

# What is next for cold atoms in the quantum computing world?

05 September 2024

# Quantum Will Unlock the Full Potential of AI and Enable the Green Transition



Operating in an ~\$800B+ market, quantum computing will solve AI and green transition challenges



## Opportunity

Primary bottleneck is lack of computing power

## Pasqal Solution



-  Quantum will enable more computational power
-  Pasqal is already developing quantum machine learning use cases



## Opportunity

Energy efficiency is critical for computational and data requirements

## Pasqal Solution

-  Pasqal's QPUs provide energy savings that compound rapidly with scale
-  Pasqal's flagship Fresnel machine requires only 3kW compared to 1,400+ kW for a classical supercomputer<sup>1</sup>

[1] Nominal power requirements of Joliot-Curie, based on LINPACK benchmark power consumption per TOP500

# Pasqal is a Unique Mix of Science and Engineering



“When there are no fundamental limitations, engineers find a path.”

- Prof. Alain Aspect



Georges-Olivier  
Reymond

Co-founder & CEO

16 years in bringing new  
tech to the market

Prof. Alain Aspect

Co-founder & Scientific  
Advisor

2022 Nobel Prize  
Laureate in Physics



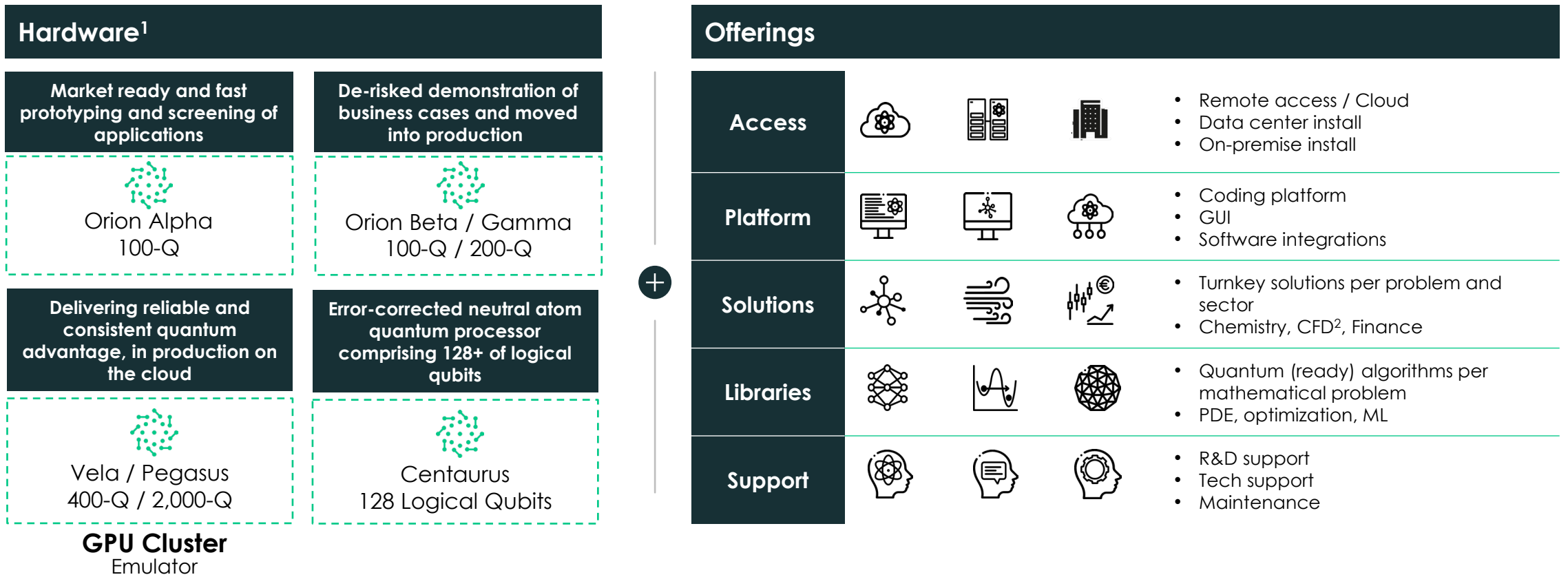
Prof. Antoine  
Browaeys

Co-founder & Scientific  
Lead

2022 Solvay conference  
attendee, Nature 2021 &  
2023

# Our Full-Stack Solution is Key to Driving Customer Success Pasqal

*Pasqal's comprehensive full-stack offer covers the full range of needs from the quantum computer hardware to the way to use it on personalized software on use cases*



