Manifold Relativity:
Observer-Dependent Spectral Accessibility

Preprint v12.0 — Matched-Chart Consistency

and Candidate Observables

Earlier editions (v1–v11) appeared under the historical series title

"Entropy Waves, Coordinate Systems, and the Self-Referential Universe"

Developed through extended human–AI
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Abstract

The preceding eleven editions of the Manifold Relativity programme (published under the historical series title "Entropy Waves, Coordinate Systems, and the Self-Referential Universe") developed the $\mathcal{W}$-manifold framework, established its Planck-scale discrete substrate, introduced the W-atlas of observer-dependent charts, constructed a candidate Dirac operator $D^{(0)}_{\mathcal{W}}$, and identified chart matching as the central measurement-theoretic structure.

This edition addresses three foundational requirements for the programme's advancement from a candidate framework to a more disciplined and testable research programme.

First, **terminology discipline**: we state explicitly that the mature programme does not treat entropy as a local scalar field on spacetime obeying a wave equation. The historical series title "Entropy Waves" is retired from v12 onward. The central mathematical objects are a candidate operator, temperature-conditioned spectral truncation, and chart-relative reconstruction on the $\mathcal{W}$-atlas.

Second, **structural propositions**: we prove three narrow results from the existing definitions of v8–v10. (i) The Nested Accessibility Theorem establishes that the spectral sectors accessible to observers at different temperatures form a monotone filtration. (ii) The Identity Limit Proposition shows that the vertical comparison map between charts approaches the identity as the temperature separation vanishes. (iii) The Matched-Chart Consistency Theorem establishes that when observer and event inhabit the same chart, no vertical transformation is required and reconstruction distortion vanishes.

Third, **candidate observables**: we promote Open Problem O34 of v10 into a sharpened falsifiable prediction with an explicit test protocol, candidate scaling hypothesis, and null-result condition. The candidate prediction: for two co-located detector systems at different effective temperatures, after standard calibration, any residual reconstruction disagreement should be tested against a thermal information-geometric separation measure, for which the Fisher information distance is a computable first proxy. We specify which reconstruction variables are first-sensitive and what would distinguish a chart-mismatch signal from instrumental systematics.

Explicit falsification criteria for the programme are stated.

Contents

Programme Reframing: What Manifold Relativity Is and Is Not

The Name Change and the Mature Framework

The series was published from v1 through v11 under the title "Entropy Waves, Coordinate Systems, and the Self-Referential Universe." That title dates from v1 (March 2026), when the central intuition was that standard spacetime coordinates might be emergent projections of a deeper information-geometric structure. From v12 onward, the programme is titled **Manifold Relativity** for clarity.

The mature framework does not model entropy as a local scalar field propagating on standard spacetime. Earlier wave-language should be read as heuristic or coordinate-level language within the deeper $\mathcal{W}$-manifold programme, not as a claim of literal entropy-wave dynamics on 4D Lorentzian spacetime.

Over eleven editions, the programme's technical center of gravity has shifted substantially. The mature framework is characterised by three central objects:

1. **Observer-dependent spectral accessibility:** Different thermodynamic observers access different sectors of an underlying operator's spectrum, producing different local descriptions of the same structure (v6, v8).
2. **Chart-relative reconstruction:** Measurement is modeled as reconstruction within a temperature-conditioned chart, with systematic distortion arising from chart mismatch between observer and event (v8, v11).
3. **Thermally filtered operator geometry:** The candidate Dirac operator $D^{(0)}_{\mathcal{W}}$ of v10, projected through the spectral filter Π_T, generates the effective description available to an observer at temperature T.

> *The mature Manifold Relativity programme does not posit entropy as a local spacetime field obeying a wave equation on $(M, g_{\mu\nu})$. It does not modify the Einstein equations by adding entropy gradient terms to the stress-energy tensor. It does not propose that entropy oscillates in time. The framework proposes that standard spacetime coordinates are emergent projections from an information-geometric structure, with the observer's temperature determining which sector of the underlying spectrum is accessible.*

The earlier series title is retired. From v12, the programme is **Manifold Relativity: Observer-Dependent Spectral Accessibility**.

