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Multiqubit nonseparability in families of entangled pure states SHOHINI GHOSE, Wilfrid Laurier University, AMIR JAFARI-SALIM, University of Waterloo — Multiqubit entanglement is a crucial ingredient for large-scale quantum information processing and can also play a role in quantum criticality phenomena in condensed matter systems. Entanglement between qubits can lead to violations of Bell-type inequalities, indicating the nonlocal nature of the correlations between qubits. We investigate genuine multiqubit nonlocality in families of entangled multiqubit pure states by analyzing the Svetlichny-Bell inequality that is violated only if all qubits are nonlocally correlated. We derive a relationship between multiqubit entanglement and nonlocality for N-qubit generalized GHZ states, and identify a subset of these states that do not violate the Svetlichny-Bell inequality. The location of the boundary between the states that do violate the inequality and those that don't is the same for all N. On the other hand, all members of a set of states called the maximal slice states violate the Svetlichny inequality and analogous to the 2-qubit case, the amount of violation increases with the amount of entanglement. Our results raise questions regarding the connection between multiqubit entanglement and nonlocality.

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