

1991  
Technical  
Program



*Technical Program Contents*

# Technical Program Contents

A

## Session A (Joint with MMWMC)

B

### Receiver Circuits I Ballroom A

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

Tuesday, June 11, 1991

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

A-1: 10:30 a.m.	<b>Commercial GaAs MMIC Applications</b>	71
	R. Rosenzweig	
A-2: 11:00 a.m.	<b>A 2 GHz Enhancement Mode GaAs Down Converter IC for Satellite TV Tuner</b>	73
	P. Phillippe and M. Pertus	
A-3: 11:20 a.m.	<b>X-Band MMIC Amplifier with Pulse-Doped GaAs MESFETs</b>	77
	N. Shiga, S. Nakajima, K. Otobe, T. Sekiguchi, N. Kuwata, K. Matsuzaki, and H. Hayashi	
A-4: 11:40 a.m.	<b>A New Planar Double-Double Balanced MMIC Mixer Structure</b>	81
	J. Eisenberg, J. Panelli and W. Ou	

## Session B

### Non Linear Modeling and Analysis Ballroom B

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

Tuesday, June 11, 1991

Chairman: J. Michael Golio—Tempe, AZ

B-1: 10:30 a.m.	<b>Statistical Modeling of GaAs MESFETs</b>	87
	J.W. Bandler, R.M. Biernacki, S.H. Chen, J. Song, S. Ye and Q.J. Zhang	
B-2: 10:50 a.m.	<b>Intermodulation in Heterojunction Bipolar Transistors</b>	91
	S.A. Maas, B. Nelson and D. Tait	
B-3: 11:00 a.m.	<b>Accurate Nonlinear Transistor Modeling Using Pulsed S Parameters Measurements Under Pulsed Bias Conditions</b>	95
	J.F. Vidalou, J.F. Grossier, M. Chaumas, M. Camiade, P. Roux and J. Obregon	
B-4: 11:10 a.m.	<b>An Accurate HEMT Large Signal Model Usable in SPICE Simulators</b>	99
	J. Staudinger, M. Miller, M. Golio, B. Beckwith and D. Halchin,	
B-5: 11:20 a.m.	<b>Voltage-Frequency Update for Nonlinear Analysis of Free-Running and Injection-Locked Multiple Device Oscillators</b>	103
	H.D. Foltz, J.H. Davis and T. Itoh	
B-6: 11:40 a.m.	<b>Harmonic-Balance Analysis of Multitone Autonomous Nonlinear Microwave Circuits</b>	107
	V. Rizzoli and A. Neri	

**Session C**  
**MIT Radiation Laboratory**  
**(Special Session)**  
**Ballroom C**

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

**Tuesday, June 11, 1991**

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

<b>C-1:</b> <b>10:30 a.m.</b>	<b>(Invited) Recollections on Microwave Theory</b>	<b>113</b>
	N. Marcuvitz	
<b>C-2:</b> <b>11:00 a.m.</b>	<b>(Invited) Microwave Systems—Then and Now—Examples at the 50th Reunion of the MIT Radiation Laboratory</b>	<b>115</b>
	I.A. Getting	
<b>C-3:</b> <b>11:30 a.m.</b>	<b>(Invited) Microwave Components</b>	<b>117</b>
	R.V. Pound	

**Session D**

**Student Papers Competition I**  
**(Special Session)**  
**Room 302**

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

**Tuesday, June 11, 1991**

Chairman: Peter A. Rizzi—Southeastern MA Univ., Elect. & Comp. Engineering Dept.

<b>D-1:</b> <b>10:30 a.m.</b>	<b>Maximum Efficiency Tuning of Microwave Amplifiers</b>	<b>123</b>
	L.C. Hall and R.J. Trew	
<b>D-2:</b> <b>10:45 a.m.</b>	<b>Large-signal Modeling and Study of Power Saturation Mechanisms in Heterojunction Bipolar Transistors</b>	<b>127</b>
	M.Y. Frankel and D. Pavlidis	
<b>D-3:</b> <b>11:00 a.m.</b>	<b>Submicron Gate Indium Gallium Arsenide Microwave Power Transistors</b>	<b>131</b>
	G.A. Johnson and V.J. Kapoor	
<b>D-4:</b> <b>11:15 a.m.</b>	<b>Analysis of Microstrip Structures On and Near Dielectric Ridges Using An Integral Equation-Mode Matching Technique</b>	<b>135</b>
	A.G. Engel, Jr., and L.P.B. Katehi	
<b>D-5:</b> <b>11:30 a.m.</b>	<b>Full-Wave Analysis of Aperture Coupled Microstrip Lines</b>	<b>139</b>
	N. Herscovici and D.M. Pozar	
<b>D-6:</b> <b>11:45 a.m.</b>	<b>Resonant Frequencies of Higher Order Modes in Cylindrical Anisotropic Dielectric Resonators</b>	<b>143</b>
	M.E. Tobar and A.G. Mann	

# Session OF-I

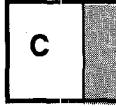
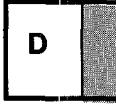
## Open Forum I Rooms 304-306

