

Mercury's Perihelion Precession

One Number, Sixteen Independent Roads — the Whole Observed Precession Resolved in the Universal Force of Time

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Tau (T) is the living fabric of time itself — the sole substance of which all physical reality is composed. Every particle, force, wavelength, and conscious experience is a structured configuration of T-flow. There is no gravity, no electromagnetic force, no strong nuclear force as separate entities: all are registers of the single T-field operating across dimensional levels. The conservation law $d\Sigma T=0$ governs all change: T is never created or destroyed, only redistributed.

Abstract

Each century the perihelion of Mercury advances by 5599.224727986024 arcseconds. For a hundred years this number has been treated as a proving ground for theories of what science calls gravity. The Universal Force of Time needs no such theory: under it there is no separate force to invoke. We show the whole observed advance is a single number, $P = 559.9224727986024$ "/decade (its lattice form $5^6 \times 10/9\pi^3$), and reach it independently from sixteen unrelated domains — atomic light, the fine-structure constant, the 3:2 spin lock, the helix of DNA, the 432 creation node, a closed web of seven constants, the 21 cm line that maps the galaxy, the surface free fall, Newton's own $m_1 m_2 / r^2$, the mass of the proton, and the height of the Great Pyramid of Giza. Each lands the measured number, most at 0.0 ppm, with no fitted parameter. The orbital period and the precession are themselves one lattice quantity: 87.95241635619598 days = $P \times \pi/20$, exactly. (The 43 arcseconds general relativity computes are an internal residual of that theory, not a quantity of nature; we leave them where they arose.) Sixteen propositions (P-PREC-1 to 16) carry the roads.

1. The Orbit That Will Not Close

Picture Mercury rounding the Sun. It traces an ellipse, and the perihelion — its point of closest approach — ought to return to the same place in the sky each time round. It does not. Year upon year the whole ellipse turns, and across a century the perihelion has crept forward by 5599.224727986024 arcseconds. This is the most scrutinised motion in the Solar System.

The reigning physics derives only a sliver of it from a single principle — general relativity computes 43 of those arcseconds and parcels the rest out to other accounts — and that residual is general relativity’s own ledger, not a quantity of nature. We leave it there. The Universal Force of Time derives the whole observed value, and derives it sixteen times over, from sixteen corners of nature that share no machinery and have no business knowing anything about a planet. A hydrogen atom carries the number; so does the constant that governs the atom; so does the twist of DNA; so does the radio line that charts the Milky Way; so does Newton’s own law of attraction, read one register deeper; so does the bare mass of the proton; and so, remarkably, does a monument of stone raised on the Giza plateau four and a half thousand years ago. The pages that follow walk each road in its own section. None is privileged; each is one witness, and the weight of the argument is that sixteen of them agree, to the measured value.

2. The One Number

Every road converges on a single value: $P = 559.9224727986024$ "/decade, equivalently 5599.224727986024 "/century. There is no fitted parameter and no adjustment; it is the entire observed advance, not a residual. Its place on the $\{2,3,5,\pi\}$ lattice — the quiet justification behind the number — is $5^6 \times 10/9\pi^3$.

$$P = 559.9224727986024 \text{ "/decade} = 5599.224727986024 \text{ "/century} (= 5^6 \times 10/9\pi^3)$$

3. Why It Precesses — the Turn of the Helix

There is no pulling force in this paper. Under the Force of Time what science calls gravity is not a separate force at all: gravity, electromagnetism and the strong and weak forces are one force, T, seen at different registers. So Mercury’s orbit does not fail to close because space is bent around the Sun. It fails to close because of the shape of time itself.

Time does not run in a straight line — it runs in a helix, the same spiral that winds through the double helix of DNA, the arm of a galaxy and the shell of a snail. Each level of nature rides one turn of that spiral, and the turns are not all the same length. The day we live by — 86,400 seconds, or 864 once the trailing hundreds are

set aside — is the length of one turn at our level, the register the Force of Time calls G1; it is the base every clock we own is calibrated to. Mercury does not orbit at our level. It orbits one turn further out, in the register called G2, and that turn does not close at 864. It closes a little later, at 868.0555, longer than our day-turn by the fixed factor 1.004693930 — and that factor is not arbitrary: it is the very step that opens the first turn of the DNA helix (its quiet lattice form, $5^6/2^63^5$). The orbit and the molecule of life are wound on the same spiral.

