we4u Insights

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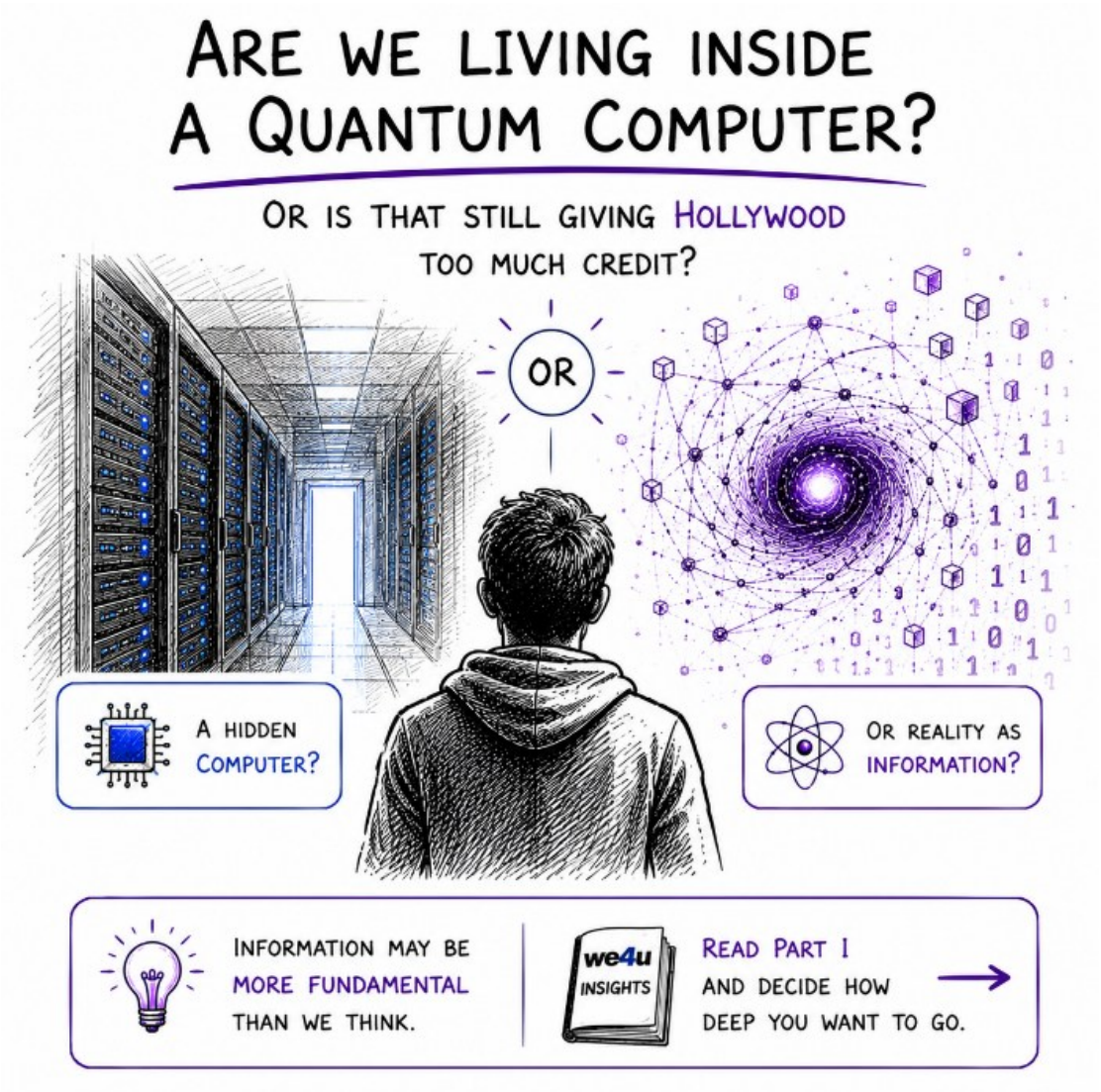
Quantum technology

Are we just living in a quantum computer simulation?



Modern ideas in quantum physics, holography and quantum gravity suggest that information may not simply be something inside the universe. It may be much closer to the foundation from which space, time, matter and energy emerge.

