What if reality isn't something we simply observe, but something we participate in shaping, moment by moment, thought by thought? In a world governed not only by gravity and motion but by uncertainty and entanglement, the simple act of observation gains an astonishing power: it defines what is real. This essay invites the reader on an exploration through quantum mechanics, not with complex equations, but through imagination, mental experiments, and conscious reflection. By connecting ideas from physics to the experience of being human, we aim to uncover how the observer is not a passive witness, but a fundamental element in the architecture of the universe. Consciousness, choice, and perception are not philosophical abstractions here, they are active components of quantum reality. Let us walk through superpositions, entangled particles, and silent awareness to uncover how deeply the physical and the personal are intertwined.

Section 1 – Mental Experiment: The Pen in Tokyo

To carry out this experiment, we will follow three postulates: You intuitively know what a pen is. You have teleportation superpowers. There is only one pen in the world. Your friend tells you, "I need you to find a pen. I have a clue about its location: it might be in Sao Paulo, Brazil, or in Tokyo, Japan." As a good adventurer, you prepare to use your powers and search for this pen, which could be in either place. You teleport to Tokyo and get lucky because the pen is there. At the moment you observe it, it automatically ceases to be in Sao Paulo. This kind of dependency is what we call quantum entanglement, where one state is only true if the other is not. Albert Einstein famously referred to this phenomenon as "spooky action at a distance," expressing his discomfort with the idea that particles could instantaneously influence each other regardless of the distance separating them (Einstein, Podolsky, Rosen, 1935). Now comes another important point: Before you found the pen, it existed in both places at the same time. This state is called superposition (Dirac, 1930). The pen both was and was not in each location until you defined it through observation.

Section 2 – Superposition as a State of Equilibrium When we study classical mechanics, we know that equilibrium means the resultant force is zero. For this to happen, two forces of equal magnitude must act on a body in the same direction but in opposite senses, so that one cancels the other. Suppose one of these forces is removed: the other prevails, and the equilibrium is broken. Now the fascinating part: In quantum mechanics, we can think of superposition as a kind of balance among multiple possible states coexisting simultaneously. As long as there is no observer to define the state of the system, these states coexist in a delicate quantum balance. When the observer acts, it breaks this balance, causing the system to collapse into a single defined state, just like in classical mechanics, where the absence of one force breaks the equilibrium. This is precisely what you did when you observed the pen and ended the possibility of it existing in Sao Paulo. From this perspective, we may conclude that for a state or action to truly exist, it must be defined by an observer (Wheeler, 1983). Let me now propose an abstraction to introduce the next ideas: How can you be sure an object exists while no one is looking at it?

Section 3 – Everything Is in Superposition

Superposition is the coexistence of multiple states until one of them is defined, as demonstrated in the mental experiment. Now I invite the reader to play a quantum game: take three empty cups and a bottle of water. Close your eyes and pour water into only one of them. Before you decide which one to fill, all three cups are both full and empty at the same time, because each cup has only two possible states. When you pour the water, you automatically define the states of the three: two empty and one full. However, your eyes remain closed and you cannot touch the cups. Therefore, even though the states are defined, no one is observing to confirm this definition. Only when someone looks at the cups will the states be truly confirmed. Following this logic, we define states and choose possibilities at every moment. Basically, our role as human beings is to take things out of their state of superposition, so to speak. When you wake up in the morning and choose your clothes, you collapse the possibility of all the other clothes, defining a state. You decide to go to the bakery to buy breakfast instead of going to the market. Thus, you break a superposition of actions. Your choices are eternal state definitions for things. But here arises a crucial question: If events are consequences of observers, then who, exactly, are these observers? When we use the term “observer” it is natural to associate it with a conscious human being. However, in quantum physics, the concept is broader. An observer can be any physical system capable of interacting with another system and interfering with its superposition state (Zurek, 2003). If we need an observer to define that something exists, it is intuitive to think that the observer itself must also be defined by another. This creates a network of mutual dependence, a kind of quantum entanglement connecting elements of reality. Nothing exists in isolation; everything depends on an observer, whatever its nature may be, to have its existence confirmed. In conclusion, the observer is an essential part of reality, and understanding its role is crucial to advancing the ideas explored in the following sections.

