LINEAR OPTICS BASED LOCAL DISCRIMINATION OF QUANTUM STATES

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Everyone is invited to attend

ABSTRACT

Experimental implementations of linear optics based quantum information processing tasks are of paramount importance due to ease in implementation, although it often suffers from reliability. We need to, therefore, understand properly what is the ultimate efficiency of any linear optics based quantum information processing task, and thereby, to look for minimally resourceful (as well as implementation friendly) non-linear gadgets or, some other minimally resourceful gadgets (e.g., entanglement in other degrees of freedom, etc.) to achieve 100% (or, nearby) efficiency in the respective implementations. Here, in the present talk, we focus on the corresponding scenario in the context of the well-known issue of LOCC (local quantum operations and classical communication) discrimination of bi-partite quantum states -- shared between distant labs. When we are not concerned about any specific physical implementation of LOCC based state discrimination task (i.e., when we look at the problem just mathematically within the purview of quantum theory), we already have several important examples of sets of LOCC-indistinguishable states as well as sets of LOCC-distinguishable states -- using one or more than one copy of the individual states. We will look at some such examples of sets of LOCC-distinguishable states from the perspective of their implementations via linear optics, and thereby, try to figure out the limitations, if any. We will then briefly discuss about how to overcome such limitations using extra resources.

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