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Nanoscale Fourier magnetic imaging using nitrogen-vacancy centers in diamond KEIGO ARAI, Massachusetts Institute of Technology, CHINMAY BELTHANGADY, Harvard-Smithsonian Center for Astrophysics, HUILIANG ZHANG, Harvard University, RONALD WALSWORTH, Harvard-Smithsonian Center for Astrophysics — We present a new technique for extending the spatial dynamic-range of nitrogen-vacancy (NV) center magnetic imaging by use of a Fourier phase encoding technique, in close analogy with conventional magnetic resonance imaging. By applying strong pulsed magnetic field gradients across a broad array of NV centers in diamond, information about the spatial location of each NV center as well as the local magnetic field is mapped onto each NV spin's phase and then read out in Fourier (k-space) by acquiring wide-field images on a camera of all NV centers simultaneously. A Fourier transform then converts this information into a magnetic field image with nanoscale resolution and wide field-of-view. We also discuss how this technique can be extended to nanoscale and wide-field electric field and temperature sensing.

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