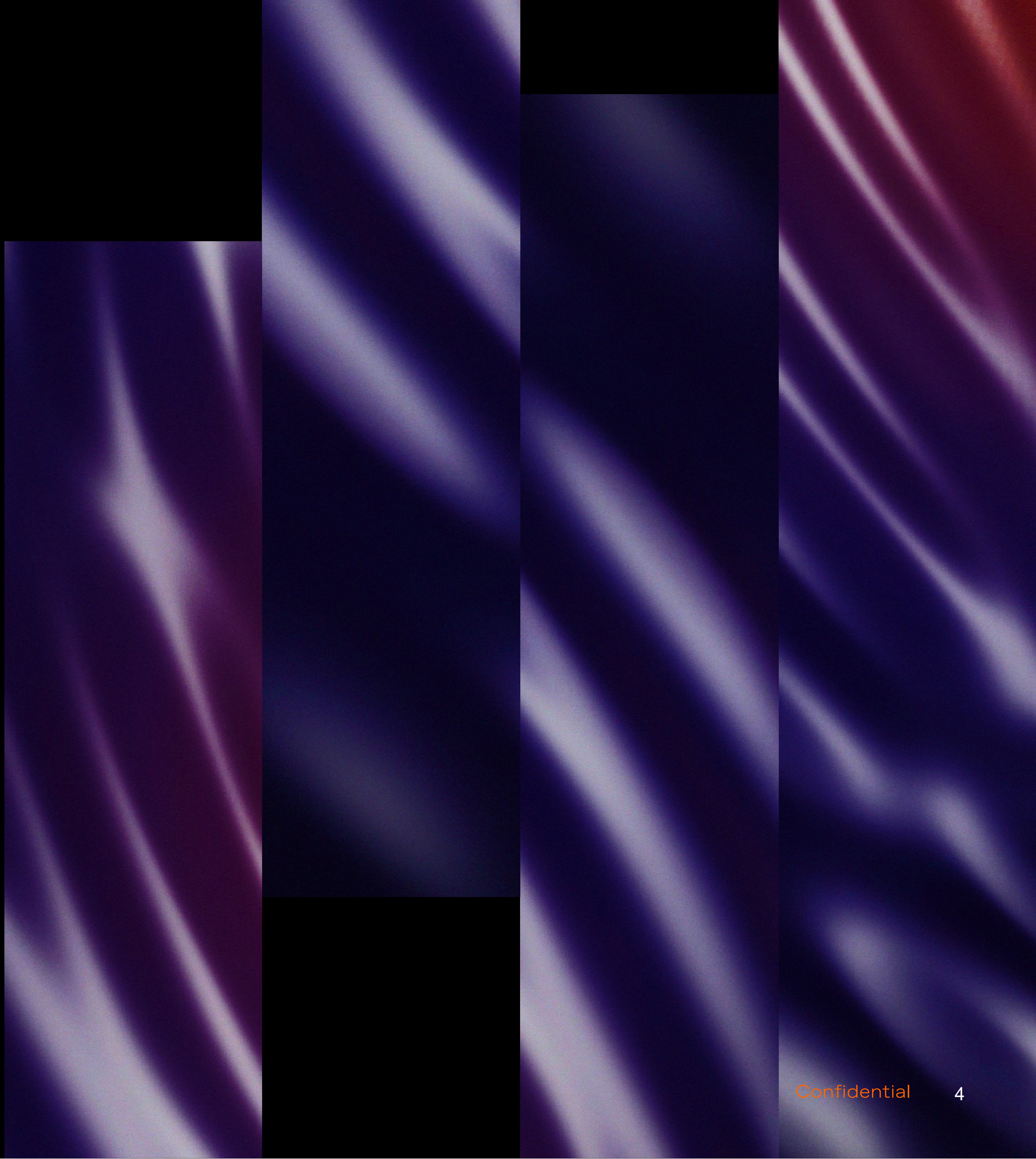
SemiQon™

Powering the million-qubit quantum computing era

What we do

Composable quantum processors with the scale, cost & size of mainstream semiconductor manufacturing

