mexico, United States; Ignacio Maqueda, Maria
Sakovsky, Sergio Pellegrino, California Institute of Technology, United States*

TH-A5.1P.3: A MICRO AIR VEHICLE DESIGN BASED ON A WIDEBAND ANTENNA 1428
Franklin Drummond, Gregory Huff, Texas A&M University, United States

TH-A5.1P.4: CHARACTERISTIC MODE SYNTHESIS OF OMNI-DIRECTIONAL RADIATION PATTERNS 1430
FOR ELECTRICALLY SMALL UAV
Yikai Chen, Chao-Fu Wang, National University of Singapore, Singapore

TH-A5.1P.5: DESIGN AND DEVELOPMENT OF VHF ANTENNAS FOR SPACE BORNE SIGNAL OF N/A
OPPORTUNITY RECEIVERS FOR CUBESAT PLATFORMS
Manohar Deshpande, Jeffery Piepmeier, NASA Goddard Space Flight Center, United States

TH-A5.1P.6: PERFORMANCE IMPROVEMENT OF EMBEDDED PLANAR FIXED BEAM ARRAYS IN 1434
FLYING UAVS
*Sameir Deif, Mohammad S. Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia; Benjamin Nold, Osamah
Rawashdeh, Daniel Aloji, Oakland University, United States*

TH-A5.1P.7: DIRECTIONAL BLADE ANTENNA WITH INCREASED SECTORAL GAIN 1436
S. Meliksah Yayan, Onurhan Duman, Meteksan Savunma (Defence) Ind. Inc., Turkey

TH-A5.1P.8: ROBERTS BALUN BASED DIPOLE DESIGN FOR TETHERED UNMANNED AERIAL 1438
VEHICLES
Yizhu Shen, Jian Lu, Tan-Huat Chio, National University of Singapore, Singapore

TH-A5.1P.9: DIRECTIONAL BLADE ANTENNA WITH TILTED BEAM 1440
S. Meliksah Yayan, Onurhan Duman, Meteksan Savunma (Defence) Ind. Inc., Turkey

TH-A2.1P: NEW TOOLS AND APPROACHES IN ELECTROMAGNETICS EDUCATION

TH-A2.1P.2: SMALL ANTENNA POSITIONING SYSTEM DESIGN AT WRIGHT STATE UNIVERSITY 1442
*Ethan Shepherd, Charles Rockett, Torki Almutairi, Emma Sum, Joshua Compaleo, Michael Saville, Wright State University,
United States*

TH-A2.1P.3: Z0LVER: A CROSS-PLATFORM OPEN-SOURCE APP FOR TRANSMISSION LINE 1444
ANALYSIS AND CIRCUIT DESIGN
Gregory Huff, Jeffrey Jensen, Jean-Francois Chamberland, Raven Standard LLC, United States

TH-A2.1P.4: DESIGNING REPLICAS OF HERTZ'S ANTENNAS USING MODERN COMPUTER METHODS 1446

Ted Simpson, University of South Carolina, United States; Milos Pavlovic, WIPL-D d.o.o, Serbia; Dragan Olcan, University of Belgrade, Serbia

TH-A5.2P: ON-CHIP ANTENNAS FOR MILLIMETER AND THZ WAVES

TH-A5.2P.1: INTEGRATED STACKED VIVALDI-SHAPED ON-CHIP ANTENNA FOR 180 GHZ 1448

Ronny Hahnel, Bernhard Klein, Dirk Plettemeier, Technische Universität Dresden, Germany

TH-A5.2P.2: V-BAND INTEGRATED ON-CHIP ANTENNA IMPLEMENTED WITH A PARTIALLY REFLECTIVE SURFACE IN STANDARD 0.13- μ M BICMOS TECHNOLOGY 1450

Chuan-Chang Liu, Roberto G. Rojas, Ohio State University, United States

TH-A5.2P.3: ON-CHIP FRACTAL BOWTIE-ANTENNA FOR 185 GHZ TO 200 GHZ 1452

Bernhard Klein, Patrick Seiler, Dirk Plettemeier, TU Dresden, Germany

TH-A5.2P.4: WIRELESS INTERCONNECTS FOR 3D NETWORK-ON-CHIP WITH EMBEDDED MICRO THERMOFLUIDIC COOLING CHANNELS 1454

Christopher Caporale, Jayanti Venkataraman, Rochester Institute of Technology, United States

TH-A5.2P.5: A 94 GHZ CMOS BASED OSCILLATOR TRANSMITTER WITH AN ON-CHIP MEANDERED DIPOLE ANTENNA 1456

Hammad M. Cheema, National University of Sciences & Technology (NUST), Pakistan; Farhan A. Ghaffar, Muhammad Arsalan, Atif Shamim, King Abdullah University of Science and Technology, Saudi Arabia

TH-A5.2P.7: BOTTOM-FEED ON-CHIP WAVEGUIDE SLOT ANTENNA FOR THZ APPLICATIONS 1458

Zheng Wang, Peyman Nazari, Payam Heydari, University of California, Irvine, United States

TH-A5.2P.9: ON-CHIP BI-SEMICIRCULAR SLOT ANTENNA AT 550 GHZ FOR 2x4 COHERENT SOURCE ARRAY IN 65NM CMOS TECHNOLOGY 1460

Hsin-Chia Lu, Hong-Pei Chen, National Taiwan University, Taiwan; Yan Zhao, Mau-Chung Frank Chang, University of California, Los Angeles, United States

TH-A5.2P.10: DESIGN OF A NOVEL GRAPHENE TERAHERTZ ANTENNA AT 500GHZ WITH RECONFIGURABLE RADIATION PATTERN 1462

HaiQiang Xia, QinXu Pan, Jun Hu, Wen-Yan Yin, Zhejiang University, China

TH-A3.1P: OTHER NUMERICAL METHODS I

TH-A3.1P.1: EFFICIENT PARTICLE LOCATOR FOR UNSTRUCTURED-GRID PIC SIMULATIONS 1464

Haksu Moon, Dongyeop Na, Fernando Teixeira, Ohio State University, United States; Yuri Omelchenko, SciberQuest Inc., United States

TH-A3.1P.2: CHARGE-CONSERVING GATHER-SCATTER ALGORITHM FOR PIC SIMULATIONS ON UNSTRUCTURED GRIDS 1466

Haksu Moon, Fernando Teixeira, Ohio State University, United States; Yuri Omelchenko, SciberQuest Inc., United States

TH-A3.1P.3: PREDICTING ISOLATION BETWEEN AIRBORNE ANTENNAS USING EQUIVALENT MODELS 1468

Siping Gao, Huapeng Zhao, Binfang Wang, Weijiang Zhao, Jason Ching Eng Png, Institute of High Performance Computing, Singapore

TH-A3.1P.4: TRACKING OF CHARACTERISTIC MODES THROUGH FAR-FIELD PATTERN CORRELATION 1470

Zachary Miers, Buon Kiong Lau, Lund University, Sweden

TH-A3.1P.5: EQUIVALENT CURRENT MODELING OF ANTENNA RADIATION..... 1472
Alper Kursat Ozturk, ASELSAN Inc., Turkey

TH-A3.1P.6: CHARACTERISTIC MODE ANALYSIS OF PEC BODIES USING COMBINED FIELD INTEGRAL EQUATION 1474

Yikai Chen, Chao-Fu Wang, National University of Singapore, Singapore

TH-A3.1P.7: STUDYING MICROSTRIP PATCH ANTENNAS USING THE THEORY OF CHARACTERISTIC MODES 1476

Hamad Alroughani, Pennsylvania State University, United States

TH-A3.1P.8: BROADBAND BOUNDED MEDIUM GREEN'S FUNCTION AND APPLICATIONS TO FAST ELECTROMAGNETIC MODELING OF HIGH SPEED INTERCONNECTS 1478

Shaowu Huang, Leung Tsang, University of Washington, United States

TH-A3.1P.9: A NUMERICAL METHOD FOR THE ELECTROMAGNETIC FIELD TIME DOMAIN PROPAGATOR EQUATIONS 1480

Jongchul Shin, Hasan Tahir Abbas, Robert Nevels, Texas A&M University, United States

TH-A3.1P.10: A SHORT-OPEN CALIBRATION (SOC) TECHNIQUE TO DE-EMBED THE COMPLEX PROPAGATION CONSTANT OF SIW 1482

Zheng Liu, Shanghai Jiao Tong University, China; Lei Zhu, Qiong Sen Wu, University of Macau, China; Gao Biao Xiao, Shanghai Jiao Tong University, China

TH-A3.2P: HYBRIDIZATION OF NUMERICAL METHODS

TH-A3.2P.1: PARALLEL HYBRID FINITE DIFFERENCE TIME DOMAIN AND MULTILEVEL FAST MULTIPOLE ALGORITHM BASED ON EQUIVALENT-PRINCIPLE 1484

Shugang Jiang, Qin Su, Yu Zhang, Yong Wang, Xunwang Zhao, Zhongchao Lin, Xidian University, China

TH-A3.2P.2: ANTENNA PLACEMENT BASED ON ACCURATE MEASURED SOURCE REPRESENTATION AND NUMERICAL TOOLS 1486

Lars Jacob Foged, Lucia Scialacqua, Francesco Saccardi, Francesca Mioc, Microwave Vision Group, Italy; Javier Leonardo Araque-Quijano, Universidad Nacional de Colombia, Colombia; Giuseppe Vecchi, Politecnico di Torino, Italy

TH-A3.2P.3: THE APPLICATION OF COMPRESSED SENSING THEORY IN WAVELET METHOD OF MOMENTS 1488

Zhe Wang, Bing-Zhong Wang, Ya-Qing Wen, Ren Wang, Institute of Applied Physics, China

TH-A3.2P.4: ELECTROMAGNETIC MODELING FOR A MINIATURIZED PATCH ANTENNA WITH THIN FERRITE FILMS 1490

Jian Zhang, Rui Peng Chen, Peng Cheng Wang, Mei Song Tong, Tongji University, China

TH-A3.2P.5: AIM-AWE TECHNIQUE FOR SURFACE-WIRE INTEGRAL EQUATION 1492

Xing Wang, Hai-Lin Dong, Shu-Xi Gong, Yan-Ping Li, Wen Jiang, Xidian University, China

TH-A3.3P: PO AND DIFFRACTION TECHNIQUES

TH-A3.3P.1: CALCULATING THE SCATTERED FIELDS FROM THE FOCK CURRENTS OF THE 3-D CONVEX SCATTERERS BY THE INCREMENTAL LENGTH DIFFRACTION TECHNIQUE 1494

Yu Mao Wu, Key Laboratory for Information Science of Electromagnetic Waves (MoE), School of Information Science and Technology, Fudan University, Shanghai, 200433, China, China; Weng Cho Chew, University of Illinois at Urbana-Champaign, United States; Tie Jun Cui, State Key Laboratory of Millimeter Waves, Southeast University, China; Ya-Qiu Jin, Key Laboratory for Information Science of Electromagnetic Waves (MoE), School of Information Science and Technology, Fudan University, Shanghai, 200433, China, China; Li Jun Jiang, University of Hong Kong, China

TH-A3.3P.2: REVISITING LEVIN+LI ACCELERATION METHOD FOR RAPID DIFFRACTION ANALYSIS OF REFLECTOR ANTENNAS	1496
<i>Arthur Densmore, Yahya Rahmat-Samii, University of California, Los Angeles, United States</i>	
TH-A3.3P.3: OPTIMIZING ITERATIVE PHYSICAL OPTICS BY USING AN ACA COMPRESSION ON INTERACTION MATRICES	1498
<i>Antoine Thomet, IETR - Institut d'Electronique et de Télécommunications de Rennes, France; Gildas Kubické, DGA Information Superiority, France; Christophe Bourlier, IETR - Institut d'Electronique et de Télécommunications de Rennes, France; Philippe Pouliguen, DGA/DS/MRIS (Direction Générale de l'Armement – Direction de la Stratégie – Mission pour la Recherche et l'Innovation Scientifique), France</i>	
TH-A3.3P.4: GPU IMPLEMENTATION OF HYBRID GO/PO BVH-BASED ALGORITHM FOR RCS PREDICTIONS	1500
<i>Alfonso Breglia, Amedeo Capozzoli, Claudio Curcio, Angelo Liseno, Jonas Piccinotti, Università di Napoli Federico II, Italy</i>	
TH-A3.3P.5: FAST SHADOWING TECHNIQUE BASED ON Z-BUFFER ALGORITHM FOR GAUSSIAN BEAM APPLICATIONS	N/A
<i>Chuan Wu, Feng Yang, Jun Ouyang, Peng Yang, Fei Yan, University of Electronic Science and Technology of China, China</i>	
TH-A3.4P: TECHNIQUES FOR TRANSIENT SIMULATIONS	
TH-A3.4P.1: SOURCE DECOMPOSITION AS A GLOBAL ABSORBING BOUNDARY CONDITION FOR MULTI-REGION PROBLEMS	1504
<i>Naor Shay, Raphael Kastner, Tel Aviv University, Israel; Daniel S. Weile, University of Delaware, United States</i>	
TH-A3.4P.2: STABILITY ANALYSIS OF TIME DOMAIN FEM BY APPLYING ROUTH-HURWITZ STABILITY CRITERION	1506
<i>Xia Wu, Tongji University, China</i>	
TH-A3.4P.3: TRANSIENT ANALYSIS OF PLASMONIC NANOSTRUCTURES USING AN MOT-PMCHWT SOLVER	1508
<i>Ismail Enes Uysal, Huseyin Arda Ulku, Hakan Bagci, King Abdullah University of Science and Technology, Saudi Arabia</i>	
TH-A3.4P.4: TRANSIENT ANALYSIS OF CIRCULAR WAVEGUIDE PROBE EXCITATION USING CAVITY MODAL EXPANSION	1510
<i>Ahmed Abdel-Rahman, Tamer Abuelfadl, Cairo University, Egypt</i>	
TH-A3.4P.5: MARCHING-ON IN DEGREE METHOD FOR ELECTROMAGNETIC ANALYSIS OF TRANSIENT SCATTERING FROM THIN WIRE ANTENNA EXCITED BY RADIATED RECTANGULAR CAVITY	N/A
<i>Dorsaf Omri, Taoufik Aguil, National Engineering School of Tunis ENIT, Tunisia</i>	
FR-SP.1A: INTERNATIONAL COLLABORATIONS ON NEXT-GENERATION RADIO ASTRONOMICAL INSTRUMENTATION II	
FR-SP.1A.1: A 64 ELEMENT, 70-95 GHZ FOCAL PLANE PHASED ARRAY	1514
<i>Neal Erickson, Gopal Narayanan, Joseph Bardin, University of Massachusetts, United States; Karl F. Warnick, Brian D. Jeffs, Junming Diao, Brigham Young University, United States</i>	
FR-SP.1A.3: QUAD-MODE ANTENNA FOR WIDE-SCAN SPARSE ARRAYS	1516
<i>David Schalk Prinsloo, Petrie Meyer, Stellenbosch University, South Africa; Rob Maaskant, Marianna Valerievna Ivashina, Chalmers University of Technology, Sweden</i>	
FR-SP.1A.4: STATISTICAL PERFORMANCE OF REFERENCE ANTENNA BASED SPATIAL RFI MITIGATION FOR RADIO ASTRONOMY	1518
<i>Gregory Hellbourg, Aaron Chippendale, John Tuthill, CSIRO, Australia; Brian D. Jeffs, Brigham Young University, United States</i>	

FR-SP.1A.6: DIFFRACTION AND PATTERN PERTURBATION EFFECTS IN OFFSET GREGORIAN REFLECTOR ANTENNAS WITH WIDEBAND FEEDS	1520
<i>Dirk De Villiers, Stellenbosch University, South Africa; Marianna Valerievna Ivashina, Chalmers University of Technology, Sweden</i>	
FR-SP.1A.7: ANALYSIS OF OFFSET GREGORIAN REFLECTOR WITH PHASED ARRAY FEED FOR SKA	1522
<i>Stephanie Smith, Stuart Hay, CSIRO, Australia</i>	
FR-SP.1A.8: A DENSE DIPOLE ARRAY FOR MID-FREQUENCY APERTURE ARRAYS	1524
<i>Jacki Gilmore, David Davidson, Stellenbosch University, South Africa; Jan Noordam, Netherlands Institute for Radio Astronomy, Netherlands</i>	
FR-SP.1A.9: HOLOGRAPHIC MEASUREMENT OF KAT-7 PRIMARY BEAMS	1526
<i>Mattieu de Villiers, SKA SA, South Africa</i>	
FR-SP.1A.10: MUTUAL COUPLING ANALYSIS IN NON-REGULAR ARRAYS OF SKALA ANTENNAS WITH THE HARP APPROACH	1528
<i>Quentin Gueuning, Christopher Raucy, Christophe Craeye, Université catholique de Louvain, Belgium; Edgar Colin-Beltran, Eloy de Lera Acedo, University of Cambridge, United Kingdom</i>	
FR-SP.2A.1: NOVEL 11 GHZ 2-PORT ANTENNA ARRAY INTEGRATED AT A CORNER OF MOBILE PHONE CASING BY LIM TECHNOLOGIES OF ITRI WITH DIVERSE END-FIRE RADIATION PATTERNS	1530
<i>Wei-Yu Li, Wei Chung, Tune-Hune Kao, Meng-Chi Huang, Ming-Tsung Hong, ITRI, Taiwan</i>	
FR-SP.2A.3: DESIGN OF A 28/38 GHZ DUAL-BAND PRINTED SLOT ANTENNA FOR THE FUTURE 5G MOBILE COMMUNICATION NETWORKS	1532
<i>Osama Haraz, Mohamed Ali, Assiut University, Saudi Arabia; Saleh Alshebeili, King Saud University, Saudi Arabia; Abdel-Razik Sebak, Concordia University, Canada</i>	
FR-SP.2A.4: A MILLIMETER-WAVE CIRCULAR REFLECTARRAY ANTENNA FOR FUTURE 5G CELLULAR NETWORKS	1534
<i>Osama Haraz, Mohamed Ali, Assiut University, Egypt</i>	
FR-SP.2A.5: 60 GHZ ANTENNAS IN PACKAGE FOR PORTABLE APPLICATIONS	1536
<i>Duixian Liu, Xiaoxiong Gu, Christian Baks, Alberto Valdes-Garcia, IBM T. J. Watson Research Center, United States</i>	
FR-SP.2A.7: CHALLENGES OF 60 GHZ ON-CHIP ANTENNA MEASUREMENTS	1538
<i>Edmund Lee, Russell Soerens, Edward Szpindor, Per Iversen, MVG-ORBIT/FR, United States</i>	
FR-SP.2A.9: A CONTINUOUS KA-BAND BEAM-SCANNING REFLECTARRAY INTEGRATED WITH BST	1540
<i>Kalyan Karnati, Xun Gong, University of Central Florida, United States</i>	
FR-SP.2A.10: 60-GHZ DUAL-POLARIZED TWO-DIMENSIONAL SWITCH-BEAM WIDEBAND ANTENNA ARRAY OF MAGNETO-ELECTRIC DIPOLES	1542
<i>Yujian Li, Kwai-Man Luk, City University of Hong Kong, Hong Kong SAR of China</i>	
FR-A1.1A: ADAPTIVE, ACTIVE AND SMART ANTENNAS	
FR-A1.1A.1: DUAL-POLARIZED WIDEBAND MULTI-BEAM ARRAYS IN WIRELESS COMMUNICATIONS	1544
<i>Lin-Ping Shen, Hua Wang, Des Bromley, Minya Gavrilovic, Communication Components Antenna, Inc., Canada</i>	
FR-A1.1A.2: ANALYSIS OF A PLL-BASED DOWN CONVERTER AND PHASE DETECTION CIRCUIT FOR SELF-TRACKING ARRAYS	1546
<i>Andreas Winterstein, Achim Dreher, German Aerospace Center (DLR), Germany</i>	
FR-A1.1A.3: IDENTIFICATION OF PARALLEL RUNNING VEHICLES BY RBF NEURAL NETWORK	1548
<i>Hiroki Tsutsumi, Yoshihiko Kuwahara, Shizuoka University, Japan; Hiroyuki Kamo, Nidec Elesys, Japan</i>	

FR-A1.1A.4: A NEW APPROACH TO RESOLVING EMITTER LOCATIONS IN THE PRESENCE OF ANTENNA MANIFOLD MISMATCH	1550
<i>Andrew Kintz, Inder Gupta, Ohio State University, United States</i>	
FR-A1.1A.5: ACCURATE AND ROBUST DOA ESTIMATION USING UNIFORM CIRCULAR DISPLACED ANTENNA ARRAY	1552
<i>Ahmed Kulaib, Raed Shubair, Mahmoud Al-Qutayri, Jason Ng, Khalifa University, United Arab Emirates</i>	
FR-A1.1A.6: MULTI-LAYER SWITCHED BEAM FABRY-PEROT LEAKY WAVE ANTENNA	1554
<i>Mohamed Aymen El Cafsi, Lotfi Osman, Ali Gharsallah, University of Tunis El Manar, Tunisia; Mourad Nedil, Université du Québec en Abitibi-Témiscamingue, Canada; Azzeddine Djaiz, Yanbu Industrial College, Saudi Arabia</i>	
FR-A1.1A.7: STABILITY ANALYSIS OF RESONANT TUNNELLING DIODE FOR RESISTIVE MATCHING OF AN ELECTRICALLY SMALL ANTENNA	1556
<i>Deepak Singh Nagarkoti, Peter Alizadeh, Yang Hao, Khalid Z. Rajab, Queen Mary University of London, United Kingdom</i>	
FR-A1.1A.8: DESIGN AND ANALYSIS OF VHF VECTOR SENSOR ANTENNA	1558
<i>Amir Musicant, Ben-Gurion University of the Negev, Israel; Benny Almog, Nadav Oxenfeld, Elta Electronics Industries, Israel; Reuven Shavit, Ben-Gurion University of the Negev, Israel</i>	
FR-A1.1A.9: HIGH-IMPEDANCE AMPLIFIER ENABLING AN EASY IMPLEMENTABLE INTERFACE FOR A DIVERSITY SYSTEM OF WINDOW-PRINTED ANTENNAS	1560
<i>Alexander Boege, Leopold Reiter, Stefan Lindenmeier, University of the Bundeswehr Munich, Germany</i>	
FR-A1.1A.10: LOW-Q ANTENNAS MINIATURIZED WITH ADAPTIVE TUNING FOR SMALL-PLATFORM APPLICATIONS	1562
<i>Johnson Wang, Wang Electro-Opto Corporation, United States</i>	
FR-A1.1A.11: PORT ISOLATION ENHANCEMENT VIA ACTIVE INTEGRATION FOR A UWB MIMO ANTENNA SYSTEM	1564
<i>Sagar Dhar, Mohammad S. Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia; Fadhel Ghannouchi, University of Calgary, Canada</i>	
 FR-A5.1A: RFID ANTENNAS	
FR-A5.1A.1: SLIM UHF TAG APPLICABLE TO METALLIC FILM CANS	1566
<i>Jingtian Xi, Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies, Hong Kong SAR of China</i>	
FR-A5.1A.2: A STRUCTURAL ANTENNA FOR UHF-RFID IMPLANT INTO LIMB PROSTHESIS	1568
<i>Rossella Lodato, Pier Paolo Valentini, Gaetano Marrocco, University of Roma Tor Vergata, Italy</i>	
FR-A5.1A.3: A CIRCULARLY POLARIZED PLANAR ANTENNA FOR NEAR FIELD AND FAR FIELD COMMUNICATION SYSTEMS	1570
<i>Takashi Yamagajo, Manabu Kai, Fujitsu Laboratories Limited, Japan</i>	
FR-A5.1A.4: ANALYSIS AND DESIGN OF A METAL-BACKED RFID TAG ANTENNA	1572
<i>Ayman Elboushi, Electronics Research Institute, Egypt; Osama Haraz, Assiut University, Egypt; Khalid Jamil, Prince Sultan Advanced Tech. Research Institute, Saudi Arabia; Abdel-Razik Sebak, Concordia University, Canada</i>	
FR-A5.1A.5: AN ANTENNA FOR RFID TAG PRINTED ON PAPER SUBSTRATE USING CONDUCTIVE INK	1574
<i>Robson Valmiro, Silvio Barbin, University of São Paulo, Brazil</i>	
FR-A5.1A.6: OPTIMIZED NEAR-FIELD ANTENNA FOR UHF RFID SMART SHELF APPLICATIONS	1576
<i>Andrey Andrenko, SYSU-CMU Shunde International Joint Research Institute, China</i>	
FR-A5.1A.7: DESIGN OF MINIATURIZED UHF RFID TAG ANTENNA ATTACHED TO DIELECTRIC AND METALLIC OBJECTS	1578
<i>Yun Jing Zhang, Jian Zhang, Guo Chun Wan, Mei Song Tong, Tongji University, China</i>	

