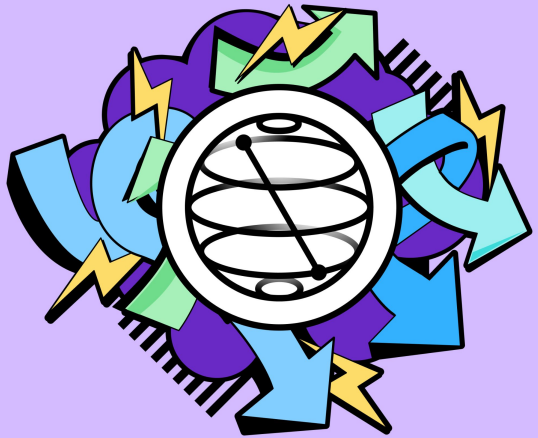
Qiskit | Fall Fest



Venezuela (Universidad Simón Bolívar) - Reto

En línea del **28 de octubre al 5 de noviembre**

Apoyado por COF Alumni USB

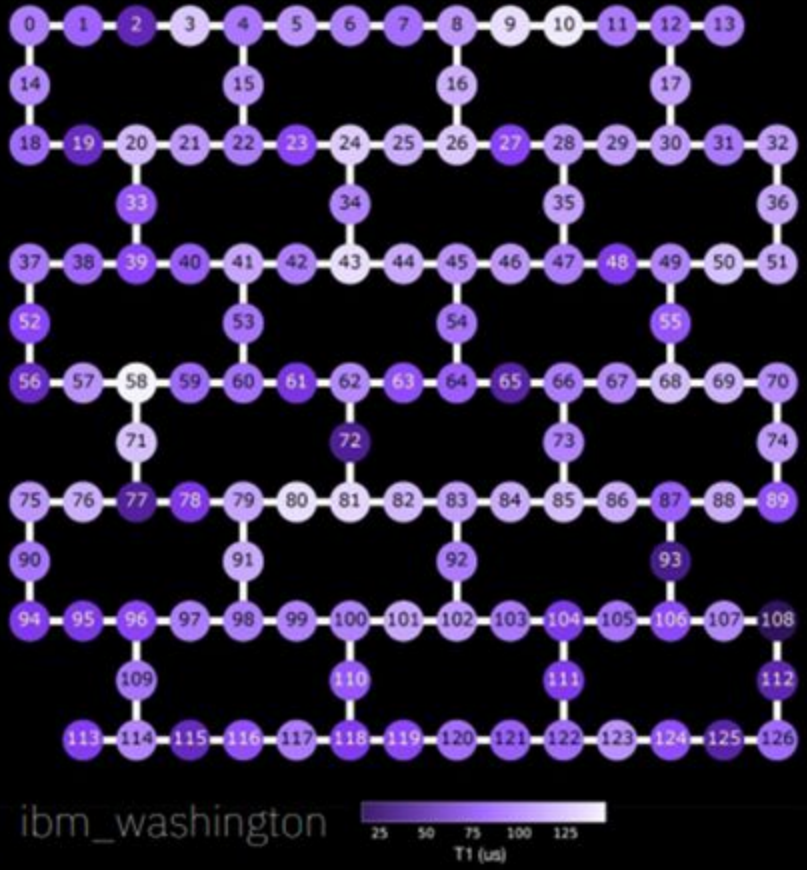
Tutorial Qiskit

Qiskit | Fall Fest

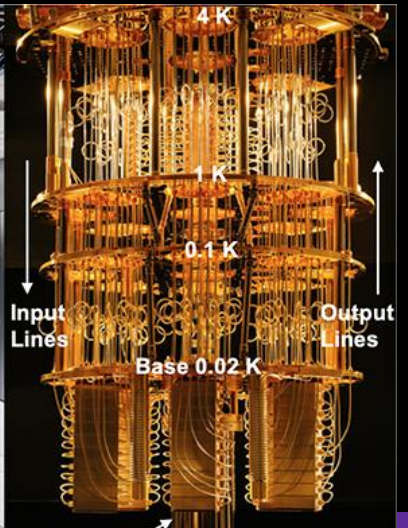
¿Qué es Qiskit?

- Es un módulo de Python
- Es de código abierto y colaborativo
- Enfocado en computación cuántica, experimentos y aplicaciones cuánticas
- Por IBM

Procesadores de IBM



IBM **Quantum**
Eagle Processor
127 qubits



Qiskit Modules

High level applications

Qiskit Nature
For applications relating to simulating quantum mechanical systems and natural phenomena.

Qiskit Finance
For applications relating to financial modeling.

Qiskit Optimization
For applications relating to optimization problems.

Qiskit Machine Learning
For applications relating to machine learning.