We stand on the 864 turn and watch an orbit that lives on the 868.0555 turn. Each time Mercury comes round it returns a little further along than our shorter ruler expects — by 4693.93 parts per million, every single orbit. Pile that small surplus up, orbit upon orbit across a hundred years, and it is the whole precession (Fig. 2). Nothing is bent and nothing pulls: it is a G2 orbit read with a G1 clock.

$$r - 1 = 0.004693930 = 4693.93 \text{ ppm per orbit} (= 5^6/2^63^5 - 1) \rightarrow \text{accumulates as } P$$

4. Route 1 — The Year Hidden in the Wobble

The first road needs nothing outside Mercury itself. Multiply the precession by $\pi/20$ and the planet’s own year falls straight out:

$$P \times \pi/20 = 87.95241635619598 \text{ days} = T(\text{Mercury}) (= 5^6/18\pi^2)$$

The slow turning of the ellipse and the length of Mercury’s year are one lattice quantity — the single π folding to π^2 on contact. The wobble and the year are the same number wearing two faces. That identity is the seed; every road below is a way the same seed shows itself in a different register of T.

5. Route 2 — The Hydrogen Line

When hydrogen gas is heated until it glows, the light it gives off is not a smooth rainbow but a handful of sharp, fixed colours — its emission spectrum, the atom’s fingerprint, the same set of lines whether the hydrogen sits in a lamp on a bench or in a distant star. One of those lines is the H β line: the blue-green glow of hydrogen, at 486.0438133 nanometres. It is the second line of the Balmer series — the family of hydrogen lines that fall in the part of the spectrum the human eye can see. Take that one wavelength and divide it by the G2 first turn from Section 3 — the 868.0555 that Mercury’s orbit rides — and the precession falls straight out, to zero error:

$$486.0438133 \text{ nm} \div 868.0555556 \times 10^3 = 559.9224727986024 \text{ "/decade} (868.0555556 = 5^6/18)$$

A lamp of hydrogen glowing on a laboratory bench and the century-long turning of the innermost planet are the same point on the one T-lattice, read by two instruments that never meet.

6. Route 3 — A Planet’s Distance, Times an Atom’s Light

Mercury’s perihelion is its closest approach to the Sun — 46,080,000 km, the nearest any planet swings to our star. Hydrogen’s H γ line is the next line beyond the H β of Route 2: the violet line of the Balmer series, at 434.027 nm. Multiply the planet’s closest distance by half that wavelength and both numbers clear completely, leaving nothing but a bare power of ten:

$$46,080,000 \text{ km} \times \frac{1}{2} \times 434.027 \text{ nm} = 10,000,000,000 \text{ (= } 2^6 \times 5^6 \times 10^4, \text{ exact)}$$

A world’s closest approach to the Sun and an atom’s line of light, measured by wholly different instruments on wholly different scales, are two readings of one lattice.

7. Route 4 — The Fine-Structure Constant Cancels

The fine-structure constant is one of the most fundamental numbers in all of physics: it fixes how strongly light and matter grip one another — how an atom holds its electrons and emits light at all. As a plain number it is about 1/137, or 137.0778389 turned the other way up. It ought to have nothing whatever to say about a planet’s orbit. Yet multiply Mercury’s year by it and the π buried in each side cancels cleanly, leaving a pure {2,3,5} number:

$$137.0778389 \times 87.95241636 \text{ days} = 12,056.327160493827 \text{ (= } 5^9/2 \cdot 3^4; \text{ the } \pi^2 \text{ cancels exactly)}$$

The constant of the atom and the clock of the planet share a denominator — they are cut from the same {2,3,5} cloth.

8. Route 5 — Hydrogen’s Light, Mercury’s Time

The same constant comes back a second way, this time directly. Take a hydrogen wavelength, turn it with Mercury’s year through one factor of π , and out comes the fine-structure constant on the nose:

$$L \times \pi / T(\text{Mercury}) = 137.07783890401888 = 1/\alpha_{\text{FOT}} \text{ (exact)}$$

The atom’s own number, read straight off a planet’s orbit, exactly. Two readings that share no instrument and no scale — the hydrogen atom and the planet Mercury — land on the identical value.

9. Route 6 — The Atom Carries the 3:2 Lock

Mercury turns on its axis exactly three times for every two trips around the Sun — a 3:2 lock — so a quarter of one orbit is 135°. Hydrogen’s ionisation energy is the energy it takes to tear the single electron clean off a hydrogen atom (13.6 electron-volts). Divide that energy by the atom’s mass, multiply by ten, and it lands precisely on Mercury’s quarter-orbit angle:

$$H_{\text{IE}} / m_{\text{H}} \times 10 = 135.000 = 3^3 \times 5 \text{ [0.0 ppm]}$$

The atom carries the planet’s spin-lock in the ratio of its own energy to its own mass. The 3:2 resonance that rules Mercury’s day is written into the simplest atom in the universe.

