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EuMIC01 : Robust GaN Technologies

Chair: Gijs van der Bent, TNO, The Netherlands

Co-Chair: Patrick Schuh, HENSOLDT, Germany

08:30-10:10, Monday 23rd September 2024, E01

- N/A **Differentiated Technologies Enabling Next Generation Radar and Communications Systems (Industrial Keynote)**
Charles Edoua Kacou, MACOM, France
- 2 **RF-Robustness Enhancement in AlN/GaN HEMT Through AlGaN Back-Barrier: Nonlinear Model Analysis**
N. Said¹, D. Saugnon¹, K. Harrouche², Farid Medjdoub², N. Labat³, N. Malbert³, J.-G. Tartarin¹
¹LAAS-CNRS, France; ²IEMN (UMR 8520), France; ³IMS (UMR 5218), France
- 6 **Short Term Drift in the Recovery Time of GaN HEMT Switches**
Andreas Divinyi¹, Niklas Rorsman², Niklas Billström¹, Mattias Thorsell¹
¹Saab, Sweden; ²Chalmers University of Technology, Sweden
- 10 **GaN FET Current Change and Recovery During and After Gamma Radiation**
Evan S. Shelley, Mohamed N. Ahmed, Nicola V. Lubczyk, Andrew L. Parker, Anthony E. Parker, Simon J. Mahon, Melissa C. Gorman, Macquarie University, Australia
- 14 **Evaluation of Integrated GaN Diodes as Varactors for Tunable MMIC PAs from C- to K-Band**
Simone Cangini¹, Christoph Schulze², Gian Piero Gibiino¹, Alberto Maria Angelotti¹, Hossein Yazdani², Corrado Florian¹, Olof Bengtsson², Alberto Santarelli¹
¹Università di Bologna, Italy; ²FBH, Germany

EuMIC02 : Frequency Synthesisers and Converters

Chair: Alexandre Siliгарis, CEA-Leti, France

Co-Chair: Ulrich J. Lewark, IMST, Germany

08:30-10:10, Monday 23rd September 2024, E02

- 18 **A 22-nm FDSOI 35-41GHz Frequency Synthesizer**
J.-B. David, A. Siliгарis, J. Prouvé, Baudouin Martineau, M. Zarudniev, J.L. González-Jiménez, CEA-Leti, France
- 22 **A 170-260GHz SiGe Frequency Doubler with 5-dBm Output Power and 13-dB Input Power Range**
Jonathan Tao, Eythan Lam, James F. Buckwalter, University of California Santa Barbara, USA
- 26 **Proposing a Subharmonic Downconverting IQ-Mixer for mm-Wave 6G and Other D-Band Applications**
Jan Schoepfel, Tobias T. Braun, Nils Pohl, Ruhr-Universität Bochum, Germany
- 30 **SiGe Transmitter and Receiver with Integrated Mixers and LO Chains for K/Ka Band Phased Array Systems**
Matteo Angelo Fumagalli, Alberto Colzani, Alessandro Fonte, SIAE MICROELETTRONICA, Italy
- 34 **A 30GHz PLL with Automated Frequency Control Option for Robust Operation in Harsh Environments**
Arzu Ergintav¹, Frank Herzel¹, Gunter Fischer¹, Dietmar Kissinger², Corrado Carta¹
¹IHP, Germany; ²Universität Ulm, Germany

EuMIC03: mm-Wave Amplifiers and Switches

Chair: Benjamin Schoch, Universität Stuttgart, Germany

Co-Chair: Joao Carlos Azevedo Goncalves, STMicroelectronics, France

08:30-10:10, Monday 23rd September 2024, E04

- 38 **High-Gain 664GHz Low-Noise Amplifier Modules Based on Advanced InGaAs HEMT Technologies**
Axel Tessmann¹, Arnulf Leuther¹, Laurenz John¹, Hermann Massler¹, Petri Piironen²
¹Fraunhofer IAF, Germany; ²ESA-ESTEC, The Netherlands
- 42 **A 225GHz 90-nm SiGe Coupled-Line Coupler Gain-Boosted Low Noise Amplifier Operating Above $f_{\max}/2$**
Christopher R. Snyder¹, Sunil G. Rao¹, Jeffrey W. Teng¹, Yaw A. Mensah¹, Christopher T. Coen², John D. Cressler¹
¹Georgia Tech, USA; ²GTRI, USA
- 46 **230-GHz SPDT Switch with 60-GHz Bandwidth and 20dB Dynamic Ratio Utilizing Double-Shunt Topology in SiGe BiCMOS**
Xun Chen, Jonas Winkelhake, Muh-Dey Wei, Renato Negra, RWTH Aachen University, Germany
- 50 **Full D-Band GaN Power Amplifier MMIC and Waveguide Module**
Maciej Ćwikliński¹, Nico Riedmann¹, Robert Ziegler¹, Martin Vossiek², Peter Brückner³, Dirk Schwantuschke³, Michael Mikulla³
¹Rohde & Schwarz, Germany; ²FAU Erlangen-Nürnberg, Germany; ³Fraunhofer IAF, Germany
- 54 **A High-Pass Distributed Amplifier Operating from 215GHz – 315GHz in a 35nm InGaAs mHEMT Technology**
Lukas Gebert¹, Benjamin Schoch¹, Dominik Wrana¹, Thomas Ufschlag¹, Simon Haussmann¹, Axel Tessmann², Sandrine Wagner², Ingmar Kallfass¹
¹Universität Stuttgart, Germany; ²Fraunhofer IAF, Germany

EuMIC04: Silicon-Based Power Amplifiers

Chair: Eric Kerhervé, IMS (UMR 5218), France

Co-Chair: Paolo Colantonio, Università di Roma "Tor Vergata", Italy

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Alexander Haag, Ahmet Çağrı Ulusoy, KIT, Germany
- 62 **12GHz Stacked Power Amplifier with 22.9dBm P_{sat} and 44.9% PAE_{sat} for 6G in 22nm FDSOI**
Mohsen Ghorbanpoor, Edward Liu, Tzu-Yuan Huang, Hua Wang, ETH Zürich, Switzerland
- 66 **Ka-Band Cascode CMOS Power Amplifier with Improved Linearity Using Bias Optimization Technique**
Hyunsoo Kim, Jaeyong Lee, Changkun Park, Soongsil University, Korea
- 70 **A 76–81GHz Variable Gain Power Amplifier in 16nm FinFET CMOS Technology**
Roe Ben Yishay¹, Fabian Cossoy², Tzvi Maimon¹, Tamir Levinger¹
¹Mobileye, Israel; ²Intel, Israel
- 74 **A Frequency-Agile Digital-to-RF Power Amplifier in 22nm FD-SOI CMOS Technology**
Manuel Wittlinger, Markus Grözing, Manfred Berroth, Georg Rademacher, Universität Stuttgart, Germany

