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## Novel Methods and Applications of NMR and MRI: Low-Power RF Excitation and Hyperpolarized Xenon-129

By Nadia Amor

Shaker Verlag Mrz 2012, 2012. Taschenbuch. Condition: Neu. Neuware - Since their discovery in the middle of the last century, Nuclear Magnetic Resonance (NMR) and Magnetic Resonance Imaging (MRI) have become an important and very versatile tool in industry, medicine, and basic research. The aim of this work is to explore possible improvements and new applications of NMR methods. First, a recently introduced excitation NMR pulse sequence, termed Frank sequence excitation, which allows for significant reduction of rf-excitation power, is systematically analyzed and compared to conventional NMR in detail. Furthermore, its feasibility for MRI is investigated and advantages as well as drawbacks in comparison to standard MRI are discussed. The second part focuses on new biomedical applications of hyperpolarized (HP) Xe which not only offers a signal enhancement of several orders of magnitude but also provides new contrast mechanisms. A setup for continuous dissolution of HP Xe gas into blood and other fluids is optimized and analyzed quantitatively by NMR and MRI. On the basis of these results, blood-dissolved HP Xe is used to investigate blood-gas dynamics, as well as the rheological behavior of blood. 224 pp. Englisch.



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