

## Physics of Magnetic Stimulation and Therapy

Magnetic stimulation (MS) has been used for noninvasive nerve stimulation, transcranial stimulation, motor evoked potentials, neuropsychiatric applications, *etc.* Despite the simplicity of its physics, MS is still a delicate medical task, and it requires the accurate identification of the intended target inside the body, suitable focus and precise strength of the magnetic stimulus, while aiming to diminish pending side effects.

Mathematical modeling of the MS-related EMF distribution inside the body and the optimization of procedural features of magnetic applicators have reached the stage where they may significantly help the advancement of this medical procedure. Analytic and numerical solutions based on imaging-based computational domains fused with CAD constructs, which unveil the underlying properties of the EMF used in MS are discussed. Magnetic stimulation of peripheral nerves, the transcranial stimulation and lumbar magnetic stimulation are presented. To these add some considerations on magnetotherapy, which is known for its numerous remedial effects and reduced costs.



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