

Abstract Submitted  
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**Tunable coupling between two electronic spin qubits in diamond** JUNGHYUN LEE, KEIGO ARAI, Massachusetts Inst of Tech-MIT, HUILIANG ZHANG, Harvard-Smithsonian Center for Astrophysics, ERIK BAUCH, EMMA ROSENFELD, Harvard University, MIKAEL BACKLUND, RONALD WALSWORTH, Harvard-Smithsonian Center for Astrophysics, WALSWORTH TEAM — 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, spin polarization can be transferred from one spin to another spin 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, with observable changes in the dominating interaction dynamics. Furthermore, we discuss how this control scheme can be applied to transfer polarization in a strongly-coupled spin-chain system.

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