

# THE QUANTUM QUARTERLY

**Q3 2022**

Welcome to the Quantum  
Quarterly Review.

Here we cover the biggest  
commercial news in the  
Quantum Computing industry  
over the last 3 months.

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# Q3 2022 IN BRIEF

We expected a quiet Q3 -- the summer months tend to be slower in terms of deals and research announcements. And it was a quiet quarter. However, with the economic gyrations, many expected not just a quiet quarter, but a chaotic quarter.

Thankfully, that didn't seem to be the case. The quantum technology industry, anecdotally, has persevered better than other industries and fields, making continual progress.

We have reviewed major advances in error-correction from Quantinuum, which was also the subject of a blockbuster analyst report that pegged the future valuation of that company at \$30+ billion. Speaking of research, institutions and organizations have announced major advances.

We'll look at the quarter's highlights next.



*Click this icon throughout this pres to see the full stories behind the brief*



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# THE BIG NEWS



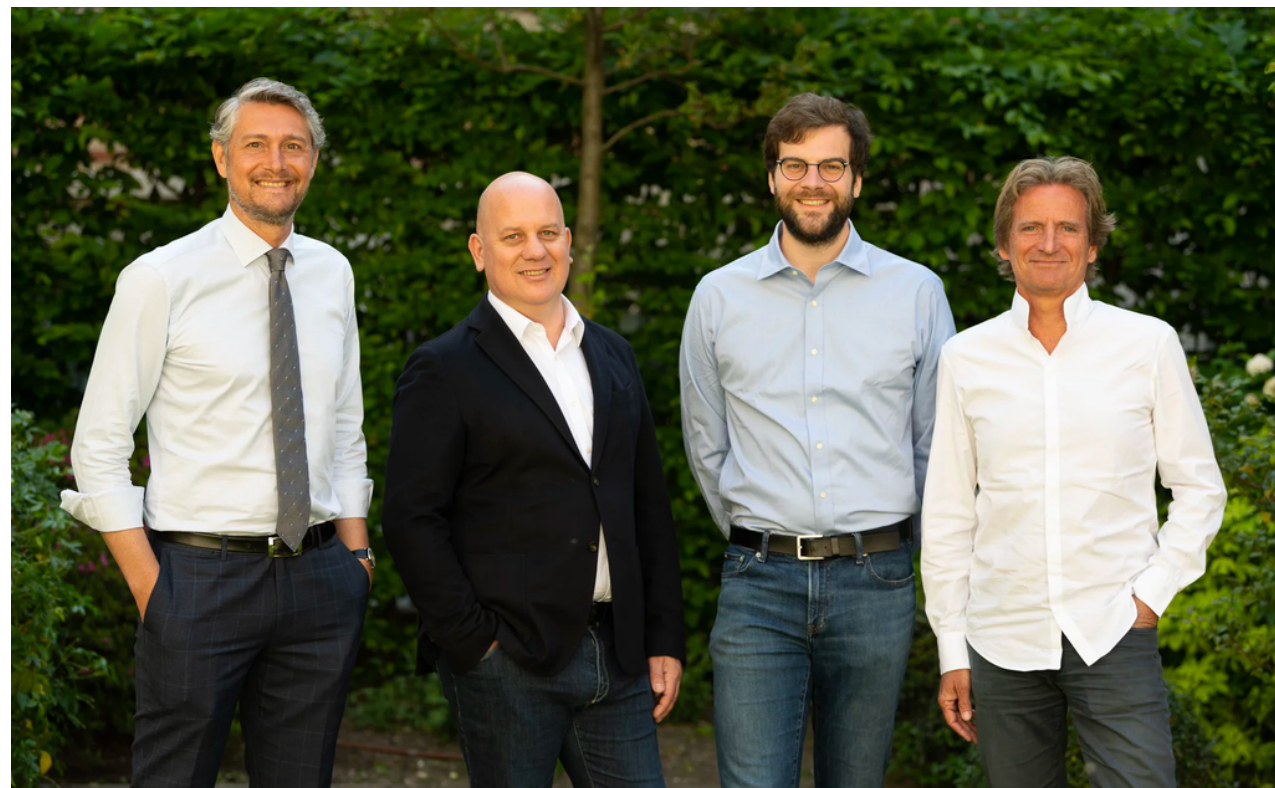
## D-WAVE BEGINS TRADING, SECURES \$150 MILLION IN LONG-TERM FUNDING



Quantum Computing pioneer D-Wave Quantum spent its first day as a publicly traded company. The company entered into an agreement with Lincoln Park Capital Fund to purchase options for up to \$150 million of D-Wave Quantum common shares at irregular intervals over the next three years.



## **QUANTONATION VENTURES CLOSES €91 MILLION QUANTUM TECH FUND**



Quantonation Ventures announces the final closing of its first fund dedicated to Quantum Technologies at €91 million, exceeding its initial target of €50 million. The company said that within three years it has helped launch the most promising Quantum Tech companies in the world and establish itself as the largest investor in the