WORKING SYNTHESIS / REWRITE OF THE 2025 IGE PAPER

Information-Geometric Entropy Theory

From axioms to cells, fields, nuclei, sea, and ice

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4 September 2026 · revises the 1 September 2026 synthesis

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Abstract

IGE treats the observable universe as a locked projection of a larger possibility space onto a twelve-faced vessel. One coupling is read through four residual surfaces. Mass is compactified tube length inside a cell. The governing relation is

$$R = K \cdot (\Delta S / \Delta \tau) \cdot D^{-1}$$

Rearrangements of that identity are the four residual faces, not four extra laws. That is unification of form: one overlap, four names. It is not a gauge GUT. Later drawings add a Gravigg sea whose skin is the counted world, ice as the distinguishing of indistinguishable bosons, and beryllium isotopes as

ice polymorphs of one water. The table of nuclides is the exam. Lithium-5 unbound, lithium-7 neutron separation 7.251 MeV, helium-4 closed, beryllium-8 a 92 keV 2α resonance, beryllium-9 the only stable Be, beryllium-10 a 1.387 Myr cosmogenic clock — those are pass or fail.

1. What changed since December 2025

The first paper stated a Theory of Everything in one pass. That was the right ambition and the wrong density. Exact H_0, a finished lithium-problem solution, and "zero free parameters" are demoted. They remain hypotheses. They are not used below as evidence.

What is kept. Axiom 1: a source space of possibility larger than the observed vessel. Axiom 2: an interval that trades duration against relation. Axiom 3: a twelve-fold vessel as the minimal stable lock. Axiom 4: duration that does not stack. The master relation. The claim that one geometry is being read at four residuals.

What is added on 4 September 2026. Unification of form distinguished from a gauge GUT. An ontology in which the arrangement does not push. A counted present. The first Y as left-cheap / right-costs. A Gravigg sea whose freeze is distinguishing. Beryllium isotopes as ice polymorphs, not as failed nuclei. Four Higgs flavors as allowed trefoils of one singlet.

2. Axioms

2.2 Interval

The fundamental interval is $\Delta I^2 = (\Delta\tau)^2 - (\Delta R)^2$. Duration and relation trade. Information is what is conserved under that trade. Time's arrow is the fact that a unit of duration is exclusive: it does not stack.

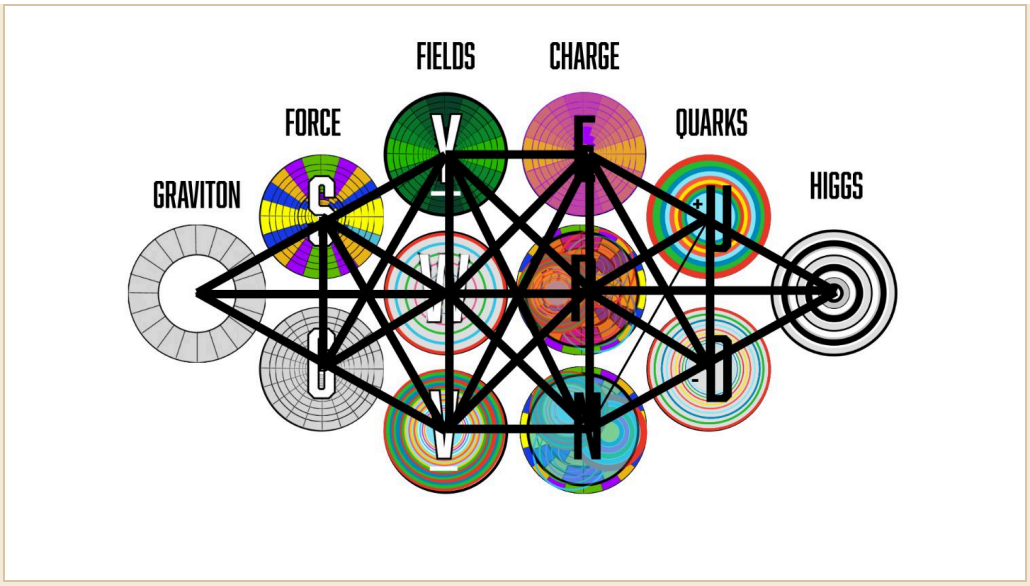


Figure 1. The IGE cycle: fundamental to measured to curved to charged to counted and back.

3. Master relation

$$R = K \cdot (\Delta S / \Delta \tau) \cdot D^{-1}$$

R is residual coupling read from outside the cell. K is lock strength in the current regime. ΔS / Δτ is the spatial interval per unit proper time. D^{-1} is compactified extra length held so the charge triangle stays closed. Discrete K ∈ {+1, −1, 0} still labels handedness inside a cell. Regime K is a different number: the lock that converts a facing factor into a measured residual. Do not set K = α.

