

La computación cuántica ya es hoy

También ha llegado, hasta en España :D

Alexandre Alemany

@alex_ao8





Google Developer Groups Menorca

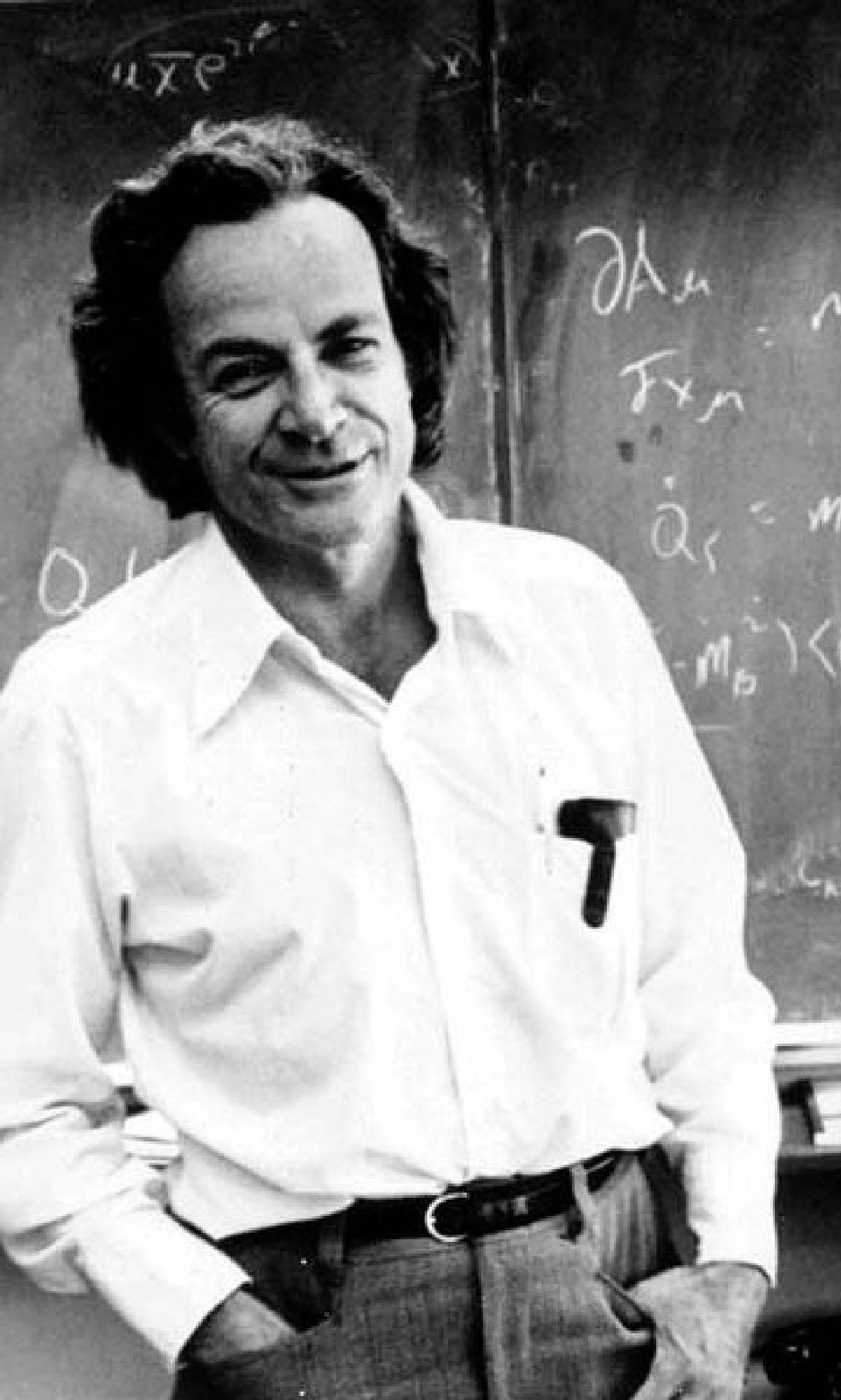
- Google Developer Group Menorca Organizer
- Ingeniero informático por la FIB - UPC
- Estudiante de máster en computación
- Software developer intern en Entrust
- GDSC Mentor en España