field. It has invested in spin-outs from the most recognized universities all over the world, including MIT, Ecole Polytechnique, Ecole Normale Supérieure, l'Institut d'Optique, Oxford University, Waterloo University and University of Sherbrooke.





## **EEROQ ANNOUNCES \$7.25 MILLION SEED ROUND FOR ITS HELIUM QUANTUM CHIP DESIGN**



EeroQ, a quantum computer (QC) chip design company, announced its first round of institutional funding after five years of R&D, a \$7.25 million seed round led by multi-stage investment firm B Capital's Ascent Fund, with participation from V Capital, Calibrate Ventures, Alumni Ventures, Unbound Ventures, and Red Cedar Ventures, according to a company statement.

According to the company, EeroQ's qubit design allows for our large-scale computers to be the size of a thumbnail as opposed to competitors which are the size of datacenters at full scale.





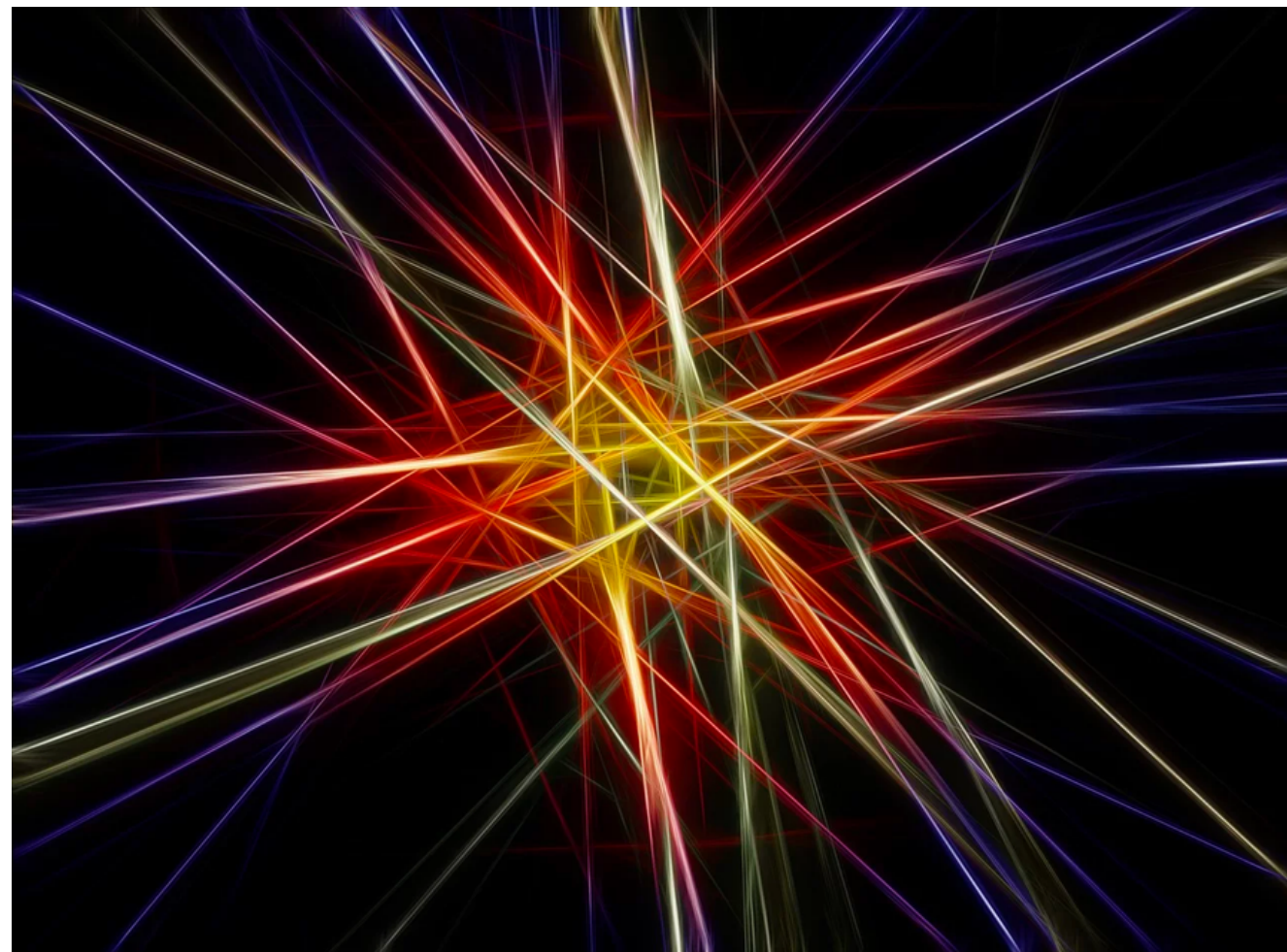
## CLASSIQ EXPANDS SERIES B TO \$49 MILLION