FR-A5.1A.8: DESIGN OF A NOVEL UHF RFID READER ANTENNA FOR NEAR-FIELD APPLICATIONS	1580
<i>Caixia Cui, Yuan Yao, Junsheng Yu, Beijing University of Posts and Telecommunications, China; Xiaodong Chen, Queen Mary University of London, China</i>	
FR-A5.1A.9: AN END-FIRE DIPOLE ARRAY FOR BIG INTERROGATION ZONE OF NEAR-FIELD RFID.....	1582
<i>Laiwei Shen, Hailing Xiang, Nanjing University of Science and Technology, China; Wanchun Tang, Wei Zhuang, Jian Ma, Nanjing Normal University, China</i>	
FR-A5.1A.10: DUAL-BAND CIRCULARLY POLARIZED MICROSTRIP PATCH ANTENNA FOR RFID	1584
APPLICATIONS	
<i>Chunling Chen, Nanjing University of Science and Technology, China; Yongxin Guo, National University of Singapore, Singapore; Hao Wang, Nanjing University of Science and Technology, China</i>	
FR-A2.1A: ELECTROMAGNETIC BANDGAP STRUCTURES IN METAMATERIALS TECHNOLOGY	
FR-A2.1A.1: A MINIATURIZED UNIPLANAR METAMATERIAL-BASED EBG FOR PARALLEL-PLATE	1586
SWITCHING NOISE SUPPRESSION	
<i>Stuart Barth, Ashwin K. Iyer, University of Alberta, Canada</i>	
FR-A2.1A.2: TRANSITION FROM MICROSTRIP TO PRINTED RIDGE GAP WAVEGUIDE FOR	1588
MILLIMETER-WAVE APPLICATION	
<i>Milad Sharifi Sorkherizi, Ahmed A. Kishk, Concordia University, Canada</i>	
FR-A2.1A.3: BAND SPLITTING IN 2D EBG STRUCTURE BY GEOMETRY MODULATION	1590
<i>Ladislau Matekovits, Politecnico di Torino, Italy; Aldo De Sabata, Politehnica University Timisoara, Romania; Ovidiu Lipan, University of Richmond, United States</i>	
FR-A2.1A.4: PROPAGATION ANALYSIS IN A DOUBLE DEFECTED-PHOTONIC CRYSTAL BASED	1592
SLOW WAVE STRUCTURE	
<i>Ahmed Nashed, Sujeet Chaudhuri, Safieddin Safavi-Naeini, University of Waterloo, Canada</i>	
FR-A2.1A.5: APPLICATION OF THE PORT-REDUCTION METHOD IN THE DESIGN SYNTHESIS OF	1594
EBGS FOR ANTENNA SYSTEMS	
<i>Idellyse Martinez, Douglas H. Werner, Pennsylvania State University, United States</i>	
FR-A2.1A.6: BANDPASS POWER DIVIDERS USING QUARTER-MODE SUBSTRATE INTEGRATED	1596
WAVEGUIDE AND DEFECTED GROUND STRUCTURE	
<i>Yong Mao Huang, Tao Huang, Zhenhai Shao, Chang Jiang You, University of Electronic Science and Technology of China, China; Guoan Wang, University of South Carolina, United States</i>	
FR-A2.1A.8: DESIGN OF LOW-COST UNIPLANAR AMC STRUCTURES FOR UHF APPLICATIONS	1598
<i>Giovanni Andrea Casula, Giorgio Montisci, Alessandro Fanti, Giuseppe Mazzarella, Paolo Maxia, Università di Cagliari, Italy</i>	
FR-A2.1A.9: A GRAPHENE-BASED TERAHERTZ WAVELENGTH DIVISION MULTIPLEXER	1600
<i>Xidong Wu, Zhaoqing Lu, Xiang Guo, Yang Xu, Zhejiang University, China</i>	
FR-A5.2A: ANTENNAS AND ELECTROMAGNETICS ON LAND VEHICLES	
FR-A5.2A.1: VEHICLE-MOUNTED STAR ANTENNA ISOLATION PERFORMANCE	1602
<i>Kenneth Kolodziej, Bradley Perry, MIT Lincoln Laboratory, United States</i>	
FR-A5.2A.2: TWO ARM OFFSET FED INVERTED-L ANTENNA FOR VEHICULAR HF	1604
COMMUNICATIONS	
<i>Saurabh Sanghai, Maxim Ignatenko, Dejan Filipovic, University of Colorado Boulder, United States</i>	
FR-A5.2A.3: A HIGHLY EFFICIENT CAR2CAR-MULTIBAND ROOFTOP AUTOMOTIVE ANTENNA	1606
<i>Miguel Angel Bueno Diez, Stefan Lindenmeier, University of the Bundeswehr Munich, Germany</i>	

FR-A5.2A.4: BANDWIDTH ENHANCEMENT OF PLATFORM-MOUNTED HF ANTENNAS USING THE CHARACTERISTIC MODES THEORY	1608
<i>Ting-Yen Shih, Nader Behdad, University of Wisconsin-Madison, United States</i>	
FR-A5.2A.5: CAPACITIVELY LOADED HIGH FREQUENCY MONOPOLE ANTENNA FOR VEHICULAR COMMUNICATIONS	1610
<i>Bradley Allen, Maxim Ignatenko, Dejan Filipovic, University of Colorado Boulder, United States</i>	
FR-A5.2A.6: STUDY ON PROPAGATION LOSS CHARACTERISTICS CONSIDERING CAR ANTENNA POSITION FOR INTER-VEHICLE COMMUNICATIONS USING 700MHZ BAND AT INTERSECTION	1612
<i>Suguru Imai, Kenji Taguchi, Takeshi Kawamura, Tatsuya Kashiwa, Kitami Institute of Technology, Japan</i>	
FR-A5.2A.7: CONFORMAL PRINTED TRAVELING WAVE ANTENNA COMPOSED OF INTERDIGITAL CAPACITOR STRUCTURE	1614
<i>Achmad Munir, Institut Teknologi Bandung, Indonesia; Cahya Edi Santosa, National Institute of Aeronautics and Space, Indonesia</i>	
FR-A5.2A.8: SLOTTED PATCH ANTENNAS WITH WIDE AXIAL RATIO BEAMWIDTH FOR PASSIVE KEYLESS ENTRY SYSTEM	1616
<i>Bo Yuan, Xiao Hong Zhang, Zhi Fang Hu, Guo Qing Luo, Hangzhou Dianzi University, China</i>	
FR-A2.2A: RECENT TRENDS IN ELECTROMAGNETIC THEORY	
FR-A2.2A.1: A COMPLETE EXPANSION SET FOR FREE-SPACE GREEN FUNCTION USING KONTOROVICH-LEBEDEV TRANSFORM	1618
<i>Mohamed A. Salem, Christophe Caloz, Polytechnique de Montréal, Canada</i>	
FR-A2.2A.2: QUASI PERIODICITY IN MOIRÉ PATTERNS AND A NUMERICAL APPROXIMATION METHOD OF DUAL WEAVES	1620
<i>Erik Sedhed, Andreas Ericsson, Niklas Wellander, Daniel Sjöberg, Lund University, Sweden</i>	
FR-A2.2A.3: OPTICAL THEOREM FOR ACTIVE MEDIA	1622
<i>Edwin Marengo, Jing Tu, Northeastern University, United States</i>	
FR-A2.2A.4: SCATTERING SIMILARITIES AND DIFFERENCES IN SPACE AND TIME DISCONTINUOUS MEDIA	1624
<i>Mohamed A. Salem, Christophe Caloz, Polytechnique de Montréal, Canada</i>	
FR-A2.2A.5: INSIGHTS ON THE POSSIBILITY OF CIRCUIT REPRESENTATION FOR SINGLE MAXWELL'S EQUATIONS	1626
<i>Carlo Andrea Gonano, Riccardo Enrico Zich, Politecnico di Milano, Italy</i>	
FR-A2.2A.6: MAGNETLESS RING CIRCULATOR BASED ON NONRECIPROCAL PHASERS	1628
<i>Nima Chamanara, Christophe Caloz, Poly-Grames Research Center, Canada</i>	
FR-A2.2A.7: SCALE MODEL HORIZONTAL HALFWAVE DIPOLE	1630
<i>Peder Hansen, URS Corporation, United States; Vincent Acevedo, Jefferey Kagan, Wendy Goebel, Doeg Rodriguez, John D. Rockway, Space and Naval Warfare Systems Center, Pacific, United States</i>	
FR-A2.2A.8: A GENERAL FLAT LENS CRITERION	1632
<i>Mohammed Al Shakhs, University of British Columbia, Canada; Peter Ott, Heilbronn University, Germany; Henri Lezec, Center for Nanoscale Science and Technology, United States; Kenneth Chau, University of British Columbia, Canada</i>	
FR-A2.2A.9: THE EXCITATION EFFICIENCY OF SURFACE WAVES ON A REACTIVE SURFACE BY A FINITE VERTICAL APERTURE	1634
<i>JiXiang Wan, Xi'an Institute of Space Radio Technology, China; Kin Fai Tong, University College London, United Kingdom; ChunBang Wu, Xi'an Institute of Space Radio Technology, China</i>	

FR-A2.2A.10: ANALYTICAL EVALUATION OF EM SCATTERING FROM A BURIED ELLIPTICAL CYLINDER 1636

Mohamed Nasr, Islam Eshrah, Essam Hashish, Cairo University, Egypt

FR-A2.3A: MICRO- AND NANO-SCALE ELECTROMAGNETICS

FR-A2.3A.1: SURFACE PLASMON MODES IN SELF-BIASED COUPLED GRAPHENE-COATED WIRES..... 1638

Diego Correias-Serrano, Alejandro Alvarez-Melcon, Universidad Polit cnica de Cartagena, Spain; Juan Sebastian Gomez-Diaz, Andrea Al , University of Texas at Austin, United States

FR-A2.3A.2: APPLICATION OF GRAPHENE NANOHOLE AS A TERAHERTZ POLARIZER 1640

S. Mohsen Raeis-Zadeh, Safieddin Safavi-Naeini, Terahertz Research Lab, Electrical and Computer Engineering, University of Waterloo, Canada

FR-A2.3A.3: HIE-FDTD METHOD FOR SIMULATING TUNABLE TERAHERTZ GRAPHENE ABSORBER 1642

Meng-Lin Zhai, Hong-Li Peng, Shanghai Jiao Tong University, China; Wen-Yan Yin, Zhejiang University, China; Zhizhang (David) Chen, Dalhousie University, Canada

FR-A2.3A.4: ENHANCED SURFACE PLASMONIC OPTICAL ABSORPTION ENGINEERING OF GRAPHENE: SIMULATION BY BOUNDARY-INTEGRAL SPECTRAL ELEMENT METHOD 1644

Jun Niu, Duke University, United States; Ma Luo, Wave Computation Technologies, United States; Jinfeng Zhu, Xiamen University, China; Qing Huo Liu, Duke University, United States

FR-A2.3A.5: FULL-WAVE THIRD HARMONIC GENERATION ANALYSES OF GRAPHENE-BASED OPTOELECTRONIC DEVICES 1646

Jun Niu, Qing Huo Liu, Duke University, United States; Ma Luo, Wave Computation Technologies, United States

FR-A2.3A.6: ROOM TEMPERATURE DETECTION OF PLASMA RESONANCES USING MULTIPLE 2DEG CHANNELS IN HEMT 1648

Shubhendu Bhardwaj, Siddharth Rajan, John L. Volakis, Ohio State University, United States

FR-A2.3A.7: ABSORPTION EFFICIENCY IN IMPEDANCE MATCHED INFRARED DIPOLE ANTENNA-COUPLED MICROBOLOMETERS 1650

Yuancheng Xu, Brian Lail, Florida Institute of Technology, United States

FR-A2.3A.8: METAMATERIAL EMITTERS WITH CUSTOM ANGLE-DEPENDENT POLARIZATION PROFILES IN THE NEAR-IR 1652

Jeremy A. Bossard, Douglas H. Werner, Pennsylvania State University, United States

FR-A2.3A.9: NEMATIC NANOPARTICLE ARRAYS WITH ANGLE-SELECTIVE EMISSIVITY IN THE NEAR-IR 1654

Jeremy A. Bossard, Douglas H. Werner, Pennsylvania State University, United States

FR-A2.3A.10: A MAGNETICALLY BIASED GRAPHENE BASED CPW SWITCH FOR MICROWAVE APPLICATIONS 1656

Branko Bukvic, University of Belgrade, Serbia; Uros Jankovic, Djurdj Budimir, University of Westminster, United Kingdom

FR-A2.3A.11: A DESIGN OF SPDT SWITCH USING GRAPHENE DEVICE 1658

Fan Yang, Xidong Wu, Xiang Guo, Yang Xu, Zhejiang University, China

FR-A3.1A: PARALLEL AND SPECIAL-PROCESSOR BASED NUMERICAL METHODS

FR-A3.1A.1: EFFICIENT EM SCATTERING ANALYSIS BASED ON MOM, HSS DIRECT SOLVER, AND RRQR DECOMPOSITION 1660

Ana Manic, Colorado State University, United States; Fran ois-Henry Rouet, Xiaoye Sherry Li, Lawrence Berkeley National Laboratory, United States; Branislav M. Notaros, Colorado State University, United States

FR-A3.1A.2: ADAPTIVE, SCALABLE DOMAIN DECOMPOSITION METHODS FOR SURFACE INTEGRAL EQUATIONS	1662
<i>Brian MacKie-Mason, Zhen Peng, University of New Mexico, United States</i>	
FR-A3.1A.3: GPU PERFORMANCE ESTIMATION OF VARIOUS MATRIX SOLVE OPERATIONS FOR APPLICATION TO 3D PLANAR MOM	1664
<i>Brian J. Rautio, Sonnet Software, United States; Vladimir I. Okhmatovski, University of Manitoba, Canada; Jay Kyoong Lee, Syracuse Univeristy, United States</i>	
FR-A3.1A.4: EFFICIENT GPU IMPLEMENTATION OF SBR FOR FAST COMPUTATION OF COMPOSITE SCATTERING FROM ELECTRICALLY LARGE TARGET OVER A RANDOMLY ROUGH SURFACE	1666
<i>Pengcheng Gao, Xiaobing Wang, Zichang Liang, Wei Gao, Science and Technology on Electromagnetic Scattering Laboratory, China</i>	
FR-A3.1A.5: SOLUTION OF EM PROBLEMS USING HYBRID PARALLEL CPU/GPU IMPLEMENTATION OF HIGHER-ORDER MOM	1668
<i>Zhongchao Lin, Yan Chen, Yu Zhang, Shugang Jiang, Xunwang Zhao, Xidian University, China</i>	
FR-A3.1A.6: WIRELESS CHANNEL MODELING USING GPU-BASED 3D RAY-TRACING	N/A
<i>Collin Joseph, Ahmed Abdellatif, Ahmed Nashed, Luyao Chen, Gholamreza Rafi, Safieddin Safavi-Naeini, University of Waterloo, Canada</i>	
FR-A3.1A.7: A HIGHLY EFFICIENT COMMUNICATION AVOIDING LU ALGORITHM FOR METHODS OF MOMENTS	1672
<i>Yu Zhang, Yan Chen, Guanghui Zhang, Xunwang Zhao, Yong Wang, Zhongchao Lin, Xidian University, China</i>	
FR-A3.1A.8: PARALLEL OUT-OF-CORE HIGHER-ORDER METHOD OF MOMENTS ACCELERATED BY GRAPHICS PROCESSING UNITS	1674
<i>Yan Chen, Zhongchao Lin, Yu Zhang, Shugang Jiang, Xunwang Zhao, Xidian University, China</i>	
FR-A3.1A.9: ANALYSIS OF AIRBORNE ARRAY USING PARALLEL OUT-OF-CORE HIGHER-ORDER DDM-MOM SOLVER	1676
<i>Yanyan Li, Yu Zhang, Zhongchao Lin, Yong Wang, Xunwang Zhao, Xidian University, China</i>	
FR-A3.2A: HYBRIDIZATION OF NUMERICAL METHODS AND HIGH-FREQUENCY TECHNIQUES	
FR-A3.2A.1: ENHANCING THE ACCURACY OF HYBRID SBR/MOM METHOD BASED ON NEW INTERACTION	1678
<i>Xiaowei Mei, Hai Lin, State Key Laboratory of CAD&CG, Zhejiang University, China</i>	
FR-A3.2A.2: EFFICIENT PROPAGATION MODELING IN RAILWAY ENVIRONMENTS USING A HYBRID VECTOR PARABOLIC EQUATION/RAY-TRACING METHOD	1680
<i>Xingqi Zhang, Neeraj Sood, University of Toronto, Canada; Joseph Siu, Thales Canada Transportation Solutions, Canada; Costas D. Sarris, University of Toronto, Canada</i>	
FR-A3.2A.3: A HYBRID METHOD OF ANALYSIS OF SHAPED DIELECTRIC LENS ANTENNAS	1682
<i>Ravishankar Sankaranarayanan, Mahesh Appajappa, R V College of Engineering, India</i>	
FR-A3.2A.4: HYBRIDIZATION OF PEPA, EPA AND PO FOR ANALYSIS OF LARGE FINITE ANTENNA ARRAY WITH PERFECT ELECTRICALLY CONDUCTING OBJECT	N/A
<i>Kaizhi Zhang, Jun Ouyang, Feng Yang, University of Electronic Science and Technology of China, China</i>	
FR-A3.2A.5: EFFICIENT 3D FORWARD MODELING OF GPR SCATTERING FROM ROUGH GROUND	1686
<i>Mohammad Tajdini, Borja Gonzalez-Valdes, Jose Angel Martinez Lorenzo, Ann Morgenthaler, Carey Rappaport, Northeastern University, United States</i>	

FR-A3.3A: OTHER NUMERICAL METHODS II

FR-A3.3A.1: ANALYTICAL SOLUTION OF RADIATION BY A HERTZIAN DIPOLE NEAR AN ELECTRICALLY LARGE LAYERED SPHEROID 1688

Chang Liu, Guneet Kaur, Ali E. Yilmaz, University of Texas at Austin, United States

FR-A3.3A.2: ROBUST COMPUTATION OF GEOELECTRIC POTENTIALS IN CYLINDRICALLY STRATIFIED ANISOTROPIC EARTH FORMATIONS 1690

Haksu Moon, Kamalesh Sainath, Fernando Teixeira, Ohio State University, United States; Burkay Donderici, Halliburton Sensor Physics and Technology, United States

FR-A3.3A.3: ELECTROMAGNETIC CHARACTERIZATION FOR GRAPHENE BY THE PEEC METHOD..... 1692

Ying S. Cao, Li Jun Jiang, University of Hong Kong, Hong Kong SAR of China

FR-SP.1P: INTERNATIONAL COLLABORATIONS ON NEXT-GENERATION RADIO ASTRONOMICAL INSTRUMENTATION III

FR-SP.1P.1: SINGLE FEED CIRCULARLY POLARIZED HALF E-SHAPED ARRAY: A COMPACT ASSEMBLY FOR DUAL-BAND DIRECT-TO-EARTH COMMUNICATIONS IN MARS ROVERS 1694

Jean Paul Santos, Yahya Rahmat-Samii, University of California, Los Angeles, United States; Neil Chamberlain, Richard Hodges, Jet Propulsion Laboratory, United States

FR-SP.1P.3: BROADBAND VHF RADIOMETRY WITH A NOTCH-FILTERED ANTENNA EXHIBITING A LARGE IMPEDANCE MISMATCH 1696

Richard Tillman, Steven Ellingson, Virginia Polytechnic Institute and State University, United States

FR-SP.1P.4: A MULTI-FEATURE VISIBILITY PROCESSING ALGORITHM FOR RADIO INTERFEROMETRIC IMAGING 1698

Mu-Min Chiou, Jean-Fu Kiang, National Taiwan University, Taiwan; Raj Mittra, Pennsylvania State University, United States

FR-SP.1P.5: DIRECTIVITY OPTIMIZATION OF A LOG-PERIODIC ANTENNA FOR THE SKA-AAMID INSTRUMENT 1700

Edgar Colin-Beltran, Eloy de Lera Acedo, University of Cambridge, United Kingdom

FR-SP.1P.6: NORMALIZED PLANE WAVE SPECTRA: QUANTIFICATION OF MEASURED NEAR-FIELD DISTRIBUTIONS FOR THE ISS-RAPIDSCAT USING MEASURED FAR-FIELD PATTERNS 1702

