

MRI at High Magnetic Fields – Biomedical Research Potential of 7 Tesla and Higher

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In the past three decades, magnetic resonance imaging (MRI) has become a vital tool for clinical diagnosis and life science research. An ongoing trend is the introduction of research magnets with much more powerful static magnetic fields, including magnets at 7 Tesla and higher. Advantages of higher magnetic fields include higher signal-to-noise ratios that enable improved spatial and temporal resolution, and unique tissue contrasts based on, for example, enhanced sensitivity to tissue susceptibility differences. It now seems plausible that 7 Tesla will be introduced as the next clinical alternative beyond 3 Tesla. Nevertheless, many technical challenges remain, including interference and penetration effects affecting the excitation radiofrequency field that make it difficult to image large cross-sections in the body. In this presentation we will take a look at the state-of-the-art of biomedical imaging at 7 Tesla and examine the perspective of MRI at even higher magnetic fields.