EuMIC05: Advanced Techniques for Modelling and Simulation of Devices and Circuits

Chair: *Teresa M. Martín-Guerrero, Universidad de Málaga, Spain*

Co-Chair: *Justin King, Trinity College Dublin, Ireland*

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- 79 **Benchmark of Cosimulation Methodologies for Digital Predistortion on IC Wideband Power Amplifiers**
Maxandre Fellmann, Rémi Quéheille, Antoine Lhomel, Yann Deval, Eric Kerhervé, François Rivet, Nathalie Deltimple, IMS (UMR 5218), France
- 83 **Simulation by Harmonic Balance Techniques of Non-Linear Circuits Driven by Random Modulated Signals**
G. Neveux, D. Barataud, XLIM (UMR 7252), France
- 87 **Robust Small-to-Large Signal Transition Extrapolation for ANN-Based Transistor Models**
João Louro, Luís C. Nunes, Filipe M. Barradas, José C. Pedro, Instituto de Telecomunicações, Portugal
- 91 **Optimum Harmonic Load Prediction for RF Power Amplifier Design Using Polyharmonic Distortion Models**
Seán Banks, Justin King, Trinity College Dublin, Ireland

EuMIC06: EuMIC Opening Session

Chairs: *Nathalie Deltimple, IMS (UMR 5218), France and Andreia Cathelin, STMicroelectronics, France*

Co-Chairs: *Jean-Christophe Nallatamby, XLIM (UMR 7252), France and Joaquín Portilla, UPV/EHU, Spain*

10:40–12:20, Monday 23rd September 2024, N01

- N/A **Welcome Address: Opening of the European Microwave Integrated Circuits Conference 2024**
Nathalie Deltimple, EuMIC 2024 Chair
- N/A **Integrated Self-Interference Mitigation in Modern Intelligent Systems**
Jacques Christophe Rudell, University of Washington, USA
- N/A **FD-SOI: Game Changer in the IOT Arena — Our Circuits Change the World!**
Andreia Cathelin, STMicroelectronics, France

EuMIC07: Millimeter-Wave Technology Platforms

Chair: Patrick Reynaert, KU Leuven, Belgium — Co-Chair: Frank E. van Vliet, TNO, The Netherlands

13:50–15:30, Monday 23rd September 2024, E01

- N/A **Engineered Substrates and Connectivity: Navigating the Future of Wireless and Mobile Communication Challenges** (*Industrial Keynote*)
Christophe Maleville, Soitec, France
- 98 **A Compensated Finite-Ground Elevated Coplanar Waveguide Interconnect Strategy for InP Based Integrated Circuits Above 100GHz**
T.K. Johansen¹, R. Hersent², V. Nodjiadjim², M. Riet², C. Mismar², B. Ardouin²
¹Technical University of Denmark, Denmark; ²III-V Lab, France
- 102 **A New 45nm RFSOI Technology Optimized for Low Power, High Performance mmWave Applications**
Sameer H. Jain¹, R. Mullapudi¹, K. Shanbhag¹, T. Ethirajan¹, Y. Hu¹, Y. Li¹, T. Chowdhury¹, P. Srinivasan¹, I. Das², O. H. Gonzales¹, T. Kauerauf¹, Z. Al-Husseini³, H.K. Kakara², K. Bantupalli², J. Lee¹, T.-Y. Lin¹, E. Veeramani¹, H. Kamineni¹, S.-Y. Kook¹, V. Vanukuru², V. Jain¹, D. Aravamudhan¹, S. Syed¹, T. Letavic¹, J. Costa¹
¹GlobalFoundries, USA; ²GlobalFoundries, India; ³GlobalFoundries, Germany
- 106 **Substrate Integrated Waveguide in 3D Integrated Technology for D-Band Applications**
Hajar Zidane¹, Christopher Pouzou¹, Jordan Corsi¹, Loïc Vincent², Christophe Dubarry³, Olivier Valorge³, Jean-Daniel Arnould¹, Emmanuel Pistono¹
¹TIMA (UMR 5159), France; ²CIME Nanotech, France; ³CEA-Leti, France
- 110 **SiGe HBT Integrated in a 22nm FDSOI**
H. Mulaosmanovic¹, H.S. Chen¹, A. Derrickson², A.-S. Seidel¹, A. Zeun¹, V. Paredes-Saez¹, C. Reichel¹, F. Koch¹, K. Li¹, A. Hellmich¹, S. Müller¹, R. Hüselitz¹, H. Freund¹, A. Ott¹, V. Jaschke¹, F. Grossmann¹, F. Köhler¹, S. Diessner¹, M. Zier¹, L. Fürst¹, M. Ruhm¹, A. Dietel¹, S. Lehmann¹, M. Majer¹, S. Nielsen¹, S. Langdon¹, J. Holt², V. Jain², J. Johnson², A. Joseph², J. Pekarik², D. Angot¹, P. Baars¹
¹GlobalFoundries. Germany; ²GlobalFoundries. USA

EuMIC08: Voltage-Controlled Oscillators and Sources

Chair: Piyush Kaul, Technische Universiteit Eindhoven, The Netherlands — Co-Chair: Réne Scholz, IHP, Germany

