

The 12th International Conference on Infrared and
Millimeter Waves

FINAL PROGRAM

NOTE: This final program for the Conference contains a small number of changes from the preliminary program that was mailed to attendees. Please do not use the preliminary program because of possible errors. Thank you.

SESSION M1

Monday Morning December 14, 1987

MMW SOURCES I

James W. Mink, Presider

- M1.1** LARGE SIGNAL MODELING OF MILLIMETER WAVE GUNN DIODES FOR PLANAR CIRCUITS - D.R. Singh, C.R. Seashore and M.J. Gawronski, Honeywell, Inc., Minnetonka, MN
- M1.2** PARAMETRIC ANALYSIS FOR A MILLIMETER WAVE LOW NOISE HIGH ELECTRON MOBILITY TRANSISTOR - A.R. Jha, Douglas Aircraft Company, 3855 Lakewood Blvd., Long Beach, CA 90846
- M1.3** BARRIER - INTRINSIC - N^+ (BIN) DIODES FOR NEAR - MILLIMETER WAVE GENERATION - U. Lieneweg, B.R. Hancock and J. Maserjian, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109
- M1.4** BROADBAND MILLIMETER WAVE GENERATION WITH FOLDED WAVEGUIDE CIRCUIT - G. Dohler, D. Gagne, D. Gallagher and R. Moats, Northrop DSD, 600 University Dr., Arlington Heights, IL 60004
- M1.5** Ka-BAND HYBRID INTEGRATED CIRCUIT MUTUALLY INJECTION LOCKED POWER COMBINED VCO - J.R. Lamberg, Honeywell Inc., Minnetonka, MN 55343
- M1.6** INFLUENCE OF TRANSIT TIME EFFECTS ON THE OPTIMUM DESIGN AND MAXIMUM OSCILLATION FREQUENCY OF QUANTUM WELL OSCILLATORS - V.P. Kesan, D.P. Neikirk, The U. of Texas at Austin, Austin, TX; T.D. Linton, and P.A. Blakey, MCC, 3500 W. Balcones Center Dr., Austin, TX 78759; and B.G. Streetman, U. of Texas at Austin
- M1.7** QUANTUM-WELL MULTIPLIERS - P.D. Batelaan and M.A. Frerking, California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA 91109

SESSION M2

Monday Morning December 14, 1987

NEAR MMW MEAS. TECHNIQUES

J. Birch, Presider

- M2.1** PRECISION MILLIMETER AND SUBMILLIMETER WAVE MEASUREMENTS OF MATERIAL PROPERTIES - (*Invited Keynote*) M.N. Afsar, MIT, Cambridge, MA 02139 (40 min.)
- M2.2** NONDISPERSIVE FOURIER TRANSFORM SPECTROSCOPY MEASUREMENTS OF THE NEAR MILLIMETER WAVE PROPERTIES OF MATERIALS USING A POLARIZING INTERFEROMETER - (*Invited Keynote*) G. Simonis and M. Stead, Harry Diamond Laboratories, 2800 Powder Mill Road, Adelphi, MD 20783 (30 Min.)
- M2.3** HIGH TEMPERATURE MILLIMETER-WAVE DIELECTRIC MEASUREMENTS BY FREE-SPACE TECHNIQUES (*Invited Keynote*) W. Ho, Rockwell International Science Center, Thousand Oaks, CA 91360 (30 min.)
- M2.4** THE HIGH BRIGHTNESS SYNCHROTRON INFRARED FACILITY AT BROOKHAVEN NATIONAL LABORATORY - G.P. Williams, P. Takacs, E. Kneedler, C. Hirschmugl, National Synchrotron Light Source, Brookhaven National Laboratory, Upton, NY 11973 and K. Moeller, Fairleigh Dickinson Univ, Teaneck, NJ; Y. Chabal, AT&T, NJ; and F.M. Hoffmann, Exxon, NJ
- M2.5** SECOND ORDER CORRECTION IN CAVITY CONSTITUTIVE PARAMETER MEASUREMENTS WITH APPLICATION TO FERRITES - R.L. Moore and C. Taylor, Georgia Tech Research Institute, Atlanta, GA
- M2.6** LASER-BASED MEASUREMENTS OF NEAR-MILLIMETER WAVE DIELECTRIC PROPERTIES - C.R. Jones and J.M. Dutta, North Carolina Central University, NC
- M2.7** DIRECT MEASUREMENTS OF COMPLEX PERMITTIVITY AND PERMEABILITY OF MAGNETIC MATERIALS - M.N. Afsar and K.J. Button, MIT, National Magnet Lab, Cambridge, MA 02139

SESSION M3

Monday Morning December 14, 1987

MMW ATMOS. PHYSICS

Ye. V. Sukhonin, Presider

- M3.1** MOLECULAR ABSORPTION INTENSITY MEASUREMENTS IN THE MILLIMETER WAVELENGTH REGION (*Invited Keynote*)
D.P. Campbell, D.M. Guillory and J.J. Gallagher, Georgia Tech Research Institute, Atlanta, GA 30332
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- M3.2** MOIST AIR ATTENUATION AT 96 GHz OVER A 21 km LINE-OF-SIGHT PATH – T. Manabe, Radio Research Lab., Koganei, Tokyo 184, Japan; R. DeBolt and Hans J. Liebe, Institute for Telecomm. Sciences, Boulder, CO 80303
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- M3.3** MILLIMETER-WAVE ATTENUATION AND DELAY FOR A FOG EVENT – H.J. Liebe, Institute for Telecomm. Sciences, Boulder, CO 80303; T. Manabe, Radio Research Lab., Koganei, Tokyo 184, Japan; and J.P. Stricklen, Institute of Telecomm. Sciences
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- M3.4** PROPAGATION STUDIES IN THE REGION OF THE OXYGEN ABSORPTION BAND IN AN URBAN ENVIRONMENT – R.S. Cole, G.L. Siqueira and H.J. Thomas, University College, Torrington Place, London, England
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- M3.5** AMPLITUDE SCINTILLATIONS MEASUREMENT ON 40-GHz, 14KM LINK IN AN ARID CLIMATE – A.A. Ali, King Saud University, Riyadh, Saudi Arabia
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- M3.6** A COMPARISON OF LINE-OF-SIGHT TRANSMISSIONS AT MILLIMETRE, INFRARED AND OPTICAL WAVE LENGTHS – C.J. Gibbins, Rutherford Appleton Laboratory, Chilton, Didcot, Oxfordshire, OX11 0QX, UK
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SESSION M4

Monday Morning December 14, 1987

FREE ELECTRON LASERS I

J. M. Baird, Presider

- M4.1** UBITRON AMPLIFIER PERFORMANCE – R.H. Jackson and D.E. Pershing, Naval Research Lab, Washington, DC 20375
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- M4.2** THREE-DIMENSIONAL MULTI-MODE SIMULATION OF FREE-ELECTRON LASER AMPLIFIERS WITH PLANAR WIGGLERS – H.P. Freund and H. Bluem, Naval Research Lab, Washington, DC 20375
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- M4.3** FEL-KLYSTRON FOR PREBUNCHED K-BAND EMISSION – K.C. Leou, D.B. McDermott, and N.C. Luhmann, Jr., Dept. of Elec. Engr., University of California, Los Angeles, CA 90024
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- M4.4** 3-D NUMERICAL SIMULATION OF RADIATION SIDEBANDS IN THE FEL USING THE SOURCE DEPENDENT EXPANSION – Cha-Mei Tang, Naval Research Lab, Washington, DC 20375; A. Ting, Berkeley Research Associates, Springfield, VA; P. Sprangle, Naval Research Lab; and B. Hafizi, Science Applications Intl. Corp., Springfield, VA
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- M4.5** GROWTH OF SIDEBAND RADIATION IN THE LINEAR REGIME OF A FREE ELECTRON LASER – A. Ting, Berkeley Research Associates, Springfield, VA; B. Hafizi, Science Applications Intl. Corp., McLean, VA; P. Sprangle, Naval Research Laboratory, Washington, DC 20375
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- M4.6** BALLISTIC MODEL OF FREE ELECTRON LASER INTERACTIONS – G. Dohler and D. Gallagher, Northrop Corporation, DSD, 600 University Dr., Arlington Heights, IL 60004
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- M4.7** ELECTROSTATICALLY PUMPED CROSS-FIELD FREE ELECTRON LASER – S.C. Chen, G.L. Johnston, F.V. Hartemann*, G. Bekefi, Physics Dept and Plasma Fusion Center, M.I.T., Cambridge, MA 02139; *THOMSON-CSF, 2 rue Latécoère, BP 23, 78140, Cedex, France
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SESSION M5

Monday Afternoon December 14, 1987

MMW SOURCES II

Margaret A. Frerking, *President*

- M5.1** DEVELOPMENT OF HIGH EFFICIENCY FREQUENCY MULTIPLIERS (*Invited Keynote*) A.V. Raisanen and T.J. Tolmunen, Helsinki University of Technology, Dept. EE, Espoo, Finland
- M5.2** DEVELOPMENT OF HIGH EFFICIENCY W-BAND MICROSTRIP CIRCUIT DOUBLERS - R. S. Tahim, Hughes Aircraft Co., P.O. Box 92919, Los Angeles, CA 90009; K. Chang, Texas A & M University, College Station, Texas 77843
- M5.3** THE OPEN-CAVITY MILLIMETER-WAVE RESONATOR AS A HIGH-Q MICROSTRIP CIRCUIT ELEMENT - K.D. Stephan, S-L. Young, ECE Department, U. of Massachusetts, Amherst, MA 01003
- M5.4** A MICROSTRIP TRIPLER TO 47 GHz - D.J.M. Hindson, COM DEV Ltd., 155 Sheldon Dr., Cambridge, Ontario, Canada, N1R 7H6
- M5.5** SYNCHROTRON RADIATION AS A LIGHT SOURCE IN THE SUBMILLIMETER AND MILLIMETER WAVE REGIONS - T. Nanba, M. Ikezawa, Tohoku University, Sendai 980, Japan; and M. Watanabe, K. Fukui and H. Inokuchi, Institute for Molecular Science, Okazaki 444, Japan
- M5.6** BROAD BAND MM TWT AMPLIFIER - G. Groshart, B. Braatz, Northrop DSD, 600 University Dr., Arlington Heights, IL 60004
- M5.7** SOLID STATE LOCAL OSCILLATOR SOURCES FOR MILLIMETER AND SUB-MILLIMETER WAVE APPLICATIONS - Terrial Cutsinger, Hughes Aircraft Co., 3100 Fujita St., Torrance, CA 90509

