Quantum

The Birth of an Industry

Grégoire Ribordy

20 YEARS SWISS PHOTONICS

October 21st, 2026

Historical Perspective

The Quantum Revolutions

Planck's quantum theory

1900

Letter from Werner Heisenberg to Wolfgang Pauli proposing a new model for quantum theory

1925

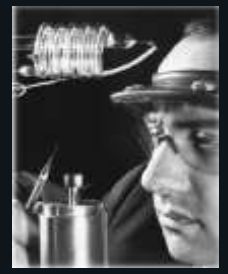
INTERNATIONAL YEAR OF Quantum Science and Technology

2025



The Quantum Revolutions





Planck's quantum theory — 1900

Transistor — 1947

Laser — 1960

1925

The 1st quantum revolution

Observation and macroscopic manifestation of quantum principles
Underpins today's technologies including lasers and semiconductors

The Quantum Revolutions





Planck's quantum theory

"Nature isn't clasical"

BB84 QKD Protocole

1900 1925 1947 1960 1981 1984

The 2nd quantum revolution

Active manipulation of single quantum particles and interaction of multiple particles for applications

Quantum Sensing

Nobel Prize 2012



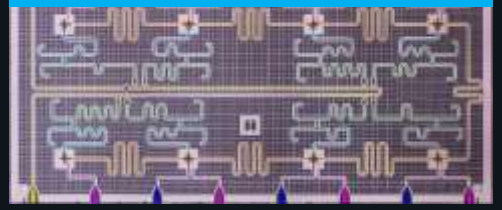
Quantum Communications

Nobel Prize 2022



Quantum Computing

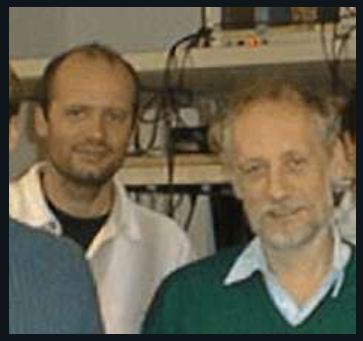
Nobel Prize 2025



The Quantum Revolutions

TELECOM PTT

UNIVERSITÉ DE GENÈVE



Pr. Nicolas Gisin & Hugo Zbinden

Planck's quantum theory

1900 — 1925 — 1947 — 1960 — 1981 — 1984 — 1993

The 2nd quantum revolution

Active manipulation of single quantum particles and interaction of multiple particles for applications

Quantum Communications

Nobel Prize 2022



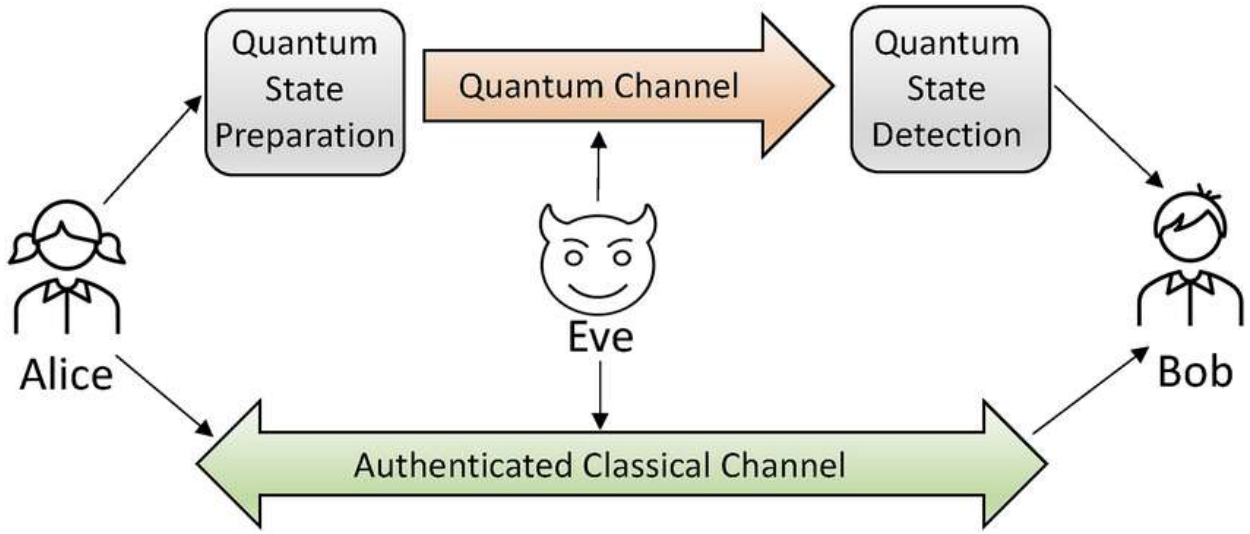
Quantum Key Distribution (QKD) at the University of Geneva