Classiq, a leader in quantum computing software, announces another expansion of its series B round to \$49 million by Canadian-Israeli VC Awz Ventures, from an initial closing of \$36M by strategic investors—in the largest quantum software round to date. Along with significantly growing its R&D team, which increase from 50 to 100 workers in 2023, the firm also announced near-term growth in Japan and Europe, opening local offices in the next months.



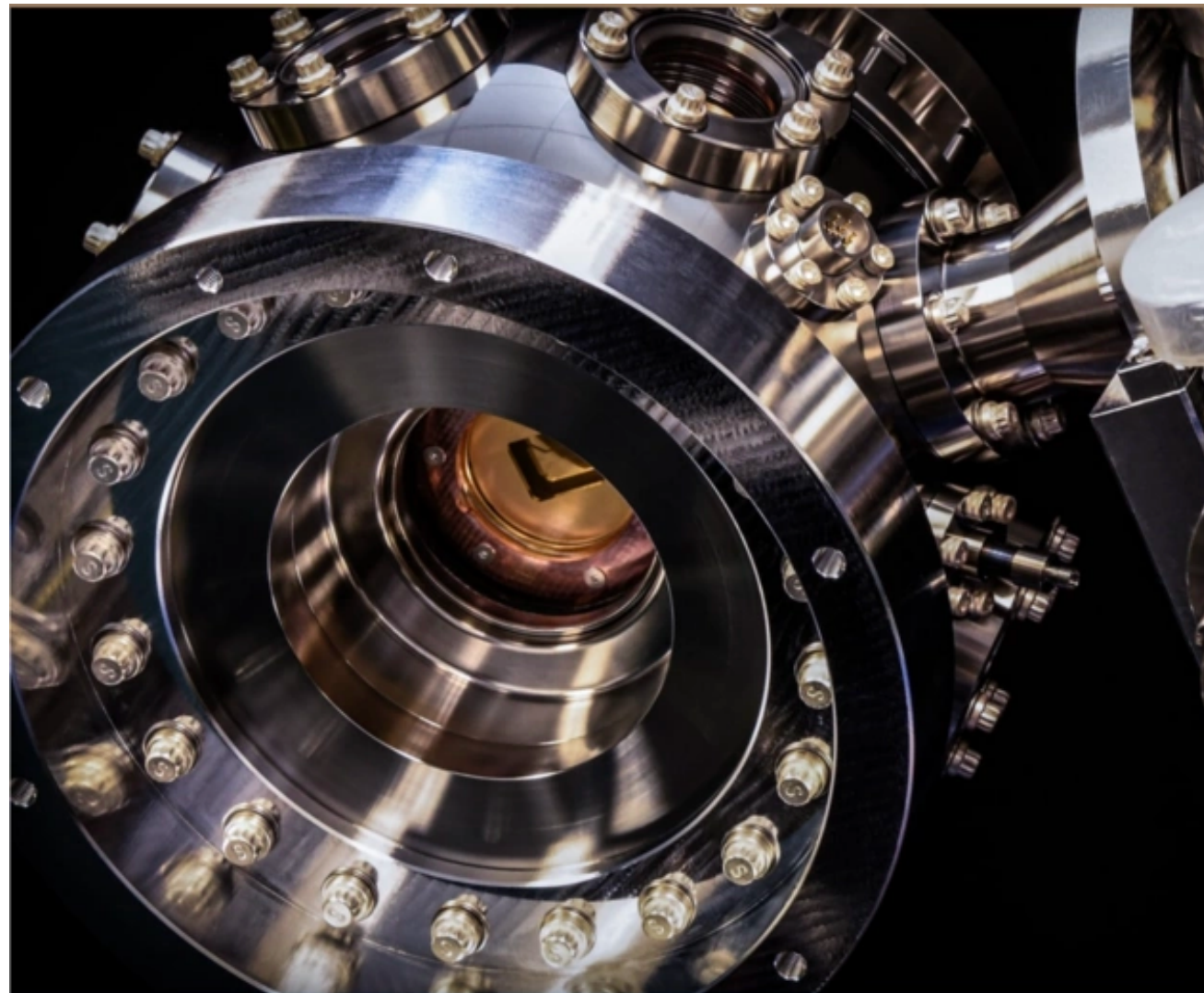
## **CAMBRIDGE UNIVERSITY SPIN-OUT RAISES OVER £800K IN FUNDING**



CamGraPhic, a Cambridge University spin-out developing graphene-based photonics technology, raised £813,475 from Wealth Club clients through the Enterprise Investment Scheme (EIS). This takes its total amount raised to £1.26 million, which has been raised through an equity funding round from existing and new investors led by Frontier IP and Wealth Club.



## **ANALYSTS: QUANTINUUM'S VALUATION COULD HIT \$37 BILLION**



Vertical Research Partners reported that, based on their assumptions and projections, the discounted equity value of Quantinuum could reach circa \$37 billion within a decade. Taking into account of Honeywell's 54% ownership, that would mean a value of about \$29 per share of Honeywell, a figure, the analysts added, that would equal to about 15% of Honeywell's total equity.





## **RESEARCH: NOVO NORDISK FOUNDATION INVESTS ABOUT \$200 MILLION IN DENMARK'S QC PROJECT**



Denmark's first fully functional generally applicable quantum computer will be available in 2034 — This is the objective of the ambitious Novo Nordisk Foundation Quantum Computing Programme that is being launched in collaboration with the University of Copenhagen. Quantum computers will help in developing new medicine and provide new insight into climate change and the green transition that cannot be achieved with classical computers today.





