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Quantum memory for light via a Raman process in an optically dense atomic system[1] DMITRIY KUPRIYANOV, OKSANA MISHINA, ALEKSANDRA SHEREMET, NICKOLAY LARIONOV, IGOR SOKOLOV, Department of Theoretical Physics, St.-Petersburg State Polytechnic University, 195251 St.-Petersburg — Quantum memories for light pose an extremely important problem for various protocols of quantum computing and secure communication, which might be solvable with currently existing technology. In the present paper we consider the coherent stimulated Raman process developing in an optically dense disordered atomic medium in application to a quantum memory scheme and we point out the difference in its physical nature from a similar but not identical protocol based on the effect of electromagnetically induced transparency (EIT). We show that the Raman and EIT memory schemes do not compete but complement one another and each of them has a certain advantages in the area of its applicability. We include in our consideration analysis of the transient processes associated with switching off/on the control pulse and follow how they modify the probe pulse dynamics on the retrieval stage of the memory protocol. The importance of the hyperfine interaction for the atomic systems consisting of alkali atoms is also discussed.

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