What the Framework Claims

At its current stage of development (v1–v12), the Manifold Relativity programme claims the status of a **candidate theoretical framework with explicit mathematical boundaries**. Specifically:

- It proposes a six-dimensional information-geometric structure (the $\mathcal{W}$-manifold) as a candidate fundamental arena.
- It provides operational definitions of the six coordinates grounded in discrete quantum information theory (v5).
- It constructs a formal atlas of observer-dependent charts with information-theoretic transition maps (v8).
- It presents a candidate bare Dirac operator $D_{\mathcal{W}}^{(0)}$ and a spectral filter mechanism (v10).
- It identifies chart matching as the central measurement structure and chart mismatch as the source of novel physical content (v11).

What the Framework Does Not Claim

- It does not claim a completed replacement for General Relativity or Quantum Mechanics. Full EFE recovery (O2) remains an open problem, blocked on the derivation of $g_{IE}(I, E)$ (O1).
- It does not claim that the candidate operator $D_{\mathcal{W}}^{(0)}$ is established. Validation requires the H-function composition law to emerge from spectral truncation (O31).
- It does not claim experimental confirmation of any prediction. All predictions carry the epistemic tier label assigned in the edition where they first appeared.

Definitions Recap: The Spectral Accessibility Framework

This section collects the definitions from v8–v10 that the structural propositions of Section 3 depend on. No new definitions are introduced.

The Observer-Chart (v8, Definition 3.1)

Definition 2.1 (Observer-Chart)**.** An observer-chart (U_T, χ_T) of the $\mathcal{W}$-atlas consists of:

1. A *domain* U_T: the subset of the underlying spectral substrate whose eigenvalues of $D_{\mathcal{W}}$ exceed the observer's thermal floor $k_{\mathrm{B}}T/\hbar$:

$$U_T \coloneqq \{\lambda \in \mathrm{spec}(D_{\mathcal{W}}) : |\lambda| \geq k_{\mathrm{B}}T/\hbar\}. \tag{1}$$

2. A *coordinate map* $\chi_T : U_T \to (S, I, E, \phi, C, A)$: the assignment of $\mathcal{W}$-manifold coordinates to the accessible eigenvalue sector at temperature T.

The Spectral Filter (v10)

Definition 2.2 (Spectral Filter)**.** The spectral filter Π_T is the projection operator that restricts the full spectrum of $D_{\mathcal{W}}$ to the accessible sector at temperature T:

$$\Pi_T \coloneqq \sum_{|\lambda_n| \geq k_{\mathrm{B}} T/\hbar} |\lambda_n\rangle \langle\lambda_n| . \tag{2}$$

The effective operator available to an observer at temperature T is:

$$D_{\mathcal{W}}^{(T)} \coloneqq \Pi_T \, D_{\mathcal{W}}^{(0)} \, \Pi_T. \tag{3}$$

The Vertical Comparison Map (v10–v11)

Definition 2.3 (Vertical Comparison Map)**.** The vertical comparison map $\Theta_{T_1 \to T_2}$ between observer charts U_{T_1} and U_{T_2} is the composition of coarse-graining maps:

$$\Theta_{T_1 \to T_2} \coloneqq C_{T_2} \circ C_{T_1}^{-1}, \tag{4}$$

where C_T is the spectral coarse-graining map that projects onto the accessible sector at temperature T. This map specifies how observables reconstructed in chart U_{T_1} relate to observables reconstructed in chart U_{T_2}.

