Abstract Submitted
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Electromagnetically induced transparency with Rydberg atoms inside a high-finesse optical cavity[1] JITENG SHENG, SANTOSH KUMAR, JONATHON SEDLACEK, YUANXI CHAO, HAOQUAN FAN, JAMES SHAFFER, University of Oklahoma — We present experimental work on the observation of Rydberg electromagnetically induced transparency (EIT) inside a high-finesse optical cavity. We show that a cold atomic cloud with controllable number of atoms can be transported into the cavity by using a focus-tunable lens. Rydberg atoms are excited via a two-photon transition in a ladder-type EIT configuration. A three-peak structure in the cavity transmission can be observed when Rydberg EIT atoms are generated inside the cavity. The two side peaks are caused by "bright state polaritons", while the central peak corresponds to a "dark-state polariton" The cavity Rydberg EIT system can be useful for single photon generation using the Rydberg blockade effect, studying many-body physics, and generating novel quantum states amongst many other applications.

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