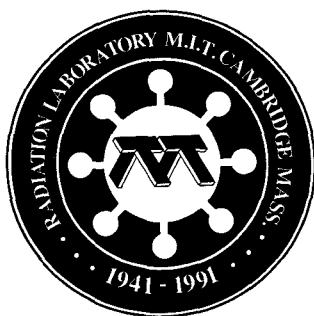


1991 Technical Program



Technical Program Contents

Technical Program Contents

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10:30 a.m. to 12:00 p.m.

Tuesday, June 11, 1991

Co-chairmen: Ho Huang—COMSAT Laboratories
Mahesh Kumar—AEL Inc.

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Co-chairmen: Theodore S. Saad—Sage Laboratories
Al Hill—MIT

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Tuesday, June 11, 1991

Co-chairmen: Ross Hicks—Compact Software, Paterson, NJ
Geoff Dawe—M/A-COM ASD, Lowell, MA

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(Joint with MMWMC)

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Co-chairmen: Yusuke Tajima—Raytheon Company, Research Division
Yalcin Ayasli—Hittite, Inc.

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P.R. Herczfeld—Drexel University, Philadelphia, PA

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J.M. Schellenberg—JMS Associates

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Chairman: Arye Rosen—David Sarnoff Research Center, Princeton, NY

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Chairman: K. Tomiyasu—General Electric Co., Philadelphia, PA

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Yi-Chi Shis—Hughes Aircraft Co.

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Chairman: Rene R. Bonetti—COMSAT LABS., Clarksburg, MD

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Wednesday, June 12, 1991

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Session Q

Microwave Monolithic ICs II

Ballroom A

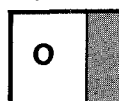
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Wednesday, June 12, 1991

Co-chairmen: Hing-Loi A. Hung—COMSAT Laboratories, Clarksburg, MD
Clifford Krowne—Naval Research Laboratory

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Wednesday, June 12, 1991

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T-2:	Recirculating Fiberoptic Link for Memory Loop	581
10:50 a.m.	R. Saedi, X. Zhou, S. Malone, A. Daryoush, P. Herczfeld and B. Even-Or	
T-3:	A 7-13 GHz Low-Noise Tuned Optical Front-End Amplifier for Heterodyne Transmission System Application	585
11:00 a.m.	F. Ebskamp, G. Schiellerup and M. Høgdal	
T-4:	Resistive Mixing and Parametric Up-Conversion of Microwave Optoelectronic Signals in a Microstrip Ring Resonator	589
11:10 a.m.	G.K. Gopalakrishnan, B.W. Fairchild, C.L. Yeh, C.S. Park, K. Chang, M.E. Weichold and H.F. Taylor	
T-5:	Fiber Optic Microwave Transmission Using Harmonic Modulation and Optoelectronic Mixing/Optically Pumped Mixing	593
11:30 a.m.	H. Ogawa and Y. Kamiya	

Session OF-II

Open Forum II

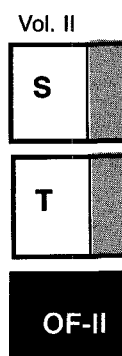
Rooms 304-306

2:30 p.m. to 5:00 p.m.

Wednesday, June 12, 1991

Co-chairmen: Ross Hicks—Compact Software, Paterson, NJ
Geoff Dawe—M/A-COM ASD, Lowell, MA

OF-2-1:	(Invited) Simulation of Nonlinear Microwave Circuits—An Historical Perspective and Comparisons M.B. Steer	599
OF-2-2:	A New Approach in CAD of MM-Wave Impatt Oscillators V. Stoiljković, M. J. Howes and V. Postoyalko	603
OF-2-3:	Pulsed-RF and Transient Analysis of Nonlinear Microwave Circuits by Harmonic-Balance Techniques V. Rizzoli, A. Lipparini, P. Ghigi, F. Mastri and C. Cecchetti	607
OF-2-4:	Effect of Distributed Gate Diode on MESFET Power Performance Evaluated by Harmonic Balance Simulation P.M. White	611
OF-2-5:	Propagation Properties of Multilayer Thin-Film Polarization- Maintaining Optical 3-D Waveguide J.-P. Hsu, T. Anada, S. Nakamura and T. Kobayashi	615
OF-2-6:	Accurate Characterization of Cross-Over and other Junction Discontinuities in Two-Layer Microstrip Circuits A. Hoorfar, J.X. Zheng and D.C. Chang	619
OF-2-7:	Study of a Novel Planar Transmission Line N.I. Dib, W.P. Harokopus, Jr., P.B. Katehi, C.C. Ling and G.M. Rebeiz	623
OF-2-8:	HELENA: A New Software for the Design of MMICS H. Happy, O. Pribetich, G. Dambrine, J. Alamkan, Y. Cordier and A. Cappy	627
OF-2-9:	3-D TLM Time Domain Electromagnetic Wave Simulator for Microwave Circuit Modeling P.P.M. So and W.J.R. Hoefer	631
OF-2-10:	Mixed Lumped and Distributed Network Applied To Superconducting Thin-Film Broadband Impedance Transforming L. Zhu and L.J.P. Linner	635
OF-2-11:	Experimental Determination of High-Speed GaAs Digital Circuit Interconnect Parameters K. Kiziloglu, N. Dagli, G.L. Matthaei and S.I. Long	639
OF-2-12:	A 1.57 W/mm GaAs-Based MISFET for High-Power and Microwave-Switching Applications F.W. Smith, C.L. Chen, L.J. Mahoney, M.J. Manfra, D.H. Temme, B.J. Clifton and A.R. Calawa	643
OF-2-13:	A Planar Integral Equation Method for the Analysis of Dielectric Ridge Structures Using Generalized Boundary Conditions T.E. van Deventer and P.B. Katehi	647
OF-2-14:	Large Signal Characterization and Numerical Modeling of the GaAs/AlGaAs HBT D.A. Teeter, J.R. East, R.K. Mains and G.I. Hadad	651
OF-2-15:	Optical Control of Microwave Active Band-Pass Filter Using MESFETs Y. Yamamoto, K.-I. Kawasaki and T. Itoh	655



