A telecom-wavelength conversion from near-infrared light based on a cold Rubidium atomic ensemble. WEI CHANG, YUNFEI PU, NAN JIANG, CHANG LI, SHENG ZHANG, LUMING DUAN, Center for Quantum Information, IIS, Tsinghua University, CENTER FOR QUANTUM INFORMATION LAB4, IIS, TSINGHUA UNIVERSITY TEAM — Exponential photon transmission losses in fiber is a severe limitation to realize long-distance quantum communication. It’s helpful to use telecom-wavelength photon transmission to mitigate these absorption losses. However, typical atomic electronic transition from ground-level is in visible wavelengths or near-infrared wavelengths, such as transitions based on Rubidium. Here we report our progress in telecom-wavelength conversion from 780nm to 1475nm and from 795nm to 1530nm in a cold optically thick gas of Rubidium. Both these two conversions are using a diamond configuration transition that we use 5S_{1/2} - 5P_{3/2} - 4D_{3/2} cascade transition for the 780nm to 1475nm route and 5S_{1/2} - 5P_{1/2} - 4D_{3/2} cascade transition for the 795nm to 1530nm route.

1 This work was supported by the National Basic Research Program of China and the quantum information project from the Ministry of Education of China. LMD acknowledges in addition support from the IARPA MUSIQC program, the AFOSR and the ARO MURI program.

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Date submitted: 01 Mar 2017