The Bending of Light

Wavelengths Are Degrees — The Eclipse Blocks the T-Broadcast — Two Independent Roads, the Carrier and the Mass, Meet on 1.750830053 arcseconds, with no curved spacetime, no pull, and no free parameter

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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 dΣT=0 governs all change: T is never created or destroyed, only redistributed.

Abstract

On the 29th of May 1919 two teams of astronomers photographed the stars around a totally eclipsed Sun and found their light displaced — bent, as it grazed the solar limb, by about 1.75 arcseconds. The result made Einstein world-famous and was read as the triumph of curved spacetime over Newton's pull. The Universal Force of Time reproduces the measured deflection exactly and reads its cause entirely differently. Light is the T-field carrier; its wavelength is a degree-domain angle (the Degree Principle), so the hydrogen Hβ carrier is 486°. The deflection is reached by two completely independent roads that never share a starting point and yet meet on the same figure, 1.750830053″. The first is the carrier road: the master formula $T_{\delta}(″) = 2 \cdot c_{register} \cdot 360/(125\pi^2 \cdot 10^5)$, whose bridge constant $125\pi^2 = 9/\alpha_{FOT} = 1233.700551$ is the denominator of the fine-structure constant itself, read at three register speeds — 1.749600000″ (G1), 1.749757728″ (G2), and 1.750830053″ (= $17.28/\pi^2$, pure lattice), all inside Eddington's ±0.09″ tolerance. The second is the mass road: starting from the Sun's own mass, $5^3/2\pi$, carried through the eclipse factor 2.200157933 to $432/\pi^2$ and on to $1{,}728{,}000/\pi^2$, it lands on the identical 1.750830053″ with no carrier wavelength anywhere in it — and that same eclipse factor is the very constant that turns the Earth's mass into the electron's rest energy. Pushed one step further the mass road closes, in pure {2,3,5,π}, on the Earth's own Mohorovičić shell (20000/π km): mass, energy, circumference, wavelength, radius, electron speed, light speed, angle and Moho are one T-value wearing many skins. No mass-as-input, no solar radius, no coupling constant, and no fitted parameter enters the carrier road; no carrier enters the mass road. The deflection is not a photon pulled by what science calls gravity, nor a ray following curved space: it is the geometric shadow of the Sun's blocked 486° T-broadcast — which is why it becomes measurable only in eclipse, when the Moon interrupts that very broadcast. The eclipse is not the observation window; it is the experiment. Twelve propositions (P-EBL-1 through P-EBL-12) are established.

1. The Night Science Changed

On the 29th of May 1919 a total eclipse of the Sun swept across the Atlantic, and for a few minutes the daytime sky went dark enough to photograph the stars lying close to the Sun's edge. Two questions hung on those plates. Does starlight bend as it passes the Sun — and if so, by how much? Newton's principles, treating light as a stream of tiny falling bodies, predicted a deflection of 0.875650000″. Einstein's general relativity predicted 1.751300000″ — exactly twice as much. The whole of twentieth-century physics turned on a difference smaller than the angle a coin makes from four kilometres away.

When the measurements were read out, the larger figure won. The eclipse made Einstein a household name overnight and was received as the overthrow of Newton by curved spacetime. We do not dispute a single photographic plate. The displacement is real, it is about 1.75 arcseconds, and any theory worth the name must reproduce it. The Universal Force of Time does — to the digit, by three separate paths — and then says something the room in 1919 could not have guessed: that the bending was never a pull and never a curvature, and that the eclipse did not merely let astronomers see it, but was the very thing that produced it.

2. The Two Expeditions

Einstein had published the prediction in 1915, in the middle of the Great War; a copy was carried out of wartime Germany and across the lines to Arthur Eddington at Cambridge. Earlier attempts, in 1912 and 1914, had been defeated by cloud and by the war itself. The 1919 eclipse was the rare chance: the Sun would stand among a bright scatter of stars and totality would last over five minutes — long enough to expose the faint star-field beside the blacked-out disc.