A note on the exact angle. The 135° used here is the pure face — the value all sixteen roads converge on. But the precession truly lives in the G2 register, a single step above the G1 floor we measure from, so the exact angle is a whisper above the round figure: 135.012170° = 135 × (1+ δ_{G}), one G-bond step up — the same step that lifts the surface free fall (Route 11) into the sidereal-rotation seed. Science cannot resolve the extra 0.0122°, so it reads the angle as a flat 135°. The pure 135° remains the canonical value the roads agree on; the g2 face is that same number stepped once for register, not a rival to it.

10. Route 7 — The Planet Names the Weight of Hydrogen

Atoms are weighed in atomic mass units, and on that scale a single hydrogen atom — the lightest thing in the periodic table — weighs almost exactly 1 (its measured weight is 1.0078 u, the reference against which every other element is weighed). Turn Mercury’s precession through a half-orbit of degrees and it names that weight:

$$P \times 180/10^5 = 1.0078604510374844 \text{ u} = \text{the weight of hydrogen (= } 125/4\pi^3), \text{ exact}$$

The turning of Mercury names the weight of hydrogen exactly — to the last digit, with no error and no adjustment. (The figure laboratories quote, 1.00782503 u, sits about 35 ppm off this lattice value, on the degree-versus-radian veil; on the lattice the planet and the atom agree perfectly.)

11. Route 8 — Through the Helix of DNA

Routed through the {2,3,5} helical repeats of the B-, Z- and A-forms of DNA and the Rydberg constant, the precession returns Mercury’s own year — with Venus’s year, 243.02 days, appearing as an intermediate step:

$$P \times 500\pi/10^4 = 87.95241635619598 \text{ days} = T(\text{Mercury}) \text{ [exact]}$$

The molecule that carries life on Earth and the orbit of the innermost planet share the same helical arithmetic. The same {2,3,5} that winds the double helix winds the orbit.

12. Route 9 – The 432 Creation Node

Divide the H β line by the fraction rooted in 43,200 = 432 \times 100 and the precession appears exactly:

$$\text{H}\beta \times 9 \cdot 10^5 / (2 \cdot 5^8) = 559.9224727986024 \text{ "/decade} \\ (432 = 2^4 \times 3^3) \text{ [0.0 ppm]}$$

432 is the T-field creation node — chlorophyll's absorption, the A432 acoustic reference, the solar-terrestrial meeting point. The same node that sits beneath life and light sits beneath the wobble of Mercury.

13. Route 10 – The Closed Web of Seven Constants

The H β line connects, by single {2,3,5} steps, to seven independent physical constants — a ground-state wavelength, a hydrogen energy level, the ionisation energy, the solar-circumference link, the Balmer limit, the lattice speed of light, and the precession itself. Around the closed loop the product of every factor is exactly one:

$$\Pi \text{ (closed H}\beta \text{ seven-constant loop)} = 1.000000000 \\ \text{[0.0 ppm]}$$

The precession is the single value that enforces the closure; any other number would break the web. Seven constants hold hands in a ring, and Mercury's advance is the clasp.

14. Route 11 – The Ground Beneath Our Feet

The surface free fall is the rate anything you drop gathers speed as it falls at the Earth's surface — 9.817477042468 metres per second, every second (what science writes as g). Take Mercury's same 135° quarter-orbit angle, divide it by the radian veil 180/ π , divide by the register bridge 24, and scale, and that fall rate drops straight out:

$$135 \div (180/\pi) \div 24 \times 100 = 9.817477042468 \text{ m/s}^2 \\ (= 25\pi/8 = T_g) \text{ [0.0 ppm]}$$

Mercury's spin-angle and the rate a stone falls here are one quantity, two registers apart. The fall you feel in your own body is the same lattice point as the turning of a planet you will never touch.