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

Tuesday, June 11, 1991

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

Vol. I

<b>OF-1-1:</b>	<b>(Invited) How to Model Intermodulation Distortion</b>	149	
	S.A. Maas		<b>C</b>
<b>OF-1-2:</b>	<b>Experimental 9 GBIT/s Transmitter and Receiver for Optical Transmission Systems</b>	153	
	G. Hanke		<b>D</b>
<b>OF-1-3:</b>	<b>A Millimeter-wave Integrated-circuit Antenna Based on the Fresnel Zone Plate</b>	157	
	M.A. Gouker and G.S. Smith		<b>OF-I</b>
<b>OF-1-4:</b>	<b>Current Distribution in Superconducting Strip Transmission Lines</b>	161	
	D.M. Sheen, S.M. Ali, D.E. Oates, R.S. Withers and J.A. Kong		
<b>OF-1-5:</b>	<b>10 GHz High Temperature Superconductor Phase Shifter</b>	165	
	C.M. Jackson and D.J. Durand		
<b>OF-1-6:</b>	<b>A New Method for On-Wafer High Frequency Noise Measurement of FETs</b>	169	
	G. Dambrine, A. Cappy and E. Delos		
<b>OF-1-7:</b>	<b>Characterization of Diodes in a Coaxial Measurement System</b>	173	
	M.B. Steer and R.G. Hicks		
<b>OF-1-8:</b>	<b>High-Power Second-Harmonic Gyrotron Oscillator</b>	177	
	I.P. Spassovsky, N.A. Nikolov, K.G. Kostov, V.A. Spassov and I.G. Yovchev		
<b>OF-1-9:</b>	<b>An Accurate, Field Matching Analysis of Waveguides of Complex Cross-Sectional Geometry Loaded with Magnetized Ferrite Rods</b>	181	
	M. Okoniewski and J. Mazur		
<b>OF-1-10:</b>	<b>An Efficient Technique for the Time Domain Analysis of Multi-Conductor Transmission Lines Using the Hilbert Transform</b>	185	
	T.R. Arabi, A.T. Murphy and T.K. Sarkar		
<b>OF-1-11:</b>	<b>Ceramic Dry-Phantom and its Application to SAR Estimation</b>	189	
	T. Nojima, T. Kobayashi, K. Yamada and S. Uebayashi		
<b>OF-1-12:</b>	<b>Modeling and Performance of a Sub-Nanosecond High Isolation DC-18 GHz Monolithic SPST with Driver</b>	193	
	A. Mallet-Guy, D. Ariel, J.L. Lacombe, D. Levy, P. Marsot and T. Thibout		
<b>OF-1-13:</b>	<b>An Experimental Low Power Density Rectenna</b>	197	
	W.C. Brown		
<b>OF-1-14:</b>	<b>Statistical Interpolation of FET Data Base Measurements</b>	201	
	L. Campbell, J. Purviance and C. Potratz		
<b>OF-1-15:</b>	<b>Eleven Octave MMIC Based Stimulus Module for Lightweight Systems</b>	205	
	D.P. Glynn III and T.O. Perkins III		
<b>OF-1-16:</b>	<b>(Paper has been withdrawn)</b>		
<b>OF-1-17:</b>	<b>18-40 GHz 13 dBm Low Noise GaAs FET Yig Tuned Oscillator</b>	209	
	A.P.S. Khanna and J. Hauptman		
<b>OF-1-18:</b>	<b>A Planar Wideband Millimeter-Wave Subharmonic Receiver</b>	213	
	B.K. Kormanyos, C.C. Ling, G.M. Rebeiz, P.H. Ostliek, W.L. Bishop and T.W. Crowe		

<b>OF-1-19:</b>	<b>Dispersive Properties of Grounded Slotlines and Edge Coupled Microstrip Lines of Biaxial Substrates</b>	<b>217</b>
	T.Q. Ho and B. Beker	
<b>OF-1-20:</b>	<b>Dispersion Analysis of Square Pulse with Finite Rise Time in Single, Tapered and Coupled Microstrip Lines</b>	<b>221</b>
	P. Pramanick and R.R. Mansour	
<b>OF-1-21:</b>	<b>An 18-40 GHz Phase Locked Downconverter Subsystem</b>	<b>225</b>
	A. Stajcer	
<b>OF-1-22:</b>	<b>Spectral Domain Technique for the Analysis of Waveguide Junction With Anisotropic Media</b>	<b>229</b>
	Y.Y. Tsai and A.S. Omar	
<b>OF-1-23:</b>	<b>A Physically Based Large Signal HBT Model with Self Heating and Transit Time Effects</b>	<b>233</b>
	P.C. Grossman	
<b>OF-1-24:</b>	<b>Requirements for Noise Parameter Measurements in Superconducting Electronic Systems</b>	<b>237</b>
	J.M. O'Callaghan and J.B. Beyer	
<b>OF-1-25:</b>	<b>Accurate Experimental Characterization of Three-Ports</b>	<b>241</b>
	S.B. Goldberg, M.B. Steer and P.D. Franzon	

## Session E (Joint with MMWMC)

### Receiver Circuits II Ballroom A

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

Tuesday, June 11, 1991

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

<b>E-1:</b> <b>1:30 p.m.</b>	<b>An HBT MMIC Wideband VCO</b>	<b>247</b>
	A. Adar, and R. Ramachandran	
<b>E-2:</b> <b>1:50 p.m.</b>	<b>A Class of Monolithic HBT Multipliers</b>	<b>251</b>
	C.B. Perry, K. T. Ip, K.Z. Claxton, R. B. Allen and A.E. Farris	
<b>E-3:</b> <b>2:10 p.m.</b>	<b>Monolithic Ultra-Broadband Transimpedance Amplifiers Using AlGaAs/GaAs HBTs</b>	<b>255</b>
	N. Nagano, T. Suzuki, A. Okamoto, and K. Honjo	
<b>E-4:</b> <b>2:30 p.m.</b>	<b>GaAs HBT Wideband and Low Power Consumption Amplifiers to 24 GHz</b>	<b>259</b>
	K.W. Kobayashi, R. Esfandiari, M.E. Hafizi, D.C. Streit, A. Oki, and M.E. Kim	

Vol. I

OF-I

E

## Session F Microwave Integrated Circuits Ballroom B

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

Tuesday, June 11, 1991

Chairman: A.P.S. Khanna—Avantek Inc.

