Microwave Abstracts

Based on technical merit and timeliness, microwave papers in journals published outside the United States have been selected and compiled below, generally with brief abstracts. Reprints of the papers may be obtainable by writing directly to the author or to the source quoted.

—F. G. R. Warren, *Associate Editor for Abstracts*
RCA Victor Company, Ltd., Montreal, Canada

Papers from Journals Published in Italy

Compiled by Dr. Nicola Rubino and Dr. Luigi Millanta, Centro Microonde del Consiglio Nazionale delle Ricerche, Florence, Italy.

48
Intermodulation Noise Generated by Antenna Feeders in Multichannel Radio Links with Frequency Modulation, by A. Pistilli (Selenia S.p.A., Rome, Italy); *Alta Frequenza*, vol. 35, pp. 780–797, October 1966.

Time propagation distortion is considered and the impossibility of compensation is pointed out. Intermodulation noise and crosstalk are calculated arising from several disturbances: end mismatch in single-mode waveguide, mismatches both at the ends and along a single-mode waveguide, multimode propagation in oversize guide. (In Italian.)

49
Band-stop Behavior of Shunt or Series Branch Microwave Resonators, by F. Valdoni (Fondazione Bordoni, Instituto Superiore PPTT, Rome, Italy); *Alta Frequenza*, vol. 35, pp. 798–813, October 1966.

Stop-band filters made up of a shorted transmission line (coaxial, strip, or waveguide) series- or shunt-connected to the main transmission line are studied. Design data are given, along with experimental results. (In Italian.)

50
Efficiency of Large Aperture Antennas and Reflectors, by G. D'Auria (Instituto di Elettronica, Facoltà di Ingegneria, Università di Roma, Rome, Italy) and C. Colavito (SIP, Direzione Generale, Rome, Italy); *Alta Frequenza*, vol. 35, English Issue 4, pp. 160E–165E, November 1966.

The causes of reduction of the effective area of large antennas are studied and an effective efficiency is analytically derived from theoretical considerations involving the propagation process and the degree of coherence of the impinging wave. (In English.)

51
Some Two-Dimensional Artificial Dielectrics: Theory and Experimental Results, by E. Corti, G. Franceschetti, and G. Latmiral (Instituto Universitario Navale and Centro per l'Elettronica e le Telecomunicazioni del CNR, Naples, Italy); *Alta Frequenza*, vol. 35. English Issue 4, pp. 176E–182E, November 1966.

The equivalent tensor permeability and permittivity of a regular array of circular rods is computed by means of static techniques. Preliminary experimental data at X-band are reported. (In English.)

52
Scattering by Finite Objects in Compressible Plasma, by C. H. Tang (Advanced Development Laboratory, Raytheon Company, Wayland, Mass.); *Il Nuovo Cimento*, vol. 46, sec. B, pp. 93–112, November 1966.

A general formalism for the problem is given from the classical point of view, using a set of linearized plasma equations. The approach is general and straightforward. As an illustration, particular attention is paid to the problem of scattering by a plasma column. (In English.)

53
Gain Versus Frequency Behavior of TWTs—Theoretical Analysis and Interpretation of the Experimental Data, by G. P. Bava, M. Sant'Agostino, and G. Zito (Instituto di Elettronica e Telecomunicazioni del Politecnico di Torino e Centro di Studi e Laboratori Telecomunicazioni, Torino, Italy); *Alta Frequenza*, vol. 35, pp. 944–951, December 1966.

A theoretical and experimental analysis is performed. A few operating anomalies are qualitatively discussed and measured diagrams are given. (In Italian.)

54
On an Extension of the Use of the Dielectrometer, by M. Calamia and G. Franceschetti (Università di Pisa e Instituto Universitario Navale, Naples, Italy); *Alta Frequenza*, vol. 35, pp. 951–959, December 1966.

The possibility of extension to measurements on magnetic materials, for the determination of complex permeabilities and permittivities, is shown. (In Italian.)

55
Design Criteria of Rectangular Waveguides with an Impedance Wall, by P. Bernardi (Instituto di Elettronica dell'Università di Roma, Rome, Italy); *Alta Frequenza*, vol. 35, pp. 960–964, December 1966.

The properties of the electromagnetic waves in such guides are examined and design criteria derived. A particular structure consisting of a guide having a longitudinally corrugated wall is discussed and some measured data reported. (In Italian.)

56
Composition of the Reflection Coefficients in a Loaded Two-Port Network, by C. Montebello (Instituto Superiore PPTT, Rome, Italy); *Alta Frequenza*, vol. 36, pp. 37–43, January 1967.

