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Towards a hybrid operating system for quantum computers

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We present Qibo, a new open-source framework for fast evaluation of quantum circuits and adiabatic evolution which takes full advantage of hardware accelerators, quantum hardware calibration and control, and large codebase of algorithms for applications in HEP and beyond. The growing interest in quantum computing and the recent developments of quantum hardware devices motivates the development of new advanced computational tools focused on performance and usage simplicity. In this work we introduce a new quantum simulation and control framework that enables developers to delegate all complicated aspects of hardware or platform implementation to the library so they can focus on the problem and quantum algorithms at hand. As example for HEP applications, we show how to use Qibo for the determination of parton distribution functions (PDFs) using DIS, fixed-target DY and LHC data, and the construction of generative models applied to Monte Carlo simulation. We conclude by providing an overview of the variational quantum circuit models included in Qibo.

In-person participation

Yes

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