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Pages 1-419



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EuMW01 : EuMW/EuMC Opening Session

Chair: Luca Perregrini, Università di Pavia, Italy

Co-Chair: Alessandra Costanzo, Università di Bologna, Italy

11:20-13:00, Tuesday 27th September 2022, Space 3-4










- (NA)  **Welcome Address: Opening of the European Microwave Week 2022**
Luca Perregrini, EuMW General Chair
- (NA)  **EuMA Welcome Address**
Frank van den Bogaart, EuMA President
- (NA)  **Greetings from the IEEE MTT-S**
Rashaunda Henderson, IEEE MTT-S President
- (NA)  **Greetings from the EuMW 2022 Platinum Sponsor: Keysight Technologies**
- (NA)  **Technical Program of EuMW 2022**
Maurizio Bozzi, EuMW General TPC Chair
- (NA)  **Announcements and Notifications**
Alessandra Costanzo¹, Luca D'Antonio²
¹EuMC Chair; ²EuMC Co-Chair
- (NA)  **Quantum Technology: Where Maxwell Meets Schrödinger**
Dana Z. Anderson, University of Colorado Boulder, USA
- (NA)  **EuMW Awards Ceremony**
Andy Gibson, EuMA Award Chair

EuMC01 : Microwave Through Terahertz Measurement Techniques

Chair: Nick Ridler, NPL, UK

Co-Chair: Kamran Ghorbani, RMIT University, Australia

09:00-10:40, Tuesday 27th September 2022, Amber 3





- (NA)  **Recent Progress in mm-Wave Wafer-Level Characterization Techniques to Accelerate 6G Deployment (Invited Keynote)**
Andrej Rumiantsev, MPI, Taiwan
- 1   **A Transmission Method for Conductivity Extraction of Printed Silver Ink**
Michael Ehrngruber, Simone Neermann, Gerald Gold, FAU Erlangen-Nürnberg, Germany
- 5   **16-Term On-Wafer Calibration with Leaky Standards and Flexible Algorithm Definition**
Friedbert van Raay, Fabian Thome, Christian Friesicke, Roger Lozar, Sebastian Krause, Michael Mikulla, Rüdiger Quay, Fraunhofer IAF, Germany
- 9   **Generalized Thru-Reflect-Line Calibration for the Measurement of Waveguide Devices up to the Third Harmonic: First Results**
*Antonio Morini¹, Marco Farina¹, Marco Guglielmi², Piero Angeletti³,
Petronilo Martín-Iglesias³*
*¹Università Politecnica delle Marche, Italy; ²Universitat Politècnica de València, Spain;
³ESA-ESTEC, The Netherlands*
- 13   **Contactless Flanges and Rail System for mm-Wave and THz Testing**
Lingyun Ren, Dhanraj Doshi, Yonghui Shu, Eravant, USA

EuMC02 : Novel Transceiver Concepts

Chair: Almudena Suarez Rodriguez, Universidad de Cantabria, Spain

Co-Chair: David Ricketts, North Carolina State University, USA

09:00-10:40, Tuesday 27th September 2022, Amber 5

- (NA)  **Judging Aperture Efficiency for Multi-Tone Arrays (Invited Keynote)**
Anton N. Atanasov¹, Mark S. Oude Alink¹, Frank E. van Vliet²
¹Universiteit Twente, The Netherlands; ²TNO, The Netherlands
- 16  **Interferometric Receiver Architecture for Multifunction Wireless Systems**
Seyed Ali Keivaan, Pascal Burasa, Ke Wu, Polytechnique Montréal, Canada
- 20  **OFDM Upconverting Transmitter Using a Frequency Multiplier**
Dhecha Nopchinda, University College London, UK
- 24  **Packaged Ka-Band GaN HEMT High Power Transmit Module for Sat-Com Applications**
Mohammed Ayad, Zineb Ouarch, Rabha Ousedrat, Philippe Sin, Philippe Fellon, Philippe Auxemery, UMS, France

EuMC03 : Focussed Session Advances in Terahertz Technologies for Communication and Sensor Applications

Chair: Dirk Nüssler, Fraunhofer FHR, Germany

Co-Chair: Andreas Grimm, Forschungsfabrik Mikroelektronik Deutschland, Germany

09:00-10:40, Tuesday 27th September 2022, Brown 1-2

- 28  **Technology for the Heterointegration of InP DHBT Chiplets on a SiGe BiCMOS Chip for mm-Wave MMICs**
Marko Rausch¹, Thomas Flisgen¹, Christoph Stölmacker¹, Andrej Stranz², Andreas Thies¹, Ralf Doerner¹, Hady Yacoub¹, Wolfgang Heinrich¹
¹FBH, Germany; ²Fraunhofer IZM, Germany
- 32  **Miniaturized Photonic Terahertz Receivers for Imaging and Sensing**
Lauri Schwenson¹, Simon Nellen¹, Sebastian Lauck¹, Milan Deumer¹, Konstantin Wenzel¹, Robert B. Kohlhaas¹, Lars Liebermeister¹, Steffen Breuer¹, Martin Schell², Björn Globisch²
¹Fraunhofer HHI, Germany; ²Technische Universität Berlin, Germany
- 36  **Terahertz Imaging Arrays for Industrial Inline Measurements**
Dirk Nüssler¹, Fabian Friederich²
¹Fraunhofer FHR, Germany; ²Fraunhofer ITWM, Germany
- 40  **Towards High-Capacity THz-Wireless P2MP Communication Systems for 6G**
Oliver Stiewe, Robert Elschner, Andreas Maaßen, Stefan Weide, Colja Schubert, Ronald Freund, Fraunhofer HHI, Germany
- 44  **Energy Efficient ADC for Low Fan-Out MIMO Sub-THz Imaging System in SiGe:BiCMOS Technology**
Max Uhlmann¹, Raphael Hussung², Mohamed H. Eissa¹, Andreas Keil², Fabian Friederich², Gunter Fischer¹, Philip Ostrovskyy¹
¹IHP, Germany; ²Fraunhofer ITWM, Germany

EuMC04: Non-planar Filters I

Chair: Cristiano Tomassoni, Università di Perugia, Italy

Co-Chair: Giuseppe Macchiarella, Politecnico di Milano, Italy

14:20–16:00, Tuesday 27th September 2022, Amber 4






- (NA)  **Enhancing the Performance and Compactness of 3D-Printed Microwave Filters with Shape Optimization** (*Invited Keynote*)
Adam Lamecki, Michał Baranowski, Lukasz Balewski, Michał Mrozowski, Gdansk University of Technology, Poland
- 48  **Novel Dual-Band In-Line Filters Using Coaxial Dual-Post Resonances**
Uwe Rosenberg¹, Smain Amari²
¹OHB System, Germany; ²RMC, Canada
- 52  **Utilization of Higher Order Dual-Post Resonance Modes for Advanced Coaxial Filter Designs**
Uwe Rosenberg¹, Smain Amari²
¹OHB System, Germany; ²RMC, Canada
- 56  **Transmission Zeros in In-Line Filters by Using Source-to-Load Paths with Suppressed Spurious Frequencies**
Abdul Rehman, Enrique López-Oliver, Cristiano Tomassoni, Università di Perugia, Italy
- 60  **EM-Based Design of Microwave Filters and Diplexers: Full-Wave Coupling Matrix and its Narrowband Counterpart**
Valentín de la Rubia, Universidad Politécnica de Madrid, Spain

EuMC05: Focussed Session Sustainable Microwave Electronics

Chair: Anthony Ghiotto, IMS (UMR 5218), France

Co-Chair: Alessandra Costanzo, Università di Bologna, Italy

16:40–18:20, Tuesday 27th September 2022, Amber 1





- (NA)  **Low Environmental Impact RF Devices for IoT Applications** (*Invited Keynote*)
Georges Zakka El Nashef, CISTEME, France
- 64  **Reconfigurable Screen-Printed Patch Antenna on Paper for 4G and 5G Applications**
T.H. Le Dam¹, Victor Thenot², Gael Depres², Thierry Lacrevez¹, Gregory Houzet¹, T. Phu Vuong¹, Pascal Xavier¹
¹IMEP-LaHC (UMR 5130), France; ²Arjowiggins, France
- 68  **A Novel Additively-Manufactured Pressure Transducer for Zero-Power Wireless Sensing**
Valentina Palazzi¹, Manos Tentzeris², Federico Alimenti¹, Paolo Mezzanotte¹, Luca Roselli¹
¹Università di Perugia, Italy; ²Georgia Tech, USA
- 72  **Wearable Coplanar-Fed 2.45GHz-Rectenna on a Flexible 3D-Printable Low-Cost Substrate**
Giulia Battistini, Giacomo Paolini, Diego Masotti, Alessandra Costanzo, Università di Bologna, Italy
- (NA)  **High Speed, Low Power, and Low Cost Solutions for a Connector-Free World** (*Invited Keynote*)
Nicolas Darbel, STMicroelectronics, France

EuMC06 : Focussed Session Microwave Systems for Cryosphere Monitoring

Chair: Marco Pasian, Università di Pavia, Italy


Co-Chair: Pedro Espín-López, CTTC, Spain

16:40-18:20, Tuesday 27th September 2022, Amber 2

- 76  **C Multi-Spectral Analysis of Dry Alpine Seasonal Snowpack**
*M. Lodigiani¹, Lorenzo Silvestri¹, R. Barella², C. Marin², B. Di Mauro³, R. Colombo⁴,
C. Notarnicola², Marco Pasian¹*
*¹Università di Pavia, Italy; ²Eurac Research, Italy; ³CNR-ISP, Italy; ⁴Università di
Milano-Bicocca, Italy*
- 80  **C A Novel Approach for Calculating the Internal Layers of Snowpacks Using a S-Band Radar**
P.F. Espín-López¹, Marco Pasian²
¹CTTC, Spain; ²Università di Pavia, Italy
- 83  **C Investigation of Cryosphere Processes in the Boreal Forest Zone Using Ground-Based SAR**
*J. Jorge Ruiz¹, J. Lemmetyinen¹, J. Lahtinen², J. Uusitalo², T. Häkkinen², A. Kontu¹,
J. Pulliainen¹, J. Praks³*
¹FMI, Finland; ²Harp Technologies, Finland; ³Aalto University, Finland
- 87  **C Evaluation of UWB Radar Module for Snow Water Equivalent Monitoring**
Kristian G. Kjelgård, Tor S. Lande, University of Oslo, Norway

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- 91  **C Monitoring of Snow Water Equivalent and Snowmelt Through Space-Borne Synthetic Aperture Radar Techniques**
*S. Pettinato¹, F. Bovenga², E. Santi¹, S. Paloscia¹, F. Baroni¹, A. Belmonte², A. Refice²,
I. Argentiero², R. Colombo³, B. Di Mauro⁴, G. Bramati³, C. Marin⁵, G. Cuozzo⁵,
L. De Gregorio⁵, C. Notarnicola⁵, M. Callegari⁵, R. Barella⁵, Marco Pasian⁶,
M. Lodigiani⁶, E. Cremonese⁷*
*¹CNR-IFAC, Italy; ²CNR-IREA, Italy; ³Università di Milano-Bicocca, Italy; ⁴CNR-ISP, Italy;
⁵Eurac Research, Italy; ⁶Università di Pavia, Italy; ⁷ARPA VDA, Italy*

