

# Repeated interactions via quantum stochastic calculus

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## **Abstract**

We consider the general physical situation of a quantum system interacting with a chain of exterior systems one after the other, during a small interval of time and following some Hamiltonian on the coupled system. We discuss the passage to the limit to continuous interactions; the limiting evolution for the whole system is driven by the solution of a quantum stochastic differential equation. Three different time scales exist; we show that these three time scales correspond to the normal regime, the weak coupling limit and the low density limit, yet their combination produces additional phenomena. We discuss relevant applications of these results.