**Erratum: Two-level-atom excitation probability for single- and N -photon wave packets
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We wish to correct some errors that appeared in Sec. III A 2 of our paper, which deals with perturbation theory in the large $\bar{n}$ limit. The perturbation parameter ϵ should not have appeared explicitly in Eqs. (38) and (39). Based on the perturbative solution that we assumed in the paper, Eq. (38) should be

$$\begin{aligned}\frac{dx^{(1)}}{d\tau} &= g(\tau)y^{(1)} - \frac{1}{2}x^{(0)}(\tau), \\ \frac{dy^{(1)}}{d\tau} &= -g(\tau)x^{(1)} - y^{(0)}(\tau).\end{aligned}\tag{38}$$

Similarly, the formal solution of $y^{(1)}(\theta)$ [given by Eq. (39) in the paper] is

$$y^{(1)}(\theta) = - \int_0^\infty \frac{d\tau}{d\theta'} \left(y^{(0)}(\theta') \cos(\theta - \theta') - \frac{x^{(0)}(\theta')}{2} \sin(\theta - \theta') \right) d\theta'.\tag{39}$$

Despite these errors in Eqs. (38) and (39), the final solution [Eq. (40)] is still true.