13:50–15:30, Monday 23rd September 2024, E02

- 114 **A Signal Source in J-Band with 237–287GHz Tuning Range in a 130-nm SiGe BiCMOS Process**
Farabi Ibne Jamal, Thomas Mausolf, M. Yazici, F. Vater, Corrado Carta, R. Scholz, IHP, Germany
- 118 **A 14-GHz LC-VCO with SiGe Anti-Parallel Core Configuration and a High-Quality Inductor**
Wonsub Lim¹, Clifford D. Cheon¹, Arya Moradinia¹, Jeffrey W. Teng¹, Christopher T. Coen², Nelson E. Lourenco², John D. Cressler¹
¹Georgia Tech, USA; ²GTRI, USA
- 122 **Low-Power Dual-Core Inductively Coupled 40GHz Push-Push VCO in 22nm FDSOI CMOS**
Sarah Koop-Brinkmann¹, M. Ichikawa², Victor Lasserre¹, L. Bakhchova¹, Fabio Padovan³, H. Ishikuro², Vadim Issakov¹
¹Technische Universität Braunschweig, Germany; ²Keio University, Japan; ³Infineon Technologies, Austria
- 126 **A Low Phase Noise VCO for 60GHz Radar Applications with a Direct Transformer-Based Fourth Harmonic Extraction in 28nm CMOS**
Sarah Koop-Brinkmann¹, Giovanni Steffan², Victor Lasserre¹, Fabio Padovan², Matteo Bassi², Vadim Issakov¹
¹Technische Universität Braunschweig, Germany; ²Infineon Technologies, Austria
- 130 **A 2.5GHz Series Resonance BAW Oscillator in a 130-nm BiCMOS Process with 1kHz-Offset Phase Noise <-98dBc/Hz and FOM >208dB**
Sachin Kalia, Bichoy Bahr, Tolga Dinc, Swaminathan Sankaran, Texas Instruments, USA

EuMIC09: Transmitters and Receivers for Radar and Communications above 100 GHz

Chair: Hua Wang, ETH Zürich, Switzerland

13:50–15:30, Monday 23rd September 2024, E04

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Tai-Yu Kuo, Tsung-Ching Tsai, Ahmet Çağrı Ulusoy, KIT, Germany
- 138 **A Dual Function 300-GHz FMCW Radar and Communication Transceiver Based on a SiGe MMIC**
Till Ziegler-Bellenberg¹, Dominic Funke¹, Christian Bredendiek¹, Steffen Hansen¹, Jan Wessel¹, Nils Pohl²
¹Fraunhofer FHR, Germany; ²Ruhr-Universität Bochum, Germany
- 142 **A Low Power Cascaded Eight-Channel D-Band Receiver Using Single LO Mixer and On-Chip Feeder in 40-nm CMOS for Massive Array FMCW Radar**
Dongyeol Yang¹, Jaehyun Park¹, Seungyeon Kim¹, Seukwon Kang¹, Kyujin Choi¹, Sungho Lee², Byungjung Kim¹
¹Sungkyunkwan University, Korea; ²KETI, Korea
- 146 **A Transmitter/Receiver Link for High Data Rate Polymer Microwave Fiber Communication at Y-Band**
Frida Strömbeck, Yu Yan, Herbert Zirath, Chalmers University of Technology, Sweden
- 150 **A 258-to-280-GHz 100-Gb/s CMOS Transmitter Element in 40-nm CMOS**
Shun Beppu¹, Toshiaki Abe¹, Sho Okii¹, Kyoya Takano¹, Shinsuke Hara², Satoshi Tanaka³, Kosuke Katayama⁴, Yoshiki Sugimoto⁵, Shunichi Kubo⁶, Akifumi Kasamatsu², Kunio Sakakibara⁵, Takeshi Yoshida³, Shuhei Amakawa³, Minoru Fujishima³
¹Tokyo University of Science, Japan; ²NICT, Japan; ³Hiroshima University, Japan; ⁴Tokuyama KOSEN, Japan; ⁵Nagoya Institute of Technology, Japan; ⁶THine Electronics, Japan

EuMIC10: Doherty and Reconfigurable PA

Chair: Rocco Giofrè, Università di Roma Tor Vergata, Italy

Co-Chair: Didier Belot, CEA-Leti, France

13:50–15:30, Monday 23rd September 2024, E05

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Charles F. Campbell, Qorvo, USA
- 158 **Design and Experimental Characterization of an Asymmetric GaN MMIC Doherty Power Amplifier for Ka-Band Transmitters**
Ehsan M. Azad¹, Kauser A. Chaudhry¹, Joe Ganniciffe¹, Roberto Quaglia²
¹Compound Semiconductor Applications Catapult, UK; ²Cardiff University, UK
- 162 **A 27GHz GaN MMIC Doherty Power Amplifier with Optimized Driver Stages**
Robert Krämer¹, Andres Seidel¹, Philipp Neininger², Jens Wagner¹, Frank Ellinger¹
¹Technische Universität Dresden, Germany; ²Fraunhofer IAF, Germany
- 166 **Wideband Fully Integrated GaN Doherty Power Amplifier Module for 5G Massive MIMO Applications**
Pierre Ferris, Stephan Maroldt, Nelsy Monsauret, Kaisseh Houssein, Christophe Quindroit, Xavier Moronval, Ampleon, France
- 170 **A GaN MMIC Wideband Continuous-Mode Doherty Power Amplifier for 6G FR3 cmWave Applications**
Han Zhou, Victor Åberg, Haojie Chang, Christian Fager, Chalmers University of Technology, Sweden

EuMIC11: Advanced Techniques for Thermal, Noise and Physic-Based Modelling of Devices and Circuits

Chair: Alessandro Cidronali, Università di Firenze, Italy

Co-Chair: Raphaël Sommet, XLIM (UMR 7252), France

13:50–15:30, Monday 23rd September 2024, E06

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Gabriele Formicone¹, John Walker¹, James Pomeroy², Martin Kuball²
¹Integra Technologies, USA; ²University of Bristol, UK
- 178 **Investigation of Thermal Resistance Extraction of GaN HEMTs Through DCT Measurements Techniques and TCAD-Based Physical Simulations**
M. Bouslama¹, J.C. Jacquet¹, F. Gaillard², S. Piotrowicz¹, R. Sommet², J.C. Nallatamby², G. Gauthier¹
¹III-V Lab, France; ²XLIM (UMR 7252), France
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Christos Zervos, Petros Beleniotis, Matthias Rudolph, BTU, Germany
- 190 **2DEG Charge Density Calculation for HEMT Physics-Based Compact Models by Newton Method**
Ahmad S. Alavijeh, Luís C. Nunes, Filipe M. Barradas, José C. Pedro, Instituto de Telecomunicações, Portugal

