Q-CTRL and Oxford Quantum Circuits Partner to Improve Algorithmic Performance on Quantum Hardware

Initial results demonstrate massive gains in hardware performance when running complex algorithms

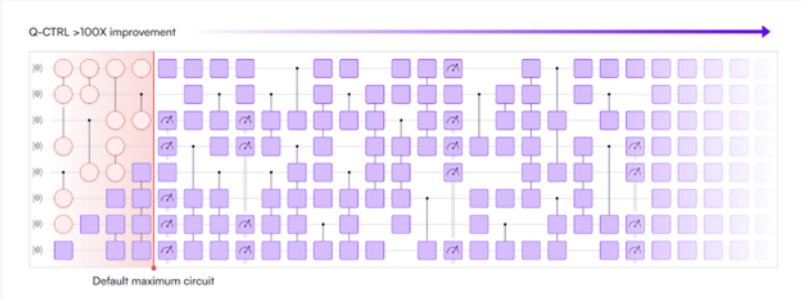

Fig 1: Q-CTRL & OQC enhanced circuit depth

TOKYO, JAPAN, July 18, 2023 /EINPresswire.com/ -- Q-CTRL, a global leader in developing useful quantum technologies through quantum control infrastructure software, today announced a partnership with Oxford Quantum Circuits (OQC), a quantum hardware manufacturer. Leveraging OQC's hardware with Q-CTRL's software, the collaboration aims to improve algorithmic performance for quantum developers, researchers, and enterprise end-users by helping them to solve complex problems that were previously infeasible.

> Quantum technology is a core component of the trilateral AUKUS framework, and this cross-border partnership is an ideal example of how by working together we can reap greater benefits,"
>
> *Louise Cantillon, British Consul General & Deputy Trade Commissioner APAC*

Q-CTRL's error suppression software enables users to get the best possible results from hardware when running quantum algorithms by reducing hardware error and instability. When combined with OQC's innovative Coaxmon technology, users get improved algorithmic performance, enabling them to run more complex algorithms geared toward solving challenging problems in fields such as chemistry, finance, and manufacturing.

"We are thrilled to be bringing our world-leading performance-management solutions to OQC's partners in the UK and Japan," said Michael J. Biercuk, CEO and Founder of Q-CTRL. "OQC is one of the best hardware players out there with a track record of delivering real computational capability on very rapid timescales. By focusing on how infrastructure software can help push hardware to the absolute limits, we're excited for the new computational opportunities opened in combination with OQC's unique hardware."

Quantum computers are extremely susceptible to errors caused by interference in the environment. These errors accumulate and lead the algorithms run on quantum computers to fail, preventing end-users from achieving the insights they're seeking.

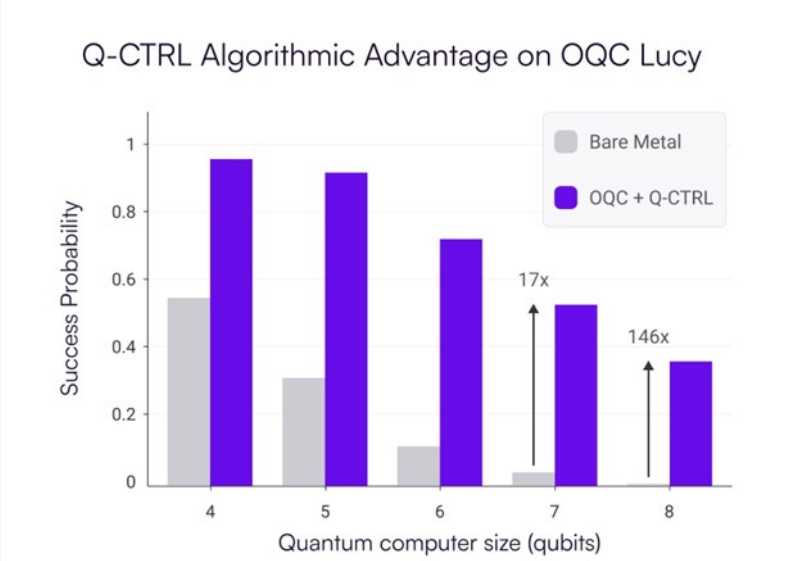

Fig 2: Q-CTRL benchmarking results show algorithmic advantage on OQC Lucy, with over 140 times improved probability of achieving success with the Berstein–Vazirani algorithm

