The Object Criterion

Objecthood as Stable Relational Closure under Accumulating Commitment

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General Reader Summary

The idea this paper explores

Almost every physical theory starts with objects *— particles, fields, instruments, observers — and explains the world in terms of how they behave. This programme cannot do that, because its starting ingredients are not objects at all. Beneath everything it places the* Fold *— the single smallest possible distinction — and* commitment*, the event in which a fold becomes a permanent* record*. Nowhere on that list is there a "thing." So this paper asks the question the starting point forces: if the world is made of committed fold-records, what* is *a thing? The answer proposed is that a thing is not a basic ingredient but a* pattern *— a bundle of committed records that holds together and keeps its identity as new records pile up. Two conditions make a pattern into an object: it must be* re-identifiable *(recognisably the same from one moment to the next) and* approximately closed *(bound more tightly to itself than to its surroundings). What makes this more than a definition is that the conditions can* fail*: a cloud or a puff of smoke is barely an object because it loses its identity and its boundary almost at once, while an atom is strongly an object. Objecthood becomes a matter of degree, with a sharp account of when something stops being a thing at all.*

The commitment programme has built its picture from the bottom up. The fold architecture established the Fold as the unique minimal admissible distinction and the elementary unit of committed structure; *Fact Production* established what a committed fact is; *Measurement as Commitment* identified measurement with commitment; *The Commitment Criterion* supplied the mechanism by which one possibility is selected to become a fact; and a companion *matter programme* established that certain stable knots in the record-fabric — *Persistent Fold Defects*, which it identifies with elementary particles — survive intact under changes of description. Each of these treats the committed record, or structures built from it, as the output. None says when a *collection* of records amounts to a thing — and yet the rest of physics, and ordinary language, lean on "object" at every turn. This paper takes the next ontological step: it derives objecthood from the substrate rather than assuming it.

The honest limits are marked throughout, and one of them is worth stating plainly because it is the paper's largest open dependency. That every object must be *made of* committed fold-records is argued as a near-theorem from the minimal-fold ontology; that the objects among record-

bundles are exactly the re-identifiable-and-closed ones is the further claim, forced only to the extent the substrate truly contains nothing beneath folds and records. The persistence half — that a thing is carried forward as the same thing — is the delicate one. The matter programme shows its stable structures survive a change of *resolution* (look closer, the particle is still there); but what objecthood needs is that they survive the *passage of fact* (wait, and the particle is still there). These are not obviously the same, and in fact they come apart: an unstable particle survives any amount of looking-closer yet decays as facts accumulate. So the paper does not claim persistence as settled. It reduces it to a single, named, and plausibly-tractable open question — whether surviving changes of resolution carries over to surviving the passage of fact, over stretches in which nothing destroys the structure — and is explicit that this question is still owed an answer, including a clean account, from the matter programme, of just which events count as "destroying the structure." The paper's own distinctive work is the *other* half: the closure condition that says which persistent structures are individuated enough to count as separate things.

The deliverable is therefore not a single theorem but a *criterion with explicit failure modes*: a statement of what objecthood requires, what would defeat it, and why a substrate of folds and records cannot offer anything more basic for a thing to be — together with a clear ledger of what is proved, what is inherited, what is conditional on a named bridge, and what remains open.

Abstract

Most physical theories begin with objects: particles, fields, systems, apparatuses, and observers are assumed to exist before the theory does its explanatory work. The VERSF programme cannot adopt that starting point. Its primitive ontology is the **Fold** — the unique minimal admissible distinction and elementary unit of committed structure — together with the commitment dynamics that convert folds into persistent **records**; committed fact and emergent temporal order are built from these **(inherited)**. Objecthood appears nowhere among the primitives, and so cannot be assumed; it must be derived, and it sits in the layered ordering Fold → Fact → Record → Persistent Fold Defect → Object that the fold and matter programmes induce.

This paper proceeds in two steps of unequal strength, and marks them apart. First, a near-theorem: every physical object must be representable as a **bundle of committed fold-records**, since by the minimal-fold ontology any persistent structure is built from records and any object lacking committed structure lacks persistence, while a non-record object would require a primitive the fold ontology excludes **(proven, given the minimal-fold ontology)**. This fixes the *material* of objects but does not yet say which bundles *are* objects. Second, the selection: among record-bundles, an object is one satisfying two conditions — **re-identifiability** across successive commitment increments (the bundle recurs recognisably as records accumulate) and **approximate closure** under relational interaction (the bundle is bound more strongly to itself than to its surroundings). The first supplies persistence and, with it, identity; the second supplies individuality and a boundary.

The central claim about the second step is that it is **forced — conditional on fold-exhaustion**, the premise that folds and the records they commit are the *only* substrate ingredients **(conditional**, on fold-exhaustion as marked**)**. Given that premise, any carrier of persistence or individuality must be assembled from records and their couplings alone, and re-identifiability and approximate closure are the unique such carriers: every alternative the words suggest — an enduring substance beneath the records, a primitive boundary, a pre-given individual — names exactly a primitive fold-exhaustion forbids. Where fold-exhaustion is itself only conditionally established in the programme (the void/fold architecture and the non-simplicial no-go), the forcing inherits that status, and we mark it accordingly rather than claiming unconditional ontological priority.

Two technical objects carry the second step and are given exactly the standing the programme's prior results support. The transport relation $\mathbf{T : B_n \to B_{n+1}}$ that grounds re-identifiability is, for the central class of objects, *nearly* discharged by the matter programme — but with one named gap the paper does not paper over. The matter programme's Persistent Fold Defects survive admissible refinement preserving their topology; whether that *description-invariance* is the *temporal* transport re-identifiability requires is the open **Refinement–Transport Bridge** (the two are relations along different axes — change of resolution versus accumulation of fact — and the matter programme does not connect them). So re-identifiability is **conditional on that bridge** for PFD-objects (elementary particles and their kind), **doubly conditional** for composites (constituent persistence plus binding stability), and **open** for marginal structures. This is still a substantial narrowing — it replaces a blanket open transport question with a single localized identification — but it is a conditional, not the outright inheritance an earlier draft claimed. The closure comparison is stated to avoid presupposing the boundary it generates: approximate closure is the existence of *some* stable, locally-maximal partition of the record-network into bundle and environment for which internal coupling dominates external coupling — *not* a partition assumed in advance — so the boundary is an output of the condition, not an input to it.

The criterion yields explicit **failure modes**: a bundle that loses re-identifiability dissolves as a persisting individual, and a bundle whose internal and external couplings become comparable loses its boundary. Objecthood is thereby a graded physical condition with definite ways to fail, not a universal label. At the lower extreme the criterion has a well-defined floor supplied by the matter programme: the **minimal object** is the minimal **Persistent Fold Defect** — the matter programme's identification of elementary particles — to which both conditions apply without degeneracy (its closure constitutive of the defect, its persistence bridge-conditional exactly as for any PFD, not specially secured by being the floor case). Because two members of the same PFD class share every closure invariant, the criterion individuates them by nothing; the paper marks this **(conjectural)** and is careful about its reach — class-identity yields *indistinguishability* (the configuration-space quotient), which is consistent with how the programme treats identical particles, but recovering the actual exchange *statistics* (which representation is selected, and the spin-statistics connection) is flagged as a separate and much larger open problem, not something this result delivers. As a **corollary** — and only as a corollary, not as an independent thesis — the meaning of object-level quantities is relational by construction: properties borne by a relationally constituted object inherit relational significance, with the strength of that inheritance depending on the property (uncontroversial for position and momentum, a stronger and separately argued claim for intrinsic quantities). A final consequence places observerhood at the end of the derived

hierarchy Fold → Fact → Record → Persistent Fold Defect → Object, with observerhood not a further rung but a composition — Observer = Object + commitment role — an observer being a sufficiently persistent, sufficiently closed object that additionally *participates in commitment as a selector*. This is a third condition beyond objecthood, additive rather than accumulative and marked **(conjectural)**, and the additive form is what keeps the observer from re-entering as a new primitive.

The paper modifies no prior result. It is a derivation of objecthood from the existing fold ontology, conditional where that ontology is conditional, and explicit about being so.

Epistemic markers: ***(inherited)*** *for results imported from prior VERSF papers;* ***(proven)*** *for results established here;* ***(conditional)*** *for results holding under stated inputs;* ***(conjectural)*** *for interpretive identifications;* ***(open)*** *for what remains undecided.*

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1. The Question the Substrate Forces

Physics speaks about objects at every turn. Electrons, atoms, instruments, and observers are treated as the entities a theory is *about*, and their existence is assumed before the explanatory work begins. The assumption is harmless in any theory that takes particles, fields, or systems as primitive — there the objects are simply on the list of starting ingredients.

It is not harmless here. The VERSF programme begins from a substrate whose primitive is the Fold — the unique minimal admissible distinction — together with the commitment dynamics that convert folds into persistent records; committed fact and the advance of temporal order are constructed from these **(inherited**, from the fold architecture, the distinguishability-geometry, Fact Production, and temporal-emergence results**)**. Objects are not on that list. A programme that derived emergent geometry, quantum probability, and temporal order from folds-and-commitment, and then quietly helped itself to objects as unexplained entities, would have smuggled a primitive in through the back door — and would owe exactly the account it had elsewhere refused to assume.

So the substrate forces a question it cannot answer by assumption:

If the only things beneath physical structure are committed fold-records, what is an object?

The answer proposed here is that objecthood is not a primitive category but an **emergent stability condition**: an object is a pattern in the accumulating network of committed records that holds together and keeps its identity well enough, and long enough, to be treated as a thing. The work of the paper is to say precisely what "holds together" and "keeps its identity" must mean when the only available materials are folds and the records they commit — and then to ask how much of the everyday notion of objecthood that minimal account is forced to recover.

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2. Why Objecthood Requires Derivation

Begin where the programme leaves off. Reality, pre-commitment, is a structure of distinguishability relations; commitment converts some admissible possibilities into facts; and facts accumulate into a growing network of committed distinctions **(inherited)**. Suppose all of this is in place. Nothing in it yet licenses the word "object."