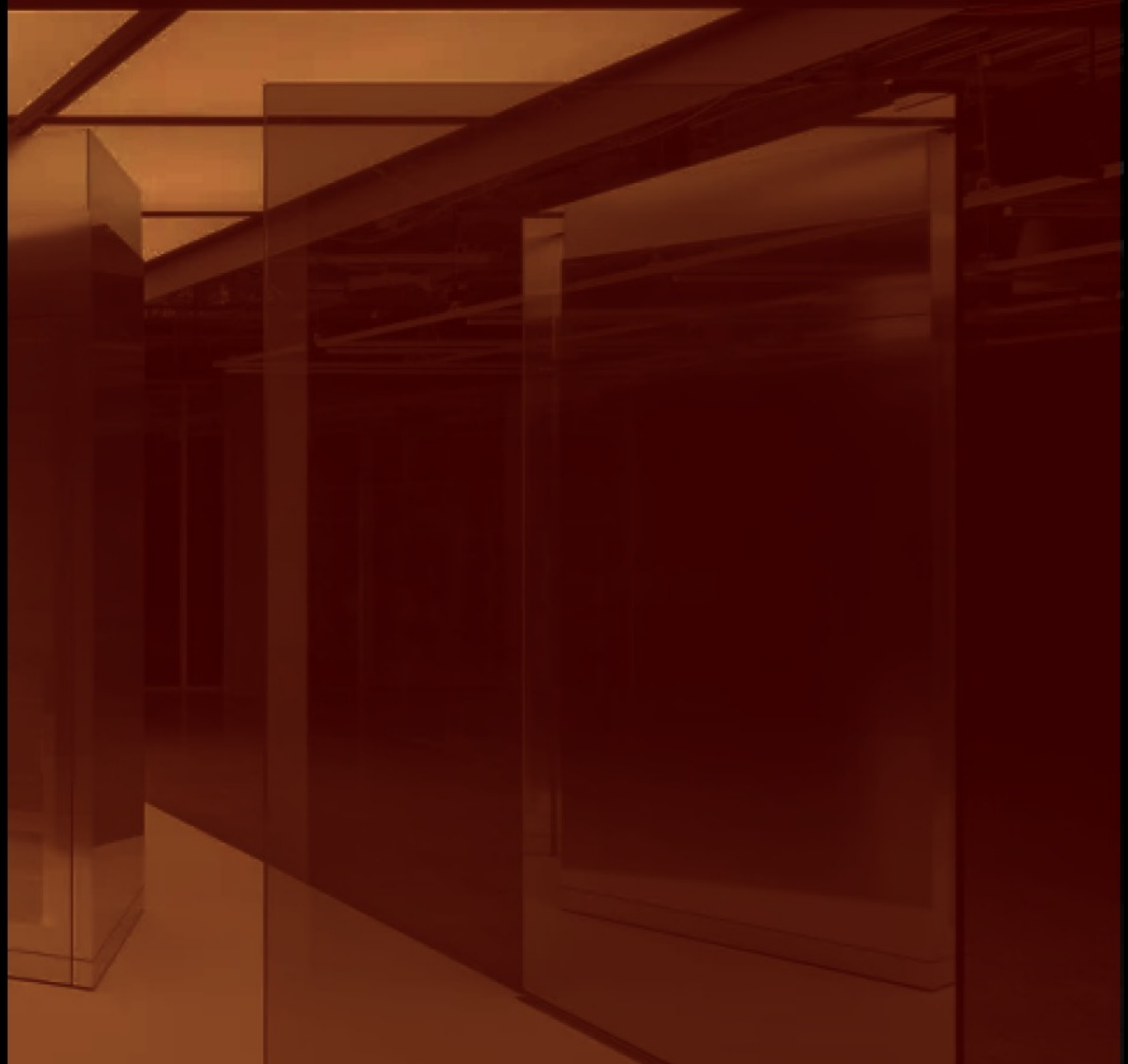
The problem



The problem

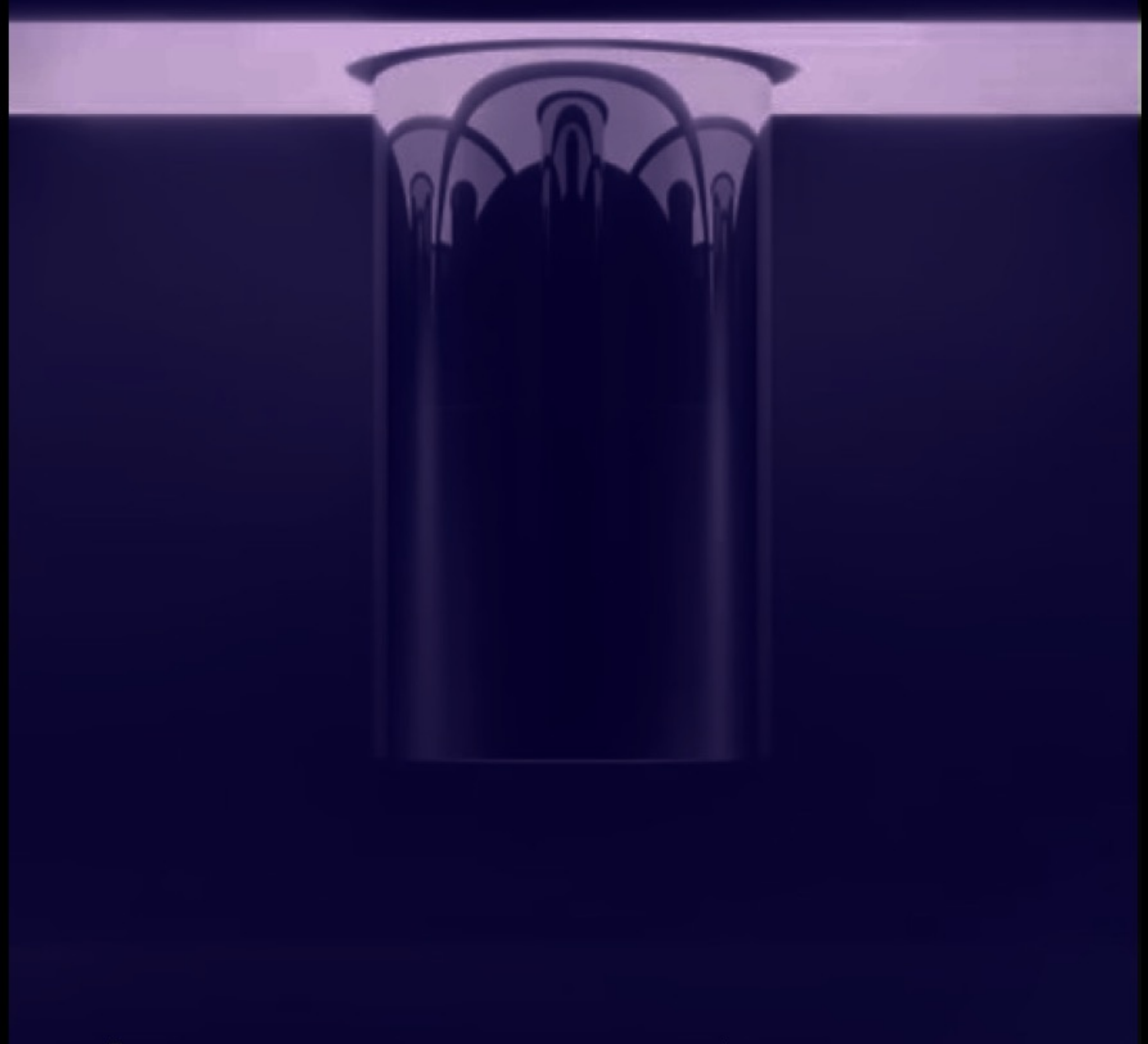
Quantum computers are not useful yet. They are expensive, inefficient, and hard to operate - and already reaching their limits in their current form, despite $Bs invested.

Size



Quantum computers keep getting bigger as they get better. The new IBM machine went from ~7m² to ~40m² with 100 to 1000 qubits. Qubit count still needs to grow 1000x more for them to be useful.

Operating cost



Quantum computers require incredibly expensive control hardware. This is hardly how the future of quantum computing will look.

