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**Novel transcranial magnetic stimulation coil for mice** STEPHEN MARCH, SPENCER STARK, LAWRENCE CROWTHER, RAVI HADIMANI, DAVID JILES, Iowa State University — Transcranial magnetic stimulation (TMS) shows potential for non-invasive treatment of various neurological disorders. Significant work has been performed on the design of coils used for TMS on human subjects but few reports have been made on the design of coils for use on the brains of animals such as mice. This work is needed as TMS studies utilizing mice can allow rapid preclinical development of TMS for human disorders but the coil designs developed for use on humans are inadequate for optimal stimulation of the much smaller mouse brain. A novel TMS coil has been developed with the goal of inducing strong and focused electric fields for the stimulation of small animals such as mice. Calculations of induced electric fields were performed utilizing an MRI derived inhomogeneous model of an adult male mouse. Mechanical and thermal analysis of this new TMS helmet-coil design have also been performed at anticipated TMS operating conditions to ensure mechanical stability of the new coil and establish expected linear attraction and rotational force values. Calculated temperature increases for typical stimulation periods indicate the helmet-coil system is capable of operating within established medical standards. A prototype of the coil has been fabricated and characterization results are presented.

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