SESSION M6

Monday Afternoon December 14, 1987

High T_c SUPERCONDUCTORS

B. Lax, *President*

- M6.1** FAR INFRARED PROPERTIES OF HIGH T_c SUPERCONDUCTORS (*Invited Keynote*) A.J. Sievers, P.E. Sulewski, T.W. Noh, Cornell University, Ithaca, NY 14853 (30 min.)
- M6.2** FAR-INFRARED CONDUCTIVITY OF $YBa_2Cu_3O_{7-y}$ (*Invited Keynote*) D. A. Bonn, J. E. Greedan, C. V. Stager and T. Timusk, McMaster University, Hamilton, Ontario, Canada; K. Kamarás, C.D. Porter, M.G. Doss, S.L. Herr and D.B. Tanner, U of Florida, Gainesville, FL 32611 (30 min.)
- M6.3** FAR INFRARED PROPERTIES OF NEW HIGH T_c SUPERCONDUCTORS (*Invited Keynote*) P.L. Richards, T.W. Kenny, D. Miller, M.S. Sherwin and A. Zettl, U. of California, Lawrence Berkeley Laboratory, Berkeley, CA 94720 (30 min.)
- M6.4** POSSIBILITIES FOR MICROWAVE/FAR INFRARED CAVITIES AND WAVEGUIDES USING HIGH TEMPERATURE SUPERCONDUCTORS (*Invited Keynote*) - D.R. Cohn, L. Bromberg, MIT Plasma Fusion Center, Cambridge, MA 02139; W. Halverson, Spire Corp, Bedford, MA; B. Lax, Physics Dept, MIT, Cambridge, MA; and P. Woskov, MIT Plasma Fusion Center
- M6.5** STUDIES OF ELECTRON-ELECTRON AND ELECTRON-PHONON INTERACTIONS IN HIGH- T_c SUPERCONDUCTORS - D.B. Tanner, M.G. Doss, S.L. Herr, K. Kamaras and C.D. Porter, U. of Florida, Gainesville, FL
- M6.6** MAGNETIC FIELD DEPENDENCE SPECTROSCOPY OF HIGH TEMPERATURE SUPERCONDUCTORS - M. Afsar and B. Lax, MIT, Cambridge, MA 02139
- M6.7** DIRECT ABSORPTION MEASUREMENTS IN HIGH T_c SUPERCONDUCTORS - M-W. Lee, T. Pham and H.D. Drew, U. of Maryland, College Park, MD 20742; K.P. Stewart, C. Lisse and H. Moseley, Goddard Space Flight Center, Greenbelt, MD 20770
- M6.8** PHONON, PLASMON AND GAP BEHAVIOR IN HIGH-TEMPERATURE COPPER OXIDE SUPERCONDUCTORS - S. Perkowitz, G.L. Carr, B. Lou, B.R. Caldwell and R. Sudharsanan, Emory University, Atlanta, GA; D.S. Ginley, Sandia Nat'l Lab, Albuquerque, NM 87185

SESSION M7

Monday Afternoon December 14, 1987

MMW ASTRON. /RADIOMETRY

Joseph A. Gagliano, Presider

- M7.1** RADIO ASTRONOMY (*Invited Keynote*) John Payne, National Radio Astronomy Observatory, Tucson, AZ
- M7.2** AIRBORNE/SATELLITE IMAGING RADIO-METERS (*Invited Keynote*) James Hollinger, U.S. Naval Research Lab, Washington, DC 20375
- M7.3** INFORMATION ENHANCEMENT OF HIGH RESOLUTION MM-WAVE IMAGES - H. Suess, Inst. for High Frequency Technology, Oberpfaffenhofen, W. Germany; and W.J. Wilson, Jet Propulsion Laboratory, Pasadena, CA 91109
- M7.4** ON INTERPRETATION OF AIRBORNE RADIO-METRIC MEASUREMENTS AT 30 AND 90 GHz - J. Kjellgren, National Defence Res. Inst., Box 1165, S-58111 Linköping, Sweden
- M7.5** THE MODIFIED EQUATIONS OF MULTI-ELEMENT PARALLEL SCANNING IMAGING SYSTEMS Δf AND NETD - Y-W. Shu and X-L. Zhang, North China Research Institute of Electron-optics, Beijing, China
- M7.6** HELIUM-3 PHOTOMETER SYSTEM FOR MILLIMETER WAVE ASTRONOMY - K. Shivanandan, P. Schwartz and S. Odenwald, Naval Research Laboratory, Washington, DC; H. Moseley, NASA/ Goddard Space Flight Center, Greenbelt, MD
- M7.7** FREQUENCY MEASUREMENT OF FIR LASER LINES OF METROLOGICAL AND ASTROPHYSICAL INTEREST - N. Ioli, A. Moretti, D. Pereira and F. Strumia, Università di Pisa, Italy

SESSION M8

Monday Afternoon December 14, 1987

FREE ELECTRON LASERS II

H. P. Freund, Presider

- M8.1** A COMPARISON AT INFRARED WAVELENGTHS OF METAL-GRATING AND DIELECTRIC-FILM FREE-ELECTRON LASERS - P.M. Phillips, E.M. Marshall, C.H. Shaughnessy and J.E. Walsh, Dept. of Physics and Astronomy, Dartmouth College, Hanover, NH 03755
- M8.2** ANALYSIS OF DYNAMICALLY GENERATED SLOW-WAVE STRUCTURES IN THE MAGNETO-ROTRON FREE-ELECTRON LASER - J. Soln, U.S. Army LABCOM, Harry Diamond Lab, Adelphi, MD 20783
- M8.3** OROTRON OSCILLATORS AT MM-WAVE FREQUENCIES - G. Dohler, D. Gallagher, and F. Scafuri, Northrop DSD, 600 University Dr., Arlington Heights, IL 60004
- M8.4** THEORETICAL ANALYSIS OF CYLINDRICAL OROTRON - Guo Jian, High Energy Electronic Research Inst., Chengdu Inst. of Radio Engr., PRC
- M8.5** A SHORT-PERIOD WIGGLER MILLIMETER WAVE FREE ELECTRON LASER FOR PLASMA HEATING AND SPACE-BORNE RADAR - J.H. Booske, T.M. Antonsen, Jr., D. Bengtson, H. Bluem, W.W. Destler, J.M. Finn, V.L. Granatstein, P.E. Latham, B. Levush, I.D. Mayergoyz, D.J. Radack, E.T. Rosenbury and A. Serbeto, Lab. for Plasma and Fusion Energy Studies, University of Maryland, College Park, MD 20742
- M8.6** TRANSVERSE MODE GENERATION FROM NON-IDEAL BEAM PROPAGATION - W.P. Marable, Berkeley Research Associates, Springfield, VA 22150; C.M. Tang, Naval Research Laboratory, Washington, DC 20375
- M8.7** SIDEBANDS IN FREE ELECTRON LASERS - S. Riyopoulos and C.M. Tang, Naval Research Laboratory, Washington, DC 20375

SESSION T1

Tuesday Morning December 15, 1987

MMW SYSTEMS & ARRAYS

Edward K. Reedy, Presider

- T1.1** COMMERCIAL MMW COMMUNICATIONS
(*Invited Keynote*) Holger Meinel, Thomson-CSF, Paris, France
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- T1.2** MISSILE SEEKERS (*Invited Keynote*) Tim Fong, TRW, Redondo Beach, CA
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- T1.3** MILLIMETRE-WAVE FREQUENCY EXTENSION RADAR WARNING RECEIVER - W. Thorpe, COM DEV Ltd., 155 Sheldon Dr., Cambridge, Ontario, Canada, N1R 7H6
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- T1.4** SYSTEM STUDY OF A MILLIMETER WAVE DEBRIS TRACKING RADAR - K. Chang, M.A. Pollock, M.K. Skrehot, T.H. Sauter, R.E. Miller and J.A. Miller, EE Dept, Texas A & M University, College Station, TX 77843; G.D. Arndt and J. Suddath, NASA Johnson Space Center, Houston, TX
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- T1.5** AIR-TO-AIR APPLICATIONS FOR MILLIMETER-WAVE COMMUNICATIONS - E.N. Barnhart, Georgia Tech Research Institute, Atlanta, GA 30332
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- T1.6** DESIGN, DEVELOPMENT AND EVALUATION OF A WAVEGUIDE SLOT ARRAY AT W-BAND - S.K.L.V. Sai Prakash, N. Gupta, and M. Singh, Radar & Comm. Ctr., Indian Inst. Tech., Kharagpur, 721302 India
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- T1.7** INTER-INJECTION LOCKING - A NOVEL PHASE CONTROL TECHNIQUE FOR MONOLITHIC PHASED ARRAYS - W.A. Morgan, Jr., K.D. Stephan, U. of Massachusetts, Amherst, MA 01003
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- T1.8** OBSERVATION OF MILLIMETER WAVE FERROMAGNETIC RESONANCE IN CUBIC AND HEXAGONAL FERRITES - K.J. Button, P.O. Box 72, MIT Branch, Cambridge, MA 02139; and M.N. Afsar, EE Dept, Tufts University, Medford, MA
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- T1.9** CONSIDERATION FOR NETWORK ANALYSIS AT MILLIMETER WAVE FREQUENCIES - D. Rytting, Hewlett Packard Network Measurement Division, 1400 Fountain Grove Pkwy, Santa Rosa, CA 95403
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SESSION T2

Tuesday Morning December 15, 1987

POSTDEADLINE PAPERS

K. J. Button, Presider

(LATE PAPERS POSTED
AT THE MEETING)

SESSION T3

Tuesday Morning December 15, 1987

Microwave-Optical Interactions I

Chi H. Lee, Presider

- T3.1** MILLIMETER-WAVE MMIC CHARACTERIZATION BY NONCONTACT ELECTRO-OPTIC SAMPLING - J.F. Whitaker and G.A. Mourou, U of Rochester, 250 East River Rd, Rochester, NY 14623; K.A. Bhasin, NASA Lewis Research Center, 21000 Brookpark Rd, Cleveland, OH 44135
- T3.2** OPTICAL ELECTRONIC CHARACTERIZATION OF MONOLITHIC MILLIMETER-WAVE INTEGRATED CIRCUITS - H.A. Hung, T. Smith and H.C. Huang, COMSAT Lab, Clarksburg, MD 20871; P. Polak-Dingels, Lab for Physical Sciences, College Park, MD 20740; K.J. Webb and C.H. Lee, Dept of EE, U of Maryland College Park, MD 20742
- T3.3** THE MEASUREMENTS OF MILLIMETER-WAVES IN AN OPTICALLY CONTROLLED SEMICONDUCTOR-INSULATOR COMPOSITE WAVEGUIDE - M.G. Li and C.H. Lee, Dept of EE, U of Maryland, College Park, MD 20742
- T3.4** 22 GHz BANDWIDTH InGaAsP BURIED HETEROSTRUCTURE LASERS - R. Olshansky, P. Hill, V. Lanzisera, W. Powazinik and R.B. Lauer, GTE Laboratories Inc., 40 Sylvan Rd, Waltham, MA 02254
- T3.5** EXPERIMENTAL PERFORMANCE OF AN OPTICALLY CONTROLLED COPLANAR WAVEGUIDE PHASE-SHIFTER - P. Cheung, D.P. Neikirk and T. Itoh, Dept of Elec and Cmptr Engr, The Univ of Texas at Austin, Austin, TX
- T3.6** ANALYSIS OF PERIODICALLY ILLUMINATED OPTICALLY CONTROLLED CPW PHASE SHIFTER - Y-D. Lin, D.P. Neikirk and T. Itoh, Dept of Elec and Cmptr Engr, The Univ of Texas at Austin, Austin, TX 78712
- T3.7** CROSSTIE OVERLAY SLOW-WAVE STRUCTURE FOR BROAD-BAND TRAVELING-WAVE TYPE ELECTRO-OPTICAL MODULATOR - H.Y. Lee, T.H. Wang and T. Itoh, Dept of Elec and Cmptr Engr, The Univ of Texas at Austin, Austin, TX
- T3.8** LASER AND PHOTODETECTOR PACKAGES FOR MICROWAVE OPTICAL TRANSMISSION - L.W. Ulbricht and J. Schlafer, GTE Laboratories, 40 Sylvan Rd, Waltham, MA 02254

