Abstracts

Microwave detection of breast cancer

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Breast cancer affects many women, and early detection aids in fast and effective treatment. Mammography, which is currently the most popular method of breast screening, has some limitations, and microwave imaging offers an attractive alternative. A microwave system for breast tumor detection that uses previously introduced confocal microwave imaging techniques is presented in this paper. The breast is illuminated with an ultrawide-band pulse and a synthetic scan of the focal point is used to detect tumors; however, the geometric configuration and algorithms are different from those previously used. The feasibility of using small antennas for tumor detection is investigated. Signal processing algorithms developed to mitigate the dominant reflection from the skin are described, and the effectiveness of these skin subtraction algorithms is demonstrated. Images of homogeneous and heterogeneous breast models are reconstructed with various numbers of antennas. Both the influence of antenna spacing and the suitability of simplified models for system evaluation are examined.

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