Google Developer Student Clubs



Alexandre Alemany

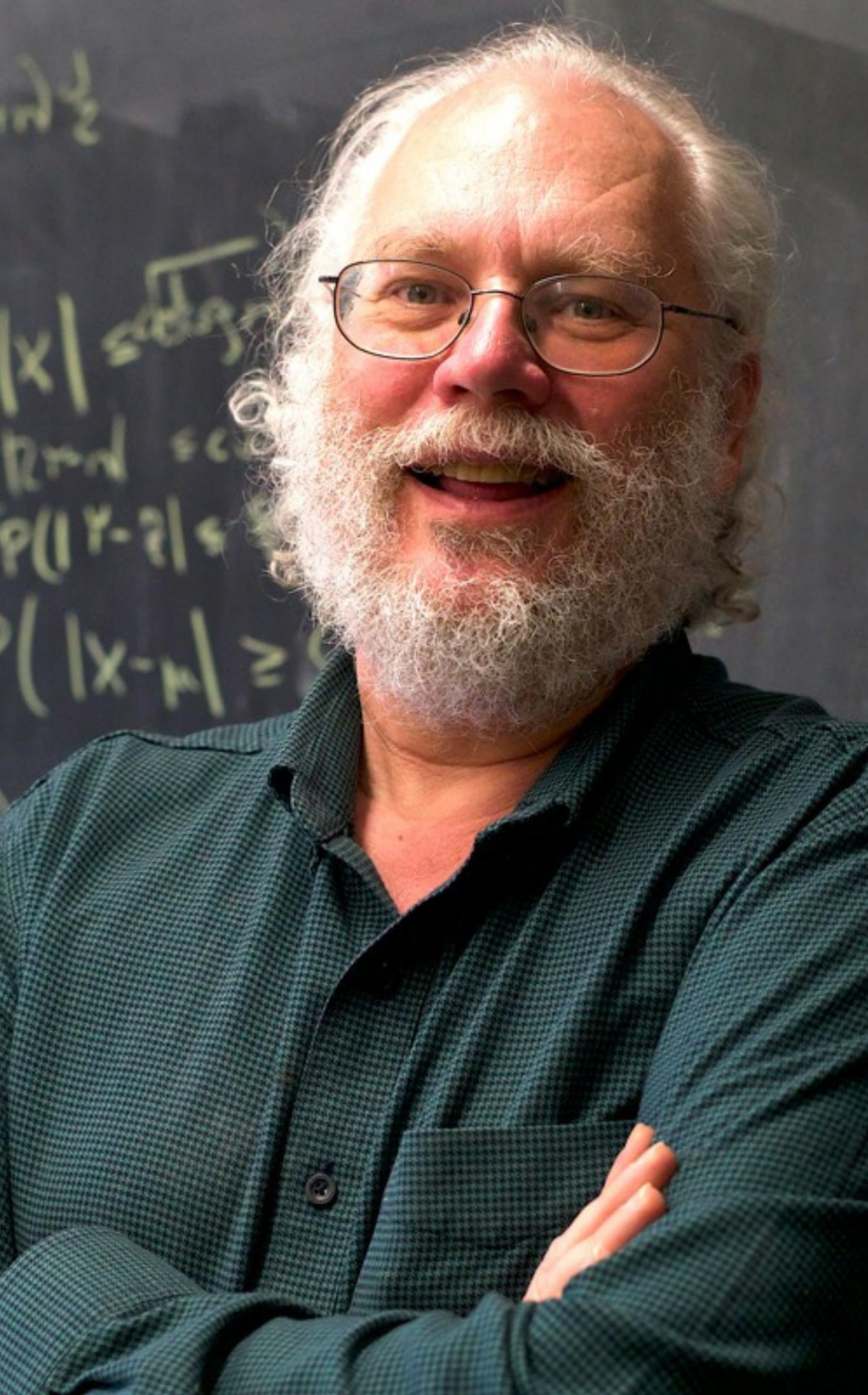


"Nature isn't classical, dammit, and if you
want to make a simulation of Nature, you'd
better make it quantum mechanical, and by
golly it's a wonderful problem because it
doesn't look so easy"

Richard Feynman - 1982

"Wow, I just cracked The whole criptography
UVU"

Peter Shor - 1994



NISQ era

Near Intermediate-Scale Quantum
(A veces, aciertan y todo)