SESSION T4

Tuesday Morning December 15, 1987

FREE ELECTRON LASERS III

C. M. Tang, Presider

- T4.1** SUBMILLIMETER WAVE INVERSE SMITH-PURCELL EFFECT, J. Pae, T. Nozokido and K. Mizuno, Research Institute of Electrical Communication, Tohoku University, Sendai 980, Japan
- T4.2** BACKWARD-WAVE INTERACTION USING STEP PERIODIC STRUCTURES - K.J. Bunch, R.W. Grow and J.M. Baird, Microwave Device and Physical Elect. Lab., University of Utah, Salt Lake City, Utah 84112
- T4.3** STIMULATED EMISSION, AMPLIFICATION AND UPWARD FREQUENCY SHIFT OF THE ORBITRON MASER - I. Alexeff, M. Rader and F. Dyer, Electrical Engr. Dept., The University of Tennessee, Knoxville, TN 37996
- T4.4** MODULATION OF AN INTENSE BEAM BY AN EXTERNAL MICROWAVE SOURCE IN THE NON-LINEAR REGIME - THEORY AND SIMULATION - J. Krall, Science Applications Intl. Corp., McLean, VA; M. Friedman, V. Serlin and Y.Y. Lau, Naval Research Laboratory, Washington, DC 20375
- T4.5** A GYRORESONANT PHASE FILTER FOR THE ENHANCEMENT OF TRAVELING WAVE GAIN AND EFFICIENCY - Q.S. Wang, T.H. Kho, A.T. Lin, D.B. McDermott and N.C. Luhmann, Jr., University of California, Los Angeles, CA
- T4.6** SIDEBAND INSTABILITY IN A FREE ELECTRON LASER - B. Hafizi, Science Applications Int. Corp., McLean, VA; A. Ting, Berkeley Research Assoc., Springfield, VA; and P. Sprangle, Naval Research Laboratory, Washington, DC 20375
- T4.7** PUMP-FREE CROSSED-FIELD FREE-ELECTRON LASER - O. Zhengbiao and L. Shenggang, Research Institute of High Energy Elec., Chengdu Inst. of Radio Engr., Chengdu, Sichuan, PRC
- T4.8** NONWIGGLER FEL WITH LOW GUIDING MAGNETIC FIELD - S.C. Zhang, Microwave Elect. Research Inst., Chengdu Inst. of Radio Engr., Chengdu, Sichuan, PRC

SESSION T5

Tuesday Afternoon December 15, 1987

MMW DETECTORS & MIXERS

Tim Fong, Presider

- T5.1** SUMMARY OF SUBMILLIMETER (TERA HERTZ) RECEIVER TECHNOLOGY CONFERENCE AT LAKE ARROWHEAD (*Invited Keynote*) M.A. Frerking, Jet Propulsion Lab, California Inst. Tech., Pasadena, CA
- T5.2** A PRODUCIBLE 94 GHz DETECTOR CIRCUIT FOR LARGE-SCALE VIDICON APPLICATIONS - H.G. Henry, R.R. Shaller, R.G. Freitag, M. Cohn, Westinghouse Electric Corp., P.O. Box 1521, Baltimore, MD 21203; and W.M. Waters, Naval Research Laboratory, Washington, DC 20375
- T5.3** SOME PROGRESS IN TECHNIQUES OF MMW AND SUB MMW DETECTION - M. Zhengyu, Z. Baoqing, Shanghai Inst. of Tech. Physics, Academia Sinica, Shanghai, China
- T5.4** MILLIMETER WAVE SCIENCE AND TECHNOLOGY AT VERY LOW TEMPERATURES - F.C. DeLucia, D.N. Bittner, D.R. Willey, Dept. of Physics, Duke University, Durham, NC 27706
- T5.5** HIGH PERFORMANCE MM-WAVE BALANCED MIXERS FOR Ka-BAND DOWN-CONVERTERS - T.C. Ho, C-Y. Chang and K. Chou, Chung Shan Inst. of Sci. and Tech., Lung-Tan, Taiwan, PRC
- T5.6** 183 GHz MONOLITHIC SUBHARMONIC MIXER - S.P. Marsh and N.J. Cronin, School of Physics, U. of Bath, UK; and P. Reece, British Aerospace, Filton, Bristol, UK
- T5.7** AN IMPROVED STRUCTURE FOR SUBHARMONICALLY PUMPED MILLIMETER-WAVE MIXERS - I. Galin, Aerojet ElectroSystems Company, Azusa, CA 91702
- T5.8** MILLIMETER WAVELENGTH BOLOMETERS COOLED BY ADIABATIC DEMAGNETIZATION REFRIGERATION - L. Lesyna, T. Roellig, M. Werner, NASA Ames Research Center, Moffett Field, CA
- T5.9** PASSIVE IMAGING WITH A BROAD-BAND, COOLED DETECTOR - D.N. Bittner, R.L. Crownover, S.L. Shostak and F.C. DeLucia, Dept. of Physics, Duke University, Durham, NC 27706

SESSION T6

Tuesday Afternoon December 15, 1987

NEAR MMW TECH. & MEAS.

M.N. Afsar, Presider

- T6.1** ERRORS IN NMM WAVELENGTH DIELECTRIC MEASUREMENTS: A DISCUSSION OF A RECENT INTERNATIONAL MEASUREMENT INTERCOMPARISON (*Invited Keynote*) J.R. Birch, National Physical Laboratory, Teddington, Middlesex TW11 OLW, UK (40 min.)
- T6.2** A COMPARISON OF W-BAND FREE-SPACE AND WAVEGUIDE DIELECTRIC PROPERTY MEASUREMENTS (*Invited*) H.M. Frost, Los Alamos National Laboratory, Los Alamos, NM 87545
- T6.3** NOISE TUBE SOURCES FOR MM WAVE FT SPECTROSCOPY - K.D. Moeller, Fairleigh Dickinson Univ, Teaneck, NJ 07666; J.B. Heaney and K.P. Stewart, Goddard Space Flight Center, Greenbelt, MD 20771
- T6.4** HIGHER ORDER MODES AND CRYSTALLOGRAPHIC AXIS ANGULAR DEPENDENCE OF PROPAGATION IN ANISOTROPIC PBN USING A SPECTRAL MATRIX METHOD - A.A. Mostafa, U. of Maryland, College Park, MD 20742; C.M. Krowne, Naval Research Laboratory, Washington, DC 20375; and K.A. Zaki, U. of Maryland
- T6.5** A NOVEL METHOD OF MEASURING THE DIELECTRIC PROPERTIES AT 100 GHz USING A GROOVE-GUIDE RESONATOR - Y.M. Choi, Hong Kong Polytechnic, Hunghom, Kowloon, Hong Kong
- T6.6** FAR INFRARED DIELECTRIC PROPERTIES OF CONDUCTING POLYMERS - G.C. Phillips, H.H. Chen, R.H. Giles, S.K. Tripathy and J. Waldman, Dept. of Physics & Chemistry, University of Lowell, Lowell, MA 01854
- T6.7** FREQUENCY DEPENDENCE AND SAMPLE VARIATION OF DIELECTRIC PROPERTIES IN A COMMERCIAL LOW LOSS ALUMINA GRADE - R. Heidinger, Institut für Material, Postfach 3640, D-7500 Karlsruhe 1, FRG; F. Königer, Universität Karlsruhe, Postfach 6380, D-7500 Karlsruhe 1, FRG
- T6.8** TECHNIQUES FOR CERAMIC SINTERING USING MICROWAVE ENERGY - H.D. Kimrey, M.A. Janney and P.F. Becher, Oak Ridge National Laboratory, Oak Ridge, TN

SESSION T7

Tuesday Afternoon December 15, 1987

Microwave-Optical Interactions II

Tatsuo Itoh, Presider

- T7.1** GENERATION AND DETECTION OF MILLIMETER WAVES AND FAR INFRARED BY FEMTO-SECOND OPTOELECTRONICS (*Invited Keynote*) D.H. Auston, M.C. Nuss and P.R. Smith, AT&T Bell Labs, Murray Hill, NJ 07974
- T7.2** OPTICALLY CONTROLLED MILLIMETER WAVE PHASED ARRAYS: STATUS AND FUTURE CHALLENGES (*Invited Keynote*) K. Bhasin, NASA, Lewis Research Center, Cleveland, OH
- T7.3** A NEW OPTOELECTRONIC CONTINUOUS WAVE MILLIMETER-WAVE SOURCE - D. Butler, E.A. Chauchard, K.J. Webb, K.A. Zaki and C.H. Lee, Dept EE, U of Maryland, College Park, MD 20742; P. Polak-Dingels, Lab for Physical Sciences, College Park, MD 20740; H.L.A. Hung and H.C. Huang, COMSAT Laboratories, Clarksburg, MD 20871
- T7.4** GENERATION OF HIGH POWER OPTICAL SIGNALS FOR 10-100 GHz OPTICAL TRANSMISSION - E. Eichen, GTE Laboratories Inc, 40 Sylvan Rd, Waltham, MA 02254
- T7.5** SOME MEASUREMENTS OF SURFACE WAVE SCATTERING BY QUASI-OPTICAL TECHNIQUES - T. Wells, GTRI/ECSL/EMED, Atlanta, GA 30332
- T7.6** FALSE ALARMS AND DETECTION PROBABILITY FACTORS AND THEIR IMPLEMENTATION ON LIDAR DESIGN - J. Gavan and A. Korman, Ctr for Technological Edu Holon, 52 Golomb St, P.O.B. 305, Holon 58 368, Israel

SESSION T8

Tuesday Afternoon December 15, 1987

GYROTRON I

T. V. George, Presider

- T8.1** INITIAL OPERATION OF A HIGH-POWER, WHISPERING GALLERY-MODE GYROTRON - (*Invited Keynote*) K. Felch, L. Ives, E. Jongewaard, H. Jory and S. Spang, Varian Associates, Inc., 611 Hansen Way, Palo Alto, CA 94303
- T8.2** 85 GHz $TE_{1,3}$ PHASE-LOCKED GYROKLYSTRON OSCILLATOR EXPERIMENT - J.M. Burke, Naval Research Laboratory, Washington, DC 20375; M.A. Czarnaski, R.P. Fischer, Jaycor Inc., Vienna, VA 22180; A.K. Ganguly, A.W. Fliflet, W.M. Manheimer, Naval Research Laboratory, Washington, DC 20375; and L.R. Barnett, University of Utah, Salt Lake City, UT 84412
- T8.3** CALCULATION OF NON-STATIONARY EFFECTS IN GYROTRONS - A.W. Fliflet, Naval Research Laboratory, Washington, DC 20375; R.C. Lee, Jaycor Inc., Vienna, VA 22180; W.M. Manheimer, Naval Research Laboratory; and E. Ott, University of Maryland, College Park, MD 20742
- T8.4** QUASI-OPTICAL GYROTRON WITH ARBITRARY BEAM INJECTION ANGLE - C.Y. Wang, R.J. Temkin and K.E. Kreisler, MIT Plasma Fusion Center, Cambridge, MA 02139
- T8.5** DESIGN CONSIDERATIONS FOR A SHEET BEAM ELECTRON GUN FOR THE QUASI-OPTICAL GYROTRON - W. Manheimer, A. Fliflet, Naval Research Laboratory, Washington, DC 20375; and R. Lee, Jaycor Inc., Vienna, VA 22180
- T8.6** ANALYSIS OF MODE COMPETITION INCLUDING MISMATCH EFFECT OF WINDOW - K. Hayashi, M. Komuro, Y. Itoh and T. Sugawara, Toshiba Corp., Toshiba R&D Center, 4-1 Ukishimacho, Kawasaki-ku, Kawasaki 210, Japan
- T8.7** NONLINEAR BEAM-WAVE INTERACTION IN A HARMONIC GYROTRON - Z.G. Chen, Institute of Electronics, Academia Sinica, Beijing, China

