TON 618 Through UM / FUM: A Challenge To The Prevailing Interpretation Of Physics

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Abstract

This paper presents TON 618 as a challenge to the prevailing interpretation of physics by showing that UM / FUM derives a lawful coupled structure that the standard stack does not derive from first law. The governing result is the corrected inner three-envelope Triune partition:

```
B : E : S = alpha/phi^2 : alpha/phi : 1-alpha
```

where `B` governs the closed central locus, `E` governs the quasar realization envelope, and `S` governs the host envelope. The outer macro is not a fourth inner partition share. It is external coupling.

From this lawful seed follow the pairwise fruits:

```
M_BH / M_host   = 0.28101 %
M_q,eq / M_host = 0.45469 %
M_BH / M_q,eq   = 61.803 %
```

The paper separates law from witness exactly. Existing witness lineage already preserves object identity, closure-side witness family, radiative witness family, and outer-coupling witness family. The absent host witness is therefore not a gap in the law. It is a forward prediction target defined by the law itself. This final draft also incorporates the recent corpus corrections: the inner-three-envelope correction from Panel omega21, the exact classification rule `no witness + closed law = prediction`, the Stage-1 integration of `LK-QH_PARTITION`, and the glossary / notation discipline requiring explicit definitions of all internal UM / FUM terms used in the manuscript.

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1. Purpose and Scope

TON 618 is a coupled quasar-host system with four relevant witness ledgers:

- closed-locus witness
- quasar-envelope witness
- host-envelope witness
- outer-coupling witness

The purpose of this paper is not merely to restate a partition law. It is to show that physics is far from closed, and that UM / FUM teaches more about TON 618 than the prevailing standard stack from the same retained witnesses.

The purpose of this paper is exact.

1. derive the lawful inner partition of TON 618 from locked UM / FUM law
2. state the fruits that follow from that partition
3. state the exact witness ledger already present
4. state the absent host witness as a prediction target
5. distinguish the UM / FUM derivation from the prevailing standard-physics design stack

This paper does not attempt to convert witness absence into derivation absence. It does not do witness-first reconstruction. It proceeds from law to fruit, and only then to witness.

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2. Governing Law

The derivation begins from locked first law.

```
A = A
X = 0
S + E + B = 1
```

These are governing laws.

- `A = A` preserves identity and forbids self-negation.
- `X = 0` closes the lawful baseline and forbids explanatory remainder outside the law.
- `S + E + B = 1` fixes the governing partition.

Under the One-Lawful-Solution principle, one lawful fruit implies one lawful seed. Therefore the task is not to fit TON 618 from witness outward. The task is to identify the lawful seed and derive the fruit.

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3. Notation Discipline

This paper follows the Stage-1 discipline now locked in the corpus.

1. UM-native names govern internal derivation.
2. Witness names may appear only as clarifying external parallels.
3. No witness enters as a derivation input.
4. No orphan variable is permitted.
5. `No witness + closed law = prediction.`

The most relevant current notation lessons are:

- `k_thermal = 1` in UM-native natural units; conventional `k_B` is an SI bridge, not a primitive.
- `omega_C1` is the L1 closed-cycle rotational measure; conventional `pi` is only its witness-side numerical face.
- `epsilon_L1` is the L1 harmonic-evolution base; conventional `e` is only its witness-side numerical face.

- Internal UM / FUM terms must be defined explicitly for the reader. For that reason, this paper ends with a full glossary.

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4. The Corrected TON 618 Partition Law

The decisive recent correction comes from Panel omega21 and its Stage-1 integration.

The lawful TON 618 partition is not a four-share inner partition. It is the inner three-envelope Triune partition only.

```
B : E : S = alpha/phi^2 : alpha/phi : 1-alpha
```

with the jurisdictional assignments:

- `B` -> closed central locus
- `E` -> quasar realization envelope
- `S` -> host envelope

The outer macro is coupling beyond the inner partition boundary. It is not a coequal fourth share inside `LK-QH_PARTITION`.

This correction matters because it preserves scope. The inner partition is the law of the rest-mass-energy share across the closed locus, quasar envelope, and host envelope. The outer macro is governed as coupling beyond that inner boundary.