Low level applications

Qiskit

Qiskit Metal
For designing quantum hardware and processors.

Qiskit Dynamics
For building, transforming, and solving time-dependent models of quantum systems.

Qiskit Experiments
For running quantum experiments with a library of characterization, calibration, and verification experiments.

Core Capabilities

Qiskit Terra
For building and transforming quantum circuits and operators at the level of gates or pulses.

Simulator

Qiskit Aer
For simulating quantum circuits on classical hardware.

Hardware providers

IBM
IBM Quantum systems

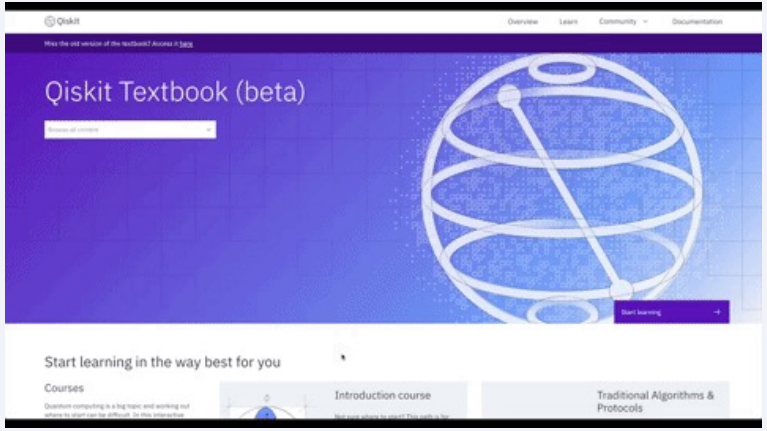
AQT
AQT systems

IonQ
IonQ systems

Qiskit can connect to many other systems

Qiskit textbook

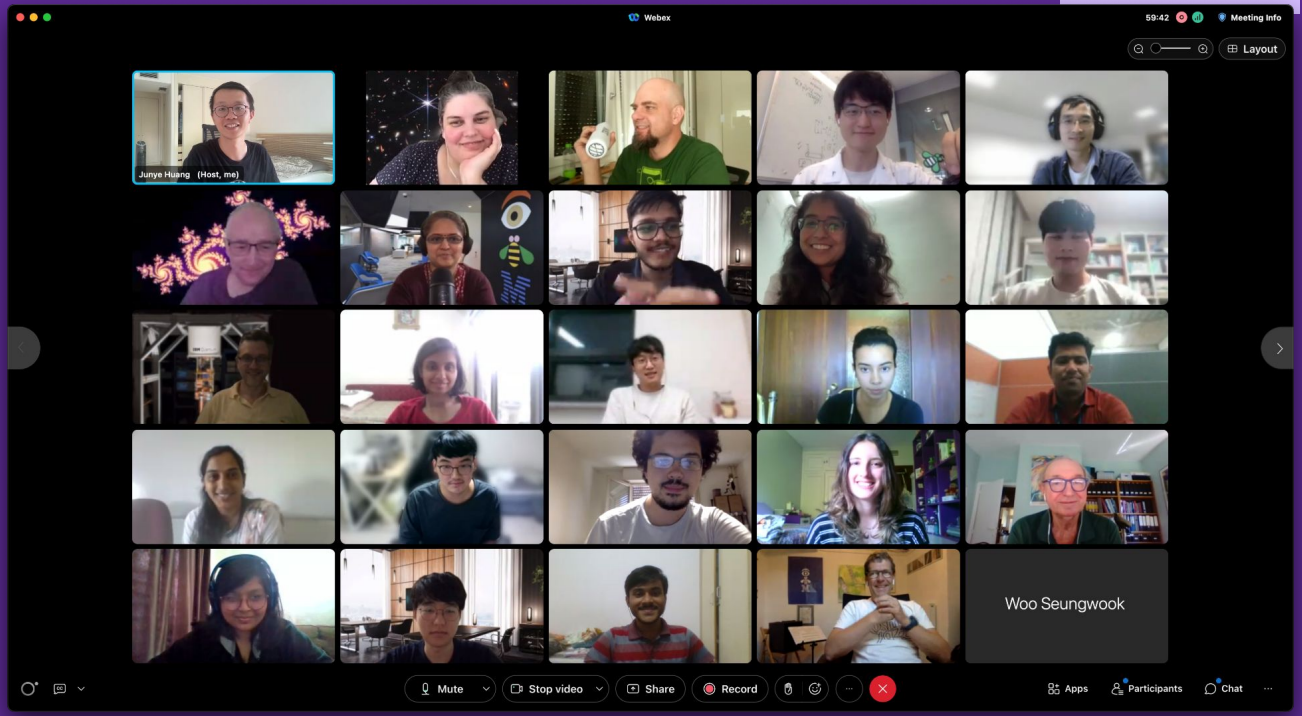
The Qiskit textbook (learn.qiskit.org) is an open-source, university-level quantum algorithms / computation course with Qiskit code implementations and interactive features