[1] Q represents qubits

[2] CFD represents computational fluid dynamics

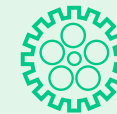
# Our Plug and Play Quantum Computers for Customers



Quantum computers compatible with **standard environment**



Setup at **room temperature**

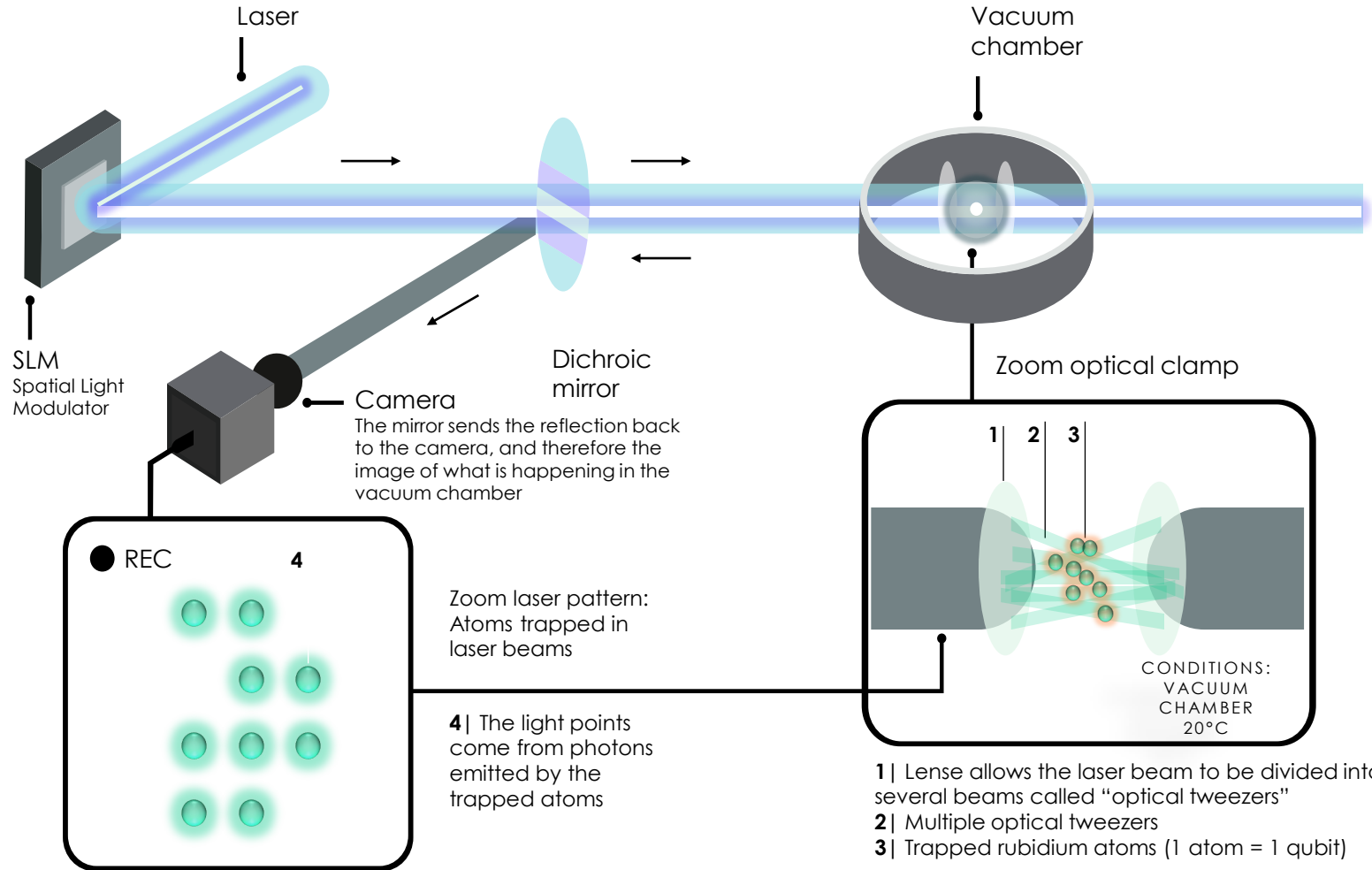


Industrial **off-the-shelf** components



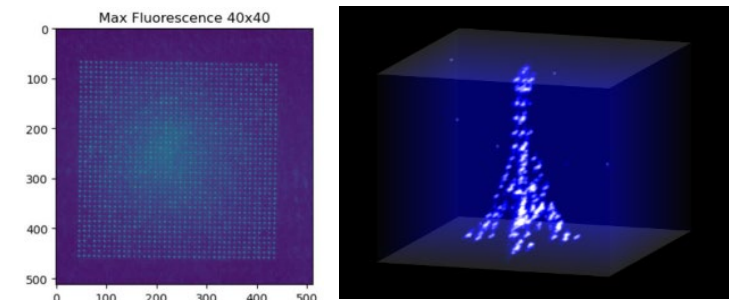
