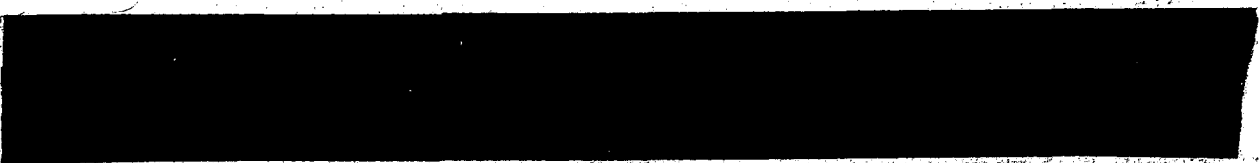


FIELD DEPOLARIZATION IN A SPHERICAL LOSSY MEDIUM



When a spherical lossy dielectric medium is irradiated by a plane electromagnetic wave, electric and magnetic fields are induced in the interior. If the original field is linearly polarized, then the direction of polarization is generally not maintained internally. A computer program based on the expansion of the incident and scattered fields in a series of orthogonal vector spherical harmonics has been used to investigate the polarization properties of the induced electric field vector in a 6.6 cm diameter homogeneous sphere irradiated by a 915 and 2450 MHz linearly polarized plane wave. Theory and computer calculations show that total or partial polarization is maintained in certain symmetry planes in the interior. The degree of departure from the original polarization direction, (the depolarization), has also been investigated at small (mm) distances from the symmetry plane. These results have implications for the experimental use of metallic leads with implantable thermistor or field probes, and for interior E-field measurements in biological media.