Near Intermediate-Scale Quantum era

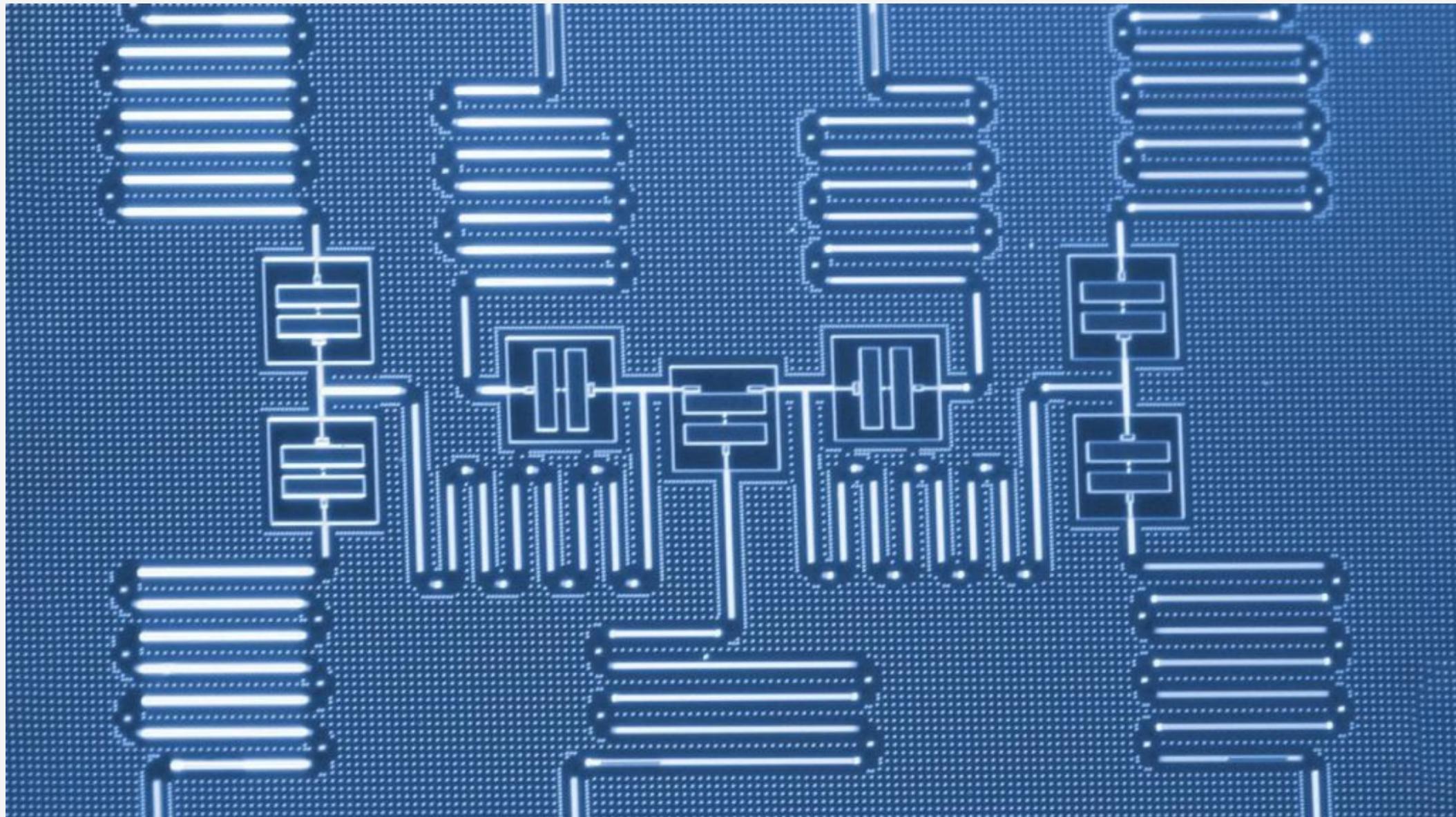


IBM



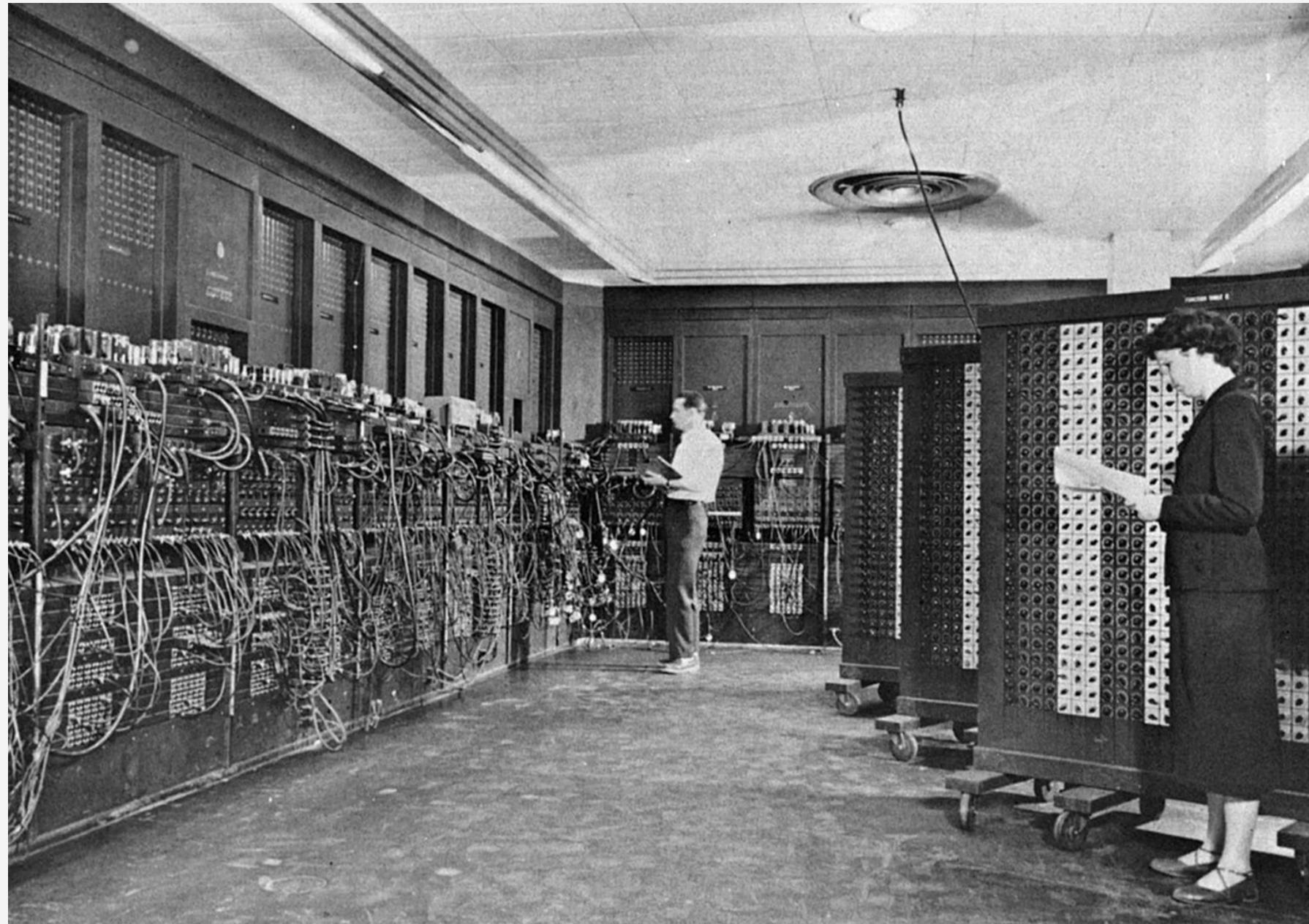
Qilimanjaro

Near Intermediate-Scale Quantum era



Chip de 7 qubits

Near Intermediate-Scale Quantum era



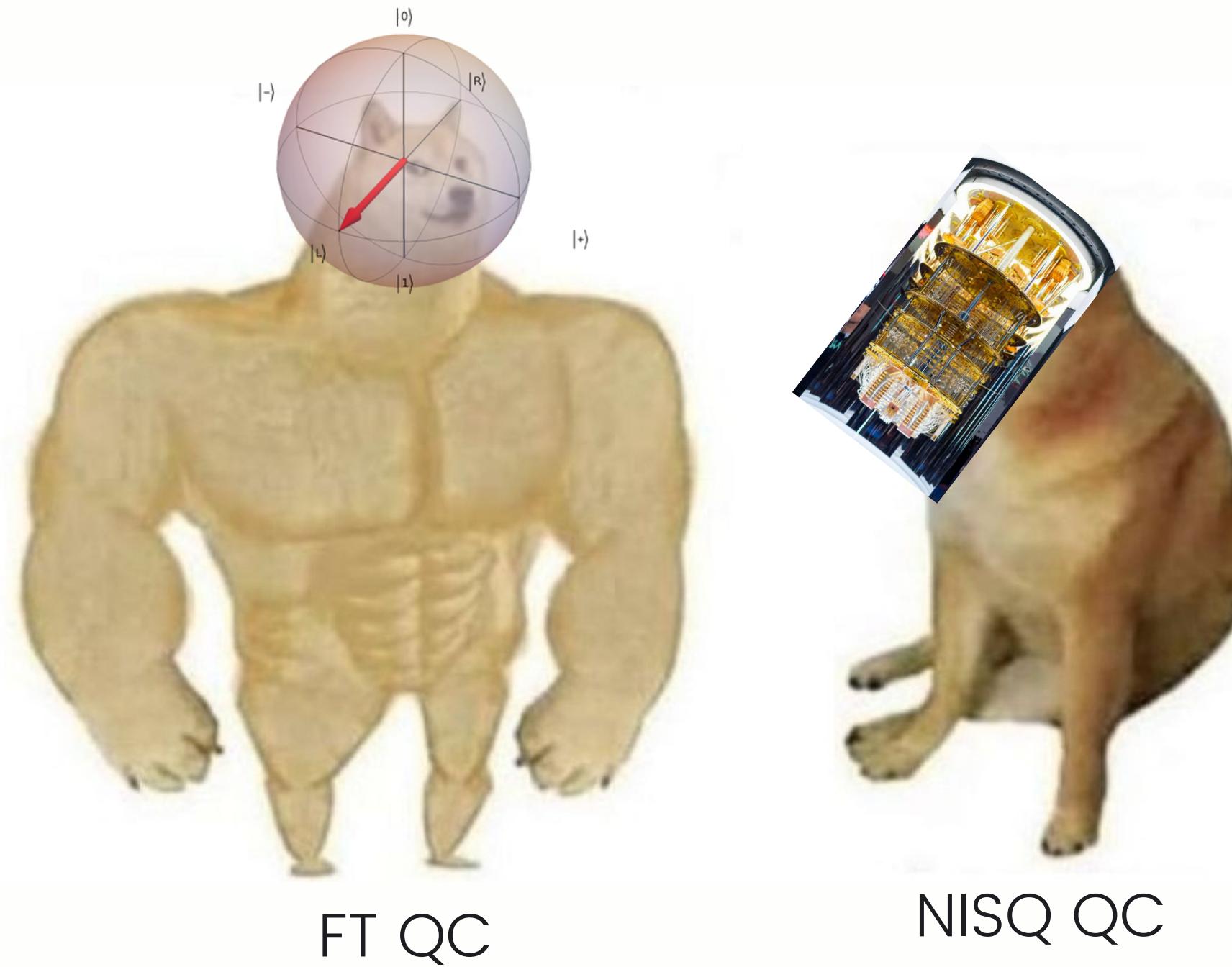
Primer ordenador “clásico”

Fault-tolerant quantum computers

Ordenadores de verdad :)

