XANADU

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About

Xanadu's mission is to build quantum computers that are useful and valuable to people everywhere.

OVERVIEW

Xanadu Quantum Technologies Inc. is a quantum computing company based out of Toronto, Canada. They are known for creating cloud-accessible photonic quantum computers. They have built open-source software for quantum machine learning through the development of PennyLane. Xanadu is uniting exceptional minds from all corners of the world to build something extraordinary.

PHOTONIC CHIPS

Xanadu technology uses photonics; the fastest path to scalable, robust, and practical quantum computers. Their X-Series Chips are made of silicon nitride. A photonic chip that isolates light has the potential to end size restrictions in quantum computing.

PENNYLANE SOFTWARE

PennyLane is the first library for quantum machine learning and integrates with the most popular quantum devices such as ones from Google, Xanadu, IBM, AWS, and many more. It uses hybrid models, connecting quantum hardware to pytorch, tensorflow, and numpy.

QUANTUM CLOUD

Xanadu has a fully managed quantum cloud service and offers direct access to Xanadu's photonic CPU. Xanadu prides itself on **Strawberry Fields**, a simulator that allows quantum developers to design, optimize, and utilize photonic quantum algorithms without the need of expert knowledge.

```python
import pennylane as qml
from pennylane import numpy as np

# create a quantum device
dev = qml.device("default.qubit", wires=1)

# a quantum node
@qml.qnode(dev)
def circuit(phi1, phi2):
    qml.RX(phi1, wires=0)
    qml.RY(phi2, wires=0)
    return qml.expval(qml.PauliZ(0))

# classical processing
def cost(x, y):
    return np.sin(np.abs(circuit(x, y))) - 1

# calculate the gradient
dcost_fn = qml.grad(cost)
```

XANADU'S COMPETITIVE EDGE

Xanadu uses a special qubit, where they use a concept called continuous variables. Instead of only three states like other qubits, conceptually, if you continue to add more states of differing values, you will eventually have a continuous set of numbers for sampling. Xanadu's roadmap predicts that they will reach 1 million qubits in the next decade.