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2025 Global Quantum Computing Industry Development Outlook

Quantum Technologies Annual Report Series

February, 2025

Definition of Quantum Computing

The research subject of this report is the Quantum Computing Industry. A quantum computer is a kind of computing device built on the principle of quantum mechanics. It is a physical system that takes a qubit as the basic unit and uses quantum properties such as interference, superposition, and entanglement to evolve quantum states through quantum gate operation, and finally obtains calculation results through measurement.

Different from classical computers, quantum computers use quantum parallelism and quantum state evolution to achieve exponential acceleration over classical computing on specific problems, which has great strategic significance and scientific value, and is one of the important means to achieve future computing-power leap.

The quantum computing industry is a comprehensive industrial system based on the principles of quantum mechanics and centered on the research and development, manufacturing, application and ecological construction of quantum computers.

The main technical routes include: superconducting, ion-trap, neutral-atom, photonics, semiconductor, diamond color center, topology and other technical routes, and the core difference is: physical carrier (circuit/ion/photon), control energy scale (microwave/optical frequency/electrostatics), environmental requirements (low temperature/vacuum/magnetic field) and expansion bottleneck (decoherence/crosstalk/photon loss).

Global Financing Is Picking Up.

Number and Amount of Global Quantum Computing Enterprise Financing in 2024 (in Million USD)

- USA is still far ahead in the scale of financing and the number of financing deals in the field of quantum computing.
- Europe has a high level of investment and activity in the field of quantum computing.
- There is still a large gap between China on one hand and USA and Europe on the other hand.
- In the future, as more countries and regions lay out the quantum computing industry, regional decentralization will be further accelerated.

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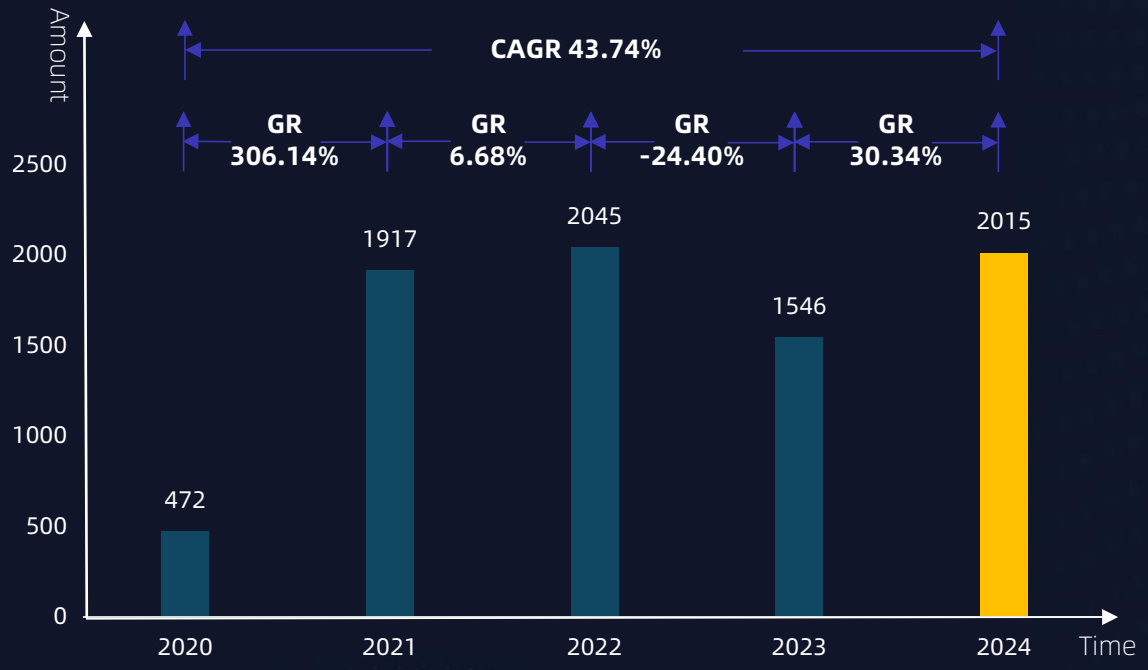
Total Funding Is Up from 2023 and on Par with 2022.

