Qiskit Fall Fest2025

Session 1:
Welcome and Running the First Quantum Circuit

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Sessions (Oct 20 - Nov 10)

- **Session (1) Oct 20 :** Introduction and running the first quantum circuit
- **Session (2) Oct 27 :** Building & Simulating Quantum Circuits
- **Session (3) Nov 3 :** Introductory Algorithms (Deutsch–Jozsa, Grover's Search)
- **Session (4) Nov 10 :** Mini-Hackathon & Showcase

Why are we interested in quantum computing?

1. Hardware challenge in building smaller nanochips

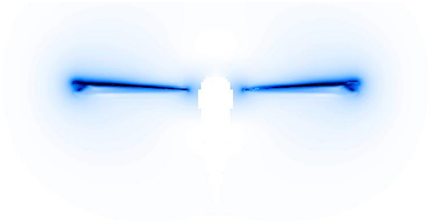
2. Classical computers cannot simulate efficiently quantum systems

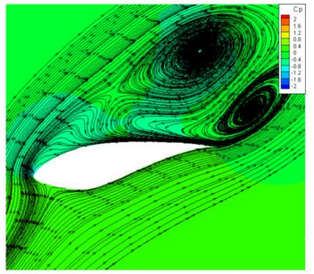
3. Information is physical

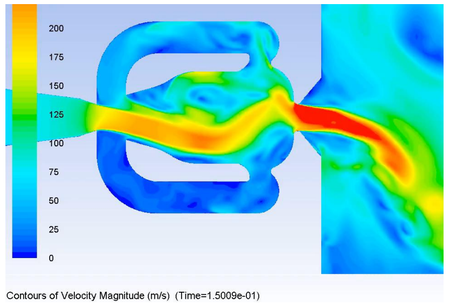
4. Rapid Quantum Hardware developments

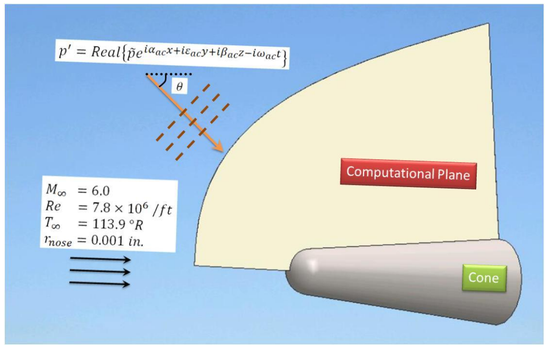
Research Areas (Kara Lab)

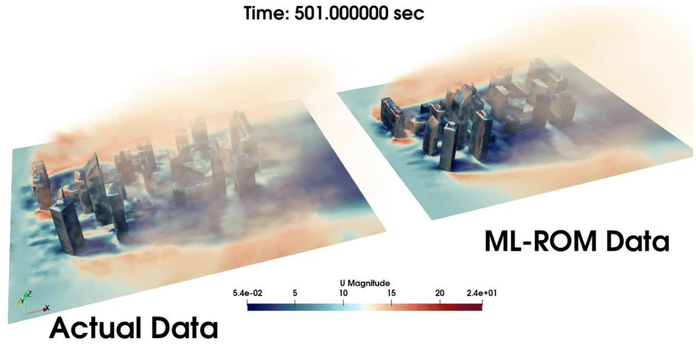
- Hypersonic boundary-layer transition (NASA Langley RC)
- Supersonic hot jet simulations for aeroacoustics (NAVAIR)
- Flow separation control (Georgia Tech, KU, KAIST)
- Sikorsky S-76 rotor in over (NASA HVAB, UW)
- Safe Wind-Aware Navigation for sUAS (NSF)
- **Blunt-Body Dynamic Stability of Entry, Descent, and Landing (EDL) Vehicles (NASA Ames RC)**

