

PROGRAM OF INVITED SPEAKERS

0900 Hours

Royal Palm Room

Monday, December 7

H. Yoshinaga, Presider

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- M-1-1: MILLIMETER/SUBMILLIMETER WAVES INTERACTING WITH GIANT ATOMS (Rydberg States)  
P. Goy, Ecole Normale Supérieure, Paris, France
- M-1-2: REVIEW OF PLASMA DIAGNOSTICS  
B. Lax, Mass. Inst. of Technology, Cambridge, MA.
- M-1-3: NEW IDEAS FOR EFFICIENT GENERATION OF SUBMILLIMETER RADIATION  
M. Feld, Mass. Inst. of Technology, Cambridge, MA.
- M-1-4: SUBMILLIMETER WAVE HETERODYNE ASTRONOMY FROM MAUNA KEA  
D. Buhl, G. Chin, G. Koepf, Nasa/Goddard Space Flight Center, Greenbelt, MD., and H. Fetterman,  
D. Peck, P. Tannenwald, B. Clifton, M.I.T. Lincoln Lab., Lexington, MA.
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Tuesday, December 8

L. Genzel, Presider

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- T-1-1: PHOTOEXCITED CYCLOTRON RESONANCE IN SEMICONDUCTORS AT FAR INFRARED WAVELENGTHS  
Tyuzi Ohya, Osaka Univ., Osaka, Japan
- T-1-2: FIR MAGNETOSPECTROSCOPY OF InAs - GaSb LAYERED STRUCTURES  
J.C. Maan, Max-Planck-Inst., Hochfeld-Lab., Grenoble, France.
- T-1-3: MEASUREMENT OF VELOCITY OVERSHOOT IN SILICON INVERSION LAYERS IN BROADBAND SMM SPECTROSCOPY  
S.J. Allen, Bell Telephone Lab., Murray Hill, N.J.
- T-1-4: UNTUNED CAVITY  
F. Kremer, Max-Planck-Inst., für Festkörperforschung, Stuttgart, FRG.
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Wednesday, December 9

K.J. Button, Presider

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- W-1-1: SUBMILLIMETER GYROTRONS  
V.A. Flyagin and G.S. Nusinovich, Inst. Applied Physics, Gorky, USSR.
- W-1-2: A TAPERED WALL GYROTRON TRAVELLING WAVE AMPLIFIER  
L.R. Barnett, Y.Y. Lau, K.R. Chu and V.L. Granatstein, Naval Research Lab., Washington, D.C.
- W-1-3: A GYROTRON STUDY PROGRAM  
G. Mourier, Ph. Boulanger, P. Charbit, G. Faillon, A. Herscovici and E. Kammerer, Thomson-CSF,  
Boulogne-Billancourt, France.
- W-1-4: ELECTRO-OPTIC DEVICES IN DIELECTRIC WAVEGUIDE  
Marvin Klein, Hughes Research Corp., Malibu, CA.
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Thursday, December 10

T.A. DeTemple, Presider

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- Th-1-1: CONTINUOUSLY TUNABLE CH<sub>3</sub>F RAMAN FIR LASER  
J.R. Izatt, Univ. Alabama
- Th-1-2: COMPLEX DIELECTRIC PROPERTIES OF SOLIDS AND LIQUIDS: METHODS OF MEASUREMENT  
George W. Chantry, National Physical Lab., Teddington, Middlesex, UK.
- Th-1-3: CONTINUOUS WAVE OPTICALLY PUMPED LASERS  
Carl R. Pidgeon, Heriot-Watt Univ., Edinburgh, Scotland
- Th-1-4: HE 3 REFRIGERATORS AND BOLOMETERS FOR IR AND MILLIMETER-WAVE OBSERVATIONS FROM SPACE  
G. Chanin, Service D'Aéronomie Du C.N.R.S., Verrieres, Le Buisson, France.
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PROGRAM OF INVITED KEYNOTE SPEAKERS  
AND CONTRIBUTED PAPERS\*

MONDAY AFTERNOON  
December 7, 1981

1400 hours

MONDAY AFTERNOON  
December 7, 1981

| Session M-2: SPECTROSCOPY*                                                                                                                                                                         |                                                                                                                                                                                                                                        | Session M-3: PLASMA DIAGNOSTICS (lasers)* |                                                                                                                                                                                                                                                  |
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| Cypress Room (Mezzanine)                                                                                                                                                                           |                                                                                                                                                                                                                                        | Royal Palm Room                           |                                                                                                                                                                                                                                                  |
| Presider: M. Inguscio                                                                                                                                                                              |                                                                                                                                                                                                                                        | Presider: Frederick J. Stauffer           |                                                                                                                                                                                                                                                  |
| M-2-1:<br>1400                                                                                                                                                                                     | SUBMILLIMETER, MILLIMETER AND MICRO-WAVE SPECTRAL LINE CATALOGUE<br>R.L. Poynter and H.M. Pickett, Jet Propulsion Lab., Pasadena, CA                                                                                                   | M-3-1:<br>1400                            | D <sub>2</sub> O LASER THOMSON SCATTERING AND SUB-MILLIMETER HETERODYNE RECEIVER MEASUREMENTS ON ALCATOR C<br>P. Woskoboinikow, H.C. Praddaude, W.J. Mulligan, D.R. Cohn, B. Lax and H.R. Fetterman, M.I.T. Plasma Fusion Center, Cambridge, MA. |
| M-2-2:<br>1420                                                                                                                                                                                     | SUBMILLIMETER WAVE DETERMINATION OF MOLECULAR CONCENTRATIONS IN DISCHARGE FLOW EXPERIMENTS<br>A.R. Ravishankara, P.H. Wine, F.L. Eisele, V. Brady and J.J. Gallagher, Georgia Institute of Technology, Atlanta, GA.                    | M-3-2:<br>1420                            | FIR SCATTERING FROM ELECTROSTATIC MODES AT THE ION CYCLOTRON RANGE OF FREQUENCIES IN A TOKAMAK PLASMA<br>P. Lee, R.J. Taylor, H. Park, Y. Xu, C.X. Yu, N.C. Luhmann, Jr., W.A. Peebles, University of California, Los Angeles, CA.               |
| M-2-3:<br>1440                                                                                                                                                                                     | CH <sub>3</sub> OH HIGH RESOLUTION FOURIER TRANSFORM SPECTROSCOPY IN THE FAR INFRARED<br>G. Moruzzi, F. Strumia, B. Carli, F. Mencaraglia, M. Carlotti, G. DiLorenzo and A. Trombetti, Istituto di Fisica dell'Universita, Pisa, Italy | M-3-3:<br>1440                            | RING RESONATORS IN THE FAR-INFRARED<br>D. Umstadter, W.A. Peebles, N.C. Luhmann, Jr., Y. Bae, University of California, Los Angeles, CA.                                                                                                         |
| M-2-4:<br>1500                                                                                                                                                                                     | PHASE ERROR CORRECTION IN THE FTS OF SPECTRA WITH POSITIVE AND NEGATIVE INTENSITIES<br>B. Carli, F. Forni and F. Mencaraglia, Istituto di Ricerca sulle Onde Elettromagnetiche, Firenze, Italy                                         | M-3-4:<br>1500                            | INJECTION-LOCKED TUNABLE TEA CO <sub>2</sub> LASER FOR SMM LASER PUMPING<br>T. Okada, K. Kato, R. Noudomi, K. Muraoka and M. Akazaki, Kyushu Univ., Fukuoka, Japan.                                                                              |
| M-2-5:<br>1520                                                                                                                                                                                     | HIGH-CONTRAST MULTIPASS FABRY-PEROT INTERFEROMETER<br>G.D. Holah and W. Cook, Emory Univ., Atlanta, GA.                                                                                                                                | M-3-5:<br>1520                            | THE TFTR 1MM WAVELENGTH DENSITY INTERFEROMETER<br>W. Ernst, M. Goldman, F. Senk, M. McCarthy, V. Arunasalam, and P.C. Efthimion, Plasma Physics Lab., Princeton, N.J.                                                                            |
| M-2-6:<br>1540                                                                                                                                                                                     | HIGH RESOLUTION IF-FIR SPECTROSCOPY OF OPTICALLY PUMPED CH <sub>3</sub> OH AROUND CO <sub>2</sub> LASER LINES<br>J.O. Henningsen, M. Inguscio, N. Ioli, A. Moretti, F. Strumia, University of Copenhagen, Denmark.                     | M-3-6:<br>1540                            | CONTINUOUS FAR-FORWARD SCATTERING AT 10 MICRONS IN A TOKAMAK<br>E.J. Doyle, D.E. Evans, D. Frigione and A. Murdoch, Culham Lab., Abingdon, Oxon, England                                                                                         |
| M-2-7:<br>1600                                                                                                                                                                                     | WIDE BANDPASS FAR INFRARED FILTERS MADE WITH METALLIC MESHES<br>J.M. Lamarre, M. Charra, L.P.S.P., Verrieres-Le-Buisson, France.                                                                                                       | M-3-7:<br>1600                            | A LITHIUM TANTALATE MODULATOR FOR A SUBMILLIMETER-WAVE POLARIMETER/INTERFEROMETER<br>D.P. Hutchinson, C.H. Ma, P.A. Staats and K.L. Vander Sluis, Oak Ridge National Laboratory, Oak Ridge, TN.                                                  |
| M-2-8:<br>1620                                                                                                                                                                                     | STUDIES OF ABSORPTION OF IR AND MM WAVES BY BIOLOGICAL MATERIALS<br>C. Cox, I. Bardich and J.J. Gallagher, Aberdeen Proving Ground, Edgewood, MD.                                                                                      | M-3-8:<br>1620                            | MEASUREMENTS OF ELECTRON DENSITY AND PLASMA CURRENT DISTRIBUTIONS IN TOKAMAK PLASMA<br>C.H. Ma, D.P. Hutchinson, P.A. Staats and K.L. Vander Sluis, Oak Ridge National Lab., Oak Ridge, TN.                                                      |
| *NOTE: The institution listed in the description of each paper is that of the first author. The institutional identification of other authors may be found by referring to the extended abstracts. |                                                                                                                                                                                                                                        | M-3-9:<br>1640                            | CRYSTAL QUARTZ ETALONS FOR FIR LASER INTERFEROMETER<br>A. Nishizawa, J. Fujita, M. Yamanaka, S. Okajima, S. Makino, M. Kondo, S. Nakata, S. Kon, A. Nagashima and Y. Tsunawaki, Inst. of Plasma Physics, Nagoya University, Nagoya, Japan        |
|                                                                                                                                                                                                    |                                                                                                                                                                                                                                        | M-3-10:<br>1700                           | REFLECTION SPECTROSCOPY OF MATERIALS FOR NEAR MILLIMETER PLASMA DIAGNOSTICS<br>J. Fisher, D. Boyd, J. Benson and N. Freygang, Univ. of Maryland, College Park, MD                                                                                |
|                                                                                                                                                                                                    |                                                                                                                                                                                                                                        | M-3-11:<br>1720                           | MEASUREMENT OF ELECTRON TEMPERATURE IN LOW PRESSURE COLD PLASMA<br>A. Dorelon, Lombardi, J.C. Maan, Lab. Spectr. Physique, Grenoble, FRANCE                                                                                                      |