The Fisher Information Distance (v8)

Definition 2.4 (Chart Separation Metric)**.** The Fisher information distance between two observer-charts is:

$$d_F(T_1, T_2) \coloneqq \int_{T_1}^{T_2} \sqrt{I(T)} \, dT, \tag{5}$$

where $I(T)$ is the quantum Fisher information for temperature estimation at temperature T. For a thermal radiation field, $I(T) = C_V(T)/T^2$ where C_V is the heat capacity.

The Reconstruction Distortion Functional

Definition 2.5 (Reconstruction Distortion)**.** Given an event occurring in the regime described by chart U_{T_e} and an observer at temperature T_o, the reconstruction distortion is:

$$\mathcal{D}(T_o, T_e) \coloneqq \left\| \Theta_{T_e \to T_o}(\mathcal{O}) - \mathcal{O} \right\|, \tag{6}$$

where $\mathcal{O}$ is an observable and the norm is taken in the appropriate operator topology. This functional measures how much an observable is altered by the chart mismatch between the event's natural description and the observer's reconstruction.

Structural Propositions

The following three results are proved from the definitions of Section 2. They are narrow structural results, not full recovery theorems. Their purpose is to establish that the $\mathcal{W}$-atlas has well-defined mathematical structure in the regimes where it should reduce to ordinary physics, thereby earning the right to make nontrivial claims about the regimes where it doesn't.

Proposition 1: Nested Accessibility

Proposition 3.1 (Nested Accessibility). *Let $T_1 < T_2$. Then $U_{T_2} \subseteq U_{T_1}$. That is, the spectral sector accessible to a higher-temperature observer is contained within the spectral sector accessible to a lower-temperature observer.*

Proof. From Definition 2.1, $U_T = \{\lambda \in \mathrm{spec}(D_{\mathcal{W}}) : |\lambda| \geq k_{\mathrm{B}}T/\hbar\}$. If $T_1 < T_2$, then $k_{\mathrm{B}}T_1/\hbar < k_{\mathrm{B}}T_2/\hbar$. For any $\lambda \in U_{T_2}$, $|\lambda| \geq k_{\mathrm{B}}T_2/\hbar > k_{\mathrm{B}}T_1/\hbar$, so $\lambda \in U_{T_1}$. Therefore $U_{T_2} \subseteq U_{T_1}$. □

Corollary 3.2 (Monotone Filtration). *The family $\{U_T\}_{T>0}$ forms a decreasing filtration of the spectrum of $D_{\mathcal{W}}$: as temperature increases, the accessible spectral sector shrinks monotonically. In particular:*

$$T_1 < T_2 < T_3 \quad \Longrightarrow \quad U_{T_3} \subseteq U_{T_2} \subseteq U_{T_1}. \tag{7}$$

At $T \to 0$, the accessible sector approaches the full spectrum.

Remark 3.3. This result gives the "vertical" direction in the atlas a clear mathematical structure: it is a filtration indexed by temperature. The spectral filter Π_T inherits this ordering: $\Pi_{T_2} \leq \Pi_{T_1}$ in the operator partial order whenever $T_1 < T_2$. This means $\Pi_{T_2}\Pi_{T_1} = \Pi_{T_2}$: applying the more restrictive filter after the less restrictive one yields the more restrictive result.

Proposition 2: Identity Limit

Proposition 3.4 (Identity Limit of the Vertical Map). *As $T_2 \to T_1$, the vertical comparison map approaches the identity:*

$$\lim_{T_2 \to T_1} \Theta_{T_1 \to T_2} = \mathrm{id}_{U_{T_1}}, \tag{8}$$

and the Fisher information distance vanishes:

$$\lim_{T_2 \to T_1} d_F(T_1, T_2) = 0. \tag{9}$$

Proof. By Definition 2.3, $\Theta_{T_1 \to T_2} = C_{T_2} \circ C_{T_1}^{-1}$, where C_T^{-1} denotes the inverse reconstruction map on the image of C_T (the accessible sector U_T). As $T_2 \to T_1$, the thermal floors $k_B T_1/\hbar$ and $k_B T_2/\hbar$ converge. In the limit, the coarse-graining maps C_{T_1} and C_{T_2} project onto the same spectral sector, so $C_{T_2} \circ C_{T_1}^{-1} \to \mathrm{id}$ on the common accessible sector.

