

Abstract Submitted
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Coherent control of single electron spins in levitated optomechanics experiments¹ ROBERT M. PETTIT, Univ of Rochester, LEVI P. NEUKIRCH, Los Alamos National Laboratory, YI ZHANG, A. NICK VAMIVAKAS, Univ of Rochester — We report progress on the coherent manipulation of single electron spins contained within optically levitated nanodiamond in a free-space optical dipole trap. Nitrogen-vacancy (NV) centers in diamond provide an ideal platform for room temperature spin manipulation, and are thus well suited for use in optical trapping schemes. Here, we demonstrate coherent control of a single NV center spin at both atmospheric pressure and low vacuum, and show that while the trapping beam reduces the fluorescence emitted by the center, it has no observable effect on the transverse spin coherence time. Furthermore, after an initial exposure to low vacuum, the nanodiamond remains at near room temperatures at all pressures and trapping powers considered in these experiments.

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