

# Planar Metamaterial Based Microwave Sensor Arrays for Biomedical Analysis and Treatment (Springer Theses)

Margarita Puentes Vargas



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This book presents an innovative concept for the realization of sensors based on a planar metamaterial microwave array and shows their application in biomedical analysis and treatment. The sensors are able to transduce the dielectric properties of materials in their direct vicinity into an electric signal. The specific array organization permits a simultaneous analysis of several materials using a single readout signal or a relative characterization of one material where information about its spatial distribution can be extracted. Two applications of the designed sensors are described here: the first is a cytological screening using micro fluidic technology, which shows that the sensors may be integrated into lab-on-chip technologies; the second application regards the use of the sensor in both the analysis and treatment of organic tissues. The developed sensor is able not only to screen the tissues for abnormalities, but also, by changing the applied signals, to perform thermal ablation and treat the abnormalities in a highly focused way. Thus, the research described in this book represents a considerable advancement in the field of biomedical microwave sensing.

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