EuMC07: Permittivity Measurement Techniques

Chair: Xiaobang Shang, NPL, UK

Co-Chair: Dominique Schreurs, KU Leuven, Belgium

16:40-18:20, Tuesday 27th September 2022, Amber 3

- (NA)  **Quasi-Optic Permittivity Measurements from 50 to 750GHz (Invited Keynote)**
Roger Appleby¹, Elena Saenz², Michal Mrnka³, Richard Wylde⁴
¹Roger Appleby Millimetre Wave Consulting, UK; ²ESA-ESTEC, The Netherlands;
³University of Exeter, UK; ⁴TK Instruments, UK
- 95  **Accurate Determination of Dielectric Properties in Small, High-Permittivity Dielectric Cylinders**
N. Tagdulang¹, P. Krkotic¹, A. Diez¹, M. Pont², J.M. O'Callaghan¹
¹Universitat Politècnica de Catalunya, Spain; ²CELLS-ALBA, Spain
- 99  **A Method for Extracting an Apparent Permittivity from Band Limited Measurements of Homogeneously Filled Transmission Lines**
Felix Bachbauer, K. Lomakin, Tim Pfahler, Gerald Gold, FAU Erlangen-Nürnberg, Germany
- 103  **Relative Permittivity Measurements with SIW Resonant Cavities at mm-Wave Frequencies**
Gabriele Federico¹, Anouk Hubrechtsen², Diego Caratelli¹, A. Bart Smolders²
¹Antenna Company, The Netherlands; ²Technische Universiteit Eindhoven, The Netherlands
- 107  **Characterisation of Dielectric Materials at G-Band (140-220GHz) Using a Guided Free-Space Technique**
Minjie Shu¹, Xiaobang Shang², Nick Ridler², Mira Naftaly², Cheng Guo¹, Anxue Zhang¹
¹XJTU, China; ²NPL, UK

EuMC08: Non-planar Filters II

Chair: Richard Snyder, RS Microwave, USA

Co-Chair: Miguel A.G. Laso, Universidad Pública de Navarra, Spain

16:40-18:20, Tuesday 27th September 2022, Amber 4


- (NA)  **Recent Advances on True Inline Filters with Transmission Zeros (Invited Keynote)**
Giuseppe Macchiarella, Politecnico di Milano, Italy
- 111  **High-Power Ka-Band Bandpass Filter Based on Movable Dielectric-Loaded TE_{01δ} Mode Resonators**
Paolo Vallerotonda¹, Fabrizio Cacciamani¹, Luca Pelliccia¹, Cristiano Tomassoni², Vittorio Tornielli di Crestvolant³
¹RF Microtech, Italy; ²Università di Perugia, Italy; ³ESA-ESTEC, The Netherlands
- 115  **Compact Ultra-Wideband Bandpass Filter Using Additively Manufactured TM-Mode Dielectric Resonators**
Abdulrahman Widaa¹, Fabrizio Cacciamani², Luca Pelliccia², Cristiano Tomassoni³, Vittorio Tornielli di Crestvolant⁴, Michael Höft¹
¹CAU, Germany; ²RF Microtech, Italy; ³Università di Perugia, Italy; ⁴ESA-ESTEC, The Netherlands
- 119  **Micromachined on Silicon Miniaturized Ka-Band Diplexer for Ground-Segment User Terminals**
Davide Tiradossi¹, Luca Pelliccia¹, Stefano Moscato², Antonio Traversa², Giandomenico Cannone³, Petar Jankovic⁴, Fabrizio De Paolis⁴
¹RF Microtech, Italy; ²SIAE MICROELETTRONICA, Italy; ³Independent Researcher, Italy; ⁴ESA-ESTEC, The Netherlands
- 123  **Ka-Band Cavity Filter Manufactured in 3D-Printed Alumina Technology**
F. Aquino¹, Davide Tiradossi¹, Luca Pelliccia¹, A. De Padova², Francesco Vitulli², Sergio Di Nardo², François Deborgies³
¹RF Microtech, Italy; ²Thales, Italy; ³ESA-ESTEC, The Netherlands

EuMC09: Oscillators and Phase Shifters

Chair: Nils Weimann, Universität Duisburg-Essen, Germany

Co-Chair: Lorenz-Peter Schmidt, FAU Erlangen-Nürnberg, Germany

16:40–18:20, Tuesday 27th September 2022, Amber 5






- (NA)  **Millimeter-Waves Propagation in Real In-Building Environment** (Invited Keynote)
Marco Fantuzzi, JMA Wireless, Italy
- 127  **Achieving a Relative Bandwidth of 176% with a Single PLL at up to 12.5GHz**
Tobias T. Braun, Jan Schöpfel, Aldo J. Marquez M., Nils Pohl, Ruhr-Universität Bochum, Germany
- 131  **Analysis of a Self-Oscillating Mixer Based on a Slow-Wave Structure**
Mabel Pontón, Franco Ramírez, Sergio Sancho, Almudena Suárez, Universidad de Cantabria, Spain
- 135  **Digital-Controlled High-Linearity Phase Shifter Using Vernier Ladder Network for Beyond 5G Phased Array Antenna**
Ren Imanishi, Hideyuki Nosaka, Ritsumeikan University, Japan
- 139  **Push-Push Oscillator Based on Packaged Space-Qualified Components Operating at 11.8GHz**
D. Trofimowicz¹, P. Kant¹, E. Lia², J.J. Michalski¹
¹SpaceForest, Poland; ²ESA-ESTEC, The Netherlands

EuMC10: Devices for Sub-THz Front-Ends

Chair: Joachim Oberhammer, KTH, Sweden

Co-Chair: Guillaume Ducournau, IEMN (UMR 8520), France

16:40–18:20, Tuesday 27th September 2022, Suite 2

- (NA)  **Challenges and Future of Sub-THz Communications Using CMOS Integrated Circuits** (Invited Keynote)
Minoru Fujishima, Hiroshima University, Japan
- 143  **A 232–242GHz Coherent Transmitter with 1.2mW Peak Radiated Power in 28nm CMOS**
Sumeet Londhe, Eran Socher, Tel Aviv University, Israel
- 147  **THz Broadband Antenna on GaAs Using Laser-Structured Fused Silica Matching Layer**
Marius Kretschmann¹, Christian Bohn¹, Benjamin Nuss¹, Akanksha Bhutani¹, Axel Tessmann², Arnulf Leuther², Thomas Zwick¹
¹KIT, Germany; ²Fraunhofer IAF, Germany
- 151  **Performance Comparison of Broadband Optical Modulators for 40GSPS All-Optical ADC**
Joseph Fasbinder, Kai Wei, Afshin S. Daryoush, Drexel University, USA
- (NA)  **Reconfigurable Intelligent Surface Technology: 6G System Enabler and Implementation Challenge** (Invited Keynote)
Tung Phan, Joonas Kokkonen, Nhan Nguyen, Ping Jack Soh, Nuutti Tervo, Marko E. Leinonen, Visa Tapio, Aarno Pärssinen, Markku Juntti, University of Oulu, Finland

EuMC11 : Interconnects and Packaging

Chair: Amelie Hagelauer, Fraunhofer EMFT, Germany

Co-Chair: Akanksha Bhutani, KIT, Germany

09:00-10:40, Wednesday 28th September 2022, Amber 1






- (NA)  **Industrial Solutions and Perspectives on Chip Packaging for mm-Wave Transceivers**
(Invited Keynote)
Alessandro Fonte, Antonio Traversa, Stefano Moscato, Giulio Favre, SIAE MICROELETTRONICA, Italy
- 155  **Broadband Circuit Board Interconnects Based on Anisotropic Conductive Adhesives**
Kevin Erkelenz, Noah Sielck, Alexander Koelpin, Arne F. Jacob, Technische Universität Hamburg, Germany
- 159  **EM Modeling and Measurement of 3D-RDL Interconnects in LGA Package for 5G RF SIP Applications**
M.W. Rousstia, S. Kits, J. Zhao, R. Gajadharsing, Ampleon, The Netherlands
- 163  **E-Band Phased Array eWLB Package Evaluation**
Ahmed Shehata Abdellatif, Wenyao Zhai, Hari Krishna Pothula, David Wessel, Huawei Technologies, Canada

EuMC12 : Multiport, Reconfigurable and Beamsteering Antennas

Chair: Anthony Ghiotto, IMS (UMR 5218), France

Co-Chair: Alessandra Costanzo, Università di Bologna, Italy

09:00-10:40, Wednesday 28th September 2022, Amber 2






- (NA)  **Wide-Band, Wide-Scan, Long Slot Array for Satcom Applications in K/Ka-Band** (Invited Keynote)
Adham Mahmoud, Ronan Sauleau, Mauro Ettorre, IETR (UMR 6164), France
- 167  **Wideband Quadruple-Differentially-Fed Aperture-Coupled Stacked Patch Antenna**
Timothée Le Gall¹, Anthony Ghiotto², Stefan Varault¹, Gwenaél Morvan¹, Bruno Louis¹, Grégoire Pillet¹
¹Thales, France; ²IMS (UMR 5218), France
- 171  **Fully-Integrated Dielectric Image Line Phased Array with Liquid Crystal Phase Shifters at W-Band**
Henning Tesmer, Ersin Polat, Dongwei Wang, Rolf Jakoby, Technische Universität Darmstadt, Germany
- 175  **Nonlinear Circuit Model of IDCs on Ferroelectric Nanomaterial for Reconfigurable Applications**
S. Trovarello¹, A. Di Florio Di Renzo¹, M. Aldrigo², Diego Masotti¹, M. Dragoman², Alessandra Costanzo¹
¹Università di Bologna, Italy; ²IMT Bucharest, Romania
- 179  **A New Wideband and Passive Tx & Rx SatCom Antenna Module for Beam Steering in the K- and Ka-Band**
Engelbert Tyroller, Stefan Lindenmeier, Universität der Bundeswehr München, Germany

EuMC13: Imaging for Biomedical Applications

Chair: Panos Kosmas, King's College London, UK

Co-Chair: Simona Di Meo, Università di Pavia, Italy

09:00-10:40, Wednesday 28th September 2022, Amber 3

- (NA)  **Solution of Complex Bioelectromagnetic and Biomedical Problems with Machine Learning** (Invited Keynote)
Luciano Tarricone¹, Alfredo de Cillis¹, Caterina Merla², Giuseppina Monti¹, Marco Zappatore¹
¹Università del Salento, Italy; ²ENEA, Italy
- 183  **PDMS Unidirectional Antenna Array for Microwave Breast Screening**
Milad Mokhtari, Milica Popović, McGill University, Canada
- 187  **Waveguide Array Applicator for Microwave Medical Imaging**
M. Babák, J. Vrba, Czech Technical University in Prague, Czechia
- 191  **Pulsed RF for Breast Screening: Chirp Z-Transform and Signal Decluttering**
Leonardo Fortaleza, Milica Popović, McGill University, Canada
- 195  **Preliminary Study of Breast Cancer Detection Using a Computational Microwave Imaging System**
Rupesh Kumar, Vincent Fusco, Okan Yurduseven, Queen's University Belfast, UK

EuMC14: Non-planar Passive Components

Chair: Antonio Morini, Università Politecnica delle Marche, Italy

Co-Chair: Luca Pelliccia, RF Microtech, Italy

09:00-10:40, Wednesday 28th September 2022, Amber 4






- (NA)  **Smooth-Profiled Rectangular Waveguide Filters** (Invited Keynote)
Jabir Hussain¹, Jamil Ahmad¹, Iván Arregui¹, Petronilo Martín-Iglesias², Israel Arnedo¹, Txema Lopetegui¹, Miguel A.G. Laso¹
¹Universidad Pública de Navarra, Spain; ²ESA-ESTEC, The Netherlands
- 199  **Full-Band E-Plane Waveguide Phase Shifters with Self-Compensating Characteristics for THz Circuits and Systems**
Jie Deng, Pascal Burasa, Ke Wu, Polytechnique Montréal, Canada
- 203  **Compact 5G N77 Bandpass Filter Design Mixing IPD and MIS Technologies**
C. Laporte, L. Schwartz, E. Saugier, S. Charley, H. Ezzeddine, STMicroelectronics, France
- 207  **Wideband Compact Dielectric-Less Launcher of an X-Band Ferrite Faraday Rotator**
Antonio Morini¹, A. di Donato¹, Marco Farina¹, D. Mencarelli¹, D. Salimbeni², D. Serluca², A. Fattori², L. Rondini², F. Serrano²
¹Università Politecnica delle Marche, Italy; ²Rheinmetall, Italy
- 210  **Three-Step Monoblock Waveguide Twist**
Matteo Oldoni¹, Stefano Moscato², Dario Tresoldi²
¹Politecnico di Milano, Italy; ²SLAE MICROELETTRONICA, Italy

