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Tu1A: AI/Machine-Learning Technologies for Microwaves

Chair: Qi-Jun Zhang, Carleton University — Co-Chair: Costas D. Sarris, University of Toronto













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Chair: Roee Ben-Yishay, Mobileye — Co-Chair: Damla Dimlioglu, Cornell University
















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Tu1E: Advanced Techniques for mm-Wave Signal Generation

Chair: José Luis Gonzalez-Jimenez, CEA-Leti — Co-Chair: Danny Elad, Indie Semiconductor







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Chair: Adrian Tang, JPL — Co-Chair: Qi-Jun Zhang, Carleton University





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¹HRL Laboratories, USA **A** ; ²AFRL, USA **A** ; ³University of Notre Dame, USA **A**
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Chair: Shirin Montazeri, Google — Co-Chair: Kevin Kobayashi, Qorvo




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¹UESTC, China **A** ; ²CETC 29, China **A**
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Tu2E: Advanced Frequency Conversion and Signal Generation

Chair: Amit Jha, Qualcomm — Co-Chair: Yi-Jan Emery Chen, National Taiwan University












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¹National Taiwan University, Taiwan  ; ²Academia Sinica, Taiwan 
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¹ESA-ESTEC, The Netherlands  ; ²IMST, Germany  ; ³University of Birmingham, UK  ; ⁴Vmicro, France  ; ⁵NPL, UK  ; ⁶Topsil GlobalWafers, Denmark 

Tu3A: Artificial Intelligence and Machine-Learning Techniques for Signal and Power Integrity

Chair: José E. Rayas-Sanchez, ITESO — Co-Chair: Costas D. Sarris, University of Toronto

















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¹Carleton University, Canada  ; ²IIT Jodhpur, India 
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Chair: Charles Campbell, Qorvo — Co-Chair: Pei-Ling Chi, NYCU















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¹IMS (UMR 5218), France  ; ²STMicroelectronics, France 
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¹imec, Belgium  ; ²AT&S, Austria 

Tu3C: Emerging mm-Wave Integrated Transceivers and Beamformers

Chair: Najme Ebrahimi, University of Florida — Co-Chair: Kenneth Mays, Boeing














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¹Zhejiang University, China  ; ²University of California, Davis, USA 
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Tu3D: Power Amplifier Design Solutions for Sub-6GHz Applications

Chair: Vittorio Camarchia, Politecnico di Torino — Co-Chair: Ali M. Darwish, U.S. Army Research Laboratory

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¹Hanyang University, Korea  ; ²Gangneung-Wonju National University, Korea 
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¹Technische Universiteit Delft, The Netherlands  ; ²Huawei Technologies, Sweden 
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Tu3D-4  **C** Load-Modulated Balanced Amplifier Design for Handset Applications
Kiichiro Takenaka, Yuuma Noguchi, Satoshi Arayashiki, Takaya Wada, Murata Manufacturing, Japan 
- PAGE 215
Tu3D-5  **C** Design of Highly-Efficient Dual-Band GaN HEMT Power Amplifier with Dual-Class E/F⁻¹ Operation
Dang-An Nguyen, Gia Thang Bui, Chulhun Seo, Soongsil University, Korea 

Tu3E: Advanced High-Frequency Mixed-Signal Circuits and Systems

Chair: Christian Carlowitz, FAU Erlangen-Nürnberg — Co-Chair: Manjunath Kareppagoudr, AMD












Room 31C, 13:30-15:10, Tuesday 13 June 2023

- N/A
Tu3E-1  **C** Low Jitter Frequency Generation for 5G mm-Wave Cellular Applications
Wanghua Wu, Samsung, USA 
- PAGE 220
Tu3E-2  **C** An All-Digital Carrier Synthesis for Stepped OFDM Radars
David Werbunat¹, Benedikt Schweizer¹, Matthias Maier¹, Christina Bonfert¹, Daniel Schindler², Philipp Hinz¹, Jürgen Hasch², Christian Waldschmidt¹
¹Universität Ulm, Germany  ; ²Robert Bosch, Germany 
- (MWTL)
Tu3E-3  **C** A 142-GHz 4/5 Dual-Modulus Prescaler for Wideband and Low Noise Frequency Synthesizers in 130-nm SiGe:C BiCMOS
Lukas Polzin¹, Marcel van Delden¹, Nils Pohl¹, Holger Rücker², Thomas Musch¹
¹Ruhr-Universität Bochum, Germany  ; ²IHP, Germany 
- PAGE 224
Tu3E-4  **C** A Fast and Highly-Linear Phase-Frequency Detector with Low Noise for Fractional Phase-Locked Loops
Marcel van Delden¹, Lukas Polzin¹, Bent Walther¹, Nils Pohl¹, Klaus Aufinger², Thomas Musch¹
¹Ruhr-Universität Bochum, Germany  ; ²Infineon Technologies, Germany 
- (MWTL)
Tu3E-5  **C** 120Gb/s 2.8V_{pp,diff} Low-Power Differential Driver for InP Mach-Zehnder Modulator Using 55-nm SiGe HBTs
Jung Han Choi, Nisarg Nijanandi, Fraunhofer HHI, Germany 
- PAGE 228
Tu3E-6  **C** A 21Gb/s Arbitrary Binary Sequence Generator for PMCW Radar Based on a TSPC Serializer in 22nm FDSOI
Florian Probst¹, Andre Engelmann¹, Vadim Issakov², Robert Weigel¹
¹FAU Erlangen-Nürnberg, Germany  ; ²Technische Universität Braunschweig, Germany 

Tu4A: Advances in Computer-Aided Analysis and Design

Chair: Erin Kiley, Massachusetts College of Liberal Arts — Co-Chair: Marco Pirola, Politecnico di Torino

Room 30AB, 15:40–17:20, Tuesday 13 June 2023

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Tu4A-1  **C** **Statistical Synthesis of Optimal Coupling Matrix for Robotic Automatic Tuning of Microwave Bandpass Filters**
Kam Fung Lao, Ke-Li Wu, CUHK, China 
- PAGE 235
Tu4A-2  **C** **Adaptive Generation of Rational Function Approximations for Microwave Network Parameters**
Andria Lemus, Arif Ege Engin, San Diego State University, USA 
- (MWTL)
Tu4A-3  **C** **Substitution Method for the Analysis of Systems Based on Two Nonlinear Resonators**
Almudena Suárez, Franco Ramírez, Universidad de Cantabria, Spain 
- PAGE 239
Tu4A-4  **C** **Analysis of a Sensor Based on an Injection-Locked Oscillator Driven by a Chirp Signal**
Sergio Sancho, Franco Ramírez, Mabel Pontón, Almudena Suárez, Universidad de Cantabria, Spain 
- PAGE 243
Tu4A-5  **C** **Geometry Scaling of Microwave Filters Using an Adaptive Homotopy Continuation Method**
Anlan Liu¹, Ming Yu²
¹Chinese University of Hong Kong, China  ; ²SUSTech, China 

Tu4B: Integrated Filters

Chair: Pei-Ling Chi, NYCU — Co-Chair: Kamal Samanta, Sony












Room 30C, 15:40–17:20, Tuesday 13 June 2023

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Tu4B-1  **C** **Intrinsically Switched Multiplexer Based Reconfigurable Filter MMIC**
Charles F. Campbell, Deep C. Dumka, Ajay S. Bodade, Randy D. Kinnison, Matthew S. Essar, Jeffrey N. Miller, Qorvo, USA 
- (MWTL)
Tu4B-2  **C** **Realization of Low-Loss Fully Passive Harmonic Rejection N-Path Filters**
Soroush Araei, Shahabeddin Mohin, Negar Reiskarimian, MIT, USA 
- PAGE 251
Tu4B-3  **C** **An Extended Mason Model for Spurious-Mode Modeling of High Q FBAR Resonators**
Jiashuai Wang, Xuan Zhang, Tao Yang, UESTC, China 
- PAGE 255
Tu4B-4  **C** **High-Q Monolithically-Integrated Bandpass Filters Using Quarter-Spherical Resonators**
Dimitra Psychogiou¹, Kunchen Zhao²
¹Tyndall National Institute, Ireland  ; ²University of Colorado Boulder, USA 
- PAGE 259
Tu4B-5  **C** **Miniaturized IPD Filter with Flexibly Controllable Transmission Zeros Based on Novel Coupling Theory for 5G Application**
Yan Zheng, Hanyu Tian, Yuandan Dong, UESTC, China 

Tu4D: Advanced Linearization Techniques for Power Amplifiers and MIMO Transmitters

Chair: Varish Diddi, Qualcomm — Co-Chair: Pere L. Gilabert, Universitat Politècnica de Catalunya






Room 31AB, 15:40-17:20, Tuesday 13 June 2023

- (MWTL)  **C** **On the Viability of Using a Subset of Transmitter-Observation Receivers for Training a Common DPD in Fully Digital MIMO Transmitters**
Jin Gyu Lim, Hoda Barkhordar-pour, Ahmed Ben Ayed, Patrick Mitran, Slim Boumaiza, University of Waterloo, Canada 
- PAGE 263  **C** **Real-Time FPGA-Based Implementation of Digital Predistorters for Fully Digital MIMO Transmitters**
Hoda Barkhordar-pour, Jin Gyu Lim, Mohammed Almoneer, Patrick Mitran, Slim Boumaiza, University of Waterloo, Canada 
- PAGE 267  **C** **Widen Linearization Angle of Beamforming Arrays with Semi-Partitioned Digital Predistortion**
Qing Luo, Anding Zhu, University College Dublin, Ireland 
- PAGE 271  **C** **New Digital Predistortion Training Method with Cross-Polarization Channel De-Embedding for Linearizing Dual-Polarized Arrays Using Far-Field Observation Receiver**
Nizar Messaoudi, Ahmed Ben Ayed, Ziran He, Bernard Tung, Patrick Mitran, Slim Boumaiza, University of Waterloo, Canada 
- PAGE 275  **C** **Incremental DPD Linearization for Mobile Terminals with Non-Flat Frequency Response in Dynamic Bandwidth Re-Allocation Scenarios**
Wantao Li¹, Yan Guo², Gabriel Montoro¹, Pere L. Gilabert¹
¹Universitat Politècnica de Catalunya, Spain  ; ²Huawei HiSilicon, China 








We1A: Space Systems and Technologies

Chair: Jan Budroweit, DLR — Co-Chair: KJ Koh, Boeing

Room 23ABC, 08:00-09:40, Wednesday 14 June 2023

- (MWTL)  **C** **A Ka-Band 64-Element Deployable Active Phased-Array TX on a Flexible Hetero Segmented Liquid Crystal Polymer for Small Satellites**
Dongwon You¹, Xi Fu¹, Hans Herdian¹, Xiaolin Wang¹, Yasuto Narukiyo¹, Ashbir Aviat Fadila¹, Hojun Lee¹, Michihiro Ide¹, Sena Kato¹, Zheng Li¹, Yun Wang¹, Daisuke Awaji², Jian Pang¹, Hiraku Sakamoto¹, Kenichi Okada¹, Atsushi Shirane¹
¹Tokyo Tech, Japan  ; ²Fujikura, Japan 
- PAGE 279  **C** **OTA Evaluation of a K-Band Receive Phased-Array Antenna-in-Package for SATCOM on the Move User Terminal**
Amir Raeesi¹, Naimeh Ghafarian¹, Ardeshir Palizban¹, Ehsan Alian², Ahmad Ehsandar², Mohammad-Reza Nezhad-Ahmadi¹, Wael M. Abdel-Wahab¹, Safieddin Safavi-Naeini¹
¹University of Waterloo, Canada  ; ²C-COM Satellite Systems, Canada 
- PAGE 283  **C** **Thinned Spiral-Configuration Ka-Band SATCOM Phased-Arrays with Diffraction-Limited Beams and Wide Scan Angles**
Jiyeon Park, Linjie Li, Kevin Kai Wei Low, Gabriel M. Rebeiz, University of California, San Diego, USA 
- PAGE 287  **C** **Inter-Satellite Phase and Frequency Synchronization for Software-Defined CubeSat Radio Subsystems**
Dominik Pearson¹, Julian Scharnagl¹, Klaus Schilling¹, Markus Gardill²
¹Zentrum für Telematik, Germany  ; ²Brandenburgische Technische Universität, Germany 

We1A continued ...