The limiting values of the magnitude of the input reflection coefficient of a two-port network are determined as a function of the phase angle of the output reflection coefficient. The expressions given contain only the magnitudes of the reflection coefficients of the network and of the load, and are valid also for lossy and/or nonreciprocal networks. (In Italian.)

57
Magnetostatic Waves in Axially Magnetized Cylinders: Experimental Dispersion Curves, by M. Bini, L. Millanta, N. Rubino, and I. Kaufman (Centro Microonde del CNR, Florence, Italy, and Arizona State University, Tempe, Ariz.); *Il Nuovo Cimento*, vol. 47, sec. B, pp. 281–293, February 1967.

Dispersion curves of magnetostatic waves in axially magnetized YIG cylinders have been experimentally obtained in the frequency range of 2 to 11 GHz at room temperature. The experimental results are in very good agreement with the theoretical predictions of Joseph and Schlömann, even in the region of long wavelengths. In particular, the surface modes have been experimentally demonstrated. The methods of investigation are described and the results are discussed in comparison with the theory. (In English.)

58
Electromagnetic-Wave Propagation in a Weakly Ionized Plasma, II, by O. De Barbieri, C. Maroli, and A. Orefice (Instituto di Scienze Fisiche dell'Università, Milan, Italy); *Il Nuovo Cimento*, vol. 48, sec. B, pp. 378–393, April 1967.

A general formula for the high-frequency conductivity of a partially ionized plasma is evaluated. This results embodies, in suitable limiting cases, the well-known expressions of the conductivity for a Lorentz plasma and for a fully ionized plasma. With the aid of this formula, the range of validity of the expression for a Lorentz plasma is pointed out. (In English.)

59
Electromagnetic-Wave Propagation in a Weakly Ionized Plasma, III, by O. De Barbieri, P. Franchi, and A. Orefice (Instituto di Scienze Fisiche dell'Università, Milan, Italy); *Il Nuovo Cimento*, vol. 48, sec. B, pp. 394–408, April 1967.

This work contains the evaluation of the conductivity of a plasma with an arbitrary ionizaton ratio, in presence of a constant and uniform magnetic field. The calculation method is a generalization of the one employed in the preceding Part II. (In English.)

60
Single Frequency Properties of 2-Port Network Scattering Matrix, by E. Carli and T. Corzani (Instituto di Elettrotecnica e di Elettronica dell'Università di Trieste, Trieste, Italy); *Alta Frequenza*, vol. 36, pp. 319–328, April 1967.

The net input power being non-negative implies some limitations on the sets of possible values for the elements of the scattering matrix. These limitations are shown and discussed. An application to the limiting values of the magnitude of the input reflection coefficient, when the magnitude of the output reflection coefficient is known, is given. (In Italian.)

61
Results from Propagation Tests at 11 and 18 GHz on the Path between Montevecchia and Cassina De'Pecchi, by P. Quarta (Societa Generale di Telefonia ed Elettronica Cassina De'Pecchi, Milan, Italy); *Alta Frequenza*, vol. 36, English Issue 2, pp. 85E–93E, May 1967.

The attenuation due to rain is measured under several conditions and compared with the theoretical values. (In English.)

62
Validity Range of the Impedance Wall Description for an Actual Microwave Structure, by P. Bernardi and F. Valdoni (Instituto di Elettronica dell'Università di Roma, Rome, Italy); *Alta Frequenza*, vol. 36, English Issue 2, pp. 148E–149E, May 1967.

Referring to a previous paper by P. Bernardi (*Alta Frequenza*, vol. 34, p. 49, July 1965), additional considerations are given with computed and measured data. (A letter, in English.)

63
Use of Time-Averaging Networks in Microwave Video Spectrometers, by A. Battaglia (Instituto di Fisica dell'Università di Pisa, Pisa, Italy); *Il Nuovo Cimento*, vol. 49, sec. B, pp. 145–147, May 1967.

A time-averaging technique improves the sensitivity of a crystal-video spectrometer. Technical information and experimental data are given. (A letter, in English.)

64
Resonance Methods for Measuring the Scattering Matrix of a Reciprocal Two-Port Microwave Junction, by T. Corzani and G. C. Corazza (Instituto di Elettrotecnica ed Elettronica dell'Università di Trieste, Trieste, Italy); *Alta Frequenza*, vol. 36, pp. 508–514, June 1967.

A few methods are suggested for the measurement of the scattering matrix of a microwave junction, based on the analysis of the behavior of a resonant cavity which includes the junction. Such methods are of special interest whenever a slotted section cannot be used, as in the presence of multimode propagation. Symmetrical and lossless junctions are considered as special cases.

