

Deployable SQUID-based Magnetic Resonance Imaging Systems

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Abstract — Magnetic Resonance Imaging (MRI) is considered the best non-invasive imaging method for soft tissue anatomy and is responsible for saving countless lives each year. MRI is held as the gold standard for diagnosis of mild to moderate traumatic brain injuries. However, conventional MRI relies on very high, fixed strength magnetic fields (> 1.5 T) with parts-per-million homogeneity, which requires very large and expensive magnets that can only be used in highly controlled settings in well-funded medical centers. Traditional high-field MRI is not available in rural settings, is not deployable to emergency situations or battlefield hospitals, and is more expensive than what poor and developing countries can afford. We will present progress toward developing a portable MRI machine based on SQUID (superconducting quantum interference device) sensor technology and ultra-low-field MRI techniques. We will show brain images acquired inside a shielded room and phantom images acquired in an unshielded setting.

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