



MICROWAVE AND GUIDED WAVE LETTERS[®]

A PUBLICATION OF THE IEEE MICROWAVE THEORY AND TECHNIQUES SOCIETY



DECEMBER 1996

VOLUME 6

NUMBER 12

IMGLE3

(ISSN 1051-8207)

ANNOUNCEMENT

1996 List of Reviewers 431

MEMS Orientational Optomechanical Media for Microwave Nonlinear Applications *B. Tsap, K. S. J. Pister, and H. R. Fetterman* 432

Weighted Haar Wavelet-Like Basis for Scattering Problems *W. Y. Tam* 435

A Novel Wavelet Based Time Domain Simulation Approach *M. Werthen and I. Wolff* 438

A 5-GHz High-Efficiency Class-E Oscillator *E. W. Bryerton, W. A. Shiroma, and Z. B. Popović* 441

A 0-to-40-GHz Direct-Coupled Distributed Baseband Amplifier IC with SCFL Interface *S. Kimura, Y. Imai, and Y. Miyamoto* 444

Frequency Dependence of the Constitutive Parameters of Causal Perfectly Matched Anisotropic Absorbers *M. Kuzuoglu and R. Mittra* 447

ASIA-PACIFIC ABSTRACTS

Papers from Journals Published in Australia, India, China, Korea, and Japan in 1995 *M. Koshiba and S.-J. Xu* 450

PATENT ABSTRACTS *W. H. Meise* 497

1996 INDEX Follows page 503



The Microwave Theory and Techniques Society is an organization, within the framework of the IEEE, of members with principal professional interests 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 \$8.00. Affiliate membership is available upon payment of the annual affiliate fee of \$35.00, plus an annual subscription fee of \$8.00. For information on joining, write to the IEEE at the address below. *Member copies of Transactions/Journals are for personal use only.*

ADMINISTRATIVE COMMITTEE

J. W. WASSEL, <i>President</i>	R. E. BRYAN, <i>Vice President</i>	R. E. LEHMANN, <i>Secretary</i>	D. G. SWANSON, <i>Treasurer</i>
J. T. BARR.	J. M. GOLIO	M. J. SCHINDLER	J. W. WASSEL
R. E. BRYAN	D. HORNBuckle	R. W. SUDBURY	C. M. JACKSON
S. J. FIEDZIUSZKO	R. H. JANSEN	E. A. REZEK	D. J. SWANSON
		G. R. THOREN	J. -W. RA

Honorary Life Members

A. C. BECK
S. B. COHN
T. ITOH

A. A. OLINER
T. S. SAAD

K. TOMIYASU
L. YOUNG

Distinguished Lecturers

M. V. SCHNEIDER
R. DIXIT
K. WAKINO

Past Presidents

E. D. COHEN (1995)
E. J. CRESCENZI (1994)
P. W. STAECCKER (1993)

S-MTT Chapter Chairmen

Albuquerque: D. D. MCLEMORE
Atlanta: D. R. LEWIS, JR.
Baltimore: H. B. SEQUEIRA
Beijing: W. G. LIN
W. X. ZHANG
Benelux: K. VAN'T KLOOSTER
Buffalo: M. R. GILLETTE
Bulgaria: H. D. HRISTOV
Central Iowa/Cedar Rapids: J. C. COZZIE
Central & South Italy: P. BERNARDI
Central New England/Boston: C. P. MCCLAY
Central Virginia: S. H. JONES
Chicago: J. DAVALOS
Cleveland: K. B. BHASIN
College Station: R. NEVELS
Columbus: R. LEE
Czechoslovakia: M. ZEMAN
Dallas: S. R. NELSON
Dayton: K. NAISHADHAM
Denver-Boulder: R. G. GEYER
Egypt: I. A. SALEM
Finland: A. H. SIHVOLA
Florida West Coast: M. SMITH
Foothill: D. A. PAUL
France: R. A. ADDE
Germany: F. ARNDT
Greece: N. K. UZUNOGLU
Houston: J. T. WILLIAMS
R. D. NEVELS
Hong Kong: K. K. MEI
Hungary: I. FRIGYES

