CEWQO 2019
Invited

Detection of bounds on quantum channel capacities and entanglement properties from limited local measurements

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Abstract

Quantum capacities represent a central quantitative notion to evaluate the efficiency of a communication channel to convey quantum information. We propose a method to detect lower bounds to quantum capacities of a noisy quantum communication channel by means of few local measurements of complementary properties and by avoiding full process tomography. We develop a similar procedure suited for entanglement detection of bipartite systems and show how to construct optimal entanglement witnesses for two qubits.