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We1A-5  **C** **Investigation of Heavy-Ion Induced Single Event Effects for GaAs and GaN-Based RF Amplifiers in Space Applications**
J. Budroweit, DLR, Germany 
- PAGE 295
We1A-6  **C** **Radiometric Noise Characterization of the 183–664GHz Front-End Receivers for the MetOp-SG Ice Cloud Imager Instrument — Prospects for Future Missions**
B. Thomas¹, G. Sonnabend¹, N. Wehres¹, M. Brandt¹, M. Trasatti¹, A. Andrés-Beivide², M. Bergada², J. Martinez², P. Robustillo³, M. Gotsmann³, U. Klein⁴
¹Radiometer Physics, Germany  ; ²Airbus, Spain  ; ³Airbus, Germany  ; ⁴ESA-ESTEC, The Netherlands 

We1B: Enabling Technologies for Sub-THz and THz Systems













*Chair: Telesphor Kamgaing, Intel — Co-Chair: Joe Qiu, U.S. Army Research Laboratory**Room 24ABC, 08:00–09:40, Wednesday 14 June 2023*

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We1B-1  **C** **A 220–300GHz Vector Modulator in 35nm GaAs mHEMT Technology**
Konstantin Kuliabin¹, Cristina Maurette Blasini¹, Roger Lozar², Sébastien Chartier², Rüdiger Quay¹
¹Albert-Ludwigs-Universität Freiburg, Germany  ; ²Fraunhofer IAF, Germany 
- PAGE 303
We1B-2  **C** **Integrated Silicon Lens-Antenna Based on a Top-Hat Leaky-Wave Feed for Quasi-Optical Power Distribution at THz Frequencies**
M. Alonso-delPino¹, S. Bosma¹, C. Jung-Kubiak², J. Bueno¹, G. Chattopadhyay², N. Llombart¹
¹Technische Universiteit Delft, The Netherlands  ; ²JPL, USA 
- PAGE 307
We1B-3  **C** **Stub-Loaded Via Transition for Wideband Impedance Matching of Sub-THz 6G Antenna-in-Package**
Dongjin Jung, Chan Ju Park, Taek Sun Kwon, ByungKuon Ahn, Jung Woo Seo, Sang-Hyuk Wi, Hwan-joon Kwon, Samsung, Korea 
- PAGE 311
We1B-4  **C** **A 28dBm-EIRP Low-Profile D-Band Transmitting Module with a Folded Transmitarray Antenna**
F. Foglia Manzillo, A. Hamani, A. Siligaris, A. Clemente, J.L. González-Jiménez, CEA-Leti, France 
- PAGE 315
We1B-5  **C** **3D Printed Metallized Polymer Slotted Waveguide Antenna Array for Automotive Radar Applications at 140GHz**
Maria Jozwicka¹, Alejandro Garcia-Tejero¹, Elizabeth Bekker², Jerzy Kowalewski¹, Francesco Merli¹, Thomas Zwick²
¹HUBER+SUHNER, Switzerland  ; ²KIT, Germany 

We1C: Broadband and High-Frequency GaN Power Amplifiers

Chair: Peter Asbeck, University of California, San Diego — Co-Chair: Sushil Kumar, National Instruments

Room 25ABC, 08:00-09:40, Wednesday 14 June 2023

- PAGE 319  **C** **A 2W 9.5–16.5GHz GaN Power Amplifier with 30% PAE Using Transformer-Based Output Matching Network**
Xiao Sun¹, Xu Zhu², Yong Wang¹, Pei-Ling Chi³, Tao Yang¹
¹UESTC, China  ; ²NWIEE, China  ; ³NYCU, Taiwan 
- PAGE 323  **C** **A 1.5-to-17GHz Non-Uniform Distributed Power Amplifier Using Reconfigurable Modules in 0.25 μ m GaN HEMT**
Shijie Chen¹, Fuchen Yan¹, Yuan Liang², Shu Ma¹, Dexin Shi¹, Xiang Li³, Huaizong Shao¹, Tao Yang¹, Yong Wang¹
¹UESTC, China  ; ²Guangzhou University, China  ; ³Nanhu Laboratory, China 
- PAGE 327  **C** **A 3-Way GaN Doherty Power Amplifier for 28GHz 5G FR2 Operation**
Anna Piacibello¹, Rocco Giofrè², Paolo Colantonio², Vittorio Camarchia¹
¹Politecnico di Torino, Italy  ; ²Università di Roma “Tor Vergata”, Italy 
- PAGE 331  **C** **A Balanced Stacked GaN MMIC Power Amplifier for 26-GHz 5G Applications**
Anna Piacibello, Chiara Ramella, Vittorio Camarchia, Marco Pirola, Politecnico di Torino, Italy 

We1D: Advanced Additively Manufactured RF Systems and Heterogeneous Solutions

Chair: Wolfgang Heinrich, FBH — Co-Chair: Arnaud Amadjikpe, Skyworks














Room 30AB, 08:00-09:40, Wednesday 14 June 2023

- (MWTL)  **C** **Additively Manufactured Flexible On-Package Phased Antenna Arrays with Integrated Microfluidic Cooling Channels for 5G/mmWave System-on-Package Designs**
Kexin Hu, Theodore W. Callis, Manos M. Tentzeris, Georgia Tech, USA 
- PAGE 335  **C** **A Fully 3D-Printed Flexible Millimeter-Wave Doppler Radar**
Hong Tang, Yingjie Zhang, Bowen Zheng, Sensong An, Mohammad Haerinia, Yunxi Dong, Yi Huang, Wei Guo, Hualiang Zhang, UMass Lowell, USA 
- PAGE 339  **C** **The Design Process for Monolithically Manufactured Millimeter-Wave Antenna Arrays Using Stereolithography 3D Printing**
Dominik Langer, Bartosz Tegowski, Nils C. Albrecht, Marvin Wenzel, Alexander Koelpin, Technische Universität Hamburg, Germany 
- PAGE 343  **C** **Low Insertion Loss Sub-6GHz Heterogeneous GaN/RF-SOI SPDT Switch for High Power Applications**
Imene Lahbib, Frédéric Drillet, Jérôme Loraine, Hassan Saleh, Ousmane Sow, Gregory U'Ren, X-FAB, France 

We1E: Theory and Inverse Design for Novel Applications

Chair: Vladimir Okhmatovski, University of Manitoba — Co-Chair: Costas D. Sarris, University of Toronto










Room 30C, 08:00–09:40, Wednesday 14 June 2023

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We1E-1  **C** **Inverse Design of Perfectly-Matched Metamaterials**
Shrey Thakkar¹, Luke Szymanski¹, Jorge Ruiz-Garcia¹, Gurkan Gok², Anthony Grbic¹
¹University of Michigan, USA  ; ²Raytheon Technologies, USA 
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We1E-2  **C** **Ultra-Fast Simulation and Inverse Design of Metallic Antennas**
Yifei Zheng, Constantine Sideris, University of Southern California, USA 
- PAGE 355
We1E-3  **C** **Time-Reversal Source Reconstruction with Arbitrary-Order Kurtosis**
Xiao-Yao Feng¹, Zhizhang Chen¹, Juan Li², Jun Cai²
¹Dalhousie University, Canada  ; ²Fuzhou University, China 
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We1E-4  **C** **Constant Impedance Transmission Line with Leaky-Wave Radiation**
Yongsheng Pan, Yuandan Dong, UESTC, China 
- PAGE 362
We1E-5  **C** **Spectral Element Method for Modeling Eccentric Coaxial Waveguides Filled with Anisotropic Media via Conformal Transformation Optics**
Raul O. Ribeiro¹, Johnes R. Gonçaves¹, Fernando L. Teixeira², José R. Bergmann¹, Guilherme S. Rosa¹
¹PUC-Rio, Brazil  ; ²The Ohio State University, USA 

We1F: Emerging Technologies for Transmission Lines and Planar Components

Chair: David R. Jackson, University of Houston — Co-Chair: Bayaner Arigong, Florida State University











Room 30DE, 08:00–09:40, Wednesday 14 June 2023

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We1F-1  **C** **Testing Dielectric Slab Mode Excitation, Non-Rectangular Conductor Profiles and Edge Roughness as Sources of Additional Loss in mmWave Transmission Lines**
F. Bergmann, N. Jungwirth, B. Bosworth, J. Killgore, E. Marks, T. Karpisz, M. Papac, A. Osella, L. Enright, C.J. Long, N.D. Orloff, NIST, USA 
- PAGE 370
We1F-2  **C** **Miniaturized 7–12GHz 1-to-4 Differential Power Splitter with Low Amplitude/Phase Imbalances Using Broadside-Coupled CPW/SIDGS Scheme and Embedded CPW Spur-Line**
Qiqi Luo, Yunbo Rao, Yiyang Shu, Xun Luo, UESTC, China 
- PAGE 374
We1F-3  **C** **A Compact and High-Power Frequency-Selective Plasma Limiter with an Ultra-High Isolation**
Sandeep Narasapura Ramesh, Abbas Semnani, University of Toledo, USA 
- PAGE 378
We1F-5  **C** **A Full Duplex RF Front End Employing an Electrical Balanced Duplexer and a Chebyshev Load-Balancing Filter**
Dror Regev¹, Itamar Melamed², Nimrod Ginzberg², Emanuel Cohen²
¹Toga Networks, Israel  ; ²Technion, Israel 

We1G: Automotive and MIMO Radar

Chair: Richard Al Hadi, ETS — Co-Chair: Jacquelyn Vitaz, Raytheon



















Room 31AB, 08:00-09:40, Wednesday 14 June 2023

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We1G-1  **C** Improving the Short-Range Perception of MIMO Radars with LO Feedthrough Topologies by Complex Sampling
Dominik Schwarz, Nico Riese, Ines Dorsch, Christian Waldschmidt, Universität Ulm, Germany 
- PAGE 386
We1G-2  **C** A Compact 77GHz IQ-Modulated Transponder for High Gain and High Dynamic Range Radar Target Simulation
Christoph Birkenhauer, Georg Körner, Patrick Stief, Andreas Hofmann, Mohamad Alami El Dine, Christian Carlowitz, Martin Vossiek, FAU Erlangen-Nürnberg, Germany 
- PAGE 390
We1G-3  **C** Doppler Ambiguity Robust DOA Estimation Method
Sungdo Choi, Hyun-Woong Cho, Youngraee Cho, Samsung, Korea 
- PAGE 394
We1G-4  **C** Fast Super-Resolution Burg Algorithm for Increasing the Radar Angular Resolution
Henna Paaso, Mervi Hirvonen, VTT, Finland 
- N/A
We1G-5  **C** A Next-Generation Hybrid Analog Beamsteering and MIMO Digital Radar for Highly Automated Driving
Kevin Gu, Metawave, USA 

We1H: Innovative Non-Planar Filter Topologies and Synthesis

Chair: Cristiano Tomassoni, Università di Perugia — Co-Chair: Vicente E. Boria, Universitat Politècnica de València













Room 31C, 08:00-09:40, Wednesday 14 June 2023

- (MWTL)
We1H-1  **C** Direct-Coupled TE-TM Waveguide Cavities
Simone Bastioli¹, Richard Snyder¹, Cristiano Tomassoni², Valentin de la Rubia³
¹RS Microwave, USA  ; ²Università di Perugia, Italy  ; ³Universidad Politécnica de Madrid, Spain 
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We1H-2  **C** Dual-Mode Dielectric-Loaded Resonator for Satellite High-Power Filters
Paolo Vallerotonda¹, Fabrizio Cacciamani¹, Luca Pelliccia¹, Cristiano Tomassoni², Vittorio Tornielli di Crestvolant³
¹RF Microtech, Italy  ; ²Università di Perugia, Italy  ; ³ESA-ESTEC, The Netherlands 
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We1H-3  **C** Metal-Dielectric Coaxial Dual-Mode Resonator for Compact Inline Bandpass Filters
Yuliang Chen, Ke-Li Wu, CUHK, China 
- PAGE 406
We1H-4  **C** Double Notch Filter for GSM-R Applications with Wide Upper Passband
Giuseppe Macchiarella¹, Gian Guido Gentili¹, Matteo Oldoni¹, Cristina D'Asta¹, Giuseppe Frisario², Stefano Balzaretto²
¹Politecnico di Milano, Italy  ; ²POLOMARCONI.IT, Italy 
- (MWTL)
We1H-5  **C** On Searching All Solutions of Microwave Filter Synthesis Based on Interval Arithmetic
Yi Zeng, Ming Yu, SUSTech, China 
- PAGE 410
We1H-6  **C** Synthesis of Simplified Cross Coupled Blocks with All Positive Couplings
Stefano Tamiazzo¹, Giuseppe Macchiarella², Matteo Oldoni²
¹CommScope, Italy  ; ²Politecnico di Milano, Italy 

We2A: Model-Based Systems Engineering for RF, Microwave, and mm-Wave Applications

Chair: Dennis Lewis, Boeing — Co-Chair: Rob Jones, BAE Systems















Room 23ABC, 10:10-11:50, Wednesday 14 June 2023

- N/A
We2A-1  **C** **Model-Based Design of Next Generation RF and mmWave Systems**
B. Katz, MathWorks, USA 
- PAGE 415
We2A-2  **C** **System Model-to-Lab Methodology for GNSS Desensitization Testing**
Andrew J. Compston, Anthony Tsangaropoulos, oneNav, USA 
- PAGE 419
We2A-3  **C** **FPGA-Based High-Performance Real-Time Emulation of Radar System Using Direct Path Compute Model**
X. Mao, M. Mukherjee, N.M. Rahman, U. Kamal, S. Sharma, P. Behnam, J. Tong, J. Driscoll, T. Krishna, J. Romberg, S. Mukhopadhyay, Georgia Tech, USA 
- PAGE 423
We2A-4  **C** **Surrogate Modeling with Complex-Valued Neural Nets and its Application to Design of Sub-THz Patch Antenna-in-Package**
Oluwaseyi Akinwande, Osama Waqar Bhatti, Kai-Qi Huang, Xingchen Li, Madhavan Swaminathan, Georgia Tech, USA 
- PAGE 427
We2A-5  **C** **A Feature-Based Filtering Algorithm with 60GHz MIMO FMCW Radar for Indoor Detection and Trajectory Tracking**
Wenjie Li, Yuchen Li, Jiayu Zhang, Jingyun Lu, Shuqin Dong, Changzhan Gu, Junfa Mao, SJTU, China 
- PAGE 431
We2A-6  **C** **Unique RF Modeling Enhances 5G Network Scenario Simulation**
Eva Ribes-Vilanova, Wilfredo Rivas-Torres, Peter Blood, Jan Verspecht, Osamu Kusano, Wei Liu, Jeffrey Weaver, Ian Rippke, Keysight Technologies, USA 

We2B: THz and Sub-THz System Demonstrations

Chair: Lei Liu, University of Notre Dame — Co-Chair: Theodore Reck, Virginia Diodes
















