

# Final Program 24

## 01) Natural and stimulated emissions in the ionosphere and magnetosphere - part 1 - ICEAA, Organized by G. Ganguli

Chair 1 G. Ganguli

Chair 2

Monday, 2

13:40 – 18:20 room Roma I ICEAA

13:40 – 14:00 Space debris identification and tracking

**135** A Truitt, IARPA, United States

14:00 – 14:20 Electronic material test approaches for natural and stimulated emissions in the ionosphere and magnetosphere

**214** B. Pokines, AFOSR, United States

14:20 – 14:40 Extended fluid simulations of precursor ion acoustic solitons

**290** A. Sen, A. Mir, P. Bandyopadhyay, Institute for Plasma Research, India; S. Tiwari, IIT-Jammu, India; C. Crabtree, A. Fletcher, G. Ganguli, Naval Research Laboratory, United States

14:40 – 15:00 Using Non-Thermal Electromagnetic Radiation to Track and Characterize Space Debris

**153** N. Renno, Y. Zhang, M. Akhavan-Tafti, T. Atilaw, E. Fischer, University of Michigan, United States

15:00 – 15:20 Simulations of nonlinear plasma structures generated by charged orbital debris

**393** A. Fletcher, C. Crabtree, G. Ganguli, R. Soto, NRL, United States; A. Sen, IPR, India

15:20 – 15:40 Plasma signatures of small orbital debris in LEO

**305** G.L. Delzanno, P.A. Resendiz Lira, D. Svyatsky, O. Koshkarov, J.C. Holmes, C. Maldonado, G. Wilson, T. Espinoza, A. Rogers, S. Janhunen, Los Alamos National Laboratory, United States

16:00 – 16:20	Plasma Wave Signatures Associated with Dusty Space Debris
<b>416</b>	W.A. Scales, Virginia Tech, United States; B. Srinivasan, University of Washington, United States; C. Skolar, New Jersey Institute of Technology, United States
16:20 – 16:40	Considerations for modifying collective Thomson scattering forward models to accommodate small scale orbital debris
<b>579</b>	P.J. Erickson, Massachusetts Institute of Technology, United States; C. Crabtree, A.C. Fletcher, G. Ganguli, Naval Research Laboratory, United States
16:40 – 17:00	Quantum Information Science Approach to Linear and Nonlinear Wave Propagation
<b>529</b>	A. K. Ram, Massachusetts Institute of Technology, United States; E. Koukoutsis, K. Hizanidis, National Technical University, Greece; G. Vahala, William and Mary, United States; M. Soe, Rogers State University, United States; L. Vahala, Old Dominion University, United States
17:00 – 17:20	Applying the spacetime geometric algebra in magnetized plasma electromagnetism: Is it only a matter of beauty?
<b>254</b>	K. Hizanidis, ; E. Koukoutsis, National Technical University, Greece; P.C. Papagiannis, National Technical University, Greece; A.K. Ram, PSFC-MIT, United States; G. Vahala, William & Mary, United States
17:20 – 17:40	Reconnecting Compressed Current Sheets: Impact of Highly Sheared Flows and Resulting Turbulence
<b>283</b>	C. Crabtree, G. Ganguli, A. M. DuBois, US Naval Research Laboratory, United States; A. Sen, IPR, India
17:40 – 18:00	Development of the ambipolar electric field in a compressed current sheet with and without a guide field
<b>157</b>	A.M. DuBois, C. Crabtree, G. Ganguli, U.S. Naval Research Laboratory, United States
18:00 – 18:20	MMS Wave-Particle Observations During Magnetotail Passes
<b>596</b>	D.N. Baker, University of Colorado Boulder, Laboratory for Atmospheric and Space Physics, United States

## 02) Advances in time - and frequency - domain methods - ICEAA, Organized by L. Klinkenbusch; T. Weiland

Chair 1 L. Klinkenbusch

Chair 2 T. Weiland

Monday, 2

13:40 – 15:40 room Roma II ICEAA

13:40 – 14:00 Self-consistent wakefield and space-charge simulations for electron injectors

**469** J. Christ, E. Gjonaj, Technical University of Darmstadt, Germany

14:00 – 14:20 Wake Fields Analysis of Curved Tube Section of Particle Accelerator by Time-Domain BEM Considering Lienard-Wiechert Fields of Electron Bunch

**353** H. Kawaguchi, T. Kawamura, Muroran Institute of Technology, Japan

14:20 – 14:40 Investigation of the Shadowing and Range Effects caused by the Scattering of Wind-Turbines in some distance to Radar Stations

**249** G.H. Greving, W.D. Beiermann, R. Mundt, NAVCOM Consult, Germany

14:40 – 15:00 Towards a broadband-stable fast method for the B-spline discretized electric field integral equation

**243** D. Jukic, Universität Rostock, Germany; B. Hofmann, T.F. Eibert, Technische Universität München, Germany; S.B. Adrian, Universität Rostock, Germany

15:00 – 15:20 Convergence study of hexahedral and tetrahedral H(curl) basis functions for quasi-affinely refined curvilinear finite elements

**191** L. L. Tóth, R. Dyczij-Edlinger, Saarland University, Germany

15:20 – 15:40 Isogeometric shape optimization of multi-tapered coaxial baluns simulated by an integral equation method

**577** B. Balouchev, Technische Universität Darmstadt, Germany; J. Dölz, Universität Bonn, Germany; M. Nolte, S. Schöps, Technische Universität Darmstadt, Germany; R. Torchio, Università degli Studi di Padova, Italy

## 03) EMC/EMI/EMP/HPE - ICEAA

Chair 1 R. Gardner

Chair 2 E. Schamiloglu

Monday, 2

16:00 – 18:20 room Roma II ICEAA

16:00 – 16:20 Field coupling of transmission lines terminated by Buck and Negative Impedance Circuits

**384** R.L. Gardner, Consultant, United States

16:20 – 16:40 Analysis of Conducted Emission EM Noise in High Voltage Power Conversion Systems for Electric Vehicle

**129** J.Yu, K. Lee, Korea Automotive Technology Institute, Korea

16:40 – 17:00 Calculation of EMP Conducted Environment Based on Hierarchical Uncertainty Quantification Method

**449** Ning Dong, Xi'an Jiaotong University, China

17:00 – 17:20 Advancing High Power Microwave Sources and Antennas to Higher Frequencies

**272** E. Schamiloglu, C.G. Christodoulou, University of New Mexico, United States

17:20 – 17:40 Statistical Estimates of Intentional Electromagnetic Interference in Unshielded Twisted-Wire Pairs

**304** T. Liang, School of Electric Engineering, Xi'an Jiaotong University, China ; G. Spadacini, F.Grassi, S. A. Pignari, Politecnico di Milano, Italy; Y.-z. Xie, Xi'an Jiaotong University, China

17:40 – 18:00 An Inflatable Electromagnetic Simulator Based on Low-Frequency-Compensated TEM Antenna

**323** Y. Zhou, Z.-h. Xu, Ya.-z. Xie, Xi'an Jiaotong University, China

18:00 – 18:20 Asymptotic Model for Non-uniform High-frequency Electromagnetic Field Coupling to Transmission Lines Using Matrix Pencil Method

**462** J. Guo, W.-c. Xie, Q.-s. Zheng, Y.-z. Xie, Xi'an Jiaotong University, China

**04) Additive manufacturing for terrestrial and space antenna and feed chains - ICEAA, Organized by G. Addamo; M. Lumia; A. Sharma**

Chair 1 G. Addamo

Chair 2 M. Lumia A. Sharma

Monday, 2

13:40 – 17:00 room Bruxelles ICEAA

13:40 – 14:00 Antenna Technologies for 1-100GHz and Beyond Spectrum Operations

**192**

D. Filipovic, S. Yen, T. Prince, D.-C. Son, C. Wallish, J. Platt, B. Cross, i. Pisani, M. Elmansouri, L. Boskovic, University of Colorado Boulder, United States

14:00 – 14:20 Additive Manufacturing for 5G: Opportunities and Challenges

**509**

W.Zimbeck, A. Sharma, Brian B. Gibbons, A. Rakovsky, Johns Hopkins University, United States

14:20 – 14:40 3D-printed millimetre-wave waveguide passive devices and antennas

**306**

Y. Wang, Q.C. You, L. Qian, T. Skaik, University of Birmingham, United Kingdom

14:40 – 15:00 3D-Printed Beam-Switching Dielectric Resonator Antenna with an Integrated Polarizer

**325**

J. Przepiorowski, Technological University Dublin, Ireland; I. Munina, Trinity College Dublin, Ireland; M.J. Ammann, Technological University Dublin, Ireland

15:00 – 15:20 Additive Manufacturing Folded Reflectarray

**330**

A. Massaccesi, Politecnico di Torino, Italy; A. Mazzinghi, University of Florence, Italy; A. Freni, University of Florence, Italy; M. Beccaria, P. Pirinoli, Politecnico di Torino, Italy

15:20 – 15:40 Advances in Microwave Filters based on Additive Manufacturing Technologies

**215**

L. Pelliccia, P. Vallerotonda, F. Cacciamani, RF Microtech Srl, Italy; C. Tomassoni, University of Perugia, Italy

16:00 – 16:20 Optimization of Electrical Conductivity of Multilayer Additively Manufactured Microwave Components on Polymer Substrate by Laser Sintering

**261**

R. Djebbi, N. Delhote, S. Verdeyme, O. Tantot, , University of Limoges, France; E. Pereira, L. Boyer, O. Durand, CTTC Centre de Transfert de Technologies Céramiques, Limoges, France; M. Valentin, ALPhANOV Talence, France

16:20 – 16:40 Additive manufactured antennas and feeds for terrestrial and space systems

**399**

A. Sharma, The Johns Hopkins University Applied Physics Laboratory, United States

16:40 – 17:00 Comparison of 3D-printed Feed Chain Architectures

**240**

G. Addamo, O.A. Peverini, M. Lumia, C G. Virone, CNR-IEIIT, Italy; F. Calignano, Politecnico di Torino, Italy; N.J.G. Fonseca, Anywaves, France

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#### 05) Frequency selective surfaces - ICEAA

Chair 1 G. Addamo

Chair 2 M. Lumia

Monday, 2

17:00 – 18:00 room Bruxelles ICEAA

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17:00 – 17:20 Dual-polarized A-T-A frequency selective rasorber based on cross-dipole and interdigital resonator

**496**

R.S. Macilon, Federal University of Rio Grande do Norte, Brazil; A.G. D'Assunção Junior, Federal Institute of Education, Science and Technology of Paraiba, Brazil; V.P. Silva Neto, A.G. D'Assunção, Federal University of Rio Grande do Norte, Brazil

17:20 – 17:40 The Research on a FSS with High Roll-Off Characteristics Based on SIW

**490**

J. Fu, Harbin Institute of Technology, China ; Z. Zhang, Institute of Remote sensing Equipment, China ; H. Feng, Harbin Institute of Technology, China ; S. Nawaz Burokur, University Paris Nanterre, France; K. Zhang, Harbin Institute of Technology, China

17:40 – 18:00 Low-Loss Miniaturized FSS for Quasi-Optical Feed System of Atmospheric Remote Sensing

**179**

Z. Chen,X. Li, F. Deng, North China Electric Power University, China ; X. Ye, Beijing Institute of Technology, China ; J. Hu, X. Yao, North China Electric Power University, China

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#### 06) Metasurfaces and symmetries - ICEAA, Organized by R. Kastner; R. Shavit

Chair 1 R. Kastner

Chair 2 R. Shavit

Monday, 2

13:40 – 16:40 room Milao I ICEAA

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13:40 – 14:00	Polarization inversion in PTD- symmetric single layered polarizers
<b>205</b>	R. Geva, Tel Aviv University, Israel; M. G. Silveirinha, University of Lisbon, Portugal; R. Kastner, Tel Aviv University, Israel
14:00 – 14:20	Line-source above a spatiotemporally modulated metasurface
<b>428</b>	M.K. Kreiczner, Y.H. Hadad, Tel-Aviv University, Israel
14:20 – 14:40	Drude-like scatterers for reconfigurable multipolar refractive metasurfaces
<b>373</b>	A. Monti, Roma Tre University, Italy; S. Vellucci, M. Barbuto, Niccolò Cusano University, Italy; L. Stefanini, D. Ramaccia, A. Toscano, F. Bilotti, Roma Tre University, Italy
14:40 – 15:00	Leaky-wave Analysis and Design of a Corrugated Sectoral Waveguide
<b>503</b>	M. Perrone, Politecnico di Torino, Italy; J. Sarrazin, G. Valerio, Sorbonne Université, France; G. Lombardi, Politecnico di Torino, Italy
15:00 – 15:20	Dispersion analysis of 3D periodic structures with a high level of symmetry
<b>225</b>	H. Wang, P. Castillo-Tapia, O. Zetterstrom, KTH Royal Institute of Technology, Sweden; F. Mesa, Universidad de Sevilla, Spain; O. Quevedo-Teruel, KTH Royal Institute of Technology, Sweden
15:20 – 15:40	Symmetries in time-varying media: on the conservation of spin angular momentum, helicity, and chirality
<b>212</b>	M. M. Jajin, J. Vázquez-Lozano, I. Liberal, Public University of Navarra, Spain
16:00 – 16:20	Circuit modeling of Metasurfaces with Printed Elements
<b>150</b>	R. Shavit, Y. Tzabari, Ben-Gurion University of the Negev, Israel

16:20 – 16:40 Physics-compliant modeling and estimation of RIS-parametrized wireless channels

188

P. del Hougne, CNRS, IETR - Univ Rennes, France

**07) Antenna, rectifier and rectenna design for RF energy harvesting / wireless power transfer applications - ICEAA, Organized by S. Rengarajan; T. Khan**

Chair 1 S. Rengarajan

Chair 2 T. Khan

Monday, 2

16:40 – 17:20 room Milao I

ICEAA

16:40 – 17:00 High-gain and broadband microstrip antenna using triple-slotted mechanism for 5G millimeter-wave applications

441

M. Saha, NIT Silchar, India; D.Sarkar, VIT-AP University, India; T. Khan, NIT Silchar, India; Pa. Pr.Shome, NIT Jalandhar, India; F. A. Talukdar, , NIT Silchar, India; Se. Rengarajan, California State Univ Northridge, United States

17:00 – 17:20 The Method of Maximum Power Transmission Efficiency and Its Applications

155

W. Geyi, Nanjing University of Information Science and Technology, China

**08) Wireless power transmission and harvesting - IEEE APWC**

Chair 1 S. Rengarajan

Chair 2 T. Khan

Monday, 2

17:20 – 18:20 room Milao I

IEEE APWC

17:20 – 17:40 Practical Superdirective and Efficient Rectenna for Low-Power RF Energy Harvesting

564

A. M. Graham, S. D. Asimonis, Queen's University Belfast, United Kingdom

17:40 – 18:00 The Airy Wave Utilization for mm-wave Wireless Power Transfer

489

A. K. Baghel, P. Pinho, Universidade de Aveiro Portugal; N. Borges Carvalho, Instituto de Telecomunicac,oes, DETI, Portugal

