The Quantum Leap
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(Quantum) Winter is coming…or is it?

The Quantum Computing (QC) industry is quite new yet is growing enormously fast as people, companies and countries around the world dedicate considerable time and resources to the evolving field. At its core, QC is centered around the exquisite control of individual atoms or photons. This typically requires conditions including extreme cryogenics, complete vacuums, precise laser/microwave control, ultra-sensitive sensors and brand-new computing languages. It is remarkably difficult, yet progress is being announced daily and working QCs are in use today (albeit not very powerful ones).

And because the underlying quantum mechanics happen on a scale we cannot see, feel or touch at our "people" scale, and involves difficult mathematics including things like "complex" and "imaginary" numbers, it's reasonable to expect many people to be highly skeptical. Just try and explain superposition, entanglement or observer effect to someone not exposed to those concepts before, and you'll know exactly what I mean.

That said, a lack of understanding of something does not mean it is a hoax.

Yesterday an activist short-selling firm named Scorpion Capital published a 183-page report excoriating every aspect of IonQ (and QC generally). The stock closed at $7.15 per share, a drop of 9% for the day on heavy trading volume and down 57% year-to-date. Market capitalization has fallen by $1.7 billion so far this year.

The Scorpion report is 183 pages, contains lots of charts, purported "extensive" interviews with insiders and plenty of smart-seeming graphics and quantum descriptors. It uses this presentation to claim that IonQ is a hoax. So it must be legit, right?

Wrong!

I won't get into all the details and won't include a link to the report because I don't want to contribute to perpetuating its false claims (you can easily find it on the web if you're curious). Here are just a few quick examples to support my position that the report is a ruse meant to lead to a decline in price in order to enrich the author.

1. It's a poorly constructed, cobbled together report meant to present its heft as validation of its conclusions. A friend who pointed it out to me said "it's so long it must contain some truth." That was the author's intent. The report contains a large number of differing fonts. This is not a professionally prepared, exhaustive analysis, it is a big cut-and-past exercise. I'd bet it was produced largely by a bot.

2. The author runs a hedge fund focused on short positions (i.e., borrows stock which it then sells, hoping to buy it back when the price declines). It is in the author's immediate self-interest to cause a panic that leads to a steep and fast stock price decline. Readers should be clear it is a self-serving piece.
3. It contains some true quantum references such as superposition, and it cites generally known current limitations in QC including the requirement of substantially more qubits to have meaningfully useful QCs. This is used to imply that the 11-qubit and 32-qubit machines IonQ offers are "toys".
4. It notes that IonQ uses "trapped ions" for its qubits, and that "ion traps" were invented in the 1950's suggesting, therefore, that IonQ hasn't done anything new. It refers to their machine as a "Willy Wonka or steampunk factory" because of all the "lasers and Nikon-like lenses." Yet somehow IonQ is able to run a Hamiltonian Simulation and Bernstein-Vazirani algorithm, among other quantum application-oriented benchmarks, which is conveniently ignored by Scorpion.
5. This is a repurposed report of a similar nature published by Scorpion in April 2021 (that one is 188 pages) to do a comparable hit job on Quantumscape, a battery company. It's a replay of many of the same sham allegations where the author exaggerates claims about the SPAC structure, with similar references to Tharanos, etc. to scare readers into selling the stock. There has been plenty of press coverage refuting that prior report and a growing chorus today of others besides me calling Scorpion to task for its misleading claims about IonQ.
6. The report claims things like "fictitious revenue" and "sham transactions." And suggests throughout that the company is a scam. Tell that to the underwriters (and their lawyers) who did extensive diligence. Or Ernst & Young who delivered a clean audit opinion. Or Amazon, NEA, Google and Breakthrough Ventures who all invested substantial sums in the company. Or Microsoft, Amazon and Google who all make the IonQ machines available via their quantum cloud services. Or Accenture, Goldman Sachs, and Hyundai who are among a growing list of cash-paying customers. Or to the many people running algorithms on the IonQ machines available via cloud access.

I'm confident that the diligence done by all of the firms noted above was substantially more robust than that done by whatever bot created the Scorpion report. Again, I do not want to provide oxygen to the report so won't get into further details here. I hope that you will do your own analysis before relying on information like that report to make investment decisions.

So why am I writing about this? For two reasons: 1) To highlight the fact that some QC companies are now public, with billions of dollars of market capitalization in the balance. Strong moves up or down by these early public QC companies will have powerful implications for the many others that hope to use public markets to help fund the steep needs required to advance this bleeding-edge science; and 2) The concept of a "quantum winter" is a real fear in the industry and a challenge that has befallen other bleeding-edge technologies (e.g., nuclear fusion). Those of us reporting on the QC industry need to be rational and sober when describing the timeline for quantum advantage and try not to over-promise. Hype tends to rebound strongly in the other direction, so I caution all QC advocates to temper their claims and enthusiasm so as to not over-hype achievements and advances. As with many things, it's better to under-promise and over-deliver.

So, is quantum winter coming? Not in this writer's opinion. There is still a long way to go before we have QCs that can add value to computational problems and even further before consistent quantum advantage. The hill is steep, and the climb is arduous, but I am confident the view will be worth the climb.

References:

IonQ website and presentations, accessed May 3, 2022.

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