Experimental results are reported at 10.3 and 32.6 GHz. (In Italian.)

65
System of Two Metallic Plates for Experiments in the Microwave Region, by G. Franceschetti (Instituto Universitario Navale, Naples, Italy) and G. Rago (Centro di Elettronica e Telecomunicazioni del CNR, Sezione di Napoli, Naples, Italy); *Alta Frequenza*, vol. 36, pp. 515–528, June 1967.

The characteristics of a transmission system consisting of two parallel metallic plates are examined; such a system can be used for reflection, diffraction, and transmission measurements in the microwave range. Design criteria for several parts and experimental results are given. (In Italian.)

66
Solution of the Discontinuity Problem between an Empty Rectangular Waveguide and the Same Guide Completely Filled with Transversely Magnetized Ferrite, by G. Gerosa (Instituto di Elettronica dell'Università di Roma, Rome, Italy); *Alta Frequenza*, vol. 36, pp. 652–656, July 1967, in Italian; published in English in *Alta Frequenza*, vol. 36, English Issue 3, pp. 176E–179E, August 1967.

See Abstract 67.

67
Solution of the Discontinuity Problem between an Empty Rectangular Waveguide and the Same Guide Completely Filled with Transversely Magnetized Ferrite, by G. Gerosa (Università di Roma, Facolta di Ingegneria, Instituto di Elettronica, Rome, Italy); *Alta Frequenza*, vol. 36, English Issue 3, pp. 176E–179E, August 1967.

The solution previously found by other authors fails in a certain range of the ferrite parameters. A modified solution is offered, introducing a ferrite-metal surface wave in order to obtain the exact solution. (In English.)

68
Stepped Aperture Distribution for Horn Antenna Side-Lobe Reduction, by R. Zich (Instituto di Elettronica e Telecomunicazioni del Politecnico di Torino, Torino, Italy); *Alta Frequenza*, vol. 36, English Issue 3, pp. 180E–188E, August 1967.

Side-lobe reduction by stepping the E-plane field distribution in a rectangular horn antenna aperture has been investigated. Proper values of geometrical parameters have been found by examining the properties of the far field which has been evaluated for different horns and different hypotheses. (In English.)

69
Radiation from a Recessed Slot in a Coated Cylinder, by O. Einarsson (The Lund Institute of Technology, Lund, Sweden) and P. L. E. Uslenghi (Radiation Lab., University of Michigan, Ann Arbor); *Alta Frequenza*, vol. 361, English Issue No. 3, pp. 189E–195E, August 1967.

The modifications which a coating layer introduces in the radiation pattern of a flush-mounted antenna are considered. A study directed to the elimination of the pattern lobing structure for a recessed annular slot in a coated metal cylinder is performed. (In English.)

70
A Complete Analysis of the Reflection and Transmission Methods for Measuring the Complex Permeability and Permittivity of Materials at Microwaves, by G. Franceschetti (Instituto Universitario Navale, Naples, Italy); *Alta Frequenza*, vol. 36, English Issue 3, pp. 201E–208E, August 1967.

The possibility of obtaining the value of permeability and permittivity of homogeneous samples through transmission and/or reflection measurements in waveguides or coaxial cables, or even in free space, under various experimental conditions is discussed. A number of techniques, are developed and discussed. (In English.)

71
Oblique Electromagnetic Radiation Incident on a Semi-Infinite Warm General Magnetoplasma, by H. Unz (RAND Corporation, Santa Monica, Calif.); *Il Nuovo Cimento*, vol. 50, sec. B, pp. 207–223, August 1967.

The general sixth-order algebraic equation of the refractive index is derived for arbitrarily directed oblique waves in a compressible general magnetoplasma with arbitrarily directed magnetostatic field. The problem of a plane electromagnetic wave with arbitrary polarization incident obliquely on a semi-infinite compressible general magnetoplasma is solved and the corresponding reflection and transmission coefficients are found. (In English.)

72
Resonance Absorption of Fine-Grained Ruby Powder in the X-band, by R. Srivastava (Physics Dept., University of Allahabad, Allahabad, India); *Il Nuovo Cimento*, vol. 50, Sec. B, pp. 382–383, August 1967.

Measurements are reported of the resonance linewidth as a function of temperature. (A letter, in English.)

Papers from Journals Published in Japan

Compiled by a committee headed by Prof. Hideo Iwakata, Waseda University, Tokyo, Japan.

73
A π-mode Laddertron for 34-GHz Band, by Y. Mizogami, H. Simizu, and S. Iwase (Oki Electric Industry Company, Ltd., Minatoku, Tokyo, Japan); *Oki Rev.*, vol. 33, pp. 15–21, June 1966.