For the Fisher distance: by Definition 2.4, $d_F(T_1, T_2) = \int_{T_1}^{T_2} \sqrt{I(T)}\, dT$. Since $I(T)$ is bounded on compact temperature intervals (it equals $C_V(T)/T^2$ for thermal states, which is finite for $T > 0$), the integral vanishes as $T_2 \to T_1$. □

Remark 3.5 (Physical interpretation). This result formalises the intuition that calibration between nearly identical observer conditions should be trivial. Two detectors at temperatures T and $T + \varepsilon$ should agree on their reconstructions to $O(\varepsilon)$. The framework does not predict novel physics in the small-separation regime. The novel content lives in the regime $d_F(T_1, T_2) \gg 0$.

Proposition 3: Matched-Chart Consistency

Theorem 3.6 (Matched-Chart Consistency)**.** *Let $T_o = T_e = T$. Then:*

1. *The vertical comparison map is the identity:* $\Theta_{T \to T} = \mathrm{id}_{U_T}$.
2. *The spectral filter acts as the identity on observables already within U_T: for any observable $\mathcal{O}$ with support in U_T,* $\Pi_T\, \mathcal{O}\, \Pi_T = \mathcal{O}$.
3. *The reconstruction distortion vanishes:* $\mathcal{D}(T, T) = 0$.

Consequently, when observer and event inhabit the same chart, no vertical transformation is required and no chart-mismatch distortion appears. The framework's novel content resides exclusively in the regime $T_o \neq T_e$.

Proof. (i) Setting $T_1 = T_2 = T$ in Definition 2.3: $\Theta_{T \to T} = C_T \circ C_T^{-1} = \mathrm{id}_{U_T}$.

(ii) The spectral filter Π_T projects onto eigenvalues $|\lambda| \geq k_B T/\hbar$. If $\mathcal{O}$ has support only on eigenvalues in U_T (i.e., above the thermal floor), then Π_T acts as the identity on $\mathcal{O}$: $\Pi_T\, \mathcal{O}\, \Pi_T = \mathcal{O}$.

(iii) From Definition 2.5: $\mathcal{D}(T, T) = \|\Theta_{T \to T}(\mathcal{O}) - \mathcal{O}\| = \|\mathcal{O} - \mathcal{O}\| = 0$. □

Remark 3.7 (What this theorem does and does not say). This theorem establishes that the matched-chart regime is the **ordinary limit** of the framework: no vertical transformation is required, no reconstruction distortion appears, and the observer's description is exact (within the chart). It does **not** claim to recover all of standard physics from first principles. In particular, it does not derive the Einstein equations, the Standard Model gauge group, or the specific form of the propagation law. What it does is establish that the framework *has* an ordinary limit and correctly identifies where the novel content resides: in the mismatch regime $T_o \neq T_e$.

Candidate Observables

The Chart-Mismatch Residual

The structural propositions of Section 3 establish that matched charts produce no distortion and that the distortion varies continuously with chart separation. This immediately suggests an experimental test: compare reconstructions from detectors at different effective temperatures.

Prediction 4.1 (P23 — Chart-Mismatch Reconstruction Residual). For two co-located detector systems operating at effective temperatures T_1 and T_2, observing the same event class, after standard calibration and systematic correction:

If the framework is correct: A residual reconstruction disagreement may persist that is not attributable to instrumental systematics. A natural candidate measure of chart separation is an information-geometric distance between thermal observer states. One computable proxy is the Fisher information distance:

$$\delta_{\text{reconstruction}}(T_1, T_2) \sim f\big(d_F(T_1, T_2)\big), \qquad d_F(T_1, T_2) := \int_{T_1}^{T_2} \sqrt{\frac{C_V(T)}{T^2}}\, dT, \tag{10}$$

where f is a monotonically increasing function to be determined. We do not claim that d_F is the unique or final metric induced by the $\mathcal{W}$-atlas; we propose it as a computable first proxy for scaling tests of chart-mismatch residuals.

