

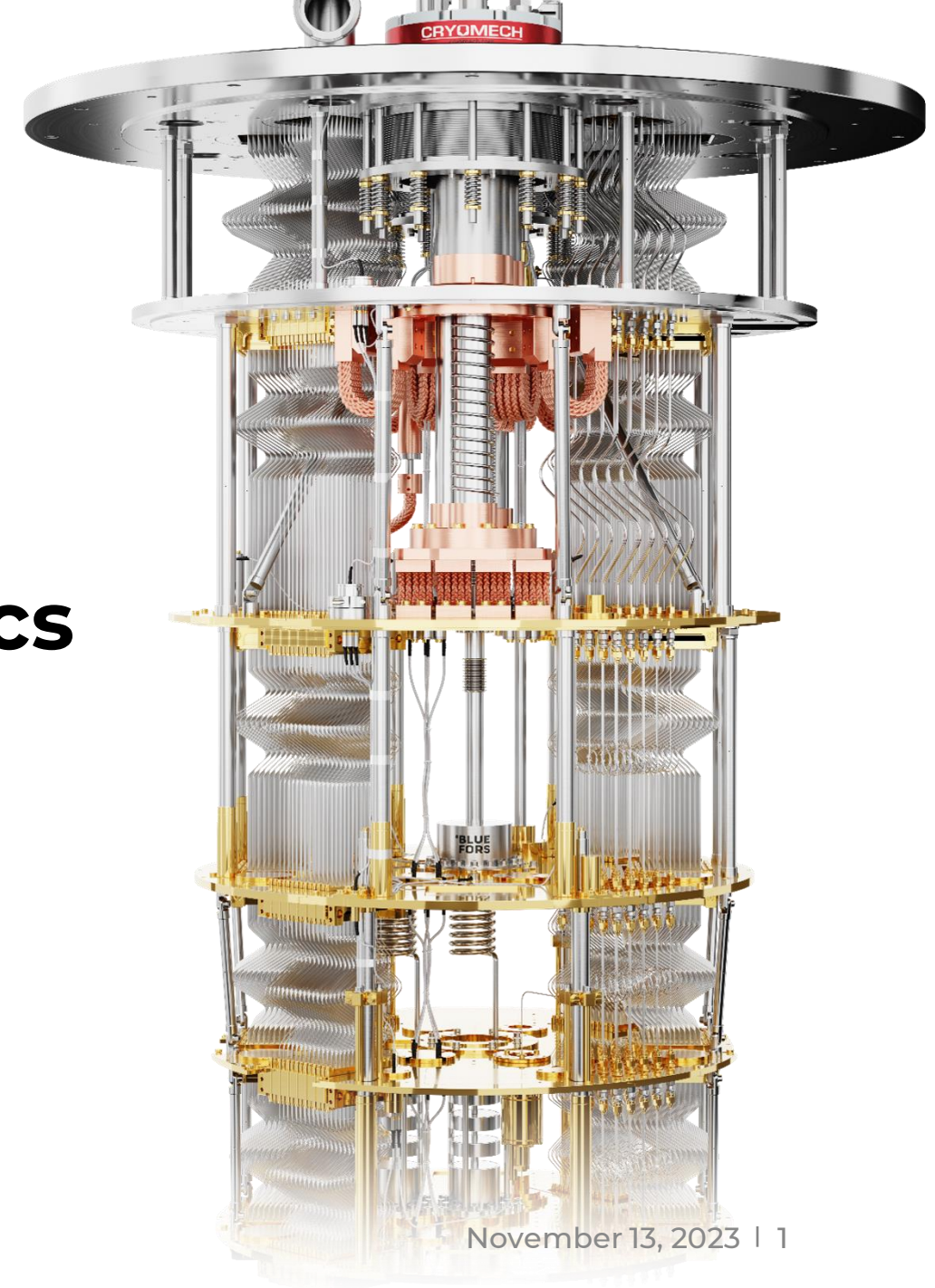


Future Computation Technology from Cryogenics Point of View

Semicon Europa– November 15, 2023

Anssi Salmela | Chief Technical Operations Officer, Bluefors

Cool for Progress.



