Welcome to Quantum Cuisine

An exclusive culinary experience where we pair quantum computing with wine tasting.

Appetizer - Quantum Terminology

Before we dive into the main course, let's familiarize ourselves with some quantum lingo.

Qubits

what it is and how it's controlled

Superconducting:

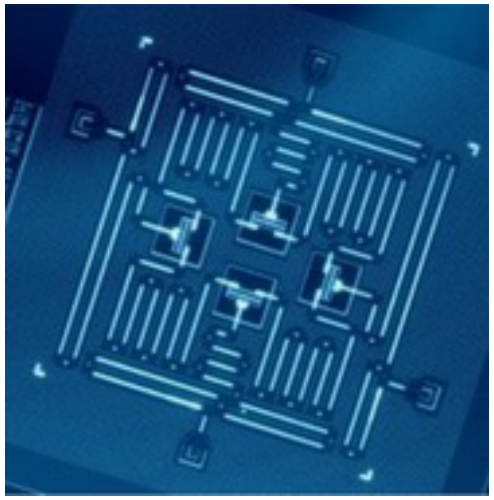
- circuits that can carry an electric current without resistance
- microwave pulses

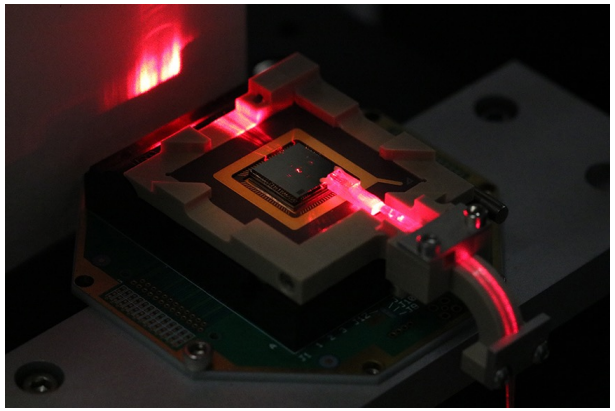
Trapped Ion:

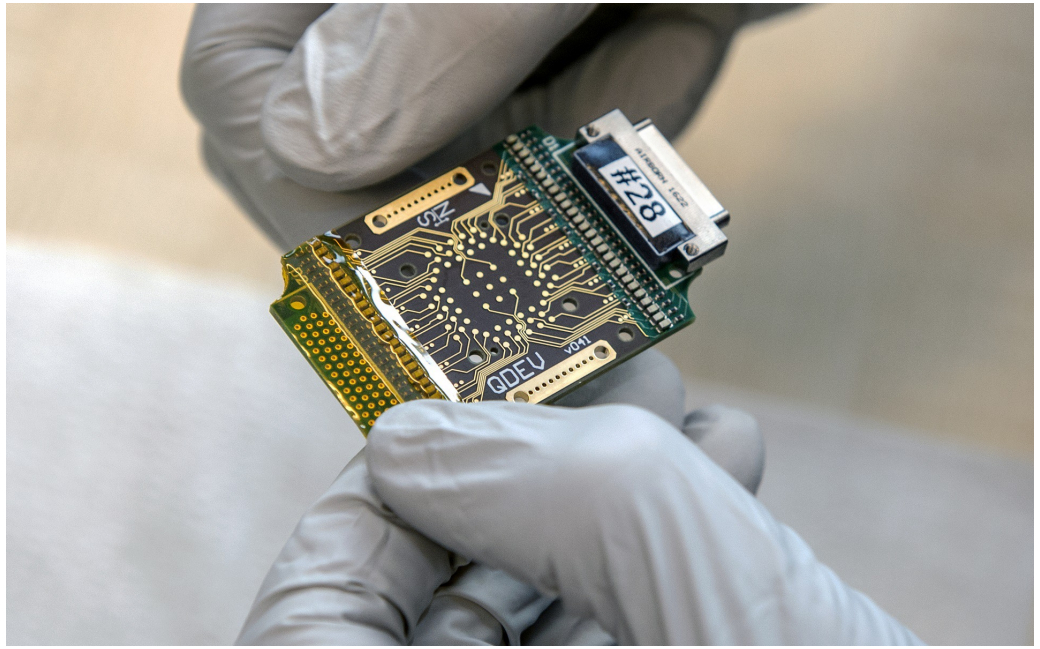
- individual ions that are trapped and isolated in electromagnetic fields
- lasers