By suppressing errors on OQC's inherently scalable superconducting hardware, the partnership will push the boundaries on the types of algorithms that can be solved with real devices. Initial algorithmic benchmarking results, employing only a sample subset of Q-CTRL's error suppression technology on OQC hardware, demonstrate vast improvements in accuracy and achievable circuit depth. The factor of performance improvement increased with qubit count, even when addressing complex algorithms with inherently higher numbers of gates, such as the Quantum Fourier Transform (QFT).

With offices in Oxford, both companies are excited to expand performance benchmarking of the technology integration to inform users of what's possible for their applications through this integration.

The partnership demonstrates the value of collaboration across various domains of expertise to move the entire industry forward toward quantum advantage. This approach is part of a global effort to deliver "frictionless" performance from today's quantum computers by seamlessly combining the best contributions from a diverse range of specialist performers. OQC's uniquely innovative and scalable hardware and Q-CTRL's industry-leading performance-management solutions form the foundation for additional future partners to contribute new simplified workflows and high-impact algorithms.

"This partnership marks the initial phase of a broader collaboration encompassing diverse companies within the quantum ecosystem. We are very excited to work with Q-CTRL on this project phase to demonstrate the need for different teams and specialities to come together to democratise quantum computing and enable previously out-of-reach outcomes," said Dr. Ilana Wisby, CEO at Oxford Quantum Circuits.

"Quantum technology is a core component of the trilateral AUKUS framework, and this cross-

border partnership is an ideal example of how by working together we can reap greater benefits," said Louise Cantillon, British Consul General and Deputy Trade Commissioner Asia Pacific (Australia & New Zealand). "The UK government warmly welcomes Q-CTRL's expansion in the UK and to ensure that this partnership delivers true strategic advantage for our nations."

Q-CTRL and OQC will be present at Q2B Tokyo, an international conference uniting academics, end users, government officials and vendors to discuss the progress and future of the quantum industry. Q-CTRL CEO and Founder, Michael J. Biercuk, will present initial benchmarking results from the collaboration in a keynote presentation on the first day of the event, July 19: Make quantum computing useful with the world's first performance management software solution.

About Q-CTRL
Q-CTRL's quantum control infrastructure software for R&D professionals and quantum computing end users delivers the highest performance error-correcting and suppressing techniques globally, and provides a unique capability accelerating the pathway to the first useful quantum computers and quantum sensors. Q-CTRL operates a globally leading quantum sensing division focused on software-level innovation for strategic capability. Q-CTRL also has developed Black Opal, an edtech platform that enables users to quickly learn quantum computing.

Founded by Michael J. Biercuk in 2017, Q-CTRL has pioneered the quantum infrastructure software segment, and has become the leading product-focused software company in the broader quantum sector. In 2022, Q-CTRL augmented its product leadership, bringing in deep tech executive Aravind Ratnam as Chief Strategy Officer and Silicon Valley veteran Alex Shih as Head of Product, to guide a team of world-class engineers and product specialists.

Q-CTRL has been an inaugural member of the IBM Quantum Startup network since 2018, and recently announced partnerships with end-users Xerox PARC, Capgemini, and Transport for NSW. The company has international headquarters in Sydney, Los Angeles, and Berlin.

About Oxford Quantum Circuits
OQC is a world-leading quantum computing company. We bring quantum to our customers' fingertips and enable them to make breakthrough discoveries. Our quantum computers are available via data centers, private cloud and on Amazon Braket. For more information: www.oxfordquantumcircuits.com

Luke Keding
HKA Marketing Communications
+1 315-575-4491
email us here

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