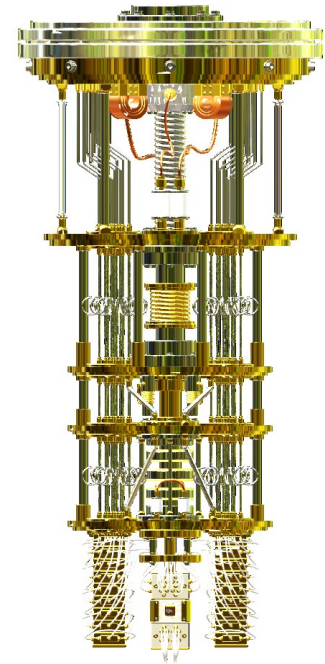
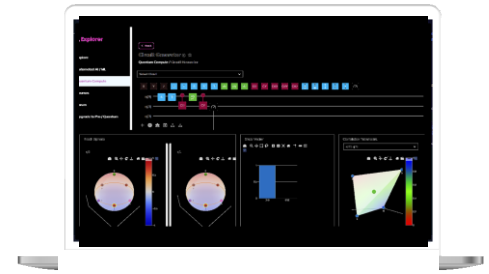
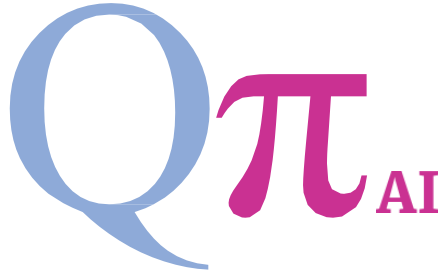


AI & Quantum Vertically Integrated.

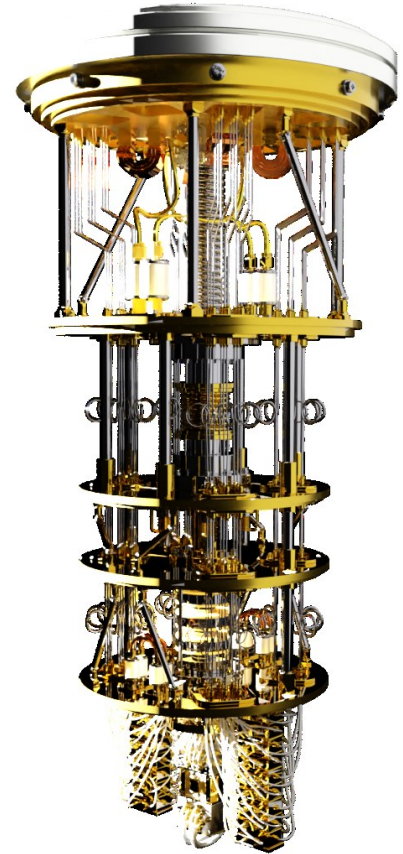




QpiAI: Quantum + AI

vertically integrated

- Building solutions for complex computational problems using AI & Quantum Computing technology
- Building **algorithms, software, hardware, applications**, & QCaaS
- Enabling enterprise quantum adoption for next-level applications
- 10 patents filed and 1 granted



Team QpiAI : Building technology for next level applications



Dr. Nagendra Nagaraja
(Founder & CEO)

Ph.D. in AI
Coventry UK



Dr. Amlan Mukherjee
(Senior Director Technology)

Ph.D. in Physics
TIFR Mumbai



Dr. Arun Sehwat
(Director Quantum Algorithms & Theory)

Ph.D. in Quantum Computing, NUS Singapore



Dr. Manjunath RV
(Senior Director Quantum Hardware)

Ph.D. in Micro-electronics, TU Delft, The Netherlands



Lakshya Priyadarshi
(Director Quantum Algorithms & Software)

B.Tech in Computer Science, AKTU



Sachin Kumar
(Senior Director AI Technology)

