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(G*) Quantum correlations in multiqubit entangled states

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Bell's inequalities provide a practical method for testing whether correlations observed between spatially separated parts of a system are compatible with any local hidden variable description. For 2— qubit pure states, entanglement and nonlocality as measured by Bell inequality violations are directly related. However, for multiqubit pure states, the much more complex relation between N-qubit entanglement and nonlocality has not yet been explored in much detail. In this work, we analyze the violation of the Svetlichny-Bell inequality by N-qubit generalized GHZ (GGHZ) states, and identify members of this family of states that do not violate the inequality. GGHZ states are a generalization of the well known GHZ state, which is a useful entanglement resource. GGHZ states are hence natural candidates to explore for extending various quantum information protocols, like controlled quantum teleportation, to more than three parties. Our results raise interesting questions regarding characterization of genuine multipartite correlations using Bell-type inequalities.

Keyword-1

Quantum entanglement

Keyword-2

Nonlocality

Keyword-3

Bell Inequalities

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