Microwave Abstracts

Based on technical merit and timeliness, microwave papers in journals published outside the United States have been selected and compiled below, many with annotations. Reprints of the papers may be obtainable by writing directly to the author. The papers are in English unless noted otherwise.

—K. TOMIYASU, *Associate Editor for Abstracts*

PAPERS FROM JOURNALS PUBLISHED IN JAPAN

Complied by Prof. H. Iwakata, Waseda University, Tokyo, and his Committee[1]

33

Olympic TV Transmission via Syncom III Satellite by M. Onoe and M. Hirai (Radio Research Lab., Ministry of Posts and Telecommunications, Kokubunji, P.O., Tokyo, Japan); *J. Radio Research Labs.*, vol. 11, pp. 363–376, November 1964.

Reports on the transmitter and experimental results of the transmission of television signals via Syncom III Satellite during the 18th Olympic Games in Tokyo. (In Japanese.)

34

The Double Ladder Type Traveling Wave Tube for Millimeter Wave Band by J. Koyama and F. Miyauchi (Electrical Communication Lab., Nippon Telegraph and Telephone Public Corp., Musashino-shi, Tokyo, Japan); *Rev. Electrical Com. Lab.*, vol. 12, pp. 707–723, November–December 1964.

A double ladder type circuit is suitable for a slow wave circuit in a high power millimeter wave TWT. This paper describes a low power demountable tube which operates in the frequency region of 48 Gc/s; the maximum output power is around 0.5 watt. (In English.)

35

Dimensional Tolerance in Circular Waveguides in the Transmission of the Circular Electric Wave by K. Noda, K. Yamaguchi, and N. Suzuki (Electrical Communication Lab., Nippon Telegraph and Telephone Public Corp., Musashino-shi, Tokyo, Japan); *Rev. Electrical Com. Lab.*, vol. 12, pp. 743–754, November–December 1964.

Report on experimental results on mode conversion due to imperfections in circular waveguides for millimeter wave transmission, such as diameter fluctuation, elliptic deformation and nonstraightness of axis. (In English.)

36

A Large Slot Antenna for 5 Gc Wave (Parts I and II) by K. Kitazato, K. Onozawa, T. Nasu, and T. Furukawa (Oki Electric Industry Co., Ltd., Tokyo, Japan); *Oki Rev.*, vol. 31, no. 4, pp. 45–55, December 1964.

Electrical and mechanical design data. (In Japanese, English summary.)

37

Curved Circular Waveguide for TE_{01} Mode Millimeter Waves by K. Takayanagi and T. Katsuta (Showa Wire and Cable Co., Ltd., Kawasaki, Japan); *Showa Densen Denran Rev.*, vol. 14, no. 2, pp. 24–30, December 1964.

Experiments on curved waveguide with eccentric dielectric rings and the corner with radial metallic fins. (In Japanese, English summary.)

38

Oscillating and Amplifying Characteristics of Mavar Using YIG Disk by N. Cho and T. Makimoto (Institute of Scientific and Industrial Research, Osaka Univ., Sakai, Osaka, Japan); *J. Inst. Electrical Commun. Engrs. Japan*, vol. 47, pp. 1835–1844, December 1964.

Experimental results and theoretical analysis on the effect of the direction of pump and signal magnetic fields for amplifying characteristics of a degenerate type Mavar. (In Japanese.)

39

Measurement of Circular Waveguide Imperfections with FM Radar by T. Nakahara, N. Kurauchi, and H. Shioyama (Sumitomo Electric Industries, Ltd., Osaka, Japan); *The Sumitomo Electric Rev.*, no. 87, pp. 73–85, January 1965.

An FM radar with a BWO at 35 Gc/s was built to evaluate a fault detection technique. (In Japanese, English summary.)

40

Development of High Self-Resonant Frequency Variable Capacitance Diode ECL-1219 by Y. Ishii, N. Ohashi, T. Yokoyama, and S. Ogawa (Electrical Communication Lab., Nippon Telegraph and Telephone Public Corp., Musashino-shi, Tokyo, Japan); *Rev. Electrical Com. Lab.*, vol. 13, pp. 25–43, January–February 1965.

