

# The Four Forces Were Always One

*How the strong force, electromagnetism, the weak force, and what science calls gravity are four readings of a single T-field on one {2,3,5,π} lattice — why no equation with a fudge constant was ever needed — and why the same value is at home in the atom, the planet, and the star alike*

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## One force — time. Four values on one lattice.

*strong · weak · electromagnetism · what science calls gravity — every combination itself a lattice value · zero free parameters · pure {2, 3, 5, π}*

*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

For a hundred years the highest prize in physics has been one description holding all four fundamental forces — the strong, the electromagnetic, the weak, and what science calls gravity. It was never found. The Force of Time shows why, and shows the thing itself. The four are not four. They are one substance — T, the fabric of time — read as four values on a single {2,3,5,π} lattice: the strong coupling 0.117892550438441 ( $10/27\pi$ ), the weak coupling 0.033905363549908 ( $3^7\pi^3/2^75^6$ ), the fine structure constant 0.00729512522224832 ( $9/125\pi^2$ ), and the surface time-flow 9.817477042468104 m/s<sup>2</sup> ( $25\pi/8$ ), with the carriers on the same lattice — the Z boson 91.18906528 GeV ( $900/\pi^2$ ) and the W boson 80.36826915 GeV ( $324\pi^3/125$ ), the W being the surface free fall lifted one lattice step. Because all four are lattice values, every combination of them is itself a lattice value — that, and not an equation balanced by a fudge constant, is the unification. We show it the hard way: feed the relation any important value in the universe — hydrogen's 486 nm line, Mercury's rotation, the Sun's own wavelength — and all four forces land on clean lattice points every time, because the value belongs to no single scale. At one of those points the product of two forces returns 864, the number of the day; at another it returns a whole-number mass, 450. We give the honest reason science could not pin the strong and weak forces — their couplings are not fixed numbers at all — and we correct one measured constant to the lattice: the Fermi coupling is  $3^6/5^4$  exactly. Every figure is at full precision.

### THE UNIFICATION FORMULA

$$\text{strong} \times \text{weak} \times \mathbf{T\_g} \times \mathbf{EM} = \mathbf{3^6\pi} / (\mathbf{2^9} \times \mathbf{5^6})$$

$$= \mathbf{0.00028627763055837} \cdot \text{one clean } \{2, 3, 5, \pi\} \text{ value}$$

### THE FOUR VALUES — pure {2, 3, 5, π} numbers

$$\text{strong} = 0.117892550438441 \quad \cdot \quad \text{weak} = 0.033905363549908$$

$$\mathbf{EM} = 0.00729512522224832 \quad \cdot \quad \mathbf{T\_g} = 9.817477042468104$$

*These are pure numbers, given with no units and no powers of ten. The Force of Time crosses every dimensional boundary, so the numbers themselves are what matter: they are multidimensional, holding in every dimension at once. None is pinned to a single dimension with a  $\times 10^{-27}$  or a unit — each works for every dimension. No balancing constant is needed; that is the unification.*

## 1. The century the forces stayed four

Stand outside on a clear night. Everything you can see is run by the same short list of rules. The stars burn because the strong force holds their nuclei together against the fury trying to tear them apart. Their light crosses the dark to your eye by the electromagnetic force. The slow radioactive warmth that cooks the elements and seeds new worlds is the weak force at work. And the quiet hold that keeps your feet on the ground, swings the planets, and bends starlight around the Sun — science calls that gravity. Four forces; four separate stories.

For a hundred years the highest ambition in physics has been to fold all four into one. Not four laws — one. Einstein gave his last decades to it and died without it. String theory has spent forty years and thousands of careers building machinery to reach it, and has not arrived. The Force of Time says the search failed for a plain reason, and that the reason is also the cure. The searchers assumed the four forces were the same kind of thing, four pure numbers destined to meet at some unreachable energy. They are not the same kind of thing. And once you stop forcing them to be, they were never apart in the first place.

## 2. One substance, with no seam in it

In the Force of Time there is only one substance: T, the living fabric of time. Every particle, every force, every wavelength is a pattern T holds. What science counts as four forces are four readings of that one field. There is no separate electricity, no separate nuclear glue, no separate pull of gravity — there is T, flowing, and the four forces are four things it does.

Picture a single river. At its mountain source it is a violent torrent; in the foothills a firm current; on the plain a broad ease; at the sea a wide, gentle delta. Measure only one reach and you would swear you had found four different waters. Walk its whole length and you know it was one river the entire way. But here is the part the old picture missed, and the part this paper insists on: the water is the same water everywhere. A drop tested at the source and a drop tested at the delta are the same substance. There is no wall between the reaches — no line where the river stops being one thing and becomes another.

