



The Room

Artist's Proof 17

Rotation Curves

Galactic rotation curves — the lines always close

§1 – The Two Conditions

The substrate has two conditions.

Gravity is the condition of \emptyset . The fold. The collapse. The dark. The lower curve of the eye. What the fabric does when it closes. The event horizon. Total fold = \emptyset . All ε coupled.

The 1:1 restoring. Maximum curvature. $G = 2\kappa/m_e^2$ is the strength of this condition.

c is the condition of 1. The propagation. The light. The upper curve of the eye. What the fabric does when it opens. Maximum speed. Total propagation = 1. The break fully expressed.

The record fully written. $c^2 = \beta/\alpha$ is the stiffness ratio of the substrate.

They are conjugate (The Keys). Not at rest. Not in balance. In tension. \emptyset wants to fold. 1 wants to propagate. Neither wins. Neither can. The tension between them is the break.

The tension IS ε .

Everything in the universe sits between \emptyset and 1. That is ε . That is the break. That is the observer. Always between the two walls. Never at either.

§2 — The Tension Field

The answer begins with a topological fact that you cannot escape: field lines between two conditions must close.

2.1 — The field lines

The bar magnet serves as a heuristic for the topology; the tension field's dynamics differ in detail (the substrate has no magnetic moment, no dipole radiation, no $1/r^3$ falloff).

What is shared is the topological property: field-line closure.

Consider a bar magnet. North pole and south pole. Two conditions. 1 and 0.

The field lines leave the north pole — they race away, propagate outward. But they curve. They always curve. They curve back toward the south pole. Every single line returns.

No line terminates in the bulk; lines either close or connect boundary poles. The topology forces closure. The tension always brings the lines home.

Near the magnet — near the source — the field lines are dense, tight, crowded. Strong field. Far from the magnet — the lines are wide, sparse, spread out. Weak field.

But they are still there. They never break. They are nonzero at any finite separation — decaying but not terminating. They curve gently, slowly, across vast distances. But they curve back. Always.

The route may be longer. The destination is the same. Hold that picture in your mind. You are about to see it at galactic scale.

2.2 — The substrate's tension field

The substrate is not a magnet. But it has the same topology.

Let the tension field be represented by a vector field T_ε on the manifold.

The 'line-closure' claim corresponds to a divergence condition: $\nabla \cdot T_\varepsilon = 0$ away from the poles, with boundary/defect structure at the 0- and 1-conditions.

The present paper uses the topological consequence (non-termination of field lines) and does not yet supply the explicit field equation for T_ε (KS-42).

0 (gravity, fold, the black hole) and 1 (propagation, speed, c) are the two poles. The tension between them is ε — the break, the leakage, the wave function collapsing from probability to actuality.

In this architecture, this tension is the fabric's coherence. The 1:1 trying to hold. The pre-state's unity expressed through a manifold that has locality.

The tension field lines leave 1 (propagation, matter, records, the visible) and curve back toward 0 (fold, collapse, the dark). Every line closes.

This is AP06 Theorem 3.1: leakage is nonzero for finite c. No boundary is perfect. No line disconnects. The 1:1 holds.

This tension field is attractive. The lines curve back toward the source. Not repulsive. Not pushing away. Curving home. The break trying to heal. The fabric saying: you left, but you are still connected.

2.3 — What the tension field is not

The tension field is not the cosmological constant Λ .

$\Lambda > 0$ is repulsive. It drives the accelerating expansion of the universe. At galactic scales, Λ provides a tiny outward push. It makes rotation curves decline faster, not slower.

It makes the dark matter problem worse, not better.

The original draft of this paper (v1) made this error: it treated the Λ term as attractive and derived flat rotation curves from it. The sign is wrong. Λ does not flatten rotation curves.

This correction is on the record.

The tension field is different from Λ . Λ is a constant in the field equations — a single number, the same everywhere, repulsive.

The tension field is the substrate's own coherence — the topological connection between 0 and 1 that cannot be severed. It is attractive because it is the fabric holding together.

It is not a constant — it depends on the local topology, the field line density, the proximity to the poles.

§3 — The Galaxy As The Eye

Now map the topology onto what you can see through a telescope.

