

Abstract Submitted  
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**Direct Neural Imaging using Ultra-Low Field Magnetic Resonance** KARLENE MASKALY, MICHELLE ESPY, MARK FLYNN, JOHN GOMEZ, ROBERT KRAUS, ANDREI MATLASHOV, Los Alamos National Laboratory, JOHN MOSHER, Cleveland Clinic, SHAUN NEWMAN, TUBA OWENS, MARK PETERS, J. SANDIN, LARRY SCHULTZ, ALGIS URBAITIS, PETR VOLEGOV, VADIM ZOTEV, Los Alamos National Laboratory — An enduring challenge in neuroscience is the accurate in vivo mapping of neural activity with high spatial and temporal resolution. A method being developed by our group tries to meet this challenge by using Ultra-Low Field (ULF) MRI. Other groups have attempted direct neural imaging (DNI) using high field MRI. However, the use of ULF presents two advantages. First, the susceptibility artifact at high fields, which masks the DNI signal, is negligible at low fields. Second, the reduced Larmor frequency at ULF may overlap with the frequency spectrum of the neural magnetic field, resonantly enhancing the MRI signal. In this presentation, I will first show our custom-built ULF MRI setups that have successfully produced ULF anatomical images. I will then highlight the numerous studies we have done to investigate the feasibility of DNI with these systems, including both experimental and theoretical studies.

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