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Fourier space encoding techniques applied to magnetic resonance imaging using NV centers in diamond YULIYA DOVZHENKO, MICHAEL S. GRINOLDS, MARC WARNER, KRISTIAAN DE GREVE, Harvard University, LUCAS THIEL, University of Basel, RONALD L. WALSWORTH, AMIR YACOBY, Harvard University — Nitrogen-vacancy (NV) centers in diamond have demonstrated a number of properties that make them viable candidates for detecting nearby external spins with sub-nanometer resolution at ambient conditions. So far, they have been used to image dark electron spins on the diamond surface and resolve few spins[1], as well as detect ensembles of nuclear spins external to the diamond[2, 3]. A promising direction for improving spatial resolution, signal-to-noise ratio, as well as stability of the detector over time is to integrate variable pulsed DC and RF magnetic field gradients on-chip. Spatial information about the target spins can then be obtained by using Fourier imaging techniques[4]. We present preliminary results in depositing silver wires on the diamond surface above the NV center. We flow time-dependent currents through the wires to produce controllable magnitudes of magnetic fields at the NV, which can be used to both address the NV and provide field gradients for imaging techniques. Our approach has the potential to enable highly-resolved nuclear spin imaging.

[1] Grinolds *et al.*, submitted (2013)
[2] Staudacher *et al.*, Science **339**, 561 (2013)
[3] Mamin *et al.*, Science **339**, 557 (2013)
[4] Nichol *et al.*, Phys. Rev. X **3**, 031016 (2013)

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