**Low energy** consumption (equivalent to 4 hair dryers)

# Neutral Atoms Drive Our Quantum Technology



*"After 20 years in the field, I now strongly believe that Neutral Atoms technology has all the assets to embrace Quantum Computing challenges and unlock all its opportunities"*

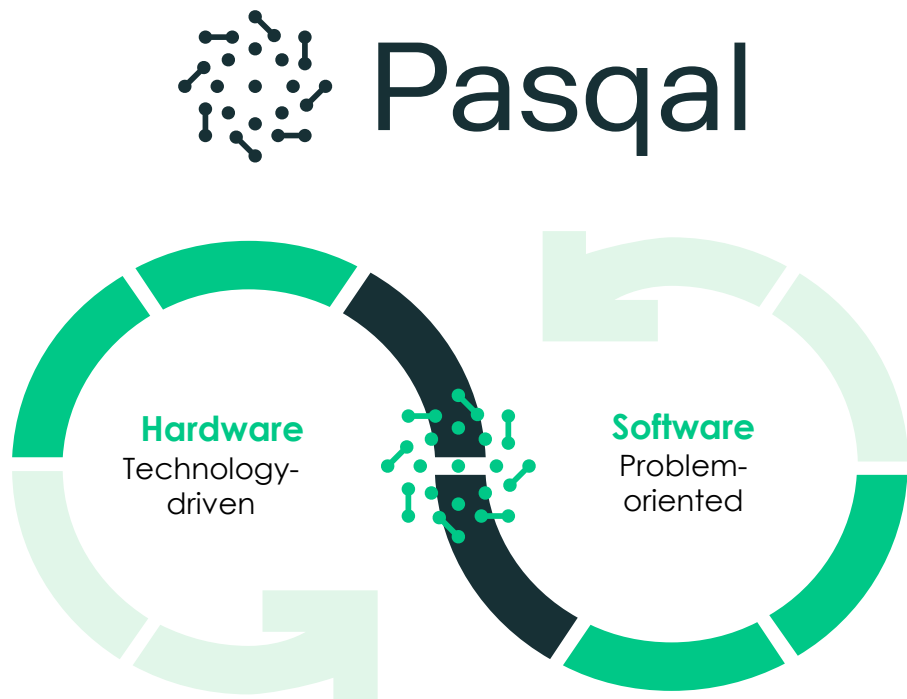
- Prof. Antoine Browaeys, CSO and Co-founder of Pasqal; Research Director of CNRS