The existence of committed facts does not by itself supply any of the marks of a thing:

- **Persistence** — a fact, once committed, is a single completed distinction; the bare accumulation of facts does not say which collections endure as the *same* collection.
- **Identity** — there is, as yet, no notion of "the same one again": facts are events, and an event does not recur.

- **Boundary** — a network of distinctions has no intrinsic division into "this thing" and "the rest"; it is, until something distinguishes them, one connected fabric.

A heap of distinctions can therefore exist without composing anything recognisable as an object. The question objecthood poses is not the one Fact Production answered —

Which facts exist?

— but a strictly downstream one:

Which collections of facts persist, and cohere, sufficiently to count as things?

That this question is downstream of commitment, not parallel to it, is the structural reason objecthood is the *next* ontological step and not an independent one (§11). The remainder of the paper answers it with two conditions and then asks how forced those conditions are.

2.1 From Folds to Objects

The paper introduces no new primitive ontology. The programme already identifies the Fold as the unique minimal admissible distinction and the elementary unit of committed structure; the commitment dynamics already convert folds into persistent records; and the matter programme already establishes a further layer above records — Persistent Fold Defects, stable localized closure structures that survive admissible refinement **(inherited)**. The relevant question is therefore not whether stable persistent structures exist — the matter programme has shown they do — but which of them acquire the identifiability that objecthood requires.

A fold is not a substance but a committed distinction. Through commitment it becomes a persistent record; records that acquire stable closure topology and survive refinement are Persistent Fold Defects; and it is among these — and their composites — that the objecthood question is posed. One dependency must be named precisely here, because the whole paper leans on it and because it is easy to overstate: the matter programme's PFDs *persist under admissible refinement preserving their topology*, and this is what the matter programme offers *toward* the structure-preserving transport the persistence condition requires. But surviving a change of resolution is not the same as enduring through the accumulation of fact, and whether the former yields the latter is the open **Refinement–Transport Bridge** (§3.1) — so for the central class of objects the persistence half is not *supplied* but *reduced to that bridge*, a narrower and more tractable dependency than leaving it wholly open, yet a dependency the paper does not discharge. Section 3.1 states the bridge and marks it open; it does not grade an inheritance, because there is no inheritance to grade until the bridge is built.

This induces the layered ordering

Fold → Fact → Record → Persistent Fold Defect → Object → (Object + commitment role = Observer),

with the matter, geometry, and gravity sectors branching off the Persistent-Fold-Defect layer in parallel rather than in series (an atom is an object and is not downstream of gravity), and the final step a composition rather than a further rung (§9). Objects are not added to the ontology. They are the *identifiable* organisations of structures the fold and matter programmes already require. Accordingly the objecthood problem reformulates as:

Which persistent fold-record structures — Persistent Fold Defects and their stable composites — possess sufficient persistence and closure to count as identifiable objects?

The matter programme reduces the persistence half for the central class to the open Refinement–Transport Bridge; the remainder of this paper supplies the rest: a near-theorem fixing the *material* of objects (§5.1), and a forcing argument fixing which organisations of that material *are* objects, with the closure-individuality condition as the paper's own distinctive contribution (§5.2, §8).

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3. Re-identifiability: the Persistence Condition

The first requirement is persistence — and, inseparably from it, identity. We argue below that in this substrate the two are *one* condition, not two, because the only sense in which a record-bundle can "persist" is for a later bundle to count as *the same* bundle continued. There is no substrate notion of a thing enduring that is separate from its being re-identifiable as itself; bare survival of *some* structure is not the survival of *this* structure unless the later structure is recognisably the continuation of the earlier.

Let B_n denote a record-bundle — a subset of the committed fold-records — at commitment stage n, where n indexes successive increments of accumulated commitment (the granularity supplied by *The Commitment Criterion*: one resolved contest, one increment). A candidate object must admit a **transport relation**

$T : B_n \rightarrow B_{n+1}$

carrying the bundle at stage n to a bundle at stage n+1, and preserving enough relational structure that B_{n+1} counts as the continuation of B_n rather than a fresh, unrelated bundle.

Definition 1 (Re-identifiability) (conditional, on the transport account of §3.1**)**

A record-bundle is *re-identifiable* if there exists a transport relation $T : B_n \rightarrow B_{n+1}$ across successive commitment increments preserving sufficient relational structure for B_{n+1} to be recognised as the same continuing bundle as B_n.

Without such a T there is no persistence and hence no identity: the bundle is a transient pattern, present at one stage and gone (or unrecognisable) at the next. With it, the bundle has the minimal continuity a thing requires. Note that identity is not a *third* mark to be derived separately — it is constituted by re-identifiability. The trilemma of §2 (persistence, identity, boundary) is therefore discharged as two conditions, not three: re-identifiability supplies the first two together, and closure (§4) supplies the third. We state this as a claim rather than leave it implicit, because a reader counting three marks and two conditions is owed the identification.

3.1 The Transport Relation and Its Inherited Status

Definition 1 is only as secure as the transport relation T, and honesty requires saying exactly where T comes from, because re-identifiability inherits whatever status the programme's account of T actually has. The matter programme supplies something very close to T for the central class of objects — but "very close" is not "identical," and the gap between them must be named, because the paper's narrowed-burden story depends on a bridge that is not yet built.

The programme requires *some* account of how committed records are carried from one increment to the next. *The Commitment Criterion* answered only *which* commitment occurs and was explicitly agnostic about *how a fact, once made, is carried forward*, locating that in the phase-as-memory companion line and marking it **(open)**. The matter programme appears to supply more: it establishes Persistent Fold Defects (PFDs) as localized closure structures that *survive admissible refinement while preserving their defining topology*. The temptation — to which an earlier draft of this paper succumbed — is to say that survival-under-refinement *is* the transport T and therefore re-identifiability is inherited for PFD-objects. That identification is too quick, and the difference is load-bearing.

The refinement / commitment-accumulation gap. Refinement-persistence and commitment-transport are relations along *different axes*. Refinement is a *description-relation*: the same committed structure viewed at finer resolution, invariance across a change of grain. Commitment-transport $T : B_n \rightarrow B_{n+1}$ is a *temporal-accumulation relation*: endurance across the advance of fact, one resolved contest per increment n. The matter programme's theorem says a PFD is *description-invariant* — refine the lens and the defect is topologically still there. Re-identifiability needs something else: *temporal endurance* — at the next increment of accumulated fact, the defect is still there. These coincide only if commitment-accumulation is itself a form of refinement (each committed fact refining the description), and the matter programme does not establish that. Absent such a bridge, what is inherited is description-invariance, not the temporal endurance Definition 1 requires.

We therefore state the result as conditional on exactly that bridge, and name the bridge, rather than assert an inheritance the programme has not earned.

Persistence Inheritance Theorem (conditional, on a restricted Refinement–Transport Bridge)

Conditional claim. If a PFD's survival under admissible refinement entails its endurance across commitment increments *over an interval in which no disrupting commitment occurs*, then every

Persistent Fold Defect satisfies the re-identifiability condition of the Object Criterion over that interval.

Argument, given the restricted bridge. A PFD persists under admissible refinement while preserving its defining topology (matter programme). *Granting the restricted bridge*, that topology-preserving survival is also survival across each increment $n \rightarrow n+1$ within a disruption-free interval, hence a structure-preserving map $B_n \rightarrow B_{n+1}$ satisfying Definition 1 over that interval. Hence the PFD is re-identifiable there.

Refinement–Transport Bridge (open, and known to need restriction). The unrestricted form — *invariance under refinement entails endurance across increments* — is not merely unproven; it is **false as stated**, and decay shows why. An unstable particle (a muon, say) is refinement-invariant in the matter programme's sense — refine the lens and the defect is topologically still there — yet it does *not* endure across increments: it decays. Refinement and accumulation are not just different axes (the point of §3.1) but actively *divergent* ones: refinement holds the facts fixed and changes the grain, while accumulation holds the grain and *adds* facts, some of which destroy the structure. A defect invariant under the first can be annihilated by the second. The honest bridge is therefore the *restricted* one — refinement-invariance entails endurance only over intervals free of disrupting commitment — and the disrupting commitments are exactly the **Failure Mode A** events (§6). The open question is whether the restricted bridge holds; the unrestricted one is settled negative.

The theorem is therefore **(conditional)**, not **(inherited)** — a correction of the earlier draft, which slid between "refinement step" and "increment n→n+1" as though they were one index — and the conditional is now sharper than "unproven": the bridge is *known to need restriction*, with decay (Failure Mode A) the named obstruction to its unrestricted form. This is a structural gain, not only a concession. The restriction ties the bridge to the criterion's own graded, finite-interval notion of persistence: the paper already wants persistence "over a lifespan" for organisms (§7), and decay shows the bridge needs the *same* finite-interval restriction. The two notions are converging on one structure — persistence-until-disruption.

One honesty owed here, because it is the place this section is tempted to be too pleased with the restriction. As stated, the restricted bridge says refinement-invariance yields endurance over intervals in which no *disrupting commitment* occurs — and "disrupting commitment" has so far been characterised as a Failure Mode A event, i.e. precisely a commitment that breaks the transport, i.e. the failure of the very endurance the bridge is meant to establish. Read that way the restricted bridge is close to vacuous: *refinement-invariance yields endurance, except where it does not, and the exceptions are the non-endurances.* The restriction earns its keep only if the disrupting class is **independently specifiable** — characterised in the matter programme's own terms (which kinds of accumulated fact annihilate a PFD's defining topology: decay channels, defect-annihilation conditions) rather than circularly as "whatever breaks transport." So the restricted bridge is the right *shape*, but it owes that independent specification before it is more than suggestive; we flag this rather than assert the restriction is non-circular, and we point at the matter programme's account of defect annihilation as where the specification would have to come from. What the matter programme genuinely delivers is description-invariance of PFDs;

whether that yields temporal endurance over an independently-characterised class of disruption-free intervals is the open, restricted bridge on which PFD-object persistence turns.