Room 24ABC, 10:10-11:50, Wednesday 14 June 2023

- (MWTL)
We2B-1  **C** **300-GHz-Band Four-Element CMOS-InP Hybrid Phased-Array Transmitter with 36° Steering Range**
Ibrahim Abdo¹, Teruo Jyo¹, Adam Pander¹, Hitoshi Wakita¹, Yuta Shiratori¹, Miwa Muto¹, Hiroshi Hamada¹, Munehiko Nagatani¹, Carrel da Gomez², Chun Wang², Kota Hatano², Chenxin Liu², Ashbir Aviat Fadila², Jian Pang², Atsushi Shirane², Kenichi Okada², Hiroyuki Takahashi¹
¹NTT, Japan  ; ²Tokyo Tech, Japan 
- PAGE 435
We2B-2  **C** **Terahertz Wireless Communications Using SiC-Substrate-Based Fermi-Level Managed Barrier Diode Receiver**
Weijie Gao¹, Tsubasa Saijo¹, Keisuke Maekawa¹, Tadao Ishibashi², Hiroshi Ito³, Tadao Nagatsuma¹
¹Osaka University, Japan  ; ²Wavepackets, Japan  ; ³Kitasato University, Japan 
- PAGE 439
We2B-3  **C** **High Capacity Dual-Polarization THz-Wireless Transmission in the 300GHz Band Using a Broadband Orthomode Transducer**
Oliver Stiewe¹, Thomas Merkle², Robert Elschner¹, Joachim Hoppe², Colja Schubert¹, Ronald Freund¹
¹Fraunhofer HHI, Germany  ; ²Fraunhofer IAF, Germany 
- PAGE 443
We2B-4  **C** **An 80Gbps QAM-16 PMF Link Using a 130nm SiGe BiCMOS Process**
Frida Strömbeck, Yu Yan, Herbert Zirath, Chalmers University of Technology, Sweden 
- PAGE 446
We2B-5  **C** **A 220GHz Code-Domain Focal Plane Imaging Radar with 0.78° Angular Resolution for Automotive Applications**
Yinuo Xu, Arjang Hassibi, Thomas H. Lee, Stanford University, USA 

We2C: High-Power (>10W) Load Modulated GaN Power Amplifiers

Chair: Taylor Barton, University of Colorado Boulder — Co-Chair: Paolo de Falco, Qualcomm













Room 25ABC, 10:10-11:50, Wednesday 14 June 2023

- (MWTL)  **C Compact 40% Fractional Bandwidth Doherty PA with Input Group Delay Engineering**
 We2C-1 *Manuel Cavarroc¹, Anthony Lamy¹, Olivier Lembeye¹, Roy McLaren², Claude Duvanaud³, Smail Bachir³*
¹NXP Semiconductors, France  ; ²NXP Semiconductors, USA  ; ³XLIM (UMR 7252), France 
- PAGE 450  **C Continuous Quasi-Load Insensitive Class-E Mode for Wideband Doherty Power Amplifiers**
 We2C-2 *Xuan Anh Nghiem, John Gajadharsing, Ampleon, The Netherlands *
- PAGE 454  **C Bandwidth Extension of a Doherty Power Amplifier Through Reduction of Packaging-Related Parasitic Effects**
 We2C-3 *Ioannis Peppas¹, Hiroaki Takahashi¹, Sebastian Sattler², Markus Kastelic³, Erich Schlaffer³, Helmut Paulitsch¹, Wolfgang Bösch¹*
¹Technische Universität Graz, Austria  ; ²Infineon Technologies, Austria  ; ³AT&S, Austria 
- PAGE 458  **C A 6-/12-dB Back-Off Multi-Mode GaN MMIC Doherty Power Amplifier for 5G Applications**
 We2C-4 *Hansik Oh¹, Woojin Choi², Jaekyung Shin², Yifei Chen², Hyunuk Kang¹, Young Yun Woo¹, Youngoo Yang²*
¹Samsung, Korea  ; ²Sungkyunkwan University, Korea 
- PAGE 462  **C Reconfigurable Hybrid Asymmetrical Load Modulated Balanced Amplifier with High Linearity, Wide Bandwidth, and Load Insensitivity**
 We2C-5 *Jiachen Guo, Kenle Chen, University of Central Florida, USA *

We2D: Advanced Packaging and Interconnects

Chair: Rhonda R. Franklin, University of Minnesota, Twin Cities — Co-Chair: Manos M. Tentzeris, Georgia Tech











Room 30AB, 10:10-11:50, Wednesday 14 June 2023

- PAGE 466  **C Broadband Hetero-Integration of InP Chipllets on SiGe BiCMOS for mm-Wave MMICs up to 325GHz**
 We2D-1 *Marko Rausch¹, Matthias Wietstruck², Christoph Stölmacker¹, Ralf Doerner¹, Gunter Fischer², Andreas Thies¹, Steffen Knigge¹, Hady Yacoub¹, Wolfgang Heinrich¹*
¹FBH, Germany  ; ²IHP, Germany 
- PAGE 470  **C A Wide-Band Millimeter Wave RWG to Air-Filled SIW Transition**
 We2D-2 *Muhammad Shah Alam¹, Khalid AlMuhanna¹, Asif Alam², Haoran Zhang³, Atif Shamim³*
¹IMSIU, Saudi Arabia  ; ²Delta International School, Saudi Arabia  ; ³KAUST, Saudi Arabia 
- PAGE 474  **C A Novel Ultra-Broadband Low-Loss Bond-Wire Interconnect Design Concept Applied to a 2GHz to 135GHz Substrate-to-Substrate Interface**
 We2D-3 *Tim Pfahler¹, Andre Scheder¹, Anna Bridier², Jan Schür¹, Martin Vossiek¹*
¹FAU Erlangen-Nürnberg, Germany  ; ²Rohde & Schwarz, Germany 
- PAGE 478  **C Design, Fabrication, and Far-Field Measurement of FOWLP-Based Tightly Coupled Antenna Modules Integrated with CMOS Chipset for mmWave Applications**
 We2D-4 *Dongseop Lee, Jae-Yeong Lee, Kangseop Lee, Minkyung Kim, Myoungsun Kim, Youngno Youn, Ho-Jin Song, Wonbin Hong, POSTECH, Korea *

We2E: Sensors and Models for Microwave and mm-Wave Propagation

Chair: Malgorzata Celuch, QWED — Co-Chair: Da Huang, MathWorks














Room 30C, 10:10–11:50, Wednesday 14 June 2023

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We2E-1  **C** **Near and Far Field Characteristics of Two In Line Graphene Coated Dielectric Nanowires Excited by Modulated Electron Beam**
Dariia O. Herasymova, NASU, Ukraine 
- (MWTL)
We2E-2  **C** **An Effective Surface Impedance Concept to Model Arbitrary Roughness Profiles on Printed Circuit Boards up to 110GHz**
Felix Sepaintner¹, Andreas Scharl¹, Johannes Jakob¹, Michael Schmalzbauer², Franz Röhr², Werner Bogner¹, Stefan Zorn²
¹Technische Hochschule Deggendorf, Germany  ; ²Rohde & Schwarz, Germany 
- PAGE 486
We2E-3  **C** **OAM Multiplexing of 5GHz Band Microwave Signal Propagating Along PVC Pipe Walls for a Buried Pipe Inspection Robot**
Akihiko Hirata, Chiba Institute of Technology, Japan 
- PAGE 490
We2E-5  **C** **Multi-Frequency Resonant Measurements of the Complex Permittivity and Initial Permeability of Barium Ferrite Ceramic**
Jerzy Krupka¹, Adam Pacewicz¹, Bartłomiej Salski¹, Damian Prusak², Adam Magalski²
¹Warsaw University of Technology, Poland  ; ²PIT-RADWAR, Poland 

We2F: Substrate Integration Technology for GHz and THz Applications

Chair: Ke Wu, Polytechnique Montréal — Co-Chair: Maurizio Bozzi, Università di Pavia












Room 30DE, 10:10–11:50, Wednesday 14 June 2023

- (MWTL)
We2F-1  **C** **Vertically Stacked Double-Layer Substrate-Integrated Nonradiative Dielectric Waveguides for THz Applications**
Chun-Mei Liu, Ke Wu, Polytechnique Montréal, Canada 
- PAGE 493
We2F-2  **C** **Implementation of SIW Cavity in Commercial CMOS Technology for Sub-Terahertz Band Applications**
Samundra K. Thapa¹, Ramesh K. Pokharel¹, Adel Barakat¹, Ruibing Dong², Shuhei Amakawa³, Shinsuke Hara², Issei Watanabe², Akifumi Kasamatsu²
¹Kyushu University, Japan  ; ²NICT, Japan  ; ³Hiroshima University, Japan 
- PAGE 497
We2F-3  **C** **200GHz-Band Low-Loss Half-Mode SIW CMOS Interconnects and Transmission Lines for Sub-Terahertz Frequency Band Applications**
Ramesh K. Pokharel¹, Tomoki Fukuda¹, Samundra K. Thapa¹, Adel Barakat¹, Ruibing Dong², Shinsuke Hara², Issei Watanabe², Akifumi Kasamatsu²
¹Kyushu University, Japan  ; ²NICT, Japan 
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We2F-4  **C** **An Ultrawideband Transition from Substrate Integrated Suspended Parallel Strip Line to Grounded Coplanar Waveguide**
Shutao He, Yongqiang Wang, Kaixue Ma, Tianjin University, China 
- PAGE 505
We2F-5  **C** **Concurrent Multi-Mode Excitation for Mode Division Multiplexing Over Substrate Integrated Waveguides**
Mohamed H.A. Elsayaf, Constantine Sideris, University of Southern California, USA 

We2G: Advanced mm-Wave Radar Systems

Chair: Nils Pohl, Ruhr-Universität Bochum — Co-Chair: Jeffrey A. Nanzer, Michigan State University






Room 31AB, 10:10-11:50, Wednesday 14 June 2023

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We2G-1  **C** **A Compact 140-GHz Radar MMIC with I/Q Downconverter in SiGe BiCMOS Technology**
Isabel Kraus¹, Herbert Knapp², Daniel Reiter¹, Nils Pohl¹
¹Ruhr-Universität Bochum, Germany  ; ²Infineon Technologies, Germany 
- PAGE 513
We2G-2  **C** **A Low-Power, Subharmonic Super-Regenerative Receiver Toward a Massive Multichannel FMCW Radar Close to Cut-Off Frequency**
Leonhard Hahn, Martin Vossiek, Christian Carlowitz, FAU Erlangen-Nürnberg, Germany 
- PAGE 517
We2G-3  **C** **An Active Self-Interference Cancellation Coupler with 60dB Isolation Applied in a 24GHz SFCW Radar**
Patrick Fenske, Tobias Kögel, Andre Scheder, Konstantin Root, Christian Carlowitz, Martin Vossiek, FAU Erlangen-Nürnberg, Germany 
- (MWTL)
We2G-4  **C** **Privacy Preserving Contraband Detection Using a Millimeter-Wave Dynamic Antenna Array**
Daniel Chen, Jeffrey A. Nanzer, Michigan State University, USA 
- PAGE 521
We2G-5  **C** **A High-Efficiency and High-Accuracy Distance Measurement Technique Based on Phase Differentiation and Accumulation with FMCW Radars**
Jingtao Liu, Zesheng Zhang, Jingyun Lu, Yuchen Li, Changzhan Gu, Junfa Mao, SJTU, China 

We2H: Advanced Waveguide Filters

Chair: Anthony Ghiotto, Université de Bordeaux — Co-Chair: Richard V. Snyder, RS Microwave












Room 31C, 10:10-11:50, Wednesday 14 June 2023

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We2H-1  **C** **Design of Dual Stopband Filters for Interference Suppression**
Joaquín F. Valencia Sullca¹, Santiago Cogollos¹, Vicente E. Boria¹, Marco Guglielmi¹, Simone Bastioli², Richard Snyder²
¹Universitat Politècnica de València, Spain  ; ²RS Microwave, USA 
- PAGE 529
We2H-2  **C** **Compact Wideband Stepped Impedance Filters with Resonant Apertures**
David Rubio, Santiago Cogollos, Vicente E. Boria, Marco Guglielmi, Universitat Politècnica de València, Spain 
- PAGE 533
We2H-3  **C** **A Frequency-Variant Coupling Structure for Inline Rectangular Waveguide Filters**
Enrique López-Oliver¹, Cristiano Tomassoni¹, Giuseppe Macchiarella², Matteo Oldoni²
¹Università di Perugia, Italy  ; ²Politecnico di Milano, Italy 
- PAGE 537
We2H-4  **C** **A Novel Multi-Functional Coupled Resonator Based Balun Filter in Waveguide Technology**
Gowrish Basavarajappa, IIT Roorkee, India 
- PAGE 541
We2H-5  **C** **In-Line Wideband Waveguide Bandpass Filters Using Hybrid Irises and Non-Uniform Resonators with Over-Octave Spurious Suppression**
Zhihong Xu, Jin Li, Sicheng Chen, Tao Yuan, Shenzhen University, China 
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We2H-6  **C** **A 250GHz Low-Loss Inline Waveguide Bandpass Filter Using Bandstop Resonator Pairs**
Jing-Yu Lin¹, Yang Yang², Ting Zhang³, Sai-Wai Wong⁴
¹Xiamen University, China  ; ²UTS, Australia  ; ³CSIRO, Australia  ; ⁴Shenzhen University, China 







We3A: Quantum Computing/Sensing Components and Techniques

Chair: Luca Pierantoni, Università Politecnica delle Marche — Co-Chair: Joseph Bardin, UMass Amherst

Room 23ABC, 13:30-15:10, Wednesday 14 June 2023

- (MWTL)  **C** **A 10-Gb/s 275-fsec Jitter Cryo-CMOS Charge-Sampling CDR for Quantum Computing Application**
Lennart de Jong, Joachim I. Bas, Jiang Gong, Fabio Sebastiano, Masoud Babaie, Technische Universiteit Delft, The Netherlands 
- PAGE 549  **C** **A Q-Band SiGe-HBT Cryogenic Colpitts VCO for Frequency-Division Multiplexed Quantum Computing**
Eren Vardarli¹, Xiaodi Jin¹, Austin Ying-Kuang Chen², Klaus Aufinger³, Michael Schröter¹
¹Technische Universität Dresden, Germany  ; ²University of California, Santa Cruz, USA  ; ³Infineon Technologies, Germany 
- (MWTL)  **C** **Resistance Ratio Enhancement in Phase-Change RF Switches at Cryogenic Temperatures**
Tejinder Singh¹, Raafat R. Mansour²
¹Dell Technologies, Canada  ; ²University of Waterloo, Canada 
- PAGE 553  **C** **Field Enhancement for Sensitivity Improvement of a Room-Temperature Rydberg-Atom Receiver**
Georgia Sandidge, Gabriel Santamaria Botello, Zoya Popović, University of Colorado Boulder, USA 













We3A continued ...