EuMC15: Load Modulated Power Amplifiers

Chair: Gavin Watkins, Toshiba, UK

Co-Chair: Roberto Quaglia, Cardiff University, UK

09:00-10:40, Wednesday 28th September 2022, Brown 1-2






- (NA)  **Balancing the Unbalanced: Using the OLMBA for PA Load Mismatch Mitigation** (Invited Keynote)
Roberto Quaglia¹, Jeff R. Powell², Kauser Chaudhry¹, Steve Cripps¹
¹Cardiff University, UK; ²Skyarna, UK
- 214  **Wideband Sequential Circulator Load Modulated Amplifier with Back-Off Efficiency Enhancement**
Han Zhou, Jose-Ramon Perez-Cisneros, Christian Fager, Chalmers University of Technology, Sweden
- 218  **90W 15dB OBO Reflective-Type DPA**
Florian Dietrich, Muh-Dey Wei, Renato Negra, RWTH Aachen University, Germany
- 222  **A Load Insensitive Doherty Power Amplifier with Better Than -39dBc ACLR on 2:1 VSWR Circle Using a Constant 50Ω Trained Pre-Distorted Signal**
Gagan Deep Singh¹, Dieuwert Mul¹, Hossein Mashad Nemati², Morteza S. Alavi¹, Leo C.N. de Vreede¹
¹Technische Universiteit Delft, The Netherlands; ²Huawei Technologies, Sweden
- 226  **A 3.5G 500W Asymmetric Doherty Amplifier Employing Subharmonic Oscillation Suppression**
Zhi Geng, Yi Zhu, Fred van Rijs, John Gajadharsing, Ampleon, The Netherlands

EuMC16: Advances in Electromagnetic Modeling and Analytical Methods

Chair: Alessandro Galli, Università di Roma "La Sapienza", Italy

Co-Chair: Walter Fuscaldo, CNR-IMM, Italy

09:00-10:40, Wednesday 28th September 2022, Suite 1













- (NA)  **Numerical Analysis of SIW Devices and RLSA Antennas for the Design of Large Structures Capable of Broadband Radiation and Near-Field Shaping** (Invited Keynote)
Massimiliano Casaletti¹, Matthieu Bertrand², Guido Valerio¹, Mauro Ettore³
¹GeEPs (UMR 8507), France; ²Thales, France; ³IETR (UMR 6164), France
- 230  **Effective TE-Polarized Bessel-Beam Excitation for Wireless Power Transfer Near-Field Links**
Edoardo Negri¹, Francesca Benassi², Walter Fuscaldo³, Diego Masotti², Paolo Burghignoli¹, Alessandra Costanzo², Alessandro Galli¹
¹Università di Roma "La Sapienza", Italy; ²Università di Bologna, Italy; ³CNR-IMM, Italy
- 234  **Excitation in Time-Domain Analyses: A Pivotal Element for Accurate Simulations**
Junhong Gu¹, Roy van Krieken¹, Martin Štumpf², Ioan E. Lager¹
¹Technische Universiteit Delft, The Netherlands; ²Brno University of Technology, Czechia
- 238  **An Analytical Model to Approximate the Radiation Conductance of Microstrip Gaps**
Benedikt Sievert, Marvin Degen, Jan Taro Svejda, Daniel Erni, Andreas Rennings, Universität Duisburg-Essen, Germany
- 242  **Lasing Threshold Conditions for Transversal Modes of Twin Graphene-Covered Circular Quantum Wires**
Dariia O. Herasymova¹, Sergii V. Dukhopelnykov¹, Ronan Sauleau²
¹NASU, Ukraine; ²IETR (UMR 6164), France

EuMC17: EuMC Posters

Chair: Marco Pasian, Università di Pavia, Italy

Co-Chair: Simona Di Meo, Università di Pavia, Italy

10:40–13:00, Wednesday 28th September 2022, Exhibition Hall

- 246   **An Ultra-Compact Power Divider for MMIC Applications**
Nethini Weerathunge, Sudipta Chakraborty, Simon J. Mahon, Michael C. Heimlich, Macquarie University, Australia
- 250   **Uniaxially Symmetrical T-Junction OMT with 45-Degree Tilted Branch Waveguide Ports**
Hidenori Yukawa, Yu Ushijima, Toru Takahashi, Toru Fukasawa, Yoshio Inasawa, Naofumi Yoneda, Moriyasu Miyazaki, Mitsubishi Electric, Japan
- 254   **Filtering Waveguide Cavity Couplers with Tight Amplitude Balance**
Xun Chen¹, Yi Wang², Qiang Shao³, Talal Skaik², Qingfeng Zhang¹
¹SUSTech, China; ²University of Birmingham, UK; ³Foshan University, China
- 258   **Hybrid TM-Mode / Coaxial Triple-Band Bandpass Filter**
Kennet Braasch, Daniel Miek, Patrick Boe, Fynn Kamrath, Michael Höft, CAU, Germany
- 262   **A Substrate Integrated Waveguide Frequency Switchable Filter Using Vanadium Dioxide Tuners**
Maxime Agaty, Claire Dalmay, Aurelian Crunteanu, Pierre Blondy, XLIM (UMR 7252), France
- 266   **Reconfigurable Parametric Mid-Infrared Frequency Up/Down Conversion Using Multimode Plasmon Resonances in Graphene Ribbon Metasurfaces**
A.M. Lerer¹, G.S. Makeeva², V.V. Cherepanov¹
¹Southern Federal University, Russia; ²Penza State University, Russia

*EuMC17 continues next page...**EuMC17 continued...*

- 270   **Spin-Wave Delay Lines Utilizing Metal-Insulator Switching of Vanadium Dioxide**
Aleksei A. Nikitin, Erkki Lähderanta, LUT University, Finland
- 274   **Study on 3D Printed Snap-Fit Joints for Assembly of PCB-Integrated Additively Fabricated Air-Filled Waveguide**
Jakub Sorocki, Krzysztof Wincza, Slawomir Gruszczynski, Ilona Piekarcz, AGH UST, Poland
- 278   **Characterization of the Dielectric Properties of Commercially Available Low-Loss UV-Curable Resins from 60GHz to 90GHz**
P. Escobari Vargas¹, E. Meyer¹, F. Chiappini², Alessandro Garufo³, Stefania Monni², Ulf Johannsen¹, Ad C.F. Reniers¹
¹Technische Universiteit Eindhoven, The Netherlands; ²CITC, The Netherlands; ³TNO, The Netherlands
- 282   **On-Wafer Characterization and Modelling of InP Resonant Tunnelling Diodes up to 500GHz**
Simone Clochiatti¹, Robin Schmidt², Enes Mutlu¹, Michael Dieudonne³, Werner Probst¹, Dominique Schreurs², Nils Weimann¹
¹Universität Duisburg-Essen, Germany; ²KU Leuven, Belgium; ³Keysight Technologies, Belgium
- 286   **Using RCS Radial Pattern Combined with Multi-Path Effect for Automotive Radar Simulations**
Mohannad Saifo¹, Alexander Ioffe², Markus Stefer², Markus Clemens¹
¹Bergische Universität Wuppertal, Germany; ²Aptiv Services Deutschland, Germany
- 290   **2-D Scattering and Absorption of E-Polarized Plane Wave by a Circular Dielectric Wire with Partial Graphene Cover**
Iryna Mikhailikova¹, Sergii V. Dukhopelnykov²
¹V.N. Karazin Kharkiv National University, Ukraine; ²NASU, Ukraine

EuMC18: Interconnects and Packaging for Sub-Millimeter-Wave Applications

Chair: Mehmet Kaynak, IHP, Germany

Co-Chair: Mario Pauli, KIT, Germany

11:20-13:00, Wednesday 28th September 2022, Amber 1






- (NA)  **Recent Advances in System in Package** (*Invited Keynote*)
*Amelie Hagelauer*¹, *Marco Dietz*², *Robert Weigel*², *Thomas Zwick*³, *Akanksha Bhutani*³
¹Fraunhofer EMFT, Germany; ²FAU Erlangen-Nürnberg, Germany; ³KIT, Germany
- 294  **Mechanically Flexible Dielectric Waveguides and Bandstop Filters in Glass Technology at G-Band**
*Thomas Galler*¹, *Malte Schulz-Ruhtenberg*², *Tobias Chaloun*¹, *Christian Waldschmidt*¹
¹Universität Ulm, Germany; ²LPKF, Germany
- 298  **Aerosol Jet Printed Millimeter Wave Interconnects in D-Band**
Georg Gramlich, *Robert Huber*, *Uli Lemmer*, *Thomas Zwick*, KIT, Germany
- 302  **A 300GHz Waveguide Cavity Filter Fabricated by 3D Screen Printing Technology**
*Talal Skaik*¹, *Milan Salek*¹, *Yi Wang*¹, *Peter G. Huggard*², *Peter Hunyor*², *Hui Wang*², *Kay Reuter*³
¹University of Birmingham, UK; ²STFC RAL, UK; ³Fraunhofer IFAM, Germany
- 306  **Differential Bondwire Interface for Chip-to-Chip and Chip-to-Antenna Interconnect Above 200GHz**
*Joachim Hebler*¹, *Luca Steinweg*², *Thomas Zwick*¹
¹KIT, Germany; ²Technische Universität Dresden, Germany

EuMC19: Antenna and Array Characterization Techniques

Chair: David Prinsloo, ASTRON, The Netherlands

Co-Chair: Yang Hao, Queen Mary University of London, UK

11:20-13:00, Wednesday 28th September 2022, Amber 2






- (NA)  **Air-Filled Substrate Integrated Technology — A Paradigm for High Performance Antenna Systems** (*Invited Keynote*)
Kamil Yavuz Kapusuz, *Sam Lemey*, *Hendrik Rogier*, Ghent University, Belgium
- 310  **Contactless Antenna Radiation Efficiency Measurement Within Reverberation Chambers: Sensitivity Improvement**
*François Sarrazin*¹, *Adnane Labdouni*¹, *Wafa Krouka*¹, *Julien de Rosny*², *Elodie Richalot*¹
¹ESYCOM (UMR 9007), France; ²ESPCI Paris, France
- 314  **Broadband Antenna Radiation Pattern Measurement from Backscattering Coefficient in a Reverberation Chamber**
*François Sarrazin*¹, *Ariston Reis*¹, *Lotfy Zeghoudi*¹, *Philippe Besnier*², *Elodie Richalot*¹
¹ESYCOM (UMR 9007), France; ²IETR (UMR 6164), France
- 318  **Spherical mm-Wave Anechoic Chamber for Accurate Far-Field Radiation Pattern Measurements**
Ad C.F. Reniers, *Anouk Hubrechs*, *Gabriele Federico*, *L.A. Bronckers*, *A. Bart Smolders*, Technische Universiteit Eindhoven, The Netherlands
- 322  **Inter-Beam Modulation Prediction and Test for Multi-Beam Active Arrays with Beam-Hopping Capability**
I. Herrero-Sebastián, *A. Martín-González*, *A. Montesano*, *D. Peña*, *F. Cano*, *D. Álvarez*, Airbus, Spain