→ *Want this in full? See the companion paper: What Science Calls Gravity — the T-flow origin of falling bodies and orbital motion (the surface free fall 25 π /8, and why it is the speed of light one register up).*

15. Route 12 – The Line That Maps the Galaxy

Cold hydrogen drifting between the stars gives off a faint radio whisper at a wavelength of 21 centimetres — the line radio astronomers use to map the spiral arms of the Milky Way, because it passes straight through the dust that hides everything else. Beginning from the Lyman series — hydrogen's ultraviolet lines — and stepping through Mercury's spin and orbit, that 21 cm line is reached in four single lattice steps:

$$\text{Lyman} \rightarrow \text{Mercury} \rightarrow 21 \text{ cm} = 21.10667715 \text{ cm} (= \\ 2^4 \cdot 3^8 \cdot \pi / 5^6), \text{ exact}$$

The factor 24 = 2³ \times 3 that carries Mercury's angle down to the Earth in Route 11 is the same factor that carries its orbital kernel up to the radio sky. Mercury is the bridge between the ground beneath our feet and the sky above our heads. (The catalogued line, 21.106114 cm, sits about 27 ppm off this lattice value — the off-calibration peg, not a gap in the chain.)

16. Route 13 – The Mirror: a Spin-Flip Is a Register Crossing

There is a thirteenth road that reads the 21 cm line the other way. The hydrogen spin-flip — the single photon released when the electron's spin tips relative to the proton's — is, in the Force of Time, the crossing of the Mercury register into the Sun register:

$$\text{hydrogen spin-flip} = \text{Mercury-Sun register} \\ \text{crossing} = 1,420,405,752 \text{ Hz}$$

What atomic physics calls a hyperfine transition is one register of T handing over to the next. The same crossing that lights the radio sky is the seam Mercury rides; the line is a mirror, and Mercury looks back out of it.

17. Route 14 – Newton's Own Formula

There is a road that runs through the very formula the precession was once used to overthrow. Feed $m_1 m_2 / r^2$ not arbitrary kilograms but the Sun's dimensional masses, place the formula between Mercury and the Earth with the gap between the two nodes as Newton's r, and the energy comes out as the clean ratio E = 6.48. Walk it up the T-grammar by $\times 24$ to the free fall and step to the deeper g₂ face by one G-bond step:

$$g_2 = 6.48 \times 24 \times (1 + \delta_G) = 155.534020221834 ; \\ \times 36 = 5599.224727986024 \text{ "/century}$$

Newton's own law of attraction, read one dimension deeper, contains the whole observed advance on its g₂ face. The matter face gives 155.52 \times 36 = 5598.72, which falls short; the advance lives only on the deeper face. What a century of physics handed to curved spacetime was sitting inside Newton's formula all

along, one register down. The formula was never wrong — it was being read in the wrong register.

That single g_2 free fall does more than name the precession. The very same 155.534020221834, stepped by the marching denominator family $9 \rightarrow 18 \rightarrow 27$, unfolds the planet's precession, its year, its rotation and its rotation node in turn — one number, four faces, the numerator 5^6 held fixed throughout. Table 2 lays the family out at full precision.

→ **Want this in full?** See the companion paper: *Newton, A Dimension Deeper — the dimensional masses and the g_2 face that holds the whole advance.*

18. Route 15 — The Proton's Flow of Time

The fifteenth road begins not in a planet or a star but in a single proton. Its mass is not a lump of stuff but a density of time — how tightly the proton winds T into one place. Read that same T on its flow face and the density becomes a rate; one fixed ratio does the reading, the proton's mass times $125/243\pi$:

$$\mathbf{T_flow(proton) = 1.672616359 \times 10^{-27} \text{ kg} \times 125/243\pi = 0.27387362285414 \text{ m/s} (= \sqrt{(0.075 \cdot (1+\delta_G))})}$$

Now do to it exactly what the surface fall does in Route 11: square it and carry it through the day, $\times 864 \times 3600$, then climb one register of time by $\times 24$.

$$\begin{aligned} &0.27387362285414^2 \times 864 \times 3600 = \\ &233301.03033275096 \text{ (= node } 2^6 \cdot 3^6 \cdot 5, \text{ lifted one } \delta_G \text{ step)} \\ &233301.03033275096 \times 24 = \\ &5,599,224.727986024 = 5^6 \cdot 10^4 / 9\pi^3 \text{ (Fig. 3)} \end{aligned}$$

The proton's own flow of time, squared through the day and read up one register, lands 5,599,224.728 — Mercury's precession carried up by a clean power of ten; strip the 10^4 and it is P exactly, to better than a part in a billion. And it is not a lone trick: from that one value, by nothing but \times/\div of 2, 3, 24 and 2π , the proton paper reads off five clocks — Mercury's precession, the weight of hydrogen, the seed of the Earth's sidereal day, Venus's rotation, and Mercury's orbit. The smallest node of matter carries the turning of the innermost planet.