OF-2-16:	Design of Millimeter-Wave Extracted-Pole Filters with Asymmetrical Frequency Characteristics R.R. Mansour and G. Woods	659
OF-2-17:	Asymmetric, Multi-Conductor Low-Coupling Structures for High-Speed, High-Density Digital Interconnects J.P.K. Gilb and C.A. Balanis	663
OF-2-18:	Analysis of Quasi Complex Modes on Lossy Substrate Boxed Microstrip Lines F. Huret, P. Pribetich and P. Kennis	667
OF-2-19:	Novel Type of Electrically-Controlled Phase Shifter for Millimeter-Use: Theory and Experiment J.W. Tao, B. Chan, H. Baudrand and J. Atechian	671
OF-2-20:	Paper has been withdrawn	
OF-2-21:	An Improved TLM Full-Wave Analysis Using a Two Dimensional Mesh H. Jin, R. Vahldieck and S. Xiao	675
OF-2-22:	Statistical Design for Microwave Systems R. Cooke and J. Purviance	679
OF-2-23:	A New Effective Approach for High Yield Microwave Matching Network and Amplifier Design C. Sheng and Y. Wang	683
OF-2-24:	Triple-Mode Dielectric Resonator Loaded Cavity Zhong-Min Gan, Yu-Quan Li, Cai-Dan Feng and Shui-Gen Yang	687
OF-2-25:	Millimeterwave Coplanar Transmission Lines on Gallium Arsenide, Indium Phosphide and Quartz with Finite Metallization Thickness W.H. Haydl, T. Kitazawa, J. Braunstein, R. Bosch and M. Schlechtweg	691
OF-2-26:	A Scattering-Type Transverse Resonance Formulation and its Application to Open, Conductor-Backed and Shielded Slotline (M)MIC Structures J. Bornemann	695
OF-2-27:	Conductor Loss in Hollow Waveguides Using a Surface Integral Formulation M. Swaminathan, T.K. Sarkar and P. Petre	699

Session U

Field Effect Transistors

Ballroom A

1:30 p.m. to 3:00 p.m.

Wednesday, June 12, 1991

Chairman: H.J. Kuno—Hughes Aircraft Co., Torrance, CA

U-1: 1:30 p.m.	Ku-band Super Low-noise Pseudomorphic Heterojunction Field-effect Transistors (HJFET) with High Producibility and High Reliability	705
	T. Tokue, Y. Nashimoto, T. Hirokawa, A. Mese, S. Ichikawa, H. Negishi, T. Toda, T. Kimura, M. Fujita, I. Nagasako and T. Itoh	
U-2: 1:40 p.m.	Enhancement-Mode Pseudomorphic Inverted HEMT for Low Noise Amplifier	709
	K. Ohmuro, H.I. Fujishiro, M. Itoh, H. Nakamura and S. Nishi	
U-3: 2:00 p.m.	An AlGaAs/InGaAs Pseudomorphic High Electron Mobility Transistor (PHEMT) for X-and Ku-band Power Applications	713
	J.C. Huang, G. Jackson, S. Shanfield, W. Hoke, P. Lyman, D. Atwood, P. Saledas, M. Schindler, Y. Tajima, A. Platzker, D. Massé and H. Statz	
U-4: 2:20 p.m.	A High Power, High Efficiency Millimeter-Wave Pseudomorphic HEMT	717
	P.M. Smith, D.W. Ferguson, W.F. Kopp, P.C. Chao, W. Hu, P. Ho and J.M. Ballingall	
U-5: 2:40 p.m.	High Power and High Efficiency AlInAs/GaInAs on InP HEMTs	721
	M. Matloubian, L.D. Nguyen, A.S. Brown, L.E. Larson, M.A. Melendes and M.A. Thompson	
U-6: 2:50 p.m.	A Highly Linear MESFET	725
	S.L.G. Chu, J. Huang, W. Struble, G. Jackson, N. Pan, M.J. Schindler and Y. Tajima	

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OF-II

U

V

Session V

Passive Components I

Ballroom B

1:30 p.m. to 3:00 p.m.

Wednesday, June 12, 1991

Chairman: Kawthar A. Zaki—Elect. Eng. Dept., Univ. of Maryland, College Park, MD

V-1: 1:30 p.m.	A Rigorous Analysis of Dielectric Ring Resonators Loaded in Waveguide or Microstrip Line Structure	731
	S.-W. Chen and K.A. Zaki	
V-2: 1:50 p.m.	Dielectric Ring-Gap Resonator for Application in MMICs	735
	Wei Ke Hui and I. Wolff	
V-3: 2:00 p.m.	A Broadband Tunable Distributed Feedback Resonator	739
	J. Hausner and P. Russer	
V-4: 2:10 p.m.	Radiation Loss From Open Coplanar Waveguide Discontinuities	743
	W.P. Harokopus, Jr. and P.B. Katehi	
V-5: 2:30 p.m.	A New Method for the Calculation of the Equivalent Inductances of Coplanar Waveguide Discontinuities	747
	M. Naghed, M. Rittweger and I. Wolff	
V-6: 2:40 p.m.	Coupled Slot-Strip Coupler in Finline	751
	M. Schoenberger, A. Biswas, A. Mortazawi and V.K. Tripathi	
V-7: 2:50 p.m.	Analysis and Design of Slot-Coupled Directional Couplers Between Double-Sided Substrate Microstrip Lines	755
	M.F. Wong, V. Foouad Hanna, O. Picon and H. Baudrand	

Session W

Novel Concepts and Characteristics of Planar Transmission Lines Ballroom C

1:30 p.m. to 3:00 p.m.

