Erratum: Diffraction-induced entanglement loss of orbital-angular-momentum states **[Phys. Rev. A 97, 013849 (2018)]**

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(Received 15 January 2019; published 30 January 2019)

DOI: [10.1103/PhysRevA.99.019904](https://doi.org/10.1103/PhysRevA.99.019904)

Equation (12) for the diffracted two-photon wave function on output needs to be amended by an additional normalization factor $1/\sqrt{1+b^2}$,

$$\Psi(\mathbf{r}_1, \mathbf{r}_2; L) = \frac{1}{\sqrt{2(1+b^2)}} [\psi_{l_0}^d(\mathbf{r}_1, L) \psi_{-l_0}^{-d}(\mathbf{r}_2, L) + \psi_{-l_0}^d(\mathbf{r}_1, L) \psi_{l_0}^{-d}(\mathbf{r}_2, L)], \quad (12)$$

with b as the overlap between the diffracted fields $\psi_{-l_0}^d(\mathbf{r})$ and $\psi_{+l_0}^d(\mathbf{r})$ as given by Eq. (17). The equations derived from Eq. (12) need to be amended accordingly

$$\varrho(\mathbf{r}_1, \mathbf{r}_1') = \int d^2 r_2 \sigma(\mathbf{r}_1, \mathbf{r}_2; \mathbf{r}_1', \mathbf{r}_2) \quad (16)$$

$$= \frac{1}{2(1+b^2)} [\psi_{l_0}^d(\mathbf{r}_1) \psi_{l_0}^{d*}(\mathbf{r}_1') + b \psi_{l_0}^d(\mathbf{r}_1) \psi_{-l_0}^{d*}(\mathbf{r}_1') + b \psi_{-l_0}^d(\mathbf{r}_1) \psi_{l_0}^{d*}(\mathbf{r}_1') + \psi_{-l_0}^d(\mathbf{r}_1) \psi_{-l_0}^{d*}(\mathbf{r}_1')],$$

$$\text{tr}(\varrho^2) = \int d^2 r \int d^2 r' \varrho(\mathbf{r}, \mathbf{r}') \varrho(\mathbf{r}', \mathbf{r}) = \frac{1+6b^2+b^4}{2(1+b^2)^2}, \quad (18)$$

$$C(|\Psi\rangle) = \frac{1-b^2}{1+b^2}. \quad (19)$$

As a result, the amplitude of the concurrence minima in Figs. 4 and 5 is slightly reduced, however, without affecting the conclusion of the original paper. The corrected figures, as derived from (12)–(19) above are displayed hereafter.

FIG. 4. Concurrence $C(|\Psi\rangle)$ vs the relative displacement d/a ($a = 200 \mu\text{m}$) for the diffracted twin-photon state of the Laguerre-Gaussian (LG) (red squares) and the Bessel-Gaussian (BG) (blue dots) modes with $l_0 = 1$. Beam waists were set to $w_{\text{LG}} = 226 \mu\text{m}$ and $w_{\text{BG}} = 1 \text{ mm}$.

FIG. 5. (a)–(c) Concurrence $C(|\Psi\rangle)$ vs the relative displacement d/a ($a = 200 \mu\text{m}$) for the diffracted twin-photon state of the LG modes with $l_0 = 2$ –4. Panels (a)–(c) correspond to three distinct values of the ratio $\xi/a = 0.4, 0.75, 1.2$, respectively. (d) Number of minima of the concurrence N_{min} vs $\xi(l_0)/a$ for $l_0 = 2$ –4.