Non-Markovian quantum dynamics: a stochastic Schroedinger equation approach

Abstract:
Open quantum system are usually described in terms of a reduced density matrix. The associated dynamics, in the Markovian case, has the well known Lindblad structure. Non-Markovian dynamics instead are far from being understood. An alternative approach to the analysis of open quantum systems (equivalent to the one based on the reduced density matrix) is provided by stochastic Schroedinger equations. In the Markovian case, the random terms are white in time, hence the Markovian character. By replacing the white noise with a coloured noise, non-Markovian dynamics are obtained. We describe how this approach offers a practical tool describing the non-Markovian evolution of open quantum systems.