Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Dynamic nuclear polarization of nitrogen-vacancy centers in diamond WEN-HUI HU, Beijing Computational Science Research Center, NAN ZHAO COLLABORATION — Single nitrogen-vacancy (NV) centers in diamond triggered the research for wild applications in quantum information processing and quantum metrology. One of the most important advantages of the NV centers is the long coherence time of the center electron spins. Dynamic nuclear polarization (DNP) has been introduced as an efficient method to protect the spin coherence. The coherence time T_2^* should have been prolonged of two orders theoretically, nevertheless less than one order in experiments. In this work, we theoretically study the DNP process in a high-purity diamond, where the dipole-dipole hyperfine interaction between the center electron spins and the bath ^{13}C nuclear spins is dominant. The simulations show that the saturated polarization of the nuclear bath depends on the spin-lock period and the efficiency of the initialization laser, accompanied with the magnitude of the external magnetic field. The polarization saturation comes from the capability of the polarization transfer and the equilibrium of probability distribution between the polarized and unpolarized states.

Wen-Hui Hu
Beijing Computational Science Research Center

Date submitted: 10 Nov 2014 Electronic form version 1.4