Fault-tolerant quantum computers

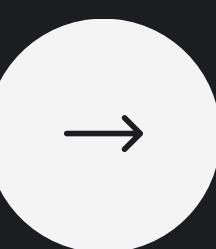
- Puede con algoritmos
- Corrección de errores
- Calidad de los qubits
- A lo mejor no parece una lámpara



- Parece una lámpara
- No acierta ni el clima
- Más grande que una nevera
- Parece una lámpara



¿Y esto porqué?
Yo soy informático
o.O



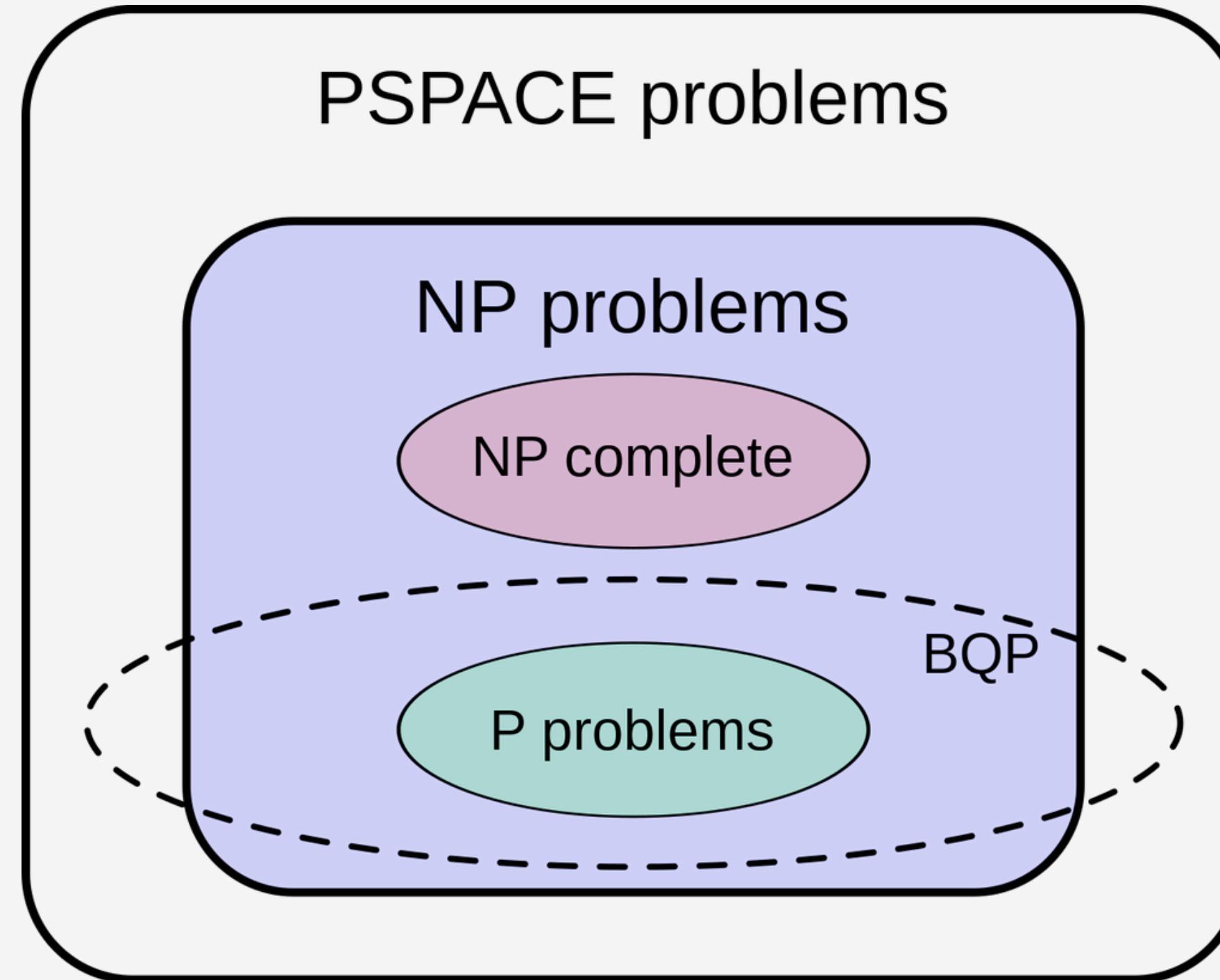
¿Qué pinta un informático?

