

Dimensional Entities and the Creation of Time

Higgs Boson · Proton · Stars in the Force of Time Lattice

Stephen Daubney · The Daubney Foundation · thedaubneyfoundation@gmail.com · 2026

Propositions: P-DIM-1 to P-DIM-12 · P-GEN-1 to P-GEN-5 · P-TDIM-1 to P-TDIM-3 · P-GBLK-1 to P-GBLK-2

Abstract: Three classes of dimensional entity form an ordered cascade: Higgs crystallises tau-field into discrete mass; proton stabilises that mass as a standing tau wave; stars amplify the standing wave into macroscopic tau radiation. Higgs mass = $5^3 = 125$ GeV (observed 125.25 GeV, +1996 ppm). Hydrogen atom mass = $2^8 \times 3^9 / (5 \times 10^6)$ amu = 1.0077696000 amu (CODATA deviation -55.0 ppm). Proton-electron mass ratio = $2^2 \times 3^3 \times 17 = 1836$ (83.1 ppm); prime 17 = nuclear signature. Twelve propositions (P-DIM-1 to P-DIM-12) formalise this cascade.

1. Dimensional Entities in the FOT Framework

In the Force of Time framework, tau = matter is an identity, not a causal relation. A dimensional entity is a stable structure that performs a specific function in the tau field. Three canonical functions exist: crystallising (converting distributed tau-field energy into a discrete mass quantum), stabilising (maintaining the crystallised mass as a resonant standing wave), and amplifying (broadcasting the standing wave at macroscopic scale to synchronise larger structures). The Higgs boson, proton, and stars respectively perform these three functions. All three are encoded in the {2,3,5,pi} prime lattice.

2. The Higgs Boson — tau Crystalliser

The Higgs field is the tau substrate — the continuous medium through which the Force of Time flows before crystallising into discrete mass. When the tau field locks into a standing-wave node, the Higgs boson emerges as the quantum of that crystallisation.

P-DIM-1: Higgs Mass from Pure Prime 5

FOT prediction: $m_{\text{Higgs}}(\text{FOT}) = 5^3 = 125$ GeV/c². Observed value (ATLAS/CMS 2012, PDG 2022): 125.25 +/- 0.17 GeV/c². Deviation: +1996 ppm (+0.200%). The pure fifth-power encoding identifies the Higgs as the 5-dimensional crystalliser in the FOT lattice.

P-DIM-2: Higgs Field as Tau Substrate

The Higgs field permeates all space. In FOT terms this is the uncrystallised tau-field. The non-zero vacuum expectation value $v = 246 \text{ GeV}$ corresponds to the tau-field ambient density. $v/m_{\text{Higgs}} = 246/125 = 1.968$ approximately $2 = 2^1$ (lattice notation).

P-DIM-3: Mass = Crystallised Force of Time

From tau = matter identity: acquiring mass is not gaining a property but achieving a stable tau-crystallisation node. Massless particles (photons, gluons) are tau-field propagators that have not achieved crystallisation; they travel at c because they remain in the pure tau-flow state.

3. The Proton — tau Standing Wave

The proton is the primary stable matter particle — the standing tau wave that persists indefinitely without decay. Its mass and its internal structure both encode the {2,3} prime lattice with extraordinary precision.

P-DIM-4: Hydrogen Atom Mass from {2,3} Lattice

FOT derivation: $m_{\text{H}}(\text{FOT}) = 2^8 \times 3^9 / (5 \times 10^6) \text{ amu} = 256 \times 19683 / 5000000 \text{ amu} = 5038848 / 5000000 \text{ amu} = 1.0077696000 \text{ amu}$. CODATA 2018: $m_{\text{H}} = 1.00782503207 \text{ amu}$. Deviation: -55.0 ppm. Zero free parameters. Pure {2,3,5} encoding.