What is QKD? – Quantum vs. Quantum

Cybersecurity Context

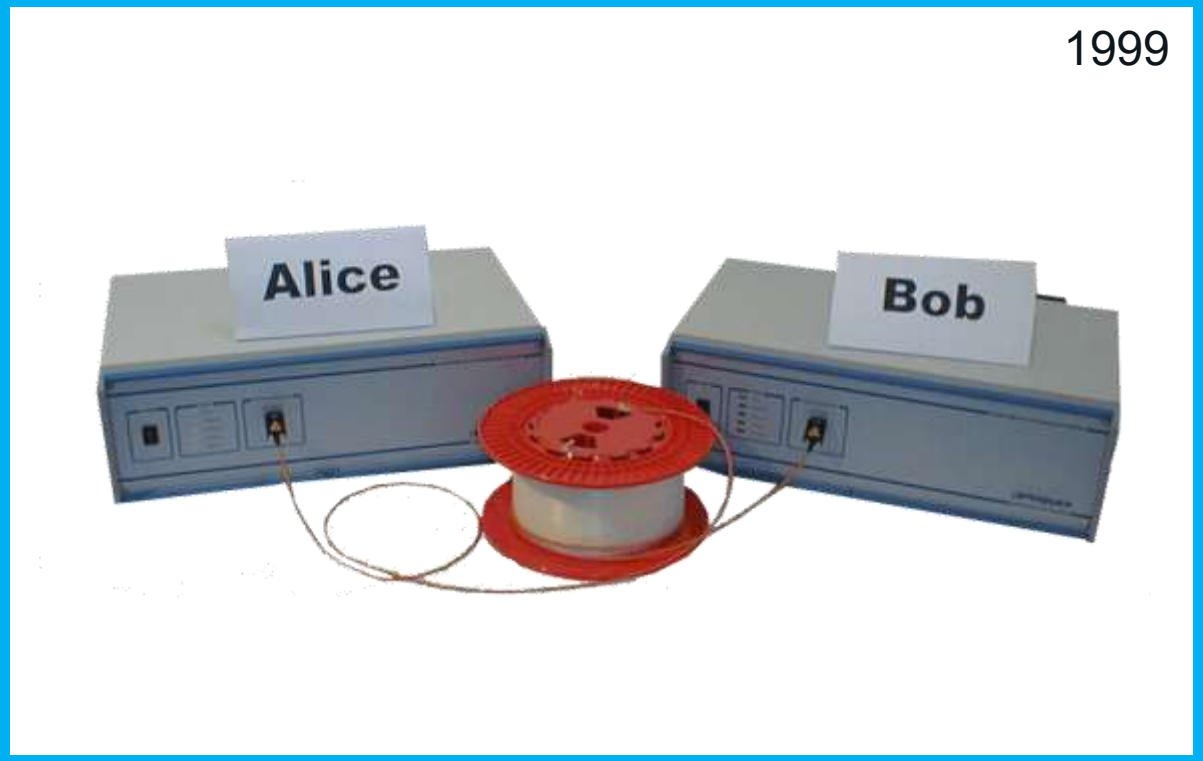
- Cryptography is used everywhere (secure communication, online commerce and banking, etc.)
- It relies heavily on public key cryptography to solve the key distribution problem
- Public key cryptography offers only computational security
- Since 1994 (Shor's algorithm), it is known that quantum computing will make public key cryptography vulnerable
- New cryptography must be implemented by 2030



Quantum Key Distribution
Process relying on the laws of quantum physics to distribute a secret sequence of bits with information theoretic security

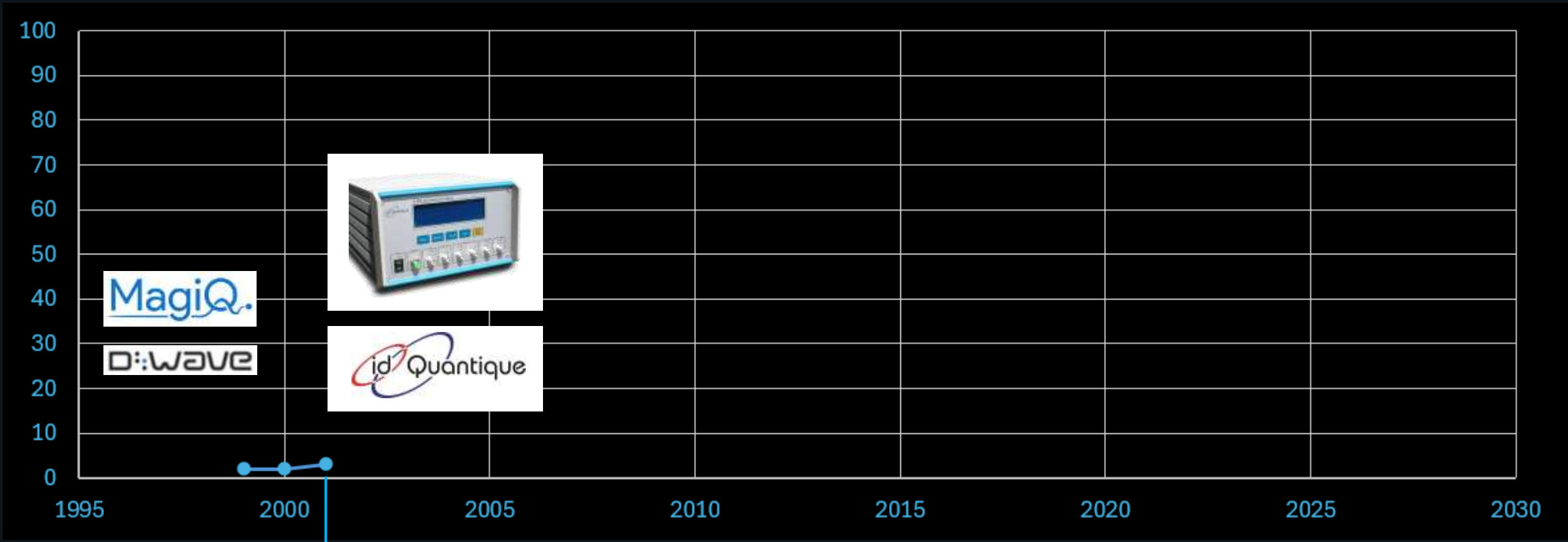
Quantum Key Distribution (QKD) at the University of Geneva