Manufacturing cost

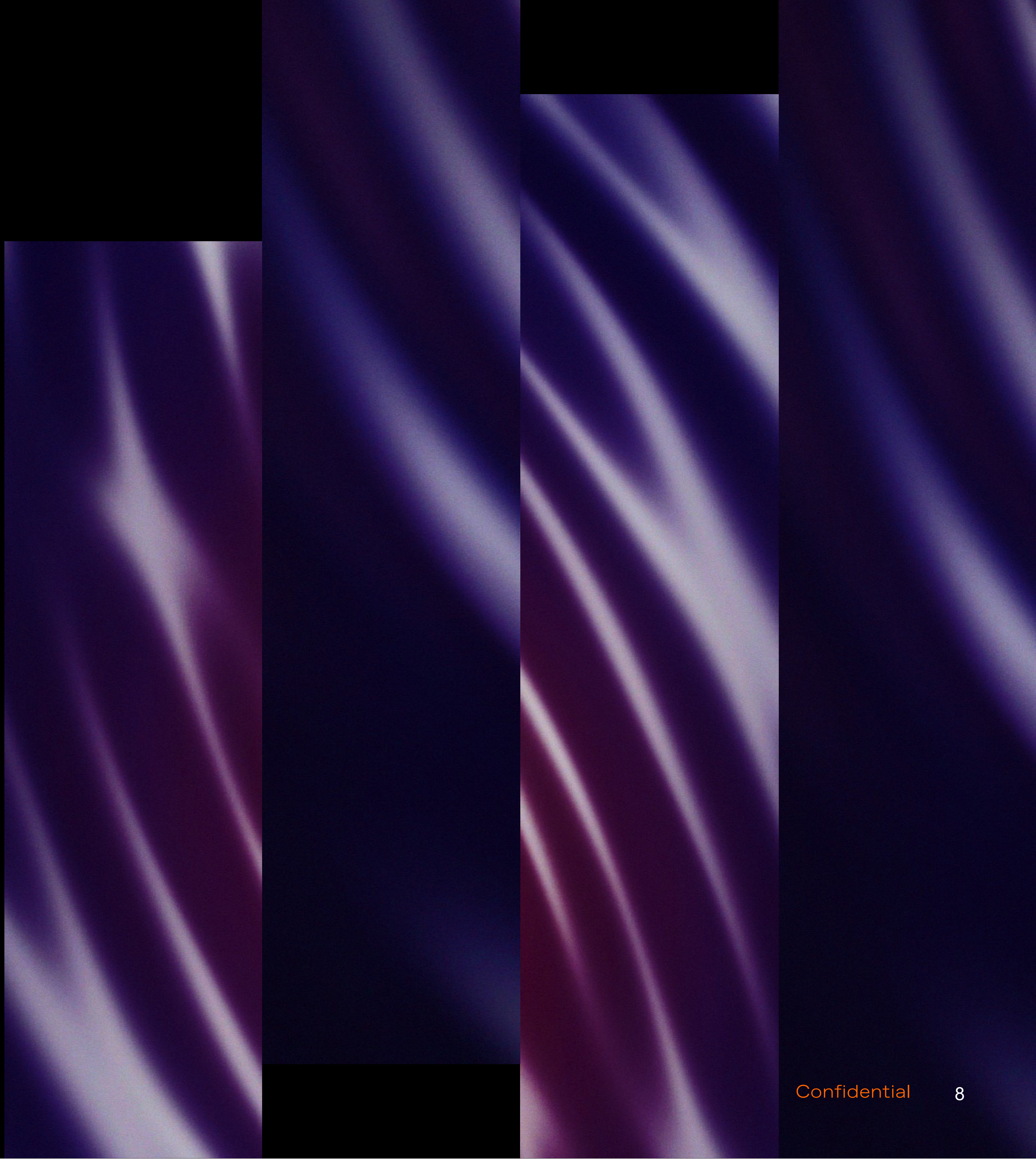
All types of proposed quantum computers require new manufacturing environments and capital investments of $100M+ for building their processors.

The inflection point for the quantum industry will be

Scalability: clear path for moving from handful of qubits to million qubit numbers with qubit quality at scale.

Integration: qubits and cryogenic electronics on the same chip eliminating need for external control electronics.

The Solution



The solution

SemiQon is pioneering silicon spin qubits, an emergent approach that allows the development of quantum processors using established semiconductor tools, materials and processes.