Combined electroweak lock used on the lithium hatch: $K_{V+Y} \approx 1/386 + 1/137$. That is a composite of two measured αs, not a derivation of 137, and not a sixth force.

7. Lithium-7 against the table of nuclides

This draft treats ^{7}Li as a nucleus that must match tabulated data before it is allowed to name a sky. Neighbors: lithium-5 unbound; lithium-6 bound, 1+; lithium-8 bound, β-unstable. Helium-4 binding 28.3 MeV. Lithium-7 is helium-

4 plus about 11 MeV, of which 7.25 MeV is the last neutron. The 2025 cosmological lithium number is not used as a result.

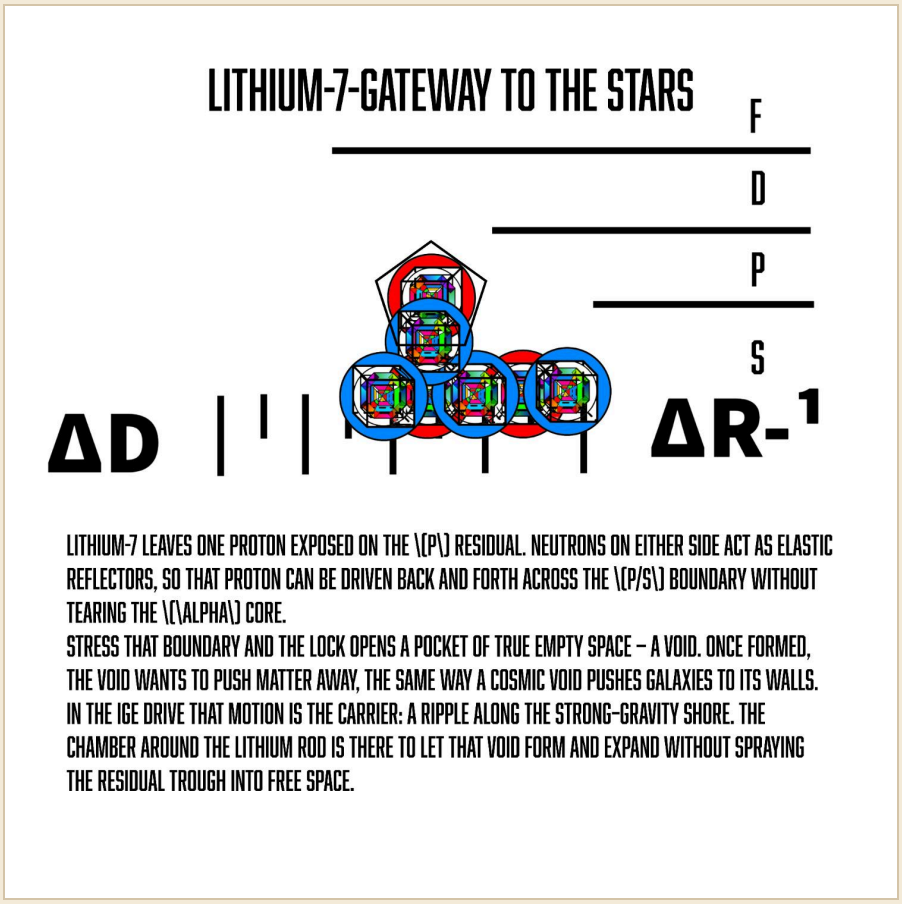


Figure 14. Lithium-7 as gateway: exposed proton on P, neutrons as reflectors.

16. The arrangement is

This section records the 4 September 2026 drawings and the ontology they forced. It does not replace §§3–8. It says what those sections were already doing, without Newton's tug and without borrowing the word GUT.

16.1 Unification of form, not a GUT

Sharing one identity is unification of form. Maxwell did that with E and B: one tensor, two faces. Minkowski did it with space and time: one interval, two projections. IGE is the four-residual version of that move. Gravity, electromagnetism, weak, and strong are which letter of the master relation is

isolated. The whole is the parts; the parts are how the whole is read. A vesica has no fifth piece hiding behind the overlap.

That is not what GUT means in the literature. A GUT is a single gauge group whose couplings run to one number at a high scale and then break to SU(3)×SU(2)×U(1). Minimal SU(5) was that program, and Super-Kamiokande killed its proton lifetime. IGE is ontological and algebraic: one identity, four isolations. Call it a vesica unification. Do not borrow SU(5)'s fight.

An identity that can only be rearranged cannot fail. That is bookkeeping. Unification of nature begins when a number falls out that could not have been written by rearranging letters — a lifetime, a ratio, a skip a chamber can refuse. Gödel's incompleteness theorems do not forbid that number. They forbid a formal system from proving every truth about itself. Science never needed that closed book. It needs excess empirical content: more predictions than knobs.