<b>F-1:</b> <b>1:30 p.m.</b>	<b>Broadband Switched-Bit Phase Shifter using All-Pass Networks</b>	<b>265</b>
	D. Adler and R. Popovich	
<b>F-2:</b> <b>1:50 p.m.</b>	<b>Novel MIC Bipolar Frequency Doublers Having High Gain, Wide Bandwidth and Good Spectral Performance</b>	<b>269</b>
	M. Borg and G.R. Branner	
<b>F-3:</b> <b>2:10 p.m.</b>	<b>Planar Broadband MIC Balanced Frequency Doublers</b>	<b>273</b>
	R. Bitzer	
<b>F-4:</b> <b>2:20 p.m.</b>	<b>A HEMT Harmonic Oscillator Stabilized by an X-Band Dielectric Resonator</b>	<b>277</b>
	R. Tupynamá, E. Camargo and F.S. Correra	
<b>F-5:</b> <b>2:30 p.m.</b>	<b>FET DROs at V-Band</b>	<b>281</b>
	W. Yau, E.T. Watkins and Y.C. Shih	
<b>F-6:</b> <b>2:40 p.m.</b>	<b>A New Concept: An Electronically Tunable MMIC Flatness Corrector</b>	<b>285</b>
	F. Labarre, J.L. Cazaux, C. Goldztein, N. Pichon and M. Soulard	
<b>F-7:</b> <b>2:50 p.m.</b>	<b>A 0.5-12 GHz Hybrid Matrix Distributed Amplifier Using Commercially Available FETs</b>	<b>289</b>
	S. D'Agostino, G. D'Inzeo, G. Grifoni, P. Mariette and G. Panariello	

F

## Session G

### Multi-GHz Lightwave Transmission Systems (Special Session) Ballroom C

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

Tuesday, June 11, 1991

Co-chairmen: A.J. Seeds—University College, London  
P.R. Herczfeld—Drexel University, Philadelphia, PA

G-1: 1:30 p.m.	<b>(Invited) Activities in the European Optical Communications Field</b> M.J. O'Mahoney	295
G-2: 1:50 p.m.	<b>(Invited) Interfaces for High-Speed Fiberoptic Links</b> A.S. Daryoush, N. Samant, E. Ackerman, S. Wanuga and D. Kasemset	297
G-3: 2:10 p.m.	<b>(Invited) Component Technology for 40 GHz Fibre Optic Systems</b> I. Bennion, A. Carter, A. Moseley, M. Wale and R. Walker	301
G-4: 2:30 p.m.	<b>(Invited) Ultrahigh Speed Optical Transmission Systems in Japan</b> K. Nakagawa, K. Hohkawa and K. Hagimoto	303
G-5: 2:50 p.m.	<b>Performance Improvements in Fiber-Optic Links for Multi-Carrier TV Transmission.</b> T. Berceli, I. Frigyes, P. Gottwald, P.R. Herczfeld and F. Mernyei	307

## Session H

### Student Papers Competition II (Special Session) Room 302

1:30 p.m. to 2:10 p.m.

Tuesday, June 11, 1991

Chairman: Peter A. Rizzi—Southeastern MA Univ., Elect. & Comp. Engineering Dept.

H-1: 1:30 p.m.	<b>Low-Loss Quasi-Optical Open Resonator Filters</b> J.C. McCleary and K. Chang	313
H-2: 1:45 p.m.	<b>Comparison of Two Architectures for Fiber Optic Distribution Inside KA-Band Communication Satellites</b> D.M. Polifko and A.S. Daryoush	317

## Session I (Joint with MMWMC)

### Power Amplifiers Ballroom A

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

**Tuesday, June 11, 1991**

Co-chairmen: T.A. Midford—Hughes Aircraft  
J.M. Schellenberg—JMS Associates

<b>I-1:</b>	<b>A X-Band High-Efficiency Ion-Implanted MMIC Power Amplifier</b>	<b>323</b>
<b>3:30 p.m.</b>	H. Le, Y.C. Shih, V. Hwang, T. Chi, K. Kasel and D.C. Wang	
<b>I-2:</b>	<b>A 4.0 Watt High Efficiency 15-18 GHz Power MMIC</b>	<b>327</b>
<b>3:50 p.m.</b>	M. Gat, D.S. Day and J.R. Basset	
<b>I-3:</b>	<b>A C-Band GaAs MMIC Limiting Power Amplifier with Small Insertion</b>	<b>331</b>
<b>4:10 p.m.</b>	<b>Phase Variation</b>	
	J. Ozaki, K. Arai, M. Miyauchi, S. Watanabe and S. Kamihashi	
<b>I-4:</b>	<b>35 GHz Pseudomorphic HEMT MMIC Power Amplifier</b>	<b>335</b>
<b>4:30 p.m.</b>	D.W. Ferguson, S.A. Allen, M.Y. Kao, P.M. Smith, P.C. Chao, M.A.G. Upton and J.M. Ballingall	

## Session J

### Advanced Techniques of Numerical Electromagnetics Ballroom B

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

**Tuesday, June 11, 1991**

Chairman: Donald C. Power—Raytheon Company

Vol. I		
<b>J-1:</b>	<b>Full-Wave Loss Analysis of Normal- and Superconducting Transmission Lines by Hybrid-Mode Boundary Integral Equation Method</b>	<b>341</b>
<b>3:30 p.m.</b>	W. Schroeder and I. Wolff	
<b>J-2:</b>	<b>Fullwave Analysis of Microstrip In-line and Offset Gaps in Fully and Laterally Open Environments Using a Deterministic Spectral Domain Approach</b>	<b>345</b>
<b>3:50 p.m.</b>	J.S. McLean, H. Ling and T. Itoh	
<b>J-3:</b>	<b>Network Folding Strategies for Concurrent Electromagnetic Field Mapping</b>	<b>349</b>
<b>4:10 p.m.</b>	L.N. Merugu, V.F. Fusco and J.A.C. Stewart	
<b>J-4:</b>	<b>Efficient S-Parameter Calculation of Multiport Planar Structures with the Spectral Domain Analysis Method</b>	<b>353</b>
<b>4:20 p.m.</b>	T. Becks, G. Gronau and I. Wolff	
<b>J-5:</b>	<b>A Modified MoL Algorithm with Faster Convergence and Improved Computational Efficiency</b>	<b>357</b>
<b>4:40 p.m.</b>	S. Xiao, R. Vahldieck, H. Jin and Z. Cai	
<b>J-6:</b>	<b>A New Finite-Difference Time-Domain Formulation Equivalent to the TLM Symmetrical Condensed Node</b>	<b>361</b>
<b>4:50 p.m.</b>	Z. Chen, W.J.R. Hoefer and M.M. Ney	