B.Tech in Control Engineering, NIT Trichy

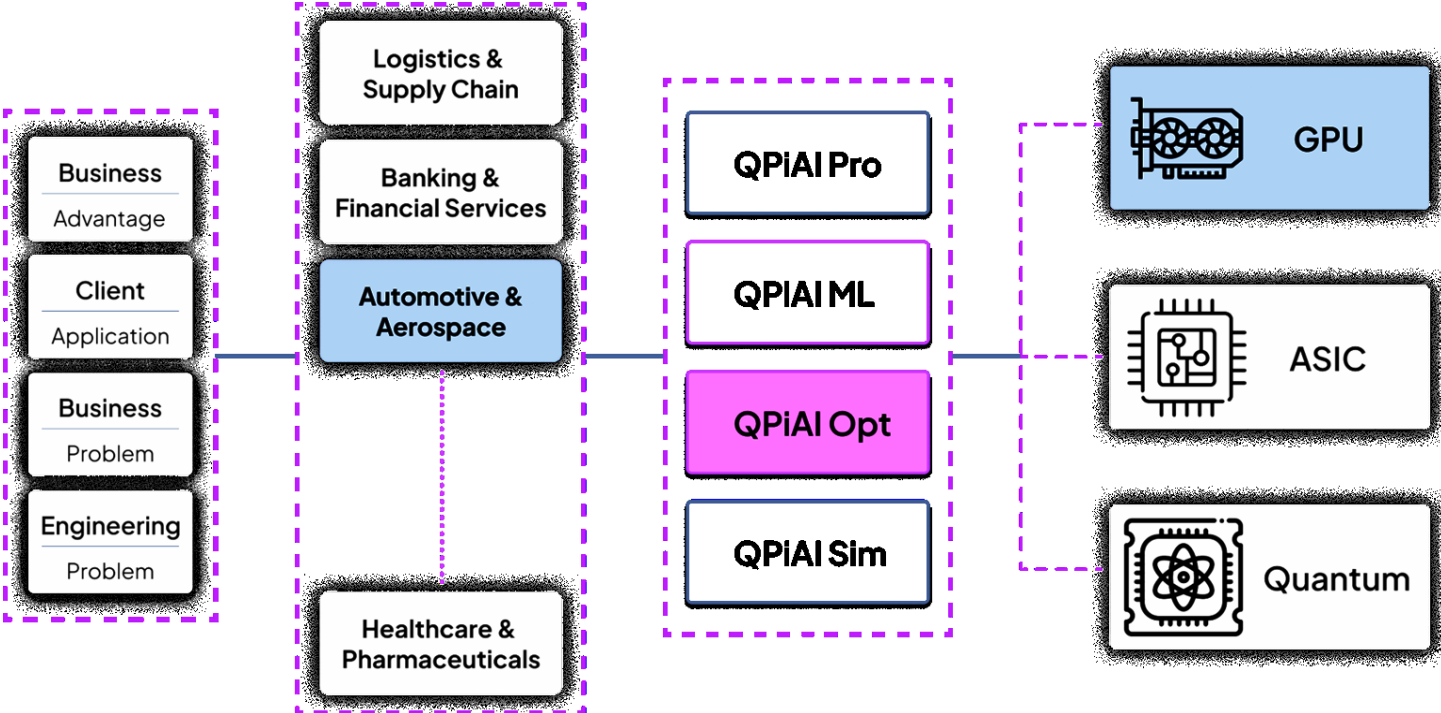


Dr Arpit Jain
(AI Practitioner)

PhD in Electronics Engineering, UPES Dehradun

- QpiAI is a part of Qpi Technology
- 40+ strong engineering team focused on technology and product building
- 10 patents filed for QpiAI; 20 patents filed, 1 granted across Qpi Technology
- 13 Ph.D.s working on algorithms, processors, and devices at the group level
- Advisors from IISc Bangalore, HRI Allahabad, and Oxford University

QpiAI Quantum Solutions and Integrations Approach



QpiAI

QpiAI Quantum Solutions

QpiAI
Explorer



Circuit
Simulation

QpiAI Opt



Quantum
Optimization

QpiAI ML



Quantum
Machine Learning

QpiAI Sim



Quantum
Enhanced Simulation

QpiAI Quantum Impact across Industries



- QpiAI's expertise on quantum technology enables customers to accelerate on quantum adoption, discover quantum utility, and capitalize on them in the near-term.
- Fully Integrated Quantum Compute as a Service via Cloud.
- Future roadmap to integrate with Quantum Data Center



