

The Eviden Qaptiva Framework

program | optimize | simulate | schedule

Benefits of Qaptiva in BMBF funded projects:

myQLM

Free and powerful quantum programming environment

- Simulate a noiseless quantum computer on your laptop
- Learn QC with a large number of Jupyter notebook tutorials
- Access Qaptiva 800s via Qaptiva Access



Qaptiva Access Server

Remote access to Qaptiva 800s & QPUs

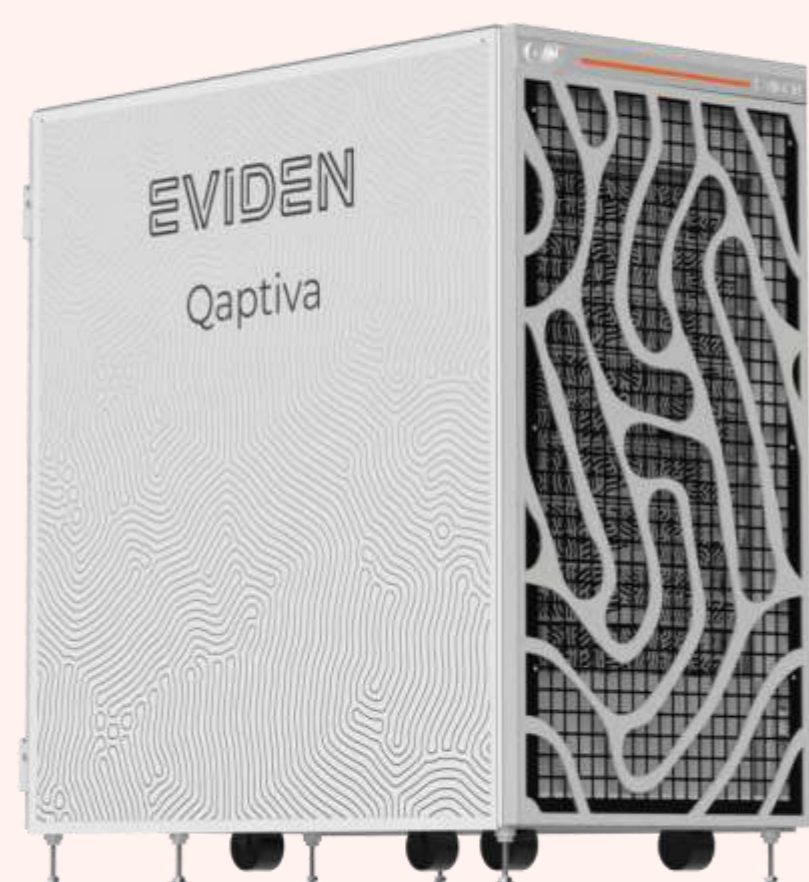
- Simulate up to 41 qubits from your laptop
- Work with your myQLM – use the power of Qaptiva and real QPUs
- Use same workflow for simulated and real quantum hardware
- Integrate external high level scheduler (e.g. Slurm)
- Benefit from built-in low level scheduler for quantum jobs
- Have a dedicated hybridisation node in your cluster



Qaptiva 800s

Hardware agnostic QPU emulator for 41+ qubits

- Circuit compilation/transpilation and optimization
- Unique modular plugin architecture
- Many different noise models (amplitude damping, depolarizing noise, etc.)
- Large collection of ready-to-use:
 - Optimizers
 - Quantum algorithms (VQE, QAOA, etc.)
 - Hardware models



