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Magnetic Neurostimulation from a Physical Perspective

By Stefan Matthias Götz

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...



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