Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Fabrication of Diamond for Low Temperature Experiments LI HE, WENQIAN LIAN, XINXING YUAN, HUILI ZHANG, CHUHENG ZHANG, XIUYING CHANG, PANYU HOU, WENGANG ZHANG, XIN WANG, XIAOLONG OUYANG, XIANZHI HUANG, LUMING DUAN, Tsinghua University, CENTER FOR QUANTUM INFORMATION TEAM — The nitrogen-vacancy (NV) center in diamond is a promising physical implementation of quantum computing. At low temperature (about 4K), NV center shows a lot of advantages comparing with room temperature. The coherence time of electron spin in NV center is 10 ms. Besides, the electron spin state read out efficiency is increased by single shot read out. Most importantly, the electron spin can be resonantly drived, so remote NV centers can be entangled by the interference of the resonant zero phonon line photons, which is a promising scheme for the realization of quantum computer based on NV center. Here we show the fabrication work on diamond and the basic test at the low temperature toward quantum network based on NV center. We fabricate solid immersion lens (sil) on the top of located NV centers and get the enhancement of fluorescence collection efficiency by a factor of 8. Metal structures are deposited beside the sil to transport microwave and RF signal for the manipulation of electron spin and nuclear spin. We also show the resonant optical spectrum of NV center with and without microwave applying.

Li He
Tsinghua University

Date submitted: 28 Dec 2016 Electronic form version 1.4