Yahya Rahmat-Samii, University of California, Los Angeles, United States; Luis Amaro, Jet Propulsion Laboratory, United States; Joshua Kovitz, University of California, Los Angeles, United States

FR-SP.2P: FUNDAMENTAL CONSIDERATIONS OF ELECTROMAGNETIC ENERGY AND INTERACTIONS: THEORY AND APPLICATIONS

FR-SP.2P.1: CONSERVATION OF REACTIVE EM ENERGY IN REACTIVE TIME 1704

Gerald Kaiser, Center for Signals and Waves, United States

FR-SP.2P.2: TIME DOMAIN SCHEME FOR STORED ENERGY EVALUATION 1706

Miloslav Capek, Lukas Jelinek, Czech Technical University in Prague, Czech Republic; Guy A. E. Vandenbosch, KU Leuven, Belgium; Pavel Hazdra, Czech Technical University in Prague, Czech Republic

FR-SP.2P.6: EIGENMODE EXPANSION AND MODE-MATCHING ANALYSIS OF BESSEL BEAM LAUNCHERS 1708

Jason Heebl, Anthony Grbic, University of Michigan, United States

FR-SP.2P.7: ANTENNA POSITIONING USING ANGULAR MOMENTUM OF ELECTROMAGNETIC FIELDS 1710

BaiYang Liu, Yuehui Cui, RongLin Li, South China University of Technology, China

FR-A1.1P: MULTI-BAND ANTENNAS FOR MOBILE DEVICES

FR-A1.1P.1: INVERTED LFFL CARD ANTENNA FOR QUADBAND OPERATION..... 1712

Hisamatsu Nakano, Yusuke Kobayashi, Junji Yamauchi, Hosei University, Japan

FR-A1.1P.2: A BEZELESS-ENABLING ANTENNA FOR ULTRA-THIN TABLET COMPUTER APPLICATIONS 1714

Hao-Han Hsu, Intel Corporation, United States

FR-A1.1P.3: DESIGN OF A SLOTTED-PATCH MICROSTRIP ANTENNA FOR MOBILE TERMINALS 1716

Masood Ur-Rehman, Shyqyri Haxha, University of Bedfordshire, United Kingdom

FR-A1.1P.4: MULTIPOLARIZED/MULTI-BAND ORTHOGONAL MIMO ANTENNA FOR WIFI AND WIMAX APPLICATIONS 1718

Omer Arabi, Glyndwr University, United Kingdom; Nazar Ali, Khalifa University, United Arab Emirates; Peter Excell, Glyndwr University, United Kingdom; Abdul Muhsin AlTimimi, University of Technology, Iraq; Raed Abd-Alhameed, University of Bradford, United Kingdom

FR-A1.1P.5: MULTIBAND BROADBAND ASYMMETRIC BOW-TIE ANTENNA FOR TABLET COMPUTER APPLICATIONS 1720

I-Fong Chen, Chia-Mei Peng, Su-Me Shen, Wei-Chen Lin, Jinwen University of Science and Technology, Taiwan

FR-A1.1P.6: A HYBRID PIFA/LOOP WLAN ANTENNA 1722

Hanyang Wang, Lijun Ying, Huiliang Xu, Lina Chen, Chienming Lee, Xuefei Zhang, Huawei Technologies, China; Yi Huang, University of Liverpool, United Kingdom

FR-A1.1P.7: COMPACT AND MULTIBAND DIELECTRIC RESONATOR ANTENNA FOR MOBILE TERMINALS 1724

Yiheng Diao, Ming Su, Yuanan Liu, Shulan Li, Weimin Wang, Beijing University of Posts and Telecommunications, China

FR-A1.1P.8: A NOVEL MULTIBAND SLOT ANTENNA FOR WLAN/4G/WIMAX APPLICATIONS N/A

Zimu Yang, Hou Zhang, Air Force Engineering University, China; Ying Jian, Liyin Jia, Electronic Systems Engineering Corporation of China, China

FR-A1.1P.9: DUAL-BAND OMNIDIRECTIONAL MONOPOLE/DIELECTRIC RESONATOR ANTENNA FED BY SICL 1728

Xiaowei Zhang, Haiming Wang, Chen Yu, Qi Wu, Wei Hong, Southeast University, China

FR-A1.1P.10: A MULTI-BAND PLANAR INVERTED-F ANTENNA FOR WIRELESS COMMUNICATIONS APPLICATIONS N/A

Bahareh Mansouri, Zaker Hossein Firouzeh, Reza Safian, Isfahan University of Technology, Iran

FR-A2.1P: METAMATERIAL-ENHANCED ANTENNAS

FR-A2.1P.1: MINIATURIZED METAMATERIAL-LOADED HORN ANTENNAS THROUGH TWO-STEP QCTE N/A

Ephrem Bekele, Giacomo Oliveri, Federico Viani, Andrea Massa, ELEDIA Research Center, University of Trento, Italy

FR-A2.1P.2: RADIATION CHARACTERISTICS OF MINIATURIZED METAMATERIAL-LINED WAVEGUIDE PROBE ANTENNAS 1734

Justin George Pollock, Ashwin K. Iyer, University of Alberta, Canada

FR-A2.1P.3: EXPERIMENTAL VERIFICATION OF BROADBAND ANTENNAS LOADED WITH METAMATERIALS 1736

Davide Ramaccia, Andrea Verrengia, Filiberto Bilotti, Alessandro Toscano, "RomaTre" University, Italy; Alessio Monti, Mirko Barbuto, "Niccolò Cusano" University, Italy; Fabrizio Trotta, Elettronica S.p.A., Italy; Damir Muha, Silvio Hrabar, University of Zagreb, Croatia

FR-A2.1P.4: CIRCULARLY-POLARIZED ANTENNA USING AN L-SHAPED PSEUDO-TRAVELING WAVE RESONATOR	1738
<i>Keisuke Ninomiya, Tetsuya Ueda, Kyoto Institute of Technology, Japan; Tatsuo Itoh, University of California, Los Angeles, United States</i>	
FR-A2.1P.5: COMPACT LEAKY WAVE ANTENNA WITH PERIODICAL SLOTS ON HALF MODE SUBSTRATE INTEGRATED WAVEGUIDE	1740
<i>Manisha Mujumdar, Alphones Arokiaswami, Nanyang Technological University, Singapore; Nasimuddin N, Institute for Infocomm Research (I²R), Singapore</i>	
FR-A2.1P.6: SUBWAVELENGTH CONFORMAL FABRY-PEROT CAVITY ANTENNA FOR SECTORAL RADIATION PATTERN	1742
<i>Mohamed Lamine Abdelghani, Tayeb A. Denidni, INRS, Canada</i>	
FR-A2.1P.7: INVESTIGATIONS ON HIGH IMPEDANCE SURFACE SIZE EFFECT TO LOW-PROFILE ANTENNA PERFORMANCE	1744
<i>Yizhu Shen, Jian Lu, Tan-Huat Chio, National University of Singapore, Singapore</i>	
FR-A2.1P.8: RADIATION PROPERTIES OF A X-BAND HORN ANTENNA COVERED WITH A WIRE MEDIUM STRUCTURE	N/A
<i>Antonio Tomaz, Aeronautics Technological Institute (ITA), Brazil; Joaquim J Barroso, National Institute for Space Research- INPE, Brazil</i>	
FR-A2.1P.9: MULTIPLE SLOT ARRAY WITH NEAR ZERO REFRACTIVE INDEX SUBSTRATE	1748
<i>Namrata Singh, Rohit Jain, Shobha Sundar Ram, Indraprastha Institute of Information Technology, India</i>	
FR-A5.1P: EMERGING APPLICATIONS OF RFID SYSTEMS	
FR-A5.1P.1: PERFORMANCE EVALUATION OF WEARABLE PASSIVE RFID TAG FOR HUMAN INDOOR POSITIONING	1750
<i>Masoumeh Hasani, Lauri Sydänheimo, Elena-Simona Lohan, Leena Ukkonen, Tampere University of Technology, Finland</i>	
FR-A5.1P.2: A PASSIVE UHF RFID TAG ANTENNA FOR ROAD MARKER NAVIGATION APPLICATION	1752
<i>Jinxin Chen, Yen B. Le, Sungkyun Lim, Georgia Southern University, United States</i>	
FR-A5.1P.3: CHARACTERIZATION SYSTEM FOR RADIATION PATTERN AND SENSITIVITY ESTIMATION OF UHF RFID TAGS	1754
<i>Riccardo Colella, Luca Catarinucci, Paolo Coppola, Luciano Tarricone, University of Salento, Italy</i>	
FR-A5.1P.4: RFID READABILITY AROUND WINE BOTTLE BOXES	1756
<i>Isabel Expósito, Iñigo Cuiñas, Universidade de Vigo, Spain</i>	
FR-A5.1P.5: CNT-RFID PASSIVE TAG ANTENNA FOR GAS SENSING IN UNDERGROUND MINE	1758
<i>Iyadh Gammoudi, Brahim Aissa, Mourad Nedil, Université du Québec en Abitibi-Témiscamingue, Canada; Mohamed Mustafa Abdallah, Minia University, Egypt</i>	
FR-A5.1P.6: DOA ESTIMATION TECHNIQUES APPLIED TO RFID TAGS USING RECEIVING UNIFORM LINEAR ARRAY	1760
<i>Yassine Mohamedatni, Belkacem Fergani, LCPTS / USTHB, Algeria; Jean-Marc Laheurte, Benoit Poussot, ESYCOM / UPEM, France</i>	
FR-A5.1P.7: RFID TAG LOAD IMPEDANCE MEASUREMENT USING BACKSCATTERED SIGNAL	1762
<i>Muhammad Bashir Akbar, Francesco Amato, Gregory Durgin, Georgia Institute of Technology, United States; Greeshma Pisharody, Seong-young Suh, Intel Corporation, United States</i>	
FR-A5.1P.8: METAMATERIAL RFID TAG DESIGNS FOR LONG READ RANGE	1764
<i>Dahbia Hamzaoui, Grenoble INP and Béjaia University, France; Tan-Phu Vuong, Grenoble INP, France; Farid Djahli, Sétif university, Algeria; Ghaffer Kiani, King Abdul Aziz University, Saudi Arabia</i>	

FR-A5.1P.9: A SCALABLE MODULAR ANTENNA CONFIGURATION TO EXTEND THE DETECTION VOLUME OF A NEAR-FIELD UHF-RFID DESKTOP READER	1766
<i>Andrea Michel, Alice Buffi, Roberto Caso, Paolo Nepa, University of Pisa, Italy</i>	
FR-A5.1P.10: A NOVEL BOOSTER ANTENNA ON FLEXIBLE SUBSTRATES FOR METAL PROXIMITY NFC APPLICATIONS	1768
<i>Hossein Saghlatoon, Pedram Mousavi, University of Alberta, Canada</i>	
FR-A5.1P.11: HIGH CAPACITY POLARIZATION SENSITIVE CHIPLESS RFID TAG	1770
<i>Munawar Masood Khan, Farooq A. Tahir, Hammad M. Cheema, National University of Sciences & Technology (NUST), Pakistan</i>	
 FR-UK.1P: ABLATION AND HYPERTHERMIA	
FR-UK.1P.9: EFFICIENT SAR LOCALIZATION FOR HYPERTHERMIA TREATMENT OF CANCER CELLS BY APPLYING A DUAL-BAND 8-ELEMENT PHASED-ARRAY	1772
<i>Mohamed Ali, Osama Haraz, Assiut University, Egypt; Ibrahim Elshafey, Saleh Alshebeili, King Saud University, Saudi Arabia; Abdel-Razik Sebak, Concordia University, Canada</i>	
 FR-A4.1P: MODELING AND MEASUREMENT FOR INDOOR PROPAGATION	
FR-A4.1P.1: SPACE-TIME FOCUSING PERFORMANCE OF TIME-REVERSAL BEAMFORMING IN RICH-SCATTERING INDOOR CHANNELS	1774
<i>Carlos Viteri-Mera, Fernando Teixeira, Ohio State University, United States</i>	
FR-A4.1P.2: UNCERTAINTY QUANTIFICATION OF RAY-TRACING BASED WIRELESS PROPAGATION MODELS WITH A CONTROL VARIATE-POLYNOMIAL CHAOS EXPANSION METHOD	1776
<i>Sarthak Garg, Neeraj Sood, Costas D. Sarris, University of Toronto, Canada</i>	
FR-A4.1P.3: COMPARISON OF INDOOR PENETRATION LOSS BETWEEN MEASUREMENT RESULT AND HYBRID METHOD BY RAY-TRACING AND PHYSICAL OPTICS	1778
<i>Hayate Kimoto, Kentaro Nishimori, Niigata University, Japan; Tetsuro Imai, Nobutaka Omaki, Ngochao Tran, NTT DOCOMO, INC., Japan</i>	
FR-A4.1P.4: IMPACT OF RECONFIGURABLE POLARIZATION PARAMETER ON TRANSFERRED SIGNAL POWER IN INDOOR MIMO CHANNELS	1780
<i>Hassan El-Sallabi, Mohamed Abdallah, Texas A&M University at Qatar, Qatar; Jean-Francois Chamberland, Texas A&M University, United States; Khalid Qaraqe, Texas A&M University at Qatar, Qatar</i>	
FR-A4.1P.5: TERAHERTZ BAND: INDOOR RAY-TRACING CHANNEL MODEL CONSIDERING ATMOSPHERIC ATTENUATION	1782
<i>Fawad Sheikh, Mohamed El-Hadidy, Thomas Kaiser, University of Duisburg-Essen, Germany</i>	
FR-A4.1P.6: ACCURATE RAY-TRACING/UTD-BASED MODEL FOR INDOOR STAIRWELLS AT 10 GHZ	1784
<i>Vincent Fono, Ousama Abu Safia, Larbi Talbi, Université du Québec en Outaouais, Canada; Mourad Nedil, Université du Québec en Abitibi-Témiscamingue, Canada</i>	
FR-A4.1P.7: 24 GHZ INDOOR MIMO CHANNEL MEASUREMENTS	1786
<i>Rashid Mehmood, Jon Wallace, Michael Jensen, Brigham Young University, United States</i>	
FR-A4.1P.8: EXPERIMENTAL ANALYSIS OF HUMAN BODY EFFECTS ON NLOS 60 GHZ PROPAGATION CHANNEL	1788
<i>Mohamad Ghaddar, Mourad Nedil, University of Quebec in Abitibi, Canada; Larbi Talbi, University of Quebec in Outaouais, Canada; Jules Lebel, Communications Research Centre Canada, Canada</i>	
FR-A4.1P.9: FEMTOCELL COOPERATION BASED ON MULTIPLE-ACCESS CHANNEL MODEL	1790
<i>Yuanyuan Shi, Gang Zhu, State Key Laboratory of Rail Traffic Control and Safety, China</i>	

FR-A4.2P: PROPAGATION CHARACTERIZATION IN URBAN ENVIRONMENT

FR-A4.2P.1: NON-LINE-OF-SIGHT PATH LOSS MODEL FOR LOW-HEIGHT TERMINALS IN URBAN STREET GRID ENVIRONMENTS 1792

Juyul Lee, Myung-Don Kim, Hyun Kyu Chung, Jinup Kim, Electronics and Telecommunications Research Institute (ETRI), Republic of Korea

FR-A4.2P.2: SEMI-DETERMINISTIC URBAN CANYON MODELS OF RECEIVED POWER FOR MICROCELLS 1794

Jonathan Lu, Jeffrey Wu, Jian Zhu, Jerome Blaha, Polaris Wireless Inc., United States

FR-A4.2P.3: COMPARISON OF DIFFRACTION WITH NUMERICAL AND PHYSICAL EXPERIMENTS..... 1796

Roshanak Zabihi, Rodney Vaughan, Simon Fraser University, Canada

FR-A4.2P.4: 28GHZ PATH LOSS MEASUREMENTS IN URBAN ENVIRONMENTS USING WIDEBAND CHANNEL SOUNDER 1798

Myung-Don Kim, Jinyi Liang, Young Keun Yoon, Jong Ho Kim, Electronics and Telecommunications Research Institute (ETRI), Republic of Korea

FR-A4.2P.5: OPTIMIZING PROPAGATION MODELS FOR LTE AND LTE-A USING GENETIC ALGORITHMS AT 850 MHZ N/A

Bruno Cavalcanti, Priscila Alves, Federal Institute of Education, Science and Technology, Brazil; Adaildo d'Assunção, Laércio Mendonça, Federal University of Rio Grande do Norte, Brazil

FR-A4.2P.6: A RAY TRACING METHOD FOR PROPAGATION PREDICTION IN A MOCK CITY WITH PARTIALLY OPEN DRAINS 1802

Almuzzaz Mohammad, Soo Yong Lim, University of Nottingham Malaysia Campus, Malaysia; Zhengqing Yun, Magdy F. Iskander, University of Hawaii at Manoa, United States

FR-A4.2P.7: HEURISTIC UTD COEFFICIENTS APPLIED FOR THE CHANNEL CHARACTERIZATION IN AN ANDEAN SCENARIO 1804

Diego Tami, Cassio G. Rego, Fernando J. S. Moreira, Federal University of Minas Gerais, Brazil; Dinael Guevara, Universidad Francisco de Paula Santander, Colombia; Andres Navarro, Universidad Icesi, Colombia

FR-A4.2P.8: STATISTICAL ANALYSIS OF SCATTERED FIELD BY BUILDING FACADES USING POLYNOMIAL CHAOS EXPANSION 1806

Pierric Kersaudy, Orange Labs, France; Shermila Mostarshedi, ESYCOM (EA 2552), UPEM, France; Bruno Sudret, ETH Zürich, France; Odile Picon, ESYCOM (EA 2552), UPEM, France; Joe Wiart, Orange Labs, France

FR-A4.2P.9: THREE-DIMENSIONAL MODELING, SIMULATION AND EVALUATION OF DEVICE-TO-DEVICE CHANNELS 1808

Yan Li, Bo Ai, Qi Wang, Zhangdui Zhong, Beijing Jiaotong University, China; David Michelson, University of British Columbia, Canada

FR-A4.2P.10: HYBRID METHOD FOR ENHANCED DETECTION OF COHERENT SIGNALS USING CIRCULAR ANTENNA ARRAYS 1810

Mohamed AlHajri, Raed Shubair, Luis Weruaga, Ahmed Kulaib, Abdulrahman Goian, Muna Darweesh, Rashid AlMemari, Khalifa University, United Arab Emirates

FR-A3.1P: INTEGRAL EQUATIONS FOR ANISOTROPIC AND INHOMOGENEOUS OBJECTS IN FREQUENCY AND TIME DOMAIN

FR-A3.1P.1: ON THE NUMERICAL INTEGRATION OF SPECTRAL DOMAIN IMMITTANCE FUNCTIONS FOR MULTIPLE PRINTED DIPOLES IN LAYERED UNIAXIAL ANISOTROPIC DIELECTRICS 1812

Benjamin Braaten, David Rogers, North Dakota State University, United States; Robert Nelson, University of Wisconsin-Stout, United States

FR-A3.1P.2: ON THE MODELING OF FLUCTUATION-INDUCED PHENOMENA IN 1814
INHOMOGENEOUS GEOMETRIES

Athanasios Polimeridis, M. T. Homer Reid, Massachusetts Institute of Technology, United States; Weiliang Jin, Princeton University, United States; Steven Johnson, Jacob White, Massachusetts Institute of Technology, United States; Alejandro Rodriguez, Princeton University, United States

FR-A3.1P.3: AN EFFICIENT EXPLICIT MARCHING ON IN TIME SOLVER FOR MAGNETIC FIELD 1816
VOLUME INTEGRAL EQUATION

Sadeed Bin Sayed, Huseyin Arda Ulku, Hakan Bagci, King Abdullah University of Science and Technology, Saudi Arabia

FR-A3.1P.4: A NYSTROM METHOD FOR SOLVING TIME-DOMAIN VOLUME INTEGRAL 1818
EQUATIONS

Rui Peng Chen, Dian Jin Li, Yi Tong Kong, Wen Jie Cheng, Mei Song Tong, Tongji University, China

FR-A3.1P.5: COMPUTATIONS OF ELECTROMAGNETIC WAVE SCATTERING FROM ANISOTROPIC 1820
AND INHOMOGENEOUS OBJECTS USING VOLUME INTEGRAL EQUATION METHODS

Lin Sun, Youngstown State University, United States

FR-A3.2P: NOVEL TIME-DOMAIN FINITE ELEMENT METHODS

FR-A3.2P.1: TIME-DOMAIN FINITE ELEMENT MODELING OF NONLINEAR CONDUCTIVITY 1822
USING NEWTON'S METHOD

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

FR-A3.2P.2: TIME-DOMAIN NONLINEAR FINITE ELEMENT ANALYSIS OF AIR BREAKDOWN USING 1824
A SIMPLIFIED PLASMA MODEL

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

FR-A3.2P.3: NEW 3D HYBRID FDTD-FETD METHOD WITH NON-CONFORMAL MESH..... 1826

Qingtao Sun, Qing Huo Liu, Duke University, United States

FR-A3.2P.4: A NEW EXPLICIT AND UNCONDITIONALLY STABLE TIME-DOMAIN 1828
FINITE-ELEMENT METHOD

Woochan Lee, Dan Jiao, Purdue University, United States

FR-A3.2P.5: ACCURATE MATRIX-FREE TIME-DOMAIN METHOD IN THREE-DIMENSIONAL 1830
UNSTRUCTURED MESHES

Jin Yan, Dan Jiao, Purdue University, United States

FR-A3.3P: FDTD APPLICATIONS

FR-A3.3P.1: BULK ACOUSTIC WAVE MEDIATED MULTIFERROIC ANTENNAS NEAR 1832
FERROMAGNETIC RESONANCE

Zhi Yao, Yuanxun Wang, University of California, Los Angeles, United States

FR-A3.3P.2: EXPERIMENTAL DESIGN OF A FICA ANTENNA 1834

Yong Wang, Scott Langdon, Remcom Inc., United States

FR-A3.3P.3: FDTD MODEL PERFORMANCE ANALYSIS FOR A CAVITY SLOT ANTENNA ARRAY IN A 1836
VARIABLE GEOMETRY CONFORMAL TEST RIG

Timothy Pelham, Geoff Hilton, Christopher Railton, University of Bristol, United Kingdom; Rob Lewis, BAE Systems Advanced Technology Center, United Kingdom

