Erratum: Quantum Langevin theory for two coupled phase-conjugated electromagnetic waves [Phys. Rev. A 107, 053703 (2023)]

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We report a typographical error in Eq. (31) of our original paper, which propagates into several subsequently derived equations. We emphasize that these corrections do not impact any of the conclusions presented in the paper.

Equation (31) in the original paper is corrected to

$$\mathrm{N_B} = \sqrt{\begin{bmatrix} -\mathrm{M_{B11}} & \mathrm{M_{B12}} \\ -\mathrm{M_{B21}} & \mathrm{M_{B22}} \end{bmatrix} + \begin{bmatrix} -\mathrm{M_{B11}} & \mathrm{M_{B12}} \\ -\mathrm{M_{B21}} & \mathrm{M_{B22}} \end{bmatrix}^*} = \mathrm{N_{BR}} + i\mathrm{N_{BI}},$$

and Eq. (32) should be deleted.

Consequently, Eq. (39) is corrected to

$$\mathrm{N_B} = \begin{bmatrix} \sqrt{2\,\mathrm{Re}\{\alpha_1\}} & 0 \\ 0 & \sqrt{2\,\mathrm{Re}\{\alpha_2\}} \end{bmatrix}.$$

Equation (40) is corrected to

$$\frac{\partial}{\partial z}\begin{bmatrix} \hat{a}_1 \\ \hat{a}_2^\dagger \end{bmatrix} = \mathrm{M_B}\begin{bmatrix} \hat{a}_1 \\ \hat{a}_2^\dagger \end{bmatrix} + \begin{bmatrix} \sqrt{2\,\mathrm{Re}\{\alpha_1\}}\hat{f}_1 \\ \sqrt{2\,\mathrm{Re}\{\alpha_2\}}\hat{f}_2^\dagger \end{bmatrix}.$$

Equation (41) is corrected to

$$\mathrm{N_B} = \begin{bmatrix} \sqrt{2\alpha} & 0 \\ 0 & i\sqrt{2g} \end{bmatrix}.$$

Equation (42) is corrected to

$$\frac{\partial}{\partial z}\begin{bmatrix} \hat{a}_1 \\ \hat{a}_2^\dagger \end{bmatrix} = \mathrm{M_B}\begin{bmatrix} \hat{a}_1 \\ \hat{a}_2^\dagger \end{bmatrix} + \begin{bmatrix} \sqrt{2\alpha}\hat{f}_1 \\ \sqrt{2g}\hat{f}_2 \end{bmatrix}.$$

Equation (44) is corrected to

$$\mathrm{N_B} = \Theta(\zeta)\sqrt{\zeta}\begin{bmatrix} 1 & -1 \\ 1 & 1 \end{bmatrix} + i\Theta(-\zeta)\sqrt{-\zeta}\begin{bmatrix} 1 & -1 \\ 1 & 1 \end{bmatrix}.$$

Equation (45) is corrected to

$$\frac{\partial}{\partial z}\begin{bmatrix} \hat{a}_1 \\ \hat{a}_2^\dagger \end{bmatrix} = \mathrm{M_B}\begin{bmatrix} \hat{a}_1 \\ \hat{a}_2^\dagger \end{bmatrix} + \Theta(\zeta)\sqrt{\zeta}\begin{bmatrix} 1 & -1 \\ 1 & 1 \end{bmatrix}\begin{bmatrix} \hat{f}_1 \\ \hat{f}_2^\dagger \end{bmatrix} + \Theta(-\zeta)\sqrt{-\zeta}\begin{bmatrix} 1 & -1 \\ 1 & 1 \end{bmatrix}\begin{bmatrix} \hat{f}_1^\dagger \\ \hat{f}_2 \end{bmatrix}.$$

Equation (46) is corrected to

$$i\frac{\partial}{\partial z}\begin{bmatrix} \hat{a}_1 \\ \hat{a}_2^\dagger \end{bmatrix} = \begin{bmatrix} -i\alpha & -\kappa \\ -\kappa & i\alpha \end{bmatrix}\begin{bmatrix} \hat{a}_1 \\ \hat{a}_2^\dagger \end{bmatrix} + \sqrt{2\alpha}\begin{bmatrix} \hat{f}_1 \\ \hat{f}_2^\dagger \end{bmatrix} = \hat{\mathcal{H}}\begin{bmatrix} \hat{a}_1 \\ \hat{a}_2^\dagger \end{bmatrix} + \sqrt{2\alpha}\begin{bmatrix} \hat{f}_1 \\ \hat{f}_2^\dagger \end{bmatrix}.$$

Equation (86) is corrected to

$$\mathrm{N_{F,B}} = \begin{bmatrix} \sqrt{2\alpha} & 0 \\ 0 & i\sqrt{2g} \end{bmatrix}.$$

Equations (A1) in Appendix A are corrected to

$$\mathrm{N_{B1}} \equiv \sqrt{\begin{bmatrix} -\mathrm{M_{B11}} & \mathrm{M_{B12}} \\ -\mathrm{M_{B21}} & \mathrm{M_{B22}} \end{bmatrix} + \begin{bmatrix} -\mathrm{M_{B11}} & \mathrm{M_{B12}} \\ -\mathrm{M_{B21}} & \mathrm{M_{B22}} \end{bmatrix}^*},$$

$$\mathrm{N_{B2}} \equiv \mathrm{N_{B1}} \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix},$$

$$\mathrm{N_{B3}} \equiv \mathrm{N_{B1}} \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix},$$

$$\mathrm{N_{B4}} \equiv \mathrm{N_{B1}} \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix} = -\mathrm{N_{B1}}.$$

These corrections do not impact any of the conclusions presented in the paper.

Data availability. No data were created or analyzed in this study.