

Prospect of delaying light by enhanced electromagnetically induced transparency using light cages

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Reliable quantum networks and quantum communication are dependent on coherent transmission of quantum states between two nodes [1]. Quantum memories and repeaters are needed to overcome the unavoidable losses of current quantum channels. [2]. The search for a relatively easy to use platform includes atomic vapor cells, which can be easily modified to host guiding photonic structures [3].

In this work we present the combination of Cs vapor cells and hollow core light cages (LC) to enhance the atom light interaction. We will discuss the benefits and limitations of these LC's in warm vapor cells and use them to delay light with electromagnetically induced transparency (EIT). For this, we will show the observation of enhanced EIT and Autlers-Townes splitting in this type of waveguides. Transmission properties of the LC are shown, in particular losses and expected atom density. From this, simulations of delaying light are calculated. This use of the LC would lead towards controllable time delay of photons in an easy to use and easy to implement device and eventually a reliable platform for a quantum memory for a single photons using the EIT-storage scheme [4].

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