18:00 – 18:20 Design considerations and implementation of coil detection and optimized switching for a moving field inductive power transfer system

451

M. Haider, M. H. Metz, T. J. A. Russer, P. Russer, Technical University of Munich, Germany



## 09) Microwave antennas, components and devices - ICEAA

Chair 1 J.A. Ruiz-Cruz

Chair 2 F. Venneri

Monday, 2

13:40 – 18:20 room Milao II ICEAA

13:40 – 14:00 SMD coincident antenna array for 2D field acquisition and reconstruction

**481** F. Ortolani, Ironbridge Electronics, Italy

14:00 – 14:20 The Role of Second-Order Symmetries in Waveguide Propagation and its Peculiarities on the Mode-Matching Problem Using the 2D Finite Element Method

**442** G. Garcia-Contreras, Universidad Autónoma de Madrid, Spain; J. Córcoles, J. A. Ruiz-Cruz, J. Ramón Montejo-Garai, J. M. Rebollar, Universidad Politécnica de Madrid, Spain

14:20 – 14:40 Compact Shorted Annular Ring Patch Antenna Loaded With DNG Material

**425** A.R. Alajmi, College of Technological Studies, Kuwait

14:40 – 15:00 Dual-polarized single-layer reflectarray as passive reflecting surface for 5G applications

**377** F. Venneri, S. Costanzo, Università della Calabria, Italy

15:00 – 15:20 A 300-GHz broadband on-chip antenna integrated with a transmitter front-end

**339** A. Korres, V. Manouras, Y. Papananos, National Technical University of Athens, Greece

15:20 – 15:40 On the theory of single aspheric lens

**313** E. Hasanoglu Isik University, Turkey

16:00 – 16:20 ABS-based 3D Printed Bowtie Antenna Fed by Planar Marchand Balun for Wireless Communication

**557** A.F. Faadhilah, S. Indriani, M.N. Arira, M.N. Karama, A.D. Prasetyo, A. Munir, Institut Teknologi Bandung, Indonesia

16:20 – 16:40 Design of X-Band GaN Power Amplifier for SAR Applications

**546** A.I Bayrak, Yeditepe University, Turkey; I. Sisman, Profen Communication Technologies, Turkey; T. Haykir Ergin, Yeditepe University, Turkey

16:40 – 17:00 Specialized X-Band LNA Design for SAR Applications

**544** E.S. Mutlu, Yeditepe University, Turkey; I. Sisman, Profen Communication Technologies, Turkey; T. Haykir Ergin, Yeditepe University, Turkey

17:00 – 17:20 Design and Implementation of X Band Synthetic Aperture Radar Antenna

**541** B. Büyükakin, Yeditepe University, Turkey; I. Sisman, Profen Communication Technologies, Turkey; T. Haykir Ergin, Yeditepe University, Turkey

17:20 – 17:40 Resonator-like antenna for parametric excitation of ultra-short spin waves

**276** A. Slavin, Oakland University, United States

17:40 – 18:00 Power Enhanced Hybrid Chireix-Doherty Topology

**549** M.D. Tanvir, A. Eroglu, University of Massachusetts Boston, United States; E. LuisLinarez, Qorvo, United States

18:00 – 18:20 Non-Folded Capacitor-Based Flexible Phase-Difference Branch-Line Couplers for Butler Matrix Feeding Networks

**553** Zulfi, Institut Teknologi Bandung, Indonesia; R.F. Iskandar, Telkom University, Indonesia; S. Indriani, A. Munir, Institut Teknologi Bandung, Indonesia

## 10) Natural and stimulated emissions in the ionosphere and magnetosphere - part 3 - ICEAA, Organized by G. Ganguli

Chair 1 C. Crabtree

Chair 2

Tuesday, 3

08:00 – 09:20 room Roma I

ICEAA

08:00 – 08:20 Plasma Instabilities Driven by Electron and Proton Ring Distributions

**282**

P.H. Yoon, University of Maryland College Park, United States

08:20 – 08:40 Generation of waves by active plasma releases in the magnetosphere and solar wind

**248**

R. Bingham, STFC Rutherford Appleton Laboratory, United Kingdom

08:40 – 09:00 Remote Sensing of the Lower Ionosphere during the April 8, 2024 Solar Eclipse by VLF Transmitter Signal Variations Recordings

**352**

Oleksiy Agapitov, UC BERKELEY, United States; Mark Golkowski, University of Colorado Denver, United States

09:00 – 09:20 Energetic Particle Dynamics and Magnetospheric Plasma Waves: Observations and Future Missions

**347**

S.G. Kanekal, NASA Goddard Space Flight Center, United States; L Kurien, Catholic University of America, United States

## 11) Electromagnetic properties of materials - ICEAA

Chair 1 G. Ganguli

Chair 2 P. Bernhardt

Tuesday, 3

09:20 – 12:00 room Roma I

ICEAA

09:20 – 09:40 Electromagnetic vector sensor satellite for detection of harmful space debris

**601**

P. Bernhardt, University of Alaska Fairbanks, United States; A. Howarth, University of Calgary, Canada; L. Scott, DRDC Canada, Canada; B. Eliasson, University of Strachclyde, United Kingdom; W. Bristow, Penn State, United States

09:40 – 10:00 FDTD Examination of Propagation Effects in GPR Wall Monitoring

**241**

S.R. Pennock, R.J. Watson, University of Bath, United Kingdom

10:20 – 10:40 Perfect narrowband absorbers using simple lithography-free structures

**186** C. Lezaun, D. Navajas, I. Liberal, M. Beruete, Public University of Navarra, Spain

10:40 – 11:00 Hybrid Near-Field Scanning Microwave Microscope with an Optical Confocal Sensor

**506** N. Vyshatko, A.Tselev, University of Aveiro CICECO, Portugal

11:00 – 11:20 Enhancing pavement integrity assessment: the role of ultra-wideband horn antennas in ground penetrating radar applications.

**519** G.R.S. Neto, Universidade do Minho, Portugal; V.U. Oliveira, Universidade de Aveiro, Portugal; S. Fontul, Universidade NOVA de Lisboa, Portugal; F.M.C.P. Fernandes, Universidade Lusíada Norte, Portugal; J.C. Pais, Universidade do Minho, Portugal

11:20 – 11:40 Dielectric properties of cactus pear and *Dactylopius opuntiae* measurement for electromagnetic applications

**411** F. EL Arroud, K. EL Fakhouri, Y. Zaarour, C. Ramdani, University of Mohammed VI Polytechnic, Morocco; M. Aznabet, Abdelmalek Essaadi University, Morocco; M. El Bouhssini, H. Griguer, University of Mohammed VI Polytechnic, Morocco

11:40 – 12:00 Composites with Combined Magnetolectric Properties

**143** P. Grinfeld, Drexel University, United States; S. Bilyk, M. Grinfeld, U.S. Army Research Laboratory, United States

## 12) Inverse scattering and imaging: theory; techniques and applications - In memory of Matteo Pastorino - ICEAA, Organized by A. Randazzo

Chair 1 A. Randazzo

Chair 2

Tuesday, 3

13:40 – 15:40 room Roma I ICEAA

13:40 – 14:00 A Study of Resonance Modes for Microwave Imaging in Biomedical Applications

**495** A. Attar, J. LoVetri, University of Manitoba, Canada

14:00 – 14:20 Electromagnetic sources localization problem for indoor surveillance through opportunistic sensors

**568** R. Scapaticci, G. Gennarelli, L. Crocco, IREA-CNR, Italy

14:20 – 14:40 3D inverse scattering through an approximated 'yo' reformulation: a preliminary investigation

**430** M. T. Bevacqua, T. Isernia, Università degli Studi Mediterranea di Reggio Calabria, Italy

14:40 – 15:00 Multipath Propagation Influence on Retrievable Information in Indoor Electromagnetic Imaging

**359** I. Catapano, G. Gennarelli, P. Imperatore, National Research Council of Italy Italy; M. Barbiroli, Università di Bologna -, Italy; F. Soldovieri, National Research Council of Italy, Italy

15:00 – 15:20 Deep and Reinforcement Learning Approach to Enhanced Microwave Imaging for Tumor Identification

**271** S. Costanzo, A. Flores, University of Calabria, Italy

15:20 – 15:40 Microwave Imaging of Partially Known Targets Through a Mild Data-Driven Approach

**386** V. Schenone, A. Fedeli, C. Estatico, A. Randazzo, University of Genoa, Italy

### 13) Inverse scattering and remote sensing - ICEAA

Chair 1 A. Randazzo

Chair 2 S.J. Ziegler

Tuesday, 3

16:00 – 18:00 room Roma I ICEAA

16:00 – 16:20 The Veselago Lens as a Scattering Problem: 2D Solutions Through Asymptotics

**510** M. T. Bevacqua, Università degli Studi Mediterranea di Reggio Calabria, Italy; M. E. Keleshteri, University of Manitoba, Canada; V. Okhmatovski, J. LoVetri, University of Manitoba, Canada; T. Isernia, Università degli Studi Mediterranea di Reggio Calabria, Italy

16:20 – 16:40 Real-Time Identification of Small Objects with Inaccurate Background Wavenumber

**433** T. Ha, National Institute for Mathematical Sciences, Korea; W.-K. Park, Kookmin University, Korea

16:40 – 17:00 A Nonlinear Inverse Scattering Approach towards RCS Modeling of Arbitrary Targets for Digital Twin Applications

**413** H.F. Alqadah, S. Ziegler, US Naval Research Laboratory, United States

17:00 – 17:20 Bayesian parameter estimation for electromagnetic inverse scattering using contrast source inversion and hamiltonian monte carlo

**398** S.J. Ziegler, H.F. Alqadah, U.S. Naval Research Laboratory, United States

17:20 – 17:40 A topological regularization term for inverse scattering problems

**395** S.J. Ziegler, U.S. Naval Research Laboratory, United States

17:40 – 18:00 3D GPU-based implementation of the contrast source inversion for breast lesion detection

**309** A. Ronca, Politecnico di Torino, Italy; A. Arduino, L. Zilberti, O. Bottauscio, Istituto Nazionale di Ricerca Metrologica, Italy; G. Tiberi, UBT S.r.l., Italy

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#### 14) Numerical methods in electromagnetics - ICEAA, Organized by R.D. Graglia, D.R. Wilton

Chair 1 R.D. Graglia

Chair 2 D.R. Wilton

Tuesday, 3

08:00 – 18:20 room Roma II ICEAA

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08:00 – 08:20 On a High-Frequency Analysis of Some Relevant Integral Equations in Electromagnetics  
Integral Equations in Electromagnetics

**604** V. Giunzioni, Politecnico di Torino, Italy; A. Merlini, IMT Atlantique, France; F. P. Andriulli, Politecnico di Torino, Italy

08:20 – 08:40

Geometry- and Physics-Aware h-p Adaptation Algorithm for Efficient Electromagnetic Scattering Simulation

**591**

C. Diaz-Caez, National Geospatial-Intelligence Agency, United States; S. Yan, Howard University, United States

08:40 – 09:00

P-refinement in electromagnetic simulations using finite element method with maximally orthogonalized basis functions

**128**

M. M. Ilic, S. V. Savic, University of Belgrade, Serbia

09:00 – 09:20

Multi-solver Electromagnetic Simulation Platform

**437**

V.F. Martin, University of Extremadura, Spain; M. Parejo, D. Jerico, EM3WORKS, Spain; L. Landesa, University of Extremadura, Spain; M.G. Araujo, F. Obelleiro, University of Vigo, Spain; J.M. Taboada, University of Extremadura, Spain

09:20 – 09:40

An Efficient GPU Acceleration Scheme for Solving Electromagnetic Problems with Moderate Scales

**455**

M.T. Zhu, H. Z. Lu, M. S. Tong, Tongji University, China

09:40 – 10:00

A Multiplicative Calderón Preconditioner for the B-Spline-Based Electric Field Integral Equation

**401**

B. Hofmann, T. F. Eibert, Technical University of Munich, Germany; F. P. Andriulli, Politecnico di Torino, Italy; S. B. Adrian, Universität Rostock, Germany

10:20 – 10:40

High-performance discontinuous Galerkin time-domain method for the analysis of electromagnetic resonant modes

**354**

G. Núñez Muñoz, Z. Peng, University of Illinois Urbana-Champaign, United States

10:40 – 11:00

Toward vector generalized source integral equations

**231**

Y. Dahan, Ben-Gurion University of the Negev, Israel; A. Boag, Tel Aviv University, Israel; Y. Brick, Ben-Gurion University of the Negev, Israel

11:00 – 11:20	Evaluation of the Tangential-to-Vertical Components of Michalski-Zheng's Layered Media Green's Function Through Duffy Transform in Off-Source Scenarios
<b>552</b>	S. Zheng, V.Okhmatovski, University of Manitoba, Canada
11:20 – 11:40	Comparative analysis of analytic and numerical versions of the laplacian representation approach for the asymptotic part of the layered-medium green's function in the mixed potential formulation
<b>417</b>	E. Bleszynski, M.Bleszynski, T.Jaroszewicz, Monopole Research, United States; W. Johnson, Consultant, United States; J. Rivero, F. Vipiana, Politecnico di Torino, Italy; D. Wilton, University of Houston, United States
11:40 – 12:00	Classical and Quantum Computational Electromagnetics: An Overview
<b>580</b>	B. Zhang, J. Zhu, Purdue University, United States; C. J. Ryu, University of Illinois Urbana-Champaign, United States; D.-Y Na, Pohang University of Science and Technology, Korea; W. C. Chew, Purdue University, United States
12:00 – 12:20	Machine precision numerical evaluation of reaction integrals in the method of moments
<b>567</b>	V. F. Martin, Universidad de Extremadura, Spain; J. Rivero, Politecnico di Torino, Italy; D. R. Wilton, University of Houston, United States; W. A. Johnson, Consultant, United States; F. Vipiana, Politecnico di Torino, Italy
13:40 – 14:00	Resonant free multi-trace, single source equations for penetrable structures
<b>436</b>	C. Münger, K. Cools, Ghent University, Belgium
14:00 – 14:20	A Summary of Recent Advances in Finite Element Particle in Cell
<b>420</b>	O. Ramachandran, Michigan State University, United States; B. Shanker, The Ohio State University, United States
14:20 – 14:40	Pyramidally shaped absorbing boundary for FDTD simulations
<b>418</b>	R. D. Jones A. Z. Elsherbeni, Colorado School of Mines, United States; J. M. Kast, No Affiliation, United States; A. J. Weiss, No Affiliation, United States; V. Demir, Northern Illinois University, United States



14:40 – 15:00 Analyzing Ultra-Wideband Electromagnetic Problems by Time-domain Integral Equation Formulations

