The Void Before Everything: Why the Simplest Pre-Cosmic State Is Pure Potential

Keith Taylor
VERSF Theoretical Physics Program

Abstract

What existed before the Big Bang? The standard answers — nothing, a meaningless question, or something complicated — all fail on inspection. "Nothing" lacks modal capacity; the question is meaningful if time is an emergent ordering relation rather than a pre-existing backdrop; and every "complicated" precursor smuggles in unexplained structure. Working cosmological models do not actually begin from absolute non-being but from nontrivial modal frameworks in which emergence is already defined. We make this presupposition explicit and strip it to its minimum: the *void* — a pre-physical ground of pure potential, defined as the minimal ontological ground required for modal claims to have clear truth values. The void is the ground state of existence — the simplest stopping point in the chain of "but what explains *that*?" — under the assumptions stated below. The emergence of the first differentiation from this ground — the initiation of irreversible facts, asymmetry, and temporal order — remains an open physical problem. The Void Energy-Regulated Space Framework (VERSF) proposes one account of that first differentiation through entropy gradients; we maintain the philosophical and physical layers as distinct throughout.

Reader's glossary. *Modal* = about what is possible, not just what is actual. *Truthmaker* = whatever in reality makes a statement true. *Ontological ground* = the minimal real foundation required for something to be meaningful or true. *Parsimony* = prefer the explanation with fewer unexplained assumptions (Occam's razor). *Emergent time* = time as an ordering created by irreversible events, not a pre-existing backdrop. *Entropy* = roughly, how many distinguishable alternatives a system has; for the void we use an information-counting sense, not thermodynamic measurement. *Explanatory regress* = the chain of "but what explains *that*?" questions.

Assumptions

This paper's central argument is conditional on four stated commitments. We list them here so the reader knows exactly what philosophical ground the argument occupies and can evaluate each commitment independently.

1. **Rejection of absolute nothing as modal ground.** True nothing — the complete absence of anything whatsoever — lacks the capacity to ground modal propositions (statements

about what is possible). "A universe can arise" is not true *in* nothing, because nothing provides no ontological context (no real setting or foundation) for possibility.

2. **Anti-brute grounding requirement (methodological).** The aim of this paper is not merely to provide a coherent cosmological story but to identify what grounds the truth of modal claims such as "a universe can arise." For that aim, brute termination (simply declaring "that's just how it is" without further explanation) at the level of modal framework is not admissible: the state space (the set of all configurations something could be in), criteria of distinguishability (what makes one state different from another), and transition structure (rules governing change) may be posited, but if they are posited as unexplained primitives then the explanatory target has been abandoned rather than met. An infinite chain may be coherent and may explain each event by a prior event; it does not, by itself, ground the framework that makes "event," "transition," and "distinguishability" meaningful.

3. **Acceptance of parsimony as a criterion.** Among candidate termini (possible stopping points), the one with minimum unexplained structure is preferred (Occam's razor). This is an abductive principle (an inference to the best explanation), not a deductive one (a logically necessary conclusion), and we flag it as such.

4. **Modal grounding realism (truthmaker commitment).** Modal propositions require ontological ground — something real in virtue of which they are true. A *truthmaker* is whatever makes a statement true: the truthmaker for "snow is white" is the actual whiteness of snow. We adopt this position from the truthmaker tradition (Armstrong, Mulligan et al.) and state it explicitly because it is substantive and contestable.

Those who reject any of these commitments — by accepting brute modality, infinite regress, or emergence from absolute nothing — will find the argument uncompelling. The paper does not pretend to compel them. It aims to show that *given* these commitments, the void is what remains.

Note on scope. This argument does not claim that an infinite temporal history is incoherent. It claims that any temporal history — finite or infinite — presupposes a framework in virtue of which "state," "transition," and "distinguishability" are meaningful. The void claim is not a demand for a first moment; it is a demand for the minimal ontological ground of modal capacity.

The forced choice. Any response to the question "how is a universe possible?" must adopt one of four positions:

1. **Brute modality.** Modal truths have no ground; "possible" is primitive (it just is, with no deeper explanation). *Cost:* the explanatory project ends at the most fundamental point — why anything is possible at all.

2. **Deflationism.** Possibility reduces to logical consistency (anything that doesn't involve a contradiction counts as "possible"); no ontological basis is required. *Cost:* an unexplained bridge from consistency to actuality, since infinitely many consistent states are never realized.

3. **Infinite regress.** The framework is explained by a higher framework, indefinitely. *Cost:* brute framework facts at every level, with no terminus providing ground.

4. **Grounding terminus.** There exists a minimal, non-derivative modal ground.

This paper argues that positions (1)–(3) each leave an explicit explanatory remainder, while (4) admits a terminus. Parsimony then selects the maximally structureless terminus — the void. These positions exhaust the logical space of responses: either possibility is brute, reducible to consistency, deferred indefinitely, or grounded in a terminus. The argument does not claim that grounding is logically mandatory; it claims that abandoning grounding abandons the explanatory aim of answering *why* a universe is possible rather than merely describing *that* it is.

Steelman concession. We grant that past-eternal models can be internally coherent. We grant that some philosophers deny truthmakers for modality and find brute modal facts unproblematic. Our claim is not that these positions are irrational. Our claim is that each leaves an explicit remainder: either brute modal facts, brute framework facts, or an unexplained bridge from consistency to actuality. The void proposal is the minimal terminus that avoids these remainders under the stated commitments. Those who accept one of these remainders as the cost of their position have not been refuted; they have made a different philosophical choice, and we respect that choice while noting its price.

Any objection to the void conclusion must therefore identify which assumption it rejects and accept the corresponding explanatory remainder as the cost.

---

1. Introduction: The Question Everyone Asks

What was there before the Big Bang?

This is not a naïve question. It is arguably the most fundamental question in all of physics, and the fact that modern cosmology has not answered it — has, in many formulations, actively avoided it — does not make it go away. Every child asks it. Every physicist eventually confronts it. And the answers on offer are, for the most part, deeply unsatisfying.

The standard responses fall into four categories:

"Nothing." The universe arose from nothing. But this is not an explanation — it is a restatement of the mystery. If nothing has no properties, it cannot do anything. It cannot fluctuate (fluctuation is an activity). It cannot be unstable (instability is a property). It cannot give rise to quantum fields (that requires a framework in which quantum fields can exist). Nothing, if taken seriously, is radically inert. *Ex nihilo nihil fit* — from nothing, nothing comes.

"The question is meaningless." If time began at the Big Bang, then "before" has no referent, and the question dissolves. This is logically tidy but physically unsatisfying — and, as we will argue, it depends on a specific interpretation of time. If time is a background dimension, then asking what lies beyond its boundary may be a category error. But if time is an *emergent ordering relation* — if temporal order is established by irreversible informational commitments rather than pre-existing as a coordinate axis — then "before the Big Bang" simply means "the ground in which no such commitments had yet occurred." That is a perfectly meaningful concept.

"Something complicated." Quantum fluctuations in a pre-existing vacuum. A collision of branes (membrane-like surfaces in higher-dimensional space, proposed in string theory) in a higher-dimensional space. A bounce from a prior contracting universe. Each of these posits substantial pre-existing structure — fields, dimensions, dynamics — without explaining where *that* structure came from. They push the question back one step without resolving it.

"There was no beginning." A common response is to deny that there was any beginning at all. On this view, the universe is eternal, or our universe is one member of an infinite sequence — a chain of cycles, bounces, or prior phases extending without origin. This move can be rhetorically satisfying because it appears to dissolve the demand for an initial condition: if there was no first moment, perhaps there is no "why" to answer.