Huntsville: H. L. BENNETT
India: K. S. CHARI
Indonesia: S. NATANAGARA
Israel: A. MADJAR
Kitchener-Waterloo: Y. L. CHOW
A. NATHAN
Korea: D. C. PARK
Los Angeles: J. A. VERKADE
Milwaukee: J. RICHIE
Montreal: G. L. YIP
New Hampshire: R. O. GEOFFROY
New Jersey Coast: A. PAOLELLA
New South Wales: T. S. BIRD
New York/Long Island: M. HANCZOR
M. E. KNOX
North Italy: C. U. NALDI
North Jersey: W. M. SCHMIDT
Oregon: V. K. TRIPATHI
Orlando: C. CHRISTODOULOU
Ottawa: D. H. REEKIE
Philadelphia: W. D. JEMISON
Phoenix: C. A. GAW
Poland: J. W. MODELSKI
B. LEVITAS
Princeton/Central Jersey: W. R. CURTICE
Rio de Janeiro/Brazil: J. R. BERGMANN
Russia: Y. I. BELOV
S. TRETYAKOV
M. V. DAVIDOVICH
V. LIOUBTCHENKO

San Diego: K.-L. P. YU
San Fernando Valley: M. M. RADMANESH
Santa Clara Valley/San Francisco: S. F. WETENKAMP
Schenectady: R. J. GUTMANN
Seattle: J. MCCANDLESS
Singapore: L. MOOK-SENG
South Africa: D. B. DAVIDSON
South Australia: B. D. BATES
South Brazil: A. O. M. ANDRADE
Southeastern Michigan: J. W. BURNS
Spain: M. SALAZAR-PALMA
Springfield: J. B. MEAD
St. Louis: R. W. KIEFEL
Sweden: P. T. LEWIN
Switzerland: W. BACHTOLD
Syracuse: T. SARKAR
Taipei: G.-L. LIU
Tokyo: Y. KOBAYASHI
Toronto: T. E. VAN DEVENTER
Tucson: H. C. KOHLBACHER
Turkey: A. ALTINTAS
Twin Cities: M. J. GAWRONSKI
Ukraine: N. N. VOITOVICH
United Kingdom/Ireland: T. H. OXLEY
Venezuela: A. N. BIANCHI
Virginia Mountain: H. P. SINGH
Washington D.C./Northern Virginia: S. BAIJAI
Winnipeg: L. SHAFAI
Yugoslavia: B. S. JOCANOVIC

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

R. SORRENTINO
Editorial Assistants
P. MEZZANOTTE
M. STOVALI

Associate Editors

M. KOSHIBA (*Asia-Pacific Abstracts*)
Sub-Associate Editor
S. XU

W. H. MEISE (*Patent Abstracts*)

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

WALLACE S. READ, *President*
CHARLES K. ALEXANDER, *President-Elect*
TSUNEO NAKAHARA, *Secretary*
HOWARD L. WOLFFMAN, *Treasurer*
JERRY R. YEARGAN, *Vice President, Educational Activities*

JOEL B. SNYDER, *Vice President, Professional Activities*
W. KENNETH DAWSON, *Vice President, Publication Activities*
RAYMOND D. FINDLAY, *Vice President, Regional Activities*
DONALD C. LOUGHRY, *Vice President, Standards Activities*
BRUCE A. EISENSTEIN, *Vice President, Technical Activities*

THEODORE W. HISSEY, JR., *Executive Director*
ROLF H. JANSEN, *Director, Division IV—Electromagnetics and Radiation*

Executive Staff

DANIEL J. SENESE, *General Manager*
RICHARD D. SCHWARTZ, *Staff Executive, Business Administration*
ANTHONY J. FERRARO, *Staff Executive, Publications*

IRVING ENGELSON, *Managing Director, Corporate Activities*
PETER A. LEWIS, *Managing Director, Educational Activities*
CECELIA JANKOWSKI, *Managing Director, Regional Activities*

ANDREW G. SALEM, *Managing Director, Standards Activities*
W. THOMAS SUTTLE, *Managing Director, Professional Activities*
ROBERT T. WANGEMANN, *Managing Director, Technical Activities*

IEEE Periodicals**Transactions/Journals Department**

Staff Director: FRAN ZAPPULLA
Transactions Manager: GAIL S. FERENC
Electronic Production Manager: JERI L. UZZO
Editorial Manager: VALERIE CAMMARATA
Managing Editor: GERALDINE E. KROLIN

Senior Editor: ROBERT W. DAVIDSON *Associate Editor:* DAWN SPETH WHITE

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/Council, or its members. **IEEE Corporate Office:** 345 East 47th Street, New York, NY 10017-2394. **IEEE Operations Center:** 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331. **NJ Telephone:** 908-981-0060. **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 for private use of patrons, provided the per-copy fee indicated in the code at the bottom of the first page is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923. For all other copying, reprint, or republication permission, write to Copyrights and Permissions Department, IEEE Publications Administration, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331. Copyright © 1996 by The Institute of Electrical and Electronics Engineers, Inc. All rights reserved. Periodicals Postage Paid 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. GST Registration No. 125634188. Printed in U.S.A.