PROGRAM OF INVITED KEYNOTE SPEAKERS  
AND CONTRIBUTED PAPERS

MONDAY AFTERNOON  
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1400 hours

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| Session M-4: <u>S-I-S MIXERS</u><br>Banyan Room (Mezzanine)<br>Presider: P.L. Richards |                                                                                                                                                                                                                   | Session M-5: <u>MILLIMETER WAVE SOURCES</u><br>Coconut Palm Room<br>Presider: H.R. Robl |                                                                                                                                                                                                                         |
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| M-4-1:<br>1400                                                                         | QUASIPARTICLE HARMONIC MIXING WITH<br>SIS JUNCTIONS<br>A.D. Smith, R.A. Batchelor, W.R.<br>McGrath, P.L. Richards, H. van Kempen,<br>D.E. Prober and P. Santhanam, Univ. of<br>California, Berkeley, CA.          | M-5-1:<br>1400                                                                          | RECENT ADVANCES IN HIGH POWER MILLI-<br>METER WAVE TRAVELING-WAVE TUBES<br>J.J. Hamilton, R. Harper and U.J.<br>Pittack, Raytheon Co., Waltham, MA.                                                                     |
| M-4-2:<br>1420                                                                         | PLANAR ANTENNA-COUPLED SIS DEVICES<br>FOR DETECTION AND MIXING<br>K.E. Irwin, S.E. Schwarz and T. Van<br>Duzer, Univ. of California, Berkeley,<br>CA.                                                             | M-5-2:<br>1420                                                                          | A MICROSTRIP IMPATT DIODE OSCILLATOR<br>FOR 100 GHz<br>G.B. Morgan, Univ. of Wales Inst. of<br>Science and Technology, Cardiff, Wales.                                                                                  |
| M-4-3:<br>1440                                                                         | CONVERSION EFFICIENCY AND NOISE<br>MEASUREMENTS OF SIS ARRAY MIXERS<br>H. van Kempen, W.R. McGrath, P.L.<br>Richards, A.D. Smith, R.E. Harris and<br>F.L. Lloyd, Univ. of California,<br>Berkeley, CA.            | M-5-3:<br>1440                                                                          | GAAS ABRUPT JUNCTION MITATT AND TUN-<br>NETT FROM 100 GHz TO 800 GHz<br>D.S. Pan and N. Lee, Univ. of Californ-<br>ia, Los Angeles, CA.                                                                                 |
| M-4-4:<br>1500                                                                         | VIVALDI ANTENNA/FINLINE CIRCUIT FOR<br>SIS MIXERS<br>E.L. Kollberg, T. Thungren and K.S.<br>Yngvesson, Chalmers University of<br>Technology, Gothenburg, Sweden.                                                  | M-5-4:<br>1500                                                                          | GENERATION OF MAGNETIC DIPOLE RADIA-<br>TION AND AMPLIFICATION OF NEAR MILLI-<br>METER WAVES<br>H.R. Robl, U.S. Army Research Office,<br>Research Triangle Park, NC.                                                    |
| M-4-5:<br>1520                                                                         | QUASIPARTICLE TUNNEL DEVICES FOR<br>MILLIMETER-WAVE DETECTION<br>K.H. Gundlach and H.J. Hartfuss, Max-<br>Planck-Institut für Astrophysik,<br>Garching/München, FRG.                                              | M-5-5:<br>1520                                                                          | COMPARISON OF NOISE FIGURE OF InP AND<br>GaAs SELF-OSCILLATING MIXER<br>S. Dixon and H. Jacobs, U.S. Army<br>Electronics Technology and Devices<br>Lab., (ERADCOM) Fort Monmouth, N.J.                                  |
| M-4-6:<br>1540                                                                         | CHARACTERIZATION OF AsGa SCHOTTKY<br>DETECTORS IN THE SUBMILLIMETER RANGE<br>M. Pyée, A. Kreisler and M. Redon,<br>Faculté Des Sciences De Paris, Paris,<br>France.                                               | M-5-6:<br>1540                                                                          | ADVANCES IN SUBMILLIMETRIC CARCINOTRONS<br>J. Boissiere, B. Epsztein, L. Teyssier,<br>Thomson-CSF, Boulogne-Billancourt<br>Cedex, France.                                                                               |
| M-4-7:<br>1600                                                                         | ELECTROMAGNETIC COUPLING BETWEEN AN<br>INFRARED ANTENNA AND 10 $\mu$ m LASER<br>RADIATION USING A CORNER REFLECTOR<br>A. Comeron, J.J. Jimenez and J.-Ch.<br>Bolomey, Université Paris XI, Orsay<br>Cedex, France | M-5-7:<br>1600                                                                          | THE TRANSFERRED ELECTRON MULTIPLIER AT<br>60 GHz<br>N. Apsley, D.J. Ashen, R.D. Hodges,<br>K.E. Howlett, J.E. Pattison, M.J.<br>Slater and L.L. Taylor, The Royal Sig-<br>nals and Radar Establishment, Malvern,<br>UK. |
|                                                                                        |                                                                                                                                                                                                                   | M-5-8:<br>1620                                                                          | INVESTIGATION OF SMALL BAND GAP MILLI-<br>METERWAVE TUNNEL TRANSIT-TIME DIODES<br>D.S. Pan and N. Lee, Univ. of Californ-<br>ia, Los Angeles, CA.                                                                       |
|                                                                                        |                                                                                                                                                                                                                   | M-5-9:<br>1640                                                                          | MILLIMETER MICROWAVE EMISSION FROM A<br>MASER USING SYNTHETIC ATOMS (THE<br>ORBITRON MASER)<br>I. Alexeff and F. Dyer, The Univ. of<br>Tennessee, Knoxville, TN.                                                        |
|                                                                                        |                                                                                                                                                                                                                   | M-5-10:<br>1700                                                                         | NONLINEAR ANALYSIS OF THE SOLID STATE<br>GYROTRON OSCILLATOR WITH MONTE CARLO<br>METHOD<br>A.K. Ganguly, B.H. Hui and K.R. Chu,<br>Naval Research Lab., Washington, D.C.                                                |

