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Magnetic field imaging with NV ensembles L.M. PHAM, Harvard University, D. LE SAGE, Harvard-Smithsonian, P.L. STANWIX, University of Western Australia, T.K. YEUNG, Harvard University, D. GLENN, Harvard-Smithsonian, A. TRIFONOV, Harvard University, N. BAR-GILL, C. BELTHANGADY, Harvard-Smithsonian, P. CAPPELLARO, MIT, P.R. HEMMER, Texas A&M University, M.D. LUKIN, H. PARK, A. YACOBY, R.L. WALSWORTH, Harvard University — We demonstrate a method of imaging spatially varying magnetic fields using a thin layer of nitrogen-vacancy (NV) centers at the surface of a diamond chip. Fluorescence emitted by the two- dimensional NV ensemble is detected by a CCD array, from which a vector magnetic field pattern is reconstructed. As a demonstration, current is passed through wires placed on the diamond chip surface, and the resulting magnetic field patterns are imaged with sub- micron resolution over a 140 μm $\times$ 140 μm field of view, giving single-pixel sensitivity $\sim$ 100 nT/$\sqrt{\text{Hz}}$. We discuss ongoing efforts to further improve sensitivity, such as using dynamical decoupling techniques in order to extend coherence times.

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