



Quantum computing and your mission

When and how you'll see benefits

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Legal

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It's not too early to start preparing for quantum...

Overall, hybrid computing is a practical and necessary approach to quantum computing, and it will continue to be used as we move towards large-scale, fully capable quantum computers.

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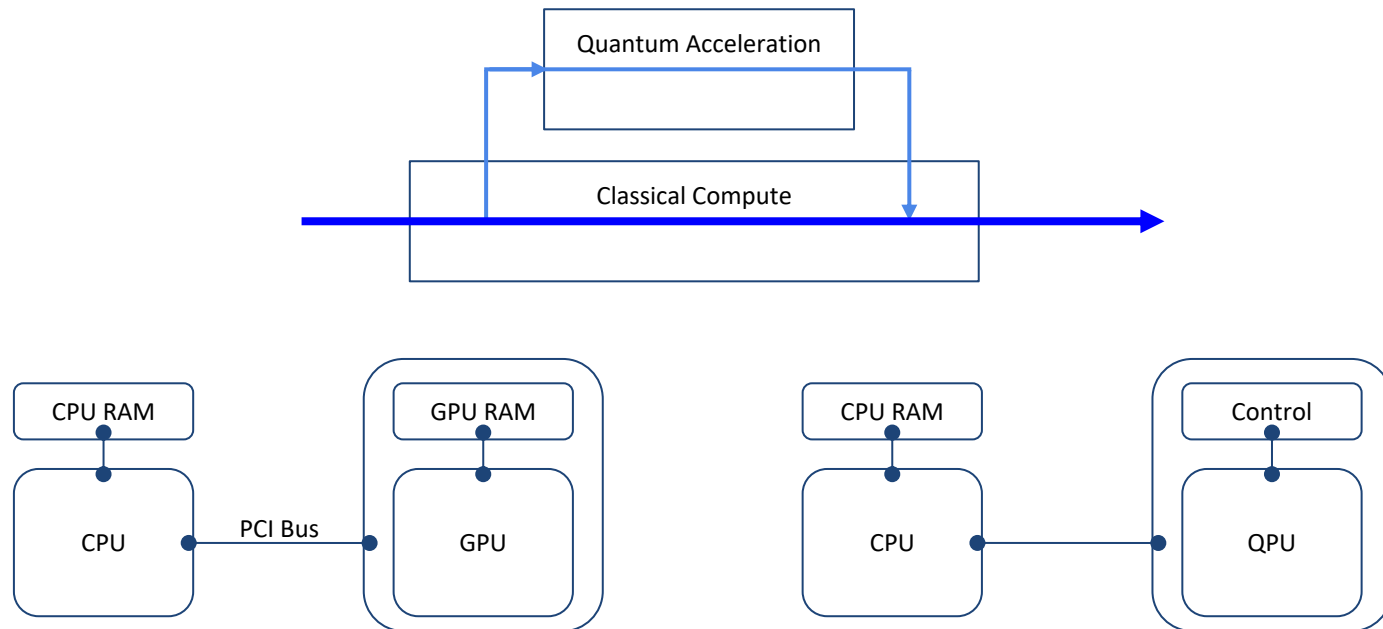
Hybrid systems are the future of quantum computing and they're here now



 By John P. Mello Jr. posted 01 Mar 2023

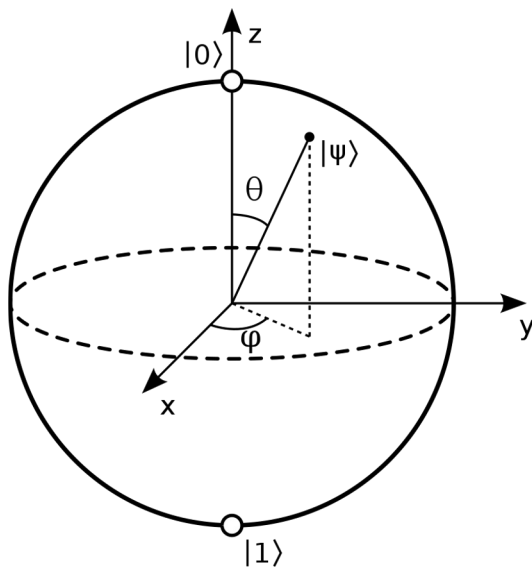
Quantum components work *with* classical components to accelerate processes.

