Automatic RF Techniques Group

90th ARFTG Microwave Measurement Conference

St. Julien Hotel in Boulder, Colorado

TECHNICAL AGENDA

Thursday, November 30

0800 to 0810 **Welcome**

Conference Chair: Ron Ginley, NIST

0810 to 0930 **Session A: Keynote Talk & On-Wafer Measurements Part 1**

Session Chair: Jon Martens, Anritsu

ThA-1 KEYNOTE: Wireless Technology – Game-Changing Solutions of Integration

0810-0850 Ke Wu, Poly-Grames Research Center, Department of Electrical Engineering, Polytechnique Montreal, Quebec, Canada

ThA-2 An Intra-laboratory Investigation of On-Wafer Measurement Reproducibility at Millimeter-wave Frequencies

0850-0910 Roland G Clarke[1], Chong Li[2], and Nick Ridler[3]
[1] University of Leeds, UK, [2] University of Glasgow, UK, [3] National Physical Laboratory, UK

ThA-3 110 GHz On-Wafer Measurement Comparison on Alumina Substrate

0910-0930 Thorsten Probst[1], Ralf Doerner[2], Matthias Ohlrogge[3], Roger Lozar[3], and Uwe Arz[1]
[1] Physikalische-Technische Bundenanstalt (PTB), Braunschweig, Germany, [2] Ferdinand-Braun Institut, Leibniz-Institut für Höchstfrequenztechnik, Berlin, Germany, [3] Fraunhofer-Institut für Angewandte Festkörperphysik, Freiburg, Germany

0930 to 1100 **Break – Exhibits and Interactive Forum**

Session Chair: Mitch Wallis, NIST

ThP-01 Kicking the Tires of the NIST Microwave Uncertainty Framework – Part 2

Ron Ginley, NIST, Boulder, Colorado, USA

ThP-02 Development of a Verification Technique for On-wafer Noise Figure Measurement Systems

Aihua Wu[1], Chen Liu[1], Chong Li[2], Jing Sun[1], and Yibang Wang[1]
[1] Hebei Semiconductor Research Institute, Shijiazhuang, China, [2] University of Glasgow, UK

ThP-03 G-band Reflectivity Results of Conical Blackbody for Radiometer Calibration

Derek A. Houtz and Dazhen Gu, NIST, Boulder, Colorado, USA

ThP-04 **Quantifying Variance Components for Repeated Scattering Parameter Measurements**
Amanda Koepke and Jeff Jargon, NIST, Boulder, Colorado, USA

ThP-05 **Background Measurement of System Nonlinearity Using Spread-Spectrum Methods**
Adam Wichman and Lawrence Larson, Brown University, Providence, Rhode Island, USA

1100 to 1200 **Session B: Panel on Future RF Instrumentation**
Session Moderator: Dylan Williams, NIST

1200 to 1300 **Lunch**

1300 to 1320 **ARFTG Business Meeting**

1320 to 1440 **Session C: Novel Application Areas for RF and Microwave Measurements**
Session Chair: Jeff Jargon, NIST

ThC-1 INVITED: Rydberg Atom Electric-Field Metrology
1320-1400 Josh A. Gordon, Matthew T. Simons, and Christopher L. Holloway, NIST, Boulder, United States

ThC-2 Measurement of Sub-Degree Angular Carbon Fiber Tow Misalignment
1400-1420 William C. Wilson[1], Jason P. Moore[1], and Hunter McCraw[2]
[1] NASA Langley Research Center, Hampton, Virginia, USA [2] Embry-Riddle Aeronautical University, Prescott, Arizona, USA

ThC-3 Demonstration of RF Impedance Matching Techniques or Near-Field Scanning Microwave Microscopy Based on Atomic Force Microscopy
1420-1440 Masahiro Horibe, Iku Hirano, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan

1440 to 1600 **Break – Exhibits and Continuation of the Interactive Forum**
Session Chair: Mitch Wallis, NIST

1600 to 1700 **Session D: Calibration, Verification, and De-embedding**
Session Chair: Jim Booth, NIST

ThD-1 Qualitative Multidimensional Calibration Comparison

1600-1620 Aric W. Sanders, Ron Ginley, Richard Chamberlin, Jasper Drisko, Christian Long, and Nathan Orloff, NIST, Boulder, Colorado, USA

ThD-2 Establishing Traceability for SOLT Calibration Kits

1620-1640 Ron Ginley, NIST, Boulder, Colorado, USA

ThD-3 How to Extract Distributed Circuit Parameters from the Scattering Parameters of a Transmission Line

1640-1700 Nate Orloff, NIST, Boulder, Colorado, USA

Friday, December 1

0830 to 0950 **Session E: On-Wafer Measurements Part 2**
Session Chair: Leonard Hayden, Qorvo

FrE-1 INVITED: Characterization of fluid permittivity to 110 GHz by microwave microfluidics

0830-0910 Chris J. Long[1], Nathan D. Orloff[1], Cully Little[1,2], Xiao Ma[1,3], Angela Stelson[1], Jasper Drisko[1], Isaac E. Hanemann[1,2], Ami Thakrar[1,4], Jordi Mateu[1,5,6], Jim Hwang[3], and Jim Booth[1], [1]NIST, Boulder, Colorado, USA, [2]University of Colorado, Boulder, USA, [3]Lehigh University, Bethlehem, Pennsylvania, USA, [4]University of California, Berkeley, USA [5]Universitat Politecnica de Catalunya, Barcelona, Spain [6]Centre Tecnologic de Telecomunicacions de Catalunya, Barcelona, Spain

FrE-2 Coplanar Waveguide for Dielectric Material Measurements at Frequencies from 140 GHz to 200 GHz

0910-0930 Xiue Bao[1], Song Liu[2], Ilja Ocket[1,3], Juncheng Bao[1], Dries Kil[1], Shengkang Zhang[2], Chunyue Cheng[2], Keming Feng[2], Bob Puers[1], Dominique Schreurs[1], and Bart Nauwelaers[1], [1]KU Leuven, Belgium, [2]Beijing Institute of Radio Metrology and Measurement, Beijing, China, [3]Interuniversity Microelectronics Center (IMEC), Heverlee, Belgium

FrE-3 Establishing Traceability for On-Wafer S-Parameter Measurements of Membrane Technology Devices up to 110 GHz

0930-0950 Uwe Arz[1], Sherko Zinal[1], Thorsten Probst[1], Gerd Hechtfischer[2], Franz-Josef Schmückle[3], and Wolfgang Heinrich[3], [1]Physikalische-Technische Bundenanstalt (PTB), Braunschweig, Germany, [2]Rohde & Schwarz, GmbH & Co. München, Germany, [3]Ferdinand-Braun Institut, Leibniz-Institut für Höchstfrequenztechnik, Berlin, Germany

0950 to 1100 **Break – Exhibits**

1100 to 1140 **Session F: Non-linear Measurements**

Session Chair: Dominique Schreurs, KU Leuven

FrF-1 Characterization of Transmission Lines with Nonlinear Dielectric Materials

1100-1120 Aaron M. Hagerstrom, NIST, Boulder, Colorado, USA

FrF-2 Load-Pull Measurement for Device-Technology Comparison

1120-1140 Leonard Hayden and Sonja Nedeljkovic, Qorvo, Inc., Hillsboro, Oregon, USA

1200 to 1300 **Lunch**