

Transcranial Magnetic Stimulation: An Automated Procedure to Obtain Coil-specific Models for Field Calculations - DTU Orbit (08/11/2017)

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Background: Field calculations for transcranial magnetic stimulation (TMS) are increasingly implemented online in neuronavigation systems and in more realistic offline approaches based on finite-element methods. They are often based on simplified and/or non-validated models of the magnetic vector potential of the TMS coils.

Objective: To develop an approach to reconstruct the magnetic vector potential based on automated measurements.

Methods: We implemented a setup that simultaneously measures the three components of the magnetic field with high spatial resolution. This is complemented by a novel approach to determine the magnetic vector potential via volume integration of the measured field.

Results: The integration approach reproduces the vector potential with very good accuracy. The vector potential distribution of a standard figure-of-eight shaped coil determined with our setup corresponds well with that calculated using a model reconstructed from x-ray images.

Conclusion: The setup can supply validated models for existing and newly appearing TMS coils.

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