This yields a three-tier account of where re-identifiability stands, re-labelled to reflect the gap:

- **PFD-objects** (elementary particles and the stable defect structures the matter programme classifies): re-identifiability is **(conditional** on the restricted Refinement–Transport Bridge**)**, and over disruption-free intervals only — a stable particle is re-identifiable across its lifetime, an unstable one only until it decays (Failure Mode A). *If* the restricted bridge holds, the matter programme's refinement-invariance supplies the transport over such intervals; until it is established, persistence for PFD-objects rests on the bridge rather than on an open general-transport account — a more localized and more tractable dependency than the blanket openness it replaces, but a dependency nonetheless.
- **Composite objects** (atoms, molecules, organisms — bundles of PFD constituents): re-identifiability is **(doubly conditional)** — it has two distinct sources of conditionality: it inherits the bridge dependency (through its constituents) *and* requires the stability of the binding among them (the **Composite Persistence Conjecture**, §8.2). Both sources must hold.
- **Marginal objects** (clouds, vortices, flames — structures that are not PFDs and not stable bindings of PFDs): re-identifiability is **graded and (open)**, depending on the general transport account the programme has not closed. These are exactly the cases §7 rates as *barely* objects.

So the blanket "re-identifiability is open" of an earlier framing is replaced by a sorted answer — conditional-on-the-restricted-bridge for PFDs, doubly-conditional for composites, open for marginal structures — which is a genuine improvement in *localization* even though it is not the clean inheritance the earlier draft over-claimed. What this paper *adds* in every tier is not the transport mechanism but the observation that *objecthood requires T to exist and be structure-preserving for the bundle in question* — a constraint on which bundles are objects, independent of how T acts. The criterion stands across all three tiers; only the *status* of its persistence clause varies, and the variation is now stated at its true strength.

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4. Approximate Closure: the Individuality Condition

Persistence is necessary but not sufficient. A pattern could persist while remaining inseparable from its surroundings — a standing ripple that endures but has no edge, no inside and outside. Objecthood additionally requires **individuality**: a sense in which the bundle is a unit set off from the rest.

Let I(X, Y) denote the *relational coupling* between two parts X and Y of the committed record-network — a measure, in the inherited distinguishability-geometry, of how densely the records in

X are related to those in Y. For a candidate bundle B with complement (environment) E, the relevant comparison is between B's internal coupling I(B, B) and its external coupling I(B, E).

Definition 2 (Approximate closure) (see §4.1 for the non-circular statement)

A bundle B is *approximately closed* if I(B, B) ≫ I(B, E) in an operational sense: the bundle is coupled far more strongly to itself than to its environment.

A strongly closed bundle interacts as a unit; its internal relations dominate, and its couplings outward are weak enough that it can be tracked, named, and treated as one thing. The boundary so generated need not be sharp — it need only be strong enough to support stable identification across the increments of §3.

4.1 Closure Without a Presupposed Boundary

Definition 2 as stated would be circular if read carelessly, and the circularity is the same shape as one the companion paper had to disarm. To compute I(B, E) one must already have drawn the line between B and E — but that line *is* the boundary closure is supposed to generate. Defining closure relative to a partition assumed in advance would presuppose the very individuality it sets out to derive, exactly as a rate-based commitment criterion would presuppose the temporal order it sets out to produce.

The escape is to quantify over partitions rather than assume one:

Definition 2′ (Approximate closure, non-circular form) (this paper)

A bundle B is *approximately closed* if there *exists* a partition of the relevant committed record-network into B and its complement E such that (i) I(B, B) ≫ I(B, E); (ii) this partition is stable under the transport of §3 — the same division continues to dominate across successive increments; and (iii) the partition is *locally maximal*: no strict enlargement or contraction of B yields a partition with strictly greater dominance. The boundary of B is the locally-optimal cut, not merely some internally-dominant cut.

On this reading the boundary is an *output*: objecthood is the claim that some stable, locally-optimal internally-dominant partition exists, not that a particular partition was handed to us in advance. A network with no such partition has no objects in it; a network admitting several admits several (possibly nested) objects; and a partition that dominates at one stage but not the next marks a bundle that is losing its closure — Failure Mode B below. The quantifier "there exists a stable, locally-maximal partition" is what converts closure from a presupposition into a derived, falsifiable condition.

The local-maximality clause (iii) is not decoration; without it the closure condition *over-generates* and fails to individuate, and the failure is worth stating because a bare existence condition invites it. In a richly correlated bundle, *many* sub-partitions are internally dominant relative to their own complements: an atom's nucleus is internally dominant, so is some sub-cluster of its electrons under a particular carving, so are various overlapping and nested chunks.

A criterion that admitted *every* internally-dominant cut as an object would not pick out the object; it would pick out a combinatorial zoo of internally-dominant sub-bundles, most of which nothing counts as a thing. An over-generating individuality condition does not individuate. Local maximality is the repair: the object's boundary is the cut that *cannot be locally improved* — enlarging B to swallow a weakly-coupled neighbour, or contracting it to shed one, both reduce dominance — so the boundary sits at a local optimum of the coupling landscape rather than anywhere a ratio happens to exceed threshold. Genuine nesting survives this (the nucleus is a locally-optimal cut *and* so is the whole atom, at different scales, each a local optimum in its own neighbourhood), which is correct; what local maximality removes is the *arbitrary* proliferation of non-optimal internally-dominant chunks, which is what was wrong. We note the clause carries its own cost: local maximality is stated over neighbouring partitions, so like the existence clause it quantifies over cuts rather than presupposing one — but it is a stronger and less elementary condition than bare existence, and giving it fully non-circular quantitative content (what counts as a "strict" improvement, how the neighbourhood of partitions is structured) is left **(open)**, a sharpening this paper states the need for without completing. And one over-reading must be pre-empted, the same shape as the "inherited" over-reading corrected elsewhere: local maximality fixes *arbitrary proliferation*, but what it leaves is a lattice of locally-optimal cuts at multiple scales, and the paper does **not** establish that this lattice matches the inventory of things intuition recognizes. It could still mispopulate — a spurious local optimum between nucleus and atom, or a weakly-bound dimer that is locally optimal yet barely a thing. So local maximality makes the individuality condition *individuate* rather than smear, but whether the resulting set of optima is the *right* set is itself unvalidated, pending the same open quantitative content; the clause removes the gross failure without yet guaranteeing the fine inventory.

The stability clause in Definition 2′ is doing more work than a passing phrase suggests, and it is worth promoting to a named principle, because it is what answers the natural referee question — *why should objecthood care about a coupling ratio at all?* The answer is that it does not care about a snapshot ratio; it cares about a ratio that *survives commitment accumulation*. A bundle that is internally dominant at one increment and not the next is not an object that briefly existed; it is a transient that never achieved closure. Objecthood is a property of the bundle *across* the increments, not at any one of them.

Closure Stability Principle (this paper)

A bundle B is approximately closed only if its internally-dominant partition *remains* dominant under successive commitment increments — not merely $I_n(B, B) \gg I_n(B, E)$ at some stage n, but $I_n(B, B) \gg I_n(B, E)$ sustained as n advances. Closure is a dynamical property of the bundle's trajectory through accumulating commitment, not a static property of a single configuration.

This moves closure from a *snapshot* property to a *dynamical* one, and the strengthening is real: it is the closure-side analogue of re-identifiability's demand that persistence be carried *forward*, and it is why the two conditions are genuinely paired rather than one temporal and one static. One guard against over-reading the principle: "sustained" means dominance holds in the typical, coarse-grained sense — bounded excursions that recover are permitted, as when a molecule passes through a collision or an organism through stress without ceasing to be one thing. The principle excludes structures whose dominance *fails and does not recover* (Failure Mode B), not

structures that dip and return. Requiring $I_n(B, B) \gg I_n(B, E)$ at literally every n would wrongly deny objecthood to exactly the strongly-closed composites §7 rates highest; sustained dominance is the correct, weaker condition.

We note one inheritance: that the coupling measure $I(\cdot,\cdot)$ is well-defined on the committed record-network is taken from the distinguishability-geometry programme **(inherited)**; this paper does not construct it, only applies it.

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5. The Record-Bundle Principle and the Object Criterion

The construction has two claims of unequal strength, and the whole honesty of the section is in keeping them apart. The first fixes what objects are *made of* and is provable from the minimal-fold ontology. The second fixes which assemblies of that material *are* objects and is forced only conditionally, by the argument of §8. Conflating them — letting a proof of the first stand in for the second — is exactly the slide a careful reader would catch, so we mark the boundary explicitly.

5.1 Objects Are Necessarily Record-Bundles

The fold programme establishes that committed records are the fundamental persistent structures of the substrate. Objecthood therefore cannot consist in anything more primitive than an organisation of such records.

Record-Bundle Principle (proven, given the minimal-fold ontology)

Every physical object is representable as a bundle of committed fold-records.

Proof. The Fold is the unique minimal admissible distinction, and commitment converts folds into persistent records **(inherited)**. Suppose some physical object were *not* representable as a bundle of committed records. Then one of two cases holds. *Either* it possesses no committed structure at all — in which case it has no persistence, and so fails the first mark of objecthood (§2), eliminating its objecthood outright. *Or* it possesses some persistent structure that is not built from committed records — in which case it requires a persistent substrate ingredient beyond the fold, contradicting the minimal-fold ontology, which holds the Fold to be the unique elementary unit of committed structure. Both cases are excluded, so any physical object must be representable as a bundle of committed fold-records. ■

Two things about what this proof does and does not establish, because the ■ is easy to over-read. First, what carries the first horn. "No committed structure → no persistence" is *not* an analytic truth the proof earns by logic alone; it is the inherited premise that persistence in this substrate *just is* continuity of committed records (§2.1), with no other carrier of endurance available under

fold-exhaustion. If one reads "persistence" pre-theoretically, the implication is substantive and rests on that inherited identification; if one reads "persistence" as continuity-of-records by definition, the implication is analytic but then the *premise* that records are the only persistence-carrier is doing the work. Either way the load sits on an inherited claim, not on the ■, and we cite it as such rather than let the proof appear to conjure necessity from nothing. Second, what the proof's scope is. It establishes the *necessity of the material*: objects are necessarily made of records, nothing more primitive being available. It does **not** establish that any particular bundle of records *is* an object — sufficiency of an organisation is a separate question the proof is silent on. A heap of records satisfying neither persistence nor closure is still "a bundle of committed records" and still not an object. The selection among record-bundles is the work of §5.2, and it does **not** inherit this proof's authority; it rests on the conditional forcing of §8.