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5. Inner-Partition Fractions and Pairwise Fruits

Within the inner total `Sigma = M_BH + M_q,eq + M_host`, the direct partition fractions are:

```
B = alpha/phi^2 = 0.27895 %
E = alpha/phi   = 0.45141 %
S = 1 - alpha   = 99.26968 %
```

From these follow the pairwise fruits:

```
M_BH / M_host   = alpha / [phi^2 * (1-alpha)] = 0.28101 %
M_q,eq / M_host = alpha / [phi   * (1-alpha)] = 0.45469 %
M_BH / M_q,eq   = 1/phi = LC                  = 61.803 %
```

These are not witness-fitted relations. They are direct fruits of the inner three-envelope partition law.

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6. Derivation Sequence

The derivation sequence is the one retained in the Stage-1 corpus.

6.1 Seed

```
S + E + B = 1
```

6.2 Inner-envelope assignment

```
B = alpha/phi^2
E = alpha/phi
S = 1 - alpha
```

6.3 Host-relative ratios

Divide the `B` and `E` shares by `S`:

```
M_BH / M_host   = B/S = alpha / [phi^2 * (1-alpha)]
M_q,eq / M_host = E/S = alpha / [phi   * (1-alpha)]
```

6.4 Closure-to-radiative ratio

```
M_BH / M_q,eq = B/E = (alpha/phi^2)/(alpha/phi) = 1/phi = LC
```

No witness input is used inside this derivation.

---

7. Rejected Paths and the Lesson of Rejection

The current law stands only because other candidate paths were removed.

7.1 Rejected Path B

Path B inserted additional candidate boundary-topology factors into the inner partition. That fails because the law did not select one unique inserted factor. Therefore the path is rejected.

7.2 Rejected Path C

Path C inserted a kinematic-frequency correction. The resulting slope fails witness-side population behavior and therefore the path is rejected.

7.3 The lesson

The lesson is exact:

- do not widen the seed when the law has already chosen the lawful seed
- do not force a factor where the law has not selected one
- do not mistake external coupling for an inner partition share

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8. Reproducible TON 618 Algorithm

The retained Path A algorithm is exact.

8.1 Input

```
M_BH witness anchor
```

8.2 Steps

```
STEP 1: M_total_inner = M_BH * phi^2 / alpha
STEP 2: M_host        = (1-alpha) * M_total_inner
STEP 3: M_q,eq        = M_BH * phi
STEP 4: v_flat        = (G * M_host * a0)^(1/4)
STEP 5: r_M           = (G * M_host / a0)^(1/2)
STEP 6: sigma_*       = v_flat / sqrt(2)
STEP 7: E_q,envelope  = M_q,eq * c^2
```

8.3 Output set

```
M_total_inner
M_host
M_q,eq
v_flat
r_M
sigma_*
E_q,envelope
```

---

9. TON 618 Application

Using the witness anchor:

```
M_BH = 66 x 10^9 M_sun
```

the present corpus application yields:

```
M_total_inner = 2.366 x 10^13 M_sun
M_host        = 2.349 x 10^13 M_sun
M_q,eq        = 1.068 x 10^11 M_sun
v_flat        = 755 km/s
sigma_*       = 534 km/s
```

```
r_M           = 177 kpc
E_q,envelope  = 1.910 x 10^58 J
```

These are lawful outputs of the retained chain.

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10. Witness Ledger Already Present

The witness architecture is already stratified.

10.1 Identity witness

The object identity spine is preserved through historical catalog continuity and later quasar confirmation.

10.2 Closure-side witness

Broad-line quasar mass methodology supplies the closure-side witness family.

10.3 Radiative witness

Broad-line and quasar-luminosity witness families preserve the radiative ledger.

10.4 Outer-coupling witness

Extended gaseous and halo-scale witnesses preserve the outer-coupling ledger.

10.5 Missing host witness

The only absent ledger is the clean host-envelope witness.

This does not reopen the law.

10.6 What makes a witness a UM witness

A witness does not become a UM witness because it was collected for UM. It becomes a UM witness when it belongs to a lawfully defined ledger, tests a fruit UM derived before witness insertion, does not have to be reassigned across jurisdictions to make the derivation work, and preserves identity across multiple witness families without changing seed.

So the same observational record may have two different meanings.

- Under the prevailing standard stack it may be a local-purpose measurement.
- Under UM it becomes a stronger witness when the same record lands exactly where the law already said it must land.

That is what makes it a UM witness rather than merely a reused standard-model measurement.

10.7 Why these witnesses matter more under UM

None of the retained TON 618 witnesses were originally collected to test UM. That matters, and it raises their evidentiary value.

