

Abstract Submitted
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Memory assisted free space quantum communication.¹ BERTUS JORDAAN, MEHDI NAMAZI, CONNOR GOHAM, REIHANEH SHAHROKSHAHI, Stony Brook University, GIUSEPPE VALLONE, PAOLO VILLORESI, University of Padova, EDEN FIGUEROA, Stony Brook University — A quantum memory assisted node between different quantum channels has the capability to modify and synchronize its output, allowing for easy connectivity, and advanced cryptography protocols. We present the experimental progress towards the storage of single photon level pulses carrying random polarization qubits into a dual rail room temperature quantum memory (RTQM) after $\sim 20\text{m}$ of free space propagation. The RTQM coherently stores the input pulses through electromagnetically induced transparency (EIT) of a warm ^{87}Rb vapor and filters the output by polarization elements and temperature-controlled etalon resonators. This allows the characterization of error rates for each polarization basis and the testing of the synchronization ability of the quantum memory. This work presents a steppingstone towards quantum key distribution and quantum repeater networks.

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