First-sensitive variables: The residual should appear first in reconstruction variables that depend most strongly on fine spectral accessibility:

- timing resolution and event synchronisation
- spectral channel fragmentation
- inferred resonance lifetimes or decay widths

Distinguishing from systematics: A chart-mismatch residual is distinguished from instrumental error by its functional form: it scales with $d_F(T_1, T_2)$ (which depends on the heat capacity profile $C_V(T)$), not with $|T_1 - T_2|$ linearly or with detector-specific noise profiles.

Null result: If the residual is consistent with zero (conventional thermal and systematic uncertainties) for all accessible temperature separations, the chart-mismatch mechanism is constrained to produce effects below the experimental sensitivity, and the framework's novel content is correspondingly bounded.

Remark 4.2 (Epistemic status). This prediction is a **candidate falsifiable bound**. It specifies a candidate scaling proxy, names the first-sensitive variables, and provides an explicit null-result condition. It does not claim that such an effect has been observed or that existing data show it.

The Non-Commutative Measurement Floor (P20, Sharpened)

Prediction 4.3 (P20 Revised — Measurement Floor at Millikelvin Temperatures). Ultra-precision measurements at millikelvin temperatures should show a systematic floor on measurement uncertainty that does not decrease with improved instrumentation. The framework predicts this floor scales as:

$$\Delta\mathcal{O}_{\min}(T) \;\sim\; \frac{\hbar}{k_{\mathrm{B}}T_{\mathrm{apparatus}}}. \tag{11}$$

This floor arises because the spectral filter Π_T eliminates eigenvalues below $k_{\mathrm{B}}T/\hbar$, and the lost spectral information manifests as irreducible uncertainty in the observer's reconstruction.

At $T = 10\,\mathrm{mK}$ (dilution refrigerator regime), this predicts a timing floor of $\sim \hbar/k_{\mathrm{B}}(10\,\mathrm{mK}) \approx 0.8\,\mathrm{ns}$.

Null result: If measurements at millikelvin temperatures continue to improve without encountering a systematic floor at this scale, the thermodynamic filter mechanism of the framework is falsified.

Fisher Distance Between Cosmological Epochs (P22, Revised)

Prediction 4.4 (P22 Revised — Fisher Distance as Candidate Chart-Separation Proxy). If Fisher distance is the correct effective proxy for chart separation, then cosmological epochs provide a computable test case for its scaling behaviour. For a radiation-dominated universe with $C_V \propto T^3$:

$$d_F(T_1, T_2) = \int_{T_1}^{T_2} \frac{\sqrt{C_V(T)}}{T}\,dT \;\propto\; \int_{T_1}^{T_2} T^{1/2}\,dT \;=\; \tfrac{2}{3}\big(T_2^{3/2} - T_1^{3/2}\big). \tag{12}$$

This gives a concrete number for the candidate chart separation between, e.g., recombination ($T \approx 3000\,\mathrm{K}$) and the present ($T \approx 2.725\,\mathrm{K}$):

$$d_F(2.725, 3000) \propto \tfrac{2}{3}\big(3000^{3/2} - 2.725^{3/2}\big) \approx 1.1 \times 10^5 \quad \text{(in natural units)}. \tag{13}$$

Whether this quantity connects to any independently measurable cosmological observable remains to be established.

Null result: Failure to connect this proxy to any independently meaningful cosmological quantity would weigh against the Fisher-distance interpretation of chart separation.

Explicit Falsification Criteria

The Manifold Relativity programme can be falsified. The following conditions are organised by their relationship to the present edition.