- PAGE 557  **C** **Impedance Standard Substrate Characterization and EM Model Definition for Cryogenic and Quantum-Computing Applications**
Ehsan Shokrolahzade¹, Fabio Sebastiano¹, Faisal Mubarak², Masoud Babaie¹, Marco Spirito¹
¹Technische Universiteit Delft, The Netherlands  ; ²VSL, The Netherlands 
- PAGE 561  **C** **Characterizing Precision Coaxial Air Lines as Reference Standards for Cryogenic S-Parameter Measurements at Milli-Kelvin Temperatures**
James Skinner¹, Manoj Stanley¹, Jonas Urbonas², Sebastian de Graaf¹, Tobias Lindström¹, Nick Ridler¹
¹NPL, UK  ; ²Maury Microwave, USA 

We3B: THz Imagers and Detectors and Microwave Photonics

Chair: Debabani Choudhury, Intel — Co-Chair: Wooram Lee, Penn State University














Room 24ABC, 13:30-15:10, Wednesday 14 June 2023

- N/A
We3B-1  **C** **Microwave Photonics and Quantum Applications**
Lute Maleki, OEwaves, USA 
- PAGE 566
We3B-2  **C** **16 Frames-per-Second Terahertz Time-Domain Imaging Through a Plasmonic Photoconductive Focal-Plane Array**
Xurong Li, Deniz Mengu, Aydogan Ozcan, Mona Jarrahi, University of California, Los Angeles, USA 
- PAGE 570
We3B-3  **C** **Development of W-Band Dual-Polarization Kinetic Inductance Detectors on Silicon**
Marina C. de Ory¹, David Rodriguez¹, Luisa de la Fuente², Beatriz Aja², Enrique Villa¹, Daniel Bordner², Juan P. Pascual², Daniel Granados³, Eduardo Artal², Alicia Gomez¹
¹Centro de Astrobiología, Spain  ; ²Universidad de Cantabria, Spain  ; ³IMDEA Nanociencia, Spain 
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We3B-4  **C** **Antenna-Coupled Terahertz Detectors in 16nm FinFET**
Christopher Chen, Richard Al Hadi, Mau-Chung Frank Chang, University of California, Los Angeles, USA 
- (MWTL)
We3B-5  **C** **Experimental Demonstration of Multiband Comb-Enabled mm-Wave Transmission**
Dhecha Nopchinda, Zichuan Zhou, Zhixin Liu, Izzat Darwazeh, University College London, UK 













We3C: Novel Power Amplifier Architectures for High-Power Applications

Chair: Xinyu Zhou, Stanford University — Co-Chair: Tony G. Ivanov, U.S. Army Research Laboratory













Room 25ABC, 13:30-15:10, Wednesday 14 June 2023

- N/A
We3C-1  **C** **High-Power (>5W) RF & Microwave Amplifiers, Below 30GHz**
David W. Runton, MACOM, USA 
- PAGE 579
We3C-2  **C** **The Role of Nonlinear C_{out} in Continuous Class F PAs**
Y. Mary Asha Latha, Luis C. Nunes, Filipe M. Barradas, José C. Pedro, Instituto de Telecomunicações, Portugal 
- PAGE 583
We3C-3  **C** **A GaN Gain Enhancement PA with Peak Power Combining**
William Sear, Taylor Barton, University of Colorado Boulder, USA 
- PAGE 587
We3C-4  **C** **A 100W 2.15GHz RF Power Amplifier Device with Novel Matching Network**
Eric M. Johnson, Vikas Shilimkar, Richard Sweeney, NXP Semiconductors, USA 
- PAGE 591
We3C-5  **C** **A GaN-Based Solid State Power Amplifier for Satellite Communications**
Rocco Giofrè¹, Lorena Cabria², Remy Leblanc³, Mariano Lopez², Fabio Vitobello⁴, Paolo Colantonio¹
¹Università di Roma "Tor Vergata", Italy  ; ²TTI Norte, Spain  ; ³OMMIC, France  ; ⁴European Commission, Belgium 

We3E: Advances in Computational Techniques for Microwave and mm-Wave Applications
Chair: Dan Jiao, Purdue University — Co-Chair: Constantine Sideris, University of Southern California
Room 30C, 13:30-15:10, Wednesday 14 June 2023

- N/A
We3E-1  **C** **Convergence of Simulation, Cloud Computing and Artificial Intelligence in Electromagnetics**
C.J. Reddy, Altair, USA 
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We3E-2  **C** **A Quantum-Walk-Unitary HHL Matrix Equation Solver and its Challenges in the NISQ Era**
Xinbo Li¹, Christopher Phillips², Ian Jeffrey¹, Vladimir Okhmatovski¹
¹University of Manitoba, Canada  ; ²University of Waterloo, Canada 
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We3E-3  **C** **Vector Single-Source SIE Formulation for Scattering Analysis of Multilayered Objects**
Zekun Zhu¹, Xiaochao Zhou¹, Zhizhang Chen², Shunchuan Yang¹
¹Beihang University, China  ; ²Fuzhou University, China 
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We3E-4  **C** **Geometric Optics with Uniform Asymptotic Physical Optics for Ray Tracing of Compound GRIN Lens Systems**
Wei Wang, Jonathan Chisum, University of Notre Dame, USA 
- PAGE 607
We3E-5  **C** **Normal Incidence Scattering of Waveguide-Like Periodic Structures in Scalar 2D-FEM Mode-Matching Extracting the Frequency Dependence**
Gines Garcia-Contreras, Juan Córcoles, Jorge A. Ruiz-Cruz, Universidad Autónoma de Madrid, Spain 














We3F: Emerging Planar Filters: From L-Band to mm-Waves
Chair: Jay McDaniel, University of Oklahoma — Co-Chair: Tarek Djerafi, University of Quebec
Room 30DE, 13:30-15:10, Wednesday 14 June 2023

- (MWTL)
We3F-1  **C** **Synthesis of Wideband Cross-Coupled Resonator Filter for Direct Circuit Implementation Using Lumped Elements**
Bin Liu¹, Kun Li¹, Xiong Chen¹, Pei-Ling Chi², Tao Yang¹
¹UESTC, China  ; ²NYCU, Taiwan 
- PAGE 611
We3F-2  **C** **Design of Wideband Hybrid QMSIW and Coupled-Line Filter by Direct-Synthesis Approach in the Bandpass Domain**
Hanyu Tian, Yuandan Dong, UESTC, China 
- PAGE 615
We3F-3  **C** **Compact Hybrid Filter Based on HMSIFW and SICL Technology with Wide-Stopband Suppression**
Yanbei Yang, Yuandan Dong, UESTC, China 
- PAGE 619
We3F-4  **C** **Compact 12-18-GHz Bandpass Filter with Wide Stopband Using Hybrid Dual-Mode SIDGS/Microstrip Resonant Cell**
Yichuan Yang, Yunbo Rao, Deshan Tang, Jie Zhou, Xun Luo, UESTC, China 
- PAGE 623
We3F-5  **C** **Millimeter-Wave Substrate-Integrated Waveguide Multiplexer with High Channel Scalability and High Isolation**
Pei-Ling Chi¹, Po-Hua Wang¹, Tao Yang²
¹NYCU, Taiwan  ; ²UESTC, China 




We3G: RF/Microwave Research in Latin America

Chair: José E. Rayas-Sanchez, ITESO — Co-Chair: J. Apolinar Reynoso-Hernández, CICESE

Room 31AB, 13:30-15:10, Wednesday 14 June 2023

- N/A
We3G-1  **C** **Resonance-Related Fluctuations on Experimental Characteristic Impedance Curves for PCB and On-Chip Transmission Lines**
Yojanes Rodríguez-Velásquez¹, Roberto S. Murphy-Arteaga², Reydezel Torres-Torres²
¹Intel, Mexico  ; ²INAOE, Mexico 
- N/A
We3G-2  **C** **Equalization Tuning of the PCIe Physical Layer by Using Machine Learning in Industrial Post-Silicon Validation**
Francisco E. Rangel-Patiño¹, Andres Viveros-Wacher¹, Chintan Rajyaguru², Edgar A. Vega-Ochoa¹, Sofia D. Rodriguez-Saenz¹, Johana L. Silva-Cortes¹, Hemanth Shival², José E. Rayas-Sánchez³
¹Intel, Mexico  ; ²Intel, USA  ; ³ITESO, Mexico 
- N/A
We3G-3  **C** **Pre-Coded Supervising System Based on Smart Antenna Array for Electric Power Distribution Grid: Optimization Aspects**
J.M.A.M. de Oliveira¹, A. Gomes Barboza¹, R.G.M. dos Santos¹, M. de Oliveira Alencar¹, J.H. de A. Dias Silva¹, M.F. Bitencourt Pedrosa¹, D. de Filgueiras Gomes¹, A.J. Belfort de Oliveira¹, M.T. de Melo¹, R.J.F.P.V. Padilha², B.A. Kleinau²
¹Universidade Federal de Pernambuco, Brazil  ; ²Neoenergia Celpe, Brazil 
- N/A
We3G-4  **C** **LARGE Characterization of Power GaN FETs and PAs Linearity at Different Load Impedances Under CW Conditions and Multitone Signals Based on the USRP LFTX Daughterboard**
Thaimí Niubó Alemán¹, J.A. Reynoso-Hernández¹, Jaime Sánchez-García¹, José Raul Loo-Yau², María del Carmen Maya-Sánchez¹
¹CICESE, Mexico  ; ²Cinvestav, Mexico 










We3G continued ...

- N/A
We3G-5  **C** **X-Parameters: The μ Stability Factor and its Application to Avoid Oscillation Problems During the Characterization of Power GaN FETs**
E.A. Hernández-Domínguez¹, José Raul Loo-Yau¹, A. Sánchez-Ramos¹, J.A. Reynoso-Hernández², P. Moreno¹
¹Cinvestav, Mexico  ; ²CICESE, Mexico 

We3H: Non-Planar Passive Components and Technologies

Chair: Luca Perregrini, Università di Pavia — Co-Chair: Simone Bastioli, RS Microwave






Room 31C, 13:30–15:10, Wednesday 14 June 2023

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We3H-1  **C Hybrid Implementation of a Compact 2-Way Wilkinson Power Divider/Combiner for Applications in the Low RF Band**
J.M. Lopez-Villegas, N. Vidal, Universitat de Barcelona, Spain 
- (MWTL)
We3H-2  **C Two-Layer Three-Way Horst Power Divider and Combiner Based on Microstrip Line with Fixed Characteristic Impedance**
Abdelkader Zerfaine, Ahmed Moulay, Tarek Djeraj, INRS-EMT, Canada 
- PAGE 645
We3H-3  **C Using a 3D-Printed Waveguide Filter with Ridge Resonators as a Dielectric Permittivity Sensor**
Francesco Romano, Nicolò Delmonte, Luca Perregrini, Maurizio Bozzi, Università di Pavia, Italy 
- PAGE 648
We3H-4  **C A Power-Efficient Microwave Microplasma Jet Utilizing an SIW Evanescent-Mode Cavity Resonator**
Kazi Sadman Kabir, Abbas Semnani, University of Toledo, USA 
- PAGE 652
We3H-5  **C N-Way Spatial Power Combiner Using Tapered Antipodal Slotline Feed Array in a Radial Waveguide**
Ilker Karaman, Volkan Acikel, Murat Koc, Aselsan, Türkiye 
- PAGE 656
We3H-6  **C Basic Study of 79GHz Band Resin Waffle-Iron Ridge Guide**
Yutaka Aoki¹, Hiroshi Tanaka¹, Hiroyuki Kamo¹, Takashi Shimizu²
¹Taiyo Yuden, Japan  ; *²Utsunomiya University, Japan* 

We4A: Advances in Quantum Devices, Circuits and Systems

Chair: Kavita Goverdhanam, U.S. Army CCDC C5ISR Center — Co-Chair: Tejinder Singh, Dell Technologies










Room 23ABC, 15:40–17:20, Wednesday 14 June 2023

- N/A
We4A-1  **C Building and Exercising a Superconducting Quantum Processor Prototype**
M. Giustina, Google, USA 
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We4A-2  **C Superconducting Non-Reciprocal Bandpass Filter Based on Spatio-Temporal Inductance Modulation**
Yi Zhuang, Chandrashekhara Gaikwad, Daria Kowsari, Erik Henriksen, Kater Murch, Aravind Nagulu, Washington University in St. Louis, USA 
- PAGE 664
We4A-3  **C Quantum Models for Flux-Driven Superconducting Traveling-Wave Parametric Amplifiers with Different Nonlinear Junction Topologies**
Michael Haider, Yongjie Yuan, Johannes A. Russer, Christian Jirauschek, Technische Universität München, Germany 
- PAGE 668
We4A-4  **C A Miniature 10MHz–3GHz Sub 1-dB NF Cryogenic Inductorless Noise-Canceling Low-Noise Amplifier for Qubit Readout**
Mahesh Kumar Chaubey¹, Yeke Liu¹, Po-Chang Wu², Hann-Huei Tsai², Shawn S.H. Hsu¹
¹National Tsing Hua University, Taiwan  ; *²NARLabs-TSRI, Taiwan* 
- PAGE 672
We4A-5  **C A 3.5~7.5GHz GaAs HEMT Cryogenic Low-Noise Amplifier Achieving 5 Kelvin Noise Temperature for Qubits Measurement**
Yatao Peng¹, Youpeng Zhong², Zechen Guo², Song Liu², Dapeng Yu²
¹University of Macau, China  ; *²Shenzhen International Quantum Academy, China* 
- PAGE 676
We4A-6  **C Surface Acoustic Wave Filters for Superconducting Qubits**
David Eslava¹, Eloi Guerrero², Lluís Acosta², Ramiro Sagastizabal¹, Paul Jamet¹, Pol Forn-Díaz¹, Pedro de Paco²
¹Qilimanjaro Quantum Tech, Spain  ; *²Universitat Autònoma de Barcelona, Spain* 

