Collisional-model quantum trajectories for entangled qubit environments

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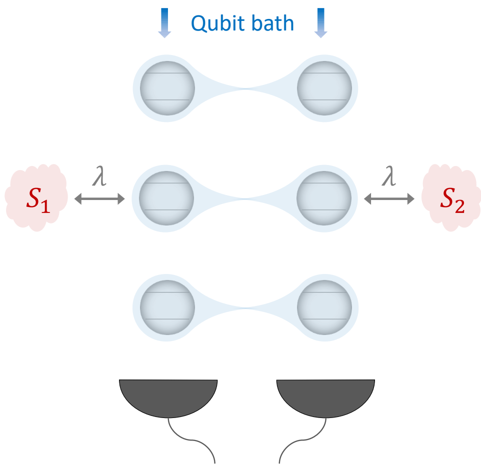
We study [1] the dynamics of quantum systems interacting with a stream of entangled qubit pairs in the weak coupling limit as depicted in the figure. For a large class of two-qubit bath states, we present a detailed framework describing conditional dynamical maps for the system, known as quantum trajectories, that arise when the qubits are measured. Depending on the measurement basis, these quantum trajectories can be jump-type or diffusive-type, and can successively transfer entanglement from the bath qubits other quantum systems. They also exhibit features not present in standard quantum optical trajectories due to the fact that collisional models are not confined by the standard white-noise limit for optical-mode baths. As an example of this formalism, we consider the case of two remote two-level systems, where jump-type quantum trajectories herald the birth and death of entanglement.



[1] Shakib Daryanoosh, Alexei Gilchrist, and Ben Q. Baragiola, *Phys. Rev A (accepted)* (2022).