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Author Correction: Metrological complementarity reveals the Einstein-Podolsky-Rosen paradox

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Correction to: *Nature Communications* https://doi.org/10.1038/s41467-021-22353-3, published online 23 April 2021.

The original version of this Article contained errors in inline Equations in the last paragraph of the "Steering of GHZ states" subsection, which incorrectly read:

For a mixture $\rho = p|\mathrm{GHZ}_\phi{}^{N+1}\rangle\langle\mathrm{GHZ}_\phi{}^{N+1}| + (1-p)\mathbb{1}/2^{N+1}$, using the same measurements we obtain $F_\mathrm{Q}{}^{\mathrm{B|A}}\ [\rho,\ J_z] \geq p^2N^2/[p + 2(1-p)/2^N]$, $4\mathrm{Var}\ _\mathrm{Q}{}^{\mathrm{B|A}}\ [\rho,\ Jz] \leq (1-p)N/2^N + p(1-p)N^2$. Whenever $p \gg 2^{-N}$, the criterion witnesses steering.

The correct form should read:

For a mixture $\rho = p|\mathrm{GHZ}_\phi{}^{N+1}\rangle\langle\mathrm{GHZ}_\phi{}^{N+1}| + (1-p)\mathbb{1}/2^{N+1}$, using the same measurements we obtain $F_\mathrm{Q}{}^{\mathrm{B|A}}\ [\rho,\ J_z] \geq p^2N^2/[p + 2(1-p)/2^N]$, $4\mathrm{Var}\ _\mathrm{Q}{}^{\mathrm{B|A}}\ [\rho,\ Jz] \leq (1-p)N + p(1-p)N^2$. For large N, whenever $p \gtrapprox 1/\sqrt{N}$, the criterion witnesses steering.

This has been corrected in the PDF and HTML versions of the Article.

The original version of the Supplementary Information associated with this Article contained errors in the last paragraph of Supplementary Note 2 "GHZ States with white noise", which incorrectly read:

For a measurement of σ_z by Alice, Bob's conditional states are easily found to give

$$\mathrm{Var}_\mathrm{Q}^{\mathrm{B|A}}[\rho, J_z] \leq \frac{(1-p)N}{4d} + \frac{p(1-p)N^2}{4},$$

where $d = 2^N$. With a σ_x measurement, (3) results in

$$F_\mathrm{Q}^{\mathrm{B|A}}[\rho, J_z] \geq \frac{p^2N^2}{p + 2(1-p)/d}.$$

When $p \gg 1/d = 2^{-N}$, we can neglect the terms involving d. Then $F_\mathrm{Q}{}^{\mathrm{B|A}}\ [\rho,\ J_z] \gtrapprox pN^2$, $\mathrm{Var}_\mathrm{Q}{}^{\mathrm{B|A}}\ [\rho,\ J_z] \lessapprox p(1-p)N^2 < pN^2$ for $p < 1$.

The correct version reads instead

For a measurement of σ_z by Alice, Bob's conditional states are easily found to give

$$\mathrm{Var}_\mathrm{Q}^{\mathrm{B|A}}[\rho, J_z] \leq \frac{(1-p)N}{4} + \frac{p(1-p)N^2}{4},$$

With a σ_x measurement, (3) results in

$$F_\mathrm{Q}{}^{\mathrm{B|A}}[\rho, J_z] \geq \frac{p^2N^2}{p + 2(1-p)/d},$$

where $d = 2^N$. When $p \gg 1/d = 2^{-N}$, we can neglect the term involving d. Then $F_\mathrm{Q}{}^{\mathrm{B|A}}\ [\rho,\ J_z] \gtrapprox pN^2$, and the difference

$$F_\mathrm{Q}^{\mathrm{B|A}}[\rho, J_z] - 4\mathrm{Var}_\mathrm{Q}^{\mathrm{B|A}}[\rho, J_z] \gtrapprox p^2N^2 - (1-p)N$$

is positive as long as $N > (1-p)/p^2$. For large N, this condition approximates to $p \gtrapprox 1/\sqrt{N}$.

The HTML has been updated to include a corrected version of the Supplementary Information.

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Additional information

Supplementary information The online version contains supplementary material available at https://doi.org/10.1038/s41467-021-26597-x.