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Dynamical decoupling induced renormalization of the non-Markovian dynamics POCHUNG CHEN, National Tsing-Hua University — In this work we develop a numerical framework to investigate the renormalization of the non-Markovian dynamics of an open quantum system to which dynamical decoupling is applied. We utilize a non-Markovian master equation which is derived from the non-Markovian quantum trajectories formalism. It contains incoherent Markovian dynamics and coherent Schrödinger dynamics as its limiting cases and is capable of capture the transition between them. We have performed comprehensive simulations for the cases in which the system is either driven by the Ornstein-Uhlenbeck noise or or is described by the spin-boson model. The renormalized dynamics under bang-bang control and continuous dynamical decoupling are simulated. Our results indicate that the renormalization of the non- Markovian dynamics depends crucially on the spectral density of the environment and the envelop of the decoupling pulses. The framework developed in this work hence provides an unified approach to investigate the efficiency of realistic decoupling pulses. This work also opens a way to further optimize the decoupling via pulse shaping.

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