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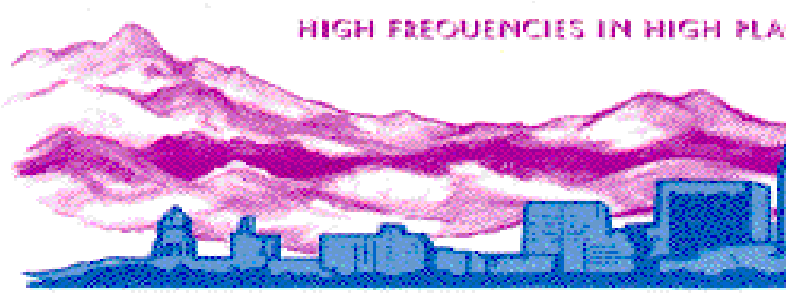
Technical Program Contents
Wednesday, June 11



Session WE1A

Nonlinear Modeling and Analysis

Chair

J.C.M. Hwang

Lehigh University

This session of highly selective papers describes recent progress in large-signal electro-thermal device modeling that are critical for the design of linear as well as digitally modulated power amplifiers. In addition, the models deal with frequency-dispersion, transient-response, and scaleability and on the increasingly important RF Si MOSFET.

Session WE1B

Passive Components II

Chair

E.J. Denlinger

David Sarnoff Research Center

This session highlights advances in various passive components, particularly couplers and power divider/ combiners. It includes structures in MMIC, waveguide, and rectangular coax. The session concludes with the design of high performance waveguide bends and interconnects for millimeter and submillimeter components.

Session WE1C

Millimeter Wave Devices and Components

Chair

P. Smith

Sanders, a Lockheed-Martin Co.

Co-Chair

M. Matloubian

Hughes Research Labs

This Session describes recent dynamic progress in the development of millimeter-wave devices and MMICs and their integration into higher level assemblies. The first two papers discuss two multiband multi-chip MMIC-based modules: a full transceiver and a 1 W transmitter. Virk *et al*. present a direct comparison of three different W-band mixers based on 0.1 μm InP HEMT technology. In the two papers that follow, workers at NEC report on the broadest band FET MMIC switch achieved to date, with a 60 GHz bandwidth, and a 60 GHz monolithic PHEMT LNA with a 3.3 NF and an improved self-bias circuit. Flip-chip mounting of a 60 GHz PHEMT MIC has been successfully demonstrated by Arai *et al*. In the final paper of the session, InP Gunn devices grown by CBE have demonstrated 100 mW at 130 GHz.

Session WE1D

Digital Microwave Circuits

Chair
A. Oki
TRW

High speed digital ICs are the key components for next-generation lightwave communications and digital receiver systems. This session presents several state-of-the-art ultra-high speed digital ICs including GaAs and InP-based FET technologies for 40-60 Gbps applications. In addition, a novel approach to GHz digital receivers and a 10 GHz package for digital ICs will be presented.

Session WE1E

New Leakage Effects in Planar Guiding Structures

Chair

A.S. Omar

Technical University Hamburg, Germany

Co-Chair

N.K. Das

Polytechnic University

Several newly discovered leakage effects in planar guiding structures are highlighted in the session. These include effects on the dominant modes in printed circuits, periodic structures and gyrotropic layers.

Session WE2A

Packaging and Interconnect Technologies

Chair
J. Pavio
Motorola

Co-Chair
M. Harris
Georgia Institute of Technology

This session features a broad range of state-of-the-art MCM, wafer-scale and discrete component packaging and interconnect technologies that demonstrate significant advancement in performance and increased levels of integration. The first microwave measurement results are reported for a 7-11 GHz tile type module. Work on MMIC flip-chip using CVD diamond substrates is presented for improved thermal management. A concept for constructing low-loss, small size millimeter-wave RF front-end boards using polyimide/alumina ceramic multilayer substrates will be presented. A novel concept of integrating InP based HBTs onto a silicon substrate using BCB insulator has been demonstrated for power amplifier applications. Finally, two papers are presented on silicon micro-machined packages for K- and Ka-band applications.

Session WE2B

High Power Sources and Control Components

Chair

J. Goel

TRW

This session covers a wide variety of topics in the high power source and control components area. It covers both commercial and military applications. A feature paper describes a 3 Watt Q-band module. There are two papers on limiters and one on a 20 Watt switch covering 6-18 GHz. A novel power combining concept which is required for generating high power levels is also discussed. The session concludes with a change of pace with the report of a rectifying C-band antenna achieving efficiencies approaching those at S-band.

Session WE2C

Millimeter and Sub-Millimeter Waves: J.C. Bose Memorial Session

Session Chair

K. Agarwal

Texas Instruments

Co-Chair

J.W. Dees

Georgia Institute of Technology

This session is dedicated to Sir Jagadis Chandra Bose upon the centenary of his 1897 presentations to the Royal Institution of London describing quasi-optical studies of 60 GHz radiation. J.C. Bose was a distinguished Indian physicist who performed extensive and astonishing quasi-optical millimeter-wave research, developing a generator, a semiconductor detector, diffraction grating, dielectric lenses, microwave absorbers, rectangular waveguides, and horn antennas. He used these to construct a spectrometer and crossed-grating polarimeter, applying them to ascertain the properties of a number of materials, including chiral materials. He was most active in the field from 1890-1900. Some of Bose's designs remain the state of the art. This session opens with two talks concerning Bose, his work, and some recent applications of his designs. These talks will be complemented by a Historical Exhibit of his original instruments. The session continues with talks concerning a micro-machined antenna at 200 GHz and a low cost 90 GHz sub-harmonic receiver. A unique submillimeter wave spectrometer system is described for detection of water in the solar system. The final paper discusses a novel millimeter-wave holographic power splitter and combiner.

