

2024 International Applied Computational Electromagnetics Society Symposium (ACES 2024)

**Orlando, Florida, USA
19-22 May 2024**



**IEEE Catalog Number: CFP2456X-POD
ISBN: 979-8-3503-6297-8**

**Copyright © 2024, The Applied Computational Electromagnetics Society (ACES)
All Rights Reserved**

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

IEEE Catalog Number:	CFP2456X-POD
ISBN (Print-On-Demand):	979-8-3503-6297-8
ISBN (Online):	978-1-7335096-7-1

Additional Copies of This Publication Are Available From:

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

CURRAN ASSOCIATES INC.
proceedings
.com

**2024 International Applied Computational Electromagnetics Society
Symposium
(2024 ACES-Orlando)
May 19-22, 2024**

**Conference Proceedings
Table of Contents**

Session 20: Advances in Radar Signal Processing Techniques and Applications

20-01	“Three-Dimensional Synthetic Aperture Radar Image Formation” Lee A. Harrison, Mateusz Marciszewski, William Abreu, Jr.	1
20-02	“A Spatial-LDI Δ - Σ LNA Design in 65nm CMOS” Nimasha Silva, Soumyajit Mandal, Leonid Belostotski and Arjuna Madanayake	3
20-03	“R-LRCBNet: A YOLOV8-based Oriented Ship Detection Method of SAR Image” Gui Gao and Yuhao Chen	5
20-04	“Multistatic, Real-time, High Resolution Lunar Penetrating Imaging Approach for Water-Ice Detection” Tatiana Valera, Stavros Koulouridis, Satheesh B. Venkatakrisnan, John L. Volakis	7

Session 21: Programming Languages for CEM

21-01	“Simulating Advanced Driver Assistance Systems using a High-Fidelity Physics-Based Asymptotic Shooting and Bouncing Ray-Tracing Electromagnetics Solver” Ushe Chipengo	8
21-02	“FORTRAN: A Personal Lifetime Experience” John Shaeffer	9
21-03	“On the Suitability of the Julia Programming Language for Computational Electromagnetics” Peter S. Simon	11
21-04	“GPU Acceleration using CUDA for Computational Electromagnetics” Constantine Sideris	12
21-05	“MESTI: Maxwell’s Equations Solver with Thousands of Inputs” Ho-Chun Lin, Shiyu Li, Zeyu Wang, and Chia Wei Hsu	13
21-06	“Computing Derivatives of Finite Element Solutions by Automatic Derivative Programs” Botian Zhang, Yahya Rahmat-Samii	15

Session 22: EM Modeling using Altair Feko - I

22-01	“New Features in Altair Feko 2023” Johann van Tonder, Marlize Schoeman, Danie le Roux, Ulrich Jakobus, Elia Amedeo Attardo, Christoph Maeurer, Felipe Cátedra, Carlos Delgado, Eliseo Garcia, Klearchos Samaras	17
22-02	“Austin RCS Benchmarks: Validation Using Altair Feko” Evan Urban, Viraj Kulkarni, C.J. Reddy	19
22-03	“Wideband Dual-Polarized Log-Periodic Pyramid Antenna at VHF/UHF” Alan J. Fenn, Cara Yang Kataria, David C. Malling, and Cheryl A. O’Keefe	21
22-04	“A Numerical Study on EMI Shielding Strategies for LV Battery Pack Components” Saranraj Karuppuswami, Aseim Elfrgani	23
22-05	“Metasurface Characterization for Low Frequency Shielding Purposes” Nunzia Fontana, Mattia Simonazzi, Leonardo Sandrolini, Sami Barmada	25
22-06	“Simulations of the 5G Beamforming Performance for mmWave Bands in an Urban Scenario” Taha Alwajeeh, Markus Helwig, Reiner Hoppe, Ulrich Jakobus, C.J. Reddy	26
22-07	“Advanced Radar Coverage Simulations Using WRAP in Altair Feko” Naveed Mufti, Ulrich Jakobus, C.J. Reddy	28