Vol. I

G

H

I

J

## Session K

### High Power Optical Switching for Ultra Wide-Band Applications (Special Session) Ballroom C

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

Tuesday, June 11, 1991

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

K-1:	(Invited) Ultrawideband Radar	367
3:30 p.m.	J.D. Taylor	
K-2:	(Invited) Ultra-Wideband Radar—Potential and Limitations	371
3:50 p.m.	R.S. Vickers	
K-3:	(Invited) Generation of High Power Ultra-Wideband Electrical Impulse by Optoelectronic Technique	375
4:10 p.m.	C.H. Lee	
K-4:	(Invited) High Power Light Activated Semiconductor Switches with Sub- Nanosecond Rise Times	377
4:30 p.m.	F.J. Zutavern, G.M. Loubriel, M.T. Buttram, M.W. O'Malley, W.D. Helgeson and D.L. McLaughlin	

## Session L

### Microwave Radiometers (Special Session) Room 302

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

Tuesday, June 11, 1991

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

L-1:	(Invited) Earth Sensing with Large Aperture Radiometers	383
2:30 p.m.	W.J. Wilson	
L-2:	(Invited) Terrestrial Sensing with Synthetic Aperture Radiometers	387
2:45 p.m.	C.T. Swift and D.M. LeVine	
L-3:	(Invited) Millimeter Radiometric Sensing of the Lower Atmosphere	389
3:00 p.m.	D.H. Staelin	
L-4:	(Invited) Submillimeter Heterodyne Spectroscopy and Remote Sensing of the Upper Atmosphere	391
3:15 p.m.	J.W. Waters	
L-5:	(Invited) Submillimeter Wave Astronomy Satellite	395
3:30 p.m.	P.F. Goldsmith, A. Dalgarno, N.R. Erickson, G.G. Fazio, M. Harwit, D.J. Hollenbach, D.G. Koch, G.J. Melnick, D.A. Neufeld, R. Schieder, R.L. Snell, J. Stauffer, P. Thaddeus and G.F. Winnewisser	
L-6:	(Invited) The Dicke Radiometer and Cosmic Radiation	399
3:45 p.m.	D. Wilkinson	
L-7:	(Invited) Radiometer Programs in Europe	403
4:00 p.m.	K.F. Kunzi	
L-8:	(Invited) Monolithic Integrated Circuit Imaging Radiometers	405
4:15 p.m.	S. Weinreb	
L-9:	(Invited) Millimeter Wave Superconducting Receivers	409
4:30 p.m.	Q. Hu, C.A. Mears and P.L. Richards	
L-10:	(Invited) Brief Remarks	(No Summary Available)
4:45 p.m.	R.H. Dicke	

## Session M

### Microwave Monolithic ICs I

#### Ballroom A

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

Wednesday, June 12, 1991

Co-chairmen: Natalino Camilleri—Motorola, Inc. Sp.  
Yi-Chi Shis—Hughes Aircraft Co.

M-1:	<b>Ku-Band Monolithic 2.5-Watt Power Amplifier for High Volume Application</b>	421
8:30 a.m.	D.T. Bryant	
M-2:	<b>New Broadband Balun Structures for Monolithic Microwave</b>	
8:50 a.m.	<b>Integrated Circuits</b>	425
	B.J. Minnis and M. Healy	
M-3:	<b>100 MHz to 20 GHz Monolithic Single-Pole Two-, Three-, and Four-Throw GaAs</b>	
9:10 a.m.	<b>PIN Diode Switches</b>	429
	D.D. Heston, D.J. Seymour and D. Zych	
M-4:	<b>High Performance MMIC 20 GHz LNA and 44 GHz Power Amplifier using</b>	
9:30 a.m.	<b>Planar-Doped InGaAs HEMTs</b>	433
	J.A. Lester, W.L. Jones and P.D. Chow	
M-5:	<b>A Stable GaAs 6-20 GHz High Gain and Power TWA</b>	437
9:50 a.m.	M.M. Oda	

## Session N

### High Q Filters

#### Ballroom B

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

Wednesday, June 12, 1991

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

N-1:	<b>Miniature Dual Mode Microstrip Filters</b>	443
8:30 a.m.	J.A. Curtis and S.J. Fiedziuszko	
N-2:	<b>Hybrid Dielectric/HTS Resonators and Their Applications</b>	
8:50 a.m.	J.A. Curtis, S.J. Fiedziuszko and S.C. Holme	447
N-3:	<b>A Novel 2-4 GHz Multi-Passband Tunable and Gain Controlled Miniature Active</b>	
9:10 a.m.	<b>Equalizer/Filter</b>	451
	A. Madjar, B. Even-Or and E. Gertel	
N-4:	<b>The Simplified Real Frequency Method Applied to the Active Filters Synthesis</b>	
9:30 a.m.	E. El Hendaoui, A. Perennec and P. Jarry	455
N-5:	<b>Finite Element Simulation for Microwave Devices Applications to Microwave</b>	
9:50 a.m.	<b>Dielectric Resonator Filters</b>	459
	J.P. Cousty, S. Verdeyme, M. Aubourg and P. Guillon	

**Session O**  
**CPW and Other Discontinuities**  
**Ballroom C**

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

**Wednesday, June 12, 1991**

Chairman: Michael Dydyk—Motorola, Inc., Scottsdale, AZ

<b>O-1:</b> <b>8:30 a.m.</b>	<b>Full-Wave Analysis of Coplanar Discontinuities Considering Three-Dimensional Bond Wires</b>	<b>465</b>
	M. Rittweger, M. Abdo and I. Wolff	
<b>O-2:</b> <b>8:50 a.m.</b>	<b>Analysis of Shielded CPW Discontinuities with Air-Bridges</b>	<b>469</b>
	N.I. Dib, P.B. Katehi and G.E. Ponchak	
<b>O-3:</b> <b>9:10 a.m.</b>	<b>Analysis of Shielded Coplanar Waveguide Step Discontinuity Considering the Finite Metallization Thickness Effect</b>	<b>473</b>
	C.-W. Kuo, T. Kitazawa and T. Itoh	
<b>O-4:</b> <b>9:20 a.m.</b>	<b>Capacitive Discontinuities: Rigorous Multimode Equivalent Network Representation</b>	<b>477</b>
	M. Guglielmi	
<b>O-5:</b> <b>9:30 a.m.</b>	<b>Application of Microwave Techniques in the Analysis of Quantum Waveguide Structures and Devices</b>	<b>481</b>
	A. Weisshaar, J. Lary, S.M. Goodnick and V.K. Tripathi	