SESSION W1

Wednesday Morning December 16, 1987

GUIDED PROPAGATION I

Banwali Rawat, Presider

- W1.1** BROADSIDE COUPLED STRIPLINES AND SUSPENDED SUBSTRATE MICROSTRIP LINES FOR MILLIMETRE WAVE APPLICATIONS - P. Bhartia and P. Pramanick, Nat'l Defence Hdqt, Ottawa, Ontario Canada and COM DEV Ltd, Cambridge, Ontario, Canada
- W1.2** A SIMPLIFIED METHOD APPLIED TO VARIOUS FIN LINE STRUCTURES INCLUDING DISPERSION, ASYMMETRY, LOSS, FINITE STRIP THICKNESS AND DISCONTINUITY - H.C.C. Fernandes, D.H. Bosco de Miranda, J.E.F. Madrigales, DEE-CT-UFRN - Brazil; A.J. Giarola, R.F. Souza, DMO-FEE-UNICAMP - Brazil
- W1.3** TWO-DIMENSIONAL FINITE ELEMENT ANALYSIS OF WAVEGUIDING STRUCTURES EMPLOYING SURFACE MAGNETOPLASMONS - N. Mohsenian, T.J. Delph, D.M. Bolle, Lehigh University, Bethlehem, PA 18015
- W1.4** DIELECTRIC TAPE LINE OF ELLIPTICAL CROSS-SECTION - J.C. Wiltse, Georgia Tech Research Institute, Atlanta, GA 30332
- W1.5** THEORETICAL AND EXPERIMENTAL RESEARCH ON NONRADIATIVE DIELECTRIC WAVEGUIDE DIRECTIONAL COUPLERS - S. Lin, L. Qi, L. Xu, Y. Lo, Huazhong U of Science and Technology, Wuhan, Hubei, PRC
- W1.6** V-GROOVE GUIDE AND COMPONENTS FOR 100 GHz OPERATION - Y.M. Choi, Hong Kong Polytechnic, Hung Hom, Kowloon, Hong Kong
- W1.7** SCATTERING MATRIX ANALYSIS OF INVERTED STRIP DIELECTRIC WAVEGUIDES - B. Rawat and G. Kumar, U of North Dakota, Grand Forks, ND 58202
- W1.8** DIELECTRIC WAVEGUIDE BRANCHING DIRECTIONAL COUPLER - S. Xu, Dept of Radio Electronics, U of Science & Technology of China, Hefei, Anhui, PRC
- W1.9** A MODULAR APPROACH TO BEAM WAVEGUIDE - THE OPTIGUIDE SYSTEM - P.F. Goldsmith and E.L. Moore, Millitech Corp, South Deerfield, MA 01373
- W1.10** A DISPERSION MODEL FOR SUSPENDED MICROSTRIP ON GALLIUM ARSENIDE SUBSTRATE - R.S. Tomar and P. Bhartia, Bolriet Tech, Carleton Place, Ontario Canada and Nat'l Defence Hdqtr, Ottawa, Ontario Canada

SESSION W2

Wednesday Morning December 16, 1987

DISORDERED SOLIDS

A. Sievers, Presider

- W2.1** THEORY OF LOW ENERGY LOSS PROCESSES IN GLASSES (*Invited Keynote*) J.C. Phillips, AT&T Bell Laboratories
- W2.2** FAR INFRARED DIELECTRIC LOSS AND LOW FREQUENCY RAMAN SCATTERING IN CHALCOGENIDE GLASSES (*Invited Keynote*) U. Strom, J.C. Culbertson and J.A. Freitas, Jr., Naval Research Laboratory, Washington, DC 20375 (30 min.)
- W2.3** THEORY OF LOW FREQUENCY EXCITATIONS IN GLASSES AND GRANULAR SYSTEMS - L.M. Schwartz, Schlumberger Doll Research, Ridgefield, CT 06877
- W2.4** RIGIDITY PERCOLATION AND LOW ENERGY LATTICE MODES IN DISORDERED SYSTEMS - M.F. Thorpe, Michigan State U, East Lansing, MI 48824
- W2.5** BRILLOUIN SCATTERING IN GLASSES (*Invited*) R. Vacher, Univ. des Sciences et Techniques du Languedoc, Montpellier, France (20 min.)
- W2.6** NEUTRON SCATTERING FROM LOW FREQUENCY EXCITATIONS IN $a - SiO_2$ (*Invited*) U. Buchenau, Institut für Festkörperforschung, KFA Jülich, Postfach 1913, 5170 Jülich, FRG (20 min.)
- W2.7** VIBRATIONAL DENSITIES OF STATES FOR GLASSY Se-Ge ALLOYS BY NEUTRON SCATTERING - W.A. Kamitakahara, Iowa State U, Ames, IA 50011; P. Boolchand, U. Cincinnati, OH 45221; and R.L. Cappelletti, Ohio U, Athens, OH 45701
- W2.8** FAR-INFRARED SPECTROSCOPY OF THE N_2 -Ar ALLOY - P. Calvini, S. Cunsolo and P. Postorino, Università degli Studi di Roma, La Sapienza, Italy
- W2.9** INFRARED DIELECTRIC PROPERTIES OF BINARY SEMICONDUCTING OXIDE GLASSES - A. Memon and D.B. Tanner, Dept. Physics, University of Florida, Gainesville, FL

SESSION W3

Wednesday Morning December 16, 1987

SubMM APPLICATIONS

H. R. Fetterman, Presider

- W3.1** A NOVEL HIGH POWER COHERENT SEMI-CONDUCTOR FIR SOURCE (*Invited*) K. Unterrainer, M. Helm, E. Gornik, Universität Innsbruck, A-6020 Innsbruck, Austria; E.E. Haller, Lawrence Berkeley Laboratory, Berkeley, CA 94720
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- W3.2** SUBMILLIMETER MEASUREMENT OF HIGH ELECTRON MOBILITY TRANSISTORS - C.S. Chang and H.R. Fetterman, U of California, Los Angeles, CA 90024 and A. Green, Naval Weapons Center, China Lake, CA 93555
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- W3.3** THE PERFORMANCE OF SCHOTTKY DIODES AS FAR-INFRARED MODULATORS - E.N. Grossman, Dept. of Physics, 320-47 California Institute of Technology, Pasadena, CA 91125
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- W3.4** PHONON PROBE FOR LASER PROPAGATION STUDIES IN MID IR FIBERS - C. Yu, C.K. Fong and C.S. Tan, North Carolina A&T State University, Greensboro, NC 27411
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- W3.5** THE GENERAL EQUATIONS OF IR SYSTEMS' ACQUISITION AND TRACKING RANGE - X. Zhang, North China Research Institute of Electro-Optics, P.O. Box 8511, Beijing, China
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- W3.6** A FAR INFRARED TUNABLE COMPENSATOR OF POLARIZED RADIATION - V. DeCosmo, Ottico Meccanica Italiana, Via della Vasca Navale 79, 00146 Roma, Italy; A. Blanco, S. Fonti, Physics Dept., U of Lecce, 73100 Lecce, Italy
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- W3.7** NON RECIPROCAL SINGLE MODE CONVERSION IN FIVE-LAYER MAGNETOPTICAL WAVEGUIDES - J. Hernández, F. Canal, E.T.S.I. de Telecomunicación de Barcelona Iona, Apartado 30.002, 08080 Barcelona, Spain
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SESSION W4

Wednesday Morning December 16, 1987

GYROTRON II

W. Manheimer, Presider

- W4.1** A 120-240 GHz STEP TUNABLE MEGAWATT GYROTRON - (*Invited Keynote*) K.E. Kreisler and R.J. Temkin, MIT Plasma Fusion Center, Cambridge, MA 02139
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- W4.2** SYMMETRIC AND NON-SYMMETRIC MODES IN A 200 kW 100 GHz GYROTRON - P. Garin, E. Jedar, G. Jendrzyczak, G. Mourier, F. Payen and L. Teyssier, Thomson CSF, 38 Rue Vauthier, BP 305, 92102 Boulogne Billancourt Cedex, France
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- W4.3** PRELIMINARY DESIGN OF A 280 GHz 1 MW CW GYROTRON OSCILLATOR - L. Ives, K. Felch and H. Jory, Varian Associates, Inc., 611 Hansen Way, Palo Alto, CA 94303
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- W4.4** MODE COMPETITION IN A COMPLEX CAVITY FOR GYROTRONS, O. Dumbrajs, Technische Universität Hamburg-Harburg, D-2000 Hamburg 90, West Germany; and B. Jödicke, Institut Kernphysik II, Kernforschungszentrum Karlsruhe, D-7500 Karlsruhe 1, West Germany
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- W4.5** OPTIMIZED EFFICIENCY OF $TE_{N,1}^0$ INTERACTION WITH FAST AXIS-ROTATING ELECTRON BEAMS, V.M. Ayres, W. Namkung, J.Y. Choe, H.S. Uhm, Naval Surface Weapons Center, 10901 New Hampshire Ave., Silver Spring, MD 20903
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- W4.6** MODE CONTROL IN AN OVERMODED GYROTRON OSCILLATOR VIA PRIMING - A.H. McCurdy, Section of Applied Physics, Yale Univ., New Haven, CT 06520; and C.M. Armstrong, Code 6842, Naval Research Laboratory, Washington, DC 20375
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- W4.7** THE THIRD CYCLOTRON HARMONIC GYROMONOTRON WITH A RIDGED WAVEGUIDE - J. Gong and S. Liu, Inst. of Microwave Electronics, Chengdu Inst. Radio Engr, Chengdu, PRC
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- W4.8** THEORETICAL INVESTIGATION OF RF STRUCTURE IN A GYROTRON AMPLIFIER - J-L. Zhang, VBERI, P.O. Box 749, Beijing, PRC
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SESSION W5