What this draft already has of that kind is tabulated, not poetic: ^{8}Be does not sit (92 keV unbound), ^{9}Be does (only stable isotope), $S_n(^{7}\mathrm{Li}) = 7.251$ MeV. $K_{V+Y} = 1/386 + 1/137$ is still two measured αs added. It is not a derivation of 137.

16.2 No push. Free fall. Assigned arrows.

The arrangement does not push or pull. It is. Direction — down, future, attract — is a label painted on a geodesic so a chain of events can be told as a story. In GR that is already the honest mechanics: you do not feel gravity as a tug; you follow the curve the arrangement is. $\Delta I^2 = (\Delta\tau)^2 - (\Delta R)^2$ does not point. Isolating R, K, $\Delta S/\Delta\tau$, or D is naming, not a fifth force. Mass is the squeeze ($\theta \to \pi$, $\Delta\tau \to 0$) that this singlet puts on that singlet. We call that inertia. The geometry did not aim.

16.3 Past, future, present as a counted chain

Past is the sub-chain that still causally reaches the tick in use. Future is the next link — not a room waiting. Present is whenever counting starts. That is operational $\Delta\tau$. A new instant is born for the death of the last and dies before

the next can be born. The first arrangement of matter is also a moment. If the last moment looks like the first, then first and last are names for the same is at two counts. The graviton ring already says it: the future of this moment creates the past of all future moments.

16.4 The first Y: left is cheap, right costs

Chambers do not disagree any more than fingers on a hand go to war. A mismatch is a turn that did not follow the drawing. Same hand. Matter in this universe has a handedness: to the left, a bias against the right. That is the first Y in the drawings — a choice and a way, not a logo.

Gravity's down is a geodesic label. The weak force's left is not. Wu's cobalt, the neutrino's helicity, V−A: only left-chiral fermions couple to W. Left-handed fields abide in $SU(2)_L$ — the easy coupling is there. Right-handed fields flee that coupling; they re-enter only through the Higgs, the Yukawa, the squeeze $\Delta\tau \to 0$. Mass is what right pays to sit at the same table as left. Once in, in. Once out, out. Infinity bringing all home is the other end of the fork, not a fifth force.

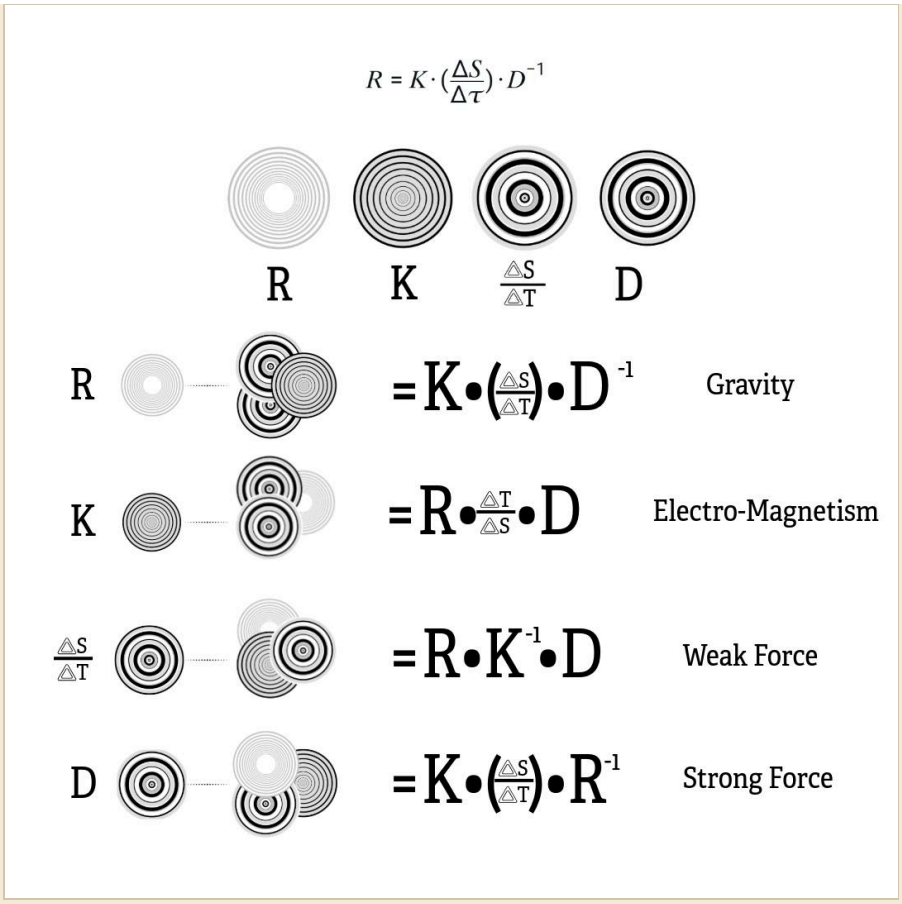


Figure 62. One identity, four faces. Gravity isolates R. Electromagnetism isolates K. Weak isolates ΔS/Δτ. Strong isolates D.