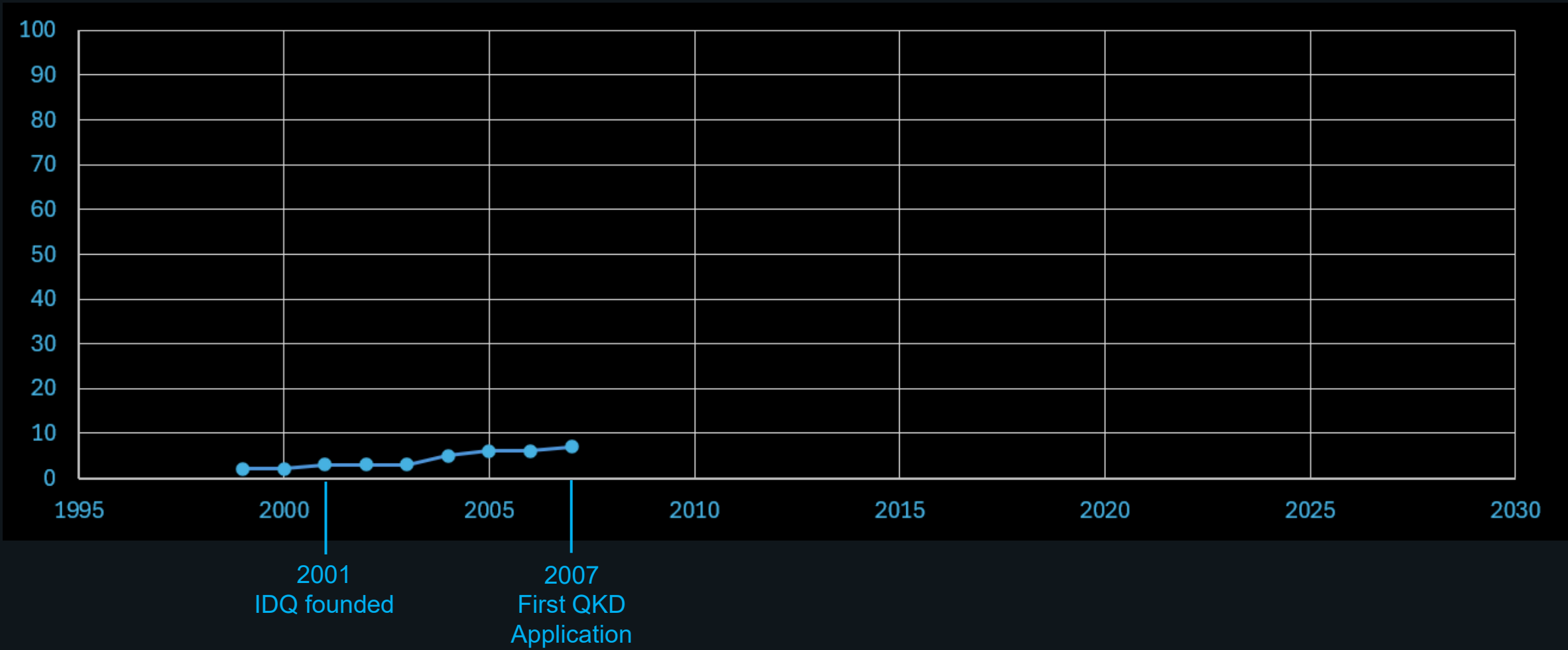
Quantum Industry

Number of pure plan quantum companies



Quantum Industry

Number of pure plan quantum companies



Quantum Networks

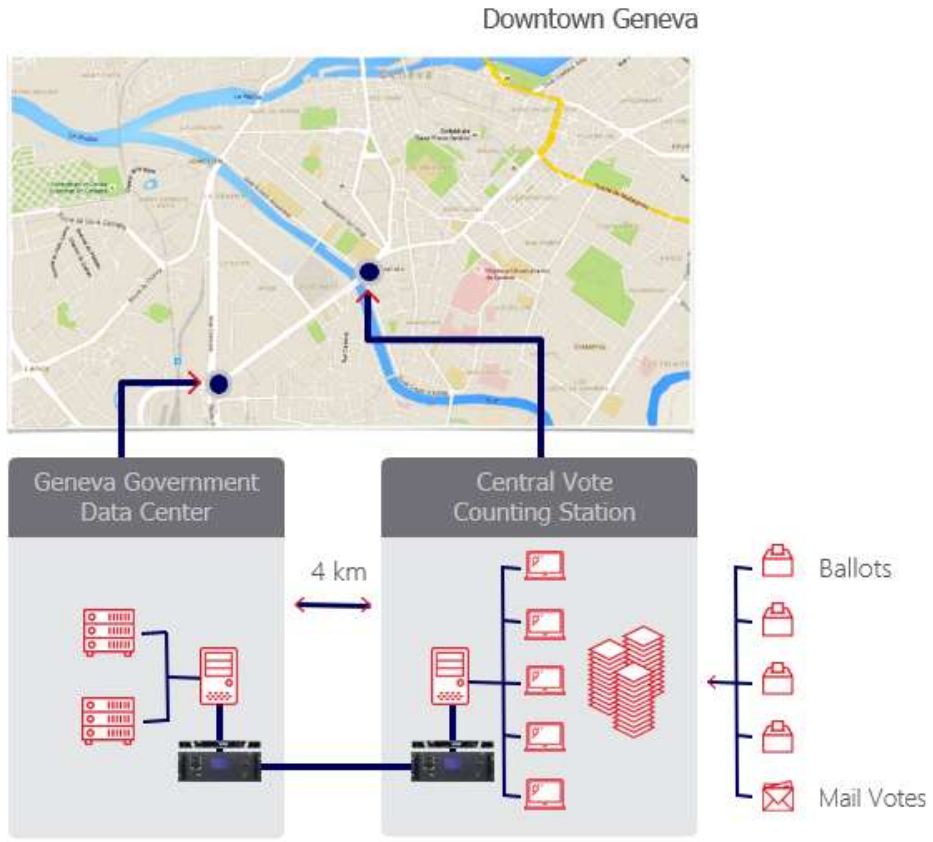
REPUBLIQUE ET CANTON DE GENEVE
