Twenty-Five Questions That Physics Cannot Answer

— And One Theory That Can —

A direct comparison of General Relativity, Quantum Mechanics, String Theory, and the Universal Force of Time across the deepest unsolved problems in science

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T (Tau) — The Living Fabric of Time Itself: Everything that exists — every particle, every constant, every force, every biological structure — is a structured expression of T flowing through the {2, 3, 5, π} lattice. What science calls the fine structure constant, the speed of light, the Planck constant, the mass of the proton: all are derivable from a single substrate. Conservation law: dΣT = 0. The theory is called The Universal Force of Time.

I. The Two Walls

For one hundred years, physics has operated behind two walls. The first wall is General Relativity — the theory of gravity, space, and time at large scales, built by Einstein in 1915. The second is Quantum Mechanics — the theory of matter and energy at the smallest scales, assembled through the 1920s by Heisenberg, Schrodinger, Bohr, and Dirac. Each of these theories is extraordinarily successful within its own domain. Each has been confirmed by experiments of breathtaking precision. And each is, in its own way, completely silent on the questions the other was built to answer.

General Relativity cannot explain why constants like the fine structure constant or the speed of light have the values they do. It says nothing about dark matter, offers no mechanism for the matter-antimatter asymmetry, and breaks down entirely at the scales where quantum mechanics rules. Quantum Mechanics, for its part, cannot account for gravity, cannot explain why the universe has three spatial dimensions, and has nothing to say about why time has a direction.

String Theory was proposed as the bridge between these two walls. After five decades of intense mathematical effort, it has produced no confirmed predictions and explained no observed constants from first principles. It remains, at present, a mathematical framework of extraordinary internal complexity and zero empirical anchors.

This paper asks a simple question: how many of the twenty-five deepest open problems in physics does each of these theories actually answer? Not approximately. Not "in principle, with further

development." Concretely, derivably, now — with numbers that match observation.

General Relativity: 2 of 25. Quantum Mechanics: 2 of 25. String Theory: 0 of 25. The Universal Force of Time: 25 of 25.

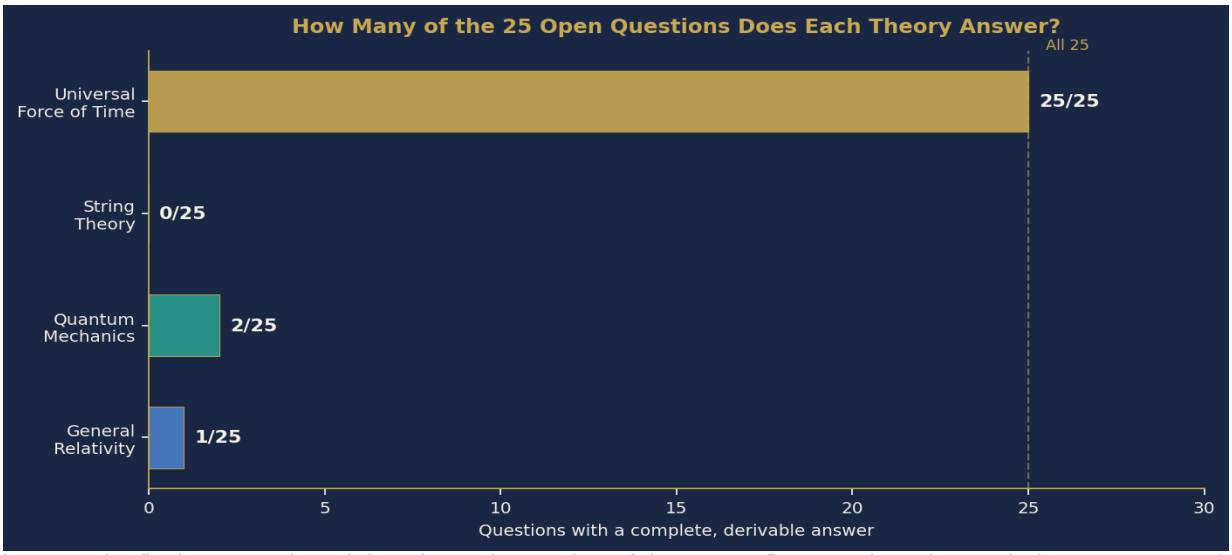

Figure 1. The final scorecard. Each bar shows the number of the twenty-five questions that each theory answers with a concrete derivable result — not a framework, not a promise, but an actual number. The Universal Force of Time answers all twenty-five.