November 13, 2023 | 1



Dr. Anssi Salmela

Chief Technical Operations Officer

After gaining his MSc Engineering from Helsinki University of Technology in 2006, and his PhD in Engineering Physics from Aalto University in 2012, Anssi joined Bluefors as a Cryoengineer and Scientist. His experience in a wide range of scientific and technical operations roles has led to his current position as Chief Technical Operations Officer, where he is responsible for Bluefors' Services, including customer care and aftersales. He also sits on the patent council and is involved in steering our product and product quality-related projects as principal scientist.



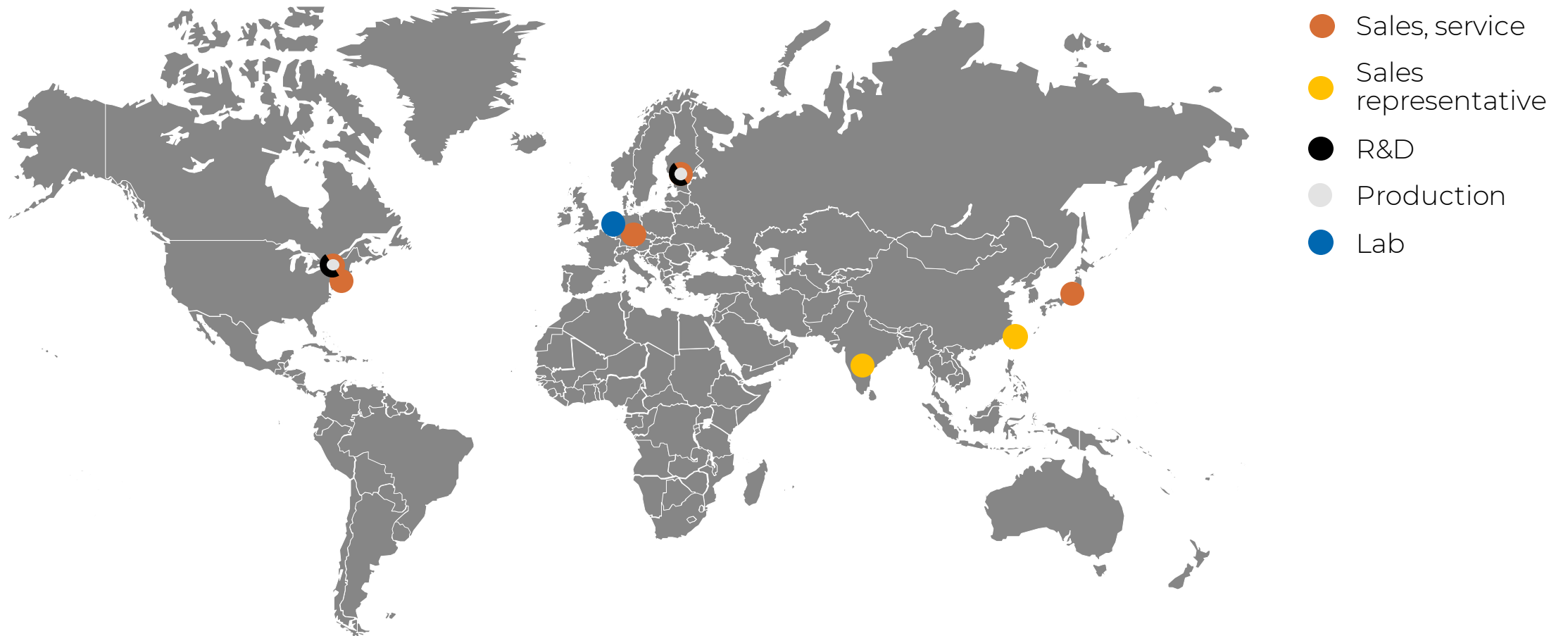
We are well established

- 📍 Founded in 2008, HQ in Helsinki
- 💰 Revenue > 160 million euro (2022)
- 🌍 About 600 professionals from over 50 nationalities
- 🌐 Installed 1 000+ systems worldwide
- 🔗 Combination of Bluefors and Cryomech product range

Cool for Progress.



