Erratum: Entangled coherent states [Phys. Rev. A 45, 6811 (1992)]

Barry C. Sanders*

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Equation (19) should read

$$E(\phi) = \frac{-\alpha^2 e^{-\alpha^2}}{\alpha^2 + \gamma^2} \cos\phi. \tag{1}$$

For small α the expression for $E(\phi)$ approaches the result for the state $\sqrt{1-\alpha^2}|0\rangle + \alpha|1\rangle$ considered by Tan, Holland, and Walls [1]. The Bell inequality is violated if the coefficient of $\cos\phi$ is greater than $1/\sqrt{2}$. Thus a violation occurs only for $\gamma^2 < (\sqrt{2}e^{-\alpha^2} - 1)\alpha^2$ and the upper bound on the coherent field photon number is given by $\alpha^2 < (\ln 2)/2$. Therefore the violation occurs only for weak coherent fields and the minimum overlap between the states $|0\rangle$ and $|\alpha\rangle$ is $|\langle 0|\alpha\rangle|^2 = 2^{-1/2}$. Although the entanglement of coherent states has meaning for small overlaps only, a violation of the inequality even for small α indicates the essentially nonclassical nature of these states. The conclusion that large photon numbers lead to a violation as well arose from the error in Eq. (19) and is not correct.

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* Electronic address (internet): barry@macadam.mpce.mq.edu.au

[1] S. M. Tan, M. J. Holland, and D. F. Walls, Opt. Commun. **77**, 285 (1990).