FR-A3.3P.4: BROADBAND AND EFFICIENT MODELLING GRAPHENE-BASED STRUCTURES WITH N/A
AN IMPROVED LOD-FDTD METHOD

Xiang-Hua Wang, Yang Guo, Jun Hu, Wen-Yan Yin, Zhejiang University, China

FR-A3.3P.5: EXPERIMENTAL NEAR-FIELD METHOD FOR VALIDATING SIMULATION ANTENNA MODELS 1840

Lars Jacob Foged, Lucia Scialacqua, Microwave Vision Group, Italy; John Estrada, Jerome Luc, MVG Inc. Americas, United States; Giorgi Bit-Babik, Antonio Faraone, Motorola Solutions, Inc., United States

FR-A3.4P: ADVANCED FINITE ELEMENT METHODS

FR-A3.4P.1: LINEAR-COMPLEXITY DIRECT FINITE ELEMENT SOLVER FOR IRREGULAR MESHES AND MATRICES WITHOUT MESH 1842

Bangda Zhou, Dan Jiao, Purdue University, United States

FR-A3.4P.2: FINITE ELEMENT MODELING OF DOUBLE-TIP DIFFRACTION 1844

Ozlem Ozgun, Hacettepe University, Turkey; Levent Sevgi, Okan University, Turkey

FR-A3.4P.3: FE-BI FORMULATION FOR CHARACTERISTIC MODES OF GENERAL BODIES 1846

Fu-Gang Hu, Chao-Fu Wang, National University of Singapore, Singapore

FR-A3.4P.4: NON-CONFORMAL DDM-FEM-BI WITH GAUSS-SEIDEL PRECONDITIONER FOR SCATTERING FROM COATING OBJECTS 1848

Mi Tian, Pinghao Jia, Jun Hu, University of Electronic Science and Technology of China, China

FR-A3.4P.5: IMPLEMENTATION OF DG-FEM WITH DYNAMIC JULIA LANGUAGE FOR ACCURATE EM SIMULATION 1850

Yi Wang, Nanjing University of Aeronautics and Astronautics, China; Meilin Liu, Shanghai Institute of Satellite Engineering, China; Huiping Li, Shu Liang, Qunsheng Cao, Nanjing University of Aeronautics and Astronautics, China

MOP-A1.4A: MICROSTRIP ANTENNA ARRAYS II

MOP-A1.4A.1: A DESIGN METHODOLOGY FOR IMPEDANCE-MATCHED ELECTRICALLY SMALL PARASITIC SUPERDIRECTIONAL ARRAYS 1852

Abdullah Haskou, Sylvain Collardey, Ala Sharaiha, University of Rennes 1, France

MOP-A1.4A.2: DESIGN OF THE SERIES FED MICROSTRIP PATCH PLANAR ARRAY ANTENNA BY THE PARATO GENETIC ALGORITHM 1854

Hiroki Tsutsumi, Yoshihiko Kuwahara, Shizuoka University, Japan; Hiroyuki Kamo, Nidec Elesys Corporation, Japan

MOP-A1.4A.3: A COMPACT PRINTED VAN ATTA ARRAY WITH ZERO-PHASE CRLH TRANSMISSION LINES 1856

Benjamin Braaten, Sajid Asif, Saeed Khan, Jared Hansen, Daniel Ewert, North Dakota State University, United States

MOP-A1.4A.4: ANALYSIS OF NONUNIFORM EXCITATION AND ELEMENT SPACING IN SIDELobe REDUCTION OF WIDEBAND U-SLOT MICROSTRIP PATCH PHASED ARRAY ANTENNAS 1858

Mohamed Elsewe, Deb Chatterjee, University of Missouri at Kansas City, United States

MOP-A1.4A.5: A COMPACT MICROSTRIP FEEDING NETWORK FOR CIRCULAR ARRAYS WITH CONICAL BEAM PATTERN 1860

Mónica Portela Táboas, María Vera Isasa, University of Vigo, Spain

MOP-A1.4A.6: CIRCULAR ARRAY WITH DUAL CONICAL BEAM PATTERN FOR EMERGENCY COMMUNICATIONS 1862

Mónica Portela Táboas, María Vera Isasa, University of Vigo, Spain

MOP-A1.4A.7: CIRCULARLY POLARIZED MICROSTRIP ANTENNA ARRAY FOR THE KA-BAND 1864

Tiago Varum, João Matos, Pedro Pinho, Vanessa Duarte, Instituto de Telecomunicações, Portugal

MOP-A1.4A.8: KU BAND PLANAR ARRAY ANTENNA FOR SATELLITE TV SIGNAL RECEPTION 1866

Lokman Kuzu, Mesut Gokten, Tubitak Space Research Institute, Turkey; Ahmet Yagli, Senol Gulgonul, TURKSAT, Turkey

MOP-A1.4A.9: A THREE-LAYER TRANSMITARRAY ELEMENT WITH 360° PHASE RANGE..... 1868
Le Chang, Zhijun Zhang, Zhenghe Feng, Tsinghua National Laboratory for Information Science and Technology, China

MOP-A1.4A.10: A NOVEL DOUBLE-LAYER RECTANGULAR MICROSTRIP ANTENNA 1870
Xiaopeng Lu, Yumei Zhang, East China Research Institute of Electronic Engineering, China

MOP-A1.4A.11: LARGE GAIN LINEAR SERIES-FED MICROSTRIP ANTENNA ARRAYS AT KA AND C 1872 BANDS
Pratigya Mathur, Girish Kumar, Indian Institute of Technology Bombay, India; Prashant Kumar Mishra, Yogesh K. Verma, Research Centre Imarat, Defense Research & Development Organization, India

MOP-A1.1A: WIDEBAND, MULTIBAND AND CIRCULARLY POLARIZED MICROSTRIP ANTENNAS I

MOP-A1.1A.1: A SELF-DIPLEXING DUAL-BAND PLANAR ARRAY FOR GNSS APPLICATIONS..... 1874
Elena Abdo-Sánchez, Teresa M. Martín-Guerrero, Universidad de Málaga, Spain; Jaime Esteban, Universidad Politécnica de Madrid, Spain; Carlos Camacho-Peñalosa, Universidad de Málaga, Spain

MOP-A1.1A.2: LOW PROFILE TRI-BANDS ANTENNA FOR 1.2/2.4/3.5 GHZ WIRELESS APPLICATIONS..... N/A
Ali Al-Azza, Frances Harackiewicz, Southern Illinois University of Carbondale, United States

MOP-A1.1A.3: MULTI-RESONANT AGNW/PDMS PATCH ANTENNA FOR BIAXIAL STRAIN SENSING 1878
Clifford Muchler, Zheng Cui, Yong Zhu, Jacob Adams, North Carolina State University, United States

MOP-A1.1A.4: JONES MATRIX AND S-PARAMETER ANALYSIS USING AN EQUIVALENT CIRCUIT 1880 MODEL FOR INTRINSICALLY DUAL CIRCULARLY POLARIZED MICROSTRIP ANTENNAS
Zhenchao Yang, Karl F. Warnick, Brigham Young University, United States

MOP-A1.1A.5: UWB L-PROBE PROXIMITY FED V-SLOT PATCH ANTENNA FOR EARLY 1882 DETECTION OF BREAST CANCER
Mahrukh Khan, Dhivya Ketharnath, Varun Dandu, Deb Chatterjee, University of Missouri at Kansas City, United States

MOP-A1.1A.6: DUAL-BAND CIRCULARLY POLARIZED STACK RING ANTENNA WITH OPEN GAP..... 1884
Dongcheol Seo, Youngje Sung, Kyonggi University, Republic of Korea

MOP-A1.1A.7: DESIGN OF A DUAL-BAND MICROSTRIP ANTENNA USING SLOTTED ANNULAR-RING 1886 AND CONCENTRIC DISK
Bo-hua Gan, Liang Zhou, Yao-Pin Zhang, Huahua Zhou, Jun-fa Mao, Shanghai Jiao Tong University, China

MOP-A1.1A.8: MINIATURIZED DIFFERENTIAL DUAL-BAND ANTENNA WITH BANDWIDTH 1888 IMPROVEMENT FOR WLAN APPLICATION
Yanfang Shen, Xinwei Chen, Runbo Ma, Wenmei Zhang, Liping Han, Shanxi University, China

MOP-A1.1A.9: NOVEL DUAL-BAND AND DUAL CIRCULARLY POLARIZED MICROSTRIP ANTENNA..... 1890
Chunlan Lu, Juhong Shen, Yisen Cao, Fanqiu Meng, Tinghui Yin, College of Communications Engineering, PLA University of Science and Technology, China

MOP-A1.1A.10: CIRCULAR POLARISED ANNULAR RING MICROSTRIP ANTENNA FOR X-BAND N/A APPLICATION
Anil Kumar Singh, Ravi Kumar Gangwar, Indian School of Mines, India; Binod Kumar Kanaujia, Ambedkar Institute of Advanced Communication Technologies & Research, India

MOP-A1.2A: MICROSTRIP ANTENNA ARRAYS I

MOP-A1.2A.1: LARGE MICROSTRIP ARRAY ANTENNA WITH HYBRID FEED NETWORK OF 1894 STANDING AND TRAVELING WAVES
Choon Lee, Mohamed Ezzat, Southern Methodist University, United States

- MOP-A1.2A.2: A 4X4 CIRCULARLY POLARIZED APERTURE COUPLED ANTENNA ARRAY FOR 1896
KA-BAND SATELLITE COMMUNICATION**
Hussam Al-saedi, Mohmmad Fereidani, Wael M. Abdel-Wahab, Rafi Gholamreza, Safieddin Safavi-Naeini, University of Waterloo, Canada
- MOP-A1.2A.3: INDENTED ANTENNA ARRAY FOR FULL-DUPLEX REPEATER..... 1898**
Qiang Xu, Shihan Qin, Yuanxun Wang, University of California, Los Angeles, United States
- MOP-A1.2A.4: APERTURE-COUPLED 2X2 MICROSTRIP ANTENNA ARRAY FOR 60 GHZ APPLICATIONS ... 1900**
Issa Mohamed, Abdel-Razik Sebak, Concordia University, Canada
- MOP-A1.2A.5: A FEED CIRCUIT-INTEGRATED PLANAR ARRAY ANTENNA USING ANISOTROPIC 1902
CONDUCTIVE PASTE**
Shimpei Akimoto, Takashi Yanagi, Toru Fukasawa, Hidenori Ishibashi, Yukihiro Tahara, Hiroaki Miyashita, Mitsubishi Electric Corporation, Japan
- MOP-A1.2A.6: A BOWTIE-SHAPED GRID ARRAY ANTENNA RADIATING LINEARLY AND CIRCULARLY .. 1904
POLARIZED BEAMS**
Toru Kawano, National Defense Academy, Japan; Hisamatsu Nakano, Hosei University, Japan
- MOP-A1.2A.7: LOW PROFILE MULTILAYER DUAL CIRCULAR POLARIZED K-BAND ANTENNA ARRAY .. 1906
FOR AEROSPACE APPLICATIONS**
Przemyslaw Gorski, Wroclaw University of Technology, Poland; Juan R. Mosig, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland
- MOP-A1.2A.8: A HYBRID-FED DUAL-POLARIZED STACKED PATCH ARRAY ANTENNA FOR KU-BAND 1908
RADAR SYSTEMS**
Lizhong Song, Yuming Nie, Harbin Institute of Technology, China
- MOP-A1.2A.9: GAP-COUPLED SERIES-FED ANTENNA ARRAY WITH IMPROVED BANDWIDTH..... 1910**
Prashant Kumar Mishra, Dhananjay Ramchandra Jahagirdar, Defence Research & Development Organization, India; Girish Kumar, Indian Institute of Technology Bombay, India
- MOP-A1.2A.10: PULSED ARRAY OF SPIRAL ANTENNAS FOR SCANNED ENERGY PATTERN WITH 1912
LOW SIDE LOBES**
Alberto Reyna, Marco Antonio Panduro, Autonomous University of Tamaulipas, Mexico
- MOP-A1.2A.11: PERFORMANCE ANALYSIS OF UNIFORM META-MATERIAL LENS EMBEDDED 1914
PATCH ANTENNAS**
Jaypal Baviskar, Afshan Mulla, Amutha Jeyakumar, Veermata Jijabai Technological Institute (VJTI), India
- MOP-A1.3A: WIDEBAND, MULTIBAND AND CIRCULARLY POLARIZED MICROSTRIP
ANTENNAS II**
- MOP-A1.3A.1: WIDE-BAND PLANAR FOLDED LOOP MIMO ANTENNA WITH PARALLEL STUBS..... 1916**
DukSoo Kwon, In-June Hwang, Seung-Tae Khang, Jong-Won Yu, Korea Advanced Institute of Science and Technology, Republic of Korea; Wang-Sang Lee, Gyeongsang National University, Republic of Korea
- MOP-A1.3A.2: THE CP HALF E-SHAPED PATCH: EVOLVING FROM LINEAR POLARIZATION TO 1918
COMPACT SINGLE FEED CIRCULARLY POLARIZED ANTENNAS**
Joshua Kovitz, Jean Paul Santos, Yahya Rahmat-Samii, University of California, Los Angeles, United States
- MOP-A1.3A.3: A WIDEBAND CIRCULARLY POLARIZED MONOPOLE ANTENNA ARRAY..... 1920**
Changfei Zhou, S.W. Cheung, Yunfei Cao, T.I. Yuk, University of Hong Kong, Hong Kong SAR of China
- MOP-A1.3A.4: HIGH-GAIN CIRCULAR POLARIZATION MONOPOLE ANTENNA USING MS FOR GNSS 1922**
Yunfei Cao, S.W. Cheung, T.I. Yuk, Hailiang Zhu, University of Hong Kong, Hong Kong SAR of China

MOP-A1.3A.5: A NOVEL PLANAR CIRCULARLY-POLARIZED ANTENNA USING STEPPED-WIDTH CROSS-DIPOLE	1924
<i>Yu Luo, Qing-Xin Chu, South China University of Technology, China; Lei Zhu, University of Macau, Macao SAR of China</i>	
MOP-A1.3A.6: A BROADBAND ANGLED-DIPOLE ARRAY ANTENNA WITH RADOM	1926
<i>Min Guo, Xiao-Bo Xuan, Min Wang, Ming-Ming Fan, Science and Technology on Electromagnetic Scattering Laboratory, China; Shun-Shi Zhong, Shanghai University, China</i>	
MOP-A1.3A.7: WIDEBAND STACKED PATCH ANTENNA FOR MODERN COMMUNICATION SYSTEMS	1928
<i>Hao Jiang, Zheng-Hui Xue, Weiming Li, Wu Ren, Beijing Institute of Technology, China</i>	
MOP-A1.3A.8: A WIDEBAND MICROSTRIP ARRAY ANTENNA WITH THE 2ND HARMONIC SUPPRESSION CHARACTERISTICS	1930
<i>Sen Feng, Mou-ping Jin, Zhouhai Wang, Qinghua Lai, East China Research Institute of Electronic Engineering, China</i>	
MOP-A1.3A.9: MULTILAYER SLOTTED MICROSTRIP ANTENNA FOR WI-FI APPLICATION	1932
<i>Khushboo Tiwari, Dhaval Pujara, Nirma University, India</i>	
MOP-A1.3A.10: DESIGN OF WIDEBAND MICROSTRIP ANTENNA WITH SPIRAL SLOT ON GROUND PLANE	1934
<i>Simin Masihi, Adiban Institute of Higher Education, Iran; Pejman Rezaei, Semnan University, Iran; Masoud Panahi, Islamic Azad University of Mashhad, Iran</i>	
MOP-A1.3A.11: A WIDE-BAND MINIATURIZED LOADED INVERTED L ANTENNA	1936
<i>Abdullah Haskou, Ala Sharaiha, Sylvain Collardey, University of Rennes 1, France</i>	
MOP-A1.2P: BROADBAND PRINTED ANTENNAS I	
MOP-A1.2P.1: A SELF-COMPLEMENTARY PICA FOR UWB APPLICATIONS	1938
<i>Nueri Quasem, University of British Columbia, Canada; Atiqur Rahman, North South University, Bangladesh; David Michelson, University of British Columbia, Canada</i>	
MOP-A1.2P.2: MULTI-OBJECTIVE OPTIMIZATION FOR UWB ANTENNAS IN IMPEDANCE MATCHING, GAIN, AND FIDELITY FACTOR	1940
<i>Yi-Hsiang Chiu, Yen-Sheng Chen, National Taipei University of Technology, Taiwan</i>	
MOP-A1.2P.3: BANDWIDTH ENHANCEMENT OF A BENT PLANAR MONOPOLE ANTENNA BY GROUND PLATE EXTENSION	1942
<i>Kyoichi Iigusa, Fumihide Kojima, Hiroyuki Yano, National Institute of Information and Communications Technology, Japan</i>	
MOP-A1.2P.4: A WIDEBAND PRINTED BENT MONOPOLE ANTENNA WITH A SMALL GROUND PLATE AND BASIC STUDY	1944
<i>Kyoichi Iigusa, Fumihide Kojima, Hiroyuki Yano, National Institute of Information and Communications Technology, Japan</i>	
MOP-A1.2P.5: WIDEBAND CIRCULARLY POLARIZED MODIFIED TRAPEZOIDAL-SHAPED MONOPOLE ANTENNA	1946
<i>Roshini John, Nanyang Technological University, Singapore; Nasimuddin Nasimuddin, Institute for Infocomm Research (I²R), Singapore; Arokiaswami Alphones, Nanyang Technological University, Singapore</i>	
MOP-A1.2P.6: A DUAL BAND DUAL POLARIZED BIDIRECTIONAL HORSE SHOE SHAPE ANTENNA	1948
<i>Mahima Arrawatia, Maryam Shojaei Baghini, Girish Kumar, Indian Institute of Technology Bombay, India</i>	
MOP-A1.2P.7: UWB ANTENNA WITH QUINTUPLE NOTCH BANDS	1950
<i>Yunnan Jin, Jaehoon Choi, Hanyang University, Republic of Korea</i>	
MOP-A1.2P.8: COMPACT ACS-FED ANTENNA FOR UWB APPLICATIONS	1952
<i>Yantao Yu, Lijun Yi, Xiaoya Liu, Zhaokai Gu, Jinghe Li, Chongqing University, China</i>	

MOP-A1.2P.9: UWB ANTENNA WITH ROUND STEPS..... 1954
Noor Awad, University of Jordan, Jordan; Mohamed Abdelazeez, German Jordan University, Jordan

MOP-A1.2P.10: COMPACT TRIANGULAR SHAPED PRINTED MONOPOLE ANTENNAS FOR N/A
BLUETOOTH AND UWB APPLICATIONS
Praveen Naidu Vummadisetty, Symbiosis International University, India; Raj Kumar, ARDE, India

MOP-A1.3P: BROADBAND PRINTED ANTENNAS II

MOP-A1.3P.1: CONDUCTIVE INKJET PRINTED ULTRA-WIDEBAND (UWB) PLANAR MONOPOLE 1958
ANTENNA ON LOW COST FLEXIBLE PET SUBSTRATE MATERIAL
Daria Lane, Alejandro Castro, Satish Sharma, San Diego State University, United States

MOP-A1.3P.2: WIDEBAND PRINTED INVERTED-F ANTENNA FOR MIMO SYSTEM 1960
Takafumi Fujimoto, Junpei Taguri, Nagasaki University, Japan

MOP-A1.3P.3: DOUBLE FOLDED INVERTED-L ANTENNA FOR ACCESS POINTS..... 1962
Jingya Deng, Lixin Guo, Xidian University, China

MOP-A1.3P.4: A NOVEL DUAL-POLARIZED BROADBAND PLANAR ANTENNA FOR BASE STATIONS 1964
Yuehui Cui, Fuyun Li, Yan Pan, South China University of Technology, China; Yi Fan, School of South China University of Technology, China; RongLin Li, South China University of Technology, China

MOP-A1.3P.5: UWB RING-SHAPED METAMATERIAL ANTENNA WITH MODIFIED PHI-SHAPED SRR..... 1966
Sameer Kumar Sharma, Ashish Gupta, Raghvendra Kumar Chaudhary, Indian School of Mines Dhanbad, India

MOP-A1.3P.6: TULIP-LIKE UWB ANTENNA WITH SWITCHABLE BULL-LIKE SLOT FOR N/A
DOUBLE/TRIPLE BAND REJECTION
Mohammad Safarpour, Pejman Rezaei, Somayeh Foroughi, Semnan University, Iran

MOP-A1.3P.7: DESIGN OF A NEW FRACTAL ANTENNA WITH CPW-FED FOR UWB APPLICATION..... 1970
Djelloul Aissaoui, Tlemcen University, Algeria; A. Tayeb Denidni, National Institute of Scientific Research, Canada; Noureddine Boukli Hacem, Tlemcen University, Algeria

MOP-A1.3P.8: A NOVEL CPW-FED COMPACT UWB MICROSTRIP ANTENNA 1972
Xieyong He, Dongya Shen, Qiong Zhou, Xiupu Zhang, Jie Zeng, Yue Lv, Yunnan University, China

MOP-A1.3P.9: BLADE ANTENNA WITH WIDEBAND DIRECTIVITY..... N/A
Mostafa Salehi, Ayaz Ghorbani, Gholamreza Moradi, Amirkabir University of Technology, Iran

MOP-A1.5P: SPIRAL AND SINUOUS ANTENNAS

MOP-A1.5P.1: TWO STACKED ORTHOGONALLY WOUND SPIRALS WITH CONNECTED ARMS..... 1976
Israel Hinojosa, Régis Guinvarc'h, SONDRRA, France; Randy Haupt, Colorado School of Mines, United States

MOP-A1.5P.2: A UWB CAVITY-BACKED COMPOUND POWER-ARCHIMEDEAN SLOT SPIRAL FOR 1978
BODY CENTRIC WIRELESS COMMUNICATIONS APPLICATIONS
Jayson Maldonado Vargas, Rafael Rodríguez Solís, University of Puerto Rico, Puerto Rico; Mohamed Elmansouri, Dejan Filipovic, University of Colorado Boulder, United States

MOP-A1.5P.3: MULTI-OCTAVE CAVITY-BACKED FOUR-ARM SLOT SPIRAL FOR MULTI-MODE 1980
OPERATION
Nathan Jastram, Mohamed Elmansouri, Dejan Filipovic, University of Colorado Boulder, United States

MOP-A1.5P.4: ENHANCED TECHNIQUE FOR MINIATURIZATION OF WIDEBAND SPIRAL ANTENNA..... 1982
Jihwan Ahn, Jun-Gi Jeong, Hyeongi Hong, Young Joong Yoon, Yonsei University, Republic of Korea