EuMC20 : Multi-Functional and Multi-Band Planar Filtering Devices

Chair: Roberto Gomez-Garcia, Universidad de Alcalá, Spain

Co-Chair: Michael Höft, CAU, Germany

11:20-13:00, Wednesday 28th September 2022, Amber 4






- (NA)  **C Coupling Matrix Based Design of Filters with Pole Generating Couplings** (Invited Keynote)
Michał Mrozowski¹, Adam Lamecki¹, Maciej Jasiński¹, Roberto Gómez-García²
¹Gdansk University of Technology, Poland; ²Universidad de Alcalá, Spain
- 325  **C Input-Reflectionless Two-Branch Channelized Passive Dual-Band Bandpass Filters**
Mohamed Malki, Li Yang, Roberto Gómez-García, Universidad de Alcalá, Spain
- 329  **C Multifunctional Switchable Filter Using Shorted Coupled-Line Sections**
Minahil Shirazi¹, David Chatzichristodoulou¹, Abdul Quddious², Noshewan Shoaib³, Dimitra Psychogiou⁴, Symeon Nikolaou¹, Photos Vryonides¹
¹Frederick Research Center, Cyprus; ²University of Cyprus, Cyprus; ³NUST, Pakistan; ⁴University College Cork, Ireland
- 333  **C Input-Absorptive High-Order Wideband Balun Bandpass Filters with Quasi-Elliptic-Type Response**
Li Yang, Roberto Gómez-García, Universidad de Alcalá, Spain
- 337  **C Self-Packaged Dual-Band Filter with High Selectivity and Low Radiation Loss**
Hanyu Tian, Yuandan Dong, UESTC, China

EuMC21 : Power Amplifiers Linearization Techniques

Chair: Anding Zhu, University College Dublin, Ireland

Co-Chair: José Carlos Pedro, Universidade de Aveiro, Portugal

11:20-13:00, Wednesday 28th September 2022, Brown 1-2






- (NA)  **C Modeling and Compensation of AlGaIn/GaN HEMT Dynamic Nonlinearities** (Invited Keynote)
José Carlos Pedro, João L. Gomes, Luís C. Nunes, Filipe M. Barradas, Universidade de Aveiro, Portugal
- 341  **C A 60GHz CMOS Power Amplifier with Combined Adaptive-Bias and Linearizer in 28nm Process**
Kyung Pil Jung¹, Tae Hwan Jang², Oung Soon Choi¹, Chul Soon Park¹
¹KAIST, Korea; ²Hanyang University, Korea
- 345  **C Accelerating Model Adaptation of Multi-Metric Digital Predistortion for RF Power Amplifiers Using Compositated Quadratic Loss Function**
Hang Yin, Chenhao Chu, Anding Zhu, University College Dublin, Ireland
- 349  **C A 28GHz 22FDX PA with 31.5% Peak PAE and Output Power of 21dBm in CW, 18.5dBm in QPSK, and 12.5dBm in 64QAM**
Z. Al-Husseini¹, S. Syed², P.V. Testa¹, G. Katzman², G. Bossu¹, Z. Zhao¹, S. Moss², C. Tianbing²
¹GlobalFoundries, Germany; ²GlobalFoundries, USA
- 353  **C GaN Power Amplifier Linearization Using Second Harmonic Injection into the Input**
Farhad Abbasnezhad, Majid Tayarani, Adib Abrishamifar, Vahid Nayyeri, IUST, Iran

EuMC22: Simulation-Oriented Characterization of Microwave Devices

Chair: Gian Guido Gentili, Politecnico di Milano, Italy

Co-Chair: Simone Bastioli, RS Microwave, USA

11:20–13:00, Wednesday 28th September 2022, Suite 1

- (NA)  **An Overview of Leaky-Mode Effects on Printed-Circuit Transmission Lines** (*Invited Keynote*)
*David R. Jackson*¹, *Francisco Mesa*², *Alessandro Galli*³, *Paolo Baccarelli*⁴,
*Paolo Burghignoli*³, *Giampiero Lovat*³, *Walter Fuscaldo*⁵
¹University of Houston, USA; ²Universidad de Sevilla, Spain; ³Università di Roma “La Sapienza”, Italy; ⁴Università di Roma Tre, Italy; ⁵CNR-IMM, Italy
- 357  **Accelerated Partial Inductance Evaluation via Cubic Spline Interpolation for the PEEC Method**
*Daniele Romano*¹, *Fabrizio Loreto*¹, *Giulio Antonini*¹, *Ivana Kovačević-Badstübner*²,
*Ulrike Grossner*²
¹Università dell’Aquila, Italy; ²ETH Zürich, Switzerland
- 361  **Simulation-Based Miniaturization of Microwave Passive Components with Explicit Equality Constraint Correction**
*Slawomir Koziel*¹, *Anna Pietrenko-Dabrowska*²
¹Reykjavik University, Iceland; ²Gdansk University of Technology, Poland
- 365  **Noise in Coherently Radiating Periodic Structures Beam Forming Networks**
Carlos Biurrun-Quel, *Carlos del-Río*, *Universidad Pública de Navarra, Spain*
- 369  **RF MEMS Switch Design Methodology by Electromagnetic Simulations and Machine Learning**
*Loukas Michalas*¹, *Kriton Konstantinidis*², *Paola Farinelli*³, *Danilo P. Mandic*²,
*George Konstantinidis*¹
¹FORTH, Greece; ²Imperial College London, UK; ³RF Microtech, Italy

EuMC23: Additive Manufacturing for Microwave Components

Chair: Giuseppe Addamo, CNR-IEIIT, Italy

Co-Chair: Oscar Antonio Peverini, CNR-IEIIT, Italy

14:20–16:00, Wednesday 28th September 2022, Amber 1



- (NA)  **Trends and Prospects of All-Metal 3D-Printing Technologies for Next-Generation Space-Borne Antenna Systems** (*Invited Keynote*)
*Oscar Antonio Peverini*¹, *Giuseppe Addamo*¹, *Flaviana Calignano*², *Mauro Lumia*¹,
*Diego Giovanni Manfredi*², *Giuseppe Virone*¹
¹CNR-IEIIT, Italy; ²Politecnico di Torino, Italy
- 373  **Additively Manufactured WR15 Waveguide to Microstrip Transition for Broadband V-Band Applications**
A. Hofmann, *L. Klein*, *K. Lomakin*, *M. Sippel*, *Gerald Gold*, *FAU Erlangen-Nürnberg, Germany*
- 377  **Additive Manufactured CPW Lines Cured by Intense Pulse Light for Automotive Microwave Applications**
*Adamantia Chletsou*¹, *Alexandra Bannon*¹, *Xenophon Konstantinou*¹, *Lauren Reimnitz*²,
*John Locke*³, *John Papapolymerou*¹
¹Michigan State University, USA; ²PulseForge, USA; ³Ford, USA
- 381  **Evaluation of Crosstalk Between Additively Manufactured Slotted Waveguides in mm-Wave Applications**
*K. Lomakin*¹, *S. Alhasson*², *Gerald Gold*¹
¹FAU Erlangen-Nürnberg, Germany; ²NXP Semiconductors, Germany

EuMC24: Novel Array Topologies and Beamsteering Techniques

Chair: Wim van Cappellen, ASTRON, The Netherlands

Co-Chair: Nuno Borges Carvalho, Universidade de Aveiro, Portugal

14:20-16:00, Wednesday 28th September 2022, Amber 2






- (NA)  **Wideband Connected Slot Arrays at mm-Wave Frequencies** (*Invited Keynote*)
Alexander van Katwijk, Daniele Cavallo, Technische Universiteit Delft, The Netherlands
- 385  **Thinned Array with Steerable Nulls to Cancel Grating Lobe for Automotive Radar Applications**
Masato Kohtani¹, Sungwoo Cha¹, Paul Schmalenberg², Jae Lee², Linjie Li³, Toshihiko Takahata¹, Shinji Yamaura¹, Toshihiko Matsuoka¹, Gabriel M. Rebeiz³
¹MIRISE Technologies, Japan; ²Toyota, USA; ³University of California, San Diego, USA
- 389  **Site-Specific Ultra-Low-Sidelobe Phased Array Topologies for Sparse Areas of Particular Shape**
Yanki Aslan, Technische Universiteit Delft, The Netherlands
- 393  **Compact 5.2GHz Reflection-Type Retrodirective Array Using Butler Matrix with Broadside Couplers**
Yusaku Honma, Jean Temga, Takashi Shiba, Noriharu Suematsu, Tohoku University, Japan
- 397  **Phase Adjustment for Beamforming Arbitrarily-Shaped Phased Arrays**
Ricardo A.M. Pereira, Nuno Borges Carvalho, Universidade de Aveiro, Portugal

EuMC25: Sensing in Biological Systems I

Chair: Luciano Tarricone, Università del Salento, Italy

Co-Chair: Francesca Apollonio, Università di Roma "La Sapienza", Italy

14:20-16:00, Wednesday 28th September 2022, Amber 3






- (NA)  **Status on Microwave Dielectric Spectroscopy for Cellular Analysis** (*Invited Keynote*)
Katia Grenier, David Dubuc, LAAS-CNRS, France
- 401  **Investigation of Hydrogel Skin Phantoms Using Terahertz Time-Domain Spectroscopy**
Divya Jayasankar¹, A.I. Hernandez-Serrano¹, Rachel A. Hand¹, Jan Stake², Emma MacPherson¹
¹University of Warwick, UK; ²Chalmers University of Technology, Sweden
- 404  **In vivo Skin-Type Classification Using Millimeter-Wave Near-Field Probe Spectroscopy**
Damaris Hecht, Tim Pfahler, Ingrid Ullmann, Thomas Altstidl, Nadia Amer, Yi Jin, Björn Eskofier, Martin Vossiek, FAU Erlangen-Nürnberg, Germany
- 408  **Penetration Depth in Multilayered Biological Tissues Using a Compact Microwave Biosensor**
Joséphine Masini, Rania Shahbaz, Frédérique Deshours, Georges Alquié, Chaïma El Bastami, Hamid Kokabi, GeePs (UMR 8507), France
- 412  **Millifluidic Sensor Designed to Perform the Microwave Dielectric Spectroscopy of Biological Liquids**
Y. Kozhemyakin¹, S. Rehault-Godbert², David Dubuc¹, Katia Grenier¹
¹LAAS-CNRS, France; ²UMR BOA, France

EuMC26: Advanced Filters in Compact Realizations

Chair: Photos Vryonides, Frederick University, Cyprus

Co-Chair: Dimitra Psychogiou, University College Cork, Ireland

14:20–16:00, Wednesday 28th September 2022, Amber 4






- (NA)  **Recent Progress on Multi-Configurable RF Filters** (Invited Keynote)
Dimitra Psychogiou¹, Roberto Gómez-García²
¹University College Cork, Ireland; ²Universidad de Alcalá, Spain
- 416  **BAW Filter for Space Applications at 4.2GHz**
*D. Mercier¹, T. Claret¹, M. Sansa¹, C. Hellion¹, J. Delprato¹, Y. Lamy¹, S. Ballandras²,
L. Carpentier³, J. Galdeano⁴*
¹CEA-Leti, France; ²frecln/sys, France; ³CNES, France; ⁴ESA-ESTEC, The Netherlands
- 420  **Quasi-Elliptic SAW Filters Using Multi-Resonant Acoustic-Wave Lumped-Element Resonator Stages**
Mohammed R.A. Nasser, Dimitra Psychogiou, University College Cork, Ireland
- 424  **High-Performance Inline Bandpass Filters Using Stub-Loaded Resonators with Internal and External Frequency-Variant Couplings**
Vinay B. Narayane, Girish Kumar, IIT Bombay, India
- 428  **Coupling Matrix Approaches for the Synthesis of Acoustic Wave Multiport Functions**
L. Acosta, E. Guerrero, C. Caballero, J. Verdú, P. de Paco, Universitat Autònoma de Barcelona, Spain