Qiskit
Overview
Learn
Community
Documentation
Miss the old version of the textbook? Access it here
Qiskit Textbook (beta)
Browse all content
Start learning
Start learning in the way best for you
Courses
Quantum computing is a big topic and working out where to start can be difficult. In this interactive textbook, the content is organised into courses with clear prerequisites and end goals. If you're looking for something specific, you can browse all content, and if you can't find what you're looking for you can ask the community on Slack.
Introduction course
Not sure where to start? This path is for you. This introduction is aimed at audiences from all backgrounds. Whether you're keen to start your journey into quantum computing, or just curious as to what it's all about, this course will take you from zero to one, without the hand waving.
Go to this course
Quantum machine learning
Want to learn about this exciting, developing field? If you're familiar with quantum computing basics, this course will give you a primer on machine learning, walk you through key concepts, and bring you up to speed with recent developments.
Go to this course
Summer schools
The Qiskit Global Summer Schools are one-of-a-kind sequences that takes students from beginner level to solving advanced quantum problems on a quantum computer. These two-week courses are designed to empower the next generation of quantum developers with the knowledge to explore quantum applications on their own.
Quantum Computing & Quantum Machine Learning (2021)
Designed to empower the next generation of quantum researchers and developers with the skills and know-how to explore quantum applications on their own. Starting with an introductory "crash course" on quantum computing, the materials continue to dive into and explore one key area: quantum machine learning.
Go to this resource
Introduction to Quantum Computing and Quantum Hardware (2020)
This introduction to the world of quantum computing explores key quantum algorithms, as well as the quantum hardware designed to run these algorithms. These lectures were first released as part of a two-week intensive summer school in July 2020.
Go to this resource
University supplements
Are you teaching a course on quantum computing? Qiskit provides freely available materials to enhance your course.
Labs
This set of labs provides 7 different exercises you (or your students) can use to investigate the behaviour of current quantum computers and practice your Qiskit coding skills.
View resource

Comunidad de Qiskit

- Investigación científica
- Desarrollo de herramientas de programación
- Desarrollo de tecnología
- Aprendizaje
- Eventos para todo público
- Desafíos y entrenamiento
- Divulgación



Qiskit Advocates 2022

¡Tú puedes formar parte! Únete al Slack

Physics REBoot Venezuela

Quantum Information Science and Technology

Abril 2022

En colaboración con:

The Abdus Salam International Centre for Theoretical Physics
Physics Without Frontiers

IAEA

¡Contenido accesible en YouTube!

Bits clásicos

72 bits son necesarios para escribir “Venezuela”

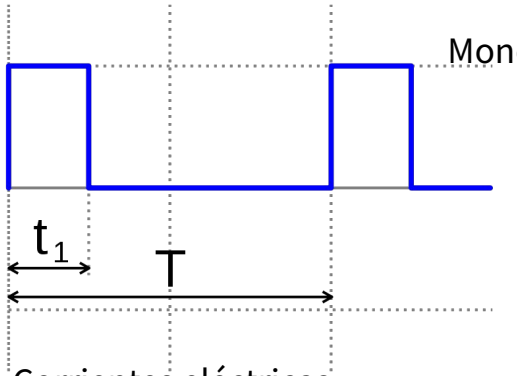
Son la unidad básica de información

1,0

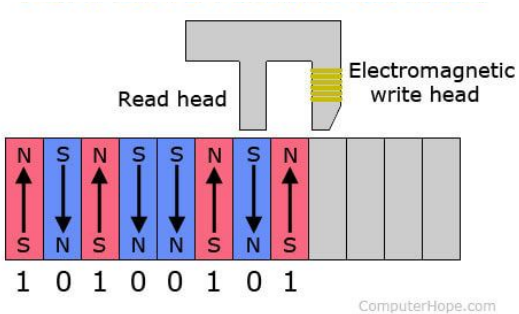
Moneda

-- .-

Morse



Corrientes eléctricas



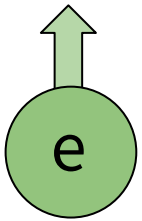
Cintas magnéticas

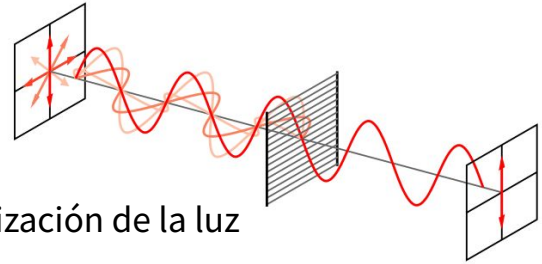
¿Que es un qubit?

