

Abstract Submitted
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Applications of Nuclear Spin Singlet States in Liquids and Solids STEPHEN DEVIENCE, NIR BAR-GILL, DAVID LE SAGE, CHINMAY BELTHANGADY, LINH PHAM, MATTHEW ROSEN, RONALD WALSWORTH, Harvard University — We explore applications of singlet states created from pairs of nuclear spins both in solutions and in solids. The singlet state is resistant to many decoherence mechanisms and can exhibit long coherence times. We show that measuring the decoherence of the singlet state allows us to detect intermolecular interactions, such as those due to binding between molecules. We also demonstrate that by manipulating the singlet states on target molecules we can extract spectral lines of the target that are overlapped by interfering peaks. Finally, we discuss the possibility of using singlet states in quantum-memory schemes in the solid-state.

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