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Fourier magnetic imaging with nanoscale resolution and compressed sensing speed-up using electronic spins in diamond KEIGO ARAI, Massachusetts Institute of Technology, CHINMAY BELTHANGADY, Harvard-Smithsonian Center for Astrophysics, HUILIANG ZHANG, STEPHEN DEVIENCE, Harvard University, NIR BAR-GILL, Harvard-Smithsonian Center for Astrophysics, PAOLA CAPPELLARO, Massachusetts Institute of Technology, AMIR YACOBY, Harvard University, RONALD WALSWORTH, Harvard-Smithsonian Center for Astrophysics — Optically-detected magnetic resonance using nitrogen vacancy (NV) color centers in diamond is playing a leading role in nanoscale magnetic field imaging of various physical and biological samples at room temperature. NV magnetic imaging techniques to date, however, are based on "real space" detection, which is either limited by optical diffraction or requires slow scanning for nanometer-scale resolution. Here we present an alternative approach of NV Fourier magnetic imaging. By employing pulsed magnetic field gradients, spatial information about the NV centers as well as the local magnetic field are phase-encoded in wavenumber or "k-space." A Fourier transform then yields real-space images with nanoscale resolution, wide field-of-view, and compressed sensing speed-up.

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