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Entanglement Criterion of N-Qubit State

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Abstract: In this paper, we shall develop a generic scheme to construct the criterion that an N-qubit state has true N-particle entanglement. For the N=3 case, we show that violation of the Mermin's inequality $|E^{LHV}(\hat{\sigma}_x\otimes\hat{\sigma}_y \otimes\hat{\sigma}_y +\hat{\sigma}_y\otimes\hat{\sigma}_x \otimes\hat{\sigma}_y+\hat{\sigma}_y\otimes\hat{\sigma}_y\otimes\hat{\sigma}_x-\hat{\sigma}_x\otimes\hat{\sigma}_x\otimes\hat{\sigma}_x)|≤2$, is sufficient to confirm three-particle entanglement.

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Key words: N-particle entanglement, Mermin's inequality