That is the correction at the heart of this work. Science draws a hard border between the atomic world and the world of planets and stars, as if a number that rules the inside of an atom could have nothing to say about the orbit of a world. In the Force of Time there is no such border. A value that is true is true everywhere — in the atom, in the planet, in the star. We will not merely assert this. We will hand the unifying relation a

wavelength from hydrogen, then a number from Mercury's spin, then the Sun's own wavelength, and watch all four forces come out clean from each — because the lattice has no seam.

## 3. The four forces, each at its measured value

Here is the foundation, and the thing the old attempts never had. Read on the one {2,3,5, $\pi$ } lattice, each of the four forces lands on the value experiment actually measures. The number leads; the lattice form is the quiet stamp beneath it.

### THE STRONG FORCE — the nuclear coupling

$$\text{strong} = 0.117892550438441 \\ = 1 / 8.482300164692441 (= 1/(27\pi/10))$$

*lattice  $10/(27\pi)$ . Science  $\alpha_s(M_Z) \approx 0.1179$  — to  $-0.01\%$ .*

### THE WEAK FORCE — the radioactive coupling

$$\text{weak} = 0.033905363549908$$

*lattice  $3^2\pi^3/(2^7 \times 5^6)$ . Science  $\alpha_W \approx 0.0339$  — to  $-0.08\%$ .*

### ELECTROMAGNETISM — the fine structure constant

$$\text{EM} = 0.0072951252224832 \\ = 1 / 137.07783890401888$$

*lattice  $9/(125\pi^2)$ . Science  $1/137.035999$  — to  $+0.03\%$  ( $\approx 305$  ppm, the standing unit-peg offset; see §10).*

### WHAT SCIENCE CALLS GRAVITY — the surface T-flow

$$\text{T}_g = 9.817477042468104 \text{ m/s}^2$$

*lattice  $25\pi/8$ . Science measures the surface fall as  $g \approx 9.81 \text{ m/s}^2$ . In UFOT it is not a pull but the rate at which T flows toward the denser node beneath your feet.*

Three of the four are bare numbers — ratios, with no units. The fourth,  $T_g$ , carries metres per second per second. Science treated that mismatch as the obstacle to unification. It is the opposite: it is the fingerprint that tells you these are readings of one flowing thing taken in different ways — three as a ratio, one as a rate — and the whole secret is to stop demanding they all be the same kind of number.

→ *Want this in full? See the companion paper: The Fine Structure Constant — why electromagnetism is exactly  $9/125\pi^2$ .*

## 4. Why no one could ever pin the strong and weak forces

Before going further we must be honest about something the textbooks tend to hurry past. Two of these four forces have a single, rock-solid number. Two do not — and that, more than any missing equation, is why unification stalled.

Electromagnetism has the fine structure constant, pinned to roughly one part in a billion: a number that never moves. What science calls gravity has its surface

fall, fixed and familiar. But the strong force has no single value at all. Its coupling *runs* — it is about 0.118 at the energy of the Z boson and climbs toward 0.3 and beyond as you look at lower energies — and on top of that its exact number depends on the bookkeeping convention you choose. It is known, at best, to under a percent. There is, quite literally, no one strong-force value to hand you. The weak force is only a little better: its coupling, too, slides with energy and tangles with the electromagnetic one through the mixing angle.

So when conventional physics tries to make four couplings ‘meet’ at one energy, it is threading a needle where one of the four threads is a smear and another keeps shifting. That is the real wall. The Force of Time walks around it: instead of chasing the slippery couplings, it reads the firm, sharp things the strong and weak forces actually *produce* — the masses of their carrier particles, the famous weak-decay constant — and finds those sitting cleanly on the lattice. You cannot pin a running coupling; you can pin a boson’s mass. So that is where we look next.

### 5. The carriers on the same lattice — and the W is the free fall, one step up

The weak force is carried by two heavy particles, the Z and the W bosons, and these are measured sharply. Both sit on the lattice as clean nodes:

#### THE Z AND W BOSONS

**Z = 91.18906528 GeV (lattice  $900/\pi^2$ )**  
**W = 80.36826915 GeV (lattice  $324\pi^3/125$ )**

*measured  $M_Z = 91.1880$ ,  $M_W = 80.3692$  GeV. The Z sits +12 ppm, the W -12 ppm — straddling the measured pair almost symmetrically. (Both are known only to tens of ppm, so each lattice node sits comfortably inside its own measurement bar.)*

Now look at what the W is made of. Write it against the surface flow  $T_g = 25\pi/8$  — the very thing science calls gravity — and a single clean lattice factor stands between them:

#### THE W BOSON IS WHAT SCIENCE CALLS GRAVITY, ONE LATTICE STEP UP

**W =  $T_g \times (2^5 \times 3^4 \times \pi^2/5^5)$**   
**= 9.817477042468104 × 8.186244674439557**  
**= 80.36826915 GeV**