- MOP-A1.5P.5: ARCHIMEDEAN SPIRAL ANTENNA WITH AN INTEGRATED DUAL BANDSTOP 1984 RESPONSE**
Jae Jeon, John Chang, Lawrence Livermore National Laboratory, United States; Anh-Vu Pham, University of California, Davis, United States
- MOP-A1.5P.6: A CONICAL FOUR-ARM SINUOUS ANTENNA..... 1986**
Shufeng Zheng, Zedong Wang, Xueshi Ren, Xidian University, China; Steven Gao, University of Kent, United Kingdom
- MOP-A1.5P.7: CONFORMAL, LIGHTWEIGHT TEXTILE SPIRAL ANTENNA ON KEVLAR FABRICS 1988**
Jingni Zhong, Asimina Kiourti, John L. Volakis, Ohio State University, United States
- MOP-A1.5P.8: INVESTIGATION OF THE EFFECTS OF SHARP-ENDS REMOVAL IN THE SINUOUS 1989 ANTENNA ARMS ON THE RADIATION PATTERNS**
Yunsu Kang, Kangwook Kim, Gwangju Institute of Science and Technology, Republic of Korea
- MOP-A1.5P.9: A LOW PROFILE CP ANTENNA BASED ON NOVEL HEXAGON GRIDS OPTIMIZATION 1991 MODEL**
Luyang Duan, Junping Geng, Ronghong Jin, Xianling Liang, Liang Liu, Jingfeng Chen, Chong He, Shanghai Jiao Tong University, China
- MOP-A1.1P: BROADBAND ANTENNAS AND SYSTEMS I**
- MOP-A1.1P.1: INVESTIGATION INTO A MINIATURIZED, WIDEBAND YAGI-UDA ANTENNA..... 1993**
Yen B. Le, Sungkyun Lim, Georgia Southern University, United States
- MOP-A1.1P.2: WIDEBAND ARRAY FOR C, X, AND KU-BAND APPLICATIONS WITH 5.3:1 1995 BANDWIDTH**
Markus Novak, Ohio State University, United States; Félix Miranda, NASA Glenn Research Center, United States; John L. Volakis, Ohio State University, United States
- MOP-A1.1P.3: ANTENNA CHARACTERIZATION FOR THE WIDEBAND INSTRUMENT FOR SNOW 1997 MEASUREMENTS (WISM)**
Kevin Lambert, Vantage Partners, LLC, United States; Félix Miranda, Robert Romanofsky, NASA Glenn Research Center, United States; Timothy Durham, Harris Corporation, United States; Kenneth Vanhille, Nuvotronics, United States
- MOP-A1.1P.4: DESIGN OF AN 8-40 GHZ ANTENNA FOR THE WIDEBAND INSTRUMENT FOR 1999 SNOW MEASUREMENTS (WISM)**
Timothy Durham, Harris GCSD, United States; Kenneth Vanhille, Nuvotronics, United States; Christopher Trent, Harris GCSD, United States; Kevin Lambert, Vantage Partners, LLC, United States; Félix Miranda, NASA Glenn Research Center, United States
- MOP-A1.1P.5: A BROADBAND DUAL-POLARIZATION BASE STATION ANTENNA ELEMENT WITH A 2001 COUPLING FEED**
Yuan He, Yejun He, Shenzhen University, China; Manos Tentzeris, Georgia Institute of Technology, China
- MOP-A1.1P.6: RAPID SIMULATION-DRIVEN DESIGN OF UWB ANTENNAS USING 2003 SURROGATE-BASED OPTIMIZATION**
Adrian Bekasiewicz, Slawomir Koziel, Reykjavik University, Iceland
- MOP-A1.1P.7: BROADBAND FRAGMENTED CYLINDRICAL ANTENNAS..... 2005**
Micah D. Gregory, Douglas H. Werner, Pennsylvania State University, United States; Donald Matz, William Schuppert, Antenna Research Associates, Inc., United States
- MOP-A1.1P.8: BROADBAND SLEEVE ANTENNAS WITH A CHOKE..... 2007**
Takashi Oki, Naobumi Michishita, Hisashi Morishita, National Defense Academy, Japan; Masao Sakuma, Sakuma Antenna, Japan

MOP-A1.1P.9: A DUAL-FREQUENCY AND DUAL-POLARIZATION ANTENNA DESIGN FOR LONG TERM EVOLUTION APPLICATIONS 2009

Ting-Jui Huang, Heng-Tung Hsu, Yuan Ze University, Taiwan

MOP-A1.1P.10: TIME-DOMAIN CHARACTERISTICS OF HORIZONTAL ARRAY ANTENNAS USING DIRECTIVE UWB PULSE RADIATORS 2011

Jae Sik Kim, Young Joong Yoon, Yonsei University, Republic of Korea; Jiheon Ryu, Agency for Defense Development, Republic of Korea

MOP-A1.4P: BROADBAND ANTENNAS AND SYSTEMS II

MOP-A1.4P.1: A SMALL MICROSTRIP ANTENNA FOR THE DIGITAL TELEVISION SYSTEM BY BENT TOPOLOGY 2013

Wen-Bin Tsai, Yen-Ting Lin, Yu-Lin Lee, Chien-Jen Wang, National University of Tainan, Taiwan

MOP-A1.4P.2: DESIGN OF CONSTANT GAIN UWB PLANAR ANTENNA USING SINGLE-LAYER FSS..... 2015

Rabia Yahya, Makoto Itami, Tokyo University of Science, Japan

MOP-A1.4P.3: MINIATURIZED LOW PROFILE ANTENNA ENABLED BY A COMPLEMENTARY SRR LOADED METASURFACE 2017

Taiwei Yue, Zhi Hao Jiang, Douglas H. Werner, Pennsylvania State University, United States

MOP-A1.4P.4: A COMPACT MULTI-RESONANCE ANTENNA FOR WIDEBAND/ULTRA WIDEBAND APPLICATIONS 2019

Reza Rezaiesarlak, Majid Manteghi, Virginia Polytechnic Institute and State University, United States

MOP-A1.4P.5: WIDEBAND DUAL-POLARIZED BASE STATION ANTENNA WITH IMPROVED RADIATION CHARACTERISTICS 2021

Boliang Liu, Wenbin Qiu, Chang Chen, Weidong Chen, University of Science and Technology of China, China

MOP-A1.4P.6: A LOW PROFILE IR-UWB ANTENNA WITH CONICAL RADIATION PATTERN FOR ON-BODY COMMUNICATIONS 2023

Wonhong Jeong, Jaehoon Choi, Hanyang University, Republic of Korea

MOP-A1.4P.7: DESIGN OF A LOW PROFILE UWB ANTENNA FOR WEARABLE APPLICATIONS..... 2025

Juneseok Lee, Jaehoon Choi, Hanyang University, Republic of Korea

MOP-A1.4P.8: AN ULTRA-WIDEBAND CROSS-DIPOLE ANTENNA WITH WIDE BEAM FOR DUAL-POLARIZATION APPLICATIONS 2027

Yezhen Li, Xianling Liang, Xudong Bai, Liang Liu, Junping Geng, Ronghong Jin, Shanghai Jiao Tong University, China

MOP-A1.4P.9: COMPACT HIGH GAIN ANTENNA WITH UNBALANCED FED INVERTED L ANTENNA AND PARASITIC PLANES 2029

Mitsuo Taguchi, Yusuke Sasaki, Nagasaki University, Japan

MOP-A1.4P.10: A DIELECTRIC EMBEDDED MONOPOLE ANTENNA FOR SUPER WIDEBAND APPLICATIONS 2031

Meng Cao, Zheng-Hui Xue, Wu Ren, Weiming Li, Beijing Institute of Technology, China

TUP-A1.2A: MILLIMETER-WAVE ANTENNAS AND ARRAYS

TUP-A1.2A.1: EXTERNAL MILLIMETER-WAVE ANTENNA USING SPATIAL COUPLING FOR ANTENNA IN IC PACKAGE 2033

Takayoshi Ito, Hideo Kasami, Toshiba Corporation, Japan

TUP-A1.2A.2: MILLIMETER-WAVE ON-CHIP ARTIFICIAL-MAGNETIC-CONDUCTOR SPIRAL-MONOPOLE BANDPASS-FILTERING ANTENNA N/A

C-C Chou, Yi Wu, W-Y. Ruan, H.-R. Chuang, National Cheng Kung University, Taiwan

**TUP-A1.2A.3: ULTRA BROADBAND MULTIPLE FEED ANTENNA FOR EFFICIENT ON-CHIP POWER 2037
COMBINING**

Benjamin Goettel, Heiko Gulan, Akanksha Bhutani, Mario Pauli, Thomas Zwick, Karlsruhe Institute of Technology, Germany

**TUP-A1.2A.4: A 60 GHZ COMPACT HIGH GAIN AND HIGH EFFICIENCY SI-BASED DIELECTRIC 2039
ANTENNA**

Mohamed Basha, Zewail City for Science and Technology, Egypt; Enass Usama, Hussein Ghouz, Arab Academy for Science, Technology, and Maritime Transport, Egypt

TUP-A1.2A.5: HIGH GAIN AND STEERABLE BULL'S EYE MILLIMETRE WAVE ANTENNA 2041

Shaker Alkaraki, Queen Mary University of London, United Kingdom; Zhirun Hu, University of Manchester, United Kingdom; Yue Gao, Queen Mary University of London, United Kingdom

**TUP-A1.2A.6: REDUCTION OF GRATING LOBES FOR SLOT ANTENNA ARRAY AT 60 GHZ USING 2043
MULTILAYER SPATIAL ANGULAR FILTER**

Hussein Attia, Milad Sharifi Sorkherizi, Ahmed A. Kishk, Concordia University, Canada

**TUP-A1.2A.7: TRANSMISSION LINE MODEL OF RGW SLOT ANTENNA COVERED WITH 2045
SUPERSTRATE AT 60 GHZ**

Hussein Attia, Ahmed A. Kishk, Concordia University, Canada

**TUP-A1.2A.8: BROADBAND PRINTED MULTI ARMS QUASI-YAGI ANTENNA FOR MILLIMETER-WAVE N/A
APPLICATIONS**

Dalia Elsheakh, Electronics Research Institute, Egypt; Magdy F. Iskander, Hawaii Center for Advanced Communication (HCAC), United States

TUP-A1.2A.9: OPTICAL BEAM SCANNING ANTENNA BY WAFFLED LEAKY WAVEGUIDE 2049

Hiroyuki Arai, Yodai Morimoto, Yokohama National University, Japan

**TUP-A1.2A.10: RFIC MEASUREMENT AND OFF-CHIP ANTENNA EXCITATION THROUGH 2051
PROXIMITY COUPLING AT 60GHZ**

Shila Shamsadini, Kambiz Moez, Pedram Mousavi, University of Alberta, Canada; Franco De Flaviis, University of California, Irvine, United States

TUP-A1.2A.11: ON THE STUDY OF FABRICATION ERRORS ON MM-WAVE ANTENNA 2053

Mohammad Zomorodi, Nemai Chandra Karmakar, Monash University, Australia

TUP-A1.1A: LENS ANTENNAS FOR MM AND SUB-MM WAVES

**TUP-A1.1A.1: A LENS-INTEGRATED ON-CHIP CIRCULAR SLOT ANTENNA FOR A 240 GHZ POWER 2055
SOURCE IN SIGE TECHNOLOGY**

Janusz Grzyb, Konstantin Statnikov, Neelanjan Sarmah, Ullrich Pfeiffer, Bergische Universität Wuppertal, Germany

**TUP-A1.1A.2: 60 GHZ MULTI SIN-CORRUGATIONS ANTIPODAL FERMI TAPERED SLOT ANTENNA 2057
LOADED WITH A SPHERICAL LENS**

Zouhair Briqech, Abdel-Razik Sebak, Concordia University, Canada; Tayeb A. Denidni, INRS, Canada

**TUP-A1.1A.3: CONSTANT REFRACTIVE INDEX LENS PRINTED YAGI ANTENNA FOR AUTOMOTIVE N/A
RADARS**

Faris Alsolamy, Ahmed AlAmoudi, Sultan Almorqi, NCS DST-KACST, Saudi Arabia; Osama Haraz, Saleh Alshebeili, KACST-TIC, Canada; Abdel-Razik Sebak, Concordia University, Canada

**TUP-A1.1A.4: WIDEBAND COMPACT VIVALDI ANTENNA LOADED WITH DIELECTRIC LENS FOR 2061
MILLIMETER-WAVE APPLICATIONS**

Muhammad Ashraf, Osama Haraz, KACST Technology Innovation Center in Radio Frequency and Photonics for the e-Society, Saudi Arabia; Abdel-Razik Sebak, Concordia University, Canada; Saleh Alshebeili, KACST Technology Innovation Center in Radio Frequency and Photonics for the e-Society, Saudi Arabia

TUP-A1.1A.5: WIDE BAND MM-WAVE, DOUBLE-SIDED PRINTED BOW-TIE ANTENNA FOR PHASED ARRAY APPLICATIONS 2063

Meijiao Li, Calvin Domier, Xiaoguang Liu, Neville Luhmann, University of California, Davis, United States

TUP-A1.1A.6: 60 GHZ PLANAR FRESNEL ZONE LENS 2065

Xiaozhou Wang, Michael Jennings, Dirk Plettemeier, TU Dresden, Germany

TUP-A1.1A.7: DESIGN OF THE MODIFIED CYLINDRICAL LUNEBOG LENS ANTENNA FOR MILLIMETER WAVE IMAGING 2067

Esha Johari, Zubair Akhter, Jaleel Akhtar, IIT-Kanpur, India

TUP-A1.1A.8: MATCHING LAYER DESIGN TO IMPROVE THE PERFORMANCE OF AN INHOMOGENEOUS DIELECTRIC FLAT LENS AT MILLIMETER-WAVE FREQUENCIES 2069

Marc Imbert, Jordi Romeu, Lluís Jofre, Universitat Politècnica de Catalunya, Spain

TUP-A1.1A.9: W-BAND COMPACT AND HIGH-GAIN LEAKY-WAVE V-SHAPED DIELECTRIC ANTENNA FOR MILLIMETER-WAVE APPLICATION 2071

Enass Usama, Hussein Ghouz, Arab Academy for Science, Technology, and Maritime Transport, Egypt; Mohamed Basha, Zewail City for Science and Technology, Egypt

TUP-A1.1A.10: ULTRA-WIDEBAND, DUAL-MODE MILLIMETER-WAVE MICRO HEMISPHERICAL SHELL ANTENNA 2073

Amir Mirbeik, Stevens Institute of Technology, United States; Vahid Tavassoli, Farrokh Ayazi, Georgia Institute of Technology, United States; Negar Tavassolian, Stevens Institute of Technology, United States

TUP-A1.3A: MILLIMETER-WAVE ANTENNAS AND TECHNIQUES

TUP-A1.3A.1: A DIELECTRIC LOADED MILLIMETER WAVE ANTENNA ARRAY FOR 60 GHZ COMMUNICATION SYSTEMS 2075

Hamsakutty Vettikalladi, Nadeem Ashraf, Majeed A. S. Alkanhal, King Saud University, Saudi Arabia

TUP-A1.3A.2: WIDEBAND MONOFILAR SQUARE SPIRAL ANTENNA AT KA-BAND FREQUENCIES 2077

Qi Luo, Long Zhang, Steven Gao, university of Kent, United Kingdom

TUP-A1.3A.3: DRA ANTENNA WITH A SUPERSTRATE AT MILLIMETER-WAVE 2079

Taieb Elkarkraoui, Gilles Y. Delisle, Laval University, Canada; Nadir Hakem, Yacouba Coulibaly, Université du Québec en Abitibi-Témiscamingue, Canada

TUP-A1.3A.4: DESIGN OF A HORN LENS ANTENNA FOR OAM GENERATION 2081

Xudong Bai, Xianling Liang, Chong He, Liang Liu, Yezhen Li, Mingming Liu, Junping Geng, Ronghong Jin, Shanghai Jiao Tong University, China

TUP-A1.3A.5: LOW-PROFILE CIRCULARLY-SIMMETRIC ANTENNA WITH RADIAL CORRUGATIONS 2083

Hon Ching Moy-Li, Miguel Ferrando-Bataller, Daniel Sánchez-Escuderos, Mariano Baquero-Escudero, Universitat Politècnica de València, Spain

TUP-A1.3A.6: SELF-ASSEMBLED MILLIMETER-WAVE HELICAL ANTENNA 2085

Sae-Won Lee, Ying Chen, Ash Parameswaran, Rodney Vaughan, Simon Fraser University, Canada

TUP-A1.3A.7: RADIATION EFFICIENCY OF SLOT ANTENNA AT 60 GHZ 2087

Ying Chen, Rodney Vaughan, Simon Fraser University, Canada

TUP-A1.3A.8: A CIRCULARLY POLARIZED HEMISPHERICAL ANTENNA FOR MILLIMETER WAVE APPLICATIONS 2089

Mohammad Haghtalab, Safieddin Safavi-Naeini, University of Waterloo, Canada

TUP-A1.3A.9: SMALL AND HIGH GAIN MILLIMETER WAVE CORRUGATED GROOVES ANTENNA 2091

Shaker Alkaraki, Yue Gao, Clive Parini, Queen Mary University of London, United Kingdom

**TUP-A1.3A.10: SYNTHETIC ULTRA-WIDEBAND ANTENNA FOR HIGH-RESOLUTION 2093
MILLIMETER-WAVE IMAGING**

Amir Mirbeik, Negar Tavassolian, Stevens Institute of Technology, United States

**TUP-A1.3A.11: A SIMULATION SOFTWARE FOR 3D QUASI-OPTICAL SYSTEM AND SHAPED-MIRROR 2095
REFLECTORS**

Kai Liu, Junsheng Yu, Xiaodong Chen, Xiaoming Liu, Yuan Yao, Zejian Lu, Beijing University of Posts and Telecommunications, China; Hui Feng, Hao Tu, D. Xiao, S. Wu, East China Research Institute of Electronic Engineering, China

TUP-A1.5A: TERAHERTZ ANTENNAS

**TUP-A1.5A.1: PLANAR, HIGH-GAIN, SUBSTRATE-INTEGRATED CAVITY ANTENNA IN THE 2097
TERAHERTZ FREQUENCY RANGE**

Truong Khang Nguyen, Ton Duc Thang University, Viet Nam; Le Khoa Dang, Ho Chi Minh City University of Technology, Viet Nam; Ikmo Park, Ajou University, Republic of Korea

TUP-A1.5A.2: TERAHERTZ HIGH GAIN ANTENNA DESIGN AND TEST..... N/A

Hongjian Wang, Min Yi, National Space Science Center, Chinese Academy of Sciences, China

TUP-A1.5A.3: HIGH GAIN LEAKY WAVE ANTENNA OPERATING AT 0.566 THZ 2101

Unai Beaskoetxea, Miguel Beruete, Francisco Falcone, David Etayo, Mario Sorolla, Universidad Pública de Navarra, Spain; Miguel Navarro-Cía, Imperial College London, United Kingdom; Mokhtar Zehar, Karine Blary, Abdallah Chahadiah, Xiang-Lei Han, Tahsin Akalin, Lille University, France

TUP-A1.5A.4: A TERAHERTZ WIRE-ARRAY ANTENNA INTEGRATED ON A 75- μ M INP SUBSTRATE..... 2103

Seung-Ho Choi, Korea University, Republic of Korea; Kook Joo Lee, LIG Nex1 Co., Ltd., Republic of Korea; Ji-Sang You, Agency for Defense Development, Republic of Korea; Moonil Kim, Korea University, Republic of Korea

TUP-A1.5A.5: 300 GHZ INP RECTANGULAR CAVITY ANTENNA 2105

Kyoung Min Lee, Il-Jin Lee, Korea University, Republic of Korea; Ji-Sang You, Agency for Defense Development, Republic of Korea; Sang Geun Jeon, Moonil Kim, Korea University, Republic of Korea

**TUP-A1.5A.6: MODELING OF PLASMONIC TERAHERTZ ANTENNAS USING COMSOL 2107
MULTIPHYSICS**

Nathan Burford, Magda El-Shenawee, University of Arkansas, United States

**TUP-A1.5A.7: AN AUTOMATED MILLIMETER-WAVE ANTENNA MEASUREMENT SETUP USING A 2109
ROBOTIC ARM**

Linus Boehm, Frank Boegelsack, Martin Hitzler, Christian Waldschmidt, University of Ulm, Germany

TUP-A1.5A.8: SILICON-ON-GLASS DUAL-TAPERED ANTENNA..... 2111

Nazy Ranjkesh, Suren Gigoyan, Safieddin Safavi-Naeini, University of Waterloo, Canada; Mohamed Basha, Mansoura University, Egypt

**TUP-A1.5A.9: 3.8 MW TERAHERTZ RADIATION GENERATION THROUGH PLASMONIC 2113
NANO-ANTENNA ARRAYS**

Nezih Yardimci, Mona Jarrahi, University of California, Los Angeles, United States

TUP-A1.5A.10: GRAPHENE-BASED HIGH-IMPEDANCE THZ LOG-SPIRAL ANTENNA..... N/A

Farzad Zangeneh-Nejad, Reza Safian, Isfahan University of Technology, Iran

TUP-A1.4A: MILLIMETER-WAVE SYSTEMS

TUP-A1.4A.1: A MILLIMETER WAVE SWITCHED BEAM PLANAR ANTENNA ARRAY 2117

Ali Alreshaid, Oualid Hammi, Mohammad S. Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia; Kamal Sarabandi, University of Michigan, United States

TUP-A1.4A.2: QUANTIZATION EFFECTS OF PHASE SHIFTERS ON 5G MMWAVE ANTENNA ARRAYS 2119
SangHyun Chang, Wonbin Hong, Jongho Oh, Samsung Electronics, Republic of Korea

TUP-A1.4A.3: 60 GHZ CIRCULARLY POLARIZED ARRAY ANTENNA-IN-PACKAGE IN LTCC N/A
TECHNOLOGY

Mohammad Fakharzadeh, Sharif University of Technology, Iran; Ahmed Shehata, PerasoTechnologies, Canada

TUP-A1.4A.4: PLANAR QUASI-OPTIC THZ SOURCE : THE MULTENNA..... 2123

Melusine Pigeon, Robert Donnan, Rostyslav Dubrovka, Theo Kreouzis, Queen Mary University of London, United Kingdom; Hui Wang, Byron Alderman, Peter Huggard, Rutherford Appleton Laboratory, United Kingdom