Global Quantum Computing Sector Funding, 2020-2024 (in Million USD)



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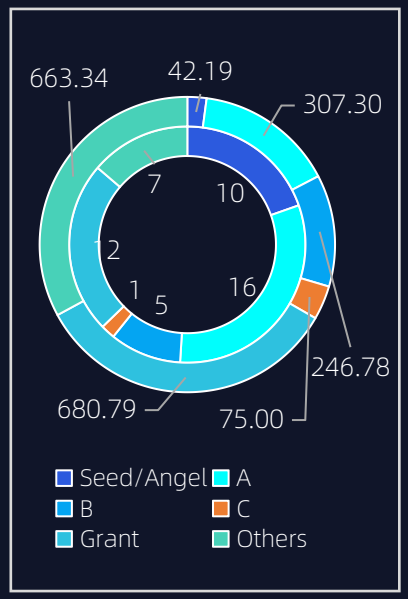
The overall investment and financing scale in 2024 increased by about 30.34% compared with 2023, indicating that global investors have recovered their investment enthusiasm for quantum computing and are optimistic about the future development of quantum computing.

However, it should be noted that the substantial increase in 2024 is premised on a sharp decline in financing in 2023. Moreover, the total financing amount in 2024 has not yet reached the level of the total financing in 2022, so it is inappropriate to be overly optimistic.

Financing Rounds Relatively Dispersed, Still in the Early Stages of Funding.

Distribution of Companies and Financing Rounds in the Global Quantum Computing Sector in 2024 (in Million USD)

Seed/Angel	$42.19M 10 Fin.
A	$307.30M 16 Fin.
B	$246.78M 5 Fin.
C	$75.00M 1 Fin.
Grant	$680.79M 12 Fin.
Other	$663.34M 7 Fin.



	Superconducting	Ion-trap	Atom	Photonic	Semiconductor	Other Hardwares	Softwares
Seed/Angel	QOLAB			QUANFLUENCE		ARCTIC INSTRUMENTS, ZWDX 中微达信	瀚海量子 Hanhai Quantum, CAVERO, QMill, kvantify
A	QOLAB	华翊量子 XYQ, 华翊量子 XYQ	planqc	QUANTUM SOURCE	diraq, diraq	Maybell QUANTUM CORRIDOR, QUANTUM BRILLIANCE, QBLOX	MULTIVERSE COMPUTING, 微观纪元 MiQro Era, QUANSCIENT
B	OQC						QCi, QUNASYS, QCi, Q-CTRL
C							river lane
Grant	rigetti, QILIMANJARO QUANTUM TECH, ATLANTIC QUANTUM	Quantum Art		PsiQuantum	EeroQ QUANTUM HARDWARE	Quantum Transistors	river lane, ephos, BlueQubit
Other	rigetti, D-Wave The Quantum Computing Company	QUANTINUUM	atom computing	QCi		C12, QPHOX	

