

Abstract Submitted  
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**Approach to solving spin-boson dynamics via non-Markovian quantum trajectories** ZENG-ZHAO LI, Beijing Computational Science Research Center, CHO-TUNG YIP, Hong Kong Polytechnic University, HAI-YAO DENG, Hong Kong Polytechnic University and National Institute for Materials Science, MI CHEN, Fudan University, TING YU, Stevens Institute of Technology, J. Q. YOU, Beijing Computational Science Research Center, CHI-HANG LAM, Hong Kong Polytechnic University — We develop a systematic and efficient approach for numerically solving the non-Markovian quantum state diffusion equation for an open quantum system that can be strongly coupled to an environment. As an important application, we consider a real-time simulation of a spin-boson model in a strong coupling regime that is difficult to deal with using conventional methods. We show that the non-Markovian stochastic Schrödinger equation can be efficiently implemented as a real-time simulation for this model, so as to give an accurate description of spin-boson dynamics beyond the rotating-wave approximation.

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