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## Going beyond Local and Global approaches for localized thermal dissipation

Identifying which master equation is preferable for the description of a multipartite open quantum system is not trivial and has led in the recent years to the 'local vs. global debate' in the context of Markovian dissipation. We treat here a paradigmatic scenario in which the system is composed of two interacting harmonic oscillators A and B, with only A interacting with a thermal bath - collection of other harmonic oscillators - and we study the equilibration process of the system initially in the ground state with the bath finite temperature. We show that the completely-positive (CP) version of the Redfield equation obtained using coarse-grain and an appropriate time-dependent convex mixture of the local and global solutions give rise to the most accurate CP approximations of the whole exact system dynamics, i.e. both at short and at long time scales, outperforming the local and global approaches.

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