Session 23: Student Paper Competition - I

23-01	“Array Failure Diagnosis via Characteristic Mode Theory and Near-Field Data” Ricardo E. Sendra, Constantinos L. Zekios, Stavros V. Georgakopoulos	30
23-02	“Experimental Studies on Quasi-Isotropic Circumferentially Short-circuited Magnetic Dipole Antennas with Different Flared Angles” Ding Ding, Xiao-Hui Mao, Wen-Jun Lu	32
23-03	“A Wideband Reconfigurable Reflectarray Using the Frequency Pulling Technique” Malak Elaouinate, Christos Exadaktylos, Anastasios G. Koutinos, Constantinos L. Zekios, Stavros V. Georgakopoulos	34

23-04	“An Intuitive Evaluation Method of 1-Bit Reconfigurable Metasurface Element Based on Radiation Viewpoint” Changhao Liu, Fan Yang, Shenheng Xu, Maokun Li	36
23-05	“Tucker-SVD-FFT-Accelerated Solution of Volume Integral Equation for Magneto-Quasi-Static Analysis of Voxalized Geometries” Xiaofan Jia, Yang Liu, Mingyu Wang, Chao-Fu Wang, Abdulkadir C. Yucel	38
23-06	“Algorithms for Accelerating the Co-simulation of Maxwell’s and Drift-Diffusion Equations for Transient Device Simulations in the THz Regime” Hongyang Liu, Dan Jiao	40
23-07	“Real-Time Computation of E-Field for Transcranial Magnetic Stimulation” Nahian I. Hasan, Moritz Dannhauer, Dezhi Wang, Zhi-De Deng, Luis J. Gomez	42

Session 24: Electromagnetic Analysis, Modeling and Applications

24-01	“Electromagnetic and Thermal Analysis of Silver-Based Low-Emissivity Coating Technology for Energy Saving Sustainable Windows Applications” Duane Mateychuk, Khashayar Ghaffari, Anthony Leger, Laila Salman	44
24-02	“Analysis of Three-dimensional Composite Penetrable Scatterers Featuring Mono-isotropic Impedance Sheets” Shaofan Xu, Jordan Budhu	46
24-03	“Use of the Extended BLT Equation for Electromagnetic Wave Coupling Analysis” Terele S. Parker, Julio V. Urbina, Erik H. Lenzing	48
24-04	“Experimental Verification of Worst-Case Waveform Coupling to a Loaded System” Richard Hunt, Daryl Beetner, Victor Khilkevich, John McGeehan, John Willits, Anthony N. Caruso, Ahmed M. Hassan, Mohamed Z. M. Hamdalla	49
24-05	“Towards Quantifying the Effect of Material Uncertainty on RCS Predictions of Composite Targets” Jon T. Kelley, Brian Mackie-Mason, David A. Chamulak, Mark Martin, Kendall Crouch, Clifton C. Courtney, Ali E. Yilmaz	51
24-06	“AI-Based Multi-Objective Design Optimization Environment for EV Wireless Power Transfer” Rakan Almazmomi, A. A. Arkadan	53
24-07	“Advanced Shielding to Suppress Magnetic Field Emission for Improved Hardware Performance” Ghaleb Saleh Ghaleb Al-Duhni, Mudit Khasgiwala, Pulugurtha Markondeya Raj, John L. Volakis	55
24-08	“A Scalable Multi-Physics Simulation of Dancing Ferrofluid” Ge Cao, Zhen Peng	57
24-09	“Wideband Supercavity Operation of Combined HIR-SIW Resonators” Zahra Manzoor, Alexander V. Kildishev, Dimitrios Peroulis	59