Computación



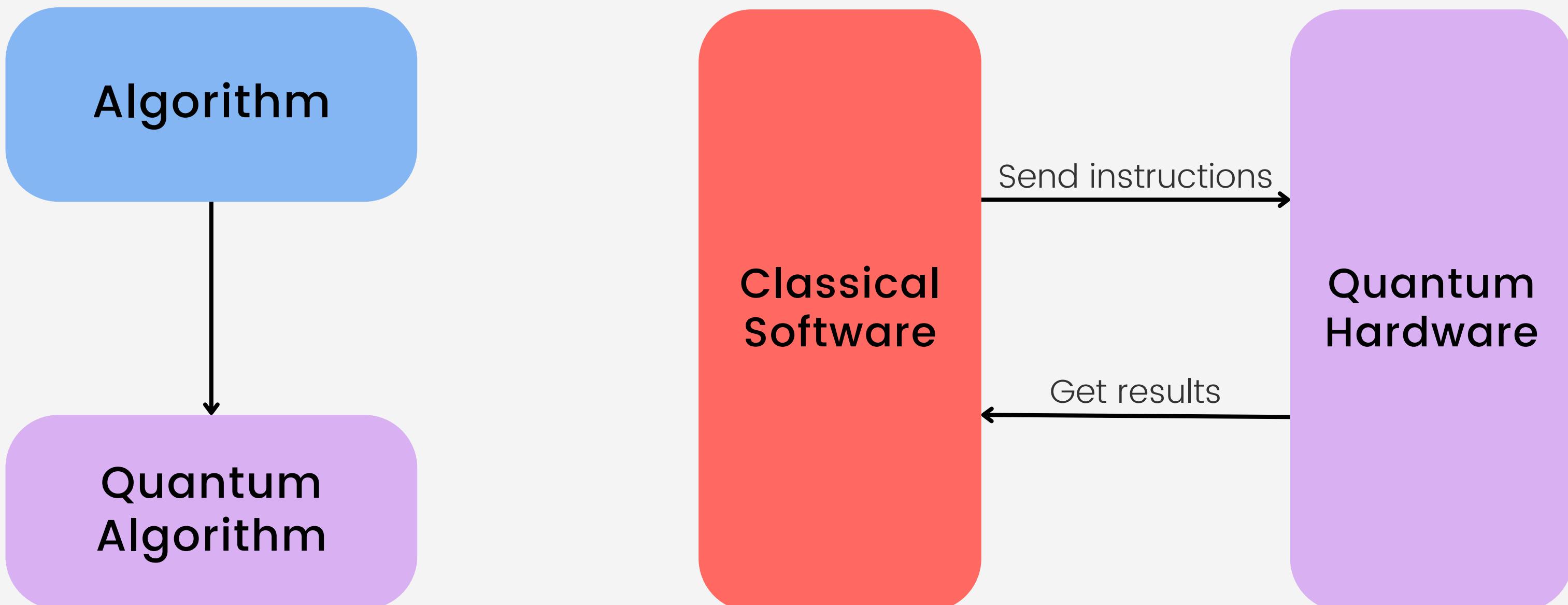
Mecánica
cuántica

¿Qué pinta un informático?



Teoria de complejidad computacional

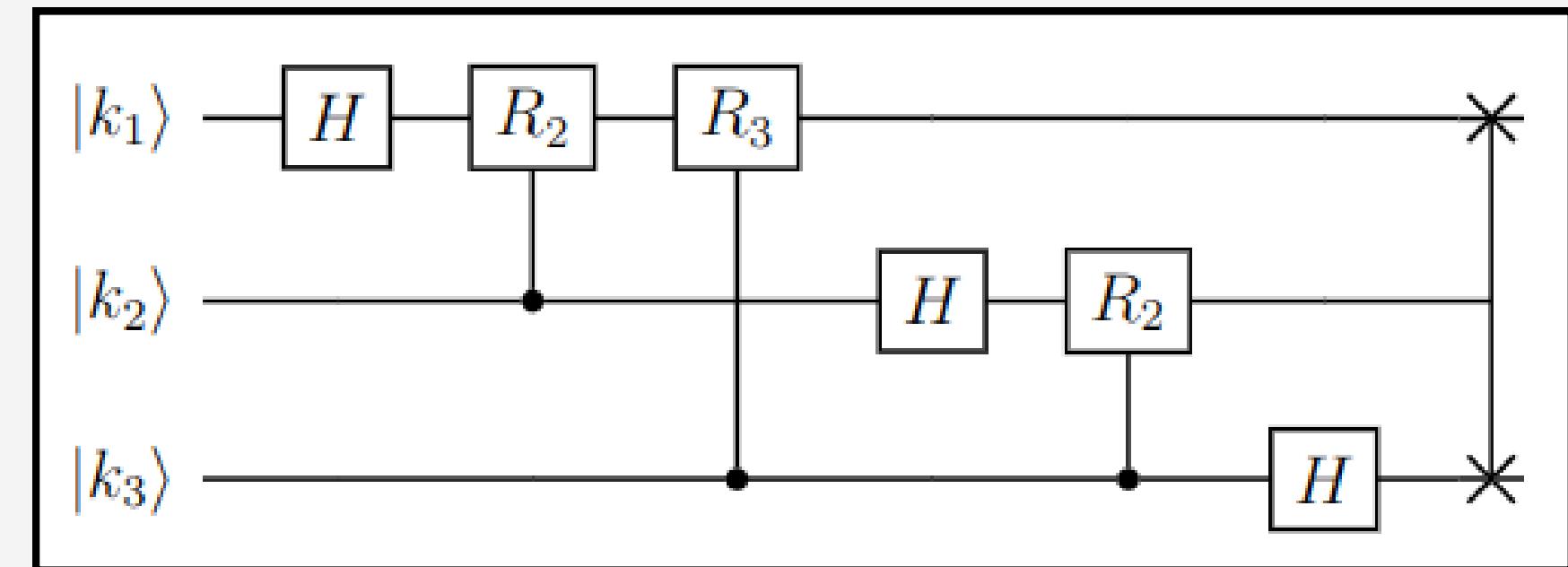
¿Qué pinta un informático?



