Title: Photonic network with room temperature atomic memories

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Scaling up quantum repeaters and photonic quantum simulators requires robust and efficient single photon sources with the memory capability. Room temperature atomic ensembles in spin protecting glass cells provide such a platform. Room temperature ensembles have been shown to work as efficient teleporters and quantum memories for continuous photonic variables [1,2]. We are presently developing the next generation of such memories for discrete photonic variables. Initial results indicate that competitive fidelity and efficiency can be achieved using the concept of motional averaging for room temperature atoms [3]. Memory time in the order of 10s of milliseconds has been measured in memories for which the expected single photon efficiency exceeds 80%. Perspectives for using room temperature ensemble memories for Boson sampling will be outlined [4].

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