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Towards a scalable quantum computation platform with solid-state spins in low temperature WENGANG ZHANG, Tsinghua Univ — 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 hyperfine-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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