Wednesday, June 12, 1991

Chairman: Arvind K. Sharma—TRW/EGS, Redondo Beach, CA

W-1:	A New Definition of Characteristic Impedance	761
1:30 p.m.	J.C. Rautio	
W-2:	Determination of the Characteristic Impedance of Single and Coupled Lines in Layered Dielectric Media	765
1:40 p.m.	A. Janhsen and V. Hansen	
W-3:	Planar Transmission Lines with Finitely Thick Conductors and Lossy Substrates	769
1:50 p.m.	T. Kitazawa, C.W. Kuo, K.-S. Kong and T. Itoh	
W-4:	Skin-Effect Current Distribution of a Unilateral Finline with Finite Conductivity	773
2:10 p.m.	C.-D. Chen, C.-K.C. Tzuang and S. T. Peng	
W-5:	Characteristics of Modified Slotline Configurations	777
2:30 p.m.	N.K. Das	
W-6:	Analysis of Stitch Line for Monolithic Microwave Integrated Circuits	781
2:40 p.m.	K. Kawasaki and T. Itoh	

Session X

Biological Effects and Medical Applications Room 302

1:30 p.m. to 3:00 p.m.

Wednesday, June 12, 1991

Chairman: Kenneth L. Carr—Microwave Medical Systems, Littleton, MA

X-1:	Microwaves in Surgery: Method and Results	787
1:30 p.m.	L.S. Taylor and W.P. Reed	
X-2:	Techniques for Heating Brain Tumors with Implanted Microwave Antennas	791
1:50 p.m.	T.P. Ryan	
X-3:	The Efficacy of Transurethral Interstitial Microwave Hyperthermia in the Management of Benign Prostatic Hyperplasia	795
2:00 p.m.	H. Arastu, P. Ginsberg, M. Hightower, H. Nisenbaum, D. Plunkett and S. Jayaraman	
X-4:	Microwave Balloon Angioplasty	797
2:20 p.m.	P. Walinsky, A. Rosen, D. Smith, D. Nardone, A. Martinez-Hernandez and Z. Kosman	
X-5:	Variations of Pain Thresholds and Norepinephrine Release in Rabbits Due to Microwave Stimulation	801
2:30 p.m.	J. Teng, H. Yan, D. Vanhoenacker and A. Vander Vorst	
X-6:	Analysis of Microwave Effects on Isolated Hearts	805
2:40 p.m.	C.C. Tamburello, L. Zanforlin, G. Tiné and A.E. Tamburello	
X-7:	New Applicators for Microwave Hyperthermia	809
2:50 p.m.	Y. Nikawa, D. Kobayashi, S. Mori and F. Okada	

Session Y

FET and HEMT Circuits

Ballroom A

3:30 p.m. to 5:00 p.m.

Wednesday, June 12, 1991

Chairman: Edward C. Niehenke—Westinghouse Electric Corp., Baltimore, MD

Y-1:	AllInAs/GaInAs on InP HEMT Low Noise MMIC Amplifiers	815
3:30 p.m.	S.E. Rosenbaum, K. Litvin, C.S. Chou, L.E. Larson, L.D. Nguyen, C. Ngo, M. Lui, J. Henige, M.A. Thompson, U. Mishra and D. Pierson	
Y-2:	Ku-Band Power Amplifier using Pseudomorphic HEMT Devices for Improved Efficiency	819
3:50 p.m.	D. Helms, J.J. Komiak, W.F. Kopp, P. Ho, P.M. Smith, R.P. Smith and D. Hogue	
Y-3:	30 V MMIC Power Amplifier with Novel Bias Circuitry	823
4:00 p.m.	K.E. Peterson, H-L. A. Hung, F.R. Phelleps, E.Y. Chang, J.L. Singer, H.E. Carlson and A.B. Cornfeld	
Y-4:	A Compact Ka-Band MIMIC Voltage Controlled Oscillator: Comparison of MESFET and HEMT Implementations	827
4:10 p.m.	D. Bosch, M. Gawronski, S. Swirhn, J. Geddes, J. Beyer and R. Cravens	
Y-5:	Monolithic 38 GHz Dielectric Resonator Oscillator	831
4:20 p.m.	P.G. Wilson	
Y-6:	Low Noise Microwave Oscillator using Ultra High Q Dielectric Resonator	835
4:30 p.m.	K. Uzawa and K. Matsumoto	
Y-7:	Novel High Performance SPDT Power Switches Using Multi-Gate FETs	839
4:40 p.m.	F. McGrath, C. Varmazis, C. Kermarrec and R. Pratt	
Y-8:	Double Balanced, Coplanar, Image Rejection Mixer Uses Monolithic MESFET Quad	843
4:50 p.m.	D. Neuf and S. Spohrer	

Session Z

Passive Components II

Ballroom B

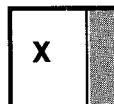
3:30 p.m. to 5:00 p.m.

