

Workshops

New Developments in Numerical Modeling of Microwave and Millimeter-Wave Structures

Date: Monday, May 7, 1990

Time: 8:00 a.m.—5:00 p.m.

Location: Hyatt Regency Hotel—Reunion Ballroom

Sponsor: MTT-15 Microwave Field Theory

Organizers: W. J. R. Hoefer, University of Ottawa
I. Wolff, University of Duisburg

Speakers: Morning Session: New Developments in Time Domain and Frequency Domain Modeling
(Moderator: J. Mink)

J. Mink	W. J. R. Hoefer
I. Wolff	R. Vahldieck

Afternoon Session: Computer Hardware for Field Modeling, and Impact of New Developments on CAD/CAE (Moderator: I. Wolff).

K. C. Gupta	F. Rosenbaum
T. Itoh	R. Sorrentino
R. Jansen	

Abstract:

This workshop is intended to stimulate activity and exchange of ideas in microwave and millimeter-wave field modeling and to encourage discussion of problems in the implementation of microwave integrated circuit models. Emphasis will be on new developments in numerical modeling of complex MMIC structures, such as:

- 1) 2-D and 3-D numerical electromagnetic field modeling in MMICs
- 2) extracting circuit characteristics of structures from numerical results
- 3) use of three-dimensional computer graphics for the processing of input/output data
- 4) the impact of these developments on computer-aided engineering

Some specific topics of discussion will be time domain modeling, nonlinear field modeling, new modeling tools, vectorization and parallel processing, field-based CAD, interacting discontinuities, leakage effects, packaging and EMI/EMC effects.

The morning session will consist of tutorial presentations by invited speakers, while the afternoon will feature a number of short statements by invited speakers and workshop attendees. The aim is to stimulate an expert-level exchange on bottleneck problems for MMIC modeling, present-day solutions and requirements for further study. Attendees will be encouraged to bring a view-graph or two to describe their problems and approaches to solutions.

Workshops

High-Frequency Properties and Characterization of High-Temperature Superconductors

Date: Monday, May 7, 1990

Time: 8:00 a.m.—5:00 p.m.

Location: Hyatt Regency Hotel—Reunion Ballroom

Sponsor: MTT-18 Microwave Superconductor Applications

Organizers: G. Gruner, UCLA
R. Ralston, Lincoln Laboratory

Speakers: D. Scalapino, UCSB
M. Beasley, Stanford University
H. Padamsee, Cornell
S. Sridhar, Northeastern
D. Brandle, AT&T
E. Belohoubeck, David Sarnoff Research Center
A. A. Valenzuela, Siemens/Technical University, Munich
D. Oates, Lincoln Laboratory
M. Nuss, AT&T

Abstract:

The focus of the workshop is on the micro- and millimeter-wavelength properties of high-temperature superconductors. A wide range of topics, including fundamental limits and basic loss mechanisms, evaluation of the high-frequency properties of various materials using frequency and time-domain techniques, and basic design features and parameters of selected passive microwave components will be discussed. The workshop will seek to strengthen connections between the various aspects of this area of superconductive electronics, and to serve also as a forum for workers in the field to discuss recent developments.

Overview papers will be given by D. Scalapino and M. Beasley, followed by several invited contributions. Participants are strongly encouraged to give short presentations on late news items.

Workshops

Application of Lightwave Technology to Microwave Antennas

Date: Monday, May 7, 1990

Time: 8:00 a.m.–5:00 p.m.

Location: Hyatt Regency Hotel—Reunion Ballroom

Sponsor: MTT-3 Lightwave Technology

Organizers: A. Paoella, Labcom, ETDL
R. Kunath, NASA Lewis
D. Curtis, RADC

<i>Speakers:</i>	P. Herczfeld	N. Jespersen
	A. Seeds	F. Tucker
	V. Way	R. Soref
	D. Curtis	L. Freschet

Abstract:

This joint MTT-S/AP-S workshop is focused on the application of lightwave technology to microwave antennas and related technologies. Definitions will be given for optically carried microwaves in terms of electrical regime variables. Applications to be addressed include antenna remoting, High Definition Television, smart skin phased array applications and technology requirements, radar, optical beamforming techniques for phased array antennas, optical T/R module technology, and state-of-the-art photonic switching concepts in integrated optics. A demonstration of microwave characterization of photonic devices will be given following the oral presentations.