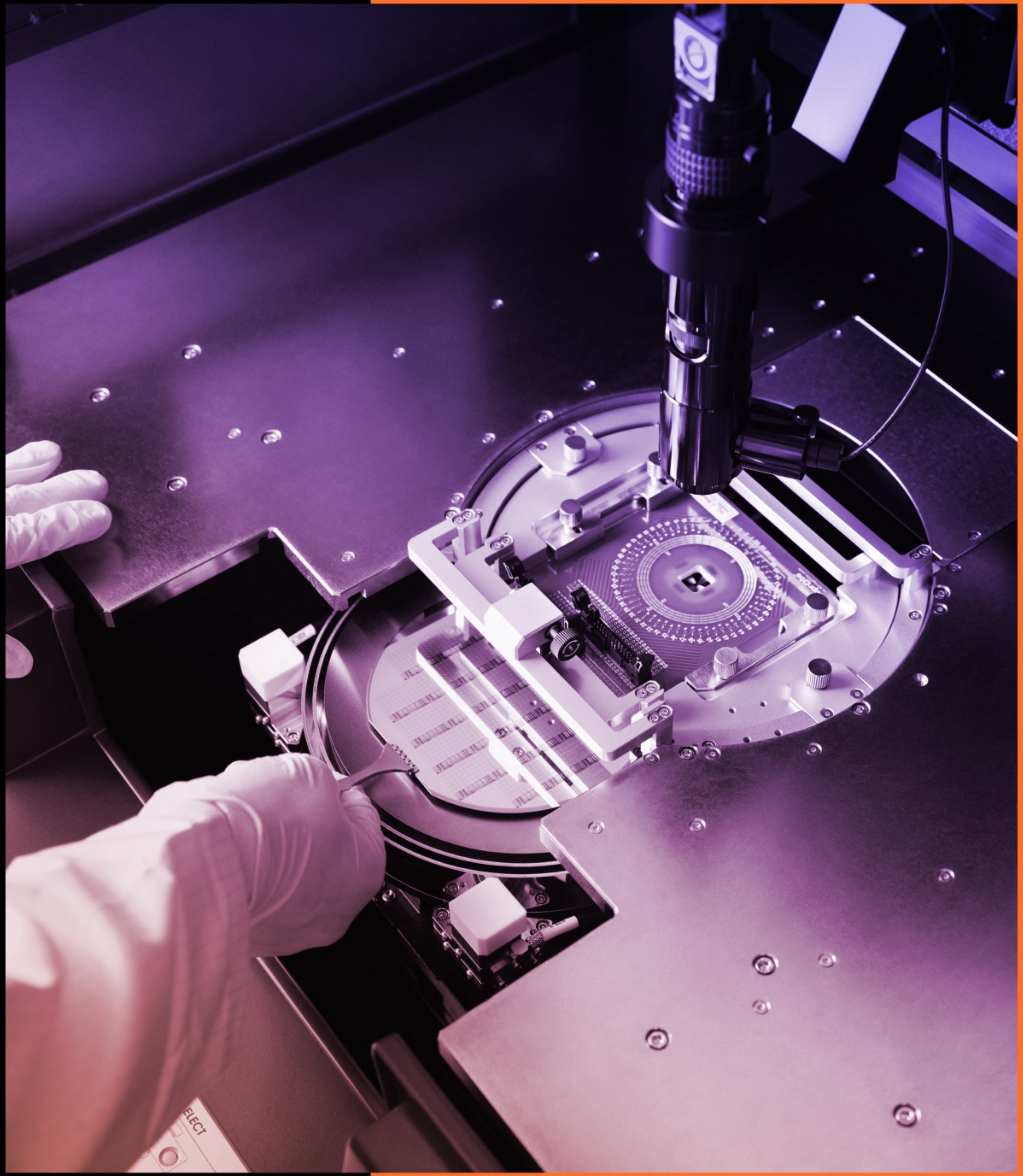
The solution

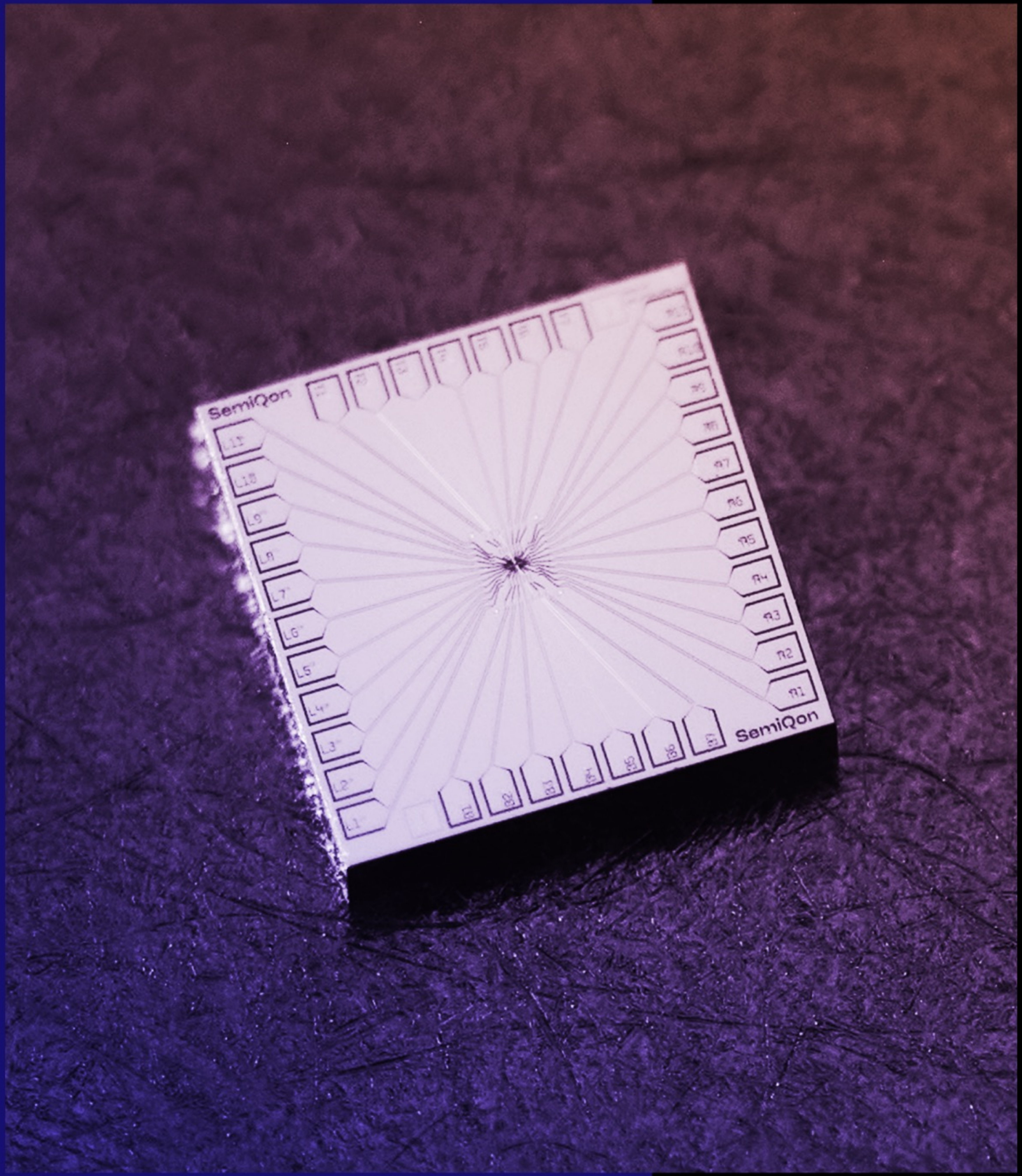
Silicon qubits and processors are 100x smaller in size and significantly cheaper at scale.

Silicon qubits have 100x better temperature tolerance allowing cheaper operations.

Significant size and cost reduction by combining silicon qubits with cryogenic CMOS.

Using existing semiconductor fabrication plants allows production with no capital investment.





The solution

Semiqon will deliver silicon quantum processors with 100+ qubits by 2027, 1000+ qubits by 2030, 100k+ qubits by 2035.

No need for external control electronics to control and read qubits, all on chip – savings of millions.

Solving the most critical piece in quantum – a fast-growing market

~10 billion USD*

Quantum processors & ICs

- Processors that are plug-and-play for quantum computer demonstration
- Additional market with cryogenic CMOS chips

>20 billion USD*

Quantum Computing hardware industry

- This includes enabling technology providers
- Full-stack quantum computers are currently available only on cloud

45 billion USD*

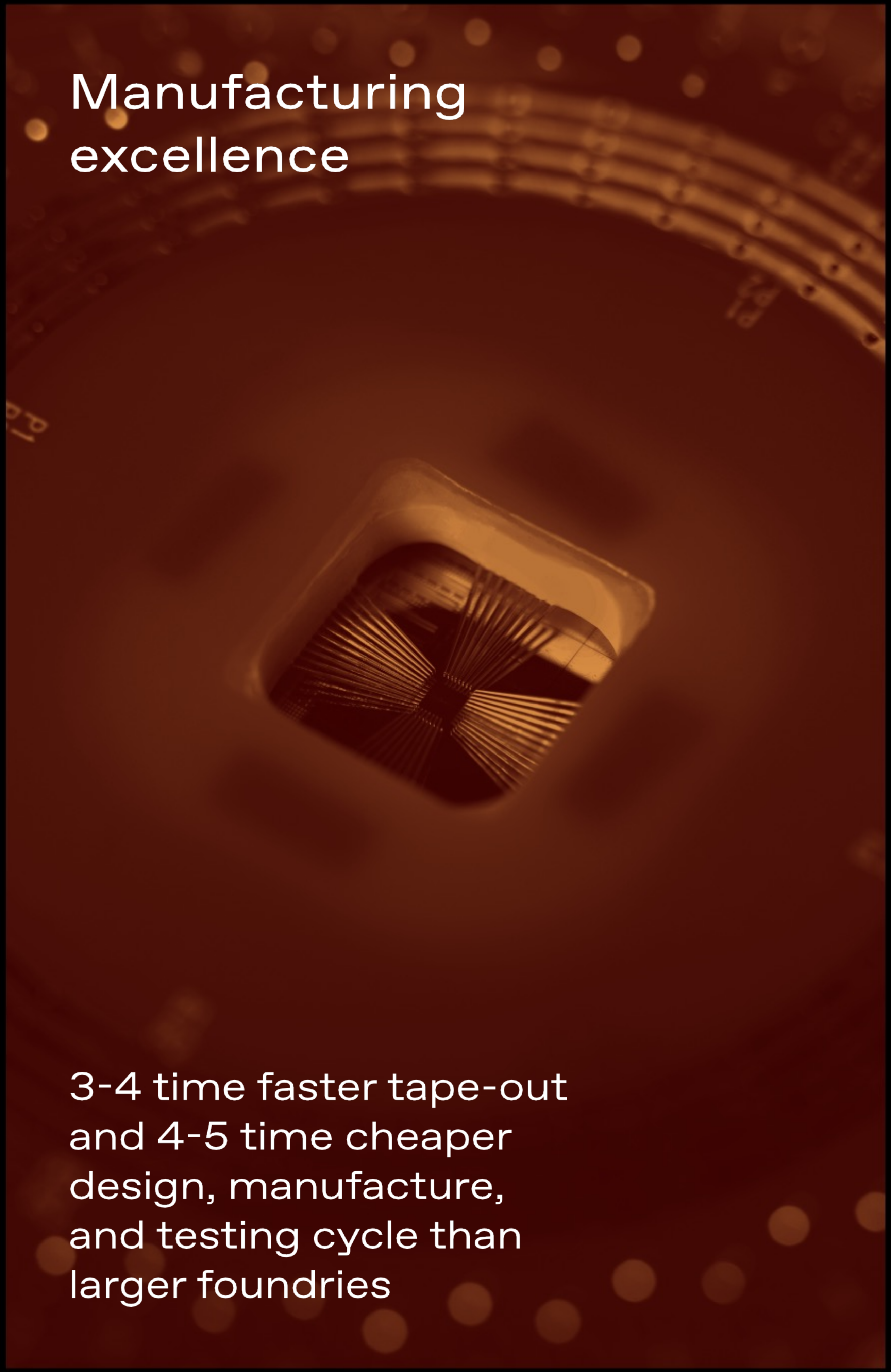
Quantum industry at large (HW & SW)