Sólo 6 qubits son necesarios para escribir “Venezuela”

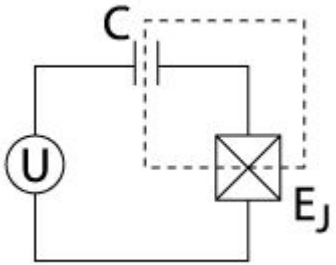
Son sistemas cuánticos con dos posibles estados

Espín





Polarización de la luz



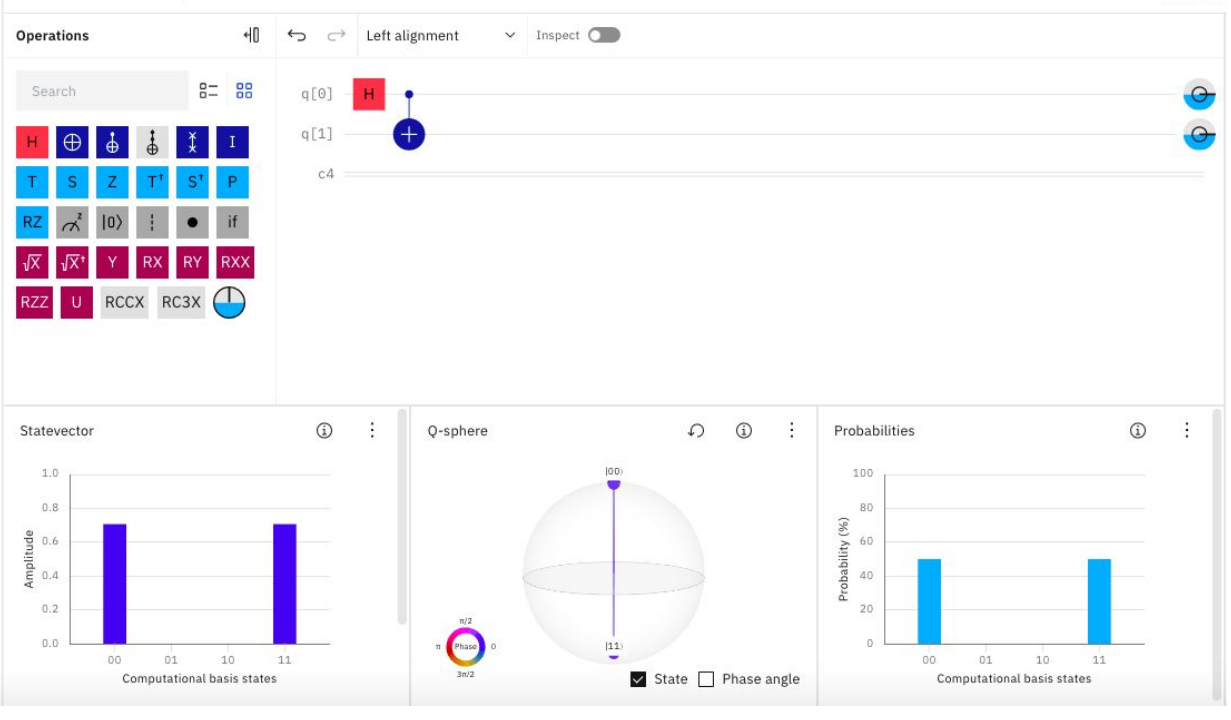
Circuito con dos estados

Que pueden estar en superposición

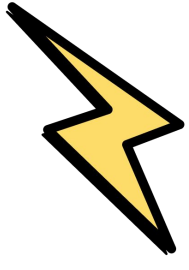
$$|\psi\rangle = z_0|0\rangle + z_1|1\rangle$$

IBM Quantum experience

https://quantum-computing.ibm.com/



- **Edición interactiva de circuitos cuánticos**
- **Plataforma en línea para utilizar Jupyter Notebooks**
- **Acceder a procesadores cuánticos reales**



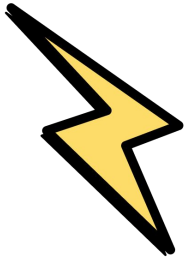
Recomendaciones

- Inscribirse a **https://quantum-computing.ibm.com/**
- Descargar la prepa de Qiskit del Physics Reboot QIP 2022: https://github.com/COFAlumni-USB/Physics-REBoot-Quantum-Information-Processing/blob/main/Tutorials%20HandsOn/PhysicsReboot_prepaQiskit.ipynb

  Y ejecutarlo en IBM Quantum Lab

- Buscar otros tutoriales en Qiskit Textbook y en Qiskit Documentation

¿Dudas? Deja tu pregunta por Discord



¿Preguntas?