This report deals with the design, manufacturing technique, and characteristics of an ECL-1219 bonded diode suitable for a parametric amplifier. Resonant frequency of the diode is about 19 Gc/s; its cutoff frequency is about 120 Gc/s. (In English.)

41

The Space Diversity Reception and Transmission Systems for Line-of-Sight Microwave Link by H. Makino and K. Morita (Electrical Communication Lab., Nippon Telegraph and Telephone Public Corp., Musashino-shi, Tokyo, Japan); *Rev. Electrical Com. Lab.*, vol. 13, pp. 111–129, January–February 1965.

This report describes two kinds of space diversity systems which have been applied to the microwave links of Nippon Telegraph and Telephone Public Corporation. One is a space diversity system with common phase control and the other is with individual phase control. (In English.)

42

Traveling Wave Slotted-Cylinder Antenna with Dipole Element by M. Matsushita and T. Takayama (Furukawa Electric Co., Ltd., Tokyo, Japan); *J. Inst. Electrical Commun. Engrs. Japan*, vol. 48, pp. 177–185; February 1965.

Analysis of slot-array antenna mounted on the outer conductor of a coaxial transmission line, and the design data for TV broadcasting antenna are presented. (In Japanese.)

43

Analysis of Electromagnetic Fields in the Cavity Containing a Gyromagnetic Material by S. Kumagai, Y. Nakanishi (Osaka Univ., Osaka, Japan), and N. Okamoto (Kinki Univ., Osaka, Japan); *J. Inst. Electrical Commun. Engrs. Japan*, vol. 48, pp. 227–233, February 1965.

Theoretical analysis, and an approximate method of calculating the eigen frequency of a circular cylindrical cavity resonator containing a cylindrical ferrimagnetic material by means of a variational method. (In Japanese.)

44

Study of Shock Waves by Microwave Techniques by S. Nakai and C. Yamanaka (Osaka Univ., Osaka, Japan), *J. Inst., Electrical Commun. Engrs. Japan*, vol. 48, pp. 289–298, February 1965.

Analysis and experiments of ionization phenomena of plasma shock waves, and propagation characteristics of electromagnetic shock waves in a circular waveguide by microwave techniques. (In Japanese.)

45

Attenuation of 11 Gc Waves by Wet Snowfall by M. Takada, S. Nakamura, H. Yagishita, and M. Haga (Electrical Communication Lab., Nippon Telegraph and Telephone Public Corp., Musashino-shi, Tokyo, Japan); *Electrical Com. Lab. Tech. J.*, vol. 14, pp. 335–351, February 1965.

This report describes the measurement of attenuation of 11-Gc/s waves due to wet snowfall. Snowfall was measured quantitatively by its volume of water content. (In Japanese.)

[1] T. Ijima, Y. Kasai, T. Nakahana, B. Oguchi, S. Okamura, T. Sekiguchi, K. Suetake, and A. Uchiyama.

Papers from Journals Published in the United Kingdom

Compiled by Dr. E. A. Ash, University College, London

46
The Double-Pumped Parametric Converter by D. P. Howson (Electronic and Electrical Engineering Dept., Univ. of Birmingham, Birmingham, England); *International J. Electronics*, vol. 18, pp. 269–281, March 1965.

Presents a general analysis of a four-frequency converter in which a phase shift between the fundamental and the second harmonic of the pump frequency is forced by the use of two separate, locked pump oscillators. The unidirectional and nonreciprocal properties which can thus be realized are examined.

47
Conjugately Matched Parametric Upconverters by D. P. Howson (Dept of Electronic and Electrical Engineering, Univ. of Birmingham, Birmingham, England); *Proc. IEE*, vol. 112, pp. 447–451, March 1965.

The types of three frequency parametric upconverters that have useful amounts of gain while being conjugately matched at both input and output terminals are reviewed. The additional freedom obtained by including four frequencies is examined, and some general conclusions on input impedances are obtained.