EuMC27: Integration of Power Amplifiers

Chair: Zoya Popovic, University of Colorado Boulder, USA

Co-Chair: Gregor Lasser, Chalmers University of Technology, Sweden

14:20–16:00, Wednesday 28th September 2022, Brown 1-2






- (NA)  **Wideband Transmit-Receive MMICs for Scalable Phased Arrays** (Invited Keynote)
Charles Campbell, Deep C. Dumka, Kevin W. Kobayashi, Paul B. Schmid, Qorvo, USA
- 432  **High Performance Stacked-FETs in 0.25 μ m GaN Technology for S-Band Power Amplifiers**
Gijs van der Bent, Peter de Hek, Rob Knight, Frank E. van Vliet, TNO, The Netherlands
- 436  **A 10W 6–12GHz GaN MMIC Supply Modulated Power Amplifier**
Connor Nogales¹, Zoya Popović¹, Gregor Lasser²
¹University of Colorado Boulder, USA; ²Chalmers University of Technology, Sweden
- 440  **An Efficient and Fast Reverse Buck Converter for High-Power Envelope-Tracking Systems**
Sophie Paul¹, Nikolai Wolff¹, Christophe Delepaut², Wolfgang Heinrich¹, Olof Bengtsson¹
¹FBH, Germany; ²ESA-ESTEC, The Netherlands
- 444  **Embedding of High Power RF Transistor Dies in PCB Laminate**
*Ioannis Peppas¹, Hiroaki Takahashi¹, Jim Yip², Erich Schlaffer³, Helmut Paulitsch¹,
Wolfgang Bösch¹*
¹Technische Universität Graz, Austria; ²Cantor Technologies, UK; ³AT&S, Austria

EuMC28: Developments in Electromagnetic Computational Techniques

Chair: *Malgorzata Celuch, QWED, Poland*

Co-Chair: *Michal Mrozowski, Gdańsk University of Technology, Poland*

14:20-16:00, Wednesday 28th September 2022, Suite 1






- (NA)  **Recent Advances in Hybrid Solver Technology for EM Simulations** (*Invited Keynote*)
*Ralf Beyer*¹, *Ralf Ihmels*², *Peter Krauß*¹, *Thomas Sieverding*¹
¹*Mician, Germany*; ²*Mician, USA*
- 448  **Two-Dimensional TE Series Node Transmission-Line Modelling Based on Unstructured Triangular Meshes**
Kaiqi Yan, Ana Vukovic, Phillip Sewell, University of Nottingham, UK
- 452  **Computation of Time Domain Scattering Parameters Through the Numerical Inversion of the Laplace Transform**
*Fabrizio Loreto*¹, *Giuseppe Pettanice*¹, *Daniele Romano*¹, *Martin Štumpf*²,
*Ioan E. Lager*³, *Giulio Antonini*¹
¹*Università dell'Aquila, Italy*; ²*Brno University of Technology, Czechia*; ³*Technische Universiteit Delft, The Netherlands*
- 456  **An Efficient Two-Step Leapfrog HIE-FDTD Method with More Relaxed Stability Condition**
Ankit Kumar Pandey, Alok Kumar Saxena, IIT Jammu, India
- 460  **An Optimized Six-Step LOD-FDTD Method Using the Artificial Anisotropy Parameters**
*Alok Kumar Saxena*¹, *Kumar Vaibhav Srivastava*²
¹*IIT Jammu, India*; ²*IIT Kanpur, India*

EuMC29: Sensing in Biological Systems II

Chair: *Katia Grenier, LAAS-CNRS, France*

Co-Chair: *Caterina Merla, ENEA, Italy*

16:40-18:20, Wednesday 28th September 2022, Amber 3






- (NA)  **Bioelectromagnetic Research Based on Lessons Learned, Reliable Techniques and Microscopic Models: The Challenge of 5G** (*Invited Keynote*)
Micaela Liberti, Francesca Apollonio, Università di Roma "La Sapienza", Italy
- 464  **A Hybrid Correlation-Dicke Radiometer for Internal Body Thermometry**
Jooeun Lee, Gabriel Santamaria Botello, Robert Streeter, Kaitlin Hall, Zoya Popović, University of Colorado Boulder, USA
- 468  **Towards Tumor Detection with a Microwave Ablator Based on Dielectrometry**
*Martin Schüßler*¹, *Markus Paravicini*¹, *Carolin Hessinger*¹, *Robin Neuder*¹,
*Frank Hübner*², *Thomas J. Vogl*², *Rolf Jakoby*¹
¹*Technische Universität Darmstadt, Germany*; ²*Universitätsklinikum Frankfurt, Germany*
- 472  **System Considerations and Analog Baseband Design for an FMCW Radar-Based Breast Cancer Detection**
Martin Maier, Vadim Issakov, Technische Universität Braunschweig, Germany
- 476  **Improvement of Breast Shape in a Female Whole-Body Model: A Numerical Evaluation of the Exposure to 2.45GHz Plane Wave**
Noemi Dolciotti, Micol Colella, Simona D'Agostino, Francesca Apollonio, Micaela Liberti, Università di Roma "La Sapienza", Italy

EuMC30: Substrate Integrated Waveguide and Multilayer Techniques

Chair: Bart Nauwelaers, KU Leuven, Belgium

Co-Chair: Tarek Djerajfi, INRS-EMT, Canada

16:40-18:20, Wednesday 28th September 2022, Amber 4






- (NA)  **Power Handling Capabilities of SIW and AFSIW Transmission Lines and Circuits**
(Invited Keynote)
Anthony Ghiotto, IMS (UMR 5218), France
- 480  **Multilayer Universal Transitions Between Substrate Integrated Waveguides and Rectangular Waveguides**
Uros Jankovic¹, Shakti Singh Chauhan², Ananjan Basu², Djuradj Budimir³
¹Military Technical Institute, Serbia; ²IIT Delhi, India; ³University of Westminster, UK
- 484  **A Vertical Transition Between Microstrip Line and Air-Filled SIW at Ka-Band**
Jingwen Zhang¹, Yvan Duroc², Ke Wu³, Anthony Ghiotto⁴, Tan-Phu Voung¹
¹IMEP-LaHC (UMR 5130), France; ²Laboratoire Ampère (UMR 5005), France; ³Polytechnique Montréal, Canada; ⁴IMS (UMR 5218), France
- 488  **A Comparative Study of Two Wideband 8×8 Butler Matrices for Millimeter-Wave Bands**
Mehri Borhani Kakhki, Ahmed Shehata Abdellatif, Hari Krishna Pothula, David Wessel, Huawei Technologies, Canada
- 492  **Substrate Integrated Coaxial Line Based Branch Line Coupler with Broad Out of Band Rejection**
Idury Satya Krishna¹, Nicolás Delmonte², Lorenzo Silvestri², Maurizio Bozzi², Soumava Mukherjee¹
¹IIT Jodhpur, India; ²Università di Pavia, Italy

EuMC31: Power Amplifiers Performance Improvement Techniques

Chair: Kevin Morris, University of Bristol, UK

Co-Chair: Vittorio Camarchia, Politecnico di Torino, Italy

16:40-18:20, Wednesday 28th September 2022, Brown 1-2






- (NA)  **Doherty Power Amplifiers for Sub-6GHz and Beyond 6GHz: Challenges and Design Approaches** (Invited Keynote)
Anna Piacibello, Vittorio Camarchia, Politecnico di Torino, Italy
- 496  **A 24–31GHz 28nm FD-SOI CMOS Balanced Power Amplifier Robust to 3:1 VSWR for 5G Application**
G. Diverrez¹, E. Kerhervé¹, Andreia Cathelin²
¹IMS (UMR 5218), France; ²STMicroelectronics, France
- 500  **Power Amplifier Design Using Interactive Multi-Objective Visualization**
Stefan Stroessner, Reyes Lucero, Jacob Kravits, Alec Russell, Seth Johannes, Kyri Baker, Joseph Kasprzyk, Zoya Popović, University of Colorado Boulder, USA
- 504  **A 1.6–2.2GHz Continuous Class-F Power Amplifier with Compact Harmonically Controlled Networks**
Shinichi Tanaka, Eri Tsuji, Shibaura Institute of Technology, Japan
- 508  **Combining Class J and Inverse Class F Continuous Modes for a Highly Efficient Broadband Power Amplifier**
Alex Pitt, Tommaso Cappello, Kevin Morris, University of Bristol, UK

EuMC32 : Microwave Sensing Devices

Chair: Ferran Martín, Universitat Autònoma de Barcelona, Spain

Co-Chair: Daniel Segovia-Vargas, Universidad Carlos III de Madrid, Spain

16:40-18:20, Wednesday 28th September 2022, Suite 1






- (NA)  **Recent Advances in Phase-Variation Microwave Sensors** (*Invited Keynote*)
Ferran Martín, Paris Vélez, Lijuan Su, Jonathan Muñoz, Pau Casacuberta, Universitat Autònoma de Barcelona, Spain
- 512  **A Generalized Noncontact Vital-Sign Sensing System Based on MIMO FMCW Radar Sensors**
Cheng Cao, Xiuping Li, Xin Liu, BUPT, China
- 516  **A Method to Retrieve the Output Variables in Reflective-Mode Phase-Variation Sensors**
Mahmoud Elgeziry¹, Ferran Paredes¹, Paris Vélez¹, Filippo Costa², Simone Genovesi², Ferran Martín¹
¹Universitat Autònoma de Barcelona, Spain; ²Università di Pisa, Italy
- 520  **Precise Active Sensor Design for Monitoring in Biological and Industrial Applications**
Sandra Santiago-Mesas¹, Daniel Segovia-Vargas¹, Adrián Amor-Martín¹, Vicente González-Posadas²
¹Universidad Carlos III de Madrid, Spain; ²Universidad Politécnica de Madrid, Spain
- 524  **Dual Band CSRR Fluidic Sensor with 3D Printed Channel**
Zsolt Szabó, PPKE, Hungary

EuMC33 : Conceptual Progress in Antenna Design

Chair: Simone Genovesi, Università di Pisa, Italy

Co-Chair: Ioan E. Lager, Technische Universiteit Delft, The Netherlands

09:00-10:40, Thursday 29th September 2022, Amber 1

- (NA)  **Unconventional Antenna Arrays for 5G and Beyond mmWave Communication Systems** (*Invited Keynote*)
Roberto Flamini, Laura Resteghini, Huawei Technologies, Italy
- 528  **Differential Split-Ring Resonator-Based Antenna at 140GHz in Embedded Wafer Level Ball Grid Array Technology**
Elizabeth Bekker, Akanksha Bhutani, Lucas Giroto de Oliveira, Theresa Antes, Thomas Zwick, KIT, Germany
- 532  **Reconfigurable Switched Beam Filtenna Based on Corner Cube Reflector and Compline SIW Resonator**
Hossein Sarbandi Farahani, Behrooz Rezaee, Wolfgang Bösch, Technische Universität Graz, Austria
- 536  **A Review of PA-Antenna Co-Design: Direct Matching, Harmonic Tuning and Power Combining**
Martijn de Kok¹, Stefania Monni², Marc van Heijningen², Alessandro Garufo², A. Bart Smolders¹, Ulf Johannsen¹
¹Technische Universiteit Eindhoven, The Netherlands; ²TNO, The Netherlands
- 540  **A Compact 2-D Phased Array Fed by 4×4 Butler Matrix Without Crossover in Broadside Coupled Stripline for Sub-6GHz 5G Applications**
Jean Temga, Takashi Shiba, Noriharu Suematsu, Tohoku University, Japan