We4B: THz Communications Components

Chair: Steven M. Bowers, University of Virginia — Co-Chair: William R. Deal, Northrop Grumman











Room 24ABC, 15:40-17:20, Wednesday 14 June 2023

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We4B-1  **C** **220-to-320-GHz Fundamental Mixer in 60-nm InP HEMT Technology Achieving 120/152/168-Gbps Data Transmission in Three Bands**
Teruo Jyo, Hiroshi Hamada, Takuya Tsutsumi, Ibrahim Abdo, Satoshi Kawahara, Daisuke Kitayama, Munehiko Nagatani, Hiroyuki Takahashi, NTT, Japan 
- PAGE 684
We4B-2  **C** **Design and Characterization of Metalized Trench Based Waveguide Technology on Glass Interposer for 6G Applications**
Xingchen Li¹, Xiaofan Jia¹, Serhat Erdogan¹, Matthew Jordan², Madhavan Swaminathan¹
¹Georgia Tech, USA  ; ²Sandia National Laboratories, USA 
- PAGE 688
We4B-3  **C** **Broadband THz Switching with Extremely Low Insertion Loss and Superior Isolation**
Peizhao Li, Weifeng Wu, Yu Shi, Yijing Deng, Patrick Fay, Lei Liu, University of Notre Dame, USA 
- PAGE 692
We4B-4  **C** **A 3D Printed Terahertz Metamaterial Lens for Beam-Steering Applications**
Jiexin Lai, Yang Yang, UTS, Australia 

We4C: HF Through UHF, Watts to Kilowatts Power Amplifiers and Applications

Chair: Paul J. Draxler, MaXentric Technologies — Co-Chair: Ramon A. Beltran, Ophir RF

















Room 25ABC, 15:40-17:20, Wednesday 14 June 2023

- N/A
We4C-1  **C** **RF Power at HF/VHF/UHF — Status and Trends**
Richard Posner, Aethercomm, USA 
- PAGE 697
We4C-2  **C** **Linearity Enhanced Broadband Darlington Power Amplifier IC Using InGaP/GaAs HBT for Handset Modules with Fractional Bandwidth of 50%**
Sooji Bae¹, Jooyoung Jeon², Sungwoon Hwang¹, Byeongcheol Yoon¹, Junghyun Kim¹
¹Hanyang University, Korea  ; ²Gangneung-Wonju National University, Korea 
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We4C-3  **C** **A 30–680-MHz GaAs pHEMT Power Amplifier with Guanella-Type Transformers Integrated on a Flexible Printed Circuit Board**
Zixian Ma¹, Bing Lan¹, Wentao Zhou¹, Jun Chen², Zhaosheng Liu², Qun Jane Gu³, Chunyi Song¹, Zhiwei Xu¹
¹Zhejiang University, China  ; ²Etra Semiconductor, China  ; ³University of California, Davis, USA 
- PAGE 705
We4C-4  **C** **200-W 13.56-MHz Class-E PA with Gate-Driver ICs**
Frederick H. Raab, Green Mountain Radio Research, USA 















IF1 : Interactive Forum Session One

Chair: Gian Piero Gibiino, Università di Bologna — Co-Chair: Andrés Zárate de Landa, pSemi






Room Sails Pavilion, 15:10–17:00, Wednesday 14 June 2023

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IF1-1  **C** **Use of Cavity Perturbation Techniques to Characterize Via-Plate Behavior**
Tim Reeves, Michael Tsuk, Vishwanath Iyer, MathWorks, USA 
- PAGE 713
IF1-2  **C** **4-Way Microstrip Wilkinson Power Splitter at Frequencies of Millimeter Waves**
Moamer Hasanovic, Juan Ayala, Michael Kettner, Smiths Interconnect, USA 
- PAGE 717
IF1-3  **C** **Input-Reflectionless 2.4–3.8GHz Balun with Low Phase/Amplitude Imbalance Using Stacked-Coupled Microstrip Line**
Siyi Zhang, Yunbo Rao, Yuandan Dong, Xun Luo, UESTC, China 
- PAGE 721
IF1-4  **C** **Characterization of a D-Band Electric-Inductive-Capacitive Metamaterial-Based Transmission Line Phase Shifter**
Gian Marco Zampa¹, Athos Sonara¹, Davide Mencarelli¹, Luca Pierantoni¹, Hardly Joseph Christopher¹, Zhibo Cao², Richard Al Hadi³, Mau-Chung Frank Chang³, Mehmet Kaynak²
¹Università Politecnica delle Marche, Italy  ; ²IHP, Germany  ; ³University of California, Los Angeles, USA 
- PAGE 724
IF1-5  **C** **A Low Loss Self-Packaged Power Divider Using Right-Angled Isosceles Triangular Patch Based on the SISL Platform**
Shupeng Zhang, Yongqiang Wang, Kaixue Ma, Tianjin University, China 
- PAGE 728
IF1-6  **C** **A Dual-Band Micromachined On-Wafer Probe with Integrated Diplexer for Ultra-Broadband Measurements to 220GHz**
Matthew F. Bauwens¹, N. Scott Barker², Florian Boes³, Michael E. Cyberey², Robert M. Weikle², Thomas Zwick³, Arthur W. Lichtenberger²
¹Dominion MicroProbes, USA  ; ²University of Virginia, USA  ; ³KIT, Germany 

IF1 continued ...

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IF1-7  **C** **Broadband 770° Phase Shifter for mm-Waves Using Controllable Delocalization of Modal Fields in a Dielectric Rod Waveguide**
Ashish Kumar¹, Daniel C. Gallego¹, Mushin Ali², Alejandro Rivera-Lavado², Daniel Headland¹, Guillermo Carpintero¹
¹Universidad Carlos III de Madrid, Spain  ; ²LeapWave Technologies, Spain 
- PAGE 736
IF1-8  **C** **A Fully 3-D-Printing-Compatible E-Plane Elliptical Waveguide Junction for Power Dividing/Combining Applications**
Sicheng Chen, Jin Li, Tao Yuan, Shenzhen University, China 
- PAGE 740
IF1-9  **C** **A New Class of Inline Microwave Filter with Transmission Zeros**
Peng Wen Wong, Guan Shen Ng, FILPAL, Malaysia 
- PAGE 744
IF1-10  **C** **Compact 3D-Printed Bandpass Filters Using Coaxial and Dual-Mode Ridged-Waveguide Resonators**
Kunchen Zhao¹, Dimitra Psychogiou²
¹University of Colorado Boulder, USA  ; ²University College Cork, Ireland 
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IF1-11  **C** **Monolithic Compact Low-Frequency Bandpass Filter Based on Intertwined Helical Resonators**
Jose L. Medrán del Río¹, Armando Fernandez-Prieto¹, Jesus Martel¹, Dimitra Psychogiou²
¹Universidad de Sevilla, Spain  ; ²University College Cork, Ireland 
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IF1-12  **C** **A Monolithically 3-D Printed Waveguide Filter Based on Elliptic Cylindrical Resonators with Enhanced Polarization Rotation Flexibility**
Yuhong Ye, Jin Li, Sicheng Chen, Zhihong Xu, Tao Yuan, Shenzhen University, China 















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IF1-13  **C** **3D-Printed Multi-Material Multilayer Wideband Microwave Absorber**
Christophe Vong¹, Alexis Chevalier¹, Azar Maalouf¹, Jean-François Rosnarho², Julien Ville³, Vincent Laur¹
¹Lab-STICC (UMR 6285), France  ; ²Cegelec Défense, France  ; ³IRDL (UMR 6027), France 
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IF1-14  **C** **Ka-Band EMI Shielding Effectiveness of Ti₃C₂T_x MXene**
Yufei Liu¹, Anupma Thakur², Babak Anasori¹, Saeed Mohammadi¹
¹Purdue University, USA  ; ²IUPUI, USA 
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IF1-15  **C** **Novel Method for High Reliability Assembly of Microwave QFN Packages for Extreme Thermal Cycling Applications**
Robiel Pino¹, Nuria Rodríguez¹, Celia Gómez¹, Alejandro Rodríguez¹, Reece Baker², Cathy Chandler²
¹ERZIA Technologies, Spain  ; ²Spur Electron, UK 
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IF1-16  **C** **2.5D Technology Based on Vertically Aligned Carbon Nanotubes for mm-Waves Passive Devices**
Simon Chun Kiat Goh¹, Chun Fei Siah², Joseph De Saxce³, Zhikai Ng², Li Lynn Shiau⁴, Lucas Lum Yun Xiang¹, Chong Wei Tan¹, Edwin Hang Tong Teo², Philippe Coquet¹, Dominique Baillargeat⁵, Beng Kang Tay¹
¹CINTRA, Singapore  ; ²NTU, Singapore  ; ³XLIM (UMR 7252), France  ; ⁴Temasek Laboratories @ NTU, Singapore  ; ⁵CNRS@CREATE, Singapore 
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IF1-17  **C** **An Improved Extraction Method for the Trapping Time Constants in GaN HEMTs**
Inês C. Lopes, Luís C. Nunes, Pedro M. Cabral, José C. Pedro, Universidade de Aveiro, Portugal 

IF1 continued ...

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IF1-19  **C** **Calibration Fixture Design for Low Intrusive Current Sensors**
Damien Gapillout, Pierre Pradel, Pierre Coudert, Alexis Collin, CEA-Gramat, France 
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IF1-20  **C** **Dielectric Loaded Decoupling Technique for Multichannel RF Coils**
Seyedamin Hashemi, Sri Kirthi Kandala, Sung-Min Sohn, Arizona State University, USA 
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IF1-21  **C** **Impact of Emission Time Constant on the Linearizability of AlGaIn/GaN HEMTs**
Zhijian Yu, Ampleon, The Netherlands 
- PAGE 787
IF1-22  **C** **A Low-Complexity Digital Predistortion Technique for Digital I/Q Transmitters**
Mohammadreza Beikmirza, Leo C.N. de Vreede, Morteza S. Alavi, Technische Universiteit Delft, The Netherlands 
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IF1-23  **C** **Direct Learning Neural Network Digital Predistortion Using Backpropagation Through a Memory Power Amplifier Model**
Erez Loeb, Nimrod Ginzberg, Emanuel Cohen, Technion, Israel 
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IF1-24  **C** **Low-Complexity Feedback Data Compression for Closed-Loop Digital Predistortion**
Arne Fischer-Bühner¹, Lauri Anttila², Vishnu Unnikrishnan², Manil Dev Gomony¹, Mikko Valkama²
¹Nokia Bell Labs, Belgium  ; ²Tampere University, Finland 
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IF1-25  **C** **Wireless Reading of Additively Manufactured Galinstan-Based Sensor Using a Polarimetric Millimeter-Wave Radar Imaging Technique**
Dominique Henry, Ahmad El Sayed Ahmad, Ali Hadj Djilani, Patrick Pons, Hervé Aubert, LAAS-CNRS, France 

IF1 continued ...

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IF1-26  **C** **A 1024-Channel Wideband Digital Subsystem Prototype for Large Aperture Array Radio Telescope**
Rui Cao¹, Manqing Wu¹, Xiaohui Tao¹, Guoliang Peng¹, Lihui Jiang¹, Kun Li², Jinzhong Zhang¹, Hongqi Zhang¹, Xiaorong Xu¹, Dawei Rong¹, Huiyue Yang¹, Ming-ao Ye¹, Chao Wang¹, Yan Zhang¹, Yulong Xu¹, Xiaolong Yu¹, Dehui Lu¹, Dezhi Zhu¹
¹CETC 38, China  ; ²Anhui University, China 
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IF1-27  **C** **Frequency Scanning Surface Velocity Radar for River Monitoring**
Giordano Cicioni, Giulia Orecchini, Roberto Vincenti Gatti, Carla Saltalippi, Valentina Palazzi, Paolo Mezzanotte, Luca Roselli, Federico Alimenti, Università di Perugia, Italy 
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IF1-28  **C** **Plasma Windowing for Hypersonic Radio Communications**
Scott D. Sifferman, Bradley Sallee, Randolph Noster, SPEC, USA 
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IF1-29  **C** **Novel Architecture for Beacon Signal Generation in Satellite Applications**
Giacomo Schiavolini¹, Giulia Orecchini¹, Andrea Beltramello², Andrea Loppi², Simone Pauletto², Francesco Adamo², Nicholas Sesto Gorella², Federico Dogo², Davide Manià², Mario Fragiaco², Valentina Palazzi¹, Luca Roselli¹, Paolo Mezzanotte¹, Anna Gregorio³, Federico Alimenti¹
¹Università di Perugia, Italy  ; ²PICOSATS, Italy  ; ³Università di Trieste, Italy 
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IF1-30  **C** **Model Based Design for Frequency Scanning Array**
Sourabh Joshi¹, Shashank Kulkarni¹, Vishwanath Iyer²
¹MathWorks, India  ; ²MathWorks, USA 

Th1A: Reconfigurable Planar Filters and Diplexers

Chair: Hjalti H. Sigmarsson, University of Oklahoma — Co-Chair: Julien Lintignat, University of Limoges












