Abstract Submitted
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A heralded quantum memory scheme with high storage-retrieve efficiency[1] ZHIQIANG ZHANG, RAVI KUMAR, MATHIAS ALEXANDER SEIDLER, CHERN HUI LEE , KYLE ARNOLD, MURRAY BARRETT, National University of Singapore — The faithful storage and retrieval of a quantum bit of light is of fundamental importance for quantum communication, quantum networking and quantum computation. Here, we demonstrate a heralded quantum memory scheme in an atomic optical cavity system with both high storage and retrieval efficiency. A 3% total storage-retrieval efficiency is reached by using a coherent pulse, which is around 10000 times higher than experiment previously presented [2]. Replacing the coherent pulse with a heralded single photon produced from four-wave mixing [3], we demonstrate a storage efficiency of 0.92%. This is an important step towards realizing a high-efficiency heralded quantum memory for a single photon.

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[2]Tanji, H. and Ghosh, Phys. Rev. Lett. **103**, 043601 (2009)
[3]B. Srivathsan and G. K. Gulati, Phys. Rev. Lett. **111**,123602 (2013)

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