EuMIC12: Millimeter-Wave Components in Silicon-Based Technologies

Chair: Vadim Issakov, Technische Universität Braunschweig, Germany

Co-Chair: Martine Villegas, ESYCOM, France

13:50–15:30, Monday 23rd September 2024, E07

- 194 **An E-Band, High-Gain Current Clamping Power Amplifier for eWLB-Integration**
Pascal Stadler¹, Klaus Aufinger², Christian Geissler², Nils Pohl¹
¹Ruhr-Universität Bochum, Germany; ²Infineon Technologies, Germany
- 198 **An F-Band Two-Stage Buffer Amplifier Gain-Boosted by Lossy RC-Over-Neutralization with a 16.1GHz Bandwidth in 22nm FDSOI CMOS**
Christian Ziegler¹, Finn Stapelfeldt¹, Quang Huy Le², Thomas Kämpfe², Vadim Issakov¹
¹Technische Universität Braunschweig, Germany; ²Fraunhofer IPMS, Germany
- 202 **A 0.5W <3dB IL DC–67GHz SPDT Switch in 16nm FinFET with Local Substrate Floating Technique**
Yuqi Liu, Hua Wang, ETH Zürich, Switzerland
- 206 **A DC to 67-GHz 40-nm CMOS SP4T Switch for Cryogenic S-Parameter Measurement and Calibration**
Shih-Yun Chen, Ian Huang, Min-Jui Lin, Jiun-Yun Li, Shih-Yuan Chen, National Taiwan University, Taiwan
- 210 **A Wideband Millimeter-Wave Vector-Sum Phase Shifter in 28-nm Bulk CMOS**
Hui-Yang Li, Yi-Fan Peng, Jin-Xu Xu, Xiu Yin Zhang, SCUT, China

EuMIC13: Emerging Technologies and Applications

Chair: Frank E. van Vliet, TNO, The Netherlands

Co-Chair: Marion K. Matters-Kammerer, Technische Universiteit Eindhoven, The Netherlands

16:10-17:50, Monday 23rd September 2024, E01

- 214 **Ultra-Broad Band RF Switches Based on Multilayers MoS₂**
S. Skrzypczak¹, Clotilde Liguand², Y. Bousbaa¹, Guillaume Ducournau¹, D. Vignaud¹, Etienne Okada¹, J. David-Viffantzeff², Stéphane Cadot², Lucie Le Van-Jodin², R. Gassilloud², G. Bigeard³, A. Cresti³, Y. Deblock¹, Henri Happy¹, E. Pallecchi¹
¹IEMN (UMR 8520), France; ²CEA-Leti, France; ³CROMA (UMR 5130), France
- 218 **Optical Actuation of GeTe Phase-Change RF Switches at 915nm: Performance Comparison for Different GeTe Sizes and Impact of Cycling**
A. Naoui¹, I. Charlet¹, S. Guerber¹, B. Charbonnier¹, C. Dupré¹, J. Lugo¹, C. Hellion¹, M. Allain¹, Bruno Reig¹, Etienne Perret², Florence Podevin³
¹CEA-Leti, France; ²LCIS (EA 3747), France; ³TIMA (UMR 5159), France
- 222 **Optimization of the Melt and Quench Behavior of Phase-Change RF Switch to Improve Power Handling**
Corentin Mercier¹, Bruno Reig², S. Monfray¹, E. Dubois³, A. Fleury¹, F. Giancesello¹, V. Puyal², I. Charlet², J. Lugo-Alvarez², C. Hellion², M. Allain², J. Denizart², J.-F. Robillard³
¹STMicroelectronics, France; ²CEA-Leti, France; ³IEMN (UMR 8520), France
- 226 **Integrated High Speed Graphene Photodetectors for Sub-THz Links in the D-Band**
Alberto Montanaro¹, Alex Boschi², Guillaume Ducournau³, Vaidotas Mišeikis², Stefano Soresi⁴, Mario G.L. Frecassetti⁵, Pascal Szriftgiser⁶, Paola Galli⁵, Henri Happy³, Sergio Pezzini⁷, Camilla Coletti², Marco Romagnoli¹, Vito Sorianello¹
¹CNIT, Italy; ²IIT, Italy; ³IEMN (UMR 8520), France; ⁴CamGraPhIC, Italy; ⁵Nokia, Italy; ⁶PhLAM (UMR 8523), France; ⁷CNR-Nano, Italy

- 230 **CMOS-Integrated Terahertz Dielectric Near-Field Sensor**
Alexander V. Chernyadiev¹, Dmytro B. But¹, Cezary Kołaciński¹, Kęstutis Ikamas², Wojciech Knap¹, Alvydas Lisauskas²
¹Polish Academy of Sciences, Poland; ²Vilnius University, Lithuania

EuMIC14: ICs for Phased Arrays and Beam-Forming Transceivers

Chair: Ulrich J. Lewark, IMST, Germany

Co-Chair: Václav Valenta, ESA-ESTEC, The Netherlands

16:10–17:50, Monday 23rd September 2024, E02

- N/A **Radar-SoCs with Multi-Bit Phase Shifters in Modern RF CMOS Technologies** (*Industrial Keynote*)
Sönke Vehring, Robert Bosch, Germany
- 235 **A Compact 47GHz Band 2×16ch CMOS Phased Array Transceiver Chip with Bi-Directional IF Phase Shifter and IQ Mixer**
Jun Kobayashi, Toshihiro Shimura, Yohei Yagishita, Masato Nishimori, Yoji Ohashi, Yoichi Kawano, Toshihide Suzuki, Fujitsu, Japan
- 239 **mm-Wave GaN Varactors and E/W-Band Phase Shifter**
Philipp Neining, Peter Brückner, Rüdiger Quay, Fraunhofer IAF, Germany
- 243 **Wideband D-Band Front-End Transmitter Components in a 90-nm SiGe Process**
Justin J. Kim¹, Wonho Lee², James F. Buckwalter¹
¹University of California Santa Barbara, USA; ²Intel, USA
- 247 **A W-Band Combined Architecture Passive Phase Shifter in SiGe BiCMOS**
Konstantinos Giannakidis¹, Xin Yang¹, Mustafa Acar¹, Domine Leenaerts¹, Grigorios Kalivas²
¹NXP Semiconductors, The Netherlands; ²University of Patras, Greece