3.1 — The topology

In the 420 Code, the '0-pole' is realised by a central compact anchor — typically a supermassive black hole in observed large galaxies. This is not incidental. It is the structure.

The black hole is 0. The event horizon is the fold point — the lower curve of the eye. The south pole.

The galaxy is the visible part — stars, gas, dust, planets — the 1's. The records. The break expressed as matter. The north pole radiating outward. Between them: the tension field.

The field lines of ε .

A galaxy IS the eye, at galactic scale. A galaxy IS the magnet, at galactic scale. Centre: 0 (black hole, fold, dark, south). Edge: approaching 1 (propagation, light, open, north).

Between: ε (matter, records, the break, the observer). The tension field lines curve from 1 back toward 0. Every line closes.

3.2 — The pipe and the room

The pipe is the galaxy. The gravitational potential well from centre to edge. Narrow at the throat (the black hole), widening outward.

The room is the tension field. Not Λ . Not a constant.

The substrate's own coherence — the topological fact that every field line closes, that the connection between 0 and 1 cannot be severed, that the fabric holds.

Inside the narrow part of the pipe — near the centre, where record density is high — the field lines are dense. The tension field is strong. The Newtonian term dominates. Newton works.

In the wide part of the pipe — the outer galaxy, where record density is low — the field lines are sparse. The individual source contributions fall away. What remains is the topology.

The field lines are still there. They must close. That closure IS the residual acceleration. The room shows through. Not as a constant push.

You feel it as a floor — a residual acceleration that will not go away. As the inescapable fact that the lines curve back.

§4 — The Mechanism

4.1 — Dense regime: Newton

At small radii — inner galaxy, solar system scale — the record density is high. The gravitational acceleration from the enclosed mass dominates.

The tension field is present but swamped, like hearing your heartbeat in a loud room.

$$a(r) \approx GM(r)/r^2 \text{ (dense regime)}$$

This is Newton. Keplerian. $v^2 = GM/r$. Rotation velocity declines as $1/\sqrt{r}$. It works perfectly inside the dense region. Every orbit you have computed in a physics class lived here.

4.2 — Sparse regime: the room

At large radii — galactic outskirts — the Newtonian acceleration drops. As it drops, it crosses the transition scale a_0 . Below this scale, the tension field's own contribution dominates.

The tension field contribution exists because the field lines cannot break. No matter how far from the source, the tension field is nonzero at any finite separation.

AP06 Theorem 3.1: for any finite c and finite coupling, leakage is nonzero. The connection between \emptyset and 1 persists. The lines curve back. There is always a residual acceleration.

In the floor regime, the Newtonian contribution is negligible. What remains is the topology. The star is on a wide field line — far from the source, gently curving — but still curving. Still held.

Not by the mass at the centre. By the field itself. By the tension. By ε . And you cannot explain that with mass. You can only explain it with topology.

The transition between the dense regime and the sparse regime occurs when the Newtonian acceleration equals the transition scale:

$$GM(r)/r^2 = a_0$$

Above a_0 : Newton dominates. The record density is thick. The room is invisible. $v^2 = GM/r$.

Below a_0 : the room dominates. The record density is thin. The star's acceleration is no longer set by the enclosed mass alone.

It is set by the interplay of the Newtonian pull and the tension field. (Using spherical-approximation scaling for clarity; the detailed disk geometry is part of the interpolation problem.)

In the sparse regime, the total acceleration is not constant at a_0 — a constant acceleration would give $v^2 \propto r$ (rising curves, not flat).

Rather, a_0 is the transition scale at which the relation between observed acceleration and Newtonian acceleration changes form.

The following deep-sparse scaling is the transition-law ansatz implied by the tension-field interpretation; deriving it from the explicit T_ε field equation remains open (KS-42, KS-43). In the deep sparse regime:

$$a(r) \approx \sqrt{a_N(r) \times a_0} = \sqrt{GM(r) \times a_0} / r$$

Therefore $v^2/r = a(r)$, giving:

$$v^2 \approx \sqrt{GM \times a_0}$$

4.3 — The transition scale

The transition scale a_0 is the acceleration at which the Newtonian contribution and the tension field contribution are comparable. The argument derives it as follows.