Session 25: Inverse-Design Techniques in Electromagnetics

25-01	“Differentiable Inverse Design of Free-form Meta-optics Using Multiplicative Filter Network” Yi Huang, Yunxi Dong, Huan Zhao, Hong Tang, Bowen Zheng, Hualiang Zhang	61
25-02	“Two-Stage Inverse Design of Superchiral Dielectric Metasurfaces” Omer Yesilyurt, Vahagn Mkhitarian, Jer-Shing Huang, Ilya Shadrivov, Alexander V. Kildishev	63
25-03	“Hessian-based Antenna Optimization with Automatic Differentiation” M. Balasubramanian, A. Das, P. L. Werner, D. H. Werner	64
25-04	“Reconstruction of Rough Surface Profiles using a CNN-enhanced RTM-based Inversion Scheme” Ahmet Sefer, Guang Ooi, Shehab Ahmed, Hakan Bagci	65
25-05	“Inverse Design of Nanophotonic and Radio-Frequency Devices using Fast Maxwell Solvers” Davit Aslanyan, Yifei Zheng, Jin Hu, Constantine Sideris	66
25-06	“Inverse Design Techniques for Optimizing Passive Lumped Networks” G. Mishra, M. Balasubramanian, A. Das, P. L. Werner, D. H. Werner	67
25-07	“Analyzing Electromagnetic Pulse Diffraction for the Reconstruction of Elliptical Cylinder Shapes” Emre Iscan, Vasil Tabatadze, Sebahattin Eker	68

Session 26: EM Modeling using Altair Feko - II

26-01	“Scattering Analysis of Aircrafts of Different Sizes Using Altair Feko” Jaehoon Kim, C.J. Reddy	70
26-02	“Design and Optimization of Blade Antenna for Automotive Cellular Applications using Altair Feko” Ali Attaran, Saeid Ghaffarian, Ervin Larashi, Christoph Mäurer, C.J. Reddy	72
26-03	“Application of the Brillouin Diagram in Log-Periodic Antenna Design” Joseph Abroquah, Songyi Yen, Dejan S. Filipovic	74
26-04	“Effect of Rough Sea Surfaces on Hertzian Dipole Patterns in the HF Band” Aadesh Neel, Songyi Yen, Dejan Filipovic	76
26-05	“FEKO Simulations of Ultra-Passive Radio Frequency Fresnel Rings Signal Amplifiers” John Anthony McVay, Joshua Romano, Joshua Benavidez	78

26-06	“Development of a 3U CubeSat Electromagnetic Model” Dipesh Aggarwal, Hariharan Krishnan, Alexander B. Murray, Ashwin K. Iyer	79
26-07	“Numerical Accuracy and Airbox Size: A Comparison of FEM to MoM and Analytical Results for Dipole Antennas” Zachary J. Kwong, Alexander B. Murray, Rashid Mirzavand, Ashwin K. Iyer	80
26-08	“Aperture Taper Efficiency and Directivity – A Comparison of Results using Analytical Techniques and Computer Simulations using FEKO” Steven Weiss	81

Session 27: Student Paper Competition - II

27-01	“A Novel Neural Point Field Framework for End-to-End Wireless Channel Modeling” Ge Cao, Zhen Peng	82
27-02	“Inverse Design of Multiple-Input Multiple-Output Perfectly-Matched Metamaterials” Shrey Thakkar, Jorge Ruiz-García, Luke Szymanski, Gurkan Gok, Anthony Grbic	84
27-03	“A Quantum-inspired Metaheuristic Algorithm for Beampattern Synthesis in Multi-User MIMO” Qi Jian Lim, Zhen Peng	86
27-04	“A Ratio-Norm Regularization for Sparsity-Promoting Electromagnetic Inversion” Lingqi Gao, Hakan Bagci	88
27-05	“Intelligent Geometric Alignment and Dimensions-Guided Approach for Design Optimization for Efficiency Improvement of WPT Systems” Ahmed M. Ibrahim, Ahmed S. Soliman, Osama A. Mohammed	90

