SFB/TRR 21 - Seminar

7. April 2011, Stuttgart

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A Light-Compensated Quantum Memory

Quantum memories are fundamental ingredients for quantum information processing systems. Of key importance is the requirement of long-lived quantum memories in a long-distance quantum communication network composed of atomic ensembles and linear optical elements. In this talk we present a long-lived quantum memory based on light-compensated cold 87Rb atoms in a dipole trap. Various decoherence mechanisms existing in a cold atomic-ensemble based quantum memory are discussed. Solutions to maintain the coherence of the stored quantum state are proposed accordingly. In particular we observe a lifetime increase of 40 times when a compensation beam is introduced to negate the differential light shift.

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