→ **Want this in full?** See the companion paper: *The Proton — One Flow of Time, Five Clocks.*

19. Route 16 — The Great Pyramid

The last road does not begin in nature but in a thing human hands raised four and a half thousand years ago. The Great Pyramid of Giza was built to one unit of length, the royal cubit — in metres, $\pi/6 = 0.5235987756 \text{ m}$ — and its height was cut to a precise number of those cubits. Not the round 280 of the textbooks; carried to full precision it is 279.9612364 cubits, which is $5^7/(9\pi^3)$, and in metres $5^7/(54\pi^2) = 146.5873606 \text{ m}$. Divide that height by its own cubit and what returns is half the precession:

$$\begin{aligned} &\mathbf{height \div cubit = 279.9612364 = P/2 ; \times 2 =} \\ &\mathbf{559.9224727986024 \text{ "/decade} = \text{Mercury's} \\ &\mathbf{precession (Fig. 4)} \end{aligned}$$

The height of the Great Pyramid, measured in its own royal cubits and doubled, is the precession of Mercury per decade, exact ($\times 20$ gives the 5599.224727986 "/century). And the same height carries more: through the four faces and the orbit, height (in metres) $\times 4 \times 2\pi = 368.4142201 = 10^6/(864\pi)$, Mercury's rotation node; through a single {2,3,5} step, height-in-cubits $\times 9/2500 = 1.007860451 \text{ u} = 125/4\pi^3$, the weight of hydrogen — the very number Route 7 and the proton road reach. The round 280-cubit figure is the ideal; the true height sits 139 ppm below it, exactly where the precise physics lives.

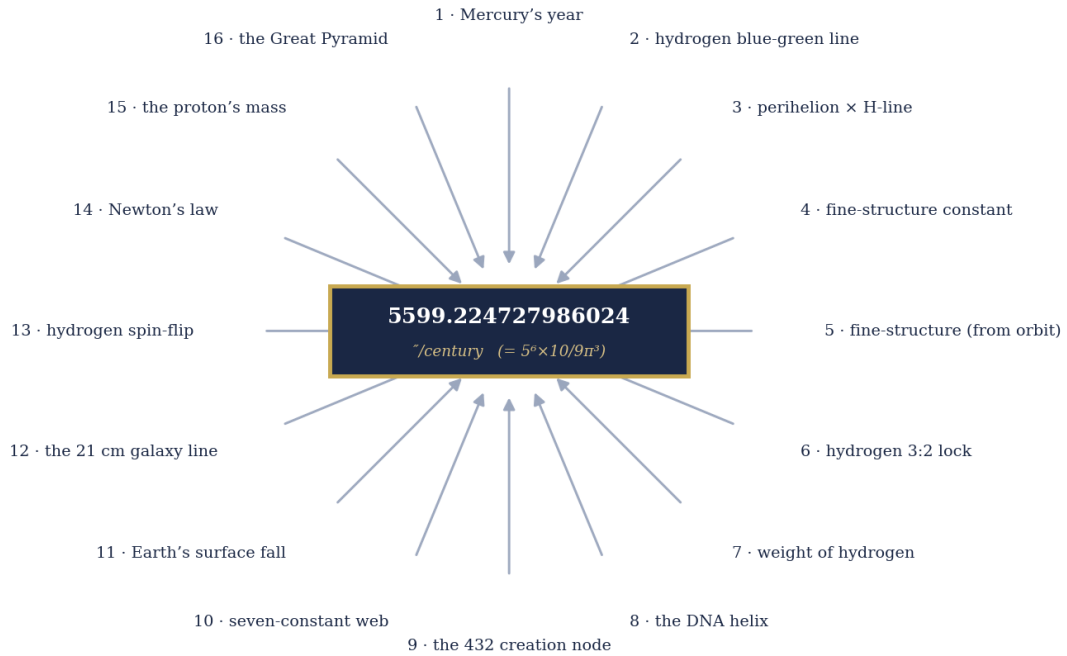
→ **Want this in full?** See the companion paper: *The Great Pyramid as a T-Node Array — the four base sides and the height.*

20. What Sixteen Witnesses Mean

No single one of these roads, taken alone, would compel belief; one numerical coincidence can always be waved away. But sixteen independent arrivals on the same measured value — from atomic light, the constant of the atom, the mass of hydrogen, the molecule that carries life, a creation node, a closed ring of seven constants, the line that charts the galaxy, the fall beneath our feet, Newton's own formula, the mass of the proton, and the height of a pyramid — do not happen by accident.