**364** R. Bai, M.-D. Zhu, Xidian University, China

15:00 – 15:20 Frame-based analysis of monostatic scattering by semi-transparent cavities

**346** C. Letrou, M. Hariz, A. Boag, Tel Aviv University, Israel

15:20 – 15:40 Extended multi-branch basis functions for non-conformal problems

**326** M. Parejo, EM3WORKS, Spain; V.F. Martín, L. Landesa, J.M. Taboada, University of Extremadura, Spain

16:00 – 16:20 Numerical Modeling of Metamaterial and Metasurface with Media Homogenization

**317** Q. Ren, Beihang University, China

16:20 – 16:40 Examining the impact of geometry modeling precision on the accuracy of monostatic RCS calculations

**307** B. M. Ninkovic, J. E. Music, B. M. Kolundzija, WIPL-D, Serbia

16:40 – 17:00 Evaluation of equivalent sheet impedance from isofrequency curves

**262** D. Tihon, C. Craeye, UCLouvain, Belgium

17:00 – 17:20 Simple randomized CUR algorithms for method of moments matrix compression

**234** J.M. Rius, A. Heldring, E. Ubeda, Universitat Politècnica de Catalunya, Spain

17:20 – 17:40 Finite element tearing and interconnecting method for electro-acoustic modeling of acoustic-wave resonators

**217** H. Li, J.Koskela, J. Massey, B.Willemsen, Resonant Inc., United States; J.M. Jin, University of Illinois at Urbana-Champaign, United States

17:40 – 18:00 Modelling the Quantum Hydrodynamic Response from an Arbitrarily Shaped Nanoantenna: A Volume Integral Equation Approach

**216** C. Mystilidis, X. Zheng, G.A. E. Vandenbosch, KU Leuven, Belgium

18:00 – 18:20 Interpolatory Curl-Conforming Pyramidal Elements: Progress and Results

**605** R.D. Graglia, P. Petrini, D. Franzó, Politecnico di Torino, Italy

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### 15) Electromagnetics in biomedical applications: advances in nervous system stimulation - ICEAA, Organized by G. Bonmassar; A. Paffi

Chair 1 G. Bonmassar                      Chair 2 A. Paffi                      Tuesday, 3                      08:00 – 10:00 room Bruxelles                      ICEAA

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08:00 – 08:20 Pulsed Electric Fields for Regeneration of Injured Spinal Cord: Calcium Oscillations Modeling

**532** A.Paffi, L. Caramazza, M. Colella, N.Dolciotti, Sapienza University of Rome, Italy; S. Fontana, F. Apollonio, M. Liberti, Sapienza University of Rome, Italy

08:20 – 08:40 Evaluating the impact of a complex volume conductor model on network dynamics for deep brain stimulation

**514** J.P. Payonk, K. Spiliotis, J. Starke, R. Köhling, U. van Rienen, R. Appali, University of Rostock, Germany

08:40 – 09:00 Towards the validation of the semi-specific model to assess PEMFs neuroprotective effect through numerical dosimetry

**493** M. Colella, Sapienza University of Rome, Italy; N. Dolciotti, Electromagnetics in biomedical applications: advances in nervous system stimulation, Italy; L. Di Nardo, S. Fontana, Sapienza University of Rome, Italy; S. Salati, R. Cadossi, IGEA Clinical Biophysics, Spa, Italy; F. Apollonio, ; M. Liberti, Sapienza University of Rome, Italy

09:00 – 09:20 Adaptable MRI Coils for Enhanced Deep Brain Stimulation Imaging: A Bioengineer's Guide from Concept to Clinic

403

L. Golestani Rad, Northwestern University, United States

09:20 – 09:40 An Absorbable ECOG system Compatible to MRI.

394

G. Bonmassar, Harvard Medical School, United States; H. Millan, eMRI Systems LLP, United States

09:40 – 10:00 A ribbon figure-8 coil design for scalable and selective Trans-Spinal Magnetic Stimulation (TSMS)

255

F. Marturano, L. Gomez-Cid, I. Ay, G. Bonmassar, Massachusetts General Hospital, United States

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#### 16) Multi/wideband antennas and innovative antenna technology - IEEE APWC, Organized by H. Nakano

Chair 1 H. Nakano

Chair 2 R.D. Tamas

Tuesday, 3

10:20 – 18:20 room Bruxelles

IEEE APWC

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10:20 – 10:40 CP beam-steerable metaline antenna system

146

H. Nakano, Science and Engineering, T. Abe, J. Yamauchi, Hosei University, Japan; A. Mehta, Swansea University, United Kingdom

10:40 – 11:00 Alternating Generation of Single and Multi-Beam Modes Using the Sequential Rotation Technique in Antenna Arrays

362

D. Pouhè, Reutlingen University of Applied Sciences, Germany

11:00 – 11:20 Design of a metasurface cavity antenna for multiple bands

203

H. Wong, S.Gao, City University of Hong Kong, Hong Kong

11:20 – 11:40 A millimeter-wave phased array antenna with subarrays for indoor applications

**237** S. Kaushal, N. Guan, Fujikura Ltd., Japan

11:40 – 12:00 PIN-Diode-based Switchable Polarized Antenna Array with Phase-Shifted Proximity-Coupled-Feed

**556** T. Yunita, E. Cahyaningsih, A.F. Faadhilah, A. Munir, Institut Teknologi Bandung, Indonesia

12:00 – 12:20 Omnidirectional compact microstrip antenna in 2.45GHz band for ocean wireless sensor network

**357** T. Fujimoto, Y. Arikawa, C.-E. Guan, Y. Maemura, University of Nagasaki, Japan

13:40 – 14:00 A BOR-SPR Antenna Operating from 2 GHz to 18 GHz

**199** Y. Oishi, Y. Masuda, M. Tanabe, Toshiba Infrastructure Systems & Solutions Corporation, Japan; H. Nakano, Hosei University, Japan

14:00 – 14:20 Wide-Band Omni-Directional Antenna of Circular Polarization

**320** W. Chen, D. Wu, Guangdong University of Technology, China ; Z. Shen, Yangtze Delta Region Academy of Beijing Institute of Technology, China

14:20 – 14:40 Dual circularly polarized metaline array antenna

**174** K. Sato, I. Oshima, DKK Co., Ltd., Japan; H. Nakano, Hosei University, Japan

14:40 – 15:00 Ultra-Low-Profile Wideband Magneto-Electric Dipole Antenna

**184** H. Wang, I. Park, Ajou University, Korea

15:00 – 15:20 Enhanced-Bandwidth T-Match Folded Antenna with Advanced Reactance Tunability for Conjugate Impedance Matching with ICs

**507** M. Matsunaga, Shizuoka University, Japan

15:20 – 15:40 Compact Robust Antenna Composed of Metal Case with a Slot and Inner Folded Dipole Element

**292** Q. Q. Phung, Le Quy Don Technical Academy, Viet Nam; H.Hashiguchi, H. Morishita, National Defense Academy, Japan; M. Takeda, A. Yamamoto, K. Matsumoto, T. Hishikawa, Panasonic Corporation, Japan

16:00 – 16:20 Study on Simultaneous Wireless Power Transfer in Air and Underwater Using Magnetic Field Coupling

**501** T. Maruyama, O. Heinen, M. Nakatsugawa, National Institute of Technology-Hakodate College, Japan; K. Nakahira, National Institute of Technology-Okinawa College, Japan; M. Okamoto, National Institute of Technology-Ube College, Japan; I. Awai, Fujiwaves, Yamaguchi Laboratories, Japan

16:20 – 16:40 Self-Interference Mitigation in In-Band Full-Duplex Systems Using 180o Hybrid Coupler for 5G Application

**554** S. Indriani, A.F. Faadhilah, R.B. Renwarin, Zulfi, Institut Teknologi Bandung, Indonesia; J. Zaid, Huawei Technologies Canada, Canada; A. Munir, Institut Teknologi Bandung, Indonesia

16:40 – 17:00 Dual-Frequency Decoupling Circuit Integrated with Matching Circuits for a Two-Element Array

**172** K. Nishimoto, Y. Inasawa, Mitsubishi Electric Corporation, Japan

17:00 – 17:20 Recent progress in surface wave fluid antennas

**348** B. Tang, University College London, United Kingdom; S. Gao, City University of Hong Kong, Hong Kong; Y. Shen, K.F. Tong, University College London, United Kingdom; H. Wong, City University of Hong Kong, Hong Kong; K.K. Wong, University College London, United Kingdom

17:20 – 17:40 A gravity control beam steerable patch antenna utilizing liquid metal flows in fluidic channels

**265** H. Cao, J. Kelly, Queen Mary University of London, United Kingdom

17:40 – 18:00 Experimental evaluation of the transmission performance between a circuit-shape slotted waveguide and a  $\lambda/2$  dipole antenna

**294**

M. Nakatsugawa, Y. Sasaki, T. Maruyama, National Institute of Technology-Hakodate College, Japan; M. Omiya, Hokkaido University, Japan; Y. Tamayama, Nagaoka University of Technology, Japan

18:00 – 18:20 Probe calibration for drone-borne wideband antenna measurements

**236**

M. Pastorcici, A.M. Ursea, R.D. Tamas, Constanta Maritime University, Romania

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**17) Modern problems of mathematical and computational electromagnetics and their advanced applications-ICEAA, Org. by M.N. Georgieva-Grosse, G.N. Georgiev**

Chair 1 M.N. Georgieva-Grosse

Chair 2 G.N. Georgiev

Tuesday, 3

08:00 – 10:00 room Milao I ICEAA

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08:00 – 08:20 On the theory of resonant interaction of electromagnetic waves with periodically modulated filling of a waveguide

**196**

E.A. Gevorkyan, Moscow Witte University, Russian Federation

08:20 – 08:40 Results of synthesis of an isotropic reactance structure from given amplitude and phase scattering diagrams

**278**

T. Y. Privalova, Southern Federal University, Russian Federation

08:40 – 09:00 Wiener-Hopf method in problems of plane wave diffraction by two opposite staggered perfectly conducting half-planes

**175**

G. Alkina, S. Sautbekov, M. Sautbekova, Al-Farabi Kazakh National University, Kazakhstan

09:00 – 09:20 A review of the method of auxiliary sources (MAS) in applied electromagnetics

**390**

H.T. Anastassiou, International Hellenic University, Greece; P.J. Papakanellos, Hellenic Air Force Academy, Greece; N.L. Tsitsas, Aristotle University of Thessaloniki, Greece

09:20 – 09:40 The generalized electromagnetic projection operator over a 3 dimension probabilistic space

**597** J.M. Velázquez-Arcos, J. Granados-Samaniego, A. Cid-Reborido, A. Pérez-Ricardez, C.A. Vargas, Metropolitan Autonomous University, Mexico

09:40 – 10:00 Contribution to the theory of the two-layered ferrite-dielectric circular waveguide

**220** M.N. Georgieva-Grosse, G.N. Georgiev, Consulting and Researcher in Physics, Mathematics and Computer Sciences, Bulgaria

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### 18) Electromagnetic modeling of devices and circuits - ICEAA

Chair 1 G. Junkin Chair 2 R. Palmeri Tuesday, 3 10:20 – 11:40 room Milao I ICEAA

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10:20 – 10:40 Impact of Magnetic Traction on Drive Vibration Dynamics

**573** G. Kobenkins, N. Rilevs, Riga Technical University, Latvia; M. Marinbahs, JSC “Riga Electric Machine Building Works”, Latvia; A. Bizans, Riga Technical University, Latvia; O. Sliskis, JSC “Riga Electric Machine Building Works”, Latvia

10:40 – 11:00 Fast Analysis of Scattering from Parallel Cylinders in the presence of Perfect Electric Conductors

**515** R. Abdullin, G.M. Battaglia, A.F. Morabito, T. Isernia, Università Mediterranea of Reggio Calabria, Italy; L. Crocco, IREA-CNR, Italy; R. Palmeri, Università Mediterranea of Reggio Calabria, Italy

11:00 – 11:20 Development of multilayer metamaterial absorber for medical applications

**308** E. Eroglu, University of North Carolina, United States; B. Chowdhury, Intel, United States

11:20 – 11:40 Time Domain Kirchhoff Integration in FDTD

**206** G. Junkin, The Autonomous University of Barcelona, Spain

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### 19) Metamaterials and metasurfaces - ICEAA

Chair 1 R.F.S. Caldeirinha Chair 2 A. Hoffmann Tuesday, 3 11:40 – 18:20 room Milao I ICEAA

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11:40 – 12:00	Design of broadband dual-polarized meta-atoms for reflecting meta-surfaces using characteristic modes
<b>218</b>	A. Hoffmann, D. Manteuffel, Leibniz University Hannover, Germany
12:00 – 12:20	Optimization of gradient core radomes
<b>300</b>	S. Poulsen, Saab Dynamics AB, Sweden
13:40 – 14:00	PTFE-Ni Metamaterial Absorber for Optical Applications
<b>296</b>	C. C. De Moro do Carmo, Ú. do Carmo Resende, CEFET MG, Brazil; R. M. de Souza Batalha, PUC M.as, Brazil
14:00 – 14:20	Non-Invasive Glucose Detection Using Triple-Pole Triangular CSRR Sensor
<b>404</b>	B. Tlili, M. Keshkar, N. R. Rishani, M. Alhomsy, Y. Benchoubane, Rochester Institute of Technology, United Arab Emirates
14:20 – 14:40	A novel wideband 1-bit reconfigurable intelligent surface design for 26 GHz
<b>479</b>	T.E.S. Oliveira, J.R. Reis, Instituto de Telecomunicações, Portugal; I. Cuiñas, Communications-atlanTTic Research Center, Department of Signal Theory, Spain; R.F.S. Caldeirinha, Instituto de Telecomunicações, Portugal
14:40 – 15:00	Polarization independent interconnected split-ring resonator with enclosed f-shape metamaterial absorber for wireless technology.
<b>485</b>	M. Faysal, International Islamic University Chittagong (IIUC), Bangladesh; M. Tariqul Islam, K. Uddin M. Lutful Hakim, B. Bais, ; K.Mat, Universiti Kebangsaan Malaysia, Malaysia; A. F. Almutairi, Kuwait University, Kuwait
15:00 – 15:20	Experimental Investigation of Polarization Performance for X-Band Metasurface Absorber
<b>550</b>	B. Syihabuddin, D.A. Nurmantris, Institut Teknologi Bandung, Indonesia; L.O. Nur, Telkom University, Indonesia; A. Munir, Institut Teknologi Bandung, Indonesia