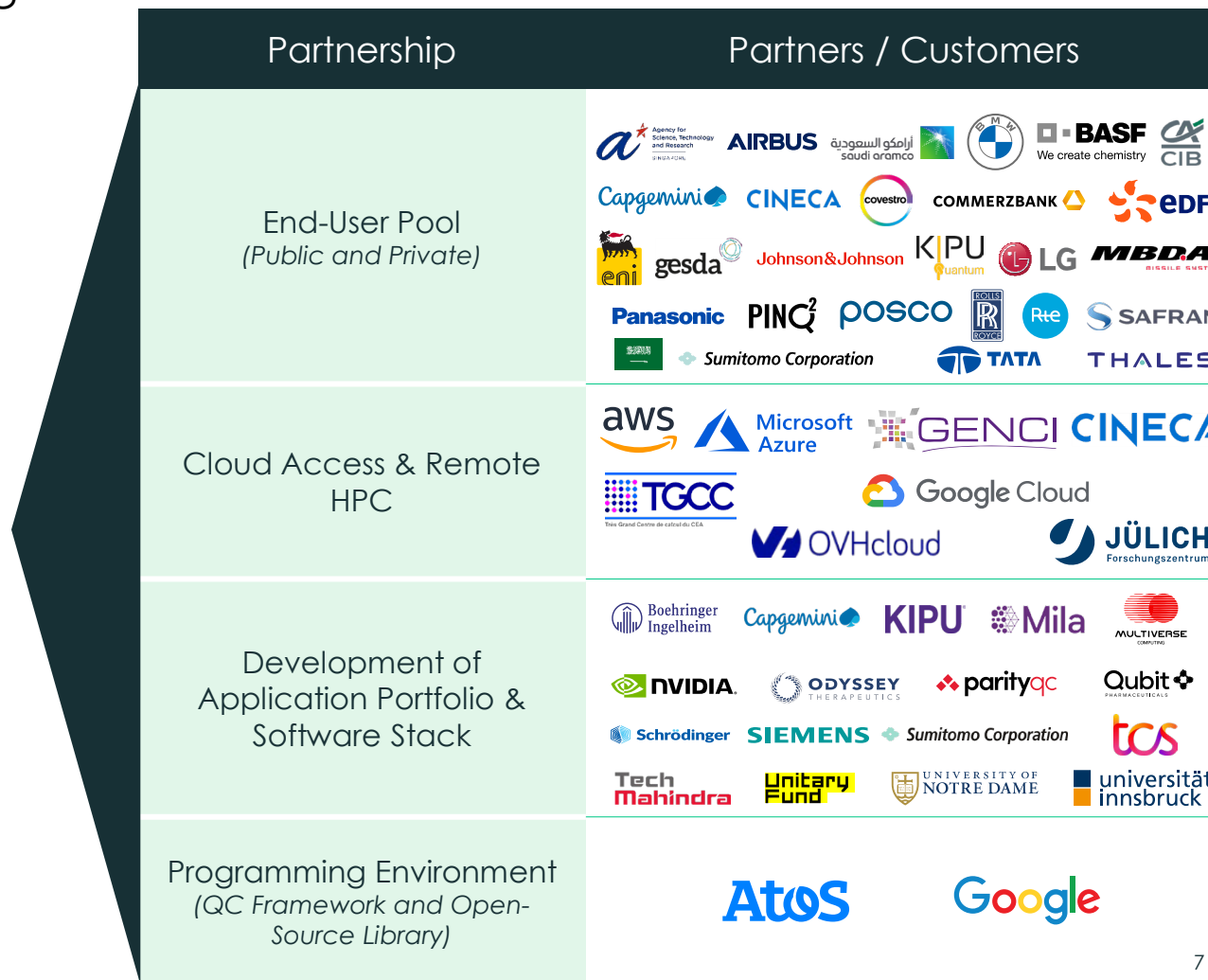
# Pasqal Fosters a Best-in-Class Ecosystem