Wednesday, June 12, 1991

Chairman: Linda P.B. Katehi—University of Michigan, Ann Arbor, MI

Z-1:	Characterizing Waveguide T-Junctions by Three Plane Mode Matching Techniques	849
3:30 p.m.	X.-P. Liang, K.A. Zaki and A.E. Atia	
Z-2:	Optimized Design of Eight-Port Branch-Waveguide Directional Couplers	853
3:50 p.m.	P. Carle	
Z-3:	A 900 MHz 90 Degree Hybrid for QPSK Modulator	857
4:10 p.m.	S. Arai, A. Kato, K. Minami and T. Nishikawa	
Z-4:	Broadband Monolithic Passive Baluns and Monolithic Double-Balanced Mixer	861
4:30 p.m.	T.H. Chen, K.W. Chang, H. Wang, G.S. Dow, L.C.T. Liu, S.B.T. Bui and T.S. Lin	
Z-5:	A 6 to 20 GHz Planar Balun Using a Wilkinson Divider and Lange Couplers	865
4:40 p.m.	J. Rogers and R. Bhatia	
Z-6:	A Branch-Line-Type Eight-Port Comparator Circuit	869
4:50 p.m.	T. Kawai, K-I Iio, I. Ohta and T. Kaneko	

Vol. II



Session AA

Receiver Components Ballroom C

3:30 p.m. to 5:00 p.m.

Wednesday, June 12, 1991

Chairman: James Whelehan—AIL Systems, Inc., Melville, NY

AA-1: 3:30 p.m.	A Subharmonically Pumped Resistive Dual-HEMT Mixer H. Zirath	875
AA-2: 3:50 p.m.	A 40 GHz Band Monolithic Even Harmonic Mixer with an Antiparallel Diode Pair K. Itoh, A. Iida, Y. Sasaki and S. Urasaki	879
AA-3: 4:10 p.m.	An Integrated GPS Receiver with Synthesizer and Downconversion Functions R.M. Herman, A. Chao, C.H. Mason and J.R. Pulver	883
AA-4: 4:20 p.m.	Improved Millimeter-Wave Mixer Performance Analysis Using a Drift Diffusion Capacitance Model I. Mehdi, P.H. Siegel and J. East	887
AA-5: 4:30 p.m.	Extremely Low Phase Noise X-Band Field Effect Transistor Dielectric Resonator Oscillator M. Mizan and R.C. McGowan	891
AA-6: 4:40 p.m.	50 GHz Sampler Hybrid Utilizing a Small Shockline and an Internal SRD W.C. Whiteley, W.E. Kunz and W.J. Anklam	895
AA-7: 4:50 p.m.	A New Design Method for Maximum Gain Formulation of a Microwave Amplifier Subject to Noise Figure and Input VSWR M. Gunes and F. Gunes	899

Session BB

Time-Resolved Spectroscopy and Imaging of Tissue Room 302

3:30 p.m. to 5:00 p.m.

Wednesday, June 12, 1991

Co-chairmen: Norman Ramsey—Harvard University, Lyman Laboratory, Cambridge, MA
Roger Powell—National Institute of Health, Bethesda, MD

BB-1: 3:30 p.m.	(Invited) Diffusion Equation Representation of Photon Migration in Tissue M.S. Patterson, S.J. Madsen, J.D. Moulton and B.C. Wilson	905
BB-2: 3:50 p.m.	(Invited) Simulations of Photon Migration and Image Formation in Highly Scattering Media J.C. Haselgrove	909
BB-3: 4:10 p.m.	(Invited) Optical Ranging of Muscle and Brain B. Chance, J. Haselgrove, J.S. Leigh, M. Patterson and E. Sevick	913
BB-4: 4:30 p.m.	(Invited) Experimental Study of the Diffraction of Photon Density Waves by an Absorbing Edge in Highly Scattering Media J.B. Fishkin, B.A. Feddersen and E. Gratton	917

Session CC

Millimeter-wave Integrated Circuits and Technology I Ballroom A

8:30 a.m. to 10:00 a.m.

Thursday, June 13, 1991

Chairman: James C. Wiltse—Georgia Tech Research Institute, Atlanta, GA

CC-1:	W-Band Whispering Gallery Dielectric Resonator Mode Oscillator	929
8:30 a.m.	D. Cros, C. Tronche, P. Guillon and B. Theron	
CC-2:	A W-Band Doubler/Amplifier Chain Using MMIC Varactor Doubler and a MMIC Power MESFET Amplifier	933
8:50 a.m.	G. Hegazi, E. Chang, J. Singer, F. Phelleps, P. McNally, K. Pande, P. Rice and P. Pages	
CC-3:	A Millimeter-wave, Third Harmonic, GUNN VCO with Ultra-Wideband Tuning	937
9:10 a.m.	L.D. Cohen	
CC-4:	43.5 to 45.5 GHz Active Times-4 Frequency Multiplier with 1.4 Watt Output Power	939
9:20 a.m.	C. Creamer, P. Chye and B. Sinclair	
CC-5:	A High Performance W-Band Monolithic Pseudomorphic InGaAs HEMT LNA	943
9:40 a.m.	H. Wang, G.S. Dow, K. Tan, J. Berenz, T.N. Ton, T.S. Lin, P. Liu, D. Streit, P.D. Chow and B. Allen	

Session DD

Ferrites and Acoustics Ballroom B

8:30 a.m. to 10:00 a.m.

Thursday, June 13, 1991

Co-chairmen: Denis Webb—Naval Research Lab
Ernst Schloemann—Raytheon Research Div.