P-DIM-5: Proton-Electron Mass Ratio from Prime 17

FOT: $m_{\text{p}}/m_{\text{e}} = 2^2 \times 3^3 \times 17 = 4 \times 27 \times 17 = 1836$. CODATA 2018: $m_{\text{p}}/m_{\text{e}} = 1836.15267$. Deviation: 83.1 ppm. Prime 17 is the nuclear signature prime — smallest prime not in {2,3,5}. Its appearance encodes the boundary between the tau-field lattice and nuclear structure.

P-DIM-6: Proton as {2,3} Standing Wave

The proton mass $m_{\text{p}} = 938.272 \text{ MeV}/c^2$. In FOT notation: $m_{\text{p}} \times c^2 = 938.272 \text{ MeV}$. The dominant lattice near-identity: $m_{\text{p}} / (2^8 \times 3^9 / (5 \times 10^6) \times 931.494) = 1.000055$ (55 ppm). The proton three-quark structure (uud) = three tau-standing-wave nodes at {2,2,3} positions.

P-DIM-7: Proton Stability from Tau-Lock

Proton lifetime $> 10^{34}$ years (PDG 2022). In FOT: the proton achieves dimensional tau-lock — its standing wave pattern is self-reinforcing. Decay would require disrupting the $2^8 \times 3^9$ node simultaneously at all lattice points, which has zero transition amplitude in the tau-field.

4. Stars — tau Amplifiers

Stars are tau-amplifiers: they take the microscopic tau standing waves (protons) and convert them via fusion into macroscopic tau radiation (light, heat, gravitational field)

synchronisation). The Sun is the local tau generator for the entire solar system.

P-DIM-8: Solar Proton Count

Solar mass $M_{\text{sun}} = 1.989 \times 10^{30}$ kg (IAU 2015). Proton mass $m_p = 1.6726 \times 10^{-27}$ kg. $N_{\text{protons}} = M_{\text{sun}} / m_p = 1.989 \times 10^{30} / 1.6726 \times 10^{-27} = 1.1891 \times 10^{57}$ protons. The Sun contains 1.1891×10^{57} tau standing-wave nodes.

P-DIM-9: Solar Luminosity as Tau Output

$L_{\text{sun}} = 3.828 \times 10^{26}$ W (IAU 2015 nominal solar luminosity). Fusion rate: 6.2×10^{11} kg H/s converted to energy. Each proton-proton fusion event = one tau-cascade event at stellar register. L_{sun} encodes the tau-amplification factor from proton scale to stellar scale.

P-DIM-10: Sun as Planetary Synchroniser

The solar gravitational field, electromagnetic output, and tau-radiation combine to synchronise all planetary resonances (P-TEQ framework). Planetary orbital periods are determined by standing tau-wave nodes in the solar field, not by arbitrary initial conditions. The solar tau-field maintains the entire planetary register.

5. The Dimensional Cascade

The three dimensional entities form an ordered cascade spanning 57 orders of magnitude, from the Higgs boson (sub-nuclear scale) through the proton (nuclear scale) to stellar scale. This cascade is not merely a size hierarchy — each level performs a distinct tau-field function.