Chancellerie d'Etat
Service communication et information

Press release of Geneva State Chancellery

Geneva, October 11th 2007

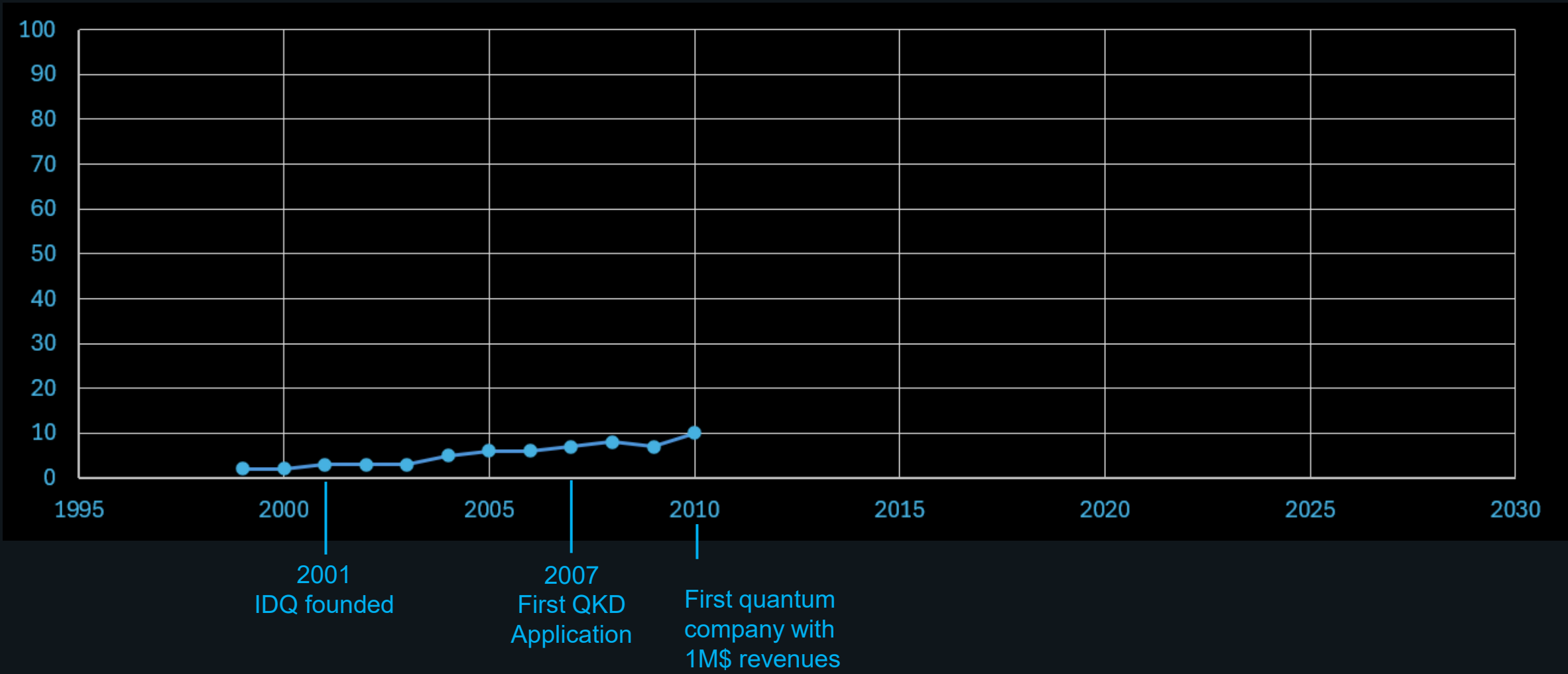
Geneva is counting on Quantum Cryptography as it counts its Votes