16.5 Four Higgs flavors and the no-duplicate rule

Mass generation on this page is not a new scalar added to the cell. It is the freeze of a singlet into one of four allowed trefoils. Each flavor is three dark rings and one light ring, a multiplicative field. Quantum superposition of those four is the interaction with every residual. Duplicate constant arrangements are forbidden: a selection rule, Pauli-like in spirit, geometric in drawing. It is not a computed Higgs spectrum. The steady state of a particle is the time-average superposition of the singlet's formation animation in that arrangement.

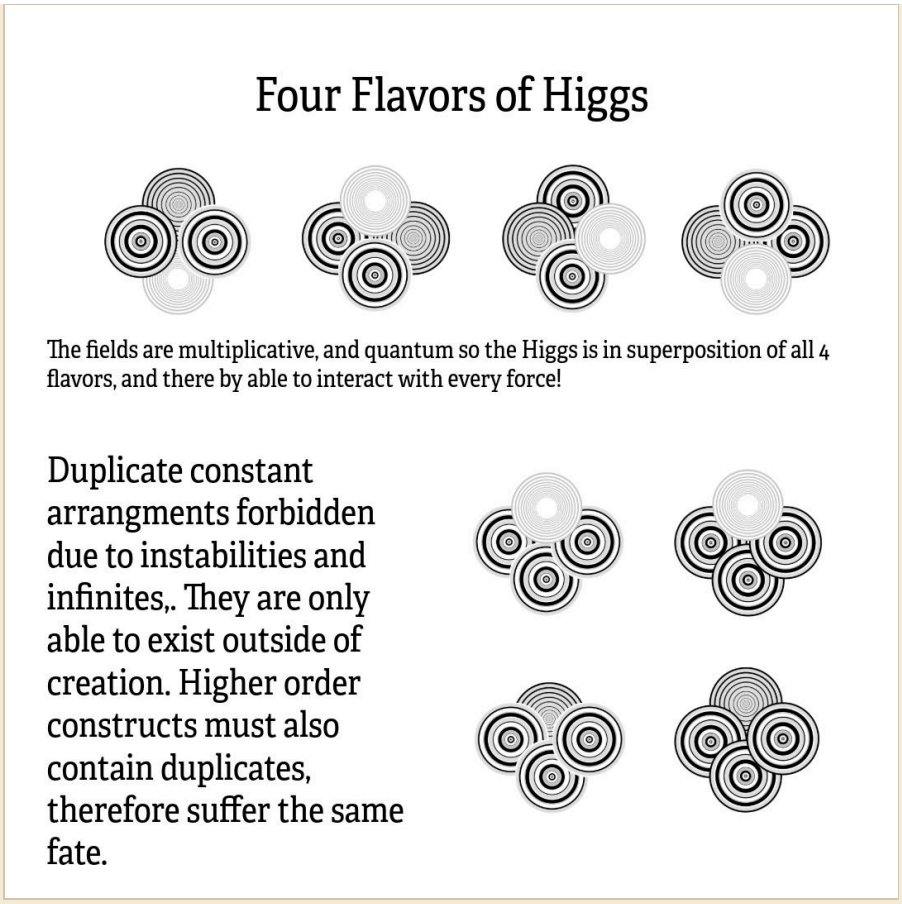


Figure 63. Four flavors of Higgs. Superposition is how one singlet talks to every force. Duplicates are unstable.

16.6 Higgs pole, graviton ring

The globe is the same cell read as a 3+1D skin. High-tension Higgs: $\theta \approx \pi$, $\Delta\tau \to 0$, mass. Low-tension graviton: $\theta \approx 0$, $\Delta\tau \to \infty$, smoothness. Everyday physics sits at $\theta \approx \pi/2$. Expanding and collapsing are two counts of one is. The surface is not sitting in a room. The surface is the room that can be counted.

