

Safety aspects of diagnostic and interventional MRI

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The main radiological imaging modalities are typically characterized by a low (ultrasound imaging: energy deposition) or obvious risk (X-ray and computed tomography imaging: radiation exposure) for the examination. Magnetic resonance imaging, in contrast, involves a number of (electro)magnetic fields that are permanently required or temporarily applied for imaging. The actual and conceivable electromagnetic interactions of these fields with tissue (patient) and objects (devices) are rather complex and may pose a considerable risk for the patient and operating staff members – not to mention the risk of a physical damage to the MRI hardware.

It is therefore important to know and understand the main phenomena in an MRI environment which go way beyond the typically cited 'attraction' of an external ferromagnetic object towards the MRI system. This paper will provide a brief overview of the underlying fields and interactions and present some examples for less obvious effects during diagnostic examinations as well as interventional procedures inside the MRI room.