TUP-A1.4A.5: DESIGN OF A BUTLER MATRIX AT 60GHZ IN INVERTED MICROSTRIP GAP 2125
WAVEGUIDE TECHNOLOGY

Astrid Algaba-Brazalez, Chalmers University of Technology, Sweden; Eva Rajo-Iglesias, University Carlos III of Madrid, Spain

TUP-A1.1P: NOVEL REFLECTARRAY AND TRANSMITARRAY DESIGNS

TUP-A1.1P.1: THE ANALOGY BETWEEN OFFSET CONFIGURATIONS OF PARABOLIC REFLECTORS 2127
AND REFLECTARRAYS

Payam Nayeri, Atef Elsherbeni, Colorado School of Mines, United States; Fan Yang, Tsinghua University, China

TUP-A1.1P.2: HIGH EFFICIENCY KA-BAND SINGLE LAYER AIR VIAS REFLECTARRAY: DESIGN 2129
AND ANALYSIS

Muhammad M. Tahseen, Ahmed A. Kishk, Concordia University, Canada

TUP-A1.1P.3: LINEARLY POLARIZED MULTI-LAYER WIDEBAND PERFORATED LENS ANTENNA IN 2131
THE V-BAND

Muhammad M. Tahseen, Ahmed A. Kishk, Concordia University, Canada

TUP-A1.1P.4: SOME PRELIMINARY RESULTS ON CONFORMAL REFLECTARRAYS 2133

Bui Van Ha, Université Catholique de Louvain, Belgium; Paola Pirinoli, Michele Beccaria, Mario Orefice, Politecnico di Torino, Italy; Fan Yang, Tsinghua University, China

TUP-A1.1P.5: AN IMPEDANCE SURFACE-BASED METHOD FOR DESIGNING WIDEBAND 2135
REFLECTARRAYS

Liang Liang, Sean Hum, University of Toronto, Canada

TUP-A1.1P.6: DESIGN OF A NOVEL CIRCULARLY POLARIZED REFLECTARRAY WITH A LINEARLY 2137
POLARIZED FEEDER

Yinyan Chen, Yuehe Ge, Yujie Liu, Huaqiao University, China

TUP-A1.1P.7: EXPERIMENTAL CHARACTERIZATION OF AN X-BAND TRANSMITARRAY WITH A 2139
REDUCED FOCAL DISTANCE

Luca Di Palma, Antonio Clemente, Laurent Dussopt, Grenoble Alpes University, CEA-Leti, France; Ronan Sauleau, University of Rennes 1, France; Patrick Potier, Philippe Pouliguen, DGA, France

TUP-A1.2P: REFLECTARRAYS AND APPLICATIONS

TUP-A1.2P.1: ISARA – INTEGRATED SOLAR ARRAY AND REFLECTARRAY CUBESAT DEPLOYABLE 2141
KA-BAND ANTENNA

Richard Hodges, Matthew Radway, Armen Toorian, Daniel Hoppe, Biren Shah, CALTECH Jet Propulsion Laboratory, United States; Andrew Kalman, Pumpkin, Inc., United States

TUP-A1.2P.2: PARABOLIC REFLECTARRAY FOR BROADBAND TELECOM SATELLITE APPLICATIONS ... 2143
WITH LOW CROSS-POLARIZATION

Min Zhou, Stig Busk Sørensen, Erik Jørgensen, TICRA, Denmark

TUP-A1.2P.3: COMMENTS ON THE SIZE-DEPENDENCE OF FOCAL POINT SHIFT IN OFFSET-FED REFLECTARRAYS	2145
<i>E'qab Almajali, Derek McNamara, University of Ottawa, Canada</i>	
TUP-A1.2P.4: IMPROVING SUB-REFLECTARRAY ANTENNAS PERFORMANCE USING SUB-WAVELENGTH INTER-ELEMENT SPACING	2147
<i>E'qab Almajali, Derek McNamara, Jonathan Ethier, University of Ottawa, Canada</i>	
TUP-A1.2P.5: OPTIMUM REFLECTARRAY FEED PATTERN SYNTHESIS	2149
<i>Mohamed Moharram, Ahmed A. Kishk, Concordia University, Canada</i>	
TUP-A1.2P.6: REFLECTARRAYS USING ACTIVE-LOADED ELEMENTS: ENHANCING PERFORMANCE BY POWER COMBINING	2151
<i>Alister Hosseini, Yahya Rahmat-Samii, University of California, Los Angeles, United States</i>	
TUP-A1.2P.7: EXPERIMENTAL STUDY OF A 1-BIT 10×10 RECONFIGURABLE REFLECTARRAY ANTENNA	2153
<i>Huanhuan Yang, Air Force Engineering University, China; Fan Yang, Shenheng Xu, Maokun Li, Tsinghua University, China; Xiangyu Cao, Air Force Engineering University, China</i>	
TUP-A1.2P.8: DESIGN OF A CIRCULARLY POLARIZED RECONFIGURABLE REFLECTARRAY USING MICROMOTORS	2155
<i>Xue Yang, Shenheng Xu, Fan Yang, Maokun Li, Tsinghua University, China; Houfei Fang, Yangqing Hou, Shanghai YS Information Technology Company Limited, China</i>	
TUP-A1.2P.9: DESIGN AN ADAPTIVE ELECTRONICALLY BEAMSTEERING REFLECTARRAY ANTENNA FOR RFID SYSTEMS	2157
<i>Khaled Hasan, Maher Khaliel, Mohamed El-Hadidy, Thomas Kaiser, Duisburg-Essen University, Germany</i>	
TUP-A1.2P.10: PERFORATED DIELECTRIC ANTENNA REFLECTARRAY FOR OAM GENERATION	2159
<i>Xudong Bai, Xianling Liang, Chong He, Yezhen Li, Liang Liu, Jingfeng Chen, Mingming Liu, Junping Geng, Ronghong Jin, Shanghai Jiao Tong University, China</i>	
 TUP-A1.3P: REFLECTARRAYS AND REFLECTARRAY ELEMENTS	
TUP-A1.3P.1: A SIMPLE METHOD TO REALIZE POLARIZATION DIVERSITY IN BROADBAND REFLECTARRAYS USING SINGLE-LAYERED RECTANGULAR PATCH ELEMENTS	2161
<i>Lu Guo, Peng-Khiang Tan, Tan-Huat Chio, Temasek Laboratories, National University of Singapore, Singapore</i>	
TUP-A1.3P.2: INSENSITIVE POLARIZATION CHARACTERISTIC USING NOVEL REFLECTARRAY ELEMENT COMBINED HEXA-POLE AND DOUBLE RINGS	2163
<i>Sung Hoe Kim, Youngsub Kim, Young Joong Yoon, Yonsei University, Republic of Korea; Hyungrak Kim, Daelim University College, Republic of Korea</i>	
TUP-A1.3P.3: DESIGN OF A LINEARLY POLARIZED METAL-ONLY REFLECTARRAY USING SLOT-TYPE PHOENIX ELEMENTS	2165
<i>Ruyuan Deng, Fan Yang, Shenheng Xu, Maokun Li, Tsinghua University, China</i>	
TUP-A1.3P.4: DESIGN OF A 2-BIT RECONFIGURABLE REFLECTARRAY ELEMENT USING TWO MEMS SWITCHES	2167
<i>Xue Yang, Shenheng Xu, Fan Yang, Maokun Li, Tsinghua University, China</i>	
TUP-A1.3P.5: DESIGN OF A DUAL-FREQUENCY BROADBAND REFLECTARRAY USING TRIPLE-RESONANCE ELEMENTS	2169
<i>Ruyuan Deng, Fan Yang, Shenheng Xu, Maokun Li, Tsinghua University, China</i>	
TUP-A1.3P.6: LOW CROSS-POLARIZATION REFLECTARRAY ELEMENTS WITH FOUR AXIAL SYMMETRY FOR DUAL-POLARIZATION AND WIDEBAND USE	2171
<i>Daichi Higashi, Shusuke Sasaki, Hiroyuki Deguchi, Mikio Tsuji, Doshisha University, Japan</i>	

TUP-A1.3P.7: DESIGN OF OPTICALLY TRANSPARENT REFLECTARRAY ANTENNA UNIT CELL INTEGRATED WITH SOLAR CELLS	2173
<i>Mohamed Moharram, Ahmed A. Kishk, Concordia University, Canada</i>	
TUP-A1.3P.8: AN ELECTRONICALLY STEERABLE REFLECTARRAY WITH INTEGRATED LEAKY-WAVE FEED	2175
<i>Jeff Nicholls, Sean Hum, University of Toronto, Canada</i>	
TUP-A1.3P.9: A TUNABLE BST INTEGRATED V-BAND PATCH ELEMENT WITH INTERDIGITAL GAP CONFIGURATION	2177
<i>Michael Trampler, Kalyan Karnati, Xun Gong, University of Central Florida, United States</i>	
TUP-A1.3P.10: DUAL-POLARIZED REFLECTARAY ELEMENT USING OPEN-LOOP PATCHES	2179
<i>Houman Ghorbani, Parisa Dehkhoda, Ahad Tavakoli, Mahdi Rabbani, Amirkabir University of Technology, Iran</i>	
 TUP-A1.4P: REFLECTOR ANTENNAS	
TUP-A1.4P.1: FAST FULL-WAVE ANALYSIS OF CHALLENGING REFLECTOR ANTENNA PROBLEMS	2181
<i>Erik Jørgensen, Oscar Borries, Peter Meincke, Niels Vesterdal, TICRA, Denmark</i>	
TUP-A1.4P.2: SOLUTION OF ELECTRICALLY LARGE SCATTERING PROBLEMS ON A LAPTOP	2183
<i>Oscar Borries, Erik Jørgensen, Peter Meincke, TICRA, Denmark</i>	
TUP-A1.4P.3: CUBESAT DEPLOYABLE KA-BAND REFLECTOR ANTENNA FOR DEEP SPACE MISSIONS	2185
<i>Nacer Chahat, Jonathan Sauder, Mark Thomson, Richard Hodges, NASA Jet Propulsion Laboratory / CalTech, United States; Yahya Rahmat-Samii, University of California, Los Angeles, United States</i>	
TUP-A1.4P.4: LINK ANALYSIS OF HIGH THROUGHPUT SPACECRAFT COMMUNICATION SYSTEMS FOR FUTURE SCIENCE MISSIONS	2187
<i>Rainee Simons, NASA Glenn Research Center, United States</i>	
TUP-A1.4P.5: BEAM SQUINT CORRECTION IN OFFSET REFLECTOR ANTENNAS WITH CIRCULARLY-POLARIZED TAPERED PRIMARY FEEDS	2189
<i>Zahra Allahgholi Pour, Lotfollah Shafai, University of Manitoba, Canada</i>	
TUP-A1.4P.6: MAGNETOMETER BOOM BLOCKAGE EFFECTS ON PERFORMANCE OF REFLECTOR ANTENNA OF EUROPA HABITABILITY MISSION	2191
<i>Vahraz Jamnejad, Jet Propulsion Laboratory, United States</i>	
TUP-A1.4P.7: HIGH GAIN ANTENNA ARRAY FEED CANDIDATE FOR NASA'S EUROPA CLIPPER	2193
<i>Matthew Bray, Ron Schulze, Johns Hopkins University Applied Physics Laboratory, United States</i>	
TUP-A1.4P.8: DESIGNING A DUAL-CIRCULARLY POLARIZED RECEIVING ANTENNA FOR 12-GHZ BAND SATELLITE BROADCASTING	2195
<i>Masafumi Nagasaka, Susumu Nakazawa, Shoji Tanaka, Japan Broadcasting Corporation, Japan</i>	
TUP-A1.4P.9: OPTIMIZATION OF A REFLECTOR ANTENNA FED BY A DOUBLE RIDGED HORN	2197
<i>Deniz Bolukbas, Okan University, Turkey; Ali Ziya Ozer, Figes A.S., Turkey</i>	
TUP-A1.4P.10: COMPARISON OF A SMALL PARABOLIC REFLECTOR FOR USE WITH AN ACOUSTIC AND A RADAR MICROPHONE	2199
<i>Herbert Aumann, Travis Russell, Nuri W. Emanetoglu, University of Maine, United States</i>	

TUP-UA.1P: MATERIAL, MODELING AND ANTENNA MEASUREMENTS

TUP-UA.1P.8: ACCURATE MEASUREMENT OF TRANSMIT AND RECEIVE PERFORMANCE OF AAS 2201 ANTENNAS IN A MULTI-PROBE SPHERICAL NF SYSTEM

Lars Jacob Foged, Alessandro Scannavini, Microwave Vision Group, Italy; Francisco Cano-Facila, Nicolas Gross, SATIMO Industries, France

WEP-A1.4A: RECONFIGURABLE ARRAYS AND APERTURES

WEP-A1.4A.1: A DESIGN FOR AN ELECTRONICALLY-STEERABLE HOLOGRAPHIC ANTENNA WITH 2203 POLARIZATION CONTROL

Daniel Gregoire, Holographic Sciences, United States; Amit Patel, Ryan Quarfoth, HRL Laboratories, LLC, United States

WEP-A1.4A.2: OMNIDIRECTIONAL/DIRECTIONAL TEM HORN CIRCULAR ARRAY FOR JOINT TIME 2205 AND FREQUENCY OPERATION

Mohamed Elmansouri, Jaegeun Ha, Dejan Filipovic, University of Colorado, United States

WEP-A1.4A.3: RECONFIGURABLE PHASED ARRAY ANTENNA ENABLING A HIGH GAIN WIDE ANGLE ... 2207 BEAM SCANNING

Arpan Pal, Amit Mehta, Swansea University, United Kingdom; Rob Lewis, BAE Systems, United Kingdom; Nathan Clow, DSTL, United Kingdom

WEP-A1.4A.4: SELF-STRUCTURING ANTENNAS FOR PHASED ARRAYS..... 2209

Christopher Oakley, Matthew Hodek, Lee Harle, Michigan State University, United States

WEP-A1.4A.5: FLUIDIC SWITCHING AND TUNING OF FABRY-PEROT ANTENNA 2211

Chanjoon Lee, Robert Sainati, Rhonda Franklin, Ramesh Harjani, University of Minnesota, United States

WEP-A1.4A.6: X-BAND HORN ANTENNA WITH INTEGRATED TUNABLE NOTCH FILTER..... 2213

Joshua Shehan, Ryan Adams, University of North Carolina at Charlotte, United States

WEP-A1.4A.7: DEPLOYABLE ORIGAMI YAGI LOOP ANTENNA 2215

Shun Yao, Xueli Liu, John Gibson, Stavros V. Georgakopoulos, Florida International University, United States

WEP-A1.4A.8: FREQUENCY RECONFIGURABLE ORIGAMI QUADRIFILAR HELICAL ANTENNA WITH 2217 RECONFIGURABLE REFLECTOR

Xueli Liu, Shun Yao, Stavros V. Georgakopoulos, Florida International University, United States

WEP-A1.4A.9: LHCP/RHCP RECONFIGURABLE TRANSMITARRAY IN KA-BAND 2219

Luca Di Palma, Antonio Clemente, Laurent Dussopt, Grenoble Alpes University, CEA-Leti, France; Ronan Sauleau, University of Rennes 1, France; Patrick Potier, Philippe Pouliguen, DGA, France

WEP-A1.4A.10: A HIGH-GAIN BEAM STEERING FABRIC-BASED ARRAY FOR BODY-WORN 2221 WIRELESS APPLICATIONS

Nowrin Chamok, Mohammad Ali, University of South Carolina, United States

WEP-A1.5A: SYSTEMS AND APPLICATIONS OF RECONFIGURABLE ANTENNA

WEP-A1.5A.1: PUMP-FREE FEEDBACK CONTROL OF A FREQUENCY RECONFIGURABLE LIQUID 2223 METAL MONOPOLE

Meng Wang, Mohammad Khan, Chris Trlica, Michael D. Dickey, Jacob Adams, North Carolina State University, United States

WEP-A1.5A.2: DUAL-BAND TIME-MODULATED/PHASE-CONJUGATING/TIME-MODULATED N/A PHASE-CONJUGATING RECONFIGURABLE ARRAY

A-Min Yao, Wen Wu, Da-Gang Fang, Nanjing University of Science and Technology, China

WEP-A1.5A.3: WIDEBAND SIMULTANEOUS TRANSMIT AND RECEIVE (STAR) BI-LAYER CIRCULAR ARRAY 2227

Ehab Etellisi, Mohamed Elmansouri, Dejan Filipovic, University of Colorado Boulder, United States

WEP-A1.5A.4: PLANAR PATTERN RECONFIGURABLE ANTENNA INTEGRATED WITH A WIFI SYSTEM FOR MULTIPATH MITIGATION AND SUSTAINED HIGH DEFINITION VIDEO NETWORKING IN A COMPLEX EM ENVIRONMENT ... 2229

Amit Mehta, Shivam Gautam, Hasanga Goonesinghe, Arpan Pal, Swansea University, United Kingdom; Rob Lewis, BAE Systems, United Kingdom; Nathan Clow, DSTL, United Kingdom

WEP-A1.5A.5: ON THE DESIGN OF A CIRCUIT FOR PHASE COMPENSATION OF SELF-ADAPTING CONFORMAL ARRAYS 2231

Sayan Roy, Benjamin Braaten, North Dakota State University, United States

WEP-A1.5A.6: A RECONFIGURABLE MONOPOLE MIMO ANTENNA WITH WIDEBAND SENSING CAPABILITY FOR COGNITIVE RADIO USING VARACTOR DIODES 2233

Shuo-Peng Cheng, Ken-Huang Lin, National Sun Yat-sen University, Taiwan

WEP-A1.5A.7: A DUAL-BAND DUAL-POLARIZED STEERABLE PATTERN RECONFIGURABLE ANTENNA... 2235

Ayah Massoud, Jennifer Bernhard, University of Illinois at Urbana-Champaign, United States

WEP-A1.5A.8: A MODE RECONFIGURABLE NOJIMA ORIGAMI ANTENNA..... 2237

Shun Yao, Xueli Liu, Stavros V. Georgakopoulos, Florida International University, United States

WEP-A1.5A.9: DOUBLE BALANCED MULTIPLIER INTEGRATED CIRCULAR POLARIZATION SWITCHABLE MICROSTRIP ANTENNA 2239

Eisuke Nishiyama, Akihiko Matsuo, Ichihiko Toyoda, Saga University, Japan

WEP-A1.5A.10: A YAGI MONOPOLE ANTENNA MADE OF PURE WATER 2241

Zhenxin Hu, Wen Wu, Nanjing University of Science and Technology, China; Zhongxiang Shen, Changzhou Hua, Nanyang Technological University, Singapore

WEP-A1.5A.11: CAN TV AND COMMUNICATION SYSTEM COEXIST IN SAME FREQUENCY BAND? APPLYING BACK-SCATTERING TECHNIQUE TO TV RECEIVER ANTENNA 2243

Naoki Honma, Takuma Ito, Iwate University, Japan; Kentaro Nishimori, Yoshitaka Tsunekawa, Niigata University, Japan

WEP-A1.2A: DESIGN AND DEVELOPMENT OF RECONFIGURABLE ANTENNAS

WEP-A1.2A.1: PATTERN RECONFIGURABLE WIDE ANTENNA WITH A SAR REDUCTION FOR PORTABLE DEVICE APPLICATIONS 2245

Wenxing Li, Lei Bao, Yingsong Li, Si Li, Harbin Engineering University, China

WEP-A1.2A.2: DUAL BEAM YAGI PATCH ANTENNA 2247

S. Samree, S. Getjulom, Chainarong Kittiyapunya, Monai Krairiksh, King Mongkut's Institute of Technology Ladkrabang, Thailand

WEP-A1.2A.3: RECONFIGURABLE CYCLICAL PATCH ANTENNA..... 2249

Firas Ayoub, COSMIAC, United States; Youssef Tawk, COSMIAC; Notre Dame University, United States; Chris Woehrle, COSMIAC, United States; Joseph Costantine, American University of Beirut, Lebanon; COSMIAC, United States; Christos Christodoulou, COSMIAC, United States

WEP-A1.2A.4: RECONFIGURABLE MICROWAVE CIRCUIT BASED ON THREE TRIANGULAR MICROSTRIP PATCHES 2251

James Kelly, University of Surrey, United Kingdom; Alejandro Borja, Universidad de Castilla La Mancha, Spain

WEP-A1.2A.5: RECONFIGURABLE MICROWAVE CIRCUIT BASED ON A SINGLE TRIANGULAR MICROSTRIP PATCH 2253

Alejandro Borja, Universidad de Castilla La Mancha, Spain; James Kelly, University of Surrey, United Kingdom