DD-1:	Application of Perturbation Theory to Toroidal Phase Shifters	949
8:30 a.m.	B. Lax, and J. Pehowich	
DD-2:	Slot Line between Oppositely-Magnetized Ferrite Layers for Broadband High-Nonreciprocity Phase Shifters	953
8:50 a.m.	C.J. Koza and E.-B. El-Sharawy	
DD-3:	Tunable Band-Stop Filter Based on Epitaxial Fe Film on GaAs	957
9:10 a.m.	V.S. Liau, T. Wong, W. Stacey, S. Ali and E. Schloemann	
DD-4:	Computer-Aided Design and Optimisation of Broadband Stripline Circulators for 18-30 GHz and 18-40 GHz	961
9:20 a.m.	M.T. Hickson, L.E. Davis, D.K. Paul and D.B. Sillers	
DD-5:	Temperature Compensated Permanent Magnet YIG Tuned Oscillators	965
9:30 a.m.	Y. Ataiyan and D. Hejmanowski	
DD-6:	A 2—5 GHz Tunable Magnetostatic Wave Oscillator	969
9:40 a.m.	I. Aoki	
DD-7:	SAW Microstrip Front-End for Mobile Communication Systems in the GHz Range	973
9:50 a.m.	K. Anemogiannis, P. Russer, R. Weigel and C. Zimmermann	

Session EE

CAD Modeling for Transmission Structures Ballroom C

8:30 a.m. to 10:00 a.m.

Thursday, June 13, 1991

Chairman: K.C. Gupta—University of Colorado at Boulder, Boulder, CO

EE-1:	Sensitivity Analysis of Lossy Coupled Transmission Lines	979
8:30 a.m.	S. Lum and M. Nakhla	
EE-2:	Analysis of Lossy Multiconductor Transmission Lines Using The Asymptotic	
8:50 a.m.	Waveform Evaluation Technique	983
	T.K. Tang, M. Nakhla, and R. Griffith	
EE-3:	High Speed Digital System Simulation using Frequency Dependent Transmission	
9:00 a.m.	Line Network Modeling	987
	M.S. Basel, M.B. Steer, P.D. Franzon and D. Winkelstein	
EE-4:	A Universal Model for Lossy and Dispersive Transmission Lines for the Time	
9:10 a.m.	Domain CAD of Circuits	991
	J.I. Alonso, J. Borja and F. Pérez	
EE-5:	Field Distribution and Dispersion Characteristics of Fundamental and	
9:20 a.m.	Higher-Order Modes in Miniature Hybrid MIC (MHMIC) Considering Finite	
	Conductor Thickness and Conductivity	995
	K. Wu and R. Vahldieck	
EE-6:	A Combination of FD-TD and Prony's Methods for Analyzing Microwave	
9:40 a.m.	Integrated Circuits	999
	W.L. Ko and R. Mittra	
EE-7:	Full Wave Analysis of Propagation Characteristics of a Through Hole using the	
9:50 a.m.	Finite-Difference Time-Domain Method	1003
	S. Maeda, T. Kashiwa and I. Fukai	

Session FF

Applications of Measurement Technology Room 302

8:30 a.m. to 10:00 a.m.

Thursday, June 13, 1991

Chairman: John T. Barr IV—Hewlett Packard, Santa Rosa, CA

FF-1:	(Invited) Industrial Microwave Sensors	1009
8:30 a.m.	E. Nyfors and P. Vainikainen	
FF-2:	Range Measurement of Nonreflecting and Reflecting Targets using Interaction of	
8:50 a.m.	Ultrasound and Microwaves	1013
	M. Daas and R. Knöchel	
FF-3:	Highly Sensitive Measurements with a Lens-Focussed Reflectometer	1017
9:10 a.m.	D.R. Gagnon	
FF-4:	Novel Truncated Cone Cavity for Surface Resistance Measurements of High T_c	
9:20 a.m.	Superconducting Thin Films	1019
	B. Mayer, R. Knöchel and A. Reccius	
FF-5:	A Highly Sensitive Millimeter-wave Quasi-Optical FM Noise Measurement System	1023
9:30 a.m.	G.M. Smith and J.C.G. Lesurf	
FF-6:	A Multistate Reflectometer in Dielectric Guide for the Frequency Range	
9:40 a.m.	75-140 GHz	1027
	R.J. Collier and M.F. D'Souza	
FF-7:	A Computer Controlled Noise Parameter Measurement System	1031
9:50 a.m.	B. Albinsson, H. Guo, M. Schöön and H.-O. Vikes	

Session GG

Millimeter-wave Integrated Circuits and Technology II Ballroom A

10:30 a.m. to 12:00 p.m.

Thursday, June 13, 1991

Chairman: K.K. Agarwal—E-Systems, Inc., Garland Division, Plano, TX

GG-1:	94 GHz Subharmonically Pumped MMIC Mixer	1037
10:30 a.m.	D. Blackwell, H.G. Henry, J.E. Degenford and M. Cohn	
GG-2:	Ultra Low Noise High Gain W-Band InP-Based HEMT Downconverter	1041
10:50 a.m.	P.D. Chow, K. Tan, D. Streit, D. Garske, P. Liu and H.C. Yen	
GG-3:	A Millimeter-wave Passive FET Mixer with Low 1/F Noise	1045
11:10 a.m.	J. Geddes, P. Bauhahn and S. Swirhun	
GG-4:	Q- and V-Band Planar Combiners	1049
11:20 a.m.	D.I. Stones and P.D. Chow	
GG-5:	Nearly Dispersionless Microstrip for 100 GHz Pulses Utilizing a Buried Silicide Groundplane	1053
11:40 a.m.	K.W. Goossen, H. Roskos, M.C. Nuss, D.W. Kisker, B. Tell, A.E. White, K.T. Short, D.C. Jacobson and J.M. Poate	

Vol. III



Session HH

Microwave and Millimeter-wave Packaging Ballroom B

10:30 a.m. to 12:00 p.m.