5.2 The Object Criterion

Among record-bundles, the objects are picked out by the two conditions of §§3–4.

The Object Criterion (conditional, on fold-exhaustion (§8) and the transport account (§3.1))

A bundle of committed fold-records qualifies as an *object* if and only if it is

1. **re-identifiable** across commitment increments (Definition 1) — there exists a structure-preserving transport $T : B_n \to B_{n+1}$; and
2. **approximately closed** under relational interaction (Definition 2′) — there exists a stable, locally-maximal partition for which $I(B, B) \gg I(B, E)$.

Re-identifiability supplies persistence-with-identity; approximate closure supplies individuality.

The "if and only if" is the substance, and its two directions have different standing. The *sufficiency* direction — satisfy both conditions and the bundle has persistence-with-identity and individuality, which are the marks of a thing — is close to immediate once the marks are granted. The *necessity* direction — that an object *must* meet these conditions, that nothing assemblable from records could play the object role without them — is the contestable claim, and it is **not** a theorem on the strength of §5.1. It is the forcing argument of §8, and it is conditional on fold-exhaustion. We state the criterion as a biconditional because that is its intended content, but we are explicit that the right-to-left (necessity) half carries the §8 conditional and not the §5.1 ■.

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6. Failure Modes

The criterion earns its standing as a *physical condition* by specifying how objecthood can fail. A definition that nothing could violate would be a label; this one has two distinct violation routes.

Failure Mode A — Loss of persistence (re-identifiability fails)

If no structure-preserving transport carries the bundle forward — $B_n \nsim B_{n+1}$, in the sense that no T preserves enough structure for continuation — then the bundle has no continuity across increments. It exists at a stage and is gone, or unrecognisable, at the next. The candidate object **dissolves**: there was a pattern, but not a persisting individual. This is the fate of a fluctuation that forms and disperses within a single increment or two.

Failure Mode B — Loss of closure (the dominant partition fails)

If a bundle's internal and external couplings become comparable — $I(B, B) \approx I(B, E)$, or no stable internally-dominant partition persists — then the bundle loses coherent separation from its environment. This is precisely failure of the Closure Stability Principle (§4.1): a partition that was dominant ceases to be so as commitment accumulates, and does not recover. Its boundary dissolves; it merges into the surrounding fabric. The structure may still be *present* (no persistence failure) yet cease to be a distinct *thing*, because there is no longer an inside set off from an outside.

The two modes are independent: a bundle can persist while losing its boundary (B without A), or keep a sharp boundary only momentarily before dispersing (A without B). Objecthood requires escaping both. This independence is what makes objecthood graded rather than binary (§7). One claim must *not* be made here, and an earlier draft made it: that the failure modes give the criterion *predictive* bite at the borderline — that it tells you where the line between atom and cloud falls. It does not, and cannot, on the present development. The failure modes are **structural**, not **quantitative**: they say what failing objecthood *consists in* (no transport; no sustained locally-maximal dominance), and in what *kind* a structure fails. They do not locate the threshold, because the $\gg$ in the closure condition has no fixed value here (§7 concedes this explicitly) and the transport-fidelity has no metric. So the modes characterise the *form* of marginality — a near-cloud has the kind of trouble closure-failure names — but they cannot adjudicate which side of the line a given borderline structure sits, and the paper does not claim they can. A forcing-of-form argument legitimately needs no threshold; it would be inconsistent to then advertise threshold-level predictive power, so we don't.

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7. Degrees of Objecthood (illustrative)

Because the two conditions admit degrees — transport can be more or less structure-preserving, the internal/external coupling ratio more or less extreme — objecthood is naturally **graded** rather than binary. We mark this section **(illustrative)**: the measures T-fidelity and the I-ratio have, as yet, no quantitative content in this paper, so the orderings below are qualitative readings of the criterion, not computed results. They show the criterion *sorts cases the way intuition does*, which is evidence it has captured the right conditions, but they are not themselves derivations.

Strongly persistent and strongly closed (high T-fidelity, extreme I-ratio): atoms, molecules, crystals, biological organisms over their lifespans. These keep recognisable identity across vast numbers of increments and maintain a dominant internal coupling.

Weakly persistent or weakly closed: clouds, smoke, turbulent vortices, flames. A vortex may persist as a pattern while leaking continuously into its surroundings (weak closure); a puff of smoke loses both identity and boundary within moments (both conditions marginal). The framework rates these as *barely* objects, and ordinary usage agrees — we hesitate to call a cloud a thing in the way an atom is a thing.

The elementary particle deserves separate treatment, and here the matter programme fixes what the abstract relational framing could only leave open — though, as §3.1 and §7.1 are careful to say, it fixes the particle's *constitution*, not its persistence, which remains bridge-conditional. By the Record-Bundle Principle (§5.1) an elementary particle must be built from committed fold-records — and the matter programme says exactly what it is built into: a **Persistent Fold Defect**, a localized closure structure with nontrivial topology and holonomy that persists under admissible refinement. A particle is therefore not a structureless point and not a "single record" with no internal decomposition; it is closure-*defined*, the minimal stably-closed defect rather than the minimal bare record. This matters for the criterion's floor, and §7.1 works it out: the minimal object is the minimal PFD, both conditions apply to it (closure constitutively, persistence bridge-conditionally), and the non-individuation of identical particles is re-grounded accordingly. The composite cases above (atoms upward) are stable bindings of such PFDs, where internal records and their couplings are uncontroversial and the full two-condition criterion applies without subtlety.

7.1 The Minimal Object: Particles as Persistent Fold Defects

An earlier framing of this paper placed the elementary particle at a hypothetical *single-record floor* — one committed fold-record with no internal decomposition, on which the closure condition would simply have no content. The matter programme rules that framing out, and the correction strengthens the section rather than weakening it. Elementary particles are not closure-free single records; the matter programme identifies them as **Persistent Fold Defects (PFDs)** — and the Dictionary results sharpen this to: Standard Model particles are the *unique stable representation classes* of PFDs, stable closure defects composed of folds, not primitive material objects **(inherited)**. A PFD is defined by nontrivial closure topology, nontrivial holonomy, persistence under admissible refinement, and positive closure stability. So an elementary particle is closure-*defined*, not closure-*free*.

The consequence for the criterion's floor is therefore the opposite of the earlier framing, and cleaner. The **minimal object is the minimal PFD**, not a bare record, and *both* conditions apply to it without degeneracy:

- **Re-identifiability** is meaningful and required, and its standing for the minimal PFD is exactly the standing it has for every PFD-object: **conditional on the Refinement–Transport Bridge (§3.1)**. What the matter programme supplies is *refinement-invariance* — the defect survives a change of resolution preserving its topology; whether that is the

temporal transport T re-identifiability needs is the open bridge, not something the floor case is spared. The minimal object inherits no more security on persistence than any other PFD; the earlier framing of this bullet, which called it inherited and identified refinement-invariance with T outright, is exactly the overclaim §3.1 retracts and is corrected here.

- **Approximate closure** does not drop out — it is *constitutive*. A PFD's defining topology and positive closure stability are precisely an internally-dominant, stably-bounded structure; the $I(B, B) \gg I(B, E)$ condition is met by the very property that makes the defect persistent. Closure applies at the floor; there is no single-record limit in which it lapses, because there is no objecthood below the minimal PFD.

The criterion is therefore the *same two conditions all the way down* — re-identifiability and approximate closure both apply to the minimal PFD and to every composite above it — with no special floor case where one lapses. The ladder is

Fold → Fact → Record → Persistent Fold Defect → Object → (Object + commitment role = Observer),

with the elementary particle entering at the Persistent-Fold-Defect rung as the minimal object, composite objects as stable bindings of PFDs, and observers as objects that additionally commit — a composition rather than a further rung (§9). No new primitive is introduced at any step.

Non-individuation, re-grounded. The earlier framing argued that identical particles are non-individuated because, as single records, they have no internal structure to tell them apart — closure being absent. That mechanism is now wrong (particles *have* closure structure), but the *conclusion* survives on a stronger footing, and it follows from a principle worth stating in its own right.

Individuation Principle (conditional on fold-exhaustion)

Under fold-exhaustion, objects are individuated from one another only by differences in their admissible invariants. Two objects with identical admissible invariants are not individuated: there is no fact of the matter distinguishing them.

The principle is conditional on fold-exhaustion for the same reason the forcing argument of §8.2 is: under fold-exhaustion the closure invariants (topology, holonomy, stability) are *all* that an object possesses to be individuated by, there being no primitive identity, no haecceity, no bare label beneath the invariants — those would be exactly the forbidden substrate ingredients. So "individuated only by invariant-differences" is not a definition but the individuation-side consequence of the same exhaustion that §8.2 applies to persistence and closure; it inherits that section's conditional status and is tied to it.

The electron case is then a two-line deduction. Electron A and electron B instantiate the same admissible PFD class: same closure topology, same holonomy, same stability invariants. By the Individuation Principle, identical admissible invariants leave no individuating difference. Therefore A and B are not individuated — there is no criterion-level fact about which is which. The non-individuation is not from absent structure (the earlier, now-rejected reading) but from

identical structure: there is no difference in any physical invariant the defect possesses, not because the defect possesses none. This is materially closer to how physics already treats identical particles: an electron has rich structure, yet any two electrons are interchangeable because they realise the same representation, with no fact of the matter about which is which. The criterion delivers exactly this: composite objects are individuated by their *particular* closure partition (this atom's records are not that atom's), while PFD-class members are individuated by *nothing*, because class-identity is identity of every invariant.

