

Abstract Submitted
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Two qubit gate operation using the frequency encoding technique¹ JUNGHYUN LEE, KEIGO ARAI, Massachusetts Inst of Tech-MIT, HUILIANG ZHANG, Harvard-Smithsonian Center for Astrophysics, ERIK BAUCH, EMMA ROSENFELD, Harvard University, RONALD WALSWORTH, Harvard-Smithsonian Center for Astrophysics — Nitrogen-vacancy (NV) color centers in diamond are good candidates for realizing a scalable spin coupled system. For a simple two NV electronic spin interacting system, two qubit gate operations can be realized through the spin dipolar interaction. With two NV electronic spins separated by about 10 nm, and by manipulating an applied magnetic field gradient and a Rabi driving field, we outline how the spin dipolar interaction can be controlled to create different types of two qubit gate operations. Furthermore, we outlook how this two electronic spin qubit system can act as a channel for entangling two nitrogen nuclear spins adjacent to each NV electronic spins.

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