Dear Stockholders,

In 2022, we delivered what we promised to our customers and to investors. We achieved our technical milestone of 25 algorithmic qubits (#AQ), and delivered strong financial growth with $24.5 million in new bookings and $11.1 in revenue. We continue to distinguish IonQ as a leader in our industry, with a significant head start relative to our peers.

The 25 algorithmic qubits milestone is one more step towards "quantum advantage," the point at which quantum computers will exceed the capabilities of their classical computing counterparts and are likely to propagate broader commercial use cases. We are confident we will hit an #AQ of 29 in 2023, putting us in clear striking range for #AQ 35 in 2024.

The #AQ milestone of 35 is particularly significant because reaching it means that classical hardware will no longer be able to fully simulate our quantum hardware at commercial scale. And more importantly, we expect that at #AQ 35, the commercial value of the first quantum machine learning (QML) applications will crystallize, driving adoption of IonQ's industry-leading quantum computers.

Today, we are laser-focused on building on our head start to be the first company to achieve quantum advantage and scaling our system manufacturing to meet surging demand.

IonQ's Head Start Towards Quantum Advantage

At IonQ, our primary focus has been not on the *quantity* of qubits in a system, but on the *quality* of the qubits and their operations. For quantum computers, this quality–also known as *fidelity*–is the key differentiator in successfully completing computational tasks. If the quality of the qubits and their operations is low, no number of qubits can lead to useful quantum computation.

IonQ differs from most other commercial quantum computers by using trapped ion qubits, which naturally have the highest fidelities of any mainstream quantum architecture. We have always maintained that the superior fidelity of our qubits and their operations will give us a head start over our peers. Others may proclaim they have over 100 qubits in their systems, but the fidelity of the 25 qubits in our IonQ Aria system is much higher, making it the most powerful commercial system we have yet to see.

In the past months, we have seen our peers (somewhat reluctantly) accept the fact that the fidelities of qubits and their operations are key indicators of performance. At least two have delayed their public technical roadmaps to give themselves additional time to improve their fidelities before scaling the number of qubits in their systems.

At IonQ, our qubit and operation fidelities are already best in class.[1] Unlike our peers, our technical roadmap has always focused on the operational fidelities of our qubits, and our public technical roadmap remains unchanged. This means that while others are debugging their qubit technology, IonQ is already hard at work scaling our qubit count, giving us a tangible advantage in addressing the quantum market opportunity.

[1] IonQ Aria has an average 1-qubit gate fidelity of 99.94% and an average 2-qubit gate fidelity of 99.4%. IonQ Forte has an average 1-qubit gate fidelity of 99.98% and an average 2-qubit gate fidelity of 99.6%.

The lead is ours. And we have full intent to take advantage of it.

The (Short) Road to Quantum Advantage

Often I hear various individuals from academia and industry opine on when quantum will take off. At a recent industry conference, this question was asked to various panelists, with answers ranging from this year to 20 years or more. It reminds me of the artificial general intelligence market prior to ChatGPT, also with a divergence of viewpoints from so-called experts.

So how can there be such conflicting stories about when the industry will reach quantum advantage? The answer lies in that these narratives are conspicuously tied to each company's individual progress and technical approach, rather than the progress of our industry as a whole. Next time you hear a company executive say, "I think quantum will take off in X years …" you need to mentally append "... for our company's technology."

The world is starting to come to grips with the implications of ChatGPT, with most caught off guard and with some facing an existential threat to their business.

Within approximately the next two years, we expect that quantum will have its own ChatGPT-like moment, with QML in 2024, and line of sight for IonQ's broader adoption with an #AQ of 64 in 2025. My prediction is that no matter how much we say it and deliver on our technology roadmap, both investors and customers will be taken by surprise. Even for OpenAI, quantum will likely be highly disruptive to their business too. The companies who choose to jump start their journey in quantum now will have the first-mover advantage in their industry sector.