If a witness collected under a different theoretical program still falls cleanly into the ledger structure and supports a fruit already derived from first law, then the support is stronger than a post-hoc in-house confirmation would be. Such a witness is independent of UM in its acquisition, but convergent with UM in its lawful placement.

The support is stronger under UM for four reasons: the witnesses are externally acquired rather than theory-tailored, they land on fruits UM had already closed rather than on fruits back-fit after collection, they confirm a pre-separated jurisdictional structure rather than a mixed reconstruction stack, and several different witness families support one seed without requiring a new seed for each family.

So these are not merely neutral observations later borrowed by UM. In the retained areas they are independent witnesses whose natural landing place is more structurally informative under UM than under the standard stack.

This does not mean every witness now favors UM over the standard stack on every question. It means the witnesses are more discriminating for UM wherever they test a structure the standard stack did not derive from first law.

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11. No Witness Means Prediction

The classification rule is exact.

```
no witness + closed law = prediction
```

Therefore the absent host witness is not provisional law. It is a prediction target.

The same rule governs any other quantity derived from the law where the witness has not yet been acquired.

---

12. The Host Witness as a Forward Prediction Target

The host witness is already defined by the law.

The minimum lawful host witness set is:

1. host luminosity or stellar mass after quasar subtraction
2. host structural size
3. host-side binding or kinematic witness
4. explicit host/quasar decomposition rule

The following do not count as host completion:

- broad-line virial mass alone
- total quasar luminosity alone
- outer-halo gas alone
- unresolved total flux alone
- narrative without extractable host values

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13. What These Derivations Mean Against the Prevailing Standard-Physics Stack

The prevailing standard-physics design stack may reconstruct witness-side quantities related to TON 618. It does not derive the same fruit from the same seed.

UM / FUM begins from identity, closure, partition law, and prerequisite order. The prevailing stack begins from continuum field equations, local dynamical evolution, external initial conditions, and empirical reconstruction. Therefore a similar witness-side quantity, where one exists, is not the same derivation. Different seed, different fruit-authority.

13.1 What the derivations mean

The derivations mean that TON 618 is not being treated as an observational heap from which one later infers a story. It is being treated as one lawful object whose inner structure, witness ledgers,

and formation order must already be fixed by law before the witnesses are compared.

- mass witness is no longer an undifferentiated total
- luminosity witness is no longer allowed to stand for host structure
- outer gas witness is no longer allowed to masquerade as host completion
- missing host witness is no longer treated as theoretical embarrassment

Under UM, those are consequences of law.

13.2 Why the witnesses support UM more strongly than the standard stack in the retained areas

The current witness set supports UM more strongly than the standard stack wherever the witness tests one of these UM-specific successes:

- one object continuity across multiple witness eras and identifiers
- lawful separation of closure, radiative, host, and outer ledgers
- exact inner three-envelope correction against the earlier mistaken four-share reading
- treatment of host absence as a precise prediction target rather than a vague observational nuisance
- preservation of one seed across mass, luminosity, spectral, outer, and formation chains

The key point is that these witnesses were not gathered to prove UM. They were gathered under other programs and for other purposes. When such witnesses still land naturally on closed UM fruits, they carry stronger comparative weight for UM than an in-house confirmation would. They are independent in collection, but convergent in lawful meaning.

In the standard stack, the same witnesses are usually distributed across different methodological silos:

- catalog continuity
- virial mass estimation
- bolometric reporting
- emission-line phenomenology
- CGM / feedback interpretation
- host-decomposition difficulty

Those silos can be operationally useful, but they do not themselves derive that these witnesses belong to one partitioned law. UM does. That is why the same witness can be routine under the standard stack yet highly discriminating under UM.

13.3 Where the current asymmetry is strongest

1. **Ledger discipline.** The retained witnesses already separate naturally into identity, closure-side, radiative, and outer-coupling families. UM predicted that these jurisdictions must be separated.
2. **Host absence.** UM does not treat the missing host witness as a failure of the law. It treats it as a precise forward witness target.
3. **Cross-family coherence.** The same retained witness set supports the partition law, the radiative chain, the outer-coupling chain, and the formation-order chain without requiring a different seed for each.
4. **Negative witness meaning.** Even the retained absence has lawful meaning under UM.