The Swiss national elections on October 21 will mark a world first for Geneva as the canton employs quantum cryptography to protect the dedicated line used for counting its ballots. This unbreakable data code was conceived by the University of Geneva and developed industrially by its spin-off, *id Quantique*. With this

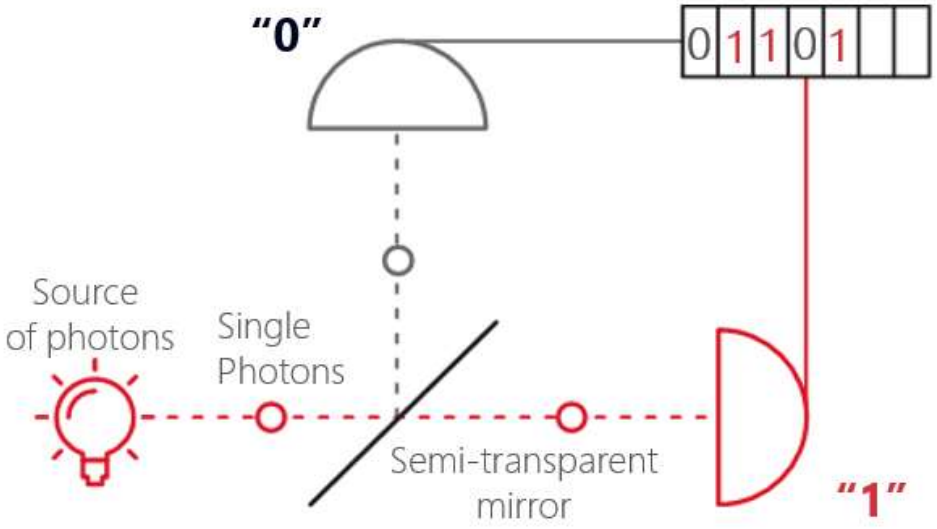


Quantum Industry