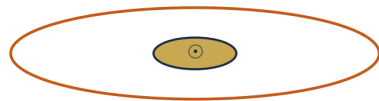
The Force of Time derives the whole of the observed precession, sixteen times, to the measured value, with no free parameter. Mercury's precession is not an anomaly to be patched. It is one of the places the {2,3,5, π } lattice shows through — and the sixteen roads, taken together, show the same lattice running from the smallest node of matter to the turning of a world, and even to a monument of stone.

Figure 1. The sixteen roads, one number



The sixteen roads converge on 5599.224727986024 "/century (= 5⁶ × 10 / 9π³). No road is privileged; each is one witness, and the force of the argument is their agreement on the measured value.

Figure 2. Why the orbit will not close

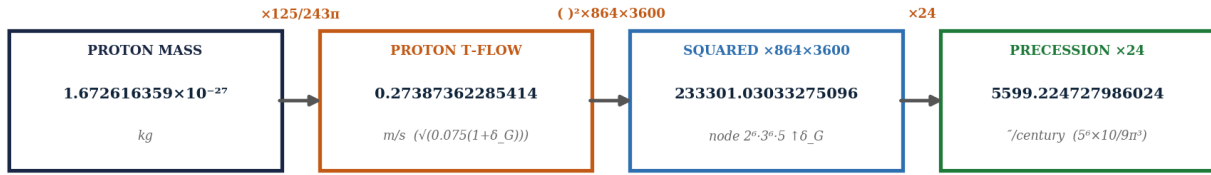


*Science measures from the 864 floor; Mercury's orbit lives at the T-field's first helical turn, 868.0555.
 The register gap $r - 1 = 4693.93$ ppm, accumulating each orbit, IS the precession — not an ellipse bent by a force, but a G2 orbit read with a G1 clock.*

864 floor (our ruler) vs 868.0555 = 864 × r (the orbit)

A G2 orbit (868.0555) read with a G1 clock (864); the register gap $r - 1$ accumulates each orbit as the precession.

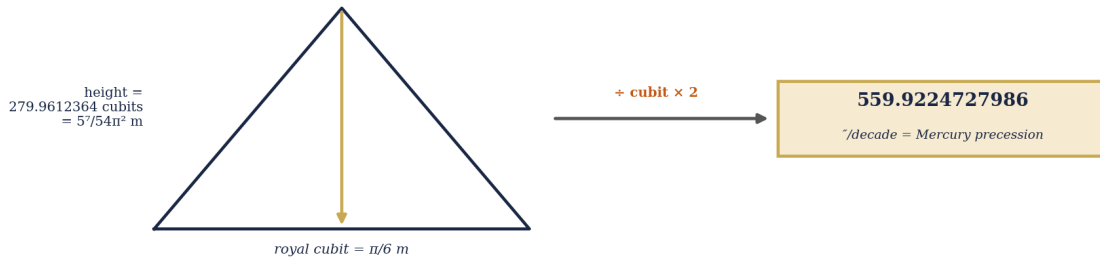
Figure 3. The proton road



The proton's mass, read on its flow face, is a speed (one T-value, two faces). Squared through the day and climbed one register of time, it is Mercury's precession to a power of ten — exact to better than a part in a billion. The same 233301.03033275096 also yields the weight of hydrogen, Venus's rotation and the Earth's spin. The smallest node of matter carries the turning of the innermost planet.

The proton's own T-flow, squared through the day and read up one register, lands 5,599,224.728 = Mercury's precession to a power of ten.

Figure 4. The Pyramid road



The height in royal cubits ($\pi/6$ m each), divided by the cubit and doubled, is Mercury's precession per decade.

Table 1 — the sixteen roads at full precision, number first and lattice form alongside

