Abstracts

New Techniques for Implementing Microwave Biological-Exposure Systems

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In investigating the biological effects of microwave radiation, one of the most vexing problems is that of generating an essentially uniform plane wave with sufficient power density for illuminating biological samples. This paper describes three illumination systems: a focused prolate spheroid, an absorber-lined horn, and a compact range. The focused prolate spheroid has two foci: a waveguide feed is located at one, and the biological sample is located at the other. Large power densities can be obtained over an area of about one square wavelength. The absorber-limed horn acts as a small source within an anechoic chamber; such an illumination system reduces errors due to interaction with the biological sample. The compact range employs a reflector and feed system to generate a plane wave across a large aperture; such a range is an attractive device for illuminating large volumes. All three systems can be implemented in a limited space without an anechoic chamber. Experimental data obtained from model systems are presented.

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