

Abstract Submitted
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Robust control of nuclear spins in diamond¹ LILIAN CHILDRESS,
BENJAMIN SMELTZER, Bates College — Isolated nuclear spins offer a promising
building block for quantum information processing systems, but their weak inter-
actions often impede preparation, manipulation, and detection. Hyperfine coupling
to a proximal electronic spin can provide a polarization and readout mechanism
and enhance manipulation and interaction speed. Using the electronic spin of the
nitrogen-vacancy center as an intermediary, we demonstrate robust initialization,
fast manipulation, and direct optical readout of ^{13}C , ^{14}N , and ^{15}N nuclear spins in
diamond. These results pave the way for nitrogen nuclear spin-based architectures
in isotopically purified diamond.

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