UNIVERSITY of HOUSTON
CULLEN COLLEGE of ENGINEERING
Department of Electrical & Computer Engineering

MS Thesis Announcement

Measurements of MRI Induced Heating

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Committee Chair: Dr. Ji Chen

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Patients with conductive medical implants are often denied magnetic resonance imaging (MRI) scans; the eddy currents induced on an implant by the MRI radio frequency (RF) signal can render the implant inoperable and also increase its temperature to levels that can harm the patient. This thesis seeks to understand how the insulation and basic dimensions of an elongated implant influence its rise in temperature when scanned. Titanium rods of different diameters, lengths, and insulations were subjected to the RF energy of a 1.5 T, 64 MHz system. Fiber optic temperature probes were used to measure the temperature. Thermal simulations of these experiments were carried out in SEMCAD X. Heating was observed to occur at the ends of the rods. In general, it was discovered that the partially coated rod with the smallest diameter, having its length being close to that of a half-wavelength dipole antenna for the operating frequency of the RF system used, and with partial insulation, experienced the highest increase in temperature.

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