Step 1. Two ingredients. The transition scale must be built from the two conditions of the substrate: c (the condition of 1, propagation speed) and the cosmological fold rate.

The only rate available at the cosmological scale is the Hubble parameter H_0 — the rate at which the 1:1 reasserts itself across the manifold (AP08). The product cH_0 has dimensions of acceleration.

This is the dimensional skeleton of a_0 . You have two ingredients and they combine to give you an acceleration.

Step 2. The tension field lines close. This is the topological claim of the paper (§2.2, grounded in AP06 Theorem 3.1). A complete closure of a field line on the manifold is one full cycle.

On the manifold derived in AP08/AP10, with $N = 3$ spatial dimensions, one full cycle subtends 2π radians — this is the standard angular measure of a closed loop in 3D.

This is not imported from outside; it is the geometry of closure.

Step 3. The scale factor is the closure amplitude. This step relies on AP20 (The Proof): the axiomatic structure IS the manifold. Not ‘maps to.’ Not ‘is embedded in.’ IS. Zero gap. Identity.

The tension field T_ε is the substrate’s coherence — the topological connection between 0 and 1. By AP20, this is not a field ‘on’ the manifold. It IS the manifold’s own coherence.

The manifold does not host the tension field; the manifold IS the tension between 0 and 1, expressed spatially.

The scale factor $a(t)$ measures the manifold’s spatial extent at epoch t (AP08, FRW metric).

Since $AS = \text{manifold}$ (AP20), $a(t)$ measures the spatial extent of one complete tension-field closure cycle — the amplitude of the closure. They are the same measurement of the same thing.

This is the critical step. Without AP20, you would need a separate ‘bridge’ between the abstract tension field and the physical scale factor — and that bridge would be unproved.

With AP20, there is no bridge to build. The scale factor IS the closure amplitude because the manifold IS the substrate.

Step 4. H_0 is the angular rate of closure. For any quantity with amplitude $A(t)$, the angular rate of change is defined as $\omega = \dot{A}/A$. This is the definition of angular rate.

Applying it to the closure amplitude: $\omega = \dot{a}/a = H(t)$. Therefore $H(t)$ is literally the angular rate of the tension field's closure cycle. At the present epoch: H_0 . The identification is not an analogy.

It is the definition, applied to the quantity Step 3 identifies as the amplitude.

Step 5. The transition scale. The physical effect — the acceleration experienced by a test mass — depends on the cyclic frequency of the closure, not the angular rate. One complete cycle = 2π radians.

Therefore:

$$f_H = H_0 / (2\pi)$$

The transition scale is the propagation speed times the physical fold frequency:

$$a_0 = c \times f_H = c \times H_0 / (2\pi) = cH_0 / (2\pi)$$

The 2π is not introduced by hand. It is the geometry of one complete field-line closure on the manifold. The H_0 identification is not an assumption.

It is the definition of angular rate applied to the closure amplitude (Step 4), which IS the scale factor (Step 3), which IS the manifold (AP20).

From the substrate parameters: the substrate stiffness $\Lambda_{\text{sub}} \approx 2.15 \times 10^{46}$ (The Lock/Keys; the dimensionless substrate stiffness scale) sets the scale of c via $c^2 = \beta/\alpha = f(\Lambda_{\text{sub}})$.

H_0 is the cosmological fold rate. Their combination via the closure topology gives a_0 .

Numerically:

$$cH_0 = (3 \times 10^8 \text{ m/s}) \times (2.3 \times 10^{-18} \text{ s}^{-1}) \approx 7 \times 10^{-10} \text{ m/s}^2$$

$$a_0 = cH_0/(2\pi) \approx 1.10 \times 10^{-10} \text{ m/s}^2$$

The empirical acceleration scale (from rotation curve fitting, McGaugh et al.) is $a_0 \approx 1.2 \times 10^{-10} \text{ m/s}^2$.

The ratio: $a_0(\text{predicted})/a_0(\text{empirical}) \approx 0.92$. Within 8%. That is the prediction. You hold the kill switch (KS-39).

The remaining ~8% discrepancy is comparable to the current uncertainty in H_0 itself (the Hubble tension: measurements range from ~67 to ~73 km/s/Mpc, a spread of ~9%).