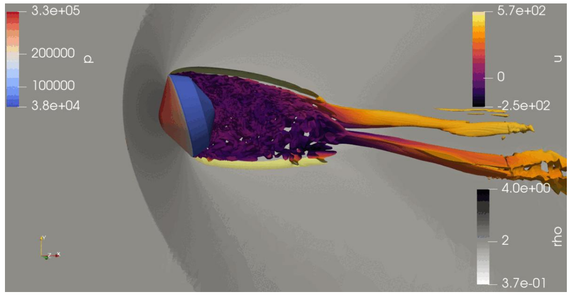


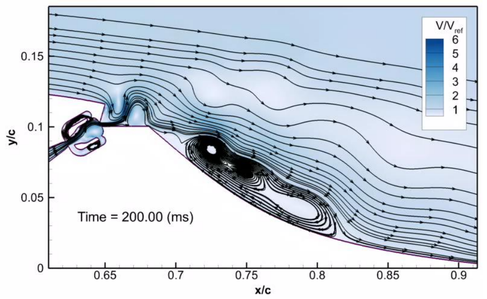


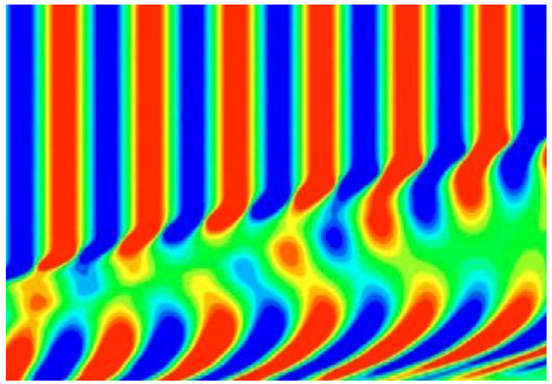


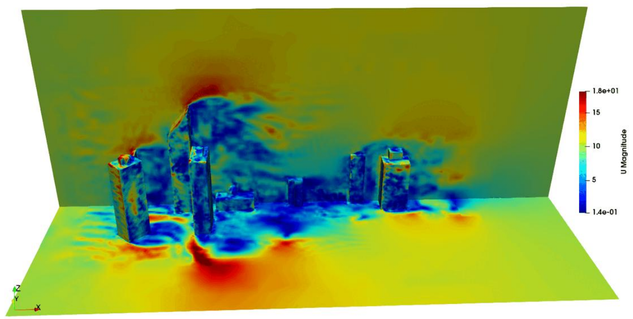


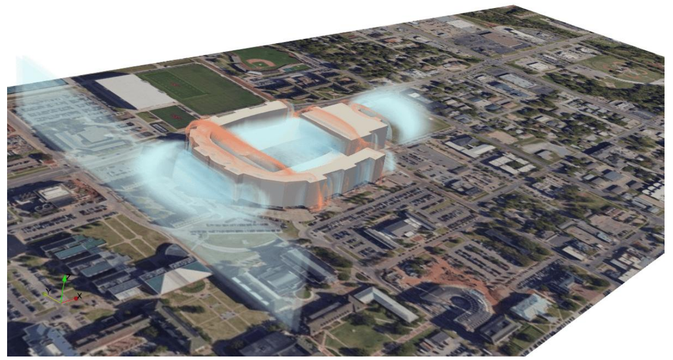


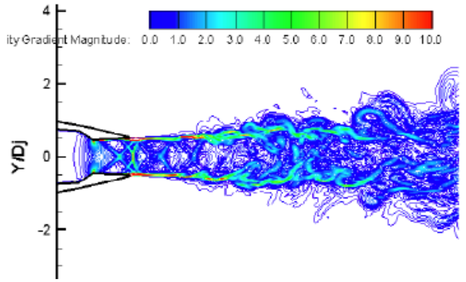












Utilizing National Computational Resources in Our Research Lab

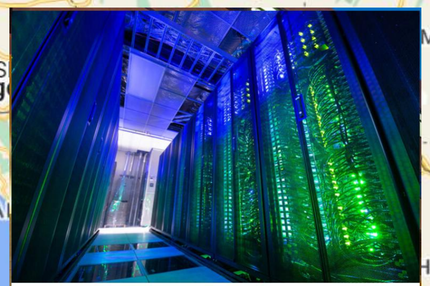
NASA NAS

Hardware challenge of building classical computers

Bridges-2

Pittsburgh Supercomput...

OSU - PETE SUPERCOMPUTER



SDSC Deploys 'Expanse' Supercomputer

Classical Bit

Only two possible states

0 and 1

Like the two faces of a coin!

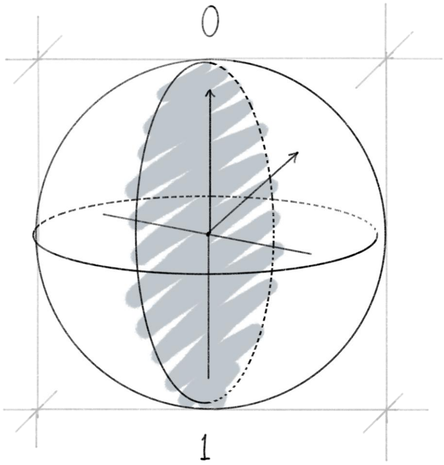
Processes information sequentially

Qubit

Quantum bit → Qubit

$|0\rangle$ and $|1\rangle$

And any linear superposition of the two!



Allows quantum computers to process information in parallel

About Qiskit Fall Fest

Qiskit is an open-source quantum information science (QIS) Python package that simulates quantum circuits which can be run on a real quantum computer.

In this year’s event, we will guide you through running quantum circuits using Qiskit.