

2019 IEEE MTT-S International Microwave Workshop Series on Advanced Materials and Processes for RF and THz Applications (IMWS-AMP 2019)

**Bochum, Germany
16 – 18 July 2019**



**IEEE Catalog Number: CFP1977Y-POD
ISBN: 978-1-7281-0937-4**

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IEEE Catalog Number:	CFP1977Y-POD
ISBN (Print-On-Demand):	978-1-7281-0937-4
ISBN (Online):	978-1-7281-0936-7

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TU1.1: Additive Manufacturing Technologies and Development — Filters

Chairs: Oscar A. Peverini (CNR-IEIIT, National Research Council of Italy), Cristiano Tomassoni (University of Perugia, Italy)

13:10–14:50, Tuesday 16 July 2019, Room 1

PAGE 1 TU1.1-1 13:10	Assembly-Free Tunable Resonator on TE011 Mode <i>(Aurélien Périgaud, Nicolas Delhote, Olivier Tantot, Serge Verdeyme, Stéphane Bila, Carpentier Ludovic)</i>
PAGE 4 TU1.1-2 13:30	3D Printed 90GHz Frequency-Coded Chipless Wireless RFID Tag <i>(Alejandro Jiménez-Sáez, Martin Schüßler, Damian Pandel, Niels Benson, Rolf Jakoby)</i>
PAGE 7 TU1.1-3 13:50	Additive Manufactured Bandpass Filters at Ka-Band <i>(P. Booth)</i>
PAGE 10 TU1.1-4 14:10	A New Class of Doublet Based on Slotted Slant Ridge in Additive Manufacturing Technology <i>(Cristiano Tomassoni, Lorenzo Silvestri, Nicolò Delmonte, Maurizio Bozzi, Luca Perregrini, Stefania Marconi, Gianluca Alaimo, Ferdinando Auricchio)</i>
PAGE 13 TU1.1-5 14:30	Additive Manufacturing of Symmetrical X-Band Waveguide Filters for Wide-Band Applications Based on Extracted Pole Filter Design <i>(Daniel Miek, Sebastian Simmich, Michael Höft)</i>

TU1.2: Material Characterization 1

Chairs: Amelie Hagelauer (FAU Erlangen-Nürnberg, Germany), Holger Maune (Technische Universität Darmstadt, Germany)

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PAGE 16 TU1.2-1 13:10	Setup for Characterization of the Non-Linear Electric Susceptibility in the Microwave Range Applied to a Glass Ceramic <i>(Florian Bergmann, Martin Letz, Holger Maune, Gerhard Jakob)</i>
PAGE 19 TU1.2-2 13:30	Characterization of Liquid Crystals Using a Temperature-Controlled 60GHz Resonator <i>(E. Polat, R. Reese, H. Tesmer, Sönke Schmidt, M. Spaeth, M. Nickel, Christian Schuster, Rolf Jakoby, Holger Maune)</i>
PAGE 22 TU1.2-3 13:50	Non-Destructive Testing of 3D-Printed Samples Based on Machine Learning <i>(Mostafa ELsaadouny, Jan Barowski, Ilona Rolfes)</i>
PAGE 25 TU1.2-4 14:10	An Error Compensation Algorithm for Indirect Resonant Planar Relative Permittivity Sensor Principles up to 100GHz <i>(Isabella Lau, Fabian Lurz, Robert Weigel, Alexander Koelpin)</i>
PAGE 28 TU1.2-5 14:30	Indoor Material Properties Extraction from Scattering Parameters at Frequencies from 750GHz to 1.1THz <i>(Fawad Sheikh, Ismail B. Mabrouk, Akram Alomainy, Qammer H. Abbasi, Thomas Kaiser)</i>

TU2.1 : Additive Manufacturing Technologies and Development — Waveguides

Chairs: *Maurizio Bozzi (University of Pavia, Italy), Oscar A. Peverini (CNR-IEIT, National Research Council of Italy)*

