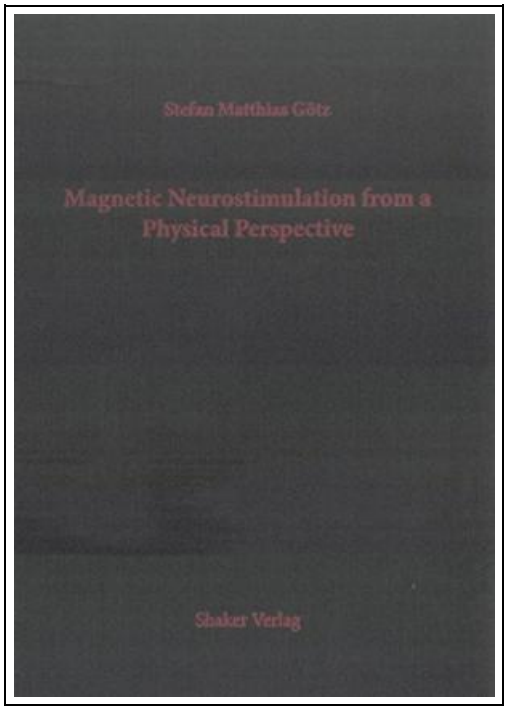
Magnetic Neurostimulation from a Physical Perspective



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Reviews

Very good e-book and helpful one. It is among the most awesome publication we have read. Its been developed in an remarkably simple way in fact it is simply right after i finished reading this book through which basically transformed me, affect the way i really believe.
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MAGNETIC NEUROSTIMULATION FROM A PHYSICAL PERSPECTIVE

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Shaker Verlag Sep 2013, 2013. Buch. Book Condition: Neu. 249x177x25 mm. Neuware - Magnetic stimulation is one of the key methods for noninvasive stimulation of neurons in the brain and the peripheral nervous system. Single magnetic stimulation pulses can evoke detectable neural response signals, while pulse combinations and repetitive protocols cause neuromodulation. This technique, which is based on electromagnetic induction, does not require contact to the tissue, and its pulses are known to be almost free of pain in contrast to other stimulation methods, such as electrical stimulation. Magnetic stimulation has a wide range of applications in experimental brain research and clinical applications of psychiatry and neurology. However, from a physical perspective, a serious issue hampers the progress of this technology: The high power consumption drives devices to their technical limits and restricts possible applications, such as synthesizing complex nonsinusoidal pulses, small, highly focal stimulation coils that can withstand the magnetic forces and the heating stress, portable repetitive stimulation devices, magnetic seizure therapy, and neuromuscular magnetic stimulation for rehabilitation. This book approaches the question of optimality of magnetic stimulation from the spatial and the temporal perspective. On the spatial side, neuromuscular magnetic stimulation is used as an example with a high power demand that cannot be achieved at a sufficient duration with available commercial equipment. As outlined in this book, high-resolution simulation models allow solving the question which physical quantity causes the stimulation effect; in consequence, they support a notable improvement of the efficiency as well as the evoked forces and a quantitative simulation of the recruitment behavior and the stimulation-strength-force-response curve. In the temporal domain, this book renounces the widely used linear models for the neuron dynamics in favor of more realistic nonlinear models and presents a systematic and practically unconstrained optimization of the pulse waveform. The analytical results...

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