Open quantum systems: irreversibility and decoherence

The dissipative influence of the environment, represented by one or several reservoirs, on a quantum system relies on a number of specific features regarding the reservoirs and their interaction with the system. The role of weak coupling ($\lambda \sim 0$) and long evolution time (large t) is discussed. The so-called van Hove $\lambda^2 t$ scaling limit is illustrated on a simple example. The resulting Lindblad operators describing the dissipative behavior are discussed in general and on simple cases. Spectral properties ensuring the convergence to a steady state are also presented.