15:20 – 15:40	Design of multifunctional metasurface based on Conformational Space Annealing (CSA) algorithm
<b>426</b>	I.J. Hwang, D.J. Yun, I.H. Lee, Y.P. Hong, Korea Research Institute of Standards and Science, Korea
16:00 – 16:20	Wiener-Hopf Solution of a Backscattering Protected Waveguide
<b>602</b>	X. Mitsalás, University of Siena, Italy; C. De Angelis, Università degli Studi di Brescia, Italy; S. Maci, University of Siena, Italy
16:20 – 16:40	Wireless power transmission using an intelligent metamaterial array non-homogeneous
<b>414</b>	I. O. Souza, U. do Carmo Resende, CEFET-MG, Brazil; Í.V. Soares, University of Rennes 1, France
16:40 – 17:00	Wideband 1-bit Filtenna-to-Filtenna Cross-Polarization Converter for Filtering Transmitarray
<b>322</b>	K.-w. Tam, H. Lin, University of Macao, China ; S.-w. Wong, Shenzhen university, China ; We. Zhang, Soochow University, China ; N.Kong, University of Macau, China
17:00 – 17:20	Radar Cross Section Reduction Based on Disordered Metasurface
<b>291</b>	Z. Li, J. Gao, Beijing University of Technology, China
17:20 – 17:40	Capacitive-Loaded Ultra-Thin Metamaterial Absorber for X-band with Polarization Insensitivity
<b>482</b>	P. Routray, D. Ghosh, IIT Bhubaneswar, India
17:40 – 18:00	A deployable V-band Reflectarray Antenna for 12U CubeSat Platform
<b>137</b>	G. Liu, H. Wang, D. Zhu, X. Dong, National Space Science Center, CAS, China

18:00 – 18:20 2-bit Reflective Electromagnetic Surface for X-band Beam Control Function

**540** D.A. Nurmantris, M.N. Arira, N. Sutisna, A. Munir, Institut Teknologi Bandung, Indonesia

**20) Artificial intelligence applications to electromagnetics - ICEAA/IEEE APWC, Organized by F. de Flaviis**

Chair 1 F. de Flaviis Chair 2 Tuesday, 3 08:00 – 10:00 room Milao II ICEAA/IEEE APWC

08:00 – 08:20 IPCSBR: A Mesh-Free Intelligence Assisted Point-Cloud Shooting and Bouncing Rays Method

**162** K. Yang, C. Liu, W. Yu, T. Cui, Southeast University, China

08:20 – 08:40 Physics-Informed Koopman Autoencoders for Dimensionality Reduction and Forecasting of Nonlinear Kinetic Plasma-Wave Interactions

**405** I. Nayak, H.H. Saleh, M. Kumar, F.L. Teixeira, The Ohio State University, United States

08:40 – 09:00 Enhancing soil moisture estimation with convolutional neural networks

**256** S. Bagherkhani, S. Alamdar, F. De Flaviis, University of California, Irvine, United States

09:00 – 09:20 Machine learning-assisted matrix compression for electromagnetic scattering analysis

**197** R. Molina-Burgues, H. Lopez-Menchon, A. Heldring, E. Ubeda, J. Romeu, J.M. Rius, Universitat Politècnica de Catalunya, Spain

09:20 – 09:40 Intelligent Automation of Antenna Array Synthesis for RF Safety Simulations

**504** R. Human, R. Swanepoel, IXUS, South Africa; D.J. Ludick, Stellenbosch, South Africa

09:40 – 10:00 Deep learning procedures for the inverse design of electromagnetic devices

**516**

R. Palmeri, Università Mediterranea of Reggio Calabria, Italy; A. Yago Ruiz, MiWEndo Solutions, Spain; R. Scapatucci, IREA-CNR, Italy; T. Isernia, Università Mediterranea of Reggio Calabria, Italy; L. Crocco, IREA-CNR, Italy

## 21) AI in electromagnetic applications - IEEE APWC

Chair 1 F. de Flaviis

Chair 2 Q. Ren

Tuesday, 3

10:40 – 14:20 room Milao II

IEEE APWC

10:40 – 11:00 A Multi-modal Fusion and Mesh-free RCS Prediction Method Based on PointNet++

**555**

Z. Yang, Q. Ren, Beihang University, China

11:00 – 11:20 Analysis of Coaxial Microstrip Patch Antenna using Artificial Neural Network

**259**

S. Borgaonkar, Shri G.S. Institute of Technology and Science, Indore, India; S.K. Jain, Centre for Remote Sensing and Satellite Technology (CRSST), SGSITS, Indore, India

11:20 – 11:40 Hybrid quantum-classical reinforcement learning in patch antenna design

**422**

M.S. Arani, R. Shahidi, L. Zhang, Memorial University of Newfoundland, Canada

11:40 – 12:00 A Neural Network Approach for the Solution of an Electromagnetic Inverse Source Problem with SVD-based Pruning

**480**

A. Capozzoli, C. Curcio, A. Liseno, Università di Napoli Federico II, Italy

12:00 – 12:20 Design of Multiband Large Reflectarray Antennas for Space Applications using Support Vector Machines

**484**

B. Imaz-Lueje, Universidad Rey Juan Carlos, Spain; D. Martinez-de-Rioja, Universidad Politécnica de Madrid, Spain; Á. F. Vaquero, J.A. López-Fernández, M. R. Pino, M. Arrebola, Universidad de Oviedo, Spain

13:40 – 14:00

AI in bioelectromagnetics for the assessment of safety and neurorestoration strategies during electrical stimulation therapies

**603**

A. Morales, University of Southern California, United States; J. Du, University of Southern California, United States; E. Iseri, University of Southern California, United States; G. Lazzi, University of Southern California, United States

14:00 – 14:20

A Clustering Approach for Understanding Bone Health using RF Transmission Characteristics

**498**

N. Shrivastava, D. Ghosh, P. K. Sahu, IIT Bhubaneswar, India

## 22) Wireless communication and networks - IEEE APWC

Chair 1 P. Geranmayeh

Chair 2 R.C.B. Monterio

Tuesday, 3

14:40 – 16:40 room Milao II

IEEE APWC

14:40 – 15:00

Comparison of optimization techniques and machine learning methods for optimized beamforming in wireless networks

**269**

P. Geranmayeh, E. Grass, Humboldt University of Berlin and IHP GmbH, Germany

15:00 – 15:20

Exploring GNSS Positioning Accuracy for Emergency Calls in Mobile Devices: An Empirical Study using a GNSS Simulator with A-GPS Technology

**470**

R.C.B. Monteiro, J.B.R. Neto, R.F. Silva, J.O. Sousa, SIDIA R&D Institute, Brazil

15:20 – 15:40

VoLTE Emergency Call over Assisted-GPS: An Experimental Evaluation

**472**

R.C.B. Monteiro, R.F. Silva, J.B.R. Neto, SIDIA R&D Institute, Brazil; J.O. Sousa, M.G.L. Damasceno, J.J.A. Arnez, SIDIA R&D Institute, Brazil

16:00 – 16:20

A Digitally Coded Time-Modulated Transmit Array: Performance Prediction, Optimization and Experimental Verification

**158**

T.T. Chia, DSO National Laboratories, Singapore; J.M. Cheng, Temasek Laboratories, Singapore; T.H. Chio, DSO National Laboratories, Singapore; L.X. Ng, NUS High School of Mathematics and Science, Singapore

16:20 – 16:40 Comparative analysis of 5G standalone and non-standalone implementations using atoll radio planning

**487** L.B.A. Costa, S.T.M. Gonçalves, CEFET-MG, Brazil

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### 23) Technologies for mm waves and optoelectronics - ICEAA

Chair 1 F. Costa Chair 2 R. Neumann Wednesday, 4 08:00 – 09:00 room Roma I ICEAA

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08:00 – 08:20 High-Voltage Driver Circuits for Electro-Optical RF Modulators

**448** R. Neumann, U. Stehr, M.A. Hein, Technische Universität Ilmenau, Germany

08:20 – 08:40 Loop Antenna Array for mm-Wave Applications

**329** N.K. Maurya, M.J. Ammann, P. McEvoy, TECHNOLOGICAL UNIVERSITY DUBLIN, Ireland

08:40 – 09:00 Fiber Bragg Grating Array-based Belts for Respiratory Activity Monitoring: Respiratory Signal Analysis

**380** M. Mishra, P.K. Sahu, Indian Institute of Technology Bhubaneswar, India

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### 24) Electromagnetic metasurfaces: design and applications - ICEAA, Organized by G. Manara, F. Costa

Chair 1 G. Manara Chair 2 F. Costa Wednesday, 4 09:00 – 14:20 room Roma I ICEAA

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09:00 – 09:20 PT-Symmetric Metasurfaces and Their Beamshaping and Beamforming Applications

**572** Pai-Yen Chen, University of Illinois Chicago, United States

09:20 – 09:40 A Near-Field Approach to Optimize Electromagnetic Skins For mm-Wave Indoor Communications

**534** A. F. Vaquero, Universidad de Oviedo, Spain; E. Martinez-de-Rioja, Universidad Rey Juan Carlos, Spain; M.Arrebola, Universidad de Oviedo, Spain

09:40 – 10:00 Mm-wave wireless sensor networks with zero energy consumption through backscattering metasurfaces

**527** F. Costa, Si. Genovesi, S. Rodini, G.Manara, University of Pisa, Italy

10:20 – 10:40 Full-metal metasurface for surface wave tailoring

**388** G Briand, A Barka, ONERA, France; S. N. Burokur, LEME, France

10:40 – 11:00 Reconfigurable intelligent surfaces for THz: hardware impairments and switching technologies

**385** S.A. Matos, Instituto Universitário de Lisboa (ISCTE-IUL) Lisbon, Portugal, Portugal; Y. Ma, University of Hertfordshire, United Kingdom; Q. Luo, University of Hertfordshire, United Kingdom; J. Deuermeier, NOVA University Lisbon, Portugal; L. Lucci, CEA Leti, France; P. Gavriilidis, University of Athens, Greece; A Kiazadeh, NOVA University Lisbon, Portugal; V Lain-Rubio, ACST, Germany; T. D. Phan, University of Oulu, Finland; P. J. Soh, University of Oulu, Finland; A. Clemente, CEA-LETI, France; L. M. Pessoa, INESC TEC, Portugal; G. C. Alexandropoulos, University of Athens, Greece

11:00 – 11:20 Dual-Band Frequency Selective Surface in Quartz for Transmitarray Applications at Sub-THz

**375** B. Ouardi, Univ Grenoble Alpes, CEA, France; R. Sauleau, Univ Rennes, CNRS, IETR - UMR CNRS 6164, France; A. Clemente, Univ Grenoble Alpes, France

11:20 – 11:40 Diffractive Deep Neural Networks based on Programmable Nonlinear Metasurfaces

**260** Y. M. Ning, Q. Ma, T. J.Cui, Southeast University, China

11:40 – 12:00 Unleashing Bandwidth: Passive Highly Dispersive Matching Network Enabling Broadband Absorbing Microwave Systems

**258** P. Nayani, M. Moradi, Y. Radi, Syracuse University, United States

12:00 – 12:20 Fabry–Perot Cavity Antennas with Polarization-Conversion Metasurface Radiating Angularly Scannable Circularly Polarized Pencil Beams

**208** M. Madji, E. Negri, Sapienza University of Rome, Italy; W. Fuscaldo, CNR, Italy; D. Comite, S. A .Galli, P. Burghignoli, Sapienza University of Rome, Italy

13:40 – 14:00 Design of Drude Metasurface Antennas for High-Band Compatibility

**207** J. Tao, P. Tang, H. Chen, Z. Wang, Zhejiang University, China

14:00 – 14:20 Advances on Huygens Metasurface Based Transmitarrays at University of Technology Sydney

**190** P.-Y. Qin, Y. Jay Guo, University of Technology Sydney, Australia

## 25) Electromagnetic measurements - ICEAA

Chair 1 F. Bevilacqua

Chair 2 M. Lumia

Wednesday, 4

14:20 – 17:40 room Roma I ICEAA

14:20 – 14:40 A preliminary experimental demonstration of the Norton Surface Wave in a radio link

**533** H. A. Belaid, B. Poussot, S. Mostarshedi, J.-M. Laheurte, Univ. Gustave Eiffel, France

14:40 – 15:00 Far-Field prediction from a reduced number of phaseless bipolar Near Field data

**478** F. Bevilacqua, Università di Salerno, Italy; A. Capozzoli, C. Curcio, Università di Napoli Federico II, Italy; F. D'Agostino, F. Ferrara, C. Gennarelli, R. Guerriero, Università di Salerno, Italy; A. Liseno, Università di Napoli Federico II, Italy; M. Migliozzi, Università di Salerno, Italy; J.C. Vardoxoglou, Loughborough University, United Kingdom

15:00 – 15:20 High-Efficiency Cylindrical Induction Coils Using Induction Heating for Food Industry Applications

**474** S. Yamadol, S. Santalunai, S. Samreong, J. Pakprom, Suranaree University of Technology, Thailand; W. Charoensiri, P. Janpangngern, T. Thosdeekoraphat, Suranaree University of Technology, Thailand; N. Santalunai, Rajamangala University of Technology Isan, Thailand; S. Santalunai, Suranaree University of Technology, Thailand; C. Thongsopa, Suranaree University of Technology, Thailand

15:20 – 15:40 A Reconstruction Method for the Surface Potential of the High Voltage Charged Body Based on Quasi-Static Electric Field Theory

**463** B. Zhang, S. He, L. Song, X. Chen, Xi'an Jiaotong University, China

16:00 – 16:20 Preliminary Research on Nonlinear Correlation Coefficient Criterion in EMTR Method for Spatial Radiation Source Localization

**460** L. Song, S. He, B. Zhang, X. Ning, X. Chen, Xi'an Jiaotong University, China

16:20 – 16:40 An approach to discretize one-dimensional equivalent radiating panels

**456** A. Capozzoli, ; C. Curcio, Università di Napoli Federico II, Italy; F. D'Agostino, Università di Salerno, Italy; A. Liseno, Università di Napoli Federico II, Italy; L. Pascarella, Università di Salerno, Italy

16:40 – 17:00 Phaseless Imaging of Planar Targets: an Experimental Result

**438** F. Bevilacqua, A. Capozzoli, C. Curcio, Università di Napoli Federico II, Italy; F. D'Agostino, F. Ferrara, R. Guerriero, Università di Salerno, Italy; A. Liseno, Università di Napoli Federico II, Italy; M. Migliozzi, Università di Salerno, Italy; J.C. Vardaxoglou, Loughborough University, United Kingdom

17:00 – 17:20 MEDUSE: 10 GHz localized quasi-planar wave measuring bench

**340** S. Barouki, P. Hoffmann, CEA Gramat, France; A. Reineix, Xlim Reseach Institute, France

17:20 – 17:40 Dielectric sensing of deeply subwavelength analytes using epsilon-near-zero waveguides

**187** C. Lezaun, Public University of Navarra, Spain; V. Pacheco-Peña, Newcastle University, United Kingdom; M. Beruete, Public University of Navarra, Spain

## 26) Novel mathematical methods in electromagnetics - ICEAA, Organized by K. Kobayashi; G. Lombardi; Y. Shestopalov

Chair 1 K. Kobayashi Chair 2 G. Lombardi Y. Shestopalov Wednesday, 4 08:20 – 17:20 room Roma II ICEAA