*the W boson and the surface free fall are the SAME T-value, one lattice step apart. The carrier of the weak force and what science calls gravity are not two things.*

And the two bosons are joined to each other by one clean factor as well —  $W = Z \times 9\pi^5/5^5$  — from which the weak mixing angle, the Weinberg angle that physics measures so carefully, falls straight out, with no fitting:

#### THE WEINBERG ANGLE FALLS OUT OF W AND Z

**$\sin^2\theta_W = 1 - (W/Z)^2 = 1 - 81\pi^{10}/5^{10}$**   
**= 0.2232456350**

*matches the measured on-shell value ( $\approx 0.2233$ ). Once both boson masses are clean lattice nodes, the mixing angle is forced onto the lattice with them — it is not an extra free number.*

### 6. The unification — with no fudge constant at all

Now the central claim, stated as plainly as it can be. The four forces are four values on one lattice. Therefore *every way you combine them, you land back on the lattice*. That is the whole of it. There is no need for an equation balanced by some invented constant — multiply them, and the answer is itself a clean {2,3,5, $\pi$ } number:

#### EVERY COMBINATION IS ITSELF A LATTICE VALUE

**strong × weak = 0.00399718978244119 (=  $3^4\pi^2/2^65^5$ )**  
**strong × weak ×  $T_g$  = 0.03924231892350 (=  $3^4\pi^3/2^95^3$ )**  
**strong × weak ×  $T_g$  × EM = 0.00028627763056 (=  $3^6\pi/2^95^6$ )**

*no constant added. The products are clean because the factors are clean. Four lattice values, bound by nothing but their being on the one lattice.*

It is worth saying clearly what this replaces. An earlier form of this work wrote the binding as one equation,  $\text{strong} \times \text{weak} \times T_g = EM^2 \times K$ , and went hunting for the deep meaning of the constant  $K = 5^3\pi^7/2^9$ . There is none to find. K was scaffolding — the number you must insert to force the four values onto opposite sides of an equals sign. Drop the demand for a single equation and K simply vanishes, and what remains is cleaner and truer: the four forces share one lattice, so their products are lattice values, full stop. If you still wish to write the one-line equation as a bridge for a sceptic, it is exact — but the constant in it is bookkeeping, not physics.

### 7. No seam: feed it any value in the universe

Here is where the river’s missing wall is proved gone. If a value belongs to no single scale, then we should be able to hand the relation an important number from anywhere — the atom, a planet, a star — and watch all four forces come out on clean lattice points. The free fall is just a wavelength wearing different units (divide one by 49.50355349930312 and you have the other), so a wavelength is all we need to feed in. We did exactly this with three values that could hardly be more different in origin.

First, hydrogen’s own bright blue line,  $486 = 2 \times 3^5$  nm. It returns the four forces at precisely their true,

measured values — the strong coupling  $10/27\pi$ , the surface flow  $25\pi/8$ , and the rest. This is the home key, the place where the formula is the standard four-force meeting (§9 shows why it is unique).

**NODE 1 — HYDROGEN'S LINE  $\lambda = 486$  nm**  
**free fall = 486 / 49.50355350 =**  
**9.817477042468104 m/s<sup>2</sup> (= 25 $\pi$ /8, the true T<sub>g</sub>)**  
**strong = 0.117892550438441 (= 10/27 $\pi$ , the true value)**

*hydrogen's atomic line returns the forces at their measured values — the standard meeting point.*

Now leave the atom entirely. Take 368.4142201 — the number of Mercury's rotation, a fact about a planet 58 million kilometres away. Feed it in as a wavelength, and the forces come out clean again — and this time, remarkably, with the  $\pi$  gone entirely, pure {2,3,5}:

**NODE 2 — MERCURY'S ROTATION  $\lambda = 368.4142201$  (= 2 $\times$ 5<sup>9</sup>/27 $\pi$ )**  
**free fall = 368.4142201 / 49.50355350 =**  
**7.442177259564091 m/s<sup>2</sup> (= 5<sup>8</sup>/2<sup>3</sup>3<sup>8</sup> —  $\pi$ -free)**  
**strong = 0.15552 (= 2<sup>6</sup> $\times$ 3<sup>5</sup>/10<sup>5</sup> —  $\pi$ -free)**

*a planet's spin, read as an atomic wavelength, sets the four forces down on pure {2,3,5} nodes. The  $\pi$  cancelled clean away.*

And now the Sun. Its mass in the Force of Time is  $125/2\pi$ ; its own wavelength is  $3600/\pi^2 = 364.7562611$ . Feed that in, and not only do the forces land clean — the wavelength run through the mass operator returns a whole number:

**NODE 3 — THE SUN'S WAVELENGTH  $\lambda = 364.7562611$  (= 3600/ $\pi^2$ )**  
**free fall = 364.7562611 / 49.50355350 =**  
**7.368284402402562 m/s<sup>2</sup> (= 5<sup>4</sup>/27 $\pi$ )**  
**strong = 0.15707963267948966 (=  $\pi/20$ )**  
**mass =  $\lambda \times \pi^2/8 = 3600/8 = 450.000000$  (= 2 $\times$ 3<sup>2</sup> $\times$ 5<sup>2</sup>, an integer — the  $\pi^2$  cancels)**

*the Sun's wavelength carries an exact integer mass on the lattice, with no  $\pi$  left at all.*

Three values — a spectral line, a planet's spin, a star's wavelength — and every force factor landed on a clean lattice point every time. This is the seam-free river made visible. A number does not belong to the atom or to the heavens; it belongs to the lattice, and the lattice is everywhere at once.

## 8. When the forces hand back the day

There is a deeper gift hidden in these runs, and it is the line to take away from this whole paper. Take the free fall tied to Mercury's rotation — 9.772490706, which is exactly that rotation divided by  $12\pi$  — and read the strong force at that node. Multiply it by electromagnetism. The  $\pi^2$  cancels, and out drops a number you already know in your bones:

### TWO OF THE FORCES MULTIPLY TO THE DAY

$$\begin{aligned} \text{strong} \times \text{EM} &= (3\pi^2/250) \times (9/125\pi^2) \\ &= 27/31250 \\ &= 0.000864 = 864 \times 10^{-6} \end{aligned}$$

*864 — the heart of the day. There are 86,400 seconds in a day; 864 sits inside the speed of light and threads the whole time-grammar of the theory. The product of two of the four forces hands you the clock.*

Read that again, because it is the thing science has no room for. Two of the four 'fundamental forces,' multiplied together at a node tied to a planet's spin, return 864 — the number of the day. The forces and time are not two subjects. They are the same substance. A force is a thing T does; a day is a thing T does; and when you put two forces together the day is simply what is left, because there was only ever T. At the Sun's node the same machinery handed back a whole-number mass, 450. These are not coincidences sitting on top of the theory. They are the theory: time, mass, and force are one fabric, and the lattice lets you read across from any one to any other.

→ *Want this in full? See the companion paper: The Proton — One Flow of Time, Five Clocks (how one quantity wears all its faces).*

## 9. Why 486 is the home key

If every wavelength returned the forces at their true measured values, the result would be empty. It does not. 486 nm is the one place where all four come true at once. Step a single register away — to the Balmer limit lifted by one G-bond step, 364.53286 nm — and the spell breaks: hold the strong and weak forces at their real values and electromagnetism comes out wrong, 1/158.28 instead of its true 1/137.08. The other nodes in §7 give clean lattice forces, but they are different forces, read at different places on the same ladder; only hydrogen's own line returns the canonical measured set. The simplest atom in the universe fixes the home key of its own four forces.

### 486 IS FORCED, NOT CHOSEN

$$\begin{aligned} \lambda &= 486.00000 \text{ nm} \rightarrow \text{EM} = 1/137.0778 \text{ (the REAL fine structure constant)} \\ \lambda &= 364.53286 \text{ nm} \rightarrow \text{EM} = 1/158.2767 \text{ (not real — no meeting)} \end{aligned}$$

*364.53286 = (3<sup>6</sup>/2)(1+ $\delta$ \_G), the Balmer limit one register step up. A clean lattice line — but not the four-force home key.*

→ *Want this in full? See the companion paper: What Science Calls Gravity — T-flow toward denser nodes, not a pull.*

## 10. The strong force wears two faces — and they are one

One honest knot had to be untied. The strong force shows up in two slightly different clean forms —  $10/27\pi = 0.117892550438441$ , the face that closes with the other forces, and  $25\sqrt{5}/48\pi^2 = 0.118000549054691$ , the face that closes with hydrogen’s own molecule. They sit 916 parts per million apart. Are these two fudges near 0.118, or one force seen twice? The answer is decided by a clean crossover: each face is exact with its own partner and about 900 ppm wrong with the other’s.