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1400 hours

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| Session T-2: SOLID STATE SPECTROSCOPY<br>Cypress Room (Mezzanine)<br>Presider: M. von Ortenberg |                                                                                                                                                                                                                              | Session T-3: PLASMA DIAGNOSTICS (ece)<br>Royal Palm Room<br>Presider: N.C. Luhmann |                                                                                                                                                                                                                                  |
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| T-2-1:<br>1400                                                                                  | MAGNETIC RESONANCES IN PEROVSKITE-TYPE LAYER STRUCTURES<br>W. Reusch, B. Zehender, K. Strobel and R. Geick, Physikalisches Inst., Wuerzburg, FRG.                                                                            | T-3-1:<br>1400                                                                     | MEASUREMENTS OF ELECTRON CYCLOTRON EMISSION WITH A CALIBRATED FOURIER TRANSFORM SPECTROMETER<br>K. Kawahata, N. Noda, T. Tetsuka and K. Sakai, Institute of Plasma Physics, Nagoya University, Japan                             |
| T-2-2:<br>1420                                                                                  | ANTIFERROMAGNETIC RESONANCES OF $(\text{CH}_3\text{NH}_3)_2\text{MnCl}_4$ IN A MAGNETIC FIELD AT ARBITRARY ANGLE TO THE EASY AXIS<br>W. Reusch, K. Strobel and R. Geick, Physikalisches Inst., Wuerzburg, FRG.               | T-3-2:<br>1420                                                                     | OBSERVATIONS OF ELECTRON CYCLOTRON EMISSION ON THE PLT TOKAMAK<br>F.J. Stauffer, D.A. Boyd and G.D. Tait, Univ. of Maryland, College Park, MD.                                                                                   |
| T-2-3:<br>1440                                                                                  | MAGNETIC EXCITATIONS IN $\text{Rb}_2\text{Cr}_{1-x}\text{Mn}_x\text{Cl}_4$ MIXED CRYSTALS<br>N. Kohles, K. Strobel and R. Geick, Physikalisches Inst., Wuerzburg, FRG.                                                       | T-3-3:<br>1440                                                                     | ECE MEASUREMENTS ON ASDEX<br>D.J. Campbell and A. Eberhagen, Max-Planck-Institut für Plasmaphysik, Garching, FRG.                                                                                                                |
| T-2-4:<br>1500                                                                                  | FAR INFRARED SPECTROSCOPY OF SUPERCONDUCTING $\text{NbN}$<br>D. Karecki, R. Pena and S. Perkowitz, Emory Univ., Atlanta GA.                                                                                                  | T-3-4:<br>1500                                                                     | TOKAMAK TEMPERATURE MEASUREMENT USING ELECTRON CYCLOTRON EMISSION AT THE THIRD HARMONIC<br>F. Pöhl, General Atomic Co., San Diego, CA.                                                                                           |
| T-2-5:<br>1520                                                                                  | NEAR-MILLIMETER WAVE STUDIES OF SUB-MICRON LAYERS OF DOPED GALLIUM ARSENIDE<br>G.J. Simonis, T.L. Worchesky, R.D. Felock, L.P. Erickson, G.D. O'Clock, Harry Diamond Lab., Adelphi, MD.                                      | T-3-5:<br>1520                                                                     | TFTR FAST-SCANNING HETERODYNE RECEIVER<br>R. Bitzer, M. Goldman, M. McCarthy, E. Fredd, V. Arunasalam, and P.C. Efthimion, Plasma Physics Lab., Princeton, N.J.                                                                  |
| T-2-6:<br>1540                                                                                  | ON THE SUBMILLIMETER-RESPONSE OF A QUASI-FREE CARRIER GAS IN THE PRESENCE OF A STRONG MAGNETIC FIELD<br>M. von Ortenberg, Max-Planck-Institute, Hochfeld-Magnet Lab., Grenoble, France.                                      | T-3-6:<br>1540                                                                     | DESIGN AND EVALUATION OF ANTENNAE FOR ELECTRON CYCLOTRON EMISSION (ECE) MEASUREMENTS ON LARGE TOROIDAL PLASMAS<br>E.A.M. Baker, A.E. Costley, W.H.M. Clark and A. Dellis, National Physical Lab., Teddington, Middlesex, England |
| T-2-7:<br>1600                                                                                  | ANOMALOUS STRESS SHIFT OF THE IMPURITY LINES IN TE UNDER HIGH HYDROSTATIC PRESSURE<br>U. Steigenberger, M.I. Eremets, S.G. Lapin, M. von Ortenberg, Yu. Kosichkin, Max-Planck-Inst., Hochfeld-Magnet Lab., Grenoble, France. | T-3-7:<br>1600                                                                     | SELF CALIBRATION OF TOKAMAK ELECTRON TEMPERATURE MEASUREMENTS BY ECE<br>L. Laurent, Association Euratom-Cea Sur La Fusion, Fontenay-Aux-Roses, France.                                                                           |
| T-2-8:<br>1620                                                                                  | CHARACTERIZATION OF IMPURITIES IN GaAs BY SUBMILLIMETER WAVE TECHNIQUES<br>M.N. Afsar and K.J. Button, M.I.T. National Magnet Lab., Cambridge, MA.                                                                           | T-3-8:<br>1620                                                                     | OPTICS FOR ELECTRON CYCLOTRON EMISSION STUDIES OF PLASMAS<br>D.A. Boyd, University of Maryland, College Park, MD.                                                                                                                |
| T-2-9:<br>1640                                                                                  | A SPECTROMETER FOR FIR MAGNETIC RESONANCE IN PULSED MAGNETIC FIELDS<br>P. Janssen, P. DeGroot, G. DeVos, F. Herlach and J. Witters, Katholieke Universiteit Leuven, Leuven, Belgium                                          | T-3-9:<br>1640                                                                     | TESTS OF FAST (~50 kHz) BOLOMETERS FOR NEAR-MILLIMETER FUSION APPLICATIONS<br>P.A.R. Ade, D. Boyd, I. Nolt, and J. Radostitz, Queen Mary College, London UK.                                                                     |
| T-2-10:<br>1700                                                                                 | FIR PARAMAGNETIC RESONANCE IN $\text{LiErF}_4$<br>P. DeGroot, P. Janssen, G. DeVos and F. Herlach, Katholieke Universiteit Leuven, Leuven, Belgium                                                                           | T-3-10:<br>1700                                                                    | EFFECT OF NEUTRON FLUX ON THE INDIUM ANTIMONIDE DETECTOR FOR THE TFTR GRATING POLYCHROMATOR<br>A.J. Cavallo, F.J. Stauffer, M. McCarthy, Plasma Physics Lab., Princeton, N.J.                                                    |
|                                                                                                 |                                                                                                                                                                                                                              | T-3-11:<br>1720                                                                    | A METHOD TO MEASURE ELECTRON DENSITY IN TOKAMAKS USING ELECTRON CYCLOTRON EMISSION<br>L. Laurent and P. Brossier, Association Euratom-Cea Sur La Fusion, Fontenay-Aux-Roses, France                                              |



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| Session T-4: <u>ATMOSPHERIC PROPAGATION</u><br>Coconut Palm Room<br>Presider: J.J. Gallagher |                                                                                                                                                                                                                                         | Session T-5: <u>MILLIMETER WAVE MIXERS &amp; DETECTORS</u><br>Banyan Room<br>Presider: T.G. Blaney |                                                                                                                                                                                                    |
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| T-4-1:<br>1400                                                                               | SPECTROPHONE MEASUREMENTS OF WATER VAPOR ABSORPTION COEFFICIENTS<br>B.L. Bean and K.O. White, White Sands Missile Range, NM.                                                                                                            | T-5-1:<br>1400                                                                                     | DETECTOR AND MIXER TECHNOLOGY FOR MILLIMETER WAVES (Invited Keynote Paper)<br>L.R. Whicker, M. Nisenoff and D.C. Webb, Naval Research Lab., Washington, D.C.                                       |
| T-4-2:<br>1420                                                                               | PROPAGATION OF VISIBLE AND INFRARED RADIATION IN SNOW AND RAIN<br>G.G. Gimmestad, L.W. Winchester, Jr., and S.M. Lee, Michigan Technological Univ., Houghton, MI.                                                                       | T-5-2:<br>1440                                                                                     | THE DEVELOPMENT OF SUBHARMONIC MIXERS FOR USE AT 183 TO 220 GHz<br>R.E. Forsythe, Georgia Inst. of Technology, Atlanta, GA.                                                                        |
| T-4-3:<br>1440                                                                               | INVESTIGATIONS OF THE BRIGHTNESS TEMPERATURE OF SNOW COVER IN SUBMILLIMETER WAVELENGTH REGION<br>L.I. Fedoseev, I.V. Kuznetsov, N.K. Polova and A.A. Shvetsov, Applied Physics Institute, Academy of Sciences of the USSR, Gorky, USSR. | T-5-3:<br>1500                                                                                     | A COMPACT JOSEPHSON MIXER APPARATUS FOR NEAR MILLIMETER HETERODYNE RECEIVERS<br>N.R. Cross and T.G. Blaney, National Physical Lab., Teddington, Middlesex, England.                                |
| T-4-4:<br>1500                                                                               | STATISTICAL PROPERTIES OF TROPICAL RAINFALL INTENSITY MEASURED AT ILE-IFE, A SOUTHERN STATION IN NIGERIA<br>G. O. Ajayi, Univ. of Ife, Ile-Ife, Nigeria.                                                                                | T-5-4:<br>1520                                                                                     | A HIGH SENSITIVITY NEAR-MILLIMETER WAVE PHOTOCONDUCTIVE DETECTOR USING MERCURY-CADMIUM-TELLURIDE<br>B.A. Weber and S.M. Kulpa, Harry Diamond, Lab., Adelphi, MD.                                   |
| T-4-5:<br>1520                                                                               | MEASUREMENT OF THE SPECTRAL THERMAL EMISSION OF THE ATMOSPHERE WITH AN AIRCRAFT<br>G. Finger and F.K. Kneubühl, ETH, Zürich, Switzerland                                                                                                | T-5-5:<br>1540                                                                                     | AN ADIABATIC DEMAGNETIZATION REFRIGERATOR FOR INFRARED BOLOMETERS<br>R.D. Britt and P.L. Richards, Univ. of California, Berkeley, CA.                                                              |
| T-4-6:<br>1540                                                                               | NEW ASSIGNMENTS IN THE SUBMILLIMETER SPECTRUM OF THE STRATOSPHERIC EMISSION<br>A. Bonetti, B. Carli, F. Mencaraglia, Istituto Di Ricerca, Sulle Onde Elettromagnetiche, Firenze, Italy.                                                 | T-5-6:<br>1600                                                                                     | NONLINEARITIES OF TUNGSTEN-NICKEL POINT-CONTACT DIODES: ARE WE CLOSE TO AN UNDERSTANDING OF THESE PUZZLING DEVICES?<br>H.D. Riccius, National Research Council of Canada, Ottawa, Ontario, Canada. |
| T-4-7:<br>1600                                                                               | LABORATORY STUDIES OF WATER VAPOR ABSORPTION IN THE ATMOSPHERIC WINDOW RANGES AT 35-90-140-220 GHz<br>H.J. Liebe, National Telecommunications and Information Administration, Boulder, CO.                                              | T-5-7:<br>1620                                                                                     | OPTIMUM SLENDER RATIO FOR MECHANICALLY AND THERMALLY STABLE HIGH POWER MOM POINT CONTACT INFRARED DETECTOR<br>C. Yu, M. Ndeti and S.A. Byers, North Carolina A & T State Univ., Greensboro, NC.    |
| T-4-8:<br>1620                                                                               | WATER VAPOR: ITS STRUCTURE AND ELECTROMAGNETIC ABSORPTION<br>H.R. Carlon, U.S. Army Armament Research and Development Command, Aberdeen Proving Ground, MD.                                                                             | T-5-8:<br>1640                                                                                     | BROADBAND NEP MEASUREMENTS FOR 10.6 $\mu$ m HETERODYNE RECEIVERS<br>E.R. Brown, Hughes Aircraft Co., Los Angeles, CA.                                                                              |
| T-4-9:<br>1640                                                                               | CALCULATION OF MILLIMETER WAVE OXYGEN ABSORPTION SPECTRA ON A SMALL MICRO-COMPUTER<br>D.J. Kozakoff, Georgia Inst. of Technology, Atlanta, GA.                                                                                          | T-5-9:<br>1700                                                                                     | QUASI-OPTICAL MILLIMETER-WAVE POWER COMBINER<br>L. Wandinger and V. Nalbandian, Electronics Research and Development Command, Fort Monmouth, NJ.                                                   |
| T-4-10:<br>1700                                                                              | RAIN-INDUCED ATTENUATION STATISTICS AT 36GHz and 55 GHz<br>F.C. Medeiros Filho, D.A.R. Jayasuriya and R.S. Cole, Univ. College, London UK.                                                                                              | T-4-13:<br>1800                                                                                    | THE EFFECTIVE HEIGHTS OF THE MILLIMETER WAVE RAIN ATTENUATION<br>E.V. Sukhonin and V.V. Stroganov, Inst. Radio Engineering and Electronics, Moscow, USSR                                           |
| T-4-11:<br>1720                                                                              | ATMOSPHERIC TRANSMITTANCE IN THE FAR INFRARED AT CUASI-EQUATORIAL ASTRONOMICAL OBSERVATORY OF VENEZUELA<br>V. De Cosmo, Dept. de Física - I.U.P.F.A.N., Maracay, Venezuela                                                              | T-4-14:<br>1820                                                                                    | INFRARED WAVE TRANSMISSION THROUGH CLOUDS WITH DIFFERENT MICROSTRUCTURE<br>V.P. Bisyarin and G.K. Tretyakov, Inst. Radio Engineering and Electronics, Moscow, USSR                                 |
| T-4-12:<br>1740                                                                              | REFLECTIVITY OF SOME MATERIALS AT 94 GHz<br>P.M. Alexander, U.S. Army Missile Command, Redstone Arsenal, AL                                                                                                                             |                                                                                                    |                                                                                                                                                                                                    |
| T-4-13 and T-4-14 →                                                                          |                                                                                                                                                                                                                                         |                                                                                                    |                                                                                                                                                                                                    |