15:20-17:20, Tuesday 16 July 2019, Room 1

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Overview of Ohmic Losses Reduction and Surface Roughness Enhancement in RF Parts Based on Electroless Plating
(P. Martín-Iglesias, Isabel Montero, F. Teberio, J.M. Percz, S. Martín-Iglesias, I. Arregui, I. Arnedo, T. Lopetegui, M.A.G. Laso)
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Electromagnetic and Mechanical Analyses of a 3D-Printed Ka-Band Integrated Twist and Orthomode Transducer
(Giuseppe Addamo, Oscar A. Peverini, Diego Manfredi, Flaviana Calignano, Fabio Paonessa, Mauro Lumia, Giuseppe Virone)
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16:00
Preparation and Properties of 3D Screen-Printed RF Components
(M. Dressler, T. Studnitzky, M. Stäter, Oscar A. Peverini, Giuseppe Addamo, H.-U. Nickel)
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16:20
High Gain Ka-Band ALM Feed Chain
(Michael Kilian, Philipp Kohl, Christian Hartwanger, Michael Schneider)
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TU2.1-5
16:40
Additive Manufacturing of 300GHz Corrugated Horn Antennas
(Alwin Reinhardt, Marvin Möbius-Labinski, Christopher Asmus, Andreas Bauereiss, Michael Höft)
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TU2.1-6
17:00
Fully 3-D Printed Tunable Microwave Subsystem
(Sang-Hee Shin, Diyar Alyasiri, Mario D'Auria, William J. Otter, Connor W. Myant, Daniel Stokes, Zhengrong Tian, Nick M. Ridler, Stepan Lucyszyn)
-

TU2.2 : New Materials and Technologies for RF/Microwave Filter

Chairs: *Roberto Gómez-García (University of Alcalá, Spain), Emiliano Pallecchi (University of Lille, France)*

15:20-17:20, Tuesday 16 July 2019, Room 2

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15:20
A Tunable mmWave Band-Pass Filter Based on Ferroelectric Hafnium Zirconium Oxide Varactors
(Sukhrob Abdulazhanov, Quang Huy Le, Dang Khoa Huynh, Defu Wang, Gerald Gerlach, Thomas Kämpfe)
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Synthesis Design of Modified Wideband Balun Bandpass Filter with Compact Structure
(Li Yang, Lei Zhu, Roberto Gómez-García, Runqi Zhang, Kam-Weng Tam)
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16:00
Resonant Frequency-Dependent Coupling Elements for the Design of Microwave Filters with Multiple Transmission Zeroes
(Ahmad Haidar, Stéphane Bila, Aurélien Périgaud, Olivier Tantot, Hussein Ezzeddine)
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Double-Layer Sixteenth-Mode Substrate Integrated Waveguide Filter Based on Defected Ground Structure
(F. Grine, H. Ammari, M.T. Benhabiles, M.L. Riabi)
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16:40
Miniature Dual-Mode Ring Resonator
(Mustafa Bakr, Ahmad Bader Alothman Alterkawi, Wolfgang Bösch)
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17:00
Multiphysic Analysis of High Power Microwave Filter Using High Performance Aluminium Alloy
(P. Martín-Iglesias, T. Raadik, F. Teberio, J.M. Percz, S. Martín-Iglesias, L. Pambaguan, I. Arregui, I. Arnedo, T. Lopetegui, M.A.G. Laso)

WE1.1: Antennas and Simulation Techniques

Chairs: Isabel Montero (Consejo Superior de Investigaciones Científicas, Spain), Christian Schulz (Ruhr-Universität Bochum, Germany)

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09:00

New Approach for the Simulation of Bent and Crumpled Antennas on a Flexible Substrate

(K. Neumann, A. Rennings, D. Erni)

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09:20

A New Extremely Ultrathin Metasurface Energy Harvester and its Simple Modelling Based on Resonant Half-Wave Dipole Antenna

