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Non-classical states of NV and N impurities in diamond CHINMAY BELTHANGADY, NIR BAR-GILL, DAVID LE SAGE, MY LINH PHAM, Harvard University, PAOLA CAPPELLARO, MIT, RONALD WALSWORTH, Harvard University — We present schemes that take advantage of the interactions of NV centers in diamonds with neighboring N impurities, which may allow improved NV performance as qubits and quantum sensors. For example, we describe pulse sequences that may allow polarization of the N spins and entanglement of N spins with the NV spin. Applying such schemes to NV ensembles may allow creation of a large number of entangled NV-N pairs. In addition, a similar approach may allow creation of a Schrodinger cat state of several N spins interacting with one NV. Finally, we find that under certain conditions, N-mediated NV-NV interactions become important, which may allow creation of squeezed states in the NV ensemble.

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