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WEDNESDAY AFTERNOON  
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| Session W-2:GYROTRON |                                                                                                                                                                                                          | Session W-3:ASTRONOMY AND LOW-NOISE MILLIMETER |                                                                                                                                                                                                                                      |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Royal Palm Room      |                                                                                                                                                                                                          | <u>WAVE RECEIVERS</u>                          |                                                                                                                                                                                                                                      |
| Presider:Y.Y. Lau    |                                                                                                                                                                                                          | Coconut Palm Room                              |                                                                                                                                                                                                                                      |
|                      |                                                                                                                                                                                                          | Presider:G.V. Schultz                          |                                                                                                                                                                                                                                      |
| W-2-1:<br>1400       | RECENT THEORETICAL DEVELOPMENTS IN<br>GYROTRON RESEARCH (Invited Keynote<br>Paper)<br>K.R. Chu, Naval Research Lab.,<br>Washington, D.C.                                                                 | W-3-1:<br>1400                                 | FAR INFRARED OBSERVATION OF SUNSPOTS<br>WITH A BALLOON-BORNE 60 cm-TELESCOPE<br>(Invited Keynote Paper)<br>F.K. Kneubühl, F. Cartier, D. Huguenin<br>and E.A. Müller, ETH, Zürich,<br>Switzerland.                                   |
| W-2-2:<br>1440       | CYCLOTRON MASER INSTABILITY AS A<br>RESONANT LIMIT OF A SPACE CHARGE WAVE<br>Y.Y. Lau, J.M. Baird, L.R. Barnett,<br>K.R. Chu and V.L. Granatstein, Naval<br>Research Lab., Washington, D.C.              | W-3-2:<br>1440                                 | KEY DEVELOPMENT ITEMS IN THE REALIZA-<br>TION OF A 300-500 GHz HETERODYNE<br>SPECTROMETER<br>P. Clancy, ESTEC, European Space Agency,<br>Noordwijk, The Netherlands.                                                                 |
| W-2-3:<br>1500       | LAUNCHING LOSS IN THE REFLECTION WIDE-<br>BAND GYROTRON TRAVELLING WAVE AMPLI-<br>FIER (GYRO - TWT)<br>Y.Y. Lau, L.R. Barnett and V.L. Gran-<br>atstein, Naval Research Lab., Washing-<br>ton, D.C.      | W-3-3:<br>1500                                 | SUBMM HETERODYNE OBSERVATIONS OF THE<br>SUN, MOON, JUPITER AND ORION AT 693<br>GHz<br>H.P. Röser, G.V. Schultz, R. Wattenbach,<br>Max-Planck-Institut für Radioastronomie,<br>Bonn, FRG.                                             |
| W-2-4:<br>1520       | LINEAR THEORY OF GYROMONOTRON<br>L. Shenggang et.al, Chengdu Institute<br>of Radio Engineering, Sichuan,<br>Chengdu, P.R.C.                                                                              | W-3-4:<br>1520                                 | PRESSURE INDUCED FAR INFRARED SPECTRA<br>OF H <sub>2</sub> -He MIXTURE<br>G. Bâchet, Faculté des Sciences et<br>Techniques de Saint Jérôme, Marseille,<br>France.                                                                    |
| W-2-5:<br>1540       | COMPACT CYCLOTRON RESONANCE MASER<br>A. Kupiszewski and N.C. Luhmann, Jr.,<br>Univ. of California, Los Angeles, CA.                                                                                      | W-3-5:<br>1540                                 | THE DESIGN AND PERFORMANCE OF A 0.4<br>KELVIN BOLOMETRIC RECEIVER SYSTEM FOR<br>MILLIMETER ASTRONOMY.<br>P. Ade, J. Davis, R. Howard, I. Nolt,<br>J. Payne, S. Predko, and J. Radostitz,<br>Queen Mary College, London, UK.          |
| W-2-6:<br>1600       | A METHOD FOR OPTIMIZING THE RF-FIELD<br>DISTRIBUTION IN A GYROMONOTRON<br>H.Döring and Yu Wei, Rhein.-Westf.<br>Technischen Hochschule, Aachen, FRG.                                                     | W-3-6:<br>1600                                 | A PORTABLE, ALL SOLID-STATE LOW-NOISE<br>RECEIVER FOR 230 GHz<br>J.W. Archer, National Radio Astronomy<br>Observatory, Charlottesville, VA.                                                                                          |
| W-2-7:<br>1620       | LOW VELOCITY SPREAD GUNS FOR 35 GHz<br>GYRO-TWTS<br>J.M. Baird, L.R. Barnett and C. Kyler,<br>B-K Dynamics, Rockville, MD.                                                                               | W-3-7:<br>1620                                 | A CRYOGENIC RECEIVER FOR 1mm WAVELENGTH<br>N.R. Erickson, Univ. of Massachusetts,<br>Amherst, MA.                                                                                                                                    |
| W-2-8:<br>1640       | OPTIMIZATION OF OPERATING PARAMETERS<br>OF GYROMONOTRON<br>M. Chu and H.S. Wu, Vacuum Electron<br>Devices Research Inst., Beijing, PRC.                                                                  | W-3-8:<br>1640                                 | AN ULTRA LOW-NOISE SCHOTTKY MIXER RE-<br>CEIVER AT 80-120 GHz<br>A. Raisanen, N. Erickson, J. Marrero,<br>P. Goldsmith and R. Predmore, Univ.<br>of Massachusetts, Amherst, MA.                                                      |
| W-2-9:<br>1660       | LINEAR THEORY OF SLOW WAVE CYCLOTRON<br>AMPLIFIER IN A DIELECTRIC LOADED<br>PARALLEL PLATE WAVEGUIDE SYSTEM<br>C.L. Chang and H.S. Wu, Vacuum Elec-<br>tron Devices Research Institute,<br>Beijing, PRC. | W-3-9:<br>1700                                 | A COHERENT 225 GHz RECEIVER<br>R.E. Forsythe, Georgia Inst. of Tech-<br>nology, Atlanta, GA.                                                                                                                                         |
|                      |                                                                                                                                                                                                          | W-3-10:<br>1720                                | MILLIMETER-WAVE RADIOMETER SYSTEM FOR<br>AN ATMOSPHERIC RESEARCH SATELLITE<br>W.J. Wilson and J.W. Waters, Jet<br>Propulsion Lab., Pasadena, CA.                                                                                     |
|                      |                                                                                                                                                                                                          | W-3-11:<br>1740                                | A PHOTOPOLARIMETER FOR FAR INFRARED<br>MEASUREMENTS<br>A. Blanco, F. D'Alessandro, P. DeBer-<br>nardis, G. Dall'Oglio, S. Fonti, S.<br>Masi, F. Melchiorri, Istituto di<br>Fisica dell'Università-Lecce, Italy.                      |
|                      |                                                                                                                                                                                                          | W-3-12:<br>1800                                | CO (J=6→5) DISTRIBUTION IN ORION AND<br>DETECTION IN OTHER GALACTIC SOURCES<br>D. Buhl, G. Chin, G.A. Koepf, D.D.<br>Peck, H.R. Fetterman, P.E. Tannenwald,<br>and B.J. Clifton, NASA/Goddard Space<br>Flight Center, Greenbelt, MD. |