Thursday, June 13, 1991

Chairman: Bert Berson—Berson & Associates, Mountain View, CA

HH-1:	Packaging and System Integration of Microwave and Digital Monolithic IC's	1059
10:30 a.m.	G.L. Holz, J.L. Bugeau and M.A. Priolo	
HH-2:	A High Performance Quartz Package for Millimeter-wave Applications	1063
10:50 a.m.	Y.C. Shih, K. Li, K. Kasel, L. Fong, G. Holz and K. Shalkhauser	
HH-3:	MMIC Transmission Lines for Multi-Layered MMICs	1067
11:10 a.m.	H. Ogawa, T. Hasegawa, S. Banba and H. Nakamoto	
HH-4:	Optimum Microstrip Interconnects	1071
11:30 a.m.	S. Nelson, M. Youngblood, J. Pavio, B. Larson and R. Kottman	
HH-5:	Effects of Coefficient of Thermal Expansion Mismatch on Solder Attached GaAs MMICs	1075
11:50 a.m.	J. Pavio and D. Hyde	

Session II

3-D Field Theory-Based CAD

Ballroom C

10:30 a.m. to 12:00 p.m.

Thursday, June 13, 1991

Chairman: Chuck Holmes—EEsof Inc., Westlake Village, CA

II-1:	Systematic Investigation of Coplanar Waveguide MIC/MMIC Structures Using a Unified Strip/Slot 3D Electromagnetic Simulator	1081
10:30 a.m.	R. Bromme and R.H. Jansen	
II-2:	A Computationally Efficient Method for Improving the Speed of Full Wave Analysis CAD Programs for Microstrip Circuits	1085
10:50 a.m.	L.C. Howard and J.M. Dunn	
II-3:	High-Speed 3-D Electromagnetic Simulation for MIC/MMIC CAD using the Spectral Operator Expansion (SOE) Technique	1087
11:00 a.m.	R.H. Jansen and J. Sauer	
II-4:	Analysis of Multiple Coupled Microstrip Discontinuities for Microwave and Millimeter-wave Integrated Circuits	1091
11:10 a.m.	A. Hill	
II-5:	A High Level Compiler for the Electromagnetic Modeling of Complex Circuits by Geometrical Partitioning	1095
11:20 a.m.	G.E. Howard and Y.L. Chow	
II-6:	A Modified Dynamic Model for Planar Microwave Circuits	1099
11:30 a.m.	T. Rozzi, A. Morini, A. Pallotta and F. Moglie	
II-7:	The Rigorous CAD of Aperture-Coupled T-Junction Bandstop-Filters, E-Plane Circuit Elliptic-Function Filters, and Diplexers	1103
11:40 a.m.	F. Arndt and T. Sieverding	
II-8:	Finite Element Analysis of Resonant Cavities and Waveguides Using a Vector Potential Formulation	1107
11:50 a.m.	B.E. MacNeal, L.A. Lakin and J.R. Brauer	

Session JJ

On-Wafer and Noise Measurements

Room 302

10:30 a.m. to 12:00 p.m.

Thursday, June 13, 1991

Chairman: Dennis D. Poulin—Hewlett Packard, Burlington, MA

JJ-1:	Extraction of FET Model Noise-Parameters from Measurement	1113
10:30 a.m.	A. Riddle	
JJ-2:	FET Noise Model and On-Wafer Measurement of Noise Parameters	1117
10:40 a.m.	M.W. Pospieszalski and A.C. Niedzwiecki	
JJ-3:	Anomalies Observed in Wafer Level Microwave Testing	1121
10:50 a.m.	T.H. Miers, A. Cangellaris, D. Williams and R. Marks	
JJ-4:	16- Term Error Model and Calibration Procedure for on Wafer Network Analysis Measurements	1125
11:10 a.m.	J.V. Butler, D. Rytting, M.F. Iskander, R. Pollard and M. Vanden Bossche	
JJ-5:	A V-Band Wafer Probe Using Ridge-Trough Waveguide.	1129
11:30 a.m.	E.M. Godshalk	
JJ-6:	Measurement of Phase and Amplitude Response of a GaAs MMIC by Electrooptic Sampling	1133
11:40 a.m.	M.S. Heutmaker, G.T. Harvey, T.B. Cook and J.S. Perino	
JJ-7:	Sheet Resistance Measurements of Implanted Layers on Silicon Wafers Using a Microwave Resistivity Probe	1137
11:50 a.m.	M.S. Wang, H. Bhimnathwala, S.S. Yao and J.M. Borrego	

Session KK

Microwave System Applications Ballroom A

1:30 p.m. to 3:00 p.m.

Thursday, June 13, 1991

Chairman: Richard W. Laton—Raytheon Missile Systems Div., Bedford, MA

KK-1: 1:30 p.m.	(Invited) The Use of Microwaves in Europe to Detect, Classify and Communicate with Vehicles H. Roe	1143
KK-2: 1:50 p.m.	94 GHz FMCW Radar for Low Visibility Aircraft Landing Systems L.Q. Bui, Y. Alon and T. Morton	1147
KK-3: 2:00 p.m.	RF Electronics Digital CHIRP for the Spaceborne Imaging Radar-C Instrument B.L. Huneycutt	1151
KK-4: 2:10 p.m.	Design of a Geostationary Microwave Precipitation Radiometer W.J. Wilson, C.S. Ruf, C.M. Satter and Y. Rahmat-Samii	1153
KK-5: 2:20 p.m.	Miniaturized Multistage Power Amplifiers for the 10.95 to 12.75 GHz Communications Satellite Band P.E. Goettle, B.D. Geller, F.R. Phelleps, A.I. Zaghloul, R.M. Sorbello and F.T. Assal	1157
KK-6: 2:30 p.m.	The Differential Reference Frequency Synthesizer Z. Galani, M.J. Bianchini and J.A. Chiesa	1161
KK-7: 2:40 p.m.	An Ultraminiature 2 to 18 GHz MMIC RF Converter for EW Applications S.M. Weiner, J.L. Merenda and J.A. Pierro	1165

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Session LL

Solid State Devices and Circuits (Non-FET) I Ballroom B

1:30 p.m. to 3:00 p.m.