Algoritmo cuántico

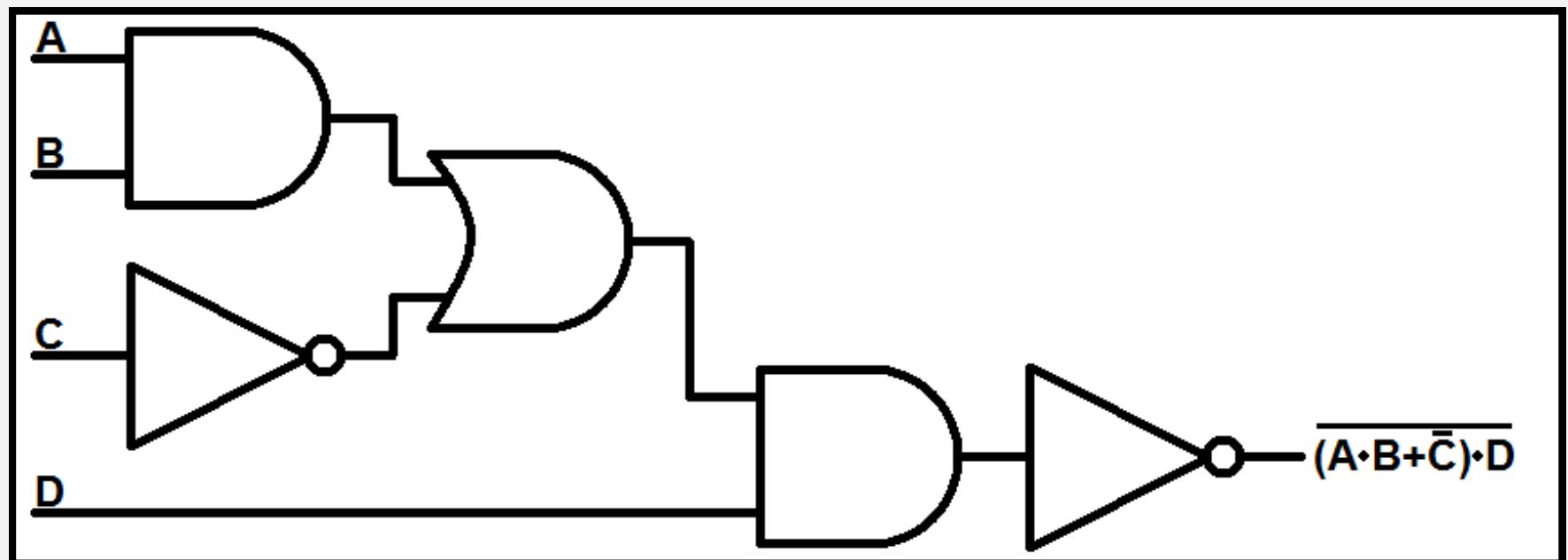
```
N ← Len(A)  
For I ← 1 to N - 1  
    For J ← 1 to N - 1  
        If (A(J) > A(J + 1)) Then  
            Temp ← A(J)  
            A(J) ← A(J + 1)  
            A(J + 1) ← Temp  
        End-If  
    End-For  
End-For
```