08:20 – 08:40 Exact transmission through a metamaterial parabolic-cylinder radome

**121** P.L.E Uslenghi, University of Illinois at Chicago, United States



08:40 – 09:00	Well-conditioned T-Matrix Method for a Dipole-Excited Infinite Dielectric Cylinder
<b>169</b>	F. Dikmen, M.E. Hatipoglu, Gebze Technical University, Turkey; K. Karaçuha, Istanbul Technical University, Turkey
09:00 – 09:20	Diffraction by planar junctions of uniaxial chiral half-planes
<b>209</b>	G. Riccio, F. Ferrara, University of Salerno, Italy; G. Gennarelli, I.R.E.A. - C.N.R., Italy; R. Guerriero, F. Chiadini, University of Salerno, Italy
09:20 – 09:40	A novel dimensional alignment of electric and magnetic field intensity vectors in FDTD for PML implementation
<b>235</b>	F. Erden, Turkish Naval Academy, Turkey
09:40 – 10:00	Field averaging techniques in electromagnetic problems
<b>253</b>	M. Nitas, Technical University of Denmark; M. Kafesaki, Foundation for Research and Technology-Hellas (FORTH-IESL), Greece; S. Arslanagic, Technical University of Denmark, Denmark
10:20 – 10:40	Scattering at a Superluminal Arbitrarily Decelerating Interface
<b>263</b>	K. De Kinder, C. Caloz, KU Leuven, Belgium
10:40 – 11:00	Plane-Wave Diffraction by a Slit Formed by Two Half-Planes with a Fractional Boundary Condition: Higher Order Asymptotics
<b>288</b>	T. Nagasaka, Ashikaga University, Japan; K. Kobayashi, Chuo University, Japan
11:00 – 11:20	TE- waves in waveguide structures filled with graded dielectric media
<b>298</b>	M. Dalarsson, KTH Royal Institute of Technology, Sweden

11:20 – 11:40 Numerical Analysis and Applications of Planar Series Feed Antennas for Near-Field UHF RFID, Sensing and Radiative WPT

**321** A.S. Andrenko, Kyoto University, Japan

11:40 – 12:00 Riemann-Silberstein vectors: streamlined Electromagnetics with applications

**335** R. Kastner, Tel Aviv University, Israel

12:00 – 12:20 Analysis of power flow around metasurface sensor

**342** S. Yagitani, M. Ozaki, T. Imachi, Kanazawa University, Japan

13:40 – 14:00 Enhancing performance and versatility of wire antennas with metasurface covers

**371** A. Monti, Z. Hamzavi-Zarghani, Roma Tre University, Italy; S. Vellucci, M. Longhi, M. Barbuto, Niccolò Cusano University, Italy; D. Ramaccia, L. Stefanini, A. Toscano, F. Bilotti, Roma Tre University, Italy

14:00 – 14:20 Two-dimensional ray-tracing model for the design of multilayered dielectric lenses in combination with array antennas

**381** P. Castillo-Tapia, N. Flores-Espinosa, KTH Royal Institute of Technology, Sweden; F. Mesa, University of Seville, Spain; M.C. Vigano, Viasat Antenna Systems S.A., Switzerland; O. Quevedo-Teruel, KTH Royal Institute of Technology, Sweden

14:20 – 14:40 High-precision calculation for the cut-off wave numbers for waveguides of arbitrary cross sections with inner conductors

**410** E.D. Vinogradova, P.D. Smith, Macquarie University, Australia; Y.V. Shestopalov, University of Gävle, Sweden

14:40 – 15:00 Resonance Scattering by Two Concentric Spherical Shells with Circular Apertures

**454** E. D. Vinogradova, Macquarie University, Australia

15:00 – 15:20	2-D Photonic crystal leaky-wave antennas: theoretical investigation and design approaches
<b>465</b>	L. Tognolatti, Roma Tre University, Italy; V. Jandieri, University of Duisburg-Essen, Germany; C. Ponti, G. Schettini, P. Baccarelli, Roma Tre University, Italy
15:20 – 15:40	Numerically stable analytical computation of double surface integrals over almost parallel flat supports for time and frequency domain Galerkin discretization of wave scattering problems.
<b>486</b>	A. Zuccotti, K. Cools, Ghent University, Belgium
16:00 – 16:20	A Review of Evaluations of Radar Cross-Section of Canonical and Complex Objects
<b>518</b>	A.Elsherbeni, Colorado School of Mines, United States
16:20 – 16:40	Development of Superscatterers via Genetical Optimization
<b>569</b>	D. Vovchuk, Tel Aviv University/Riga Technical University, Israel; K. Grotov, A. Mikhailovskaya, D. Dobrykh, Tel Aviv University, Israel; T. Salgals, V. Bobrovs, Riga Technical University, Latvia; P. Ginzburg, Tel Aviv University, Israel
16:40 – 17:00	The Spectral Theory of Transients (STT): A Unified Formulation with Illustrative Examples
<b>595</b>	E. Heyman, Tel Aviv University, Israel
17:00 – 17:20	The Fredholm Factorization Method Directly Applied to Generalized Wiener-Hopf Equations for Wedge Diffraction Problems in Complex Media
<b>600</b>	V. Daniele, G. Lombardi, Politecnico di Torino, Italy

**27) Microwave and mmwave sensors in advanced applications - ICEAA, Organized by C. Baer; C. Schulz**

Chair 1 C. Baer                                      Chair 2 C. Schulz                                      Wednesday, 4                                      08:00 – 09:20      room Bruxelles                                      ICEAA

08:00 – 08:20 Radar-based investigation of electromagnetic waves under different temperature and humidity conditions

**476** J. Mahendran, F. Schenkel, I. Rolfes, C. Schulz, Ruhr University Bochum, Germany

08:20 – 08:40 A mmWave Phase Correlation Based Gas Velocity Sensor Utilizing Time Domain Multiplexed Fixed Target Radar Measurements

**232** C. Baer, Ruhr University Bochum, Germany; T. Jaeschke, 2Pi Labs GmbH, Germany

08:40 – 09:00 Radar-based tomography with filtered backprojection using attenuation and time shift profiles of a reference reflection

**461** I. Barengolts, A. Al-Tayar, M. Funk, K. Dausien, D. Pohle, C. Schulz, I. Rolfes, J. Barowski, Ruhr University Bochum, Germany

09:00 – 09:20 Lithography Process Verification on Porous PET Membranes for Cell Measurements Using THz-TDS Imaging

**247** P. Hinz, M. Mueh, A. Diepolder, C. Damm, Ulm University, Germany

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## 28) Dielectric waveguides and polymer microwave fiber technology - ICEAA, Organized by C. Baer

Chair 1 C. Baer

Chair 2

Wednesday, 4

09:20 – 14:20 room Bruxelles ICEAA

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09:20 – 09:40 A Compact W-Band TE<sub>10</sub>-TE<sub>01</sub> Mode Converter for Industrial Radar Applications

**561** C. Schulz, Ruhr University Bochum, Germany

09:40 – 10:00 Classification of Range-Doppler Radar Echoes for Condition Monitoring in Industrial Processes: Shallow Learning versus Deep Learning

**467** R./J. Schmitz, M. Vogt, Ruhr University Bochum, M. Roitzheim, M. Hammes, Krohne Messtechnik GmbH, Germany; C. Schulz, Ruhr University Bochum, Krohne Messtechnik GmbH, Germany; J. Barowski, I. Rolfes, Ruhr University Bochum, Germany

10:20 – 10:40	Metal Sheet Thickness Measurement using Dielectric Waveguides with Millimeter Wave Radar
<b>432</b>	N. Muckermann, C. Baer, N. Pohl, Ruhr University Bochum, Germany
10:40 – 11:00	Ultra-Broadband Material Characterization in W- and D-Band Using a Free-Space Setup
<b>324</b>	M.Funk, I.Barengolts, J.Altholz, J.Barowski,C. Schulz, I. Rolfes, Ruhr University Bochum, Germany
11:00 – 11:20	Circular dielectric waveguides for D-band applications in communications and radar
<b>458</b>	M. Schneider, University of Bremen, Germany
11:20 – 11:40	Exploring the Potential of Six-Port Technology in Microwave Nondestructive Testing: Current Status and Future Directions
<b>565</b>	K. Haddadi, IEMN CNRS UMR 8520, France
11:40 – 12:00	A Compensation Method for Reducing the Influence of Printing Voids on the Wave Propagation Properties of FDM-manufactured Dielectric Waveguides
<b>194</b>	C. Baer, Ruhr University Bochum, Germany
12:00 – 12:20	A dielectric waveguide solution for automotive high-speed communication – a potential extension to traditional signal transmission options?
<b>245</b>	J. Wenninger, R. Klapfenberger, F. Graßl, G. Armbrrecht, Rosenberger Hochfrequenztechnik GmbH & Co. KG, Germany
13:40 – 14:00	Beyond the IC – couplers, channels and components for high-performance polymer microwave fiber communication systems
<b>193</b>	K. Dens, M. De Baecke, B. Gungor, P. Reynaert, KU Leuven, Belgium

14:00 – 14:20 Investigation on LNN-Self-Calibration Procedures for Dielectric Waveguide Measurements

**400**

K.Dausien, I. Barengolts, L. Schmitt, M.Burfeindt, C. Baer, C. Schulz, J. Barowski, M. Hoffmann, I. Rolfes, Ruhr University Bochum, Germany

### 29) Radar technologies - ICEAA

Chair 1 C. Baer

Chair 2 A. Hizal

Wednesday, 4

14:20 – 15:20 room Bruxelles ICEAA

14:20 – 14:40 Enhanced Chipless RFID Detection Algorithm for Dense Multipath Channels based on Calibration Equalization Techniques

**570**

M.El Hadidy, I. Bakri, RheinMain University of Applied Science, Germany

14:40 – 15:00 Inverse synthetic aperture radar imaging using the Simultaneous Iterative Reconstruction technique

**210**

D. Holtshausen, L. Grootboom, Stellenbosch University, South Africa

15:00 – 15:20 X-Band Near-Field GPR Based on Collimated and Focused Vortex Waves Using Ellipsoidal Reflector

**144**

R. Cetiner, A. Hizal, Aselsan, Turkey; S.S. Koc, METU, Turkey; H. Yildiz, Baskent University, Turkey

### 30) Periodic and quasi - periodic electromagnetics - ICEAA, Organized by L. Matekovits; K. Esselle

Chair 1 L. Matekovits

Chair 2 K. Esselle

Wednesday, 4

16:00 – 17:40 room Bruxelles ICEAA

16:00 – 16:20 EBG Periodic Structures with Glide-Symmetry Hexagonal Lattices

**238**

J.M Jimenez-Suarez, KTH Royal Institute of Technology, Sweden; F. Mesa, Universidad de Sevilla, Spain; O. Quevedo-Teruel, KTH Royal Institute of Technology, Sweden

16:20 – 16:40 Measured performance of dielectric rod EBG leaky-wave antenna

**444**

L. Tognolatti, P. Baccarelli, C. Ponti, Roma Tre University, Italy; S. Ceccuzzi, ENEA, Italy; V. Jandieri, University of Duisburg-Essen, and CENIDE-Center for Nanointegration Duisburg-Essen, Germany; G. Schettini, Roma Tre University, Italy

16:40 – 17:00 Study Regarding the Tunability of a Frequency Selective Surface Having Incorporated Active Devices and Control Network

**145** A.-M. Silaghi, C. Pescari, A.De Sabata, Politehnica University Timisoara, Romania; L. Matekovits, Politecnico di Torino, Italy; A.Neiconi, Politehnica University Timisoara, Romania

17:00 – 17:20 Design of Wideband Metasurface Structure with the Aid of Bottom-Up Optimization

**338** S. Ozer, L. Kouhalvandi, Dogus University, Turkey; L. Matekovits, Politecnico di Torino, Italy; M. Alibakhshikenari, Universidad Carlos III de Madrid, Spain

17:20 – 17:40 Feasibility study of XLA very light space-borne orientable antenna for telecommunication applications

**336** G. Perona, CSP - Innovazione nelle ICT, Italy; M. Allegretti, Politecnico di Torino,, Italy; I. Bordi, Envisens Technologies srl, Italy

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### 31) Space relevant laboratory experiments - ICEAA, Organized by W.E. Amatucci; E. Scime

Chair 1 W.E. Amatucci                      Chair 2 E. Scime                      Wednesday, 4                      08:00 – 14:40      room Milao I                      ICEAA

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08:00 – 08:20 Sheared ExB stirring and cross-field electron inertial length structuring generated by shear Alfvén wave heating

**545** S. Vincena, W. Gekelman, T.A. Carter, J.E. Maggs, G.J. Morales, UCLA, United States

08:20 – 08:40 ELF/VLF micro-array transmitters with Fe-Co high- $\mu$  core for space platforms

**349** B. Amatucci, K. Hrenyo, Naval Research Laboratory, United States; D. Papadopoulos, University of Maryland, United States; M. Finn, S. Bennett, A. Hyde, Naval Research Laboratory, United States

08:40 – 09:00 First results from the LIEFSI campaign

**508** J. Bowman, West Virginia University United States; E. Tejero, U.S Naval Research Laboratory, United States; J. Bonnell, University of California, Berkely, United States; W. Amatucci, U.S Naval Research Laboratory, United States; K. Goodrich, , West Virginia University United States

09:00 – 09:20

Exploring Neutral Particle Dynamics with Fs-TALIF in Fusion Systems

**367**

A. Diallo, Princeton Plasma Physics Laboratory, United States; A. Dogariu, Texas A&M University, United States; A. Starikovskiy, Princeton University, United States

09:20 – 09:40

Using field-particle correlations to diagnose wave-particle interactions in laboratory experiments

**447**

G.G. Howes, University of Iowa, United States

09:40 – 10:00

Energetic Electron Generation During Electron-Only Reconnection

**136**

E. Scime, G. Bartolo, R.S. Nirwan, T. Rood, S. Yadav, West Virginia University United States

10:20 – 10:40

Results from the LIEFSI Campaign – Interpretations and Applications

**492**

J.W. Bonnell, Space Sciences Laboratory, UC Berkeley, United States; J. Bowman, West Virginia University United States; E. Tejero, W. Amatucci, US Naval Research Laboratory, United States; K. Goodrich, West Virginia University United States

10:40 – 11:00

Magnetosphere-relevant wave research at Caltech involving or motivated by lab experiments

**328**

P. M. Bellan, M. Haw, Y.D. Yoon, Caltech, United States

11:00 – 11:20

Laboratory investigation of triggered emissions

**351**

E.M. Tejero, US Naval Research Laboratory, United States; J.W.R. Schroeder, Wheaton College, United States; F.N. Skiff, University of Iowa, United States; A.M. Dubois, C.L. Enloe, C.E. Crabtree, US Naval Research Laboratory, United States; A.A. Sahai, V. Harid, University of Colorado, Denver, United States

11:20 – 11:40

Plasma physics at comets – what can we learn from laboratory experiments?