Thursday, June 13, 1991

Chairman: Joseph F. White—Applied Microwave Magazine, Lexington, MA

LL-1: 1:30 p.m.	High Peak Power Dielectric Resonator Oscillator Combiner B.E. Sigmon	1171
LL-2: 1:50 p.m.	Voltage Controlled Push-Push Oscillators Using Miniaturized Hairpin Resonators H. Yabuki, M. Sagawa and M. Makimoto	1175
LL-3: 2:10 p.m.	Performance and Applications of Novel Tunable Oscillators Utilizing Focused-Ion-Beam-Implanted Gunn-Effect Devices A. Chu, L. Chu, W. Macropoulos, K. Khair, R. Patel, M. Cordaro, L.J. Mahoney, H. Lezec and J. Melngailis	1179
LL-4: 2:30 p.m.	Temperature Stable, Low-Phase Noise 2 GHz Dielectric Resonator Oscillator M. Mizan, R.C. McGowan, T. Lukaszek and A. Ballato	1183
LL-5: 2:40 p.m.	A Novel Varactor Tunable Coplanar Waveguide-Slotline Gunn VCO J.A. Navarro, Y.-H. Shu and K. Chang	1187
LL-6: 2:50 p.m.	A Better Biasing Technique for IMPATT Diodes R.L. Eisenhart	1191

Session MM

CAD for Yield and Noise Characterization Ballroom C

1:30 p.m. to 3:00 p.m.

Thursday, June 13, 1991

Chairman: Mark C. Calcaterra—USAF, Wright Laboratories, WPAFB, OH

MM-1: 1:30 p.m.	Gradient Quadratic Approximation Scheme for Yield-Driven Design J.W. Bandler, R.M. Biernacki, S.H. Chen, J. Song, S. Ye and Q.J. Zhang	1197
MM-2: 1:50 p.m.	Accurate Design Centering and Yield Prediction Using the “Truth Model” M.D. Meehan, T. Wandinger and D.A. Fisher	1201
MM-3: 2:10 p.m.	Yield Optimization of a MMIC Distributed Amplifier Using Physically-Based Device Models R.J. Gilmore, M. Eron and T. Zhang	1205
MM-4: 2:20 p.m.	Statistical Techniques for Objective Characterization of Microwave Device Statistical Data M.D. Meehan and L. Campbell	1209
MM-5: 2:30 p.m.	Acceleration of Simulated Annealing and Its Application to Microwave Device and Circuit Optimization M.-K. Vai, J.-S Lin and S. Prasad	1213
MM-6: 2:40 p.m.	A Unified Framework for Computer-Aided Noise Analysis of Linear and Nonlinear Microwave Circuits S. Heinen, J. Kunisch and I. Wolff	1217
MM-7: 2:50 p.m.	A Simple Circuit Model for Resonant Mode Coupling in Packaged MMICs J.J. Burke and R.W. Jackson	1221

Session NN

Superconducting Microwave Components Room 302

1:30 p.m. to 3:00 p.m.

Thursday, June 13, 1991

Chairman: Kul Bhasin—NASA Lewis Research Center, Cleveland, OH

NN-1: 1:30 p.m.	High-Temperature Superconductive Passive Microwave Devices W.G. Lyons, R.S. Withers, J.M. Hamm, A.C. Anderson, P.M. Mankiewicz, M.L. O'Malley, R.E. Howard, R.R. Bonetti, A.E. Williams, and N. Newman	1227
NN-2: 1:50 p.m.	S-Parameter Measurement and Applications of Superconducting Flux Flow Transistors J.S. Martens, V.M. Hietala, T.E. Zipperian, D.S. Ginley, C.P. Tigges and J.M. Phillips	1231
NN-3: 2:10 p.m.	High T_c Superconducting Coplanar Delay Line with Long Delay and Low Insertion Loss Z.-Y. Shen, P.S.W. Pang, W.L. Holstein, C. Wilker, S. Dunn, D.W. Face and D.B. Laubacher	1235
NN-4: 2:20 p.m.	Low Phase Noise Superconducting Oscillators A.P.S. Khanna and M. Schmidt	1239
NN-5: 2:30 p.m.	Radiation Efficiency Measurements of a Thin-Film Y-Ba-Cu-O Superconducting Half-Loop Antenna at 500 MHz R.J. Dinger, D.R. Bowling, A.M. Martin and J. Talvacchio	1243

Session OO

Phased and Active Array Techniques Ballroom A

3:30 p.m. to 5:00 p.m.

