

Abstract Submitted
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Measurement of ^{85}Rb excited state lifetime using two-pulse photon echo¹ ERIC ROTBERG, SCOTT BEATTIE, MATTHEW WEEL, IAIN CHAN, A. KUMARAKRISHNAN, York University — We have observed two-pulse photon echoes in a Doppler broadened rubidium vapor. The system interacts with traveling wave optical pulses that are $\sim 10\text{ns}$ in duration. The pulses are on resonance with the $F = 3 \rightarrow F' = 4$ transition in ^{85}Rb and they are generated from a cw laser using an acousto-optic modulators. The first pulse, occurring at $t = 0$, induces a macroscopic dipole moment that dephases due to atomic motion. The second pulse, occurring at $t = T$, reverses the direction of the dephasing process so that the echo is formed at $t = 2T$. The echo is detected using a heterodyne technique and its intensity decays exponentially as a function of $2T$. Our results suggest that the excited state lifetime can be determined to a precision of $\sim 1\%$ from the decay time constant. We present a detailed analysis of the systematic effects that contribute to the decay.

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