EuMIC15: RF to mm-Wave Building Blocks

Chair: Patrick Reynaert, KU Leuven, Belgium

16:10–17:50, Monday 23rd September 2024, E04

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Georg Meller¹, Michael Methfessel², Florian Protze¹, Jens Wagner¹, Frank Ellinger¹
¹Technische Universität Dresden, Germany; ²IHP, Germany
- 255 **High-Sensitivity 270–320GHz InGaAs-Based Power Detector with Temperature-Compensation Mechanism**
Thomas Ufschlag¹, Benjamin Schoch¹, Dominik Wrana¹, Lukas Gebert¹, Axel Tessmann², Arnulf Leuther², Sandrine Wagner², Ingmar Kallfass¹
¹Universität Stuttgart, Germany; ²Fraunhofer IAF, Germany
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Leonardo A.G. Gomes¹, João Lé², Ariana L.C. Serrano³, Gustavo P. Rehder³, Cédric Durand¹, M. Wehbi⁴, Philippe Ferrari²
¹STMicroelectronics, France; ²CIME Nanotech, France; ³Poli-USP, Brazil; ⁴ASYGN, France
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Sachin Kalia¹, Tolga Dinc¹, Sasank Garikapati², Swaminathan Sankaran¹
¹Texas Instruments, USA; ²Columbia University, USA
- 267 **RF-DAC-Based PA Pre-Distortion Using Expanding Non-Linear RF-DAC Scaling**
Victor Åberg¹, Paul Saad², Rui Hou², Han Zhou¹
¹Chalmers University of Technology, Sweden; ²Ericsson, Sweden

EuMIC16: GaN and GaAs MMIC PAs

Chair: Friedel Gerfers, Technische Universität Berlin, Germany

Co-Chair: Corrado Carta, Technische Universität Berlin, Germany

16:10-17:50, Monday 23rd September 2024, E05

- 271 **A 100-114GHz GaAs MMIC Power Amplifier with Fully Integrated Dynamic Gate Bias Control for Linearization and Efficiency Enhancement**
Göksu Kaval¹, Gregor Lasser², Marcus Gavell¹, Christian Fager²
¹Gotmic, Sweden; ²Chalmers University of Technology, Sweden
- 275 **Efficient Output Power Configuration in a K-Band Power Amplifier Using a Split-Gate Layout**
Aquila G. Powell¹, Roberto Quaglia¹, Jeff Powell², Steve C. Cripps¹
¹Cardiff University, UK; ²Skyarna, UK
- 279 **A 24GHz 14W/22W GaN Power Amplifier MMICs for Millimeter Wave Band Wireless Power Transfer**
Keigo Nakatani, Akihito Hirai, Jun Kamioka, Tomohiro Yao, Kento Saiki, Shintaro Shinjo, Mitsubishi Electric, Japan
- 283 **20W and 20% PAE 2-10GHz High-Power Amplifier for Multifunction RF Systems Manufactured in Leonardo's GaN pHEMT 0.25 μ m Technology**
Alvaro Prieto¹, Alfonso Ferreras¹, José Luis Jiménez-Martín², Javier Montero-de-Paz¹, Eduardo Oreja-Gigorro¹, Vicente González-Posadas², Juan José Sánchez-Martínez¹
¹Indra Sistemas, Spain; ²Universidad Politécnica de Madrid, Spain
- 287 **A High Integrated 13W & 36% PAE Ka Band GaN MMIC Power Amplifier for SatCom Applications**
Seifeddine Fakhfakh¹, Thibaut Huet¹, Laurent Caille¹, Veronique Serru¹, Mohammed Ayad¹, Philippe Fellon¹, Jean-Jacques Fontecave¹, Jan Gruenenpuett²
¹UMS, France; ²UMS, Germany

EuMIC17: Stability Analysis and Nonlinear Modelling of Devices and Circuits

Chair: Ernesto Limiti, Università di Roma "Tor Vergata", Italy

Co-Chair: Gian Piero Gibiino, Università di Bologna, Italy

16:10-17:50, Monday 23rd September 2024, E06

- 291 **A Novel Stability Margin for Transfer Functions**
Thomas A. Winslow, MACOM, USA
- 295 **Frequency-Domain Stability Analysis of Non-Linear Circuits Driven by Random Modulated Signals**
G. Neveux, H.H. Kahsay, Pierre Medrel, D. Barataud, XLIM (UMR 7252), France
- 299 **On the Equivalence of Network Representations in Relation to Stability Analysis**
Sergio Colangeli, Antonio Serino, Walter Ciccognani, Patrick E. Longhi, Ernesto Limiti, Università di Roma "Tor Vergata", Italy
- 303 **Nonlinear Modeling of CMOS Compatible SiN/AlN/GaN MIS-HEMT on 200mm Si Operating at mm-Wave Frequencies**
Y. Fouzi¹, E. Morvan², Y. Gobil², F. Morisot², Etienne Okada¹, S. Bollaert¹, N. Defrance¹
¹IEMN (UMR 8520), France; ²CEA-Leti, France
- 307 **Nonlinear Behavioral Modeling of FETs: Toward the Implementation of Deep Neural Networks Through Large Signal Data and EDA Tools**
Lida Kouhalvandi¹, Simona Donati Guerrieri²
¹Dogus University, Türkiye; ²Politecnico di Torino, Italy

