

Abstract Submitted
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A telecom-wavelength frequency down-conversion based on a cold Rubidium atomic ensemble WEI CHANG, YUNFEI PU, NAN JIANG, CHANG LI, SHENG ZHANG, LUMING DUAN, Tsinghua Univ — Long-distance quantum communication is limited by exponential photon transmission losses in fiber. Typical transitions from ground-level based on neutral atom or ion are in visible wavelengths or near-infrared wavelengths, outside the telecom-wavelength window. Telecom-wavelength conversion is essential to solve this limitation. Here we report our progress in telecom-wavelength frequency down-conversion between 795nm and 1530nm in a cold optically thick gas of Rubidium-87. Based on an EDMOT (Extended Dark Magneto-Optical Trap) with optical density above 30, an efficient four-wave mixing wavelength-conversion is realized. This conversion is using a $5S_{1/2}$ - $5P_{1/2}$ - $4D_{3/2}$ - $5P_{3/2}$ diamond configuration, achieving efficiencies up to 16%.

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