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Quantum Brownian-motion in dissipative collapse models

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Abstract

Continuous Spontaneous Localization (CSL) is the most refined collapse model which describes the localization of spatial wavefunction of macroscopic objects with the destruction of spatial quantum superposition through a nonlinear interaction with the collapse noise. These are not the only distinctive feature of the CSL model with respect to the usual Schrdinger evolution. The action of the noise induces a steady increase of the mean kinetic energy, which diverges on the long time scale, thus leading to a violation with energy conservation principle. In this talk we discuss about a dissipative generalization of CSL model which guarantees a finite energy exchange during the entire system's evolution. This is achieved by introducing a proper non-linear stochastic modification of the Schrdinger equation via the introduction of new operators. These new operators depend on the momentum of the system and describe the action of a dissipative finite-temperature collapse noise. So in this dissipative model there is a continuous localization of the wavefunction, while the mean energy of the system will converge to a finite asymptotic value. Then we will see that this dissipative CSL master equation can be well approximate by the master equation of Standard Quantum Brownian Motion and then will lead to the modified Langevian equations with respect to DCSL model.