



1993 IEEE MTT-S International Microwave Symposium Digest

Workshops

MTT-S IMS Workshops

The workshop format includes invited speakers discussing a variety of topics. Participation by the workshop attendees is encouraged by providing an adequate period of time after each invited talk for discussion pertaining to that talk. Attendees are encouraged to bring a few viewgraphs to assist in “making a point.”

Workshops

WSFA: Microwave HBTs and HEMTs: Circuit Applications and Reliability

Date: June 18, 1993
Time: 8:00 AM–5:00 PM
Location: Bonn and London, Marriott Marquis
Sponsor: MTT-6 Microwave and mm-Wave Integrated Circuits
Organizers: Fazal Ali, Westinghouse-ATL
Aditya Gupta, Westinghouse- ATL
Burhan Bayraktaroglu, Wright-Patterson Lab
Speakers: John Huang, Raytheon
Louis Liu, TRW
Phil Smith, GE
Hiroschi Kondoh, HP
Ali Khatibzadeh, TI
Aaron Oki, TRW
P.C. Chao, GE
Dale Dawson, Westinghouse-ATL
H. Hartnagel, University of Darmstadt, Germany
Kajuhiko Honjo, NEC, Japan
Peter Topham, GEC-Marconi, UK
C. Aitchison, Brunel University, UK
A. Higgins, Rockwell
D. Pons, Thomson, France
A. Colquhoun, Siemens, Germany

Abstract:

GaAs heterojunction bipolar transistors (HBT) and high electron mobility transistors (HEMTs) are emerging as key technologies for precision analog/digital circuits, power amplifiers, low phase-noise oscillators, low noise amplifiers, frequency converters, multifunction MMICs, frequency dividers and mm-wave circuits. The purpose of this workshop is to bring to participants the latest information on the microwave and mm-wave circuit applications of HBTs and HEMTs. Various circuit and system insertion examples will be presented and discussed. In addition, invited speakers will share their findings about the reliability of these devices and implications for system insertion.

Workshops

WSFB: Combined Self-Consistent Particle Transport Simulation and Full Wave Dynamic Field Simulation for Monolithic Solid-State Device and Circuit Calculations

Date: June 18, 1993
Time: 8:00 AM–5:00 PM
Location: Salon III, Marquis Ballroom
Sponsors: MTT-6 Microwave and mm-Wave Integrated Circuits
MTT-7 Microwave and mm-Wave Devices
MTT-15 Microwave Field Theory
Organizer: Clifford M. Krowne, Naval Research Laboratory
Speakers: V. Tripathi and S. Goodnick, Oregon State University
K. Webb, S. Datta and M. Lundstrom, Purdue University
R. Ziolkowski, University of Arizona
S. El-Ghazaly, Arizona State University
N. Goldman, University of Maryland, College Park
C. Moglestue, Fraunhofer Institute of Applied Solid-State Physics, Germany
H. Grubin and J. Kreskovsky, Scientific Research Associates
U. Ravaioli, Beckman Institute, University of Illinois
C. Lent, University of Notre Dame
F. Buot, R. Salvino, C. Krowne, and K. Jensen, NRL
M. Feng, University of Illinois

Abstract:

This workshop will foster the development of computer codes that are user friendly and that allow the modeling of solid-state devices interacting with electromagnetic fields so that a nonlinear self-consistent numerical simulation occurs, which simultaneously accounts for the microscopic transport equations (Boltzmann, Monte Carlo or many-body) and the classical electromagnetic Maxwell field equations. Limitations of the classical field equations and the necessary use of quantized field equations will also be treated. The various theoretical methods and numerical algorithms are to be considered. All participants should bring viewgraphs to share. A group of invited speakers, expert in the areas to be discussed, will be present.

Workshops

WSFC: EM Modelling of Microwave Packages and Interconnects

Date: June 18, 1993
Time: 8:30 AM–4:30 PM
Location: Salon IV, Marquis Ballroom
Sponsors: MTT-1 Computer-Aided Design
MTT-15 Microwave Field Theory
MTT-12 Microwave and mm-Wave Packaging
Organizers: K.C. Gupta, University of Colorado, Boulder
Barry Perlman, US Army ETDL
Speakers: Raj Mittra, University of Illinois
Bob Jackson, University of Massachusetts
Matthias Rittweger, University of Duisburg, Germany
Shigeki Takeda, Kyocera Corp., Japan
Panelists: Martin P. Goetz, StratEdge Corp.
Bert Berson, Berson & Associates

Abstract:

As microwave designs increase in complexity and digital designs are operated at higher and higher speeds, the design of packages and interconnects becomes more and more critical to the subsystem performance. This workshop will provide a forum to discuss how electromagnetic analysis and modeling techniques can be employed for package and interconnect designs.