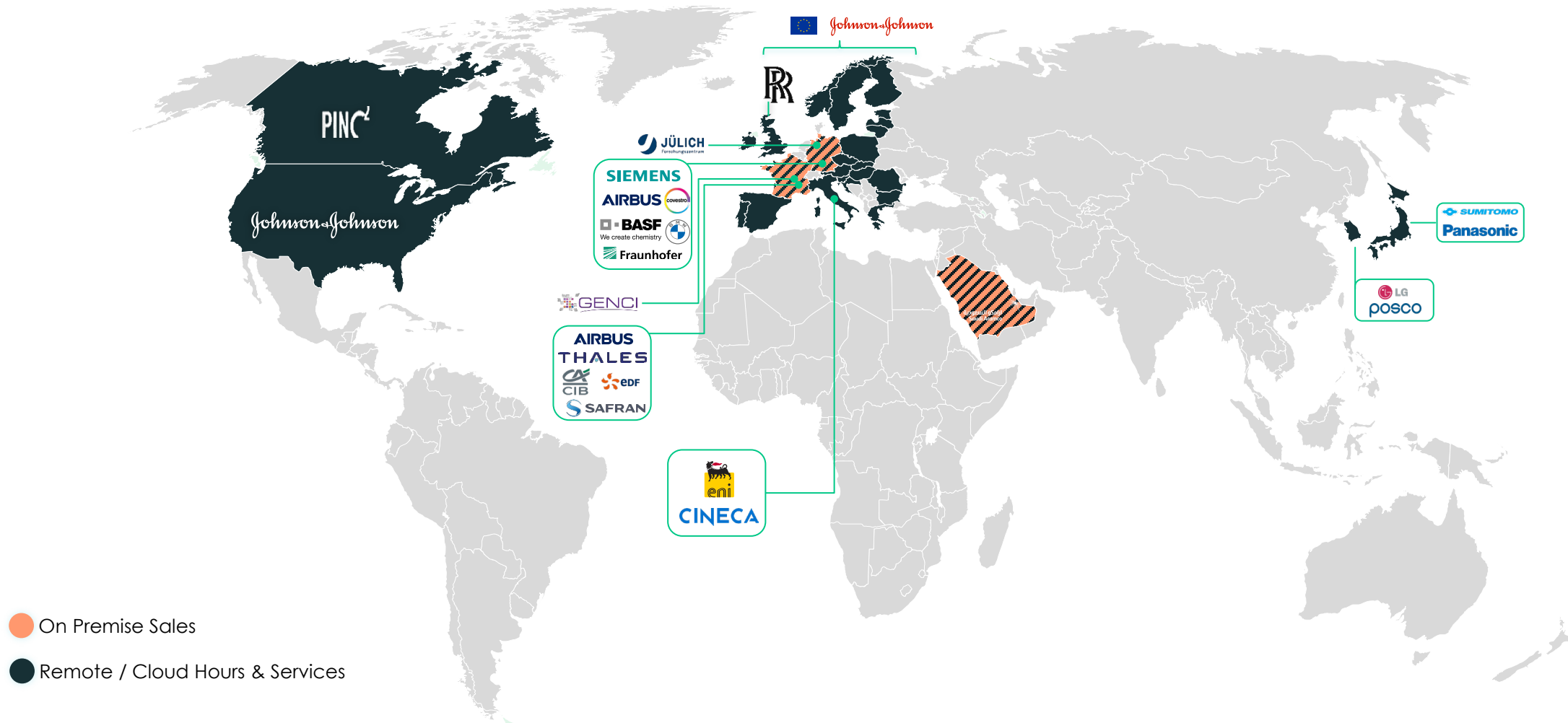
Our technology unifies partners to collaborate, share resources, and combine capabilities to unlock the true value of quantum computing



**Co-developing hardware and software will allow Pasqal to reach Practical Quantum Advantage**



# Our Customers and High-Value Prospects Today are Global



- On Premise Sales
- Remote / Cloud Hours & Services



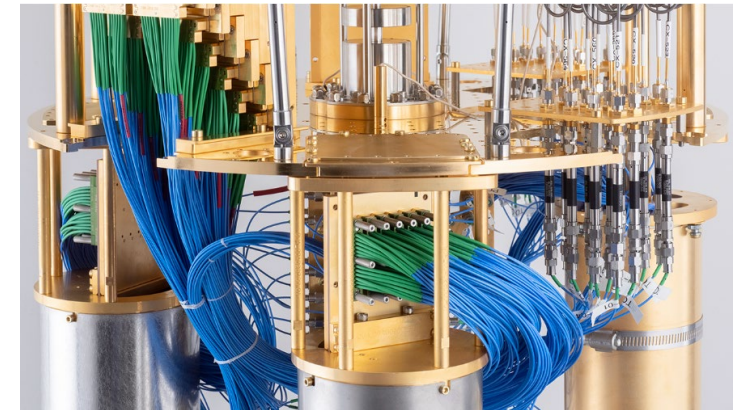
# Recently on the news



Pasqal event with BMW, J&J, BCG, IDC, French Minister of Digital Affairs



Aramco Signs Agreement With Pasqal To Deploy First Quantum Computer In The Kingdom Of Saudi Arabia



Pasqal and IBM announce their partnership to develop a common approach to quantum-centric supercomputing