Number of pure plan quantum companies



Quantum Random Number Generation



UNIVERSITÉ DE GENÈVE



2001

Innosuisse

EPFL



2004



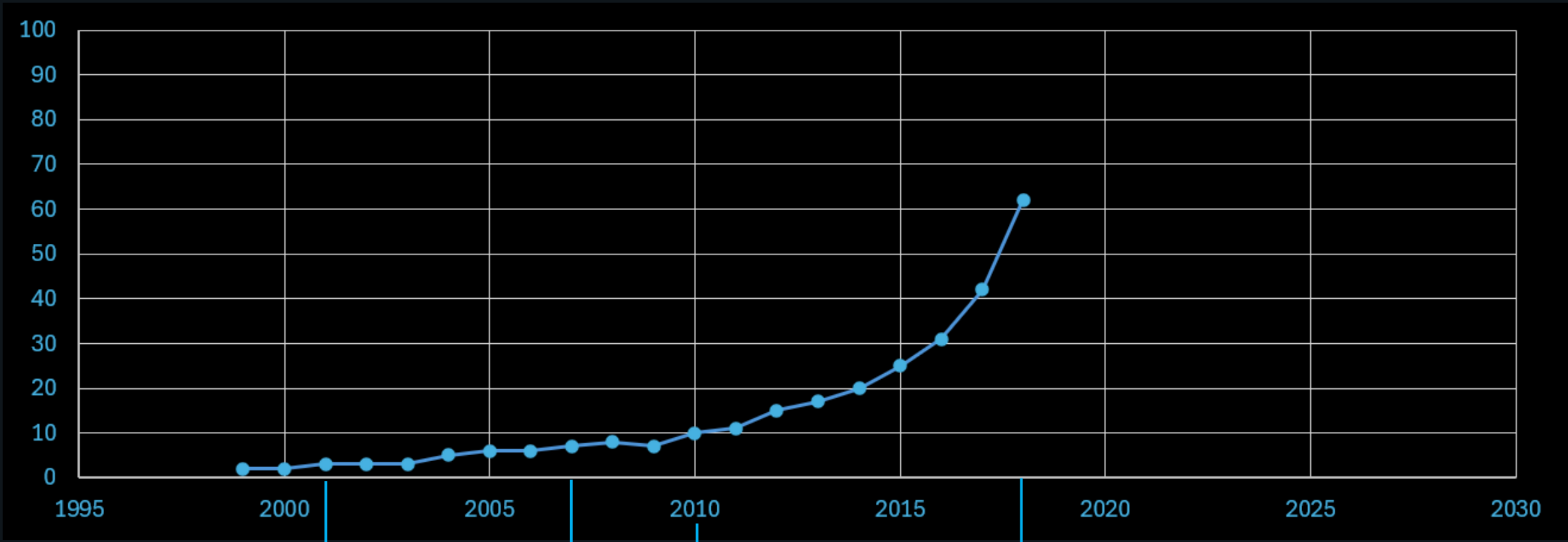
SK telecom



2018

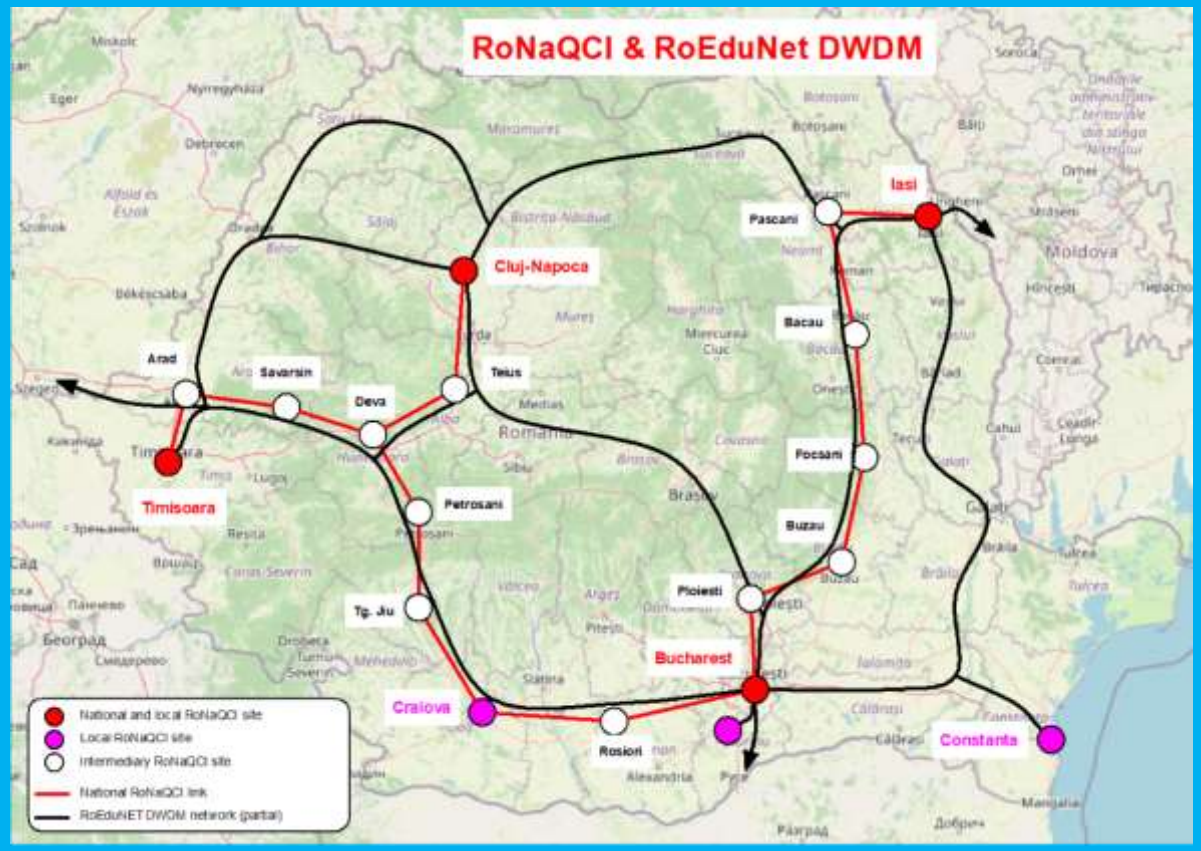
Quantum Industry

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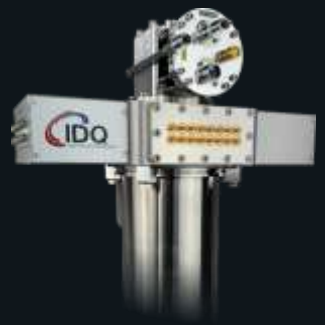
Quantum Networks