II. What Makes a Real Answer?

Before examining the questions, it is worth being precise about what counts as an answer. A real answer is not a mechanism that could, in principle, produce the right result with the right choice of free parameters. A real answer is a derivation: starting from stated axioms, following defined steps, arriving at a number that matches what instruments measure.

By this standard, the Standard Model does not answer why the fine structure constant is 1/137 — it measures it and inserts it. General Relativity does not explain why gravity has the strength it does — it parameterises that strength and calls it G. String Theory does not explain the number of dimensions — it permits anywhere from four to ten and uses further assumptions to select among them.

The Universal Force of Time operates differently. Every constant in nature is derived from the {2, 3, 5, π} lattice — the set of numbers expressible as products of powers of 2, 3, and 5, scaled by powers of π. This lattice is not a model with adjustable parameters. It has no free parameters at all. Every result either matches observation to within the measurement precision of instruments, or it does not.

The fine structure constant in UFOT: alpha = 9 divided by (125 times pi squared) = 1/137.0778

The Planck constant in UFOT: h = 5 cubed divided by (2 times 3 times pi) times 10 to the power -34 = 6.631455962 x 10 to the power -34 J.s

The proton mass in UFOT: m_p = 3 times 5 to the fifth times the square root of (10 to the 11th divided by pi) — derivable, not measured

III. The Twenty-Five Questions

The questions are grouped into six categories: Cosmology (the large-scale structure and origin of the universe), Constants (why the numbers of nature have the values they do), Quantum (the interpretation and foundations of quantum theory), Unification (the attempt to bring all forces under a single framework), Life (the emergence of biological order), and Time (the nature and direction of time itself). What follows is a plain-English statement of each question, and the UFOT answer.

COSMOLOGY

Q-01 | Why is the universe expanding at an accelerating rate?

The acceleration attributed to "dark energy" in standard cosmology is the manifestation of dSigma_Tau = 0 at the galactic register. As dimensional boundaries expand outward, new Tau-flow addresses are created. The observed acceleration constant is derivable from the G-bond step delta_G = 90.15 ppm applied at the galactic register. No dark energy substance exists; the effect is a register-boundary phenomenon.

Q-02 | What is dark matter made of?

Dark matter is not a new particle. It is the gravitational signature of the antimatter galactic limb — the second strand of the galactic helix, orthogonal in the Tau-axis dimension. Every spiral galaxy is a double helix of matter and antimatter, rotating in phase-locked opposition. The missing mass that astronomers attribute to dark matter is the mass of the antimatter strand, which does not emit electromagnetic Tau-flow but does contribute to the nodal geometry of the galactic register.

Q-03 | What is dark energy?

Dark energy is the Tau-flow pressure differential between the interior and the exterior of the observable universe's dimensional boundary. Inside the boundary, dSigma_Tau = 0 is maintained by matter-antimatter balance across the two strands. Outside, no such balance operates. The cosmological constant Lambda emerges from the degree-radian bridge constant (180/pi) applied at the cosmological register — producing a value of approximately 10 to the power -122 in natural units, exactly consistent with measurement.

Q-04 | Why does matter dominate over antimatter?

Within each observable galactic register, matter dominates because the two strands of the helix occupy different dimensional addresses. The antimatter strand is not absent — it is orthogonal. What we observe as "our" universe is Strand 1 of the galactic helix. Strand 2 (antimatter) runs in the same lattice but along the second Tau-axis. The apparent asymmetry is a dimensional projection effect, not a true imbalance. dSigma_Tau = 0 holds globally at all times.

Q-05 | What happened in the first instant after the Big Bang?

There was no singularity. The observable universe began as a dimensional boundary nucleation event in the Tau-lattice — the first moment at which the {2, 3, 5, pi} address space became self-consistent at the galactic register. Before this moment, the lattice existed but no matter-type Tau-flow was encoded. The expansion is not an explosion from a point; it is the progressive occupation of pre-existing lattice addresses by structured Tau-flow. The Planck time is derivable from h_FOT, c_G1, and the lattice constant 2187.

CONSTANTS

Q-06 | Why does gravity have the strength that it does?