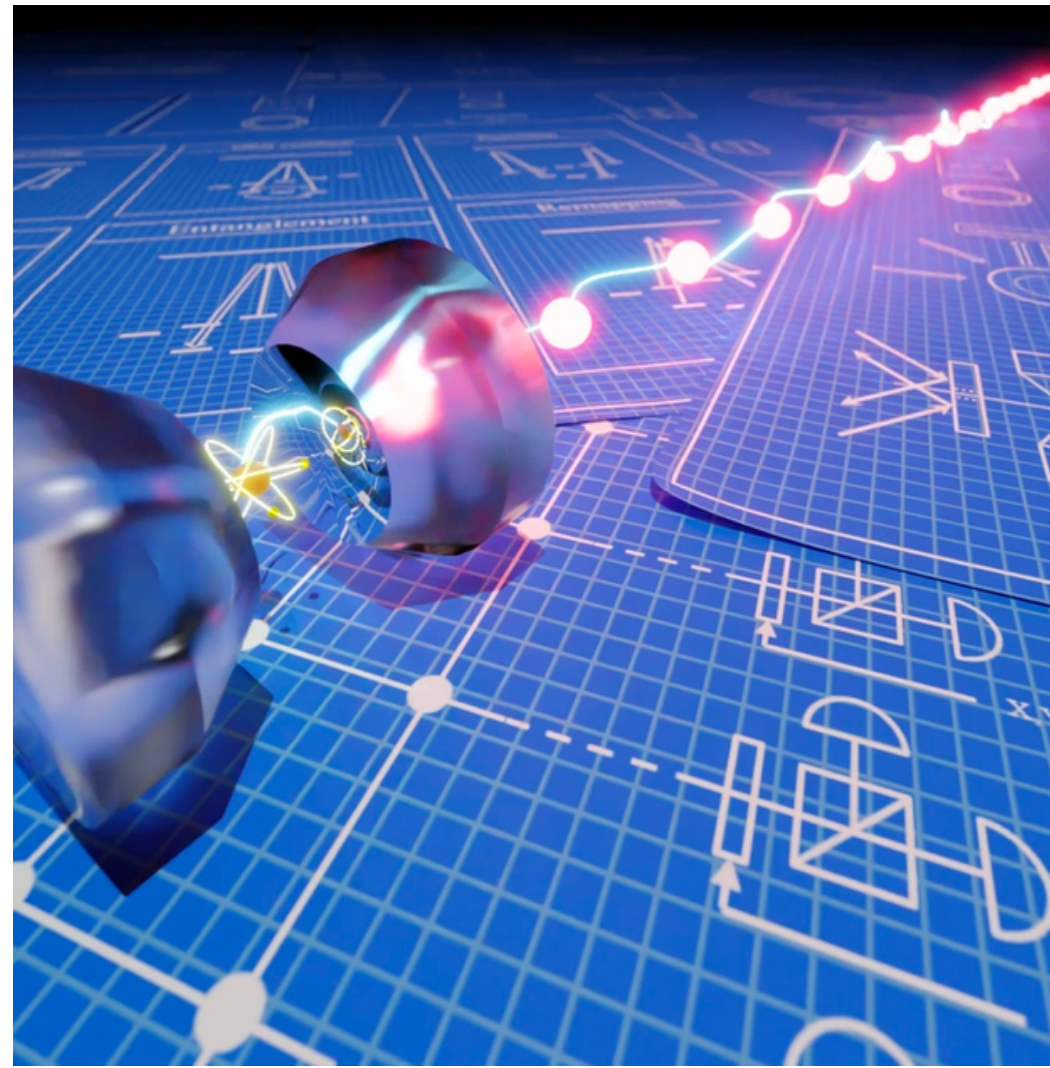
## **RESEARCH: QUANTUM MATERIALS: RESEARCHERS FIND ENTANGLEMENT OF MANY ATOMS**



Entanglement and superposition were thought to occur only on the smallest particles, now researchers in Technical University of Dresden and Technical University of Munich report they've observed these behaviors on a much larger scale — in the thousands of atoms. The findings could have implications in quantum sensors and quantum computing.



