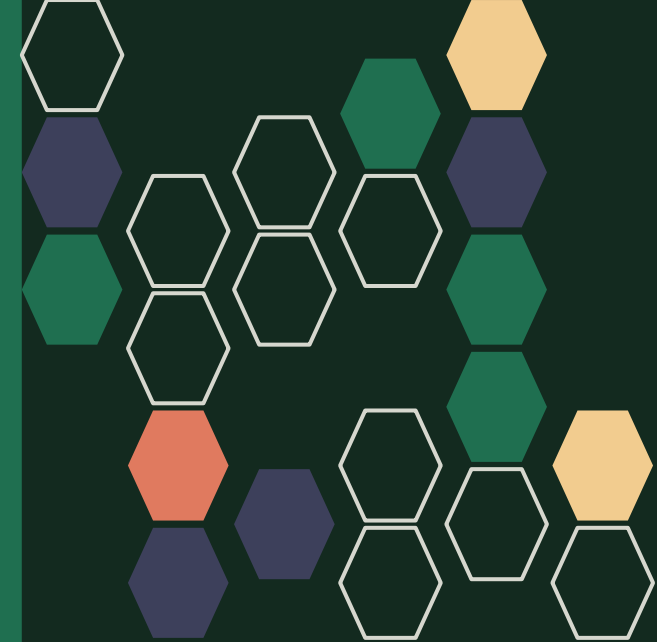


TECHNICAL SEMINAR

Quantum Computing



A beginner-friendly look at qubits and what they could change

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Agenda

01 Overview

02 Core concepts

03 Applications

04 Challenges

05 Future



Image

01

OVERVIEW

Introduction

- Classical computers use bits that are either 0 or 1
- Quantum computers use qubits that can be in superposition
- Some problems may become dramatically faster to solve
- Today's machines are still small and error-prone



Evolution



02

CORE CONCEPTS

Key concepts



Superposition

A qubit can represent 0 and 1 at the same time.



Entanglement

Qubits linked so one's state depends on another.



Interference

Amplifying right answers and cancelling wrong ones.

Architecture



Architecture diagram

A quantum computer is a classical computer wrapped around a very cold, very quiet core.

Control electronics send precise pulses to qubits kept near absolute zero. Results are measured and post-processed classically, many times over.

03

APPLICATIONS

Applications



Image 1

Drug discovery

Simulating molecules more accurately



Image 2

Optimisation

Logistics and scheduling problems

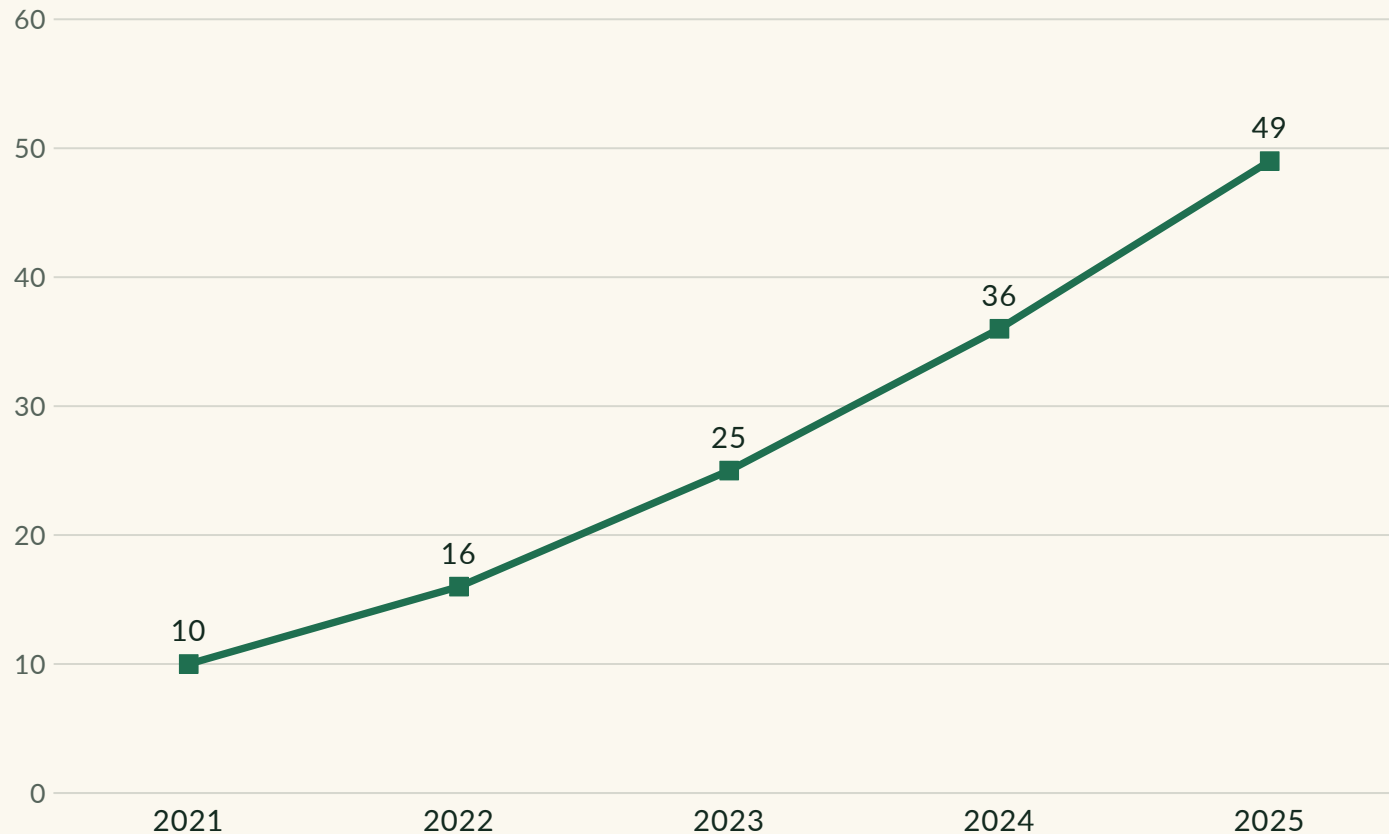


Image 3

Cryptography

New, quantum-safe security methods

Adoption trend



Research activity keeps rising, though practical advantage is still limited to narrow tasks.

Sample data for illustration — replace with your own figures.

Advantages and limitations

Advantages

- ✓ Potential speed-ups for some problems
- ✓ Natural fit for simulating chemistry
- ✓ Drives new cryptography

Limitations

- Qubits are fragile and noisy
- Needs extreme cooling
- Few useful algorithms so far

Open challenges



Error correction

Many physical qubits per reliable qubit.



Scaling

From hundreds to millions of qubits.



Software

Tools and skills are still scarce.

04

FUTURE



Quantum computers will
not replace laptops —
they will solve problems
laptops cannot.

Looking ahead

Conclusion

- Qubits use superposition and entanglement
- Real advantage is narrow but growing
- Error correction is the key milestone to watch



References

- [1] Survey paper on the topic, IEEE Access, 2024.
- [2] Textbook chapter covering fundamentals, 2023.
- [3] Recent conference paper on applications, 2025.
- [4] Industry white paper (generic reference).



Questions?

Thank you for listening.

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