

Abstract Submitted  
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**Measurement of the enhancement of the radiative decay of atoms near an optical nanofiber**<sup>1</sup> P. SOLANO, J.A. GROVER, L.A. OROZCO, S.L. ROLSTON, Joint Quantum Institute, Dept. of Physics, UMD and NIST, College Park, MD 20742, USA, H.J. CARMICHAEL, Dept. of Physics, University of Auckland, Auckland 1010, New Zealand — The spontaneous decay rate of an atom near a dielectric is modified by the induced dipole and by a change in the modes of the vacuum electromagnetic field. This decay rate directly determines the coupling strength between an atom and the guided mode of a waveguide. We measure the spontaneous decay rate of the  $5P_{3/2}$  state in  $^{87}\text{Rb}$  atoms near a silica optical nanofiber with a diameter of 500 nm that allows only the fundamental  $HE_{11}$  mode at 780 nm. We excite a cloud of cold atoms with short, near-resonant laser pulses and use time-correlated single photon counting to directly measure the spontaneous emission into free space and into the nanofiber guided mode. Comparing the two decay constants yields a  $\sim 4\%$  enhancement due to the nanofiber, consistent with theory.

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