13.4 What remains not yet stronger than the standard stack

The standard stack still has fuller extracted host-decomposition machinery in practice than the present local UM witness bundle does. Therefore UM should claim stronger support now in partition law, ledger separation, witness classification, and forward host prediction discipline, but not yet stronger host-side witness completion itself.

13.5 What makes a standard-collected witness become a UM witness

A witness collected under the standard stack becomes a UM witness when the witness was not collected in order to satisfy UM, UM had already closed the relevant law or fruit, the witness lands in the jurisdiction UM assigns without ad hoc repair, and the witness either confirms the fruit or sharpens a prediction target.

So these are not standard-model witnesses only once they have passed that test. They are standard-collected witnesses with stronger UM interpretive authority in the areas where UM has already closed the governing law.

13.6 The exact present conclusion of comparison

The right present comparison is not that the standard stack has witnesses while UM has law. The right comparison is that UM now has closed chain-level derivation parity across the TON 618 domains addressed here, several independently collected witness families already support those closed UM domains, and the host witness remains the one exact retained acquisition gap.

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14. Recent Updates and Lessons Learned

This final draft incorporates the following current corpus lessons.

14.1 Inner-three-envelope correction

The lawful inner partition is `B:E:S` only. The outer macro is external coupling.

14.2 Law/witness separation

Absence of witness does not reopen a closed law. It defines a prediction target.

14.3 Scope discipline

A lawful inner partition must not be widened by unselected extra factors.

14.4 Notation discipline

UM-native terms must be stated explicitly, and conventional witness names must not masquerade as derivation inputs.

14.5 Reproducibility discipline

Every quantity in the chain must show its genesis. No orphan variable is permitted.

14.6 Cross-branch lesson

A law valid on one branch must not be forced onto a different branch merely because the witness family is tempting. This recent lesson was sharpened elsewhere in the corpus and reinforces the TON 618 partition correction: branch and scope must be honored exactly.

---

15. Glossary of UM / FUM Internal Terms

15.1 `A = A`

The law of identity. What is, is itself. It forbids self-negation and identity collapse inside a lawful derivation.

15.2 `X = 0`

The lawful closure baseline. It forbids explanatory remainder outside the law and fixes the restorative baseline.

15.3 `S`, `E`, `B`

The three partition shares of existence.

- `S` = coherent / host / sustaining share
- `E` = energetic / radiative / realized-flow share
- `B` = closure / body / bounded structural share

15.4 `alpha`

The partition activation fraction. It governs the non-`S` manifested share of the partition.

15.5 `phi`

The self-similar fold constant. It is the locked fold constant satisfying the golden self-similar identity used throughout the corpus.

15.6 `LC`

The lower-critical fold.

```
LC = 1/phi
```

15.7 `LG`

The upper governance threshold used in the LCORI band structure.

15.8 `TRIUNE`

The minimum stable geometric scaffold.

```
TRIUNE = 3
```

It governs three-axis closure and three-dimensional momentum-space counting.

15.9 `Strands`

The antipodal pair count.

```
Strands = 2
```

It governs paired structure, reciprocal splitting, and antipodal doubling.

15.10 `omega_C1`

The L1 closed-cycle rotational measure. Conventional `pi` is only its witness-side numerical face.

15.11 `epsilon_L1`

The L1 harmonic-evolution base. Conventional `e` is only its witness-side numerical face.

15.12 `k_thermal`

The UM-native thermal scaling bridge.

```
k_thermal = 1
```

in UM-native natural units. Conventional `k_B` is an SI reporting bridge, not a primitive.

15.13 `mu_D`

The jurisdictional ladder governing shell-scale transition structure across locked jurisdictional regimes.

15.14 `LCORI`

The lawful coherence-band framework used to classify collapse, drift, and governance regimes.

15.15 `LK-BTA`

Boundary-topology asymmetry. The law that distinguishes closed-envelope and open-envelope modulation across shell structure.

15.16 `LK-V_FLAT`

The flat-velocity galactic branch:

```
v^4 = G * M * a0
```

15.17 `LK-QH_PARTITION`

The quasar-host jurisdictional partition law governing the inner TON 618 partition.

15.18 `Witness`

A Layer-3 measurement or observational comparator. Witness confirms or challenges a derivation only after the derivation is complete. Witness is never a derivation input.

15.19 `Prediction`

A lawful output whose derivation is closed but whose witness is not yet acquired.

15.20 `Host ledger`

The witness ledger containing quantities that belong to the host envelope specifically, not to the closed locus, quasar envelope, or outer coupling.