Logistics
& SCM



O&G, Energy
and Materials



Financial
Services



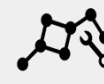
Automotive
Manufacturing



Power & Grid
Infrastructure



Transportation
& Smart Cities



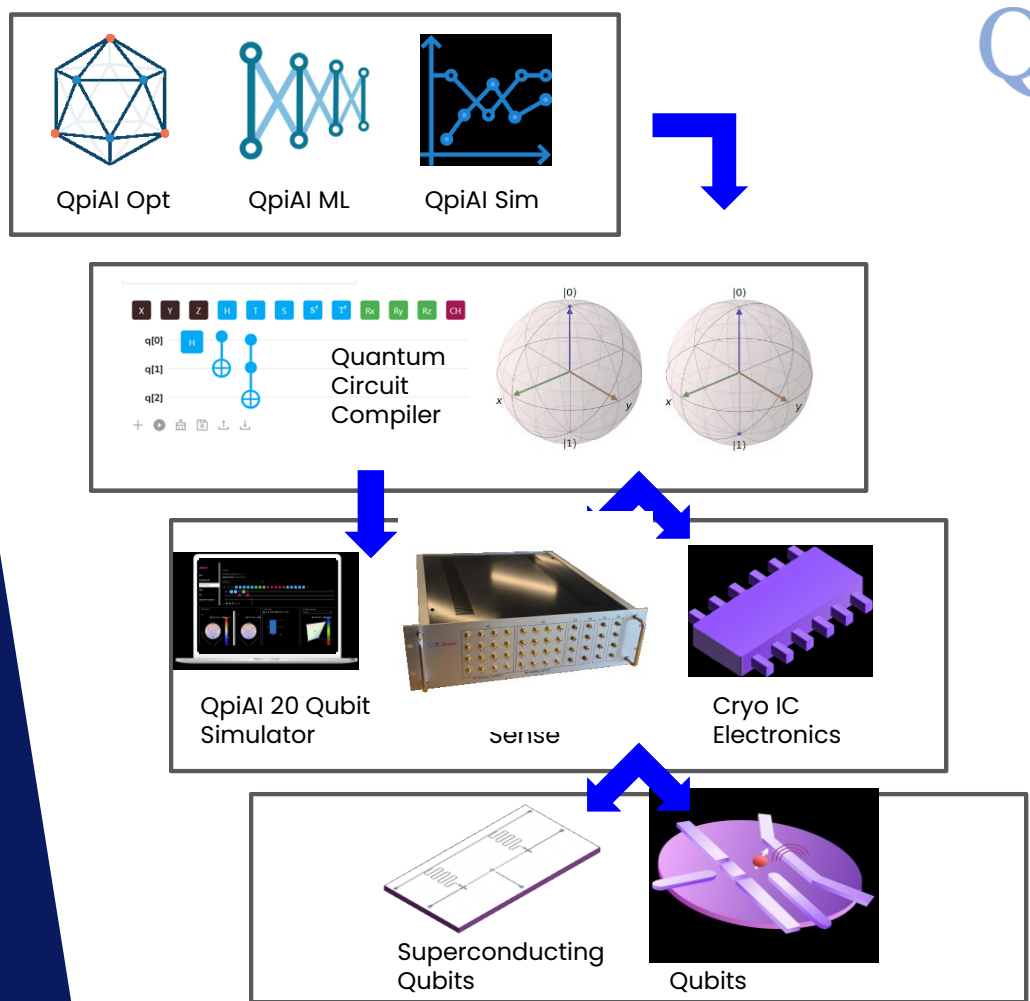
Pharma