Wednesday Afternoon December 16, 1987

Guided Propagation/Arrays

James C. Wiltse, *Presider*

- W5.1** ANALYSIS OF THE PROPAGATION PROPERTIES IN AN INVERTED STRIP DIELECTRIC GUIDE - M-Q. Shi, D-H. Jiang, Peking University, Beijing, PRC
- W5.2** LOSS AND MODE CHARACTERISTICS OF OVERSIZED WAVEGUIDES AND RESONATORS - F.J. Tischer, North Carolina State U, Raleigh, NC 27695
- W5.3** ATF ECH WAVEGUIDE COMPONENT DEVELOPMENT AND TESTING - T.S. Bigelow, T.L. White, H.D. Kimrey, Oak Ridge Natl Lab, P.O. Box Y, Bldg 9201-2, MS-2, Oak Ridge, TN 37831
- W5.4** COUPLING BETWEEN GAUSSIAN AND GUIDED MODES AT THE INPUT AND OUTPUT OF OVERSIZED CIRCULAR WAVEGUIDES - D. Pasquet, J.L. Gauthier, P. Pouvil, ENSEA, Les Chenes Pourpres, 95000 Cergy, France
- W5.5** NEW COMPACT QUASI-PERIODIC AND APERIODIC MODE CONVERTERS FOR 60 AND 140 GHz GYROTRONS - M.J. Buckley, G.H. Luo and R.J. Vernon, University of Wisconsin, Madison, Wisconsin 53706
- W5.6** PLANAR ANTENNAS ON THICK DIELECTRIC SUBSTRATES - K.A. Lee and M.A. Frerking, Jet Propulsion Laboratory, Pasadena, CA
- W5.7** A 3MM HETERODYNE IMAGING ARRAY - N.R. Erickson, P.F. Goldsmith, C.R. Predmore and P. Viscuso, Five College Radio Astronomy Observatory, U of Massachusetts, Amherst, MA 01003
- W5.8** APERTURE EFFICIENCY OF LTSA FOCAL PLANE ARRAYS FOR MILLIMETER WAVES - Y. Kim and K.S. Yngvesson, Dept of Electrical and Cmptr Engr, U of Massachusetts, Amherst, MA 01003
- W5.9** PRINTED CIRCUIT ANTENNAS AND FET DETECTORS FOR MILLIMETER-WAVE IMAGING - W. Chew and H.R. Fetterman, Dept of EE, U of California, Los Angeles, CA 90024

SESSION W5

- W5.10** TWO-DIMENSIONAL HORN IMAGING ARRAYS - G.M. Rebeiz, Y. Guo and D.B. Rutledge, California Institute of Technology, Pasadena, CA 91125; D.P. Kasilingam, Ocean Research and Engineering, La Cañada, CA 91011
- W5.11** SYNTHESIS OF BANDPASS GRID FILTER FOR LINEAR POLARIZED MILLIMETER WAVE - Zhengmi Du, Ding Hanyi and Lin Zhi Chang, Zhongshan U, Guangzhou, PRC

SESSION W6

Wednesday Afternoon December 16, 1987

MATERIAL CHARACTERIZATION

G.J. Simonis, *Presider*

- W6.1** CHARACTERIZATION OF DUAL MODE IR/MMW MATERIALS AND COMPONENTS (*Invited Keynote*) M. Stead and G. Simonis, Harry Diamond Laboratories, Adelphi, MD 20783 (30 min.)
- W6.2** HIGH-TEMPERATURE DIELECTRIC MEASUREMENTS OF HIGH-PURITY ALUMINA CERAMICS - H.M. Frost and P.D. Shalek, Los Alamos National Laboratory, Los Alamos, NM 87545
- W6.3** NEAR MILLIMETRE AND INFRARED DIELECTRIC MEASUREMENTS ON SOLIDS - J.R. Birch, National Physical Laboratory, Teddington, Middlesex TW11 OLW. UK
- W6.4** CENTIMETER/MILLIMETER PERMITTIVITY MEASUREMENTS OF COMPOSITES: OPEN AND CLOSED CAVITY - R.L. Moore, E. Kuster and D. Acree, Georgia Tech Research Institute, Atlanta, GA
- W6.5** HIGH TEMPERATURE LOSSES IN SELECTED MATERIALS AT 245 GHz - J.M. Dutta and C.R. Jones, North Carolina Central Univ., NC
- W6.6** COMPLEX PERMITTIVITY OF WATER BETWEEN 0 AND 30 THz - T. Manabe, Radio Research Laboratory, Koganei, Tokyo 184 Japan; H.J. Liebe and G.A. Hufford, Natl. Telecomm. & Info. Admin., Institute for Telecomm. Sciences, Boulder, CO 80303
- W6.7** ANISOTROPIC REFLECTIVITY OF BLACK PHOSPHOROUS IN THE FAR-INFRARED REGION - T. Nanba and M. Ikezawa, Tohoku U, Sendai 980, Japan; I. Shirovani, Murooran Inst. Tech., Murooran 050, Japan; and H. Inokuchi, Inst. for Molecular Sci., Okazaki 444, Japan
- W6.8** EFFECT OF MEDIUM ON THE INTENSITY OF INFRARED ABSORPTION BANDS - M.I. Nasser, Department of Physics, National Research Center, Dokki, Cairo, Egypt

SESSION W7

Wednesday Afternoon December 16, 1987

SubMM DETECTORS

B. W. James, Presider

- W7.1** A NEW SUBMILLIMETRE-WAVE DETECTOR USING CYCLOTRON RESONANCE IN $Ga_{1-x}Al_xAs$ /GaAs HETEROSTRUCTURES - S.M. Smith and N.J. Cronin, School of Physics, U of Bath, Bath, BA2 7AY, UK; J.J. Harris and C.T. Foxon, Philips Res. Lab., Redhill, Surrey, RH1 5HA, UK
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- W7.2** FAR INFRARED DETECTION WITHOUT PREAMPLIFIERS - A.G.U. Perera and D.D. Coon, Applied Technology Laboratory, U of Pittsburgh, PA 15260
-
- W7.3** $Cd_{0.2}Hg_{0.8}Te$ EPI-LAYER FOR A HIGH DETECTIVITY PC TYPE IR DETECTOR - Y. Komine, Y. Yoshida, M. Hibino, Y. Hisa, R. Ohkata, K. Ikeda and W. Susaki, Mitsubishi Electric Corp., 4-1, Mizuhara, Itami, 664 Japan; K. Yasumura and K. Sato, Mitsubishi Electric Corp., 1-1-8, Tsukaguchi-honmachi, Amagasaki, 661 Japan
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- W7.4** SCHOTTKY BARRIER DIODES FOR SUBMILLIMETRE WAVELENGTHS - A NEW FABRICATION PROCESS - W.M. Kelly, Farran Technology Ltd, Ballincollig, Cork, Ireland; P.P. Maaskant, National Microelectronics Research Centre, University College, Cork, Ireland; J. Pike, Farran Technology Ltd.; A. Herbert, National Microelectronics Research Centre
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SESSION W8

Wednesday Afternoon December 16, 1987

GYROTRON III

K. E. Kreischer, Presider

- W8.1** THE NRL QUASI-OPTICAL GYROTRON EXPERIMENT - (*Invited Keynote*) T.A. Hargreaves, Naval Research Laboratory, Washington, DC 20375; M. Barsanti and R. Fischer, Jaycor, Vienna, VA 22180; J.M. Burke, Burke Technologies, Inc., San Diego, CA 92111; A. Fliflet and W. Manheimer, Naval Research Laboratory, Washington, DC 20375
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- W8.2** SECOND HARMONIC 106.4 GHz GYROTRON - J.F. Shively, K. Felch, H. Jory and J. Neilson, Varian Associates, Inc. 611 Hansen Way, Palo Alto, CA 94303
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- W8.3** STUDY OF A 5 MW, 300 GHz QUASI-OPTICAL GYROTRON, M.E. Read and A.J. Dudas, Physical Sciences Inc., 603 King Street, Alexandria, VA 22314
-
- W8.4** HARMONIC AUTO-RESONANT PENIOTRON (HARP) INTERACTIONS - J.M. Baird, L.R. Barnett and R.W. Grow, Microwave Device and Physical Electronics Laboratory, University of Utah, Salt Lake City, Utah 84112
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- W8.5** PENIOTRONS AT MM-WAVE FREQUENCIES - G. Dohler, D. Gallagher and F. Scaturri and R. Moats, Northrop DSD, 600 University Drive, Arlington Heights, IL 60004
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- W8.6** SELF CONSISTENT NONLINEAR THEORY OF THE GYROPENIOTRON AMPLIFIER - A. K. Ganguly, S. Ahn and S.Y. Park, Naval Research Laboratory, Washington, DC 20375
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- W8.7** THEORETICAL ANALYSIS OF THE GYROPENIOTRON IN A RECTANGULAR WAVEGUIDE - L-Z. Zhou, Dept. of Radio Electronics, Peking University, Beijing, PRC
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- W8.8** THEORETICAL ANALYSIS OF A NEW KIND OF QUASI-OPTICAL CAVITY - G. Jian and L. Chongwen, High Energy Electronic Research Institute, Chengdu Institute of Radio Engineering, PRC
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SESSION Th1

Thursday Morning December 17, 1987

INTEGRATED CIRCUITS I

Wolfgang Hofer, Presider

- Th1.1** MILLIMETER WAVE MONOLITHIC TRANSCEIVERS (*Invited Keynote*) C.R. Seashore, Honeywell Inc. Minnetonka, MN 55343
- Th1.2** A VERY HIGHLY INTEGRATED W-BAND MIC TRANSCEIVER MODULE - M.R. Nicholls, Marconi Defence System, Stanmore, Middlesex, Britain
- Th1.3** A FREQUENCY DOUBLER FOR MILLIMETER-WAVE APPLICATIONS - J-S. Hong and J-M. Shi, Dept. of Radio Engr., Fuzhou University, Fujian, PRC
- Th1.4** MILLIMETER-WAVE MICROSTRIP INTEGRATED CIRCUIT TRANSCEIVER PACKAGING - M.J. Gawronski, J.R. Lamberg, and D.R. Singh, Honeywell Inc., Minnetonka, MN 55343
- Th1.5** A NEW TYPE OF MILLIMETER-WAVE INTEGRATED DIRECTIONAL COUPLERS - S-F. Li and A-S. Rong, Dept. of Radio Engr., Nanjing Institute of Tech., Nanjing, China
- Th1.6** THE STATUS OF MILLIMETER WAVE HYBRID INTEGRATED CIRCUIT BALANCED MIXERS - Cam Nguyen, Martin Marietta Orlando Aerospace, Orlando, FL 32855