Room 23ABC, 08:00-09:40, Thursday 15 June 2023

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Th1A-1  **C** **Multi-Configurable Bandpass Filters with Tune-All Single-, Dual-Band Transfer Functions and Reconfigurable Directionality**
Zixiao Zhang, Dimitra Psychogiou, Tyndall National Institute, Ireland 
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Th1A-2  **C** **Independently Tunable Compact Dual-Band Bandpass Filter with High Selectivity and Wide Stopband Using Multilayer Folded Dual-Mode SIDGS Resonator**
Yiyang Wan, Jie Zhou, Yunbo Rao, Jiacheng Xie, Qingxian Li, Xun Luo, UESTC, China 
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Th1A-3  **C** **A Novel Filter Architecture with Five Reconfigurable Filtering Functions**
Yuhang Ning¹, Zhihua Wei¹, Pei-Ling Chi², Tao Yang¹
¹UESTC, China  ; ²NYCU, Taiwan 
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Th1A-4  **C** **1.26–2-GHz Miniaturized Tunable Bandpass Filter with Constant Absolute Bandwidth and Wide Stopband Using Two-Path Electrical Complementary Coupling**
Jiacheng Xie, Wen Chen, Deshan Tang, Yiyang Shu, Xun Luo, UESTC, China 
- PAGE 839
Th1A-5  **C** **A 1.32 to 1.89GHz Diplexer/Filtering-Switch for Reconfigurable FDD/TDD Operations**
Zhihua Wei¹, Yuhang Ning¹, Pei-Ling Chi², Ruimin Xu¹, Tao Yang¹
¹UESTC, China  ; ²NYCU, Taiwan 

Th1B: Advances in Biomedical Sensing and Wave Interaction

Chair: Christian Damm, Universität Ulm — Co-Chair: Mohammad H. Zarifi, University of British Columbia












Room 24ABC, 08:00-09:40, Thursday 15 June 2023

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Th1B-1  **C** **A Microwave System for the Extraction and Measurement of Candida Cells in Blood**
Neelima Dahal¹, Caroline Peak¹, Carl Ehrett¹, Nitya Harikumar¹, Ralu Divan², Pingshan Wang¹
¹Clemson University, USA  ; ²Argonne National Laboratory, USA 
- PAGE 847
Th1B-2  **C** **A Waveguide Resonator Sensor for Bacterial Growth Monitoring: Towards Antibiotic Susceptibility Testing**
Omid Niksan, James D. Fowler, Vishal Balasubramanian, Aaryaman Shah, Sepideh Pakpour, Mohammad H. Zarifi, University of British Columbia, Canada 
- (MWTL)
Th1B-3  **C** **A 13-GHz “3-D” Near-Field Imager Employing Programmable Fringing Fields for Cancer Imaging**
Zong-Jun Cheng, Shu-Yan Chuang, Wei-Yang Weng, Guan-Yu Huang, Yan-Huei Li, Fu-Siang Yu, Hsiu-Cheng Yeh, Yu-Cheng Lin, Yun-Jui Chang, Hung-Yu Hou, Yi-Ting Chen, Jun-Chau Chien, National Taiwan University, Taiwan 
- (MWTL)
Th1B-4  **C** **Noninvasive Internal Body Thermometry with On-Chip GaAs Dicke Radiometer**
Jooeun Lee, Gabriel Santamaria Botello, Robert Streeter, Zoya Popović, University of Colorado Boulder, USA 
- PAGE 851
Th1B-5  **C** **Evaluation of MRI RF-Induced for Active Implantable Medical Implants in the Vicinity of Other Implantable Devices**
Lijian Yang, Mir Khadiza Akter, Ran Guo, Jianfeng Zheng, Ji Chen, University of Houston, USA 

Th1C: Recent Advances in Injection Locked Radar Sensing

Chair: Chung-Tse Michael Wu, Rutgers University — Co-Chair: Chia-Chan Chang, National Chung Cheng University









Room 25ABC, 08:00-09:40, Thursday 15 June 2023

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Th1C-1  **C** **Cosine Transform with Frequency-Domain Correction Technique for Radar-Based Short-Time Vital Sign Monitoring**
Ju-Yin Shih, Ji-Xun Zhong, Fu-Kang Wang, National Sun Yat-sen University, Taiwan 
- PAGE 859
Th1C-2  **C** **Displacement Monitoring Using Phase- and Quadrature Self-Injection-Locked (PQSIL) Radar**
Ji-Xun Zhong, Ju-Yin Shih, Fu-Kang Wang, National Sun Yat-sen University, Taiwan 
- PAGE 863
Th1C-3  **C** **Low-IF Doppler Radar Using Delay- and Self-Injection-Locking Technology with Clutter Cancellation for Biomedical Monitoring**
Wei-Chih Su, Chia-Hao Chang, Yi-Yang Wu, Tzyy-Sheng Horng, Shiang-Hwua Yu, National Sun Yat-sen University, Taiwan 
- PAGE 867
Th1C-4  **C** **An Ambiguity-Free Depth Detection Method for Wireless Capsule Endoscopy by Combining Frequency Locking and Signal Strength Tracking of Self-Injection-Locked Radars**
Jyun-Yan Lai, Hao-Ping Li, Sheng-Fuh Chang, Chia-Chan Chang, Shih-Cheng Lin, National Chung Cheng University, Taiwan 
- PAGE 871
Th1C-5  **C** **A W-Band Self-Injection-Locked Vital Sign Radar Sensor with On-Chip SIW Monopole Antenna in 0.1- μ m GaAs pHEMT**
Donglin Gao¹, Shuping Li¹, Austin Ying-Kuang Chen², Chung-Tse Michael Wu¹
¹Rutgers University, USA  ; ²California State University, USA 

Th1D: Advanced Near-Field Wireless Power Transfer

Chair: Kenjiro Nishikawa, Kagoshima University — Co-Chair: Amir Mortazawi, University of Michigan















Room 30AB, 08:00-09:40, Thursday 15 June 2023

- (MWTL)  **C** **Electrode Design Theory Using Highly Accurate Equivalent Circuits in Biological Capacitive WPT**
 Th1D-1 *Takamasa Segawa, Ryubi Aoyama, Masaya Tamura, Toyohashi University of Technology, Japan* 
- PAGE 875  **C** **High Sensitivity RF Energy Harvesting System with Self-Calibrate Network**
 Th1D-2 *Yabin An, Xiaoming Li, Xiting Feng, Hui Xu, Yiqi Zhuang, Xidian University, China* 
- PAGE 879  **C** **Adaptive NFC WPT System Implementing Neural Network-Based Impedance Matching with Bypass Functionality**
 Th1D-3 *J. Romero Lopera¹, R. Fischbacher¹, R. Pestros¹, D. Pommerenke¹, B. Auinger¹, J. Grosinger²*
¹Silicon Austria Labs, Austria  ; ²Technische Universität Graz, Austria 
- PAGE 883  **C** **Capacitive Wireless Power Transfer Independent of Load Impedance Fluctuation with Transfer Distance**
 Th1D-4 *Yasumasa Naka, Akihiko Ishiwata, Masaya Tamura, Toyohashi University of Technology, Japan* 
- PAGE 887  **C** **Extended Embedded Depth Using Cascaded Resonators Near-Field WPT System with High Efficiency for Biomedical Implants**
 Th1D-5 *Mohamed Aboulalaa¹, Ramesh K. Pokharel¹, Takana Kaho²*
¹Kyushu University, Japan  ; ²Shonan Institute of Technology, Japan 

Th1E: Recent Advances on Microwave Acoustics

Chair: Amelie Hagelauer, Technische Universität München — Co-Chair: Holger Maune, OvG Universität Magdeburg












Room 30C, 08:00-09:40, Thursday 15 June 2023

- (MWTL)  **C** **An mm-Wave Trilayer AlN/ScAlN/AlN Higher Order Mode FBAR**
 Th1E-1 *Suhyun Nam, Wenhao Peng, Ping Wang, Ding Wang, Zetian Mi, Amir Mortazawi, University of Michigan, USA* 
- PAGE 891  **C** **A Manufacturable AlScN Periodically Polarized Piezoelectric Film Bulk Acoustic Wave Resonator (AlScN P3F BAW) Operating in Overtone Mode at X and Ku Band**
 Th1E-2 *Ramakrishna Vetury¹, Abhay Kochhar¹, Jeff Leathersich¹, Craig Moe¹, Mary Winters¹, Jeffrey Shealy¹, Roy H. Olsson III²*
¹Akoustis Technologies, USA  ; ²University of Pennsylvania, USA 
- PAGE 895  **C** **A 20.4-GHz Lithium Niobate A3-Mode Resonator with High Electromechanical Coupling of 6.95%**
 Th1E-3 *Fuhong Lin, Kai Yang, Chengjie Zuo, USTC, China* 
- PAGE 899  **C** **A 6.4-GHz Spurious-Free Acoustic Filter Based on Lithium Niobate S1-Mode Resonator**
 Th1E-4 *Xueyan Liu, Zhongbin Dai, Zijia Su, Chengjie Zuo, USTC, China* 
- PAGE 903  **C** **Extracting Acoustic Loss of High-Order Lamb Modes at Millimeter-Wave Using Acoustic Delay Lines**
 Th1E-5 *Jack Kramer¹, Sinwoo Cho¹, Kenny Huynh², Vakhtang Chulukhadze¹, Omar Barrera¹, Mark S. Goorsky², Ruochen Lu¹*
¹University of Texas at Austin, USA  ; ²University of California, Los Angeles, USA 
- PAGE 907  **C** **Twist Piezoelectric Coupling Properties to Suppress Spurious Modes for Lithium Niobate Thin-Film Acoustic Devices**
 Th1E-6 *Fangsheng Qian, Tsz Fung Ho, Yansong Yang, HKUST, China* 

Th1F: Advances in Over-the-Air and mm-Wave Measurements

Chair: Jon Martens, Anritsu — Co-Chair: Marco Spirito, Technische Universiteit Delft


Room 30DE, 08:00-09:40, Thursday 15 June 2023

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Th1F-1  **C** **Simplified Over-the-Air Noise Figure Measurement Method for Reduced Uncertainty**
Anouk Hubbrechtsen, Tim Stek, A. Bart Smolders, Technische Universiteit Eindhoven, The Netherlands 
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Th1F-2  **C** **Hierarchical Code-Modulated Embedded Test and Calibration on a 64-Element Phased Array**
Zhangjie Hong, Brian A. Floyd, North Carolina State University, USA 
- PAGE 919
Th1F-3  **C** **Over-the-Air Characterization Techniques for Antenna-Coupled Direct-Detectors at Terahertz Frequencies**
M. Hoogelander, M. Alonso-delPino, N. Llombart, Marco Spirito, Technische Universiteit Delft, The Netherlands 
- PAGE 923
Th1F-4  **C** **An All-Electronically-Scanned Antenna Measurement Technique for Rapid Performance Characterization by Using a Circular Array of Reflection Surfaces**
Yuan-Chun Lin, Ting Hao Shin, Yu-Teng Chang, Chia-Chan Chang, Shih-Cheng Lin, Sheng-Fuh Chang, National Chung Cheng University, Taiwan 
- PAGE 927
Th1F-5  **C** **A D-Band Vector Network Analyzer Extension Module Based on a SiGe Reflectometer MMIC**
Justin Romstadt¹, Stephan Hauptmeier¹, Tobias T. Braun¹, Ahmad Zaben¹, Marvin Krüner¹, Klaus Aufinger², Jan Barowski¹, Nils Pohl¹
¹Ruhr-Universität Bochum, Germany ; *²Infineon Technologies, Germany* 

Th1G: High-Linearity mm-Wave Power Amplifiers

Chair: Laya Mohammadi, Qualcomm — Co-Chair: Zoya Popović, University of Colorado Boulder

Room 31AB, 08:00-09:40, Thursday 15 June 2023

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Th1G-1  **C** **A 25.5–31GHz Power Amplifier Using Enhancement-Mode High-K Dielectric GaN MOS-HEMTs in 300nm GaN-on-Si Technology**
Qiang Yu, Han Wui Then, Ibukunoluwa Momson, Derek Thomson, Jeffrey Garrett, Said Rami, Intel, USA 
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Th1G-2  **C** **37–43GHz Wide-Band Doherty Power Amplifier with Enhanced AM-PM Characteristic**
Hang Yu, Mehran Hazer Sahlabadi, Emile Traore, Mahitab Eladwy, Haien Ma, Slim Boumaiza, University of Waterloo, Canada 
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Th1G-3  **C** **A 24–31GHz 28nm FD-SOI CMOS 3:1 VSWR Resilient Inductive Hybrid Coupler-Based Doherty Power Amplifier**
Gwennaël Diverrez¹, Eric Kerhervé¹, Magali De Matos¹, Andreia Cathelin²
¹IMS (UMR 5218), France ; *²STMicroelectronics, France* 
- N/A
Th1G-4  **C** **Highly-Linear and Efficient mm-Wave GaN MMICs: Challenges in Model and Validation**
Jeong-sun Moon, HRL Laboratories, USA 

Th2A: Advanced Reconfigurable Filters

Chair: Roberto Gómez-García, Universidad de Alcalá — Co-Chair: Mohammad Abu Khater, Purdue University













Room 23ABC, 10:10-11:50, Thursday 15 June 2023

- (MWTL)  **C** **Bandwidth-Reconfigurable Coaxial Bandpass Filter with Multioctave Tuning Using a Single Element**
 Th2A-1 *Abdulrahman Widaa¹, Abhishek Sharma², Chad Bartlett¹, Santiago Cogollo², Vicente E. Boria², Marco Guglielmi², Michael Höft¹*
¹CAU, Germany  ; ²Universitat Politècnica de València, Spain 
- (MWTL)  **C** **Micromachined Tunable Magnetostatic Forward Volume Wave Bandstop Filter**
 Th2A-2 *Yiyang Feng¹, Sudhanshu Tiwari¹, Sunil A. Bhave¹, Renyuan Wang²*
¹Purdue University, USA  ; ²BAE Systems, USA 
- PAGE 944  **C** **High-Power Tunable FDD Front-End Employing a Balanced CMOS N-Path Receiver and Evanescent-Mode Cavity Filters**
 Th2A-3 *Nimrod Ginzberg¹, Thomas R. Jones², Avi Lax¹, Erez Zolkov¹, Michael D. Sinanis², Dimitrios Peroulis², Emanuel Cohen¹*
¹Technion, Israel  ; ²Purdue University, USA 
- PAGE 948  **C** **Design of a Microstrip Dual-/Quad-Band Switchable Bandpass Filter with Dual-Band Bandpass Filters**
 Th2A-4 *Ching-Wen Tang, Jian-Ming Jiang, National Chung Cheng University, Taiwan *
- PAGE 951  **C** **A Low-Loss High-Speed SIW Cavity SPDT Switch Architecture**
 Th2A-5 *Kareem H. El-Gendy¹, Mohammad Abu Khater², Mahmoud A. Abdalla¹, Dimitrios Peroulis², Mohamed F. Hagag¹*
¹Military Technical College, Egypt  ; ²Purdue University, USA 