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WEDNESDAY AFTERNOON  
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| Session W-4: GUIDED PROPAGATION |                                                                                                                                                                          | Session W-5: SPECTROSCOPY |                                                                                                                                                                                               |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Banyan Room (Mezzanine)         |                                                                                                                                                                          | Cypress Room (Mezzanine)  |                                                                                                                                                                                               |
| Presider: D. Harris             |                                                                                                                                                                          | Presider: B. Carli        |                                                                                                                                                                                               |
| W-4-1:<br>1400                  | A COMPARATIVE STUDY OF MILLIMETER-WAVE TRANSMISSION LINES (Invited-Key-note Paper)<br>T. Itoh and J. Rivera, Univ. of Texas, Austin, TX.                                 | W-5-1:<br>1400            | FIR DETECTION IN THE PRESENCE OF HIGH HYDROSTATIC PRESSURE<br>U. Steigenberger, M.I. Eremets, S.G. Lapin and A.M. Shirokov, Univ. of Wuerzburg, FRG.                                          |
| W-4-2:<br>1440                  | SOME NEW ASPECTS OF THE ELECTROMAGNETIC WAVE PROPAGATION THROUGH DIELECTRIC MEDIUM<br>J. Soln, Harry Diamond Lab., Adelphi, MD.                                          | W-5-2:<br>1420            | FIR TWO-PHOTON TRANSITIONS IN n-GaAs<br>W. Böhm, E. Ettlinger and W. Prettl, Universität Regensburg, Regensburg, FRG.                                                                         |
| W-4-3:<br>1500                  | NONRADIATIVE DIELECTRIC WAVEGUIDE CIRCUIT COMPONENTS<br>T. Yoneyama and S. Nishida, Research Inst. of Electrical Communication, Sendai, Japan.                           | W-5-3:<br>1440            | A NEW METHOD OF PHONON DETECTION USING TIME-RESOLVED FAR-INFRARED LASER SPECTROSCOPY<br>H. Lengfellner and K.F. Renk, Univ. Regensburg, Regensburg, FRG.                                      |
| W-4-4:<br>1520                  | COMPUTER ANALYSIS OF RECTANGULAR DIELECTRIC WAVEGUIDE FOR MILLIMETER WAVES<br>E. Schweig and W.B. Bridges, California Inst. of Technology, Pasadena, CA.                 | W-5-4:<br>1500            | FIR IMPURITY SPECTROSCOPY OF MBE GaAs<br>R. Meisels, F. Kuchar, H. Burkhard and G. Weimann, Inst. f. Festkörperphysik, University, Vienna, Austria.                                           |
| W-4-5:<br>1540                  | DIELECTRIC WAVEGUIDE CIRCULATOR<br>R.A. Stern and R.W. Babbitt, Eradcom, Fort Monmouth, N.J.                                                                             | W-5-5:<br>1520            | HETERODYNE SPECTROSCOPY WITH TUNABLE LASER SIDEBANDS<br>G. Magerl, W. Schupita, Institut für Nachrichtentechnik, T.U. Wien, Vienna, Austria.                                                  |
| W-4-6:<br>1600                  | FLEXIBLE DIELECTRIC WAVEGUIDE FOR MILLIMETER WAVE APPLICATIONS USING EXPANDED PTFE DIELECTRIC<br>R.K. Moorthy, W.L. Gore and Associates, Inc. Newark, DE.                | W-5-6:<br>1540            | COLLISION INDUCED FAR INFRARED ABSORPTION AT HIGH PRESSURES IN MIXED RARE GAS SYSTEMS<br>R.P. Lowndes and A.K. Pastogi, Northeastern Univ., Boston, MA.                                       |
| W-4-7:<br>1620                  | ANALYSIS OF A NEAR MILLIMETER WAVE, PERIODICALLY LOADED, MICROSTRIP TRANSMISSION LINE ANTENNA<br>A.R. Sindoris, M. Campi and S.T. Hayes, U.S. Army ERADCOM, Adelphi, MD. | W-5-7:<br>1600            | TUNABLE LASER SIDEBAND SPECTROMETER<br>E. Bonek and G. Magerl, Inst. für Nachrichtentechnik, T.U. Wien, Vienna, Austria.                                                                      |
| W-4-8:<br>1640                  | CONTROL OF DIFFRACTION LOBES IN THE MILLIMETER REGION<br>A. Blanco, W.D. Duncan, S. Fonti, Istituto di Fisica, Univ. of Lecce, Italy.                                    | W-5-8:<br>1620            | ESR IN n-InSb UNDER UNIAXIAL STRESS<br>F. Kuchar, R. Meisels and M. Kriechbaum, Inst. f. Festkörperphysik, Univ., Vienna, Austria.                                                            |
| W-4-9:<br>1700                  | QUASI-OPTICAL RING RESONATOR DIPLEXERS: THEORY AND EXPERIMENT<br>A.E. Chiou and H.M. Pickett, Jet Propulsion Lab., Pasadena, CA.                                         | W-5-9:<br>1640            | OPTICALLY PUMPING OF CH <sub>3</sub> Br USING A CW WAVEGUIDE CO <sub>2</sub> LASER<br>M. Inguscio, S. Marchetti, A. Moretti and F. Strumia, Istituto di Fisica dell' Università, Pisa, Italy. |
| W-4-10:<br>1720                 | WAVE GUIDING OF FAR INFRARED RADIATION FOR THE JET INTERFEROMETER<br>J.P. Crenn and D. Véron, Association Euratom-Cea Sur La Fusion, Fontenay-Aux-Roses, France.         |                           |                                                                                                                                                                                               |
| W-4-11:<br>1740                 | THEORY OF MULTIPLE SCATTERING OF ELECTROMAGNETIC WAVES BY TWO PROLATE SPHEROIDS<br>R. Deleuil and J. Dalmas, Univ. de Provence, Marseille, France.                       |                           |                                                                                                                                                                                               |

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| THURSDAY AFTERNOON<br>December 10, 1981 |                                                                                                                                                                   | 1400 hours | THURSDAY AFTERNOON<br>December 10, 1981             |                                                                                                                                                                                                                              |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Session Th-2:GYROTRON                   |                                                                                                                                                                   |            | Session Th-3:MILLIMETER AND SUBMILLIMETER MATERIALS |                                                                                                                                                                                                                              |
| Royal Palm Room                         |                                                                                                                                                                   |            | Cypress Room (Mezzanine)                            |                                                                                                                                                                                                                              |
| Presider:Richard J. Temkin              |                                                                                                                                                                   |            | Presider:George W. Chantry                          |                                                                                                                                                                                                                              |
| Th-2-1:<br>1400                         | HIGH POWER, 140 GHz GYROTRON<br>K.E. Kreischer, R.J. Temkin, W.J. Mulligan and S. MacCabe, Mass. Inst. of Technology, Cambridge, MA.                              |            | Th-3-1:<br>1400                                     | MEASUREMENT OF THE DIELECTRIC CONSTANT AND LOSS TANGENT OF THALLIUM MIXED HALIDE CRYSTALS KRS-5 AND KRS-6 AT 95 GHz<br>W.B. Bridges, M.B. Klein and E. Schweig, Cal. Inst. of Technology, Pasadena, CA.                      |
| Th-2-2:<br>1420                         | GENERAL THEORY AND DESIGN OF OPEN MICROWAVE RESONATORS<br>Z. Le-Zhu, X. Cheng-He, G. Zhong-Lin, Peking University, PRC.                                           |            | Th-3-2:<br>1420                                     | MILLIMETER REFLECTION AND TRANSMISSION MEASUREMENTS OF THIN RESISTIVE SHEETS<br>R.L. Moore and J.W. Bond, Georgia Inst. of Technology, Atlanta, GA.                                                                          |
| Th-2-3:<br>1440                         | THEORY OF OPEN RESONATORS IN THE FORM OF THE WAVEGUIDE WITH SLOWLY VARYING CROSS SECTIONS<br>Q.F. Li, J.L. Hirshfield, and K.R. Chu, Yale Univ., New Haven, CT.   |            | Th-3-3:<br>1440                                     | THE TRANSMISSION SPECTRA OF SOME POTENTIAL RADOME MATERIALS FOR MILLIMETRE AND NEAR MILLIMETRE WAVELENGTH APPLICATIONS<br>J.R. Birch, J.D. Dromey and R.L.T. Street, National Physical Lab., Teddington, Middlesex, England. |
| Th-2-4:<br>1500                         | COMPARISON OF THEORETICAL PERFORMANCE IN THE SLOW AND FAST WAVE GYROTRON AMPLIFIERS<br>S. Ahn, Naval Research Lab., Washington, D.C.                              |            | Th-3-4:<br>1500                                     | MILLIMETER AND SUBMILLIMETER MEASUREMENTS OF COMPLEX DIELECTRIC PARAMETERS OF MATERIALS<br>M.N. Afsar and K.J. Button, M.I.T. National Magnet Lab., Cambridge, MA.                                                           |
| Th-2-5:<br>1520                         | LINEAR THEORY OF A GYRO-SLOW-WAVE-AMPLIFIER FOR TE <sub>02</sub> -MODE<br>S.Y. Park, J.M. Baird and J.L. Hirshfield, B-K Dynamics, Inc., Rockville, MD.           |            | Th-3-5:<br>1520                                     | MATERIALS IMPLICATIONS ON MILLIMETER WAVE RADOME PERFORMANCE<br>D.J. Kozakoff and J.D. Hensel, Georgia Inst. of Technology, Atlanta, GA.                                                                                     |
| Th-2-6:<br>1540                         | OPERATION OF GYROTRONS WITH VERY LOW Q CAVITIES<br>M.E. Read, A.W. Fliflet, and K.R. Chu, Naval Research Lab., Washington, D.C.                                   |            | Th-3-6:<br>1540                                     | INFRARED PROPERTIES OF QUARTZ FIBRES<br>F. Thiébaud and F.K. Kneubühl, ETH, Zürich, Switzerland.                                                                                                                             |
| Th-2-7:<br>1600                         | DESIGN OF A PROOF OF PRINCIPLE EXPERIMENT FOR A QUASI-OPTICAL GYROTRON<br>K.Kim, M. Read, and J.Vomvoridis, Naval Research Lab., Washington, D.C.                 |            | Th-3-7:<br>1600                                     | THE FAR INFRARED REFLECTANCE OF OPTICAL BLACK COATINGS<br>S.M. Smith, NASA/AMES Research Center, Moffett Field, CA.                                                                                                          |
| Th-2-8:<br>1620                         | SECOND HARMONIC-ONE MILLIMETER CYROMONOTRON<br>J.D. Silverstein, R.M. Curnutt and M.E. Read, U.S. Army Electronics Research and Development Command, Adelphi, MD. |            | Th-3-8:<br>1620                                     | MEASUREMENT OF THE OPTICAL CONSTANTS OF InSb AT 4.2K AND 1.5K.<br>G. Ya-Qian, E.A.M. Baker, J.R. Birch, A.E. Costley, Univ. of Essex, Colchester, Essex, England.                                                            |
| Th-2-9:<br>1640                         | SPACE CHARGE EFFECTS IN GYROTRON USING SOLID ELECTRON BEAM<br>H. Keren and J.L. Hirshfield, Yale Univ., New Haven, CT.                                            |            | Th-3-9:<br>1640                                     | STUDY OF STRESS AND PRESSURE INDUCED CRYSTALLINE PHASE TRANSITIONS IN HIGH POLYMERS USING SUBMILLIMETER SPECTROSCOPY<br>W.F.X. Frank, U. Leute and W. Strohmeier, AEG-Telefunken, Ulm, FRG.                                  |
| Th-2-10:<br>1700                        | GENERAL OPERATIONAL CHARACTERISTICS OF THE CYROMONOTRON<br>R.C. Lee, J.L. Hirshfield, and K.R. Chu, Yale Univ., New Haven, CT.                                    |            | Th-3-10:<br>1700                                    | CORRECTION OF PHASE ERRORS IN FAR INFRARED FOURIER TRANSFORM SPECTROSCOPY<br>D.B. Tanner and C.D. Porter, Ohio State Univ., Columbus, OH.                                                                                    |

