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## Quantum memory based on optical subradiance: Optimization of the signal-to-noise ratio

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### Abstract

A scheme for creating subradiant states in an extended system of atoms, based on the use of an external inhomogeneous electric field, is proposed. It is shown that the maximum signal-to-noise ratio at the output of a quantum memory device using such subradiant states for data storage is obtained when the temporal shape of recorded single-photon wave packets (quantum information carriers) is a time-reversed pulse characteristic of a resonant atomic system. In this case, the quantum memory efficiency tends to unity in the limit of large optical thickness of the resonant medium. © Allerton Press, Inc. 2008.

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