

Erratum: Theory of multiqubit superradiance in a waveguide in the presence of finite delay times and two quantum excitations [Phys. Rev. A 112, 063702 (2025)]Sofia Arranz Regidor , Franco Nori , and Stephen Hughes 

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This erratum contains some noted minor corrections to our recent paper, specifically related to complex operator correlations, as shown in Fig. 6. Here, we include the updated figure, and related discussions. The main findings and conclusions in the original paper remain unaffected.

Recently, we noticed a small inaccuracy in the results presented in Figs. 6(c), 6(f), 6(i), and 6(l) for the light-matter correlations, $\langle \sigma_1^+ b_R \rangle$ (black dashed curves) and $\langle \sigma_2^+ b_R \rangle$ (dotted blue curves).

These observables are complex values, and in the results presented in Fig. 6, we did not separate the real and imaginary components properly, giving rise to inaccurate results. Upon revisiting these results, we realized that these two values are indeed purely imaginary, both in the Markovian and non-Markovian domains. Thus, even in the Markovian regime, we can observe light-matter correlations. We present here the updated results in Fig. 1, where we are now showing the absolute values of these observables in order to avoid any confusion.

It is important to note that the discussions in our paper remain the same, where we have shown how, by using MPS and avoiding certain approximations, we can capture quantum dynamics that are not accessible with other methods, and we fully include non-Markovian delay dynamics and without separation of the emitter and light operators. Indeed, the fact that these emitter-field correlation dynamics are also shown in our Markovian solution means that these correlations cannot be factored out, for example, by treating the waveguide as a bath.

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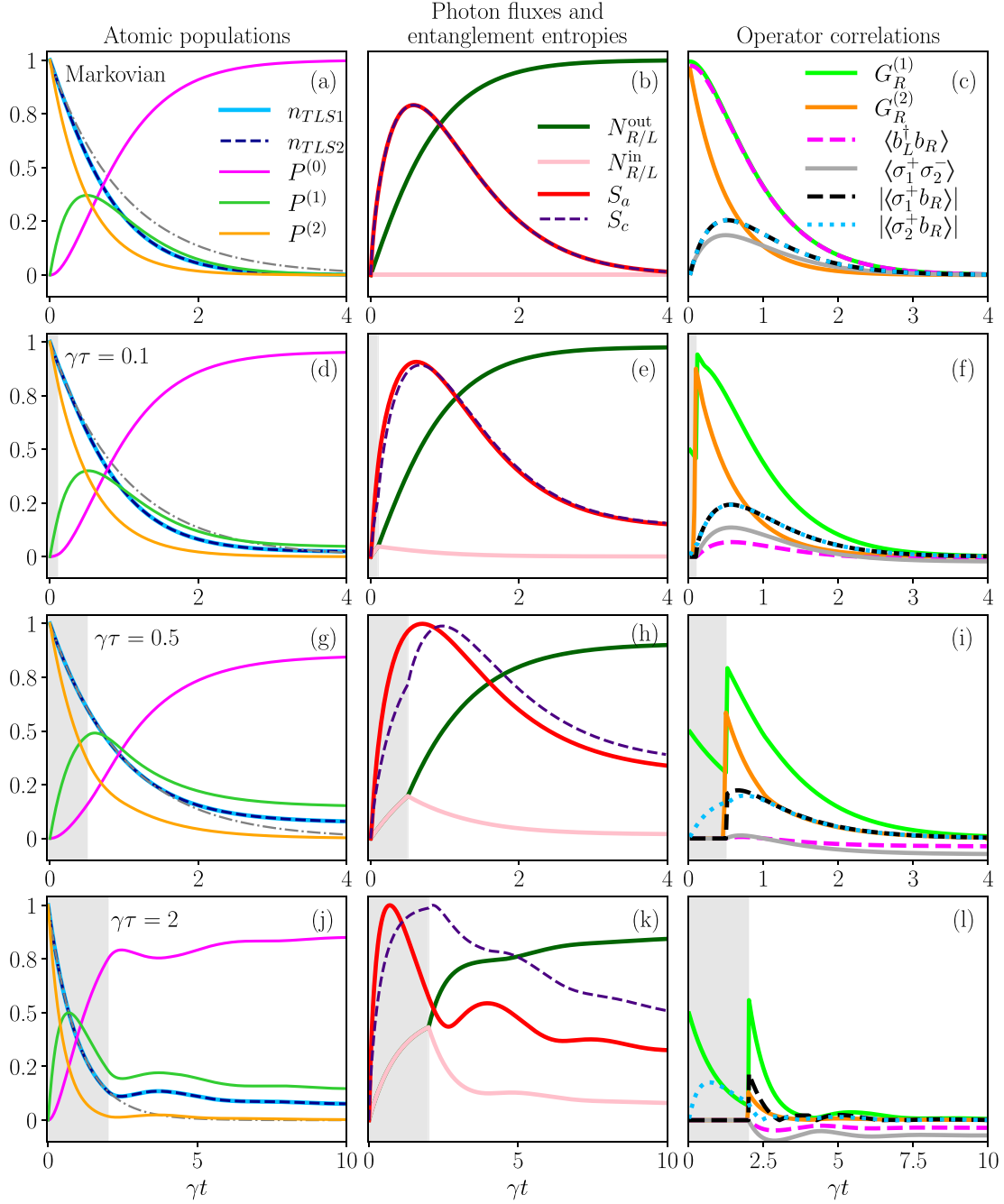


FIG. 1. Multipanel plot summarizing various important observables for four different cases: (a)–(c) Markovian regime; (d)–(f) $\gamma\tau = 0.1$; (g)–(i) $\gamma\tau = 0.5$; and (j)–(l) $\gamma\tau = 2$. (a), (d), (g), and (j) show the atomic population dynamics (single TLS decay represented with the dashed-dotted gray curve for reference), (b), (e), (h), and (k) show photon fluxes and entanglement entropies, and (c), (f), (i), and (l) show correlations between operators in the system.