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Development of reinforced learning optimal control based on ML-MCTDHX LUSHUAI CAO, MINKANG ZHOU, YUTING TAN, XIANG DI, Huazhong University of Science Technology — In this poster, we present our recent development of the optimal control based on the reinforced learning, on top of the numerical engine of ML-MCTDHX. The optimal control has become a powerful tool in various fields for improving the fidelity of the state transformation. An efficient optimal control mainly relies on two key ingredients: One is the powerful numerical engine which are cable to perform numerical simulation on a complicate setup, and the other is the efficient optimization of the parameters of the Hamiltonian. In our routine, we combine ML-MCTDHX, which is an ab-initio numerical tool capable to handle strongly correlated multiple degrees of freedom systems, and the reinforced learning optimization scheme, which has been proved to efficiently perform optimization in a high-dimension parameter space. We will demonstrate the efficiency of the routine with a state preparation in an ultracold atom setup.

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