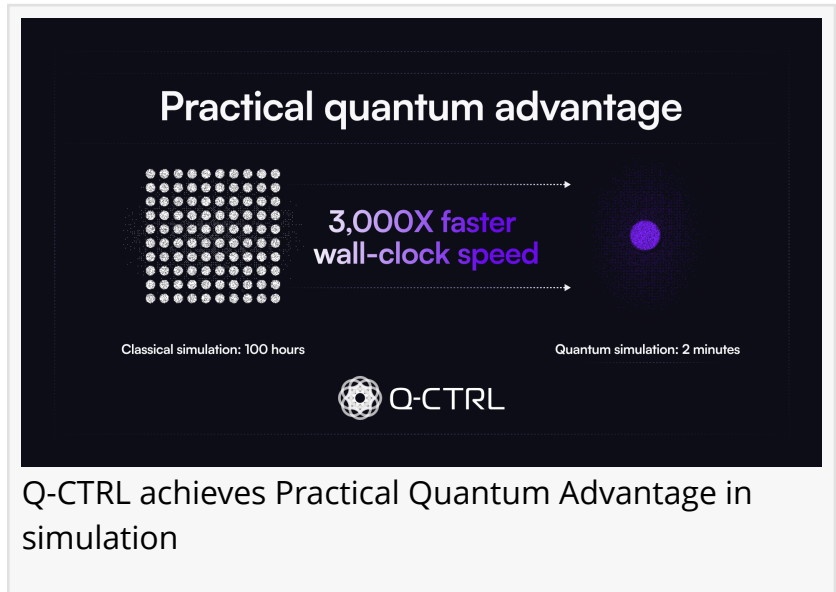


Q-CTRL Delivers 3,000x Speedup in Materials Discovery, Demonstrates Evidence of Practical Quantum Advantage

Performance-management software pushes IBM Quantum Platform to surpass classical benchmarks, reducing simulation times from over 100 hours to just two minutes.

LOS ANGELES, CA, UNITED STATES, May 6, 2026 /EINPresswire.com/ -- Q-CTRL, the global leader in quantum infrastructure software, today announced it has achieved a 3,000 times speedup on a problem of commercial relevance using the IBM Quantum Platform. Q-CTRL has achieved evidence of practical quantum advantage over performance-optimized industry-standard classical software on a known, practically useful problem in materials science, marking the first achievement of practical quantum advantage.



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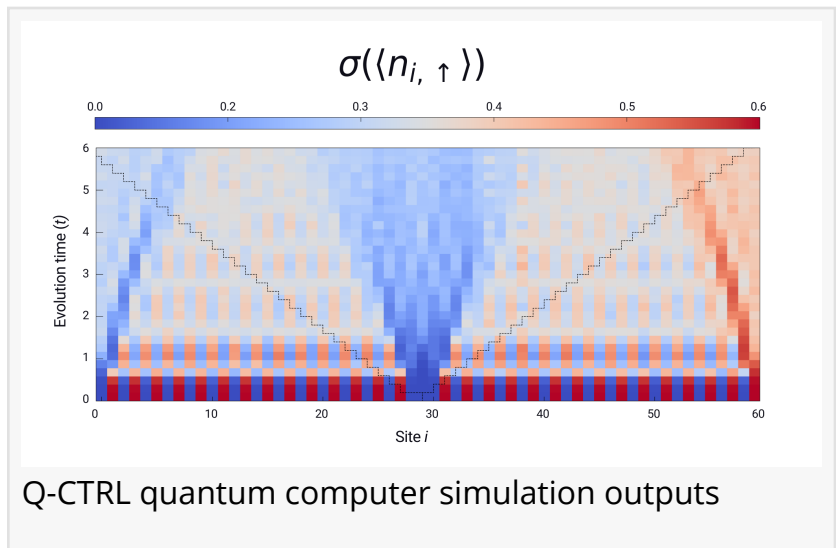
At a scale beyond the reach of exact calculation, Q-CTRL used the native integration of its performance-management software on the IBM Quantum Platform to successfully run a quantum algorithm and return results with accuracy meeting industry-standard expectations. The quantum algorithm took just two minutes to run, while the same problem took over 100 hours using the best classical tools to execute on classical hardware.