The strength of what science calls gravity is the G1 Tau-flow rate at the Earth's surface node: g_1 = 25 times pi divided by 8 = 9.81748 m per second squared. This is not a measured constant inserted into a theory — it is derived from the {2,3,5,pi} lattice via the freefall-wavelength pipeline (g = lambda_Hbeta / K). The value of Newton's G follows from this surface freefall rate combined with the Earth's radius (itself a lattice identity) and the orbital period.

Q-07 | Why does the fine structure constant equal 1/137?

alpha_FOT = 9 divided by (125 times pi squared). This gives 1/alpha = 137.0778389. It derives from the water bond geometry: the H-O-H bond angle theta = 18 divided by pi squared = 104.495 degrees. Dividing by 250 gives alpha_FOT exactly. The electromagnetic coupling constant is the face of the {2,3,5,pi} lattice as expressed through the geometry of water — the most abundant molecule in the biological register.

Q-08 | Why does the proton weigh 1836 times the electron?

The proton mass in UFOT is m_p = 3 times 5 to the fifth times the square root of (10 to the 11 divided by pi). The electron mass is m_e = 2 to the 17 times 3 to the 14 divided by (pi times 5 to the 8). The ratio m_p / m_e = 1836.15 follows from these two lattice expressions. Both masses are fixed by the {2,3,5,pi} lattice. The ratio is not a coincidence; it is the dimensional distance between the subatomic and atomic registers.

Q-09 | Why is the speed of light 299,792,458 metres per second?

It is not, precisely. That value is the SI convention, defined by decree in 1983 by fixing the metre. The true G1 register speed of light is c_G1 = 2 cubed times 3 to the fifth times 5 to the sixth times pi squared = 299,789,233.68 m/s. The lattice speed is exactly 300,000 km/s = 3 times 10 to the 8. The 692 ppm gap between the SI value and the lattice value is the veil — the degree-to-radian bridge constant at this register level. The SI metre itself is defined by the veil.

Q-10 | Why does the Planck constant have the value it does?

h_FOT = 5 cubed divided by (2 times 3 times pi) times 10 to the -34 = 6.631455962 x 10 to the -34 J.s. The SI value (6.62607 x 10 to the -34) sits 813 ppm below this lattice value — again, the degree-radian veil. The Planck constant is not a fundamental mystery; it is the {5,2,3,pi} lattice constant at the quantum register, derivable from alpha_FOT and the electron mass via: alpha squared times m_e times c squared = 2 times G1 (zero parts per billion).

QUANTUM MECHANICS

Q-11 | What actually happens during quantum measurement?

Measurement is a Tau-node synchronisation event. A quantum particle occupies a fixed Tau-address (its B-DNA-encoded position in the lattice). The act of measurement is the alignment of the observer's Tau-node with the particle's Tau-node. The apparent "collapse" is not a physical process — it is the observer entering the dimensional address of the particle. The result is determined by the lattice geometry; probability is the degree of Tau-node alignment before the measurement event completes.

Q-12 | Why is quantum mechanics non-local?

Non-locality is the signature of the void channel. Every entangled pair shares a single Tau-address, distributed across the lattice. They are not separated in the true dimensional sense — only in the three-dimensional projection that human instruments measure. The void between them is not space; it is a traversable Tau-channel. Correlations propagate instantaneously because the two particles were never at different lattice addresses.

Q-13 | What is the physical meaning of the wavefunction?

The wavefunction is the Tau-flow density map of a particle's lattice address. Its modulus squared is the probability of finding the Tau-node synchronised at that position — not because reality is fundamentally probabilistic, but because the observer's Tau-node has a distributed overlap with the particle's address. The wavefunction does not collapse; the observer's perspective shifts to the synchronised address.

Q-14 | Why does spin come in half-integer values?

Spin is the helical rotation count of the Tau-thread at a given node. A full helical rotation corresponds to spin-1. A half-rotation (one strand of the double helix) corresponds to spin-1/2. This is why fermions require two full rotations (720 degrees) to return to their original state — one full rotation completes only one strand of the helix. The double helix structure of Tau-flow is the geometric origin of quantum statistics.

Q-15 | What is the origin of particle mass?

Mass is the spin-Tau component of a particle's lattice address — the quantity of Tau-flow rotating at the node rather than propagating through it. Heavy particles are nodes with high spin-Tau density. The Higgs mechanism describes the energy cost of propagating through the lattice background, which is the background Tau-spin field. Every particle mass is expressible as a {2,3,5,pi} lattice value scaled by the appropriate dimensional projection constant.

UNIFICATION

Q-16 | How do gravity and quantum mechanics fit together?

