

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Controllable scattering of photons in a one-dimensional resonator waveguide¹ C.P. SUN, L. ZHOU, Z.R. GONG, RIKEN, Japan, and CAS, China, Y.X. LIU, RIKEN, Japan, F. NORI, RIKEN, Japan, and University of Michigan, Ann Arbor, USA — We analyze the coherent transport of a single photon, which propagates in a one-dimensional coupled-resonator waveguide and is scattered by a controllable two-level system located inside one of the resonators of this waveguide. Our approach, which uses discrete coordinates, unifies low and high energy effective theories for single-photon scattering. We show that the controllable two-level system can behave as a quantum switch for the coherent transport of a single photon. This study may inspire new electro-optical single-photon quantum devices. We also suggest an experimental setup based on superconducting transmission line resonators and qubits.

L. Zhou, Z.R. Gong, Y.X. Liu, C.P. Sun, F. Nori, Controllable scattering of photons in a 1D resonator waveguide, Phys. Rev. Lett. 101, 100501 (2008). URL: <http://link.aps.org/abstract/PRL/v101/e100501>

¹Supported in part by LPS, NSA, ARO, NSF, NSFC, CREST, & RIKEN.

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Date submitted: 26 Nov 2008

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