Foreword

SPECIAL ISSUE ON MILLIMETER WAVES: CIRCUITS, COMPONENTS, AND SYSTEMS

FOR MORE THAN a quarter of a century, engineers and scientists have been challenging the frontier of microwave technology with the prospect of extending it into millimeter-wave systems applications. The progress toward this goal had been relatively slow. In recent years, however, a significantly increased effort has been directed toward the development of various solid-state devices for use at millimeter-wave frequencies. This has brought a rapid progress in the field of millimeter waves in many countries, particularly in Europe, Japan, and North America.

This Special Issue reflects the depth and breadth attained by millimeter-wave theory and techniques. As the reader may find by scanning this issue, the field of millimeter waves is not only moving forward but also has been expanding. Numerous applications are being introduced, in some cases complementing functions performed up to now at lower microwave frequencies and in other cases actually improving some aspects of the performance of microwaves. The use of millimeter waves offers many advantages over microwaves including broader bandwidths, increased resolutions, reduced component size and weight, and smaller antenna size. These advantages should lead to lower systems production cost. In addition, the frequency-dependent atmospheric attenuation characteristics in the millimeter-wave region offer various unique applications. Current activities of millimeter-wave applications cover communications, radars, radiometry, radio astronomy, spectroscopy, plasma diagnostics, electron spin resonance measurements, medical research, vibration analysis and measurements, and many other fields. It is hoped that the present issue adequately conveys the variety and vigor of the ongoing research and development effort of many scientists around the world in the field of millimeter waves. The papers cover the following topics of millimeter waves:

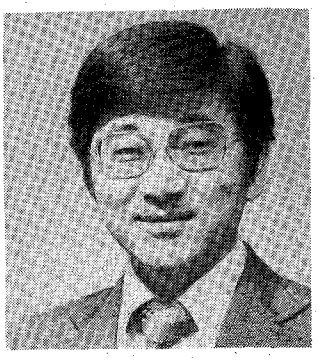
—semiconductor devices technology;
—masers and mixers;
—IMPATT and Gunn-effect oscillators and amplifiers;
—frequency multipliers and converters;
—systems and subsystems;
—integrated circuits;
—ferrite devices;
—filters and diplexers;
—waveguide transmission characteristics;
—dielectric and magnetic materials characterization.

All together these papers represent a wide coverage of the current status and significant trends in millimeter-wave techniques. It is now time for further refinement of these techniques and for our combined efforts to pursue the goal of millimeter-wave systems development.

The large response to the Call for Papers reflects the degree of current interest in the field. Regrettably, however, many papers could not be included in this issue due to the page limit budgeted for the Special Issue. The editor thanks each of the authors for submitting the manuscripts published in this issue and those which unfortunately could not be included. Special thanks go to Linda Stager whose enthusiastic, skillful assistance has made the editor's task easier and to Dr. F. Bernues whose valuable advice contributed to the technical content of this issue. As in any other issue of this TRANSACTIONS, the contribution of reviewers to this Special Issue was essential, not only in selecting the best papers for publication but also in improving the content and presentation of these papers. The editor wishes to express his sincere gratitude to the people listed below for reviewing the manuscripts and giving recommendations and constructive criticisms.

T. A. Abele
D. A. Alsberg
R. Bernick
F. J. Bernues
C. A. Brackett
A. Cardiasmenos
Y. Chang
C. Chao
M. M. Chrepta
R. C. Clauss
P. A. Crandell
E. J. Denlinger
T. Fong
T. H. K. Frederking
J. W. Gewartowski
P. Greiling
U. Gysel
G. Haddad
R. Harp
G. Heller
W. Higa
A. Hislop
P. T. Hutchison
T. Itoh
R. Iwasaki
W. L. Jones
M. Kanda
A. Kerechman
R. T. Kihm
N. B. Kramer
P. Kwok
R. W. Laton
B. Levin
G. S. Levy
W. H. Lockyear
R. M. Malbon
J. E. Mercereau
C. K. S. Miller
J. L. Mitchell
B. Owen
J. A. Paul
S. T. Peng
D. F. Peterson
A. Podell
M. S. Reid
C. Ren
H. E. Rowe
M. V. Schneider
T. Seidel
C. Snapp
F. J. Tischer
R. D. Tuminaro
D. Wait
K. P. Weller
L. Wicker
G. T. Wrixon
C. Yeh
K. S. Yngvesson
D. T. Young

H. J. KUNO
Guest Editor



H. J. Kuno (S'61–M'63–SM'75) received the B.S., M.S., and Ph.D. degrees in engineering from the University of California, Los Angeles, in 1961, 1963, and 1966, respectively.

From 1961 to 1966 he was with the Electronics Division of the NCR, Hawthorne, CA. His work concerned various projects, including the development of solid-state digital and analog circuits, and the development of high-speed thin magnetic film memories. From 1965 to 1966 he was a Post Graduate Research Engineer, under a NASA Research Grant at the University of California, Los Angeles, investigating microwave and millimeter-wave propagation in solid-state plasmas. From 1966 to 1969 he was with the RCA David Sarnoff Research Center, Princeton, NJ, as a member of the technical staff where he worked on solid-state microwave devices and high-power semiconductor devices. In 1969 he joined the Hughes Aircraft Company, Torrance, CA, where he has been involved in the development of various solid-state millimeter-wave devices and circuits. He is currently Manager of the Solid-State Subsystems Department in charge of development and manufacturing of solid-state millimeter-wave and microwave devices, circuits, components, and subsystems.

Dr. Kuno is a member of Tau Beta Pi, Sigma Xi, and the American Physical Society.