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Many-boson Quantum Walks on Graphs with Shared Coins

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Quantum walks of particles obeying Bose statistics are introduced. In such a quantum walk the conditional shift operation is performed with the single coin tossing for the whole lattice. An explicit form for the transition probabilities in a single step is derived. This allows to describe the evolution of an arbitrary state and an arbitrary number of steps. This model easily embraces the concepts such as the joint probability, the counting statistics and the high-order correlations. It also presents the computational challenges arising from the exponential increase in the number of basis states entering into the lattice state as a function of the number of quantum walkers and the number of steps. Possible solutions are proposed in some applications of the model to quantum walks on finite graphs.

Level (Hons, MSc, PhD, other)?

PhD

Consider for a student award (Yes / No)?

yes

Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

yes

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