Bubble sort

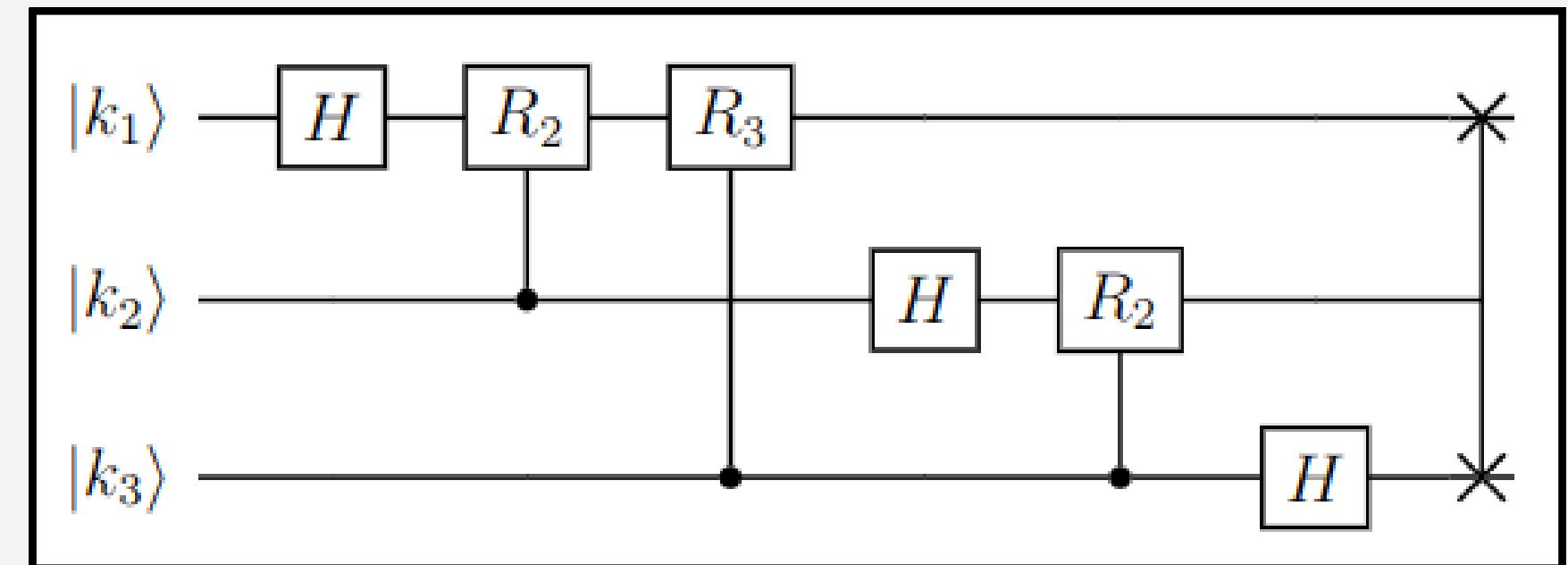


Quantum fourier transform

Algoritmo cuántico

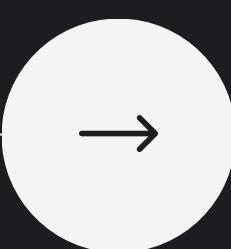


Circuito lógico

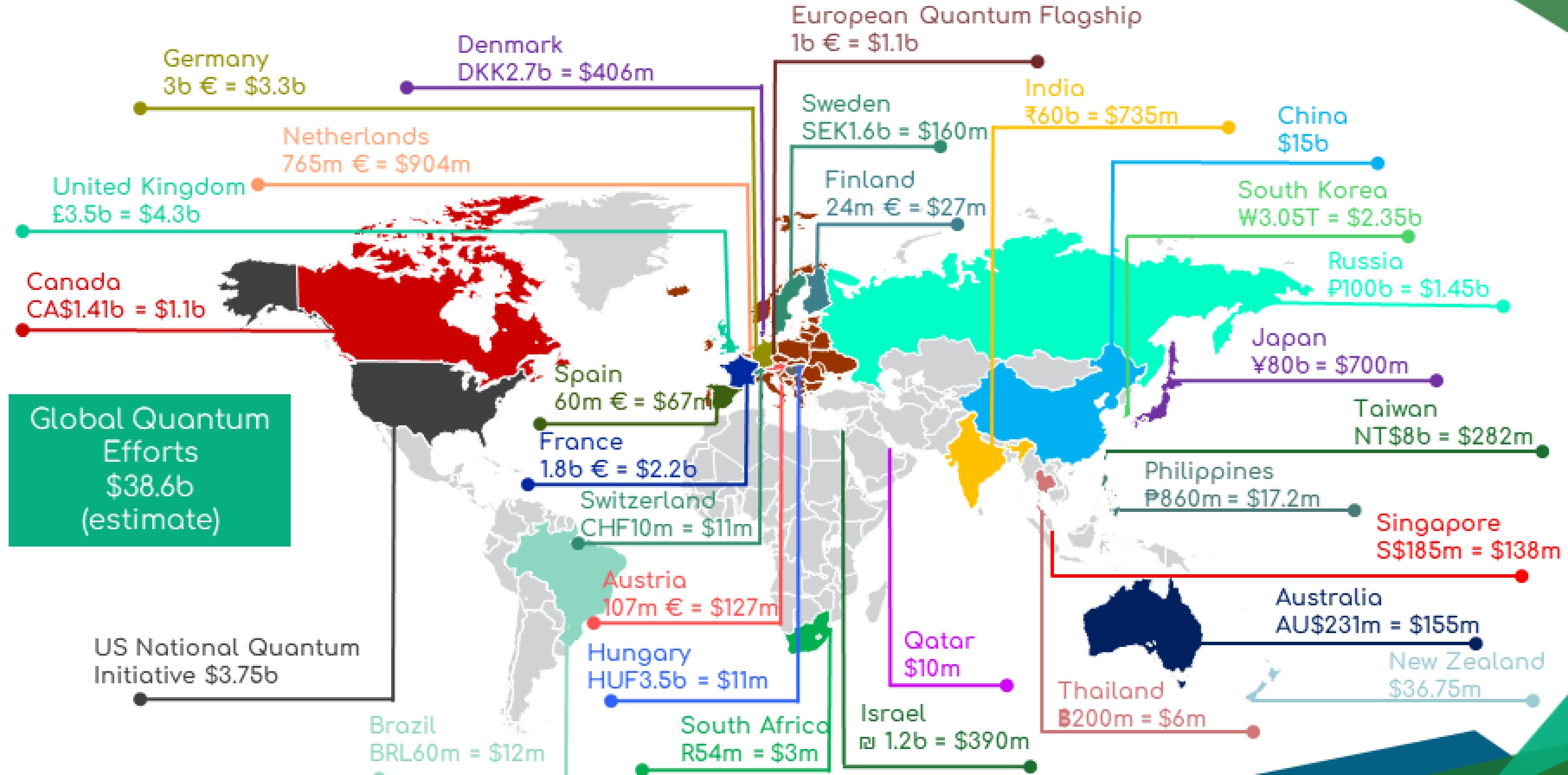


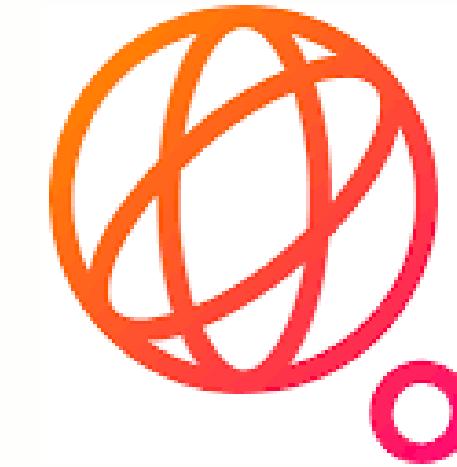
Quantum fourier transform

**Esto no funciona,
¿nos interesa?**



Quantum effort worldwide





QUANTUM
FLAGSHIP



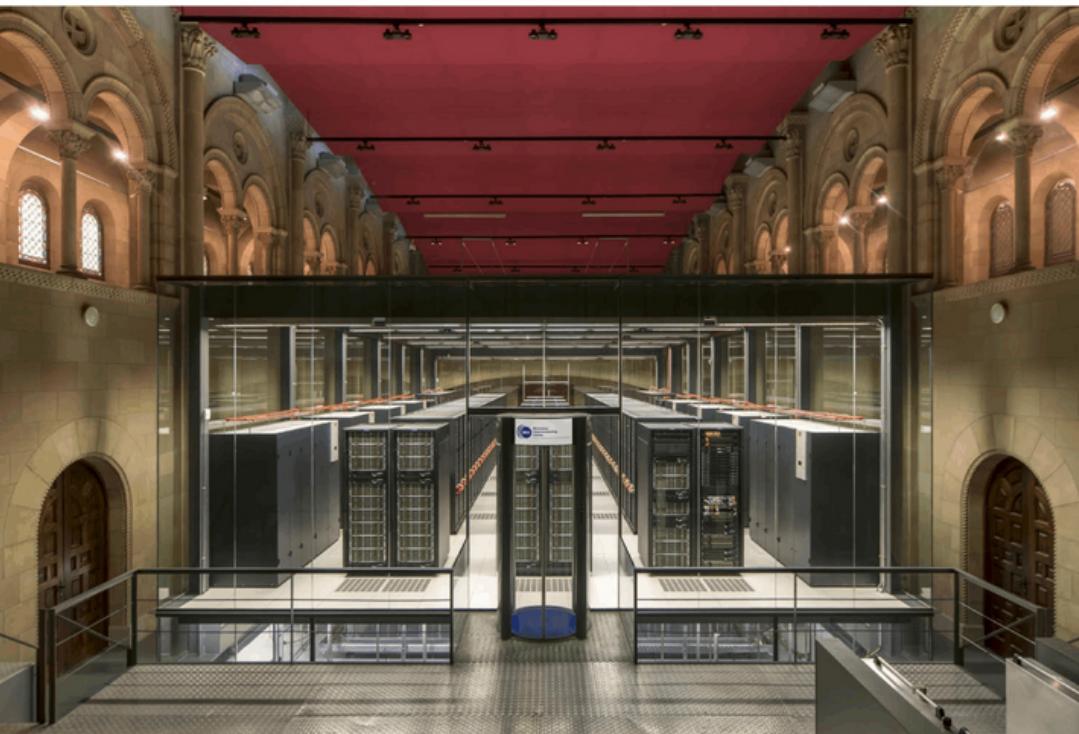