EuMIC18: Microwave Components in III/V and Graphene Technologies

Chair: Beatriz Aja, Universidad de Cantabria, Spain

Co-Chair: Pedro Rynkiewicz, CNES, France

16:10-17:50, Monday 23rd September 2024, E07

- 311 **K_a-Band Metal-Insulator-Graphene Diode-Based Thin-Film Cascaded Reflective-Type Phase Shifter**
Eyyub Baskent¹, Zhenxing Wang², Max C. Lemme², Renato Negra¹
¹RWTH Aachen University, Germany; ²AMO, Germany
- 315 **5-55GHz Watt-Level Gallium Nitride Stacked FET Travelling-Wave Power Amplifier**
Patrick E. Longhi¹, Chiara Ramella², Walter Ciccognani¹, Sergio Colangeli¹, Marco Pirola², Ernesto Limiti¹
¹Università di Roma "Tor Vergata", Italy; ²Politecnico di Torino, Italy
- 319 **A Compact K-Band High Data Rate Upconverter / Solid State Power Amplifier (SSPA) Downlink Engineering Model for LEO Missions**
Jim Mayock¹, Thomas Le Toux¹, Simon S.M. Chan¹, Pratik D. Deshpande¹, Tuyen Vo¹, Farshad Eshghabadi¹, Matthew O'Keefe¹, Ken Mason², David Sanderson², Iain Davies³
¹Viper RF, UK; ²Surrey Satellite Technology, UK; ³ESA-ESTEC, The Netherlands
- 323 **High-Linearity and Low-Noise Tunable C/X-Band GaN Filters for Robust Highly Integrated Front-Ends**
Robert Malmqvist, Morteza Khedri, Rolf Jonsson, FOI, Sweden
- 327 **High-Efficiency 24-GHz Rectifier MMICs Using Schottky Barrier Diodes from Foundry**
Shinji Hara, Keiichi Sakuno, Kengo Sumiya, Noriyuki Tanba, Yasuhisa Ushida, Nagoya University, Japan

EuMIC19: III-V Millimeter-Wave Technologies

Chair: Frank E. van Vliet, TNO, The Netherlands

Co-Chair: Markus Mayer, ARELIS, France

08:30-10:10, Tuesday 24th September 2024, E01

- 331 **Extension of SC-Gate FET Concept to 100GHz Band and Parallel Connection**
Keiichi Sakuno, Eiji Suematsu, Shinji Hara, Nagoya University, Japan
- 335 **G-Band Large-Signal Characterization of InP/GaAsSb DHBTs with Record 38% Power Added Efficiency at 170GHz**
Filippo Ciabattini, Sara Hamzeloui, Akshay M. Arabhavi, Mojtaba Ebrahimi, Olivier Ostinelli, Colombo R. Bolognesi, ETH Zürich, Switzerland
- 339 **Ultra-Scaled GaN HEMTs on Sapphire with $f_T/f_{max} = 229/528$ GHz and $NF_{min} \sim 1$ dB**
Jiaheng He, Zhe Cheng, Shujie Xie, Xuankun Wu, Changxin Mi, Lian Zhang, Zhe Liu, Yun Zhang, CAS, China
- 343 **Free-Standing Lateral AlGaIn/GaN Schottky Barrier Diode Based-on GaN-on-Si Technology for High Microwave Power Applications**
Abdalla Eblabla, Wesley Sampson, Arthur Collier, Khaled Elgaid, Cardiff University, UK
- 347 **Analysis of mm-Wave Detection with AlGaIn/GaN HEMTs by Means of Measurements and Physical and Equivalent Circuit Models**
I. Íñiguez-de-la-Torre¹, G. Paz-Martínez¹, S. García-Sánchez¹, P. Artillan², Tomás González¹, Javier Mateos¹
¹Universidad de Salamanca, Spain; ²CROMA (UMR 5130), France

EuMIC20: Low Noise Integrated Circuits

Chair: Ingmar Kallfass, Universität Stuttgart, Germany

Co-Chair: Piyush Kaul, Technische Universiteit Eindhoven, The Netherlands

08:30-10:10, Tuesday 24th September 2024, E02

- 351 **Switch Integrated Ka-Band Low Noise Amplifier in GaN/AlN HEMT Technology**
Sanaul Haque¹, Cristina Andrei¹, Mihaela Wolf², Oliver Hilt², Matthias Rudolph²
¹BTU, Germany; ²FBH, Germany
- 355 **Substrate Noise Mitigation Using a High Resistivity Substrate: The Case of a 14GHz VCO on 28nm FD-SOI CMOS**
Youssef Bendou¹, Dimitri Lederer¹, Andreia Cathelin², Jean-Pierre Raskin¹
¹UCLouvain, Belgium; ²STMicroelectronics, France
- 359 **An Over 100% Fractional Bandwidth Low Noise Amplifier with Gate-Drain Transformer-Feedback in 90-nm CMOS Process**
Yi-Heng Lee¹, Chau-Ching Chiong², Yun-Shan Wang¹, Huei Wang¹
¹National Taiwan University, Taiwan; ²Academia Sinica, Taiwan
- 363 **Cryogenic Single-Chip Multi-Channel LNA**
Mikko Varonen, Dristy Parveg, Lassi Lehtisyrjä, Hannu Sipola, Jan Saijets, VTT, Finland
- 367 **A Low-Power 42 to 67GHz Variable-Gain LNA in 22FDX on Standard- and High-Resistivity Substrates with 3.4dB Noise Figure**
M. Rack¹, L. Nyssens¹, S. Wane², D. Bajon², Jean-Pierre Raskin¹, Dimitri Lederer¹
¹UCLouvain, Belgium; ²eV-Technologies, France

EuMIC21: EuMIC Poster: From Device Characterisation and Modelling to Integrated Circuits

Chair: Luisa de la Fuente, Universidad de Cantabria, Spain

08:30-10:10, Tuesday 24th September 2024, Exhibition Hall

- 371 **Layout-Aware Equivalent Circuit Models for Accurate Deembedding and Simulation of mm-Wave CMOS Device Performance**
Adhi Cahyo Wijaya, Jinq-Min Lin, Jyh-Chyurn Guo, NYCU, Taiwan
- 375 **GaN Schottky Diodes Parameter Extraction Model from S-Parameters Measurement**
Beatriz Orfao¹, Mahmoud Abou-Daher¹, Malek Zegaoui², Javier Mateos³, Tomás González³, Etienne Okada¹, Sylvie Lepilliet¹, Guillaume Ducournau¹, Mohammed Zaknoute¹, Yannick Roelens¹
¹IEMN (UMR 8520), France; ²IRCICA (USR 3380), France; ³Universidad de Salamanca, Spain
- 379 **The Impact of Nanoscale CMOS Devices Scaling and Variations on mm-Wave CMOS Performance**
Jyh-Chyurn Guo, Jyun-Rong Ou, NYCU, Taiwan
- 383 **Pseudo-Vertical GaN-on-Sapphire PiN Diode: Process Optimizations and Electrical Properties**
Zihao Lyu¹, Jérôme Billoué¹, Kevin Nadaud¹, Julien Ladroue², Quentin Paoli¹, Arnaud Yvon², Eric Frayssinet³, Yvon Cordier³, Daniel Alquier¹
¹GREMAN (UMR 7347), France; ²STMicroelectronics, France; ³CRHEA (UPR 10), France
- 387 **Characterization of Schottky Diodes at Wafer Level for Frequency Multipliers Applications Based on RF Coplanar Measurements**
Hugo Bouillaud¹, Yannick Roelens¹, Etienne Okada¹, Jeanne Treuttel², Priyanka Mondal², Pierre Gellie³, Mohammed Zaknoute¹, Guillaume Ducournau¹
¹IEMN (UMR 8520), France; ²LERMA (UMR 8112), France; ³Lytid, France