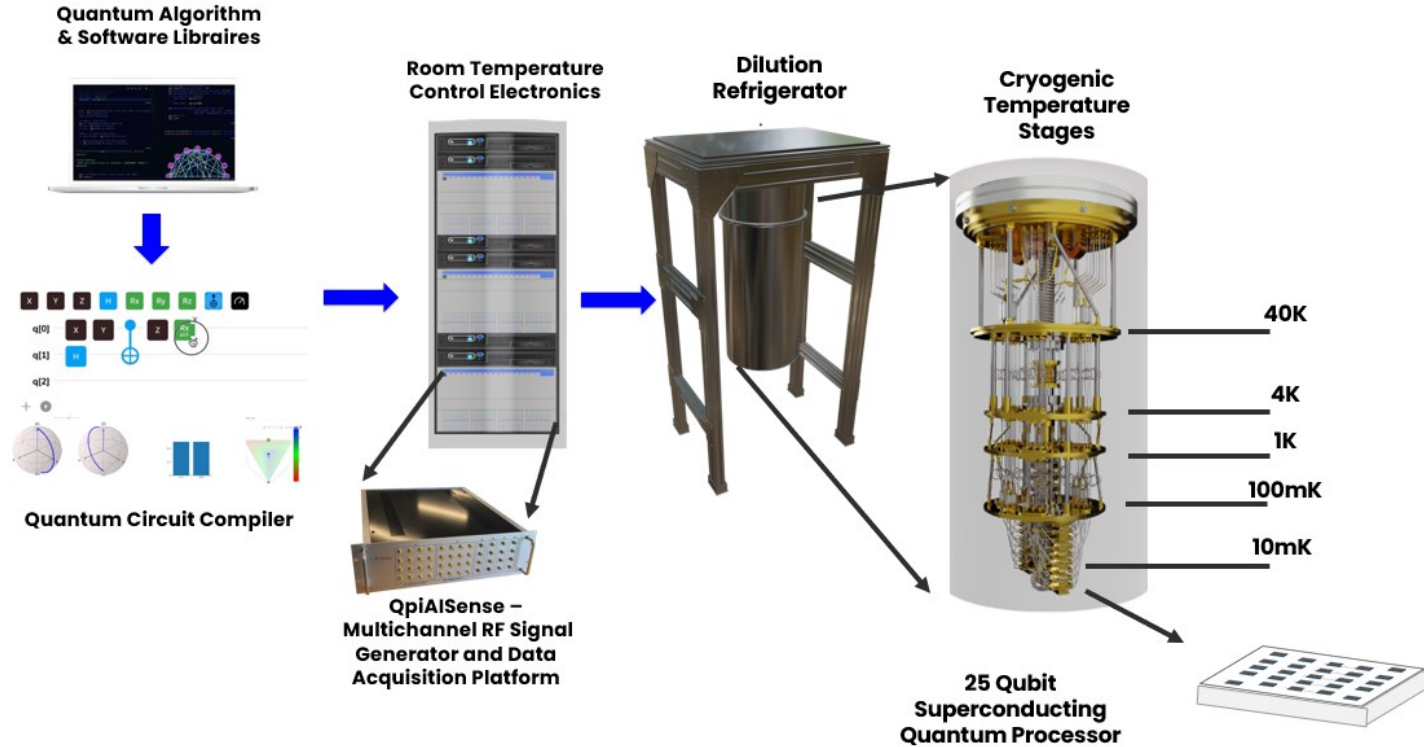
Aerospace
& Defence

QpiAI Full-Stack Quantum Computing Solution

- **Algorithm Libraries**
 - Quantum Applications
 - Software & Solutions
- **20 Qubit Simulator**
- **Control & Readout**
- **Qubits Access via Cloud**

