Three Level Systems for Quantum Memories in Erbium Doped Materials SARA HASTINGS-SIMON, MATTHIAS STAUDT, BJOERN LAURITZEN, MIKAEL AFZELIUS, HUGUES DE RIEDMATTEN, NICOLAS SAN-GOUARD, CHRISTOPH SIMON, University of Geneva, WOLFGANG TITTEL, NICOLAS GISIN, University of Geneva — Quantum memories for single photons could play an important role in quantum communication and optical quantum computing. We are working towards the realization of such a quantum memory based on the controlled reversible inhomogeneous broadening (CRIB) of a single absorption line in a rare earth ion. The implementation of the CRIB protocol for such a quantum memory requires a three level system such that the absorption over a broad bandwidth in a material can be greatly reduced via optical pumping to the auxiliary level. We report on the first experimental steps towards the realization of such a three level systems in Erbium doped materials with spectral hole burning techniques.

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