

QuREKA-lab

QuREKA Lab

QuREKA Lab is a **dedicated quantum algorithm development environment** established by creating a Quantum Server.

- **Server-Based Environment:** You can access the lab by clicking the **[Open]** button in the Quantum Server list. It provides a development interface powered by JupyterLab.
- **Customized Specifications:** The development environment is configured precisely according to the hardware specifications (CPU, RAM, GPU, and Storage) you selected during the Quantum Server creation step.
- **Consistent Development Experience:** Based on high-performance computing resources allocated according to your subscription plan, you can reliably perform complex quantum simulations and algorithm designs.

- [Notebook](#)
- [Quantum Composer](#)

Notebook

QuREKA Lab provides a powerful Python development environment based on JupyterLab, supporting an efficient workflow through dedicated extensions and AI-powered tools optimized for quantum algorithm development.

1. Jupyter Notebook Environment

- **Python-Based Development:** Utilize standard Python libraries and quantum computing frameworks within a JupyterLab-based environment.
- **Instant Start:** Create new Jupyter Notebook files and begin development immediately.
- **Sample Files Provided:** **Sample Notebooks** containing example code for major quantum algorithms are provided by default to assist with learning and practice.

2. Dedicated Extensions and Support Tools

QuREKA Lab places optimized tools in the left and right sidebars for development convenience.

- **AI Assistant (Left Panel):** Provides **AI-powered assistance** for quantum algorithm development and coding. You can easily access the conversational assistant from the left sidebar to receive support for complex implementation processes.

 AI 

- **Right Panel Extensions:**

- **Task (Job Monitoring):** Monitor the real-time status and success/failure of your submitted quantum jobs.

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- **Resource (Resource Information):** View a list of available QPUs and simulators along with their detailed specifications.

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- **Workspace (Workspace Information):** Check current workspace details and your real-time credit balance.

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Quantum Composer

Quantum Composer is a **GUI-based quantum circuit design tool** utilizing drag-and-drop functionality. It allows users to intuitively construct circuits without complex coding and view simulation results in real-time.

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Key Features

- **Intuitive Design:** Build circuits by placing gates and efficiently manage logical structures using slicers and barriers.
- **Real-time Simulation:** Instantly updates output states and histograms for up to 16 qubits using GPU acceleration upon any design modification.
- **Visual Analysis:** Provides a clear understanding of qubit phase changes and dynamic state flows through graphics and animations.
- **Multi-Environment Support:** Convert designed circuits into over 10 different quantum languages, such as Qiskit and Cirq, or directly submit them to actual QPU and simulator resources.