⟨HPC|QS⟩

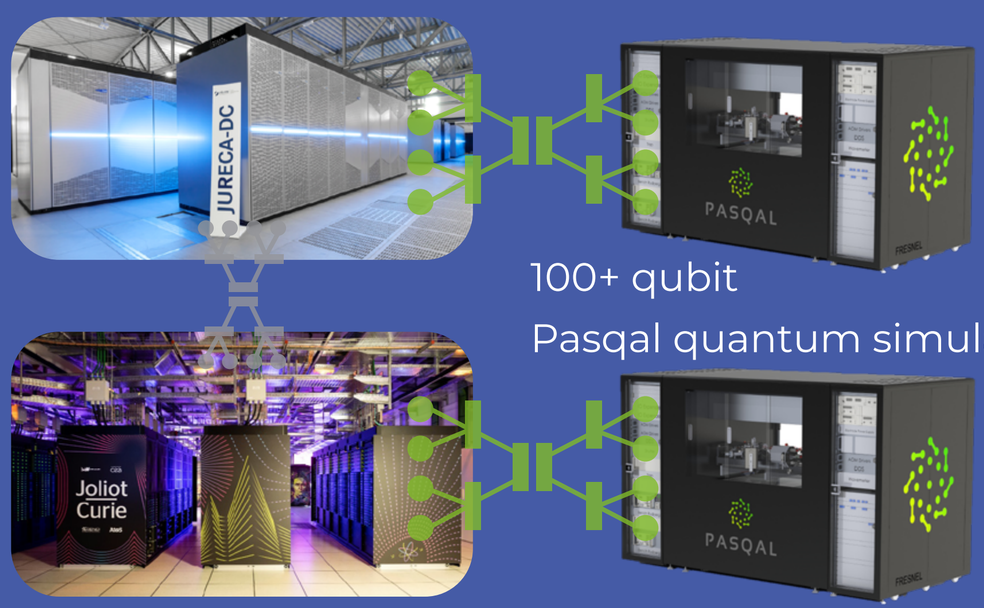
High Performance Computer – Quantum Simulator hybrid

www.hpcqs.eu

Towards a Pan-European Hybrid HPC/Quantum Infrastructure

OBJECTIVE

Develop, deploy and coordinate a non-commercial cloud-based European federated infrastructure, tightly integrating two quantum computers (QCs), each controlling more than 100 qubits.



100+ qubit
Pasqal quantum simulators

PROJECT

Duration: 2021–2025

Coordinator: Forschungszentrum Jülich GmbH

15 partners + 3 linked 3rd parties from 6 countries

OUTCOME

Creation of a quantum-HPC hybrid system as an essential step forward to utilize the power of QCs for handling first practical applications related to complex simulations and optimization problems, such as materials and drug design, logistics and transportation.

ACHIEVEMENTS

- Computer room preparation and installation of two Pasqal QSs
- Co-design of pilot HPC-QS use-case applications with hybrid system software and programming framework
- Design of a resource management that covers hybrid use cases from interactive cloud usage to quantum-offloading by parallel HPC jobs
- Development of a generic programming language for the input to the QS

MILESTONES

- Procurement of two quantum simulators (QSs)
- Installation of the QS at CEA/TGCC and FZJ/JSC
- Development and deployment of a full hybrid software stack
- Training and user engagement with use case demonstrators

HPCQS has received funding from the European High-Performance Computing Joint Undertaking (JU) under grant agreement No 101018180. The JU receives support from the European Union's Horizon 2020 research and innovation programme and Germany, France, Italy, Ireland, Austria and Spain in equal parts.