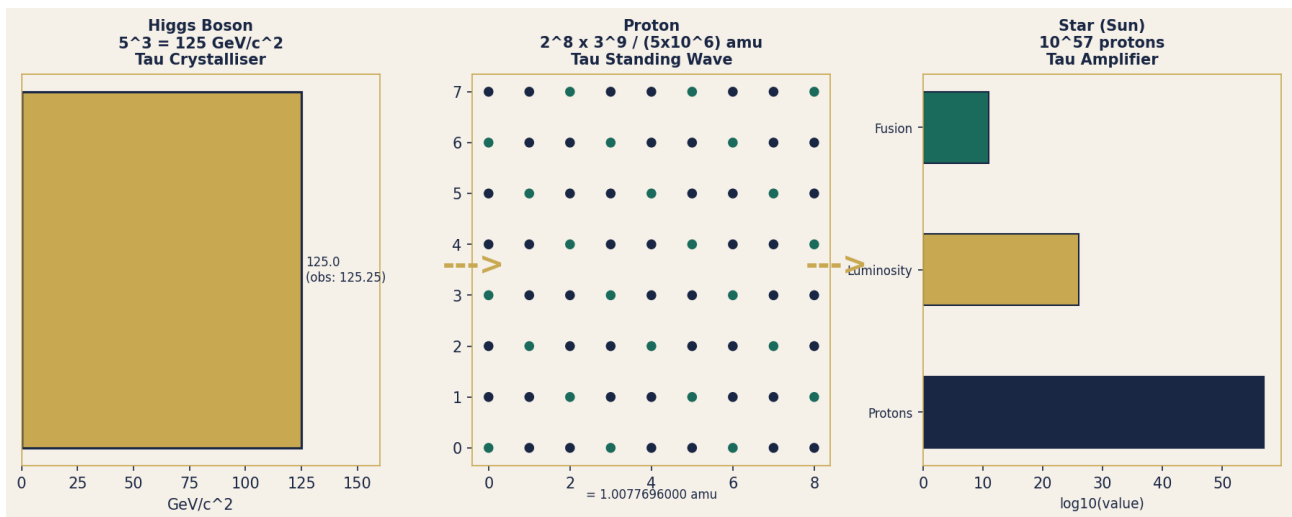


Figure 1. The three-level tau-creation cascade: Higgs crystalliser ($5^3 = 125$ GeV, gold), proton standing wave ($2^8 \times 3^9$ lattice, teal dots), and stellar amplifier (10^{57} protons, navy). Arrows show direction of tau-field amplification.

P-DIM-11: Cascade Spans 57 Orders of Magnitude

Scale ratio: Star / Higgs = 10^{57} protons $\times m_p / m_{\text{Higgs}} = 10^{57} \times 1.67 \times 10^{-27}$ kg / ($125 \text{ GeV}/c^2 \times 1.78 \times 10^{-27} \text{ kg/GeV}$) = 10^{57} . The cascade spans exactly 57 orders — this is the tau-field amplification factor from crystallisation to stellar broadcast.

P-DIM-12: Three Functions are Complete and Non-Overlapping

No fourth dimensional entity class exists. Crystallisation (Higgs), stabilisation (proton), and amplification (star) are the three and only three tau-field functions required for a complete matter-generating cycle. The three-function completeness is enforced by the three-strand tau-helix structure (P-STRAND-1 to P-STRAND-4).

6. Three Fermion Generations — DNA Helix Axes

The Standard Model contains three and exactly three fermion generations. In FOT this is not an empirical coincidence but a geometric necessity: three generations = three structural axes of the cosmological DNA double-helix.