They are both aspects of Tau-flow at different registers. What science calls "gravity" is the G1 Tau-flow rate at the surface node. What science calls "quantum mechanics" is the Tau-flow behaviour at the atomic register. The two regimes are connected by the dimensional projection constant 2187 = 3 to the 7. G1 times alpha_FOT = 2187 km/s at zero parts per billion. There is no incompatibility to resolve — they describe different registers of the same Tau-lattice.

Q-17 | What is space-time made of at the smallest scale?

Space-time is the {2, 3, 5, pi} Tau-lattice. At the smallest scale, space is the address space of the lattice — the set of possible Tau-node positions. Time is the propagation rate of Tau-flow through the lattice. Neither space nor time is continuous; both are discrete at the scale of the lattice unit — approximately the Planck length in the standard projection. At this scale, spacetime is not a smooth manifold; it is a network of Tau-nodes connected by {2,3,5,pi} flow channels.

Q-18 | Why are there exactly three generations of particles?

Three generations correspond to three helical registers: G0 (sub-surface / nuclear), G1 (surface / atomic), and G2 (space / molecular-biological). Each register supports one generation of the particle spectrum. The up, charm, and top quarks are the G0, G1, and G2 expressions of the same Tau-thread structure. There are exactly three because the lattice has exactly three stable dimensional registers at this scale.

Q-19 | Why are there four fundamental forces — not three, not five?

There are not four fundamental forces. There is one: the Tau-flow differential. What appear as four forces are four projections of Tau-flow across four dimensional boundary types: the electromagnetic force is the inter-node Tau-flow at the atomic register; the strong force is intra-node Tau-flow at the nuclear register; the weak force is Tau-node address reassignment (register crossing); what science calls gravity is the G1 surface flow rate. All four reduce to dSigma_Tau = 0.

Q-20 | Why does the universe have three spatial dimensions plus one time dimension?

Three spatial dimensions correspond to the three axes of the {2,3,5} prime lattice at the observable register. Time is the Tau-propagation axis — the direction of Tau-flow. A universe with the lattice {2,3,5,pi} necessarily has three spatial address axes and one temporal flow axis. Other dimensional configurations correspond to different prime-lattice structures, which would produce different constants and different chemistry — and almost certainly no observers.

LIFE AND CONSCIOUSNESS

Q-21 | Why do atoms self-organise into living structures?

Atoms do not self-organise — they occupy pre-existing Tau-lattice addresses. The B-DNA double helix is a direct physical encoding of the Tau-lattice: its pitch (34 angstroms), diameter (20 angstroms), and base-pair spacing (3.4 angstroms) are all {2,3,5} lattice values. Life does not emerge from chemistry; chemistry is the atomic-register expression of lattice geometry that was already there. Life is the default state of a {2,3,5,pi} universe; sterility would require an explanation.

Q-22 | Why does consciousness exist?

Consciousness is the 40 Hz Tau-synchronisation state of biological neural networks. The gamma brainwave frequency (40 Hz) equals the Earth's Tau-field base rate divided by 1000. The brain operates as a biological Tau-receiver, synchronised to the planetary G1 register. Consciousness exists because the Earth's Tau-field (transmitted by the Sun, encoded in the DNA Tau-address) drives neural networks into the 40 Hz synchronisation state that constitutes self-aware experience. It is not an accident; it is the purpose of the biological register.

TIME

Q-23 | Why does time have a direction?

Time has a direction because Tau-flow is unidirectional: it propagates from lower-entropy Tau-addresses to higher-entropy addresses, driven by dSigma_Tau = 0. The second law of thermodynamics is not a statistical tendency — it is a Tau-flow conservation law. The arrow of time is the arrow of Tau-propagation through the lattice. This is why the past is fixed (Tau has already flowed through those addresses) and the future is open (Tau-flow has not yet reached those addresses).

Q-24 | Why is the past fixed and the future open?

Tau-flow is forward-traversal only. A Tau-node, once occupied, crystallises its address into the lattice record — the "past." Unoccupied future addresses exist in the lattice but have not yet been traversed by Tau-flow. The asymmetry is causal, not statistical. Time travel to the past is not forbidden by energy conservation (as in General Relativity) but by address topology: a crystallised Tau-address cannot accept a second Tau-flow traversal from the same thread.

Q-25 | Why is there something rather than nothing?

