Abstracts

The Electromagnetic Field of an Insulated Antenna in a Conducting or Dielectric Medium

R.W.P. King, B.S. Trembly and J.W. Strohbehn. "The Electromagnetic Field of an Insulated Antenna in a Conducting or Dielectric Medium." 1983 Transactions on Microwave Theory and Techniques 31.7 (Jul. 1983 [T-MTT]): 574-583.

Insulated antennas are useful for localized heating as in the hyperthermia treatment of tumors and the extraction of shale oil. The distribution of current in and the admittance of a center-driven dipole embedded in a general medium are reviewed. Formulas for the electric field generated by the currents in the dipole are derived for all points outside the antenna. Near the antenna, the field is elliptically polarized. Formulas for the polarization ellipses are derived and evaluated for antennas with electrical half-lengths Beta/sub L/h = pi/4, pi/2, pi, and 3pi/2, where k/sub L/ =beta/sub L/ + i alpha/sub L/ is the wavenumber of the current, and this is different from the wavenumber of the ambient medium.

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