

Collapse Reframed: From Reduction to Actualization

Kernel Specification and Signature-Mapped Predictions for a Coherence-
First Research Program

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Abstract

The measurement problem persists because quantum mechanics describes smooth unitary evolution while observation yields a single definite outcome. Collapse is conventionally described as the reduction of superposition, a destructive narrowing that eliminates alternatives. Decoherence theory explains the suppression of interference and the stability of pointer states, and Quantum Darwinism shows how records are distributed across environments, but neither explains why one outcome occurs.

This paper proposes a reframing: collapse is not destruction but the act of actualization under constraint. Decoherence embeds constraints and disperses records, but collapse actualizes one outcome, writes its record, and updates the constraint set. In this framework, entropy is the record of collapse expressed as residue—the redistributed traces of pruning already enacted—and time is the sequential accumulation of records. Objectivity arises naturally once record distribution saturates.

The mathematics of quantum mechanics remains intact; the contribution is interpretive clarity. This reframing yields testable predictions: consensus rises with record distribution, operational collapse latencies increase under weak or balanced constraints, constraint sweeps produce hysteresis, and entropy growth correlates with record accumulation. These signatures can be probed with existing experimental platforms.

By reframing collapse as actualization, we recast the measurement problem, clarify decoherence's role, and establish a physics-facing research program. This also sets the stage for the UCT physics wing (WP01–WP02) and its Tier-2 companion, Structural Physics, which operationalizes collapse under constraint as a working hypothesis; law-level evaluation and criteria are treated explicitly in WP05.

All predictions are stated for regimes where experimental conditions permit clear separation of decoherence (record dispersal) from actualization and where standard quantum dynamics and no-signaling remain fully intact; quantitative fits are reported with platform-specific uncertainties and explicit limits of applicability.

Keywords: quantum measurement problem; wavefunction collapse; decoherence; quantum Darwinism; open quantum systems; weak measurement; quantum trajectories; records; objectivity; entropy production; arrow of time.

1. Introduction

The measurement problem remains one of the most persistent fractures in quantum theory. The wavefunction evolves unitarily under the Schrödinger equation, but measurement yields a single definite outcome. The standard solution — wavefunction collapse — is described in destructive terms: a superposition of possibilities reduces to one observed eigenstate, with all others eliminated. This language of reduction has proven difficult to reconcile with the otherwise smooth, deterministic evolution of the theory.

Decoherence theory has clarified part of this puzzle. Through interaction with an environment, interference terms are suppressed, stable “pointer states” emerge, and outcomes become robust against disturbance. Quantum Darwinism extends this account by showing how outcomes are redundantly encoded in environmental fragments, allowing multiple observers to agree. These advances explain why classicality emerges from quantum dynamics, but they leave one central question unanswered: why does a single outcome occur at all? Decoherence suppresses alternatives, but it does not select one.

Interpretive responses have varied. Many-Worlds theory denies collapse entirely, treating all possible outcomes as co-realized. Objective collapse models propose stochastic mechanisms or new dynamics to force collapse. Bohmian mechanics introduces hidden variables. Each strategy has explanatory power, but each also carries conceptual or empirical costs. The fracture persists: what is collapse, and how should it be understood?

The reframing proposed here is not an objective-collapse proposal in the GRW/CSL sense: it introduces no new stochastic dynamics and makes no modification to unitary evolution between collapse events. It is also not an attempt to derive single outcomes from decoherence alone, as in decoherent-histories programs that rely on consistency conditions to select outcome sets; rather, it treats decoherence as the record-embedding prelude to a distinct actualization step that decoherence prepares but does not perform. Finally, it differs from epistemic reframings such as QBism, which treat collapse as a belief-update by the observer: here, collapse is an ontic actualization event — an outcome-and-record-making step in the world — while remaining fully compatible with standard quantum probabilities and no-signaling constraints.

This paper proposes a reframing. Collapse should not be understood as destruction, but as the act of actualization under constraint. It is not an anomalous reduction layered onto unitary evolution, but the structural process by which potential resolves into outcome. Constraints are not secondary boundary conditions imposed on pre-existing dynamics; they are the primary architecture **for selection and actualization** through which potential resolves into form. Decoherence is not collapse but its prelude: the embedding of constraints and dispersal of records that stabilize outcomes. Collapse is the step that decoherence prepares but does not perform.

