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Non-Markovian trajectory approach of three-level quantum systems¹ TING YU, JUN JING, Department of Physics and Engineering Physics, Stevens Institute of Technology, Hoboken, New Jersey 07030, USA — The non-Markovian dynamics of a three-level quantum system coupled to a bosonic environment is a difficult problem due to the lack of an exact dynamic equation such as a master equation. We present for the first time an exact quantum trajectory approach to a dissipative three-level model. We have established a convolutionless stochastic Schrödinger equation called time-local quantum state diffusion (QSD) equation without any approximations, in particular, without Markov approximation. Our exact time-local QSD equation opens a new avenue for exploring quantum dynamics for a higher dimensional quantum system coupled to a non-Markovian environment.

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