Recent development of Laddertron. (In Japanese, English Summary.)

74
Leaky Waveguide Radar System, by Y. Amemiya, N. Kurita, K. Uematsu, T. Nakahara, N. Kurauchi, and H. Kitani (Railway Tech. Research Inst. of Japanese National Railways, Kokubunji, Tokyo, and Sumitomo Electric Industries, Ltd., Konohana-ku, Osaka, Japan); *Sumitomo Elec. Rev.*, no. 93, pp. 56–65, September 1966.

Proposal and experiments of a new railway obstacle detection system at 50 GHz. (In Japanese, English Summary.)

75
Recent Developments in Waveguide for Millimeter Wave Transmission, by T. Nakahara, H. Shioyama, and M. Hoshikawa (Sumitomo Electric Industries, Ltd., Konohana-ku, Osaka, Japan); *Sumitomo Elec. Tech. Rev.*, no. 8, pp. 51–57, October 1966.

Structure and manufacturing process and electrical characteristics of helical waveguide and lined waveguide. (In English.)

76
Aluminum Elliptic Waveguide, I: Transmission Characteristics of Elliptical Waveguide, by T. Maeda (Dainichi-Nippon Cable Company, Ltd., Ikejiri, Itami, Japan); *Dainichi-Nippon Cable Rev.*, no. 33, pp. 42–48, July 1966.

Theoretical analysis. (In Japanese, English Summary.)

77
Delay Equalizer Using Tapered Waveguide at 11 GHz, by F. Ishihara and N. Ishida (ECL, Musashino-shi, Tokyo, Japan); *ECL Tech. J.*, vol. 15, pp. 1747–1805, September 1966.

A delay equalizer using tapered waveguide, which may be employed for low-loss waveguide transmission, is analyzed theoretically and experimentally, and its design methods are described. (In Japanese.)

78
Conversion Power and Intermodulation of High-Power Parametric Up-Converter, by S. Nakamura, H. Yamamoto, and A. Furukawa (ECL, Musashino-shi, Tokyo, Japan); *ECL Tech. J.*, vol. 15, pp. 1725–1746, September 1966.

Large-signal model analysis of up-conversion by means of variable capacitance diodes and its intermodulation characteristics are treated theoretically and experimentally in the frequency region of 11 GHz. (In Japanese.)

79
Frequency Modulators Using Variable Capacitance Diodes, by K. Noda (ECL, Musashino-shi, Tokyo, Japan); *ECL Tech. J.*, vol. 15, pp. 2011–2037, October 1966.

Frequency modulators for microwave multichannel relay systems using variable-capacitance diodes in the 70-MHz band are treated theoretically and experimentally. (In Japanese.)

80
Stability of a Light Beam in a Beam Waveguide, by Y. Fukatsu and J. Hirano (ECL, Musashino-shi, Tokyo, Japan); *ECL Tech. J.*, vol. 15, pp. 1913–1935, October 1966.

In a beam waveguide, problems of stability of beam, such as fluctuation of beam path, stability of spot size, matching of beam waveguide, and stability of curved beam, are analyzed theoretically. (In Japanese.)

81
Experimental Studies on Atmospheric Ducts and Microwave Fading, by F. Ikegami, M. Haga, T. Fukuda, and H. Yoshida (ECL, Musashino-shi, Tokyo, Japan); *Rev. ECL*, vol. 14, pp. 505–533, July–August 1966.

Variation with time of ducts, refractive index gradient of the atmosphere, and microwave fading were measured in parallel to the radiometeorological observations. (In English.)

82
Resonant Mode in a Fabry–Perot Resonator Consisting of Nonuniform Reflectors, by N. Kumagai, H. Mori, and T. Shiozawa (Faculty of Engineering, Osaka University, Osaka, Japan); *J. IECEJ*, vol. 49, pp. 1249–1256, July 1966.

Theoretical analysis of a Fabry–Perot resonator whose reflection coefficient at surfaces is not uniform. (In Japanese.)

83
A Circuit-Theoretic Treatment of Laser Actions, by N. Kumagai and M. Matsuda (Faculty of Engineering, Osaka University, Osaka, Japan); *J. IECEJ*, vol. 49, pp. 1257–1262, July 1966.

Representation of laser action using an equivalent electric circuit model for the energy level model. (In Japanese.)

84
Mutual Frequency Entrainment of Two Reflex Klystrons, by J. Ikenoue and K. Fukui (Faculty of Engineering and Training Institute for Engineering Teachers, Kyoto University, Kyoto, Japan); *J. IECEJ*, vol. 49, pp. 1321–1328, July 1966.