SESSION Th2

Thursday Morning December 17, 1987

SEMICONDUCTORS

U. Strom, Presider

- Th2.1** FAR INFRARED CHARACTERIZATION OF SEMICONDUCTOR MICROSTRUCTURES (*Invited Keynote*) S. Perkowitz, Emory University, Atlanta, GA (30 min.)
- Th2.2** SUBMILLIMETER-MAGNETO SPECTROSCOPY ON P-TYPE GaAs/Ga(Al)As HETERO STRUCTURES (*Invited Keynote*) P. Kempf, M. von Ortenberg, E. Bangert, G. Landwehr, Universität Würzburg, D-8700 Würzburg, FRG; G. Weimann, W. Schlapp, Forschungszentrum der Deutschen Bundespost, D-6100 Darmstadt, FRG (30 min.)
- Th2.3** A FAR INFRARED STUDY OF SHALLOW ACCEPTORS IN ALGaAs/ GaAs QUANTUM WELLS (*Invited*) A. A. Reeder and B. McCombe, SUNY, Buffalo, NY; F.A. Chambers, G.P. Devane, Amco Corp, IL 60566
- Th2.4** STUDY OF VALENCE BAND STRUCTURE OF SILICON BY FTIR AT LIQUID HELIUM TEMPERATURES - M.M. Pradhan, R.K. Garg and M. Arora, National Physical Laboratory, New Delhi 110012, India
- Th2.5** FAR INFRARED PHOTOCONDUCTIVITY EXPERIMENTS ON THE Si DONOR IN GaAs - A.C. Labrujere, T.O. Klaassen, W. Th. Wenckeback, Kamerlingh Onnes Laboratorium, Leiden, Netherland; C.T. Foxon, Philips Res. Lab, Redhill, Surrey, England
- Th2.6** FAR INFRARED SPECTROSCOPY OF DEFECTS IN SUPERLATTICES - B.V. Shanabrook, E. Glaser and D. Gammon, Naval Research Laboratory, Washington, DC 20375
- Th2.7** FREE ELECTRON LASER STUDY OF THE NONLINEAR MAGNETOPHOTOCONDUCTIVITY IN n-GaAs - J. Kaminski, J. Spector, Dept. of Physics & FEL Studies, U. of California, Santa Barbara, CA 93106; and W. Prettl, Institut für Angewandte Physik der Universität Regensburg, West Germany
- Th2.8** PROPERTIES OF EVAPORATED Ge THINFILMS FOR WARM CARRIER DEVICES - N. Inoue and Y. Yasuoka, The National Defense Academy, Hashirimizu Yokosuka 239, Japan
- Th2.9** TUNNELING CYCLOTRON RESONANCE IN SEMICONDUCTOR SUPERLATTICES - S.J. Allen, Bell Communications Research, Inc., Redbank, NJ

SESSION Th3

Thursday Morning December 17, 1987

SubMM SPECTROSCOPY

- Th3.1** SUBMILLIMETER SPECTRUM OF THE COSMIC BACKGROUND RADIATION (*Invited Keynote*) T. Matsumoto, S. Hayakawa, H. Matuo, H. Murakami, and S. Sato, Nagoya U, Nagoya 464, Japan; A.E. Lange and P.L. Richards, U of California, Berkeley, CA 94720
- Th3.2** A BALLOON-BORNE FAR INFRARED LIMB OBSERVING SPECTROMETER - H.M. Pickett and J. Farhoomand, Jet Propulsion Lab, California Institute of Technology, Pasadena, CA 91109
- Th3.3** "COMPLEX" MOLECULAR SPECTRA AND THE PHYSICS OF THE MOLECULE: THE CASE OF METHANOL - P. Carneseccchi, G. Moruzzi and F. Strumia, Dipartimento di Fisica dell' Università di Pisa, Pisa, Italy
- Th3.4** SELECTABLE-FINESSE FABRY-PEROT INTERFEROMETER FOR THE FREQUENCY MEASUREMENTS OF MILLIMETER AND SUBMILLIMETER WAVES - T. Hori, T. Matsui, K. Araki and H. Inomata, Radio Research Laboratory, 4-2-1 Nujui-Kita, Koganei, Tokyo 184 Japan
- Th3.5** INFRARED-RADIO FREQUENCY DOUBLE RESONANCE OF CH₃OD - H.K. Pak and J.C. Petersen, The University of Alabama, Tuscaloosa, AL 35487
- Th3.6** ON THE HIGH RESOLUTION FAR INFRARED SPECTROSCOPY OF C-13 METHANOL: b-TYPE R-BRANCHES IN THE TORSIONAL GROUND STATE - I. Mukhopadhyay, R.M. Lees and J.W.C. Johns, U of New Brunswick, Fredericton, N.B., E3B 5AE, Canada
- Th3.7** THEORETICAL AND EXPERIMENTAL RESULTS COMPARISON OF MESHES AS BEAM-SPLITTER - I. Boscolo and A. Pando, Dipartimento di Fisica, Università degli Studi, 73100 Lecce, Italy
- Th3.8** PROBING SEMICONDUCTOR SUPERLATTICE TRANSPORT BY SUBMILLIMETER WAVE CYCLOTRON RESONANCE - S.J. Allen, Jr., R. Bhat, M. Koza, F. DeRosa, D.M. Hwang, and P. Grabbe, Bell Communication Research Inc, Redbank, NJ 07701

SESSION Th4

Thursday Morning December 17, 1987

GYROTRON IV

A. W. Fliflet, Presider

- Th4.1** EXPERIMENTAL STUDY OF GYRO-BWO - (*Invited Keynote*) S.Y. Park, Omega-P, Inc., 2008 Yale Station, New Haven, CT 06520; R.H. Kyser, B-K Technology, 3204 Monroe St., Rockville, MD 20850; C.M. Armstrong and R.K. Parker, Naval Research Laboratory, Washington, DC 20375
- Th4.2** POWERFUL GYROTRONS - (*Invited Keynote*) A.L. Gol'denberg, Institute of Applied Physics, Academy of Sciences of the USSR, Gorky, USSR
- Th4.3** DESIGN OF AN ELECTRONICALLY TUNABLE MILLIMETER WAVE GYROTRON BACKWARD WAVE OSCILLATOR - M. Caplan, Lawrence Livermore Nat'l. Lab., P.O. Box 808, Livermore, CA 94550
- Th4.4** HIGH POWER, SUBMILLIMETER GYROTRON - S.E. Spira, K.E. Kreischer and R.J. Temkin, MIT Plasma Fusion Center, Cambridge, MA 02139
- Th4.5** 3-D RIBBON BEAMS FOR GYROTRONS - A.M. Ferendeci, A. Darkazanli and D. Slimani, Case Western Reserve University, Cleveland, OH 44106
- Th4.6** HIGH CURRENT DENSITY CATHODES FOR USE IN HIGH POWER MICROWAVE SOURCES - M.E. Read and A.J. Dudas, Physical Sciences Inc., 603 King Street, Alexandria, VA 22314; P.E. Oettinger, Thermo Electron, Inc. 101 First Avenue, Waltham, MA 02254
- Th4.7** NUMERICAL SIMULATION OF ELECTRON CYCLOTRON MASER WITH AXIAL MAGNETIC AND RADIAL ELECTROSTATIC FIELDS - S-C. Zhang, Chengdu Institute of Radio Engr., Chengdu, Sichuan, PRC
- Th4.8** RELATIVISTIC CYCLOTRON MASER DRIVEN BY AN INTENSE ELECTRON BEAM GENERATOR WITH 0.4 μ s PULSELENGTH - R.M. Gilgenbach, R.A. Bosch, J. Choi, and J.G. Wang, Nuclear Engineering Dept, U of Michigan, Ann Arbor, MI 48109-2104

SESSION Th5

Thursday Afternoon December 17, 1987

INTEGRATED CIRCUITS II

Charles E. Seashore, Presider

- Th5.1** QUASI-PLANAR WAVEGUIDES (*Invited Keynote*) Wolfgang Hoefler, University of Ottawa, Ottawa, Ontario, Canada
- Th5.2** COMPUTER-AIDED DESIGN OF MILLIMETER-WAVE INTEGRATED FIN-LINE BANDPASS FILTERS - J.S. Hong and J.M. Shi, Dept. of Radio Engr., Fuzhou University, Fujian, PRC
- Th5.3** INVESTIGATION OF FINLINE STRIP DISCONTINUITIES AND ITS APPLICATION TO MILLIMETER-WAVE FILTERS - A-S. Rong and S-F. Li, Dept. of Radio Engr., Nanjing Institute of Tech., Nanjing, China
- Th5.4** PLANAR MATCHING OF ANTENNAS ON ELECTRICALLY THICK DIELECTRIC SUBSTRATES - R.L. Rogers, D.P. Neikirk and H. Ling, The University of Texas at Austin, Austin, TX
- Th5.5** ANALYSES OF PICOSECOND PULSE PROPAGATION ALONG A COUPLED SLOTLINE ON A LOSSY MULTILAYER INTEGRATED CIRCUIT SUBSTRATE - C-K C. Tzuang, J.T. Kuo, S.C. Kao, S. Su and K.P. Chang, Nat'l Chiao Tung Univ., 1001 Ta Hsueh Rd., Hsinchu, Taiwan, PRC
- Th5.6** MILLIMETER-WAVE PIN DIODE CONTROL DEVICES - D.J. Cole, J.A. Duff, J. Grant, M. Huggan and J.R.G. Twisleton, EEV Microwave, UK
- Th5.7** THE THEORETICAL PROPERTIES OF HIGHER MODE CYLINDRICAL DIELECTRIC RESONATORS FOR MILLIMETRE WAVE MONOLITHIC CIRCUITS - D. Sing and G.B. Morgan, University of Wales Inst. of Sci and Tech, Cardiff, Britain
- Th5.8** A MULTI-OCTAVE MILLIMETRE WAVE COMBINER AND SEPARATOR NETWORK - M. Medeiros and N. Williams, ERA Technology Ltd, Leatherhead, Surrey, KT22 7SA, England
- Th5.9** A NEW TECHNIQUE FOR RAISING OPERATING FREQUENCY OF PIN DIODE - L-Q. He, G-H. Xu and S-F. Li, Dept. of Radio Engr., Nanjing Institute of Tech., Nanjing, Jiangsu, PRC

SESSION Th6

Thursday Afternoon December 17, 1987

MATERIAL PROPERTIES

B. McCombe, Presider

- Th6.1** THEORY OF LATTICE EXCITATIONS IN PREDICTED ALKALI HALIDE SUPERLATTICE - L.L. Boyer and J.L. Feldman, Naval Research Laboratory, Washington, DC 20375; P.J. Edwardson and J.R. Hardy, U. of Nebraska, Lincoln, NE 68588
- Th6.2** INTERSTITIAL DONOR IMPURITIES IN SILICON - L.T. Ho, Institute of Physics, Academia Sinica, Taipei, Taiwan, PRC
- Th6.3** ULTRASONIC SEARCH FOR FLOPPY-TO-RIGID TRANSITION IN BULK $Se_{1-x}Ge_x$ GLASSES - R.L. Cappelletti, S.S. Yun and H. Li, Ohio University, Athens, OH 45701; P. Boolchand, U of Cincinnati, Cincinnati, OH 45221
- Th6.4** FIR RESULTS IN $[Pd(1 - chnx)_2Br]Br_2$, - P. Janssen and K.U. Leuven, Katholieke Universiteit Leuven, Belgium
- Th6.5** MATERIAL REQUIREMENTS FOR GYROTRON WINDOWS (*Invited Keynote*) H. Jory, K. Felch and E. Jongewaard, Varian Associates, Palo Alto, CA (30 min.)
- Th6.6** STUDY OF VALENCE BAND STRUCTURE OF SILICON BY FTIR AT LIQUID HELIUM TEMPERATURES - M.M. Pradhan, R.K. Garg and M. Arora, National Physical Laboratory, New Delhi, India
- Th6.7** INDUSTRIAL APPLICATIONS OF FAR INFRARED LASERS - P. Cheo, United Technologies Research Center, East Hartford, CT 06108
- Th6.8** METROLOGY PLAN FOR ELECTROMAGNETIC PROPERTIES OF MATERIALS - G.R. Reeve, National Bureau of Standards, 325 Broadway, Boulder, CO 80302

