Priority Note: Duality Laws and Core Claims

Reverse Universe Theory (RUT) - Claim Set DUAL-01 through LI-05

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Intended use: priority disclosure + citation anchor for RUT duality claims.

Abstract. This note states five core claims from the Reverse Universe Theory (RUT) in a form that is hard to appropriate: each claim is given a stable identifier, a narrow scope boundary, an operational definition, a falsifier, and a minimal prediction/deliverables list. The goal is to establish priority and provide a compact, citable reference that points to longer technical materials hosted on GitHub and the Open Science Framework (OSF).

Suggested citation. Van Dyk, M. (Question Mark). "Priority Note: Duality Laws and Core Claims (RUT) - Claim Set DUAL-01 through LI-05" (v0.2), 2026-02-16. GitHub + OSF release.

Priority statement. The novelty claimed here is not the general idea that "there may be physics before the Big Bang" or that "duality is common". The novelty claimed is the *specific* law set below (DUAL-01, GM-02, ES-03, CB-04, LI-05) as defined by these operational criteria, boundaries, falsifiers, and prediction commitments.

Non-claims (to prevent strawman). This note does **not** claim (i) that gravity is literally electromagnetism, (ii) that accepted physics is "wrong" in general, or (iii) that philosophical metaphors alone constitute evidence. Each claim below requires an explicit mapping rule and at least one testable consequence.

Repository practice (GitHub + OSF). Publish this PDF in a tagged GitHub release (e.g., *priority-note-v0.2*) and upload the same PDF to OSF. Cross-link both records. Keep Claim IDs stable across future versions; only add new IDs or mark prior IDs as deprecated.

DUAL-01: Complementary-pair principle for physical laws

Statement. Fundamental descriptions of nature can be organized into complementary paired descriptions that are jointly necessary (neither alone is complete) and that map into one another by a definable transformation (symmetry, dual formulation, limit, or change of variables).

Operational definition. A pair counts only if (i) a repeatable mapping rule is written down, and (ii) the pairing yields an additional constraint or prediction that is not obvious from either description alone.

Scope boundary. This is a structural principle about model descriptions. It is not a claim that every pair is physically equivalent, nor a license to create arbitrary analogies without a mapping rule and predictive consequence.

Falsifier. If a broad class of well-tested laws/models cannot be expressed in any nontrivial paired form without ad hoc choices, or if proposed pairings never yield additional constraints, then DUAL-01 reduces to storytelling and is rejected.

Minimum deliverables (for priority + clarity).

- A table of at least 20 canonical laws/models with: (A) paired description, (B) mapping rule, (C) new constraint/prediction.
- A short list of 3-5 pairings where the new constraint is explicitly testable (even if small).

Prediction hooks (committable).

- A public 'Duality Map Table' in the repo, referenced by version tag, that is stable across updates.
- At least one pairing that implies a measurable sign/pattern in an observable (to be specified in the ledger).

Notes for attribution: If someone uses this claim, cite the Claim ID above and the version/date of this document.

GM-02: Gravity-magnetism structural duality (formal analogy, not identity)

Statement. There exists a useful, formally stated analogy or dual description linking gravitational 'attraction/curvature' structures to magnetic-like 'circulation/field-line' structures under a defined mapping, enabling cross-constraints or model-building heuristics in specified regimes.

Operational definition. The mapping must specify: (i) which gravitational variables correspond to which magnetic-style variables, (ii) the regime of validity (e.g., weak-field/linearized, stationary, or effective-field), and (iii) at least one derived constraint or relationship.

Scope boundary. This does not claim ordinary gravity equals electromagnetism. It claims a structured correspondence that may be exact only in a limit, a toy model, or a defined effective description.

Falsifier. If no mapping can be written without violating core consistency requirements in the stated regime (e.g., covariance in the gravity side, or known weak-field limits), or if the mapping yields no testable constraints, GM-02 is rejected.

Minimum deliverables (for priority + clarity).

- A 'toy mapping' write-up with explicit variable correspondences and a worked example.
- One measurable consequence or constraint derived from the mapping (even if it only sets a bound).

Prediction hooks (committable).

- Identify one observable where the mapping changes scaling/structure (e.g., a weak-field relation or frame-dragging analog) and state the expected direction of the effect.
- Provide at least one falsifiable bound statement (e.g., 'parameter X must be < Y in regime R, else mapping fails').

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ES-03: Dual-layer reality: metric spacetime vs underlying 'empty-space' substrate

Statement. Reality admits a two-layer description: (A) the dynamical relational geometry measured by clocks/rods (spacetime metric structure) and (B) an underlying substrate conceptually treated as 'empty space' that constrains or sources the dynamics of Layer A via a specified rule.

Operational definition. Layer A is operationally defined by measurable intervals/curvature. Layer B is defined only by the constraints/rules it imposes on Layer A (it is not 'extra matter'). The coupling must be stated as an equation, algorithm, or invariant condition that changes predictions.

