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Erratum

Retrodictive states and two-photon quantum imaging

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Some of the detail in Section 3 of Eur. Phys. J. D **22**, 495 (2003) are incorrect. However, the main idea of the paper still holds and our principal conclusions remain valid. The corrections are listed as below.

(I) To be consistent with the standard predictive treatment, the object transmission function t in equations (7, 8, 21) and the fourth line after equation (20) should be t^*. On the other hand, it should be t in equation (24).

(II) Equation (19) should be replaced by the equation

$$\tilde{\alpha}_1(k_x) = \mathrm{e}^{-\mathrm{i}k(z_1+f)} \left(\frac{\mathrm{i}f}{\pi^{1/2}k\sigma} \right)^{1/2} \exp\left[-\frac{x_1^2}{2\sigma^2} + \left(\frac{\mathrm{i}(z_1-f)}{2k} - \frac{f^2}{2k^2\sigma^2} \right) k_x^2 + \frac{f x_1 k_x}{k\sigma^2} \right].$$

(III) Equation (20) should be replaced by the equation

$$\alpha_1(x) = \mathrm{e}^{-\mathrm{i}k(z_1+f)} \left(\frac{\mathrm{i}2\pi^{1/2}\sigma}{\lambda\eta z_1 \left(\frac{1}{\eta} + \frac{1}{z_1} - \frac{1}{f} \right)} \right)^{1/2} \exp\left[-\frac{\mathrm{i}\pi}{\lambda} \left(\frac{x_1^2}{\eta} + \frac{x^2}{z_1} \right) + \frac{\mathrm{i}\pi}{\lambda \left(\frac{1}{\eta} + \frac{1}{z_1} - \frac{1}{f} \right)} \left(\frac{x_1}{\eta} + \frac{x}{z_1} \right)^2 \right],$$

where $\eta = f + \mathrm{i}k\sigma^2$.

(IV) Equation (25) should be replaced by the equation

$$\beta_2(x) = \mathrm{e}^{\mathrm{i}k(z_2+f)} \left(\frac{f}{2\pi(f-z_2)} \right)^{1/2} \int \mathrm{d}k_x \tilde{\beta}_1(k_x) \exp\left[\frac{\mathrm{i}f^2}{2k(z_2-f)} \left(k_x - \frac{k}{f}x \right)^2 \right].$$

(V) z_1 and z_2 are taken into account because they affect the spatial profile in the transverse detection plane in arm 2. For the case where $z_1 = z_2 = f$ and the limit of $\sigma, \kappa \to 0$, the transverse probability distribution for detection in arm 2 takes on the form of the squared modulus of the spatial Fourier transform of $t(x)$. On the other hand, for the same configuration in arm 1, if the crystal and detector are both positioned at a distance $2f$ from the lens in arm 2, the transverse probability distribution in arm 2 will be proportional to $|t(x)|^2$.

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