(Alireza Ghaneizadeh, Mojtaba Joodaki, Josef Böröcsök, Khalil Mafinezhad)

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09:40

A Wearable, Low-Profile, Fractal Monopole Antenna Integrated with a Reflector for Enhancing Antenna Performance and SAR Reduction

(Nikolay T. Atanasov, Gabriela L. Atanasova, Aleksey K. Stefanov, Ivan I. Nedialkov)

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10:00

Gain Enhancement of Annular Ring Patch Using Cascaded EBG

(R. Venkata Sravya, Runa Kumari, Balamati Choudhury)

WE1.2: Advanced Passive Components

Chairs: Michael Höft (Kiel University, Germany), Oscar A. Peverini (CNR-IEIT, National Research Council of Italy)

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09:00

3-dB Filtering Power Dividers with Quasi-Reflectionless Behavior at All Their Ports

(Roberto Gómez-García, José-María Muñoz-Ferrer, Dimitra Psychogiou)

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Design and Characterization of Broadband Triplexers

(Florian Boes, Marius Kretschmann, Sören Marahrens, Thomas Zwick)

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Reconfigurable Hairpin Filter with Tunable Center Frequency, Bandwidth and Transmission Zero

(Christian Schuster, Lukas Schynol, E. Polat, Elias Schwab, Sönke Schmidt, Rolf Jakoby, Holger Maune)

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Dual-Mode Coupler with Branch-Line/Rat-Race Responses on Integrated Passive Device Process

(Huy Nam Chu, Gao-Yi Li, Tzyh-Ghuang Ma)

WE2.1: Materials and Process Technologies

Chairs: Jan C. Balzer (University of Duisburg-Essen, Germany), Holger Maune (Technische Universität Darmstadt, Germany)

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Glasses and Glass Ceramics for Applications in High Frequency Electronics

(Martin Letz)

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Low-K LTCC Dielectrics: Novel High-Q Materials for 5G Applications

(Peter M. Marley, Ellen S. Tormey, Yi Yang, Cody Gleason)

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WE2.1-3
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Polyurethane-Based Functionalized CNT Composites as Absorbers for Microwave Applications

(Syed S. Jehangir, Mousa I. Hussein, I.J. Rajmohan, Y. Haik, Q. Clément, N. Vukadinovic)

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Simulation and Manufacturing of Low Loss PCB Structures with Additional Electromagnetic Field in Air

(Felix Sepaintner, Andreas Scharl, Franz Xaver Röhr, Werner Bogner, Stefan Zorn)

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12:10

Nanostructured Coatings of Low-Secondary Electron Emission to Avoid Multipactor Discharge in High-Power Microwave Devices

(Leandro Olano, María E. Dávila, José M. Rojo, P. Martín-Iglesias, Isabel Montero)

WE2.2: Material Characterization 2

Chairs: Jan Barowski (Ruhr-Universität Bochum, Germany), Tuami Lasri (University of Lille, France)

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10:50 **Experimental Investigation of Terahertz Wave Scattering by Statistically Controlled Rough Surfaces**
(Mai Alissa, Benedikt Friederich, K. Kolpatzeck, Andreas Czulwik, Thomas Kaiser)
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11:10 **Investigations on Foam Detection Utilizing Ultra-Broadband Millimeter Wave FMCW Radar**
(Marcel van Delden, Stephan Westerdick, Thomas Musch)
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WE2.2-3
11:30 **A Novel Calibration Technique for FMCW Radar Systems Enabling Material Characterization in Variable Distances**
(Jochen Jebramcik, Ilona Rolfes, Jan Barowski)
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11:50 **Asymptotic Simulation Methods as Forward Models in Multilayer Material Characterization Applications**
(Steffen Vogt, Orell Garten, Jochen Jebramcik, Jan Barowski, Ilona Rolfes)
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12:10 **Wide Band (0.5–67GHz) Dielectric Properties of Biosourced Cellulose Ester Flexible Films**
(S. Li, G. Boussatour, P.-Y. Cresson, B. Genestie, N. Joly, T. Lasri)
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WE3.1: Photonic THz Systems