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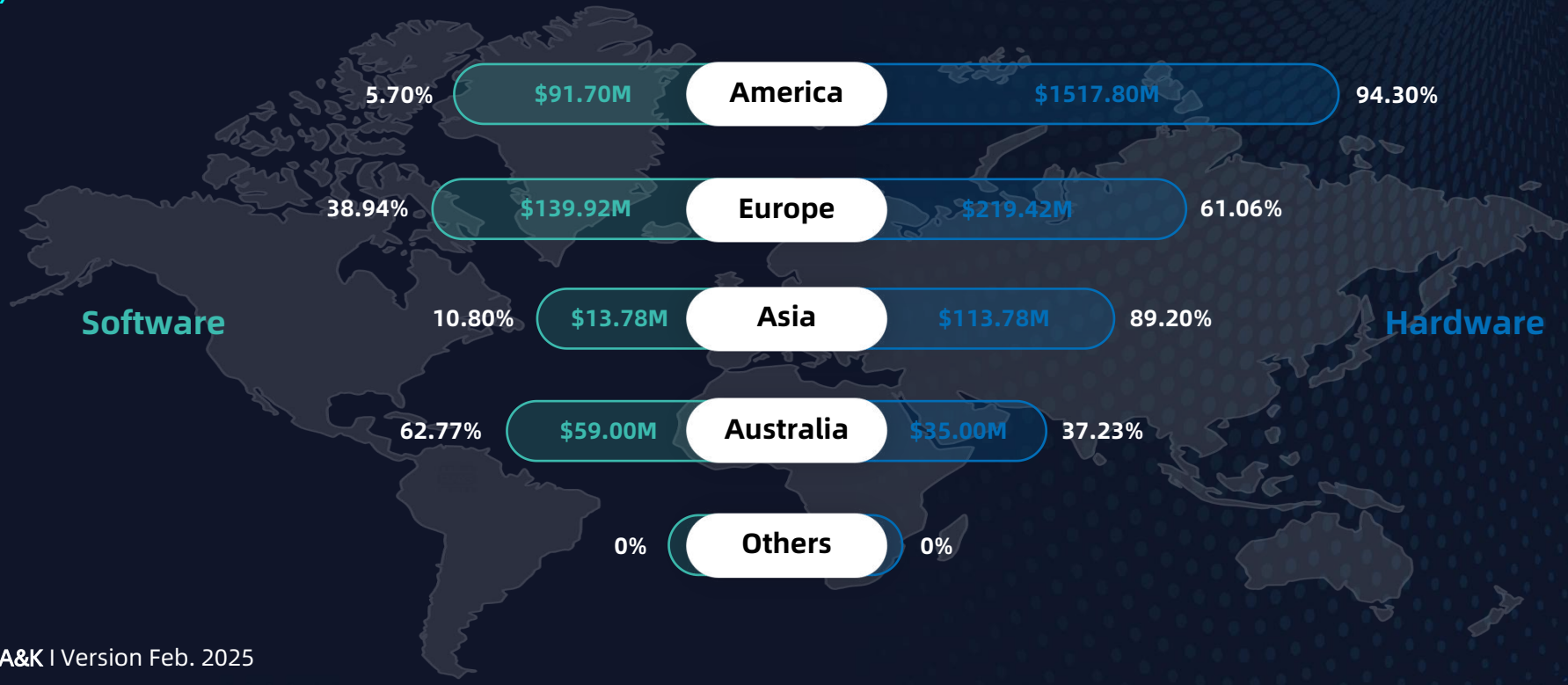
In 2024, financing rounds were dispersed without a concentrated trend, covering Seed, Angel, Series A, Series B, Series C, as well as government Grants.This indicates that quantum enterprises have made varying degrees of progress at different stages.

Financing Is Hardware-Oriented.

Share of Hardware and Software Financing in the Global Quantum Computing Sector in 2024 (in %, Million USD)



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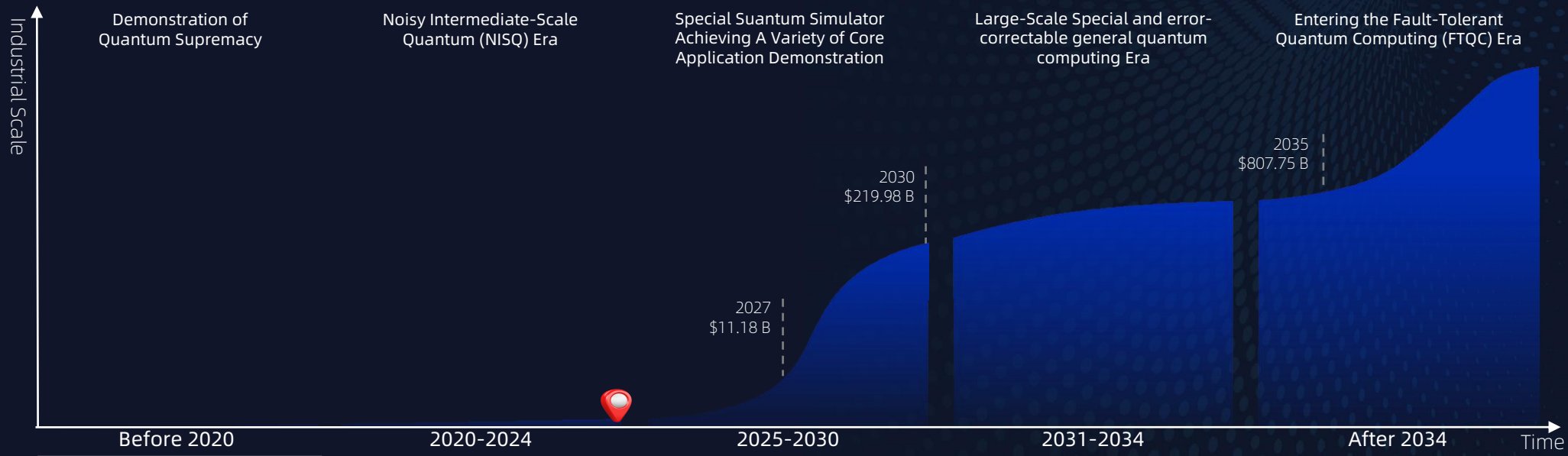
In the context of the economic downturn in 2023, quantum software, as an asset - light model, had a comparative advantage in financing with its low capital threshold. In 2024, the global quantum computing venture - capital trend has shifted, from favoring quantum software to hardware investment.