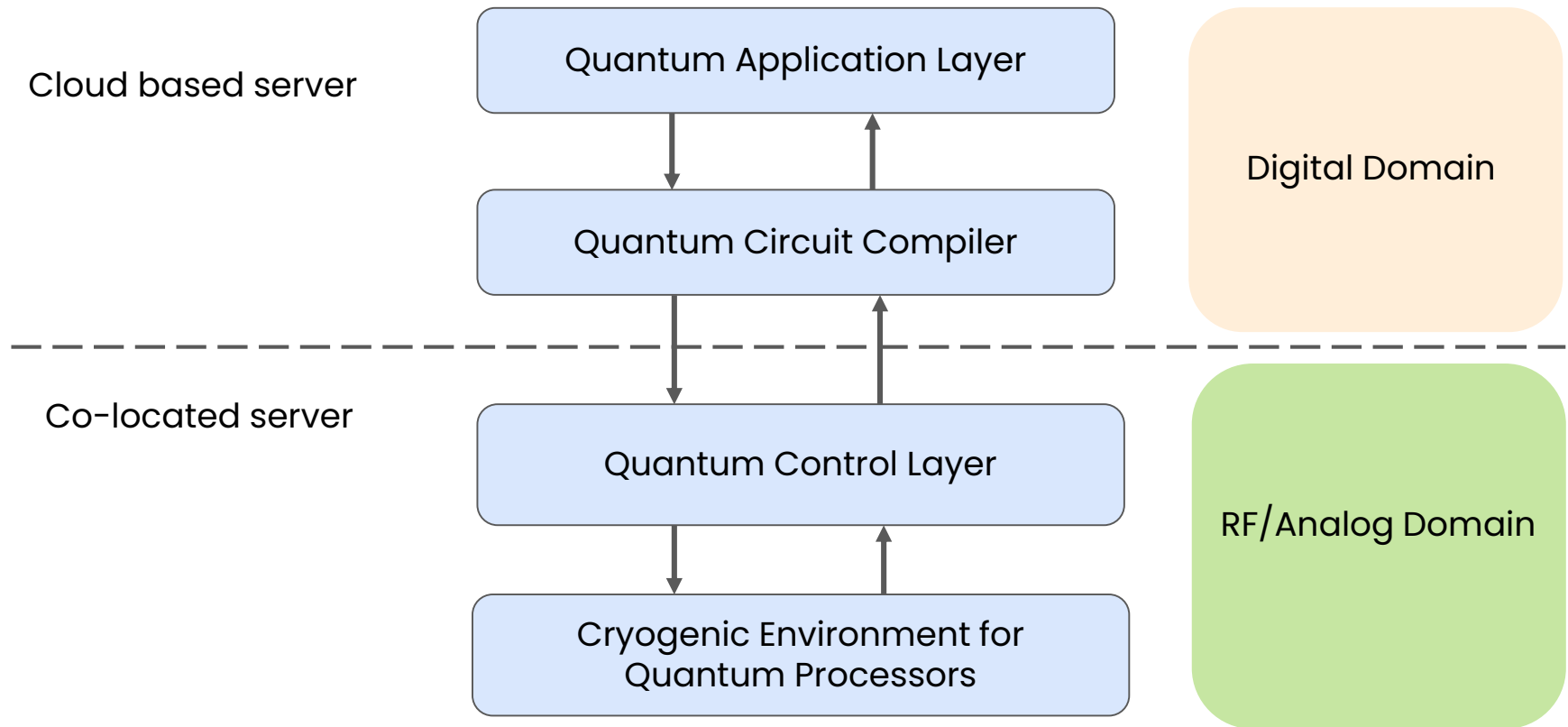


QpiAI 25 Qubit Quantum Computer



- Estimated Launch date Q3 2024/Q1 2024
- Scalable to 300 Qubits.

Full-Stack Quantum Computer Architecture



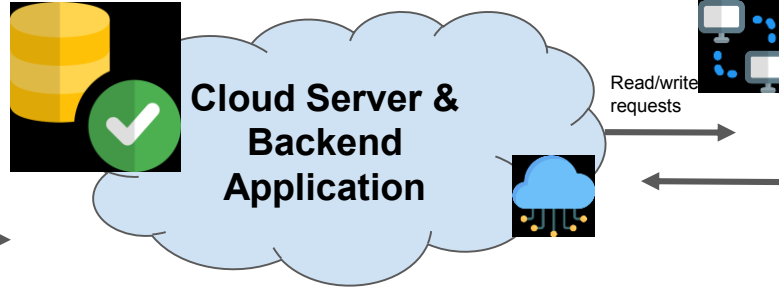
Challenges : Quantum Application Layer

Digital Domain

Optimisation in
Logistics

Machine Learning
in Finance

Material
Discovery



Frontend Dashboard



Quantum Circuit Compiler

Co located Server
With Quantum Control
Hardware

Challenges

- Standard SDKs for Quantum Algorithm and Quantum Software developer.
- Cloud Application for Managed Jobs to run on Quantum Computer.
- Computation Workload distribution between GPUs, CPUs and Quantum Computers

Challenges : Quantum Circuit Compiler

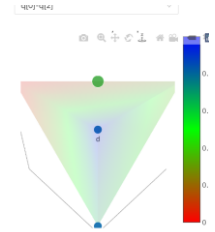
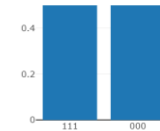
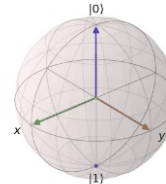
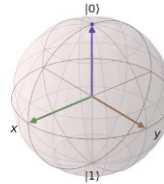
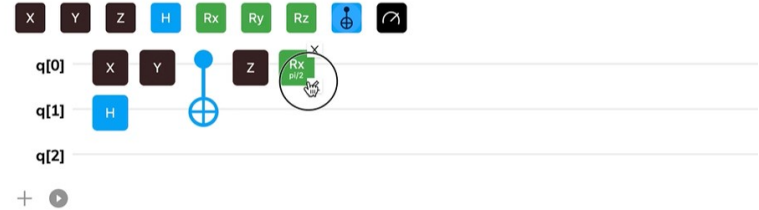
Digital Domain