Contact

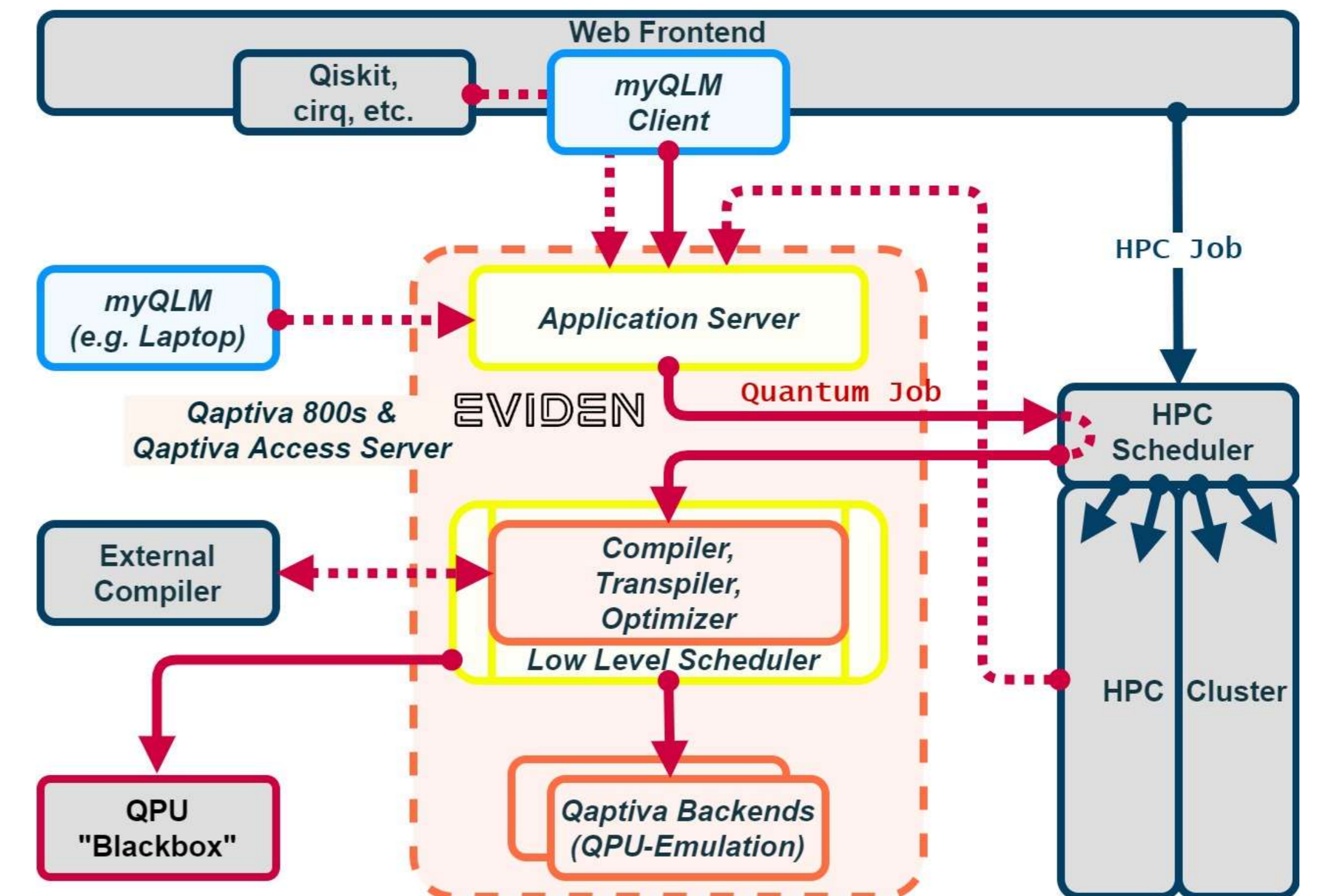
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QSolid (www.q-solid.de)

Quantum computer in the solid state

- ▶ Develop 30 Qubit superconducting quantum computer at the Forschungszentrum Jülich
- ▶ Moonshot system: Reach the “beyond classical” limit with coupled multi-level resonators
- ▶ Project runtime: 5 years (2022-2026)
- ▶ Project coordination: Forschungszentrum Jülich GmbH, Prof. Dr. Frank Wilhelm-Mauch

Qaptiva Access Server as Middleware (Application Server) for HPC integration:



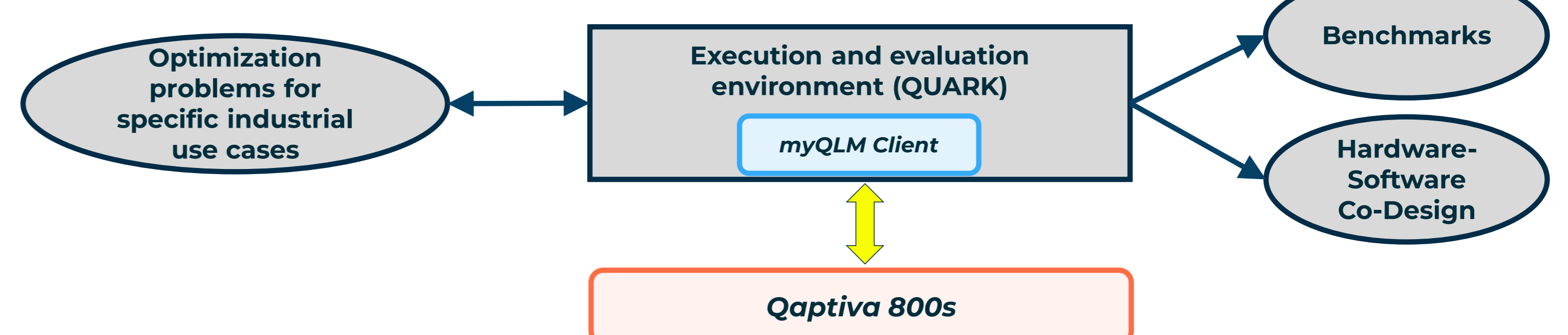
TAQO-PAM

Tailored application of quantum optimization for planning and control of assembly and manufacturing

- ▶ Evaluate QC potential in optimization problems for specific industrial use cases
- ▶ Project runtime: 3 years (2022-2024)
- ▶ Project coordination: OTH Regensburg, Prof. Dr. Wolfgang Mauerer

Qaptiva provides:

- ▶ QPU simulation with realistic modelling of imperfections
- ▶ seamless integration of simulated and real QPUs



QUARK: <https://github.com/QUARK-framework/QUARK>

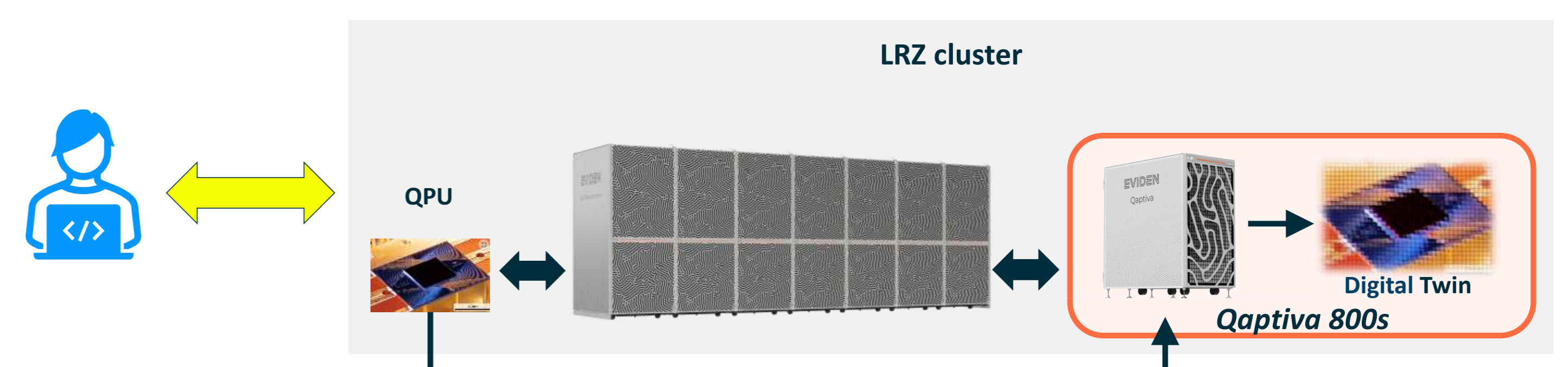
Q-Exa

Quantum computing for exascale-HPC

- ▶ Develop 20 qubit superconducting quantum computer and integrate it into exascale environment at LRZ
- ▶ Provide simulated version of real quantum hardware as additional backend for users
- ▶ Project runtime: 3 years (2021-2024)
- ▶ Project coordination: IQM Germany GmbH

Eviden provides:

- ▶ Integration of noisy IQM hardware model into Qaptiva
- ▶ Support to hardware developers by optimizing their QPUs
- ▶ Benchmarks of real quantum hardware
- ▶ Use cases before real hardware is available
- ▶ Integration of distributed simulation methods on HPC for effective simulation of large quantum circuits/algorithms



SPONSORED BY THE



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