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THURSDAY AFTERNOON  
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| Session Th-4:IMAGING                       |                                                                                                                                                                                                                | Session Th-5:LASERS                            |                                                                                                                                                                                                                    |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Coconut Palm Room<br>Presider:M.F. Kimmitt |                                                                                                                                                                                                                | Banyan Room (Mezzanine)<br>Presider: K. Mizuno |                                                                                                                                                                                                                    |
| Th-4-1:<br>1400                            | IMAGING ANTENNA ARRAYS (Invited<br>Keynote Paper)<br>D.B. Rutledge, California Inst. Tech.,<br>Pasadena, CA.                                                                                                   | Th-5-1:<br>1400                                | SEMICONDUCTOR RAMAN LASER FOR FAR<br>INFRARED GENERATION (Invited Keynote<br>Paper) J. Nishizawa and K. Suto, Tohoku<br>University, Sendai, Japan.                                                                 |
| Th-4-2:<br>1450                            | AN AIRBORNE IMAGING SYSTEM AT 140 AND<br>220 GHz<br>J.P. Hollinger, M.F. Hartman, R.E.<br>Forsythe and J.J. McSheehy, Naval<br>Research Lab., Washington, D.C.                                                 | Th-5-2:<br>1440                                | LETHARGIC GAIN<br>T.A. DeTemple and H.K. Chung, Univ.<br>of Illinois, Urbana, IL.                                                                                                                                  |
| Th-4-3:<br>1510                            | A SEGMENTED APERTURE APPROACH TO<br>HIGH RESOLUTION MMW IMAGING<br>D.E. Schmieder, R. Loefer, and R.<br>Weathersby,                                                                                            | Th-5-3:<br>1500                                | THE PHASE FRONT CURVATURE OF LIGHT<br>GUIDED IN LOSSY HOLLOW DIELECTRIC<br>WAVEGUIDES<br>M. Tacke, Physikalisches Institut der<br>Universitaet, Wuerzburg, FRG.                                                    |
| Th-4-4:<br>1530                            | NEAR MILLIMETER IMAGERY WITH THE PY-<br>ROELECTRIC VIDICON<br>M.F. Kimmitt, E.H. Putley, C. Smith<br>and W.M. Wreathall, Univ. of Essex,<br>UK.                                                                | Th-5-4:<br>1520                                | INTRACAVITY PUMPED FIR NH <sub>3</sub> LASER BY<br>TE CO <sub>2</sub> LASER<br>H. Hirose, H. Matsuda and S. Kon,<br>Nagoya Univ., Furo-cho, Chikusa-ku<br>Nagoya, Japan.                                           |
| Th-4-5:<br>1550                            | PHOTOTHERMAL NONDESTRUCTIVE MATERIAL<br>TESTING AND IMAGING<br>G. Busse, Hochschule der Bundeswehr<br>München, Neubiberg, FRG.                                                                                 | Th-5-5:<br>1540                                | COUPLING LOSSES IN WAVEGUIDE LASERS<br>CONTAINING A DIFFRACTION GRATING<br>A.M. Holohan, S.L. Prunty and M.C.<br>Sexton, Univ. College, Cork, Ireland.                                                             |
| Th-4-6:<br>1610                            | AIRBORNE MILLIMETER WAVE RADIOMETER<br>FOR 94/183 GHz ATMOSPHERIC MEASURE-<br>MENTS AT HIGH ALTITUDE<br>J.A. Gagliano, J.J. McSheehy, T.T.<br>Wilheit, J.L. King, Georgia Inst.<br>of Technology, Atlanta, GA. | Th-5-6:<br>1600                                | LENSING EFFECTS IN CW FIR OPTICALLY<br>PUMPED LASERS<br>J.M. Lourtioz and R. Adde, Université<br>Paris XI, Orsay, France.                                                                                          |
| Th-4-7:<br>1630                            | RADIOMETRIC DETECTION OF ICE ON THE<br>SPACE SHUTTLE CRYOGENIC FUEL TANK<br>J. Newton, M. Foster, Georgia Inst.<br>of Technology, Atlanta, GA.                                                                 | Th-5-7:<br>1620                                | THE SO <sub>2</sub> SUBMILLIMETER WAVE LASER<br>J.P. Sättler, G.J. Simonis, G.L. Wood,<br>M.S.Tobin and W.J. Lafferty, U.S. Army<br>Harry Diamond Lab., Adelphi, MD.                                               |
| Th-4-8:<br>1650                            | PROGRESS IN SUBMILLIMETER INTEGRATED-<br>CIRCUIT IMAGING ARRAYS<br>M.S.Muha,D.P.Neikirk and D.B. Rutledge,<br>California Inst. of Technology,<br>Pasadena, CA.                                                 | Th-5-8:<br>1640                                | INFRARED-INFRARED DOUBLE RESONANCE<br>IN CH <sub>3</sub> OH, CH <sub>3</sub> OD AND CD <sub>3</sub> OD<br>J.C. Petersen, G. Duxbury, H. Kato,<br>and M.L. LeLerre, University of<br>Strathclyde, Glasgow, Scotland |

