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Dependence of NV-Ensemble T2* on Applied Magnetic Field CONNOR HART, ERIK BAUCH, Department of Physics, Harvard University, Cambridge, Massachusetts 02138, USA, JOHN BARRY, Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, Massachusetts 02138, USA, JEN-NIFER SCHLOSS, Department of Physics, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, USA, MATTHEW TURNER, RONALD WAL-WORTH, Department of Physics, Harvard University, Cambridge, Massachusetts 02138, USA — In measurements using ensembles of nitrogen vacancy (NV) centers in diamond, the magnetic field sensitivity can be improved by increasing the NV spin dephasing time, T2*. For NV ensembles, T2* is limited by inhomogeneous broadening arising from variations in the local environment sensed by individual NVs, such as magnetic fields and strain. Here, we describe a systematic study of parameters influencing the NV ensemble $T2^*$, and efforts to mitigate sources of inhomogeneity. In particular, we report a non-trivial dependence of $T2^*$ on applied external magnetic field. These results suggest new pathways to improving the sensitivity of NV-ensemble magnetometry.

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