Th2B: Microwave/mm-Wave Sensing Techniques and Applications

Chair: Dieff Vital, University of Illinois at Chicago — Co-Chair: Mohammad H. Zarifi, University of British Columbia















Room 24ABC, 10:10-11:50, Thursday 15 June 2023

- PAGE 955  **C** **Design of Spoke Type CSRR Based RF Sensor for Non-Destructive Quality Evaluation of Wood**
 Th2B-1 *Apala Banerjee, Prakrati Azad, M. Jaleel Akhtar, IIT Kanpur, India *
- PAGE 959  **C** **Highly Sensitive Phase-Variation Microwave Sensor for Measuring the Thickness of Dielectric Films on Metals with Micrometer-Scale Resolution**
 Th2B-2 *Pau Casacuberta, Paris Vélez, Lijuan Su, Jonathan Muñoz-Enano, Ferran Martín, Universitat Autònoma de Barcelona, Spain *
- PAGE 963  **C** **Salinity-Independent Multiphase Fraction Metering for the Oil and Gas Industry Using Microwave Sensors**
 Th2B-3 *Zubair Akhter¹, Muhammad Akram Karimi², Muhammad Arsalan³, Atif Shamim¹*
¹KAUST, Saudi Arabia  ; ²Saher Flow Solutions, Saudi Arabia  ; ³Aramco, Saudi Arabia 
- PAGE 967  **C** **A New Microwave Oscillator-Based Microfluidic Sensor for Complex Permittivity Measurement**
 Th2B-4 *Chu-Hsuan Pai, Chao-Hsiung Tseng, Taiwan Tech, Taiwan *
- PAGE 971  **C** **A Linear Seismometer Using Octagonal Microwave Sensor Based on Inverted Pendulum Structure for Earthquake Detection**
 Th2B-5 *De-Fang Wang, Chin-Lung Yang, National Cheng Kung University, Taiwan *

Th2C: Recent Advances in Microwave and mm-Wave Biomedical Radar Sensing Techniques
Chair: Changzhi Li, Texas Tech University — Co-Chair: Alessandra Costanzo, Università di Bologna
Room 25ABC, 10:10-11:50, Thursday 15 June 2023

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Th2C-1  **C** **Non-Contact mmWave Physiological Sensor in Eyewear Based on Spoof Localized Surface Plasmons**
Xin Yang¹, Selman A. Kurt¹, Qihang Zeng¹, Xi Tian¹, Mingmin Zhao², John S. Ho¹
¹NUS, Singapore  ; ²University of Pennsylvania, USA 
- PAGE 979
Th2C-2  **C** **Radar Assistive System for People with Neurodegenerative Disorders Through Head Motion and Eyes Blinking Detection**
Emanuele Cardillo¹, Gaia Sapienza², Luigi Ferro¹, Changzhi Li³, Alina Caddemi¹
¹Università di Messina, Italy  ; ²Tre Ali Onlus, Italy  ; ³Texas Tech University, USA 
- PAGE 983
Th2C-3  **C** **Noncontact Monitoring of Infant Apnea for Hypoxia Prevention Using a K-Band Biomedical Radar**
Li Wen, Shuqin Dong, Yi Wang, Changzhan Gu, Zheng Tang, Zhiwei Liu, Junfa Mao, SJTU, China 
- (MWTL)
Th2C-4  **C** **Heart Rate Detection with Hilbert Vibration Decomposition in Random Body Movements Based on FMCW Radars**
Pei-Ling Cheng, Chin-Lung Yang, National Cheng Kung University, Taiwan 
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Th2C-5  **C** **Occupant Entry and Exit Event Extraction Using Continuous Wave (CW) Doppler Radar and Wavelet Analysis**
Shekh M.M. Islam¹, Olga Boric-Lubecke², Victor M. Lubecke²
¹University of Dhaka, Bangladesh  ; ²University of Hawaii at Manoa, USA 














Th2D: Advanced Far-Field Wireless Power Transfer
Chair: Marco Dionigi, Università di Perugia — Co-Chair: Etienne Perret, Université Grenoble Alpes
Room 30AB, 10:10-11:50, Thursday 15 June 2023

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Th2D-1  **C** **Rotman-Lens-Based Reconfigurable Intelligence Surface mmID with Energy Harvesting Capability**
I-Ting Chen¹, Charles A. Lynch III¹, Aline Eid², Jimmy G.D. Hester³, Manos M. Tentzeris¹
¹Georgia Tech, USA  ; ²University of Michigan, USA  ; ³Atheraxon, USA 
- PAGE 995
Th2D-2  **C** **Comparison of CMOS Bulk-Biased and Cross-Coupled Rectifiers in Wireless Power Receivers**
S. Guigue, T. Taris, J.B. Begueret, C. Leroux, D. Karolak, IMS (UMR 5218), France 
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Th2D-3  **C** **Fully Passive Modulation Technique for SWIPT Scenarios**
Helena Ribeiro¹, Simon Hemour², Nuno B. Carvalho¹
¹Universidade de Aveiro, Portugal  ; ²IMS (UMR 5218), France 
- PAGE 1003
Th2D-4  **C** **5.8GHz Band 10W Rectenna with GaAs E-pHEMT Gated Anode Diode on the Aluminum Nitride Antenna for Thermal Dispersion**
Naoki Sakai, Naoki Furutani, Kaito Uchiyama, Yuya Hirose, Fumiya Komatsu, Kenji Itoh, Kanazawa Institute of Technology, Japan 
- PAGE 1006
Th2D-5  **C** **Design and Characterization of Low-Power Rectifiers at X-Band Using a Low-Barrier Schottky Diode for Wireless Power Transfer Applications**
Joshua M. Kovitz¹, Michael Grady¹, James Dee¹, Cheong-Wo Chan¹, Christopher T. Rodenbeck², Christopher R. Valenta¹
¹Georgia Tech, USA  ; ²U.S. Naval Research Laboratory, USA 

Th2E: Application of Integrated Magnetic Materials and Control Circuits

Chair: Siva Yegnanarayanan, MIT Lincoln Laboratory — Co-Chair: Pierre Blondy, XLIM (UMR 7252)















Room 30C, 10:10–11:50, Thursday 15 June 2023

- PAGE 1009  **C Self-Biased Ku-Band Circulators**
 Th2E-1 *Norbert Parker¹, Vincent Laur¹, Richard Lebourgeois², Gérard Cibien², Laurent Roussel², Jean Luc Mattei¹, Alexis Chevalier¹*
¹Lab-STICC (UMR 6285), France  ; ²Thales, France 
- PAGE 1013  **C Dual-Band Microstrip Ferrite Circulator**
 Th2E-2 *Vincent Olivier¹, Thierry Monédière², Bertrand Lenoir¹, Hamza Turki¹, Laure Huitema²*
¹INOVEOS, France  ; ²XLIM (UMR 7252), France 
- (MWTL)  **C A W-Band SPDT Photoconductive Evanescent-Mode Waveguide Switch**
 Th2E-3 *Eric T. Der¹, Thomas R. Jones², Alden Fisher², Michael D. Sinanis², Kambiz Moez¹, Douglas W. Barlage¹, Dimitrios Peroulis²*
¹University of Alberta, Canada  ; ²Purdue University, USA 
- PAGE 1017  **C Symmetrical Multiport mmWave Chalcogenide Phase-Change RF Switches**
 Th2E-4 *Tejinder Singh, Raafat R. Mansour, University of Waterloo, Canada *
- PAGE 1021  **C Optimization of Coplanar Waveguide Integrated PCM Switches**
 Th2E-5 *N. Le Gall, I. Bettoumi, M. Lajaate, C. Hallepee, D. Passerieux, P. Blondy, XLIM (UMR 7252), France *

Th2F: Conducted and Over-the-Air Nonlinear Characterization Techniques

Chair: Patrick Roblin, The Ohio State University — Co-Chair: Marcus Da Silva, National Instruments










Room 30DE, 10:10–11:50, Thursday 15 June 2023

- N/A  **C Precision DPD Measurements and Modeling of Non-Linear Amplifiers**
 Th2F-1 *Joel Dunsmore, Keysight Technologies, USA *
- PAGE 1026  **C New Real-Time Pulsed-RF NVNA Testbed for Isothermal Characterization of Traps in GaN HEMTs**
 Th2F-2 *Miles Lindquist¹, Patrick Roblin¹, Nicholas C. Miller²*
¹The Ohio State University, USA  ; ²AFRL, USA 
- PAGE 1030  **C Instrumentation for the Time and Frequency Domain Characterization of Terahertz Communication Transceivers and their Building Blocks**
 Th2F-3 *Ingmar Kallfass¹, Dominik Wrana¹, Benjamin Schoch¹, Jeffrey Hesler², Matthias Kohler³, Jean-Pierre Teyssier⁴, Joel Dunsmore⁴*
¹Universität Stuttgart, Germany  ; ²Virginia Diodes, USA  ; ³Keysight Technologies, Germany  ; ⁴Keysight Technologies, USA 
- (MWTL)  **C Array Calibration and Digital Predistortion Training Using Embedded Near-Field Feedback Probes and Orthogonal Coding for Enhancing the Performance of Millimeter-Wave Beamforming Arrays**
 Th2F-4 *Ahmed Ben Ayed, Huixin Jin, Bernard Tung, Patrick Mitran, Slim Boumaiza, University of Waterloo, Canada *
- PAGE 1034  **C Fast Simultaneous Distortion Measurement Technique for Mismatch Compensation of Doherty Phased-Array Beamformers**
 Th2F-5 *Yuuichi Aoki, Yonghoon Kim, Yongan Hwang, Sung-Gi Yang, Samsung, Korea *

Th2G: Broadband mm-Wave MMIC Power Amplifiers

Chair: David Brown, BAE Systems — Co-Chair: Munkyo Seo, Sungkyunkwan University












Room 31AB, 10:10-11:50, Thursday 15 June 2023

- PAGE 1038  **C** Millimeter-Wave LNA and PA MMICs with 10:1 and 4:1 Bandwidth in a 35-nm Gate-Length InGaAs mHEMT Technology
Fabian Thome, Hermann Massler, Arnulf Leuther, Sébastien Chartier, Fraunhofer IAF, Germany 
- PAGE 1042  **C** A Multi-Stage 19.2-dBm, 30.4%-PAE D-Band Power Amplifier in a 250-nm InP HBT Process
Eythan Lam, Kang Ning, Ahmed S.H. Ahmed, Mark Rodwell, James F. Buckwalter, University of California, Santa Barbara, USA 
- PAGE 1046  **C** H-Band Differential Cascode Power Amplifier Achieving 9.5-dBm OP1dB at 260GHz in 250-nm InP DHBT Process
Chan-Gyu Choi, Jiseul Kim, Kyunghwan Kim, Ho-Jin Song, POSTECH, Korea 
- (MWTL)  **C** 2.6- and 4-W E-Band GaN Power Amplifiers with a Peak Efficiency of 22% and 15.3%
Bharath Cimbili¹, Christian Friesicke¹, Friedbert van Raay¹, Sandrine Wagner¹, Mingquan Bao², Rüdiger Quay¹
¹Fraunhofer IAF, Germany  ; ²Ericsson, Sweden 

Th3A: Tunable Devices

Chair: Tao Yang, UESTC — Co-Chair: Xun Gong, University of Central Florida

Room 23ABC, 13:30-15:10, Thursday 15 June 2023

- PAGE 1050  **C** Low Delay and Loss Variation Reflection Type Phase Shifter with Sequentially Controlled Varactor Diodes
Gisung Yang, Donghyun Lee, Byung-Wook Min, Yonsei University, Korea 
- PAGE 1054  **C** A Broadband Reflection-Type Phase Shifter with Low Loss Variation Using Magic-T and Anti-Phase Reflection Loads
Jo Tamura, Hiroyuki Arai, Yokohama National University, Japan 
- PAGE 1058  **C** Silicon-Micromachined Liquid Crystal Variable Capacitors for Tunable RF Devices
Hassan Kianmehr, Raafat R. Mansour, University of Waterloo, Canada 
- PAGE 1061  **C** Reconfigurable Microwave Components Based on Optimization of Field Programmable Microwave Substrate
Aarefa Saifee¹, Christophe Durousseau¹, Aurelien Perigaud¹, Nicolas Delhote¹, Muhammad F. Farooqui², Ying Wang², Langis Roy²
¹XLIM (UMR 7252), France  ; ²Ontario Tech University, Canada 
- PAGE 1065  **C** A Reconfigurable Reflective/Absorptive SPDT Plasma Switch
Alden Fisher, Thomas R. Jones, Dimitrios Peroulis, Purdue University, USA 

Th3B: Integrated RFID Systems and Applications

Chair: Victor M. Lubecke, University of Hawaii at Manoa — Co-Chair: Kazuya Yamamoto, Mitsubishi Electric