Industrial Growth Is Expected to Be Positive.

Schematic Diagram of Quantum Computing Development Life Stage



- Led by mature companies in the computing sector, preliminary concept validation has been achieved.
- IBM established a dedicated quantum computing research team as early as the 1990s, while the Google team first demonstrated quantum supremacy.

- Start-ups and most research institutes have begun to conduct hardware research and development and research on error correction, and comprehensively promote the development of various technical routes.
- Quantum algorithms mainly include hybrid quantum-classical algorithms, quantum simulation algorithms, quantum annealing algorithms, etc., and small-scale application exploration has been carried out for these algorithms.

- Special quantum computers for each technology route continue to emerge, and the middle and downstream quantum software companies grow rapidly at this stage.
- Priority will be given to replacing classical computers in biomedicine, chemical materials, financial services, AI and other fields, and as a result, a variety of core application examples are produced.

- The pros and cons of various technical pathways are gradually amplified, potentially converging towards one or a few specific routes, while the cost of error correction is significantly reduced.
- Driven by the demand for new application scenarios in downstream sectors, the industrial chain is further refined, leading to an increase in the upstream's influence in the industrial chain.

- The errors in computations are approaching or becoming smaller than those of classical computers, and the number of qubits is expected to reach the million level.
- Even as the computer industry enters the era of fully fault-tolerant quantum computing, quantum computers and classical computers will continue to coexist, each leveraging its strengths.

Germination Stage | Initial Stage | Growth Stage

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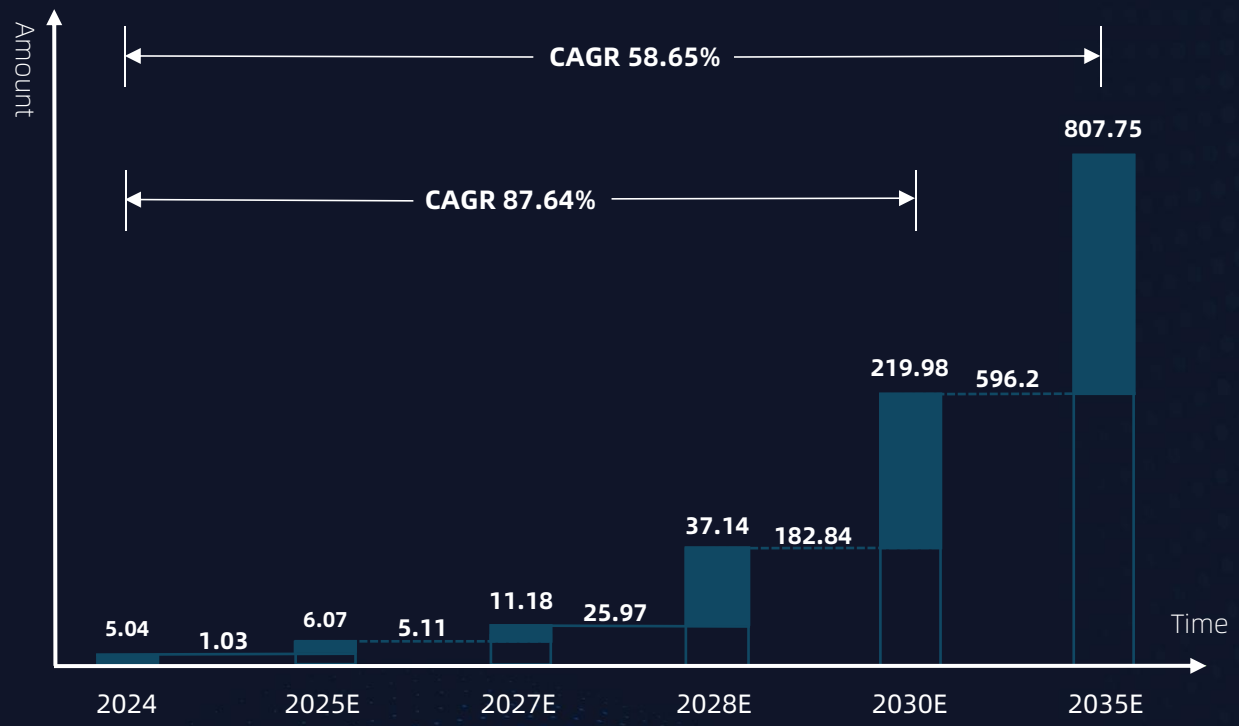
Global Quantum Computing Sector Size Forecast.