Session 32: Application of AI in Microwave, Terahertz and Photonic Devices

32-01	“Deep Neural Network Implementation for Material Characterization at W-Band Frequencies” Ana M. Cardero, Elias A. Alwan	92
32-02	“Object Classification using Electromagnetic Data and Neural Networks” Ergun Simsek, Raonaqul Islam	93
32-03	“A Marching-on-Frequency-Inspired Cascaded Network for Multi-frequency Microwave Imaging” Ben Martin, Colin Gilmore, Ian Jeffrey	95
32-04	“Description of a 2D Experimental Machine-learning Microwave Dataset and Initial Supervised Descent Method Imaging Results” Seth Cathers, Ben Martin, Noah Stieler, Ian Jeffrey, Colin Gilmore	97

Session 33: Electromagnetic Simulations using Ansys HFSS

33-01	“HFSS Enables Cold Plasma Simulation for RF and Microwave Applications” Shahid Ahmed	99
33-02	“Optimization of the Radial Lines of an LP-RLSA for 40-50 GHz Frequency Band” Md Faiyaz Bin Hassan, Shubendu Bhardwaj	101
33-03	“High-Bandwidth Aperture-Coupled 4×4 Patch Antenna Array at 28GHz for Thin Device Integration Design” Carlos J. Arteaga, Elias Alwan	103
33-04	“Equivalent Circuit Model for a Waveguide Fed Dual Rectangular Slot Antennas” Yeonghoon Noh, Divya Pande, Mohammad Ranjbarnikkhah, Mohsen Sazegar, David R. Smith	104

Session 34: Advances in Antenna and Antenna Array Designs - I

34-01	“A Flexible Ku-Band Checkerboard Phased Array Antenna” Theng Huat Gan, Ankang Liu, Peng Khiang Tan, Jian Lu	105
34-02	“Miniaturizing Microstrip Antennas Using the Frequency Pulling Technique” Anastasios G. Koutinos, Constantinos L. Zekios, Stavros V. Georgakopoulos	107
34-03	“A Magnetic Window Antenna Based on Artificial Electromagnetic Structure” Cheng Guo, Qingqing Jia, Ye Yuan, Jisheng Tong, Qing Zhao	109
34-04	“Optimizing Antenna Element Distribution for Enhanced Gain in Sparse Array Configurations” Michael Ortiz, Md Nazim Uddin, Elias Alwan	111
34-05	“Design of Pentaband Antenna with High Frequency Ratio for CubeSat Applications” Md Nazim Uddin, Elias A. Alwan	113
34-06	“Simulation Studies of Electromagnetic Energy Absorption by Hydride Materials” Michael A. Brown, Mohammad Ali	115
34-07	“Design and Simulation of Base Station Tightly Coupled Antenna Array Using Plastic Materials as Substrate” Yuhao Feng, Yikai Chen, Atef Z. Elsherbeni	117

Session 35: Reconfigurable Devices for High Frequency Applications

35-01	“Reconfigurable HoneyComb Series Fed Patch Antenna Array” Sima Noghianian, Reena Dahle, Patricio Guerron, Yi-hsiang Chang	119
-------	--	-----

35-02	“Design of 3-bit Angle-Insensitive RIS for 5G Communication Systems” T. Islam, A. Eroglu	121
35-03	“Effect of Radii of Curvature in Flexible Substrates on the Performance of Super-Wideband Antennas” Semire Olatunde-Salawu, Mohamed Z. M. Hamdalla, Travis D. Fields, Kalyan C. Durbhakula, Ashiqur Rahman	123
35-04	“Performance Comparison of Different Phase-Gradient Metasurface Unit Cells for Wide Angle Beam Steering Applications” Mashrur Zawad, Mohamed Z. M. Hamdalla, Kalyan Durbhakula, Ahmed M. Hassan	125
35-05	“1-bit Wideband Reconfigurable Intelligent Surface Design at Sub-6 Band” Kitch Mensah-Bonsu, Binbin Yang, Abdullah Eroglu, Hao Xu, Lijun Qian	127
35-06	“Multilayer Reconfigurable Antenna Design for RADAR Sensor Applications” J. M. Karra, J. P. Eanes, A. Eroglu	129

