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Self-trapped quantum walks

We study the existence and charaterization of self-trapping phenomena in discrete-time quantum walks. By considering a Kerr-like nonlinearity, we associate an acquisition of the intensity-dependent phase to the walker while it propagates on the lattice. Adjusting the nonlinear parameter (χ) and the quantum gates (θ), we will show the existence of different quantum walking regimes, including those with travelling soliton-like structures or localized by self-trapping.

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