- Emerging technology – problems unsolvable with classical computing
- Market expected to grow at CAGR 30-40%

Semiconductor-based quantum IC chips and computers
the indispensable solution among many options

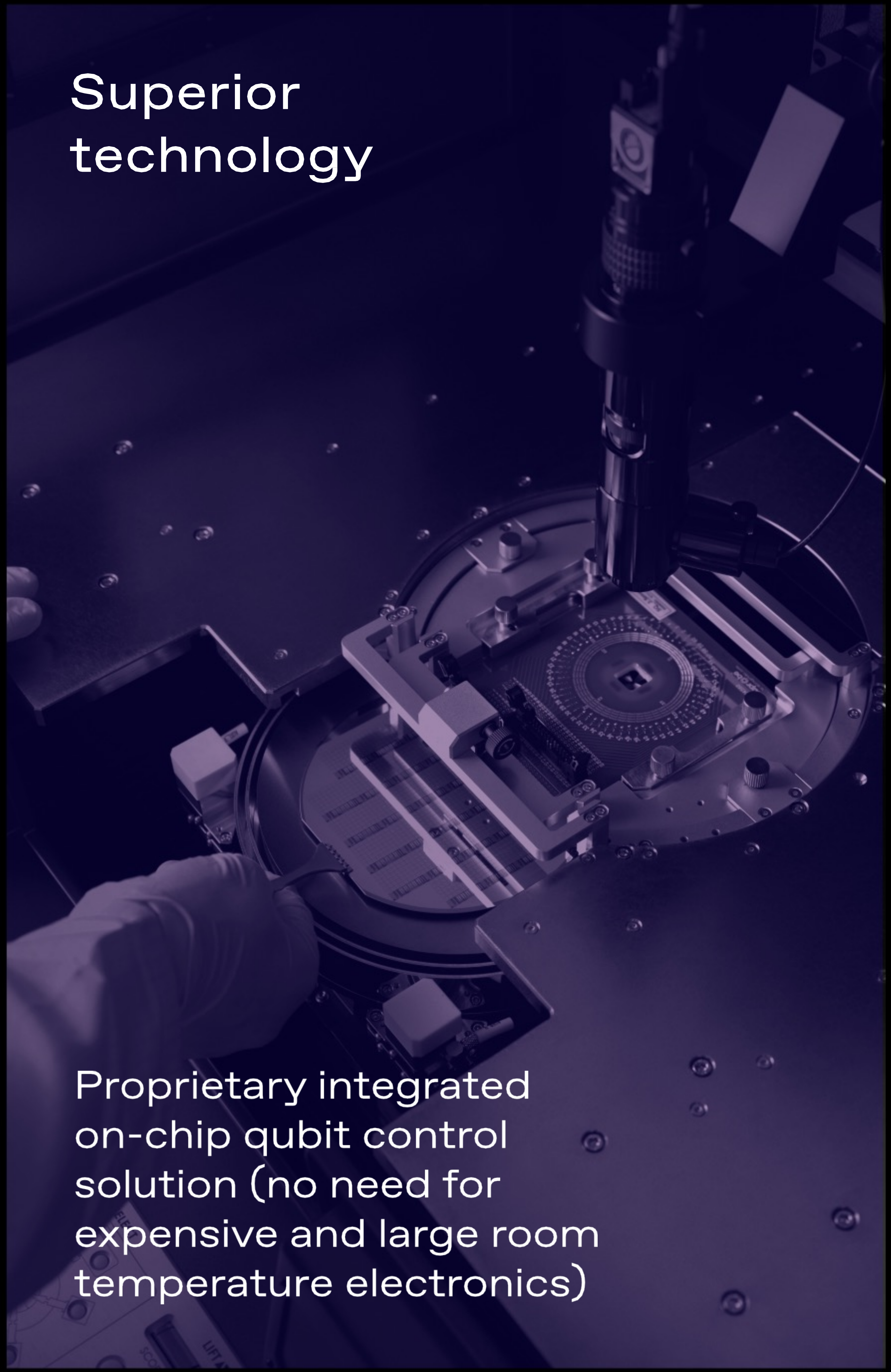
Qubit (quantum processor) modality	Superconducting IBM	Trapped-ion IONQ	Photonics XANADU	Neutral atom PASQAL	Silicon spin SemiQon™
Qubit gate speed How fast a quantum operation can run.	Fast (10ns -196ns)	Slow (1us-3ms)	Very Fast (1ns)	Moderately fast (1us)	Very Fast (0.8ns-80ns)
Qubit real-estate related to size of qubit on a wafer	Large 300 – 500 um for each qubit	Large 2-6 mm for 32 qubits	Large	Large	Small 10-20 nm for each qubit + mm for control electronics
Thermal requirements cost of cooling infrastructure	High 10s of mK	Low Few Ks	High 10s of mK (for detectors)	Very low Room temperature	Low 1K
Other high costs and scalability restrictions	Expensive control electronics and cables. IBM already adapting tandem modules of smaller qubit chips	Ultra-high vacuum requirement. Lasers hard to align and scale. Ion charges restrict scaling. Expensive control electronics and cables	Cryogenic needs for detectors. Photons do not interact with each other. 2Q gate challenges. Expensive control electronics and cables	Ultra-high vacuum requirements. Laser scaling challenge. Expensive control electronics and cables	Cryostat @1K – available already as table-top versions

Our differentiators & moats



Manufacturing excellence

3-4 time faster tape-out and 4-5 time cheaper design, manufacture, and testing cycle than larger foundries



Superior technology

Proprietary integrated on-chip qubit control solution (no need for expensive and large room temperature electronics)

Closed loop: Protected Design and Manufacturing IP

Full ownership over design and process, allowing tight feedback loop and development of proprietary IP

The team

Dr. Himadri Majumdar
CEO

Former Quantum Lead & Global Head of Sales @ VTT
- 10+ years technical sales
- 15 years in electronics & semiconductor research
- Global thought leader in quantum tech

