Erratum: Two qubits of a $W$ state violate Bell’s inequality beyond Cirel’son’s bound


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The reasoning leading to Eq. (16) is incorrect. The correct reasoning is the following: Qubit $k$ is defined as the one in which, if we had measured $\sigma_z$, we would have found the result 1. The other two qubits are denoted $i$ and $j$. For the $W$ state (2),

$$P(X_2 = X_3 | Z_1 = 1) = P(X_2 = -X_3 | Z_1 = 1),$$

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where $P(X_2 = X_3 | Z_1 = 1)$ is the conditional probability of $X_2$ and $X_3$ having the same result, given that the result of $Z_1$ is 1. Therefore, irrespective of whether $i$ and $j$ are qubits 2 and 3, or 1 and 3, or 1 and 2, we conclude that

$$C(X_1, X_j) = 0.$$ (4)

I thank Daniel Collins for pointing out this mistake.

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