Global Quantum Computing Sector Size Projection (2023-2035E, in Billion USD)



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In 2024, the global quantum industry will reach 5.04 billion USD, with a compound annual growth rate (CAGR) of 87.64% from 2024 to 2030.

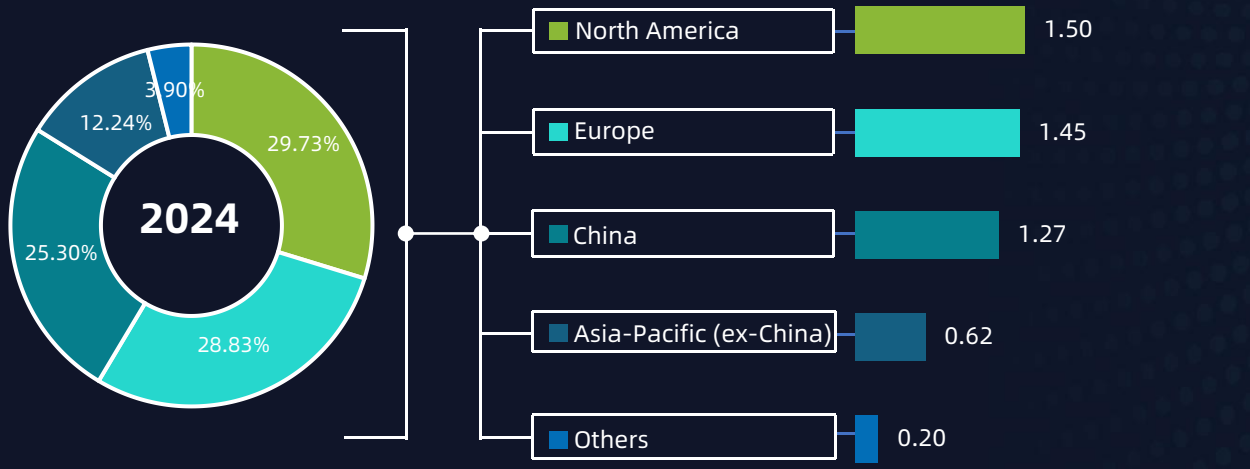
In 2027, special quantum computers are expected to achieve performance breakthroughs, driving the overall industry size to 11.18 billion USD.

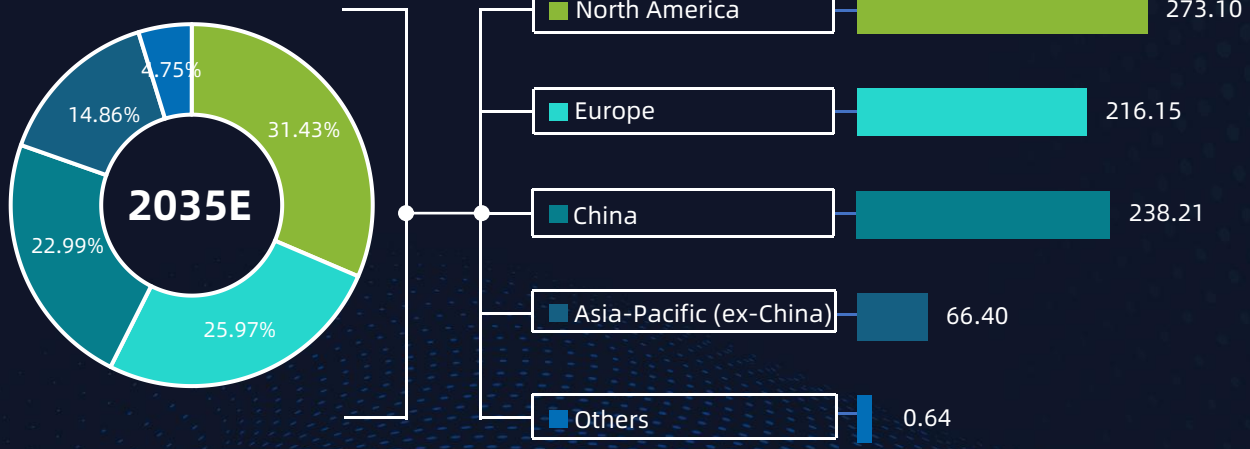
In 2028 to 2035, the scale of the industry will continue to expand rapidly, benefiting from the wide application of special quantum computers in specific fields and the technological advances of general - purpose quantum computers, and the total industry scale is expected to reach 807.75 billion USD by 2035.