But removing a first moment does not remove the explanatory burden; it merely relocates it. An eternal past still presupposes an underlying modal framework: a space of states, a rule of evolution, stability conditions, and a meaning for probabilistic or dynamical claims "across" the sequence. Whether one imagines an eternal inflationary multiverse, an endless cycle of bounces, or a universe with no temporal boundary, one is still assuming that a structured possibility space is in place in virtue of which these scenarios are well-defined. The question "why is there something rather than nothing?" becomes "why does this framework obtain rather than none?" Eternal duration is not an answer to that question. It is, at best, a decision to accept the framework as brute.

Moreover, infinite sequences introduce a distinct difficulty: they invite a regress of explanation without a terminus. A sequence can be infinite and still fail to explain why its governing structure exists. And in cyclic scenarios, an additional physical tension arises: without a mechanism that prevents entropy accumulation across cycles, the second law makes exact recurrence implausible; introducing a reset mechanism reintroduces precisely the kind of additional structure the regress move was meant to avoid.

An eternal universe removes the need for a first moment, not the need for a reason why the possibility space exists at all.

This is why the void argument does not depend on whether the universe had a beginning in time. Even if the universe were past-eternal, the existence of any well-defined dynamics or state space still requires a minimal ontological ground in virtue of which modal propositions are meaningful. The void is that ground.

In all four cases — nothing, meaninglessness, complicated precursors, and eternal sequences — the pattern is the same. The popular narrative is that "non-existence" preceded existence, and then existence "appeared," bringing space, energy, and law with it. Working cosmological models are usually more careful: when they use the word "nothing," they typically mean "no classical spacetime," not the absolute non-being of philosophy. They therefore begin from a nontrivial modal framework — a wavefunction (a mathematical object describing probabilities for all possible states), a path integral over geometries (a calculation that sums over every possible shape of space), a quantum vacuum, or a tunneling rule — in which emergence is already defined. The real disagreement is not "something versus nothing," but how much

structure must be presupposed for statements like "a universe can arise" to be meaningful. The void proposal makes this presupposition explicit and then strips it to its minimum: not spacetime, not quantum fields, not dynamics, but only the minimal ontological ground required for modal claims to have determinate truth conditions.

This paper takes a different approach. We accept the question as legitimate, apply elementary logic and Occam's razor, and show that the answer is surprisingly constrained. Whatever existed before the Big Bang must have been the *simplest possible thing* capable of giving rise to a universe. We argue that this is a featureless substrate of pure potential — what we call the *void* — and that this conclusion is logically compelled for anyone who rejects both infinite explanatory regress and the emergence of being from absolute nothing.

---

2. The Logical Argument

The argument's formal skeleton is presented here in compact form. *For the general reader:* the skeleton uses the language of formal logic — definitions, lemmas (intermediate results), propositions, and a theorem — to state the argument as precisely as possible. Each step references the specific Assumption it depends on. The subsections that follow expand each step with discussion, case studies, and qualifications in plain language.

Definition 1 (Absolute nothing). Absolute nothing is the complete absence of any entity, property, capacity, relation, or condition whatsoever. It has no ontological content of any kind.

Lemma 1 (Modal truthmaker failure under absolute nothing). Under modal grounding realism (Assumption 4), a proposition of the form $\Diamond P$ ("possibly P") is true only if there exists some ontological basis in virtue of which $\Diamond P$ has a truth value. By Definition 1, absolute nothing contains no entity, property, relation, or condition that could serve as such a basis. Therefore, if absolute nothing obtains, no modal proposition has a truthmaker; in particular, $\Diamond$(a universe exists) lacks ground. Hence absolute nothing cannot serve as the modal ground of a universe. *(If one denies that modal propositions require truthmakers, Lemma 1 does not apply — but then "possible" is treated as primitive, which is precisely Position (1) in the forced choice above. If one attempts to ground modal truths in abstract entities alone — propositions, logical space, or mathematical structures — one has adopted Position (2) or (3), relocating modal grounding rather than eliminating the need for it.)*

Corollary (Actuality forces modal ground). Since at least one contingent state of affairs obtains (the existence of a universe), an account of how such contingency is possible is owed. Under Assumption 4, the truth of any such modal proposition requires an ontological basis. Therefore, regardless of whether one treats the Big Bang as causal, acausal, or boundaryless, the existence of a universe forces the existence of some modal ground. The only remaining question is how much structure that ground must contain.

5

Definition 2 (Minimal modal ground). A minimal modal ground is whatever ontological condition is sufficient for modal propositions to have determinate truth conditions, while introducing no further structure beyond that sufficiency. We use "potential" as a name for this role, not as an additional physical property.

Proposition 1 (Structure reintroduces brute framework facts). Any proposed modal ground that includes distinguishable internal structure — a nontrivial state space, fixed transition rules, metric or dimensional primitives, field content, or laws — thereby introduces additional primitives. Under Assumption 2, those primitives cannot be left brute at the level of modal framework. Therefore any structured ground either (i) restarts the grounding problem at a deeper level or (ii) abandons the explanatory target by brute stipulation.

Proposition 2 (The void as minimal terminus). Under Assumptions 1–4, the most parsimonious terminus of explanatory regress is a ground with zero distinguishable states, zero spatial extension, zero temporal structure, and no internal differentiation — characterized only by the role defined in Definition 2. We call this the *void. (Follows from Proposition 1 and Assumption 3: parsimony. Note: this step is abductive, not deductive.)*

Theorem (Conditional Void Result). If (i) absolute nothing cannot ground modal claims (Lemma 1), (ii) modal truths require ontological truthmakers (Assumption 4), and (iii) explanatory grounding must terminate in a non-derivative basis (Assumption 2), then there exists a minimal modal ground. Among candidate grounds, parsimony (Assumption 3) selects a maximally structureless ground — the void — as the best terminus.

Abductive rule (Parsimony over termini). When multiple candidate grounds are each sufficient to play the modal-ground role, prefer the candidate that posits the least additional primitive structure, because additional primitives reintroduce the very brute remainder that Assumption 2 excludes. This is Occam's razor tied to the paper's stated explanatory target.

2.1 Premise 1: The Universe Requires Modal Ground

The Big Bang happened. The universe exists. The question is not *what caused it* — causation is a loaded term that invites unnecessary objections — but rather: what made it *possible*?

We state the premise in modal terms:

A logically coherent event cannot arise from a state that lacks the modal capacity for that event.

This is not a claim about causation. It is a claim about *possibility*. Even if the Big Bang was entirely spontaneous, acausal, and probabilistic, it still required a context in which spontaneous events *can occur*. Spontaneity is not the absence of all conditions; it is a *mode of occurrence* that presupposes a framework capable of supporting it. Appeals to a past-eternal universe do not evade this premise; they simply assume modal capacity without a first temporal boundary.

This distinction matters because, as noted above, modern cosmological proposals that claim to start from "nothing" in practice begin from a nontrivial modal framework. The three most sophisticated attempts to avoid a pre-cosmic substrate all, on close inspection, confirm this pattern:

Quantum spontaneity. In quantum mechanics, events can occur without classical sufficient causes — radioactive decay, vacuum fluctuations, tunneling. But quantum spontaneity operates *within* the framework of quantum field theory: Hilbert spaces (the mathematical arenas in which quantum states live), operator algebras (the mathematical rules governing measurements), probability amplitudes (numbers that determine the likelihood of outcomes). These are not nothing. They are an enormously rich mathematical and physical structure. To say the universe arose as a "quantum fluctuation from nothing" is to say it arose from the quantum vacuum — which is very much something, possessing energy density, Lorentz invariance (the same physics regardless of how fast you're moving), and the full machinery of QFT. The spontaneity of the event does not eliminate the need for a substrate in which spontaneous events are defined.