SESSION Th7

Thursday Afternoon December 17, 1987

LASERS I

P. Woskov, Presider

- Th7.1** RECENT ADVANCES IN TUNABLE, RAMAN FIR LASERS (*Invited Keynote*) J.R. Izatt, B.K. Deka, W. Zhu and J. Rai, U of Alabama, Tuscaloosa, 35487
- Th7.2** A SMALL TUNABLE OPTICALLY PUMPED FAR INFRARED LASER - H.O. Everitt and F.C. DeLucia, Duke University, Durham, NC 27706; D.D. Skatrud, Army Research Office RTP, NC 27709; R.I. McCormick, US Military Academy, West Point, NY 10996
- Th7.3** TUNING BEHAVIOR OF A CH₃F AMPLIFIED SPONTANEOUS EMISSION LASER - S.G. Evangelides, Jr., L.L. Carson, Jr., B.G. Danly and R.J. Temkin, MIT Plasma Fusion Center, Cambridge, MA 02139
- Th7.4** CH₃OH LASER LINES ASSIGNMENTS AND FREQUENCY PREDICTIONS BY TRANSITION LOOPS - P. Carnesecchi, G. Moruzzi and F. Strumia, Dipartimento di Fisica dell'Università di Pisa, Pisa, Italy; R.M. Lees, U New Brunswick, Canada
- Th7.5** ASSIGNMENTS OF FIR LASER LINES FROM NON-CO-STRETCH STATES OF CH₃OH - R.M. Lees, I. Mukhopadhyay and J.W.C. Johns*, U of New Brunswick, Fredericton, N.B., E3B 5A3, Canada; *Herzberg I. Astrophysics, NRC of Canada, Ottawa
- Th7.6** HIGH POWER CH₃OH 70.5 μm LASER TO MEASURE THE ABSOLUTE FREQUENCY OF CO₂ LASER - E. Sakuma and Y. Miki, Natl Research Lab of Metrology, 1-4, 1-chome, Umezono, Sakura-mura, Niihari-gun, Ibaraki 3-5, Japan
- Th7.7** HIGH-J INFRARED SPECTRUM AND FAR-INFRARED LASER ASSIGNMENTS IN CH₃OH - M. Mollabashi, W. Lewis-Bevan*, I. Mukhopadhyay and R.M. Lees, U of New Brunswick, Fredericton, N.B., E3B 5A3, Canada; *U of B.C., Canada
- Th7.8** NEW LARGE OFFSET FIR LASER LINES FROM CD₃OH AND ASSIGNMENTS IN THE C-O STRETCH Q-BRANCH - N. Ioli, G. Carelli, A. Moretti, G. Moruzzi, D. Pereira and F. Strumia, Dipartimento di Fisica, Università di Pisa, Italy
- Th7.9** ANALYSIS OF THE HIGH EFFICIENCY 127 μm FIR LASER LINE OF ¹³CD₃OH AND OTHER ¹³CD₃OH, CD₃OH, CD₃OD, CH₃OH and ¹³CH₃OH FIR LASER LINES - R.M. Lees and I. Mukhopadhyay, U of New Brunswick, Fredericton, N.B., E3B 5A3, Canada

SESSION Th8

Thursday Afternoon December 17, 1987

GYROTRON V

M. E. Read, Presider

- Th8.1** THE 150 GHz GYROTRON EXPERIMENT AT THE KERNFORSCHUNGSZENTRUM KARLSRUHE (*Invited Keynote*) G. Hochschild, B. Jödicke, E. Borie, G. Dammertz, O. Dumbrajs, T. Geist, M. Kitlinski, M. Kuntze, B. Piosczyk, H. Stickel, H. Wenzelburger, Institut für Kernphysik II, Postfach 3640, D-7500 Karlsruhe, FRG
- Th8.2** CYCLOTRON AUTO-RESONANT MASER (CARM) EC HEATING SOURCE FOR HIGH FIELD TOKAMAKS - (*Invited Keynote*) A.T. Lin, N.C. Luhmann, Jr. and D.B. McDermott, University of California, Los Angeles, CA; K.R. Chu, Nat'l Tsing Hua Univ, Hsinchu, Taiwan
- Th8.3** DESIGN OF A HIGH POWER, 140 GHz CARM AMPLIFIER - K.D. Pendergast, B.G. Danly, R.J. Temkin, MIT Plasma Fusion Center, Cambridge, MA 02139; T.M. Tran, CRPP, 21 Av, des Bains, Lausanne, Switzerland
- Th8.4** THE NRL 100 GHz CARM OSCILLATOR EXPERIMENT - R.B. McCowan, Science Applications Intl. Corp, McLean, VA 22102; A.W. Fliflet, W.M. Manheimer, S.H. Gold, W.M. Black, Naval Research Laboratory, Washington, DC 20375; G.L. Bergeron, Jaycor Inc., Vienna, VA; A.K. Kinkead, V.L. Granatstein, U. Maryland, College Park, MD; and M. Sucey, Jaycor, Vienna, VA
- Th8.5** RESULTS OF A LARGE ORBIT, HIGH HARMONIC GYRO-TWT AMPLIFIER - D.S. Furuno, D.B. McDermott and N.C. Luhmann, Jr., University of California, Los Angeles, CA
- Th8.6** HIGH POWER GYROTRON EXPERIMENTS - S.H. Gold, A.W. Fliflet, W.M. Manheimer, Science Applications Intl. Corp., McLean, VA; W.M. Black, U of Fairfax, VA; R.B. McCowan, Sci. Appl; R.C. Lee, Jaycor Inc., Vienna, VA; V.L. Granatstein, U Maryland, College Park, MD; D.L. Hardesty, A.K. Kinkead and M. Sucey, Jaycor Inc.
- Th8.7** A STUDY OF THE EFFICIENCIES OF HIGH HARMONIC GYROTRONS - S.P. Kuo and S.C. Kuo, Polytechnic University, Route 110, Farmingdale, NY; M.C. Lee, MIT, Cambridge, MA
- Th8.8** HIGH-POWER TE₁₁ AND TM₁₁ CIRCULAR POLARIZERS IN OVERSIZED WAVEGUIDE AT 70 GHz - M. Thumm and H. Kumrić, Institut für Plasmaforschung, Universität Stuttgart, Pfaffenwaldring 31, D-7000 Stuttgart 80, West Germany

SESSION F1

Friday Morning December 18, 1987

MMW DEVICES

Holger Meinel, *Presider*

- F1.1** FERRITE DEVICES (*Invited Keynote*) Gordon Harrison, EMS, Norcross, GA
- F1.2** MILLIMETER WAVE PHASE SHIFTERS BASED ON MICROWAVE-INDUCED BIREFRINGENCE- B. Bobbs, R. Shih, and H.R. Fetterman, University of California, Los Angeles, CA 90024; W. Ho, Rockwell Int'l. Sci. Ctr., 1049 Camino dos Rios, Thousand Oaks, CA 91360
- F1.3** PARASITIC EFFECTS ON MILLIMETER-WAVE PHASE SHIFTER DESIGN - J. Bong and K. Chang, Texas A & M University, College Station, TX 77843
- F1.4** A NEW DESIGN METHOD OF H-PLANE WAVEGUIDE CIRCULATOR - Z. Dengguo and L. Weigan, Applied Phys. Inst., Box 83, Chengdu, Sichuan, PRC
- F1.5** A FERRITE SPHERE Y-JUNCTION WAVEGUIDE CIRCULATOR - Z. Dengguo, P. Shirong and H. Futiang, Applied Phys. Inst., Box 83, Chengdu, Sichuan, PRC
- F1.6** A FULL BAND 18-225 GHz SCALER NETWORK ANALYZER - P. Goy, M. Gross, J.M. Raimond, Ecole normale supérieure, 24, rue Lhomond, 75231 Paris Cedex 05, France; C. Mauc, Sielux Co., 61, ave Carnot, 94230 Cachan, France
- F1.7** A MM-WAVE ELECTRICALLY CONTROLLED DIELECTRIC WAVEGUIDE PHASE SHIFTER - B. Chan, B. Dirassen and F. Christophe, ONERA-CERT, 2 ave Edouard Belin, 31055 Toulouse Cedex, France
- F1.8** Ka BAND DIGITALLY ADDRESSED ATTENUATOR - J.A. Duff, M. Huggan, J.R.G. Twisleton and D. Valentine, EEV Microwave, UK
- F1.9** RELIABLE, HIGH POWER, PASSIVE Ka BAND RECEIVER PROTECTION - J.A. Duff and M. Huggan, EEV Microwave, UK
- F1.10** IMAGE GUIDE COUPLERS USED IN MILLIMETER WAVE INTEGRATED CIRCUITS - L. Qi, L. Xu, Y. Lo, Dept of Elec & Info. Engr, Huazhong Univ. of Sci and Tech, Wuhan, Hubei, PRC

SESSION F2

Friday Morning December 18, 1987

PLASMA DIAGNOSTICS

- F2.1** FAR-FORWARD SCATTERING FROM A TOKAMAK PLASMA WITH A TUNABLE GYROTRON - G.F. Brand, P.W. Fekete and K.J. Moore, School of Physics, University of Sydney, NSW 2006 Australia
- F2.2** GYROTRON SCATTERING FROM NON-THERMAL FLUCTUATIONS IN THE TARA TANDEM MIRROR - J.S. Machuzak, D.R. Cohn, M.Gerver, S.N. Golovato, S.Horne, S. Kubota, W.J. Mulligan, R.C. Myer, R.S. Post, D. Rhee, R.J. Temkin and P. Woskoboinikow, MIT Plasma Fusion Center, Cambridge, MA 02139
- F2.3** TWELVE CHANNEL ECE DIAGNOSTIC SYSTEM OF THE NEW WENDELSTEIN STELLERATOR W VII-AS - H.J. Hartfuss and W VII-AS Team, Max-Planck-Institut für Plasmaphysik, EURATOM Ass., D-8046 Garching, West Germany
- F2.4** A MULTICHANNEL FAR-INFRARED INTERFEROMETER ON ATF - D.P. Hutchinson, W.H. Casson and C.H. Ma, Oak Ridge National Laboratory, Oak Ridge, TN 37831
- F2.5** SUBMILLIMETER LASER SCATTERING FROM A TOKAMAK PLASMA - B.W. James, M.D. Bowden, I.S. Falconer and P.A. Krug, School of Physics, University of Sydney, NSW 2006 Australia; P.A. Stimson, CSIRO, Div of Applied Physics, Lindfield, NSW 2070 Australia
- F2.6** INDUCED MAGNETIC PERTURBATIONS BY PLASMA HEATING - M.C. Lee, MIT, Cambridge, MA; S.P. Kuo, Polytechnic University, Farmingdale, NY 11735
- F2.7** AN INFRARED INTERFEROMETER/POLARIMETER ON THE COMPACT IGNITION TOKAMAK - C.H. Ma and D.P. Hutchinson, Oak Ridge National Laboratory, Oak Ridge, TN 37831
- F2.8** GYROTRON THOMSON SCATTERING DIAGNOSTICS OF IONS IN D-T BURNING TOKAMAKS - P. Woskoboinikow, D.R. Cohn, J.S. Machuzak, R.C. Myer and D. Rhee, MIT Plasma Fusion Center, Cambridge, MA 02139

