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Dynamically Decoupled ^{13}C Spins in Hyperpolarized Nanodiamond EWA REJ, TORSTEN GAEBEL, THOMAS BOELE, DAVID WADDINGTON, DAVID REILLY, ARC Centre of Excellence for Engineered Quantum Systems, School of Physics, University of Sydney, Sydney, NSW 2006, Australia — The spin-spin relaxation time, T_2, which determines how long a quantum state remains coherent, is an important factor for many applications ranging from MRI to quantum computing. A common technique used in quantum information technology to extend the T_2, involves averaging out certain noise spectra via dynamical decoupling sequences. Depending on the nature of the noise in the system, specific sequences, such as CPMG, UDD or KDD, can be tailored to optimize T_2. Here we combine hyperpolarization techniques and dynamical decoupling sequences to extend the T_2 of ^{13}C nuclear spins in nanodiamond by three orders of magnitude.

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