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Title: Quasi-classical Limit of a Spin Coupled to a Reservoir

Abstract: We consider a spin in contact with a bosonic reservoir, whose state contains a parameter interpolating between quantum and classical reservoir features. For energy conserving interactions we study decoherence and markovianity properties of the effective dynamics of the spin for all values of the parameter. Our main finding is that the spin decoherence is enhanced (full decoherence) when the spin is coupled to quantum reservoir states while it is dampened (partial decoherence) when coupled to classical reservoir states. The markovianity properties depend in a subtle way on the classicality parameter and on the finer details of the spin-reservoir interaction. We further examine scattering and periodicity properties for energy exchange interactions.

Joint work with M. Falconi, M. Fantechi, M. Merkli.