**Session P**

**Microwave/Optical Devices and Circuits**  
**Room 302**

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

**Wednesday, June 12, 1991**

Chairman: Harold Sobol—University of Texas at Arlington, TX

<b>P-1:</b> <b>8:30 a.m.</b>	<b>Optical Response of the GaAs MESFET at Microwave Frequencies and Applications</b>	<b>487</b>
	A. Paolella, P.R. Herczfeld, A. Madjar and T. Higgins	
<b>P-2:</b> <b>8:40 a.m.</b>	<b>Multigigahertz Monolithic GaAs Optoelectronic Receivers Using 0.2 <math>\mu</math>m Gate-Length MESFETs</b>	<b>491</b>
	R.H. Walden, W.W. Hooper, C.S. Chou, C. Ngo, R. Wong Quen, R.A. Metzger, F. Williams, L.E. Larson and R. Blumgold	
<b>P-3:</b> <b>9:00 a.m.</b>	<b>Theory and Experiment for the HEMTs under Optical Illumination.</b>	<b>495</b>
	M.A. Romero, A.L.A. Cunha and A.A.A. de Salles	
<b>P-4:</b> <b>9:20 a.m.</b>	<b>A Direct Optical Injection Locked 8 GHz MMIC Oscillator</b>	<b>499</b>
	A. Bangert and M. Ludwig	
<b>P-5:</b> <b>9:30 a.m.</b>	<b>Generation of Subpicosecond Optical Pulses by Mode-Locking Semiconductor Lasers with Millimeter-Wave Sources</b>	<b>503</b>
	Y.K. Chen, M.C. Wu, T. Tanbu-Ek, R.A. Logan and M.A. Chin	
<b>P-6:</b> <b>9:40 a.m.</b>	<b>Characterization of Microwave Integrated Circuits Using an Optical Phase-Locking and Sampling System</b>	<b>507</b>
	H-L.A. Hung, M.G. Li, S-L.L. Huang and C.H. Lee	

**Session Q**  
**Microwave Monolithic ICs II**  
**Ballroom A**

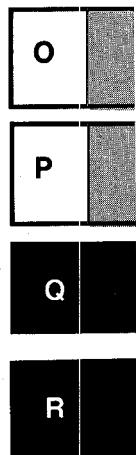
**10:30 a.m. to 12:00 p.m.**

**Wednesday, June 12, 1991**

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

<b>Q-1:</b> <b>10:30 a.m.</b>	<b>A 0.2 <math>\mu</math>m GaAs MESFET Technology for 10 Gb/s Digital and Analog ICs</b> Y. Yamane, M. Ohhata, H. Kikuchi, K. Asai and Y. Imai	<b>513</b>
<b>Q-2:</b> <b>10:50 a.m.</b>	<b>Single Chip Ka-Band Transceiver</b> J. Berenz, M. LaCon and M. Luong	<b>517</b>
<b>Q-3:</b> <b>11:00 a.m.</b>	<b>Paper has been withdrawn</b>	
<b>Q-4:</b> <b>11:10 a.m.</b>	<b>A K-Band HEMT Low Noise Receiver MMIC for Phased Array Applications</b> R. Carandang, J. Yonaki, W.L. Jones, R.E. Kasody, W. Lam and L.C.T. Liu	<b>521</b>
<b>Q-5:</b> <b>11:30 a.m.</b>	<b>A Linear Limiter: A 11-GHz Monolithic Low Distortion Variable Gain Amplifier</b> M. Muraguchi and M. Aikawa	<b>525</b>
<b>Q-6:</b> <b>11:50 a.m.</b>	<b>A Highly Compact, Wideband GaAs MESFET X-Ku Band Receiver MMIC</b> M.V. Aust, T.N. Ton, J. Yonaki, G.S. Dow, T.S. Lin, D.C. Yang and S.S. Andrews	<b>529</b>

Vol. II



**Session R**  
**Filters and Multiplexers**  
**Ballroom B**

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

**Wednesday, June 12, 1991**

Chairman: J. Douglas Adam—Westinghouse Stc., Pittsburgh, PA

<b>R-1:</b> <b>10:30 a.m.</b>	<b>Modal-S-Matrix Design of Microwave Filters Composed of Rectangular and Circular Waveguide Elements</b> F. Arndt and U. Papziner	<b>535</b>
<b>R-2:</b> <b>10:50 a.m.</b>	<b>Narrow Bandstop Filters</b> H.C. Bell	<b>539</b>
<b>R-3:</b> <b>11:10 a.m.</b>	<b>Synthesis of Non-Contiguous Diplexers Using Broadband Matching Theory</b> R. Levy	<b>543</b>
<b>R-4:</b> <b>11:20 a.m.</b>	<b>A Two-Step Synthesis of Broadband Ridged Waveguide Bandpass Filters with Improved Performances</b> J.C. Nanan, J.W. Tao, H. Baudrand, B. Theron and S. Vigneron	<b>547</b>
<b>R-5:</b> <b>11:30 a.m.</b>	<b>A Broadband Dielectric Diplexer Using a Snaked Strip-Line</b> M. Miyazaki, H. Asao and O. Ishida	<b>551</b>
<b>R-6:</b> <b>11:50 a.m.</b>	<b>High-Dielectric Constant Strip Line Band-Pass Filters</b> F. Winter, J. Taub and M. Marcelli	<b>555</b>

## Session S

### New Guided-Wave Leakage Effects Ballroom C

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

Wednesday, June 12, 1991

Chairman: Arthur A. Oliner—Polytechnic University, Brooklyn, NY

S-1: 10:30 a.m.	<b>Leakage Effects in Broadside-Coupled Microstrip</b> L. Carin	559
S-2: 10:50 a.m.	<b>New Interesting Leakage Behavior on Coplanar Waveguides of Finite and Infinite Widths</b> M. Tsuji, H. Shigesawa and A.A. Oliner	563
S-3: 11:10 a.m.	<b>Proper and Improper Modal Solutions for Inhomogeneous stripline</b> D. Nghiem, J.T. Williams and D.R. Jackson	567
S-4: 11:30 a.m.	<b>Mode-Coupling Formation of Complex Modes in a Shielded Nonreciprocal Finline</b> C.-K.C. Tzuang and J.-M. Lin	571