Want the full story? Read our we4u Insights edition.

Here the link: https://we4u.io/we4u-Insights-Quantum-Technology

So, was Hollywood right after all, and are we just living in a quantum computer simulation?

Here is the short answer:

probably not. At least not in the Hollywood sense.

There is no need to assume leather coats, hidden server rooms, suspiciously well-dressed agents or a giant machine rendering our world from the outside.

The idea that we live in an artificial simulation may be an entertaining cultural metaphor, but it is not what quantum physics requires us to believe.

The more interesting question is different:

What if reality does not need to be simulated because, at a deeper level, it already behaves like a quantum information process?

This is where the idea becomes less cinematic and more serious.

In the chapter **“What is a quantum?”** of our **we4u Insights** on Quantum Technology, we explain that quantum physics does not describe the world as a collection of tiny classical objects. A quantum is not a small thing flying around like a microscopic billiard ball. Rather, quantum physics shows that certain physical quantities, states and interactions are not arbitrarily continuous, but structured in discrete, probabilistic and state-dependent ways.

The chapter **“The quantum paradox”** then shows why this matters. In the double-slit experiment, a quantum object does not behave as if it simply takes one hidden classical path that we have not yet discovered. As long as no which-path information is available, several possibilities contribute coherently to the outcome. When measurement information becomes physically available, the interference disappears.

This already tells us something important: information is not merely a passive description of reality. In quantum physics, information is tied to the physical state itself.

The chapter **“Quantum state”** makes this point even more concrete. Quantum technologies depend on creating, preserving, manipulating and measuring quantum states. If a quantum state is disturbed, measured or copied in the wrong way, it changes or is lost. In this sense, information is not just content transported by a system. The physical state itself carries the information.

This is one of the reasons why quantum technology is not simply about faster computers. Quantum computers, quantum sensors and quantum communication systems are built on a deeper layer of physical reality: superposition, interference, measurement and entanglement.

The question becomes even more radical in the later chapters of this **we4u Insights**, especially **“Emerging reality”**, **“Quantum gravity”** and **“Speculative excursus: Is information the deeper level of reality?”** There we discuss the possibility that space, time, matter and energy may not be the most fundamental ingredients of reality. Some modern research programs suggest that geometry, distance and even spacetime could emerge from deeper quantum structures, correlations and entanglement patterns.

This does not mean that the universe is literally a computer sitting somewhere outside itself.

It means something more subtler: information, state, correlation and relation may be more fundamental than the objects and locations we experience in everyday life.

This is why the phrase **“It from Bit”**, associated with John Archibald Wheeler, remains so powerful. It suggests that physical reality may arise from elementary distinctions or information. In a quantum version, we might speak of **“It from Qubit”**: not classical bits, but quantum states, superpositions and entanglements as a deeper level of description.

But we should be careful.

This is not established physics in the same sense as quantum mechanics, relativity or experimentally confirmed entanglement. It is a speculative synthesis inspired by serious fields of research: quantum information, holography, entanglement entropy, emergent spacetime and quantum gravity.

These fields provide real scientific motivation, but they do not yet amount to a complete, experimentally confirmed theory saying that the universe is a quantum computer.

So Hollywood was probably not “right”.

But it may have accidentally pointed toward a deeper question:

What if reality is not made primarily of things in space and time, but of quantum states, relations and information structures from which space, time and matter emerge?

- That would not make our world less real.
- It would make reality deeper than the classical picture suggests.
- We would not be living inside a simulation.
- We would be living inside the emergent surface of a quantum information process that is reality itself.

If this has caught your interest, just follow us and learn more about the strange world of quantum technology in our in our **we4u Insights** edition “Quantum Technology: What makes it so extraordinary?”, we explore exactly this shift.

Part I starts with the foundations, from the classical worldview to quantum states, entanglement, emergent spacetime and the speculative idea that information may be the deeper level of reality.

Part II then moves to the technological implications for quantum computing, post-quantum cryptography, quantum key distribution, network security, digital sovereignty and the long-term prospect of a quantum internet.

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