Quantum Physics

Theory of single-photon transport in a single-mode waveguide coupled to a cavity containing a two-level atom

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The single-photon transport in a single-mode waveguide, coupled to a cavity embedded with a two-leval atom is analyzed. The single-photon transmission and reflection amplitudes, as well as the cavity and the atom excitation amplitudes, are solved exactly via a real-space approach. It is shown that the dissipation of the cavity and of the atom respectively affects distinctively on the transport properties of the photons, and on the relative phase between the excitation amplitudes of the cavity mode and the atom.

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