Room 24ABC, 13:30–15:10, Thursday 15 June 2023

- PAGE 1069  **C** **mmIDs Enter the 3rd Dimension: A Camera Inspired Broadbeam High-Gain Retrodirective Backscatter Tag**
 Th3B-1 *Charles A. Lynch III¹, Genaro Soto-Valle¹, Jimmy G.D. Hester², Manos M. Tentzeris¹*
¹Georgia Tech, USA  ; ²Atheraxon, USA 
- PAGE 1073  **C** **Long-Range Chipless RFID for Objects in Translation Using Doppler-Modulated Depolarizing Tags**
 Th3B-2 *Ashkan Azarfar, Nicolas Barbot, Etienne Perret, LCIS (EA 3747), France *
- (MWTL)  **C** **A 27-mW Ka-Band Complex Dielectric Sensor Chip with Readout and Reference Circuits Using 1.2-V Supply in 130-nm SiGe BiCMOS**
 Th3B-3 *Batuhan Sutbas, Mohamed Hussein Eissa, Gunter Fischer, Gerhard Kahmen, IHP, Germany *
- (MWTL)  **C** **A UHF 1.3cm² Passive Subharmonic Tag with a 13m Read-Range**
 Th3B-4 *Nicolas Casilli, Luca Colombo, Cristian Cassella, Northeastern University, USA *
- PAGE 1077  **C** **3D-Printable Rectenna for Passive Tag Localization Exploiting Multi-Sine Intermodulation**
 Th3B-5 *Giulia Battistini, Giacomo Paolini, Alessandra Costanzo, Diego Masotti, Università di Bologna, Italy *

Th3C: High-Accuracy Physiological Sensing and Positioning

Chair: Olga Boric-Lubecke, University of Hawaii at Manoa — Co-Chair: Aly E. Fathy, University of Tennessee














Room 25ABC, 13:30–15:10, Thursday 15 June 2023

- PAGE 1081  **C** **Effect of Respiration Harmonics on Beat-to-Beat Analysis of Heart Signal**
 Th3C-1 *Jannatun Noor Sameera, Mohammad Shadman Ishrak, Victor M. Lubecke, Olga Boric-Lubecke, University of Hawaii at Manoa, USA *
- PAGE 1085  **C** **Seatbelt-Embroidered Metamaterials for In-Vehicle Vital Sign Monitoring**
 Th3C-2 *Qihang Zeng, Xi Tian, Dat T. Nguyen, Xin Yang, Patrick Chia, Changsheng Wu, John S. Ho, NUS, Singapore *
- PAGE 1089  **C** **Convolutional Neural Network-Based MIMO Radar Channel Selection for Improving Robust Remote Heart Rate Estimation Accuracy**
 Th3C-3 *Chandler J. Bauder, Toan K. Vo Dai, Abdel-Kareem Moadi, Aly E. Fathy, University of Tennessee Knoxville, USA *
- PAGE 1093  **C** **Temporal-Spatial Equivalent Virtual Array Technique for Accurate Vital Sign Monitoring**
 Th3C-5 *Yuchen Li, Jingyun Lu, Shuqin Dong, Changzhan Gu, Junfa Mao, SJTU, China *
- PAGE 1097  **C** **High-Accuracy Cardiac Activity Extraction Using RLMD-Based Frequency Envelopogram in FMCW Radar Systems**
 Th3C-6 *Jian-Fu Li, Chin-Lung Yang, National Cheng Kung University, Taiwan *














IF2: Interactive Forum Session Two

Chair: Jim Carroll, AmpliTech — Co-Chair: Gian Piero Gibiino, Università di Bologna


















Room Sails Pavilion, 13:30–15:30, Thursday 15 June 2023

- PAGE 1101  **C** **Millimeter-Wave On-Wafer Large Signal Characterization System for Harmonic Source/Load Pull and Waveform Measurements**
Alexander Baddeley¹, Simon Woodington², Dragan Gecan², Aamir Sheikh², Jamie Lunn³, Paul Tasker¹, Roberto Quaglia¹
¹Cardiff University, UK  ; ²Focus Microwave, UK  ; ³Rohde & Schwarz, UK 
- PAGE 1105  **C** **Detecting Low-Frequency Critical Resonances in Power Amplifiers Using the Periodicity of Floquet Exponents**
Nerea Otegi¹, Juan-Mari Collantes¹, Martin Grao², Jorge Feuchtwanger¹
¹Universidad del País Vasco, Spain  ; ²IKERLAN, Spain 
- PAGE 1109  **C** **A Miniature W-Band Substrate-Integrated Waveguide Cavity Bandpass Filter Using GaAs-Based IPD Technology**
Yin-Cheng Chang¹, Ta-Yeh Lin¹, Jiayou Wang², Shuw-Guann Lin¹, Chao-Ping Hsieh¹, Yi Huang³, Shawn S.H. Hsu², Da-Chiang Chang¹
¹NARLabs-TSRI, Taiwan  ; ²National Tsing Hua University, Taiwan  ; ³University of Liverpool, UK 
- PAGE 1112  **C** **A Ka-Band 35-dBm P_{0.1dB} Low-Loss Monolithic SPDT Switch Using Anti-Series Diode Connection**
Jung Chou, Wei-Cheng Chen, Yong-Le Wang, Yi-Fu Chen, Hong-Yeh Chang, National Central University, Taiwan 

IF2 continued ...

- PAGE 1116  **C** **A Modulation-Defined RF Micro-Acoustic Delay Line Based on ScAlN MEMS Resonators for Self-Interference Cancellation**
Giuseppe Michetti¹, Sasank Garikapati², Meruyert Assylbekova¹, Harish Krishnaswamy², Matteo Rinaldi¹
¹Northeastern University, USA  ; ²Columbia University, USA 
- PAGE 1120  **C** **Robust Fulcrum-Type Wafer-Level Packaged MEMS Switches Utilizing Al-Ru/AlCu Contacts Fabricated in a Commercial MEMS Foundry**
Tejinder Singh, Raafat R. Mansour, University of Waterloo, Canada 
- PAGE 1124  **C** **Low-Cost and High Performance Antenna Setup for Updating ePaper Displays on Curved RFID SmartTags Used in Pharmaceutical Studies**
Sebastian Peters¹, Christian Hangmann², Ingo Wüllner², Joschka Traupe², Tobias John², Robert Weigel¹, Benedict Scheiner¹
¹FAU Erlangen-Nürnberg, Germany  ; ²SIL System Integration Laboratory, Germany 
- PAGE 1128  **C** **Down-Conversion Mixer Using $\lambda/4$ -TL-C-Based Coupler and BSFB Technique for 28GHz 5G NR**
Yo-Sheng Lin, Kai-Siang Lan, National Chi Nan University, Taiwan 
- PAGE 1132  **C** **A G-Band SiGe BiCMOS LNA with an On-Chip and Compact Temperature Compensation Biasing Circuit**
Alvaro Urain, David Del Río, Rolando Torres, Roc Berenguer, Universidad de Navarra, Spain 
- PAGE 1136  **C** **Ultra-Low-Noise InGaAs mHEMT Technology and MMICs for Space Missions and Radio Astronomy**
Fabian Thome, Laurenz John, Rainer Weber, Felix Heinz, Hermann Massler, Arnulf Leuther, Sébastien Chartier, Fraunhofer IAF, Germany 














IF2 continued ...

- PAGE 1140  **C** **A W-Band Phase-Shifter-Embedded PA in 40-nm CMOS for 6G Applications**
IF2-11 *Chun Wang¹, Pin-Chun Chiu², Chun-Hsing Li²*
¹National Tsing Hua University, Taiwan  ; ²National Taiwan University, Taiwan 
- PAGE 1144  **C** **A High Efficiency Q-Band MMIC GaN Power Amplifier for Space Applications**
IF2-12 *Mohammed Ayad¹, Kimon Vivien¹, Hugo Debergé², Zineb Ouarch¹,
Philippe Auxemery¹*
¹UMS, France  ; ²ESA-ESTEC, The Netherlands 
- PAGE 1148  **C** **A Novel Frequency Reconfigurable Real-Time RF Edge Detector**
IF2-13 *Hanxiang Zhang, Bayaner Arigong, FAMU-FSU, USA *
- N/A  **C** **A 56–67GHz CMOS Phased-Array Transmit Beamformer with 26.2dB Peak Gain, 15
IF2-15 dBm P_{SAT}, and 20% PAE**
Kyung Pil Jung¹, Joon Hyung Kim², Geon Ho Park¹, Chul Soon Park¹
¹KAIST, Korea  ; ²Kunsan National University, Korea 
- PAGE 1156  **C** **A 30–88GHz Phase Shifter with Broadband 90° Hybrid Marchand Balun Network
IF2-16 and Common-Base Buffer Achieving 1.34–3.1° RMS Phase Error in 90nm SiGe**
Zheng Liu, Emir Ali Karahan, Kaushik Sengupta, Princeton University, USA 
- PAGE 1160  **C** **Improving Temperature Stability of Dickson Charge Pump Rectifiers for
IF2-17 Battery-Free Wireless Sensing Applications**
Xiaoqiang Gu¹, Simon Hemour², Roni Khazaka¹, Ke Wu³
¹McGill University, Canada  ; ²IMS (UMR 5218), France  ; ³Polytechnique Montréal,
Canada 


IF2 continued ...

- PAGE 1164  **C** **Design and Implementation of Near-Field Spatial Wireless Power Transfer Using
IF2-18 Orthogonal Multiple Coils**
*Seong-Hyeop Ahn, Ho-Seong Jeong, Wang-Sang Lee, Gyeongsang National University,
Korea *
- PAGE 1168  **C** **High Performance Lamb Wave Resonator Operating in the 900MHz ISM Band for
IF2-19 Wireless Sensing Applications**
*Anne-Marie Zaccarin¹, Gokulanand M. Iyer¹, Abhay Kochhar², Ramakrishna Vetury²,
Kevin T. Turner¹, Roy H. Olsson III¹*
¹University of Pennsylvania, USA  ; ²Akoustis Technologies, USA 
- PAGE 1172  **C** **Enhanced FSK-Modulated Ambient Backscatter Communication System**
IF2-20 *Kai Xu¹, Jayakrishnan Methapettyparambu Purushothama¹, Yuan Ding¹,
George Goussetis¹, John Thompson², Steve McLaughlin¹*
¹Heriot-Watt University, UK  ; ²University of Edinburgh, UK 
- PAGE 1176  **C** **Virtual Receiver Matrix for Multifunction Communication and Sensing Wireless
IF2-21 Systems Using Simultaneous Incident Waves at the Same Carrier Frequency**
Seyed Ali Keivaan, Pascal Burasa, Ke Wu, Polytechnique Montréal, Canada 
- PAGE 1180  **C** **Directional Modulation Retrodirective Array-Enabled Physical Layer Secured
IF2-22 Transponder for Protected Wireless Data Acquisition**
*Shaghayegh Vosoughitabar, Alireza Nooraiepour, Waheed U. Bajwa,
Narayan B. Mandayam, Chung-Tse Michael Wu, Rutgers University, USA *
- PAGE 1184  **C** **Disposable Planar Microwave Sensor for Real-Time Monitoring of Lubricant
IF2-23 Depletion on Lubricant-Infused Coated Medical Implants**
*Amirhossein Yazdanicherati, Erin L. Roberts, Maryam Badv, Zahra Abbasi, University
of Calgary, Canada *

IF2 continued ...

- PAGE 1188  **C** **Chest-Worn Transmitarray Lens for Monitoring Heart Rate Variability with a Remote Self-Injection-Locked Doppler Radar**
Rezki El Arif¹, Wei-Chih Su¹, Tzyy-Sheng Horng¹, Chung-Tse Michael Wu²
¹National Sun Yat-sen University, Taiwan  ; ²Rutgers University, USA 
- PAGE 1192  **C** **Heart Sound Detection Using an Ultra-Wideband FMCW Radar**
Marvin Wenzel, Bartosz Tegowski, Nils C. Albrecht, Dominik Langer, Alexander Koelpin,
Technische Universität Hamburg, Germany 
- PAGE 1196  **C** **Accurate Fast Heartrate Detection Based on Fourier Bessel Series Expansion During Radar-Based Sleep Monitoring**
Shuqin Dong¹, Jingyun Lu¹, Yuchen Li¹, Caojun Ji², Chengmei Yuan², Dayue Zhao³,
Menghan Wang³, Jingxian Chen¹, Changzhan Gu¹, Junfa Mao¹
¹SJTU, China  ; ²Shanghai Mental Health Center, China  ; ³China Pacific Insurance, China 
- PAGE 1200  **C** **Tube Positioning System Designed for Nasogastric Intubation**
Meng-Hsuan Lin, Shi-Meng Yang, Chia-Chan Chang, Sheng-Fuh Chang, National
Chung Cheng University, Taiwan 
- PAGE 1203  **C** **A Thru-Reflect-Series-Resistance (TRS) Calibration for Cryogenic Device Characterization in 40-nm CMOS Technology**
Yi-Ting Chen, Ian Huang, Min-Jui Lin, Shu-Yan Chuang, Hua Ling Ho, Kai-Syang Hsu,
Pin-Yu Lin, Sih-Ying Chen, Liang-Hung Lu, Shih-Yuan Chen, Jiun-Yun Li,
Jun-Chau Chien, National Taiwan University, Taiwan 

IF2 continued ...

- PAGE 1207  **C** **Negative Resistance Quasiparticle SIS Amplifiers**
Peter Russer¹, Dieter Schuöcker²
¹Technische Universität München, Germany  ; ²Technische Universität Wien, Austria 
- PAGE 1211  **C** **A Converged Optical and mm-Wave, Dual-band, Multi-Beam Rotman Lens Antenna System Enabling Simplified Designs of 5G/mmW Base Stations and Network Densification**
Lauryn Smith¹, Charles Lynch¹, C. Alex Kaylor¹, L. Alberto Campos², Lin Cheng²,
Stephen Ralph¹, Manos M. Tentzeris¹
¹Georgia Tech, USA  ; ²CableLabs, USA 