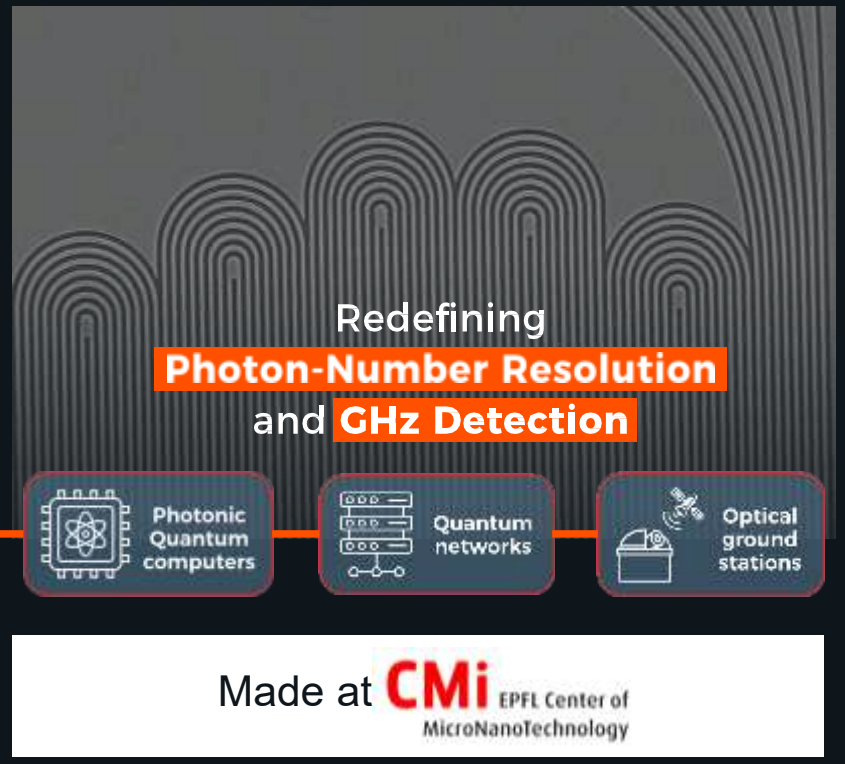
Superconducting Nanowire Single-Photon Detectors

Frontier Quantum Science





Enterprise-ready



	2001	2026
Technology	SPAD	SNSPD
Detection efficiency	10%	>90%
Dark counts	~5000 Hz	<1 Hz
Timing jitter	~500 ps	~10 ps
Afterpulsing	1%	None
Detector T	~223K	4K