With approximately [one-third](#) of global supercomputer time currently dedicated to chemistry and materials simulation, delivering new computational capabilities can

be transformative for applications critical to the future of energy. However, these applications remain constrained by massive computational bottlenecks.

Quantum computers often follow the same quantum physics as the problems being simulated, making these prime candidates for quantum acceleration.

The Q-CTRL team compared its quantum calculations, focused on how electrons in materials give rise to the properties we use for energy transmission, storage, and generation, to the best implementation of a state-of-the-art, industry-standard software package from the materials-science community.



The two approaches agreed, up to a point. To improve the agreement, the team had to increase the resolution of the classical simulation, at the cost of a major blowout in execution time: the classical simulation increased to over 3,000 times longer than the time required by the IBM quantum computer.

“Scientists and engineers dedicate thousands of hours to performing materials simulations in their efforts to unlock the future of energy, from photovoltaics to fusion,” said Michael J. Biercuk, CEO and Founder of Q-CTRL. “These results mark the beginning of an era of positive ROI from today’s widely available quantum computers on problems that early adopters truly care about. That’s the nature of Practical Quantum Advantage.”

Despite their promise, quantum computers can be limited by noise and errors, which can degrade performance and prevent users from achieving useful results on relevant problems. Q-CTRL’s performance-management infrastructure software addresses this problem and expands the capabilities of today’s most advanced machines.

“Q-CTRL’s demonstrations showcase the crucial role of software in unlocking near-term quantum capabilities,” said Andre Konig, CEO of Global Quantum Intelligence. “A standout aspect of Q-CTRL’s recent effort is their emphasis on runtime error suppression, highlighting speed as a critical advantage for quantum computers, and proving that quantum hardware can currently outpace state-of-the-art classical architectures in total wall-clock time for certain applications of high strategic value.”

The specific infrastructure software configuration used for these demonstrations will soon be publicly accessible on the IBM Quantum Platform as a new Qiskit Function, so anyone can build off of these results and incorporate quantum computing directly into their chemistry and materials R&D.

"We've moved past the question of whether quantum computers have utility and onto the question of how to use them well. IBM has built the largest quantum computing ecosystem in the world, and we're putting increasingly capable systems in the hands of the people doing the work," said Jay Gambetta, Director of IBM Research and IBM Fellow. "Results from partners like Q-CTRL are showing how these systems contribute to scientific workflows."

"Developing room-temperature superconductors and carbon-neutral materials represents some of the most significant computational challenges today," said Jean-Francois Bobier, Partner and Vice President at the Boston Consulting Group. "Q-CTRL and IBM have now demonstrated that a quantum processor, reinforced by advanced error suppression, can surpass leading tensor-network heuristics on a non-trivial Fermi-Hubbard model. This achievement represents a major signal to industry that quantum simulation is both ready and an essential component of the R&D roadmap for future materials discovery."

This outcome follows just one year after Q-CTRL demonstrated [commercial quantum advantage](#) in navigation, producing a GPS-free quantum navigation system that outperformed the best like-for-like classical alternative by 100 times. These milestones highlight how Q-CTRL's focus on quantum control infrastructure software as a quantum-hardware enabler has proven key to advancing the entire quantum industry.

To learn more about the demonstration, read the [technical manuscript](#). To learn more about Q-CTRL, visit the company's website: <https://q-ctrl.com/>

About Q-CTRL

Q-CTRL is the pioneer in AI-powered infrastructure software for quantum technology, offering a hardware-agnostic software platform that makes quantum machines thousands of times more powerful. This opens many parallel market verticals in computing, sensing, and health, making Q-CTRL a truly diversified quantum opportunity based on a single unique technology.

The company's marquee product is an unjammable, unspoofable, undetectable quantum navigation system that works when GPS is unavailable, is 100 times better than the best alternative, and is being deployed on commercial aircraft with Airbus, in defense with Lockheed Martin, and on unmanned drones.

The company's breakthroughs have been featured in The New York Times, The Wall Street Journal, Forbes, and Newsweek. Founded in 2017 by Professor Michael J. Biercuk, Q-CTRL operates globally from offices in Sydney, Los Angeles, San Francisco, Huntsville, Berlin, and Oxford.

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