A Coprocessor like a GPU



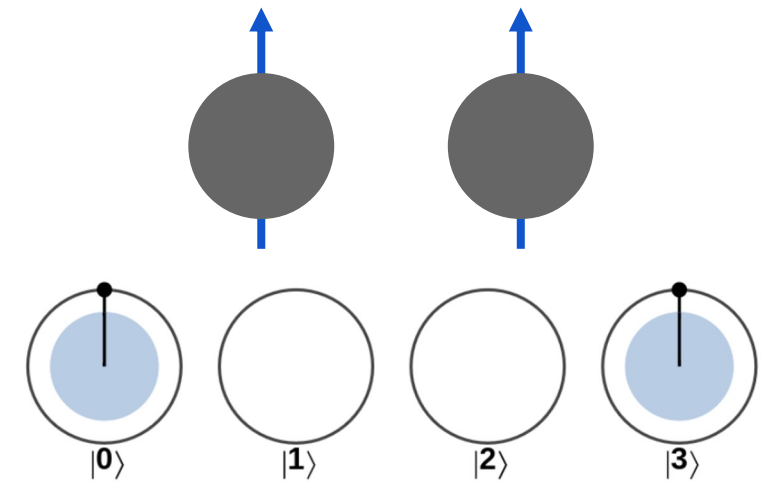
How does Quantum gain advantage?