EUQC
European Quantum
Industry Consortium





Quantum SPAIN

 QILMANJARO
QUANTUM · TECH

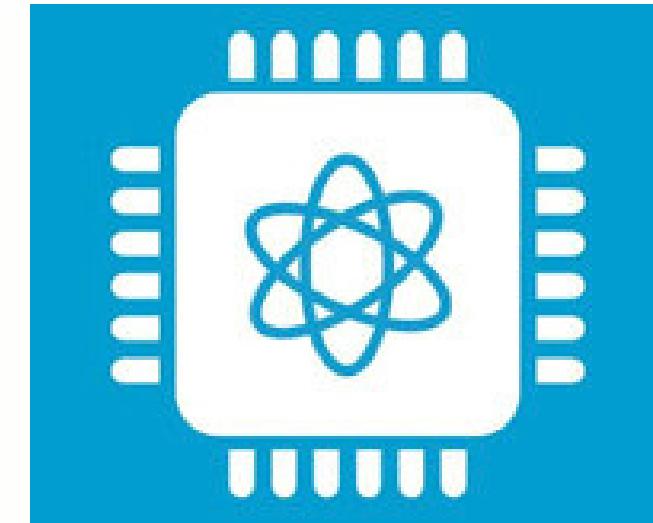
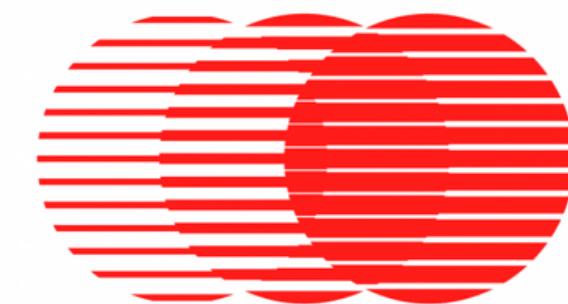


 FUJITSU

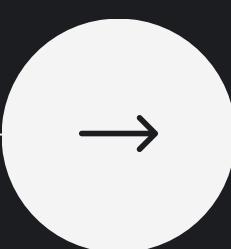


IBM Quantum





¿Cómo se programa?

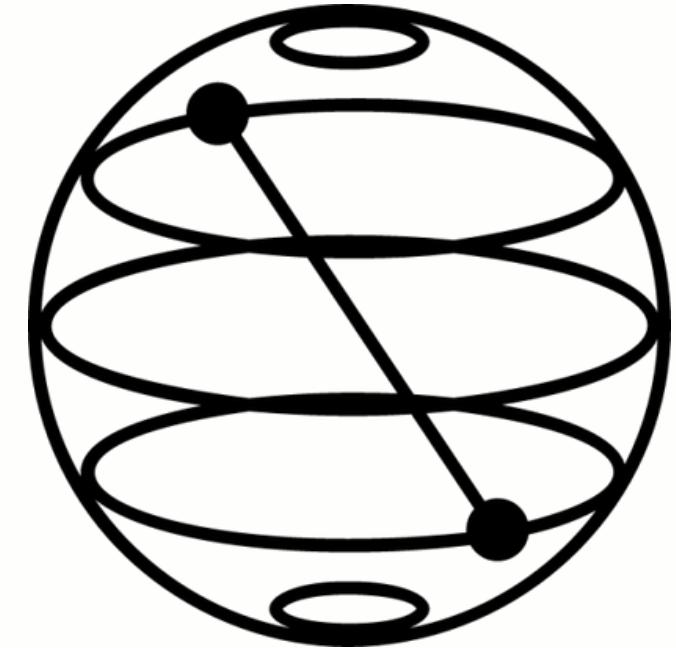


Frameworks de python

QIBO



Pennylane



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