Topological:

- anyons or other exotic quasi-particles
- "braiding" the particles around each other in a specific pattern







Mechanics

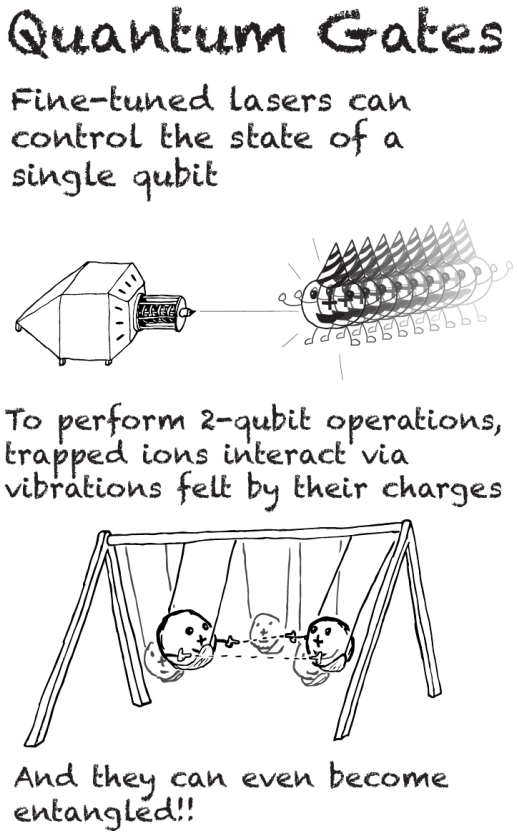
Superposition:

the ability of a quantum system to exist in multiple states simultaneously

a superposition of 0 and 1 is not both 0 and 1, neither 0 nor 1, not 0, and not 1

Entanglement:

a physical resource that allows qubits to be in correlated states, necessary for certain quantum algorithms and protocols



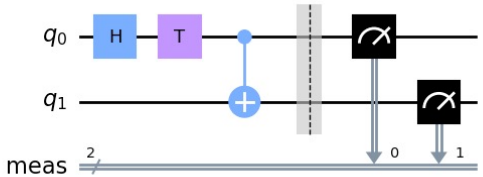
Software

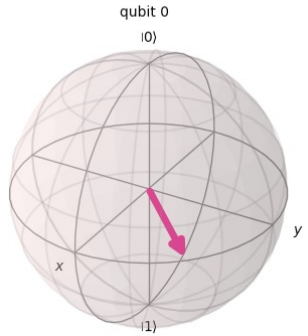
- Qubit
  - the quantum analog of a classical bit, capable of existing in a superposition of states
- Quantum Gate
  - an operation that changes the state of a qubit or set of qubits, analogous to a logical gate in classical computing
- Quantum State
  - the complete description of a quantum system, usually expressed as a wavefunction or density matrix
- Measurement
  - the process of observing a quantum system, causing it to collapse into one of its basis states
- Bloch Sphere
  - a graphical representation of the state space and state vector of a single qubit
- Quantum Circuit
  - a sequence of quantum gates and measurements that performs a specific computation
- Quantum Algorithm
  - a step-by-step procedure for solving a problem using quantum computing

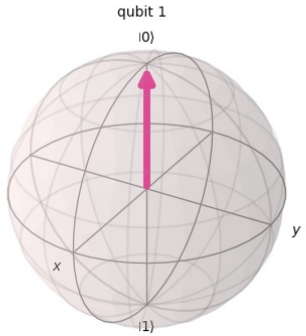
Qiskit

NVIDIA
CUDA QUANTUM

Cirq







Starter – A simple quantum circuit

Comes with a side of visualizations

Second dish – Parameterized circuits

Pair your circuits with any angle you'd like!

Main dish - quantum optimization

Enjoy wine while we have quantum tell us how much to enjoy it

Optimizer App

Or you can order to-go and have all the food prepared and delivered

Dessert

1. Trapping Ions for Quantum Computing – Diana Prado Lopes Aude Craik
2. Qiskit Textbook – IBM Quantum
3. Quantum Computing: An Applied Approach – Jack Hidary