Workshops

Silicon, GaAs MMIC's and Beyond

Date: Friday, May 11, 1990

Time: 8:00 a.m.–5:00 p.m.

Location: Hyatt Regency Hotel—Reunion Ballroom

Sponsor: MTT-6 Microwave and Millimeter-Wave Integrated Circuits
MTT-14 Microwave Low Noise Techniques

Organizers: K. K. Agarwal, E-Systems Inc., Garland
R. L. Carter, Univ. of Texas at Arlington

Speakers: C. Snapp, Avantek
C. Huang, Aadigics
P. Asbeck, Rockwell Science Center
U. Mishra, North Carolina State University
K. Slegger, Naval Research Laboratories

Abstract:

This one day workshop will present the state of MMIC technology using Silicon, Gallium Arsenide and Indium Phosphide materials. Extensive work is being done in Silicon MMICs. Devices with good performance for system applications are now available at reasonable cost. Gallium Arsenide MMICs using MESFET technology have progressed to a point that one can confidently say that GaAs MMICs are here and offer excellent performance. HEMT, HBT and other advanced device technologies are being explored in several research laboratories with some MMICs and discretes available today.

Presenters will discuss present and future material, device and circuit performances, and related technologies. Topics will be covered by tutorial presentations of 40–45 minutes each.

The afternoon session is an open discussion with audience participation. Attendees are strongly urged to make one or two vugraph type short presentations.

Workshops

Modeling and Design of Coplanar MMICs

Date: Friday, May 11, 1990

Time: 8:00 a.m.–5:00 p.m.

Location: Hyatt Regency Hotel—Reunion Ballroom

Sponsor: MTT-6 Microwave and Millimeter-Wave Integrated Circuits
MTT-15 Microwave Field Theory

Organizers: A. K. Sharma, TRW/ESG
T. Itoh, University of Texas at Austin

Speakers: N. G. Alexopoulos, UCLA
T. Itoh, University of Texas at Austin
M. Muraguchi, NTT, Japan
H. Ogawa, NTT, Japan
A. K. Sharma, TRW/ESG
Y.-C. Shih, Hughes Aircraft Co.
I. Wolff, University of Duisburg, W. Germany

Abstract:

Microwave and millimeter-wave monolithic integrated circuits utilizing grounded and ungrounded coplanar waveguides, along with the other planar transmission lines such as microstrip and slot lines, referred to as coplanar MMICs (CMMICs), are now being pursued for components requiring a high level of integration.

The lack of design information on discontinuity structures in coplanar waveguides and interacting structures formed with the other planar transmission lines has so far precluded them from being extensively used in CMMICs. Consequently, a designer is forced to design circuits using heuristic procedures which neither inspires confidence nor achieves first-pass success. The purpose of this workshop is, therefore, to bring this inadequacy to the attention of researchers in the areas of field theory and circuit designs.

In the first session of the workshop, in-depth tutorial discussions as well as state-of-the-art reviews on theoretical approaches and experimental characterization techniques for discontinuity structures will be presented. The analytical model development and its integration in circuit simulation tools, as well as the design of active and passive CMMIC components will be discussed. This will stimulate those uninitiated in the area, and also provide a forum for discussions for those already familiar with it. The second session of the workshop will provide a forum for discussions on current bottleneck issues, possible solutions and future directions on CMMICs in the form of a panel session. Participants will be strongly encouraged to explain their views and share their experiences.

