

Quantum Physics

Teleportation via a mixture of a two qubit subsystem of a N-qubit W and GHZ state

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In this work we study a state which is a random mixture of a two qubit subsystem of a N -qubit W state and GHZ state. We analyze several possibilities like separability criterion (Peres-Horodecki criterion [14,15]), non violation of Bell's inequality [6] ($M(\rho) < 1$) and teleportation fidelity [1,2,3,4] ($F_{\max} > 2/3$) for this state. We also obtain a relationship between N (number of qubits) and p (the classical probability of random mixture) for each of these possibilities. Finally we present a detailed analysis of all these possibilities for $N=3,4,5$ qubit systems. We also report that for $N=3$ and $p \in (.75, 1]$, this entangled state can be used as a teleportation channel without violating Bell's inequality.

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