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## Quantum correlations without entanglement

Quantum states of a composite system can be divided into entangled and separable once. Entangled states display "nonlocal features" violating Bell's inequalities and are considered a necessary resource for quantum communication and pure quantum computation allowing computational speedup over the best classical algorithm. On the contrary, separable states are generally considered as purely classical, since they do not violate Bell's inequalities and can be prepared by local operations and classical communication. However, it is valid to ask if highly mixed states, and in particular separable states, are completely useless from quantum information perspective. Recent investigations give compelling evidences that this is not the case. The "non-classicality" of bipartite correlations other than entanglement are characterized via new measure - quantum discord.

Ref: B. Dakic, V. Vedral and, C. Brukner, Phys. Rev. Lett. 105, 190502 (2010).