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Title

Range, resolution and power of THz systems for remote detection of concealed radioactive materials

Source

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Abstract

This paper analyzes parameters required for realizing remote detection of a concealed source of ionizing radiation by observing the occurrence of breakdown in air by a focused wave beam. Production of free electrons and the free electron density in the absence/presence of additional sources of ionization are analyzed. The maximum electron density in the discharge and the time required for this density to return after the discharge back to its stationary level, are estimated. The optimal excess of the power density and the corresponding power level as the function of frequency are determined. It is shown that the optimal frequency of such systems ranges from 0.3 up to 0.8 THz. The paper also determines the range of such systems as the function of the source frequency and power and contains a brief analysis of available sources of microwave, millimeter-wave and THz radiation. (11 References).