Dr. Janne Lehtinen
C Science O

World leader in Spin-qubit
- Former Research Team Lead, Quantum @ VTT
- Led European initiatives in Quantum

Prof. Mika Prunnila
C Research O

Global authority on cryo-electronics
- 20+ years broad experience in R&D across semiconductor life cycle
- Key advisor to European quantum strategy

Markku Kainlauri
Director, Operations

Leader in commercial semiconductor fabrication
- Former Senior Scientist at VTT with 15+ years in semicon engineering
- Led full lifecycle semiconductor projects, from design to shipping

Prof. Prineha Narang
UCLA, USA

- US Science envoy
- Science and Strategy advisor

Prof. Juha Muhonen
Jyväskylä University, Finland

- European Research Council awardee
- Science and Technology advisor

Mehdi Ghissasi
Google Deepmind
Angel investor

Amar Shah
Wayve co-founder
Angel investor

Charlie Songhurst
Angel investor

SEMIQON'S COMPETITIVE ADVANTAGES

Key requirements for success	SemiQon	Intel	Quobly	Diraq	Quantum Motion	Equal1	**Arque**	Groove
Unique IP - Monolithic integrated QD and cryoCMOS on chip - Ultra-low dissipation transistors (as building block)	Yes	Not making them	No	No	No	No	Not making them	Not making them
Traditional CMOS (Si), not exotic (SiGe, Ge, etc). Exotic materials require special manufacturing, large infra investment.	Si	SiGe	Si	Si	Si	Si	SiGe	Ge
Focus on scaling QPU Some competitors focus on building ineffective full stack machines with handful of qubits, requiring very high investment and scattered focus.	Yes	Yes	No	No	No	No	No	No

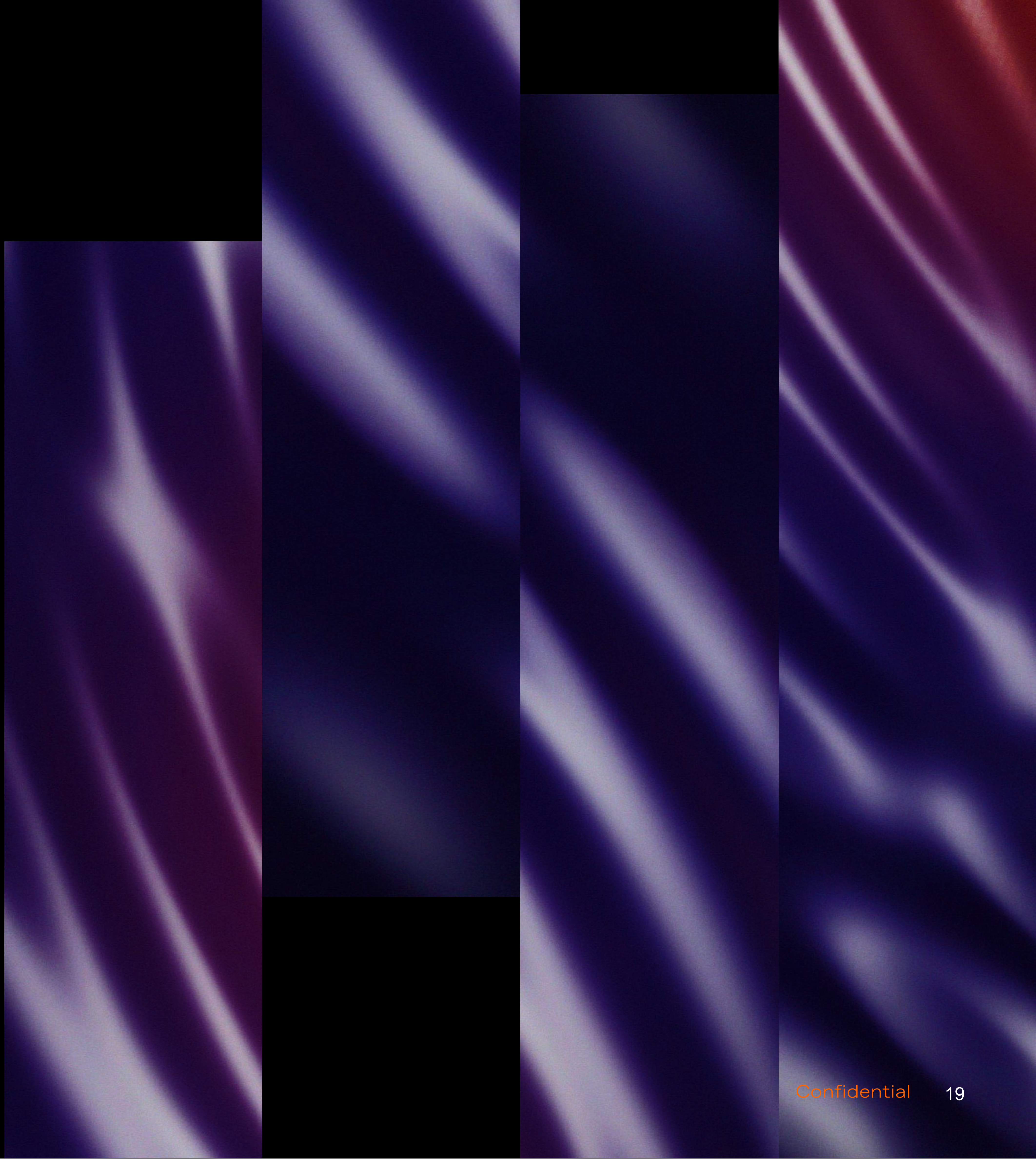
SILICON QUBIT COMPETITIVE LANDSCAPE

SemiQon: capital efficient & high velocity seed stage team, competing at a Series B level, and primed to become the European leader in the space

Company	Years old	Geo	Money raised	Number of qubits	Shipped	Proprietary Fab	Fab cycle*
SemiQon	2	EU	$2M	Working on a 12-qubit chip.	yes	yes	4 months
Intel	50+	US	$100B+	12	yes	yes	3 months
Quobly	2	EU	$20M	2	No	No	1.5+ years
Diraq	5	AUS	$46M	1-5	No	No	1.5+ years
Quantum Motion	5	UK	$64M	1-5	No	No	1.5+ years
Equal1	6	UK/US	$13M	0	No	No	1.5+ years
Arque	1	EU	-	-	No	No	1.5+ years
Groove	1	EU	-	6	No	No	1.5+ years