Theoretical and experimental analysis of entrainment due to a mutual coupling. (In Japanese.)

85
Design of Dielectric Lens for Communication using Beam Waves, by Y. Akao, Y. Miyazaki, and T. Matsumoto (Faculty of Engineering, Nagoya University, Nagoya, Japan); *J. IECEJ*, vol. 49, pp. 1358–1359, July 1966.

A study by the angular characteristic functions. (Correspondence, in Japanese.)

86
Electron Admittance of Reflex Klystron, by S. Okamura and Z. Kyo (Dept. of Electronic Engineering, University of Tokyo, Tokyo, Japan); *J. IECEJ*, vol. 49, pp. 1470–1477, August 1966.

Relations of electron admittance versus potential distribution of repeller space and the method of analysis of electron admittance are explained. Experiments at 35 GHz are also shown. (In Japanese.)

87
Amplification of Microwaves by the Interaction of an Electron Beam with a Cesium Plasma, by H. Kato, K. Ayaki, M. Ozawa, and Y. Asami (Nippon Electric Company, Ltd., Kawasaki, Japan); *J. IECEJ*, vol. 49, pp. 1495–1500, August 1966.

Experimental results of microwave amplification, frequency characteristics, and noise figure. (In Japanese.)

88
Radiation Characteristics of Antenna Arrays in a Moving Medium, by H. Fujioka and N. Kumagai (School of Engineering, Osaka University, Osaka, Japan); *J. IECEJ*, vol. 49, pp. 1509–1515, August 1966.

Theoretical analysis. (In Japanese.)

89
Beam Waveguide Consisting of Cylindrical Conducting Reflectors, by N. Kumagai, K. Yoshida, and T. Nakahara (College of Engineering, Osaka University, and Sumitomo Electric Industries, Ltd., Osaka, Japan); *J. IECEJ*, vol. 49, pp. 1523–1528, August 1966.

Theoretical analysis of transmission characteristics for beam waveguide consisting of parabolic-cylindrical conducting reflectors as phase compensators. (In Japanese.)

90
Mode Conversion in Light Beam Waveguides, by Y. Suematsu and K. Iga (Dept. of Electronics, Tokyo Inst. of Technology, Tokyo, Japan); *J. IECEJ*, vol. 49, pp. 1645–1652, September 1966.

Theoretical analysis of mode conversions of light beam for various type of beam waveguide. (In Japanese.)

91
Graphical Method of Diode Modulator Analysis, by K. Tanaka, T. Toida, and M. Miyazawa (Oki Electric Industry Company, Ltd., Minatoku, Tokyo, Japan); *Oki Rev.*, vol. 33, pp. 15–23, October 1966.

Theoretical analysis. (In Japanese, English Summary.)

92
Microwave Frequency Converter Using Esaki Diode, by T. Ohta and T. Sekiguchi (Oki Electric Industry Company, Ltd., Minatoku, Tokyo, Japan); *Oki Rev.*, vol. 33, pp. 24–28, October 1966.

The physical mechanism of frequency conversion and the comparison between measured and calculated values of conversion gain and noise figure. (In Japanese, English Summary.)

93
Development of a Laser Communication System, Part I: Instrumentation, by M. Ito and T. Uchida (Nippon Electric Company, Ltd., Tamagawamukai, Shimonumabe, Kawasaki, Japan); *NEC Research and Develop.*, no. 8, pp. 75–83, October 1966.

Work with He-Ne gas lasers, collimation of laser beams, three kinds of modulation schemes, and detection of light are discussed and an example of laser TV transmission equipment is introduced. (In English.)

94
Development of a Laser Communication System, Part II: Propagation Test, by M. Ito (Nippon Electric Company, Ltd., Tamagawamukai, Shimonumabe, Kawasaki, Japan); *NEC Research and Develop.*, no. 8, pp. 84–88, October 1966.

Behavior of a laser beam in the atmosphere and its effect on the transmission characteristics of signal, optimization of parameters, and overall performance of the laser communication system are discussed. Application of the instrument up to several kilometer range is feasible. (In English.)

95
Solid-State Microwave Source—Generation and Amplification of Microwaves by Bulk GaAs, by J. Okada, Y. Sawayama, S. Okamura, and M. Ohtomo (Central Research Lab., Tokyo, Shibaura Electric Company, Ltd., Komukai, Kawasaki, Japan); *Toshiba Rev.*, vol. 21, pp. 1055–1062, October 1966.

Experiments and computation. (In Japanese, English Summary.)

