

The First Advanced Quantum Processing Unit Delivered by Pasqal to GENCI and CEA

A delivery that strengthens Europe's Position in Hybrid High-Performance Computing and brings industrial use cases closer to fruition

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/EINPresswire.com/ -- A pioneering 100+ qubit quantum processing unit (QPU), acquired by [GENCI \(Grand Équipement National de Calcul Intensif\)](#), was delivered at TGCC, the [CEA](#) computing centre, announce the three partners.



QPU delivery is underway

As the first QPU to be delivered to a third party by Pasqal, a global leader in neutral atom quantum computing, this significant milestone is part of the broader [High-Performance Computer and Quantum Simulator hybrid \(HPCQS\)](#) project, co-funded by the European HPC Joint Undertaking, along with GENCI, in the field of HQI (France Hybrid HPC Quantum Initiative), supported by the France2030 investment programme.

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*Pasqal's co-founder and CEO,
Georges-Olivier Reymond*

Pasqal's QPU will be integrated with GENCI's supercomputer, Joliot-Curie, which is hosted and operated by CEA at TGCC, marking a significant advancement in hybrid computing capabilities in Europe. The TGCC environment is renowned for its high-performance scientific computing and Big Data capabilities, making it an

ideal home for one of the first quantum computers designed to operate in tandem with supercomputers. The integration of the analog quantum computers with supercomputers will allow European and French researchers to work on hybrid use cases and to experiment on actual hardware.

Philippe Lavocat, CEO of GENCI, declared that “this delivery milestone marks a major first in France towards the commissioning of a cold atom quantum machine soon hybridized with our

supercomputer, in the service of science, knowledge and innovation. This first also reflects a strong commitment on the part of France and Europe, through EuroHPC and the HPCQS project, to make quantum technologies a strategic and sovereign tool. GENCI is very proud of this efficient partnership with the CEA, and to be one of Pasqal's first customers!"

Jacques-Charles Lafoucriere, programme director at CEA and coordinator of the France Hybrid HPC Quantum Initiative (HQI) added that: "This delivery will allow HPC and quantum computing communities to complete their work with emulators with real computations on real hardware. All our users are eager to use Pasqal's Orion system and to demonstrate all the results they will get from it."

Pasqal's co-founder and CEO, Georges-Olivier Reymond, expressed enthusiasm about the deployment: "Delivering our first QPU to CEA is a landmark that underscores our commitment to accelerating the integration of quantum computing into mainstream technology sectors. By harnessing the synergies between quantum computing and classical HPC environments, we are paving the way for breakthroughs that were previously beyond reach. This achievement also marks the historic debut of Pasqal's quantum computing technology in the hands of a customer, which speaks to the strength and dedication of our team."

In the context of HPCQS, another QPU will also be installed in Germany at Forschungszentrum Jülich (FZJ) and coupled with the JURECA supercomputer. Both systems will form the embryo of a pan European hybrid HPC + quantum computing infrastructure soon to be completed by other various European quantum computing technologies funded by EuroHPC JU and Member States, open to all European users to start exploring concretely the potential of quantum computing on their applications.

A Leap Towards Practical Quantum Applications

This collaboration between Pasqal, GENCI and CEA, provides pioneering scientific and industrial users with combined capabilities for intensive and quantum computing (HPC+QC). It is set to revolutionize areas ranging from pharmaceuticals to energy, leveraging quantum computations to enhance complex data processing and simulation tasks. The integration of Pasqal's quantum technology with TGCC's supercomputing resources aims to develop practical applications that address real-world challenges through enhanced computational capabilities.

Analog quantum computing, a product of this HPC-QC integration, is particularly suitable to promote optimization workloads and the simulation of physical systems. Such optimization has numerous practical applications in the banking industry, logistics, transportation, energy grid management, and many others.

Enhancing Research and Industry Capabilities

The HPCQS project is advancing, with the integration of the QPU into the existing supercomputer infrastructure already underway. CEA and Pasqal have worked with EVIDEN to leverage EVIDEN's Qaptiva environment to integrate the QPU with the HQI platform. The objective of this

integration is to allow end-users to program their hybrid code and to send it to Joliot-Curie, which will then offload the quantum code to the Pasqal system via Qaptiva.

The acquisition of Pasqal's QPU is an essential part of CEA and GENCI's collaborative work on the France Hybrid HPC Quantum Initiative (HQI). This initiative aims to deploy a hybrid HPC-QC platform coupling several quantum technologies with a classical supercomputer for the benefit of open research. HQI also includes an academic and industrial research program that focuses on this HPC-QC integration, the development of hybrid applications and exploratory topics like noise characterization and the mitigation and use of quantum links for computing.

About GENCI

Created by the public authorities in 2007, GENCI (Grand Équipement National de Calcul Intensif) is a major research infrastructure. This public operator aims to democratise the use of digital simulation through high performance computing associated with the use of artificial intelligence, and quantum computing to support French scientific and industrial competitiveness.

GENCI is in charge of three missions:

- To implement the national strategy for the provision of high-performance computing resources, storage, massive data processing associated with Artificial Intelligence technologies and quantum computing, for the benefit of French scientific research, in conjunction with the 3 national computing centres (CEA/TGCC, CNRS/IDRIS, France Universités/CINES).
 - Supporting the creation of an integrated ecosystem on a national and European level
 - Promoting digital simulation and supercomputing to academic research and industry
- GENCI is a civil company 49% owned by the State represented by the Ministry in charge of Higher Education and Research, 20% by the CEA, 20% by the CNRS, 10% by the Universities represented by France Universités and 1% by Inria.

About CEA

The CEA is a major research organisation working in the best interests of the French State, its economy and citizens. Thanks to its strong roots in fundamental research, it is able to provide tangible solutions to meet their needs in four key fields: low-carbon energy, digital technologies, technologies for medicine of the future, defence and national security.

As the world's leading innovator among public research organisations (Clarivate 2024), the CEA acts as a catalyst and accelerator of innovation for French industry. It helps businesses in all sectors be more competitive, creating high-performance products that stand out from the crowd and developing trail-blazing solutions that lead to changes in society. The CEA deploys this dynamic in all regions of France aiding local partners to innovate themselves, thus helping to create sustainable value and jobs nationwide, tailored to meet actual industry needs. At the same time, it supports the development of its 250 start-ups, agile vectors for transferring the disruptive technology and knowledge developed at CEA laboratories to industry. www.cea.fr

About Pasqal

Pasqal is a leading Quantum Computing company that builds quantum processors from ordered neutral atoms in 2D and 3D arrays to bring a practical quantum advantage to its customers and

address real-world problems. Pasqal was founded in 2019, out of the Institut d'Optique, by Georges-Olivier Reymond, Christophe Jurczak, Professor Dr. Alain Aspect – Nobel Prize Laureate Physics, 2022, Dr. Antoine Browaeys and Dr. Thierry Lahaye. Pasqal has secured more than €140 million in financing to date. To learn more about us, visit www.pasqal.com

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Luke Keding

HKA Marketing Communications

+1 315-575-4491

[email us here](#)

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