This modest change in framing preserves all the mathematics of quantum mechanics and decoherence theory while clarifying their interpretive gap. It also brings entropy and time into the same picture: entropy as the record of collapse expressed as residue, time as the sequential accumulation of records. The result is a coherent, single-world account of collapse that is testable

through specific predictions in quantum experiments, mesoscopic systems, and non-equilibrium physics.

Our goal is not to overthrow existing physics but to refine its language. Collapse reframed as actualization recasts the measurement problem, clarifies decoherence's role, and provides a research program with falsifiable signatures. It also lays the groundwork for the UCT physics wing (WP01–WP02) and its Tier-2 companion, Structural Physics, which operationalizes collapse under constraint as a working hypothesis; the law-level evaluation and criteria are treated explicitly in WP05.

1.1 Reader Contract and Scope

This paper advances a structural interpretation of collapse within standard quantum mechanics. It does not introduce new stochastic dynamics, hidden variables, or signaling mechanisms. The Schrödinger equation, Born rule, and no-signaling constraints remain intact.

Scope.

We operate at the level of the possibility structure Ω (*the latent structured space of admissible outcomes/configurations in the active measurement context*) and its constraint-mediated resolution (see WP01 for formalism). **Ω is not an added ontology or new dynamics; it is a bookkeeping name for the structured set of possibilities already implicit in standard QM descriptions.** The micro-mechanism of selection is not replaced; rather, collapse is reframed as constraint-conditioned actualization within Ω .

Ontological stance.

- Collapse is ontic actualization (single-world).
- Decoherence prepares outcome stability but does not itself select.
- Records are physically instantiated constraints that stabilize selection.
- Apparent randomness at the quantum level is attributed to unresolved constraint structure rather than to ontological indeterminacy. This is a methodological stance about incomplete constraint characterization in practice, not a claim of locally accessible hidden variables or a modification of Bell-type constraints.

Falsifiability.

The framework stands or falls on the presence or absence of three cross-domain signatures:

- S_1 — Redundancy $\rightarrow$ Consensus
- S_2 — Neutrality $\rightarrow$ Delayed Resolution
- S_3 — Constraint Sweeps $\rightarrow$ Hysteresis

Failure of these signatures under stated regimes would undermine the structural-collapse interpretation.

Formal development of the kernel and signature system is provided in WP01; cosmological and large-scale implementations appear in WP02. A concrete measurement-level mapping of the kernel schematics is provided in Appendix A.

1.2 What Is New Relative to Standard Measurement Theory?

Standard continuous measurement theory already predicts decoherence rates, stochastic trajectories, and conditioned state-update statistics.

This framework adds:

1. **A constraint-structured interpretation:** collapse is framed as constraint-conditioned actualization within the full measurement context (system + apparatus + environment), not merely an epistemic/Bayesian update.
2. **A cross-domain signature suite (S_1 – S_3)** expected wherever structured collapse occurs.
3. **An explicit mapping between record formation and entropy-like residue** under specified regimes (record-writing as constraint stabilization with measurable residue).
4. **A recursive constraint update map U :** a bookkeeping rule for how written records update the active constraint set across repeated actualizations, making law-like stability emergent over iteration.

If the S -signatures reduce entirely to known decoherence scalings with no additional structural regularities, the framework adds no explanatory value.

A side-by-side comparison of standard versus structural-collapse expectations for each signature, with a discriminator clause, is provided in Appendix B.

1.3 Cross-Domain Extension Note (S_3)

S_3 tests structural constraint path-dependence beyond quantum measurement.

It does not claim that macroscopic systems undergo quantum collapse in the same sense. Rather, it treats hysteresis as a **structural signature of constraint-conditioned stabilization** wherever records and constraints generate path dependence.

2. Collapse in Quantum Mechanics

Collapse is conventionally described as the destructive reduction of possibilities when a quantum system is measured. In the Copenhagen interpretation, a system evolves unitarily until a measurement yields one outcome; the wavefunction “collapses,” eliminating all others. This framing has long fueled both conceptual puzzles and alternative interpretations.