- Explore
- Automate AI / ML
- Quantum Compute

Circuit Generator

Quantum Compute / Circuit Generator

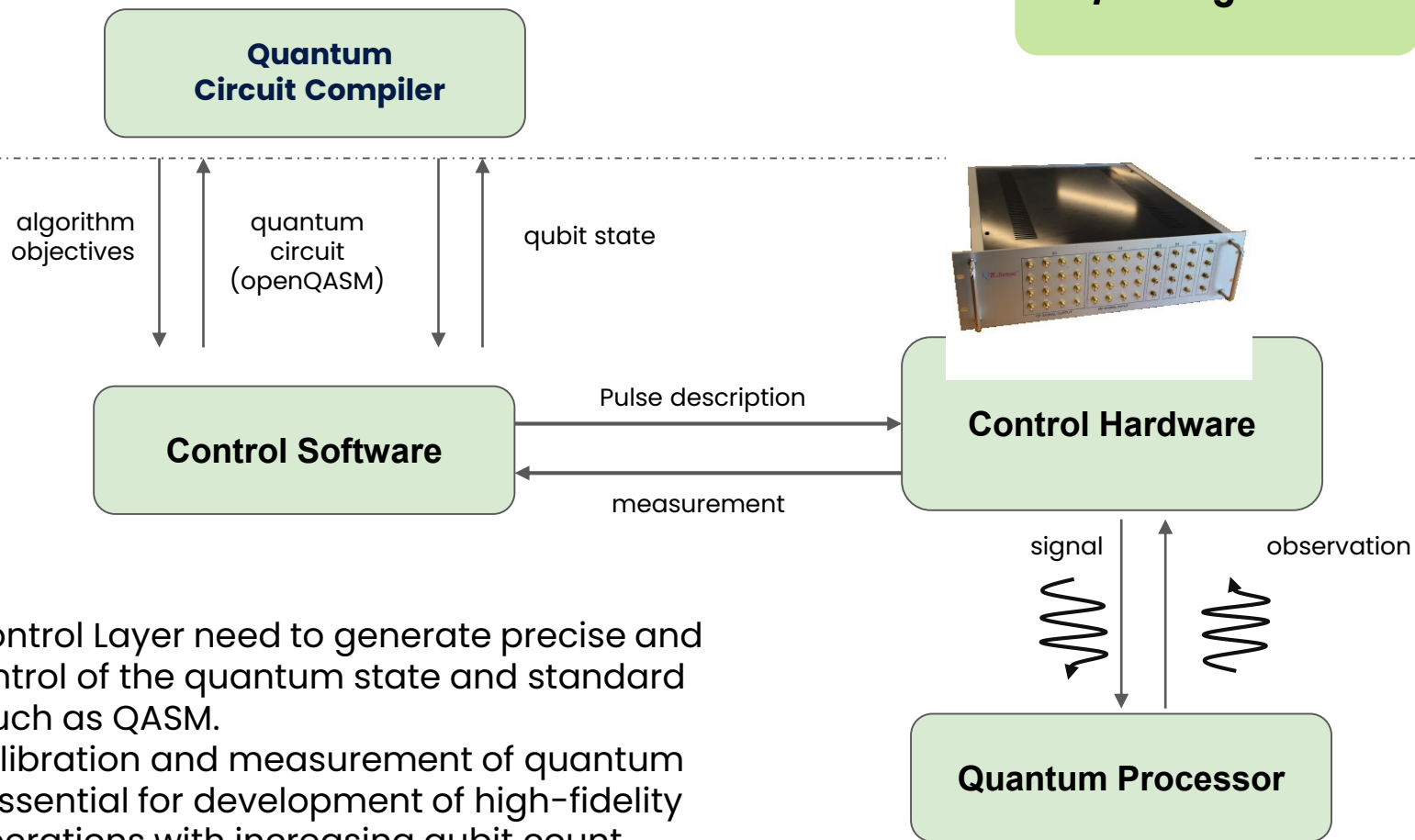


Challenges

- Standardised QASM interface with High level software and Quantum Hardware
- Development of Hardware aware optimised quantum circuit compiler with Qubit Mapping and routing for quantum software.
- Framework for Hybrid Quantum Classical Compilation

Challenges : Quantum Control Layer

RF/Analog Domain

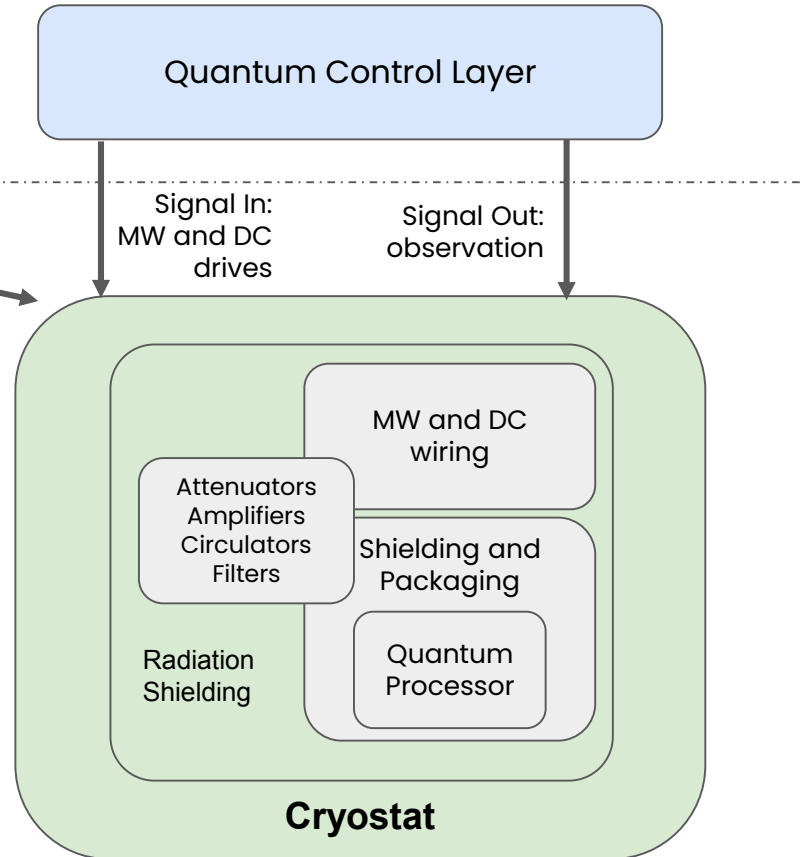
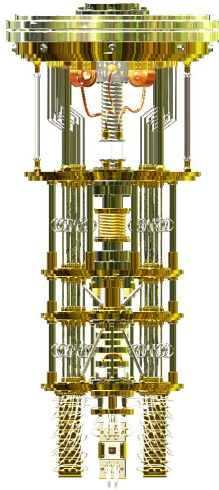