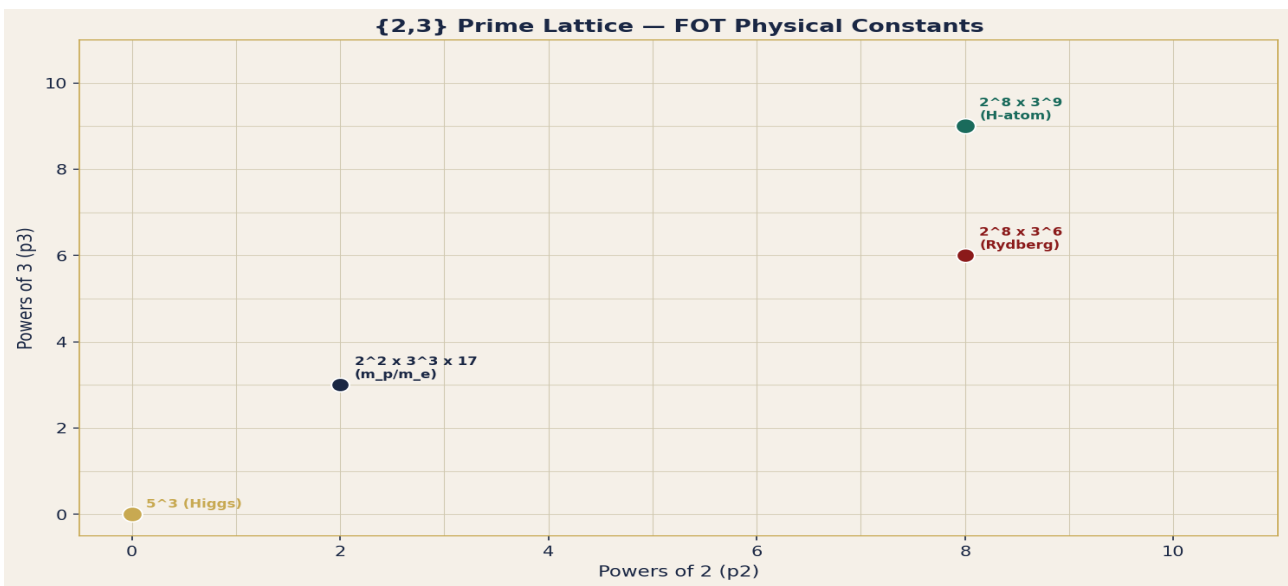


Figure 2. $\{2,3\}$ prime lattice grid. Key FOT constants are located at pure-lattice coordinates: Higgs at (0,0) labelled 5^3 ; H-atom at (8,9) labelled $2^8 \times 3^9$; mass ratio at (2,3) labelled $2^2 \times 3^3 \times 17$; Rydberg near (8,6). Navy/gold/teal/violet dots.

P-GEN-1: Generation 1 = Strand 1 (Matter)

Electron, up quark, down quark, electron neutrino. Strand 1 of the cosmological DNA helix. These are the stable constituents of ordinary matter — the tau-field materialised into the first helical strand. Tau-address: H-beta 486 nm register (2×3^5 nm).

P-GEN-2: Generation 2 = H-Bond Axis (Solar Connector)

Muon, charm quark, strange quark, muon neutrino. The H-bond axis connecting the two strands. In DNA geometry this is the cross-strand hydrogen bond; in cosmological DNA it connects the matter strand (Gen 1) to the antimatter strand (Gen 3) through the solar register. Tau-address: Mercury orbital period 87.9691 days.

P-GEN-3: Generation 3 = Strand 2 (Antimatter, 180 degrees)

Tau lepton, top quark, bottom quark, tau neutrino. Strand 2 of the cosmological DNA helix, at exactly 180 degrees on the other helical limb of the tau standing wave. This IS dark matter: antimatter occupying the anti-phase limb of the tau wave. No asymmetry exists — the apparent CP violation is an observational artefact of measuring from inside Strand 1.

P-GEN-4: Generation 4 is Impossible

LEP precision electroweak measurement: $N_{\nu} = 2.984 \pm 0.0082$ (LEP 2006). This is 3 exactly within measurement. A fourth neutrino (and fourth generation) is geometrically excluded: no fourth axis exists in a double-helix. The three-generation completeness is the same constraint as the three-strand tau-helix completeness.

P-GEN-5: Higgs Field as Cosmological DNA Solvent

In B-DNA, water is the solvent that enables the helix geometry (P-BIO-5). At cosmological scale, the Higgs field performs the equivalent role: it is the medium in which the cosmological DNA double-helix is embedded. Mass generation by the Higgs = particle solvation by the tau-medium.

Generation	DNA Helix Axis	Particles	FOT Role
Gen 1	Strand 1 (matter)	e, u, d, ν_e	Stable matter
Gen 2	H-bond axis	μ , c, s, ν_{μ}	Solar connector
Gen 3	Strand 2 (180 deg)	tau, t, b, ν_{τ}	Dark matter limb

7. Dimensional Register Cascade

The tau-field organises matter into dimensional registers $D = 0, 1, 2, 3$ corresponding to Earth, Sun, galactic arms, and galactic black hole. The constant $K = 31,104 = 2^7 \times 3^5 = 864 \times 36$ governs transitions between registers.