We propose a reframing: collapse is not destruction but the act of actualization under constraint. It is the narrowing of structured potential into one realized trajectory. Alternatives are not annihilated, nor are they “realized elsewhere”; they remain latent only in the minimal sense that Ω continues to encode counterfactual structure — what could have occurred under nearby constraints — even though a single outcome is actualized and recorded. Collapse selects one realized trajectory; it does not multiply worlds. Collapse is generative: it produces outcome, record, and recursive update **as records feed back into the constraint field ($K \rightarrow K'$), shaping subsequent actualizations.**

This can be expressed in a compact kernel schematic, consistent with **WP01**:

$$x^* = C^K(\Omega), S := Res(\Omega; K, x^*, R), \quad T \equiv \sum_t r_t, \quad K' = U(K, R)$$

Ω : latent structured possibility space (admissible outcomes/configurations in the active measurement context).

K : active constraint set (apparatus + environment + already-written records).

C^K : constraint-conditioned actualization map (selection conditioned by K ; mechanism not replaced).

x^* : realized outcome.

R : records (durable imprints of collapse written into the world).

$Res(\cdot)$: residue associated with actualization under constraint (entropy-like remainder under specified regimes; not literal subtraction).

r_t : scalar measure of the record written at step t (used to define record-time).

T : record-time / event-depth (sequential accumulation of record measures).

$U(K, R)$: constraint update map (records update the active constraint set, yielding K').

Status of the kernel notation. The expressions above function as structural schematics — role-labels for the architecture of collapse under constraint — not as fully specified operator equations on a particular state space. They compactly identify what must be present for a single-world collapse account to be coherent:

a latent possibility space (Ω),
 an active constraint set (K),
 an actualization map (C^K),
 durable records (R),
 a measurable residue term (Res),
 and a recursive constraint update (U).

Formal elaboration — including candidate state-space choices, event-depth indexing, and platform-specific instantiations — is developed in **WP01** and **WP02** (Jones 2025); the present paper restricts itself to interpretive clarity and testable signatures.

A double-slit experiment illustrates the reframing. With no which-path detector, the wavefunction supports multiple path amplitudes, producing an interference pattern — evidence of structured possibility (Ω). Adding a detector introduces a constraint K that writes a record R . Collapse then actualizes one definite path x^* , consistent with that constraint. The durable record stabilizes the outcome across observers, ensuring consensus.

Thus collapse is not failure but structure. It is the act by which potential becomes form, records are written, constraints update, and physics remains coherent.

3. Decoherence and Records

Decoherence is typically presented as the suppression of interference terms when a system couples to its environment. Off-diagonal terms in the reduced density matrix are suppressed, leaving apparent classicality. Yet decoherence alone does not produce a single outcome.

In this framework, decoherence is constraint embedding and record dispersal. System–environment interaction imposes constraints K and writes outward imprints, which this framework terms records R . These records are durable traces: readouts, correlations, environmental marks. Decoherence distributes them across fragments of the environment, stabilizing collapse conditions.

Quantum Darwinism describes this as redundancy. (Terminology note: we retain the literature’s term “redundancy” when referencing prior work, but use “distributed record” to emphasize that observers access slices of a single coherent imprint rather than fully independent copies.) Reframed, these are not wasteful duplicates but distributed parts of one coherent record. Multiple observers converge because they read slices of the same imprint.

Sequence:

1. **Decoherence embeds constraints K** and disperses **record-candidates** (correlations / environmental imprints) into accessible fragments.
2. **Collapse actualizes** one outcome x^* under the active constraint set K .
3. The realized outcome is **stabilized as a durable record R** (pointer state, detector click, redundancy across the environment).
4. **Constraints update:** $K' = U(K, R)$, so subsequent actualizations occur under an updated constraint field.

In the double-slit with detectors, decoherence disperses coherence into detector + environment. Collapse then actualizes a single trajectory. Observers sampling fragments all agree because they share one distributed record.

Decoherence prepares; collapse selects. Records bridge them both.

Fragment dependence & distribution. In finite experimental settings, environmental fragments may not be strictly independent and can contain initial correlations. Accordingly, when we speak of “distributed parts of one coherent record,” we will (i) estimate effective fragment independence (e.g., via conditional information metrics), (ii) report consensus saturation with confidence intervals, and (iii) treat “redundancy” in the operational sense of multiple accessible encodings, not as an assertion of literal statistical independence across all fragments.

4. Entropy and Time

Classically, entropy is disorder and time an external parameter. Both framings miss their structural role.

