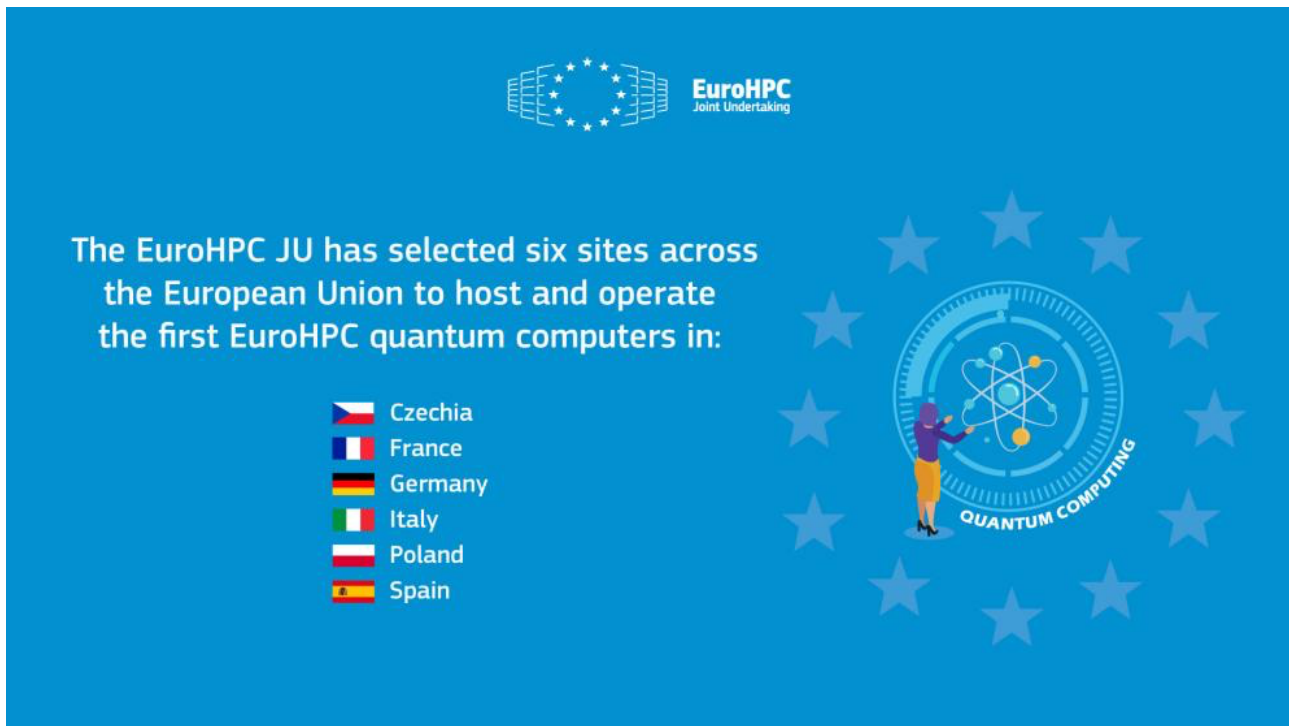


The EuroQCS-France consortium led by GENCI/CEA was selected by EuroHPC to host and operate a photonic quantum computer



The European High Performance Computing Joint Undertaking (EuroHPC JU) has selected six sites across the European Union (EU) to host and operate the first EuroHPC quantum computers: IT4I (Czechia), LRZ (Germany), BSC-CNS (Spain), GENCI-CEA (France), CINECA (Italy), and PSNC (Poland).

Among the expressions of interest received by the EuroHPC JU, those led by Italy, France, Spain and Poland stand out: as indicated, amongst other items, by the use of a common prefix “EuroQCS” in the name of their consortia, they share the will to promote the principles expressed in the Quantum Flagship’s EuroQCS - European Quantum Computing & Simulation Infrastructure - whitepaper. This manifesto aims to encourage the foundation of a federated HPC+Quantum infrastructure and related services:

- Expose as many complementary **Quantum Computing and Quantum Simulation hardware** in a Pan-European HPC-QC infrastructure as possible;
- Foster the **integration and hybridization** between HPC and Quantum;
- Shape the **ecosystem** by creating synergies in the EuroQCS developer community, supporting users and attracting new ones.

More information on the EuroQCS whitepaper can be found here¹.

The four selected hosting entities did not simply draft a project which demonstrated their ability to accommodate and make a quantum machine operational. Relying on this common EuroQCS vision, they established a joint collaboration around four pillars:

- Provide access to complementary quantum technologies to European users;
- Share and reuse ongoing software foundations (such as HPCQS or national initiatives);
- Work on common use cases;
- Set up a distributed High Level Support team (HLST).

¹ https://qt.eu//app/uploads/2022/02/20220202_HPC-QCS-JWP-final.pdf

To throw the foundations of the shared EuroQCS infrastructure, the four consortia also rely on their respective partners, on their national efforts on quantum technologies and on the specific use cases they can bring to this initiative.

EuroQCS-France

The **EuroQCS-France** consortium is led by GENCI as hosting entity and CEA as hosting site, with the University Politehnica of Bucharest (UPB, Romania), Forschungszentrum Jülich (FZJ, Germany) and Irish Centre for High-End Computing (ICHEC, Ireland) as members.

The targeted technology will be a photonic quantum computer that will be installed at TGCC and coupled with the Joliot Curie supercomputer just like the 100-qubit Pasqal quantum simulator acquired in the context of the HPCQS project.

In the context of the French National Quantum Plan, GENCI and the CEA have been mandated, among other partners, to participate in the France Hybrid HPC Quantum Initiative (HQI), which aims at coupling a HPC system with different flavors of quantum simulators and quantum computers. On top of this infrastructure, HQI also consists in an academic and industrial research program around HPC+Quantum, along with dissemination and end-user support activities. The Pasqal system and the EuroHPC photonic quantum computer will be the first two machines exposed within this HQI platform. The ambition is to learn from the integration of these platforms in an HPC+Quantum ecosystem to propose an optional production-class Quantum partition for targeted workloads in the future French Exascale supercomputer.

EuroQCS-France also contributes use cases to the EuroQCS joint effort, around various topics such as electromagnetic simulation, structural mechanics, engine combustion, material simulation, meteorology and earth observation.

