Storing light by variable delay based on electro-magnetically induced transparency in cesium gas at room temperature

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With the fast development of quantum information and quantum networks, the needs of reliable memories are also on the rise. These memories must be able to coherently store quantum states between two or more nodes in order to build a scalable quantum network [1]. In this work we present a system that temporarily stores light based on controllable delay of light pulses traveling through a cesium vapor cell at room temperature. This delay is created by electromagnetically induced transparency (EIT) addressing three hyperfine states of the D1 absorption line of cesium [2]. The obtained EIT windows reach a FWHM of 250 MHz, making them a good option for storing single photons produced by quantum light sources, in particular quantum dots with comparable Fourier-limited linewidth emission [3]. This will lead, after improving the laser systems and their filtering, to a real quantum memory based on cesium, similar to the currently proposed gas memory schemes based on other alkali atoms [4].

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