Workshops

Low Noise Techniques and Applications

Date: Friday, May 11, 1990
Time: 8:00 a.m.–5:00 p.m.
Location: Hyatt Regency Hotel—Reunion Ballroom
Sponsor: MTT-14 Microwave Low Noise Techniques
Organizer: J. Goel, TRW Electronic Systems Group
Speakers: S. Weinreb, Martin Marietta
U. Mishra, North Carolina State University
M. Gupta, Hughes Aircraft Co.
M. Pospieszalski, Radio Astronomy Labs
R. Trew, North Carolina State University
J. Pierro, AIL Systems Inc.

Abstract:

The low noise area has developed significantly over the past few years and is presently evolving at an accelerated rate. Several new and novel FET structures have recently been developed. The emergence of lattice matched and pseudomorphic HEMT's are changing the architecture and performance of newly configured systems.

The intent of this workshop is to review and present the rapid advances being made in this revolutionary field. Tutorial discussions on different HEMT structures, noise modeling of three terminal devices, temperature dependence of noise parameters, 1/f noise in amplifiers and oscillators, measurement of noise parameters and various system applications will be presented. These tutorials will address the significant progress and potential problems in their respective areas, bottleneck issues, state-of-the-art results, and the future low noise devices, applications and measurements. Participants will be strongly encouraged to explain their views and share their experience following each speaker.

Workshops

GaAs Monolithic Control Circuits: Design Issues and Applications

Date: Friday, May 11, 1990
Time: 8:00 a.m.–5:00 p.m.
Location: Hyatt Regency Hotel—Reunion Ballroom
Sponsor: MTT-6 Microwave and Millimeter-Wave Integrated Circuits
Organizers: F. Ali, Pacific Monolithics
Y. Ayasli, Hittite Microwave

Abstract:

Monolithic control circuits with small size, good reliability, low cost, and repeatable performance offer distinct advantages over their hybrid counterparts. The aim of this workshop is to address the circuit design, process considerations, and applications of GaAs monolithic control circuits. The derivation of linear and nonlinear MESFET models for control components will be discussed. The tradeoffs among frequency, bandwidth, switching speed, isolation, and insertion loss when using MESFETs in switches, attenuators and phase shifters will be addressed.

Some of the pressing questions to be considered are:

- Can a monolithic switch handle multiwatt input power?
- How does one design a phaseless monolithic attenuator?
- On-board digital driver circuitry—is it a must?
- What are the process considerations for monolithic integration of analog and digital functions on the same chip?
- What kind of bit resolution is required for the next generation of phased array radar?
- What are the potential sockets for their insertion?

Invited speakers will discuss various aspects of these control circuits in their tutorial overview. The afternoon session will be divided into discussion groups on topics of interest to allow more detailed technical discussion and interaction among participants.

Workshops

Superconducting Microwave Applications

Date: Friday, May 11, 1990

Time: 8:00 a.m.–5:00 p.m.

Location: Hyatt Regency Hotel—Reunion Ballroom

Sponsor: MTT-18 Microwave Superconductor Applications

Organizers: B. R. McAvoy, Westinghouse Science & Tech. Center
C. K. Jones, Westinghouse Science & Tech. Center
P. Carr, Rome Air Development Center

Speakers: T. G. Berlincourt, Dept. of Defense
M. Nisenoff, Naval Research Laboratory
R. Ralston, MIT Lincoln Laboratory
J. Billing, Westinghouse Electronic Systems Group
R. Dinger, NWC, China Lake
A. Silver, TRW

Abstract:

The purpose of this workshop is to bring to participants the latest information on the microwave applications of superconductors. Dr. T.G. Berlincourt, Office of the Undersecretary of Defense for Research and Development, will give the talk, “Military Applications of Superconducting Electronics.” The other invited speakers will provide comprehensive overviews in such areas as delay lines, high Q filters, space and antenna applications, oscillators, and receivers.

We are actively seeking contributions to help focus workshop discussions. These include progress reports on current government sponsored programs such as space applications, microwave digital circuits and specific component studies.