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# HARMONIC GENERATION, MIXING AND DETECTION OF MILLIMETER AND SUBMILLIMETER WAVES USING PARAMETRIC OR TUNNEL DIODES

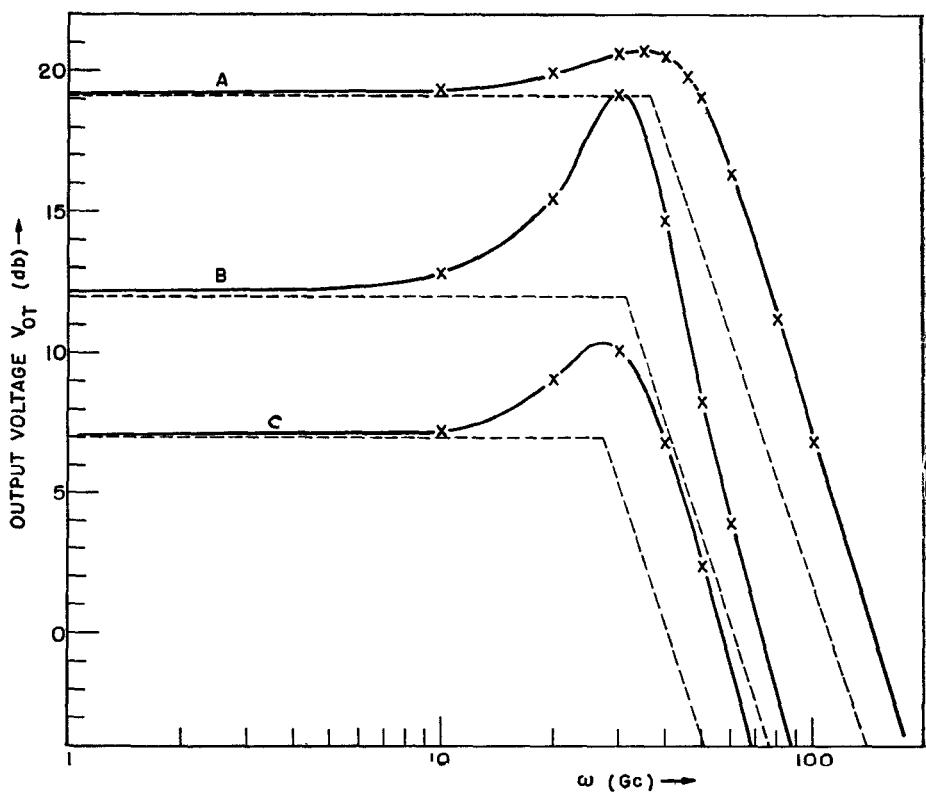
KERN. K. N. CHANG

RCA Laboratories Div., Radio Corporation of America,  
Princeton, N. J.

## ABSTRACT

A general discussion of harmonic generation, mixing and detection through use of parametric or tunnel diodes is given. The efficiency, noise factor and sensitivity of such devices are presented. In particular, the circuit design and its associated diode fabrication, together with recent experimental results at millimeter wave frequencies are described. Based on general considerations, similar experimental results can be anticipated in the submillimeter wave region.

The accompanying figure demonstrates, for example, the performance of tunnel diodes, computed (--) and measured (—), as detectors for frequencies up to 55 Gc. In this Figure, the output voltage of a IN53 crystal diode detector (Curve C), is compared with the output voltage of a tunnel diode detector operated with the tunnel diode biased near the peak current point (Curve A), and back-biased (Curve B).



OUTPUT FROM VARIOUS DETECTOR DIODES

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**NOTES**

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## NOTES

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