Here, entropy and time are products of record formation.

$$S := \text{Res}(\Omega; K, x^*, R), \quad T \equiv \sum_t r_t$$

Operational note. These identifications— S as residue/entropy-tracking and T as record-accumulation—are conceptual-role claims that track the structural function of entropy and time within the collapse framework. Experimentally, they are assessed via platform-appropriate proxies (e.g., entropy production rates, mutual information growth, redundancy of environmental records), with correlations and effect directions reported rather than literal equalities asserted beyond the validity of the proxies and models used. In the companion paper WP02, T is expressed explicitly as cumulative event-depth ($T = \sum_t r_t$, where r_t is a scalar record measure at step t); the present paper uses this form to keep the conceptual point precise without overcommitting the mathematics. We do not assert an identity between thermodynamic entropy and collapse; rather, in regimes where stable records form, entropy production tracks record formation and time corresponds operationally to cumulative record-depth. Proxy measurements may include entropy budgets in monitored systems, accessible classical information in environment fragments, and record persistence duration. Detailed derivations and cosmological-scale implications appear in WP02.

Entropy S : the record of collapse expressed as residue. Collapse narrows Ω into x^* . Alternatives are not realized elsewhere; they persist only as counterfactual structure encoded in Ω and as redistributed traces in the environment under the active constraints. In record-forming regimes, entropy production tallies these traces: the residue of pruning already enacted.

Time *T*: the accumulation of records. Time is not an independent backdrop but the monotone stacking of stabilized records. Its arrow is collapse writing history.

A star fusing hydrogen into helium exemplifies this. Latent nuclear potential resolves into structure (helium, radiation, and long-lived astrophysical state). The entropy exported is the cost of stabilized structure; emitted radiation and environmental degrees of freedom can carry records *R* outward. Over cosmic history, layered records—from the CMB to geology—constitute time’s ledger.

Entropy is not chaos but the record of collapse expressed as residue. Time is not a stage, but the ledger of collapse.

5. Predictions and Testable Signatures (Physics-Facing)

If collapse is the act of actualization under constraint, with records as its durable residue, then specific signatures should follow. These predictions are consistent with UCT’s physics handles and can be probed with existing experimental platforms.

ID	Domain	Prediction	Observable Metric(s)
S ₁	Quantum exp.	Redundancy → Consensus	κ, NMI vs. fragment count m
S ₂	Quantum exp.	Neutrality → Delayed Resolution	Latency, visibility vs. coupling
S ₃	Fluid/meso.	Constraint Sweeps → Hysteresis	Correlation length, Nu
P ₁	Physics/Cosmo	Entropy ↔ Record Growth (Proxy)	Entropy production vs. mutual information/ record-index growth

Note: **κ** = Cohen’s kappa (agreement), **NMI** = normalized mutual information, **m** = fragment count, **Nu** = Nusselt number (heat transport)

5.1 Redundancy → Consensus (S₁)

Consensus rises monotonically with record distribution, saturating at agreement.

Testbeds: quantum Darwinism experiments with qubits or photons. Metrics: κ, NMI.

Caveat to disclose. Consensus—with–distribution curves depend on fragment independence and initial mixedness; in small photonic or cQED environments the knee and plateau height can shift. We therefore (a) estimate effective independence, (b) report redundancy/consensus with

confidence intervals, and (c) do not construe less-than-ideal plateaus as falsifying record distribution.

5.2 Neutrality → Delayed Resolution (S_2)

Operational collapse latency increases under weak or balanced constraints.

Testbeds: weak measurement experiments, mesoscopic superconducting circuits. Metrics: latency distributions, visibility vs. coupling.

Caveat to disclose. “Collapse latency” is a platform-dependent, operational measure that scales with measurement strength and calibration. Backaction engineering (e.g., partial cloaking) and drift can shift apparent latencies. We preregister calibration runs, report device settings, and treat latency as an empirical signature rather than a fundamental constant.

5.3 Constraint Sweeps → Hysteresis (S_3)

Collapse trajectories depend on path through constraint space. Hysteresis loops and attractors are expected.

Testbeds: Rayleigh–Bénard convection, reaction–diffusion systems. Metrics: correlation length, Nusselt number (Nu).

Caveat to disclose. Finite-size effects, wall geometry, sweep rate, and non-Boussinesq corrections can generate or mask hysteresis. We therefore (i) document boundary geometries, (ii) replicate with small geometry variations and sweep-rate controls, and (iii) report hysteresis area and onset/offset thresholds with uncertainties.

