

Quantum Computing

How close or how far?

Joel López Villanueva

Physics and Mathematics Student
University of Oviedo



QUANTUM HYPERMACHINE

REALITY OR FICTION?

The quantum race is driven by major headlines.

The media constantly announces amazing breakthroughs that mix revolutionary science and strategic clickbait.

Is it a real technological revolution or just marketing to attract investment?

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Supercomputer makes calculations in blink of an eye that take rivals 47 years

Google claims to have proved its supremacy over conventional machines with new quantum computer

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FORTUNE

Quantum computers could be powerful enough to crack Bitcoin a few years after 2030, CEO of Nvidia's quantum partner says



Quantamagazine

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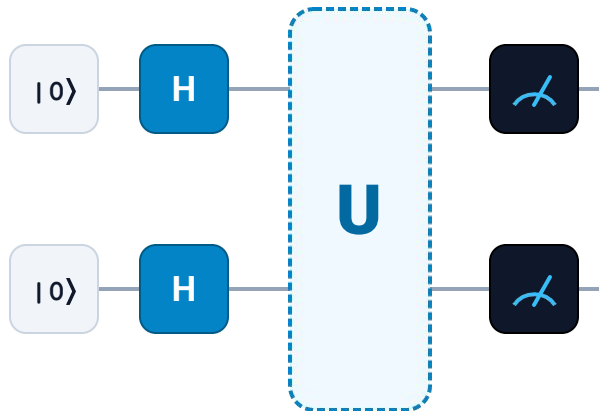
QUANTUM GRAVITY

Physicists Create a Holographic Wormhole Using a Quantum Computer

Science China / Science

Chinese quantum computer is 180 million times faster on AI-related tasks, says team led by 'father of quantum' Pan Jianwei

QUANTUM CIRCUITS AS AN AMPLITUDE ENGINE



State Prep.
 $|0\rangle$ & H

Unitary Evolution
Operator U

Measurement
Born Rule

State Preparation

- 01 Qubit initialization in $|0\rangle^{\otimes n}$ and application of Hadamard gates to generate a uniform superposition.

Unitary Evolution

- 02 Application of unitary operators U to manipulate complex phases, amplifying the target state's probability.

Measurement and Collapse

- 03 Projective measurement collapses the superposition into a single state $|i\rangle$ with probability given by $P(i) = |c_i|^2$.

Statistical Sampling

- 04 Process repetition ($N \gg 1$) to sample the probability distribution and extract the optimal result.

THE PRESENT: QUANTUM REALITY AT CERN

Quantum is Present

High-energy physics hubs like CERN are already deploying quantum hardware in active, real-world particle accelerator experiments.

A Proven Advantage

Hybrid quantum reinforcement learning algorithms are actively outperforming classical baselines in beamline optimization tasks today.

Quantum Science and Technology

PAPER

Hybrid actor-critic algorithm for quantum reinforcement learning at CERN beam lines

Michael Schenk^{1,*}, Elías F Combarro², Michele Grossi¹, Verena Kain¹, Kevin Shing Bruce Li¹, Mircea-Marian Popa³ and Sofia Vallecorsa¹

¹ European Organisation for Nuclear Research, Espl. des Particules 1, 1211 Meyrin, Switzerland

² Computer Science Department, University of Oviedo, C. San Francisco 3, 33003 Oviedo, Asturias, Spain

³ Politehnica University of Bucharest, Splaiul Independentei 313, 060042 Bucharest, Romania

* Author to whom any correspondence should be addressed.

E-mail: michael.schenk@cern.ch

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THE ROAD AHEAD

A Present Reality

Quantum computing is no longer a distant theoretical concept; it is actively deployed today by major research hubs like CERN to solve real physics problems.

Massive Industry Drive

Industrial giants like IBM and Google are heavily investing in this paradigm, establishing it as a critical and expanding career path for physicists and mathematicians.

The Hardware Bottleneck

There is an overwhelming, urgent need for experimental physicists to redesign quantum architectures, shielding qubits from environmental sensitivity to eliminate decoherence and noise.

Thank you!