We mark the resulting identification **(conjectural)**, and here the earlier draft made a claim that must be sized down, because it promised the hardest part for free. The defensible claim is narrow: PFD-class-identity yields *indistinguishability* — no fact about which class-member is which — which is the statement that the configuration space of identical PFDs is a *quotient* (identical members are not separately labelled). That much the Individuation Principle delivers. But indistinguishability is necessary and nowhere near sufficient for identical-particle *statistics*. The boson/fermion dichotomy comes from the topology of that configuration space — the relevant fundamental group, the symmetric group in three dimensions, the braid group in two — and the choice of which one-dimensional representation is selected (the ± of symmetrization versus antisymmetrization), together with its correlation to spin, carries real geometric and relativistic content that *no amount of non-individuation supplies*. Mere class-identity tells you the space is a quotient; it tells you nothing about which representation of the exchange group is realised, or why that realisation tracks spin. So the honest statement is two-tiered: **class-identity yields indistinguishability (the quotient structure) — this is the conjecture's defensible content; recovering the actual exchange statistics (which representation, and the spin-statistics connection) is a separate and much larger open problem**, not a sharpening of this one. The earlier phrasing — that class-identity "reproduces exchange symmetry" — overstated the reach by collapsing that second tier into the first; we withdraw it. The connection to the Dictionary programme's representation-class identification is real but should be read at this corrected size: the criterion contributes the quotient structure, and the representation-selection that *is* quantum statistics remains to be derived, by the Dictionary line or elsewhere. This paper claims the indistinguishability, flags the statistics as a distinct and harder target, and does not pretend the second follows cheaply from the first.

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8. Why the Criterion Is Forced — and Exactly How Far

The central claim is not that the Object Criterion is *useful* — Definitions 1 and 2′ would be useful regardless. It is that the criterion's necessity half (§5.2) is *forced* by the inherited ontology: that within this substrate there is no other thing objecthood *could* be. This section states that claim at its true strength, which is **conditional**, and is careful to say on what. Note at the outset two distinctions the section keeps. First, the *material* half is not at issue here — §5.1 proved objects are necessarily record-bundles outright; what §8 forces is the *selection*, that the objects among record-bundles are exactly the re-identifiable-and-closed ones. Second, forcing concerns

the *form* of the two conditions — that persistence must take the form of a structure-preserving transport and individuality the form of coupling-dominance — and is distinct from whether that form is *instantiated*: §8.2 notes that the matter programme comes close to instantiating the persistence form for PFD-objects, supplying a refinement-invariance that *would* be the required transport if the Refinement–Transport Bridge (§3.1) held — a bridge the paper marks open rather than assumes.

8.1 The Fold-Exhaustion Premise

The forcing argument requires a premise the rest of the paper has been leaning on, and which must now be made explicit and marked, because the entire strength of the conclusion is the strength of this premise. The fold framing lets it be stated more sharply than a generic "relations and commitment are all there is": the relevant exhaustion is of the *substrate beneath the Fold*.

Fold-Exhaustion Premise (inherited; conditional at programme level)

The substrate is exhausted by folds and the records that commitment makes of them. There is no further ingredient — no enduring substance beneath the records, no primitive boundary, no pre-given individuated entity — from which a thing could alternatively be built.

This is not this paper's to prove; it is the foundational stance of the programme, argued in the void/fold architecture and sharpened by the no-go result for non-simplicial relational substrates, which together hold that the substrate admits *only* the fold's simplicial-relational structure plus the commitment dynamics that act on it **(inherited)**. To the extent those results establish exhaustion, the forcing below is established; to the extent they leave it conditional — and a programme-level exhaustion claim is the kind of thing rarely closed beyond all alternative — the forcing inherits that conditional status. We therefore mark the premise **(inherited; conditional at programme level)** and the forcing conclusion **(conditional on it)**, and we do *not* claim objecthood-selection is forced absolutely. It is forced *given that folds and their records are all there is.*

8.2 The Forcing Argument

Granting the premise, the argument runs as follows.

By the Record-Bundle Principle (§5.1) every object is a bundle of committed records; the question §8 settles is which such bundles qualify. Persistent collections of records inevitably arise as commitment accumulates, and they sort into exactly three classes:

1. **Unstable collections**, which fail persistence — no transport carries them forward intact.
2. **Diffuse collections**, which fail closure — no stable internally-dominant partition sets them off from the rest.
3. **Persistent, approximately closed collections**, which fail neither.

The first class cannot support identity through time; the second cannot support individuality; only the third supports both. But persistence and individuality are precisely the marks ordinarily attributed to objects (§2). So the third class is *sufficient* for objecthood. The forcing claim is the converse — that objecthood *requires* membership in the third class, that re-identifiability and closure are not one qualifying pair among others but the only ones — and it is here that the exhaustion premise does its work. Take the two marks in turn:

- **Persistence-with-identity.** The only materials are records (committed distinctions, which as events do not themselves recur) and their couplings across increments. The sole way a *bundle* can be "the same again" at a later increment, given only these, is for a relation to carry the earlier bundle to the later one preserving enough structure to count as continuation — which is precisely a structure-preserving transport T (§3). There is no rival construction: a persistence not routed through some inter-increment relation among records would require an enduring substance *beneath* the records, and fold-exhaustion forbids exactly that. Re-identifiability is therefore not *a* persistence condition among alternatives; under exhaustion it is the *only* form persistence can take.
- **Individuality.** The only materials for setting a bundle off from the rest are the couplings among records — there is no primitive boundary, no container, no pre-given individuation, since those too would be ingredients the premise excludes. The sole way a unit can be distinguished from its surroundings, given only couplings, is for the bundle's internal couplings to dominate its external ones along some stable partition (§4.1). Any individuation *not* grounded in the coupling structure would again require a forbidden primitive. Approximate closure is therefore the only form individuality can take.

The structure of both arguments is proof by elimination, and an elimination is only as good as the exhaustiveness of what it eliminates over. An earlier framing left this exposed: it struck a *list* of candidate carriers (enduring substance, primitive continuant, primitive boundary, haecceity) and conceded the list might not close. A list invites "why only these?"; the fix is to replace the list with a *partition* — a division of the possibility space generated by stated cuts, so that exhaustiveness is argued rather than hoped.

Carrier Partition Lemma (under fold-exhaustion)

Any admissible carrier of objecthood's marks is exactly one of:

- **primitive-external** — requiring an ingredient beneath folds-and-records;
- **record-internal** — a property predicable of a record (or bundle) in isolation;
- **record-relational** — a relation among records, or among record-stages.

These three are *exhaustive*, because they are the cells of two binary cuts: a carrier either requires a sub-fold ingredient or it does not (external vs. substrate-built), and a substrate-built carrier either is a relation or it is not (relational vs. internal). There is no fourth cell, because each cut is a yes/no.

Primitive-external carriers are excluded by fold-exhaustion outright. *Record-internal carriers are excluded by type*: persistence is a relation between a bundle and its earlier stage, and

individuality a relation between a bundle and its environment — both are *relational* quantities (so defined in §§3–4), and a property predicable of a record in isolation is not a relation and therefore cannot constitute either. Hence every admissible carrier of persistence or individuality is **record-relational**.

The lemma converts the elimination from a list into a partition: a critic can no longer ask "why only these candidates?", because the three are not candidates but the cells of two exhaustive cuts. What a critic *can* still do is attack a cell — deny fold-exhaustion (the marked premise), or deny that persistence and individuality are relational (hard, since §§3–4 define them so), or deny that record-internal entails non-relational (true by the partition's construction). The completeness worry that the earlier list carried is therefore not waved away but *relocated*: from "is the enumeration complete?" (unanswerable without listing everything) to "is the two-cut partition exhaustive and are its cells disjoint?" (a structural question with the stated answer above). That is a far better-defended footing, and the forcing is now conditional on the partition's exhaustiveness rather than on an open enumeration.

The four candidates the earlier framing struck are now simply *instances* sorted into the two excluded cells, which is the right demotion: an enduring substance and a primitive temporal continuant are primitive-external (or, if read as intra-record, record-internal and excluded by type); a primitive boundary and a haecceity (a bare individuating label) are primitive-external. None survives, and none needed naming individually — they fall as members of cells the lemma excludes wholesale.

One guard against a circularity of the bridge's family. "Record-relational" includes *relations among record-stages*, and a critic may worry this smuggles in the temporal ordering the programme is trying to derive — that "stages" presupposes time. It does not: the relations in play are the *substrate* relations (couplings, inter-stage maps) the programme already uses to *construct* emergent order, deployed here at the level they are independently licensed, not by assuming a prior time. The lemma uses inter-stage relations to *build* persistence, exactly as the programme uses substrate relations to build emergent geometry; it does not presuppose the temporal endurance it is characterising.

What the lemma does **not** do is fix the *specific* record-relational form. It forces "record-relational"; it does not, by itself, force "single-valued transport T specifically" for persistence or "coupling-dominance specifically" for individuality. Records and their couplings could in principle support structure-preserving inter-stage relations that are not single maps — multivalued continuations, branching, merging. So the lemma closes the *partition* step (record-relational is forced, conditional on the partition's exhaustiveness), and hands the *form* step to the Uniqueness Proposition below, where T and coupling-dominance are the single-valued, dominant-partition specializations, with multivalued continuations remaining a marked **(open)** alternative the paper does not exclude.

This conclusion deserves to be stated as a proposition, because it is the formal result the elimination establishes and the answer to the referee's "why *these* two conditions?"

Objecthood Uniqueness Proposition (conditional on fold-exhaustion and on the Carrier Partition Lemma's exhaustiveness)

Under fold-exhaustion, by the Carrier Partition Lemma every admissible carrier of persistence or individuality is record-relational. Among record-relational carriers, the single-valued inter-stage continuation is the transport T (Definition 1) and the dominant-stable-partition structure is approximate closure (Definition 2′). No alternative pair — weaker, stronger, or merely different — survives, *subject to* the partition being exhaustive and to single-valuedness being granted over branching record-relational continuations.