Thursday, June 13, 1991

Chairman: David Rutledge—CALTECH, Pasadena, CA

OO-1:	Microwave and Millimeter-wave Staring Array Technology	1249
3:30 p.m.	C.J. Alder, C.R. Brewitt-Taylor, R.J. Davis, M. Dixon, R.D. Hodges, L.D. Irving, H.D. Rees, J. Warner and A.R. Webb	
OO-2:	An EHF Backplate Design for Airborne Active Phased Array Antennas	1253
3:50 p.m.	H. Wong, S.S. Chang, D.C.D. Chang, G.S. Bretana, G.A. Hill, T.Q. Ho and M.N. Wong	
OO-3:	Wideband Integrated Varactor-Tunable Active Notch Antennas and Power Combiners	1257
4:10 p.m.	J.A. Navarro, Y.-H. Shu and K. Chang	
OO-4:	A Layered Negative Resistance Amplifier and Oscillator Using a FET and a Slot Antenna	1261
4:30 p.m.	S. Kawasaki and T. Itoh	
OO-5:	A Circularly Polarized FET Oscillator Active Radiating Element	1265
4:40 p.m.	J. Birkeland and T. Itoh	
OO-6:	Millimeter-wave Integrated Phased Arrays with Ferrite Control	1269
4:50 p.m.	E.F. Zaitsev, Y.P. Yavon, Y.A. Komarov and A.Y. Kanivets	

Session PP

Solid State Devices and Circuits (Non-FET) II Ballroom B

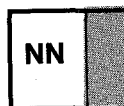
3:30 p.m. to 5:00 p.m.

Thursday, June 13, 1991

Chairman: Joseph A. Calviello—AIL System Inc., Melville, NY

PP-1:	A Limiting Filter	1275
3:30 p.m.	R.J. Tan	
PP-2:	Low Noise HEMTs with Multi-Feed Gate Configurations	1279
3:50 p.m.	K. Hosogi, T. Katoh, T. Kashiwa, H. Matsuoka, H. Minami, K. Kosaki, K. Nagahama, K. Nishitani and M. Otsubo	
PP-3:	A Si Wide-Band MMIC Amplifier Family for L-S Band Consumer Product Applications	1283
4:00 p.m.	H. Takeuchi, M. Muraoka, T. Hatakeyama, A. Matsuoka, M. Honjou, S. Miyazaki, K. Tanaka and T. Nakata	
PP-4:	20-GHz 5-dB-Gain Analog Multipliers with AlGaAs/GaAs HBTs	1285
4:10 p.m.	K. Osafune and Y. Yamauchi	
PP-5:	Miniaturized Reverse Modulation Loop for a CQPSK 120 Mbit/s Modem	1289
4:30 p.m.	K.K. Ralston, R.K. Gupta, F.T. Assal and R.T. Kroll	
PP-6:	A Submillimeter-wave Planar Diode Mixer—Design and Evaluation	1293
4:50 p.m.	T. Newman and K.T. Ng	

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Session QQ

High Power Devices and Systems

Ballroom C

3:30 p.m. to 5:00 p.m.

Thursday, June 13, 1991

Chairman: Don W. Reid—Los Alamos National Laboratory, Los Alamos, NM

QQ-1:	Eight Watt Ku-Band Module	1299
3:30 p.m.	M. Gat, D.S. Day and J.R. Basset	
QQ-2:	Development of 20 GHz-Band On-Board Power Amplifiers	1303
3:50 p.m.	H. Makishima and N. Mita	
QQ-3:	A PIN Diode Switch that Operates at 100 Watts CW at C-Band	1307
4:00 p.m.	J. Sherman	
QQ-4:	Pulse Generation and Measurement of Radiated Waveforms from an Optically Activated Impulse Generator	1311
4:10 p.m.	A. Kim, R. Zeto, R. Youmans, M. Weiner, J. Fishback and B. Lalevic	
QQ-5:	Generation of Highly Tunable Microwave Radiation Via a Relativistic Ionization Front.	1315
4:30 p.m.	R.L. Savage Jr., C. Joshi and W.B. Mori	
QQ-6:	A New Generation of Power Klystrons on the Base of Multiple-Beam Design	1319
4:40 p.m.	E.A. Gelvich, E.V. Zhary, L.M. Borissov, A.D. Zakurdayev, A.S. Pobedonostsev and V.I. Poognin	
QQ-7:	Millimeter-wave Power Amplifiers	1321
4:50 p.m.	M.I. Lopin, B.A. Belyavsky, K.G. Simonov and V.A. Cherepenin	

Session RR

Superconducting Filters

Room 302

3:30 p.m. to 5:00 p.m.

Thursday, June 13, 1991

Chairman: Barry E. Spielman—Washington University in St. Louis, St. Louis, MD

RR-1:	Present and Projected Performance of High-Temperature Superconducting Filters	1325
3:30 p.m.	S.H. Talisa, M.A. Janocko, J. Talvacchio and C. Moskowitz	
RR-2:	Critical Design Issues in Implementing a YBCO Superconductor X-Band Narrow Bandpass Filter Operating at 77 K	1329
3:50 p.m.	A. Fathy, D. Kalokitis and E. Belohoubek	
RR-3:	A Coplanar Waveguide Filter Using Thin-Film High Temperature Superconductor	1333
4:10 p.m.	W. Chew, L.J. Bajuk, T.W. Cooley, M.C. Foote, B.D. Hunt, D.L. Rascoe and A.L. Riley	
RR-4:	High-T_c Superconducting High-Q Coplanar Resonator Made on MgO	1337
4:20 p.m.	T. Konaka, M. Sato, H. Asano, S. Kubo and Y. Nagai	
RR-5:	Characterization of Microstrip Discontinuities on LaAlO₃	1341
4:30 p.m.	P.A. MacDonald, D.B. Rensch, J.Y. Josefowicz, F. Williams and W. Hoefer	
RR-6:	Low-Loss Bandpass Filter Using Dielectric Rod Resonators Oriented Axially in a High-T_c Superconductor Cylinder	1345
4:40 p.m.	Y. Kogami, Y. Kobayashi, T. Konaka and M. Sato	