Chair: Martin Hofmann (Ruhr-Universität Bochum, Germany)

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14:20 **High Dynamic Range THz Systems Using ErAs:In(Al)GaAs Photoconductors**
(Uttam Nandi, Fahd R. Faridi, Anuar D.J. Fernandez Olvera, Justin Norman, Hong Lu, Arthur C. Gossard, Sascha Preu)
- WE3.1-2
14:40 **Integrated Microwave Photonics for Mobile Terahertz Spectroscopy and Imaging**
(Andreas Stöhr, Sebastian Dülme, Nils Schriniski, Peng Lu)
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WE3.1-3
15:00 **Characterization and Application of a Commercially Available Laser Diode in a THz System**
(K. Kolpatzeck, S. Tonder, X. Liu, Andreas Czulwik, J.C. Balzer)
- WE3.1-4
15:20 **High-Resolution Molecular Spectroscopy with Terahertz Quantum-Cascade Lasers**
(Martin Wienold, Till Hagelschuer, Heiko Richter, Heinz-Wilhelm Huebers)
-

WE4.1: RF Nanotechnology: Packaging and Circuits

Chairs: Dominique Baillargeat (University of Limoges, CNRS, XLIM, France), Tuami Lasri (University of Lille, France)

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16:00 **Characterization of Carbon Fiber Reinforced Plastic for Microwave Circuit Design**
(Christopher M. Preddy, Rajinder Singh, Haris Votsi, Peter H. Aaen, S. Ravi P. Silva)
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16:20 **Millimeter-Wave CNT Based Resonant Cavity**
(Joseph de Saxcé, Philippe Roux-Lévy, Siah Chun Fei, Jianxiong Wang, Tay Beng Kang, Philippe Coquet, Dominique Baillargeat)
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16:40 **Boron Nitride Coated Three-Dimensional Graphene as an Electrically Insulating Electromagnetic Interference Shield**
(Zhi Lin Ngoh, Fei Ni Leong, Roland Yingjie Tay, Matthew David Whiteside, Soon Siang Chng, Jong Jen Yu, Siu Hon Tsang, Dunlin Tan, Geok Ing Ng, Edwin Hang Tong Teo)
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17:00 **Graphene Field Effect Transistors for High Frequency Applications**
(Emiliano Pallecchi, Henri Happy, Wei Wei, Marina Deng, Sebastien Fregonese, Dalal Fadil, Di Zhou, Soukaina Ben Salk, Wlodek Strupinski)
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17:20 **Graphene-Diode-Based Frequency Conversion Mixers for High-Frequency Applications**
(Ahmed Hamed, Mohamed Saeed, Zhenxing Wang, Mehrdad Shaygan, Daniel Neumaier, Renato Negra)

TH1.1 : Millimeter Wave Imaging

Chair: Jan Barowski (Ruhr-Universität Bochum, Germany)

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Imaging Characteristics of a 24×24 Channel MIMO FMCW Radar Based on a SiGe:C Chipset
(Simon Kueppers, Reinhold Herschel, Siying Wang, Dirk Nüßler, Nils Pohl)
- TH1.1-2
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Addressing Automotive Radar End-of-Line Testing Applications with a Millimeter Wave Imaging System
(Tobias Koeppe)
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Synthetic Aperture Radar Imaging Using MIMO Frequency Modulated Continuous Wave Sensors
(Jonas Wagner, Christoph Dahl, Ilona Rolfes, Jan Barowski)
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Spatial Identification of Dielectric Properties Using Synthetic Aperture Radar
(Jan Barowski, Jochen Jebramcik, Jonas Wagner, Nils Pohl, Ilona Rolfes)
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10:00
Pulse-Resolved Data Acquisition System for THz Pump Laser Probe Experiments at TELBE Using Super-Radiant Terahertz Sources
(M. Bawatna, B. Green, J.-C. Deinert, S. Kovalev, O. Knodel, R. Spallek, T. Cowan)
-