We are close to our customers



°BLUEFORS

Bluefors role in the quantum ecosystem

- **Promise:** To enable the quantum computing breakthrough, and help solve the world's biggest challenges.
- We support scientists and industries to drive future innovation
- We offer scalable production for cryogenic measurement systems
- We deliver an industrial supply chain for cryogenics.

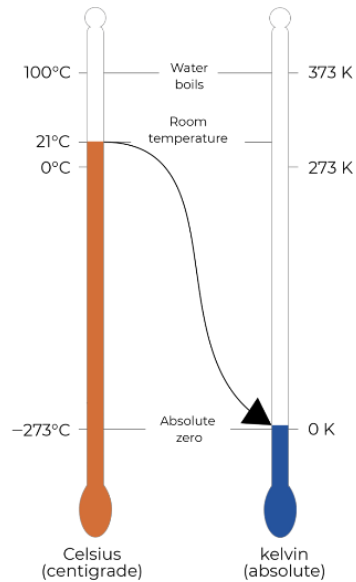
Cool for Progress.



Why Cryogenics?

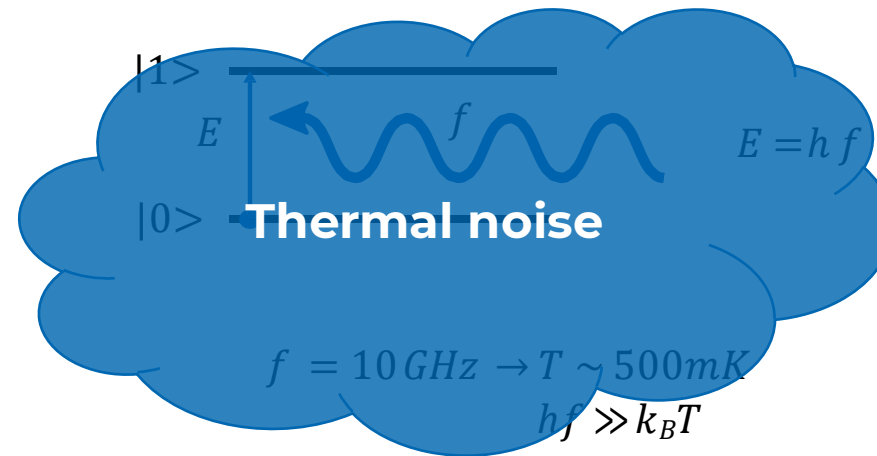
Business:

Cryogenic measurement systems



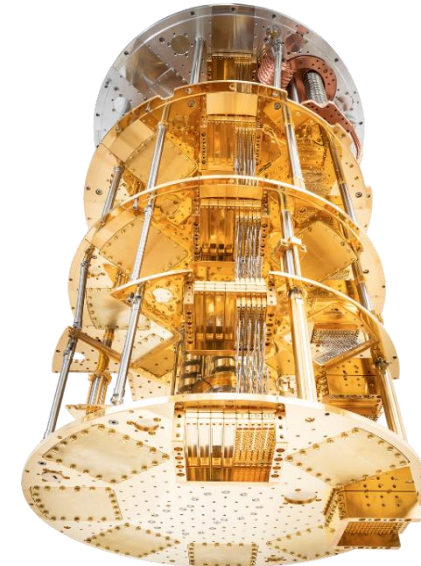
Quantum nature:

Hidden under thermal noise



Core technology:

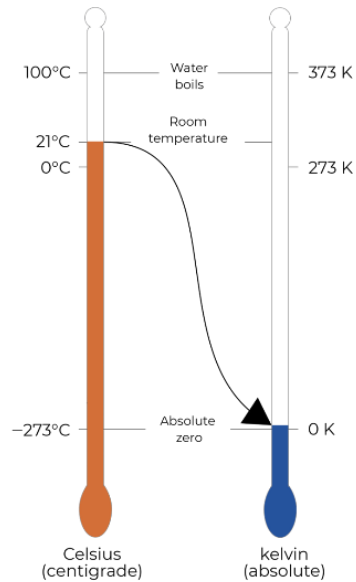
Dilution refrigerator



Why Cryogenics?

