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Cascading Quantum Light-Matter Interfaces[1] MEHDI NAMAZI, THOMAS MITTIGA, CONNOR KUPCHAK, SAM RIND, EDEN FIGUEROA, Stony Brook University — We present, for the first time to our knowledge, the cascading storage of few photon pulses in a room temperature quantum memory based on Electromagnetically Induced Transparency. The interface is realized in ^{87}Rb gas and by using a powerful control field which is filtered out through our filtering system. The retrieval control field pulse has been temporally reshaped in amplitude in order to preserve the temporal shape of the signal pulse after the storage. This signal pulse then is sent back to the quantum memory as the input for a sequential storage. The cascadability of the quantum memory is tested with both classical light and weak coherent input pulses containing on average 8 photons. In the latter case, an efficiency of 14.6% with a signal-to-background-ratio of (SBR) 13 has been recorded for the first storage. Including the lost in the system and the storage efficiency, the stored pulse contains on average 0.6 photons. This pulse is again stored with an efficiency of 22.9% with SBR of 1.2.

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