WEP-A1.2A.6: PIFA WITH RECONFIGURABLE FREQUENCY BANDWIDTH	2255
<i>James Kelly, University of Surrey, United Kingdom</i>	
WEP-A1.2A.7: WIRELESSLY RECONFIGURABLE ANTENNA.....	2257
<i>Pavel Nikitin, Honeywell Scanning and Mobility, United States</i>	
WEP-A1.2A.8: A SIMPLE RECONFIGURABLE PATCH ANTENNA FOR MOBILE APPLICATIONS.....	2259
<i>Budhaditya Majumdar, Karu P. Esselle, Macquarie University, Australia</i>	
WEP-A1.2A.9: A RECONFIGURABLE LAYOUT FOR A SELF-STRUCTURING	2261
LIFE-JACKET-INTEGRATED ANTENNA OF A SAR SYSTEM	
<i>Andrea Baroni, Paolo Nepa, University of Pisa, Italy; Hendrik Rogier, Ghent University, Belgium</i>	
WEP-A1.2A.10: RECONFIGURABLE ORIGAMI EQUIANGULAR CONICAL SPIRAL ANTENNA	2263
<i>Xueli Liu, Shun Yao, Stavros V. Georgakopoulos, Florida International University, United States</i>	
 WEP-A1.3A: RECONFIGURABLE ANTENNAS FOR ADAPTIVE AND MOBILE SYSTEMS	
WEP-A1.3A.1: DESIGN AND BREADBOARDING OF A FREQUENCY-RECONFIGURABLE,	2265
BOARD-MOUNTED COMPACT ANTENNA	
<i>Sergio Arianos, Istituto Superiore Mario Boella, Italy; Javier Leonardo Araque-Quijano, Universidad Nacional de Colombia, Colombia; Gianluca Dassano, Francesca Vipiana, Mario Orefice, Giuseppe Vecchi, Politecnico di Torino, Italy</i>	
WEP-A1.3A.2: REALIZATION OF A PATTERN RECONFIGURABLE ANTENNA EMPLOYING PIN	2267
DIODES	
<i>Jerzy Kowalewski, Tobias Mahler, Tom Schipper, Thomas Zwick, Karlsruhe Institute of Technology, Germany</i>	
WEP-A1.3A.3: A MULTI-BAND-RECONFIGURABLE ANTENNA USING SPLIT-RING RESONATORS.....	2269
<i>Ferhad Kasem, Hamid Moghadas, Pedram Mousavi, University of Alberta, Canada; Mohammed Al-Husseini, Karim Y. Kabalan, Ali El-Hajj, Youssef Nasser, American University of Beirut, Lebanon</i>	
WEP-A1.3A.4: A NEW DESIGN OF RECONFIGURABLE SLOT-RING ANTENNA USING PIN DIODES	2271
<i>Mahmoud Shirazi, Tianjiao Li, Xun Gong, University of Central Florida, United States</i>	
WEP-A1.3A.5: FREQUENCY-AGILE E-SHAPED PRINTED ANTENNA FOR MILLIMETER WAVES	2273
APPLICATIONS	
<i>Igor Feliciano da Costa, Danilo H. Spadoti, Federal University of Itajubá, Brazil; Arismar Cerqueira Sodre Junior, INATEL, Brazil</i>	
WEP-A1.3A.6: RECONFIGURABLE QUARTER-MODE SIW ANTENNA EMPLOYING A FLUIDICALLY	N/A
SWITCHABLE VIA	
<i>Alireza Pourghorban Saghati, Sina Baghbani Kordmahale, Ali Pourghorban Saghati, Jun Kameoka, Kamran Entesari, Texas A&M University, United States</i>	
WEP-A1.3A.7: UWB ARRAYS WITH TUNABLE BAND REJECTION	2277
<i>Dimitrios Papantonis, Nima Ghalichechian, John L. Volakis, Ohio State University, United States</i>	
WEP-A1.3A.8: DESIGN OF POLARIZATION RECONFIGURABLE ANTENNA USING ACTIVE	N/A
POLARIZER	
<i>Wenting Li, Steven Gao, Chunxu Mao, Yuanming Cai, University of Kent, United Kingdom</i>	
WEP-A1.3A.9: DESIGN OF A BEAM-SCANNING REFLECTARRAY ANTENNA WITH AN OFFSET	2281
MECHANICALLY ROTATIONAL HORN	
<i>Lin Gao, Fan Yang, Shenheng Xu, Maokun Li, Tsinghua University, China; Xiaolong Liu, Northwest Institute of Nuclear Technology, China</i>	
WEP-A1.3A.10: ELECTRONICALLY STEERABLE DIRECTED ENERGY USING SPACE-TIME	2283
NETWORK RESONANT DIGITAL SYSTEMS	
<i>Arjuna Madanayake, Nilan Udayanga, University of Akron, United States; Chamith Wijenayake, University of New South Wales, Australia; Len Bruton, University of Calgary, Canada</i>	

WEP-A1.1A: ADVANCES IN TUNABLE MATERIALS FOR RECONFIGURABLE ANTENNAS

WEP-A1.1A.1: RECONFIGURABLE ANTENNA PROTOTYPE UTILIZING THE PHASE CHANGE 2285 CHARACTERISTICS OF VANADIUM DIOXIDE

Tarron Teeslink, South Dakota School of Mines and Technology, United States; David Torres, Michigan State University, United States; Michael Chryssomallis, Democritus University of Thrace, Greece; Nelson Sepulveda, Michigan State University, United States; Dimitris E. Anagnostou, South Dakota School of Mines and Technology, United States

WEP-A1.1A.2: UHF TUNABLE COMPACT ANTENNAS ON CO₂Z HEXAFERRITE SUBSTRATE WITH 2287 2.5/1 TUNABLE FREQUENCY RANGE

Zhijiao Chen, Junsheng Yu, Beijing University of Posts and Telecommunications, China; Xiaodong Chen, Clive Parini, Queen Mary University of London, United Kingdom; Xinjun Wang, Hwaider Lin, Ziyao Zhou, Tianxaing Nan, Nian. X Sun, Northeastern University, United States

WEP-A1.1A.3: BANDWIDTH RECONFIGURABLE THZ FILTER EMPLOYING PHASE-CHANGE 2289 MATERIAL

Varitha Sanphuang, Nima Ghalichechian, Niru K. Nahar, John L. Volakis, Ohio State University, United States

WEP-A1.1A.4: A SELF-BIASED 3D TUNABLE HELICAL ANTENNA IN FERRITE LTCC SUBSTRATE 2291

Farhan Abdul Ghaffar, Atif Shamim, King Abdullah University of Science and Technology, Saudi Arabia

WEP-A1.1A.5: GRAPHENE RECONFIGURABLE COPLANAR WAVEGUIDE (CPW)-FED CIRCULAR 2293 SLOT ANTENNA

Xiao Zhang, Gregory Auton, Ernie Hill, Xianjun Huang, Ting Leng, University of Manchester, United Kingdom; Habiba Ouslimani, Université Paris Ouest Nanterre La Défense, France; Mahmoud Abdalla, MTC College, Egypt; Zhirun Hu, University of Manchester, United Kingdom

WEP-A1.1A.6: RECONFIGURABLE DIPOLE ANTENNA DESIGN USING GRAPHENE BASED SWITCH..... 2295

Ting Leng, XianJun Huang, Xiao Zhang, Zhirun Hu, University of Manchester, United Kingdom

WEP-A1.1A.7: NOVEL RECONFIGURABLE ANTENNAS USING LIQUID CRYSTALS ELASTOMERS 2297

John Gibson, Xueli Liu, Stavros V. Georgakopoulos, Florida International University, United States; Taylor Ware, Jeong Jae Wie, Timothy White, Air Force Research Laboratory, United States

WEP-A1.1A.8: MICROFLUIDICALLY CONTROLLED METALIZED PLATE BASED FREQUENCY 2299 RECONFIGURABLE MONOPOLE FOR HIGH POWER RF APPLICATIONS

Abhishek Dey, Gokhan Mumcu, University of South Florida, United States

WEP-A1.1A.9: A SMART ANTENNA BASED ON METAMATERIAL..... 2301

Weiping Cao, Beibei Li, L. Shafai, Simin Li, Xi Gao, Xinhua Yu, Guilin University of Electronic Technology, China

WEP-A1.1A.10: TUNABLE FREQUENCY ANTENNA INTEGRATED WITH MICROFLUIDIC CHANNEL 2303

Navid Hosseini, Nasim Seyedpour Esmaeilzad, Ozlem Aydin Civi, Middle East Technical University, Turkey

WEP-A1.2P: BROADBAND MIMO SYSTEMS

WEP-A1.2P.1: A 4 ELEMENT COMPACT ULTRA-WIDEBAND MIMO ANTENNA ARRAY..... 2305

Muhammad Khan, Antonio Capobianco, University of Padova, Italy; Sajid Asif, Adnan Iftikhar, Benjamin Braaten, North Dakota State University, United States

WEP-A1.2P.2: COMPACT DUAL BAND NOTCHED PRINTED UWB MIMO ANTENNA WITH PATTERN 2307 DIVERSITY

Kaustubh Chhabilwad, Shrikanth Reddy, Anil Kamma, Basudev Majumder, Jayanta Mukherjee, Indian Institute of Technology, Bombay, India

WEP-A1.2P.3: AN ISOLATION ENHANCED ULTRA-WIDEBAND SEMI-RING MONOPOLE MIMO 2309 ANTENNA

Sagar Dhar, Mohammad S. Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia

WEP-A1.2P.4: A COMPACT ULTRA-WIDEBAND MIMO ANTENNA WITH IMPROVED ISOLATION..... 2311
Avez Syed, Rabah W. Aldhaferi, King Abdulaziz University, Saudi Arabia

WEP-A1.2P.5: A PROPOSAL OF MIMO UWB ANTENNA WITH FOUR ELEMENTS..... N/A
Nguyen Quoc Dinh, Le Trong Trung, Le Quy Don Technical University, Viet Nam

WEP-A1.1P: AXIAL BROADBAND ANTENNAS

WEP-A1.1P.1: A NOVEL ULTRA-WIDEBAND FRACTAL MONOPOLE ANTENNA..... 2315
Kathryn Smith, Ryan Adams, University of North Carolina at Charlotte, United States

WEP-A1.1P.2: WIDEBAND, LOADED, LOW PROFILE, SMALL DIAMETER MONOCONE ANTENNA..... 2317
Jaegyun Ha, Mohamed Elmansouri, Dejan Filipovic, University of Colorado Boulder, United States

WEP-A1.1P.3: BROADBAND AND LOW-PROFILE H-PLANE RIDGED HORN ANTENNA 2319
Zhuozhu Chen, Zhongxiang Shen, Nanyang Technological University, Singapore

WEP-A1.1P.4: OPTICALLY TRANSPARENT BALLOON ANTENNA 2321
Xiang Gao, Zhongxiang Shen, Nanyang Technological University, Singapore

WEP-A1.1P.5: WIDEBAND CIRCULAR POLARIZED CROSS BOW TIE ANTENNA WITH BALUN 2323
INTEGRATION FOR X BAND COMMUNICATION
Amna Mir, Junsheng Yu, Beijing University of Posts and Telecommunications, China

WEP-A1.4P: WIDEBAND SLOT ANTENNAS

WEP-A1.4P.1: A CIRCULAR WIDE SLOT UWB ANTENNA WITH TRIPLE BAND-NOTCH 2325
CHARACTERISTICS
Yingsong Li, Wen Zhang, Harbin Engineering University, China; Raj Mittra, Pennsylvania State University, United States

WEP-A1.4P.2: SIMPLIFIED DESIGN OF AN X/KU-BAND VIVALDI ARRAY FOR ROCKET EXHAUST 2327
PLUME DIAGNOSTICS
Jorge Torres, William Barott, Embry-Riddle Aeronautical University, United States

WEP-A1.4P.3: CIRCULARLY POLARIZED ANTENNA USING METASURFACE WITH INTERDIGITAL 2329
CAPACITOR AND TILTED SLOT LOADINGS
Taiwei Yue, Zhi Hao Jiang, Douglas H. Werner, Pennsylvania State University, United States

WEP-A1.4P.4: EFFECT OF CURVATURE OF ANTIPODAL STRUCTURE ON VIVALDI ANTENNAS..... 2331
Hien Chu Ba, Hiroshi Shirai, Chuo University, Japan; Chien Dao Ngoc, Hanoi University of Science and Technology, Viet Nam

WEP-A1.4P.5: DIRECTIVITY ENHANCEMENT OF DOUBLE SLOT VIVALDI ANTENNA USING 2333
ANISOTROPIC ZERO-INDEX METAMATERIALS
Pankaj Kumar, Zubair Akhter, Abhishek Jha, Jaleel Akhtar, Indian Institute of Technology Kanpur, India

WEP-A1.4P.6: A HIGH GAIN HORIZONTALLY POLARIZED UWB ANTENNA N/A
Raj Kumar, ARDE, India; R.V.S. Ram Krishna, Nagendra Kushwaha, DIAT, India

WEP-A1.4P.7: DIELECTRIC RESONATOR LOADED SUBSTRATE INTEGRATED WAVEGUIDE 2337
CAVITY BACKED SLOT ANTENNA FOR BANDWIDTH ENHANCEMENT
Abhishek Sharma, Soumava Mukherjee, Animesh Biswas, Indian Institute of Technology Kanpur, India

WEP-A1.4P.8: A WIDEBAND BEAM-FORMING ANTIPODAL TAPERED SLOT ANTENNA, EMBEDDED 2339
IN A DIELECTRIC
Lin Yuan, Ming Su, Yuanan Liu, Jianguo Yu, Beijing University of Posts and Telecommunications, China

WEP-A1.4P.9: A WIDEBAND CIRCULARLY POLARIZED CAVITY BACKED SLOT ANTENNA..... 2341
Wenhui Shen, Jiahong Lin, Kang Yang, Guangli Yang, Shanghai University, China

WEP-A1.4P.10: GAIN ENHANCEMENT TECHNIQUE FOR AN ANTIPODAL VIVALDI ANTENNA 2343
Hyeongi Hong, Jihwan Ahn, Jun-gi Jeong, Young Joong Yoon, Yonsei University, Republic of Korea

WEP-A1.3P: WEARABLE AND ON-BODY ANTENNAS AND MODELING

WEP-A1.3P.1: DUAL SHORTED MICROSTRIP PATCH ANTENNA FOR ON-BODY SYSTEMS..... 2345
Sehwan Choi, Hojun Lee, Korea Electronics Technology Institute, Republic of Korea

WEP-A1.3P.2: DUAL-RESONANT PIFA FOR BODY AREA NETWORKS 2347
Sampo Salo, Gaurav Khairkar, Jari Holopainen, Ville Viikari, Aalto University, Finland

WEP-A1.3P.3: WIDE BANDWIDTH AND COMPACT WEARABLE ANTENNA DESIGN FOR SENSING N/A
APPLICATIONS
Ankit Dabas, Shyqri Haxha, Masood Ur-Rehman, University of Bedfordshire, United Kingdom

WEP-A1.3P.4: DESIGN OF A SMALL RECTANGULAR PATCH FOR BODY AREA NETWORK 2351
APPLICATIONS
Emmanuel Valentín, Rafael Rodríguez Solís, University of Puerto Rico, Puerto Rico

WEP-A1.3P.5: E-PLANE SLICED PATCH ANTENNA 2353
Yiyang Wang, Yinghua Lu, Beijing University of Posts and Telecommunications, China; Ahmed A. Kishk, Concordia University, Canada

WEP-A1.3P.6: WEARABLE CONFORMAL SCMR SYSTEMS..... 2355
Karina Quintana, John Gibson, Stavros V. Georgakopoulos, Florida International University, United States

WEP-A1.3P.7: PARALLEL FEED WEARABLE ZIGBEE ANTENNA WITH SYMMETRY MEANDER 2357
LINES
Bin Hu, Lele He, Guoping Gao, Lanzhou University, China

WEP-A1.3P.8: OFF-BODY PERFORMANCE OF PATCH ANTENNA IN UNDERGROUND MINE 2359
Moulay ElHassan El Azhari, Mourad Nedil, UQAT, Canada; Ismail Benmabrouk, Larbi Talbi, UQO, Canada; Khalida Ghanem, Centre de développement des technologies avancées, Algeria

WEP-A1.3P.9: CHARACTERIZATION OF AN ON-BODY QUASI-STATIC CHANNEL IN 2361
UNDERGROUND MINE ENVIRONMENT
Moulay ElHassan El Azhari, Mourad Nedil, UQAT, Canada; Ismail Benmabrouk, Larbi Talbi, UQO, Canada; Khalida Ghanem, Centre de développement des technologies avancées, Algeria

WEP-A1.3P.10: MULTIBAND-OFDM BASED ULTRA WIDEBAND SYSTEM MODELLING OF 2363
ON/OFF-BODY ANTENNA DIVERSITY
Qammer Hussain Abbasi, Texas A&M University at Qatar, Qatar; Erchin Serpedin, Texas A&M University, United States; Khalid Qaraqe, Texas A&M University at Qatar, Qatar; Akram Alomainy, Yang Hao, Queen Mary University of London, United Kingdom

WEP-A1.3P.11: INFLUENCE OF BODY PLACEMENT ON LOW PROFILE UWB ANTENNA 2365
OFF-BODY RANGING PERFORMANCE
Andela Zaric, University of Lisbon, Instituto de Telecomunicacoes, Portugal; Carlos Fernandes, Universidade de Lisboa, Instituto de Telecomunicacoes, Portugal; Jorge Costa, ISCTE-IUL, Instituto de Telecomunicacoes, Portugal

THP-A1.3A: RECONFIGURABLE MICROSTRIP AND SIW ANTENNAS

THP-A1.3A.1: DESIGN OF A NOVEL RECONFIGURABLE RECTANGULAR PATCH ANTENNA FOR N/A
BLUETOOTH AND GPS OPERATION
Waqas Farooq, Masood Ur-Rehman, University of Bedfordshire, United Kingdom; Qammer Hussain Abbasi, Texas A&M University at Qatar, Qatar

- THP-A1.3A.2: TRANSMISSION LINE BASED APPROACH FOR THE SYNTHESIS OF PATTERN RECONFIGURABLE ANTENNAS 2369**
Leonardo Lizzi, Le Huy Trinh, Fabien Ferrero, Jean-Marc Ribero, Robert Staraj, University Nice-Sophia Antipolis, LEAT-CNRS, France
- THP-A1.3A.3: POLARIZATION RECONFIGURABLE OMNIDIRECTIONAL ANTENNA USING CROSSED DIPOLES 2371**
Yi Fan, Yuehui Cui, RongLin Li, South China University of Technology, China
- THP-A1.3A.4: A TUNABLE QUARTER-MODE SUBSTRATE INTEGRATED WAVEGUIDE ANTENNA N/A**
Alireza Pourghorban Saghati, Ali Pourghorban Saghati, Kamran Entesari, Texas A&M University, United States
- THP-A1.3A.5: A NOVEL POLARIZATION RECONFIGURABLE ANTENNA BASED ON TRANSMISSION LINE THEORY 2375**
Xiao Ding, Ren Wang, Ya-Qing Wen, Bing-Zhong Wang, University of Electronic Science and Technology of China, China; Dimitris E. Anagnostou, South Dakota School of Mines and Technology, United States
- THP-A1.3A.6: SIW-HORN ANTENNA CONTROLLABLE GAIN ENHANCEMENT 2377**
Mejdi Laribi, Mourad Nedil, Nahi Kandil, UQAT-LRTCS, Canada; Azzeddine Djaiz, Electronics and Instrumentation Engineering Technology, Saudi Arabia
- THP-A1.3A.7: KU-BAND SIW ANTENNA WITH IMPROVED FTBR N/A**
Zhenhua Chen, Jiangsu Key Laboratory of Meteorological Observation and Information Processing, China; Dongquan Sun, State Key Laboratory of Millimeter Waves, Southeast University, China
- THP-A1.3A.8: A NOVEL APERTURE SHARING MULTI-FUNCTIONAL MIMO ANTENNA 2381**
Yezhen Li, Xianling Liang, Liang Liu, Xudong Bai, Fuwen Liu, Junping Geng, Ronghong Jin, Shanghai Jiao Tong University, China
- THP-A1.3A.9: PRACTICAL APPROACH - TUNABLE ANTENNAS AND TUNABLE MATCHING NETWORKS .. 2383**
George Mankaruse, Raafat Mansour, University of Waterloo, Canada
- THP-A1.3A.10: DUAL POLARIZED PROXIMITY COUPLED MAGNETIC MICROSTRIP ANTENNAS FOR MIMO APPLICATION N/A**
Omer Arabi, Glyndwr University, United Kingdom; Nazar Ali, Khalifa University, United Arab Emirates; Peter Excell, Glyndwr University, United Kingdom; Abdul Muhsin AlTimimi, University of Technology, Iraq; Raed Abd-Alhameed, University of Bradford, United Kingdom
- THP-A1.4A: RECONFIGURATION OF COMPACT AND ELECTRICALLY SMALL STRUCTURES**
- THP-A1.4A.1: SUPERSTRATE CONFIGURATIONS FOR A MEMS RECONFIGURABLE PIXELATED PATCH ANTENNA FOR CLAS 2387**
Michael Wright, University of South Carolina, United States; William Baron, Jason Miller, James Tuss, David Zeppettella, Air Force Research Laboratory, United States; Mohammad Ali, University of South Carolina, United States
- THP-A1.4A.2: METAMATERIAL BASED RECONFIGURABLE MULTIBAND ANTENNA 2389**
Aswin Babu Jagadeesan, Arokiaswami Alphones, Nanyang Technological University, Singapore; Muhammad Faeyz Karim, Michael Ling Chuen Ong, Institute for Infocomm Research (I²R), Singapore
- THP-A1.4A.3: AN ELECTRICALLY SMALL CPW FED FREQUENCY RECONFIGURABLE ANTENNA 2391**
Muhammad Khan, Antonio Capobianco, University of Padova, Italy; Adnan Iftikhar, Sajid Asif, North Dakota State University, United States; Bilal Ijaz, COMSATS Institute of Information Technology, Pakistan; Benjamin Braaten, North Dakota State University, United States
- THP-A1.4A.4: COMPACT PLANNER UWB ANTENNA WITH DUAL BAND-NOTCHED CHARACTERISTICS 2393**
Ali Abbas, University of Jordan, Jordan; Mohamed Abdelazeez, German Jordan University, Jordan

THP-A1.4A.5: EFFECTS OF THE GROUND PLANE SIZE ON RADIATION PATTERN OF RECONFIGURABLE SLOT-RING ANTENNAS	2395
<i>Tianjiao Li, Xun Gong, University of Central Florida, United States</i>	
THP-A1.4A.6: COMPACT MULTI-BAND RECONFIGURABLE ANTENNA FOR COGNITIVE RADIO	2397
<i>Mohammad Safarpour, Pejman Rezaei, Alireza Zarkhoshk, Semnan University, Iran</i>	
THP-A1.4A.7: DESIGN OF A COMPACT UWB ANTENNA WITH CONTROLLABLE BAND-NOTCHED	N/A
<i>Sedighe Saghayi, Pejman Rezaei, Esmail Nasrabadi, Semnan University, Iran</i>	
THP-A1.4A.8: POLARIZATION DIVERSITY CONVERTER BASED ON MULTILAYER FREQUENCY SELECTIVE SURFACES	2401
<i>Yongjiu Li, Long Li, Xidian University, China</i>	
THP-A1.4A.9: TRANSPARENT AND MECHANICALLY RECONFIGURABLE SMALL ANTENNA BASED ON STRETCHABLE MICROMESH	2403
<i>Taehee Jang, Cheng Zhang, Hongseok Youn, Jing Zhou, L. Jay Guo, University of Michigan, United States</i>	
THP-A1.4A.10: K-BAND CIRCULARLY-POLARIZED RECONFIGURABLE TRANSMIT-ARRAY UNIT-CELL	2405
<i>Parinaz Naseri, Pedram Mousavi, Hamid Moghadas, University of Alberta, Canada</i>	
 THP-A1.5A: TUNABLE MICROSTRIP ANTENNAS	
THP-A1.5A.1: TUNABLE ANTENNA USING NOVEL FECO NANOPARTICLES FOR WIFI BANDS	2407
<i>Yaaqoub Malallah, Antarpreet Singh, Sampada Deshmukh, Drexel University, United States; Chins Chinnasamy, Melania Marinescu, Electron Energy Corporation, United States; Afshin Daryoush, Drexel University, United States</i>	
THP-A1.5A.2: A FREQUENCY TUNABLE RING MICROSTRIP ANTENNA FED BY AN L-PROBE WITH VARACTOR DIODES	2409
<i>Shuhei Sato, Sakuyosi Saito, Yuichi Kimura, Saitama University, Japan</i>	
THP-A1.5A.3: TUNABLE CIRCULAR-POLARIZATION ANTENNA FOR RFID APPLICATIONS	2411
<i>Jamal Zaid, Tayeb A. Denidni, INRS, Centre Énergie Matériaux Télécommunications, Canada</i>	
THP-A1.5A.4: A NOVEL DESIGN OF TUNABLE TERAHERTZ DEVICES USING GRAPHENE PARALLEL-PLATE WAVEGUIDE	2413
<i>Han Ren, Jun Ding, Bayaner Arigong, Mi Zhou, Jin Shao, Yuankun Lin, Hualiang Zhang, University of North Texas, United States</i>	
THP-A1.5A.5: A MICROSTRIP PATCH ANTENNA MANUFACTURED WITH FLEXIBLE GRAPHENE-BASED CONDUCTING MATERIAL	2415
<i>Sayed Sajal, Benjamin Braaten, Val Marinov, North Dakota State University, United States</i>	
 THP-A1.2A: MICROSTRIP PATCH ANTENNAS	
THP-A1.2A.1: HIGH GAIN PLANAR ANTENNA USING TM₁₃ MODE OF CIRCULAR DISC	2417
<i>Prateek Juyal, Lotfollah Shafai, University of Manitoba, Canada</i>	
THP-A1.2A.2: PRINTABLE PLANAR DIELECTRIC PASSIVE MICROWAVE COMPONENTS	2419
<i>Atabak Rashidian, Lotfollah Shafai, University of Manitoba, Canada; M. Sobocinski, J. Peräntie, J. Juuti, H. Jantunen, University of Oulu, Finland</i>	
THP-A1.2A.3: STACKED CPW-FED ANTENNA FOR SATELLITE APPLICATIONS WITH GAIN ENHANCEMENT	2421
<i>Azzeddin Naghar, Ana Alejos, Manuel García Sanchez, University of Vigo, Spain; Otman Aghzout, Abdelmalek Essaadi University, Morocco; Francisco Falcone, Universidad Pública de Navarra, Spain</i>	