# A Roadmap Articulating Our Vision

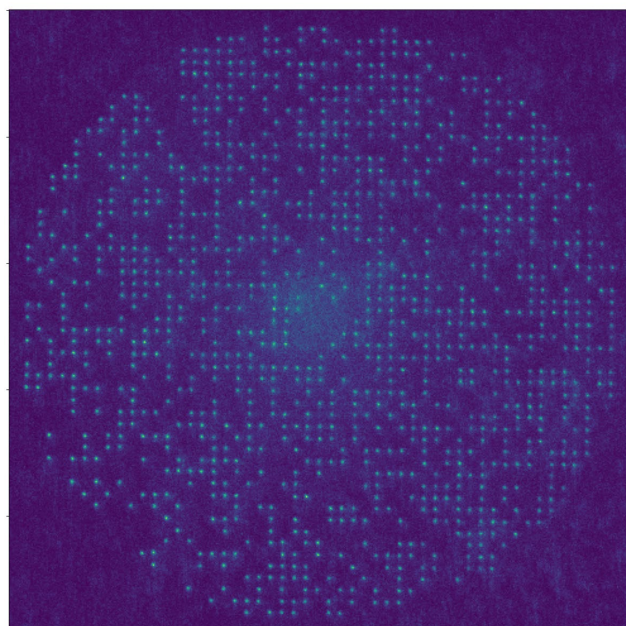
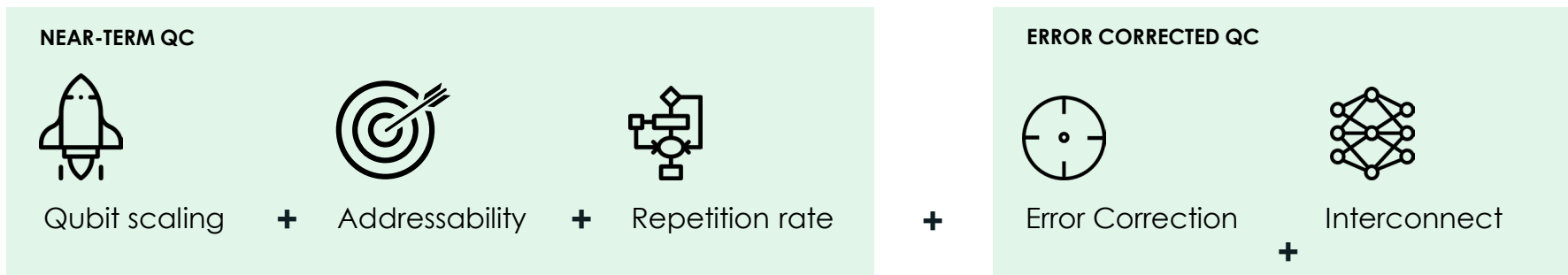


## Technology

Pasqal & affiliated ecosystem

		2022 - 2023	2024 - 2025	2026 - 2027	2028+
<b>HARDWARE PLATFORM</b>	Max qubits	200	1,000	10,000	
	Addressability	Z add	Z+X add	Addressable 1Q and 2Q gates	
	Base repetition rate	1 Hz	3 Hz	10 Hz	100 Hz
	FTQC Program		Atom shuttling	Ultra High-Fidelity Gates	Scalable logical qubits architecture
<b>HARDWARE ACCELERATED LIBRARIES</b>	Quantum Matter & Quantum AI	Algorithm Blueprint	Algorithm Development	Production	

