

A repeated interaction approach to open quantum walks and open quantum Brownian motion

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Open quantum walks are discrete time random walks completely driven by dissipation. It is quite natural to derive them by reduction from a microscopic Hamiltonian for a walker-environment system in a repeated interaction scheme. Open quantum Brownian motion, on the other hand, is known to be a particular continuum limit of open quantum walks. Here we extend the repeated interaction perspective to the open quantum Brownian motion case. We show that a unified repeated interaction approach to both open quantum walks and open quantum Brownian motion is possible. We propose and discuss a quantum optical implementation of open quantum Brownian motion.