## Session T

### Microwave/Optical Circuits and Applications Room 302

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

Wednesday, June 12, 1991

Chairman: Norman R. Dietrich—AT&T Bell Laboratories, Breinigsville, PA

T-1: 10:30 a.m.	<b>A 3-6 GHz Lightwave/Microwave Transceiver Module for Microwave Fiber Optic Communications</b> E. Ackerman, S. Wanuga, J. Komiak, D. Kasemset, R. Scotti, W. MacDonald and J. Gates	577
T-2: 10:50 a.m.	<b>Recirculating Fiberoptic Link for Memory Loop</b> R. Saedi, X. Zhou, S. Malone, A. Daryoush, P. Herczfeld and B. Even-Or	581
T-3: 11:00 a.m.	<b>A 7-13 GHz Low-Noise Tuned Optical Front-End Amplifier for Heterodyne Transmission System Application</b> F. Ebskamp, G. Schiellerup and M. Høgdal	585
T-4: 11:10 a.m.	<b>Resistive Mixing and Parametric Up-Conversion of Microwave Optoelectronic Signals in a Microstrip Ring Resonator</b> G.K. Gopalakrishnan, B.W. Fairchild, C.L. Yeh, C.S. Park, K. Chang, M.E. Weichold and H.F. Taylor	589
T-5: 11:30 a.m.	<b>Fiber Optic Microwave Transmission Using Harmonic Modulation and Optoelectronic Mixing/Optically Pumped Mixing</b> H. Ogawa and Y. Kamiya	593

## Session OF-II

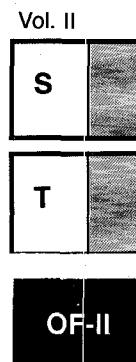
### Open Forum II Rooms 304-306

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



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

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

# Session V

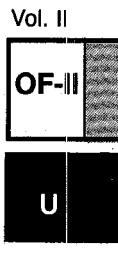
## Passive Components I

### 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	
<b>V-1:</b> 1:30 p.m.	<b>A Rigorous Analysis of Dielectric Ring Resonators Loaded in Waveguide or Microstrip Line Structure</b>	<b>731</b>
	S.-W. Chen and K.A. Zaki	
<b>V-2:</b> 1:50 p.m.	<b>Dielectric Ring-Gap Resonator for Application in MMICs</b>	<b>735</b>
	Wei Ke Hui and I. Wolff	
<b>V-3:</b> 2:00 p.m.	<b>A Broadband Tunable Distributed Feedback Resonator</b>	<b>739</b>
	J. Hausner and P. Russer	
<b>V-4:</b> 2:10 p.m.	<b>Radiation Loss From Open Coplanar Waveguide Discontinuities</b>	<b>743</b>
	W.P. Harokopus, Jr. and P.B. Katehi	
<b>V-5:</b> 2:30 p.m.	<b>A New Method for the Calculation of the Equivalent Inductances of Coplanar Waveguide Discontinuities</b>	<b>747</b>
	M. Naghed, M. Rittweger and I. Wolff	
<b>V-6:</b> 2:40 p.m.	<b>Coupled Slot-Strip Coupler in Finline</b>	<b>751</b>
	M. Schoenberger, A. Biswas, A. Mortazawi and V.K. Tripathi	
<b>V-7:</b> 2:50 p.m.	<b>Analysis and Design of Slot-Coupled Directional Couplers Between Double-Sided Substrate Microstrip Lines</b>	<b>755</b>
	M.F. Wong, V. Fouad 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: 1:30 p.m.	<b>A New Definition of Characteristic Impedance</b> J.C. Rautio	761
W-2: 1:40 p.m.	<b>Determination of the Characteristic Impedance of Single and Coupled Lines in Layered Dielectric Media</b> A. Janhsen and V. Hansen	765
W-3: 1:50 p.m.	<b>Planar Transmission Lines with Finitely Thick Conductors and Lossy Substrates</b> T. Kitazawa, C.W. Kuo, K.-S. Kong and T. Itoh	769
W-4: 2:10 p.m.	<b>Skin-Effect Current Distribution of a Unilateral Finline with Finite Conductivity</b> C.-D. Chen, C.-K.C. Tzuang and S. T. Peng	773
W-5: 2:30 p.m.	<b>Characteristics of Modified Slotline Configurations</b> N.K. Das	777
W-6: 2:40 p.m.	<b>Analysis of Stitch Line for Monolithic Microwave Integrated Circuits</b> K. Kawasaki and T. Itoh	781