We are in the "development window" for quantum advantage: if preparations for the propagation of quantum computing were once theoretical or exploratory, they are now immediate and urgent. Today's leading companies and US-friendly governments need to be building their first quantum applications now if they want to benefit from the new opportunities enabled by quantum.

IonQ is partnering with forward-looking companies to accelerate their quantum applications. Our approach in the near term is to form a limited number of highly strategic partnerships to develop solutions that open up quantum advantage in select industry sectors, while focusing on our technology development to reach quantum advantage. We challenge leading companies that want to reap the benefits of quantum advantage to step forward now with proposals for joint applications.

Leveraging Existing Technology to Scale

With quantum advantage on the horizon and IonQ's technological head start, we have seen rapidly growing demand for our current supply of IonQ computers. As a result, our team is focused on scaling up our manufacturing processes to design increasingly modular, economical, and serviceable systems in the near future.

One may assume that scaling quantum computer manufacturing will be an uphill battle given the nascency of the technology. But while the ions at the core of our systems are quantum in nature, everything else in our systems is classical. This means we can leverage half a century of advancements in manufacturing computer chips, optical networks and other semiconductor devices to accelerate the manufacturing of our IonQ systems. We see ample opportunity to optimize our hardware.

Take, for example, our photonic interconnects technology, a technique invented and demonstrated by our founders that will allow us to scale to multiple, networked quantum processors in the same system. This technology uses the same optical switching technology developed for optical communications that are

now deployed at scale in data centers. It is no coincidence that our co-founder and CTO, Dr. Jungsang Kim, led a team to build the world's largest optical switch during his time at Bell Labs. Employing optical switches makes IonQ's networked system designs look like a data center made of a large network of computers, and we can leverage the learnings from these highly mature industries to scale our systems.

Another example lies in our laser technology, where we have already made great strides in improving miniaturization and stability. While the high-powered lasers currently used in IonQ's systems can be bulky and expensive, we remind investors of the rapid advances in laser technology we have seen play out historically, such as in the Blu-ray DVD industry. We deploy commodity semiconductor diode lasers and mature laser systems widely used in the semiconductor manufacturing process to build our systems, rather than relying upon exotic laser systems normally used in scientific research labs. We are now starting to learn how to miniaturize the lasers and their delivery systems to make them extremely stable, leading to even higher performance quantum computing operations.

We are already at work deploying these classical computing technologies for the benefit of IonQ systems. With every new system we design, we methodically review each component technology and ask ourselves if we should buy it, build it, or partner on its development, which keeps us focused on what matters most to us at IonQ: delivering the best systems possible to service our customers.

Over the past months, we have provided you with glimpses of how IonQ is scaling to meet the growing demand in our market. We announced our new Bothell, Washington location, the first dedicated quantum computing manufacturing facility in the United States, a year ahead of schedule. We shared news of recent additions to the IonQ team who will spur growth in sales and production engineering. We have discussed the potential for full-system sales to customers who see the immediate value of having quantum compute capabilities on premises.

In many ways, 2023 is just the beginning, as the power of a quantum computer doubles with each incremental #AQ. In the coming months, we expect to announce our progress in achieving new heights of system performance, new projects with leading customers, and even a new system that incorporates learnings from the latest generations. We encourage our investors to stay tuned for what should be a thrilling couple of years ahead.

Our Thanks

Our first year as a public company was an opportunity for IonQ to demonstrate our ability to project and deliver on our financial and technical milestones. We broke apart from the pack and have set our sights on becoming the first quantum company to offer quantum advantage to the market. With a strong balance sheet and a healthy head start achieved by the outstanding IonQ team, we look to the future with confidence.

On behalf of the full IonQ team, we appreciate your support as an investor in IonQ and look forward to an exciting journey together in 2023 and beyond.

Best,

Peter Chapman

Peter Chapman
President and Chief Executive Officer
IonQ, Inc.