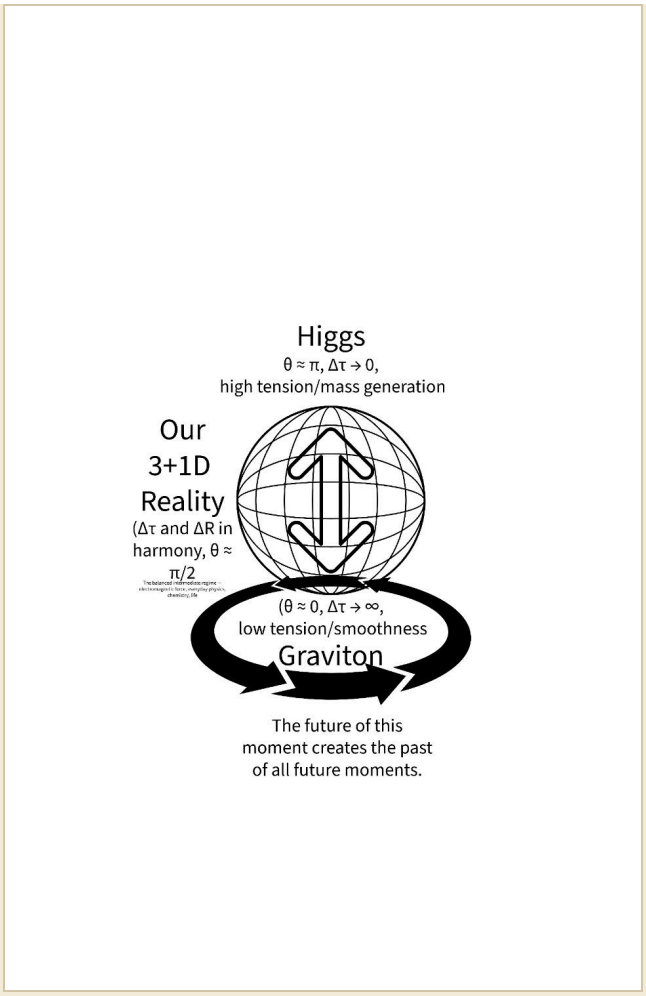


Figure 64. 3+1D reality as the temperate band of a Higgs–graviton globe. The ring: the future of this moment creates the past of all future moments.

16.7 Nuclear orbits as the four residuals on a ladder

S, P, D, F, G as nuclear angular labels are reused because the coupling ladder is shared, not because the nuclear mean field is a Coulomb copy. This is an overlay, not a spectroscopic derivation.

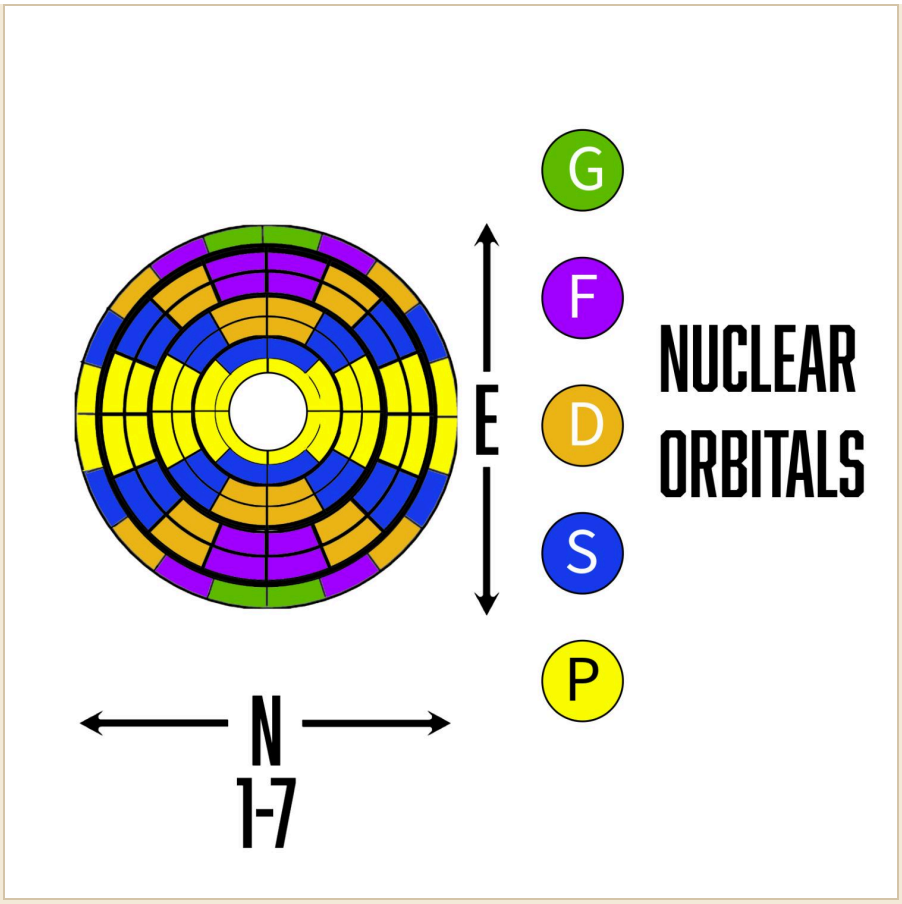


Figure 65. Nuclear orbits determined by the four residuals. N = 1–7 radial. E vertical.