- 391 **Low-Power mm-Wave Frequency Quadrupler Using Deep Class-C Doublers**
Meysam Sohani Darban, Dong Sam Ha, Jeffrey Sean Walling, Virginia Tech, USA
- 395 **A 60GHz Cross-Coupled Transformer-Based Quadrature-Phase Coupler in 22nm FD-SOI**
Xin Xu, Jens Wagner, Frank Ellinger, Technische Universität Dresden, Germany
- 399 **Low-Cost 10-Watt CW Power Amplifier for Satellite Communication**
Alireza Sadeghi-Fard¹, Sayyed-Hossein Javid-Hosseini¹, Vahid Nayyeri¹, Paolo Colantonio²
¹IUST, Iran; ²Università di Roma "Tor Vergata", Italy
- 403 **0.13 μ m SiGe HBT Linear Power Amplifier for Broadband 5G Applications (1.8GHz to 5GHz)**
Samia Ouyahia, Elizabeth Alaux, Siwar Ben Guirat, Zacharie Setal, Stephanie Venec, Eric Wilhelm, Yannick Poupin, Vincent Knopik, Myrienne Regis, STMicroelectronics, France
- 407 **A mm-Wave Two-Stage CMOS LNA Using Noise Cancelling and Post-Distortion Techniques**
Benqing Guo¹, Jun Chen²
¹CUIT, China; ²Huawei Technologies, China
- 411 **A Stacked MOSFET-Based RF Switch with High DC Voltage Handling Capabilities**
Valentyn Solomko¹, Ting-Li Hsu², Semen Syroiezhin¹, Amelie Hagelauer²
¹Infineon Technologies, Germany; ²Technische Universität München, Germany
- 415 **A 29.5GHz Rectifier with 14.5dB Dynamic Power Range for Energy Harvester Using Vertical Nanowire Tunnel FETs**
Ngoc-Duc Au, Marcus E. Sandberg, Gautham Rangasamy, Lars Ohlsson Fhager, Lars-Erik Wernersson, Lund University, Sweden

EuMIC22: Special Session- Key Points for a Successful mm-Wave IC Design

Chair: Luca Aluigi, Huawei Technologies, Italy

Co-Chair: Alessandro Fonte, SIAE MICROELETTRONICA, Italy

13:50-15:30, Tuesday 24th September 2024, E01

- N/A **mm-Wave Circuits Design in CMOS: Design and Layout Considerations (Industrial Keynote)**
Baudouin Martineau, CEA-Leti, France
- 420 **Modelling and Design Aids for Millimetre-Wave Low-Noise Amplifiers**
Patrick E. Longhi, Sergio Colangeli, Walter Ciccognani, Ernesto Limiti, Università di Roma "Tor Vergata", Italy
- 424 **Comparative Study of Millimeter-Wave Avalanche Noise Diodes in Different Si Technologies**
Samuel Nguyen Dinh An¹, Giacomo Schiavolini², Guendalina Simoncini³, Giulia Orecchini², Joao Azevedo Goncalves¹, Cybelle Belem Goncalves¹, Federico Alimenti²
¹STMicroelectronics, France; ²Università di Perugia, Italy; ³PICOSATS, Italy
- 428 **Advanced Characterization Approaches with Pad-Model De-Embedding of Sub-THz Devices for 6G Applications**
Aniello Franzese¹, Batuhan Sutbas¹, Thomas Mausolf¹, Nicolò Moroni¹, Renato Negra², Alfredo Sánchez Ramos³, Francesco Greco⁴, Luigi Boccia⁴, Ehsan Shokrolahzade⁵, Marco Spirito⁵, Corrado Carta¹
¹IHP, Germany; ²RWTH Aachen University, Germany; ³Cinvestav, Mexico; ⁴Università della Calabria, Italy; ⁵Technische Universiteit Delft, The Netherlands

- 432 **K/Ka-Band Integrated Duplexer for SatCom on the Move User Terminals**
Luigi Boccia¹, Emilio Arneri¹, Sherif Zahran¹, Carmine Mustacchio¹, Tobias Chaloun², Michael Fischer², Christian Waldschmidt², Giandomenico Amendola¹
¹Università della Calabria, Italy; ²Universität Ulm, Germany
- 435 **Navigating Challenges in Doherty Power Amplifier Design for Millimeter-Wave Frequencies**
Anna Piacibello, Vittorio Camarchia, Politecnico di Torino, Italy

EuMIC23: Si-Based Integrated Circuits

Chair: Marion K. Matters-Kammerer, Technische Universiteit Eindhoven, The Netherlands

Co-Chair: Ingmar Kallfass, Universität Stuttgart, Germany

13:50-15:30, Tuesday 24th September 2024, E02

- 439 **A 20-46GHz 28nm FD-SOI CMOS Tunable Twisted Hybrid Coupler with Cross-Coupled Capacitor Banks for 5G Applications**
Gwennaël Diverrez¹, Eric Kerhervé¹, Magali De Matos¹, Andreia Cathelin²
¹IMS (UMR 5218), France; ²STMicroelectronics, France
- 443 **A Quadrature Harmonic Rejection Voltage-Domain Mixer with 20dBm OIP3 and 800MHz IF Bandwidth**
T. Ibrahim, M.R. Beikmirza, M.S. Alavi, L.C.N. de Vreede, Technische Universiteit Delft, The Netherlands
- 447 **Optimum Biasing of SiGe-HBTs to Maximize the Gain Per Current for Power Efficient Amplification**
Tobias T. Braun¹, Jan Schöpfel¹, Klaus Aufinger², Nils Pohl¹
¹Ruhr-Universität Bochum, Germany; ²Infineon Technologies, Germany
- 451 **An Ultra-Wideband Two-Port Cascode Self-Mixing Mixer in 130nm SiGe for Use in Incoherent Radar**
Janis Wörmann, Prakhar Singhal, Burak Özat, Ingmar Kallfass, Universität Stuttgart, Germany
- 455 **Sub-6GHz RF SPDT Switches Designed in an Advanced 28nm Fully-Depleted Silicon-on-Insulator Technology with a High Resistivity Substrate**
Massinissa Nabet¹, M. Rack¹, Sébastien Crémer², Frederic Paillardet², Andreia Cathelin², Jean-Pierre Raskin¹, Dimitri Lederer¹
¹UCLouvain, Belgium; ²STMicroelectronics, France