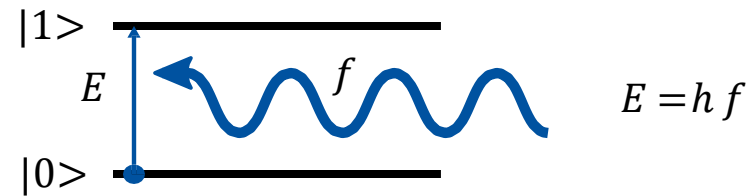
Business:

Cryogenic measurement systems



Quantum nature:

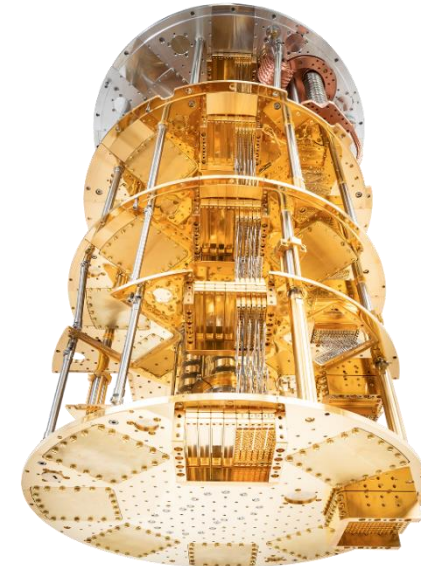
Hidden under thermal noise



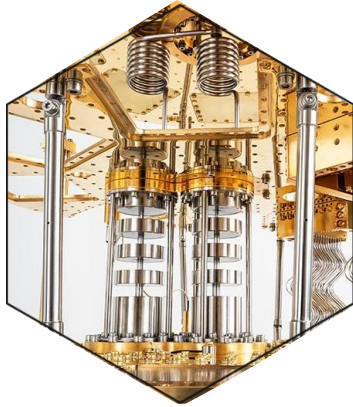
$$f = 10 \text{ GHz} \rightarrow T \sim 500 \text{ mK}$$
$$hf \gg k_B T$$

Core technology:

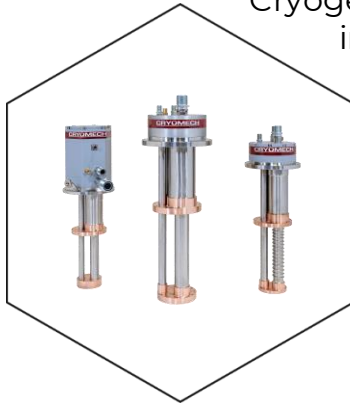
Dilution refrigerator



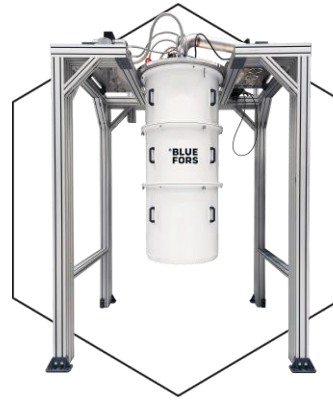
°BLUEFORS



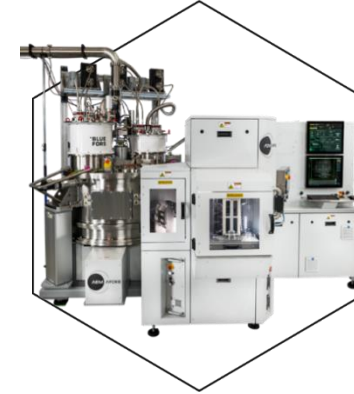
Cryogenic measurement infrastructure



Cryomech



Generic systems



High through-put characterization



Large-scale / industrial cryogenics



Bluefors Lab

Total Customer Care



KIDE, ready for 1000 qubits

Controlling more qubits than ever

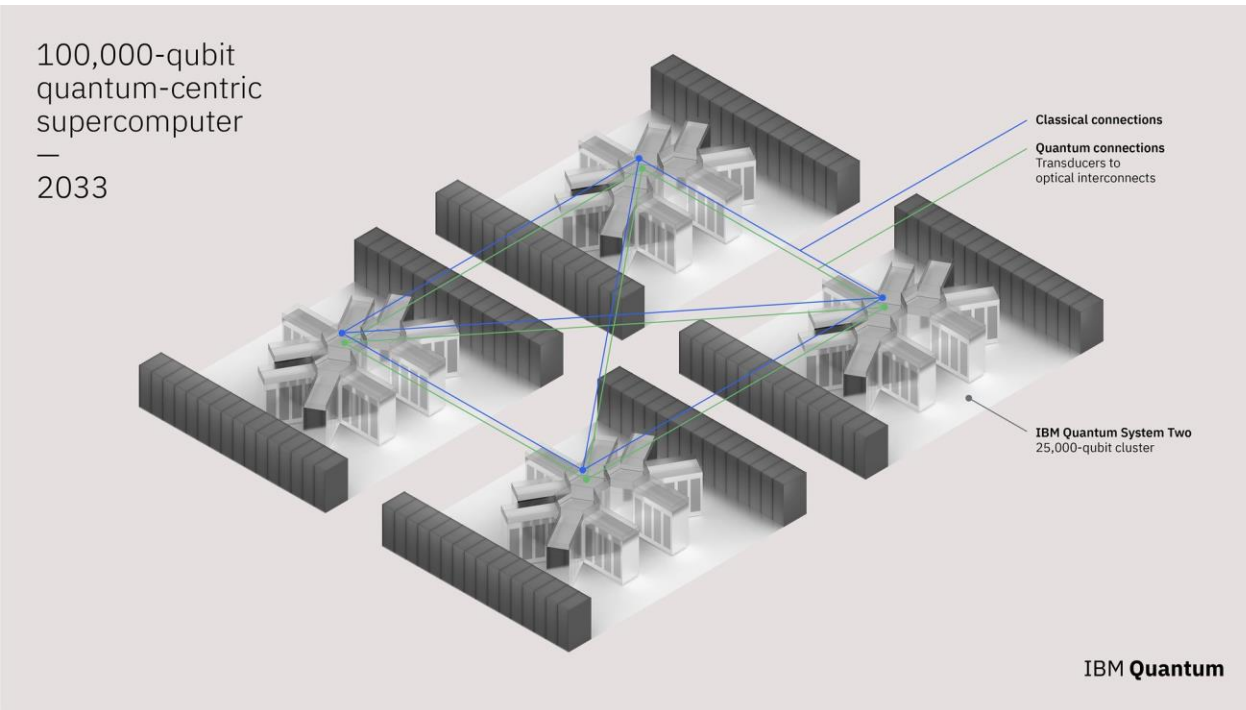
- Self-supporting vacuum platform with multiple access points for easier maintenance
- Easy access to users' payload, one person can operate
- Larger payload space
- System for larger QC infrastructure
- Separated cooling for user payload and fridge operation
- Cold stages partitioned to allow user specific configurations with regards to available space, cooling power and temperature

Cool for Progress.





The Cryogenic Heart of HPC-QC Infrastructure



Cool for Progress.



Thank you!

You're always welcome to contact us with any questions.

+358 9 561 748 00
info@bluefors.com

Cool for Progress.

[BLUEFORS.COM](https://bluefors.com)