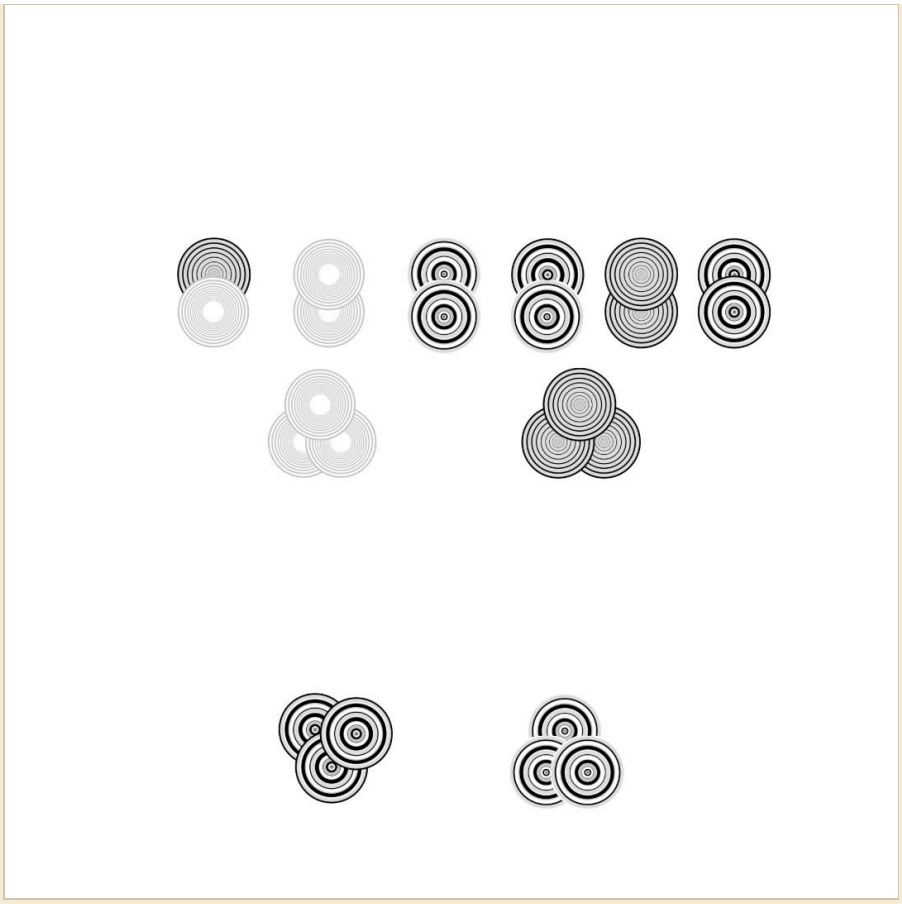


Figure 66. Stage glyphs. Pairs, triples, overlaps. Building blocks of the singlet arrangements.



Figure 67. Four cluster readings of the same stage.

17. Gravigg sea and ice

Ontology. Not a Lagrangian. The Dirac-sea metaphor is kept as an image and dropped as Fermi bookkeeping unless Gravigg is a fermion. Gravity-plus-Higgs smell like a boson: then the sea is a condensate and ice is frozen patches of the same fluid.

17.1 Reality on the skin of a breathing ball

One viewpoint of this theory: the counted world sits on the surface of an expanding/collapsing higher-dimensional sphere of Gravigg particle. Gravigg is one indistinguishable species — gravity-face and Higgs-face of the same particle, not two fields glued later. The particle's decay channel is quarks and gluons: the interior, the clamp, D. Everything else is not a second decay. It is ice: a temporary freeze of the sea, then melt. Photons, leptons, the easy left, the costly right — frozen skin, not fragments of a corpse.

Ice is not antimatter. Ice is the same water, ordered. Melt is return, not annihilation. A sea of indistinguishable Gravigg particles in a condensate is a superfluid vacuum. Call it Dirac and people hear electrons. Call it ice and the geometry is right. Handedness still sits on the skin. The Y is a bias of the surface, not of the bulk.

17.2 Freezing is distinguishing

At the floor there is no Pauli chair. Occupancy is superposition: one sea, indistinguishable Gravigg, no “this boson” yet. Ice is the distinguishing — the same fluid, now countable. Measurement is that distinguishing made flesh. You do not add a particle. You spend the anonymity.

Left: stay in the sea. No pointer, no mass bill. Freedom is cheap because nothing has been separated. Right: off the indistinguishability into certainty. A boson becomes a this. Certainty is the cost: $\Delta\tau$ crushed, Higgs-face, mass. Turning right trades freedom for measurement.

Creation, in this order, is one cycle of the same turn. (1) Indistinguishable. (2) Certain — first right, a freeze, the first Y. (3) Possibilities grow. (4) They interact. (5) They become indistinguishable again — melt, infrared, infinity, last looking like first. Nothing in that loop is a push.