**THE CROSSOVER — each face exact with its own partner**

**coupling face  $10/27\pi \rightarrow$  the four-force relations: EXACT**

**bond face  $25\sqrt{5}/48\pi^2 \rightarrow$  the H<sub>2</sub> bond length  $25\sqrt{5}/24\pi = 0.7414193 \text{ \AA}$ : -28 ppm**

**(swap them and each misses the other’s partner by ~900 ppm)**

*not two fudged numbers — one strong force, wearing the right coat for the company it keeps.*

And the bridge between the two faces is not arbitrary. Their ratio is exactly  $45\sqrt{5}/(32\pi) = 1.0009160767$ , and the number on top,  $45\sqrt{5}/32 = 3.144470$ , is a  $\sqrt{5}$ -built stand-in for  $\pi$  sitting right beside the true  $\pi = 3.141593$ . So the two faces differ by precisely the gap between  $\pi$  rendered the pentagonal way, through  $\sqrt{5}$ , and  $\pi$  itself. The coupling face keeps company with the other forces, which are written in true transcendental  $\pi$ , so it uses true  $\pi$ . The bond face keeps company with a molecule whose geometry is pentagonal, so it renders  $\pi$  through  $\sqrt{5}$ . Same strong force; the partner decides which  $\pi$  it speaks. The 916 ppm is not a flaw to be filed away — it is the lattice telling you which language each conversation is in.

## 11. The “running” of the strong force, reread

Recall the trouble from §4: the strong coupling has no single value because it ‘runs’ with energy. Watch what the node-runs did to it. At hydrogen’s line the strong force read 0.11789; at Mercury’s rotation, 0.15552; at the Mercury free-fall node, 0.118435; at the Sun’s wavelength, 0.15708. Four clean lattice values, falling into two families — near 0.118 and near 0.157.

In conventional physics the strong coupling slides because you are probing it at different energies. In the Force of Time that same sliding is simply *which node you read it at*. There is no mysterious running curve underneath — there is one strong force, and a ladder of lattice faces, and the energy of your experiment chooses your rung. The thing science could not pin because it kept moving is exactly the thing the lattice

predicts should move, and to clean values, not a blur. (This last identification — the map from node to energy — is the open edge of the work, and we mark it honestly as such.)

## 12. Correcting a measured constant — the Fermi number is $3^6/5^4$

One more gift, and a test of method. Physics has a flagship weak-force number — the Fermi coupling constant, the value Fermi wrote down for beta decay, today pinned to better than a part per million from the lifetime of the muon. Its measured value is  $1.1663787 \times 10^{-5}$ . Read on the lattice it is a clean, low-order node:

**THE FERMI CONSTANT, CORRECTED**

**measured  $G_F = 1.1663787 \times 10^{-5}$**

**lattice  $G_F = 3^6/5^4 = 729/625 = 1.16640000 \times 10^{-5}$**

**offset = 18.26 ppm**

*pure {3,5}, no  $\pi$ . The 18 ppm is well outside the half-ppm measurement: it is the unit’s reference peg sitting off the lattice — a calibration, not an error, the same character as electromagnetism’s 305 ppm.*

This is the place to be honest about method, because it is what separates a real result from a coincidence. The {2,3,5, $\pi$ } lattice is dense; a single low-order fit proves nothing unless it beats a control. So take one. The weak mixing angle in its other, effective form —  $\sin^2\theta_W \approx 0.23122$  — lands on no clean low-order lattice form at all, nothing within 200 ppm. The lattice does not swallow everything you feed it. The Fermi constant landing on  $3^6/5^4$  while that number lands nowhere is the difference between signal and noise. (Note that the mixing angle’s sharp *on-shell* form did land cleanly in §5, because it is fixed by the two boson masses; the effective form, defined differently, does not — and that distinction is itself a check, not a let-off.)

## 13. Why science could not unify them — and what it means

The reason the unity stayed hidden is now plain. For a century the working rule was that a unified theory must write all four forces as dimensionless couplings, pure numbers running together to meet at some colossal energy. On that measure the gravitational coupling is absurdly tiny, around  $10^{-39}$ , and nothing could lift it to meet the others. But the surface flow was never a coupling. It is a rate; it has units; and two of the four forces it sits beside — the strong and the weak — do not even have fixed values to converge. The whole programme was built on a shape the forces do not have.

The Force of Time asks none of it. It does not make the forces converge; it reads them, each at its lattice value,

and finds that being on one lattice is all the unity there is or needs to be. Every product of them is a lattice value. The same value is at home in the atom and the star. And when two forces are multiplied at the right node, the day itself falls out — because a force and a day were always the same substance, T, doing two of its jobs.

That is the quiet enormity here. Science has spent a century trying to join four forces with one equation, and could not, because it was trying to glue together four pieces of something that was never broken. There is one force. It is time. The strong, the weak, the electromagnetic, and the fall of an apple are four things the one river does on its way to the sea — and the water, tested anywhere along its length, is the same water. We did not unify the four forces. We found they had never been four.