The proposition is uniqueness of *form*, not minimality of *strength*: it does not rank the conditions on some scale and claim they are the lowest adequate point (which would invite "weaker in what ordering?"), but shows — via the partition, not an open list — that any carrier other than the two is either in an excluded cell (primitive-external or record-internal) or a record-relational form other than single-valued-transport/dominant-partition. We deliberately do **not** state this as "no other carrier is *expressible* in the substrate," as an earlier draft did: inexpressibility is a modal claim about a representational system, and one cannot prove "X is not expressible in language L" without a formalized L, which this paper does not provide. The honest claim is the defensible one — every carrier falls in a cell the lemma excludes, or is a record-relational form the Uniqueness step narrows away by granting single-valuedness — not the unprovable *cannot be expressed at all*. The two conditionals in the marker are the price of that honesty: the proposition holds given fold-exhaustion *and* given the partition's exhaustiveness, and it identifies T and closure specifically only by granting single-valuedness over the open branching alternative. With those stated, it is the formal answer to "why these two conditions?" — and it is exactly as strong as its two conditionals, no stronger. The improvement over the earlier draft is that the first conditional is now *partition-exhaustiveness* (a structural claim with a stated two-cut argument) rather than *enumeration-completeness* (an open list); a critic must now break a cut or a cell, not merely name a carrier.

The two conditions are thus not merely sufficient and not merely natural: under fold-exhaustion, by the Carrier Partition Lemma every carrier of objecthood's marks falls in an excluded cell (primitive-external, record-internal) save the record-relational one, and the two conditions are its single-valued/dominant-partition specializations. Removing either condition leaves a structure that cannot exhibit the corresponding mark by any record-relational means. Hence — conditional on fold-exhaustion and on the partition's exhaustiveness — the selection half of the Object Criterion is forced, and the layered ordering Fold → Fact → Record → Persistent Fold Defect → Object is not merely available within the framework but close to compelled.

The matter programme nearly supplies the persistence half — conditional on one bridge — and that narrows what this paper must establish. The forcing argument above shows that persistence *must take the form* of a structure-preserving transport — but it does not, by itself, exhibit such a transport. The matter programme exhibits something close: Persistent Fold Defects survive admissible refinement preserving their defining topology. Whether that refinement-invariance *is* the commitment-transport T re-identifiability needs is the open Refinement–Transport Bridge (§3.1); they are relations along different axes (description vs temporal accumulation) and the matter programme does not connect them. So for PFD-objects

the persistence condition is not shown inherited outright; it is *conditional on the bridge* — but this is still a substantial narrowing, because it replaces the blanket open transport question with a single, localized, tractable identification. Of the two conditions, persistence is — for the central class — discharged *modulo the bridge*, and the paper's own distinctive contribution narrows to the **closure** condition: the classification of which persistent structures additionally possess the internally-dominant partition that confers individuality. The Object Criterion's work, given the matter programme and the bridge, is not "can persistent structures exist?" (answered: PFDs, description-invariantly) but "which persistent structures are individuated objects?" — and that is the closure half.

For objects that are not themselves PFDs, persistence is inherited only derivatively, and we state the bridge as a marked conjecture rather than assume it:

Composite Persistence Conjecture (conjectural)

A composite object — a bundle of PFD constituents — is re-identifiable if its constituent PFDs are individually re-identifiable (conditional on the Refinement–Transport Bridge, §3.1) *and* the binding and closure relations among them are themselves stable across increments. Composite persistence thereby reduces to constituent persistence plus binding stability.

The reduction is natural — an atom persists because its nucleons and electrons persist and their binding holds — but it is not automatic: the binding's stability is a further fact, not entailed by the constituents' persistence (a bound state can dissociate while its constituents survive). The "binding stability" here is not a new kind of stability bolted on from outside; it is the **Closure Stability Principle (§4.1) applied one level up**, to the composite's own partition. The binding among constituents is a coupling structure on the record-network, and the composite persists as one object exactly when that structure's internally-dominant partition — constituents bound to each other more than to the environment — remains dominant across increments. So composite persistence reduces to constituent persistence (itself conditional on the restricted bridge, §3.1) plus the composite *itself* satisfying the closure condition objecthood already requires; the conjecture is self-similar with the rest of the machinery rather than appealing to an external stability fact. We mark it **(conjectural)** with two distinct sources of conditionality: it *inherits the bridge dependency* — through every constituent, since each is a PFD whose persistence rests on the restricted bridge — and it *adds binding-stability* on top. "Doubly conditional" means these two sources (bridge, binding), not the bridge counted once per constituent; a many-constituent atom has one binding-stability requirement and inherits the single shared bridge dependency through all its constituents alike. This yields the three-tier persistence structure of §3.1: **conditional on the restricted bridge** for PFD-objects, **doubly conditional** (bridge inherited through constituents, plus binding-stability) for composite objects, and **open** (general transport, graded) for marginal structures that are neither PFDs nor stable bindings of PFDs.

8.3 What the Forcing Does and Does Not Claim

The argument of §8.2 turns on the word "only," and it is worth saying exactly what carries it and what does not, because an earlier and weaker version of this section rested on an unargued

"minimal" — and the companion fold note's "nearly forced" and "close to forced" are the same hedge, which we now replace with the precise conditional.

What carries the "only" is *fold-exhaustion* plus the Carrier Partition Lemma, not an independent minimality intuition. The claim is not "re-identifiability feels like the simplest persistence condition" — that would be taste. It is "under fold-exhaustion, the carrier-possibility space partitions into primitive-external, record-internal, and record-relational, the first two are excluded, and persistence and individuality are therefore record-relational." That is a sharper and more defensible claim than the inexpressibility version an earlier draft used, and it is the one the paper makes. "Nearly forced" was throat-clearing standing in for it; the honest statement is *forced, conditional on fold-exhaustion and on the partition's exhaustiveness* (§8.2). Note its precise scope:

- It is **conditional on fold-exhaustion**, and fails exactly if the substrate turns out to contain more than folds and their records — in which case persistence or individuality might be grounded in the extra primitive, and the selection would no longer be forced (though it might remain true). This is the criterion's deepest falsifier (§12): a found substrate ingredient beneath the records.
- It is **conditional on the Carrier Partition Lemma's exhaustiveness** (§8.2): the forcing breaks only if the two-cut partition is not exhaustive or its cells not disjoint — a structural objection, not the mere naming of an unlisted carrier.
- It does **not** claim the conditions are *quantitatively* unique — how much structure T must preserve, how extreme the I-ratio must be, are matters of degree (§7) the paper does not fix. Forcing is about the *form* of the conditions (transport; coupling-dominance), not their thresholds.
- It does **not** claim objecthood is forced for any *particular* bundle — only that *if* a record-bundle is an object, *these* are the conditions it meets. Which bundles satisfy them is contingent on the actual committed record-network.

With those scopes marked, the conclusion stands at its honest strength: within the fold ontology, objecthood is **derived, not assumed** — its material necessarily record-bundles (§5.1, proven) and its selection the re-identifiable-and-closed ones (§5.2, forced conditional on fold-exhaustion and the partition's exhaustiveness). The route is not one choice among many but the only route the substrate's own poverty of primitives is shown to allow — *conditional on that poverty being real* (the fold-exhaustion premise) and *on the carrier-possibility space partitioning as the lemma claims*.

8.4 The Reduction, Gathered

The local results of this section and the last assemble into one statement — the paper's master theorem — provided it is read at the strength its components actually have, not smoothed into a flat reduction. We state it with the seams visible, because the seams are exactly where the honest version differs from the over-claimed one.

Objecthood Reduction Theorem (conditional on fold-exhaustion and the partition's exhaustiveness; of form, not standing)

Under fold-exhaustion and the Carrier Partition Lemma's exhaustiveness, objecthood reduces in *form* as follows. Objecthood reduces to persistence and individuality (the forcing, §8.2); persistence reduces in form to re-identifiability and individuality to approximate closure (the Objecthood Uniqueness Proposition). The reduction fixes what objecthood *consists in*; it does not equalize the *standing* of the reduced components, which is as established elsewhere — re-identifiability conditional on the restricted Refinement–Transport Bridge for PFD-objects (§3.1), doubly conditional for composites (Composite Persistence Conjecture), open for marginal structures; approximate closure the paper's own condition throughout, carrying the local-maximality clause (§4.1) whose full quantitative content is open.

The chain is

objecthood → persistence + individuality (forcing, conditional on fold-exhaustion + enumeration, §8.2) → re-identifiability + closure (uniqueness of form, §8.2)

with the standing-rider that the two reduced conditions are *not* of equal strength: closure is the paper's own (and well-defined modulo the open maximality threshold), while re-identifiability's instantiation rests on the open Refinement–Transport Bridge for the central class and on conjecture or open transport beyond it. The theorem is therefore a reduction of *form* — it says objecthood is *nothing but* persistence-and-individuality, which are *nothing but* transport-and-closure — and it is exactly this formal reduction, not a claim that every component is discharged, that the paper establishes. Calling it "reduces entirely" without the rider would smooth precisely the proven/conditional/conjectural distinctions the rest of the paper is built to keep. Read with the rider, it is the honest master theorem: the whole of objecthood is accounted for by two conditions, each named, each carrying its own marked standing, and none smuggling in a primitive.

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9. Observerhood as Objecthood Plus Commitment

A consequence follows that is worth isolating, because it removes another category from the list of primitives — but it requires one honest addition, which we flag rather than slip in.

Observers are routinely treated as fundamental, especially in discussions of measurement. On the present account they are not. But an observer is *not simply* a strongly persistent, strongly closed object — that would be a rock. An observer is such an object that *additionally participates in commitment as a selector*: it is a bundle stable and closed enough to persist and be individuated, **and** which figures in the commitment contest of *The Commitment Criterion* not merely as part of the committed record but as a locus where further commitments are resolved.

This is a **third condition**, beyond the two of the Object Criterion, and we state it as such rather than folding it into "object":

Observerhood (derived) (conjectural)

An *observer* is an object (re-identifiable and approximately closed) that is additionally a site of ongoing commitment — a bundle through which the readiness contest resolves further facts, so that the object does not merely persist but *participates in fact production*.

