

Quantum as word is very popular today: quantum physics, quantum mechanics, quantum computers etc..., but there is no way my friends will want to have an overall conversation about it. Sure when quantum computers will be in store they may want to be the first to buy one even they do not understand how it works, there is a button to turn it on!

Do not be afraid of the word quantum, it just stands for the smallest amount as unit of something, especially energy. Let's take an example, we want to study a stone and a flower. From classical point of view (Newtonian), both are made of chemical elements and atoms, then both are made of subatomic particles, and as we zoom in forward, we will arrive to the quantum level where the smallest amount as unit is a quantum particle.

Now it comes the weirdest part of quantum. A quantum particle is a fundamental unit of matter or energy that exhibits both particle-like and wave-like properties. Imagine a spaghetti, it looks like a wave when you look at it from one perspective and is a dot when you look at it transversal. There is no duality intrinsic but is a perception observer perspective. Einstein said matter is energy.

The quantum unit is particle and wave in same time. We can now see how both matter and biological systems are built from the quantum level. Life is as quantum as anything else, so the study of biology must fully extend to quantum research. Now, to study this observer-dependent quantum realm, we must redefine the concept of time.

Time is not a thing out there to be measured, and is not a property, is not a background that you walk in. Time is a mathematical operation that relates what we observe and also relates active interactions, so time is relational also.

The biological systems processes depend on internal time operator and external time operator. The dual time operators are necessary for processing data. The internal time operator (do not think in a clock that measures internal time as a thing), it relates internal biological processes, complex biochemical reactions so to speak the life laboratory backstage. It also preserves a self identity (a reference) as a separation from the external data and phenomena. The external time relates the biological system as self, with the external phenomena and data. Qualia, the subjective perception is the upper operator that observes the dual times operators processing.

Is not familiar to you? When you think, you can have this dual inner thoughts that are like chatting together: if that, then that, or what? ... if so, then so, or what?... Sure, but who is the one to acknowledge and observe this dual inner chat? Is the consciousness. Consciousness is a process, not something exotic. As the thoughts and consciousnesses are energy (waves) in quantum level, could be studied and measured too. Reality is a process not a substance.

To investigate the processes of life (valid also to all reality process) we need to dismiss assumptions as space as background, vacuum... and specially we need to use nonlinear mathematics. Why we should do this? If we deeper zoom in, reality is wave-particle alike, but we are also wave-particle alike, the separation is a construct. So the dual slits experiment just shows as how observation (our wave) collapses another wave (the observed).

When we observe an external object (we look at it), our eyes imprint the image (external temporal operator) and reflect it in the brain (inverted image) (we see it), which processes it (internal temporal operator) and becomes aware of it. Similarly, when you look in a mirror, you will see an inverted horizontal image of yourself, not the one an external observer sees when looking at you. Perhaps that's why we see ourselves as more beautiful than others see us, or vice versa.

How to understand the reality as nonlinear?

Imagine the Newtonian observation from A to B in linear way. Now imagine the nonlinear reality that builds up like you make a ball of yarn or like you make a snowball. The yarn is like waves recursions, the intersections are nodes or standing waves and the space is emergent as relations between the scaling recursive waves. We can say the space is the wave amplitude and the time is the wave frequency.

Now, watch the ball form: it begins with waves compact in frequency and amplitude (compressed space and

time) at the lower (quantum) level, and we, as observers, are at a higher (Newtonian) level, where we can observe the thread as linear from our horizon. Discover the next step for yourself: the cosmic scale (dilation of space and time)! And the bias observation if we want to understand the ball in linear framework!

The quantum physics may study the yarn as nonlinear but the quantum mechanics is studying the snowflakes as particles in a snowball, so may merely use probability! Both frameworks are valid if we combine but we have to build up new frameworks, upon both of theme to fully understand the reality.

In a non vacuum model, the entanglement and tunneling are natural wave resonances and field-mediated energy redistribution. Just image the yarn recursions in the ball! Biological systems are highly structured energy in nonlinear dynamics, so quantifying and measuring correlations is like quantifying and measuring correlations of water droplets in an ocean. We need to separate the droplets from the ocean, the observed from the field, but also the observer (us) from the observed. Think of reality as a quantum ocean of energy, but you are a part of that energy. Measurements must be relational by mapping waves, standing waves, and resonances.

