

Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Towards magnetic imaging of neurons using NV diamond JOHN BARRY, MATTHEW TURNER, DAVID GLENN, YUYU SONG, RONALD WALSWORTH, Harvard University — Magnetic field imaging based on optically detected magnetic resonances (ODMR) in NV diamond offers an unmatched combination of sensitivity, resolution and field-of-view. For certain biological applications NV diamond imaging is particularly useful; in contrast to traditional fluorescent markers, NV diamond imaging is label-free and does not suffer from bleaching. Additionally the solid-state nature of NV diamond imaging allows for various fast modulation techniques to be employed to increase the signal-to-noise ratio. Here we present progress towards creating an NV diamond imager with sensitivity and resolution appropriate for imaging neural activity within a living neural network. When integrating over our detector, we demonstrate a DC magnetic field sensitivity of better than $50 \text{ pT/Hz}^{1/2}$, which we demonstrate is suitable for detecting the action potentials in invertebrate giants axons.

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Date submitted: 30 Jan 2015

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