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A Ramsey-based wide-field magnetic imager using NV-diamond PATRICK SCHEIDEGGER, Department of Physics, ETH Zurich. Department of Physics, Harvard University., CONNOR HART, ERIK BAUCH, Department of Physics, Harvard University, JENNIFER SCHLOSS, Department of Physics, Massachusetts Institute of Technology, MATTHEW TURNER, Department of Physics, Harvard University, RONALD WALSWORTH, Harvard-Smithsonian Center for Astrophysics. Department of Physics, Harvard University — We demonstrate a Ramsey-based wide-field magnetic imager employing a high density layer of nitrogen-vacancy (NV) color centers at the surface of a diamond chip. Three extensions to standard Ramsey sensing are employed to significantly enhance the sensitivity of the imager. First, we sense in the NV center double-quantum basis {-1,+1}to eliminate common-mode noise sources, such as crystal-lattice strain fields. Second, we control the diamond bath spins to extend the effective sensing time, which is typically limited by interactions with an inhomogeneous spin environment. Lastly, we deploy a double-differential noise cancellation scheme for effective noise rejection and mitigation of pulse errors caused by inhomogeneities of the applied MW fields.

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