

Title:

Interacting quantum walk on graphs: thermalization and entanglement

Abstract:

We extend quantum walks by introducing an interaction of the particle degrees of freedom with local spins sitting on the nodes of a graph. This system allows us to investigate, in an isolated quantum system, the appearance of a thermal state and its entanglement properties. A modification of the model, in which the spins are on the network edges, exhibit a rich dynamical behavior, including oscillations, relaxation and localization of states.