Abstracts

Very High Sensitivity Heterodyne Detection of X-Band Radiation with Neon Indicator Lamps

Y. Makover, O.R. Manor and N.S. Kopeika. "Very High Sensitivity Heterodyne Detection of X-Band Radiation with Neon Indicator Lamps." 1978 Transactions on Microwave Theory and Techniques 26.1 (Jan. 1978 [T-MTT]): 38-43.

Very high sensitivity with simple inexpensive commercial neon glow lamps designed for indicator-lamp applications is observed at X band in synchronous detection. Typical minimum detectable signals with 10-nW-order local-oscillator powers are 10/sup -17/ W /spl dot/ Hz/sup -1/ or lower. This is equivalent to 10/sup -22/ W /spl dot/Hz/sup -1/ with 1-mW local-oscillator power. As such lamps can be used without damage in high microwave fields, they can be used in principle with appropriate local-oscillator power levels to reach ideal microwave noise equivalent power (NEP) limits. The low NEP and noise figure result from the high responsivities of such devices which are due to high internal signal gain. Experimental results correlate well with the enhanced-ionization collision-rate detection model.

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