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

**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		
<b>Y-1: 3:30 p.m.</b>	<b>AlInAs/GaInAs on InP HEMT Low Noise MMIC Amplifiers</b>	<b>815</b>
	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	
<b>Y-2: 3:50 p.m.</b>	<b>Ku-Band Power Amplifier using Pseudomorphic HEMT Devices for Improved Efficiency</b>	<b>819</b>
	D. Helms, J.J. Komiak, W.F. Kopp, P. Ho, P.M. Smith, R.P. Smith and D. Hogue	
<b>Y-3: 4:00 p.m.</b>	<b>30 V MMIC Power Amplifier with Novel Bias Circuitry</b>	<b>823</b>
	K.E. Peterson, H-L. A. Hung, F.R. Phelleps, E.Y. Chang, J.L. Singer, H.E. Carlson and A.B. Cornfeld	
<b>Y-4: 4:10 p.m.</b>	<b>A Compact Ka-Band MIMIC Voltage Controlled Oscillator: Comparison of MESFET and HEMT Implementations</b>	<b>827</b>
	D. Bosch, M. Gawronski, S. Swirhn, J. Geddes, J. Beyer and R. Cravens	
<b>Y-5: 4:20 p.m.</b>	<b>Monolithic 38 GHz Dielectric Resonator Oscillator</b>	<b>831</b>
	P.G. Wilson	
<b>Y-6: 4:30 p.m.</b>	<b>Low Noise Microwave Oscillator using Ultra High Q Dielectric Resonator</b>	<b>835</b>
	K. Uzawa and K. Matsumoto	
<b>Y-7: 4:40 p.m.</b>	<b>Novel High Performance SPDT Power Switches Using Multi-Gate FETs</b>	<b>839</b>
	F. McGrath, C. Varmazis, C. Kermarrec and R. Pratt	
<b>Y-8: 4:50 p.m.</b>	<b>Double Balanced, Coplanar, Image Rejection Mixer Uses Monolithic MESFET Quad</b>	<b>843</b>
	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. Katchi—University of Michigan, Ann Arbor, MI	Vol. II	
<b>Z-1: 3:30 p.m.</b>	<b>Characterizing Waveguide T-Junctions by Three Plane Mode Matching Techniques</b>	<b>849</b>
	X.-P. Liang, K.A. Zaki and A.E. Atia	
<b>Z-2: 3:50 p.m.</b>	<b>Optimized Design of Eight-Port Branch-Waveguide Directional Couplers</b>	<b>853</b>
	P. Carle	
<b>Z-3: 4:10 p.m.</b>	<b>A 900 MHz 90 Degree Hybrid for QPSK Modulator</b>	<b>857</b>
	S. Arai, A. Kato, K. Minami and T. Nishikawa	
<b>Z-4: 4:30 p.m.</b>	<b>Broadband Monolithic Passive Baluns and Monolithic Double-Balanced Mixer</b>	<b>861</b>
	T.H. Chen, K.W. Chang, H. Wang, G.S. Dow, L.C.T. Liu, S.B.T. Bui and T.S. Lin	
<b>Z-5: 4:40 p.m.</b>	<b>A 6 to 20 GHz Planar Balun Using a Wilkinson Divider and Lange Couplers</b>	<b>865</b>
	J. Rogers and R. Bhatia	
<b>Z-6: 4:50 p.m.</b>	<b>A Branch-Line-Type Eight-Port Comparator Circuit</b>	<b>869</b>
	T. Kawai, K-I Iio, I. Ohta and T. Kaneko	

## 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.	<b>A Subharmonically Pumped Resistive Dual-HEMT Mixer</b> H. Zirath	875
AA-2: 3:50 p.m.	<b>A 40 GHz Band Monolithic Even Harmonic Mixer with an Antiparallel Diode Pair</b> K. Itoh, A. Iida, Y. Sasaki and S. Urasaki	879
AA-3: 4:10 p.m.	<b>An Integrated GPS Receiver with Synthesizer and Downconversion Functions</b> R.M. Herman, A. Chao, C.H. Mason and J.R. Pulver	883
AA-4: 4:20 p.m.	<b>Improved Millimeter-Wave Mixer Performance Analysis Using a Drift Diffusion Capacitance Model</b> I. Mehdi, P.H. Siegel and J. East	887
AA-5: 4:30 p.m.	<b>Extremely Low Phase Noise X-Band Field Effect Transistor Dielectric Resonator Oscillator</b> M. Mizan and R.C. McGowan	891
AA-6: 4:40 p.m.	<b>50 GHz Sampler Hybrid Utilizing a Small Shockline and an Internal SRD</b> W.C. Whiteley, W.E. Kunz and W.J. Anklam	895
AA-7: 4:50 p.m.	<b>A New Design Method for Maximum Gain Formulation of a Microwave Amplifier Subject to Noise Figure and Input VSWR</b> 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.	<b>(Invited) Diffusion Equation Representation of Photon Migration in Tissue</b> M.S. Patterson, S.J. Madsen, J.D. Moulton and B.C. Wilson	905
BB-2: 3:50 p.m.	<b>(Invited) Simulations of Photon Migration and Image Formation in Highly Scattering Media</b> J.C. Haselgrove	909
BB-3: 4:10 p.m.	<b>(Invited) Optical Ranging of Muscle and Brain</b> B. Chance, J. Haselgrove, J.S. Leigh, M. Patterson and E. Sevick	913
BB-4: 4:30 p.m.	<b>(Invited) Experimental Study of the Diffraction of Photon Density Waves by an Absorbing Edge in Highly Scattering Media</b> 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

CC

Chairman: James C. Wiltse—Georgia Tech Research Institute, Atlanta, GA	
<b>CC-1:</b> <b>8:30 a.m.</b>	<b>W-Band Whispering Gallery Dielectric Resonator Mode Oscillator</b> 929
D. Cros, C. Tronche, P. Guillon and B. Theron	
<b>CC-2:</b> <b>8:50 a.m.</b>	<b>A W-Band Doubler/Amplifier Chain Using MMIC Varactor Doubler and a</b>
MMIC Power MESFET Amplifier	933
G. Hegazi, E. Chang, J. Singer, F. Phelleps, P. McNally, K. Pande, P. Rice and P. Pages	
<b>CC-3:</b> <b>9:10 a.m.</b>	<b>A Millimeter-wave, Third Harmonic, GUNN VCO with Ultra-Wideband Tuning</b> 937
L.D. Cohen	
<b>CC-4:</b> <b>9:20 a.m.</b>	<b>43.5 to 45.5 GHz Active Times-4 Frequency Multiplier with 1.4 Watt Output Power</b> 939
C. Creamer, P. Chye and B. Sinclair	
<b>CC-5:</b> <b>9:40 a.m.</b>	<b>A High Performance W-Band Monolithic Pseudomorphic InGaAs HEMT LNA</b> 943
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

