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Title:	Storing vector-vortex states of light in an intra-atomic frequency-comb quantum memory.
Authors:	Chanchal (/jspui/browse?type=author&value=Chanchal) G, P. Teja (/jspui/browse?type=author&value=G%2C+P.+Teja) K. Goyal, Sandeep (/jspui/browse?type=author&value=K.+Goyal%2C+Sandeep)
Keywords:	Polarization of light Quantum memories Quantum description of light-matter interaction
Issue Date:	2021
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Citation:	Physical Review A, 104(4).
Abstract:	Photons are a prominent candidate for long-distance quantum communication and quantum information processing. Certain quantum information processing tasks require storage and faithful retrieval of single photons, preserving the internal states of the photons. Here we propose a method to store orbital angular momentum and polarization states of light which facilitates the storage of the vector-vortex states in the intra-atomic frequency-comb-based quantum memory. We show that an atomic ensemble with two intra-atomic frequency combs corresponding to $\Delta m = \pm 1$ transitions of similar frequency is sufficient for a robust and efficient quantum memory for vector-vortex states of light. As an example, we show that Cs and Rb atoms are good candidates for storing these internal modes of light.
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