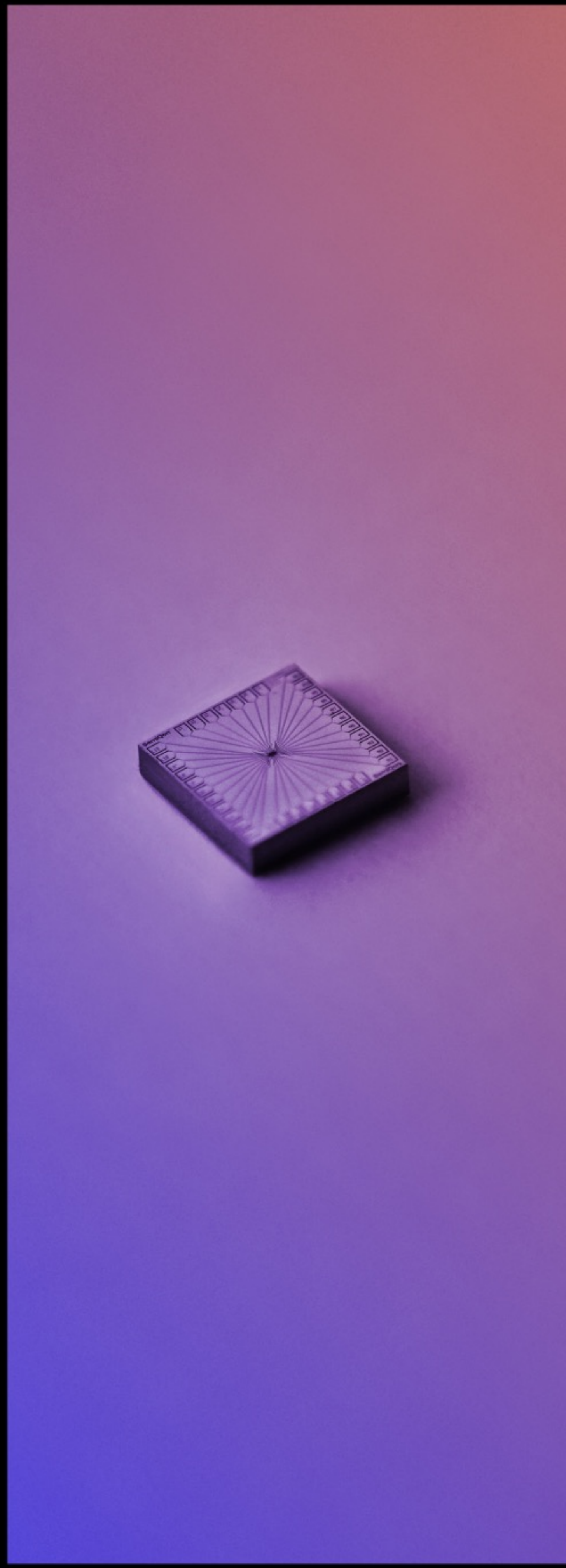
*fab cycle is length of design, manufacturing & preliminary testing of one generation of quantum processor chip

Achievements of the SemiQon team to date



Commercial

R&D



Pre-seed Round

Secured pre-seed funding within 6 months, led by Voima Ventures, Lunar Ventures, and tiny.vc, with notable angels.

Strategic Partnerships

Established collaboration with Qblox within 1 month and got project funded by EIC; strategic partnership with CMC microsystems within 3 months, potentially opening doors to the US and North American market. Sub-contractor agreement with IQM to provide cryogenic switches. Commercial agreement with SDT in Korea.

Quantum Dot Technology

Developed state-of-the-art quantum dot technology demonstrating low noise levels essential for scalable quantum computers before incorporation.

First Fabrication Run

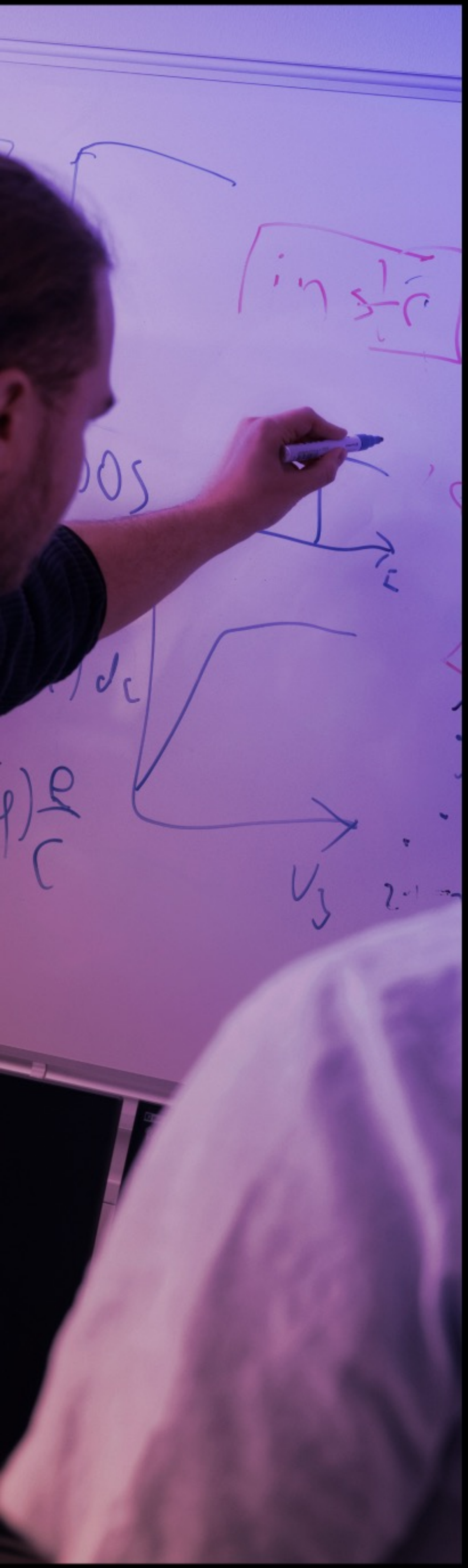
Successfully produced a batch of 1.5k chips with 12 qubits each, surpassing industry standards within 6 months (compared to competitors with fewer qubits).

Key Measurements

Conducted initial measurements to validate low noise levels and build first qubits, progressing towards single and two-qubit gate demonstrations.

