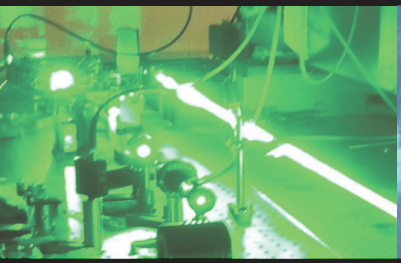
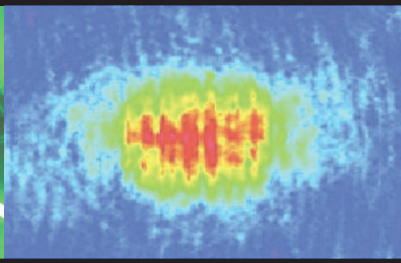
Joint UoC/FORTH AMO Seminar





02 December 2020, 16:30, Online Seminar

Master Thesis Presentation

Analysis of basic quantum protocols in the IBM quantum experience platform: estimation of π

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In this project we aim to understand and implement a few basic quantum algorithms and protocols using IBM-Qiskit in the IBM Quantum Experience Platform. We also estimate the value of π using one of the sub-routines called the quantum phase estimation algorithm. Further studies on the execution time of the algorithm for the estimation of π in the simulator were conducted. We observe that, because the actual device is noisy, it gives random results not close to the actual value of π. Also, as the number of gates in the circuit increases, the error is prone to increase. The execution run-time was studied to understand if this would be a satisfactory method to e stimate the value of π on an actual quantum device. If we are unable to run it well on a simulator, it is unlikely that it will work well in a quantum computer. Nevertheless, the simulator does give a value of π accurate to about four decimal places. The number of qubits required to obtain that level of accuracy is18. Currently, IBM only gives public access to 15-qubit devices. Even in this case, it is observed that the circuit is too long to run in the actual quantum device. A detailed study of the issues associated with running this algorithm was conducted, along with the explanation of the results of several basic quantum protocols and algorithms.

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