Challenges

- Quantum control Layer need to generate precise and complex control of the quantum state and standard interfaces such as QASM.
- Accurate calibration and measurement of quantum systems is essential for development of high-fidelity quantum operations with increasing qubit count.

Challenges : Cryogenic Environment

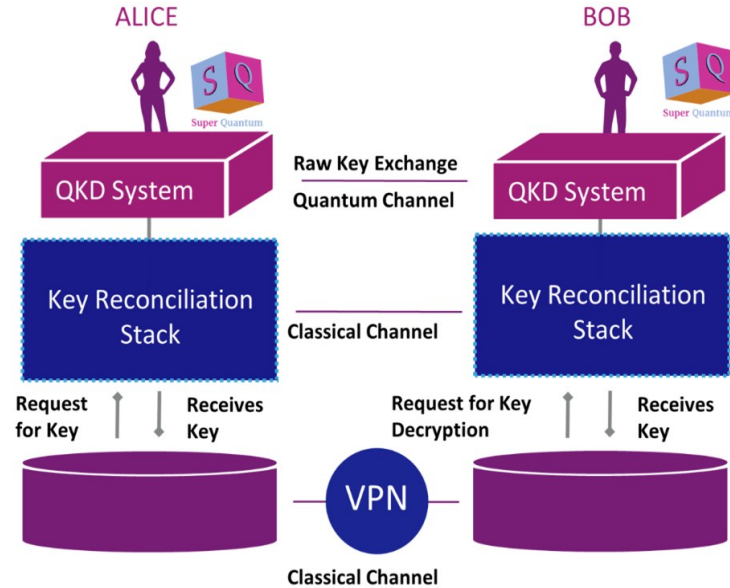
RF/Analog Domain



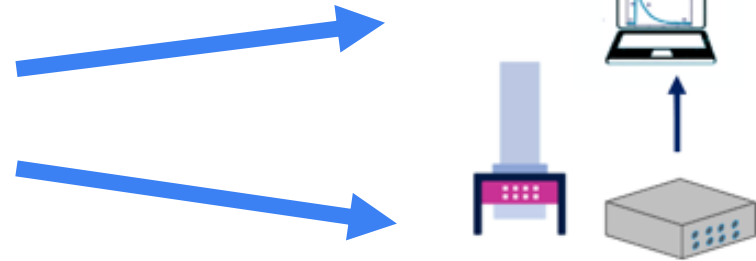
Challenges

- At Cryogenic environments, the qubit generate heat, that needs to be managed to maintain stability and high fidelity operation.
- Efficient design of EMI and radiation shields to mitigate the noise and interference for operation of the qubits.