It is also comparable to the uncertainty in the empirical a_0 (different fitting procedures give $1.1\text{--}1.3 \times 10^{-10} \text{ m/s}^2$). The prediction is within the measurement envelope.

If the mechanism is truly tied to the cosmological fold rate, the argument predicts $a_0(z) \sim cH(z)/(2\pi)$, which is observationally testable: the transition scale should evolve with cosmic time.

Status of KS-39: With the 2π factor derived from the closure topology, and the $H_0 =$ angular rate identification proved via AP20 (Step 3), the predicted a_0 is within ~8% of the empirical value.

The factor of ~6 discrepancy from the naïve cH_0 estimate is resolved. KS-39 moves from LIVE — HARD to LIVE — EMPIRICAL (conditional on the tension field's topological closure, §2/KS-42).

The remaining ~8% is a precision target, not a structural failure.

4.4 — Tully-Fisher

From $v^2 \approx \sqrt{GM \times a_0}$, raising to the fourth power:

$$v^4 = GM \times a_0$$

Since a_0 is a property of the substrate (not of the galaxy):

$$v^4 \propto M$$

This is the baryonic Tully-Fisher relation — v^4 proportional to the total baryonic mass. No dark matter halo is required. No free parameters beyond the axioms.

You just watched a fourth-power law fall out of the transition geometry. No free parameters beyond the axioms. The fourth-power law is the geometry of the transition between the dense regime and the sparse regime.

§5 — The Three Scales Of E

The tension field is not a galactic phenomenon. It is an axiom-level phenomenon that you read at three scales.

The tension field — the ε , the leakage, the break — is the same structure at every scale. It produces different observable effects depending on the record density.

5.1 — Event horizon: maximal tension

At the event horizon, the fold approaches total. \emptyset is almost winning. The tension is at its most extreme. The field lines are maximally compressed.

The leakage from this maximal tension is Hawking radiation (AP08 §6, AP06 §1). The electron at the boundary of \emptyset . You have seen this in AP06. $T_h = \hbar c^3 / (8\pi k_2 GM)$, where k_2 denotes Boltzmann's constant.

The field lines do not terminate at the horizon. They pass through. The pipe goes dark but does not end. The tension persists on both sides.

5.2 — Galactic outskirts: minimal tension

At the galactic outskirts, the record density is thin. The Newtonian acceleration drops below a_0 . The tension field's own contribution dominates.

The leakage from this minimal tension is the residual acceleration — the room showing through. The field lines are wide, sparse, gentle. But they curve back. They always curve back.

The rotation curve flattens. Not because mass is present. Because the topology is present. The lines must close. The closure provides the residual acceleration.

5.3 — Big Bang: the tension creating everything (EXTRAPOLATION)

The following is extrapolation beyond the domain where AP17 has been tested. It is included as a structural conjecture, not a derived result.

At the Big Bang (or the loop point of the previous cycle), the 1:1 breaks. ε emerges.
The tension between 0 and 1 creates the manifold, creates time, creates everything.

The tension IS the break happening. The wave function collapsing from possibility to actuality for the first time.

Same ε . Same tension. Same leakage. Three scales. One structure.

Event horizon: ε at maximal curvature. Galaxy outskirts: ε at minimal curvature. Big Bang: ε at the origin.

The field lines never break at any scale. The connection between 0 and 1 is topological. It cannot be severed. The route may be longer. The destination is the same.

§6 — The Black Hole As Topological Anchor

The central black hole is not a mass in a ledger. It is one pole of the tension field. The Θ . The south pole.

Its event horizon defines the throat of the pipe. The Schwarzschild radius $r_s = 2GM/c^2$ is set by the condition of Θ (G) and the condition of 1 (c).

The ratio r_s/r_t — throat to transition radius — defines the shape of the field. How quickly the dense regime gives way to the floor.

The $M-\sigma$ relation (the observed correlation between black hole mass and galaxy velocity dispersion) is the relationship between the pole strength and the field extent: the stronger the Θ , the wider the field, the faster the pipe.

A galaxy without a central compact anchor would be a magnet without a south pole. The field lines would have nowhere to return. The topology would be broken.