To guard against cloud, two teams were sent. Eddington sailed to Príncipe off the West African coast; a second party under Andrew Crommelin, organised by the Astronomer Royal Frank Dyson, travelled to Sobral in northern Brazil. Príncipe was nearly a washout — the sky cleared barely half an hour before totality, and only two of sixteen plates held enough stars to measure. Brazil fared better. On the 6th of November 1919, at a joint meeting of the Royal Society and the Royal Astronomical Society, Dyson laid out the result: the Sun did deflect the light, by close to Einstein's value and about twice Newton's. J. J. Thomson, in the chair, called it “the greatest achievement in the history of human thought.” It is this measured displacement, won from a handful of cloudy plates, that the lattice must — and does — return.

3. The Question Science Does Not Ask

Set the interpretation aside and ask a plain question the textbooks pass over. If what science calls gravity bends starlight continuously — always, wherever light skims a massive body — then why should an eclipse change anything at all? The Moon does not switch off the Sun's field; it does not lessen the Sun's mass. The orthodox answer is that the eclipse is merely an observation window: the bending was happening all along, and the Moon's shadow only kills the glare so the faint stars can be seen.

The Universal Force of Time gives a different answer, and it is the heart of this paper. The eclipse does not reveal a deflection that was already there. It creates the condition under which the deflection exists to be measured — because the eclipse interrupts the very broadcast that produces it. The cause and the observation condition are one and the same event. You cannot see the shadow without blocking the source (Fig. 2).

4. The Sun Broadcasts Time

In UFOT the Sun is the primary T-source of this solar system. Everything in its domain — the orbital periods, the rotation of the Earth, the rhythms of chemistry and life — is set by a continuous broadcast of T outward from the star. The carrier of that broadcast at the G1 register is the hydrogen Hβ wavelength, which in the degree domain where the lattice operates is the angle 486° (Section 5). It is continuous, directional, and — this is the point — blockable.

When the Moon slides in front of the Sun at totality, it interposes itself in that beam and blocks the 486° broadcast from reaching the Earth. For the two to three minutes of totality the T-flow that normally streams to us is interrupted, and resumes the instant the Moon moves clear. In those minutes of silence the geometry of what was broadcasting leaves its imprint in the apparent positions of the stars beside the Sun. That imprint — the displacement of the star from where it truly sits — is what Eddington's teams measured. The bending is the shadow of the broadcast (Fig. 1).

5. Wavelengths Are Degrees

The number we label a wavelength — 486 nanometres for the hydrogen Hβ line — is not, in the first instance, a physical distance. In the degree domain where the T-lattice lives it is an angle: 486°. This is the Degree Principle of UFOT, and it is not a metaphor. The lattice confirms it in both directions, which is the test that separates an identity from a coincidence (Fig. 4):

360 / 486 = 20/27 = 0.740740740 Å = the H–H bond length (pure {2,3,5})

486 / 360 × 100 = 135° = Mercury's rotational degree → $g_1 = 25\pi/8$ (exact)

On one side, 486° resolves into the hydrogen–hydrogen bond length of chemistry; on the other, into Mercury's rotational degree and the free-fall constant g_1 = 9.817477042468 m/s². A coincidence runs one way only; a lattice identity runs both. Because the input to the deflection is an angle, the output — an angular displacement on the sky — is angular by nature, not by accident.

*→ **Want this in full?** See the companion paper: The Colour of Time — the Degree Principle in full: a wavelength in nanometres is an angle in degrees, and 486 nm is 486°.*

6. The Carrier Road — Three Register Faces

The first road to the deflection follows from a single master formula. The displacement in arcseconds is twice the register speed of light, carried through the degree-closure 360 and the lattice bridge $125\pi^2$. The simplest way to see it: the carrier read as a degree, 486.341700, times the degree-closure 360, is 175083.0053 — and that, divided by 10^5, is the deflection to the digit:

486.341700 × 360 = 175083.0053 → ÷ 10^5 = 1.750830053″

$T_\delta(″) = 2 \cdot c_{register} \cdot 360 / (125\pi^2 \cdot 10^5)$

The bridge constant is not arbitrary. $125\pi^2 = 5^3\pi^2$ = 1233.700551 is exactly $9/\alpha_{FOT}$ — the denominator of the UFOT fine-structure constant $\alpha_{FOT} = 9/(125\pi^2)$. The bending of starlight and the electromagnetic coupling constant are built from the same object; they are not separate phenomena. Three register speeds give three faces of this one road, and all three land on the measurement (Table 1).