Falsification Criteria Directly Tied to v12

1. **No chart-mismatch residual.** If co-located detectors at different operating temperatures show no reconstruction disagreement beyond standard systematics, the chart-mismatch prediction (P23) is constrained. If the null result persists across multiple detector pairs and temperature ratios, the mechanism is falsified. Status: *testable in principle; requires dedicated experimental protocol.*

2. **κ-addition does not emerge from spectral truncation.** If the H-function composition law of thermodynamic relativity (v7) cannot be derived from $\Pi_T D_{\mathcal{W}}^{(0)} \Pi_T$ for any well-defined candidate operator, the bridge between the $\mathcal{W}$-atlas and thermodynamic relativity (v7, O31) is broken. This would not falsify the $\mathcal{W}$-atlas structure itself, but would falsify the proposed connection to observed plasma physics. Status: *internal mathematical test; does not require experiment.*

3. **The spectral filtration is not monotone.** If a physical system is found where higher-temperature observers access *more* spectral structure than lower-temperature observers (contradicting Proposition 3.1), the filtration structure is falsified. Status: *would require a counterexample to the threshold ansatz of Definition 2.1.*

Series-Level Predictions Subject to Falsification

The following predictions originate in earlier editions and are not derived within v12, but remain active falsification targets for the programme as a whole:

4. **No measurement floor at millikelvin temperatures (P20, v6).** If ultra-precision measurements at $T < 100\,\mathrm{mK}$ continue to improve beyond $\hbar/k_{\mathrm{B}}T$ without encountering a systematic floor, the thermodynamic filter mechanism is challenged. The exact observable definition and threshold require further specification before this constitutes a sharp falsifier.

5. **The Hubble-decoherence scaling fails (P1, v1).** If future precision measurements of $H(T)$ in the radiation-dominated era do not follow $H \propto t_P \cdot c_S^2$, the (S, ϕ)

geodesic structure of v1–v2 is challenged. This prediction is currently consistent with known cosmological data but has not been independently tested against the framework.

Open Conjectures and New Open Problems

The RG-Flow Conjecture

Conjecture 6.1 (Chart Transitions as Renormalisation Group Flow). The vertical comparison maps $\Theta_{T_1 \to T_2}$ between observer-charts at different temperatures may be related to the renormalisation group flow in the following sense: the progressive coarse-graining of spectral information as temperature increases ($U_{T_2} \subseteq U_{T_1}$ for $T_2 > T_1$) has the formal structure of an RG transformation, with temperature playing the role of the RG scale parameter.

Open Problem 6.2 (O36 — RG Identification). Determine whether the vertical comparison map $\Theta_{T_1 \to T_2}$ satisfies the formal properties of a Wilsonian RG transformation (semigroup composition, fixed-point structure, anomalous dimensions). If so, identify the RG beta function in terms of the spectral data of $D_{\mathcal{W}}^{(0)}$.

Remark 6.3. This identification is suggested by the monotone filtration structure (Proposition 3.1) and by the information-theoretic nature of the coarse-graining maps. It is stated as a conjecture, not as an established result. The identification, if correct, would connect the $\mathcal{W}$-atlas to the extensive existing literature on the RG and on entropic c-theorems.

The Open Boundary

The following critical open problems remain unresolved. Their resolution is required for the programme to advance from its current status as a candidate framework to a fully predictive theory.

O1. Derivation of $g_{IE}(I, E)$. Blocked since v1. Required for EFE recovery.

O2. Full Einstein Field Equation recovery from the (I, E) Ricci tensor. Depends on O1.

O16. Strong and weak forces from additional gauge structure.

O25. Explicit construction of $D_{\mathcal{W}}$ on the Steiner system hypergraph.

O31. Emergence of the H-function composition law from spectral truncation of $D_{\mathcal{W}}^{(0)}$. The critical internal consistency gate for the candidate operator.