EuMC34: Novel Antennas for 5G and Beyond 5G Communication Systems

Chair: Zhinong Ying, Sony, Sweden

Co-Chair: Marta Martínez-Vázquez, Renesas Electronics, Germany

09:00-10:40, Thursday 29th September 2022, Amber 2






- (NA)  **Antenna Technologies for B5G and 6G Mobile System** (*Invited Keynote*)
Zhinong Ying, Sony, Sweden
- 544  **5G mm-Wave Dual-Orthogonal Polarized Antenna Array**
Mojtaba Sohrabi¹, Ronny Hahnel¹, Dirk Plettemeier¹, Stefan Schindler², Hans-Dieter Wohlmuth²
¹*Technische Universität Dresden, Germany;* ²*Infineon Technologies, Germany*
- 548  **Evolutionary Optimized Pixelated Antennas for 5G IoT Communication**
Dominik Mair, Markus Unterladstaetter, Michael Renzler, Thomas Ussmueller, Universität Innsbruck, Austria
- 552  **A Dual-Band Millimeter Wave SRR Loaded Printed Monopole with Annular Slot MIMO Antenna for 5G Applications**
Priyank Mishra¹, Maharana Pratap Singh¹, Aditi Sharma², Kumar Vaibhav Srivastava², Saptarshi Ghosh¹
¹*IIT Indore, India;* ²*IIT Kanpur, India*
- 556  **Design of a Dual-Polarized SIW Cavity-Backed Self-Quadruplexing Antenna for mm-Wave 5G Applications**
Amar D. Chaudhari¹, Soumava Mukherjee²
¹*IIT Delhi, India;* ²*IIT Jodhpur, India*

EuMC35: Integration and Miniaturization of Filter Components

Chair: Anthony Ghiotto, IMS (UMR 5218), France

Co-Chair: Roberto Gomez-Garcia, Universidad de Alcalá, Spain

09:00-10:40, Thursday 29th September 2022, Amber 4






- (NA)  **Passive Circuit Integration: Multi-Dimensional Evolution from Micro-Scale Components to Large-Scale Systems** (*Invited Keynote*)
Ke Wu, Polytechnique Montréal, Canada
- 560  **A 3D Slow-Wave Transmission Line Approach for the Design of Ka-Band CMOS Compact Filters**
O. Occello¹, L. Boukhezar¹, Marc Margalef-Rovira², M. Barragan¹, Cedric Durand³, L. Vincent⁴, Philippe Ferrari¹
¹*TIMA (UMR 5159), France;* ²*IEMN (UMR 8520), France;* ³*STMicroelectronics, France;* ⁴*CIME Nanotech, France*
- 564  **A Compact Millimeter-Wave On-Chip DGS-Based Bandstop Filter with Two Transmission Poles in CMOS Technology**
Samundra K. Thapa, Baichuan Chen, Adel Barakat, Ramesh K. Pokharel, Kyushu University, Japan
- 568  **A Miniaturized X-Band High-Index Supercavity Resonator in Microstrip Technology**
Zahra Manzoor, Michael Dimitri Sinanis, Vahagn Mkhitarian, Omer Yesilyurt, Alexander V. Kildishev, Dimitrios Peroulis, Purdue University, USA
- 572  **Miniaturized 6-Bit Phase-Change Capacitor Bank with Improved Self-Resonance Frequency and Q**
Tejinder Singh, Raafat R. Mansour, University of Waterloo, Canada

EuMC36: Wireless Power Transmission Recent Advances

Chair: Diego Masotti, Università di Bologna, Italy

Co-Chair: Martino Aldrigo, IMT Bucharest, Romania

09:00-10:40, Thursday 29th September 2022, Brown 1-2






- (NA)  **UHF RFID-Based Wireless Power Transfer for Implantable Devices (Invited Keynote)**
Leena Ukkonen, Lauri Sydänheimo, Toni Björninen, Tampere University, Finland
- 576  **A New Wheel-Spoke Transmitter for Efficient WPT Based on Frequency Diversity**
Enrico Fazzini, Alessandra Costanzo, Diego Masotti, Università di Bologna, Italy
- 580  **Design of Multiple-Transmitter WPT System with Angular Misalignment Estimation from Mutual Inductance Tracking**
Seong-Jin Kim, Jeong-Wook Kim, Hyo-Won Lee, Hyunyoung Cho, Ju-Ik Oh, Jong-Won Yu, KAIST, Korea
- 584  **Realization of a Passive UHF RFID Sensor Platform for the Detection of Damages on a Concrete Reinforcement**
Djordje Gunjic, Jasmin Walk, Moritz Fischer, Thomas Ussmueller, Universität Innsbruck, Austria
- 588  **Wireless Power Charging System with DC Combined 3-Dimensional Receiver**
Hyo-Won Lee, Jeong-Wook Kim, Seong-Jin Kim, Sang Hyuck Han, Ji-Hoon Lee, Jong-Won Yu, KAIST, Korea

EuMC37: Technological Advances for Integrated Antenna Design

Chair: Matthias Geissler, IMST, Germany

Co-Chair: Daniel Segovia-Vargas, Universidad Carlos III de Madrid, Spain

11:20-13:00, Thursday 29th September 2022, Amber 1

- (NA)  **Electromagnetic Simulations of mm-Wave and Sub-THz Antennas Embedded in Real Systems (Invited Keynote)**
Simona Bruni, Marta Arias Campo, Enrico Tolin, Winfried Simon, Oliver Litschke, IMST, Germany
- 592  **A New GNSS Micro-Diversity System**
Emanuel Panholzer, Stefan Lindenmeier, Universität der Bundeswehr München, Germany
- 596  **The TRENI Project: Development of a Galileo-Based GNSS Receiver and Antenna for Railway Safety-Related Applications**
M. Puccitelli¹, L. Marradi¹, G. Pastore¹, H. Al Bitar², A.M. Tobie², R. Guidi³, G. Galgani³, F. Inzirillo⁴, F. Rodriguez⁵, A. Martinelli⁵, Y.B. Yossef⁶, D. Lopour⁷
¹Thales, Italy; ²Thales, France; ³EikonTech, Italy; ⁴MERMEC, Italy; ⁵Telespazio, Italy; ⁶Saphyrion, Switzerland; ⁷EUSPA, Czechia
- 600  **Polarization Reconfigurable Patch Antenna Using ScDDAs**
Rozenn Allanic¹, Denis Le Berre¹, Cédric Quendo¹, Douglas Silva De Vasconcellos², Virginie Grimal², Damien Valente², Jérôme Billoué²
¹Lab-STICC (UMR 6285), France; ²GREMAN (UMR 7347), France
- 604  **Dual-Band Structure-Shared Antenna With Large Frequency Ratio Using HMSIW Cavity**
Yu Lei Yang, Xian Qi Lin, Yi Hong Su, Feng Xiao, UESTC, China

EuMC38: Advances in Antennas for Sensing and Testing

Chair: Dirk Heberling, RWTH Aachen University, Germany

Co-Chair: Lars Jacob Foged, Microwave Vision Group, Italy

11:20-13:00, Thursday 29th September 2022, Amber 2






- (NA)  **Recent Developments in Probe Array Technology for NF and FF Antenna Testing**
(Invited Keynote)
Lars Jacob Foged, Francesco Saccardi, Microwave Vision Group, Italy
- 608  **A Large Distance Focus Dielectric Fresnel-Based Lens Antenna for Millimeter Wave Radar**
Niklas Muckermann, Jan Barowski, Nils Pohl, Ruhr-Universität Bochum, Germany
- 612  **Rotationally Symmetric Lens Antenna with Biconical Feed for Broadband Measurement Applications**
Z. Tian¹, Benedikt Sievert¹, M. Eube², P. Hildenhagen², Daniel Erni¹, Andreas Rennings¹
¹Universität Duisburg-Essen, Germany; ²RF-Frontend, Germany
- 616  **Fully 3-D Printed Dielectric End-Fire Antenna Fed by Hollow Rectangular Waveguide**
Stefan Simion, MTA, Romania
- 620  **A LHCP Printed Cross Dipole Antenna for Glacial Environmental Sensor Networks**
Muhammad Abdur Rehman Hashmi, Paul V. Brennan, University College London, UK

EuMC39: Broadband Coupler and Divider Design Techniques

Chair: Ke Wu, Polytechnique Montréal, Canada

Co-Chair: Alexander Kölpin, Technische Universität Hamburg, Germany

11:20-13:00, Thursday 29th September 2022, Amber 4






- (NA)  **The Beauty of Miniaturization in Electronics: An Overview on Integrated Passive Device (IPD) Technology** (Invited Keynote)
Enrico Massoni, STMicroelectronics, Italy
- 624  **Circular Gysel Divider for the Frequency Range from 18GHz to 26GHz**
Jasmin Gabsteiger¹, Christopher Beck², Marco Dietz¹, Robert Weigel¹, Fabian Lurz²
¹FAU Erlangen-Nürnberg, Germany; ²Technische Universität Hamburg, Germany
- 628  **Improved Bandwidth 4- and 5-Branch Hybrids Using Stepped Mainline Impedance Technique**
Jatin Khare¹, Praween Kumar Nishad², Debapratim Ghosh²
¹University of Texas at Austin, USA; ²IIT Bhubaneswar, India
- 632  **Broadband Improved Directivity Microstrip Coupler Using Doubly Wound Planar Inductors**
Praween Kumar Nishad, Debapratim Ghosh, IIT Bhubaneswar, India
- 636  **Super-Compact, High-Performance Rat-Race Coupler for Sub-1GHz 5G Applications**
Vahid Irannejad¹, Stuart Barth², Daniel Oloumi³
¹FH Kärnten, Austria; ²ACAMP, Canada; ³Infineon Technologies, Austria

EuMC40 : Near-field Wireless Power Transfer

Chair: *Giuseppina Monti, Università del Salento, Italy*

Co-Chair: *Jasmin Grosinger, Technische Universität Graz, Austria*

11:20-13:00, Thursday 29th September 2022, Brown 1-2






- (NA)  **Analysis of Inductive Power Transfer Systems Using High Efficiency Oscillators**
(Invited Keynote)
Almudena Suárez Rodríguez, Universidad de Cantabria, Spain
- 640  **Unchain Wireless Power — The Future of NFC Wireless Charging**
D. Lopez-Diaz, O. Kronschläger, P. Thüringer, U. Neffe, NXP Semiconductors, Austria
- 644  **Near-Field Chipless-RFID System Based on Hybrid Time/Frequency Domain Encoding and Power Splitter Reader**
Amirhossein Karami-Horestani, Ferran Paredes, Ferran Martín, Universitat Autònoma de Barcelona, Spain
- 648  **Optimal Coupling for Capacitive Wireless Power Transfer with One Repeater**
Ben Minnaert¹, Giuseppina Monti²
¹Universiteit Antwerpen, Belgium; ²Università del Salento, Italy
- 652  **A 6.78MHz Current Detector Using PCB Transformer for Responsible Wireless Power Transfer**
Seonhye Jang, Sunju Kim, Jaeyong Lee, Changkun Park, Soongsil University, Korea

EuMC41 : Metasurfaces and Applications

Chair: *Francisco Medina, Universidad de Sevilla, Spain*

Co-Chair: *Pierre Blondy, XLIM (UMR 7252), France*

11:20-13:00, Thursday 29th September 2022, Suite 1


- (NA)  **Using Metamaterials to Enhance Medical Sensing and Imaging** (Invited Keynote)
Panagiotis Kosmas, King's College London, UK
- 656  **Meta-Gaps for Mechanically Reconfigurable Phased Arrays**
D. Elliott Williams, Ali Hajimiri, Caltech, USA
- 660  **Frequency Controlled Polarization Rotating Transmitarray for Polarimetric Radar Applications**
Tim Freialdenhoven¹, Maurice Schepers², Thomas Dallmann¹
¹Fraunhofer FHR, Germany; ²RWTH Aachen University, Germany
- 664  **Study of a 3D FSS-Based Printed Radome Demonstrator for a Patch Antenna at 3.6GHz**
*T.H. Le Dam¹, Alejandro Niembro-Martin², Thierry Lacrevaz¹, Gregory Houzet¹,
Camille Delfaut¹, Damien Paulet³, Nadege Reverdy-Bruas⁴, Q. Bao Duong⁵,
T. Phu Vuong¹*
*¹IMEP-LaHC (UMR 5130), France; ²Schneider Electric, France; ³UGA-IUT1, France; ⁴LGP2
(UMR 5518), France; ⁵S.mart Grenoble Alpes, France*
- 668  **Investigation of a Digitally-Reconfigurable Metasurface for Magnetic Resonance Imaging**
*Marius Lippke¹, Endri Stoja¹, Dennis Philipp², Simon Konstandin², Jürgen Jenne²,
Thomas Bertuch¹, Matthias Günther²*
¹Fraunhofer FHR, Germany; ²Fraunhofer MEVIS, Germany