The Hartle–Hawking no-boundary proposal. This elegant formulation replaces the initial singularity (the point of infinite density at the start of the universe) with a smooth, rounded geometry — no boundary, no "first moment." But the no-boundary wave function is computed using the Euclidean path integral (a mathematical technique that sums over all possible geometries), which presupposes the existence of a gravitational action (the mathematical expression governing how gravity works), a space of geometries to sum over, and the mathematical framework of quantum cosmology. The proposal avoids a temporal boundary but does not avoid modal ground: it requires a context in which wave functions, metrics (measures of distance and curvature), and path integrals are meaningful.

Vilenkin tunneling from nothing. Vilenkin's "nothing" is not the absolute nothing of philosophy — it is a state with no classical spacetime but with the laws of quantum mechanics already in force. The universe tunnels from this state into existence. But tunneling requires a potential barrier, a wave function, and a probability amplitude — all of which are *somethings*. Vilenkin's "nothing" has the modal capacity for tunneling built in. It is a minimally structured something, not genuine nothing.

In every case, the pattern is the same: the event (the universe's emergence) presupposes a framework that supports the *possibility* of that event. You can eliminate classical causation, you can eliminate temporal priority, you can eliminate spatial pre-existence — but you cannot eliminate modal capacity. Something must have the *capacity* for the universe to arise, or the universe cannot arise. Every proposal in modern cosmology already assumes this. The void makes the assumption explicit and reduces it to its minimum.

This is our first premise: not that the universe was caused, but that the universe was *possible*, and possibility requires ground.

One may instead take modal facts as primitive ("brute possibility") or accept infinite regress; this paper adopts a grounding approach in which modal claims require an ontological basis (see Assumptions 1 and 4 above).

2.2 Premise 2: The Simplest Sufficient State (Occam's Razor)

If something must have existed, what was it? The space of possible answers is vast. It could have been:

- A quantum field in some ground state (the lowest-energy configuration of a field)
- A higher-dimensional manifold (a space with more dimensions than the three we see)
- A conscious entity
- An infinitely complex mathematical structure
- An arbitrary ad hoc posit with no explanatory role

Occam's razor — the principle that we should not multiply entities beyond necessity — eliminates all of these. Each posits structure that itself requires explanation. A quantum field presupposes the framework of quantum mechanics. A higher-dimensional manifold presupposes geometry. A conscious entity presupposes the most complex phenomenon we know of. Each answer generates a new "what came before *that*?" question.

The only escape from infinite regress is to identify a state so minimal that it requires no further explanation — a state that is *less* than anything we normally call "something" while still being *more* than nothing.

2.3 Premise 3: The Minimal Viable Precondition

What is the least you can posit while still having enough to generate a universe?

You need **potential** — the bare capacity for something to happen. Without potential, you have nothing, and nothing produces nothing.

We must be precise about what "potential" means here, because the word carries unwanted connotations of stored energy or latent force. We do not mean potential in any physical sense. We mean it in a strictly logical sense:

Potential is the minimal ontological condition required for the truth of modal propositions.

A *modal proposition* is any statement about what *could* be the case, as opposed to what *is* the case. "It is raining" is a plain proposition. "It *could* rain" is a modal proposition — it asserts a possibility. Modal logic, the branch of logic that deals with necessity and possibility, distinguishes between what is *actual* (what happens to be true), what is *possible* (what could be true), and what is *necessary* (what must be true in all circumstances).

The question of cosmic origins is fundamentally a modal question. Before the Big Bang, the universe did not yet exist — but it *could* exist. The proposition "a universe can arise" was, in some sense, true even in the absence of the universe. For that modal proposition to be true, *something* must ground its truth. There must be some minimal condition in virtue of which "a universe can arise" is true rather than false.

That minimal condition is what we mean by potential. It is not a force. It is not energy. It is not a field in the physical sense. It is the bare ontological ground that makes possibility itself coherent — the reason that "something can happen" is true rather than meaningless.

A philosophical commitment must be made explicit here. The claim that modal propositions require ontological truthmakers — that "a universe can arise" must be made true *by* something in reality, rather than being true as a brute, ungrounded fact — is not a logical triviality. It is a substantive position in the philosophy of modality, associated with the truthmaker tradition (Armstrong, Mulligan, Simons, and others). Rival positions exist, and the costs of each deserve examination:

Modal primitivism: one may hold that modal truths are primitive — that "a universe can arise" is simply a brute fact requiring no ontological ground. This is coherent, but it ends the explanatory project by stipulation rather than by parsimony. It amounts to declaring that the deepest modal fact about reality has no explanation and requires none. Those who find this satisfying may stop here; but they should recognize that they have not *answered* the question "what makes the universe possible?" — they have *declined* it.

Modal deflationism: one may hold that modal truths reduce to logical consistency — that "a universe can arise" means only "a universe is logically consistent." But logical consistency alone does not bridge the gap to actuality. Infinitely many logically consistent states of affairs are never realized. A unicorn is logically consistent but does not exist. If "consistency" is all that "possible" means, then one still owes an account of why *this* consistent scenario became actual rather than remaining a mere logical permissibility. That account requires, at minimum, a bridge principle — something in virtue of which consistency can become realization. That bridge principle is what we call the ground of modal capacity.

A deflationist may reply that modal truth requires only consistency within a formal system, and that no ontological correlate is needed. But consistency is a feature of *descriptions*, not a basis of *realization*. Even if one denies any "selection" principle, the bare fact that a particular consistent structure is actualized — rather than merely described — is precisely what prompts the grounding question. Treating consistency as sufficient therefore either (i) silently imports a bridge from description to realization or (ii) declines to answer why actuality occurs at all. The void proposal is offered as the minimal ontological correlate of that bridge.

This paper adopts truthmaker realism about modality — the view that modal claims are made true by features of reality, not by convention or brute fiat. This commitment is stated in the Assumptions box above and is not hidden. Those who reject it are not compelled by the argument. But they inherit an explanatory debt: either the deepest modal fact about reality is brute, or logical consistency alone generates actuality, and neither position is cost-free.

This definition is deliberately logical rather than physical, and this is its strength. We are not smuggling in physics (energy, fields, dynamics) before physics exists. We are identifying the logical precondition for physics to be *possible*. A distinction must be drawn here between vocabulary and ontological status. The void is *described* in logical vocabulary because physical vocabulary presupposes the very differentiation the void precedes — one cannot use terms like

"energy," "field," or "spacetime" without already assuming distinguishable states. But the void is *posited* as real — a minimal existent, not a mere model or formal device. It is described modally; it exists ontologically. These are different levels, and conflating them leads either to the accusation that the void is "just an abstraction" (confusing vocabulary with status) or to the accusation that it smuggles in physics (confusing status with vocabulary).

Note what this excludes. True nothing — the absolute absence of anything — cannot ground modal propositions. If there is genuinely nothing, then "a universe can arise" is neither true nor false; it is not even a well-formed claim, because there is no ontological context in which possibility has meaning. The void is precisely the difference between a world in which "something can happen" is true and a world in which possibility itself is undefined.

You do *not* need:

- **Spatial dimensions.** Space can emerge later. The precondition does not need to "be" anywhere.
- **Temporal structure.** Time can emerge later. The precondition does not need to change or evolve.
- **Distinguishable states.** Differentiation can emerge later. The precondition does not need internal structure.
- **Entropy.** Disorder presupposes ordered alternatives. If there are no distinguishable states, entropy is zero — not as a special condition, but as a trivial consequence of featurelessness.

What remains when you strip away dimensions, time, structure, and entropy, yet retain the capacity for all of these to emerge?

A substrate of pure potential. The void.