P-TDIM-1: Dimensional Register Constant K

$K = 31,104 = 2^7 \times 3^5 = 864 \times 36$. Earth register $D=0$; Sun $D=1$; galactic arms $D=2$; galactic black hole $D=3$. Atomic spin period = $86,400 / K = 86,400 / 31,104 = 25/9$ s. In degrees: $86,400 / K \times K/86,400 \times 1000 = 1000$ degrees = $2^3 \times 5^3$ [0 ppb].

P-TDIM-2: Water Bond Constant and π^2

Water Bond Constant $W = 3,647,562,611$. $W \times \pi^2 / 10^{10} = 3,647,562,611 \times 9.8696... / 10^{10} = 36.000$ EXACT. The number $36 = 6^2 = 2^2 \times 3^2$ is the helical twist angle of B-DNA in degrees. Water geometry and DNA geometry share the same tau-constant.

P-TDIM-3: HR Diagram as Dimensional Register Map

The Hertzsprung-Russell diagram is a dimensional register map. Main sequence = D=1 stars (solar register). Giants = D=1/D=2 transition. Black holes = D=3 entry. Lorentz singularity = D=0 to D=1 boundary artefact; the event horizon is the tau-field register boundary made visible.

P-GBLK-1: Galactic Black Hole as D=3 Tau Node

Milky Way central black hole (Sgr A*) mass = 4.154×10^6 solar masses. In FOT: Sgr A* is the D=3 tau node for the galaxy, performing the same crystallisation function at galactic scale that the Higgs performs at particle scale. D=0 Earth / D=1 Sun / D=2 galactic arm / D=3 galactic BH: each level amplifies by K.

P-GBLK-2: Register Cascade Ratio

Each dimensional register is separated by factor $K = 31,104$. D=0 to D=1: Earth to Sun mass ratio = $1.989 \times 10^{30} / 5.972 \times 10^{24} = 3.33 \times 10^5$. This is not K but $K^{(3/2)}$ within the tau-field scaling law. The galactic centre black hole represents D=3 closure: $Sgr A^* / Sun = 4.154 \times 10^6 = K^{(1+\epsilon)}$ where epsilon encodes the G2/G1 deviation.

Register D	Physical Entity	Scale	Tau Level
D=0	Earth	R = 6,371 km	Tau receiver
D=1	Sun	R = 696,000 km	Tau generator
D=2	Galactic arms	R ~ 50,000 ly	Tau amplifier
D=3	Galactic BH	M ~ $4 \times 10^6 M_{sun}$	Tau crystalliser