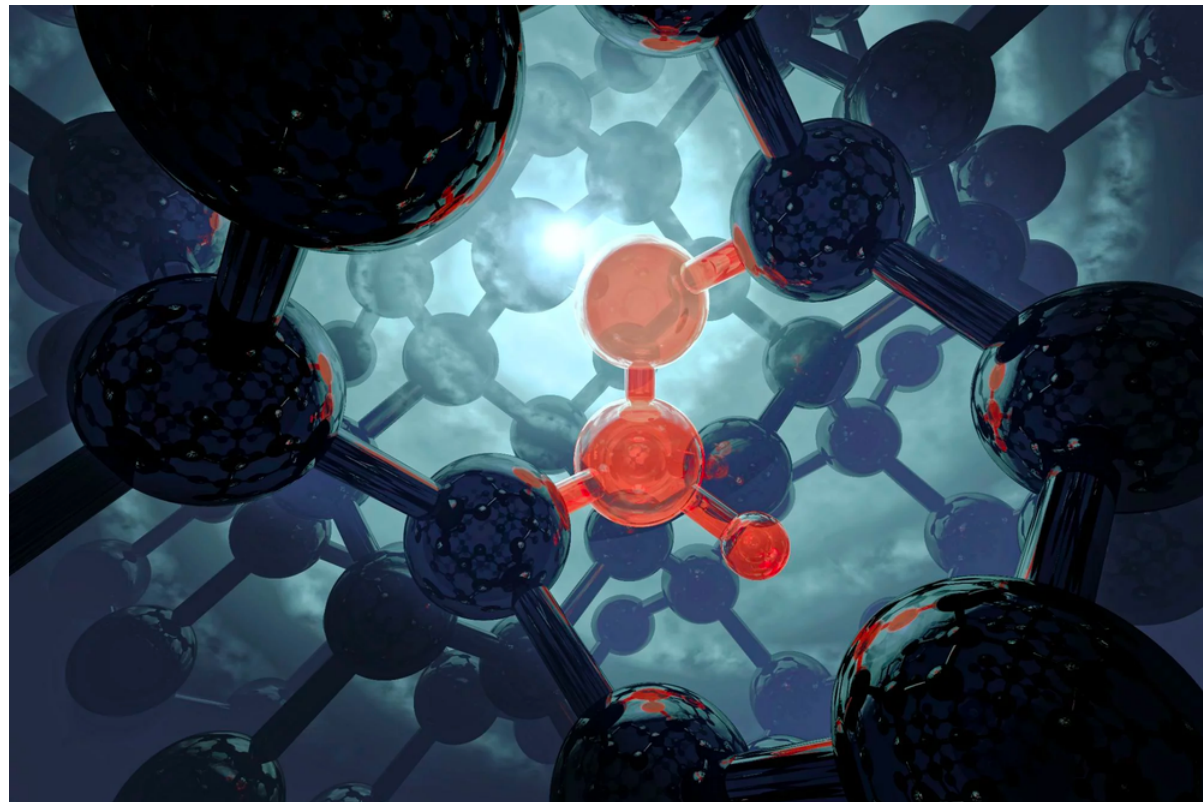
## **RESEARCH: EFFICIENT PHOTON ENTANGLEMENT ADVANCES NEW QUANTUM COMPUTER**



A team of physicists at the Max Planck Institute of Quantum Optics in Garching has now for the very first time demonstrated this task with photons emitted by a single atom. Following a novel technique, the researchers generated up to 14 entangled photons in an optical resonator, which can be prepared into specific quantum physical states in a targeted and very efficient manner. The new method could facilitate the construction of powerful and robust quantum computers, and serve the secure transmission of data in the future.