This near-trillion-level of industry scale marks that the quantum computing will enter a critical stage of full maturity and commercialization, indicating that the future quantum computing will bring far-reaching and lasting impacts in various fields.

Europe and North America Take the Lead, China's Quantum Computing Industry Share Has Grown Significantly.

2024 & 2035E Global Quantum Computing Sector Size by Region (in %, Billion USD)



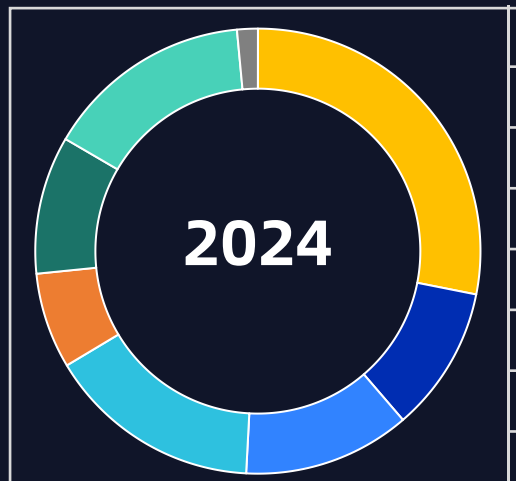


The global quantum computing market exhibits a highly dynamic and evolving trend. In 2024, with 29.73% of the 5.04 billion USD global quantum computing industry scale in North America, 28.83% in Europe, 25.30% in China, 12.24% in the Asia-Pacific region (excluding China), and 3.90% in other regions, the overall scale of the industry will reach 5.04 billion USD.

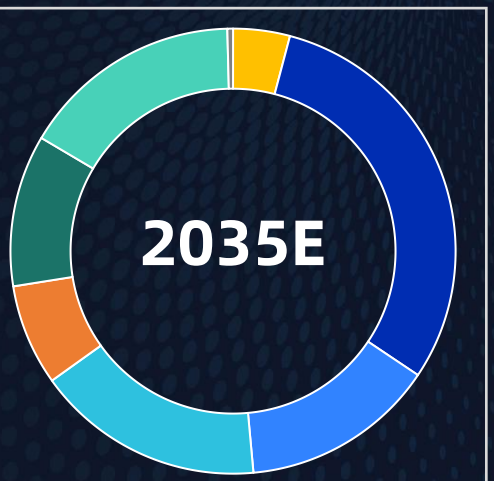
In 2035, as the quantum computing market continues to mature and develop, the global industry scale will soar to 807.75 billion USD. During this period, China's share of the industry will increase significantly to 29.49%.The Asia-Pacific region (excluding China) will decrease slightly to 8.22%, the rest of the regions will account for 1.72%, North America will further increase to 33.81%, and Europe will remain at 26.76%.

The Potential Market in the Financial Sector Is Huge.

2024 & 2035E Global Quantum Computing Downstream Application Market Size (in Billion USD)



0.07	Scientific Research	8.35
0.03	Finance	61.37
0.03	Medicine	28.66
0.04	Chemical Engineering	33.60
0.02	Energy	14.90
0.03	Logistics	22.33
0.04	Defense	32.63
0.01	Others	0.83



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At present, the main application scenario of quantum computers globally is scientific research. Specifically, universities, national laboratories, and technical companies purchase real quantum computers to study their operating principles, conduct relevant R&D activities, or engage in research in basic disciplines like mathematics, physics, and chemistry.

With the maturation of quantum computers and the emergence of other application scenarios, the proportion of the scientific research market will decline rapidly. In 2035, the scale of scientific research applications will reach 8.35 billion USD, representing a significant increase from 7.79 billion USD in 2030 and 70 million USD in 2024.

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