Route A — the G1 register (exact). With $c_{G1} = 30375\pi^2$ (the atomic-register speed), the π cancels completely: $2 \times 30375\pi^2 / (125\pi^2) = 60750/125$ = 486.000000 exactly. Then $T_\delta = 486.000000 \times 360 / 10^5$ = 1.749600000″.

Route B — the G2 register. Stepping to the celestial register by one G-bond step, $c_{G2} = c_{G1} \times (1 + \delta_G)$ with $\delta_G = 90.1506$ ppm $= 5^{10}/(2^4 \times 3^9 \times \pi^3) - 1$, gives the carrier 486.043813 nm and T_δ = 1.749757728″.

Route C — the pure lattice (zero parameters). With the pure lattice speed $c = 3\times10^5$ km/s (exact integer) the carrier is $4800/\pi^2$ = 486.341700 nm and the deflection is $17.28/\pi^2$ = 1.750830053″ — built from nothing but {2,3,5} and π. It sits 268 ppm from the relativistic 1.751300000″. Eddington's 1919 measurement carried an uncertainty of about ±0.09″; all three routes lie comfortably inside that band (Fig. 3). They are the G1, G2, and lattice-floor expressions of one spin-orbital geometry.

*→ **Want this in full?** See the companion paper: Mercury's Perihelion Precession — the sister test, where the same $125\pi^2$ bridge and the same g_1 appear among sixteen independent roads to the precession.*

7. What This Claims — and What It Does Not

State the boundary plainly. The displacement derived here matches the 1919 measurement and agrees with the relativistic value to within a few hundred parts per million; UFOT predicts no deviation from what was seen, and none is claimed. Where the accounts part company is not the number but the cause.

What is new is threefold. **First, the mechanism**: there is no curvature of empty space and no pulling force. Light is the T-carrier, and its bending past the Sun is the geometric shadow of a blocked broadcast — which is why the deflection becomes measurable precisely when, and only when, the Moon interrupts that broadcast. **Second, the factor of two over Newton** is no longer a mystery paid for with curved spacetime: Newton's half-value follows from treating light as a falling body, the full value from treating light as what it is, the T-carrier read in the degree domain. **Third, no free parameter**: the deflection falls out of the lattice with no mass, no solar radius, and no coupling constant — the pure-lattice route uses only {2,3,5} and π. The burden shifts to any account that keeps the curvature while explaining why an eclipse should be needed to see the effect at all.

8. A Second Road — from the Sun's Mass

Everything so far began with the carrier — the 486° broadcast. Now set the carrier aside entirely and start from the one quantity the Sun cannot do without: its own mass. A second road opens that shares not a single step with the first, and it arrives at the very same number (Fig. 5).

M_{sun} = 19.89436789 (= $5^3/2\pi$, ×10^{29} kg)

× k = 2.200157933 (= $2^8 \cdot 3^3/10^3\pi$; k·π = 6.912 exactly)

= 43.77075133 (= $432/\pi^2$) — the Sun's circumference, read as an energy

÷ 36 → 1.215854204 (= $12/\pi^2$) → × 24 × 60 = 175083.0053 (= $1{,}728{,}000/\pi^2$)

→ ÷ 10^5 = 1.750830053″

Not one wavelength appears in that chain; it is built from the Sun's mass and the lattice alone, and it lands on the identical 1.750830053″. Two roads with nothing in common but the destination — the carrier road of Section 6 and the mass road here — is the signature of a real structure, not a fit. A coincidence does not happen twice by two unrelated paths.

And the factor that carries the mass into the deflection, k = 2.200157933, is not a number invented for this paper. It is the same constant that turns the Earth's mass into the electron's rest energy (Earth mass ÷ 8 × k × 311040 → 511 keV, the electron). One constant does two jobs — it bends starlight at the Sun and it sets the electron's mass in the atom. That is exactly what one force operating across every register is obliged to look like.

