Foreword

ELECTROMAGNETIC wave guiding and transmission are an integral part of microwave, millimeter-wave, and optical systems. Passive components can be made with particular waveguide or transmission-line configurations and active components can be realized by installing solid-state devices in them. To design passive and active components, characteristics of related waveguiding structures must be clearly understood.

Traditional metal-walled waveguides isolate the electromagnetically useful "interior" region from the "exterior" region. Signals are carried and processed inside the "interior" region. The open guided wave structures treated in this Special Issue do not possess such a clear distinction between the "interior" and the "exterior" regions; the entire space becomes the waveguiding medium, at least theoretically. Dielectric image guides, channel waveguides, and optical fibers are in this category; microstrips and other printed transmission-line structures also belong to the same category. With the rapid advance in integrated circuit technology, it is not unreasonable to expect more and more new waveguide types added to this group.

During the past decade, significant efforts have been made towards a better understanding of optical signal processing circuits. Techniques employed in the optical regime have been used successfully to investigate similar dielectric waveguiding structures for millimeter wave application. Quasi-optical structures have been used in a number of low-noise receivers. Some of the problems unique to millimeter waves have been studied. Many printed transmission lines have characteristics inherent to open structures such as coupling, dispersion, and radiation. Although these phenomena have been investigated extensively in the case of microstrips operating in microwave frequencies, the need to extend to higher frequencies as well as to other printed transmission-line structures pose new challenges and require new solutions.

In light of these developments, the Microwave Theory and Techniques Society Technical Committee on Microwave Field Theory (MTT-15) considers it timely to organize this Special Issue on open guided wave structures. It contains six papers that analyze isotropic planar dielectric waveguides, followed by seven papers on other open structures representing a wide range of waveguide forms. The parallel presentation serves to remind our readers of the many facets of guided waves, and the commonality among different structures both in terms of their governing principles and related analyses. In addition, we have also included in the issue six application-oriented papers and three short papers. We hope they not only provide some state-of-the-art information, but more importantly, a proper perspective to an otherwise highly theoretical and academic viewpoint.

The help of the reviewers was indispensible to bring this Issue to existence. We sincerely appreciate their efforts:

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TATSUO ITOH
DAVID C. CHANG
Guest Editors

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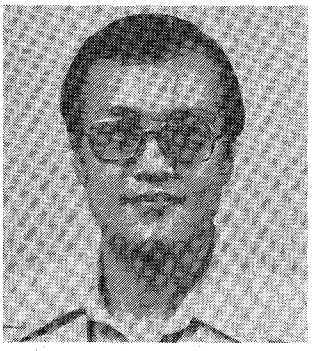
Tatsuo Itoh (S'69–M'69–SM'74) received the Ph.D. degree in electrical engineering from the University of Illinois, Urbana, in 1969.

From September 1966 to April 1976 he was with the Electrical Engineering Department, University of Illinois. From April 1976 to August 1977 he was a Senior Research Engineer in the Radio Physics Laboratory, SRI International, Menlo Park, CA. From August 1977 to June 1978 he was an Associate Professor at the University of Kentucky, Lexington. In July 1978 he joined the faculty at The University of Texas at Austin, where he is now a Professor of Electrical Engineering and Director of Microwave Laboratory. During the summer 1979, he was a guest researcher at AEG-Telefunken, Ulm, West Germany.

Dr. Itoh is a member of the Institute of Electronics and Communication Engineers of Japan, Sigma Xi, and Commissions B and C of USNC/URSI. He is a Professional Engineer registered in the State of Texas.



David C. Chang (M'67–SM'76) was born in Hupeh, China, on September 9, 1941. He received the B. S. degree in electrical engineering from Cheng Kung University, Tainan, Taiwan, China, in 1961 and the M. S. and Ph.D. degrees in applied physics from Harvard University, Cambridge, MA, in 1963 and 1967, respectively.

He joined the University of Colorado, Boulder, in 1967, and is now a Professor of Electrical Engineering and Director of the Electromagnetics Laboratory. In 1972 he was a visiting Professor at Queen Mary College, University of London, London, England. In addition, he is an associate Editor of IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION and is a consultant to Kaman Science Corp., Colorado Springs, CO, and Arthur D. Little Company, Cambridge, MA.

Dr. Chang is a member of the International Scientific Radio Union Commissions A, B, C, and E. He is the immediate past Chairman of the IEEE Microwave Theory and Techniques Society 15 subcommittee on Microwave Field Theory, and Chairman of the Denver Chapter of the IEEE Electromagnetic Compatibility/Instrumentation and Measurement Groups.