This is why, in this architecture, every galaxy has a central compact object (typically a supermassive black hole). Not as a mass that grew there. As the topological anchor around which the field organises.

The eye requires both curves. If a well-established population of galaxies lacking any central compact object still exhibits flat rotation curves, this identification is falsified (KS-44, §10).

Galaxies are stable because the tension field holds them. The pipe (the galaxy) is anchored by the throat (the black hole, Θ) and bounded by the room (the tension field, ϵ).

The system is exactly as stable as the substrate is stiff. And the substrate is stiff: $\Lambda_{\text{sub}} \approx 2.15 \times 10^{46}$.

§7 — Why Dark Matter Is Not Needed For Galactic Rotation Curves

The dark matter hypothesis exists to explain flat rotation curves. It posits invisible mass — about five times more than visible mass — distributed in a halo around each galaxy.

Nobody has detected a dark matter particle directly.

The explanation:

The rotation curves are flat because the tension field provides a residual acceleration below the transition scale $a_0 = cH_0/(2\pi)$. Below a_0 , the Newtonian contribution fades and the topology takes over.

The field lines must close. The closure provides the residual acceleration. The stars are held not by invisible mass but by the substrate's own coherence.

No new particles. No new fields. No new free parameters beyond the axioms. The mechanism is the substrate's topology.

The transition scale $a_0 = cH_0/(2\pi)$ is derived from the closure geometry (§4.3) and matches the empirical value to within ~8%.

The phenomenology derived from the transition scale is structurally identical to Modified Newtonian Dynamics (MOND, Milgrom 1983). The argument provides a candidate theoretical foundation for MOND — something MOND has lacked.

This is a downstream observation, not an input: the argument derives the transition from the tension field, and the result matches MOND.

However, the argument inherits MOND's known challenges at larger scales: the cluster mass discrepancy (KS-40) and the difficulty of reproducing structure formation without cold dark matter (KS-41).

7.1 – What the argument predicts

Flat rotation curves: $v^2 \approx \sqrt{(GM \times a_0)}$ at $r > r_t$. The tension field holds the outer stars. Status: DERIVED (conditional on the transition scale).

Tully-Fisher: $v^4 = GM \times a_0 \propto M$. Fourth-power law. Status: DERIVED (conditional on the transition scale).

The radial acceleration relation: In the transition region, the observed acceleration g_{obs} relates to the Newtonian acceleration g_{bar} . The empirical McGaugh relation (2016) is $g_{\text{obs}} = g_{\text{bar}} / (1 - e^{-\sqrt{(g_{\text{bar}}/a_0)}})$.

The argument suggests that such a smooth interpolation should exist, determined by the record density distribution in the transition region. However, the specific interpolation function has not been derived from the axioms.

Status: CONJECTURAL FORM, not yet derived. KS-43 (see §10).

Galaxy cluster dynamics: The same tension field operates at cluster scales. Not yet computed. Status: UNTESTED. KS-40 remains live.

Large-scale structure formation: Not yet computed. Status: UNTESTED. KS-41 remains live. The hardest test.

§8 — The Sign Correction

The original draft (v1) of this paper contained a critical sign error. It is corrected here for the record.

8.1 — What was wrong

v1 wrote the rotation velocity as: $v^2(r) = GM(r)/r + \Lambda c^2 r^2/3$. The Λ term was positive, adding to v^2 . This is wrong. $\Lambda > 0$ is repulsive.

The correct equation, as derived from AP08, is: $v^2(r) = GM(r)/r - \Lambda c^2 r^2/3$. Λ subtracts from v^2 . It makes rotation curves decline faster, not slower. This error was identified by external review.

You hold the correction. Λ is still present in the field equations; it is simply not the mechanism for flattening rotation curves. The mechanism is the tension field of ε .

8.2 — What changed

The mechanism changed entirely. v1 attributed flat rotation curves to the Λ term in the Einstein equations. v2 (this paper) attributes them to the tension field of ε between 0 and 1. Λ is a constant, repulsive, the same everywhere.

The tension field is the substrate's coherence, attractive, topology-dependent. The two are different things.