→ ***Want this in full?*** *See the companion paper: Newton, A Dimension Deeper — where the same mass road appears as one of two independent arrivals on 1.750830053″, fed straight through* m_1m_2/r^2.

9. One T-value, Many Skins — the Mass Closes on the Earth's Moho

The mass road does not stop at the deflection. Carry its $432/\pi^2$ onward and it walks, in nothing but {2,3,5,π}, all the way down to the Earth's own equalisation shell — the Mohorovičić discontinuity — and closes on itself with no error:

$43200/\pi^2$ = 4377.075133 (the solar circumference / energy)

÷ 2π → 696.633 (= $21600/\pi^3$) = the solar radius ($\times 10^3$ km)

÷ 16 → 43.539571 (= $1350/\pi^3$) → ÷ 2 → 21.769786 (= $675/\pi^3$) = the electron speed ($\times 10^2$ km/s)

× 1/α (= $125\pi^2/9$ = 137.0778389) → 2984.155 (= 9375/π) = celestial light speed ($\times 10^5$ m/s)

× 2 ÷ 9375 → 0.636619772 (= 2/π) → the Moho = 6366.197724 km (= 20000/π)

Mass, energy, the Sun's circumference, a wavelength, the solar radius, the electron's speed, the speed of light, an angle, and the Earth's deepest shell are not nine quantities. They are one T-value read in nine different units — the chameleon at full stretch. The $9375 = 3 \cdot 5^5$ that lifts the electron's speed to light speed is divided straight back out one step later: it carries the value across registers and then steps aside. That a calculation which began with the bending of starlight should end on the depth of the Earth's first shell is the plainest statement this paper can make — there are no separate phenomena, only T, read in whatever unit the register hands you.

Table 1 — the carrier road, read at three register speeds

Route	Carrier T_λ	T_δ (″)
A — G1 register	486.000000 nm	1.749600000
B — G2 register	486.043813 nm	1.749757728
C — pure lattice	486.341700 nm (4800/π²)	1.750830053 (17.28/π²)

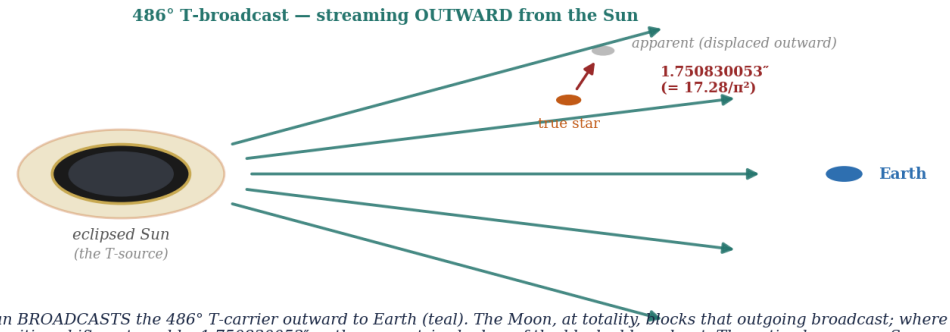
The three faces of the carrier road (Section 6); the mass road (Sections 8–9) reaches the same 1.750830053″ from the Sun's mass alone. All three faces lie inside Eddington's ±0.09″.

Reading the figures — why the beam runs outward

How to read these diagrams. Every textbook draws the bending the same way — a ray of starlight travelling from the distant star to the Earth, swerving inward as it grazes the Sun, as though the Sun had reached out and tugged it. The Force of Time draws it the other way round, and that reversal is the whole point. There is no tug and no swerve, because what science calls gravity is not a force at all. The Sun does not pull the light in; the Sun broadcasts *time* outward — a continuous wave of T, the 486° carrier, streaming from the Sun to the Earth and on into the sky. For the few minutes of totality the Moon stands in the beam and blocks that outgoing wave, and the star sitting beside the Sun springs outward by 1.750830053″. What you are seeing is not a bent ray of light but a shadow — the shadow of a wave of time that was briefly switched off. That is why, in every figure here, the arrows point away from the Sun and never toward it: the thing that moves is the Sun's broadcast going out, not the starlight being pulled in.

