Abstract Submitted
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Towards a scalable quantum computation platform with solid-state spins in low temperature[1] WENGANG ZHANG, XIANZHI HUANG, XIAOLONG OUYANG, XIN WANG, PANYU HOU, WENQIAN LIAN, HUILI ZHANG, CHUHENG ZHANG, LI HE, XIUYING CHANG, LUMING DUAN, Center for Quantum Information, IIIS, Tsinghua University, CENTER FOR QUANTUM INFORMATION, IIIS, TSINGHUA UNIVERSITY TEAM, DEPARTMENT OF PHYSICS, UNIVERSITY OF MICHIGAN, ANN ARBOR TEAM — Nitrogen-vacancy (NV) center can be treated as an "ion" trapped in the diamond lattice. An electron spin triplet ground state (S=1) of NV center can be polarized, coherently manipulated and detected. Together with hyper ne-coupled proximal Carbon-13 and Nitrogen-14 (15) nuclear spins, NV center acts as a promising platform for large scale quantum computation platform at room temperature. By cooling down the diamond to liquid-helium temperature (4K), phonons can be largely suppressed, giving us much longer spin relaxation time (T1) and coherence time (T2) compared with room temperature, and a possibility to readout electron spin state in a single shot. Here we report our progress in building up a prototype for a scalable diamond based quantum computer.

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