THP-A1.2A.4: ANALYSIS OF MINIATURIZED MPA DESIGN USING THEORY OF CHARACTERISTIC MODES 2423

Muhammad Umar Khan, Mohammad S. Sharawi, King Fahd University of Petroleum and Minerals, Saudi Arabia

THP-A1.2A.5: A SINGLE-LAYER WIDEBAND CAVITY-BACKED MICROSTRIP PATCH ANTENNA 2425

Xiao Di Song, Xiao Peng Lu, Wei Wang, East China Research Institute of Electronic Engineering, China

THP-A1.2A.6: 4 BY 4 ULTRA-WIDEBAND MILIMETER-WAVE PRINTED LOG-PERIODIC DIPOLE ARRAY ANTENNA 2427

Wan Muhammad Imran Wan Mohd Zamri, Nemai Chandra Karmakar, Monash University, Australia

THP-A1.1A: MICROSTRIP ANTENNAS FOR DIVERSIFIED APPLICATIONS AND SITUATIONS

THP-A1.1A.1: ANALYSIS OF THE EFFECT OF SOLAR CELLS ON THE ANTENNA INTEGRATED ON TOP OF THEIR COVER GLASS 2429

Taha Yekan Shahvirdi, Reyhan Baktur, Utah State University, United States

THP-A1.1A.2: EFFECT OF AG ELECTRODE LATTICE IN A COMMERCIAL SPACE SOLAR CELL ON A PATCH ANTENNA INTEGRATED ON TOP OF IT 2431

Taha Yekan Shahvirdi, Reyhan Baktur, Utah State University, United States

THP-A1.1A.3: SUPPRESSING HIGHER ORDER MODES OF CAVITY SURROUNDED STACKED MICROSTRIP ANTENNAS FOR PRIME FOCUS REFLECTORS 2433

Mohammad Qudrat-E-Maula, Skyware Global, United States; Zahra Allahgholi Pour, Lotfollah Shafai, University of Manitoba, Canada; Saeed I. Latif, University of South Alabama, United States

THP-A1.1A.4: ON USING THE ELECTRICAL CHARACTERISTICS OF GRAPHENE-BASED CONDUCTORS FOR DESIGNING A CONFORMAL MONOPOLE ON A TRANSPARENT SUBSTRATE 2435

Benjamin Braaten, Travis Tolstedt, Sajid Asif, Mark Schroeder, Muhammad Khan, North Dakota State University, United States

THP-A1.1A.5: A COMPACT MONOPOLE FRACTAL ANTENNA FOR TV WHITE SPACE ENERGY HARVESTING APPLICATIONS 2437

Aditya Goyal, Arokiaswami Alphones, Nanyang Technological University, Singapore; Muhammad Faeyz Karim, Michael Ling Chuen Ong, Nasimuddin Nasimuddin, Institute for Infocomm Research (I²R), Singapore

THP-A1.1A.6: OMNIDIRECTIONAL COMPOSITE RIGHT/LEFT-HANDED LEAKY-WAVE ANTENNA WITH DOWNTILTED BEAM 2439

Ichiro Oshima, Takuya Seki, Denki Kogyo Co., Ltd., Japan; Naobumi Michishita, National Defense Academy, Japan; Keizo Cho, Chiba Institute of Technology, Japan

THP-A1.1A.8: A NEW COMPACT FOLDED PATCH GPS ANTENNA USING MEANDER LINE 2441

Chien Hung Chen, ROC Air Force Academy, Taiwan; Chow-Yen-Desmond Sim, Feng Chia University, Taiwan; Hua-Ming Chen, Yi-Fang Lin, National Kaohsiung University of Applied Sciences, Taiwan; Yang-Kai Wang, Advance Connection Technology Inc., Taiwan

THP-A1.1A.9: MICROSTRIP ANTENNA FOR 5G BROADBAND COMMUNICATIONS: OVERVIEW OF DESIGN ISSUES 2443

David Alvarez Outerelo, Ana Alejos, Manuel García Sanchez, María Vera Isasa, University of Vigo, Spain

THP-A1.1A.10: PARASITIC STACKED SLOT PATCH ANTENNA FOR DTT ENERGY HARVESTING 2445

Tiago Moura, Luis Brás, Instituto de Telecomunicações, Universidade de Aveiro, Portugal; Pedro Pinho, Instituto de Telecomunicações, Universidade de Aveiro / Instituto Superior de Engenharia de Lisboa, Portugal; Nuno Carvalho, Ricardo Gonçalves, Instituto de Telecomunicações, Universidade de Aveiro, Portugal

**THP-A1.1A.11: A PLANAR SURFACE WAVE ANTENNA WITH A BIDIRECTIONAL PATTERN FOR N/A
TELEMETRY APPLICATIONS**

Isa Mazraeh-Fard, Zaker Hossein Firouzeh, Mohsen Maddah-Ali, Hamed Khayam Nekoei, Reza Safian, Isfahan University of Technology, Iran

THP-A1.4P: PHASED ARRAY SYNTHESIS AND SIDELobe SUPPRESSION

THP-A1.4P.1: SIDE LOBE REDUCTION IN UNIFORMLY EXCITED LINEAR ARRAYS 2449

Ahmad Safaai-Jazi, Warren Stutzman, Virginia Polytechnic Institute and State University, United States

THP-A1.4P.2: A SIMPLE TECHNIQUE FOR SYNTHESIS OF LINEAR ARRAYS 2451

Ahmad Safaai-Jazi, Warren Stutzman, Virginia Polytechnic Institute and State University, United States

**THP-A1.4P.3: WIDEBAND QUANTIZATION LOBE SUPPRESSION IN ARRAYS OF COLUMNS FOR 2453
LIMITED FIELD OF VIEW (LFOV) SCANNING**

Robert Mailloux, ARCON Corporation, United States

THP-A1.4P.4: SIZE CONSTRAINT IN DESIGN OF CONCENTRIC RING ARRAY 2455

Pedro Mendes, Israel Hinojosa, Régis Guinvarc'h, SONDRRA, France; Randy Haupt, Colorado School of Mines, United States

**THP-A1.4P.5: EXPEDITED MICROSTRIP LINEAR ANTENNA ARRAY DESIGN USING RADIATION 2457
RESPONSE SURROGATES**

Slawomir Koziel, Stanislav Ogurtsov, Reykjavik University, Iceland

**THP-A1.4P.6: SIDELobe SUPPRESSION OF PLANAR MICROSTRIP ARRAYS BY 2459
SIMULATION-BASED PHASE- AND POSITION-ONLY ADJUSTMENT**

Slawomir Koziel, Stanislav Ogurtsov, Reykjavik University, Iceland

THP-A1.4P.7: SPARSE PHASED ARRAY ANTENNA FOR SPACE-BORNE SAR 2461

Junqi Lu, Yongxin Guo, National University of Singapore, Singapore; Hu Yang, National University of Defense Technology, China

**THP-A1.4P.8: PLANAR THINNED ANTENNA ARRAY SYNTHESIS USING MULTI-OBJECTIVE BINARY 2463
CAT SWARM OPTIMIZATION**

Lakshman Pappula, Debalina Ghosh, IIT Bhubaneswar, India

THP-A1.4P.9: SPARSE ARRAY SYNTHESIS USING OFF-GRID TECHNIQUE 2465

Fei Yan, Peng Yang, Feng Yang, Chuan Wu, University of Electronic Science and Technology of China, China; Tao Dong, Space Star Technology Co., Ltd [China], China

THP-A1.1P: BEAM STEERING IN PHASED ARRAYS

**THP-A1.1P.1: BROADSIDE UNIFORM LEAKY-WAVE SLOT ARRAY FED BY RIDGE GAP SPLITTED 2467
LINE**

Shoukry I. Shams, Mohamed A. Abdelaal, Ahmed A. Kishk, Concordia University, Canada

**THP-A1.1P.2: PHASED ARRAY ANTENNA EMPLOYING RECONFIGURABLE DEFECTED 2469
MICROSTRIP STRUCTURE (RDMS)**

Can Ding, Macquarie University, Australia; Y. Jay Guo, Pei-Yuan Qin, University of Technology Sydney, Australia; Eryk Dutkiewicz, Macquarie University, Australia; Yintang Yang, Xidian University, China

THP-A1.1P.3: A 2-DIMENSIONAL CRLH CIRCULARLY-POLARIZED LEAKY WAVE ANTENNA ARRAY N/A

Jiahui Fu, Wan Chen, Kuang Zhang, Guohui Yang, Fanyi Meng, Qun Wu, Harbin Institute of Technology, China

**THP-A1.1P.4: DUAL POLARIZED ELECTRICALLY ADJUSTABLE ANTENNA FOR MOBILE 2473
COMMUNICATION BASE STATION**

Hai-Jian Xu, Xiao-Wei Zhu, Zhen-Qi Kuai, State Key Lab. of Millimeter Waves, Dept. of Radio Engineering, Southeast University, China

THP-A1.1P.5: DESIGN AND FABRICATION OF AN ARRAY ELEMENT FOR A LOW-COST FREQUENCY-SCANNING LINEAR ARRAY 2475

Mahta Mahdiroodi, Mahmoud Shahabadi, University of Tehran, Iran

THP-A1.2P: MILLIMETER-WAVE PHASED ARRAYS

THP-A1.2P.1: KU-BAND TRAVELING WAVE SLOT ARRAY USING SIMPLE SCANNING CONTROL 2477

Nicholas Host, Chi-Chih Chen, John L. Volakis, Ohio State University, United States; Félix Miranda, NASA, United States

THP-A1.2P.2: KA-BAND PHASED ARRAY ANTENNA WITH CIRCULAR RIM 2479

Omer Bayraktar, Yusuf Sevinc, Ozlem Aydin Civi, Simsek Demir, Sencer Koc, Middle East Technical University, Turkey

THP-A1.2P.3: A BEAM-SWITCHING TAPERED SLOT ANTENNA ARRAY WITH AN 8 X 8 BUTLER MATRIX 2481

Yu-Sheng Chen, Te-Hsin Chou, Yu-De Lin, National Chiao Tung University, Taiwan

THP-A1.2P.4: POLARIZATION INSENSITIVE KA-BAND REFLECTARRAY ANTENNA 2483

Rania Elsharkawy, Electronics Research Institute, Egypt; Abdel-Razik Sebak, Montreal, Quebec, Canada, Canada; Moataza Hindy, Electronics Research Institute, Egypt; Osama Haraz, Assiut University, Egypt; Adel Saleeb, El-Sayed El-Rabaie, Menoufia University, Egypt

THP-A1.2P.5: A CIRCULARLY POLARIZED WAVEGUIDE PHASED ARRAY ANTENNA FOR K BAND SATELLITE COMMUNICATIONS 2485

Hong-tao Zhang, Wei Wang, Mou-ping Jin, Yong-qing Zou, East China Research Institute of Electronic Engineering, China

THP-A1.5P: PHASED ARRAYS WITH WIDE-ANGLE SCANNING

THP-A1.5P.1: LOW COST, WIDE SCANNING DUAL-POLARIZED PLANAR RADIATING ELEMENT FOR WEATHER MEASUREMENTS 2487

Matilda Livadaru, John L. Volakis, Ohio State University, United States

THP-A1.5P.2: A LOW PROFILE DUAL POLARIZED ULTRA WIDE SCAN PRINTED ARRAY ELEMENT 2489

Kwok Kee Chan, Chan Technologies Inc., Canada

THP-A1.5P.3: QCTO LENS DESIGN FOR CONFORMAL PHASED ARRAY ANTENNA 2491

Juan Lei, Queen Mary University of London, United Kingdom; Xidian University, China; Junming Zhao, Queen Mary University of London, United Kingdom; Guang Fu, Xidian University, China; Yang Hao, Queen Mary University of London, United Kingdom

THP-A1.5P.4: WIDE-ANGLE SCANNING PHASED ARRAY BASED ON MICROSTRIP MAGNETIC DIPOLE YAGI SUB-ARRAYS 2493

Ya-Qing Wen, Bing-Zhong Wang, Xiao Ding, Ren Wang, University of Electronic Science and Technology of China, China

THP-A1.5P.5: A WIDE-ANGLE SCANNING ARRAY BASED ON THE IMAGE THEORY AND TIME REVERSAL SYNTHESIS METHOD 2495

Ren Wang, Bing-Zhong Wang, Xiao Ding, Zhi-Shuang Gong, Yu Yang, Ya-Qing Wen, University of Electronic Science and Technology of China, China

THP-A1.3P: PHASED ARRAY MUTUAL COUPLING AND TOLERANCE EFFECTS

THP-A1.3P.1: DISTRIBUTED LINEAR ANTENNA ARRAY PATTERN PERFORMANCE ENHANCEMENT 2497

Andrew Adrian, Leo Kempel, Michigan State University, United States

THP-A1.3P.2: RANDOM ANTENNA ARRAY PHASE AND RANGE LIMITATIONS 2499

Kristopher Buchanan, John D. Rockway, Space and Naval Warfare Systems Center, Pacific, United States; Gregory Huff, Texas A&M University, United States

THP-A1.3P.3: TOLERANCE ANALYSIS OF PLANAR ARRAYS THROUGH MINKOWSKI-BASED INTERVAL ANALYSIS	2501
<i>Nicola Anselmi, Lorenzo Poli, Lorenza Tenuti, Paolo Rocca, Federico Viani, Andrea Massa, ELEDIA Research Center, University of Trento, Italy</i>	
THP-A1.3P.4: HYBRID ARRAY PATTERN CALCULATION TECHNIQUE	2503
<i>W. Mark Dorsey, Naval Research Laboratory, United States; Amir Zaghloul, Army Research Laboratory, United States</i>	
THP-A1.3P.5: RECEIVED VOLTAGE AND POWER FOR AN ARBITRARY ELEMENT OF INFINITE PLANAR ARRAYS	2505
<i>Do-Hoon Kwon, University of Massachusetts Amherst, United States</i>	
THP-A1.3P.6: PREDICTION OF THE DIRECTION OF INTERMODULATION BEAMS IN ACTIVE TRANSMIT ARRAYS	N/A
<i>Manoja Weiss, Ball Aerospace, United States; Randy Haupt, Colorado School of Mines, United States</i>	
THP-A1.3P.7: PLANAR PHASED ARRAY CALIBRATION METHOD BASED ON PLANAR NEAR-FIELD MEASUREMENT SYSTEM	N/A
<i>Rui Long, Jun Ouyang, Feng Yang, University of Electronic Science and Technology of China, China</i>	
THP-A1.3P.8: INTERFERENCE REDUCTION BETWEEN SDD LINEAR ARRAY ANTENNAS USING END-FIRE ARRANGEMENT	2511
<i>Masakuni Tsunetzawa, Naoki Honma, Kazuya Takahashi, Yoshitaka Tsunekawa, Iwate University, Japan; Kentaro Murata, National Defense Academy, Japan; Kentaro Nishimori, Niigata University, Japan</i>	
 THP-A1.6P: WIDEBAND PHASED ARRAYS	
THP-A1.6P.1: LOW-COST END-POINT MODULAR PUMA ARRAY	2513
<i>Rick W. Kindt, Naval Research Laboratory, United States; Marinos N. Vouvakis, University of Massachusetts Amherst, United States</i>	
THP-A1.6P.2: SIMPLIFIED DESIGN OF 6:1 PUMA ARRAYS	2515
<i>Michael Lee, John Logan, University of Massachusetts Amherst, United States; Rick W. Kindt, Naval Research Laboratory, United States; Marinos N. Vouvakis, University of Massachusetts Amherst, United States</i>	
THP-A1.6P.3: FINITE ARRAY TRUNCATION EFFECTS ON POLARIZATION	2517
<i>Michael Lee, Marinos N. Vouvakis, University of Massachusetts Amherst, United States</i>	
THP-A1.6P.4: LOW COMPLEXITY FEED SYSTEM FOR A LONG SLOT ANTENNA ARRAY	2529
<i>Abhishek Kumar Awasthi, A. R. Harish, Indian Institute of Technology Kanpur, India</i>	
THP-A1.6P.5: WIDEBAND & WIDE ANGLE SCANNING ARRAY WITH PARASITIC SUPERSTRATE	2521
<i>Ersin Yetisir, Nima Ghalichechian, John L. Volakis, Ohio State University, United States</i>	
THP-A1.6P.6: A PLANAR WIDEBAND WIDE-SCAN PHASED ARRAY: CONNECTED ARRAY LOADED WITH ARTIFICIAL DIELECTRIC LAYERS	2523
<i>Daniele Cavallo, Waqas H. Syed, Harshitha Thippur Shivamurthy, Andrea Neto, Delft University of Technology, Netherlands</i>	
THP-A1.6P.7: DISPERSION ENGINEERED RIGHT/LEFT-HANDED TRANSMISSION LINES ENABLING NEAR-OCTAVE BANDWIDTHS FOR WIDEBAND CP PATCH ARRAYS	2525
<i>Joshua Kovitz, Yahya Rahmat-Samii, University of California, Los Angeles, United States; Jun Choi, Syracuse University, United States</i>	
THP-A1.6P.8: EMPIRICAL AND THEORETICAL CHARACTERIZATION OF MULTIOCTAVE PLANAR PHASED ARRAYS	2527
<i>Johnson Wang, Wang Electro-Opto Corporation, United States</i>	
THP-A1.6P.9: A LOW CROSS-POLARIZATION DECADE-BANDWIDTH VIVALDI ARRAY	2519
<i>John Logan, Marinos N. Vouvakis, University of Massachusetts Amherst, United States</i>	

FRP-UB.1A: FILTER DESIGN, TRANSITIONS AND FEEDING NETWORKS

FRP-UB.1A.3: OPTICALLY TRANSPARENT COMPACT 4×4 BUTLER MATRIX..... N/A
Ousama Abu Safia, Larbi Talbi, University of Quebec in Outaouais, Canada; Khelifa Hettak, Communications Research Centre Canada, Canada; Mustapha Yagoub, University of Ottawa, Canada

FRP-UB.1A.4: FAST AND ACCURATE SIMULATION OF COAXIAL-FED ANTENNAS USING FULL-WAVE 2533 AND ASYMPTOTIC COMPUTATIONAL METHODS

Hipolito Gomez-Sousa, Marcos Arias-Acuña, University of Vigo, Spain; Jose Angel Martinez Lorenzo, Northeastern University, United States; Oscar Rubiños-Lopez, University of Vigo, Spain; Thomas Jost, German Aerospace Center (DLR), Germany; Georg Strauss, Munich University of Applied Sciences, Germany

FRP-A1.1A: PRINTED CIRCUITS AND FRONT-ENDS

FRP-A1.1A.1: WIDEBAND DIGITAL 5-BIT PHASE SHIFTERS FOR WIDEBAND PHASED ARRAYS 2535

Hongzhao, Ray Fang, Ramanan Balakrishnan, Koen Moutaah, National University of Singapore, Singapore; Régis Guinvarc'h, SONDRRA, Supélec, France

FRP-A1.1A.2: SIGNAL-INTERFERENCE RF WIDE-BAND BANDPASS FILTERS USING HALF-MODE 2537 SUBSTRATE-INTEGRATED-WAVEGUIDE (HM SIW) DIRECTIONAL COUPLERS

Roberto Gomez-Garcia, Jose-Maria Munoz-Ferreras, University of Alcalá, Spain; Dimitra Psychogiou, Dimitrios Peroulis, Purdue University, United States

FRP-A1.1A.3: A MULTILAYER SIW-CPW TRANSITION JUNCTION FOR EFFICIENT MM-WAVE 2539 PHASED ARRAY APPLICATIONS

Wael M. Abdel-Wahab, C-COM Satellite Systems Inc., Canada; Hussam Al-Saedi, Mohmmadbagher Fereidani, Safieddin Safavi-Naeini, University of Waterloo, Canada

FRP-A1.1A.4: BROADBAND PHASE SHIFTER FOR K- AND KA- BANDS BEAM-STEERING NETWORKS..... 2541

Abdulrahman Alaqeel, Sultan Almorqi, Mohammad Algassim, King Abdulaziz City for Science and Technology, Saudi Arabia; Osama Haraz, Saleh Alshebeili, Abdel-Razik Sebak, King Saud University, Saudi Arabia

FRP-A1.1A.5: A TRI-BAND BANDSTOP FILTER WITH SHARP REJECTION AND CONTROLLABLE 2543 BANDSTOP FREQUENCIES

Liang Liu, Ronghong Jin, Xudong Bai, Yezheng Li, Xianling Liang, Junping Geng, Chong He, Shanghai Jiao Tong University, China