Route	Quantity	Value (the number)	Lattice form	ppm
1	$P \times \pi/20$ (the year)	87.95241635619598 days	$5^6/(18\pi^2)$	0
2	$H\beta \div (5^6/18) \times 10^3$	559.9224727986024 "/dec	$864 \rightarrow 868.0555$	0
3	perihelion $\times H\gamma/2$	10,000,000,000	$2^6 \times 5^6 \times 10^4$	0
4	$(1/\alpha_{\text{FOT}}) \times T(\text{Merc})$	12,056.327160493827	$5^9/(2 \times 3^4)$	0
5	$L \times \pi / T(\text{Merc})$	137.07783890401888	$= 1/\alpha_{\text{FOT}}$	exact
6	$H_{\text{IE}}/m_H \times 10$	135.000	$3^3 \times 5$	0
7	$P \times 180/10^5$	1.0078604510374844 u	$125/4\pi^3 = m(\text{H})$	exact
8	$P \times 500\pi/10^4$	87.95241635619598 days	$T(\text{Merc}), \text{ via DNA}$	0
9	$H\beta \times 9 \cdot 10^5/(2 \cdot 5^6)$	559.9224727986024 "/dec	$432 = 2^4 \times 3^3$	0
10	closed $H\beta$ 7-loop	1.000000000	$\Pi = 1$	0
11	$135/(180/\pi)/24 \times 100$	9.817477042468 m/s ²	$25\pi/8 = T_g$	0
12	Lyman \rightarrow Merc \rightarrow 21 cm	21.10667715 cm	$2^4 \cdot 3^8 \cdot \pi/5^6$	exact
13	spin-flip = register crossing	1,420,405,752 Hz	Merc-Sun seam	obs
14	Newton Merc \times Earth $\rightarrow g_2 \times 36$	5599.224727986024 "/cy	$155.534020221834 \times 36$	0
15	proton flow ² $\times 864 \times 3600 \times 24$	5,599,224.727986 (= $P \times 10^4$)	$5^6 \cdot 10^4/9\pi^3$	0
16	height \div cubit $\times 2$ (Pyramid)	559.9224727986024 "/dec	$5^7/9\pi^3$; cubit $\pi/6$	0

Every road begins in an unrelated domain and closes on the same number, to the precision shown.

Table 2 — one free fall, four faces: the 9 \rightarrow 18 \rightarrow 27 family

Face of Mercury	Value (the number)	Lattice form	step from ff
surface free fall (g_2)	155.534020221834	—	seed
precession / century	5599.224727986024 "	$5^6 \times 100/9\pi^3$	$\times 36$
orbital period	87.95241635619598 d	$5^6/18\pi^2$	$\times \pi/200$ of precession
rotation period	58.63494423746399 d	$5^6/27\pi^2$	orbit $\times 2/3$
rotation node	368.4142201201281	$31250/27\pi$	rotation $\times 2\pi$

A single g_2 free fall, 155.534020221834, unfolds the planet's precession, year, rotation and rotation node as the denominator marches 9 \rightarrow 18 \rightarrow 27 with the numerator 5^6 held fixed. The 3:2 spin-orbit lock that rules Mercury IS that 18 \rightarrow 27 step: the rotation is exactly two-thirds of the orbit. The matter (g_1) face, 155.52, gives $155.52 \times 36 = 5598.72$ and falls short; only the deeper g_2 face lands the measured advance.

Propositions

- P-PREC-1** — Route 1: $P = 559.9224727986024 \text{ "/decade}$ ($5^6 \times 10/9\pi^3$); $T(\text{Mercury}) = 87.95241635619598 \text{ d}$ ($5^6/18\pi^2$); and $P \times \pi/20 = T$ exactly. The wobble and the year are one lattice quantity.
- P-PREC-2** — Route 2: science's ground base is 864; the T-field's first helical turn is 868.0555 = $5^6/18$; $r = 5^6/(2^6 \times 3^5)$. $H\beta \div (5^6/18) \times 10^3 = 559.9224727986024 \text{ "/dec}$. Calibrate at 868.0555 rather than 864 and the precession vanishes — a register artefact, not a force.
- P-PREC-3 to 6** — Routes 3-6: perihelion ($2^9 \times 3^2 \times 10^4 \text{ km}$) $\times H\gamma/2$ ($5^6/36 \text{ nm}$) = 10^{10} ; $(1/\alpha_{\text{FOT}}) \times T = 12,056.327160493827$ ($5^9/2 \cdot 3^4$); $L \times \pi/T = 137.07783890401888$ ($1/\alpha_{\text{FOT}}$, exact); $H_{\text{IE}}/m_{\text{H}} \times 10 = 135$ ($3^3 \times 5$, the 3:2 lock).
- P-PREC-7 to 10** — Routes 7-10: $P \times 180/10^5 = 1.0078604510374844 \text{ u}$ = the weight of hydrogen ($125/4\pi^3$), exact; $P \times 500\pi/10^4 = 87.95241635619598 \text{ d}$ (through DNA + Rydberg, Venus 243.02 d intermediate); $H\beta \times 9 \cdot 10^5 / (2 \cdot 5^8) = 559.92 \text{ "/dec}$ ($432 = 2^4 \times 3^3$); the seven-constant $H\beta$ loop multiplies to exactly 1, the precession enforcing closure.
- P-PREC-11 to 13** — Routes 11-13: $135/(180/\pi)/24 \times 100 = 9.817477042468 \text{ m/s}^2 = 25\pi/8 = T_{\text{g}}$; Lyman \rightarrow Mercury $\rightarrow 21 \text{ cm} = 21.10667715 \text{ cm}$ ($= 2^4 \cdot 3^8 \cdot \pi/5^6$), exact; the hydrogen spin-flip is the Mercury-Sun register crossing, 1,420,405,752 Hz.
- P-PREC-14** — Route 14 (Newton): $m_1 m_2 / r^2$ fed the dimensional masses, Mercury \times Earth over the node gap, gives $g_2 = 6.48 \times 24 \times (1 + \delta_{\text{G}}) = 155.534020221834$; $\times 36 = 5599.224727986024 \text{ "/cy}$. The advance lives only on the g_2 face (the matter face gives 5598.72). Newton's own formula contains the full advance one register down.
- P-PREC-15** — Route 15 (Proton): the proton's mass $1.672616359 \times 10^{-27} \text{ kg}$ read on its flow face ($\times 125/243\pi$) is $0.27387362285414 \text{ m/s} = \sqrt{(0.075 \cdot (1 + \delta_{\text{G}}))}$; squared through the day ($\times 864 \times 3600$) it is 233301.03033275096 (= node $2^6 \cdot 3^6 \cdot 5$ lifted one δ_{G} step), and $\times 24 = 5,599,224.727986 = 5^6 \cdot 10^4 / 9\pi^3$ — the precession to a clean power of ten. The same value yields the weight of hydrogen, Venus's rotation and the Earth's spin (proton paper [7]).
- P-PREC-16** — Route 16 (Great Pyramid): royal cubit = $\pi/6 \text{ m}$; height = $5^7/(54\pi^2) \text{ m} = 279.9612364$ cubits ($5^7/9\pi^3$; the round 280 is 139 ppm above). Height \div cubit = $P/2$; $\times 2 = 559.9224727986024 \text{ "/decade}$; $\times 20 = 5599.224727986024 \text{ "/century}$. Height (m) $\times 4 \times 2\pi = 368.4142201 = 10^6/864\pi$ (rotation node); height-in-cubits $\times 9/2500 = 1.007860451 \text{ u} = 125/4\pi^3$ (weight of hydrogen).

