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## Digital simulation of many-body non-Markovian dynamics

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**Abstract content (Max 300 words) (Formatting & Special chars)**

We present an algorithmic method for the digital quantum simulation of many-body locally-indivisible non-Markovian open quantum systems. It consists of two parts: Firstly, a Suzuki-Lie-Trotter decomposition of the  $k$ -local global system propagator into the product of strictly  $k$ -local propagators, which may not be quantum channels, and secondly, an algorithmic procedure for the implementation of the strictly  $k$ -local propagators through unitary operations and measurements on a dilated space. By providing rigorous error bounds for the relevant Suzuki-Lie-Trotter decomposition, we are able to analyse the efficiency of the method, and connect it with an appropriate measure of the local indivisibility of the system. In light of our analysis, the proposed method is expected to be experimentally achievable for a variety of interesting cases.

**Apply to be considered for a student award (Yes / No)?**

Yes

**Level for award (Hons, MSc, PhD, N/A)?**

Ph.D.

**Main supervisor (name and email) and his / her institution**

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**Would you like to submit a short paper for the Conference Proceedings (Yes / No)?**

No

**Please indicate whether this abstract may be published online (Yes / No)**

Yes

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