**246**

H. Gunell, Umeå University, Sweden; D. Schaeffer, University of California–Los Angeles, United States; C. Goetz, Northumbria University, United Kingdom; F. Cruz, Universidade de Lisboa, Portugal; C. S. Wedlund, Austrian Academy of Sciences, Austria; H. Nilsson, A. Moeslinger, G. Stenberg Wieser, N. Edberg, Swedish Institute of Space Physics, Uppsala, Sweden



11:40 – 12:00 Experimental investigation of soliton formation in a simple ion-electron plasma

**273** P. Mehta, E. Scime, K. Kumar, T.Rood, G.Lusk, West Virginia University United States

12:00 – 12:20 Debris plasma density perturbations as seen through a modern collective Thomson scatter radar processing chain

**211** J. B. Parham, J. Li, M. Dickson, G. Ginet, MIT Lincoln Laboratory, United States; P. J. Erickson, F. Lind, Haystack Observatory, United States; L. Paritsky, J. Swoboda, Haystack Observatory, United States

13:40 – 14:00 Study of debris-plasma interaction in the Earth's ionosphere.

**387** P. A. Resendiz Lira, G. L. Delzanno, D.Svyatsky, O. Koshkarov, J. Craig Holmes, Ca.Maldonado, G. Wilson, T. Espinoza, Los Alamos National Laboratory, United States

14:00 – 14:20 Experimental investigation of orbital debris soliton generation

**350** B. Amatucci, E. Tejero, A. DuBois, L. Enloe, D. Blackwell, C. Crabtree, G. Ganguli, Naval Research Laboratory, United States; A. Sen, Institute for Plasma Research, India

14:20 – 14:40 Experimental exploration for precursor solitons in a flowing plasma

**270** K. Kumar, T. Rood, G. Lusk, E.Scime, P. Mehta, West Virginia University United States

### 32) Propagation and Channel modeling - IEEE APWC

Chair 1 S. Malik

Chair 2 F. Paonessa

Wednesday, 4

14:40 – 17:40 room Milao I

IEEE APWC

14:40 – 15:00 An initial study of human-scale blockage in sub-THz radio propagation with application to indoor passive localization

**242** F. Paonessa, G. Virone, S. Kianoush, A. Nordio, S. Savazzi, CNR-IEIIT, Italy

15:00 – 15:20	Balancing between data efficiency and RF-EMF exposure reduction via beam switching in 5G mm-Wave channel
<b>156</b>	S. Malik, R. Schulpen, L.A. Bronckers, U. Johannsen, Eindhoven University of Technology, Netherlands
15:20 – 15:40	Wideband joint elevation-azimuth angle estimation based on multiple frequency model and atomic norm minimizaion
<b>180</b>	J. Zhang, I M. Wu, Institute of Acoustics, Chinese Academy of Sciences, China ; C. Hao, Da Xu, Chinese Academy of Sciences, China
16:00 – 16:20	Comparative Study of 5G and Wi-Fi Private Networks: A Case Study
<b>505</b>	G.R. Zouza, U.C. Resend, S.T.M. GonÇalves, CEFET-MG, Brazil
16:20 – 16:40	Bridging Simulation and Measurements through Ray-Launching Analysis: A Study in a Complex Urban Scenario Environment
<b>464</b>	X. Long, Karlsruher Institut für Technologie (KIT), Germany; A.M.A. Fellan, Rheinland-Pfälzische Technische Universität Kaiserslautern-Landau (RPTU), Germany; M. Pauli, Karlsruher Institut für Technologie (KIT), Germany; H. Schotten, Rheinland-Pfälzische Technische Universität Kaiserslautern-Landau (RPTU), Germany; T. Zwick, Karlsruher Institut für Technologie (KIT), Germany
16:40 – 17:00	Impact of parallel interference on FMCW radar detection in indoor environments
<b>202</b>	P. Reitz, N. Franchi, M. Lübke, Friedrich-Alexander Universität Erlangen-Nürnberg, Germany
17:00 – 17:20	Modeling Path Loss in Structured Mango Orchards: An Empirical Approach in Accordance with IEEE 802.11 Standards
<b>376</b>	K. M. Boga, H.Nandivelugu, S.Su. Raj Gaddala, D. Kandimalla, R. V. Prasad Yerra, Indian Institute of Information Technology Sri City, Chittoor, India
17:20 – 17:40	Propagation and performance analysis of 5G communications in maritime environments
<b>267</b>	R. Byl, F. Quitin, Université libre de Bruxelles, Belgium

### 33) Antennas - ICEAA

Chair 1 P. Di Ninni

Chair 2 L.M. Pessoa

Wednesday, 4

08:00 – 14:20 room Milao II

ICEAA

08:00 – 08:20 Reconfigurable Antennas Enabled by Compliant Mechanisms

**483**

S. D. Campbell, G. Makertich-Sengerdy, P. L. Werner, D. H. Werner, The Pennsylvania State University, United States

08:20 – 08:40 Memristor-Based 1-Bit Reconfigurable Intelligent Surface for 6G Communications at D-Band

**530**

M. Elsaid, S.I. Inacio, H.M. Salgado, L.M. Pessoa, INESCTEC, Portugal

08:40 – 09:00 Steering the beam of an end-fire Antenna using near-field meta-steering method

**365**

K. Singh, M. I. Nabeel, D. Thalakituna, K. Esselle, University of Technology Sydney, Australia

09:00 – 09:20 Tunable Frequency Selective Antenna Based on Variable Liquid Metal Coupling Length

**279**

V. Sharbati, X. Bao, J.J. Healy, N. Zhang, University College Dublin, Ireland

09:20 – 09:40 The Transformer as a Balun

**124**

E. Carpentieri, MBDA, Italy

09:40 – 10:00 A multibeam antenna array fed by a new design of RF beamforming network

**201**

Y. Xu, University of Technology Sydney, Australia; H. Zhu, Commonwealth Scientific and Industrial Research Organization, Australia; J. Guo, University of Technology Sydney, Australia

10:20 – 10:40	Development of Flexible Textile Patch Antenna Using Coating Technique
<b>558</b>	M.N. Arira, B. Syihabuddin, T. Yunita, A. Munir, Institut Teknologi Bandung, Indonesia
10:40 – 11:00	Monopole-based Wideband Antenna with Embedded Band-notch for Applications in Upper UWB
<b>409</b>	Y. Dang, T. Alam, M. Cheffena, Norwegian University of Science and Technology, Norway; K.G. Kjelgard, University of Oslo, Norway
11:00 – 11:20	A Compact Capsule Antenna Design Based on Metamaterial Resonators
<b>343</b>	M. Ciflik, C. Basaran, Akdeniz University, Turkey
11:20 – 11:40	Dual-band Conformal Capsule Antenna Design for Biotelemetry Applications
<b>334</b>	M. Kasli, M. Ciflik, C. Basaran, Akdeniz University, Turkey
11:40 – 12:00	Propagation of Higher-Order Waveguide Modes from the OMT into the Far Field
<b>598</b>	M.S. de Villiers, A. Peens-Hough, South African Radio Astronomy Observatory, South Africa
12:00 – 12:20	Radiation and Polarisation Performance of SADino: an Italian Aperture Array for Technological Verification Tests in Radio Astronomy
<b>374</b>	P. Di Ninni, National Institute for Astrophysics, Italy; T.D. Carozzi, Onsala Space Observatory - Chalmers University of Technology, Sweden; M. Schiaffino, G. Comoretto, A. Melis, M. Murgia, National Institute for Astrophysics, Italy
13:40 – 14:00	A frequency tunable rectangular patch antenna based on anisotropic artificial material at C-Band
<b>543</b>	H. J. Martínez, M. A. Yarlequé, S. Alvarez, Pontificia Universidad Católica del Perú, Peru

14:00 – 14:20 UWB antenna with WLAN and X-band rejection based on metamaterials

**160**

I. Fortas, University of Boumerdes, Algeria; M.Ayad, University of Setif, Algeria; B. Zoubiri, Center for Development of Advanced Technologies-CDTA, Algeria; S. Tebache, Ecole Nationale Polytechnique (ENP), Algeria; K. Fertas, Ecole Nationale Polytechnique (ENP), Algeria

**34) Antenna array modelling - ICEAA, Organized by C. Craeye; M. Botha**

Chair 1 C. Craeye

Chair 2 M. Botha

Wednesday, 4

14:20 – 17:40 room Milao II ICEAA

14:20 – 14:40 Method of moments for the two-dimensional analysis of array-fed metasurface antennas

**268**

J. Dessy, UCLouvain, Belgium; M. Bodehou, Université d'Abomey-Calavi, Benin; C. Craeye, UCLouvain, Belgium

14:40 – 15:00 Numerical Analysis of Finite Antennas Over Two-Dimensional Infinite Periodic Structures Using Method of Moments

**159**

K. Konno, Tohoku University, Japan; Q. Chen, Tohoku University, Japan

15:00 – 15:20 DD-MLFMA-slotFFT Framework for the Electromagnetic Solution of Mounted Finite Periodic Structures

**435**

V.F. Martin, A. Serna, L. Landesa, University of Extremadura, Spain; F. Obelleiro, University of Vigo, Spain; M.G. Araujo, F. Vipiana, Politecnico di Torino, Italy; J.M. Taboada, University of Extremadura, Spain

15:20 – 15:40 Fast Analysis of Large Antenna Arrays with Static and Dynamic Macro Basis Function Methods

**315**

K. Sewraj, Université des Mascareignes, Mauritius; M.M. Botha, Stellenbosch University, South Africa

16:00 – 16:20 A Broadband multipole method for the scattering analysis of antenna arrays

**452**

Q. D. Gueuning, E. de Lera Acedo, University of Cambridge, United Kingdom; A. K. Brown, Queen Mary University of London, United Kingdom; O. O'Hara, University of Cambridge, United Kingdom

16:20 – 16:40 Efficient Analysis of SKA-Low Antenna Arrays with Dynamic Macro Basis Functions

**277** A.S. Conradie, M.M. Botha, Stellenbosch University, South Africa

16:40 – 17:00 A Method to Enhance the Active Modal Configuration of a Circularly Polarized Patch Antenna Array Using Characteristic Modes

**239** L. Mörlein, D. Manteuffel, Leibniz University Hannover, Germany

17:00 – 17:20 Array Synthesis Using Spherical Wave Elements for EMF Compliance

**500** R. Swanepoel, IXUS, South Africa; D.I.L. De Villiers, D.J. Ludick, Stellenbosch, South Africa

17:20 – 17:40 Antenna characterization by the back-scattering measurement method using the integrated RF-frontend as load modulation device

**453** I. Shilinkov, V. Chernikov, R. Maaskant, M. Ivashina, Chalmers University of Technology, Sweden

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### 35) Nonlinear media; resonances; and inverse problems - ICEAA, Organized by Y. Shestopalov

Chair 1 Y. Shestopalov

Chair 2

Thursday, 5

08:00 – 10:40 room Roma I ICEAA

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08:00 – 08:20 Frequency inversion method and device for malignant melanoma detection using RF/microwaves

**586** L. Beilina, A. Eriksson, Chalmers University of Technology and University of Gothenburg, Sweden; N. Neittaanmäki, University of Gothenburg, Sweden

08:20 – 08:40 A hybrid finite element/finite difference method for reconstruction of dielectric properties of conductive objects

**585** E. Lindström, L. Beilina, Chalmers University of Technology and University of Gothenburg, Sweden

08:40 – 09:00 Wide-Angle Broadband Cancellation of Scattering from Metasurfaces with OAM and Combined Phase Profiles

**183** A. I. Semenikhin, D. V. Semenikhina, Y. V. Yukhanov, A. M. Zikina, Southern federal university, Russian Federation

09:00 – 09:20 Explicit determination of the spectrum of normal waves in an inhomogeneous plane-parallel dielectric layer with a parabolic permittivity profile

**176** E. Smolkin, University of Gävle, Sweden

09:20 – 09:40 Dynamic model for predicting instability of multiphase processes: direct and inverse problems

**154** Y. Shestopalov, Russian Technological University MIREA, Russian Federation; A. Shakhverdiev, Russian State Geological Prospecting University, Russian Federation

09:40 – 10:00 Diffraction by circular pin: Wiener-Hopf method

**149** S. Sautbekov, M. Sautbekova, G. Alkina, Al-Farabi Kazakh National University, Kazakhstan

10:20 – 10:40 Integro-differential equations in the problem of electromagnetic wave scattering on a dielectric body covered with graphene

**165** Y. Smirnov, Penza State University, Russian Federation; Y. Shestopalov, Russian Technological University MIREA, Russian Federation; O. Kondyrev, Penza State University, Russian Federation

### **36) Mathematical advances in electromagnetics - ICEAA, Organized by P.D. Smith; E. Vynogradova**

Chair 1 P.D. Smith                      Chair 2 E. Vynogradova                      Thursday, 5                      10:40 – 12:00                      room Roma I                      ICEAA

10:40 – 11:00 Reflection and transmission at a parabolic-cylinder interface

**177** P.L.E. Uslenghi, University of Illinois at Chicago, United States

11:00 – 11:20 A fast multiplication algorithm for gabor coefficients

**297** S. Eijsvogel, R.J. Dilz, M.C. van Beurden, Eindhoven University of Technology, Netherlands

11:20 – 11:40 Accurate Analysis of the High-Frequency Near-Field Arising as a Result of Plane Wave Diffraction on an Open Metallic Spherical Shell

**446** E. D. Vinogradova, Macquarie University, Australia

11:40 – 12:00 Regularized solution of 2D scattering from impedance-loaded cavities

**358** P.D. Smith, E.D. Vinogradova, Macquarie University, Australia

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### 37) Machine learning in antenna arrays and EMT based imaging - ICEAA, Organized by A.E. Cetin; P. - Y. Chen

Chair 1 A.E. Cetin

Chair 2 P.-Y. Chen

Thursday, 5

13:40 – 15:00 room Roma I ICEAA

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13:40 – 14:00 Phaseless Radar Coincidence Imaging via Low-Rank Matrix Recovery Theory

**587** B. Yonel, N. Choudhury, B. Yazici, Rensselaer Polytechnic Institute, United States

14:00 – 14:20 Deep Learning for SAR Ship classification: Focus on Unbalanced Datasets and Inter-Dataset Generalization

**332** C.M. Awais, University of Pisa, Italy; M. Reggiannini, National Research Council (CNR), Institute of Information Science and Technologies (ISTI), Italy

14:20 – 14:40 Effect of Data Compression on Crack Location Prediction Using Acoustic Emission Sensor Arrays

**592** E. Hamdan, X. Zhu, D. Ozevin, P.Y. Chen, A.E. Çetin, University of Illinois Chicago, United States



14:40 – 15:00 Electromagnetically Unclonable Function with Immunity to Machine Learning Attacks

**571** Y. Ren, H. Pan, A. Enis Cetin, P.-Y. Chen, University of Illinois Chicago, United States

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**38) Communication technologies of rail transit in extreme scenarios - ICEAA, Organized by Y. Wen**