96
Short-Haul Microwave Relay System in the 15 GHz Band, by M. Takada, S. Kato, S. Ito, and S. Nakamura (ECL, Musashino-shi, Tokyo); *ECL Tech. J.*, vol. 15, pp. 2409–2448, November 1966.

A short-haul microwave relay system operating in the frequency region of 15 GHz has been developed. The repeater equipments are transistorized and low-loss circular waveguide feeders are employed. As the results of field test, this system is capable of transmitting 960 telephonic signals to a distance of 100 km. (In Japanese.)

97
Digital Phase and Modulator using Diode Switches in 2-GHz Region, by S. Nakamura and Y. Inoue (ECL, Musashino-shi, Tokyo); *ECL Tech. J.* vol., 16, pp. 11–32, January 1967.

A new type of high-speed microwave digital phase modulator composed of semiconductor diode switches short plungers, and circulators for use in the microwave PCM system. (In Japanese.)

98
***S*-Band Wide-Band Pulse Klystrons,** by T. Okada, T. Onodera, T. Shinsei, A. Ono, and H. Ieki (Mitsubishi Electric Corporation, Marunouchi, Chiyodaku, Tokyo, Japan); *Mitsubishi Denki Giho*, vol. 41, pp. 356–360, February 1967.

Experiments made on a stagger tuning of intermediate cavities. (In Japanese.)

99
Leaky Waveguide Radar System—An Approach to Obstacle Detection System for Railroad, by Y. Amemiya, N. Kurita, K. Uematsu, T. Nakahara, N. Kurauchi, and H. Kitani (Sumitomo Electric Industries, Ltd., Konohana-ku, Osaka, Japan); *Sumitomo Elec. Tech. Rev.*, no. 9, pp. 82–92, March 1967.

Railway obstacle-detection experiments with leaky circular waveguide with TE_{01} mode at 9.4 GHz. See Abstract 74. (In English.)

100
VHF Pulse-Carrier Reflectometer, by A. Kusui (Dainichi-Nippon Cable Company, Ltd., Ikejiri, Itami, Japan); *Dainichi-Nippon Cable Rev.*, no. 35, pp. 51–57, March 1967.

Results of trial production of a useful and sensitive VHF pulse-modulation testing equipment. (In Japanese, English Summary.)

101
Traveling Wave Maser, by M. Shiotani, H. Hayashi, H. Hozumi, and Y. Inamine (Nippon Electric Company, Ltd., Tamagawamukai, Shimonumabe, Kawasaki, Japan): *Nippon Denki Giho*, no. 82, pp. 120–125, March 1967.

Structure and characteristics of a ruby maser at 4 GHz. (In Japanese.)

102
VHF UHF Miniaturized *Y*-Circulators, by S. Okamura and Y. Kikuchi (Central Research Lab., Tokyo Shibaura Electric Company, Ltd., Komukai, Kawasaki, Japan); *Toshiba Rev.*, no. 207, pp. 508–512, April 1967.

The new developed circulators show an insertion loss below 0.5 dB at any frequency between 100 and 1000 MHz. (In Japanese, English Summary.)

103
Cassegrainian Antenna for 15-GHz Super Multichannel Transmission System, by S. Kagawa, H. Yamaguchi, and Y. Takamatsu (Mitsubishi Electric Corporation, Marunouchi, Chiyoda-Ku, Tokyo, Japan); *Mitsubishi Denki Giho*, vol. 41, pp. 568–572, April 1967.

Design, production, and characteristics. (In Japanese, English Summary.)

104
Measurement of Complex Permeabilities of VHF Ferrites by means of a Shortcircuited Coaxial Cavity Coupled with a *Q*-Meter, by T. Arai (Mitsubishi Electric Corporation, Marunouchi, Chiyodo-ku, Tokyo, Japan); *Mitsuchishi Denki Giho*, vol. 41, pp. 610–614, April 1967.

Distributional parameters play a very important role in the short-circuit coaxial cavity. The measurement method in this paper introduces equations of μ_1 and μ_2 with the parameters and has relatively high accuracy. (In Japanese, English Summary.)

105
Dominant Mode and Higher Modes of Linear Tapered Waveguide, by S. Iiguchi and F. Ishihara (ECL, Musashino-shi, Tokyo, Japan); *ECL Tech. J.*, vol. 16, pp. 669–689, April 1967.

Characteristics of dominant modes and higher modes of linearly tapered waveguides whose sections are circular or rectangular are calculated theoretically and numerically, including at and near the cutoff frequency region. (In Japanese.)

106
Measuring Equipment of TE_{01}-Mode Attenuation Characteristics by Sweeping Frequency Method, by M. Shimba, K. Kondo, and N. Suzuki (ECL, Musashino-shi, Tokyo, Japan); *ECL Tech. J.*, vol. 16, pp. 691–703, April 1967.