Just as an interstellar spacecraft will navigate by mapping stars (standing waves - attractors) and gravity (wave resonance), a scientific researcher will navigate in the quantum field by mapping the energy levels of standing waves, particle radii (high-density structured energy nodes), and lengths (relational) in a non-linear scaling framework. Ask yourself, how a tree do not grow infinitely? There is a scaling rule till where a leave or a branch grow, it shows as how recursive waves of energy determine the geometry and scaling. Now ask yourself how this tree after cutting a branch will *know* how to regrow again!

Let's take another example: water: H_2O , in the form of ice (solid), liquid, and gas. Water, in its solid, liquid, and gaseous forms, has the same composition (2H and O), but at a lower (quantum) level, it exhibits different geometric and energetic structures in each state. Entropy is assumed to be disorder, and in this case, entropy increases from solid to gas. Entropy is not random disorder, but a different reorganization of the same energetic structure. The interpretation of random bias is driven by our desire to understand nonlinear processes linearly.

Entropy is the recursive loss of resonance. Temperature is the disruptive pressure that widens phase intervals. The Hz decreases slightly because the waves in the system no longer return to their attractor with as much force or frequency. The phase coherence between the molecules weakens. In the case of water, entropy is reversible: we condense the vapor and restore the liquid state, or we freeze the water and restore it to ice. When we refer to entropy as decay, it could be so drastic that the coherence of the waves could no longer be restored to its previous state.

Recent ongoing research has identified two new scaling constants: one related to recursions in topology (an attractor (standing wave) that represents the limit to the growth of the value of energy and length (amplitude); the other, derived from the Ricci curvature in recursions, represents the amount of energy released for the recursion to occur. By integrating these two new constants with the fine-structure constant, π , and another related constant, a universal harmonic scaling law emerges. Computational evidence confirms the predictive power of this law in all physical domains, from quantum particles to electrons and planets, with unprecedented accuracy. This suggests a deep recursive symmetry underlying the quantum and cosmic scales.

An intriguing property of this scaling law is that applying a scaling shift of $-?$ to any reference value, yields the reflected value of itself, suggesting a universal symmetry principle. This $-?$ based reflection appears to underlie the duality observed in both quantum and macroscopic systems, pointing to a recursive, self-reflective structure in physical reality. This is a symmetry: where the system "reflects" itself, similar to how the brain hemispheres reflect each other to process information, or how an image is reflected in a mirror. This property is not just mathematical, but structural, and suggests that reality is inherently self-referential and self-reflecting at this fundamental level. This method allows for precise mapping of physical properties across scales, demonstrating the universality of the underlying mathematical structure as nonlinear and scalable.

Biological quantum behaviors are not trial-and-error optimizations but emerge from intrinsic resonant structures described by precise mathematical laws, suggesting a geometric basis for life.

How does biology maintain coherence?

Cells are octave harmonic cavities where energy is “printed” (mirrored) before full decoherence, via π -phase coupling.

“Is quantum biology just stochastic chemistry?”

Classical noise is structured by Qualia operators (brain-like recursion at cellular level), explaining why biology isn’t random.

Experiments:

Perhaps the key experiment would be to study a photosynthetic cellular material constructed with the exact elements and geometry of a living cellular system versus the cellular system of the simulated living plant (natural photosynthesis versus artificial synthetic photosynthesis), under the same universal harmonic law of scaling equation. A synthetic copy vs original living system.

Testable Predictions and Simple Experiments

Experiment 1: The Biological Metronome** Setup: Stimulate neurons or photosynthetic complexes with precisely timed light pulses while monitoring output Prediction: Response will show resonance peaks at intervals matching the scaling octave harmonic ratios (π , golden ratio) Why: Would demonstrate biological systems are “tuned” to dual-time processing

Experiment 2: Quantum Memory Test Setup: Measure how long enzyme systems “remember” quantum perturbations using 2D infrared spectroscopy Prediction: Memory decay follows a step-wise (quantized) pattern rather than smooth curve Why: Would reveal recursive information processing

Experiment 3: Qualia Interference Setup: Have subjects report visual perception while their retina is exposed to quantum-correlated light patterns Prediction: Conscious perception will correlate with the scaling law harmony phase relationships Why: Would directly link qualia to quantum biological processes The proposed experiments require only existing lab equipment but could fundamentally change our understanding of mind-matter relationships. Life didn’t evolve in a quantum world—it evolved because of it. By listening to nature’s quantum rhythm, we might finally compose the symphony of the future.

As Schrodinger might say: “The atoms in our genes are quantum. Therefore, so are we. As Einstein might say:”The aether is back—but this time, it’s recursive.