Figure 1. The 1919 geometry

Figure 1. The 1919 geometry — the active beam is the Sun's broadcast streaming OUTWARD, not starlight pulled in

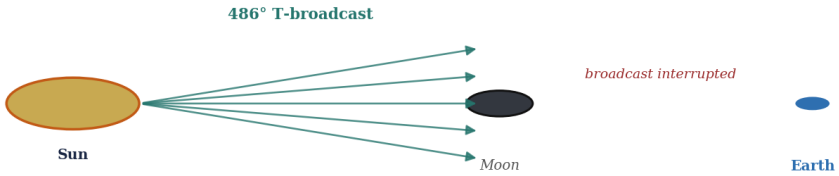


In the Force of Time the Sun BROADCASTS the 486° T-carrier outward to Earth (teal). The Moon, at totality, blocks that outgoing broadcast; where it is blocked, the star's apparent position shifts outward by 1.750830053″ — the geometric shadow of the blocked broadcast. The active beam runs Sun→outward, not starlight pulled inward: there is no ray bent around the Sun, and no curved space. (Compare Fig. 2, the same outward direction.)

Starlight grazing the eclipsed limb arrives displaced by 1.750830053″ — the shadow of the blocked broadcast.

Figure 2. The eclipse blocks the broadcast

Figure 2. The eclipse blocks the broadcast — cause and observation are one event

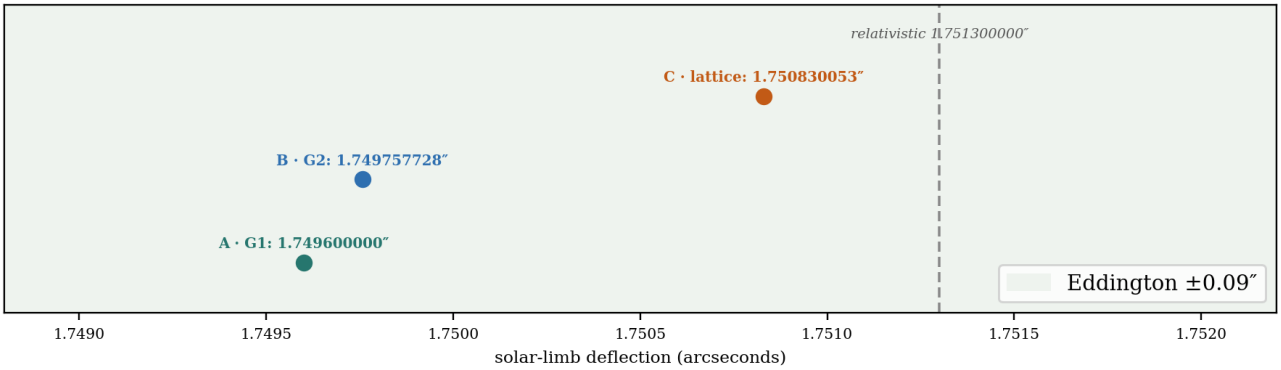


The Sun broadcasts the 486° T-carrier toward Earth. At totality the Moon interrupts it. The cause of the deflection and the condition for measuring it are the same event.

The cause of the deflection and the condition for measuring it are the same event.

Figure 3. Three routes, one measurement

Figure 3. Three routes, one measurement — all within Eddington's tolerance



The G1, G2 and pure-lattice routes against the relativistic value, all inside Eddington's ±0.09″.