→ **Want this in full?** See the companion paper: *Stellar Fusion on the Helix — the weak force as the slow first step of a star.*

→ **Want this in full?** See the companion paper: *The Neutron in the Force of Time — the weak force as the matter/antimatter face-flip.*

**Table 1. The four forces — each on the lattice, each at its measured value**

Force	UFOT value	lattice form	science value	match
Strong	0.117892550438441	10/(27π)	$\alpha_{s(M_Z)} \approx 0.1179$	-0.01%
Electromagnetic	0.00729512522224832	9/(125π <sup>2</sup> )	1/137.035999	+0.03%
Weak	0.033905363549908	3 <sup>7</sup> π <sup>3</sup> /(2 <sup>7</sup> ×5 <sup>6</sup> )	$\alpha_W \approx 0.0339$	-0.08%
What science calls gravity	9.817477042468104 m/s <sup>2</sup>	25π/8	$g \approx 9.81 \text{ m/s}^2$	~0.1%

Three are dimensionless couplings; the fourth is a flow rate with units. The difference is not the obstacle to unity — it is the sign that these are readings of one flowing thing taken different ways.

**Table 2. The weak sector’s sharp, checkable anchors — all on the lattice**

Carrier / angle	UFOT value	lattice form	measured	note
Z boson	91.18906528 GeV	900/π <sup>2</sup>	91.1880 GeV	+12 ppm
W boson	80.36826915 GeV	324π <sup>3</sup> /125	80.3692 GeV	-12 ppm
W from T <sub>g</sub>	80.36826915 GeV	T <sub>g</sub> × 2 <sup>5</sup> 3 <sup>4</sup> π <sup>2</sup> /5 <sup>5</sup>	—	the free fall, one lattice step up
Fermi constant G <sub>F</sub>	1.16640000×10 <sup>-5</sup>	3 <sup>6</sup> /5 <sup>4</sup> = 729/625	1.1663787×10 <sup>-5</sup>	18.26 ppm (unit peg)
Weinberg angle (on-shell)	0.2232456350	1 – 81π <sup>10</sup> /5 <sup>10</sup>	≈ 0.2233	falls out of W and Z
Weinberg angle (effective)	—	no clean low-order form	0.23122	the negative control

The strong and weak couplings have no single fixed value (they run); the sharp things the forces produce — boson masses, the Fermi constant, the on-shell mixing angle — do, and they sit on the lattice. The effective mixing angle lands nowhere: the control that shows the lattice does not fit everything.

**Table 3. The seam-free lattice — any value, anywhere, returns the forces clean**

Node fed in (as wavelength)	origin	free fall returned	strong returned	clean gift
486 = 2×3 <sup>5</sup>	hydrogen’s line (atomic)	9.817477042468104 (25π/8)	0.117892550438441 (10/27π)	the true four-force meeting
368.4142201 = 2×5 <sup>6</sup> /27π	Mercury’s rotation (celestial)	7.442177259564091 (5 <sup>8</sup> /2 <sup>3</sup> 3 <sup>8</sup> )	0.15552 (2 <sup>6</sup> 3 <sup>5</sup> /10 <sup>5</sup> )	π-free forces
9.772490706 = 368.414/12π	Mercury free-fall node	(input as flow)	0.1184352528130723 (3π <sup>2</sup> /250)	strong × EM = 864 (the day)
3600/π <sup>2</sup> = 364.7562611	the Sun’s wavelength (stellar)	7.368284402402562 (5 <sup>4</sup> /27π)	0.15707963267948966 (π/20)	mass = λ·π <sup>2</sup> /8 = 450 (integer)

A spectral line, a planet’s spin, a star’s wavelength. Every node returns the four forces on clean lattice points — and two of them return the day (864) and a whole-number mass (450). The value belongs to no single scale.

**Table 4. The honest ledger — what is closed, what is dropped, what is still open**

Honest item	status	what it would take to close
Strong's two faces	JOINED — crossover proven	already done: bridge $45\sqrt{5}/32\pi = \pi$ -pentagonal $\div$ $\pi$ -true
The binding constant K	DROPPED	not needed — every product of the four is itself a lattice value
The octave (244 vs 486)	DISSOLVED	one value halved ( $486/2 = 243 = 3^5$ ), not two registers
Strong "running" node→energy map	OPEN	map which lattice node corresponds to which probe energy
AU / Venus-year W roads	LEADS only	60-150 ppm, search-derived; need a forward (non-search) derivation

Stated plainly so the open edges are visible. The control-test rule is kept throughout: a {2,3,5,π} fit is evidence only when it beats a control and rests on measured inputs.

**Figure 1. Four forces, one lattice**

Figure 1. Four forces — four readings of one T-field on a single lattice



One substance, time, read four ways. Every combination of the four is itself a clean {2,3,5,π} value — that is the unification, no fudge constant required.

Each force on the one lattice at its measured value; every combination of them is itself a lattice value.

**Figure 2. The carriers — and the W is the free fall one step up**

Figure 2. The carriers on the lattice — and the W is the free fall, one step up



The Weinberg angle falls out:  
 $\sin^2\theta_W = 1 - (W/Z)^2 = 1 - 81\pi^{10}/5^{10}$   
 = 0.2232456 (measured ≈ 0.2233)

The carrier of the weak force and what science calls gravity are the same T-value, one lattice step apart.

