

Quantum correlations: much ado about nothing?

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Entanglement is one of the most profound properties of quantum states and leads to predictions deviating from our classical intuition. Although non-classicality is often thought to be directly related to entanglement, in the past decade quantum correlations different from entanglement are believed to play a complementary role. The most prominent example is the so called quantum discord. Many more related measures were defined (e.g. the quantum information deficit, the relative entropy of quantumness, etc.) to show specific facets of quantum features in quantum protocols and quantum settings. Here we highlight the differences of such quantum correlations in comparison to entanglement. It is shown under which circumstances local channels can even generate quantum correlations [1]. The connection of quantum correlations to the unavoidable generation of entanglement in a von Neumann measurement [2] indicates, like in the case of sending entanglement by separable states [3], that quantum correlations are a necessary resource in certain quantum tasks.

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