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Steady states of Open Quantum Brownian Motion

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Open Quantum Brownian Motion (OQBM) describes a Brownian particle with an additional internal quantum degree of freedom. Originally, it was introduced as a scaling limit of Open Quantum Walks (OQWs). Recently, it was noted, that for the model of free OQBM with a two-level system as an internal degree of freedom and decoherent coupling to a dissipative environment, one could use weak external driving of the internal degree of freedom to manipulate the steady-state position of the walker [Sinayskiy, I., and Petruccione, F. (2016). Fortschr. Phys. doi:10.1002/prop.201600063]. This observation establishes a useful connection between controllable parameters of the OQBM, e.g. driving strengths and magnitude of detuning, and its steady state properties. Although OQWs satisfy a central limit theorem (CLT), it is known, that OQBM, in general, does not. The aim of this work is to derive steady states for some particular OQBMs and observe possible transitions from Gaussian to non-Gaussian behavior depending on the choice of quantum coin and as a function of diffusion coefficient and dissipation strength.

Apply to be
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No

Level for award
 (Hons, MSc,
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N/A

Main supervisor (name and email)
and his / her institution

N/A

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Yes

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