EuMC42: Advances in Antenna Arrays

Chair: Yang Hao, Queen Mary University of London, UK

Co-Chair: Marianna Ivashina, Chalmers University of Technology, Sweden

14:20-16:00, Thursday 29th September 2022, Amber 2






- (NA)  **Challenges and Outlook for Radar Antenna Technologies** (Invited Keynote)
Piotr Marek Kamiński¹, Alessandro Garufo², Dave Bekers², Erio Gandini³, Cristina Yepes², Stefania Monni²
¹Airbus, Germany; ²TNO, The Netherlands; ³ESA-ESTEC, The Netherlands
- 672  **Direct Analytical Synthesis of Broadside Inline Antenna Arrays**
Matteo Oldoni¹, Stefano Moscato², Steven Caicedo Mejllones¹, Cristian Franceschet³
¹Politecnico di Milano, Italy; ²SIAE MICROELETTRONICA, Italy; ³Università di Milano, Italy
- (NA)  **A G-Band Horn and OMT Platelet Array**
Mark A. McCulloch¹, Jack Ross Graham², Danielle George¹, Keith Grainge¹, Créidhe O'Sullivan²
¹University of Manchester, UK; ²National University of Ireland, Ireland
- 680  **High Gain Omnidirectional Array Antenna Using SIW Technology**
Ahmad Emadeddin¹, Saeideh Shad², B.L.G. Jonsson¹
¹KTH, Sweden; ²Boise State University, USA
- 684  **Cavity PCB Process-Based Ka-Band Phased Array with Offset-Fed Aperture Coupled Patch Antenna**
Ju-ik Oh, Hyunyoung Cho, Ji-Hoon Lee, Sang Hyuck Han, Chanhee Lee, Jong-Won Yu, KAIST, Korea

EuMC43: Focussed Session Efficient Millimeter-Wave Communications for Mobile Users

Chair: Elmine Meyer, Technische Universiteit Eindhoven, The Netherlands

Co-Chair: Ulf Johannsen, Technische Universiteit Eindhoven, The Netherlands

14:20-16:00, Thursday 29th September 2022, Amber 5


- 688  **A W-Band Low-Power Gilbert Cell Mixer with Image Rejection in 130nm SiGe BiCMOS Technology**
Kateryna Smirnova¹, Mehmet Kaynak², Ahmet Çağrı Ulusoy¹
¹KIT, Germany; ²IHP, Germany
- 692  **Demonstration of Flexible mm-Wave Digital Beamforming Transmitter Using Sigma-Delta Radio-over-Fiber Link**
Husileng Bao¹, Zhongxia Simon He¹, Filippo Ponzini², Christian Fager¹
¹Chalmers University of Technology, Sweden; ²Ericsson, Italy
- 696  **Mutual Coupling Analysis of Open-Ended Ridge and Ridge Gap Waveguide Radiating Elements in an Infinite Array Environment**
Yingqi Zhang, Artem R. Vilenskiy, Marianna V. Ivashina, Chalmers University of Technology, Sweden
- 700  **Effect of Phase-Noise on the Distributed Massive MIMO Networks**
Jafar Banar, Thomas Eriksson, Chalmers University of Technology, Sweden
- 704  **A mm-Wave Hybrid Stirring Technique for Over-the-Air Testing in Reverberation Chambers**
N. Farid¹, Anouk Hubrechsens², J. Fridén³, Ulf Johannsen¹, A. Bart Smolders², L.A. Bronckers²
¹Technische Universiteit Eindhoven, The Netherlands; ²AntenneX, The Netherlands; ³Ericsson, Sweden

EuMC44 : Energy Harvesting and Antennas Solutions for WPT

Chair: Jasmin Grosinger, Technische Universität Graz, Austria

Co-Chair: Nuno Borges Carvalho, Universidade de Aveiro, Portugal

14:20-16:00, Thursday 29th September 2022, Brown 1-2






- (NA)  **WPT as an Enabler of Space Exploration** (Invited Keynote)
Nuno Borges Carvalho, Universidade de Aveiro, Portugal
- 708  **Reflector-Based Power Output Maximization and Near-Field Detuning-Mitigation in Miniaturized Tightly-Coupled Flexible Rectenna Arrays**
Mahmoud Wagih¹, Steve Beeby²
¹University of Glasgow, UK; ²University of Southampton, UK
- 712  **Screen Printing of Flexible Dual-Band Antenna on a New Biocomposite Based on a Flax Fiber Laminate**
A. Sennouni¹, J.-M. Floc'h¹, S. Guéret², F. Callebert³, A.-C. Tarot¹
¹IETR (UMR 6164), France; ²GDS Composites, France; ³Groupe Depestele, France
- 716  **An Energy Harvester for a Battery-Free Wireless Sensor System on a Marine Propulsion Shaft**
Van Ai Hoang, Young Chul Lee, Mokpo National Maritime University, Korea
- 720  **Dynamically Reconfigurable Broadband SP3T Switch Powered by WPT for Antenna Switching Applications**
Asif Bilal¹, Abdul Quddious¹, Sasan Ahdi Rezaeieh², Stavros Iezekiel¹, Marco A. Antoniadis¹
¹University of Cyprus, Cyprus; ²University of Queensland, Australia

EuMC45 : Metasurfaces

Chair: Ferran Martín, Universitat Autònoma de Barcelona, Spain

Co-Chair: Vahid Nayyeri, IUST, Iran

14:20-16:00, Thursday 29th September 2022, Suite 1

- (NA)  **Glide Symmetries and Their Practical Implications in Periodic Structures** (Invited Keynote)
Oscar Quevedo-Teruel, KTH, Sweden
- 724  **A Resorber with a Selective In-Band Transmission Response Between Wide Absorption Bands**
Aditi Sharma¹, Mondeep Saikia¹, Saptarshi Ghosh², Kumar Vaibhav Srivastava¹
¹IIT Kanpur, India; ²IIT Indore, India
- 728  **Broadband Radar Cross Section Reduction Using Generalized Phase-Polarization Cancellation**
Ali Ghadimi, Mohammad Shirmohammadkarimi, Mohammad Soleimani, Vahid Nayyeri, IUST, Iran
- 732  **Efficient Modeling of Nonlinear Graphene as a Surface Boundary Condition in the Finite-Difference Time-Domain Method**
Fatemeh Moharrami¹, Vahid Nayyeri²
¹TCl, Iran; ²IUST, Iran
- 736  **Resonances in the E-Polarized Terahertz Wave Scattering and Absorption by a Graphene Strip On-Substrate Grating**
Fedir O. Yevtushenko, Sergii V. Dukhopelnykov, NASU, Ukraine

EuMC46 : EuMC Closing Session

Chair: Alessandra Costanzo, Università di Bologna, Italy

Co-Chair: Luca D'Antonio, JMA Wireless, Italy and Marco Pasian, Università di Pavia, Italy

16:40-18:20, Thursday 29th September 2022, Brown 1-2

- (NA)  **EuMC Closing Session Welcome**
Alessandra Costanzo¹, Luca D'Antonio², Marco Pasian³
¹EuMC Chair; ²EuMC Co-Chair; ³EuMC TPC Chair

- (NA)  **New Trends and Advances in Wireless Communications — The Paradigm of the Smart Electromagnetic Environment**
Andrea Massa, Università di Trento, Italy

- (NA)  **Meeting the Challenges of Connectivity Technologies for Today and Tomorrow**
Frederic Giancesello, STMicroelectronics, France

- (NA)  **EuMC Awards Ceremony**
Giuseppe Macchiarella, EuMW 2022 Awards Chair

- (NA)  **EuMC Closing Remarks**
Luca Perregrini, EuMW 2022 General Chair


- (NA)  **Invitation to EuMW 2023**
Thomas Zwick, EuMW 2023 General Chair



EuMIC/EuMC01 : Receivers



Chair: Friedel Gerfers, Technische Universität Berlin, Germany



Co-Chair: Frank van den Bogaart, TNO, The Netherlands



09:00-10:40, Tuesday 27th September 2022, Amber 2

- (NA)  **Transmit/Receive Modules for ECM AESA: Architectures and Enabling Components**
(Invited Keynote)
Andrea Bentini, Elettronica, Italy

- (NA)   **A 67GHz 23mW Receiver Utilizing Complementary Current Reuse Techniques**
Jesse Moody, Stefan Lepkowski, Travis Forbes, Sandia National Laboratories, USA

- (NA)   **28GHz Down-Conversion Mixer with RF Back-Gate Excitation Topology in 22nm FD-SOI**
Massinissa Nabet, Martin Rack, L. Nyssens, Jean-Pierre Raskin, Dimitri Lederer, UCLouvain, Belgium

- (NA)   **A 60GHz Four-Element Beam-Tapering Receive Phased Array**
Geon Ho Park¹, Tae Hwan Jang², Chul Soon Park¹
¹KAIST, Korea; ²Hanyang University, Korea

- (NA)   **A 8-18GHz Low Noise Variable Gain Amplifier with 30dB Gain Control Range**
Kutay Altintas¹, Tahsin Alper Ozkan¹, Melik Yazici¹, Mehmet Kaynak², Yasar Gurbuz¹
¹Sabancı University, Türkiye; ²IHP, Germany

EuMIC/EuMC02 : Wireless Systems for Mobile Communication and Radar

Chair: Jonas Hansryd, Ericsson, Sweden

Co-Chair: Holger Maune, OvG Universität Magdeburg, Germany

14:20-16:00, Tuesday 27th September 2022, Amber 5




- 756  **C** **E-Band Ultra-Low-Noise (4.5dB) and High-Power (27dBm) GaN T/R Front-End MMIC**
Erdin Ture, Fabian Thome, Dirk Schwantuschke, Michael Mikulla, Rüdiger Quay, Fraunhofer IAF, Germany
- 760  **C** **Long-Reach E-Band HPA for 5G Radio Link**
Alberto Colzani¹, Matteo Fumagalli¹, Alessandro Fonte¹, Antonio Traversa¹, Erdin Ture²
¹ SIAE MICROELETTRONICA, Italy; ² Fraunhofer IAF, Germany
- 764  **C** **Opportunities, Progress and Challenges in Active Heatsink Antenna Arrays for 5G and Beyond**
Yanki Aslan, Technische Universiteit Delft, The Netherlands
- 768  **C** **Highly Integrated Real-Time Imaging MIMO D-Band Radar for Industrial Applications**
S. Leuchs¹, C. Krebs¹, S. Gütgemann¹, S. Wickmann¹, J. Perske¹, H. Cetinkaya¹, Nils Pohl¹, B. Fischer², Enrico Tolin³, Marta Arias Campo³, Simona Bruni³, J. Romstadt⁴, H. Papurcu⁴, T. Haschke⁵, T. Hüge⁵
¹ Fraunhofer FHR, Germany; ² IMS Messsysteme, Germany; ³ IMST, Germany; ⁴ Ruhr-Universität Bochum, Germany; ⁵ SMS group, Germany
- 772  **C** **D-Band Backhaul and Fronthaul Solutions for 5G Radio Access Network**
Mario G.L. Frecassetti¹, Juan F. Sevillano², David del Río², Mehmet Izzet Saglam³, Antti Lamminen⁴, Vladimir Ermolov⁴
¹ Nokia, Italy; ² Ceit, Spain; ³ Turkcell Technology, Türkiye; ⁴ VTT Technical Research Centre of Finland, Finland

