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Photonic quantum memories for quantum repeaters CHRISTOPH SIMON, NICOLAS SANGOUARD, HUGUES DE RIEDMATTEN, MIKAEL AFZELIUS, HUGO ZBINDEN, NICOLAS GISIN, University of Geneva — We analyze a quantum memory protocol for photons based on the controlled reversible broadening of absorption lines. Based on an explicit solution of the equations of motion, we have studied the dependence of the memory efficiency on the optical depth of the medium and on the characteristics of the spectral distribution of the absorbers. Our group is particularly interested in the implementation of the described protocol using crystals doped with rare-earth ions. We describe how quantum memories based on this principle could be used to realize effective quantum repeaters.

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