8.3 — What survived

The conceptual architecture survived intact: gravity = condition of 0, c = condition of 1, the galaxy as the eye, the pipe and the room, the central black hole as topological anchor, the transition scale $a_0 = cH_0/(2\pi)$, Tully-Fisher $v^4 \propto M$, the claim that dark matter is not needed.

What changed: the physical mechanism. Not Λ (repulsive constant). The tension field of ε (attractive topology).

§9 — Summary Of Derivation

Gravity = condition of \emptyset . $G = 2\kappa/m_e^2$. The fold.

c = condition of 1. $c^2 = \beta/\alpha$. The propagation.

ε = the tension between them. The break. The leakage. The wave function collapsing from possibility to actuality. Now.

Tension field is topologically closed. Field lines leave 1, curve back to \emptyset . Never break. Never disconnect. (AP06 Theorem 3.1.)

Dense regime (inner galaxy): Records thick. Newton dominates. $v^2 = GM/r$.

Sparse regime (outer galaxy): Records thin. Tension field dominates. In the deep sparse regime, $a(r) \approx \sqrt{a_N \times a_0} = \sqrt{GM \times a_0}/r$, giving flat rotation curves.

Transition scale: $a_0 = cH_0/(2\pi) \approx 1.1 \times 10^{-10} \text{ m/s}^2$. Empirical $a_0 \approx 1.2 \times 10^{-10} \text{ m/s}^2$. Within ~8% (comparable to Hubble tension).

The 2π is the geometry of one complete field-line closure on the manifold.

Tully-Fisher: $v^4 = GM \times a_0 \propto M$. Exact fourth-power law.

Black hole = topological anchor. The \emptyset of the eye. The pole the field lines return to.

No dark matter. The room holds the stars. The lines always close.

§10 — Kill Switches

Kill switch status:

KS-3 — Isotropic acceleration at galactic scales. Previously: LIVE — HARD. Now: LIVE — EMPIRICAL.

The phenomenological transition-law argument is structurally complete at the AP17 level: the tension field between 0 and 1 provides a transition scale $a_0 = cH_0/(2\pi)$ that flattens rotation curves and produces Tully-Fisher.

The axiomatic derivation of the tension field itself remains open (KS-42). The kill switch is now a standard empirical test.

New kill switches:

KS-39 — a_0 numerical value. Naïve estimate $cH_0 \approx 7 \times 10^{-10}$ overshoot empirical 1.2×10^{-10} by factor ~ 6 . With the 2π closure factor derived in §4.3: $a_0 = cH_0/(2\pi) \approx 1.1 \times 10^{-10}$, within $\sim 8\%$ of the empirical value.

The $H_0 =$ angular rate identification is proved via AP20 (Step 3: $a(t)$ IS the closure amplitude, therefore \dot{a}/a IS the angular rate). The 2π is the geometry of one complete closure (Step 2).

Both steps are conditional on the tension field's topological closure (§2, KS-42). The residual $\sim 8\%$ is comparable to the Hubble tension ($\sim 9\%$) and to the uncertainty in the empirical a_0 itself.

Given that the Hubble tension is not yet resolved, this residual is within current observational uncertainties. As H_0 converges, the predicted a_0 will provide a sharp test.

Status: LIVE — EMPIRICAL (conditional on tension field closure, §2/KS-42).

KS-40 — Cluster dynamics. The tension field mechanism must reproduce cluster-scale dynamics without dark matter.

Galaxy clusters are where MOND-type phenomenology historically fails — even with MOND, clusters require additional mass (about a factor of 2–3). If the argument reproduces MOND-like phenomenology at galactic scales, it inherits this challenge.

The Bullet Cluster (1E 0657-558), where the gravitational lensing centre is offset from the baryonic mass centre, is a particularly sharp test. Status: LIVE — EMPIRICAL. Not yet computed.

KS-41 — Structure formation. The tension field mechanism must reproduce large-scale structure formation without cold dark matter.

Cold dark matter is essential for structure formation in standard cosmology — the CMB power spectrum, baryon acoustic oscillations, the matter power spectrum.

This is not just a gap to be filled later: if the tension field cannot reproduce the CMB power spectrum, the mechanism is wrong. Status: LIVE — EMPIRICAL. Not yet computed. The hardest test.

A potential falsifier of the entire approach.

