

Abstract Submitted
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Resonant Coupling Between NV Centers and Dark Spins at the Surface of Diamond LINH PHAM, CHINMAY BELTHANGADY, Harvard-Smithsonian Center for Astrophysics, STEPHEN DEVIENCE, Harvard University, NIR BAR-GILL, Hebrew University, JUNGHYUN LEE, PAOLA CAPPELLARO, Massachusetts Institute of Technology, MIKHAIL LUKIN, AMIR YACOBY, RONALD WALSWORTH, Harvard University — Recent studies of the surface of diamond have revealed the presence of as-yet-unidentified dark electronic spins on the diamond-air interface. These spins could serve as very sensitive probes of their local magnetic field environment. Of particular interest is the possibility of enhancing sensitivity in diamond-based nano-scale nuclear magnetic resonance (NMR) experiments due to the close proximity of nuclear spins to these dark surface spins. An efficient route towards initialization and spin-state detection of the dark spins is provided by controlled coupling with nitrogen-vacancy (NV) color centers, which can be spin polarized and readout optically. We describe the use of dressed-state schemes to achieve such resonant coupling, which may enable NMR spectroscopy and imaging of individual nuclear spins in samples on the diamond surface.

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