

# MICROWAVE AND GUIDED WAVE LETTERS

MAY 1991

VOLUME 1

NUMBER 5

(ISSN 1051-8207)

A PUBLICATION OF THE IEEE MICROWAVE THEORY AND TECHNIQUES SOCIETY



---

**LETTERS**

|                                                                                                                   |                                                                                                                  |     |
|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----|
| Full-Wave Analysis of Composite-Metal Multidielectric Lossy Microstrips . . . . .                                 | <i>W.-K. Wang and C.-K. Tzuang</i>                                                                               | 97  |
| W-Band Oscillator Using Ion-Implanted InGaAs MESFET's . . . . .                                                   | <i>J. M. Schellenberg, C. L. Lau, M. Feng, and P. Brusenback</i>                                                 | 100 |
| A 5-Gb/s Decision Circuit Fabricated in a 1.5- $\mu$ m Super-Self-Aligned Silicon Bipolar IC Technology . . . . . | <i>R. G. Swartz, V. D. Archer, T. Y. Chiu, Y. Ota, A. M. Voshchenkov, T. Long, K. Moerschel, and W. Possanza</i> | 103 |
| Monolithic AlGaAs-GaAs HBT Single- and Dual-Stage Ultra-Broadband Amplifiers . . . . .                            | <i>F. Ali, R. Ramachandran, and A. Podell</i>                                                                    | 107 |
| A MESFET-Controlled X-Band Active Bandpass Filter . . . . .                                                       | <i>Y. Yamamoto, K.-I. Kawasaki, and T. Itoh</i>                                                                  | 110 |
| Two-Port FET Oscillators with Applications to Active Arrays . . . . .                                             | <i>J. Birkeland and T. Itoh</i>                                                                                  | 112 |
| A Super Low-Noise 0.1 $\mu$ m T-Gate InAlAs-InGaAs-InP HEMT . . . . .                                             | <i>K. H. G. Duh, P. C. Chao, S. M. J. Liu, P. Ho, M. Y. Kao, and J. M. Ballingall</i>                            | 114 |
| Noise Waves and Passive Linear Multiports . . . . .                                                               | <i>S. W. Wedge and D. B. Rutledge</i>                                                                            | 117 |

---

|                            |     |
|----------------------------|-----|
| PATENT ABSTRACTS . . . . . | 120 |
|----------------------------|-----|

---

**ANNOUNCEMENTS**

|                             |     |
|-----------------------------|-----|
| Author Check List . . . . . | 126 |
| Call for Papers . . . . .   | 127 |

---



The Microwave Theory and Techniques Society is an organization, within the framework of the IEEE, of members with principal professional interest in the field of microwave theory and techniques. All members of the IEEE are eligible for membership in the Society and will receive the *LETTERS* upon payment of the annual Society membership fee of \$12.00. Affiliate membership is available upon payment of the annual affiliate fee of \$24.00, plus the Society fee of \$12.00. For information on joining write to the IEEE at the address below.

**ADMINISTRATIVE COMMITTEE**F. IVANEK, *President*R. S. KAGIWADA, *Vice President*D. SWANSON, *Secretary*

K. AGARWAL  
R. E. BRYAN  
E. D. COHEN  
E. J. CRESCENZI, JR.

A. L. ESTES  
Z. GALANI  
F. IVANEK  
R. H. JANSEN

B. S. JOKANOVIC  
R. S. KAGIWADA  
S. MAAS  
M. A. MAURY, JR.

R. A. MOORE  
B. S. PERLMAN  
J. E. RAUE  
P. W. STAECKER

S. J. TEMPLE  
R. S. TUCKER  
J. C. WILTSE

*Honorary Life Members*

A. C. BECK  
S. B. COHN  
A. A. OLINER

T. S. SAAD  
K. TOMIYASU  
L. YOUNG

*Distinguished Lecturers*

W. CURTIS  
V. RIZZOLI  
J. WHINNERY

*Past Presidents*

B. E. SPIELMAN (1988)  
V. G. GELNOVATCH (1989)  
T. ITOH (1990)

**S-MTT Chapter Chairmen**

Albuquerque: M. A. DINALLO  
Atlanta: W. R. SCOTT  
Baltimore: P. ESKER  
Beijing: W. LIN  
Benelux: A. VAN DE CAPELLE  
Buffalo: M. R. GILLETTE  
Central & South Italy: P. LAMPARIELLO  
Central New England/Boston: P. H. CARR  
Chicago: C. F. CLARK  
Cleveland: R. J. KERCZEWSKI  
Columbus: L. HENDERSON  
Dallas: D. M. DRURY  
Dayton: B. M. KENT  
Denver-Boulder: J. M. DUNN  
Egypt: O. L. EL-SAYED  
Finland: A. V. RAISANEN  
Florida West Coast: J. SHERMAN  
France: V. F. HANNA  
Houston: J. T. WILLIAMS  
Huntsville: H. L. BENNETT  
India: S. K. KOUL  
Indonesia: A. DJITWATAMPU  
Israel: A. SAAD

Ithaca: R. C. COMPTON  
Kitchner-Waterloo: Y. L. CHOW  
Korea: J.-W. RA  
Los Angeles: M. I. HERMAN  
Milwaukee: R. A. STRANGWAY  
Montreal: C. C. HUANG  
New Hampshire: R. O. GEOFFROY  
New Jersey Coast: E. E. MULLER  
New South Wales/Australia: B. THOMAS  
New York/Long Island: M. JACOBS  
North Italy: C. NALDI  
North Jersey: R. V. SNYDER  
Orlando: R. T. COCK  
Ottawa: I. STREIBL  
Philadelphia: N. ENGHETA  
Phoenix: V. NAIR  
Portland: D. W. TUGGLE  
Princeton: J. N. LATRADE  
Rio de Janeiro/Brazil: J. R. BERGMANN  
San Diego: J. J. FRATAMICO, JR.  
San Fernando Valley: R. E. BRYAN  
Santa Clara Valley/San Francisco: S. JERRY FIEDZIUSZKO  
Sao Paulo: D. CONSONI