Session 36: Recent Advances in Integral Equation Based Methods

36-01	“Superior Far Field Accuracy of the Normally-Integrated MFIE Compared to the Conventional MFIE for Flat-faceted Targets” Andrew F. Peterson, Malcolm M. Bibby	131
36-02	“A Simple Algebraic Method to Solve the Matrix Equation Generated by the Method of Moments” Sadasiva M. Rao, Charles F. Nelatury	133
36-03	“A T-Matrix EFIE-PMCHWT Method for Computing Electromagnetic Scattering from Composite Conductor-Dielectric Objects” Arkaprovo Das, Manushanker Balasubramanian, Pingjuan L. Werner Douglas H. Werner	135
36-04	“A Phase-Informed p-Adaptation Method for Electromagnetic Scattering Analysis” Christian Diaz-Caez, Su Yan	136
36-05	“Accurate Modeling for Electromagnetic Interaction with Plasma-Surrounded Metallic Objects” Wei Lin Yang, Mei Song Tong	138
36-06	“A Hybrid Simulation Method for Electromagnetic Scattering by Electrically Large Rough Surfaces” Hongxia Ye, Chenyu Guo, Mei Song Tong	140

Session 37: Low Frequency EM Computations and Applications

37-01	“Analytical Green’s Functions for Two-dimensional Electrostatics and Boundary-element based Solver” Chungwei Lin, Bingnan Wang	142
37-02	“Novel PM-Assisted Three-Layer Sub-Harmonic Synchronous Machine” S. M. Sajjad Hossain Rafin, Qasim Ali, Osama A. Mohammed	144
37-03	“Characterization and Comparative Analysis of the Electrostatic Properties of Different Lunar Regolith Simulants” Aidin Hassanzadeh, Ahmed M Hassan, Adele P. Peskin, Orion Kafka, Newell Moser, Andrew Sharits, Ann N. Chiramonti, Thomas Lafarge, Jay D. Goguen, Doug Rickman, Edward J. Garboczi	146
37-04	“A Novel A- ϕ Formulation for Efficient Electromagnetic Computations” Minyechil Mekonnen, Su Yan	147
37-05	“An Interactive Visualization of Electrostatic Electric Field and Potential Distribution” Charles A. Vath, Atef Z. Elsherbeni	149
37-06	“Geometric Dispersion Effects of Sinusoidal Corrugation Depth and Periodicity in Coaxial Cables” David B. Cravey, Natalie B. Kostinski, Brian R. Poole, David A. Garren	151

Session 38: Advances in Antenna and Antenna Array Designs - II

38-01	“Miniaturization of Deployable Inverted-Hat Monopole Antenna via Artificial Transmission Line Loading” Muhammad Mubasshir Hossain, Satheesh Bojja Venkatakrishnan, and John L. Volakis	153
38-02	“Inverse Design of Multi-Beam Metasurface Antennas for Spaceborne Systems” F. Alsolamy, N. Chahat, G. Chattopadhyay, A. Grbic	154
38-03	“Gain Enhancement of a Patch Antenna using Wideband Modified Split Ring Resonator” Al-Moatasem Al-Hinaai, Anthony N. Caruso, Travis D. Fields, Mohamed Z. M. Hamdalla, Kalyan C. Durbhakula	155
38-04	“Design of A Cavity-Backed 360° Beam Steerable Antenna for 5G Wireless Communication” Chandana Kolluru, Mashrur Zawad, Kalyan Durbhakula, Travis Fields, Ahmed M. Hassan, Mohamed Z. M. Hamdalla	157
38-05	“Automated Pixelated Unit Cell Design for Reflectarray Antennas and Reconfigurable Intelligent Surfaces” Nolan H. Grant, Atef Z. Elsherbeni, Quang M Nguyen, Amir Zaghloul	159
38-06	“Measurement and Characterization of an UWB mmWave 2-40 GHz TCDA” Michail O. Anastasiadis, Md Rakibul Islam, Jorge A. Caripidis Troccola, Gregory Mitchell, John L. Volakis	161
38-07	“Low-Loss Ultra-Wideband Feeding Network for Foldable Spaceborne Multifunctional Antenna Arrays” Jorge A. Caripidis Troccola, Satheesh B. Venkatakrishnan, John L. Volakis	163

