SPECTRUM
THE QUANTUM SWITCH

About the project

Spectrum EU Project is developing QueSt, the first switch made specifically for QCs, which provides ultrashort down to near-zero downtimes between switching events and negligible heat injection.

Through the innovative radiofrequency (RF) switch QueSt, Spectrum aims to increase the scalability and minimize problems related to heating, thus expediting the development of Quantum Computers.

Project partners

Consiglio Nazionale delle Ricerche

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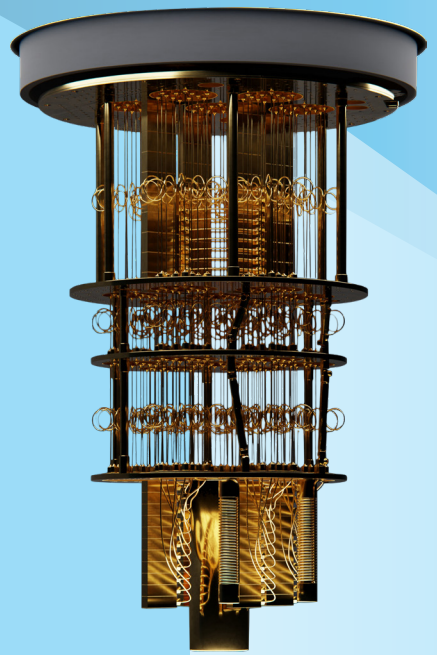
GRANT AGREEMENT 101057977

SPECTRUM
on a QueSt to accelerate Quantum Computer development



A new computational frontier with a bulky issue

Poor scalability and high cost are among the main limiting factors for the development and deployment of quantum computers.
Both problems are related to the **bulkiness and multiplicity of the signal lines that run through the quantum computer.** The large number of wires limits scalability and decreases the thermal stability of the quantum processing units (QPUs).

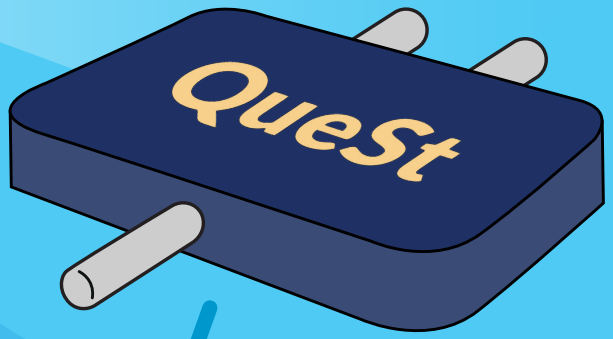
- **High cost** to acquire, upgrade and maintain the architecture.
- Electronics-induced **downtimes** after switching event.
- Hardware as **bulky** as the number of qubits.

QueSt

QUANTUM SUPERCONDUCTING SWITCH

Spectrum is poised to solve part of the technological pitfalls that are hindering the development of Quantum Computing by delivering a **novel QC** component that is able to significantly reduce the number of wires and thus costs of the entire QC setup, by compacting the physical lines onto a solid-state device.

The possibility of combining **more switches inside the cryostat**, alongside the above mentioned characteristics, will boost the usability of superconducting quantum computers, opening further commercial opportunities.



The switch bridges the connection from classical electronics outside of the cryostat to the qubits on the inside, to be able to route signals to and from the qubits in a versatile and programmable way.

Advantages

Low power dissipation
Reduces QC downtime after a single switching event.

Control of multiple qubit configurations
Reduces the footprint and cost of wiring by about 75 % over current values.

Voltage control and compatibility with cmos system
Controls a large number of output devices with one input signal.

High switching speed
Reduces switching times, compared with state-of-the-art switching devices.