**Fidelity estimation for multiphoton states in linear optics networks**

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Linear optics networks (LONs) are multimode linear optical interferometers constructed with Beam splitters. With a multiphoton input state, the explicit probability distribution of photon number occupations in the output modes of a LON transformation can not be efficiently predicted before experimental implementation of the LON transformation. This leads to the application of Boson sampling, which shows quantum supremacy over its classical counterpart. In this presentation, we will address the reverse question, that is how can we infer the input multiphoton state from the output statistics in LONs. More precisely, we will derive an approach to estimate the closeness between input states and a target multiphoton state in LONs, which is evaluated by the quantum state fidelity. The quantum state fidelity of a testing state will be estimated by state verifiers that are initially employed in quantum state verification. We will construct such state verifiers associated with a set of Pauli measurements for particular multiphoton states in LONs. Exploiting these state verifiers, one can then estimate the quantum state fidelity for multiphoton states in LONs from Pauli measurement statistics without dealing with the Boson sampling complexity.