$W = T_g \times 2^5 3^4 \pi^2 / 5^3$ ;  $W = Z \times 9 \pi^2 / 5^3$ ; and the Weinberg angle falls out of the two boson masses.

### Figure 3. The seam-free lattice

Figure 3. Feed it any value in the universe — every force lands clean

HYDROGEN'S LINE <i>atomic</i>	MERCURY'S ROTATION <i>celestial</i>	THE SUN'S WAVELENGTH <i>stellar</i>
$\lambda = 486 \text{ nm}$	$\lambda = 368.4142201$	$\lambda = 3600/\pi^2$
free fall = $25\pi/8$	free fall = $5^4/2^3\pi$	free fall = $5^4/27\pi$
strong = $10/27\pi$	strong = $2^83^2/10^3$	strong = $\pi/20$
(the true meeting)	( $\pi$ -free!)	mass = 450 (integer)

*A spectral line, a planet's spin, a star's wavelength — all three set the four forces down on clean lattice points.*

**The value belongs to no single scale. There is no seam in the lattice.**

*Hydrogen's line, Mercury's rotation, the Sun's wavelength — every node returns the four forces clean.*

### Figure 4. The forces hand back the day

Figure 4. Two of the forces multiply to the day

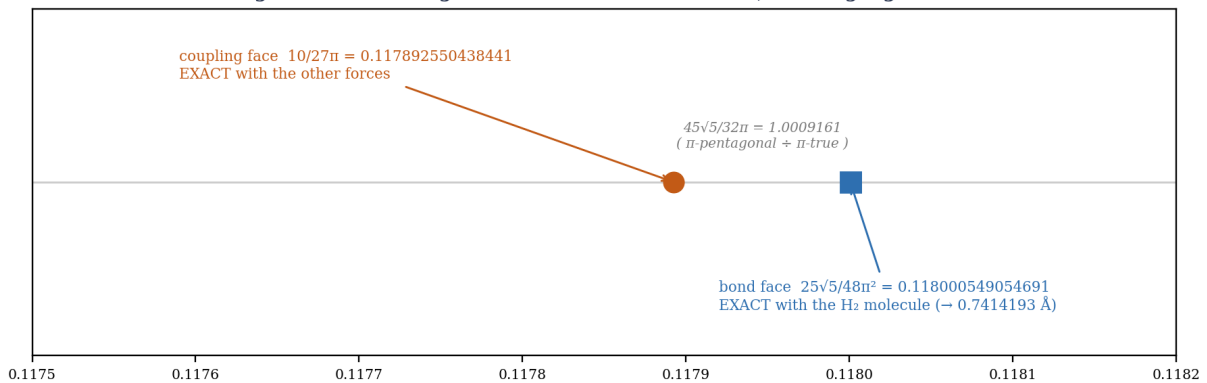
$$\begin{aligned} \text{strong} \times \text{EM} &= (3\pi^2/250) \times (9/125\pi^2) = 27/31250 = 0.000864 \\ &= 864 \times 10^{-6} \end{aligned}$$

*864 — the heart of the day (86,400 seconds), sitting inside the speed of light and the whole time-grammar. The  $\pi^2$  cancels; the forces hand back the clock.*

*strong  $\times$  EM =  $864 \times 10^{-6}$  — the number of the day, falling out of the product of two forces.*

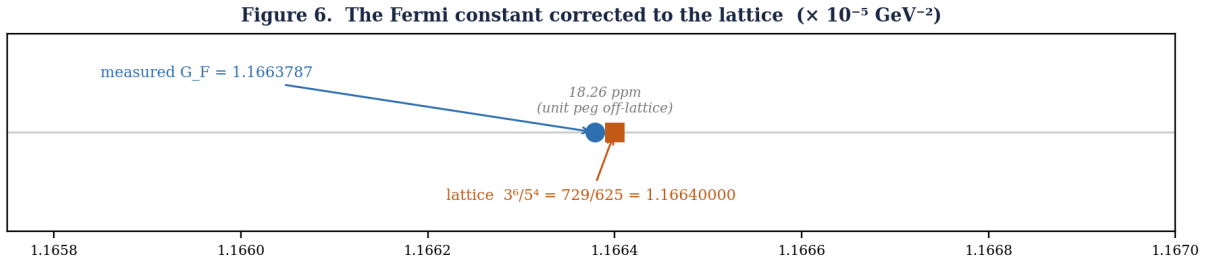
### Figure 5. The strong force's two faces

Figure 5. The strong force's two faces — one force, two languages for  $\pi$



*Each face is exact with its own partner; the bridge between them is  $\pi$  rendered pentagonally versus truly.*

