

**Erratum: Closed-time-path approach
to the optomechanical backreaction problem
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Salvatore Butera 



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Equation (94) of our paper, which gives the discrete frequency-domain representation of the second-order influence action, and its continuum limit, Eq. (96), contain errors in the dissipative contribution and in the zero-frequency term.

In both equations, the dissipation kernel $\mu^{(2)}$ was contracted with the same quadratic form, $|\tilde{x}_+ - \tilde{x}_-|^2$, as the fluctuation kernel $\nu^{(2)}$. As in the time-domain expressions, Eqs. (83) and (84), the dissipation kernel must instead couple the difference variable $\tilde{x}_+ - \tilde{x}_-$ to the sum variable $\tilde{x}_+ + \tilde{x}_-$. In addition, the zero-frequency term in Eq. (94), which originates from the static kernel N_{--}^{00} in Eq. (83), must carry the factor $\bar{\nu}_{kk}^{(2)} \equiv (z_k^2 - 1)/16$ instead of $\nu_{kk}^{(2)} = (z_k^2 + 1)/16$. With this factor, the term vanishes at zero temperature, consistent with the discussion below Eq. (87).

Equations (94) and (96) should read

$$\begin{aligned} \mathcal{A}_2[\tilde{x}_+, \tilde{x}_-] = & \frac{i\pi^2}{d^2} \sum_{k,j=-\infty}^{+\infty} (\omega_k + \omega_j)^2 \{ \nu_{kj}^{(2)} |\tilde{x}_+ - \tilde{x}_-|_{\omega_k + \omega_j}^2 + i\mu_{kj}^{(2)} (\tilde{x}_+ - \tilde{x}_-)^*_{\omega_k + \omega_j} (\tilde{x}_+ + \tilde{x}_-)_{\omega_k + \omega_j} \} \\ & + \frac{i\pi^2}{d^2} \sum_{k=-\infty}^{+\infty} (2\omega_k)^2 \bar{\nu}_{kk}^{(2)} |\tilde{x}_+ - \tilde{x}_-|_0^2, \end{aligned} \quad (94)$$

and

$$\mathcal{A}_2[\tilde{x}_+, \tilde{x}_-] = i \int_{-\infty}^{+\infty} d\omega \int_{-\infty}^{+\infty} d\omega' (\omega + \omega')^2 \{ \nu_{\omega\omega'}^{(2)} |\tilde{x}_+ - \tilde{x}_-|_{\omega + \omega'}^2 + i\mu_{\omega\omega'}^{(2)} (\tilde{x}_+ - \tilde{x}_-)^*_{\omega + \omega'} (\tilde{x}_+ + \tilde{x}_-)_{\omega + \omega'} \}. \quad (96)$$

These corrections do not affect the other results or the conclusions of the paper. The optical backreaction forces and the dissipated energy, Eqs. (102)–(107), follow from the time-domain expressions, Eqs. (83) and (84). The transition probability, Eq. (118), depends only on $\text{Im} \mathcal{A}[x_+ = x, x_- = 0]$, to which the dissipation term does not contribute.