Abstracts

Harmonics at Millimeter Wavelengths

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Two techniques for obtaining millimeter waves with sufficient power to make physical measurements have been investigated at the Columbia Radiation Laboratory. The first in point of time was to use the harmonics of the fundamental frequency directly emitted by a magnetron when it is in oscillation. Harmonics up to wavelengths of 1.25 mm have been observed. The only advantage of the magnetron is in the ease of adjustment. An operator of moderate experience should be able to produce 1.5 mm radiation within a few hours using this technique. The other method in use is to frequency multiply the power emitted by a klystron by means of a silicon-tungsten contact used as a non-linear device. This method ps produced 1.5mm wavelength radiation at Columbia and wavelengths up to 0.77 mm at Duke University. It has the advantages that the radiation is stable in power and frequency, is monochromatic, and also is tuneable. The price paid is in a considerably greater time of adjustment and alignment, a few weeks being not at all uncommon.

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