5.4 Entropy ↔ Record Growth (Proxy)

Entropy and record accumulation correlate across controlled conditions.

Testbeds: non-equilibrium physics, cosmological entropy budgets. Metrics: entropy vs. mutual information.

Caveat to disclose. Entropy production and record indices are related by information-thermodynamics constraints in specific models; in general experiments we expect robust monotone associations rather than exact linear relations. We therefore report nonparametric correlations (e.g., Kendall- τ /Spearman- ρ), with model-dependent fits provided only where justified.

Reporting & preregistration. For each signature we preregister: (i) calibration protocols and exclusion criteria, (ii) primary/secondary metrics (with nonparametric alternatives), (iii) effect-direction hypotheses and stopping rules, and (iv) robustness checks

(fragment-independence estimates for S_1 ; device-setting sensitivities for S_2 ; geometry and sweep-rate variations for S_3 ; proxy justification for the entropy–record analysis).

6. Implications (Physics-Facing)

This reframing clarifies fractures without altering quantum mechanics.

Measurement problem recast. Decoherence disperses records and embeds constraints; collapse actualizes one outcome under those constraints. What the standard account treats as an inexplicable reduction, this framework treats as the generative step decoherence prepares but does not perform.

Objectivity grounded. Consensus among observers arises from distributed records — multiple observers reading slices of a single coherent imprint — rather than from redundant independent copies. Objectivity is a structural consequence of record saturation, not an axiom.

Entropy and time unified. Both are consequences of record formation: entropy as the residue of actualization, time as the sequential accumulation of records. They are two faces of the same collapse process.

Laws and constants reframed. If collapse under constraint is the generative mechanism by which structure forms, then what we call physical laws are best understood as records of stabilized constraint architectures that have stabilized across deep record-time — persistent residues of structural resolution rather than unexplained givens. Physical constants appear as entrenched parameters of these stabilized regimes. This forward-looking implication is operationalized in Structural Physics (Constraint Primacy) and evaluated at the law level in WP05. Testing any such claim requires a separate treatment; no departure from local Lorentz invariance or no-signaling is assumed or claimed here.

6.1 Limitations and Failure Modes

- **Finite environments & fragment correlations.** Redundancy/consensus may underperform in small or correlated environments; we treat this as a limitation of the platform rather than a falsification of record distribution.
- **Calibration & latency.** Miscalibration or backaction engineering can distort S_2 ; preregistered calibration tests and sensitivity analyses will accompany latency claims.
- **Hysteresis confounds.** Boundary effects or sweep-protocol artifacts can mimic hysteresis; we require replication under minor geometry and sweep-rate changes.
- **Entropy–record proxies.** Where thermodynamic and information measures are only approximately linked, we report correlation with uncertainty, not identity.

- **Falsifiable conditions.** Failure to observe: (i) increasing consensus with increased record access (S_1), (ii) latency increase under weaker measurement (S_2), (iii) reproducible hysteresis under constraint sweeps with controls (S_3), or (iv) positive association between entropy production and record indices across controlled conditions (P_1) would undermine the collapse-as-actualization program within the tested regimes.

7. Conclusion

Collapse has too often been treated as a destructive reduction. Here it is reframed as the act of actualization under constraint: the narrowing of structured potential into realized outcome. Decoherence embeds constraints and disperses record-candidates; collapse selects one trajectory, stabilizes a durable record, and updates the constraint field forward.

Entropy is the record of collapse expressed as residue; time is the ledger of records. Objectivity arises once record distribution saturates. These clarifications preserve the mathematics of quantum mechanics while resolving its interpretive fracture.

The reframing yields testable predictions: consensus scales with record distribution, operational collapse latency increases under weak or balanced constraints, hysteresis appears in constraint sweeps, and entropy growth correlates with record accumulation. Together, these signatures make *Collapse Reframed* a physics-facing research program.

This paper sets the stage for the UCT physics wing (WP01–WP02) and its Tier-2 companion, *Structural Physics*, which operationalizes collapse under constraint as a working hypothesis; the law-level evaluation and criteria are treated explicitly in WP05. In that program, the interpretive shifts introduced here—entropy as residue, time as record-depth, constraints as primary architecture—become axiomatic foundations for coherence-first modeling. But even at the quantum and thermodynamic levels, collapse reframed as actualization provides a coherent, single-world account that anchors experimental work.