TH1.2 : Innovative Integration Techniques

Chairs: Roberto Gómez-García (University of Alcalá, Spain), Sven Thomas (Fraunhofer FHR, Germany)

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On the Design of Antennas in eWLB Package for Radar Applications Above 100GHz
(Faisal Ahmed, Muhammad Furqan, Andreas Stelzer)
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Polymer Based 140GHz Planar Gap Waveguide Array Antenna for Line of Sight (LOS) MIMO Backhaul Links
(Sadia Farjana, Sofia Rahiminejad, Ashraf Uz Zaman, Jonas Hansson, Mohammad Amir Ghaderi, Sjoerd Haasl, Peter Enoksson)
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Ink-Jet Implementation of Stacked-Patch Antenna for Wireless Applications
(Eduardo García-Marin, Enrique Márquez-Segura, Pablo Sánchez-Olivares, José Luis Masa-Campos, Jorge A. Ruiz-Cruz, Carlos Camacho-Peñalosa)
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Embedded Suspended Stripline Substrate Technology (ESSS) as a Catalyst for Low-Loss PCB Structures in the Ka-Band
(Sebastian W. Sattler, Ahmad Bader Alothman Alterkawi, Fabrizio Gentili, Reinhard Teschl, Erich Schlaffer, Bernhard Reitmaier, Wolfgang Bösch)
-

TH2.1 : Microwave Sensors

Chairs: Sascha Preu (Technische Universität Darmstadt, Germany), Cristiano Tomassoni (University of Perugia, Italy)

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Microwave Characterization of Liquid Mixtures with a Miniaturized Interdigital Sensor
(Xiue Bao, Ilja Ocket, Meng Zhang, Juncheng Bao, Dominique Schreurs, Bart Nauwelaers)
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Planar Microwave Bragg Reflector Resonant Dielectric Sensor
(Abhishek Kumar Jha, Michal Mrozowski, Nicolò Delmonte, Adam Lamecki, Maurizio Bozzi)
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Minimally Invasive Supervision of Plasma-Assisted Dielectric Deposition Processes
(Dennis Pohle, Christian Schulz, Moritz Oberberg, Peter Awakowicz, Ilona Rolfes)
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Emulation of Spatially Distributed Plasma Density Profiles in 3D Electromagnetic Field Simulations
(Birk Hattenhorst, Dennis Pohle, Christian Schulz, Ilona Rolfes, Thomas Musch)

TH2.2: Advanced Devices and Circuits

Chairs: *Faisal Ahmed (Infineon Technologies AG & DICE GmbH & Co KG, Austria), Marcel van Delden (Ruhr-University Bochum, Germany)*

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Analysis of Stochastic Schottky Barrier Variations Within Printed High Frequency Rectifiers for Harmonics Generation

(K. Neumann, L. Kuehnel, F. Langer, A. Rennings, Niels Benson, R. Schmechel, D. Erni)

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Design and Characterisation of VO₂ Based Switches for Ultra-Fast Reconfigurable Devices

(M.N. Sadiq, M. Le Roy, A. Perennec, P. Laurent, N. Martin, D. Passerieux, A. Crunteanu, R. Boyer, F. Dumas-Bouchiat, M.-B. Martin, L. Divay, Q. Levesque, G. Tanné)

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11:30

A mmWave Phase Shifter Based on Ferroelectric Hafnium Zirconium Oxide Varactors

(Sukhrob Abdulazhanov, Quang Huy Le, Dang Khoa Huynh, Defu Wang, Gerald Gerlach, Thomas Kämpfe)

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11:50

An 8-to-20GHz Wideband Yttrium-Iron-Garnet Tuned Oscillator Design with SRFT Integration

(Hui Yan Huan, Narendra Kumar, Amir Effendy, T.A. Latef, B.S. Yarman)