Section 4 – Everything Is Interconnected, and the Big Bang Might Prove It

Let us assume, as the standard cosmological model suggests, that the universe began with the Big Bang. In this initial state, all matter and energy were concentrated in a single, incredibly dense point (Peebles, 1993). This means that all atoms, or more precisely, all quantum particles such as quarks, leptons, and bosons, were once in direct contact, interacting with one another. In such a scenario, it is reasonable to imagine that the spin, charge, or state of one particle would directly influence another. If one particle's spin became positive, its counterpart became negative. Their superpositions collapsed in mutual agreement from the beginning. As time progressed, these elementary imbalances generated electric fields and currents, giving rise to complex structures such as atoms and molecules. Yet, everything began from a shared quantum interaction. The universe was born in a state of total entanglement, and traces of that quantum memory are still observable in the fundamental behavior of nature. In this context, could quantum mechanics have been the driving force behind the creation of life? Before addressing this question, how can we define life? Life is a complex and fascinating phenomenon, characterized by processes such as growth, reproduction, metabolism, adaptation, and response to stimuli. It involves organized systems of molecules that maintain their structure and function continuously. If superposition and quantum entanglement were the foundations for the formation of atoms and molecules, and life is precisely composed of these structures, then it follows that quantum mechanics is, in essence, the origin of life itself.

Mental Experiment – Cosmic Entanglement

Imagine we have two magnetic balls, one green and one red. Together, they form a pair with a neutral charge, meaning their effects cancel out when they are together. This is our entangled system. At first, these balls were kept inside a small box. The box fell, and they got lost in a lake. After a long search, we found the red ball, which has a negative magnetic charge. Automatically, we know the green ball has a positive charge because they are opposites. Suppose this charge is unique and tailor-made for this pair: the red ball depends on the green one to stay in equilibrium, and no other ball could neutralize its charge. This is an analogy for atoms forming pairs linked throughout the universe, entangled and dependent on each other even when far apart. There might be an atom inside you that is entangled with an atom in the Andromeda galaxy, or perhaps on the Moon. Although separated by immense distances, their quantum states remain correlated, as if they were still part of a shared memory from the beginning of the universe.

Section 5 – The Brain's Functioning at the Quantum Level

The brain is our most remarkable structure and, at the same time, one of the least understood. To comprehend reality, we must first understand that which allows us to perceive it. Neuroscience explains that all our experiences are processed through nerve impulses, electrical signals that travel through networks of billions of neurons, transmitting commands, memories, and sensations (Kandel et al., 2013). The focus now shifts to the quantum nature of these impulses. If we accept that the atoms of the universe have been entangled since the beginning, then the atoms in our brain also carry this quantum heritage. Each electrical impulse involves the movement of subatomic particles, such as electrons, which possess quantum properties. Thus, it is plausible to think that part of the brain's activity is subject to the logic of quantum mechanics (Penrose, 1989; Hameroff & Penrose, 2014). This leads us to an intriguing possibility: the definition of the quantum state of one electron in the brain could instantaneously affect the state of others, setting off a chain reaction of collapses. The Pauli Exclusion Principle ensures that no two electrons can occupy the same quantum state simultaneously. This fundamental rule forces electrons to arrange themselves uniquely, so when one electron's state is defined, it imposes constraints on the possible states of others nearby. This interplay may drive the cascade of quantum state definitions that underlies the synchronized firing of neurons, our thoughts, decisions, and perceptions. In other words, what we call a "thought" could be the final product of a long sequence of quantum definitions within a deeply entangled neural network. Before a decision is made, multiple paths coexist as possibilities in a kind of cerebral superposition. The choice of a path, a thought, or an action collapses this state into a single defined reality. Consciousness, therefore, may be the capacity to break these superposition states of various potential realities through choice, interaction, and awareness. Based on this definition, even the most primitive life forms would possess a degree of consciousness, as they are capable of affecting the state of their surroundings (Tegmark, 2000).

