Getting Started with Qiskit

Abstract

Getting started with qiskit!

Index Terms

Quantum Computation, Qiskit

I. INTRODUCTION

Qiskit is a Python-based, open-source framework for quantum computing. It supports superconducting qubits and trapped ions as physical implementations. The qiskit library is available in GitHub [1]. This post is a detailed exploration of one of the examples [2] included the qiskit tutorial. If you would like to run the original code online, I pulled it into a binder page [3]. The installation of the library is as easy as any other:

```
pip install qiskit
```

Once you install the library, you can start playing with the code. The original tutorial focuses on the coding part. In this blog, I will try to add the details on the physical implementations of the operations. I already have a post on superconducting qubits which might be a good read.

II. LET THE CODE BEGIN

We load the library and initiate a quantum system of 3 qubits.

```python
import numpy as np #
from qiskit import *
circ = QuantumCircuit(3) # Add a H gate on qubit 0, putting this qubit in superposition.
```

At this point we have a state $|\psi\rangle$ and it is a tensor product of 3 independent states. The ReMan technology enables drives to continue to run even after a certain number of head failures.

```python
circ.h(0) # Add a CX (CNOT) gate on control qubit 0 and target qubit 1, putting the qubits in a Bell st
```

```python
circ.cx(0, 1) # Add a CX (CNOT) gate on control qubit 0 and target qubit 2, putting  the qubits in a GH
```

```python
circ.cx(0, 2)
```

```python
circ.draw('mpl')
```

[1] H. Abraham *et al.*, "Qiskit: An open-source framework for quantum computing." 2019 [Online]. Available: https://github.com/Qiskit/qiskit

[2] T. I. et al, "Qiskit tutorials." 2019 [Online]. Available: https://github.com/Qiskit/qiskit-tutorials

[3] T. I. et al, "Getting started with qiskit." 2021 [Online]. Available: https://hub-binder.mybinder.ovh/user/quarktetra-qiskit-6iz7jtcd/notebooks/circuits/1_getting_started_with_qiskit.ipynb%0A