Equipment for measuring attenuation characteristics of circular waveguide for millimeter wave transmission by the sweep frequency method and the measured results of dielectric coated waveguides are described. (In Japanese.)

107
TE_{02}-Mode Filter for TE_{01} Circular Waveguide at Millimeter Wavelengths, by S. Shimada (ECL, Musashino-shi, Tokyo, Japan); *ECL Tech. J.*, vol. 16, pp. 647–668, April 1967.

This paper describes two types of mode filters, that is, coupled wave type and resonant slot type, for suppressing the TE_{02} mode in a TE_{01}-mode circular waveguide. The characteristics of these mode filters are measured in the frequency region of 50 GHz. (In Japanese.)

108
Characteristics of Inhomogeneous Linear Tapered Waveguides, by F. Ishihara (ECL, Musashino-shi, Tokyo, Japan); *ECL Tech. J.*, vol. 16, pp. 705–722, April 1967.

This paper describes characteristics of homogeneous and inhomogeneous linear tapered waveguides theoretically. The theory was verified experimentally. (In Japanese.)

109
Double-Prism Type Variable Attenuator for TE_{01}-Mode Circular Waveguide at Millimeter Wavelengths, by S. Shimada (ECL, Musashino-shi, Tokyo, Japan); *ECL Tech. J.*, vol. 16, pp. 1241–1256, July 1967.

This paper describes a variable attenuator of the TE_{01} mode consisting of two dielectric prisms, based on quasioptical principles. (In Japanese.)

110
Millimeter Wave Pulse Generation Using Frequency Multiplier, by S. Kita, S. Seki, and K. Tahara (ECL, Musashino-shi, Tokyo, Japan); *ECL Tech. J.*, vol. 16, pp. 1225–1240, July 1967.

This paper describes a quadrupler of millimeter wave pulses. The input of 12-GHz pulses are multiplied four times in frequency and 48-GHz pulses are obtained. The on–off ratio of the output pulses is improved through the quadrupler. (In Japanese.)

Papers from Journals Published in the United Kingdom

Compiled by Dr. M. G. F. Wilson, University College London, London, England

111
Use of a Waveguide Dispersive Line in an F.M. Pulse-Compression System, by R. A. Bromley and B. E. Callan (Royal Radar Establishment, Great Malvern, U. K.); *Proc. IEE*, vol. 114, pp. 1213–1218, September 1967.

An *S*-band radar system is described. The advantages of pulse compression are discussed and theoretical and experimental results are presented. Attention is paid to spectrum shaping and a simple cosine shaping filter is described.

112
Measurement of the Dielectric Properties of Soft Materials with High Loss and Permittivity in a Parallel-Plate Region, by K. Jizuka and T. Sugimoto (Division of Engineering and Applied Physics, Harvard University); *Proc. IEE*, vol. 114, pp. 1219–1222, September 1967.

The material is placed within a parallel-plate transmission line which forms one arm of a bridge. Balance is obtained by adjusting a probe in the line. Good contact between the dielectric and the plates is ensured. Measurements are presented for agar agar.

113
Characterisation of Tunnel Diodes at Microwave Frequencies, by J. O. Scanlan and V. P. Kodali (Dept. of Electronic Engineering, Leeds University, U. K.); *Proc. IEE*, vol. 114, pp. 1231–1236, September 1967.

The equivalent circuits of coaxial mounted tunnel diodes are deduced from microwave measurements. The series resistance component is frequency-dependent and is due, it is suggested, to microwave absorption within the *p-n* junction. The true resistive cutoff frequency should be lower than the value suggested by the low-frequency parameters.

114
Synthesis of Non-Uniform Antenna Arrays Using Lambda Functions, by S. L. Shih and

L. Bergstein (Electrical Engineering Dept., Polytechnic Institute of Brooklyn); *Proc. IEE*, vol. 114, pp. 1237–1241, September 1967.

A new method is presented for the synthesis of nonuniformly spaced arrays. By means of the Chebyshev–Gauss quadrature and the Hankel transform, the space factor of an array and a prescribed radiation pattern can be reduced into the same form in terms of the lambda functions. The element excitation can be determined directly.

115

Two-Diode Bandpass Parametric Amplifier, by W. S. Jones and F. J. Hyde (School of Engineering Science, University College of North Wales, Bangor, U. K.); *Proc. IEE*, vol. 114, pp. 1365–1372, October 1967.

The gain-bandwidth of a filter-type degenerate parametric amplifier incorporating two synchronously pumped varactor diodes is analyzed for general conditions. Experimental work confirms the theory.