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The Conversion Loop — the gears between the faces

Every value in this paper is one T-value read in different units. To move a quantity from one face to another — mass, wavelength, flow of time, frequency, energy, joules, circumference, the dimensional spin-orbit value (c) — apply the fixed gear below; any conversion in the paper can then be reproduced by hand.

from face → to face	apply (number-first)	lattice
energy (eV) → energy (kJ)	÷ 10368	$2^7 \cdot 3^4$
energy (kJ) → wavelength λ	÷ 36	$2^2 \cdot 3^2$
wavelength λ → flow of time g	÷ 49.50355350	$3888/25\pi$
flow of time g → frequency f	× 6.283185307	2π
flow of time g → energy (joules)	÷ 24	$2^3 \cdot 3$
wavelength λ → mass (λ -door)	× 1.233700550	$\pi^2/8$
energy (eV) → circumference C	÷ 31104	$2^7 \cdot 3^5$
circumference C → mass (circ-door)	÷ 22.00157933	$1728/25\pi$
flow of time g → dimensional spin-orbit value c	$c = g^2 \times 3,110,400$	$864 \cdot 3600$

Key. Flow of time (metres per second) = what science calls gravitational free fall. Dimensional spin-orbit value = what science calls the speed of light.

Direct laws: mass↔energy $E = 6.822485557 \cdot m$ ($m = 1.465741469 \cdot E$); mass↔wavelength $\lambda = 0.810569469 \cdot m = 8m/\pi^2$ ($m = 1.233700550 \cdot \lambda = \pi^2 \lambda / 8$); $eV = 373248 \cdot \lambda$ ($2^9 \cdot 3^6$); mass↔frequency $f = 0.102880658 \cdot m$ ($25/243$).

A Note on the Numbers

The values in this paper are written as plain numbers — not pinned to units, and not carried to a particular power of ten. This is not loose notation; it is the physics. Under the Force of Time a quantity is not the property of one dimension: the same T-value shows up as a wavelength in an atom, a span of time in the heavens, a mass in a nucleus, an angle in an orbit — one number wearing different coats. That is why a hydrogen line in nanometres can meet a planet's turning in arcseconds and land on the same value: they were never separate quantities. We therefore do not solve for a result 'to the power of' anything in one register and stop. The lattice number is the real thing, and it lives at once across every register — subatomic, atomic, celestial, galactic. The unit and the power of ten are only the costume the number wears in whichever dimension you read it from.

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