## RESEARCH: PHOTONIC LINK COULD SPARK AN ALL- SILICON QUANTUM INTERNET, SCALABLE QUANTUM DEVICES



Researchers at the Simon Fraser University report on research that they say could pave the way toward an all-silicon quantum internet and quantum computers that can tackle real-world computational challenges. That internet theoretically will be much more secure and much more powerful than today's version. In the study, the scientists describe their observations of silicon 'T centre' photon-spin qubits, an important milestone that unlocks immediate opportunities to construct massively scalable quantum computers and the quantum internet that will connect them



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# CAPITAL MARKETS



**\$1.6  
BILLION**

of new private capital flowing into  
Quantum Technology companies in  
2022 YTD












*Excludes unknown raises from companies  
such as Synergy Quantum, Good Chemistry  
and Diraq*

**16**

New disclosed private funding rounds in  
Q3 22

# FUNDRAISES IN THE QUARTER

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Companies	Primary Classification	Secondary Classification	Date	Country	City	Transaction Type	Region	Total \$
 <b>Classiq</b>	Software	Development Toolkits	2022-09-20	Israel	Tel Aviv-Yafo	Series B	EMEA	48,500,000
 <b>Kipu Quantum</b>	Software	Quantum Computing Algorithms	2022-09-15	Germany	Berlin	Other	EMEA	3,000,000
 <b>EeroQ</b>	Quantum Computers	Neutral Atoms	2022-08-23	United States	New York	Seed	Americas	7,250,000
 <b>CamGraPhIC</b>	Hardware Components	Multiple Hardware Offerings	2022-08-05	United Kingdom	Cambridge	Other	EMEA	1,524,600
 <b>QLM</b>	Quantum Sensing & Imaging	Quantum Sensing & Imaging Hardware	2022-08-04	United Kingdom	Bristol	Series A	EMEA	14,640,000
 <b>Abbelight</b>	Quantum Sensing & Imaging	Quantum Sensing & Imaging Hardware	2022-08-01	France	Cachan	Other	EMEA	59,000
 <b>iPronics</b>	Hardware Components	Processors and Chips	2022-07-27	Spain	València	Seed	EMEA	3,774,000
 <b>Origin Quantum</b>	Quantum Computers	Superconducting	2022-07-26	China	Hefei	Series B	APAC	148,200,000
 <b>IQM</b>	Quantum Computers	Superconducting	2022-07-22	Finland	Espoo	Series A	EMEA	130,000,000
 <b>Atlantic Quantum</b>	Quantum Computers	Superconducting	2022-07-21	United States	Cambridge	Seed	Americas	9,000,000
 <b>BosonQ Psi</b>	Software	Simulators	2022-07-12	India	Bhilai	Other	APAC	525,000

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Notes: All fundraises shown in \$m and converted at spot rate on the day of announcement \*Total \$m is latest round



# NEW ANALYSIS TOOLS - QCAAS / QPU

The screenshot shows the 'The Quantum Insider' website interface. The main content area displays a table titled 'QCaaS and QPU' with a filter for 'QPU providers'. The table lists several quantum computing providers with their respective details.

Company	Cloud offering	Simulator offering	Accessible via	Provides access to	Consulting offering?
<b>Alibaba Quantum Lab</b>	Alibaba Cloud launched their cloud offering in March 2018. The Alibaba group has been working on quantum technologies since 2015. The services are not easy to access / easy to find ( <a href="http://quantumcomputer.ac.cn/Home">http://quantumcomputer.ac.cn/Home</a> ) and unclear how well maintained offering is.	Offers Alibaba Cloud Quantum Development Platform (ACQDP) - a simulator-driven development tool for quantum algorithms and quantum computers	Alibaba Quantum Lab	Alibaba Quantum Lab	Unknown
<b>Alpine Quantum Technologies</b>	Alpine Quantum Technologies provides access to its simulators in the Cloud. Given the room temperature operation of its quantum computers it offers these for sale / installation to customers. TBC if cloud access is being provided to these systems	Provides ideal quantum simulation and realistic ion trap simulation	Alpine Quantum Technologies	Alpine Quantum Technologies	Unknown
<b>Atom Computing</b>	None	n.a.	-	-	Yes
<b>D-Wave Systems</b>	D-Wave provides Leap, its Cloud offering. This was originally launched in 2018 and provides access to its Advantage quantum computer	Offers simulated annealing as part of its Leap package (Ocean Software)	D-Wave Systems	QC Ware, Amazon Braket, D-Wave Systems	Yes
<b>Equal1</b>	None	n.a.	-	-	Unknown
<b>Google Quantum AI lab</b>	Google's Quantum Computing Service gives customers access to Google's quantum computing hardware. Programs that are written in Cirq, an open-source quantum computing program language, can be sent to run on a quantum computer in Google's quantum computing lab in Santa Barbara, CA.	Google offers access to its simulator in the same interface as its access to quantum computer offering. It also offers TensorFlow Quantum to support testing running ML applications on simulators	Google Quantum AI lab, IonQ	Google Quantum AI lab	Unknown