Chair 1 Y. Wen

Chair 2

Thursday, 5

15:00 – 18:00 room Roma I ICEAA

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15:00 – 15:20 BDS for Railway Train Localization Test and Evaluation Using 3D Environmental Characteristics

**578** W. Qiao, J. Wang, D. Lu, J. Liu, B. Cai, Beijing Jiaotong University, China

15:20 – 15:40 LIO-SAM for Vehicle Localization Using FGO Architecture

**576** L. Yue, D. Lu, B. Cai, J. Wang, J. Liu, W. Jiang, Beijing Jiaotong University, China

16:00 – 16:20 Fault analysis and optimization design of electronic ignition system for fuel powered vehicles

**445** D.Wang, China Faw Group CO., LTD, China ; Yi. We, Ji. Hu, Beijing Jiaotong University, China ; X.Zhu, Hongji Han, W. Liu, China Faw Group CO., LTD, China

16:20 – 16:40 Design and testing of a specialized antenna array for GNSS receiver anti-interference enhancement

**424** W. Wang, Y. Wen, Y. Liu, Beijing Jiaotong University, China

16:40 – 17:00 Research on the Influence of Internal Parameters of SiC MOSFET on EMI of Traction Inverter

**366** J.N. Cui, Y.H. Wen, Beijing Jiaotong University, China ; X.M. Liu, Changchun Railway Vehicle Co., Ltd, China ; D. Zhang, J. Ren, Beijing Jiaotong University, China

17:00 – 17:20 Research on Electromagnetic Compatibility of Wireless Transmission in High-Speed Railway Train Control System Based on Knowledge Graph

**319** X. Geng, P. Dong, F.P. Kong, China Railway Information Technology Group Co., Ltd, China ; K. Xiong, Beijing Jiaotong University, China

17:20 – 17:40 Research on electromagnetic compatibility of maglev train on high-speed maglev demonstration line

**301** S. Xiao, Z.Q. Zhang, CRRC Qingdao Sifang Co., Ltd., China ; T. Zan Su, J.B. Zhang, X. Jia, Beijing Jiaotong University, China

17:40 – 18:00 An innovative combined train speed measurement method for medium-low speed maglev trains

**275** H. Susu, China Academy of Railway Science Co. Ltd, China

### 39) Antennas for RF passive sensors - ICEAA/IEEE APWC, Organized by P. Pinho

Chair 1 P. Pinho Chair 2 Thursday, 5 08:00 – 10:00 room Roma II ICEAA/IEEE APWC

08:00 – 08:20 Ultra-Wideband Vivaldi Antenna for Through-Wall-Radar Applications

**488** M. Amador, A. Rouco, D. Albuquerque, P. Pinho, Universidade de Aveiro, Portugal

08:20 – 08:40 Multilayer K-Band 4x4 Planar Array for Satellite Communications

**582** A. Ramos, T. Varum, J. N. Matos, Instituto de Telecomunicações, Universidade de Aveiro, Portugal

08:40 – 09:00 Measurement Setup of a Ka band Switchable Circularly Polarized Phased Array Module for LEO Satellite Communications Systems

**583** A. Ramos, T. Varum, J. N. Matos, Instituto de Telecomunicações, Universidade de Aveiro, Portugal

09:00 – 09:20 Mm-wave near-field focused antenna array for chipless RFID detection

**528** S.Rodini, S. Genovesi, G. Manara, F. Costa, University of Pisa, Italy

09:20 – 09:40 Dual-Port Folded Dipole Antenna for Harmonic RFID Over Metallic Surfaces

**575** V.U. Oliveira, N.B. Carvalho, Instituto de Telecomunicações, Portugal

09:40 – 10:00 PIN-diode controlled slot-fed MED antenna for 5G sub-6 GHz applications

**466** K. Kaboutari, Universidade de Aveiro, Portugal; A. Siahcheshm, Islamic Azad University, , Iran ; M. Shokri, Zh. Amiri, Urmia University, Iran ; A. Abraray, P. Pinho, Universidade de Aveiro, Portugal; Ch. Ghobadi, ; J. Nourinia, Urmia University, Iran,; S. Maslovski, Universidade de Aveiro, Portugal

#### 40) Antennas and arrays - IEEE APWC

Chair 1 P. Pinho

Chair 2 J. Zaid

Thursday, 5

10:20 – 14:20 room Roma II

IEEE APWC

10:20 – 10:40 Constellation with optimal LEO spacing for satellite-to-mobile downlink communication

**397** R.I. Fernandez, Y. Ma, R. Tafazolli, University of Surrey, United Kingdom

10:40 – 11:00 X band antennas for NASA's Interstellar Mapping and Acceleration Probes (IMAP) mission

**392** A. Sharma, The Johns Hopkins University Applied Physics Laboratory, United States

11:00 – 11:20 Coupling Reduction in Two by Two MIMO Vivaldi Antennas For Full Duplex Applications

**125** J. Zaid, Huawei Technologies, Canada; J. Griffiths, Huawei Technologies, Canada

11:20 – 11:40

Full-wave EM simulation analysis of human body blockage by dense 2D antenna arrays

**316**

F. Fieramosca, Politecnico di Milano, Italy; V. Rampa, CNR - Consiglio Nazionale delle Ricerche, Italy; M. D'Amico, Politecnico di Milano, Italy; S. Savazzi, CNR - Centro Nazionale delle Ricerche, Italy

11:40 – 12:00

Efficiency optimization for Electrically Small Antennas

**440**

L. Persano, M. Jadid, C. Delaveaud, T.P. Vuong, Univ. of Grenoble Alpes, France

12:00 – 12:20

A simulation study of specific absorption rate with twisted loop antennas

**402**

W. Fu, M. Wikner, H. Lindohf, S. Clendinning, S. He, KTH Royal Institute of Technology, Sweden

13:40 – 14:00

Integrated antenna design for Autonomous Train Control System

**547**

D.-J. Lee, I. Byun, R.-G. Jeong, Korea Railroad Research Institute, Korea

14:00 – 14:20

Circularly Polarized Compact Antenna Design With OAM Structured Wave Beam Recovery Using Pyramidal Horn Reflector

**281**

T. A. C. Barros, Federal University of Campina Grande, Brazil; G. Fontgalland, University of Mount Union, United States; F. L. Teixeira, Ohio State University, United States; P. H. F. Silva, Federal Institute of Paraiba, Brazil; E. E. C. Oliveira, State University of Paraiba, Brazil

**41) Recent advancement of electromagnetic theory - ICEAA, Organized by H. Shirai**

Chair 1 H. Shirai

Chair 2

Thursday, 5

14:20 – 18:00 room Roma II ICEAA

14:20 – 14:40

A study on lateral wave for edge diffraction of electromagnetic wave by dielectric wedges

**223**

D. M.h Nguyen, H. Shirai, Chuo University, Japan

14:40 – 15:00	Experimental validation of an EM scattering formulation for buildings with multiple windows
<b>224</b>	C. M. Bui, H. Shirai, Chuo University, Japan
15:00 – 15:20	Method for estimating scatterer information from the response waveform of a backward transient scattered field when a line source and an observation point are at different positions
<b>198</b>	K. Goto, T. Kawano, T. Toribe, National Defense Academy of Japan, Japan
15:20 – 15:40	Method for estimating scatterer information from the response waveform of a backward transient scattered field when a line source and an observation point are at same position
<b>200</b>	K. Goto, T. Kawano, T. Kulphan, National Defense Academy of Japan, Japan
16:00 – 16:20	Study on improvement of the fast inverse Laplace transform for transient analyses
<b>295</b>	K. Watanabe, Fukuoka Institute of Technology, Japan
16:20 – 16:40	Evaluation method for whole-body exposure from 5G base stations using superposition
<b>574</b>	Y. Kushiyama, T. Nagaoka, National Institute of Information and Communications Technology, Japan
16:40 – 17:00	T-method Time-domain Analysis of Eddy Currents on Bellows Duct of Booster Synchrotron in Synchrotron Radiation Facility
<b>355</b>	H. Kawaguchi, Muroran Institute of Technology, Japan; M. Katoh, Hiroshima University, Japan
17:00 – 17:20	Polarimetric scattering estimation of urban buildings by using polsar data
<b>363</b>	H. Yamada, C. Kobayashi, R. Sato, Niigata University, Japan

17:20 – 17:40 Polarimetric feature investigation of scattering from manmade structures for improving change detection of flood-affected urban area

**548** R. Sato, M. Watabe, H. Yamada, Y. Yamaguchi, Niigata University, Japan

17:40 – 18:00 Non-Line-of-Sight Imaging by Linearized Inverse Scattering Method Based on Physical Optics

**257** H. Suenobu, T. Nakanishi, Y. Nishioka, Y. Inasawa, Mitsubishi Electric Corporation, Japan; S.Kidera, The University of Electro-Communications, Japan

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#### 42) Radio telescopes and radio astronomy systems - ICEAA, Organized by D. de Villiers; E. de Lera Acedo; R. Lehmensiek

Chair 1 D. de Villiers Chair 2 E. de Lera Acedo R. Lehmensiek Thursday, 5 08:00 – 11:40 room Bruxelles ICEAA

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08:00 – 08:20 Design and Measurements of a Prototype Quadruple-Ridged Flared Horn for the ngVLA Radio Telescope

**314** R. Lehemensiek, NRAO, United States; D. de Villiers, Stellenbosch University, South Africa

08:20 – 08:40 Multi-modal measurement of waveguide orthomode transducers for quad-ridge horn-feeds

**378** J.M. Kotze, W. Steyn, P. Meyer, Stellenbosch University, South Africa

08:40 – 09:00 Towards practical implementation of tri-ridged orthomode transducers

**345** A. Lötter, D.I.L. de Villiers, Stellenboch University, South Africa

09:00 – 09:20 18-32.3 GHz Cryogenic front-end for 40 m Yebes radiotelescope

**204** F. Tercero, O. García-Pérez, Observatorio de Yebes, Spain; G. Gómez-Molina, Observatorio de Yebes, Spain; R. Sanchez-Montero, University of Alcala, Spain

09:20 – 09:40 A hybrid cavity-planar P-band illuminator for primary focus reflector antenna

**311** P. Bolli, INAF - Arcetri Astrophysical Observatory, Italy; L. Mezzadrelli, Sirio Antenne, Italy; G. Kyriakou, INAF - Arcetri Astrophysical Observatory, Italy; F. Perini, INAF - Institute of Radio Astronomy, Italy

09:40 – 10:00 On the feasibility of a generic phased array feed for the European VLBI network

**289** S. Aslam, The Netherlands Institute for Radio Astronomy (ASTRON), Netherlands; O. Talcoth, L. Manholm, S. Agneessens, Ericsson AB, Sweden; U. Johannsen, Eindhoven University of Technology (TU/e), Netherlands; D.S. Prinsloo, The Netherlands Institute for Radio Astronomy (ASTRON), Netherlands

10:20 – 10:40 A connected Vivaldi aperture array outrigger station for the BINGO radiotelescope

**299** P. Motta, Universidade de São Paulo, Brazil; D. S. Prinsloo, R. Witvers, M. Arts, ASTRON, Netherlands Institute for Radio Astronomy, Netherlands; F. Abdalla, University College London, United Kingdom; E. Abdalla, A. Pereira de Sousa, Universidade de São Paulo, Brazil; S. Barth, B. da Silva, S. Rakotozafy, S. Bosse, B. Censier, J. M. Martin, Observatoire Radioastronomique de Nancay, France

10:40 – 11:00 Multi-band Radio Astronomy Receivers: A Concept Exploration

**431** T. Stander, University of Pretoria, South Africa; A. de Witt, South African Radio Astronomy Observatory, South Africa; D.I.L. de Villiers, Stellenbosch University, South Africa; S. Malan, South African Radio Astronomy Observatory, South Africa; I. Jinzeng, National Astronomical Observatories of China, China ; S.E. Kurtz, National Autonomous University of Mexico, Mexico

11:00 – 11:20 Antenna gain pattern blindness due to mutual coupling in broadband arrays

**251** J. Cumner, D. Anstey, Q. Gueuning, O. O'Hara, E. de Lera Acedo, University of Cambridge, United Kingdom; A. Brown, Queen Mary, University of London, United Kingdom; A. Faulkner, F. Dulwich, P. Scott, University of Cambridge, United Kingdom

11:20 – 11:40 Investigating Frequency Dependency in Characteristic Basis Function Pattern Modelling with Geometric Perturbations

**383** C.M. Pieterse, M. Venter, D.I.L. de Villiers, Stellenbosch University, South Africa

#### **43) Integral equation and hybrid methods - ICEAA**

Chair 1 F. Andriulli

Chair 2 I. Fenni

Thursday, 5

11:40 – 14:40 room Bruxelles ICEAA

11:40 – 12:00 Gradient-Informed Weighted Sum Multi-Objective Topology Optimization in Electromagnetics

**195** F. Lucchini, R. Torchio, P. Alotto, Università degli Studi di Padova, Italy

12:00 – 12:20 Use of 2nd order Rao-Wilton-Glisson basis functions to model scattering by strongly nonlinear surfaces

**511** J. Prakash, K. Cools, Ghent University, Belgium

13:40 – 14:00 Comparing MoM-CBFM and DDA Approaches in Solving EM Scattering of Realistic Solid Hydrometeors at Submillimeter Wavelengths

**535** I. Fenni, JIFRESSE UCLA, United States; K.S. Kuo, University of Maryland, United States; H. Roussel, Sorbonne Universités, France

14:00 – 14:20 Adaptive spatial resolution for spatial spectral integral equations

**229** R.Dilz, Eindhoven University of Technology, Netherlands

14:20 – 14:40 On Computation of Green's Function for 1-D Periodic Structures in Planar Layered Media

**170** M.E. Hatipoglu, Gebze Technical University, Turkey; A. Sanli, Softeal Ltd., Turkey; A. Alparslan, Trakya University, Turkey; F. Dikmen, Y.A. Tuchkin, Gebze Technical University - Emeritus, Turkey

#### **44) Fast and efficient solvers and stable discretizations - ICEAA, Organized by F. Andriulli**

Chair 1 F. Andriulli Chair 2 Thursday, 5 14:40 – 18:00 room Bruxelles ICEAA

14:40 – 15:00 Efficient Solutions of Time-Domain Volume Integral Equations Based on Meshless Discretization