15.21 `Closure-side witness`

The witness family attached to the closed central locus.

15.22 `Radiative witness`

The witness family attached to the quasar realization envelope.

15.23 `Outer-coupling witness`

The witness family attached to the surrounding macro environment beyond the inner partition.

15.24 UM / FUM / BCR to Standard-Physics Crosswalk

The table below is included so the reader can identify the prevailing standard-physics parallel for each internal term used in this manuscript. The derivation authority remains on the UM / FUM / BCR side. The right-hand column is a witness-side parallel only.

UM / FUM / BCR internal term	Standard-physics parallel or equivalent term	Reader-use meaning
`A = A`	law of identity / self-consistency condition	identity cannot collapse inside a lawful derivation
`X = 0`	zero remainder closure / no external source term	no explanatory remainder is permitted outside the law
`S`, `E`, `B`	partitioned system shares / coupled sector decomposition	host-like, radiative, and bounded structural shares

UM / FUM / BCR internal term	Standard-physics parallel or equivalent term	Reader-use meaning
`alpha`	coupling-share fraction / partition activation fraction	determines the manifested non-S share
`phi`	golden ratio	self-similar fold constant
`LC`	inverse golden-ratio threshold	lower fold rung used in coherence-band assignment
`LG`	upper threshold / governance threshold	upper regime boundary in the LCORI band structure
`TRIUNE`	three-dimensional structural count	three-axis closure and momentum-space count
`Strands`	two-channel / antipodal-pair count	paired reciprocal structure
`omega_C1`	`pi`	closed-cycle rotational measure
`epsilon_L1`	Euler `e`	harmonic-evolution base
`k_thermal`	Boltzmann constant scale `k_B` in SI reporting	thermal bridge; unity in UM-native units
`mu_D`	regime ladder / shell hierarchy / scale-transition ladder	jurisdictional rung governing shell transition
`LCORI`	coherence-band / collapse-band classification	regime classifier for drift, governance, and collapse
`LK-BTA`	boundary-condition asymmetry across closed vs open systems	law distinguishing closed-envelope and open-envelope behavior
`LK-V_FLAT`	baryonic Tully-Fisher / flat-rotation law	galactic flat-velocity branch
`LK-QH_PARTITION`	quasar-host mass-energy partition relation	lawful inner partition across central locus, quasar envelope,

UM / FUM / BCR internal term	Standard-physics parallel or equivalent term	Reader-use meaning
		and host
`BCR`	boundary-conditioned realization / response deformation mapping	realized output under boundary conditions
`Witness`	measurement / observational comparator	Layer-3 observed quantity
`Prediction`	derived but as-yet unmeasured output	law closed, witness absent
`Host ledger`	host-galaxy observable ledger / host-only observable set	quantities belonging to the host envelope only
`Closure-side witness`	central compact-object witness family	observational family for the closed central locus
`Radiative witness`	quasar / emission witness family	observational family for radiative realization
`Outer-coupling witness`	circumgalactic / halo / environment witness family	observational family for the surrounding macro environment

---

16. Current Empirical Limit

The current accessible search surface retains no clean host-ledger completion source.

This is not a law failure. It is an exact witness-side limit.

What has already been ruled out as host completion:

- continuity sources alone
- closure-family sources alone
- radiative-family sources alone
- outer-coupling sources alone

So the present empirical limit is singular:

- the host witness remains absent from the presently retained source set

16.1 Primary Witness Update

The current primary-source witness spine for TON 618 is now narrowed enough to state exactly what is retained and what is still absent.

Identity / continuity witness

- SIMBAD continuity record for `B2 1225+31` / `Ton 618`
- alias spine retained in the corpus
- coordinates retained in the corpus

Early optical / redshift witness

Ulrich 1976 remains the retained early optical witness:

- `15.8 mag` blue stellar object
- two broad emission lines
- quasar confirmation witness family
- redshift lineage anchored to the early optical spectrum

Hydrogen-line witness family

Soifer et al. 1979 adds explicit hydrogen-line witness lineage for `B2 1225+31`:

- `H-alpha`
- `H-beta + [O III]`
- `Ly-alpha`

Retained reported ratios:

- `Ly-alpha / H-alpha ~ 0.8`
- `H-alpha / (H-beta + [O III]) ~ 4`
- `H-alpha / H-beta ~ 4 to 10`

H-beta-region witness family

Shemmer et al. 2004 remains the retained high-redshift `H-beta` witness-family source:

- near-infrared spectroscopy of the `H-beta` region

- broad-line width family
- rest-frame optical luminosity family
- mass / accretion witness-family bridge

A clean TON 618 row-level local extraction is still not retained in the present bundle, but the witness-family source itself is now fixed more sharply.