Scope boundary. This is not a rebranding of 'vacuum energy' unless the coupling rule is explicitly the same. If Layer B adds no unique constraint, ES-03 becomes interpretive language rather than physics.

Falsifier. If Layer B can be removed (gauged away, reparameterized away, or set to a constant) without changing any predictions, ES-03 is rejected as non-physical.

Minimum deliverables (for priority + clarity).

- A minimal coupling rule (equation/algorithm) that shows how Layer B affects Layer A.
- A worked example in cosmology or gravitational collapse where the coupling changes an observable or fit.

Prediction hooks (committable).

- State at least one observable signature (e.g., a residual pattern in expansion history or structure statistics) implied by the coupling.
- Provide a dataset/regime where ES-03 would be decisively wrong (clear falsifier threshold).

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CB-04: Cosmic Breathe Law: alternating expansion-contraction motif with observable imprint

Statement. Large-scale dynamics follow an alternating expansion-contraction motif governed by a specific rule (cycle/phase relation, amplitude evolution, or reset mechanism) that leaves a detectable imprint in cosmological observables.

Operational definition. A 'breathe cycle' is defined by (i) a sign-changing or oscillatory component in an expansion proxy (e.g., H(z) residuals) and (ii) a stated phase relationship to at least one other observable (e.g., clustering/void statistics).

Scope boundary. CB-04 is not a claim that the universe is presently contracting. It is a claim that the governing dynamics contain an alternating component that can be extracted statistically or via model fit.

Falsifier. If the predicted oscillatory/alternating component is absent in the stated statistics at the stated scale, or if a monotonic model dominates with no need for the breathe component, CB-04 is rejected.

Minimum deliverables (for priority + clarity).

- A 'Prediction Ledger' entry specifying: observable, redshift/scale range, expected sign/pattern, and falsifier threshold.
- A simple forward model or simulation demonstrating the imprint mechanism.

Prediction hooks (committable).

- Commit to at least one redshift/scale window where the breathe signature should be most visible.
- Commit to the sign/phase relation between two observables (e.g., expansion residuals vs clustering residuals).

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LI-05: Mark's Light Law of In and Out: time-direction tied to expansion vs compression of radiative/field content

Statement. The effective directionality of time in RUT aligns with an 'outward' vs 'inward' evolution of radiative/field degrees of freedom, where expansion-like behavior corresponds to forward-time ordering and compression-like behavior corresponds to reversed ordering in a defined sense.

Operational definition. The law must be stated using an invariant quantity that tracks 'outward/inward' (e.g., a scalar built from flux, divergence, or entropy-like measure) and a rule connecting that quantity to time-asymmetry or ordering.

Scope boundary. This is not a claim of macroscopic time travel. It is a claim about an ordering rule and its connection to observed time asymmetry in chosen regimes (cosmology, collapse neighborhoods, or simulation outputs).

Falsifier. If no invariant definition can be provided, or if the rule contradicts established causal/thermodynamic constraints in the regimes where it is claimed to apply, LI-05 is rejected.

Minimum deliverables (for priority + clarity).

- Define the invariant 'In/Out' tracker explicitly and show how it is computed in at least one worked example or simulation.
- State one regime where the law predicts a measurable asymmetry and one regime where it should not apply (guardrail).

Prediction hooks (committable).

- Provide a concrete signature in a modeled system (e.g., characteristic scaling, asymmetry, or residual pattern) and define the falsifier.
- Tie the signature to CB-04 and ES-03 via a stated relationship (even if provisional), so the claim set is internally testable.

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Prediction Ledger (v0.2)

This ledger lists committable, test-facing hooks for each Claim ID. Update future versions by adding rows, not rewriting history: if a prediction changes, mark the old row deprecated and add a new row with a new sub-ID (e.g., CB-04-P2).

Claim ID	Observable / test handle	Expected pattern (qualitative)	Falsifier (what would refute it)
DUAL-01	Duality Map Table coverage	Non-arbitrary mapping rules with added constraints	Pairings are arbitrary and yield no extra constraints
GM-02	Worked mapping in stated regime	Explicit variable mapping + derived constraint/bound	Cannot preserve stated regime consistency / no testable consequence
ES-03	Coupling rule changes a fit or statistic	Unique constraint beyond re-parameterization	Layer B removable with no prediction change
CB-04	Expansion proxy residuals vs scale/z	Alternating component + stated phase relation	No alternating component in declared window; monotonic dominates
LI-05	Invariant In/Out tracker behavior	Time-asymmetry aligned with tracker sign/flow	No invariant tracker or contradiction with regime constraints

Next concrete repo steps.

- GitHub: create a release tag 'priority-note-v0.2' and attach this PDF.
- OSF: upload the same PDF as a component (or registration) and copy the GitHub release link into the OSF description.
- In both places: keep the 'Suggested citation' text identical, and do not change Claim IDs across versions.