Key Patents

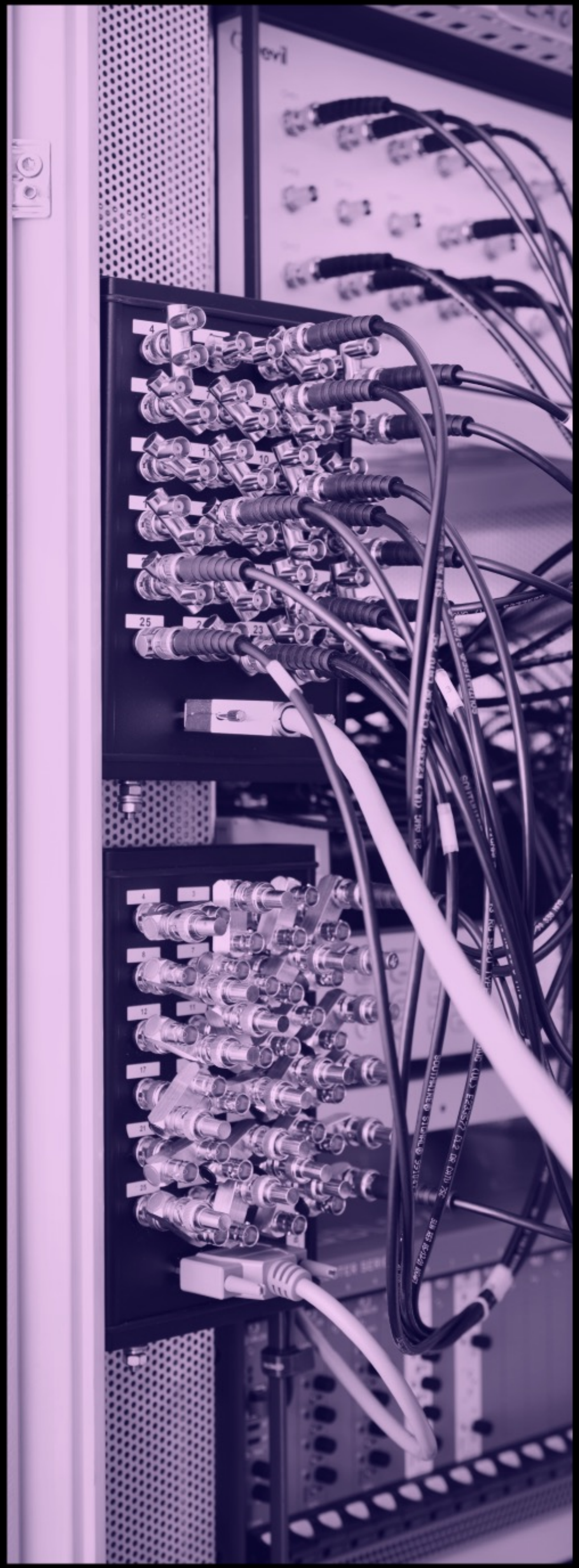
5 patents filed, and multiple invention disclosures lined to be patented. Licensed patent from VTT further strengthened geographically.



Manufacturing

Lab and Fab Access
Gained fabrication facilities and started manufacturing within 2 months of operation. Built the test facility within 9 months with installed cryostat and other equipment, enabling rapid prototyping despite global chip shortages.¨

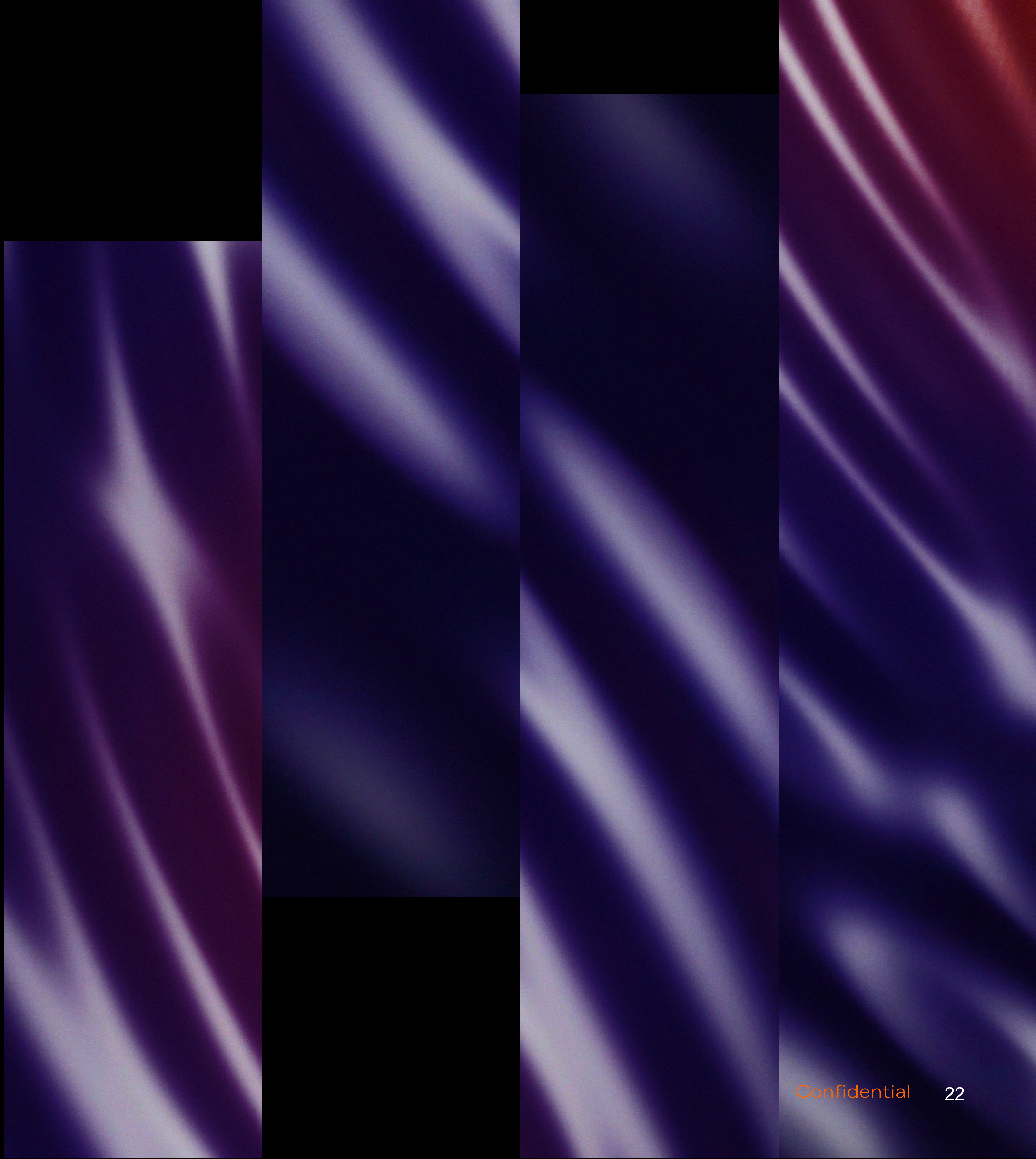
Three Fabrication Runs
Completed three fab runs within 1 year to produce improved devices and validate reproducibility and yield. This is 4x faster than global throughput.



Team Expansion

Key Hires
Added 7 key members over past 1.5 years, enhancing the team's measurement and device development capabilities.

SemiQon growth plan 2025-27



SemiQon growth plan 2025-2027

Build a commercial team to streamline potential revenue from sales of around 0.5M€/year, predominantly from cryo-CMOS product.

Technical goal is to reach a processor with 100+ qubits and cryo-CMOS for sale in 2027.

Increasing production volume with small investment in dedicated space and equipment on top of the confirmed Finnish national pilot-line foundry investment of 0.5B€ through Chips act.

SemiQon growth plan 2025-2027

Design, test, and measurement capability expansion in

- → Circuit design software licensing
- → Second cryostat and measurement setup

Technical team expansion from 12 (end of 2024) to 25 (end of 2027)

- → Circuit design experts and other design capabilities to increase design complexity and iterations
- → Increase manufacturing personnel for production and to have more design and fabrication iterations
- → Increase measurement personnel to support measurements in both cryostats and measurement setup – quicker measurement and analysis before shipping chips

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