Entanglement-Optimal Trajectories of Many-Body Quantum Markov Processes

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In this talk I present a method to solve the equations of motion of open quantum many-body systems. It is based on a combination of generalized wave function trajectories and matrix product states. More specifically, we developed an adaptive quantum stochastic propagator, which minimizes the expected entanglement in the many-body quantum state, thus minimizing the computational cost of the matrix product state representation of quantum trajectories. I illustrate this approach on the example of one-dimensional open Brownian circuit: First, I show that this model displays an entanglement phase transition between area and volume law when changing between different propagators and then I show that our method autonomously finds an efficiently representable area law unravelling.

References

[1] Tatiana Vovk and Hannes Pichler, arXiv:2111.12048 (2021)

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