Open quantum random walks

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Open quantum random walks (OQRW) are introduced as a tool for the formulation of dissipative quantum computing algorithms and formulated as quantum Markov chains on graphs. Examples of OQRWs show a rich dynamical behavior. It is shown that on finite graphs OQRWs converge towards a unique stationary state, as is needed in dissipative quantum computing and dissipative state engineering. Furthermore, promising dissipative mechanisms of transport of excitations can be implemented in the formalism, which makes them interesting candidates for the investigation of quantum efficiency.