Session 39: Numerical Methods in EMC

39-01	“Fresnel Region Fields of Aperture Antennas Used in EMC Radiated Emission Testing” Lloyd S. Riggs, Marsellas L. Waller, Riley Carroll, Matthew Hartline, Aubrey N. Beal	164
39-02	“Broadband Modeling of Mutual Coupling between Surface-Mounted Devices” Christian Riener, Thomas Bauernfeind, Manfred Kaltenbacher	166
39-03	“Integral Equation-Based Topology Optimization of an EMI Filter” Francesco Lucchini, Riccardo Torchio	168
39-04	“Near Field Electromagnetic Interference Coupling-Mechanisms of Multilayer Ceramic Capacitors” Dominik Kreindl, Thomas Bauernfeind, Bernhard Weiss, Christian Stockreiter, Manfred Kaltenbacher	170
39-05	“Model Order Reduction Approach for PCB Structures based on Semi-discretized Darwin Model using FEM” Samuel Kvasnicka, Klaus Roppert, Christian Riener, Thomas Bauernfeind, Manfred Kaltenbacher	172
39-06	“Simulation of Mutual Coupling in Aperiodic Arrays” Matthew J. Dodd, Atef Z. Elsherbeni	174
39-07	“Using the Darwin Approximation for Equivalent Circuit Parameter Extraction with Frequency-dependent Linear Materials” Klaus Roppert, Samuel Kvasnicka, Mehdi Hatab, Thomas Bauernfeind	176

Session 44: Emerging Technologies for Phased Array Radars

44-01	“Gain Analysis of Domino and Tetromino-shaped Irregular Tiled Arrays” Yankai Ma, Qiang Sun, Quanyuan Feng, Yan Wen	178
44-02	“Compact Multibeam Antenna without Crossovers Based on FCSIW for mm-wave Applications” Qiang Sun, Yankai Ma, Qianyin Xiang, Yan Wen, Quanyuan Feng	180
44-03	“Modern Radar Vertical Coverage Diagram Including Interference” Wilfredo Rivas-Torres	182
44-04	“Foldable Circularly Polarized Tightly Coupled Dipole Array for High Resolution Radars” Muhammad Mubasshir Hossain, Satheesh Bojja Venkatakrishnan, John L. Volakis	184

Session 45: Devices for Antennas and Communication Systems - I

45-01	“On the Numerical Modeling of Tapered Anechoic Ranges” Vince Rodriguez	186
45-02	“All-in-One Integrated Multiport Receiver for Giga-Speed Backhaul Applications” Mansoor Dashti Ardakani, Reza Karimian, Shahrokh Ahmadi, Mona Zaghoul, Amir Zaghoul	188
45-03	“Enhancing Quantum Non-reciprocity: From Lorentz to Fano Qubits for Improved Isolation and Bandwidth in Circuit QED Systems” Deepanshu Trivedi, Arjuna Madanayake, Alex Krasnok, Leonid Belostotski	N/A
45-04	“1D Equivalent Circuit Models for Computation of the Dispersion Relation of 2D Metamaterial-based EBG Structures” Samuel Clark, Braden P. Smyth, Ashwin K. Iyer	190
45-05	“Sensor Data Relay System for Underground Mine Communications” Kenneth Y. Hora, Trevor J. Wolf, Collin Kringlen, Atef Z. Elsherbeni, Jamal Rostami	191