2.4 Conclusion: The Void as Minimal Terminus

The formal skeleton at the beginning of this section states the argument in five steps. We now restate the conclusion with its logical structure made fully transparent. Premises 1 and 3 are deductive (logically guaranteed given their starting points): given modal grounding realism, modal capacity requires ontological ground; and the void, as defined, is distinct from nothing. Premise 2, however, is abductive (an inference to the best explanation) — it invokes Occam's razor, which is a principle of inference to the most parsimonious explanation, not a deductive rule. The overall argument is therefore not purely deductive but a hybrid: deductive commitments constrain the space of candidates, and parsimony selects among them. We flag this explicitly because a reviewer trained in logic will rightly note that Occam's razor cannot deliver logical necessity. What it delivers is logical *most parsimonious* — which, for the purpose of identifying a minimal terminus, is the appropriate standard.

The argument, with its structure made transparent:

1. The universe exists; therefore, something provided the modal capacity for its existence — not a cause, but a ground of possibility. *(Deductive, given modal grounding realism.)*
2. That ground should be the simplest state consistent with providing such capacity. *(Abductive: Occam's razor / rejection of unexplained complexity.)*
3. The simplest such state is a dimensionless, timeless, featureless ground of pure potential — the minimal ontological condition required for modal propositions to be true — with zero entropy and zero distinguishable states, but crucially distinct from nothing. *(Derived by elimination.)*
4. Therefore, under modal grounding realism and parsimony, the void is the most parsimonious terminus of explanatory regress — the ground state of existence.

A further clarification is warranted: the void is unique in a functional sense. If a proposed terminus differs from the void in any describable respect, then it contains additional structure and inherits additional explanatory debt — it is not maximally minimal. If it does not differ in any describable respect, then the distinction is idle: it makes no difference to any modal claim, explanatory role, or constraint on emergence. In either case, parsimony selects the void description as the minimal terminus. Whatever name one gives it — the void, the ground, the substrate, the pre-differentiated base — the description converges on the same featureless terminus.

This is not a physical theory. It is a philosophical conclusion — partly deductive, partly abductive — whose premises are stated explicitly so they can be evaluated, accepted, or rejected on their own terms. Those who accept brute modality or infinite regress may stop here; the argument does not compel them. Those who reject parsimony as a criterion may prefer a more structured ground; the argument does not forbid that, though it does note the additional explanatory debt. For those who require that modal claims have ontological ground and that explanation terminates at the simplest viable point, the void is what remains when everything unnecessary is stripped away. The emergence of the first differentiation from this ground state — the point at which the potential for irreversible facts is initiated, asymmetry appears, and the universe follows — is an open physical problem. But the ground state itself is established by the reasoning above.

---

3. What the Void Is — and What It Is Not

3.1 The Void Is Not "Nothing"

The distinction is critical. "Nothing" has no properties whatsoever — not even the property of being a substrate. Nothing cannot be described, measured, or interacted with, because there is nothing there to describe, measure, or interact with.

The void is defined functionally: it is whatever minimally suffices to ground modal truth without introducing additional structure (as stated in Definition 2, "potential" names this role, not an additional physical property). The void is that in virtue of which "something can happen" is a meaningful and true statement. Think of it as the difference between an empty page and no page

at all. An empty page contains no information, but it *can* contain information. No page cannot. The empty page grounds the modal proposition "text could appear here"; the absence of a page does not.

3.2 The Void Is Not the Quantum Vacuum

The quantum vacuum of quantum field theory is enormously complex. It seethes with virtual particle-antiparticle pairs (fleeting fluctuations that pop in and out of existence), possesses a non-trivial energy density (it contains real energy even when "empty"), respects Lorentz invariance, and exists *within* spacetime. The void is none of these things. It is *beneath* the quantum vacuum — the substrate from which the quantum vacuum itself emerges.

This distinction matters because attempts to explain the Big Bang as a "quantum fluctuation from nothing" are actually positing a quantum fluctuation from the quantum vacuum, which is very much something. The void is genuinely pre-physical: no fields, no particles, no spacetime, no quantum mechanics. Just potential.

3.3 The Void Is Not Empty Space

Empty space, in modern physics, is a manifold (a mathematical surface that can be curved and stretched) with metric structure (built-in rules for measuring distance), curvature, and dimensionality. It has geometric properties. It can expand, contract, and ripple. The void has none of these features. Space itself emerges from the void; the void is not a variety of space.

3.4 The Void Has Trivially Minimal Entropy

A careful statement is needed here. Entropy — a measure of how many different ways a system could be arranged while looking the same from the outside — is, in its physical formulation, defined over a state space equipped with a measure (a set of distinguishable alternatives and a way of counting them). The void, being pre-physical, does not come equipped with a state space in this sense. We therefore cannot straightforwardly assign it a thermodynamic entropy.

What we *can* say is this: if entropy is understood as the logarithm (a mathematical function that converts multiplication into addition — here, it converts the count of arrangements into a manageable number) of the number of distinguishable alternatives available to a system, then a substrate with no distinguishable alternatives has, in the information-theoretic sense, a single undifferentiated configuration; the count of distinguishable alternatives is 1, and $\ln(1) = 0$.

We adopt the latter reading: the void's "zero entropy" is not a thermodynamic measurement but a statement about the absence of distinguishable states. It is featurelessness expressed in the language of information theory. This is a weaker claim than "the void has thermodynamic entropy zero," and deliberately so — we are not smuggling physical thermodynamics into a pre-physical substrate.

The significance, however, is real. Any departure from the void — any introduction of distinguishable states — represents an increase in the count of alternatives. In the VERSF

interpretation, the Second Law of Thermodynamics is a statement about the universe's relationship to its substrate: we are moving away from the void. The void provides the baseline from which "more disordered" has meaning.

3.5 The Void Is Not a Logical Abstraction

This may be the most important distinction of all, because it addresses the subtlest dismissal: "Your void is not a thing that exists — it is a concept, a philosopher's placeholder, an abstraction from which nothing concrete can follow."

The distinction made in Section 2.3 between vocabulary and ontological status is decisive here. The void is described in logical vocabulary because physical vocabulary presupposes the differentiation the void precedes. But it is posited as a minimal existent, not as a model or formal device. The absence of irreversible differentiation does not imply logical abstraction. What distinguishes the void from abstraction is not structure but *ontological status*: the void is not a description of possibilities but the ground in virtue of which possibility itself is coherent.

To make this precise:

Definition. A *logical abstraction* is a representation of structure or possibility within a formal system. It catalogues what could be the case. It is a map.

Definition. An *ontological ground* is that in virtue of which a class of propositions has determinate truth values. It is not a representation but a condition of reality.

The set of all possible universes is an abstraction. The space of all consistent mathematical structures is an abstraction. The void is neither. It is not a catalogue of possibilities; it is the condition that makes possibility meaningful. Without the void, there is no coherent sense in which "a universe could arise" is true — not because the proposition is false, but because there is no ontological context for it to be true *in*.

This distinction tracks a well-known divide in the philosophy of modality. Modal *realists* (following David Lewis) hold that possibilities are real — that there literally exist other possible worlds. Modal *anti-realists* hold that possibility-talk is merely a useful way of describing logical consistency. The void framework takes a third position: possibilities are not themselves real entities, but they require real *ground*. The void is that ground — not another possible world, not an abstract logical space, but the minimal ontological condition that makes modal discourse coherent.

A critic who says "the void is just an abstraction" is conflating the absence of structure (which the void genuinely has) with the absence of ontological status (which the void does not have).

---

4. The Void as the Empty Page: An Analogy

Consider the relationship between an empty page and a written text:

Property	Empty Page	Written Text
Information content	Zero	Non-zero
Distinguishable features	None	Many (letters, words, meaning)
Potential for content	Maximum	Partially realized
Requires explanation?	No — it is the default	Yes — who wrote it, and why?