The third clause is what distinguishes an observer from an inert object, and it is marked **(conjectural)** because it leans on identifying "where commitments resolve" with "the observer," which the commitment programme has not independently established — it is a natural reading of the contest's locality structure, not a derived result. The conjecture faces a sharp dilemma that is worth stating outright, because it tells the commitment programme exactly what it owes for this clause to have content. Commitment, on the programme's account, is happening continuously in and around every object — facts are being resolved everywhere there is structure. So either (a) *every* object is a site where commitments resolve, in which case "participates in commitment" is satisfied by every object and the third clause is trivial — every rock is an observer; or (b) there is some unstated further condition that isolates *selector* sites from the ambient commitment going on everywhere — observers are objects at a *distinguished* kind of commitment locus — in which case the clause has content but rests on a locality structure the commitment programme has not established. The clause is non-trivial only on horn (b), and horn (b) is precisely the open debt: it requires the programme to single out what makes a commitment site a *selecting* site rather than merely a site where the ambient contest happens to resolve. We do not discharge this; we mark it as the specific thing observerhood needs and name the dilemma so the debt is visible rather than buried in the conjectural marker. With that stated, the full hierarchy extends cleanly — but its last step is not like the others, and the notation should show it:

Fold → Fact (committed distinction) → Record (persistent fact) → Persistent Fold Defect (stable closure structure; the minimal object) → Object (re-identifiable + closed record-structure)

Observer = Object + commitment role **(conjectural; non-trivial only given a selector-site condition the programme owes)**

The arrows in the first block are not all the same kind, and the break before the last line marks the most important difference. Most steps are *emergence by accumulation or stabilisation*: folds accumulate into records, records stabilise into Persistent Fold Defects, defects and their composites are classified as objects. Each yields a new structure from the materials below it. The step to observerhood is different in kind. An observer is not a *new structure* above objects — not "more object," not a further accumulation — but an object *plus a functional role*: an object that additionally occupies a commitment-resolving position. The composition Object + commitment role is therefore the honest form, and it does real work, because the additive reading is exactly what keeps observerhood from smuggling a quasi-primitive back in. Were observerhood a genuine new rung — a new kind of thing above objects — the paper would have reintroduced precisely the unexplained category it set out to remove. By rendering it as objecthood plus a role any sufficiently stable object could in principle occupy, we make explicit that an observer is *nothing but* an object at a commitment site: no new substance, no new category. The visual asymmetry is what blocks the misreading of observerhood as a fifth kind of entity, and it is also

where the one conjectural clause sits — so the broken arrow flags both that this step is composition rather than accumulation and that its standing is the weakest in the ladder.

The matter, geometry, and gravity sectors of the programme branch off the *Persistent Fold Defect* rung in parallel — matter is *what* PFDs are; objecthood is the *classification* of which PFD-structures (and their composites) are identifiable entities — so they are two readings of the same layer rather than further rungs in series. Observerhood sits at the end, downstream of objecthood, which is downstream of persistent closure, which is downstream of record, fact, and fold — and the much-discussed special role of the observer in measurement becomes, on this account, the unremarkable fact that observers are objects that happen to be sites of commitment, with no primitive observer-category required.

The additive form licenses a proposition that states the section's point as a result rather than leaving it as commentary, and that reinforces the paper's through-line of removing primitives:

Observer Reduction Proposition (conjectural)

Observerhood adds no new ontological primitive beyond objecthood and commitment. An observer is exhausted by *objecthood* (necessary: re-identifiability and approximate closure) together with *commitment participation* (additional: occupying a site where the readiness contest resolves), and nothing further.

The proposition decomposes observerhood into one necessary part already derived — objecthood — and one additional part already primitive to the programme — commitment, from *The Commitment Criterion*. Neither part is new: the paper does not introduce "observer-stuff," a special observer-substance, or an observer-category alongside object and commitment. It is marked **(conjectural)** because it rests on the same identification §9 already flags — that the relevant commitment sites *are* the observers — which the commitment programme has not independently established; the reduction is exactly as secure as that identification and no more. With that marker, the proposition does real work: it converts "observers are not primitive" from a hopeful remark into a stated claim about what observerhood reduces *to*, and exposes precisely where the claim could fail (the site-identification), rather than leaving the reduction implicit.

Why Object comes after Persistent Fold Defect, and not before. A referee might reasonably ask whether the ordering is arranged rather than forced — whether PFDs are simply being called "pre-objects" for tidiness, when they could as well be read as a special *kind* of object, inverting the hierarchy. They cannot, and the reason fixes the ordering as forced. Objecthood requires re-identifiability, which requires a structure-preserving transport (§3), which requires that there be a persistent structure *to* transport. Persistent closure is what supplies that structure: no persistent closure, no surviving structure across increments, hence no transport, hence no re-identifiability, hence no object. The dependency runs strictly one way —

no persistent closure → no transport → no object —

so persistent closure is the *precondition* of objecthood, not a species of it. A PFD is not a special object; it is the stable closure *without which* objecthood has nothing to be predicated of. This is

the same relation that holds lower in the ladder — recordhood presupposes fact-formation, fact-formation presupposes folds — and it is what makes the ordering forced rather than chosen: each layer is the precondition the next requires, and objecthood enters exactly where persistent closure first makes a transportable, individuable structure available. The hierarchy is read upward as "what must already exist for the next to be possible," not as a ranking imposed from outside.

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10. Relational Meaning as a Corollary

The broad thesis that "meaning is relational" — elsewhere tempting to assert as a free-standing principle — appears here only as a *corollary* of the derivation, which is the honest place for it. It is earned by the emergence of objecthood, not assumed prior to it.

Corollary (Relational meaning) (conditional, on the Object Criterion; strength property-dependent**)**

If objecthood is itself a derived, relational condition (§5, §8), then a property borne by an object inherits relational significance: it is a property of a relationally constituted bundle, not of a primitive individual, and its operational meaning is fixed by the bundle's place in the relational network.

The corollary holds with *different strengths* for different properties, and conflating them would overclaim — so we separate them:

- **Uncontroversially relational:** position, momentum, duration, and the like are relational on essentially any account — they are defined by comparison between bundles, and the present framework simply locates *why* (there is no primitive individual to bear an absolute position). The corollary is immediate for these.
- **A stronger, separately-argued claim:** intrinsic quantities such as mass and charge. That an object's *bearer* is relational does not by itself make its mass relational; one must further argue that the *value* is fixed by relational structure rather than merely carried by a relational bundle. The programme's mass and charge derivations (the proton-mass-from-information and baryon/lepton-spectrum results) are where that stronger claim would be made good, if it can be; this paper does **not** establish it and flags it as the more contestable half of the corollary. We assert relational meaning unconditionally only for the comparison-defined quantities, and mark the intrinsic-quantity case **(open**, pending the mass/charge derivations**)**.

So the slogan survives, but bounded: meaning is relational *as a consequence of objecthood being relational*, fully for comparison-defined quantities and conjecturally-to-openly for intrinsic ones. It arrives as a result with marked strength, not as a thesis asserted up front — which is the whole reason this corollary, rather than a broad "Distinguishability Principle," is the right vehicle for the claim.

11. Relation to Existing VERSF Results

The paper extends the commitment programme without modifying any of it, and its relation to each prior result should be stated at the right size.

The **fold architecture** supplies the Fold as the unique minimal admissible distinction and the conversion of folds into persistent records — the ontology on which the Record-Bundle Principle (§5.1) is proved and the fold-exhaustion premise (§8.1) rests **(inherited; the exhaustion claim conditional at programme level)**. **Distinguishability geometry** supplies the record-network and the coupling measure $I(\cdot,\cdot)$ that §4 applies; this paper constructs neither, only reads objecthood off them **(inherited)**. **Fact Production** supplies the committed facts that are the records' content **(inherited)**. The **matter programme** (*Matter from Persistent Fold Closure*) supplies the most important inheritance and the most important caveat: Persistent Fold Defects as stable localized closure structures that survive admissible refinement preserving their topology. This delivers *description-invariance* of PFDs — but whether description-invariance is the *temporal-endurance* transport T re-identifiability needs is the open Refinement–Transport Bridge (§3.1), so the contribution to the persistence half is **conditional on that bridge**, not an outright inheritance. The matter programme also supplies the minimal object (the minimal PFD) and the identification of elementary particles as PFDs (§7.1) **(inherited; at the matter programme's status)**. The **Dictionary** results add that Standard Model particles are the unique stable representation classes of PFDs; §7.1's non-individuation result yields the *quotient structure* (indistinguishability) consistent with this, while the actual exchange statistics remain a separate open problem the Dictionary line would address **(inherited; statistics open)**. **Measurement as Commitment** identifies measurement with commitment, which §9 uses to locate observerhood **(inherited)**. **The Commitment Criterion** supplies the mechanism by which facts are selected and the increment-granularity (one resolved contest, one stage n) that §3 indexes transport against **(inherited)**. The **no-go for non-simplicial relational substrates** sharpens fold-exhaustion **(inherited; conditional at programme level)**. The **phase-as-memory** companion line is where the *general* transport account would be made concrete — the one re-identifiability falls back on for marginal (non-PFD, non-composite) objects, and the line most likely to settle the Refinement–Transport Bridge — which carries its open status **(inherited, open)**. The **mass and charge derivations** are where §10's stronger corollary would be discharged **(inherited, open for that purpose)**.

The relation to the matter programme deserves a sentence of its own, because it fixes the paper's place in the sequence. The matter paper answered *what kind of thing is matter?* — its answer, Persistent Fold Defects. The present paper answers a different question at the same layer: *what makes a persistent structure count as an identifiable object?* — its answer, re-identifiability plus approximate closure. The two address different aspects of one architecture: the matter programme establishes that stable persistent structures *exist* and what they *are*; the Object Criterion establishes the conditions under which such structures become *identifiable entities*. Read together they yield the extended ontology Fold → Fact → Record → Persistent Fold Defect → Object, closed by the composition Observer = Object + commitment role, with matter,

geometry, and gravity as parallel readings of the persistent-closure layer rather than rungs above it.

The contribution is therefore best stated as a classification given an inheritance, not a derivation from scratch: objecthood is shown to be the *stable identifiable regime* of persistent closure — its material necessarily record-bundles (§5.1, proven), its persistence conditional on the Refinement–Transport Bridge for the central class (§3.1, §8.2), and its own distinctive condition the closure-individuality that sorts which persistent structures are objects (§4, §8). The paper adds no primitive; it removes two — object and observer — from the list of things assumed, relocating them downstream of the commitment-and-closure architecture, and pays for the relocation in clearly-marked dependence on prior results and one named open bridge.