Session 46: Electromagnetics in Health Care

46-01	“Wearable MagnetoCardioGraphy (MCG) Sensor Using a Single Coil” A. Kaiss, A. Kiourti	193
46-02	“Advancements in Wearable MagnetoCardioGraphy (MCG) Sensors” A. Kaiss, A. Kiourti	195
46-03	“Safety of Wireless Brain Implants: A Review” Nelson L. Angels, Atef Z. Elsherbeni	197
46-04	“Wireless Monitoring of S-Parameters Measurement using a Nano-VNA for Biomedical Applications” Lisa K. Elmiladi, Kenneth Y. Hora, Peter H. Aaen, Atef Z. Elsherbeni	199
46-05	“Comparison and Validation of Different Tissue Mimicking Protocols for The Novel Development of an Arm Tissue Phantom” Anthony V. Giordano, Melany Gutierrez Hernandez, Satheesh B. Venkatakrishnan	201
46-06	“Towards the Design of a Non-invasive Glucose Monitoring Sensor” Silje Ostrem, Collin Kringlen, Cameron Evanovich, Atef Elsherbeni, Peter Aaen	203

Session 47: Advanced Methods and Applications based on Integral Equations

47-01	“Analytic Two-Dimensional Logarithm Integrals on Curvilinear Domains” Jordon N. Blackburn, John C. Young	205
47-02	“Frequency-time Hybrid Method in Exterior and Interior Domains” Oscar P. Bruno	207
47-03	“Analytic Integrals with $\nabla \partial R^{-1} / \partial n$ Kernels for Linear Triangular Mesh Elements”	208

	Jordon N. Blackburn, John C. Young, Robert J. Adams, Stephen D. Gedney	
47-04	“Higher Order Mortar Methods for the EFIE using Parametric Curved Surfaces” James B. Dee, Andrew F. Peterson	210
47-05	“A Mixed-Order Divergence-Conforming Locally Corrected Nyström Method for Triangular Cells” John C. Young, Stephen D. Gedney, Robert J. Adams	211
47-06	“Lumped-Element Circuit Construction for Lossy Distributed Circuits” R. J. Adams, C. Lu, J. C. Young, S. Velamparambil, I. Chowdhury, W. Thiel	213
47-07	“Parallel Fast Iterative H-Matrix-Accelerated Locally Corrected Nyström Method with an Unreliable H-matrix Based Preconditioner” Omid Babazadeh, Jin Hu, Emrah Sever, Ian Jeffrey, Constantine Sideris, Vladimir Okhmatovski	215

Session 48: Biocompatible and Therapeutic Electromagnetic Systems

48-01	“Bidomain Boundary Element Modeling of Pseudo-realistic Neurons with Advanced Membrane Mechanisms” David M. Czerwonky, Luis J. Gomez	216
48-02	“Group-Level Optimum Coil Placement for Transcranial Magnetic Stimulation (TMS)” Nahian I. Hasan, Luis J. Gomez	217
48-03	“Design and Characterization of Coil and its Pulse Generator for Transcranial Magnetic Stimulation Experiments in Mice” Akila Murugesan, Luis J. Gomez, Weng C. Chew	218
48-04	“Battery-less, Multichannel and Wireless Recorder for Neuronal Activity Monitoring” Melany Gutierrez-Hernandez, Sally P. Duarte, Satheesh Bojja-Venkatakrishnan, Jorge Riera Diaz, John L. Volakis	219