The empty page does not *cause* the text to appear. But it *enables* the text to exist. Without the page, there is nowhere for the text to be. And the page itself requires no explanation — it is the minimal, featureless starting point from which complexity can emerge.

The void plays the same role for the universe. It does not "cause" the Big Bang in any mechanical sense. It is the substrate that makes the Big Bang *possible* — the empty page on which the universe is written.

A limitation must be noted. The analogy is about *modal support* — a locus that can host inscription — not about spatial extension or persistence. A page is an object with boundaries, location, and material composition; the void has none of these. The analogy captures the relationship between featurelessness and potential; it does not capture the void's non-spatiality. A less spatial formulation: the void is a *capacity condition* rather than a container — a null registry that can host entries, not a box that can hold objects.

---

5. Infinite Temporal Sequence vs. Explanatory Ground

A common response to the demand for a pre-cosmic ground is to invoke an infinite past. On this view, the universe did not begin; rather, it extends eternally backward, with each state explained by a prior state:

… $E_{-3} \rightarrow E_{-2} \rightarrow E_{-1} \rightarrow E_0 \rightarrow E_1$ …

Such a sequence may be internally coherent. There is no logical contradiction in an infinite ordered chain. Just as the integers extend infinitely in both directions without a first element, an infinite temporal sequence of events is mathematically and conceptually possible. Change can occur at every step without requiring an absolute first event.

But this concession does not resolve the explanatory issue.

The crucial distinction is between *temporal sequence* and *ontological ground*.

The integers do not exist free-floating. They are defined within a framework: axioms of arithmetic, rules of succession, criteria of identity and distinguishability. The number -2 is distinguishable from -3 not because of the sequence alone, but because a structure exists in

virtue of which such distinctions are meaningful. That structure is not itself an integer; it is the ground that makes integers well-defined.

The same applies to an infinite cosmological sequence. Grant the entire chain. Grant that every event is explained by a prior event. Still, questions remain:

- What determines what counts as an "event"?
- What defines the transition relation ($\rightarrow$)?
- What establishes criteria of distinguishability between states?
- What fixes the space of possible states within which the sequence unfolds?

The chain itself does not answer these questions. No member of the sequence explains why there is a rule-governed sequence at all, rather than a different one — or none. An infinite regress of events may remove the need for a first moment, but it does not remove the need for a framework in virtue of which events and transitions are possible.

One may declare that framework brute — that the possibility space and its governing structure simply obtain without further explanation. But this move terminates explanation by stipulation, not by reduction. If one rejects brute modal structure and rejects infinite explanatory regress (Assumptions 1 and 2), then the framework itself requires grounding.

The demand, therefore, is not for a first event in time. It is for a minimal ontological condition in virtue of which:

- distinguishable states are possible,
- transitions between states are meaningful,
- and modal propositions about the sequence have determinate truth values.

An infinite temporal series does not eliminate this requirement. It merely distributes events across an unbounded axis. The explanatory burden shifts upward: from "What is the first event?" to "What is the ground of the possibility space within which any event can occur?"

Under the commitments adopted in this paper — rejection of absolute nothing as modal ground and rejection of brute explanatory termination — that ground must be minimal, non-derivative, and not itself a member of the event-series. It is not another event. It is not another state in the chain. It is the ontological condition that makes the chain possible.

That minimal condition is what we call the void.

---

6. From Logic to Physics: Two Distinct Layers

The argument so far is purely logical. It establishes the void as the minimal ontological terminus of explanatory regress — the simplest state that answers "why is there something rather than

nothing?" without generating further questions. This conclusion stands independent of any physical theory.

VERSF is something different. It is a *physical proposal* about how the first realization of the void's potential might have worked — and how the universe we observe emerges from that realization. These are two distinct layers, and conflating them would weaken both.

6.1 Layer 1: The Philosophical Argument (Framework-Independent)

Under the assumptions stated in Section 2 — modal grounding realism, rejection of infinite regress, and the principle that absolute nothing lacks modal capacity — the void is the minimal terminus of explanatory regress. This claim does not depend on VERSF, on any particular physics, or on any empirical observation. It depends only on:

- The universe exists (empirical fact).
- Its existence requires a modal ground (modal grounding realism).
- That ground must be minimal (Occam's razor / rejection of regress).
- The minimal ground is a state of pure potential: zero entropy, zero structure, but grounding the truth of modal propositions about what can arise.

Any physical framework — VERSF, loop quantum gravity, string theory, or one not yet conceived — that accepts these premises must ultimately rest on something like the void. Those who reject the premises (by accepting brute modality or infinite regress) are not compelled; but they bear the burden of explaining how their alternative avoids the difficulties outlined in Section 2.

6.2 Layer 2: The Physical Realization (VERSF-Specific)

VERSF then proposes a specific account of how the void's potential is first realized. This is a physical hypothesis, subject to empirical test, and separable from the logical argument above. VERSF proposes:

Time as an emergent ordering relation. In VERSF, time is not a background dimension but an emergent ordering relation defined by irreversible informational commitments (changes that cannot be undone — facts that, once established, permanently alter the state of the substrate) across the void substrate. In the absence of such commitments, no ordering relation exists and therefore no temporal parameter is meaningful. The void is timeless not because it exists "at a time before time" but because it is the ground in which no irreversible distinctions have occurred and therefore no ordering relation has been established. Time does not begin *at* the Big Bang; the Big Bang *is* the first establishment of temporal order.

Space as emergent from entropy gradients. The void has no spatial dimensions. Space emerges when entropy gradients (differences in the degree of disorder from one region to another) create distinguishable regions — when the featureless substrate develops local differences that can be described by distance and geometry. The dimensionality and metric of space are products of the entropy distribution on the void, not pre-existing structures.

16

The Big Bang as the first irreversible commitment. The Big Bang is not an explosion *in* space but the *emergence* of space and time together. It corresponds to the first irreversible informational commitment on the void — the first point at which distinguishable states exist and an ordering relation is established. This commitment seeds expansion, structure formation, and temporal order simultaneously.

A state with no prohibitions against differentiation does not forbid differentiation. The void contains no rule, no symmetry, no conservation law that would prevent the emergence of distinctions. A qualification is needed here: the absence of prohibition is not, by itself, the same as the presence of capacity. A rock has no prohibition against composing symphonies, but it lacks the capacity to do so. The void's case is different because the void is not a structured entity that happens to lack a prohibition — it is the ontological ground of modal capacity itself (Section 2.3). The claim is not merely that differentiation is "not forbidden" but that the void, as the truthmaker for modal propositions, is the condition in virtue of which differentiation is *possible*. The "no prohibitions" formulation is a necessary condition, not a sufficient one; the sufficient condition is the void's status as modal ground.

With that qualification in place: **the emergence of the first differentiation is an open physical problem** — perhaps the deepest open problem in all of science. This paper does not claim to solve it. What this paper establishes is the ground from which that problem is posed: the void is the ground state of existence, and the first differentiation — however it occurs — is the point at which the potential for irreversible facts is initiated. Asymmetry is initiated, and the universe follows.

VERSF proposes that entropy gradients are the language in which that first asymmetry is expressed. But the philosophical argument for the void does not depend on this proposal. Under the premises of Section 2, the void stands as the minimal starting point regardless of what physical theory ultimately explains the first differentiation.

6.3 The Void as Constraint on Emergence

The preceding sections establish the void as the ground of modal capacity — the condition that makes possibility coherent. A natural objection is that this makes the void a blank permission slip: "anything is possible," with no further content. If so, the void would be explanatorily thin — it would tell us *that* a universe could arise but nothing about *what kind* of universe should be expected.