SESSION F3

Friday Morning

December 18, 1987

LASERS II

J. R. Izatt, Presider

- F3.1** EFFICIENCY OF CH₂F₂ LASER LINES AT 184 AND 214 MICRON OPERATING WITH CASCADE TRANSITIONS - B.W. Davis, Edinburgh Instruments Ltd., Riccarton, Currie, Edinburgh EH14 4AP, Scotland; A. Vass, Heriot-Watt University, Riccarton, Currie, Edinburgh EH14 4AP, Scotland
- F3.2** MODELING OF COLLISIONAL ENERGY TRANSFER IN OPTICALLY PUMPED FAR INFRARED LASERS - R.I. McCormick, US Military Academy, West Point, NY 10996; D.D. Skatrud, Army Research Office, RTP, NC 27709; H.O. Everitt and F.C. DeLucia, Duke Univeristy, Durham, NC 27706
- F3.3** PARAMETRIC OPTICAL PUMPED FIR-LASERS - J.S. Bakos, Central Research Institute for Physics, 1515 Budapest 114, P.O. Box 49, Hungary; V.A. Batanov and A.Y. Volkov, General Physics Inst. of the Academy of Sci. of the USSR, Moscow, Vavilov St., 38 117333
- F3.4** AN EXPERIMENTAL INVESTIGATION OF ENERGY TRANSFER IN OPTICALLY PUMPED FIR LASERS - R.I. McCormick, US Military Academy, West Point, NY 10996; D.D. Skatrud, Army Research Office, RTP, NC 27709; H.O. Everitt and F.C. DeLucia, Duke Univeristy, Durham, NC 27706
- F3.5** INTERMODAL TUNING BEHAVIOR OF AN ETALON TUNED SLM TEA-CO₂ LASER - M.A. Rob and J.R. Izatt, Dept. Physics, U of Alabama, Tuscaloosa, AL 35487
- F3.6** INFRARED LASER POWER AMPLIFIERS ON E-BEAM CONTROLLED DISCHARGE PUMPED CARBON MONOXIDE - V. Danilychev, Lebedev Physical Institute Leninsky, Prospect 53, Moscow USSR
- F3.7** ON THE HIGH RESOLUTION INFRARED SPECTROSCOPY OF THE C-O STRETCH BAND OF ¹³CH₃OH: PHENOMENOLOGICAL PARAMETERS FOR THE A-SPECIES IN THE TORSIONAL GROUND STATE - I. Mukhopadhyay, R.M. Lees and W. Lewis-Bevan, U of New Brunswick, Fredericton, N.B., E3B 5A3, Canada
- F3.8** SIMULTANEOUS TRIPLE CASCADE OPERATION OF OPTICALLY PUMPED SUB-MILLIMETER LASERS - B.W. James, I.S. Falconer and M.D. Bowden, School of Physics, U of Sydney, NSW 2006, Australia; L.B. Whitbourn, CSIRO Div Mineral Phys and Mineralogy, Lindfield NSW, 2070, Australia; P.A. Stimson and J.C. Macfarlane CSIRO Div of Applied Physics, Lindfield NWS, 2070, Australia

SESSION F4

Friday Morning

December 18, 1987

GYROTRON VI

B. G. Danly, Presider

- F4.1** FINAL DESIGN AND INITIAL OPERATION OF A HIGH PEAK POWER X-BAND GYROKLYSTRON - (*Invited Keynote*) W. Lawson, B. Hogan, J. Calame, V.L. Granatstein, H. Heikkinen, P.E. Latham, C.D. Striffler, W. Wang and D. Welsh, University of Maryland, College Park, MD 20742; M.E. Read, Physical Sciences, Inc., Alexandria, VA
- F4.2** A HIGH POWER GYROTRON OSCILLATOR AT 8 GHz - H.G. Mathews, G. Agosti, K. Holm, and D. Kuse, BBC Brown Boveri Ltd., CH-5401 Baden, Switzerland; P. Mugli, M.Q. Tran, S. Alberti, A. Perrenoud and T.M. Tran, CRPP, CH-1007 Lausanne, Switzerland
- F4.3** EFFECT OF INCOHERENT BEAM OFF-CENTERING IN CUSPTRON - J.Y. Choe, W. Namkung, V. Ayres, and H. Uhm, Naval Surface Weapons Center, Silver Spring, MD 20903
- F4.4** HIGH HARMONIC EMISSION FROM SLOTTED RECTANGULAR GYROTRON OSCILLATORS - P. Vitello and C. Menyuk, Science Applications Intl. Corp., McLean, VA 22102
- F4.5** FUNDAMENTAL AND SECOND-HARMONIC FREQUENCY GENERATION FROM A CUSPTRON - W. Namkung, J.Y. Choe, H.S. Uhm and V. Ayres, Naval Surface Weapons Center, Silver Spring, MD 20903
- F4.6** DEPRESSED COLLECTORS FOR A LARGE-ORBIT GYROTRON - A. Singh, D. Goutos, W.R. Hix, W. Lawson, C.D. Striffler, V.L. Granatstein and W.W. Destler, Unviersity of Maryland, College Park, MD 20742
- F4.7** SIMULATION FOR THE OPERATION CHARACTERISTICS OF CUSPTRON OSCILLATORS- S.P. Kuo and K.K. Tiong, P.E. Miller and Q. Ji, Polytechnic University, Farmingdale, NY; W. Namkung, Naval Surface Weapons Center, Silver Spring, MD
- F4.8** EXPERIMENTS FOR AN EIGHTH HARMONIC CUSPTRON TUBE - K.K. Tiong, S.P. Kuo and P.E. Miller, Polytechnic University, Farmingdale, NY

SESSION F3

Friday Morning

December 18, 1987

LASERS II

J. R. Izatt, Presider

- F3.1** EFFICIENCY OF CH₂F₂ LASER LINES AT 184 AND 214 MICRON OPERATING WITH CASCADE TRANSITIONS - B.W. Davis, Edinburgh Instruments Ltd., Riccarton, Currie, Edinburgh EH14 4AP, Scotland; A. Vass, Heriot-Watt University, Riccarton, Currie, Edinburgh EH14 4AP, Scotland
- F3.2** MODELING OF COLLISIONAL ENERGY TRANSFER IN OPTICALLY PUMPED FAR INFRARED LASERS - R.I. McCormick, US Military Academy, West Point, NY 10996; D.D. Skatrud, Army Research Office, RTP, NC 27709; H.O. Everitt and F.C. DeLucia, Duke University, Durham, NC 27706
- F3.3** PARAMETRIC OPTICAL PUMPED FIR-LASERS - J.S. Bakos, Central Research Institute for Physics, 1515 Budapest 114, P.O. Box 49, Hungary; V.A. Batanov and A.Y. Volkov, General Physics Inst. of the Academy of Sci. of the USSR, Moscow, Vavilov St., 38 117333
- F3.4** AN EXPERIMENTAL INVESTIGATION OF ENERGY TRANSFER IN OPTICALLY PUMPED FIR LASERS - R.I. McCormick, US Military Academy, West Point, NY 10996; D.D. Skatrud, Army Research Office, RTP, NC 27709; H.O. Everitt and F.C. DeLucia, Duke University, Durham, NC 27706
- F3.5** INTERMODAL TUNING BEHAVIOR OF AN ETALON TUNED SLM TEA-CO₂ LASER - M.A. Rob and J.R. Izatt, Dept. Physics, U of Alabama, Tuscaloosa, AL 35487
- F3.6** INFRARED LASER POWER AMPLIFIERS ON E-BEAM CONTROLLED DISCHARGE PUMPED CARBON MONOXIDE - V. Danilychev, Lebedev Physical Institute Leninsky, Prospect 53, Moscow USSR
- F3.7** ON THE HIGH RESOLUTION INFRARED SPECTROSCOPY OF THE C-O STRETCH BAND OF ¹³CH₃OH: PHENOMENOLOGICAL PARAMETERS FOR THE A-SPECIES IN THE TORSIONAL GROUND STATE - I. Mukhopadhyay, R.M. Lees and W. Lewis-Bevan, U of New Brunswick, Fredericton, N.B., E3B 5A3, Canada
- F3.8** SIMULTANEOUS TRIPLE CASCADE OPERATION OF OPTICALLY PUMPED SUB-MILLIMETER LASERS - B.W. James, I.S. Falconer and M.D. Bowden, School of Physics, U of Sydney, NSW 2006, Australia; L.B. Whitbourn, CSIRO Div Mineral Phys and Mineralogy, Lindfield NSW, 2070, Australia; P.A. Stimson and J.C. Macfarlane CSIRO Div of Applied Physics, Lindfield NWS, 2070, Australia

SESSION F4

Friday Morning

December 18, 1987

GYROTRON VI

B. G. Danly, Presider

- F4.1** FINAL DESIGN AND INITIAL OPERATION OF A HIGH PEAK POWER X-BAND GYROKLYSTRON - (*Invited Keynote*) W. Lawson, B. Hogan, J. Calame, V.L. Granatstein, H. Heikkinen, P.E. Latham, C.D. Striffler, W. Wang and D. Welsh, University of Maryland, College Park, MD 20742; M.E. Read, Physical Sciences, Inc., Alexandria, VA
- F4.2** A HIGH POWER GYROTRON OSCILLATOR AT 8 GHz - H.G. Mathews, G. Agosti, K. Holm, and D. Kuse, BBC Brown Boveri Ltd., CH-5401 Baden, Switzerland; P. Mugli, M.Q. Tran, S. Alberti, A. Perrenoud and T.M. Tran, CRPP, CH-1007 Lausanne, Switzerland
- F4.3** EFFECT OF INCOHERENT BEAM OFF-CENTERING IN CUSPTRON - J.Y. Choe, W. Namkung, V. Ayres, and H. Uhm, Naval Surface Weapons Center, Silver Spring, MD 20903
- F4.4** HIGH HARMONIC EMISSION FROM SLOTTED RECTANGULAR GYROTRON OSCILLATORS - P. Vitello and C. Menyuk, Science Applications Intl. Corp., McLean, VA 22102
- F4.5** FUNDAMENTAL AND SECOND-HARMONIC FREQUENCY GENERATION FROM A CUSPTRON - W. Namkung, J.Y. Choe, H.S. Uhm and V. Ayres, Naval Surface Weapons Center, Silver Spring, MD 20903
- F4.6** DEPRESSED COLLECTORS FOR A LARGE-ORBIT GYROTRON - A. Singh, D. Goutos, W.R. Hix, W. Lawson, C.D. Striffler, V.L. Granatstein and W.W. Destler, University of Maryland, College Park, MD 20742
- F4.7** SIMULATION FOR THE OPERATION CHARACTERISTICS OF CUSPTRON OSCILLATORS - S.P. Kuo and K.K. Tiong, P.E. Miller and Q. Ji, Polytechnic University, Farmingdale, NY; W. Namkung, Naval Surface Weapons Center, Silver Spring, MD
- F4.8** EXPERIMENTS FOR AN EIGHTH HARMONIC CUSPTRON TUBE - K.K. Tiong, S.P. Kuo and P.E. Miller, Polytechnic University, Farmingdale, NY