Superposition



State Space
Explosion

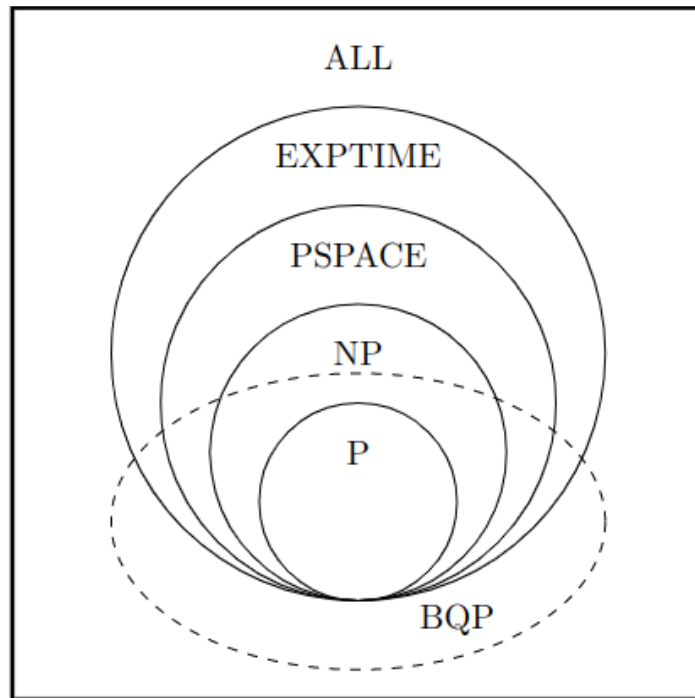
Entanglement



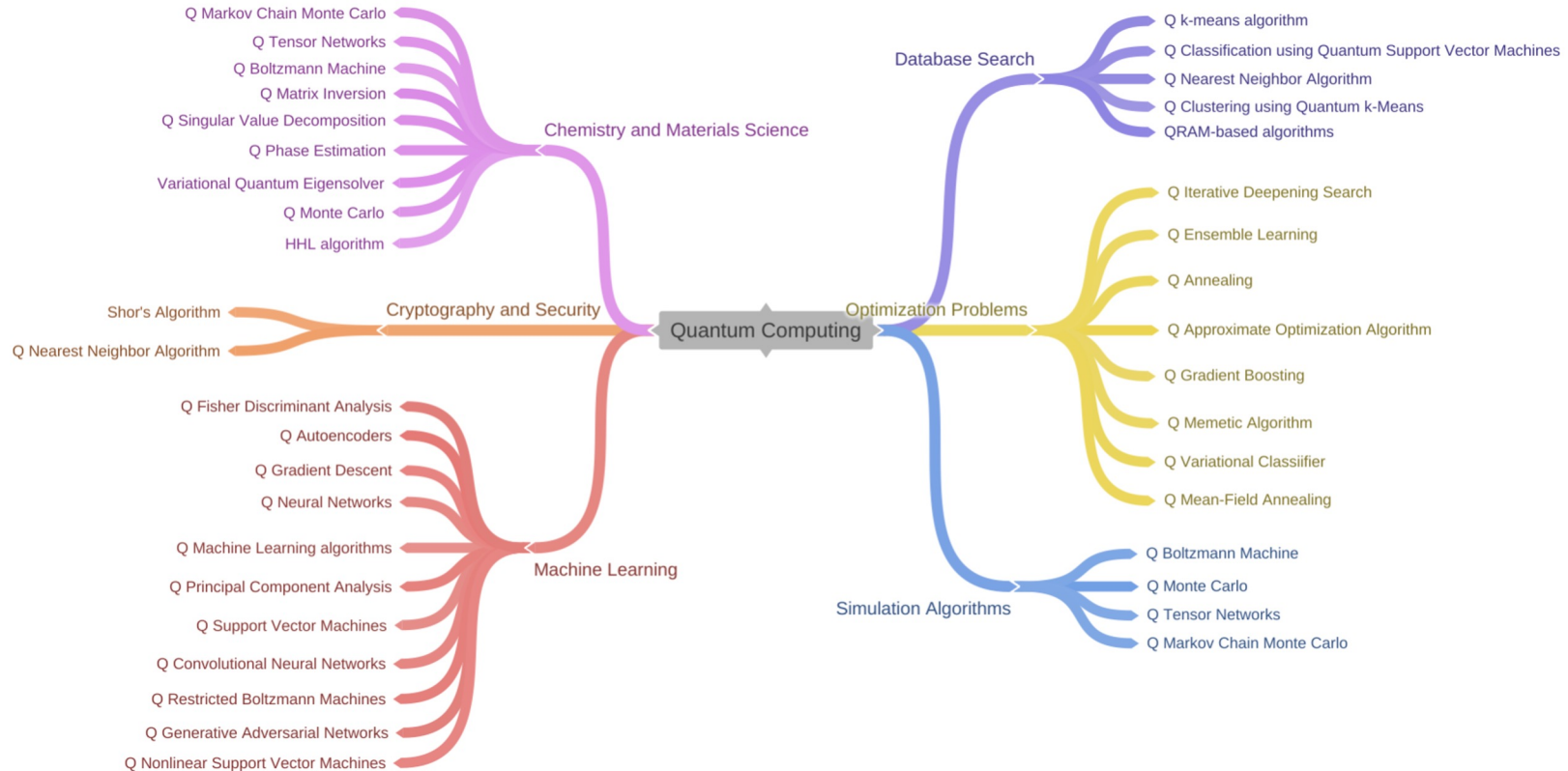
Non-Local
Computation

What is the advantage?

Quantum computing provides access to BQP and the ability to solve more and larger problems: classically tractable (P) problems as well as *some* classically intractable (NP) problems.

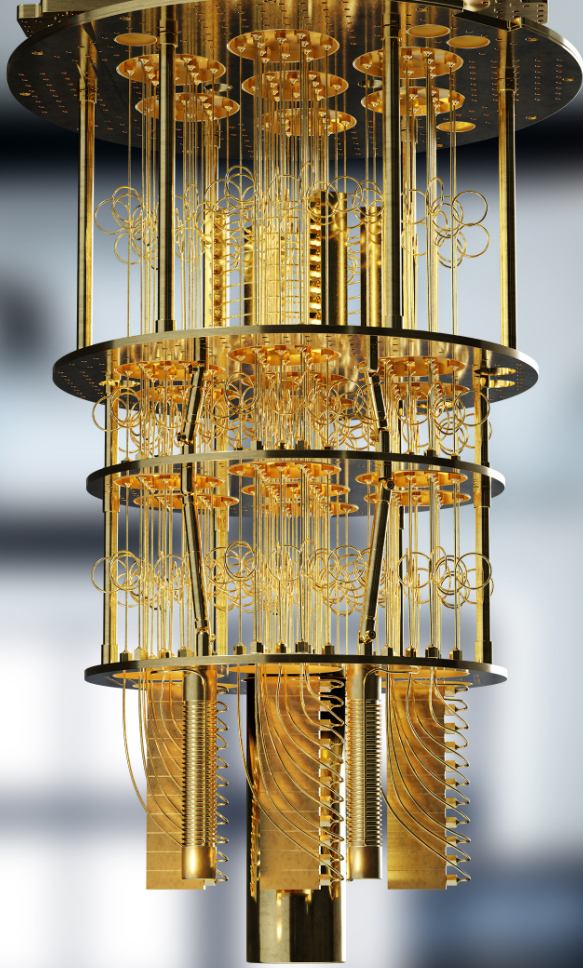


For certain challenges, quantum computing could yield benefits within the next five years.

