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The role of non-stabilizerness in Bell's inequality violation

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Bell's inequality represent a cornerstone in our understanding of quantum theory, as they allow to prove the quantum mechanics is non-local and no hidden variable theory can give the same results.

While known to the community, it is often not highlighted the role of non-stabilizerness, often dubbed magic, in the violation of Bell's inequalities.

In our work we show how much non-stabilizerness, as quantified by the Stabilizer Rényi Entropy is necessary in order to violate the Bell's inequalities, proving that the violations can be used as a witness for the presence of magic in a quantum state.

Moreover, we prove results on the probabilistic violation of Bell's inequality by random unitary operations picked from the Clifford group and the full Unitary group respectively, highlighting the role of t-doping in the probabilistic violation.

Sessione

Studi fondazionali

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