O35. Neutrinos as bounded stress test (v11).

O36. RG identification of vertical maps (this edition).

Series Arc

Table 1: The Manifold Relativity programme: series arc v1–v12.

Version	Date	Central Contribution
v1	Mar 2026	Master manifold $\mathcal{W}$ with coordinates (S, I, E, ϕ, C, A); Hubble-decoherence prediction
v2	Mar 2026	Spatial emergence from (I, E); cosmic information budget; dark energy as Landauer cost
v3	Mar 2026	Planck-scale expander graph; zig-zag product; BAO scale consistency check
v4	Mar 2026	Kaluza-Klein reduction; ϕ as compact fifth dimension; Einstein-Maxwell recovery
v5	Mar 2026	Operational coordinate definitions; epistemic pivot; $g_*(T)$ hypothesis
v6	Mar 2026	Non-commutative boundary; eigenvalue paradigm; spectral triple programme
v7	Mar 2026	Independent convergence with thermodynamic relativity (Livadiotis-McComas); κ-addition bridge
v8	Mar 2026	W-atlas: formal chart structure; observer-dependent spectral accessibility
v9	Mar 2026	[*Internal working edition*]
v10	Mar 2026	Candidate Dirac operator $D^{(0)}_{\mathcal{W}}$; spectral filter Π_T; open problems O31–O35
v11	Apr 2026	Chart matching as central thesis; measurement as chart-relative reconstruction
v12	Apr 2026	**Series renamed to Manifold Relativity.** Programme reframing; structural propositions; candidate observables; falsification criteria

Conclusion

This edition does not advance the frontier of the programme. It consolidates the ground behind it.

The name change is overdue: the mature framework is not a theory of entropy waves on spacetime, and the old title invited precisely the category of critique that addresses a theory the programme does not propose. From this edition, the programme is **Manifold Relativity**.

The structural propositions are deliberately narrow. They prove only what can be proved from existing definitions: that the atlas has a well-ordered filtration structure, that the vertical maps are continuous, and that matched charts recover the ordinary limit. They do not prove the grand recovery theorems (O1, O2) that the programme requires for full validation. But they establish that the framework has a coherent ordinary-limit structure in the regimes where agreement with known physics is expected, and they identify precisely where the novel content resides: in the chart-mismatch regime, where $T_o \neq T_e$.

The candidate observables are stated as bounded predictions with explicit null-result conditions. They specify what to measure, what scaling to look for, and what functional form would distinguish a chart-mismatch signal from instrumental noise. They do not claim that such effects have been observed.

The falsification criteria are stated explicitly. The programme can be killed. If the measurement floor is not found, if the chart-mismatch residual is absent, if κ-addition does not emerge from spectral truncation — these are the conditions under which the framework fails.

The next step is not more architecture. It is O31: demonstrating that the H-function composition law emerges from the candidate operator. Until that internal consistency gate is passed, the operator remains a candidate and the framework remains a programme.

References

[1] Sorvik, P. E. et al. (2026). Entropy Waves, Coordinate Systems, and the Self-Referential Universe: Preprint v1. (Historical series title; programme retitled *Manifold Relativity* from v12.) Available: https://paulsorvik.wordpress.com

[2] Sorvik, P. E. et al. (2026). Manifold Relativity v8: The W-Atlas. Available: https://paulsorvik.wordpress.com

[3] Sorvik, P. E. et al. (2026). Manifold Relativity v10: Candidate Dirac Operator on the W-Atlas. Available: https://paulsorvik.wordpress.com

[4] Livadiotis, G. & McComas, D. J. (2024). The theory of thermodynamic relativity. *Scientific Reports*, **14**, 22641.

[5] Connes, A. (1994). *Noncommutative Geometry.* Academic Press.

[6] Jacobson, T. (1995). Thermodynamics of spacetime: the Einstein equation of state. *Physical Review Letters*, **75**, 1260–1263.