## Figure 6. The Fermi constant on the lattice



*The measured Fermi constant sits 18 ppm from  $3^6/5^4$  — the unit's peg off-lattice, not error.*

## Propositions

- P-4F-1** — The four fundamental forces are four readings of the single T-field on one  $\{2,3,5,\pi\}$  lattice: strong  $0.117892550438441$  ( $10/27\pi$ ), weak  $0.033905363549908$  ( $3^7\pi^3/2^75^6$ ), electromagnetic  $0.00729512522224832$  ( $9/125\pi^2$ ), and the surface flow  $9.817477042468104 \text{ m/s}^2$  ( $25\pi/8$ ). They are not distinct entities.
- P-4F-2** — Because all four are lattice values, every combination of them is itself a lattice value: strong $\times$ weak =  $3^4\pi^2/2^65^5$ , strong $\times$ weak $\times$ T\_g =  $3^4\pi^3/2^95^3$ , strong $\times$ weak $\times$ T\_g $\times$ EM =  $3^6\pi/2^95^6$ . This — not an equation balanced by a constant — is the unification. No free parameter is introduced.
- P-4F-3** — The W and Z bosons are lattice nodes: Z =  $900/\pi^2 = 91.18906528 \text{ GeV}$  (+12 ppm), W =  $324\pi^3/125 = 80.36826915 \text{ GeV}$  (−12 ppm). The W is the surface free fall lifted one lattice step: W = T\_g  $\times 2^53^4\pi^2/5^5$ .
- P-4F-4** — W = Z  $\times 9\pi^5/5^5$ , from which the on-shell weak mixing angle is forced:  $\sin^2\theta_W = 1 - (W/Z)^2 = 1 - 81\pi^{10}/5^{10} = 0.2232456$  (measured  $\approx 0.2233$ ).
- P-4F-5** — The same value lives at every scale (no register boundary). Fed as a wavelength, hydrogen's line ( $486 = 2 \times 3^5$ ), Mercury's rotation ( $368.4142201 = 2 \times 5^6/27\pi$ ) and the Sun's wavelength ( $3600/\pi^2$ ) each return all four forces on clean lattice points.
- P-4F-6** — At the Mercury free-fall node ( $9.772490706 = 368.4142201/12\pi$ ) the product strong  $\times$  EM =  $(3\pi^2/250)(9/125\pi^2) = 27/31250 = 864 \times 10^{-6}$  — the number of the day. At the Sun's node, mass =  $\lambda \cdot \pi^2/8 = 3600/8 = 450$  exactly, a pure integer.
- P-4F-7** — 486 nm is the unique four-force home key: at  $364.53286 \text{ nm} = (3^6/2)(1 + \delta_G)$ , one register step away, electromagnetism returns  $1/158.28$ , not its real  $1/137.08$ .
- P-4F-8** — The strong force wears two lattice faces: coupling  $10/27\pi$  (exact with the other forces) and bond  $25\sqrt{5}/48\pi^2$  (exact with the H<sub>2</sub> bond,  $25\sqrt{5}/24\pi = 0.7414193 \text{ \AA}$ ). They are one force; their ratio  $45\sqrt{5}/32\pi = 1.0009161$  is exactly  $\pi$  rendered pentagonally ( $45\sqrt{5}/32 = 3.144470$ ) divided by true  $\pi$ .
- P-4F-9** — The strong coupling reads clean lattice values that differ by node —  $10/27\pi$ ,  $3\pi^2/250$ ,  $2^63^5/10^5$ ,  $\pi/20$  — in two families ( $\sim 0.118$ ,  $\sim 0.157$ ). The conventional “running” of  $\alpha_s$  is this node-dependence; the node $\rightarrow$ energy map is open.
- P-4F-10** — The Fermi coupling constant is  $3^6/5^4 = 729/625 = 1.16640000 \times 10^{-5}$  exactly; the measured  $1.1663787$  sits 18.26 ppm off because its unit is pegged off-lattice. Control: the effective weak mixing angle  $0.23122$  lands on no clean low-order form — the lattice does not fit everything.
- P-4F-11** — The strong and weak couplings have no single measured value (they run and are scheme-dependent); this, not a missing equation, is why conventional unification stalled. UFOT reads the sharp quantities the forces produce — boson masses, G\_F, the on-shell mixing angle — which are fixed and lattice-clean.
- P-4F-12** — There is no boundary between the atomic and celestial domains. A value true on the lattice is true at every scale; the registers G0/G1/G2 are fine  $\delta_G$  steps ( $\delta_G = 5^{10}/(2^4 \times 3^9 \times \pi^3) - 1 = 90.1506 \text{ ppm}$ ), not walls between separate worlds.

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## A Note on the Numbers

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*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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