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# NEW ANALYSIS TOOLS - QCAAS / QPU

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The screenshot displays the 'The Quantum Insider' web interface. The top navigation bar includes a search bar and an 'Ask a Question' button. A left-hand sidebar lists various categories such as Dashboard, Companies, Investors, Funding rounds, and Government Funding (which is currently selected). The main content area is titled 'Government Funding' and features a map view of the world. A pop-up window is overlaid on the map, providing detailed information for the United Kingdom. This window includes a table with columns for 'Country' and 'Funding USD', and two columns of text providing context and future outlook for the UK's quantum funding.

Country	Funding USD
United Kingdom	1.2bn

**United Kingdom** 1.2bn

- The National Quantum Technologies Programme was funded for GBP 400 million between 2014-2019. In the years 2019-2024, the funding will be GBP 94 million in the four quantum hubs, GBP 93 million in the National Quantum Computing Centre, GBP 153 million for ISCF quantum projects and GBP 11.6 million for Centres for Doctoral Training.
- British Business Bank has invested in multiple quantum startups. The Scottish National Investment Bank invested GBP 12.5 million in the company M Squared.

Looking forward: The UK has invested GBP 300-400 million in two previous five-year cycles. These initiatives have just led to the formation of many new entities such as the NQCC, and moreover have seen the UK's continued leadership in quantum technology in both industry and academia. This strongly suggests that more government funding will come at the end of this five-year cycle in 2024.

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# THE QUANTUM INSIDER (TQI) IS THE LEADING PROVIDER OF NEWS AND MARKET INTELLIGENCE IN THE QUANTUM TECHNOLOGY SECTOR



TQI has 3 mutually synergistic offerings

## WHAT WE HAVE

## WHAT WE OFFER



### NEWS

Incisive and regular news on the quantum technology market - keeping people informed, up-to-date and connected

Multi-channel digital marketing campaigns designed to support your product, service or call to action



### INTELLIGENCE

Robust market intelligence on the quantum technology industry - providing stakeholders with rich commercial data and insights

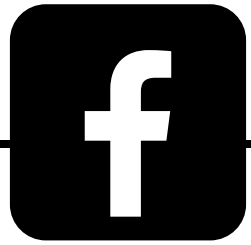
Free community access to our basic data; paid subscription access to online intelligence platform



### CONSULTING

Advisory and strategy consulting in the quantum technology market - supporting client's business growth through quantum tech

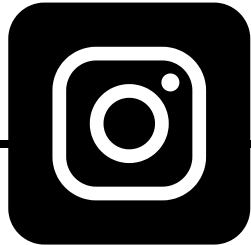
Bespoke advisory and consulting projects to answer specific questions for our clients



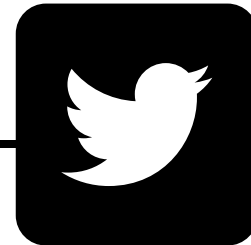
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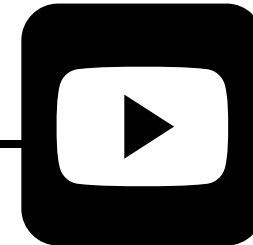
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