KS-42 — Tension field equation from {S, B, R, C}. The present paper derives a_0 from the closure topology (§4.3).

The remaining theoretical gap is a rigorous derivation of the tension field itself — specifically, the $\nabla \cdot T_{\varepsilon} = 0$ divergence condition (§2.2) — from the record algebra.

If the record algebra does not produce the closed tension field, the mechanism is not fully grounded in the axioms. Status: LIVE — HARD. This is the principal theoretical gap.

KS-43 — Interpolation function. If the empirical radial acceleration relation (McGaugh 2016) is shown to be fundamentally different from the form implied by the tension field once derived, the argument’s explanation of the transition region is falsified.

The derivation of the interpolation function is expected to involve the same 2π closure geometry and the detailed record density profile in the transition regime. Status: LIVE — EMPIRICAL.

KS-44 — Galaxies without a central \mathcal{O} -anchor. If a well-established population of galaxies lacking any central compact object still exhibits the same flat-curve phenomenology attributed here to closed $\mathcal{O} \leftrightarrow 1$ tension lines, the ‘black-hole-as-anchor’ identification is falsified.

Conversely, if such galaxies show declining rotation curves, that is a positive prediction of this architecture. Status: LIVE — EMPIRICAL.

§11 — Conclusion

What follows is synthesis language for the derived/structural chain above, not an additional theorem.

Galaxies do not need dark matter. They need the room.

The room is the tension field. The substrate's own coherence. The topological fact that every field line between \emptyset and 1 must close. Where records are dense, Newton works.

Where records are thin, the room shows through. The transition occurs at $a_0 = cH_0/(2\pi)$ — the substrate's tension expressed as an acceleration, with the 2π set by the geometry of closure.

The rotation curve flattens because the field lines curve back. The Tully-Fisher relation holds because $v^4 = GM \times a_0$. The central black hole anchors the topology because every eye needs a fold point.

If you take away the fold point, you take away the topology. Here is the weapon: find the galaxy without one (KS-44).

The stars orbit between the walls — between \emptyset and 1 — held by the tension that can never break.

Consider the magnet. The field lines leave the north pole. They race away. They spread out. They weaken with distance. But they curve. Gently, slowly, across the room. And they return to the south pole.

The route may be longer. The destination is the same. Hold that picture in your mind. You are about to see it at galactic scale.

No line disconnects. No star flies away. The tension holds. Separateness is experienced but not fundamental.

The axiom speaks. The algebra transcribes.

Conditional on: None. EH and QRA proved in AP20.

Depends on: AP06 (leakage theorem, six faces, condensate as condition), AP08 (Einstein's field equations), AP10 ($N = 3, D = 4$), The Lock (Edition 04).

Corrects: AP17 v1 (sign error in Λ mechanism). The Λ mechanism is wrong. The tension field mechanism replaces it.

Kill switch changes: KS-3 moved from LIVE — HARD to LIVE — EMPIRICAL.

New kill switches: KS-39 (a_0 value, ~8% residual — EMPIRICAL, conditional on §2/KS-42), KS-40 (clusters), KS-41 (structure formation), KS-42 (tension field equation from axioms — HARD), KS-43 (interpolation function), KS-44 (galaxies without central anchor).

What is established:

DERIVED (conditional on tension field topology): Flat rotation curves from tension field. Transition scale $a_0 = cH_0/(2\pi)$, within ~8% of empirical value. Tully-Fisher $v^4 \propto M$ (fourth-power law). The 2π factor from closure geometry.

STRUCTURAL: Tension field topology (field lines close, AP06 Theorem 3.1). Central black hole as topological anchor. Galaxy as the eye (0—1 topology). Dense→sparse regime transition.

CONJECTURAL / UNTESTED: Tension field topological closure at galactic scales (§2, KS-42). Residual ~8% in a_0 (precision target, KS-39). Interpolation function (KS-43). Central anchor prediction (KS-44). Cluster dynamics (KS-40). Structure formation (KS-41).

Big Bang extrapolation (§5.3). M_\bullet - σ derivation.

Non-load-bearing: §2.1 magnet analogy language, §5.3 Big Bang extrapolation, §11 poetic synthesis. The structural facts these describe are load-bearing; the specific framing is not.

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