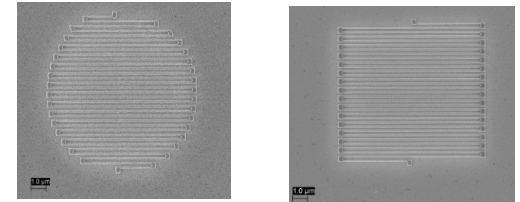
Quantum Communication



SuperQ SNSPD System Integrated in a QKD Receiver

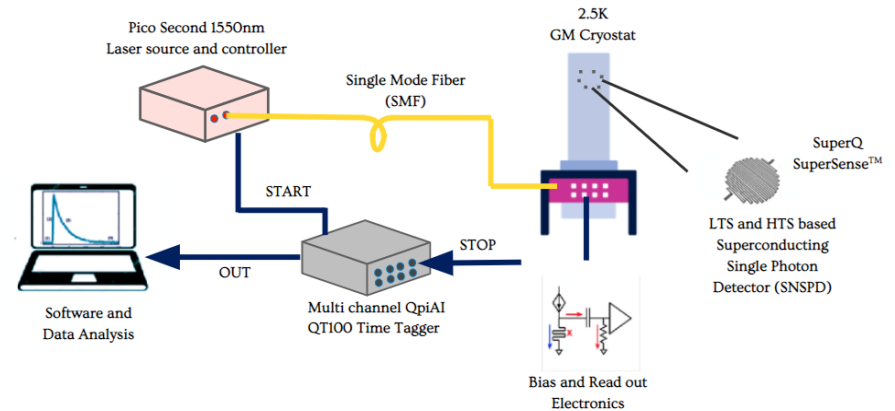
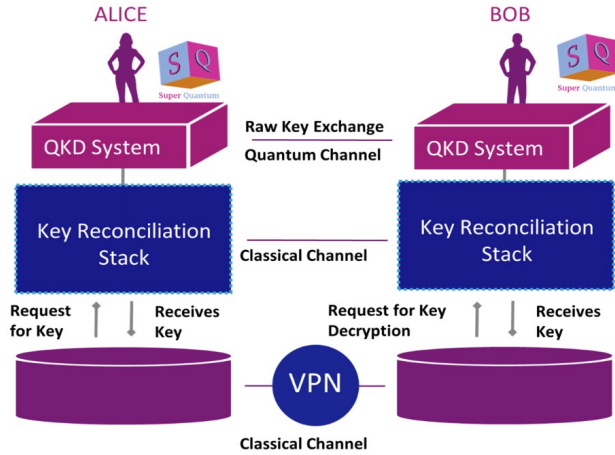


SUPERSENS™ SNSPD Devices



- Single photon detectors are essential components used to detect and measure individual photons of light that are used to encode and transmit information

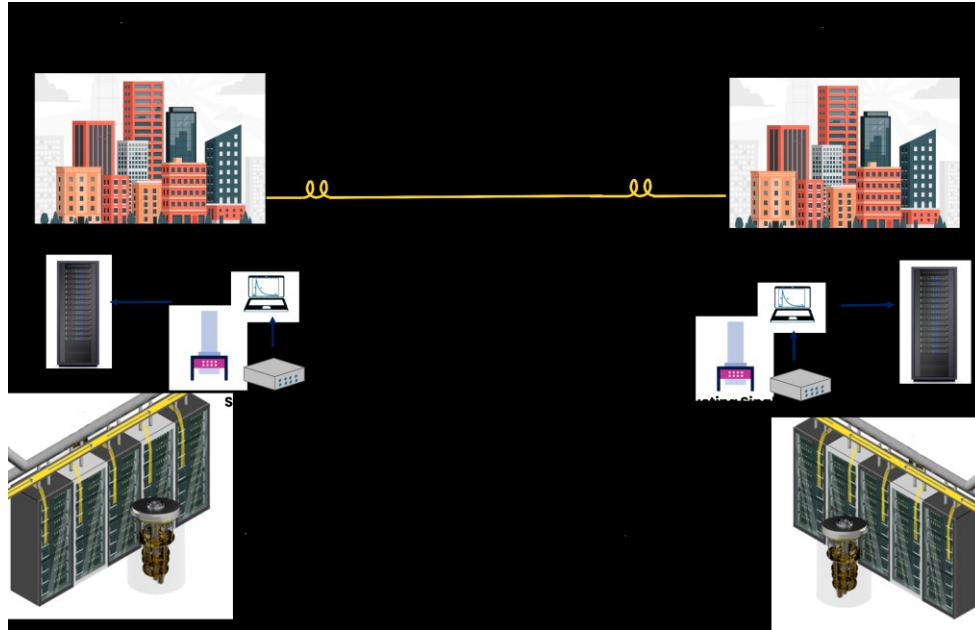
Challenges : Quantum Communication



Challenges

- **Noise and signal loss in transmission:** Quantum signals can easily be disturbed or lost during transmission, leading to errors in the communication channel.
- **Limited distance of transmission :** The practical use of QKD system is limited to short-range communication applications.
- **Limited Detector Efficiency:** The presence of high dark counts in the detector can lead to errors in the key distribution and compromise the security of the communication channel.

Connected Quantum Computers with Secure Quantum Communication



- **Connected Quantum Computers** will be the next generation of computation technology that would requirement in many secure computing environments such as banks, defense, government and enterprises.
- The **processed information** in the Quantum computers in the two cities are transmitted over a secure quantum communication network.

Thank You!

www.qpaii.tech