PROGRAM OF INVITED KEYNOTE SPEAKERS  
AND CONTRIBUTED PAPERS

FRIDAY MORNING  
December 11, 1981

0900 hours

FRIDAY MORNING  
December 11, 1981

| Session F-1: LASERS                        |                                                                                                                                                                                                                   | Session F-2: MILLIMETER WAVE SYSTEMS             |                                                                                                                                                                                                 |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Royal Palm Room<br>Presider: F.K. Kneubühl |                                                                                                                                                                                                                   | Banyan Room (Mezzanine)<br>Presider: J.C. Wiltse |                                                                                                                                                                                                 |
| F-1-1:<br>0900                             | (Invited Keynote Paper)<br>F. Strumia, Istituto di Fisica dell'<br>Universita, Pisa, Italy.                                                                                                                       | F-2-1:<br>0900                                   | 225 GHz RADAR SYSTEM<br>C.W. Trussell, R.W. McMillan, R.E.<br>Forsythe and R.A. Bohlander, Night<br>Vision & Electro-Optics Lab., Fort<br>Belvoir, Virginia                                     |
| F-1-2:<br>0940                             | CONTINUOUSLY TUNABLE CO <sub>2</sub> LASER FOR<br>RAMAN FIR LASER PUMPING<br>P. Mathieu and J. Rizzatt, Université<br>Laval, Quebec, Canada                                                                       | F-2-2:<br>0920                                   | 140 GHz MICROWAVE SPECTROMETER FOR<br>GASEOUS POLLUTANT DETECTION<br>W.F. Kolbe and B. Leskovar, Lawrence<br>Berkeley Lab., Berkeley, CA.                                                       |
| F-1-3:<br>1000                             | A FAR-INFRARED ROOFTOP RESONATOR<br>D.K. Mansfield, A. Semet and L.C.<br>Johnson, Princeton Plasma Physics<br>Lab., Princeton, N.J.                                                                               | F-2-3:<br>0940                                   | MMW SIMULATOR DESIGN CONSIDERATIONS<br>FOR HARDWARE-IN-THE-LOOP GUIDANCE<br>SYSTEM EVALUATION<br>J.M. Schuchardt and D.J. Kozakoff<br>Georgia Inst. of Tech., Atlanta, GA.                      |
| F-1-4:<br>1020                             | INTENSITY MODULATION OF A SUBMILLI-<br>METER LASER WITH A SCHOTTKY BARRIER<br>DIODE<br>K. Mizuno and T. Suzuki, Tohoku<br>Univ., Sendai, Japan.                                                                   | F-2-4:<br>1000                                   | RADAR CROSS SECTION PREDICTION OF A<br>CONICAL SPIRAL ANTENNA BY GTD<br>M.S. Soheli, General Dynamics, Fort<br>Worth, TX.                                                                       |
| F-1-5:<br>1040                             | GENERATION OF TUNABLE RADIATION FOR<br>SUBMILLIMETER SPECTROSCOPY<br>C.R. Jones, H. Dave, and J.M. Dutta,<br>No. Carolina Central Univ., Durham,<br>NC.                                                           | F-2-5:<br>1020                                   | A QUASI-OPTICAL SCANNING MULTI-PORT<br>(QUOSM) NETWORK ANALYZER<br>R.A. Bohlander, A. McSweeney, J.M.<br>Newton and R.G. Shackelford, Georgia<br>Inst. of Tech., Atlanta, GA.                   |
| F-1-6:<br>1100                             | TUNABLE FAR-INFRARED RADIATION FROM<br>OPTICALLY PUMPED POTASSIUM RYDBERG<br>TRANSITIONS<br>W.A. Bookless, L.W. Hrubesh, C.G.<br>Stevens and E.A. Rinehart, Lawrence<br>Livermore National Lab., Livermore, CA.   | F-2-6:<br>1040                                   | ANALYSIS AND DESIGN APPROACH FOR 200<br>GHz FREQUENCY TRIPLERS<br>M.A. Frerking and A.L. Riley, Jet<br>Propulsion Lab., Pasadena, CA.                                                           |
| F-1-7:<br>1120                             | HIGH REPETITION RATE CO <sub>2</sub> LASER<br>J.M. Telle, Los Alamos National Lab.,<br>Los Alamos, N.M.                                                                                                           | F-2-7:<br>1100                                   | NEW RESULTS FOR NEAR-MILLIMETER WAVE<br>ISOLATORS AND PHASE SHIFTERS BASED ON<br>MAGNETOPLASMONS ON GaAs SUBSTRATES<br>W.-L. Hwang, S.H. Talisa and D.M. Bolle,<br>Lehigh Univ., Bethlehem, PA. |
| F-1-8:<br>1140                             | A COMPARISON BETWEEN CONVENTIONAL AND<br>WAVEGUIDE CO <sub>2</sub> LASER AS A PUMP FOR FIR<br>LASERS<br>N. Ioli, G. Moruzzi, M. Pellegrino<br>and F. Strumia, Istituto di Fisica<br>dell'Università, Pisa, Italy. | F-2-8:<br>1120                                   | A MM-WAVE COLLISION WARNING DEVICE FOR<br>HELICOPTERS<br>W.F.X. Frank, B. Rembold, H.-G. Wippich<br>and E. Woelfle, AEG-Telefunken AG, Ulm,<br>FRG.                                             |
|                                            |                                                                                                                                                                                                                   | F-2-9:<br>1140                                   | ON THE THEORY OF PRINTED CIRCUIT AN-<br>TENNAS FOR MILLIMETER WAVES<br>P.L. Katehi and N.G. Alexopoulos, Univ.<br>of California, Los Angeles, CA.                                               |

PROGRAM OF INVITED KEYNOTE SPEAKERS  
AND CONTRIBUTED PAPERS

FRIDAY MORNING  
December 11, 1981

0900 hours

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Session F-3: FREE ELECTRON LASER

Coconut Palm Room

Presider: J. Hirshfield

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- F-3-1:       THEORY OF THE FREE ELECTRON LASER  
0900       (Invited Keynote Paper)  
            C.M. Tang and P. Sprangle, Naval  
            Research Lab., Washington, D.C.
- F-3-2:       RESULTS OF THE LOS ALAMOS NATIONAL  
0940       LABORATORY FREE ELECTRON LASER EXPER-  
            IMENT (Invited Keynote Paper)  
            R.W. Warren, B.E. Newman, W.E. Stein  
            and C.A. Brau, Los Alamos National  
            Lab., Los Alamos, N.M.
- F-3-3:       FREE ELECTRON LASER CAVITY RESONATOR  
1020       THEORY  
            D.S. Birkett and T.C. Marshall,  
            Columbia Univ., New York, N.Y.
- F-3-4:       A MM-WAVE RAMAN FREE ELECTRON LASER  
1040       EXPERIMENT  
            S.H. Gold, R.H. Jackson, R.K. Parker,  
            V.L. Granatstein, H.P. Freund, P.C.  
            Efthimion, M. Herndon and A.K.  
            Kinkead, Naval Research Lab., Washing-  
            ton, D.C.
- F-3-5:       EXACT MAGNETIC FIELD OF A HELICAL  
1100       WIGGLER  
            S.Y. Park, J.M. Baird and J.L.  
            Hirshfield, B-K Dynamics, Inc., Rock-  
            ville, MD.
- F-3-6:       MAGNETIC RESONANT THREE DIMENSIONAL  
1120       KINETIC THEORY OF THE FREE ELECTRON  
            LASER WITH WAVEGUIDE CAVITY  
            C.-Y. Wang, Univ. of Science Tech. of  
            China, Hefei, PRC.
- F-3-7:       SYNCHROTRON FREE ELECTRON LASER  
1140       A.M. Afonin, V.V. Dolmatov, V.I.  
            Kanavets, A.N. Sandalov, A.V. Terebilov  
            and V.A. Cherepenin, Moscow State  
            Univ., Moscow, USSR.



PROGRAM OF INVITED KEYNOTE SPEAKERS  
AND CONTRIBUTED PAPERS

FRIDAY AFTERNOON  
December 11, 1981

1400 hours

FRIDAY AFTERNOON  
December 11, 1981

| Session F-4: LASERS                     |                                                                                                                                                                                          | Session F-5: MILLIMETER SOURCES AND COMPONENTS    |                                                                                                                                                                                                                           |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Royal Palm Room<br>Presider: M.S. Tobin |                                                                                                                                                                                          | Banyan Room (Mezzanine)<br>Presider: W.F.X. Frank |                                                                                                                                                                                                                           |
| F-4-1:<br>1400                          | FREQUENCY TUNING AND EFFICIENCY ENHANCEMENT OF HIGH POWER FIR LASERS (Invited Keynote Paper)<br>B.G. Danly, R.J. Temkin and B. Lax, M.I.T., Cambridge, MA.                               | F-5-1:<br>1400                                    | WIDE APERTURE NOISE STANDARD SOURCES FOR ANTENNA PARAMETERS CALIBRATION<br>V.A. Lander, Airtron Corp., Morris Plains, N.J.                                                                                                |
| F-4-2:<br>1440                          | RESONANT SECOND HARMONIC GENERATION<br>T.A. DeTemple, L.A. Bahler and J. Osmundsen, Univ. of Illinois, Urbana, IL.                                                                       | F-5-2:<br>1420                                    | ELECTROMAGNETIC STUDY OF THE GRATING-ENHANCED EXCITATION OF A FAR INFRARED SURFACE WAVE<br>M. Neviere and R. Reinisch, Faculté des Sciences et Techniques, Centre de St Jérôme, Marseille, France.                        |
| F-4-3:<br>1500                          | NEW FIR LASER EMISSION BY OPTICAL PUMPING WITH A TUNABLE CW WAVEGUIDE CO <sub>2</sub> LASER<br>M. Inguscio, N. Ioli, A. Moretti and F. Strumia, Istituto di Fisica, Pisa, Italy.         | F-5-3:<br>1440                                    | CHARACTERISTICS OF PHASE CORRECTING FRESNEL ZONE PLATE ANTENNAS<br>J.C. Wiltse, Georgia Inst. of Technology, Atlanta, GA.                                                                                                 |
| F-4-4:<br>1520                          | DOPPLER-FREE OPTOACOUSTIC SPECTROSCOPY IN CH <sub>3</sub> OH AND CH <sub>2</sub> F <sub>2</sub><br>Y. Tsunawaki, M. Yamanaka and S. Fujita, Osaka Industrial Univ., Osaka, Japan         | F-5-4:<br>1500                                    | MILLIMETER WAVE AMPLIFICATION IN THE NEGATIVE GLOW<br>A.J. Palmer, Hughes Research Lab., Malibu, CA.                                                                                                                      |
| F-4-5:<br>1540                          | THEORY ON DISTRIBUTED FEEDBACK (DFB) LASERS WITH STRONG PERIODIC MODULATIONS<br>S. Gnepf, H.P. Preiswerk and F.K. Kneubühl, ETH, Zürich, Switzerland                                     | F-5-5:<br>1520                                    | SECOND HARMONIC GENERATION IN LiNbO <sub>3</sub> AND LiTaO <sub>3</sub> IN THE MILLIMETER WAVE REGION<br>B.H. Ahn, W.W. Clark, III, R.R. Shurtz, II and C.D. Bates, Night Vision & Electro-Optics Lab., Fort Belvoir, VA. |
| F-4-6:<br>1600                          | OPTICALLY PUMPED DISTRIBUTED FEEDBACK (DFB) 496 $\mu$ m CH <sub>3</sub> F LASER<br>H.P. Preiswerk, A. Rozkwitalski, S. Gnepf and F.K. Kneubühl, Physics Dept., ETH, Zürich, Switzerland. | F-5-6:<br>1540                                    | HARMONIC GENERATION IN THE NEAR-MILLIMETER-WAVE RANGE BY THIN MOS-STRUCTURES<br>U. Lieneweg and J. Maserjian, Jet Propulsion Lab., Pasadena, CA.                                                                          |
| F-4-7:<br>1620                          | PUMP SATURATION IN OPTICALLY PUMPED FIR LASERS AND NON-LINEAR HANLE EFFECT<br>M. Inguscio, A. Moretti, F. Strumia, K. Ernst, Istituto di Fisica dell'Università, Pisa, Italy.            | F-5-7:<br>1600                                    | LIMITING PERFORMANCE OF RADIOMETER SENSORS<br>J.M. Schuchardt and J.C. Wiltse, Georgia Inst. of Tech., Atlanta, GA.                                                                                                       |
|                                         |                                                                                                                                                                                          | F-5-8:<br>1620                                    | FABRY-PEROT INTERFEROMETER FOR FAR INFRARED SPECTROSCOPY<br>H. Blancher, G. Bachet and R. Coulon, Faculté des Sciences et Techniques de Saint Jérôme, Marseille, France.                                                  |
|                                         |                                                                                                                                                                                          | F-5-9:<br>1640                                    | OPTICAL TESTS OF QUASI-OPTICAL COMPONENTS FOR THE MM REGION<br>O.A. Simpson and R.A. Bohlander, Georgia Inst. of Technology, Atlanta, GA.                                                                                 |

