

TUESDAY, JUNE 27, 8:00 PM
PANEL DISCUSSION ON APPLICATIONS OF
MILLIMETER-WAVE AND OPTICAL/IR TECHNOLOGIES

Sponsored by:

MTT-6 Committee on Microwave and
Millimeter Wave Integrated Circuits
R. H. Knerr, Chairman

MTT-3 Committee on Optical Techniques
D. B. Anderson, Chairman

Organized by:

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Moderator:

Leo Young
Naval Research Laboratory
Washington, DC 20375

Panelists:

L. Biberman, Institute for Defense Analyses, Arlington, VA
M. Kaswen, Hughes Aircraft, Torrance, CA
P. Kruse, Honeywell Corp., Bloomington, MN
N. Levine, Bell Laboratories Holmdel, NJ
J. Payne, Natl. Radio Astronomy Obs., Tuscon, AZ
J. Taub, AIL/Cutler-Hammer, Melville, NY

Background

Millimeter waves have been "around the corner" for at least 25 years. Every few years there is a revival of interest, some special millimeter-wave symposia are organized, and perhaps a special issue of the MTT Transactions is published. Then interest fades, only to revive again a few years later, repeating the cycle.

There is a revival of interest in millimeter and submillimeter waves now, but has anything changed? There have been some impressive advances in the components and device areas (including gyrotrons, IMPATT's, low-noise receivers and integrated circuits, but are the applications there?

Millimeter waves are more heavily attenuated by the atmosphere than microwaves, but there are "windows" of relatively low absorption at 35 GHz, 94 GHz, 140 GHz, 230 GHz, etc. In some cases, the absorption may be a virtue (for example, to limit interference or for covertness). Millimeter waves can penetrate clouds, fog, dust and smoke better than visible or infrared radiation can. However, the quality (resolution) of millimeter wave imaging is necessarily inferior to imaging at shorter (IR) wavelengths.

So millimeter waves are worse than microwaves and better than infrared for penetrating clouds, but

they are worse than infrared and better than microwaves for resolution and imaging. Their bandwidth or channel capacity is also in between. For scientific purposes (such as astronomy and spectroscopy), we can expect a continuing interest in millimeter waves, but for military or commercial applications (such as surveillance and communications) what is their place?

Panel Discussion

The session will begin with introductory remarks by the moderator. With the aid of several Vu-graphs, each of the panelists will then highlight current or projected applications for the technologies with which he is most familiar. A series of discussions will then follow among the panelists, with audience participation encouraged.

The panel will focus on the properties of millimeter (and submillimeter) waves for imaging and for communications, as well as on recent advances in radiometry.

The discussion is expected to be lively, as many potential applications for millimeter and optical techniques have been identified in the military and civilian sectors, and controversy over an "optimum" approach is inevitable in many areas.