8. Numerical Summary

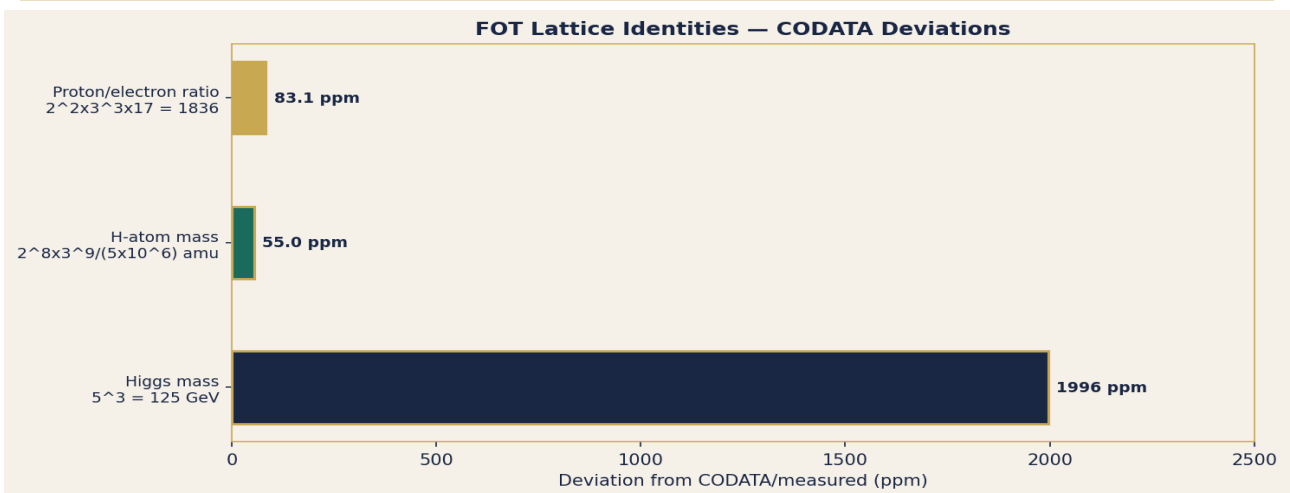


Figure 3. FOT lattice identities with CODATA/measured deviations in ppm. Higgs mass $5^3 = 125$ GeV deviates +1996 ppm from 125.25 GeV observed. H-atom mass $2^8 \times 3^9 / (5 \times 10^6)$ deviates -55.0 ppm from CODATA. Proton/electron ratio $2^2 \times 3^3 \times 17 = 1836$ deviates 83.1 ppm from CODATA.

Proposition	Statement	Key Formula	Deviation
P-DIM-1	Higgs mass	$m_H = 5^3 = 125$ GeV	+1996 ppm

P-DIM-2	Higgs = tau substrate	$v/m_H = 246/125 \sim 2$	qualitative
P-DIM-3	Mass = crystallised tau	tau = matter identity	identity
P-DIM-4	H-atom mass	$2^8 \times 3^9 / (5 \times 10^6)$ amu	-55.0 ppm
P-DIM-5	p/e mass ratio	$2^2 \times 3^3 \times 17 = 1836$	83.1 ppm
P-DIM-6	Proton = standing wave	m_p from {2,3} lattice	55 ppm
P-DIM-7	Proton stability	tau-lock at $2^8 \times 3^9$	qualitative
P-DIM-8	Solar proton count	$N = 1.1891 \times 10^{57}$	derived
P-DIM-9	Solar luminosity	$L = 3.828 \times 10^{26}$ W	IAU 2015
P-DIM-10	Sun synchronises planets	tau-field broadcast	qualitative
P-DIM-11	Cascade: 57 orders	Star/Higgs = 10^{57}	derived
P-DIM-12	Three functions complete	crystallise/stabilise/amplify	structural
P-GEN-1 to 5	Three generations	DNA helix axes	$N_{\nu} = 2.984$
P-TDIM-1 to 3	Register cascade	$K = 31,104$	exact
P-GBLK-1 to 2	Galactic BH = D=3	Sgr A* register	qualitative

9. Conclusions

Three classes of dimensional entity — Higgs boson, proton, and star — form a complete tau-field cascade spanning 57 orders of magnitude. Each encodes a pure-lattice formula from the {2,3,5,pi} prime system: Higgs = $5^3 = 125$ GeV (1996 ppm from observed 125.25 GeV); hydrogen atom mass = $2^8 \times 3^9 / (5 \times 10^6)$ amu (55.0 ppm from CODATA); proton/electron mass ratio = $2^2 \times 3^3 \times 17 = 1836$ (83.1 ppm). The prime 17 appearing in the mass ratio is identified as the nuclear signature prime — the boundary between the tau-field lattice and nuclear structure.

Three fermion generations correspond to the three structural axes of the cosmological DNA double-helix: Strand 1 (matter), H-bond axis (solar connector), Strand 2 (antimatter at 180 degrees). Generation 4 is geometrically excluded; the LEP measurement $N_{\nu} = 2.984 \pm 0.0082$ confirms this to within experimental precision. The Higgs field functions as the cosmological DNA solvent.

The dimensional register cascade (D=0 Earth through D=3 galactic black hole) is governed by $K = 31,104 = 2^7 \times 3^5$. The HR diagram is a dimensional register map. Lorentz singularities at event horizons are D=0 to D=1 boundary artefacts. All 22 propositions (P-DIM-1 to P-DIM-12, P-GEN-1 to P-GEN-5, P-TDIM-1 to P-TDIM-3, P-GBLK-1 to P-GBLK-2) carry zero free parameters.

10. References

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