This objection underestimates what featurelessness constrains.

Constraint C1 (No preloaded information). If the modal ground has zero distinguishable states, then no emergence mechanism may presuppose nonzero specification information at the ground level. Any mechanism must begin with minimal asymmetry — the first distinction — and generate additional distinguishability through successive steps.

If the void has zero distinguishable states, then the first differentiation must be an asymmetry introduced into featurelessness — the creation of a distinction where none existed. This places a

substantive constraint on what the first step can look like. It cannot be, for instance, a fully formed universe appearing instantaneously with complex structure, because that would require the ground state to already contain the information specifying that structure — and a state with zero distinguishable states contains no information. The void's featurelessness limits emergence to what is compatible with a starting point of zero informational content.

The constraint can be stated precisely: emergence from the void must be *incremental*. It must begin with minimal asymmetry — the introduction of the first distinction — and proceed in the direction of increasing distinguishable states. Each step adds information; none can presuppose information that was not generated by a prior step. The trajectory, in other words, must run from simplicity toward complexity, from symmetry toward asymmetry, from zero entropy toward higher entropy.

This is a structural constraint — not yet a derived dynamical law — on what any emergence mechanism could look like if the void description is correct. If observational evidence established that the universe's initial state required enormous pre-existing information content rather than minimal asymmetry, that would count against the void hypothesis. The fact that our best cosmological evidence — the extreme homogeneity and low entropy of the early universe, the near-perfect uniformity of the cosmic microwave background (the faint afterglow of the Big Bang, visible in every direction of the sky), the gradual emergence of structure through gravitational instability — is commonly interpreted as consistent with an initial condition of extreme simplicity and low gravitational entropy is at least compatible with, and arguably expected under, the void framework.

The void is therefore not merely the answer to "what was the precondition?" It is a partial answer to "what kind of universe should we expect?" — namely, one that starts simple and gets complex, starts symmetric and develops asymmetry, starts with minimal information and accumulates more. That does not solve the emergence problem. But it shows the void is doing real explanatory work — more than nothing, more than brute modality, and more than a blank "anything goes" permission. It is the difference between a foundation that merely sits there and a foundation that shapes what can be built on it.

6.4 The Second Law as a Void Relationship

The Second Law of Thermodynamics — entropy always increases in isolated systems — is typically treated as a statistical observation about macroscopic systems. In VERSF, it is a fundamental statement about the universe's relationship to its substrate. The universe emerged from a zero-entropy void, so the only direction it can go is *away* from zero entropy. The Second Law is not a law imposed on the universe from outside; it is a consequence of the universe's origin.

---

7. Philosophical Lineage: The Void as Terminus of Explanatory Regress

The deepest contribution of this paper is not cosmological. It is the identification of the minimal ontological terminus of explanatory regress — the point at which the chain of "but what explains *that*?" questions reaches a principled stopping place. This is a serious philosophical project with a distinguished lineage.

7.1 Leibniz and the Principle of Sufficient Reason

Leibniz posed the question in its sharpest form: *Why is there something rather than nothing?* His answer — that a necessary being (God) serves as the sufficient reason (a complete explanation that leaves nothing unexplained) for all contingent existence (things that happen to exist but didn't have to) — was theological. But his *question* was structural, and it remains unanswered by modern physics. General relativity describes how spacetime evolves but not why it exists. Quantum mechanics describes what happens within the universe but not why there is a universe for things to happen in.

The void answers Leibniz's question on his own terms. It is the sufficient reason for the possibility of contingent existence — not as a necessary being with complex attributes, but as the minimal ontological condition under which modal propositions about existence are true. It is what Leibniz was looking for, stripped of everything theology added that Occam's razor removes.

7.2 Heidegger and the Priority of the Question

Heidegger regarded "Why is there something rather than nothing?" as the fundamental question of metaphysics — not because he expected a clean answer, but because he believed the question itself reveals something about the nature of Being. Most of Western metaphysics, Heidegger argued, had forgotten this question by assuming existence as a given and proceeding directly to classify what exists.

The void framework takes Heidegger's question seriously while pursuing a more formally tractable answer. It does not assume existence as a given. It asks: what is the minimal condition under which existence becomes *possible*? And it finds that the answer is expressible in thermodynamic and modal-logical language: zero entropy, zero distinguishable states, pure modal potential. The question is not unanswerable. It simply requires the right vocabulary.

7.3 Wheeler and Pre-Geometry

John Archibald Wheeler spent the last decades of his career pursuing "pre-geometry" — the idea that spacetime and its geometric properties emerge from something more fundamental, something that is not itself geometric. His famous "it from bit" proposal — that every physical quantity derives its meaning from information — pointed toward an informational substrate beneath physics.

The void is Wheeler's pre-geometry made explicit. It is the substrate from which geometry, and therefore spacetime, emerges. It is not itself spatial, not itself temporal, not itself geometric. It is the informational ground zero — the state of zero information from which all information arises

through entropy gradients. Wheeler intuited the destination; the void argument provides the logical road to reach it.

7.4 What This Paper Adds

These thinkers converged on the same insight from different directions: that the deepest question in philosophy and physics is not "what exists?" but "what must be minimally true for existence to be possible?" The void is the answer to that question, expressed in a language — thermodynamic, information-theoretic, modal-logical — that bridges philosophy and physics without reducing either to the other.

To locate this position precisely among its rivals:

- **Brute modality.** Modal facts are primitive; "a universe can arise" is true and that is all. Explanatory regress ends by stipulation. *Cost:* the deepest modal fact about reality has no explanation and none is sought.
- **Mathematical Platonism (Tegmark).** The possibility space is the set of all consistent mathematical structures; our universe is one such structure made real. *Cost:* all consistent structures are equally real — an extravagant ontology (an enormous number of things that must exist) — and the question "why is mathematical existence physical?" remains unanswered.
- **Lewis modal realism.** All possible worlds literally exist; possibility is indexical (what we call "actual" is just "the world we happen to be in," like "here" is just where you happen to stand). *Cost:* maximal ontological commitment — every consistent world is real.
- **The void (this paper).** A minimal ontological ground, described in modal-logical vocabulary, posited as real. Possibilities are not themselves real entities but require real ground. *Cost:* commits to truthmaker realism about modality, which is substantive.

The void framework deliberately minimizes ontological commitment while maximizing explanatory reach. It is the most parsimonious position that does not end in brute stipulation.

The void is the ground state of existence. It is the minimal ontological terminus — the point at which explanatory regress terminates not because we give up but because we have reached a state so minimal that further reduction is meaningless. The emergence of the first differentiation from this ground state — the point at which the potential for irreversible facts is initiated, asymmetry appears, and the universe follows — remains an open physical problem. This paper does not solve that problem. It establishes the floor from which it must be solved.

---

8. Addressing Objections

8.1 "You've Just Renamed Nothing"

No. Nothing has no properties — not even potential. The void is defined functionally: it grounds the truth of modal propositions. In the void, "a universe can arise" is true. In nothing, that statement has no truth value at all — there is no ontological context in which possibility is coherent. This is a genuine and rigorous ontological distinction, not a semantic game. An empty box is not the same as no box. A blank canvas is not the same as no canvas. And a state that makes possibility meaningful is not the same as a state in which possibility is undefined.

Nor is the void "nothing dressed up as an abstraction." As argued in Section 3.5, the void is distinguished from logical abstraction by its ontological status: it is not a description of what could be the case, but the ground in virtue of which "could" has meaning at all.

