

Classical and quantum particles coupled to a vibrational environment

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Abstract : It is possible to model dissipation effects subjected by a particle by interactions between the particle and its environment. This seminal idea dates back to Caldeira-Leggett in the '80ies. The specific case of a particle interacting with vibrational degrees of freedom has been thoroughly investigated by S. De Bièvre and his collaborators. We will go back to these issues in the framework of kinetic equations, and also consider quantum versions of the problem based on couplings with the Schrödinger equation. We are particularly interested in stability issues. We will describe; through rigorous statements and numerical experiments, analogies and differences with the case of a single classical particle and with the standard coupling with the Poisson equation.