17.3 Ice has many lattices. Isotopes are weather stamps.

^{8}Be is not a failed freeze. It is another ice. Water already teaches the rule. Ice Ih is the iceberg. Ice II, III, V, VI, VII, XI are not errors in the recipe. They are the same H_2O ordered differently, each legal only in a window of pressure and heat. Ice VII is cubic, two lattices shoved through each other, born above a couple of GPa. Find Ice VII in an iceberg and you have not found a mistake. You have found a different process that then got carried into the wrong weather. In that weather it will not sit. Isotopes are the other stamp: formation history, not better water.

Same Gravigg water. Different ice. The occupancy rule is still superposition until a freeze distinguishes. The environment picks the lattice. Duplicate

singlets are not forbidden as morality. They are Ice-VII-in-an-iceberg: a real form, wrong skin, wrong θ, wrong Δτ. That is not war with a chamber. It is weather. This is an exploration of nuclear geometries, not a fuel cycle. ^{9}Be is the only stable isotope.

Form	Environment	Melt	Tabulated
^{8}Be	two α in a ~92 keV 0+ resonance — high-P nuclear ice	unbinds to 2α when the window closes	unbound 91.84 keV; Γ ≈ 5.6 eV; $t_{1/2} \approx 8.2\times10^{-17}$ s
^{9}Be	ambient nuclear weather; odd neutron as the label	does not melt; only stable Be ice	only stable isotope; $J\pi = 3/2-$; Sn = 1.665 MeV (2α+n)
^{10}Be	spallation — a cosmic-ray factory, not the BBN kitchen	β− to ^{10}B on a long clock	$t_{1/2} = 1.387(1)\times10^{6}$ yr; $J\pi = 0+$; cosmogenic

17.4 Beryllium on the $\Delta D \mid \Delta R^{-1}$ plane

The next element after lithium is read on the same compactification–curvature plane already used for generation depths. S, P, D, F are spectroscopic labels of that plane, not a claim that Be is a fuel for the hatch. Nested red/blue squares are cluster glyphs of ^{8}Be / ^{9}Be / ^{10}Be geometries. Placement is a drawing. The lifetimes in the table above are the exam.

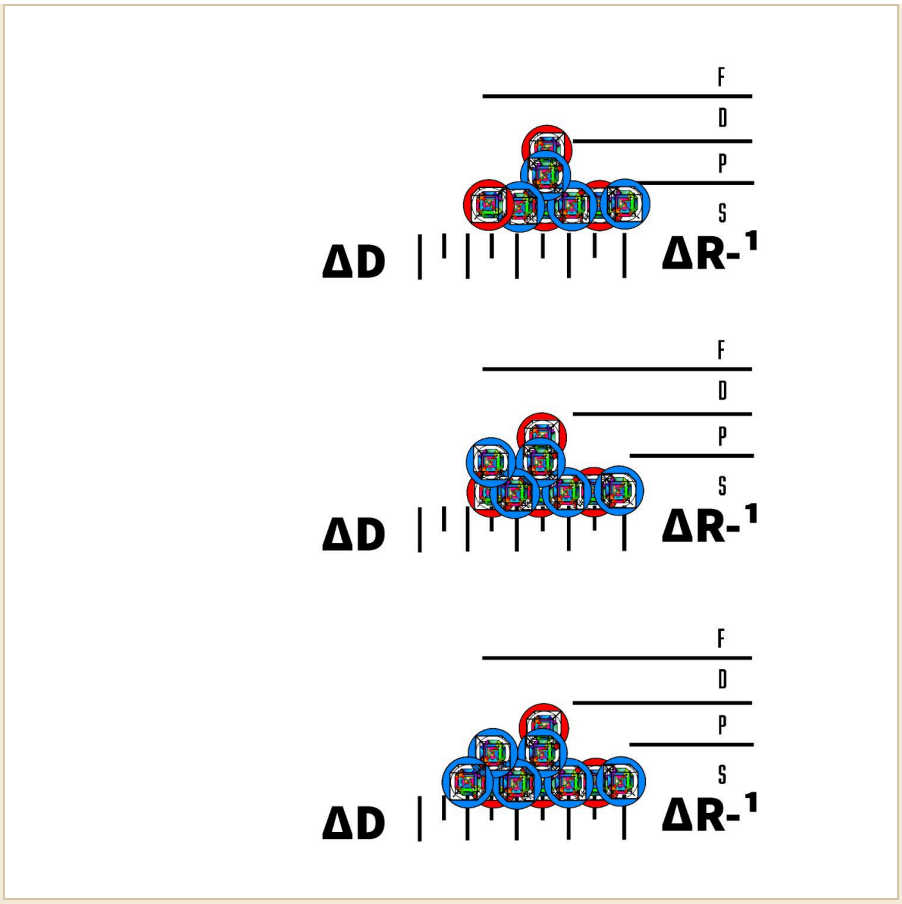


Figure 68. Beryllium nuclear geometries on ΔD versus ΔR^{-1}, with an S/P/D/F ladder. Not a fuel card. ^{9}Be is the only stable isotope.