Session WE2D

Phased Arrays

Chair

M. Thursby

Florida Institute of Technology

The phased arrays session will present recent advances in modeling, design, reliability, and testing of arrays and components. Two papers on T/R modules will be presented, one describing a three-dimensional interconnect method which significantly reduces the required space for each module. The second paper describes a novel method of accelerated reliability testing at the module level. Novel methods of beam steering are described, one, using a vector synthetic method and the other using a new integrated mixer self-tuning array. The effects of modulation on the radiation pattern of a coupled oscillator array will be presented. Test results for a polarization controlled phased array will be presented.

Session WE2E

Guided Waves and Discontinuity Effects

Chair

M. Dydyk

Motorola

Co-Chair

S. El-Ghazaly

Arizona State University

This session will have four full length papers. The first paper is a continuation of the Session on New Leakage Effects in Planar Guiding Structures. The next two papers will cover discontinuity effects. The last paper presents a field-theoretical algorithm for characterizing unbounded and bounded circuits and antennas.

Session WE3A

Advanced CAD Methodologies

Chair

R.M. Biernacki

Optimization Systems Associates

Co-Chair

M.D. Abouzahra

MIT Lincoln Laboratory

This session concentrates on new developments in conventional CAD techniques as well as on emerging CAD methodologies. Applications of these techniques span both active and passive components. The audience will be introduced to a new method in stability analysis, numerical network methodology for microwave circuit design, EM-based design and space mapping optimization, and a number of new ideas applicable to filter design.

Session WE3B

Frequency Converters and Mixers

Chair

B.E. Sigmon

Motorola SSTG, Inc.

This session covers frequency converters and mixers below 30 GHz. Five papers are presented. The first three are on mixers showing state-of-the-art performance. The fourth covers a unique 2 GHz subharmonic sampler for signal down conversion. The fifth presents a low power consumption 0.15 GaAs MODFET front-end IC current reuse.

Session WE3C

Quasi-Optical Amplifiers

Chair

D. Rutledge

California Institute of Technology

Quasi-optical amplifiers have recently attracted attention from both academia as well as industry. The goal of such circuits is to replace traveling wave tubes using solid-state amplifiers at millimeter-wave frequencies. In this session both three as well as two dimensional slab type amplifiers are presented. Among new ideas are bidirectional amplifiers for the construction of quasi-optical transmit-receive modules.

Session WE3D

Active and Planar Filters

Chair

D. Swanson

Watkins-Johnson

Small size and low cost are the goals for the active filter topologies discussed here. Adding active elements can also overcome the low Q of planar resonators. When low cost is the prime concern, planar resonators without active elements may be the best choice.

Session WE3E

Hybrid Interconnects and Components

Chair

G. Brehm

Texas Instruments

Multilayer interconnect circuits combined with chip mounting techniques that avoid wire bonds are being developed to reduce hybrid MIC size and cost, and to enable operation at millimeter-wave frequencies. Papers in this session report advances in interconnection techniques and passive components for circuits designed for a wide range of applications from 1.9 to 77 GHz.

Session WE4A

Electromagnetic Theory Based CAD

Chair

I. Wolff

Duisburg University, Germany

Computer aided analysis techniques have been developed to a high standard. Meanwhile, further improvements are directed to synthesis techniques, optimization strategies and the integration of active elements into the CAD techniques.

Session WE4B

Millimeter-Wave Mixers and Switches

Chair

M. Schindler

ATM-Microwave

Millimeter-wave mixers and switches are of growing importance as personal and satellite communications move to higher frequencies, and with the potential for high volume automotive radars. This session includes papers with innovative approaches and excellent performance for these applications.

Session WE4C

Quasi Optical Oscillators

Chair

R. York

University of California-Santa Barbara

In this session we present progress in quasi-optical oscillator design, a new millimeter-wave oscillator, a self-oscillating Doppler sensor, and a computer-aided engineering package for quasi-optical systems.

Session WE4D

Passive Bandpass Filters

Chair

G.L. Matthaei

University of California-Santa Barbara

Advances have been achieved in filter size and cost reduction while maintaining high quality performance as needed for modern satellite and wireless applications.

Session WE4E

Ferrite Devices: Modeling and Applications

Chair

J.M. Owens

Auburn University

Co-Chair

M. Afsar

Tufts University

The session contains six papers reporting advances in the analysis and modeling of ferrite devices. The first two papers use numerical techniques to analyze transversely magnetized devices. The next two papers develop physical models for predicting phase shifter performance. A C-band microstrip limiter is described in the fifth paper. The session closes with an analysis of the performance of a thin-film circulator.