Open Talk

18th February, 2020 **4:00 PM** **Fermion**

SPEAKER

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TITLE OF THE TALK

Fidelity deviation in quantum teleportation with a two-qubit state

ABSTRACT

Quantum teleportation with an arbitrary two-qubit state can be appropriately characterized in terms of maximal fidelity and fidelity deviation. The former quantifies optimality of the process and is defined as the maximal average fidelity achievable within the standard protocol and local unitary strategies, whereas the latter, defined as the standard deviation of fidelity over all input states, is a measure of fidelity fluctuations. The maximal fidelity for a two-qubit state is known and is given by a simple formula which can be exactly computed, but no such formula is known for the fidelity deviation. In this talk, I will present an exact computable formula for the fidelity deviation in optimal quantum teleportation with an arbitrary state of two qubits derived by us. From this formula, we obtain the universality condition: the condition that all input states are teleported equally well and provide a necessary and sufficient condition for a state to be both useful (maximal fidelity larger than the classical bound) and universal (zero fidelity deviation). We also argue that the universal states are the most desirable ones within the set of useful states. Next, we consider the problem of characterizing two-qubit states that are optimal for quantum teleportation for a given value of some state property. The optimal states are defined as those states that, for given value of the state property under consideration, achieve the largest maximal fidelity and also exhibit minimum fidelity deviation. We provide a complete characterization of optimal states for a given linear entropy, Bell-nonlocality, and concurrence, respectively.

HOST FACULTY

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