Schenectady: R. J. GUTMANN  
Seattle: R. H. BRUNTON III  
South Africa: C. W. I. PISTORIUS  
South Brevard/Indian River: T. DURHAM  
Southeastern Michigan: R. KATEHI  
Spain: M. P. SIERRA  
Springfield: K. M. LAU  
St. Louis: P. L. HUDDLESTON  
Sweden: T. LEWIN  
Switzerland: A. C. BAUDER  
Syracuse: K. H. SNOW  
Taiwan: J. Y. C. CHIN  
Tokyo: Y. NAITO  
Tucson: H. C. KOHLBACHER  
Twin Cities: M. J. GAWRONSKI  
United Kingdom/Ireland: I. M. WILLIAMSON  
Utah/Salt Lake City: M. F. ISKANDER  
Venezuela: A. BIANCHI  
Virginia Mountain: I. J. BAHL  
Washington/Northern Virginia: K. BONTZOS  
West Germany: H. L. HARTNAGEL  
Winnipeg: L. SHAFI  
Yugoslavia: B. JOKANOVIC

**IEEE MICROWAVE AND GUIDED WAVE LETTERS****Editor-in-Chief**

T. ITOH

**Associate Editors**

M. AKAIKE

(Abstracts Editor—Asia)

W. H. MEISE

(Patent Abstracts)

**THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.****Officers**

ERIC E. SUMNER, *President*  
MERRILL W. BUCKLEY, JR., *President-Elect*  
HUGH RUDNICK, *Secretary*  
THEODORE W. HISSEY, JR., *Treasurer*  
RICHARD S. NICHOLS, *Vice President, Educational Activities*

MICHAEL J. WHITELAW, *Vice President, Professional Activities*  
J. T. CAIN, *Vice President, Publication Activities*  
ROBERT T. H. ALDEN, *Vice President, Regional Activities*  
FERNANDO ALDANA, *Vice President, Technical Activities*

MARTIN V. SCHNEIDER, *Director, Division IV—Electromagnetics and Radiation***Headquarters Staff**

ERIC HERZ, *Executive Director and General Manager*  
THOMAS W. BARTLETT, *Associate General Manager—Finance and Administration*  
WILLIAM D. CRAWLEY, *Associate General Manager—Programs*  
JOHN H. POWERS, *Associate General Manager—Volunteer Services*

DONALD CHRISTIANSEN, *Editor, IEEE Spectrum*  
IRVING ENGELSON, *Staff Director, Technical Activities*  
LEO FANNING, *Staff Director, Professional Activities*  
PHYLLIS HALL, *Staff Director, Publishing Services*  
MELVIN I. OLKEN, *Staff Director, Field Services*

EDWARD ROSENBERG, *Controller*  
ANDREW G. SALEM, *Staff Director, Standards*  
RUDOLF A. STAMPFL, *Staff Director, Educational Activities*  
THOMAS C. WHITE, *Staff Director, Public Information*

**Publications Department**

*Publications Managers:* ANN H. BURGMAYER, GAIL S. FERENC  
*Managing Editor:* DAVID A. GEORGE  
*Associate Editor:* JEFFREY E. CICHOCKI

IEEE MICROWAVE AND GUIDED WAVE LETTERS is published monthly by The Institute of Electrical and Electronics Engineers, Inc. Responsibility for the contents rests upon the authors and not upon the IEEE, the Society, or its members. **IEEE Headquarters:** 345 East 47 Street, New York, NY 10017-2394. **NY Telephone:** 212-705 + extension: Information-7900; General Manager-7910; Public Information-7867; Publishing Services-7560; Spectrum-7556. **Telecopiers:** NY (Headquarters) 212-752-4929, NY (Publications) 212-705-7682. **NY Telex:** 236-411 (international messages only). **IEEE Service Center** (for orders, subscriptions, address changes, Educational Activities, Standards, Region/Section/Student Services): 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331. **NJ Telephone:** Information: 908-981-0060; 908-562 + extension: Controller -5365; Technical Activities -3900. **IEEE Washington Office** (for U.S. professional activities): 1828 L Street, NW, Suite 1202, Washington, DC 20036-5104. **Washington Telephone:** 202-785-0017. **Price/Publication Information:** Individual copies: IEEE members \$10.00 (first copy only), nonmembers \$20.00 per copy. (Note: Add \$4.00 postage and handling charge to any order from \$1.00 to \$50.00, including prepaid orders.) Member and nonmember subscription prices available on request. Available in microfiche and microfilm. **Copyright and Reprint Permissions:** Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limits of the U.S. Copyright Law for private use of patrons: 1) those post-1977 articles that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 29 Congress Street, Salem, MA 01970; 2) pre-1978 articles without fee. Instructors are permitted to photocopy isolated articles for noncommercial classroom use without fee. For all other copying, reprint, or republication permission, write to Copyrights and Permissions Department, IEEE Publishing Services, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331. Copyright © 1991 by The Institute of Electrical and Electronics Engineers, Inc. All rights reserved. Application to mail at second-class postage rates is pending at New York, NY, and at additional mailing offices. **Postmaster:** Send address changes to IEEE MICROWAVE AND GUIDED WAVE LETTERS, IEEE, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331.