Session 49: Devices for Antennas and Communication Systems - II

49-01	“RF-SoC Platforms for RF-AI Spectrum Perception” Hasitha Weerasooriya, Gayani Rathnasekara, Francesco Restuccia, Arjuna Madanayake	221
49-02	“Design of 145 GHz BPSK SDR on RF-SoC” Kasun Karunanayake, Hasitha Weerasooriya, Gayani Rathnasekera, Arjun Singh, Josep M. Jornet, Theodore S. Rappaport, Arjuna Madanayake	223
49-03	“Differential Arrays for Butler Multi-Beam STAR” Yinyi Zhao, Satheesh Bojja Venkatakrishnan, Constantinos L. Zekios, Soumyajit Mandal, Arjuna Madanayake	225
49-04	“Design of a Tunable 2-bit Phase Shifter at Ka-Band” Antonio A. Garcia, Elias A. Alwan	227

Session 50: Fast Algorithms

50-01	“Frequency- and Time-domain Green Function Methods for Electromagnetic Simulation, Optimization, and Design” Oscar P. Bruno	228
50-02	“Recent Algorithm Developments in the ButterflyPACK Package” Yang Liu	230
50-03	“A Multi-Region ACA-Accelerated Approach for High-Quality-Factor Resonant Cavities” Vinh Q. Dang, Robert A. Pfeiffer, Joseph D. Kotulski	231
50-04	“Numerical Accuracy of Circuit-Based Equations for Antenna Quality Factor” Alexander B. Murray, Ashwin K. Iyer	232
50-05	“Group-based Compression of an FMM for Smooth Kernels” Robert J. Adams, John C. Young, Stephen D. Gedney	233
50-06	“Algorithmic Acceleration of the Chebyshev-based Boundary Integral Equation Method for 3D Maxwell Problems using the Interpolated Factored Green Function” Jagabandhu Paul, Constantine Sideris	235
50-07	“MFIE-Induced RCS Errors in CFIE Simulations of a Fan-Loaded Camera Box” Andrew Maicke, Jon T. Kelly, Ali E. Yilmaz	236
50-08	“Broadband Delayed Border Oblique Incidence Simulation Technique for Finite Difference Time Domain Method” Ilya Valuev, Sergei Belousov, Sergei Khilkov	238
50-09	“Scalable Parallel Implementation of the Broadband Delayed Border Oblique Incidence Simulation Technique for FDTD” Ilya Valuev, Sergey Khilkov, Sergey Belousov	240

Session 51: Finite Difference Methods and Applications in Photonic, Microwave, and Quantum Device Design

51-01	“A Subgrid Model Utilizing Extra- and Inter-polation Schemes for the Nonstandard FDTD Method” Tadao Ohtani, Yasushi Kanai, Nikolaos V. Kantartzis	241
51-02	“Modeling Two-Dimensional Material-Based Photodetectors with Finite-Difference Methods” Raonaqul Islam, Ergun Simsek	243

51-03	“Design and Finite-Difference Time-Domain Analysis of Three-Dimensional Printed W-Band Reflector Fresnel Lens Antenna Using Acrylonitrile Butadiene Styrene Plastic” Shunichi Futatsumori	245
51-04	“Modeling of 2D ADI-FDTD for THz Region Using a Tridiagonal Matrix Inversion Approach” Md Faiyaz Bin Hassan, Shubhendu Bhardwaj	247
51-05	“Recent Advancements in D-TTIT” Alireza Baghai-Wadji	249
51-06	“Method for Analytically Finding the Left and Right Nullspace of Curl-Curl Operator in Unsymmetrical Finite-Difference Subgridding Algorithm” Hongyang Liu, Dan Jiao	251
51-07	“Comparison of Concrete Sample Scattering Parameters Obtained from FDTD and Microwave Measurement” Ummu Sahin Sener, Sebahattin Eker	253
51-08	“Implementation of Inhomogeneous Broadening in Time-Domain Dispersive Maxwell Solvers” Ludmila J. Prokopeva, Advika Vidhyadhiraja, Alexander V. Kildishev	255