48
Derivation of Cavity Coupling to Feeder from Tuning Curves by J. R. G. Twisleton (Associated Electrical Industries, Ltd., Rugby, England); *Proc. IEE*, vol. 112, pp. 452–456, March 1965.

Describes a method of measuring coupling constants of a transmission cavity, based on the use of a movable short in the output guide.

49
Measurement of Semiconductor Properties in a Slotted Waveguide Structure by M. W. Gunn (Electrical Engineering Dept., McMaster Univ., Hamilton, Ontario, Canada) and J. Brown (Dept. of Electrical Engineering, University College, London, England); *Proc. IEE*, vol. 112, pp. 463–468; March 1965.

Describes a method for determining the complex permittivity. The sample is inserted in slots at the center of the broad walls of the guide, and a microwave bridge is used for the measurement. Corrections for end effect and slot radiation are derived.

50
Transmission-Line Directional Couplers for Very Broad-Band Operation by R. Levy (Electrical Engineering Dept., Leeds Univ., Leeds, England); *Proc. IEE*, vol. 112, pp. 469–476, March 1965.

Following a review of fundamental theory, the design of multielement couplers is discussed, with special emphasis on the effect of tolerance errors.

51
Screened Surface Waves and Some Possible Applications by H. E. M. Barlow (Dept. of Electrical Engineering, University College, London, England); *Proc. IEE*, vol. 112, pp. 477–482, March 1965.

It is shown that it is possible to excite a mode on a coaxial line in which the field distribution corresponds to weakly coupled surface waves propagating on both the inner and the outer conductor. The loss can be substantially less than for the TEM mode. A similar mode for a planar system is also analyzed. Applications are discussed.

52
Birefringence in Semiconductor Magnetoplasmas for Ultramicrowave Gyratory Devices by O. P. Gandhi (Central Electronics Engineering Research Institute, Pilani, Rajasthan, India); *Proc. IEE*, vol. 112, pp. 483–486, March 1965.

Following a brief account of wave propagation in a magnetoplasma, experiments on helicon resonances in indium antimonide carried out at 20 Gc/s are described. Clear resonances were obtained. It is concluded that it should be possible to realize useful gyratory devices at millimeter wavelengths.

53
Nonlinear-Transmission-Line Harmonic Generator by F. A. Benson and J. D. Last (Dept. of Electronic and Electrical Engineering, Univ. of Sheffield, Sheffield, England); *Proc. IEE*, vol. 112, pp. 635–643, April 1965.

Presents an analysis of harmonic generation taking losses and the finite pass band of the line into account. Experimental results are shown to be in accord with theory.

54
Nonuniform TEM Transmission Line. Part 1. Lossless and Log-Periodic Properties by R. M. Bevensee (Lawrence Radiation Lab., Univ. of California, Livermore, Calif.); *Proc. IEE*, vol. 112, pp. 644–654, April 1965.

The nonuniform transmission lines are transformed to a form corresponding to the one dimensional time independent Schroedinger equation. This is then used in a general analysis of input impedances and log periodic lines.

55
Current-Distribution Measurements on Thin Conducting Sheets by P. P. Magoulas (Wayne Kerr Ltd., London, England) and P. A. Mathews (Dept. of Electrical Engineering, University College, London, England), *Proc. IEE*, vol. 112, pp. 655–660, April 1965.

Describes S-band current distribution measurements on metal strips illuminated end on by a plane wave. Measurements were also made on dielectric coated strips, and the results correlated with theory.

56
Resonant-Slot Hybrid Junctions and Channel-Dropping Filters by G. Craven, D. W. Stopp, and R. R. Thomas (Standard Telecommunication Labs., Ltd., London, England); *Proc. IEE*, vol. 112, pp. 669–680, April 1965.

Describes a type of four port resonant slot hybrid junction. Matching can be effected without use of posts and irises, making the designs particularly useful for millimeter waves. Experimental results and construction techniques are presented.