

1089-92-211

**Igor M Savukov\*** (isavukov@lanl.gov), **Todor Karaulanov** and **Larry J Schultz**. *Ultra-low field anatomical magnetic resonance imaging*. Preliminary report.

Anatomic imaging based on nuclear magnetic resonance, MRI, is a powerful diagnostic method. The quality improves with the strength of magnetic field and high-field scanners are routinely used in hospitals. However, the high-field MRI machines are bulky, expensive, and restrictive to patients and settings. Our SQUID team at Los Alamos works on alternatives – ultra-low field (ULF) MRI with sensitive detectors such as SQUIDs and atomic magnetometers. ULF MRI systems are cheaper, portable and have other advantages. The main problem of ULF MRI is low sensitivity. This leads to the compromise between image resolution, signal-to-noise ratio, scanning time, etc. How to make images applicable to medical diagnostics is the important challenge of the ULF MRI research. We investigate various methods for image improvement: the scan time increase, more sensitive detection, larger magnetic fields to align nuclear spins, and multi-channel detection. Image processing methods can be also used to improve the quality. I will present anatomical images obtained with a portable ULF MRI system and discuss various issues for improving them and making ULF MRI a useful medical tool. (Received February 15, 2013)