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# Asymptotic trapping in coined Grover flip-flop quantum walks on general graphs with dynamical percolation

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It is known from previous works that discrete flip-flop quantum walks with the Grover coin on finite graphs can exhibit the phenomenon of asymptotic trapping, where the walker can evade a sink introduced in the graph indefinitely with non-zero probability. This interference phenomenon is caused by so-called trapped states –eigenstates of the walk with limited support, i.e. with zero coefficients for some positions in the graph. It is also known that some of these states remain present in the asymptotic dynamics of the walk after disruption by dynamical percolation –random closing and re-opening of edges in the graph at each time step. In this work we extend a recipe for construction of a basis of the trapped states subspace available previously for finite simple 3-regular planar graphs to all finite simple graphs. We also provide new insights into the role of the position of the sink and its relation to the initial position of the walker, we give general advice how some changes of the graph influence transport, and we support the above by presenting several closed-form formulas for the asymptotic transport probability in dependence on parameters describing the graph.

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