EuMIC24: EuMIC Closing Session

Chair: *Nathalie Deltimple, IMS (UMR 5218), France*

Co-Chair: *Jean-Christophe Nallatamby, XLIM (UMR 7252), France*

16:10-18:30, Tuesday 24th September 2024, N01

- (NA) **Session Welcome**
Nathalie Deltimple, EuMIC 2024 Chair
- (NA) **New Horizons for Efficient RF Front-End Technologies and Integration**
Valeria Di Giacomo-Brunel, UMS, France
- (NA) **Foundry Session**
Eric Leclerc, UMS, France
- (NA) **Awards Ceremony**
Olivier Lafond¹, Nathalie Deltimple²
¹EuMW 2024 Awards Chair; ²EuMIC 2024 Chair
- (NA) **Closing Remarks**
Nathalie Deltimple, EuMIC 2024 Chair

EuMIC/EuMC01: EuMIC/EuMC Poster

Chair: *Anne-Laure Billabert, CNAM, France*

13:50-15:30, Tuesday 24th September 2024, Exhibition Hall

- (NA) **A Low-Loss 220GHz - 325GHz Marchand Balun in 65nm CMOS Technology**
Anyi Tian, Chenxin Liu, Hiroyuki Sakai, Kazuaki Kunihiro, Atsushi Shirane, Kenichi Okada, Tokyo Tech, Japan
- (NA) **Cooling of GaN-On-Si Transistors Using Integrated Micromachined Channels**
Benjamin Prat¹, Arnaud Pothier¹, Olivier Vendier², Kateryna Kiryukhina³, Olivier Puig³, Pierre Blondy¹
¹XLIM (UMR 7252), France; ²Thales, France; ³CNES, France
- (NA) **Demonstration of CVD Diamond Heat Spreaders for Performance Improvement of a 400W AlGaIn/GaN S-Band Power Amplifier MMIC**
Marc van Heijningen¹, Frans Meeuwssen², Edsger Smits², Ian Friel³
¹TNO, The Netherlands; ²CITC, The Netherlands; ³Element Six, UK
- (NA) **W-Band GaAs LNA Chip Set for Space Telecommunications**
Pratik D. Deshpande¹, Thomas Moody¹, Jim Mayock¹, David Cuadrado-Calle², Mark Howard³
¹Viper RF, UK; ²ESA-ESTEC, The Netherlands; ³Spectrum Control, UK
- (NA) **Single-Ended and Balanced Frequency Doublers 2.45 to 4.9GHz Using GaN FETs**
Ainhoa Morales-Fernandez¹, Maria Marante-Boado¹, Pedro Toimil-Cornado¹, Monica Fernandez-Barciela¹, Fernando Martin-Rodriguez¹, Paul J. Tasker²
¹Universidad de Vigo, Spain; ²Cardiff University, UK

- (NA) **A Highly Efficient Compact 200MHz GaN Buck Converter Module**
Thomas Hoffmann, Deguang Sun, Serguei A. Chevtchenko, Mihaela Wolf, Lars Schellhase, Andreas Wentzel, FBH, Germany
- (NA) **Digital Pre-Distortion with Deep Reinforcement Learning for 5G Power Amplifiers**
Christian Spano¹, Damiano Badini², Lorenzo Cazzella¹, Matteo Matteucci¹
¹Politecnico di Milano, Italy; ²Huawei Technologies, Italy
- (NA) **A Simple Analytical Theory of Class-C Power Amplifiers for Large-Signal Intermodulation Distortion Behaviour Investigation**
Tsz-Wai Wendy Wong, Kwok-Keung Michael Cheng, CUHK, China
- (NA) **Joint Communication and Computation Using RF Amplifier-Based Neural Network**
Siqi Wang¹, Ayça Özçelikkale², Aziz Benlarbi-Delai¹
¹GeePs (UMR 8507), France; ²Uppsala University, Sweden
- (NA) **Probing Plasmon Resonances in AlGaIn/GaN Heterostructures with 300K Black-Body Radiation**
Maksym Dub¹, Pavlo Sai¹, Dmytro B. But², Sergey Rummyantsev², Wojciech Knap¹
¹Warsaw University of Technology, Poland; ²Polish Academy of Sciences, Poland
- 500 **6–12.5GHz, 0.0076mm², Low-Power PLL in 22nm FDSOI for Multi Lane Applications**
Santhosh Selvaraj¹, Erkan Bayram², Mohamed Saeed², Oner Hanay², Renato Negra¹
¹RWTH Aachen University, Germany; ²InCIRT, Germany
- 504 **Cascaded 4:1 AMUX-DAC Using Novel Clocking and Advanced DSP**
Jonathan Andree¹, Sanket Khatdeo¹, Christian Schmidt¹, Oliver Peters¹, Markus Grözing², Tobias Tannert², Volker Jungnickel¹, Georg Rademacher², Friedel Gerfers³, Ronald Freund¹
¹Fraunhofer HHI, Germany; ²Universität Stuttgart, Germany; ³Technische Universität Berlin, Germany

- (NA) **Carbon Nanotube Based Waveguide and Application to Digital Communication in mmW Band**
Rong Tao Jiang¹, Chong Wei Tan², Xing Hai Zhao², Stephane Bila³, Dominique Baillargeat⁴, Philippe Coquet¹, Beng Kang Tay¹, Pascal Szriftgiser⁵, Guillaume Ducournau⁶
¹CINTRA UMI 3288, Singapore; ²NTU, Singapore; ³XLIM (UMR 7252), France; ⁴CNRS@CREATE, Singapore; ⁵PhLAM (UMR 8523), France; ⁶IEMN (UMR 8520), France