Qiskit: Open-Source Quantum Development, an introduction

Organisers

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Abstract

Qiskit is open-source software for working with quantum computers at the level of circuits, pulses, and algorithms. Additionally, several domain specific application API's exist on top of this core module.
Qiskit core compiles and optimizes circuits before running. It includes several modules to create and transform quantum circuits. These transformations are part of the compilation process and Qiskit includes several tools to customize it.
In this workshop we are going to dive deep into Qiskit core modules. We will see how to easily design experiments and run them on simulators (with simulated noise) or real quantum computers. In the second part we will have a look at the compilation internals and how to customize the pipeline for different needs. We will then use all of these concepts in the context of a quantum algorithm.
For that, participants will sign up in IBM Quantum and use the IBM Quantum Lab tool, an environment that provides access to quantum computers in the cloud and where Qiskit is already installed and up to date.

Goals of the Workshop

- Learn how to program with Qiskit core
- Learn about the modules included in Qiskit core
- Being able to customize a compilation pipeline
- Being able to run quantum circuits on simulators or real hardware

Schedule of the Tutorial

10:30-11:00 Intro IBM Quantum lab and Qiskit modules
11:00-11:30 Building Circuits with multiple components
11:30-12:30 Compiling circuits
12:30-13:30 Running circuits and applications

Prerequisite from Participants

Basic Python programming skills, browser, internet connection, being registered at https://quantum-computing.ibm.com/