Abstracts

Heating Characteristics of Thin Helical Antennas with Conducting Cores in a Lossy Medium--I: Noninsulated Antennas

M.S. Mirotznik, N. Engheta and K.R. Foster. "Heating Characteristics of Thin Helical Antennas with Conducting Cores in a Lossy Medium--I: Noninsulated Antennas." 1993 Transactions on Microwave Theory and Techniques 41.10 (Nov. 1993 [T-MTT]): 1878-1886.

We report a combined theoretical and experimental study of the heating characteristics of helical antennas in lossy dielectric media. Proposed biomedical application of such antennas include angioplasty, hyperthermia, and catheter ablation of tissue. The study focuses on helical antennas, operated in the normal mode (wavelength greater than antenna diameter but comparable to antenna length), that are terminated at one end by a short circuit and at the other by a coaxial feedpoint. The analytical model is based on the helical sheath approximation, extended to the case of lossy media. In addition, experimental studies were performed on helical antennas immersed in aqueous electrolyte of various conductivity. The antennas show two distinct modes of propagation: a slow mode similar to that observed in helical antennas in loss-free media, and a faster mode. The analytical/numerical results are in good agreement with experimental data, thus demonstrating the validity of the model.

❑ Return to main document.