PROGRAM OF INVITED KEYNOTE SPEAKERS  
AND CONTRIBUTED PAPERS

FRIDAY AFTERNOON  
December 11, 1981

1400 hours

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Session F-6: FREE ELECTRON LASER

Coconut Palm Room

Presider:

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- F-6-1: 1400 A FREE ELECTRON LASER DRIVEN BY A  
LONG PULSE INDUCTION LINAC (Invited  
Keynote Paper)  
C.W. Roberson, J. Pasour, F. Mako, R.  
Lucey, R. Gilgenbach and P. Sprangle,  
Naval Research Lab., Washington, D.C.
- F-6-2: 1440 EVOLUTION OF AMPLIFIED RADIATION ON  
A FINITE LENGTH AND RADIUS ELECTRON  
BEAM  
P. Sprangle and C.M. Tang, Naval Re-  
search Lab., Washington, D.C.
- F-6-3: 1500 CERENKOV-RAMAN FREE ELECTRON LASERS  
J.E. Walsh, S. von Laven, J. Branscum  
and R.W. Layman, Dartmouth College,  
Hanover, N.H.
- F-6-4: 1520 COLLECTIVE EFFECTS ON THE OPERATION OF  
FREE ELECTRON LASERS WITH AN AXIAL  
GUIDE FIELD  
H.P. Freund and P. Sprangle, Naval  
Research Lab., Washington, D.C.
- F-6-5: 1540 A FREE ELECTRON TRAVELING-WAVE-TUBE  
L.W. Davis and G. Patsakos, Univ. of  
Idaho, Moscow, ID.
- F-6-6: 1600 CHIRPED PULSES IN TAPERED-WIGGLER FREE  
ELECTRON LASER OSCILLATORS  
J.C. Goldstein, Los Alamos National  
Lab., Los Alamos, N.M.
- F-6-7: 1620 3-D NONLINEAR THEORY OF THE FREE  
ELECTRON LASER FOR AN ELECTRON BEAM  
WITH FINITE AXIAL AND TRANSVERSE  
DIMENSIONS  
P. Sprangle and Cha-Mei Tang, Naval  
Research Lab., Washington, D.C.

PROGRAM OF INVITED KEYNOTE SPEAKERS  
AND CONTRIBUTED PAPERS

FRIDAY AFTERNOON  
December 11, 1981

1400 hours

FRIDAY AFTERNOON  
December 11, 1981

Session F-4: LASERS

Royal Palm Room  
Presider: M.S. Tobin

- F-4-1: 1400 FREQUENCY TUNING AND EFFICIENCY ENHANCEMENT OF HIGH POWER FIR LASERS (Invited Keynote Paper)  
B.G. Danly, R.J. Temkin and B. Lax, M.I.T., Cambridge, MA.
- F-4-2: 1440 RESONANT SECOND HARMONIC GENERATION  
T.A. DeTemple, L.A. Bahler and J. Osmundsen, Univ. of Illinois, Urbana, IL.
- F-4-3: 1500 NEW FIR LASER EMISSION BY OPTICAL PUMPING WITH A TUNABLE CW WAVEGUIDE CO<sub>2</sub> LASER  
M. Inguscio, N. Ioli, A. Moretti and F. Strumia, Istituto di Fisica, Pisa, Italy.
- F-4-4: 1520 DOPPLER-FREE OPTOACOUSTIC SPECTROSCOPY IN CH<sub>3</sub>OH AND CH<sub>2</sub>F<sub>2</sub>  
Y. Tsunawaki, M. Yamanaka and S. Fujita, Osaka Industrial Univ., Osaka, Japan
- F-4-5: 1540 THEORY ON DISTRIBUTED FEEDBACK (DFB) LASERS WITH STRONG PERIODIC MODULATIONS  
S. Gnepf, H.P. Preiswerk and F.K. Kneubühl, ETH, Zürich, Switzerland
- F-4-6: 1600 OPTICALLY PUMPED DISTRIBUTED FEEDBACK (DFB) 496  $\mu$ m CH<sub>3</sub>F LASER  
H.P. Preiswerk, A. Rozkwitalski, S. Gnepf and F.K. Kneubühl, Physics Dept., ETH, Zürich, Switzerland.
- F-4-7: 1620 PUMP SATURATION IN OPTICALLY PUMPED FIR LASERS AND NON-LINEAR HANLE EFFECT  
M. Inguscio, A. Moretti, F. Strumia, K. Ernst, Istituto di Fisica dell'Università, Pisa, Italy.

Session F-5: MILLIMETER SOURCES AND COMPONENTS

Banyan Room (Mezzanine)  
Presider: W.F.X. Frank

- F-5-1: 1400 WIDE APERTURE NOISE STANDARD SOURCES FOR ANTENNA PARAMETERS CALIBRATION  
V.A. Lander, Airtron Corp., Morris Plains, N.J.
- F-5-2: 1420 ELECTROMAGNETIC STUDY OF THE GRATING-ENHANCED EXCITATION OF A FAR INFRARED SURFACE WAVE  
M. Neviere and R. Reinisch, Faculté des Sciences et Techniques, Centre de St Jérôme, Marseille, France.
- F-5-3: 1440 CHARACTERISTICS OF PHASE CORRECTING FRESNEL ZONE PLATE ANTENNAS  
J.C. Wiltse, Georgia Inst. of Technology, Atlanta, GA.
- F-5-4: 1500 MILLIMETER WAVE AMPLIFICATION IN THE NEGATIVE GLOW  
A.J. Palmer, Hughes Research Lab., Malibu, CA.
- F-5-5: 1520 SECOND HARMONIC GENERATION IN LiNbO<sub>3</sub> AND LiTaO<sub>3</sub> IN THE MILLIMETER WAVE REGION  
B.H. Ahn, W.W. Clark, III, R.R. Shurtz, II and C.D. Bates, Night Vision & Electro-Optics Lab., Fort Belvoir, VA.
- F-5-6: 1540 HARMONIC GENERATION IN THE NEAR-MILLIMETER-WAVE RANGE BY THIN MOS-STRUCTURES  
U. Lieneweg and J. Maserjian, Jet Propulsion Lab., Pasadena, CA.
- F-5-7: 1600 LIMITING PERFORMANCE OF RADIOMETER SENSORS  
J.M. Schuchardt and J.C. Wiltse, Georgia Inst. of Tech., Atlanta, GA.
- F-5-8: 1620 FABRY-PEROT INTERFEROMETER FOR FAR INFRARED SPECTROSCOPY  
H. Blancher, G. Bachet and R. Coulon, Faculté des Sciences et Techniques de Saint Jérôme, Marseille, France.
- F-5-9: 1640 OPTICAL TESTS OF QUASI-OPTICAL COMPONENTS FOR THE MM REGION  
O.A. Simpson and R.A. Bohlander, Georgia Inst. of Technology, Atlanta, GA.

PROGRAM OF INVITED KEYNOTE SPEAKERS  
AND CONTRIBUTED PAPERS

FRIDAY AFTERNOON  
December 11, 1981

1400 hours

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Session F-6: FREE ELECTRON LASER  
Coconut Palm Room  
Presider:

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- F-6-1: 1400 A FREE ELECTRON LASER DRIVEN BY A  
LONG PULSE INDUCTION LINAC (Invited  
Keynote Paper)  
C.W. Roberson, J. Pasour, F. Mako, R.  
Lucey, R. Gilgenbach and P. Sprangle,  
Naval Research Lab., Washington, D.C.
- F-6-2: 1440 EVOLUTION OF AMPLIFIED RADIATION ON  
A FINITE LENGTH AND RADIUS ELECTRON  
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P. Sprangle and C.M. Tang, Naval Re-  
search Lab., Washington, D.C.
- F-6-3: 1500 CERENKOV-RAMAN FREE ELECTRON LASERS  
J.E. Walsh, S. von Laven, J. Branscum  
and R.W. Layman, Dartmouth College,  
Hanover, N.H.
- F-6-4: 1520 COLLECTIVE EFFECTS ON THE OPERATION OF  
FREE ELECTRON LASERS WITH AN AXIAL  
GUIDE FIELD  
H.P. Freund and P. Sprangle, Naval  
Research Lab., Washington, D.C.
- F-6-5: 1540 A FREE ELECTRON TRAVELING-WAVE-TUBE  
L.W. Davis and G. Patsakos, Univ. of  
Idaho, Moscow, ID.
- F-6-6: 1600 CHIRPED PULSES IN TAPERED-WIGGLER FREE  
ELECTRON LASER OSCILLATORS  
J.C. Goldstein, Los Alamos National  
Lab., Los Alamos, N.M.
- F-6-7: 1620 3-D NONLINEAR THEORY OF THE FREE  
ELECTRON LASER FOR AN ELECTRON BEAM  
WITH FINITE AXIAL AND TRANSVERSE  
DIMENSIONS  
P. Sprangle and Cha-Mei Tang, Naval  
Research Lab., Washington, D.C.