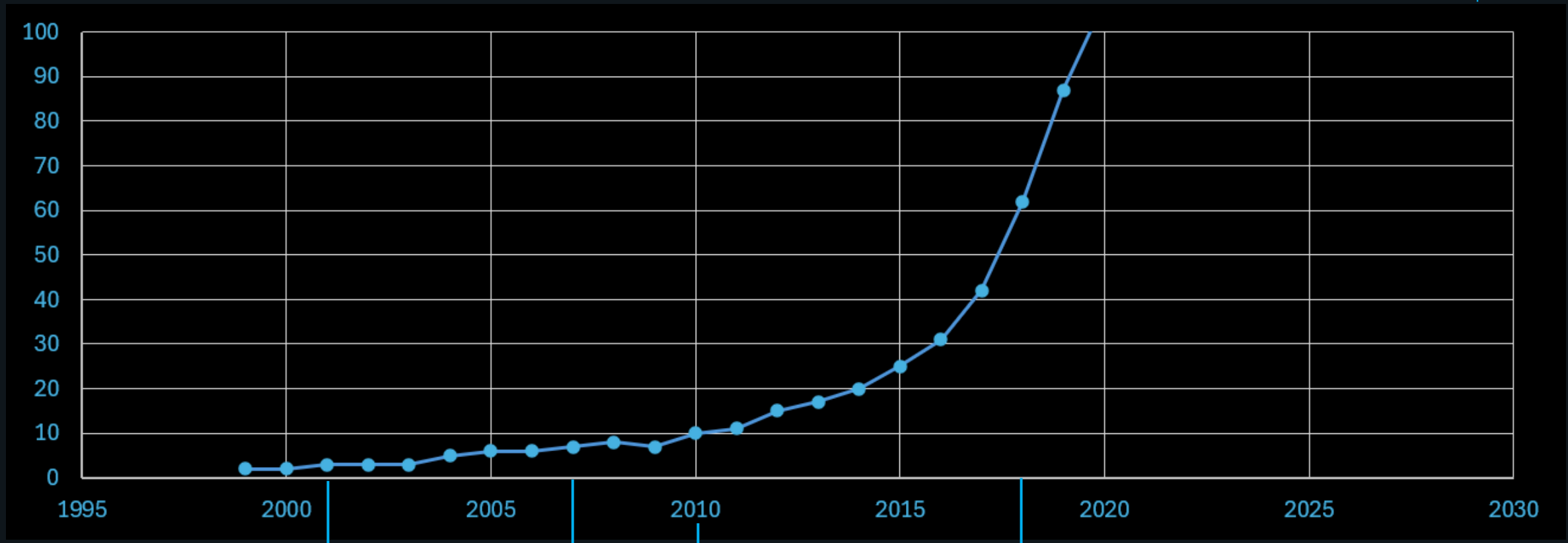
IDQ’s fundraising journey



Quantum Industry

Number of pure plan quantum companies

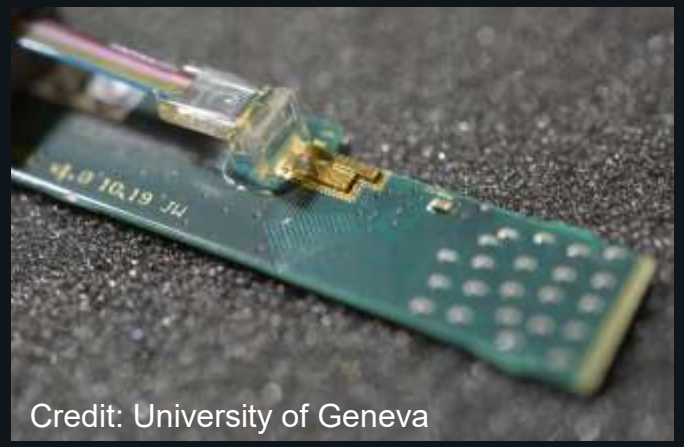
2025
Quantum companies: ~500
Total Revenues[1]: ~2B$
Venture Capital[2]: 12B$
Public investment[3]: 66B$



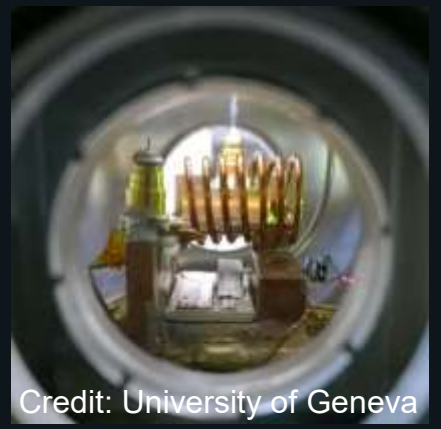
[1]: QED-C 2026 State of Quantum report
[2]: McKinsey Quantum Monitor 2026
[3]: Qureca 2026 Report on Quantum Initiatives

Outlook – Quantum Communications

QKD Devices


Credit: University of Geneva

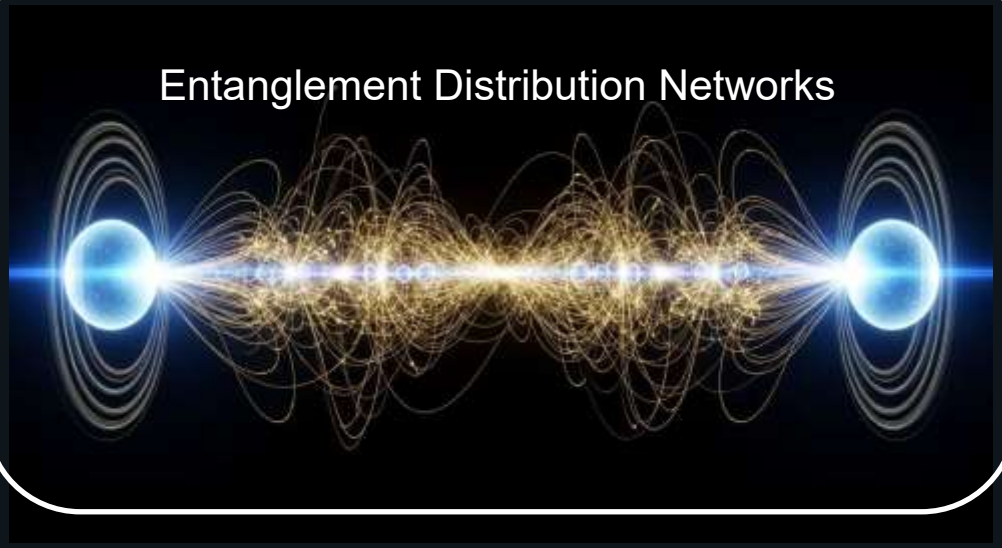
Quantum Memories


Credit: University of Geneva

Satellite QKD



Entanglement Distribution Networks



SQIN connects the Swiss quantum industry

The Swiss Quantum Industry Network creates access, exchange and a common voice.

Next meeting: 25 November 2026

≈30

organizations in the network; around 20 regularly active.

Est. summer 2024

under the leadership of Swissmem – together with industry, SATW and SCNAT.

WHO PARTICIPATES

01 Industrial companies & SMEs

Evaluate new fields of application and introduce requirements.

02 Start-ups & technology providers

Bring solutions, services and components into the value chain.

03 Researchers

Provide links to academic research.



Join us for a stronger ecosystem.

Start-ups, SMEs and large companies with experience in quantum technologies or an interest in their market applications are welcome.

CONTACT US NOW

No Swissmem membership required; admission is managed through the network.

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