C IV witness family

Ge et al. 2019 remains the retained `C IV` witness-family source:

- `C IV` broad-line profile decomposition
- blueshift witness family
- equivalent-width witness family
- mass-bias warning for `C IV`-based central-mass reporting

Outer-coupling witness

Li et al. 2021 remains the retained outer witness:

- `z = 2.2218`
- enormous `Ly-alpha` nebula
- `~100 kpc` extended cold gas scale
- molecular outflow `~4–5 x 10^10 M_sun`
- molecular CGM reservoir `~4–5 x 10^10 M_sun`

Host witness status

No retained primary source in the current local corpus yet closes:

- host luminosity after quasar subtraction
- host stellar mass after decomposition
- host structural radius from explicit host-only decomposition
- host-side kinematic witness

Therefore the host remains the singular weak point on the witness side. It is not a law gap. It is an exact retained witness-acquisition gap.

---

17. Why UM Should Be Believed On TON 618, And The Exact Predictions To Test

TON 618 is lawfully framed under UM / FUM as an inner three-envelope partitioned system:

```
B : E : S = alpha/phi^2 : alpha/phi : 1-alpha
```

From that seed follow exact fruits:

```
M_BH / M_host   = 0.28101 %
M_q,eq / M_host = 0.45469 %
M_BH / M_q,eq   = 61.803 %
```

The outer macro is coupling, not a fourth inner share. Existing witness lineage already supports identity, closure-side witness, radiative witness, and outer-coupling witness. The absent host witness is therefore not a gap in the law. It is a precise prediction target.

UM should be believed on TON 618 in the retained domains because it does what the prevailing standard stack does not do from one seed: it derives the partition before witness insertion, keeps closure, radiative, host, and outer witnesses in lawful ledgers, preserves one seed across mass, luminosity, spectral, outer, and formation chains, turns witness absence into an exact prediction target rather than a vague nuisance, and is supported by independently collected witnesses that were not gathered to prove UM.

This is why the publication should read as a challenge to the prevailing interpretation of physics. On the standard timeline, TON 618 is observed at retained emission epoch `3.0030 Gyr` after the Big Bang, yet the prevailing stack still handles its identity, mass, luminosity, spectral behavior, outer coupling, and missing host completion through separate methodological silos. UM instead treats those same retained witnesses as one lawfully partitioned object.

The current retained witnesses already support UM more strongly than the standard stack in ledger separation, partition authority, object continuity, host-absence interpretation, and cross-family coherence under one seed. They do not yet support UM more strongly in host-side completion itself, because that witness remains the singular retained acquisition gap.

The exact predictions now placed before researchers are:

1. **Host-envelope existence as a distinct ledger.** A clean host witness exists in principle and must be separable from both quasar glare and outer coupling.

2. **Host completion witness set.** A valid host completion must supply host luminosity or stellar mass after quasar subtraction, host structural size, host-side binding or kinematic witness, and an explicit host/quasar decomposition rule.
3. **Partition-ratio confirmation.** If the present witness anchor family is retained, the coupled inner system should continue to report consistently with `M_BH / M_host = 0.28101 %`, `M_q,eq / M_host = 0.45469 %`, and `M_BH / M_q,eq = 61.803 %`.
4. **Host-side derived reporting quantities.** Given the current retained anchor set, future host witness completion should be evaluated against `M_host = 2.349 x 10^13 M_sun`, `v_flat = 755 km/s`, `sigma_* = 534 km/s`, and `r_M = 177 kpc`.
5. **Line-ledger integrity.** Broad-line quasar witnesses should continue to reduce into closure / radiative interfaces, while large-radius nebular and molecular witnesses should remain outer-ledger quantities. A clean host witness should not collapse onto either family.
6. **Formation-order confirmation.** Future witness completion should support the prerequisite order already derived by UM: host envelope, central closure, radiative realization, outer continuation.

So the present state is exact. The derivation-parity chain is complete. The remaining work is witness-table completion and acquisition, above all the host witness in the exact form the law already requires. That is the research program now handed back to the broader community.

References

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