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12. What This Paper Does and Does Not Claim

The paper does **not** prove the Object Criterion's *selection* half as an unconditional theorem; that half is **(conditional)**, resting on the fold-exhaustion premise (§8.1) and on the Carrier Partition Lemma's exhaustiveness (§8.2). It does **not** leave the *material* half unproven, however: that every object is a bundle of committed fold-records is established as the Record-Bundle Principle **(proven, given the minimal-fold ontology)** (§5.1) — though even there the load-bearing step rests on an inherited premise about what persistence is (§5.1), not on logic alone. It does **not** establish that the transport relation T is inherited: the matter programme delivers PFD *description-invariance* under refinement, and whether that is the *temporal* transport re-identifiability needs is the open **Refinement–Transport Bridge** (§3.1) — so re-identifiability is **(conditional on the restricted bridge)** for PFD-objects, **doubly conditional** for composites, and **(open)** for marginal structures. This is a correction of an earlier draft that wrongly called PFD persistence inherited outright. It does **not** give the closure condition full quantitative content: the local-maximality clause that stops closure over-generating (§4.1) is stated but its threshold structure is **(open)**, and the I-ratio and T-fidelity are unquantified, so the §7 gradations are **(illustrative)** and the §6 failure modes are **structural, not predictive** — the paper does **not** claim to locate the atom/cloud threshold. It does **not** leave the elementary particle as a single-record limit: §7.1 identifies it as a minimal PFD to which both conditions apply. It does **not** establish identical-particle *statistics*: §7.1's non-individuation yields only *indistinguishability* (the configuration-space quotient) **(conjectural)**; the exchange statistics proper — which representation is selected, and the spin-statistics connection — are a **separate and larger open problem**, and the earlier "reproduces exchange symmetry" claim is withdrawn as overstated. It does **not** establish the intrinsic-quantity half of the relational-meaning corollary; that is **(open)** (§10). It does **not** prove the commitment-participation clause of observerhood, which is **(conjectural)** and non-trivial only given a selector-site condition the commitment programme owes (§9). It modifies no prior result and adds no primitive.

The paper **does** prove, **(given the minimal-fold ontology and an inherited premise about persistence)**, that objects are necessarily bundles of committed fold-records (§5.1), fixing their material. It **does** define the selection from substrate materials alone, as the conjunction of re-identifiability (Definition 1) and approximate closure stated non-circularly with a local-maximality clause (Definition 2′), the closure boundary an *output* rather than a presupposed input **(this paper)**. It **does** supply explicit, independent failure modes (§6) that make objecthood a graded condition — structurally, not predictively **(this paper)**. It **does** argue, **(conditional on fold-exhaustion and the partition's exhaustiveness)**, that the selection is not one option among many but the record-relational carrier of objecthood's marks, every alternative falling in a cell the Carrier Partition Lemma excludes (§8.2–8.3). It **does** gather these into the Objecthood Reduction Theorem **(conditional; of form, not standing)** (§8.4). It **does** extend the hierarchy to observerhood, with the commitment clause **(conjectural)** and non-trivial only given an owed selector-site condition (§9). And it **does** recover "meaning is relational" as a bounded **corollary** (§10). These claims are carried by a spine of named results stated at their proper strengths — the Record-Bundle Principle **(proven, given the ontology)**, the Persistence Inheritance Theorem **(conditional on the restricted Refinement–Transport Bridge)**, the Carrier Partition Lemma, Closure Stability and Individuation Principles, and Objecthood Uniqueness Proposition (**this paper**; **conditional on fold-exhaustion**, the Lemma and Proposition also on the partition's exhaustiveness), the Composite Persistence Conjecture and Observer Reduction Proposition **(conjectural)**, and the Objecthood Reduction Theorem gathering them **(conditional, of form)** — and the spread of those markers is itself the paper's honesty: it shows at a glance which load-bearing claims are imported, which are the paper's own, which are conditional on a named bridge or partition, and which remain conjectural.

The honest summary is that the paper proves the *material* of objecthood (record-bundles), reduces its *persistence* for the central class to a single named open bridge (the Refinement–Transport Bridge), and contributes its *selection* proper — the closure-individuality condition, now carrying a local-maximality clause against over-generation — keeping proven, conditional, and conjectural apart. Its residue is therefore: the fold-exhaustion premise **(inherited, conditional)** and the Carrier Partition Lemma's exhaustiveness **(this paper; defended by a two-cut argument, attackable only by breaking a cut or a cell)**, on which the forcing jointly stands; the Refinement–Transport Bridge **(open, and known to need restriction)**, on which PFD-object persistence turns: its unrestricted form is refuted by decay (a muon is refinement-invariant yet does not endure), so the live question is the *restricted* bridge — endurance over intervals free of disrupting commitment — which earns its keep only once the disrupting class is independently specified in the matter programme's terms (decay channels, defect annihilation) rather than circularly as "whatever breaks transport," and which the phase-as-memory line is likeliest to settle; the Composite Persistence Conjecture **(conjectural)**, doubly conditional — inheriting the bridge through its constituents and adding binding-stability; the general transport account **(open)**, for marginal objects; the local-maximality threshold and the two coupling measures **(open)**; and the intrinsic-quantity corollary **(open)**. Two earlier over-claims are explicitly withdrawn: PFD persistence is *not* inherited outright but conditional on the bridge, and PFD-class-identity does *not* reproduce exchange symmetry — it yields only indistinguishability (the configuration-space quotient), with the actual statistics and the spin-statistics connection left as a separate and larger open problem. None of the residue is an empirical prediction that could clash with experiment — the paper imports the fold ontology rather than modifying it — so, like

the companion commitment papers, it is observationally safe and internally exposed, with its vulnerabilities located in its own structure: a found substrate ingredient beneath the records would break the forcing; a failure of the Refinement–Transport Bridge would return PFD-object persistence to open; and a structure uncontroversially an object yet provably admitting no structure-preserving transport would break the persistence condition directly.

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13. Conclusion

Objecthood is not fundamental. A framework whose primitive is the Fold — the minimal committed distinction — and whose dynamics commit folds into persistent records cannot introduce objects as unexplained starting points, and so must derive them. The derivation comes in two strengths, kept apart. First, the *material*: every object is necessarily a bundle of committed fold-records, since anything lacking committed structure lacks persistence and anything persisting on a non-record substrate would need a primitive the fold ontology excludes — proven, given that ontology. Second, the *selection*: among record-bundles, objects are those that are **re-identifiable** across increments — there is a structure-preserving transport carrying the bundle forward as the same bundle — and **approximately closed** — some stable partition couples it to itself far more strongly than to its surroundings. The first condition supplies persistence and the identity inseparable from it; the second supplies individuality and a boundary that is an output of the condition rather than an input to it.

The selection is forced, but exactly as far as the substrate is poor: given that folds and their records are *all* there is, every alternative way a thing might persist or be individuated names a primitive the substrate does not contain, so re-identifiability and closure are not chosen but compelled. That forcing is conditional on fold-exhaustion, inherited from the void/fold architecture and the non-simplicial no-go and itself conditional, and on the Carrier Partition Lemma's exhaustiveness — the two-cut division of the carrier-possibility space that replaces an earlier open enumeration. The persistence condition, for the objects that matter most, is *nearly* discharged by the matter programme but for one named gap: the matter programme's Persistent Fold Defects survive admissible refinement, and whether that description-invariance is the temporal endurance re-identifiability needs is the open Refinement–Transport Bridge. So re-identifiability is conditional on that bridge for PFD-objects, doubly conditional for composites, and open for marginal structures — a localized and tractable dependency, but a dependency, not the outright inheritance an earlier draft claimed. This narrows the paper's own burden to the closure condition — the individuality criterion, now carrying a local-maximality clause so that it individuates rather than over-generates — and it is there that the paper's distinctive work lies. We have marked every dependency rather than hidden it, named the bridge rather than slid across it, and confined the proof-mark to the material claim it actually covers, because the difference between a derivation and a definition is precisely whether it admits where it is conditional.

What the criterion buys is a physical account of thinghood with definite ways to fail: structures that cannot be carried forward dissolve, structures that cannot maintain a dominant internal

coupling lose their edges, and most of what the world contains sits somewhere on the graded scale between an atom and a cloud. The most elementary objects — elementary particles — enter as Persistent Fold Defects, the minimal objects, individuated from one another by nothing because they instantiate the same defect class — which yields their indistinguishability, though not yet their full quantum statistics, a larger problem the paper is careful to leave open. Observerhood falls at the end of the same hierarchy — not as a further rung but as a composition, an object *plus* a commitment role — removing the observer from the list of primitives at the cost of one clause we have marked conjectural, and doing so precisely by making the observer nothing more than an object at a commitment site rather than a new kind of thing. And the broad intuition that meaning is relational arrives, correctly, as a corollary: if the thing itself is a relational construction, its properties inherit that status — fully for the quantities defined by comparison, and pending further work for those that are intrinsic.

Stated at its sharpest, the paper's advance is a single distinction. Earlier stages of the programme established facts, records, and — in the matter programme — persistent closure structures: stable things that endure. This paper's contribution is to show that *persistent structure alone is not sufficient for objecthood*. A structure can persist and still fail to be a thing, if it never separates from its surroundings — endures without individuality, like a standing ripple with no edge. Objecthood requires individuality in addition to persistence, and individuality appears precisely when a persistent structure also satisfies approximate closure. The matter programme supplies the persistence; this paper supplies the individuality; an object is a persistent structure that is *also* individuated. That is the conceptual line the paper draws — between persistent structure and object — and drawing it is what the Object Criterion is for.

The universe, on this account, is not fundamentally made of objects connected by relations. It is made of folds and the records commitment makes of them; stable closure structures among those records are the persistent defects the matter programme calls matter; and objects are those persistent defects, and their stable composites, that keep their identity and hold their edge across the increments of accumulating fact.

A thing is not a starting ingredient.

A thing is a bundle of committed fold-records that keeps its identity and holds its edge — and ceases to be a thing exactly when it can no longer do either.