Abstracts

New Technique for Microwave Radiometry

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An interference modulation technique for microwave radiometry is described. Use of the technique is considered for the development of a radiometer for tuning over a wide range of frequencies, a radiometric device for determining the absolute sensitivity of detectors over a wide range of frequencies, and a means for determining the power level of coherent sources as a function of frequency. A device using this technique does not require the use of a coherent source, and the technique is applicable to wavelengths well into the low millimeter region. A tunable radiometer using interference modulation has been operated as a measurements system within the 50-90 Gc region. Successful performance required the use of a sensitive detector which consisted of a barretter operated in an evacuated atmosphere. A noise source having known temperature was used as the source of microwaves for determining the sensitivity of detectors as a function of frequency. It has been found that the sensitivity of barretters is greatly improved by a reduction in air pressure and that, when evacuated, a commercially available barretter will provide a sensitivity of approximately 6 x 10/sup -11/ watts for an audio bandwidth of one cycle per second. The technique discussed provides the opportunity for developing a calibrated power meter for millimicrowatt levels from coherent sources.

❑ Return to main document.