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**Evaluation of the dielectric constant for RF shimming at high field MRI** MOHAN JAYATILAKE, JUDD STORRS, WEN-JANG CHU, JING-HUEI LEE — Optimal image quality for Magnetic Resonance Imaging (MRI) at high fields requires a homogeneous RF (B1) field; however, the dielectric properties of the human brain result in B1 field inhomogeneities and signal loss at the periphery of the head. These result from constructive and destructive RF interactions of complex wave behaviour, which become worse with increasing magnetic field strength. Placement of a shim object with high-dielectric constant adjacent to the body has been proposed as a method for reducing B1 inhomogeneity by altering wave propagation within the volume of interest. Selecting the appropriate permittivity and quantity of material for the shim is essential. Whereas previous work has determined the dielectric properties of the shim empirically, this work introduces an improved theoretical framework for determining the requisite dielectric constant of the passive shim material directly by increasing the axial or minimizing the radial propagation constant.

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