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Manipulation of ^{13}C nuclear spins in diamond via dynamical decoupling control of the electron spin[1] HOI-CHUN PO, REN-BAO LIU, Department of Physics, The Chinese University of Hong Kong — Utilizing the anisotropic nature of the hyperfine coupling between a negatively charged nitrogen-vacancy (NV) center spin and a moderately separated ^{13}C nuclear spin, we present a scheme to efficiently control the ^{13}C spin in 3 to 4 pulse cycles. This scheme uses only microwave pulses tuned to swap the NV center spin between the $m_s = 0$ and $m_s = 1$ states. With a strong magnetic field of the order of 10^3 G along the NV center symmetry axis, the nuclear spin can be flipped in approximately 10 μs. We also numerically study the effect of various sources of errors in realistic scenario and demonstrate that the fidelity of the scheme is satisfactory. The pulse sequences can be readily generalized to perform any single qubit operation on the nuclear spin.

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