

## Adiabatic theorems for open quantum systems

Philip Grech \*  
pgrech@itp.phys.ethz.ch

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Consider a system whose dynamics is given by a slowly evolving family of generators of a contraction semigroup. Within this framework I shall present two adiabatic theorems.

The first relies on the assumption of a spectral gap and yields an expansion in the parameter measuring the slowness. The structure of the expansion has a geometric meaning entailing a distinction between terms which are local and terms which are non-local in time. The theorem is likewise applicable to closed systems (described by a Hamiltonian) and open systems (described by a dephasing Lindbladian). However, its physical implications are different in the two cases.

If the gap condition is abandoned a second adiabatic theorem can be proved, though without information on the rate of convergence in the adiabatic limit. As before the theorem can be applied to Hamiltonian and dephasing Lindblad evolutions.

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