

We consider a two-level quantum system subject to repeated interactions with an environment. Namely, the interaction of the system and the environment will be switched on and off for a finite number of times. Consider that the evolution of the system and the environment is described by the rather general Hamiltonian

$$\hat{H} = \hat{H}_s + \hat{H}_E + \hat{H}_{SE}, \quad (1)$$

where  $\hat{H}_E$  denotes the free evolution of the environment, which we leave arbitrary.  $\hat{H}_s = \Omega \mathbf{h} \cdot \hat{\boldsymbol{\sigma}}$  is the free Hamiltonian of the two-level system. The spin-environment interaction Hamiltonian is given by

$$\hat{H}_{SE} = \chi(t) \boldsymbol{\alpha} \cdot \hat{\boldsymbol{\sigma}} \otimes \hat{O}. \quad (2)$$

Here  $\mathbf{h} \cdot \hat{\boldsymbol{\sigma}}$  and  $\boldsymbol{\alpha} \cdot \hat{\boldsymbol{\sigma}}$  are Pauli observables in the directions  $\mathbf{h}$  and  $\boldsymbol{\alpha}$  respectively.  $\hat{O}$  is an observable of the environment, that is, a self-adjoint operator that also commutes with all observables of the spin.

Finally  $\chi(t)$  is a switching function that regulates the rate and intensity of the interactions between the two-level system and the environment. Note that outside the support of  $\chi$  the two subsystems evolve independently.