A tutorial overview of the state of the art will be presented. A panel discussion and an open forum will also be included. The panel discussion will emphasize applications of electromagnetic field simulation for package designing. For the open forum, participants are encouraged to bring one or two viewgraphs to express their viewpoints and to contribute to the workshop discussions.

Workshops

WSFD: The Art of Designing Power MMICs

Date: June 18, 1993
Time: 8:00 AM–5:00 PM
Location: Salon A, Imperial Ballroom, Marriott Marquis
Sponsors: MTT-15 Microwave Field Theory
MTT-6 Microwave and mm-Wave Integrated Circuits
MTT-1 Computer-Aided Design
Organizers: Arvind K. Sharma, TRW/ESG
Tatsuo Itoh, University of California, Los Angeles

Abstract:

Recent advances in GaAs materials, processing and device technology have made power monolithic microwave integrated circuit (power MMIC) technology feasible for various military, space and commercial communication systems. In these applications, monolithic power amplifiers extensively utilize heterojunction bipolar transistors (HBT) at microwave frequencies in addition to MESFETs, and high electron mobility transistors (HEMT) at mm-wave frequencies. However, the successful development of power MMIC depends on the quality and reproducibility of the material properties, tighter process control, accurate characterization and the modeling of active devices under extreme operating conditions.

The design of a monolithic power amplifier depends considerably on the empirical device models and heuristic design procedures. It requires careful consideration in the areas of processing, device characterization and modeling, circuit simulation, combiner design, module assembly, thermal packaging and testing. Appropriate design methodologies are required to achieve maximum performance in terms of the prescribed power, gain and efficiency.

In-depth tutorial discussions, as well as state-of-the-art reviews on monolithic power amplifier design techniques, including planar and waveguide power combining techniques; experimental characterization of active devices; and nonlinear device modeling, including parameter extraction and determination of optimum loads, will be discussed for MESFETs, HEMTs and HBTs. In addition, the workshop will focus on design methodologies and producibility aspects of monolithic power amplifiers.

This workshop will stimulate those uninitiated in the area, and also provide a forum for discussions for those already familiar with it. It will provide a forum for discussions on current bottleneck issues, possible solutions and future directions on the design of monolithic power amplifiers at microwave and mm-wave frequencies.

Workshops

WSFE: Civil Microwave Packaging

Date: June 18, 1993
Time: 8:00 AM–12:00 PM
Location: Sydney Room, Marriott Marquis
Sponsors: MTT-12 Microwave and mm-Wave Packaging
Organizers: Bert Berson, Berson & Associates
Douglas Maki, Raytheon

Abstract:

As the microwave industry moves aggressively, albeit somewhat awkwardly, toward commercial applications, the military oriented packages are becoming too expensive and the available plastic packages are limiting in performance. This workshop will investigate new approaches to inexpensive packaging for civil applications. Topics to be covered include modeling and reduction of parasitics; heatsinking, grounding and hermeticity considerations in plastic packages; low cost ceramic packaging techniques; microwave TO-X packages; wafer based fabrication for microwave packages; and novel materials for low cost packaging. Attendees are encouraged to bring a viewgraph or two to describe work ongoing at their facility.

WSFF: System Implications of Atmospheric Transmission Effects

Date: June 18, 1993
Time: 8:00 AM–12:00 PM
Location: Summit Room, Marriott Marquis
Sponsors: MTT-16 Microwave and Communications Systems
Organizers: R.W. McMillan, Georgia Tech Research Institute
A.C. VanderVorst, U.C. Louvain-la-Neuve, Belgium
Speakers: C. Gibbins and J. Norbury, Rutherford Appleton Lab., UK
H. Meinel, Deutsche Aerospace, Germany
D. Vanhoenacker, U.C. Louvain-la-Neuve, Belgium
Three U.S. Speakers

Abstract:

Atmospheric measurements have been made worldwide for 20 years, and atmospheric models have been derived from the measurements. Systems have been designed, taking those models into consideration.

This workshop concentrates on system applications, with an emphasis on mm-wavelengths. Three presentations from Europe will describe mm-wave systems, in particular at 60 GHz, the European effort in propagation studies at frequencies above 20 GHz, and the effect of atmospheric turbulence on communications links on theoretical developments. Presentations by US speakers will cover other system applications.