116

Unilateral 2-Diode Parametric Amplifier, by W. S. Jones and F. J. Hyde (School of Engineering Science, University College of North Wales, Bangor, U. K.); *Proc. IEE*, vol. 114, pp. 1373–1377, October 1967.

A parametric amplifier in which two varactor diodes are pumped with a $\pm\pi$–2 phase difference is shown to give good forward gain with approximately unity reverse gain.

117

Electrical Characteristics of Corners in Surface-Wave Lines, by P. L. Chu and A. E. Karbowiak (School of Electrical Engineering, University of New South Wales, Australia); *Proc. IEE*, vol. 114, pp. 1409–1417, October 1967.

The theory of surface wave propagation around sharp corners on single wire transmission lines is developed. Radiation loss and radiation patterns are computed and compared with experiments. Agreement is good for small angles of deviation.

118

Nonlinear Diaphragms in Waveguides, by P. Anastasovskr, F. Benson, and H. Po (Dept. of Electrical Engineering, Sheffield University, U. K.); *Proc. IEE*, vol. 114, pp. 1418–1424, October 1967.

Diaphragms made of ferrite slabs have been used to couple a waveguide to a cavity. It is possible to tune the cavity by altering the magnetic field biasing the ferrite.

119

Characterisation of Waveguide-Mounted Tunnel Diodes, by J. O. Scanlan and V. P. Kodali (Dept. of Electronic Engineering, Leeds University, U. K.); *Proc. IEE*, vol. 114, pp. 1844–1849, December 1967.

A theoretical circuit model for the tunnel diode mounted in a reduced-height waveguide is given. The parameters of the model are deduced from standing wave measurements. A comparison of the equivalent circuit with that found from measurements in coaxial line shows that if the power/voltage basis is used to define waveguide characteristic impedance, the relevant parameters from both sets of measurements are the same.

120

Wave Propagation in a Rectangular Waveguide with a Semi-Conducting Wall, by M. W. Gunn and R. H. Sheikh (Electrical Engineering Dept., McMaster University, Ontario, Canada); *Proc. IEE*, vol. 115, pp. 32–36, January 1968.

Theoretical and experimental results are given for the propagation coefficient of a waveguide whose narrow wall is made from semiconducting germanium. The method may be employed to measure complex permittivity of semiconductors with $\sigma \approx \omega\epsilon_0\epsilon_r$ and to measure conductivity when $\sigma > \omega\epsilon_0\epsilon_r$.

121

Harmonic Generators and Detectors for Millimetre Wavelengths, by F. A. Benson and W. F. Winder (Dept. of Electronic Engineering, Sheffield University, U. K.); *Proc. IEE*, vol. 115, pp. 37–42, January 1968.

Designs of harmonic generators and detectors for several-millimeter wavelengths are described, and detailed information is included on crystal and whisker treatments and junction formation. The voltage sensitivities of detectors and the conversion efficiencies of harmonic generators have been measured and the relative merits of different crystal and whisker materials have been observed.

122

TEM Wave Properties of Microstrip Transmission Lines, by P. Silvester (Electrical Engineering Dept., Imperial College of Science and Technology, London, U. K.); *Proc. IEE*, vol. 115, pp. 43–48, January 1968.

An electrostatic solution is obtained using the method of images. Wave impedances and velocities are calculated and compared with experimental values.

123

High-Frequency Coaxial Cables, by H. E. M. Barlow (Dept. of Electronic Engineering, University College London, U. K.); *Proc. IEE*, vol. 115, pp. 243–246, February 1968.

The paper is concerned with coaxial cables partially loaded with dielectric material. The field pattern is modified and the loss is reduced. An approximate theory is presented and is compared with experimental measurements.

124

Electromagnetic Waves in Media with Finite Discontinuities, by C. R. James and G. B. Walker (Electrical Engineering Dept., University of Alberta, Edmonton, Canada); *Proc. IEE*, vol. 115, pp. 381–386, March 1968.

A wave equation is applied to the whole medium. The physical parameters of the medium appear in the coefficients of the equation. Meaningful solutions can be obtained when the physical parameters possess finite discontinuities. Examples are given and the work is compared with a previous attempt of Brillouin.

125

Narrowband Microwave Suppression Filters, by D. M. Kitching, B. G. Bosch, and W. A. Gambling (Dept. of Electronics, University of Southampton, U. K.); *Proc. IEE*, vol. 115, pp. 479–486, April 1968.

A theoretical and experimental investigation into narrow-bandwidth rejection filters is described. They can be made from simple, standard components. Suppression factors of at least 50-dB at resonance are possible.