Abstract Submitted
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Light imprisonment in a nanofiber mode by an ensemble of few cold atoms[1] P. SOLANO, S. L. ROLSTON, L. A. OROZCO, JQI, Univ of Maryland-College Park, J. P. CLEMENS, P. R. RICE, Miami University — We study the escape of light emitted by cold Rb atoms in the vicinity of an optical nanofiber. We excite the atoms with a pulse propagating perpendicular to the nanofiber, which turns off faster than the atom natural lifetime. We use time correlated single photon counting techniques to measure the decay of the emitted light. For very low optical density we see the natural lifetime reduced by the presence of the nanofiber and its only available mode, while for higher optical densities the decay time can be many times longer. Provided that an average atom can absorb as much as 30% of the light in the mode, we only need few atoms to observe light imprisonment. We explore radiation trapping and the presence of other collective phenomena to explain this effect.

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