**559** S.Y. Li, M. S. Tong, Tongji University, China



15:00 – 15:20	On a Novel Calderón Preconditioning Strategy Based on High-Order Quasi-Helmholtz Projectors
<b>531</b>	J. Bourhis, D. Franzò, Politecnico di Torino, Italy; A. Merlini, IMT Atlantique, France; F. P. Andriulli, Politecnico di Torino, Italy
15:20 – 15:40	Monostatic RCS in a large number of directions: Feasibility study
<b>512</b>	B. M. Kolundzija, University of Belgrade, Serbia
16:00 – 16:20	Parallel fast iterative h-matrix locally corrected nyström discretization of integral equations with an inaccurate h-matrix preconditioner
<b>499</b>	O. Babazadeh, University of Manitoba, Canada; J. Hu, University of Southern California, United States; E. Sever, Aselsan, Turkey; I. Jeffrey, University of Manitoba, Canada; C. Sideris, University of Southern California, United States; V.r Okhmatovski, University of Manitoba, Canada
16:20 – 16:40	Toward the design of preconditioners for the global multi-trace integral equation for the vector potential
<b>459</b>	P. Olyslager, H. Rogier, K. Cools, Ghent university, Belgium
16:40 – 17:00	A time domain combined field integral equation for open screens
<b>457</b>	P. Olyslager, H. Rogier, K. Cools, Ghent University, Belgium
17:00 – 17:20	Origami Basis Functions for Modeling the Curvature Correction in H-refinement Methods via Method of Moments
<b>429</b>	V.F. Martin, L. Landesa, University of Extremadura, Spain; J.A. Tobón, Politecnico di Torino, Italy; J.M. Taboada, University of Extremadura, Spain; F. Vipiana, Politecnico di Torino, Italy
17:20 – 17:40	Comparison of nested and non-nested direct solver performance for generalized source integral equations
<b>285</b>	Y. Dahan, A. O. Maimon, Y. Brick, Ben-Gurion University of the Negev, Israel

17:40 – 18:00 On a novel pivoting strategy for the nested cross approximation

**266** J. M. Tetzner, S. B. Adrian, Universität Rostock, Germany

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**45) Electromagnetic models and geophysical products for signal - of - opportunity reflectometry - ICEAA, Organized by J. Fayne; J. Campbell**

Chair 1 J. Fayne

Chair 2 J. Campbell

Thursday, 5

08:20 – 11:40 room Milao I

ICEAA

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08:20 – 08:40 Interferometric coherence of bistatic radar observations and spatial resolution

**471** S. Yueh, X. Xu, T. Wang, M. Chaubell, California Institute of Technology, United States

08:40 – 09:00 Coherent reflectometry from space: sensitivity to sea-surface height and atmospheric disturbance

**337** M. Semmling, Institute for Solar-Terrestrial Physics DLR-SO, Germany; W. Li, Institute for Space Studies Catalunya IEEC, ICE-CSIC, Spain; J. Wickert, German Research Centre for Geosciences GFZ, Germany; E. Cardellach, Institute for Space Studies Catalunya IEEC, ICE-CSIC, Spain; A. Dielacher, Beyond Gravity Austria BGA, Austria; H. Nahavandchi, Norwegian University of Science and Technology NTNU, Norway

09:00 – 09:20 HydroSwarm: towards fine resolution 2D imaging of surface water with GNSS-R flight formation

**185** E. Cardellach, Institute of Space Sciences (ICE-CSIC), Institute of Space Studies of Catalonia (IEEC), Spain; W. Hill, N. Bernardini, M. Unwin, Surrey Satellite Technology Ltd (SSTL), United Kingdom; C. Pirat, European Space Agency (ESA, ESTEC), Netherlands

09:20 – 09:40 ESA Scout HydroGNSS: A Satellite Mission using GNSS Reflections to Monitor Hydrological Climate Variables

**213** M. Unwin, SSTL, United Kingdom; E. Cardellach, IEEC/ICE-CSIC, Spain; N. Pierdicca, Sapienza University of Rome, Italy; J.P. Lejault, ESA, Netherlands

09:40 – 10:00 An Overview of CYGNSS's Level-3 Storm Centric, Merged Wind Speed Product

**163** A. Warnock, SRI International, United States; C. Ruf, A. Russel, University of Michigan, United States; M. Al-Khaldi, The Ohio State University, United States; R. Balasubramaniam, University of Michigan, United States

10:20 – 10:40 An Analysis of Commercial Level-2 GNSS-R Data Products From The NASA CSDA Archive

**164** M. Al-Khaldi, J. Johnson, The Ohio State University, United States; D. McKague, D. Twigg, A. Russel, University of Michigan, United States

10:40 – 11:00 Advancing hydrological insights: daily surface water dynamics through CYGNSS data in tropical wetlands

**221** T. Pu, C. Gerlein-Safdi, University of California, Berkeley, United States

11:00 – 11:20 Quantifying Uncertainty in Machine Learning Based Soil Moisture Retrieval From GNSS-R Measurements

**427** G. Tsagkatakis, FORTH, Greece; A. Melebari, USC, United States; J. Campbell, USC, United States; E. Hodges, USC, United States; M. Moghaddam, USC, United States

11:20 – 11:40 Comparison of vegetation scattering models for GNSS-R

**581** J. D. Campbell, M. Moghaddam, University of Southern California, United States

#### **46) Advanced architectures supporting radiationless anapole modes in electrodynamics and nanophotonics - ICEAA, Organized by L. Matekovits; A. Basharin**

Chair 1 L. Matekovits

Chair 2 A. Basharin

Thursday, 5

13:40 – 17:00 room Milao I ICEAA

13:40 – 14:00 Tunable Bound States in the Continuum in Toroidal Metasurfaces

**178** F. Kovalev, Australian National University, Australia; A. Miroschnichenko, University of New South Wales Canberra, Australia; A. Basharin, University of Eastern Finland, Finland; H. Toepfer, Technische Universität Ilmenau, Germany; I. Shadrivov, Australian National University, Australia

14:00 – 14:20 Chiral Realm of Photonic Bound States in the Continuum (invited)

**171** M.V. Gorkunov, Shubnikov Institute of Crystallography, NRC “Kurchatov Institute”, Russian Federation

14:20 – 14:40 Broadband transparency observation in different topologies

**122** A. Ospanova, M.Cojocari, G. Matveev, M.Bukharin, University of Eastern Finland, L.Matekovits, Politecnico di Torino, Italy; A.Basharin, University of Eastern Finland

14:40 – 15:00 Nonreciprocity in toroidal electrodynamics

**250** N. Papasimakis, C. Mididoddi, N. I. Zheludev, University of Southampton, United Kingdom

15:00 – 15:20 Research of anapole modes in ring-shaped subwavelength periodic structures fabricated on thin free-standing metal film

**590** S. R. Ayyagari, Center for Physical Sciences and Technology, Lithuania; A. Basharin, University of Eastern Finland, Finland; S. Indrišunus, D. Pashnev, V. Janonis, Center for Physical Sciences and Technology, Lithuania; P. Kuzhir, University of Eastern Finland, Finland; G. Ducournau, Université de Lille, France; I. Kasalynas, Center for Physical Sciences and Technology, Lithuania

15:20 – 15:40 Free-standing compound anapoles

**523** A.A. Basharin, University of Eastern Finland, Finland

16:00 – 16:20 Advanced anapole effects in dielectric and metallic metasurfaces

**599** I. Allayarov, Leibniz university Hannover, Germany; E. Hassan, Umeå University, Sweden; A.B. Evlyukhin, A. Calà Lesina, Leibniz University Hannover, Germany

16:20 – 16:40 Investigation of Dielectric Deep-Groove-Gratings as a Quarter Waveplate in the Terahertz Range

**589** S.Revanth Ayyagari, V.Janonis, FTMC, Lithuania; A. K Klein, University Duisburg-Essen, Germany; S. Indrišunus, D.Pashnev, D. Seliuta, FTMC, Lithuania; A. Stöhr, University Duisburg-Essen, Germany; I. Kašalynas, FTMC, Lithuania; G. Ducournau, Université de Lille, France

16:40 – 17:00 High Q-Factor Dual-Layer Anapole Metamaterial

**522** M. Cojocari, G. Matveev, University of Eastern Finland, Finland; L. Matekovits, G. Dassano, Politecnico di Torino, Italy; P. Kuzhir, A. Basharin, University of Eastern Finland, Finland

**47) Electromagnetic sensing and imaging technologies for health applications - ICEAA, Organized by L. Crocco; R. Cruz Conceição; F. Vipiana**

Chair 1 L. Crocco Chair 2 R. Cruz Conceição Thursday, 5 08:20 – 10:00 room Milao II ICEAA

08:20 – 08:40 Bone tissue regeneration monitoring using magnetic scaffold via microwave imaging: a feasibility assesment

**551**

S. Zappia, IREA-CNR, Italy; M.B. Lodi, Università di Cagliari, Italy; R. Palmeri, Università Mediterranea of Reggio Calabria, Italy; A. Fanti, Università di Cagliari, Italy; L. Crocco, R. Scapatucci, IREA-CNR, Italy

08:40 – 09:00 Studying the effects of water content in breast microwave imaging with a volunteer

**536**

D. M. Godinho, A. Simões, B. Mendes, G. Canastra, I. A. Correia, J. Saraiva, R. Dias, R. C. Conceição, Universidade de Lisboa, 1749-016 Lisbon, Portugal

09:00 – 09:20 Numerical Assessment of a Microwave Imaging Technique for Pediatric Stroke Diagnostics

**473**

V. Schenone, A. Fedeli, University of Genoa, Italy; C. Parodi, IRCCS Istituto Giannina Gaslini, Italy; I. Bisio, A. Sciarrone, University of Genoa, Italy; A. Rossi, IRCCS Istituto Giannina Gaslini, Italy; F. Lavagetto, A. Randazzo, University of Genoa, Italy

09:20 – 09:40 A breast microwave sensing system utilizing a fixed antenna array: system design and feasibility of material characterization using transmission measurements

**408**

F. Eashour, S. Pistorius, University of Manitoba, Canada

09:40 – 10:00 Comparative Assessment of Electro-Mechanical and Solid-State Switching Matrices for a Portable Microwave (pMWI) Scanner in Brain Imaging Applications

**584**

M. Gugliermينو, D. O. Rodriguez-Duarte, S. Garino, S. Corallo, C. Origlia, J. A. Tobon Vasquez, Politecnico di Torino, Italy; R. Scapatucci, L. Crocco, National Research Council, CNR, Naples, Italy; F. Vipiana, Politecnico di Torino, Italy

**48) Electromagnetic applications to biomedicine - ICEAA**

Chair 1 L. Crocco Chair 2 R. Cruz Conceição Thursday, 5 10:20 – 14:40 room Milao II ICEAA

10:20 – 10:40 Estimation of Whole-Body Averaged SARs in Computational Human Models for Plane Wave Exposure at Frequencies from 10 GHz to 60 GHz

**562**

T. Nagaoka, National Institute of Information and Communications Technology, Japan

10:40 – 11:00 Biomedical Imaging and Impressioning Using Low-Frequency Electromagnetic Energy

**497** O. Ramahi, H. Akbari-Chelaresi, M. Hernandez, G. Tashtarian, University of Waterloo, Canada

11:00 – 11:20 Gradiometer-based assessment of magnetic nanoparticles quantification

**491** G. Barbieri, J. Arbustini, L.I.A. Acharán, A. Bahr, M. Gerken, CAU University, Germany

11:20 – 11:40 In-body and on-body antennas for the ISM 2.45 GHz band

**406** P.T. Pinho, Universidade de Aveiro, Portugal; C. Mendes, A. Ribeiro, Instituto Superior de Engenharia de Lisboa, Portugal

11:40 – 12:00 Conformal Electromagnetic Skin Based on Flexible Materials

**396** R. Rizzo, IETR - University of Rennes, France; G. Ruello, R. Massa, University of Napoli Federico II, Italy; M. Zhadobov, G. Sacco, IETR - CNRS, France

12:00 – 12:20 Preliminary Study of Spinal Fixation System Effect on Neural Activation During Spinal Cord Stimulation

**391** L.Yang, X.Yang, J. Zheng, J. Chen, University of Houston, United States

13:40 – 14:00 Anisotropic 3D printed unit cells for more realistic EEG physical head phantoms

**370** P. Kadera, J. Lacik, Brno University of Technology, Czech Republic

14:00 – 14:20 Design and Modeling of Magnetolectric Micro-Particles for Neuromodulation

**341** R.P. Narayanan, Walton Institute for Information and Communication Systems Science, Ireland; A. Khaleghi, Norwegian University of Science and Technology, Norway

14:20 – 14:40 A comparison of ECG and FMCW Radar heart beat measurements based on an envelope analysis

**182** A. Marnach, L. Dirksmeyer, V. Lücken, Hochschule Trier, Germany; A.R. Diewald, Hochschule Trier, Germany

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**49) Multi - band and UWB antennas and systems - IEEE APWC**

Chair 1 B. Büyükakin Chair 2 T.Y. Lin Thursday, 5 14:40 – 18:00 room Milao II IEEE APWC

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14:40 – 15:00 Performance Improvement of 5G Metasurface Antennas

**421** T. Islam, North Carolina A&T State University, United States; A. Eroglu, University of Massachusetts Boston, United States

15:00 – 15:20 A broadband high-gain D-band dielectric resonator antenna with substrate-integrated waveguide edged slot feed in GaAs IPD

**168** T.Y. Lin, S.G. Lin, Y.C. Chang, C.P. Hsieh, D.C. Chang, Taiwan Semiconductor Research Institute, Taiwan

15:20 – 15:40 Design of Dual Band K and Ka Corrugated Horn Antenna for Satellite Communication Applications

**542** B. Büyükakin, Yeditepe University, Turkey; I. Sisman, Profen Communication Technologies, Turkey; T. Haykir Ergin, Yeditepe University, Turkey

16:00 – 16:20 Development of A Tapered CPW-fed Spline-based Planar Monopole Antenna with Ultra-Wideband Characteristics

**538** D. P. Setiawan, Telkom University, Indonesia; A. Munir, Institut Teknologi Bandung, Indonesia

16:20 – 16:40 Low-profile multiband filtering patch antenna

**379** Xi. Lin, J. Huang, H. Liu, C. Zhou, Dalian University of Technology, China

16:40 – 17:00

A multi-band slot-coupled rectangular dielectric resonator antenna using E-coupling technique

**344**

Z. Shou, Z. Wu, University of Manchester, United Kingdom; H. Wang, H. Zhou, M. Hou, Huawei Technologies (China) Co., Ltd., China

17:00 – 17:20

UWB slot bow-tie antenna for FMCW GPR applications

**331**

L. Matsepe, W. Steyn, L. Grootboom, Stellenbosch University, South Africa

17:20 – 17:40

A Dual-Band Wideband Antenna on Thin Polyimide Film with Rectangular Slot-Loaded DGS

**293**

M.F. M. Omar, S.K. A. Rahim, M.F. Ain, Universiti Sains Malaysia, Malaysia; A. A. Manaf, Collaborative Microelectronic Design Excellence Center (CEDEC), Malaysia; E.H. Lim, Universiti Tunku Abdul Rahman, Malaysia

17:40 – 18:00

An UWB antenna with total and sharp rejection of wimax band using metamaterial cells

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K. Fertas, F. Fertaas, UMBB, Algeria; S. Tebache, ENP, Algeria