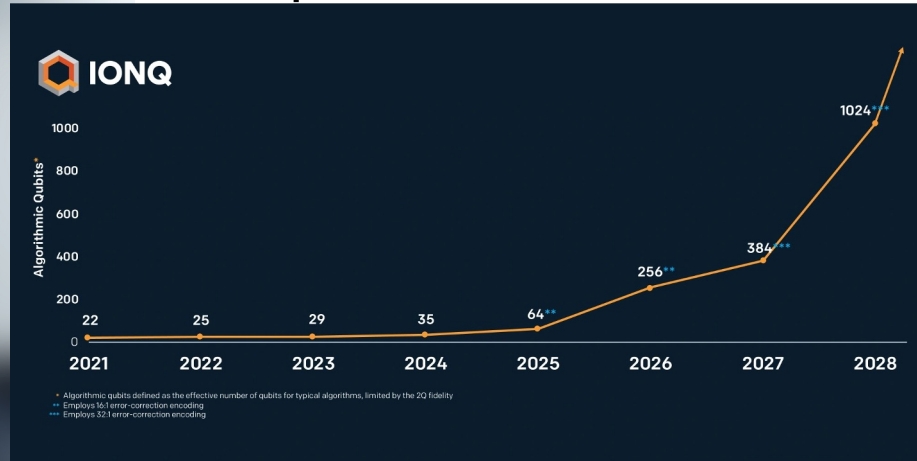


Optimization Applications



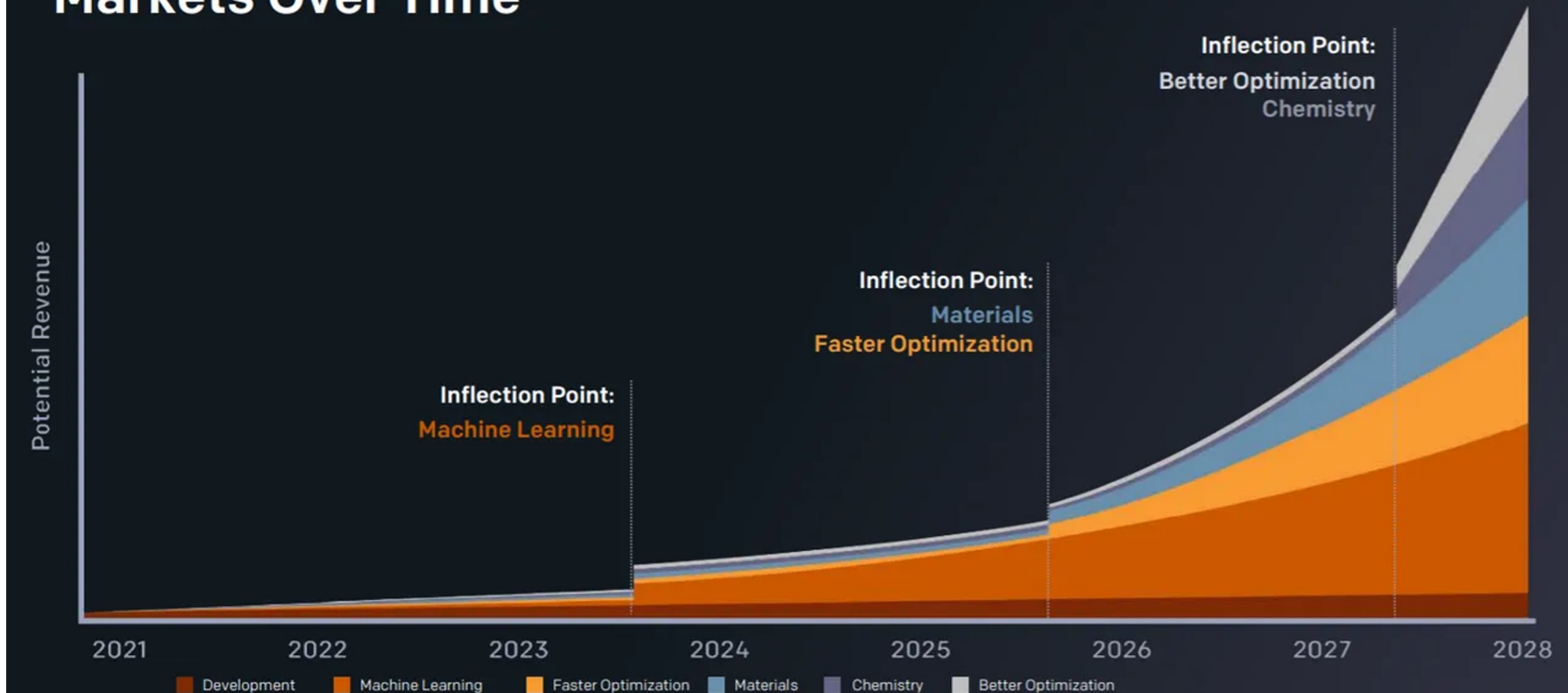


Recent advances in quantum algorithms and the availability of quantum hardware put the fast and efficient problem solving abilities of quantum computers within reach for real-world problems.



[IONQ, SEC Analyst Day, 2021](#)

Technical Progress Unlocks Quantum Commercial Markets Over Time



[IONQ, SEC Analyst Day, 2021](#)

How do we get there?

Managers should focus on two key activities: vigilance and visioning.

--[Harvard Business Review](#)

Identify a team that can understand and monitor progress in quantum computing.

Identify problems that your organization is currently having due to computing constraints.

Aim for an “active” approach to quantum in the cycle of [technology awareness](#).

Contact our team

At the Carnegie Mellon University Software Engineering Institute, our team of quantum computing experts is researching

- Quantum advantage
- Quantum computing as a service
- Quantum software architectures



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