

## Erratum: Phonon mediated off-resonant quantum dot–cavity coupling under resonant excitation of the quantum dot [Phys. Rev. B **84**, 085309 (2011)]

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Equation (A26) from the paper should be corrected to

$$\gamma_r = \frac{\pi}{2} \rho_{\text{dos}}(\nu) \left| \frac{g_{23}(\nu)g_v}{\Delta - \nu} \right|^2,$$

where  $\rho_{\text{dos}}(\nu)$  is the density of states of phonons at frequency  $\nu$  and other parameters are explained in the original paper. The values of  $\gamma_r$  used in the paper were based on the experimental results. Therefore, the error in Eq. (A26) does not affect any conclusions and results of the paper.

The derivation of this expression follows Carmichael (Ref. 1, Chap. 1.3). Starting with the equations for correlation functions [(A24) and (A25)] from the paper, the summation over reservoir oscillators can be replaced with integration over the reservoir by introducing a density of states of phonons at a frequency  $\omega$  as  $\rho_{\text{dos}}(\omega)$  [such that  $\rho_{\text{dos}}(\omega)d\omega$  gives the total number of oscillators, i.e., phonons with frequencies in the intervals  $\omega$  and  $\omega + d\omega$ ], and transforming  $g_{23}^j \rightarrow g_{23}(\omega)$ . We note that, by such definition,  $\rho_{\text{dos}}(\omega)$  has a dimension of inverse frequency. This leads to the following expressions for the correlation functions (where  $\tau = t' - t$ ):

$$\langle \Gamma^\dagger(t + \tau)\Gamma(t) \rangle_R = \int_0^\infty d\omega e^{i\omega\tau} \rho_{\text{dos}}(\omega) \left| \frac{g_{23}(\omega)g_v}{\Delta - \omega} \right|^2 \bar{n}(\omega, T),$$

and

$$\langle \Gamma(t + \tau)\Gamma^\dagger(t) \rangle_R = \int_0^\infty d\omega e^{-i\omega\tau} \rho_{\text{dos}}(\omega) \left| \frac{g_{23}(\omega)g_v}{\Delta - \omega} \right|^2 [\bar{n}(\omega, T) + 1].$$

After the integration of these expressions (as in Ref. 1), the value of  $\gamma_r$  given above can be extracted. As expected,  $\gamma_r$  peaks when  $\nu = \Delta$ , i.e., for phonon modes with frequencies equal to detuning between the quantum dot and the cavity mode. We note that, under our simplified assumption of phonon modes being lossless,  $\gamma_r$  goes to infinity at such resonances. However, as stated above, we do not use this expression for any analysis in the paper and, instead, use experimental values of  $\gamma_r$ .

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<sup>1</sup>H. Carmichael, in *An Open Systems Approach to Quantum Optics*, Lecture Notes in Physics New Series M Vol. 18 (Springer, Berlin, 1993).