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Low Temperature Symmetric Dynamical Decoupling in NV Centers LINH PHAM, Harvard-Smithsonian Center for Astrophysics, DEMITRY FARFURNIK, Hebrew University of Jerusalem, ANDREY JARMOLA, University of California, Berkeley, ZHIHUI WANG, University of Southern California, VIATCHESLAV DOBROVITSKI, Iowa State University, RONALD WALSWORTH, Harvard University, DMITRY BUDKER, Helmholtz Institute Mainz, NIR BAR-GILL, Hebrew University of Jerusalem — Increasing the coherence time of an arbitrary spin state is a major step toward enhanced quantum information and quantum sensing in variety of quantum systems. In this work, we explore several dynamical decoupling techniques in order to determine a robust protocol for increasing the coherence time of an ensemble of nitrogen-vacancy (NV) centers. By optimizing experimental parameters and using a concatenated version of the XY8 dynamical decoupling sequence, we preserve a general spin state up to almost 30 ms at a temperature of 77 K. The concatenated sequence performs better than standard CPMG and XY sequences on an arbitrary spin state and thus may be immediately applied to enhance the sensitivity of nv-based magnetometers. Additional potential applications include quantum memory and interaction-dominated dynamics.

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