Mental experiment – The last observer I now invite the reader to embark on a quantum journey inside their own mind. For a few seconds, try not to think or verbalize anything. Just be. You don't think with the little voice inside your head, you don't imagine, you don't analyze. You only observe. You know you exist, where you are, and what you're doing, but you don't translate that into words. I call this state the "last observer," and here's why. In this state, there is no thought defining reality, only pure awareness. This awareness is silent yet witnesses everything. It doesn't need language, emotion, or judgment. It simply is. From a quantum perspective, this might be the closest we get to being a true observer, the one who sees all possibilities before collapsing them. If we assume consciousness is what defines states and breaks superpositions, then this silent presence, free from narrative or interference, could represent the origin of all observation. This is not the thinking mind that chooses between options, but the conscious core that makes observation itself possible. As discussed, I propose that an observer needs another observer to have its existence confirmed. Therefore, in the brain's quantum system, it is likely we have at least two observers. One is the last observer, the one that simply is, the pure and silent consciousness. The other is the active observer, who interprets, debates, and decides, thereby altering the reality around them. Perhaps this is why we dream. We create a new, even if momentary, reality, because that's what observers do.

Section 6 - The Superposition Between Life and Death

The mental experiment known as Schrodinger's cat is a foundational milestone in quantum physics, from which many key concepts began to emerge. Mentally imagine a sealed box containing a living cat and a mechanism that can release poisonous gas depending on the state of an unstable quantum particle. While the box remains closed, it is impossible to know whether the cat is alive or dead, because the particle may exist in a superposition of both decayed and not decayed states at the same time. For this reason, the cat inside the box is also in a quantum superposition, both alive and dead simultaneously, until someone opens the box to observe its state (Schrodinger, 1935). Only through observation does this superposition collapse into one of the two definite outcomes: alive or dead. Considering the earlier discussion about life and consciousness, it becomes evident that between the moment we are alive and the moment we die, something must happen to the observer. Similarly, when we were still a fetus, something occurred at some point that granted us the ability to define states. At that moment, we ceased to be "not alive." If a human being can only exist in one of two possible states, alive or dead, then being alive means death has not yet occurred, and being dead means that life no longer persists. Perhaps, between these two states, there exists a region of uncertainty, a kind of superposition experienced only by a final internal observer, whose perception eludes external observation.

Mental Experiment – The Blind Observer

Now imagine an individual born without any of the five senses: no sight, no hearing, no touch, no taste, no smell. No external world ever reached them. This person would have no access to shape, color, sound, or even language. And yet, something within them would still exist, a presence that witnesses itself in silence. Deprived of all sensory input, this being does not define external states, nor do they collapse external superpositions. But internally, something remains aware. Could this be the purest form of the observer? In quantum terms, it is as if their consciousness remains unmeasured, suspended in superposition, untouched by collapse, yet undeniably present. Perhaps this is the origin of observation itself: not shaped by what is sensed, but by the very fact of being.

