Erratum: Theoretical analysis of Hanbury Brown and Twiss interferometry at soft-x-ray free-electron lasers [Phys. Rev. A 104, 023508 (2021)]

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We found some misprints in our Appendix. We specifically corrected the last equation in Eq. (A1) by providing simpler notations and correcting the sign before the term $2\beta q_1^D q_2^D$. We added an equation after (A1) with the definition of parameters a and b, which was not done in the main text and, finally, we updated the exponent of Eq. (A4) where the term q_i^D was substituted by the term $(q_i^D)^2$. Below, the corrected Appendix is provided. This update does not affect any conclusions made in the original publication.

APPENDIX

Here we show how the result in Eq. (95) is obtained. By substituting the cross-spectral density function in Eqs. (66) and (67), in Eq. (93) one can transform integration in the numerator to (see also [27])

$$\iint e^{iq_1^D x_1 - iq_2^D x_2} W_{\text{in}}(x_1, x_2)dx_1 dx_2 = \iint \exp\{-[a(x_1^2 + x_2^2) - 2bx_1 x_2]\}\exp(iq_1^D x_1 - iq_2^D x_2)dx_1 dx_2$$
$$= \frac{\pi}{(a^2 - b^2)^{1/2}} \exp\{-[\alpha(q_1^D)^2 + \alpha(q_2^D)^2 - 2\beta q_1^D q_2^D]\}, \quad \text{(A1)}$$

where

$$a = \frac{1}{4\sigma_I^2} + \frac{1}{2l_c^2}, \qquad b = \frac{1}{2l_c^2}.$$

and

$$\alpha = \frac{a}{4(a^2 - b^2)}, \qquad \beta = \frac{b}{4(a^2 - b^2)}. \quad \text{(A2)}$$

This result is obtained by the use of the known integral

$$\int e^{-at^2} e^{iqt} dt = \sqrt{\frac{\pi}{a}}\, e^{-q^2/4a}. \quad \text{(A3)}$$

In the denominator, similar integration of Eq. (94) gives

$$S_D(q_i^D) = \int e^{iq_i^D x_1 - iq_i^D x_2} W_{\text{in}}(x_1, x_2)dx_1 dx_2 = \frac{\pi}{(a^2 - b^2)^{1/2}} e^{-2(\alpha - \beta)(q_i^D)^2}. \quad \text{(A4)}$$

Substituting the results of integration in Eqs. (A1) and (A4) into Eq. (93) gives [34]

$$g_{\text{in}}(q_1^D, q_2^D) = e^{-\beta(q_2^D - q_1^D)^2}. \quad \text{(A5)}$$

2469-9926/2023/107(4)/049902(1)