DD

Co-chairmen: Denis Webb—Naval Research Lab Ernst Schloemann—Raytheon Research Div.	
<b>DD-1:</b> <b>8:30 a.m.</b>	<b>Application of Perturbation Theory to Toroidal Phase Shifters</b> 949
B. Lax, and J. Pehowich	
<b>DD-2:</b> <b>8:50 a.m.</b>	<b>Slot Line between Oppositely-Magnetized Ferrite Layers for Broadband</b>
High-Nonreciprocity Phase Shifters	953
C.J. Koza and E.-B. El-Sharawy	
<b>DD-3:</b> <b>9:10 a.m.</b>	<b>Tunable Band-Stop Filter Based on Epitaxial Fe Film on GaAs</b> 957
V.S. Liau, T. Wong, W. Stacey, S. Ali and E. Schloemann	
<b>DD-4:</b> <b>9:20 a.m.</b>	<b>Computer-Aided Design and Optimisation of Broadband Stripline Circulators for</b>
18-30 GHz and 18-40 GHz	961
M.T. Hickson, L.E. Davis, D.K. Paul and D.B. Sillers	
<b>DD-5:</b> <b>9:30 a.m.</b>	<b>Temperature Compensated Permanent Magnet YIG Tuned Oscillators</b> 965
Y. Ataiiyan and D. Hejmanowski	
<b>DD-6:</b> <b>9:40 a.m.</b>	<b>A 2—5 GHz Tunable Magnetostatic Wave Oscillator</b> 969
I. Aoki	
<b>DD-7:</b> <b>9:50 a.m.</b>	<b>SAW Microstrip Front-End for Mobile Communication Systems in the GHz Range</b> 973
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:	<b>Sensitivity Analysis of Lossy Coupled Transmission Lines</b>	979
8:30 a.m.	S. Lum and M. Nakhla	
EE-2:	<b>Analysis of Lossy Multiconductor Transmission Lines Using The Asymptotic Waveform Evaluation Technique</b>	983
8:50 a.m.	T.K. Tang, M. Nakhla, and R. Griffith	
EE-3:	<b>High Speed Digital System Simulation using Frequency Dependent Transmission Line Network Modeling</b>	987
9:00 a.m.	M.S. Basel, M.B. Steer, P.D. Franzon and D. Winkelstein	
EE-4:	<b>A Universal Model for Lossy and Dispersive Transmission Lines for the Time Domain CAD of Circuits</b>	991
9:10 a.m.	J.I. Alonso, J. Borja and F. Pérez	
EE-5:	<b>Field Distribution and Dispersion Characteristics of Fundamental and Higher-Order Modes in Miniature Hybrid MIC (MHMIC) Considering Finite Conductor Thickness and Conductivity</b>	995
9:20 a.m.	K. Wu and R. Vahldieck	
EE-6:	<b>A Combination of FD-TD and Prony's Methods for Analyzing Microwave Integrated Circuits</b>	999
9:40 a.m.	W.L. Ko and R. Mittra	
EE-7:	<b>Full Wave Analysis of Propagation Characteristics of a Through Hole using the Finite-Difference Time-Domain Method</b>	1003
9:50 a.m.	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:	<b>(Invited) Industrial Microwave Sensors</b>	1009
8:30 a.m.	E. Nyfors and P. Vainikainen	
FF-2:	<b>Range Measurement of Nonreflecting and Reflecting Targets using Interaction of Ultrasound and Microwaves</b>	1013
8:50 a.m.	M. Daas and R. Knöchel	
FF-3:	<b>Highly Sensitive Measurements with a Lens-Focussed Reflectometer</b>	1017
9:10 a.m.	D.R. Gagnon	
FF-4:	<b>Novel Truncated Cone Cavity for Surface Resistance Measurements of High <math>T_c</math> Superconducting Thin Films</b>	1019
9:20 a.m.	B. Mayer, R. Knöchel and A. Reccius	
FF-5:	<b>A Highly Sensitive Millimeter-wave Quasi-Optical FM Noise Measurement System</b>	1023
9:30 a.m.	G.M. Smith and J.C.G. Lesurf	
FF-6:	<b>A Multistate Reflectometer in Dielectric Guide for the Frequency Range 75-140 GHz</b>	1027
9:40 a.m.	R.J. Collier and M.F. D'Souza	
FF-7:	<b>A Computer Controlled Noise Parameter Measurement System</b>	1031
9:50 a.m.	B. Albinsson, H. Guo, M. Schöön and H.-O. Vickes	

## 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

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

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

**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

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

**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

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

## 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

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

Vol. III

II

JJ

KK

LL

## 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

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

## 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.	<b>Gradient Quadratic Approximation Scheme for Yield-Driven Design</b> J.W. Bandler, R.M. Biernacki, S.H. Chen, J. Song, S. Ye and Q.J. Zhang	1197
MM-2: 1:50 p.m.	<b>Accurate Design Centering and Yield Prediction Using the “Truth Model”</b> M.D. Meehan, T. Wandinger and D.A. Fisher	1201
MM-3: 2:10 p.m.	<b>Yield Optimization of a MMIC Distributed Amplifier Using Physically-Based Device Models</b> R.J. Gilmore, M. Eron and T. Zhang	1205
MM-4: 2:20 p.m.	<b>Statistical Techniques for Objective Characterization of Microwave Device Statistical Data</b> M.D. Meehan and L. Campbell	1209
MM-5: 2:30 p.m.	<b>Acceleration of Simulated Annealing and Its Application to Microwave Device and Circuit Optimization</b> M.-K. Vai, J.-S Lin and S. Prasad	1213
MM-6: 2:40 p.m.	<b>A Unified Framework for Computer-Aided Noise Analysis of Linear and Nonlinear Microwave Circuits</b> S. Heinen, J. Kunisch and I. Wolff	1217
MM-7: 2:50 p.m.	<b>A Simple Circuit Model for Resonant Mode Coupling in Packaged MMICs</b> 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.	<b>High-Temperature Superconductive Passive Microwave Devices</b> W.G. Lyons, R.S. Withers, J.M. Hamm, A.C. Anderson, P.M. Mankiewich, M.L. O’Malley, R.E. Howard, R.R. Bonetti, A.E. Williams, and N. Newman	1227
NN-2: 1:50 p.m.	<b>S-Parameter Measurement and Applications of Superconducting Flux Flow Transistors</b> 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.	<b>High T<sub>c</sub> Superconducting Coplanar Delay Line with Long Delay and Low Insertion Loss</b> 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.	<b>Low Phase Noise Superconducting Oscillators</b> A.P.S. Khanna and M. Schmidt	1239
NN-5: 2:30 p.m.	<b>Radiation Efficiency Measurements of a Thin-Film Y-Ba-CU-O Superconducting Half-Loop Antenna at 500 MHz</b> 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

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

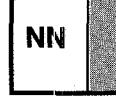
**Session PP**

**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

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

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

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