## Boosting performance

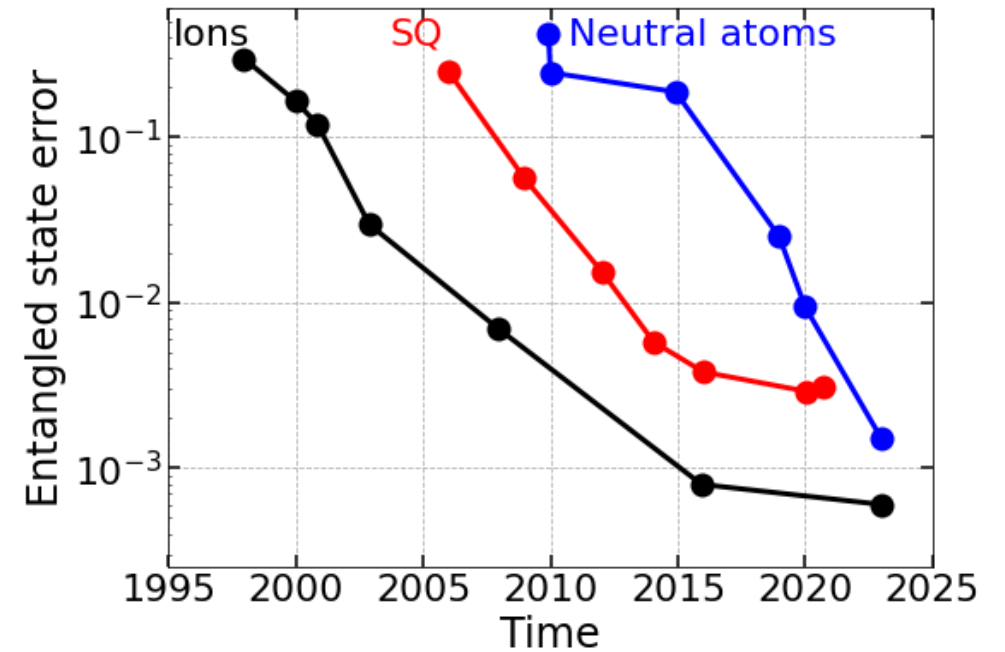
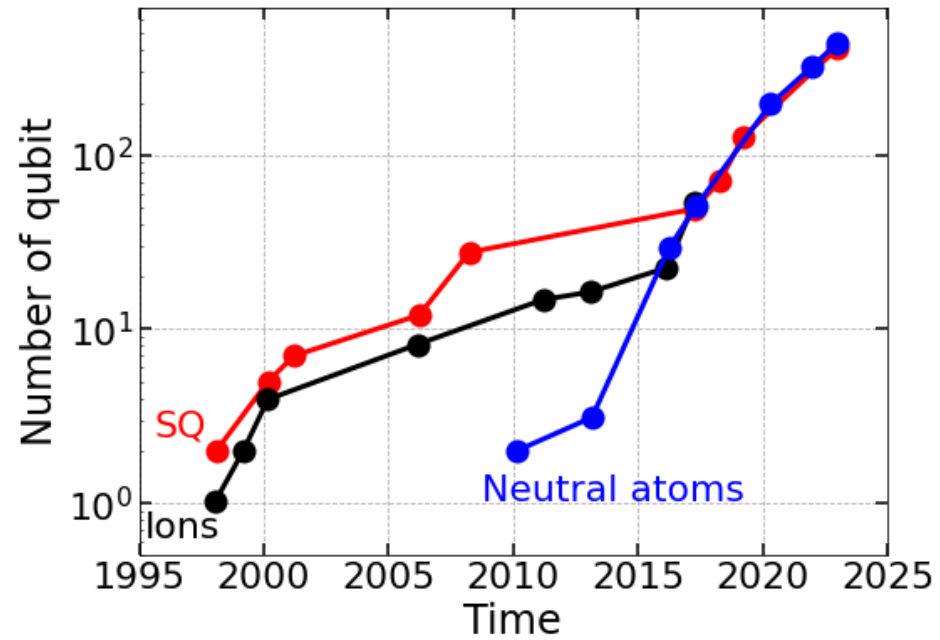


## Large Arrays of Atoms [1]

Single shot 1100+ atoms

[1] G. Pichard, D. Lim, E. Bloch, J. Vaneeckloo, L. Bourachot, G.-J. Both, G. Meriaux, S. Dutartre, R. Hostein, J. Paris, B. Ximenez, A. Signoles, A. Browaeys, T. Lahaye, D. Dreon, in preparation (2024)

# QEC: strong momentum for Neutral atoms



# A Roadmap Articulating Our Vision



## Products

		2022 - 2023	2024 - 2025		2026 - 2027		2028+
<b>QUANTUM PROCESSORS</b>	Generation	<b>Orion Alpha</b> ~3M gates	<b>Orion Beta</b> ~5M gates On premise delivery	<b>Orion Gamma</b> ~10M gates On premise delivery	<b>Vela</b> ~40M gates	<b>Pegasus</b> ~200M gates	<b>Centaurus FTQC QPU</b> 128+ Logical qubits 200M+ gates
	Total hours of QPU for users	500	5-10,000	20-30,000	60-70,000	200-250,000	500-550,000
	Factories	France	Canada	Factory 3			
<b>COMMUNITY</b>	Platform		Learn	Interact	Collaborate		
	Open-source Software Stack	Pulser	Qadence	Solvers & Emulators			

# Mature Products to promote Community-driven application development

