Contribution ID: **30** Type: **Contributed Talk (15 min)**

Depth requirement reduction using sequential execution

Monday 19 September 2022 10:00 (15 minutes)

State-of-the-art quantum computers cannot run arbitrarily long quantum algorithms since their decoherence time is limited. The quality of the results unavoidably decays as the execution time increases. This work introduces a method to reduce the depth requirements of a circuit to be executed in a quantum device. The method consists in splitting the circuit in several stages to be applied sequentially. The output of one stage is the input of the next one. All outputs are recombined at the end to estimate the results of the original algorithm. The output of each stage should have a small number of non-neglectible outcomes to avoid an exponential computational cost. With this purpose, a variational reducer is added to the cut of the circuit. The optimization procedure of the reducer is done activating the circuit adiabatically. The method is numerically simulated for estimating the probability of sampling a bitstring in the outcomes of a quantum circuit split in few stages.

Author: PÉREZ SALINAS, Adrián (Leiden University)

Co-authors: Mr DRAŠKIĆ, Radoica (Leiden University); Dr TURA I BRUGUÉS, Jordi (Leiden University); Dr DUNJKO, Vedran (Leiden University)

Presenter: PÉREZ SALINAS, Adrián (Leiden University)

Session Classification: Optimization and Control

Track Classification: Optimization and Control