

Abstract Submitted  
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**Tunable coupling in atom-mirror system** I.-C. HOI<sup>1</sup>, L. TORNBERG, A.F. KOCKUM, A. POURKABIRIAN, G. JOHANSSON, Department of Microtechnology and Nanoscience (MC2), Chalmers University of Technology, SE-412 96 Gothenburg, Sweden, C.M. WILSON, Institute for Quantum Computing and Electrical and Computer Engineering Department, University of Waterloo, Waterloo, Canada, P. DELSING, Department of Microtechnology and Nanoscience (MC2), Chalmers University of Technology, SE-412 96 Gothenburg, Sweden — We embedded an artificial atom, a superconducting transmon qubit, at a distance from the end of a transmission line. The distance between the qubit and the end (mirror) determines the electromagnetic (EM) environment coupled to the qubit. By tuning the transition wavelength of the qubit, we can control the coupling. In particular, we show that when the qubit stays a node of the EM field, the coupling is completely off. For finite coupling, we investigate the coherent scattering properties of the system, including both the time dynamic response and the steady state behavior.

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