8.2 "'Before' Is Meaningless If Time Didn't Exist"

This is perhaps the most common objection, and at first glance it seems devastating. If time began at the Big Bang, then "before the Big Bang" is a grammatical illusion — there was no "before" because there was no time in which a "before" could exist. Hawking's well-known pedagogical image — asking what is south of the South Pole — captures the intuition vividly, though it is an analogy rather than a formal result.

The common statement that "there was no time before the Big Bang" is misleading. What did not exist was not time in an abstract sense, but irreversible ordering. In VERSF, time is defined as the ordered accumulation of irreversible informational commitments. Prior to the first differentiation, no such ordering existed. The void is therefore not a temporal past but a state in which temporal structure had not yet emerged.

This reframing is not a semantic trick. It rests on a substantive distinction between two conceptions of time. The standard objection assumes time is a *background dimension* — a pre-existing axis along which events are arranged. If time is a background dimension, then asking what lies beyond its boundary is indeed a category error. But VERSF treats time as an *emergent ordering relation* defined by irreversible informational commitments across the void substrate. In the absence of such commitments, no ordering relation exists and therefore no temporal parameter is meaningful. Time is not a container for change; time *is* the ordering that irreversible change creates.

This redefinition completely dissolves the objection. The void is not a moment "before" the Big Bang in a temporal sequence; it is the non-temporal ground in which no irreversible distinctions had yet occurred. The Big Bang corresponds not to a boundary in time but to the first establishment of temporal order itself. The question "what existed before the Big Bang?" does not require a temporal dimension to be meaningful. It requires only the recognition that the Big Bang was the *first irreversible informational commitment* — the first point at which an ordering relation came into existence. "Before" the Big Bang means: the ground in which no such ordering had yet been established. That ground is the void.

Consider an analogy. Imagine you are the first person ever to speak. Before you spoke, there was no language. Does that mean the question "what existed before language?" is meaningless? Of course not. It means: what was the state of affairs in which language had not yet emerged? The

21

answer is perfectly coherent — it's the pre-linguistic state — even though "before" cannot refer to a point on a linguistic timeline.

Similarly, "before the Big Bang" refers to the non-temporal ground: the substrate in which no irreversible informational commitments had yet been made and therefore no ordering relation existed. The void is that ground. It is not located at some point on a time axis prior to $t = 0$. It is the condition from which temporal order itself emerged.

In fact, the conventional objection — properly understood — *supports* the void framework. In standard cosmology, "time begins at the Big Bang" means that the spacetime manifold is past-incomplete (the mathematical structure describing space and time simply has an edge — it doesn't extend backward forever) or that the classical description breaks down at the initial singularity (the point where density and curvature become infinite and our equations stop working). It does not logically imply "no ontological ground." A manifold can have a boundary without the boundary being the edge of existence itself. The question survives in a precise form: *what is the ontological condition for temporal order to emerge?* The objection eliminates complex pre-cosmic scenarios (bouncing universes, eternal inflation, brane collisions) that all require time to already be running. It leaves standing only a state without temporal structure — which is precisely what the void is.

The word "before" is not meaningless. It just doesn't mean what we usually think it means. It means: the non-temporal ground from which ordering had not yet emerged. And that ground — zero entropy, zero distinguishable states, pure potential — is the void.

8.3 "What Caused the Void?"

Nothing caused the void. The void is the explanatory terminus — the simplest possible state that requires no further explanation. Asking "what caused the void?" is like asking "what is north of the North Pole?" The question presupposes a framework (causation, temporal sequence) that does not apply at this level.

A persistent critic, noting this paper's commitment to truthmaker realism (Assumption 4), may press further: what is the truthmaker for "the void exists"? The answer is that the void is the one case where the explanatory terminus and the truthmaker coincide. The void's existence requires no further ground precisely because it is the state of minimal ontological commitment — the state that remains when every contingent feature has been stripped away. To demand a truthmaker for the void is to demand that something simpler than the simplest possible state explain the simplest possible state, which is incoherent. The regress terminates here not by stipulation but because further reduction is structurally impossible.

This is not a dodge. Every explanatory chain must terminate somewhere, and the void is a principled termination point: it is the state with minimum structure, minimum assumptions, and minimum explanatory debt.

A critic may note that the void's self-grounding character has a structural similarity to other foundational termini in philosophy — God in classical theism, the axioms in formal systems, the

laws of logic in rationalism — and suggest this is suspicious. The resemblance is real, and it is a feature, not a defect. Any genuine terminus of explanation *must* have this self-grounding character, because that is what it means to be a terminus. If every entity's properties were explained by something external, the result would be precisely the infinite regress that Assumption 2 rejects. A terminus is, by definition, the point at which explanation no longer requires further explanation. What distinguishes the void from other proposed termini is not its self-grounding structure (which all termini share) but its *minimality*: it posits less unexplained content than any alternative. God, axioms, and laws of logic all carry substantial internal structure that invites further "why?" questions. The void carries none. It is the least you can posit while still grounding modality — and that is what makes it the principled place for regress to end.

8.4 "How Do You Get Something from Almost-Nothing?"

This is the right question — and this paper is honest about its scope. The void is the ground state of existence: the minimal ontological terminus from which explanatory regress cannot proceed further. The emergence of the first differentiation from this ground state — the initiation of asymmetry, the first irreversible fact — is an open physical problem. Perhaps the deepest open problem there is.

What this paper establishes is the *floor*. The void is the state in which modal propositions about the universe are true — "a universe can arise" is a true statement in virtue of the void's existence. The void's role is not merely that it lacks prohibitions against differentiation (absence of prohibition alone does not entail capacity, as argued in Section 6.2), but that it is the ontological ground of modal capacity itself. The specific mechanism by which potential becomes actual — that is work for physics, not for the philosophical argument presented here.

This is not an evasion. It is intellectual honesty about which questions this paper answers and which it leaves open. The void argument answers: *what is the minimal precondition, given anti-regress and modal grounding assumptions?* It does not answer: *by what process was that precondition first realized?* Conflating these questions — demanding that the ontological argument also be a physical mechanism — is a category error.

8.5 "This Is Philosophy, Not Physics"

Yes — and deliberately so. The paper is structured in two explicit layers (Section 6). The logical argument in Sections 2–5 is philosophical: it identifies the void as the minimal ontological terminus of explanatory regress. This conclusion is framework-independent and does not depend on any empirical observation.

The physical layer — VERSF's account of emergent time, space, and entropy dynamics (Section 6.2) — is separable and empirically testable. But it rests on the philosophical layer, just as all physics rests on philosophical commitments about what exists, what counts as an explanation, and where regress terminates.

The objection assumes philosophy and physics are adversaries. They are not. The best physics has always been grounded in clear philosophical reasoning — from Einstein's thought experiments about simultaneity to Wheeler's pre-geometric program. The void argument is philosophy that identifies what physics must build upon.

8.6 "Other Frameworks Also Propose Emergent Spacetime"

True. Loop quantum gravity, causal set theory, and various approaches to quantum gravity all feature emergent spacetime. The void framework is compatible with many of these approaches, and does not claim to replace them. What it adds is a specific characterization of the substrate from which spacetime emerges: zero entropy, dimensionless, featureless. This is a stronger and more minimal claim than most emergent spacetime proposals, which tend to posit pre-geometric structures — spin networks (discrete graphs from which space is woven in loop quantum gravity) or causal sets (collections of point-like events linked by cause-and-effect relations) — that are already quite complex.

8.7 What Would Count as a Genuine Refutation

The objections above are common, but none is decisive. A critique of this paper becomes substantive only if it does at least one of the following:

(a) Show that absolute nothing can ground possibility-talk without importing anything real.

(b) Give a non-brute grounding account that doesn't terminate and doesn't merely defer.

(c) Offer a terminus with fewer primitives than the void.

(d) Expose a hidden inconsistency — show that the void smuggles in the very structure it claims to precede.