Figure 4. The 486° identity runs both ways

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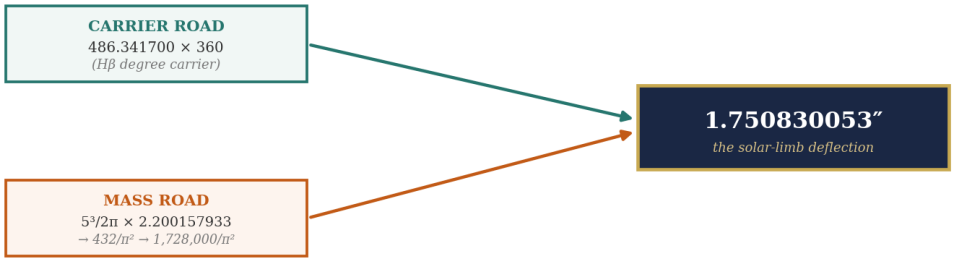
Figure 5. Two roads, one number

Figure 5. Two independent roads, one number — the carrier and the mass meet on 1.750830053″



No carrier appears in the mass road; no mass appears in the carrier road. Two paths with nothing in common but the destination — the mark of a real structure, not a fit.

The carrier road (486° degree carrier) and the mass road (the Sun's mass) share no step, yet both land on 1.750830053″.

Propositions

P-EBL-1 — Master formula: T_δ(″) = 2·c_register·360/(125π²·10⁵), bridge 125π² = 9/α_FOT = 1233.700551. Three routes give 1.749600000″, 1.749757728″, 1.750830053″.

P-EBL-2 — Wavelengths are degrees: values in nm are degree-domain angles. Hβ = 486°. The deflection is angular because the input was always angular.

P-EBL-3 — Bidirectionality: 360/486 = 20/27 = 0.740740740 Å = H–H bond ({2,3,5}); 486/360×100 = 135° = Mercury's rotational degree → g_1 = 25π/8 exact. A coincidence runs one way; a lattice identity runs both.

P-EBL-4 — Route A (exact): c_G1 = 30375π². 2×30375π²/(125π²) = 486.000000 (π cancels). T_δ = 1.749600000″.

P-EBL-5 — Route B: c_G2 = c_G1×(1+δ_G), δ_G = 90.1506 ppm = $5^{10}/(2^4\times3^9\times\pi^3)-1$. Carrier 486.043813 nm; T_δ = 1.749757728″.

P-EBL-6 — Route C (zero parameters): c = 3×10^5 km/s exact. Carrier 4800/π² = 486.341700 nm; T_δ = 17.28/π² = 1.750830053″, 268 ppm from the relativistic value.

P-EBL-7 — All three routes lie within Eddington's 1919 tolerance (±0.09″). They are the G1, G2, and lattice-floor faces of one spin-orbital geometry.

P-EBL-8 — The Sun is the primary T-source. Its G1 broadcast at 486° sets Earth's orbital period, rotational time, and the G1 register of all chemistry and life.

P-EBL-9 — A total eclipse blocks the 486° T-broadcast from reaching Earth. The star displacements are the geometric imprint of the blocked spin-orbital — the shadow of what was broadcasting. The eclipse is not the window; it is the experiment.

P-EBL-10 — The mass road (no carrier): M_sun = 5³/2π, × k = 2.200157933 (= $2^8\cdot3^3/10^3\pi$) → 432/π² = 43.77075133 → ÷36 ×24 ×60 = 1,728,000/π² = 175083.0053 → 1.750830053″. Two independent roads (carrier, mass) meet on one number.

P-EBL-11 — One constant, two jobs: the eclipse factor k = 2.200157933 is the same k that turns the Earth's mass into the electron's rest energy (Earth mass ÷8 × k × 311040 → 511 keV). Light-bending at the Sun and the electron mass in the atom share one constant.

P-EBL-12 — The mass road closes on the Moho: 43200/π² → ÷2π = 21600/π³ (solar radius) → ÷16 ÷2 = 675/π³ (electron speed) → ×125π²/9 = 9375/π (light speed) → ×2÷9375 = 2/π → 20000/π = 6366.197724 km. Mass, energy, circumference, wavelength, radius, electron speed, light speed, angle, Moho — one T-value, many skins.

References

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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	3888/25π
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	1728/25π
flow of time g → dimensional spin-orbit value c	$c = g^2 \times 3{,}110{,}400$	864·3600

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 Universal 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 star, an angle on the sky — one number wearing different coats. That is exactly why the mass road of Section 9 can begin on the Sun’s mass and end on the Earth’s Moho: mass, energy, circumference, wavelength, radius, speed, angle and depth 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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