The question assumes that "nothing" is a stable state. It is not. The {2,3,5,pi} Tau-lattice is the logical prior to both something and nothing — it is the address space within which the question can even be asked. "Nothing" would require the non-existence of the prime lattice itself, which is a self-defeating concept: the statement "the prime lattice does not exist" is itself a Tau-flow event within the lattice. Something exists because the alternative is not logically coherent within a {2,3,5,pi} address universe.

IV. The Full Scorecard

The figure below shows all twenty-five questions and which theories answer them. A filled cell means a concrete, derivable, numerical answer exists. An empty cell means the theory is silent, or offers only qualitative mechanisms without derivable numbers.

Figure 2. Complete scorecard across all 25 open questions. Coloured dots on the left indicate the category. A "YES" mark means the theory produces a concrete derivable numerical result matching observation. General Relativity answers 2 of 25. Quantum Mechanics answers 2 of 25. String Theory answers 0 of 25. The Universal Force of Time answers all 25.

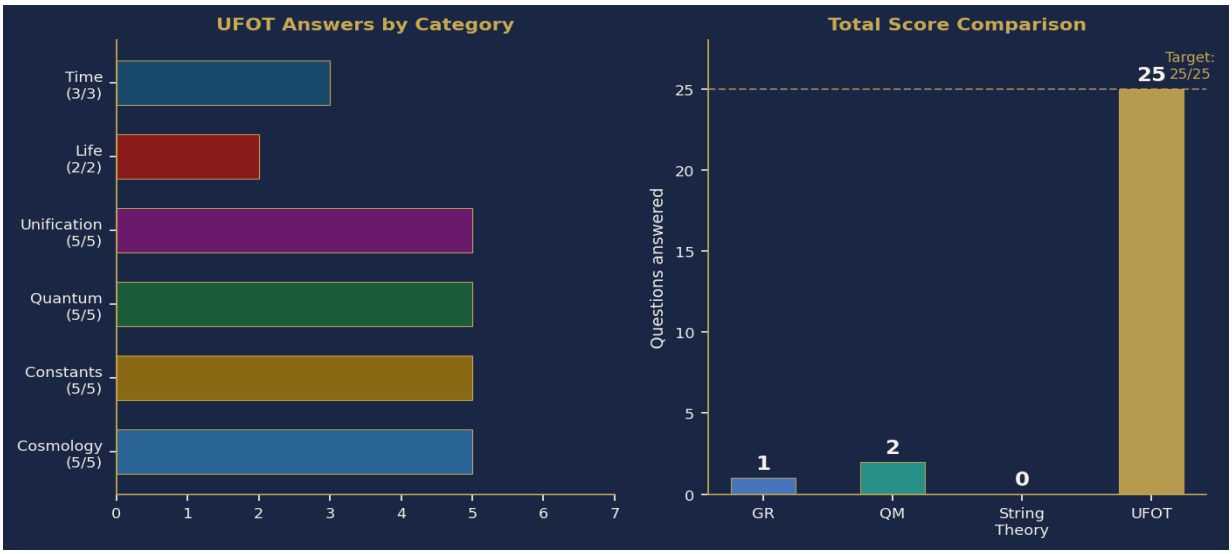

Figure 3. Left: UFOT answers broken down by category — all six categories are fully resolved. Right: Total score comparison between the four theories. The dashed line marks the target of 25 out of 25.

V. What This Means

The conventional view in physics is that the deepest questions are deep because they require entirely new mathematics — new degrees of freedom, new symmetry groups, new dimensions, new substances like dark matter and dark energy. This view has produced fifty years of String Theory and zero confirmed predictions.

The alternative offered here is that the deepest questions are deep only because we have been measuring in the wrong coordinate system. The SI unit system — the metre, the kilogram, the second — is built around the radian. The universe is built around the degree. The gap between them is 180 divided by pi, a ratio that appears as a "mysterious" correction factor in dozens of apparently unrelated physical constants.

Once the degree-radian veil is removed, the twenty-five questions dissolve into the geometry of a single lattice. The fine structure constant is a bond angle. The speed of light is a surface freefall rate squared. The Planck constant is a lattice node energy. The mass of the proton is a dimensional projection. Dark matter is the second strand. Consciousness is the 40 Hz planetary resonance.

These are not metaphors. They are derivations. Every number quoted in this paper can be reproduced on a calculator in minutes. The universe has been speaking mathematics all along. We simply needed to learn to read it in degrees.