EuMIC/EuMC03 : THz Communication Systems in D and H bands: from Circuits to System-level

Chair: Guillaume Ducournau, IEMN (UMR 8520), France

Co-Chair: Joachim Oberhammer, KTH, Sweden

14:20-16:00, Tuesday 27th September 2022, Suite 2






- (NA) **C** **mm-Wave and Sub-THz Integrated Circuits for Wireless Link Applications: Technology and Research Trends** (*Invited Keynote*)
Maurizio Pagani, Huawei Technologies, Italy
- 776  **C** **Polarisation Multiplex in 300GHz Wireless Communication Link Using Orthomode Transducer**
Simon Haussmann¹, Dominik Wrana¹, Benjamin Schoch¹, Axel Tessmann², Ralf Henneberger³, Ingmar Kallfass¹
¹ Universität Stuttgart, Germany; ² Fraunhofer IAF, Germany; ³ Radiometer Physics, Germany
- 780  **C** **Sub-THz Radio Communication Links from Research to Field Trial**
M. Babay¹, M. Moretto², P. Perrault¹, R. Bara-Maillet¹, P. Mcillree¹, E. Froger¹, P. Di Prisco², P. Lopez¹
¹ Nokia, France; ² Nokia, Italy
- 784  **C** **A D-Band High-Gain Antenna Module Combining an In-Package Active Feed and a Flat Discrete Lens**
J.L. Gonzalez-Jimenez, F. Foglia Manzillo, A. Hamani, A. Siligaris, A. Clemente, C. Dehos, CEA-Leti, France

EuMIC/EuMC04: EuMIC/EuMC Posters

Chair: Alessandro Cidronali, Università di Firenze, Italy

Co-Chair: Lorenzo Silvestri, Università di Pavia, Italy

16:00-18:20, Tuesday 27th September 2022, Exhibition Hall

- 788  **A CMOS-Compatible Signal-to-Noise Enhancer Enabling a Filter-Less 14.5dB C/IMD Boost in Slowly Modulated LTV RF Circuits**
Hussein M.E. Hussein, Cristian Cassella, Northeastern University, USA
- 792  **W- to Ka-Band Frequency Converter for Ultra-High Throughput Satellite Systems**
Alessandro Barigelli¹, Sergio Di Nardo¹, Francesco Vitulli¹, Ernesto Limiti², Patrick E. Longhi², Lorenzo Pace², François Deborgies³
¹Thales, Italy; ²Università di Roma "Tor Vergata", Italy; ³ESA-ESTEC, The Netherlands
- 796  **Compact Harmonic Transmitter and Receiver Architectures for Multifunction Wireless Systems**
Yasser Bigdeli, Pascal Burasa, Ke Wu, Polytechnique Montréal, Canada
- 800  **Numerical Comparison of Plane Wave Propagation Inside Realistic Anatomical Models and Multilayer Slabs**
Micol Colella¹, Simona Di Meo², Micaela Liberti¹, Marco Pasian², Francesca Apollonio¹
¹Università di Roma "La Sapienza", Italy; ²Università di Pavia, Italy
- 804  **Reconfigurable Dual-Type Sensor for Resonant and Broadband Liquid Materials Characterization**
Ilona Piekarz, Slawomir Gruszczynski, Krzysztof Wincza, Jakub Sorocki, AGH UST, Poland


EuMIC/EuMC04 continues next page...

EuMIC/EuMC04 continued...

- 808  **Structural Investigations on Leonardo da Vinci's Mural Painting "The Last Supper" with Terahertz FMCW and TDS Techniques**
Maris Bauer¹, Kaori Fukunaga², Andreas Keil¹, Fabio Aramini³, M. Palazzo⁴, L. Dall'Aglio⁴, Fabian Friederich¹
¹Fraunhofer ITWM, Germany; ²NICT, Japan; ³ISCR, Italy; ⁴Museo del Cenacolo Vinciano, Italy
- 812  **2-Dimensional Beam Scanning Using Reflector-Based Holographic Antenna Arrays**
Ali Mohammad Hakimi, Homayoon Oraizi, IUST, Iran
- 816  **E-Band Magneto-Electric Dipole Antenna for 5G Backhauling Applications**
Carmine Mustacchio¹, Luigi Boccia², Riccardo Maggiora³, Emilio Arnieri², Giandomenico Amendola²
¹CEA-Leti, France; ²Università della Calabria, Italy; ³Politecnico di Torino, Italy
- 820  **Dielectric Response of Biological Systems at Cellular and Subcellular Level: A Modelling Study**
Laura Caramazza¹, Annalisa De Angelis², Franck M. Andre³, Lluis M. Mir³, Francesca Apollonio¹, Micaela Liberti¹
¹Università di Roma "La Sapienza", Italy; ²IIT, Italy; ³METSY (UMR 9018), France
- 824  **Near-Field Millimetre Wave Vector Microscopy — Buried Structure Imaging**
T. Auriac, J. Raoult, IES (UMR 5214), France
- 828  **Microwave Alignment and Displacement Sensors in Groove Gap Waveguide Technology**
Ali K. Horestani, Zahra Shaterian, Michał Mrozowski, Gdansk University of Technology, Poland

EuMIC/EuMC04 continues next page...

EuMIC/EuMC04 continued...

- 832  **C** **A Wideband Sensor for Complex Permittivity of Carasau Bread Dough Based on a Double Ridge Waveguide**
C. Macciò¹, M.B. Lodi¹, N. Curreli², A. Melis¹, G. Mazzarella¹, Maurizio Bozzi³, A. Fanti¹
¹Università di Cagliari, Italy; ²IIT, Italy; ³Università di Pavia, Italy

EuMC/EuRAD01 : Automotive Radar II

Chair: Thomas Zwick, KIT, Germany

Co-Chair: Kevin Cinglant, ZF Group, France

14:20-16:00, Wednesday 28th September 2022, Amber 5


- (NA) **C** **Status and Trends in Automotive Radars** (*Invited Keynote*)
Marlene Harter, Hochschule Offenburg, Germany
- (NA)  **C** **Instantaneous Ego-Motion Estimation Using a Coherent Radar Network**
Marcel Hoffmann¹, Lena Krabbe¹, Christian Schüßler¹, Peter Gulden², Martin Vossiek¹
¹FAU Erlangen-Nürnberg, Germany; ²indie Semiconductor, Germany
- (NA)  **C** **Doppler Beam Sharpening for High-Resolution Imaging in Dynamic Automotive Scenes**
S.L. Cassidy, S. Pooni, Anum Pirkani, E.G. Hoare, Mikhail Cherniakov, Marina S. Gashinova, University of Birmingham, UK
- (NA)  **C** **Influence of Ramp Timing Dither on Modulation-Based Radar Target Simulators**
Pirmin Schoeder, Vinzenz Janoudi, Timo Grebner, Arne Martin, Christian Waldschmidt, Universität Ulm, Germany
- (NA)  **C** **Non-Invasive Axle-Based Vehicle Classification Utilising Tracking Radar Technology**
V.R.J. Deville¹, C.M. Lievers², J.H. Manton¹
¹University of Melbourne, Australia; ²Sensys Gatso Group, The Netherlands

EuMC/EuRAD02 : Novel Antennas for Space Applications

Chair: Piero Angeletti, ESA-ESTEC, The Netherlands

Co-Chair: Stefania Monni, TNO, The Netherlands

16:40-18:20, Wednesday 28th September 2022, Amber 2







- (NA)  **Antennas for Space: Recent European Developments and Trends** (*Invited Keynote*)
Peter de Maagt, Salvatore D'Addio, Natanael Ayllon, Piero Angeletti, ESA-ESTEC, The Netherlands
- 852  **Low-Profile Highly Directive 2D-Beam-Steering Antenna in Ka-Band with 3D-Printed All-Dielectric Sub-Wavelength Deflectors**
Thi Quynh Van Hoang, Matthieu Bertrand, Erika Vandelle, Brigitte Loiseaux, Thales, France
- 856  **Numerical Investigation About the Impact of Struts on the European Space Agency Deep Space Antennas Efficiency and Sidelobes**
D. Arenare¹, F. Pelorossi², F. Concaro², Marco Pasian¹
¹Università di Pavia, Italy; ²ESA-ESOC, Germany
- 860  **A Mechanically Steered Antenna Using a Moving Part Based on Gap Waveguide**
Bertrand Boin, Agnès Lesure, Thales, France
- 864  **Link Budget and Design Approach of a Non-Terrestrial 5G Automotive Antenna**
Umair Tayyab¹, Hans-Peter Petry², Ashish Kumar¹, Md. Golam Robbani¹, Thomas Wack³, Matthias A. Hein¹
¹Technische Universität Ilmenau, Germany; ²DeSK, Germany; ³Wiegand, Germany

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Chair: Fabiola Colone, Università di Roma "La Sapienza", Italy



Co-Chair: Nicolò Delmonte, Università di Pavia, Italy



16:00-18:20, Wednesday 28th September 2022, Exhibition Hall



- 868  **Increased Coding Capacity of Chipless RFID Tags Using Radiation Pattern Diversity**
Florian Requena, Nicolas Barbot, Darine Kaddour, Etienne Perret, LCIS (EA 3747), France
- 872  **A Multicarrier Communication Method to Increase Radio Coverage for UHF RFID**
Jasmin Walk¹, Martin Maderboeck¹, Georg Saxl¹, Manuel Ferdik², Moritz Fischer¹, Thomas Ussmueller¹
¹Universität Innsbruck, Austria; ²MCI, Austria
- 876  **Antenna Design for 5G-Based Train-Centric Control System**
Dong-Jin Lee¹, Sang-Jin Oh², In-June Hwang³
¹KRRI, Korea; ²C to C tech, Korea; ³KRISS, Korea
- 880  **Analysis of Onboard Channel Measurements for Train Communication Scenarios in the Context Towards 6G Enabling Technologies**
Johann Lichtblau¹, Kariem Elkholy², Alexander Koelpin¹
¹Technische Universität Hamburg, Germany; ²FAU Erlangen-Nürnberg, Germany
- 884  **A Standalone 5G Industrial Testbed Design Considerations for Industry 4.0**
Ying Rao Wei, Anil S. Keshavamurthy, Ralph Wittmann, Antonio R. Zahonero, Intel, Germany
- 888  **Multi-Hole Waveguide Directional Coupler Design via Brick-Based Microwave Design Methodology**
Sefa Erdogan¹, Anil Arici¹, Umut Bulus¹, Huseyin Aniktar²
¹Antenom Antenna Technologies, Türkiye; ²TÜBİTAK BİLGEM, Türkiye



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- (NA)   **Hybrid Mechanical/Electrical Steering Antenna: Concept, Design and First Mockup**
Benoît Lesur¹, Anaël Lohou¹, Fabien Péleau¹, Alain Karas¹, Romain Contreres²
¹Safran Data Systems, France; ²CNES, France

- (NA)   **2D Virtual Array Techniques for MIMO Radar**
H. Yamada¹, T. Kato¹, H. Mori²
¹Niigata University, Japan; ²Toshiba, Japan

- (NA)   **Quasi-Monostatic Antenna Displacement in Radar Target Simulation**
Axel Diewald, Benjamin Nuss, Thomas Zwick, KIT, Germany

- (NA)   **Human Interpretable Radar Through Deep Generative Models**
Nir Dvorecki, Yuval Amizur, Leor Banin, Mobileye, Israel

- (NA)   **Sensing Performance of Different Codes for Phase-Coded FMCW Radars**
Utku Kumbul¹, Nikita Petrov², Cicero S. Vaucher², Alexander Yarovoy¹
¹Technische Universiteit Delft, The Netherlands; ²NXP Semiconductors, The Netherlands