Section 7 – The Observer and the Superposition of Light

You have probably heard about the duality of light, which manifests both as a wave and as a particle at the same time. This fundamental characteristic reveals one of the central mysteries of quantum physics. Light can behave like a wave, spreading and interfering with itself, but also like a particle, the photon, which carries energy and can be counted individually. This dual behavior became evident in classic experiments, such as the famous double-slit experiment. In it, a beam of light passes through two closely spaced slits and creates an interference pattern typical of waves. However, when one tries to observe through which slit the photon passes, the interference pattern disappears, and the light behaves like a particle, choosing a definite path (Feynman, 1965). This demonstrates that the act of observation, the role of the observer, directly influences the quantum state of light. It is important to highlight that the presence of a sensor or detector in the experiment raises a crucial question: could the mere physical interaction of electromagnetic waves with the apparatus be the cause of the loss of the interference pattern? Indeed, the light or any other form of energy used to detect the particle's path can disturb the system. However, modern experiments have been carefully designed to minimize these direct physical disturbances (Durr et al., 1998). Even so, whenever information about "which path" the particle took is obtained, the interference pattern disappears. This suggests that the act of acquiring knowledge about the system plays a fundamental role, independent of direct physical impact. Thus, in the most widely accepted interpretation of quantum mechanics, the collapse of the wave function is caused by the process of obtaining information, not merely by physical interaction, which highlights the profound role of the observer in defining quantum reality. In other words, experimental evidence points to a reality very different from that described by classical physics, opening doors to fascinating new understandings.

Section 8 – Mental Experiment draft: Quantum Library

Imagine an infinite library, with endless shelves and an uncountable number of books. Each book represents a plausible quantum state, a possible reality. All of them coexist in perfect superposition, waiting to be read. This is our metaphor for the nature of reality. You live inside this library. The moment you wake up, you instinctively pick up a book titled "Eggs for Breakfast." The instant you open it and begin to read, all other books that contradict this path vanish, not into another room, not into storage, but into nonexistence. Their contents are never written into your version of the world. And yet, a new infinity of books appears, now aligned with the consequences of your first choice. Throughout the day, you continue reading. You choose "Took the Bus," "Talked to a Friend," "Watched the Sunset." Each book you select redefines the catalog around you. You do not merely discover stories, you write reality through the act of choosing what to read. By the end of the day, the library you walked through is no longer the same one you woke up in. Its shelves have been rewritten by your own decisions. Your knowledge, your experience, your very sense of what is real, is the result of the specific books you've opened and the infinite others you've left unread.
This experiment captures the essence of how consciousness interacts with quantum reality: * Superposition: All books exist simultaneously ,representing a field of possible states. * Collapse: Reading (choosing, acting, observing) collapses this into a single defined state. * Dynamic superposition: Each choice reshapes the entire structure of possible next choices. * The observer: You are not merely reading the library, you are the organizing principle that gives it structure. Reality is not fixed. Like a quantum field, it is an ever-shifting landscape of possibilities

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Section 9 – Final Thoughts Throughout this essay, we have journeyed from abstract mental experiments to the deep structure of the universe, guided by one unifying thread: the observer. From defining the location of a pen to shaping the states of electrons in our brain, we have seen that observation is not a passive act, but a creative one: it collapses possibilities and defines reality. We explored how quantum superposition and entanglement might underlie not only the behavior of particles but also the emergence of life, thought, and consciousness itself. The observer, far from being a mere external presence, is embedded in the system, a participant in the unfolding of the universe. In the human mind, electrons may define each other's states through chains of collapses, governed by quantum rules like the Pauli exclusion principle. The result of this invisible dance may be what we call a thought, a decision, a memory, or an emotion. Consciousness, then, becomes the capacity to break superpositions, not just through perception, but through awareness. We questioned whether there exists a pure observer, one that does not interact or collapse, and imagined it as someone deprived of all sensory input, suspended in a state of internal presence. We extended this notion to the threshold between life and death, suggesting a final superposition that only a silent internal observer might experience. Finally, we revisited one of the most iconic experiments in physics: the double slit. There, too, the presence or even the knowledge of an observer changes everything. The lesson is clear: the universe does not simply exist , it becomes, in response to those who observe it. This essay stands out not for proposing absolute answers, but for inviting the reader to inhabit questions that blend quantum mechanics with lived experience. Its aim was to offer new perspectives on the perception of reality, to spark reflection, and, above all, to reveal the inherent beauty of physics. I encourage the reader to reflect, to refute, to think, and to build their own visions, because physics is not only a science, it is also a journey of transformation for those who dare to explore it. As Kant once said: Sapere aude – dare to know.