In short: collapse is not destruction, but construction—the act by which potential becomes form, records are written, and the universe coheres into the single trajectory we observe.

Appendix A: Minimal Instantiation (Physics Example)

To anchor the kernel schematics, we give a concrete measurement-level mapping.

Minimal Model A (measurement-level mapping)

- Ω = latent structured possibility space represented (in this instantiation) by a quantum state ρ over Hilbert space H .
- K = active constraint set induced by a measurement context: apparatus specification including measurement basis / POVM elements $\{E_i\}$, measurement strength (coupling parameter g), and environmental decoherence structure.
- $C^K(\Omega)$ = constraint-conditioned *actualization-and-update* map under K that yields both an outcome and a conditioned post-state, e.g. $(x^*, \rho') = C^K(\rho)$.
- x^* = selected outcome index i with probability $p_i = \text{Tr}(\rho E_i)$.
- R = physically accessible record (pointer state, detector click, and/or environmental redundancy) which *encodes* x^* .
- $U(K, R)$ = post-record constraint update (apparatus state, classical register, boundary update), yielding K' .

Kernel (schematic):

$$(x^*, \rho') = C^K(\Omega), \quad T = \sum_t r_t, \quad K' = U(K, R)$$

In this instantiation, Ω is represented by the quantum state ρ , so $C^K(\Omega)$ may be written $C^K(\rho)$.

In regimes where residue is tracked, define

$$S := \text{Res}(\Omega; K, x^*, R)$$

(an entropy-like remainder under specified coarse-graining).

Where:

- T is cumulative record-depth (number or strength of stabilized records).
- r_t is the incremental record contribution per interaction event.

This instantiation makes explicit:

- Decoherence is a stabilization channel within K .
- Collapse is the resolution event selecting x^* (with standard Born-rule probabilities).
- Record R is the physically persistent imprint that updates the active constraint set $K \rightarrow K'$.

No modification of standard probabilities is introduced; the reinterpretation concerns structural role.

Appendix B: Signature-Mapped Predictions

The table below states each signature, an example platform, the standard expectation, and the additional structural expectation.

Signature	Platform example	Standard expectation	Structural-collapse expectation
S_1 — Redundancy → Consensus	Multi-fragment environment monitoring	Decoherence suppresses interference and stabilizes pointer states	Inter-observer consensus probability scales with record redundancy (controlling for effective fragment independence / initial correlations); measurable relationship between redundancy growth and outcome stability
S_2 — Neutrality → Delayed Resolution	Weak / balanced continuous measurement	Operational latency / trajectory timescales scale with measurement strength, noise, and calibration (platform-dependent)	Near-balanced competing constraints produce extended latency beyond decoherence timescale; latency depends on constraint symmetry (e.g., balanced POVM weights, near-degenerate pointer-basis competition, equalized measurement channels), not only coupling magnitude
S_3 — Constraint Sweeps → Hysteresis	Parameter sweep through near-degenerate states	Adiabatic response and relaxation to instantaneous conditions	Path-dependent stabilization: outcome memory reflects prior constraint configuration even when control parameters are returned to their initial values

Discriminator clause.

If observed redundancy–consensus scaling, operational latency, or hysteresis can be fully accounted for by standard decoherence plus stochastic state-update models—with **no residual dependence on constraint symmetry or path history once controls are applied**—the S -signatures fail.

Referenced work

WP01 (OSF canonical):

Jones, Jeremy C. (2025). *Universal Collapse Theory—Foundations of Collapse: Latent Potential, Constraint, and Collapse as a Candidate Law of Coherence (WP01 v2.0)*. HoldingLight LLC. Version v2.0 (Prepared 2025-11-11). CC BY 4.0. OSF. doi:10.17605/OSF.IO/Z6GQ8.
<https://osf.io/vz836/overview>.

WP02 (PhilArchive canonical for now):

Jones, Jeremy C. (2025). *Universal Collapse Theory—Collapse in Physics: Coherence as Law from Cosmology to Matter (WP02 v1.0)*. HoldingLight LLC. Version v1.0 (Prepared 2025-11-11). CC BY 4.0. PhilArchive (record: JONUCT-3).
<https://philarchive.org/rec/JONUCT-3>.