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【503】Simple atomic quantum memory suitable for semiconductor quantum dot single photons

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Quantum memories matched to single photon sources will form an important cornerstone of future quantum-network technology. We demonstrate such a memory in warm Rb vapor with on-demand storage and retrieval, based on electromagnetically induced transparency. We test the memory with laser pulses, attenuated to the single photon level. Their bandwidth is chosen to be 660(10) MHz to simulate the photons emitted by semiconductor quantum dots. In this regime, vapor cell memories offer an excellent compromise between storage efficiency, storage time, noise level, and experimental complexity. For 50 ns storage time, we measure an end-to-end efficiency of 3.4(3) %, extrapolating an intrinsic storage and retrieval efficiency of 17(3) %.

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