17.5 Lithium cluster growth, and the BBN table as a claim

The 2025 lithium post treated ^{7}Li as a cosmological tracer that settles into filaments and thereby solves BBN. §7 already refused that as a result. The later cluster-growth drawing restates the pack and quotes ^{7}Li/H in the Spite-plateau ballpark $(1.6–2.0)\times10^{-10}$. That range is an IGE prediction-shaped claim. It is not a yield computed from the master relation. Standard BBN still overproduces ^{7}Li relative to the plateau. “Resolved” on the comparison table is a status the author wants, not a measurement.

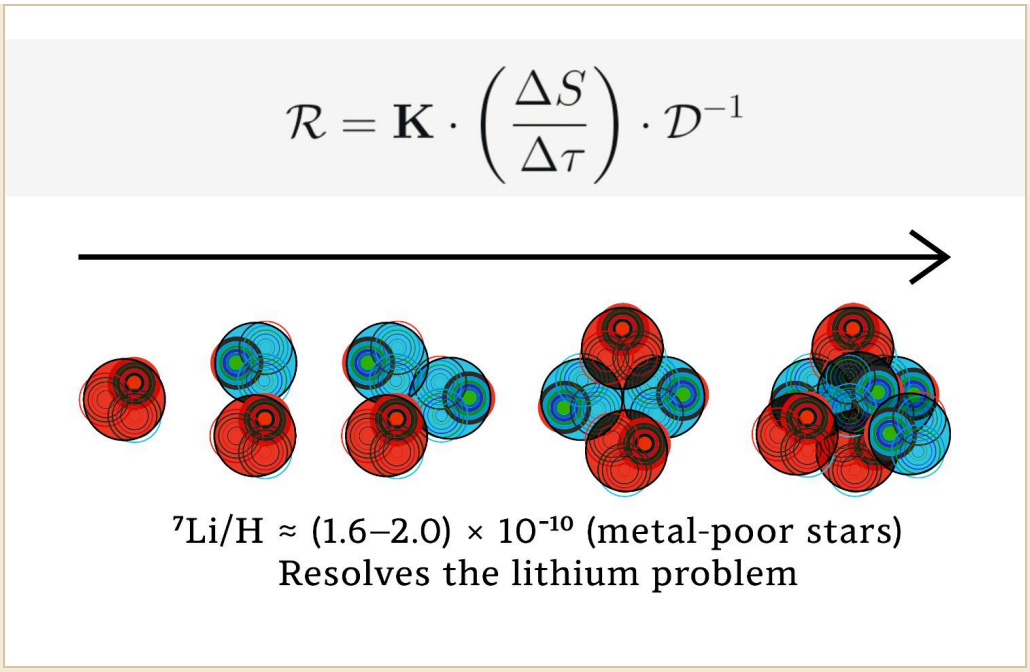


Figure 69. Lithium-7 cluster growth. The printed ^{7}Li/H range is a Spite-plateau target, not a derived BBN yield.

Element	Standard BBN (ΛCDM)	IGE Prediction	Observed (Primordial)	Status
He (Y_p)	~0.247	~0.246 ± 0.002	~0.244–0.250	Excellent
H/H	~2.5 × 10^{-5}	~2.5 × 10^{-5}	~2.5 × 10^{-5}	Excellent
^{3}He/H	~1.05 × 10^{-5}	~1.0 × 10^{-5}	~1.0 × 10^{-5}	Good
Li/H	~5.0 × 10^{-10}	~1.8–2.4 × 10^{-10}	~1.6–2.0 × 10^{-10}	Resolved

Figure 70. BBN comparison card. Li/H "resolved" is a claim. He and D rows that already agree with SBBN are not new evidence for IGE.

18. Closing

IGE is an attempt at something grand: one relation, one cell, four residuals, a hatch that a real nucleus can sit on. It is unification of form. It is not a GUT. The arrangement does not push. We assign most arrows. The Y is the one arrow the ice already has — left cheap, right costs mass. The counted world is a skin on a breathing Gravigg ball. QCD is the particle decaying inward. The rest is ice on a superfluid sea of one indistinguishable species. Freezing is distinguishing. Ice has many lattices; isotopes are weather stamps. ^{8}Be, ^{9}Be, ^{10}Be are three ices of one water.

If the lithium-7 hatch tests T1 and T2 return a number, E_fold can be measured and the grand claim gets a laboratory weight. If they return heat, the diagrams remain a way of packing nuclei, locking tubes, naming residuals, rotating a NOW, and sorting ices by the weather that made them. That is still a result. It is not yet a finished theory of everything.