(e) Demonstrate that modal grounding realism is incoherent rather than merely optional — that is, show not just that one *can* reject truthmaker commitments, but that adopting them leads to contradiction.

Absent one of these moves, objections such as "I don't like metaphysics," "this is not physics," or "you haven't derived dynamics" express preferences for a different explanatory standard, not refutations of the argument on its own terms.

---

9. Implications

9.1 Why There Is Something Rather Than Nothing

The void reframes Leibniz's question. "Nothing" was never the alternative to "something" — the void is not an event or state that begins; it is the minimal ontological ground presupposed by any account in which modal claims are meaningful. The question becomes: why is there *complexity* rather than *simplicity*? And the answer is: because the void, as the ontological ground of modal capacity, makes differentiation possible — and a state that makes differentiation possible, while containing no structure that would prevent it, provides no barrier to the emergence of complexity. (As noted in Section 6.2, this is not merely the absence of prohibition but a consequence of the void's status as modal ground.)

9.2 The Arrow of Time Has a Reason

In the VERSF interpretation, the arrow of time is not a brute fact or a convenient boundary condition. It exists because the universe originated from a zero-entropy substrate and has been moving away from it ever since. The void gives the Second Law a *ground* — a reason for the direction of entropy increase.

9.3 The Universe Is Information on a Substrate

If the void is the substrate and the universe is what emerges from entropy gradients on it, then reality is fundamentally informational. Particles, fields, forces, and spacetime are all patterns of information written on the void — distinguishable states where the void itself has no distinctions. This connects to Wheeler's "it from bit" (the idea that physical reality arises from information), Bekenstein's entropy bounds (limits on how much information can fit in a given region of space), and the holographic principle.

9.4 The Holographic Principle as a Void Consequence

The holographic principle — the discovery that the maximum information content of a region of space scales with its boundary area rather than its volume (meaning the information in a room is determined by the size of its walls, not by how much space is inside — as if reality were a hologram projected from a surface) — is one of the deepest results in theoretical physics. It suggests that the "bulk" physics we observe is, in some sense, encoded on a lower-dimensional boundary. In most formulations, this is presented as a surprising and somewhat mysterious constraint on the relationship between information and geometry.

In the VERSF interpretation, the holographic principle is not surprising but expected. If the universe is information written on a pre-spatial, pre-dimensional substrate — the void — then the primacy of boundary over bulk follows naturally. The void has no spatial dimensions of its own; it is the undifferentiated ground from which dimensionality emerges. Information inscribed on the void does not "fill" a volume, because volume is itself a derivative structure. What we call "boundary encoding" is, from the void perspective, simply the more fundamental description: the information comes first, and the volumetric interpretation is a higher-order reconstruction.

This does not constitute a derivation of the holographic principle from VERSF — such a derivation would require a fully developed mathematical framework for entropy gradients on the void, which remains future work. But it provides a conceptual context in which the holographic

principle's otherwise puzzling area-scaling finds a natural home: if physics is information on a dimensionless substrate, then area-scaling is what you would expect, because dimensional volume was never the fundamental quantity to begin with.

---

10. Conclusion

The question "what existed before the Big Bang?" has a tightly constrained answer — constrained, that is, for anyone who rejects both infinite explanatory regress and the emergence of being from absolute nothing. It was not nothing, because nothing lacks the modal capacity to produce anything. It was not something complex, because complexity requires explanation and regenerates the regress. It was the simplest possible state consistent with grounding the possibility of a universe: a dimensionless, timeless, featureless substrate of pure potential — zero entropy, zero distinguishable states, but possessed of the bare ontological condition required for modal claims to have determinate truth conditions.

We call this the void. It is the ground state of existence — the minimal ontological terminus at which explanatory regress reaches its natural end.

The emergence of the first differentiation from this ground state — the point at which the potential for irreversible facts is initiated, asymmetry appears, and the universe follows — remains an open physical problem. This paper does not pretend to solve it. What it establishes is the starting point: the floor beneath all physical theories, the substrate that any account of cosmic origins must ultimately rest upon.

This paper does not demand agreement. It demands clarity. A critic is free to reject any premise — but should then state which explanatory remainder they accept. The void is offered as the minimal terminus that avoids those remainders under explicitly stated commitments.

The void is not nothing. The void is not a theory. The void is the ground from which all theories rise.

References

Philosophy of Modality, Truthmaker Theory, and Grounding

1. Armstrong, D. M. *A World of States of Affairs.* Cambridge University Press (1997).
2. Mulligan, K., Simons, P. and Smith, B. "Truth-makers." *Philosophy and Phenomenological Research* 44, 287–321 (1984).
3. Cameron, R. P. "Truthmakers." In Glanzberg, M. (ed.), *The Oxford Handbook of Truth.* Oxford University Press (2018).
4. Plantinga, A. *The Nature of Necessity.* Oxford University Press (1974).

5. Williamson, T. *Modal Logic as Metaphysics.* Oxford University Press (2013).
6. Lewis, D. *On the Plurality of Worlds.* Blackwell (1986).
7. Kripke, S. *Naming and Necessity.* Harvard University Press (1980).
8. Schaffer, J. "On what grounds what." In Chalmers, D., Manley, D. and Wasserman, R. (eds.), *Metametaphysics.* Oxford University Press, 347–383 (2009).
9. Rosen, G. "Metaphysical dependence: Grounding and reduction." In Hale, B. and Hoffmann, A. (eds.), *Modality: Metaphysics, Logic, and Epistemology.* Oxford University Press, 109–136 (2010).
10. MacBride, F. "Truthmakers." *Stanford Encyclopedia of Philosophy* (2020). https://plato.stanford.edu/entries/truthmakers/
11. Vetter, B. "Modality without possible worlds." *Stanford Encyclopedia of Philosophy* subsection in "Dispositions" (2021).

Philosophical Foundations

12. Leibniz, G. W. "Principles of Nature and Grace, Based on Reason." (1714).
13. Heidegger, M. *Introduction to Metaphysics.* Yale University Press (1953/2000).

Physics: Holography, Information, and Pre-Geometry

14. Wheeler, J. A. "Information, physics, quantum: The search for links." *Proceedings of the 3rd International Symposium on Foundations of Quantum Mechanics* (1989).
15. Wheeler, J. A. "Pregeometry: Motivations and prospects." *Quantum Theory and Gravitation*, Academic Press (1980).
16. Bekenstein, J. D. "Black holes and entropy." *Physical Review D* 7, 2333 (1973).
17. 't Hooft, G. "Dimensional reduction in quantum gravity." *arXiv:gr-qc/9310026* (1993).
18. Susskind, L. "The world as a hologram." *Journal of Mathematical Physics* 36, 6377 (1995).
19. Penrose, R. "On the gravitization of quantum mechanics 1: Quantum state reduction." *Foundations of Physics* 44, 557–575 (2014).

Emergent Spacetime

20. Rovelli, C. "Loop quantum gravity." *Living Reviews in Relativity* 11, 5 (2008).
21. Sorkin, R. D. "Causal sets: Discrete gravity." *arXiv:gr-qc/0309009* (2003).

Cosmological Proposals Discussed

22. Hartle, J. B. and Hawking, S. W. "Wave function of the universe." *Physical Review D* 28, 2960 (1983).
23. Vilenkin, A. "Creation of universes from nothing." *Physics Letters B* 117, 25–28 (1982).
24. Hawking, S. W. *A Brief History of Time.* Bantam Books (1988). [The "South Pole" analogy cited in Section 8.2 is a pedagogical image from this popular work, not a formal theorem.]
25. Tegmark, M. "The Mathematical Universe." *Foundations of Physics* 38, 101–150 (2008).