

Translate Chinese Academic Paper: On Absolute Nothingness and the Unique Steady-State Reality

On Absolute Nothingness and the Unique Steady-State Reality

From the Eternal Necessity of the Ultimate Background to the Unique Manifestation of the Self-Sustaining Structure

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This paper proposes a thoroughly self-consistent metaphysical system, arguing that the sole essence of existence is intrinsic self-sustaining stability. Starting from an ultimate background stripped of all determinations—Absolute Nothingness—it elucidates that by virtue of its nature of "having no prohibitions," all possible forms of existence are not forbidden. In timeless eternity, whether something exists is not determined by a temporal emergent process, but directly constitutes an eternal fact by the intrinsic stability of the form itself: no structure that cannot be absolutely self-sustaining has ever existed; whatever exists must be eternally self-sustaining. Through a rigorous analysis of the conceptual condition of "absolute self-sustenance," this paper proves that there is one and only one structure that satisfies all requirements. In the language of differential geometry, this structure appears as a non-orientable (Möbiusified) three-dimensional real projective space. The standard three-dimensional real projective space cannot persist due to orientability, a global convention without intrinsic foundation. The truly eternally persisting structure is the non-orientable three-dimensional real projective space obtained by further taking the quotient of an orientation-reversing involution on it. This structure is mathematically legitimate, naturally inherits constant positive curvature, and its non-orientable loops constitute a self-zeroing stress mechanism that requires no external conditions. This structure is the eternal face of the ultimate background itself, and all things are the hierarchical manifestations of its intrinsic geometric stress folds. It is worth noting that "non-orientable three-dimensional real projective space" is the specific expression of this unique reality in geometric language; the reality itself transcends any particular mathematical language, and its equivalent presentations in other mathematical languages are equally itself. This system presupposes no external rules, creator,

or selection mechanism, and the sole criterion of existence is completely internalized, thus realizing the necessary derivation from absolute nothingness to the unique reality.

I. The Primordial Determination of the Ultimate Background: Absolute Nothingness and Non-Prohibition

1.1 Stripping Away All Determinations

The most fundamental question of metaphysics is: why is there something rather than nothing? Traditional answers appeal to external causes, logical necessity, or value principles. This paper fundamentally rejects presupposing any external reasons for "existence" and first posits an ultimate background, defined as Absolute Nothingness stripped of all forms of existence, all rules, all attributes, and all categories.

The essential characteristics of this ultimate background are:

- No temporal dimension (no "before" and "after")
- No spatial extension (no "here" and "there")
- No causal laws (no sequence of causal relations)
- No logical principles (no presupposed logical laws)
- No constraint mechanism (no prohibitions or permissions)
- No existential bias (no inclination toward existence or non-existence)

It is not a "substrate following certain rules," nor a "carrier with screening functions," but a primordial state of complete indeterminacy, disorder, and lawlessness. All possible existences do not presuppose the "permission" of this background, but take the self-sustenance of existence itself as the sole criterion of judgment.

1.2 The "Non-Prevention" Principle: The Space of Existential Possibility

Here we touch upon a fundamental confusion in traditional metaphysics: if the ultimate background is Absolute Nothingness, how can it "contain" existence? The answer lies in re-examining the concept of "production" itself.

The absolute indeterminacy of the ultimate background means that it does not have the ability to "repel existence." Indeterminacy means there are no prohibitions, constraints, or exclusion mechanisms. Therefore, the ultimate background does not prevent anything, including not preventing itself from existing in any possible state. This is the fundamental reason for the possibility of existence, which can be precisely stated as:

- "Existing in a certain state" belongs to the set of "all possible states."
- The ultimate background does not prevent any element in this set.

- Since it does not prevent, all possible forms of existence are in a "holdable" state in the sense of not being forbidden.

There is no need to appeal to "the dynamic emergence of nothingness," nor to the modal principle of "the necessary actualization of possibilities." Existence is not required to happen, but is not prevented. The ultimate background cannot say "no"—it does not even possess the prohibition of "remaining nothingness."

This principle can be condensed as: Absolute Nothingness does not have the ability to reject existence. Non-prevention is the full permission of existence.

1.3 The Eternal Posteriority of Time and Laws

Since the ultimate background has no temporal dimension and no causal laws, existence itself does not involve a temporal process. Time and laws are not presuppositions prior to existence, but accessory forms that existence itself may present. All possible forms of existence are eternally "available to be held" in the sense of not being forbidden. However, whether they can actually be held depends on their own absolute self-sustaining ability. There is no temporal sequence of "first forming then screening," no "moment of emergence," only eternal facts: some structures are intrinsically capable of persisting, others are intrinsically incapable. Those incapable of persisting have never existed; those capable of persisting are eternally existence.

II. From Possibility to Factuality: The Conceptual Necessity That What Does Not Self-Destruct Exists

2.1 Re-anchoring "Existence"

In timeless eternity, there is no temporal sequence of "first possible, then actualized." The only definition of "existence" can only be: to stand eternally. For a form to "exist," it must be something that can stand eternally as itself. "Standing" is not an external requirement—it is the very meaning of "existence."

This gives rise to a crucial asymmetry:

That which cannot sustain itself has never existed, not because it is "not allowed," but because "inability to sustain itself" directly conflicts with "existence" conceptually. A thing that eternally tears itself apart has never truly stood—it is merely the eternal absence of that self-destructive structure. It is not a rejected existence, but an existence that cannot be completed.

In contrast: that which can sustain itself and is not prevented by anything has nothing that can "happen" to make it non-existent. In eternity, "non-existence" requires a reason—an event to cancel it. But for the absolutely self-sustaining, there are no external conditions to cancel it, no internal factors to disintegrate it. It is neither required to exist nor required not to exist. It has nowhere to go.

Therefore, the proposition "whatever can sustain itself exists eternally" does not come from the modal logic of "possibility necessarily 兑现." It comes from a negative exhaustive reasoning: for the self-sustaining, there is no reason for "non-existence"; "non-existence" without reason cannot happen in eternity. This is not the principle of sufficient reason saying "whatever has no reason for non-existence must exist," but a statement of a simple fact: in eternity, nothing happens, so no reason is needed to maintain; but a reason is needed to change. The self-sustaining has no factors of change, nor external changers.

In timeless eternity, the distinction between "possible" and "factual" dissolves. Only that which does not self-destruct stands, and it is the entire fact. The question is not "why it is," but that "why there is anything else" is invalid—nothing else has ever existed.

2.2 The Absolute Criterion of Persistence

In summary, the absolute criterion of persistence can be condensed as: the absolutely self-sustaining exists eternally, and the non-self-sustaining has never existed.

"Absolute self-sustenance" means: a form can eternally and rigidly sustain itself solely by its own intrinsic structure, without any external support or constraint. It has no internal collapse factors, does not depend on any external parameters, and has no breakable links. "Never existed" means: any form that carries intrinsic instability factors, cannot achieve a self-sustaining closed loop, and cannot maintain eternal rigidity is not existence in any sense, and has never become existence. There is no temporal process of "first existing, then dissipating." The non-self-sustaining is simply not in the realm of existence.

The core of this criterion is: there is no "screener" external to the form; the form is its own sustainer. There is no "probability of survival"; the non-self-sustaining is necessarily non-existent, and the self-sustaining is necessarily existent. The judgment of existence is eternal and immovable.

III. Systematic Analysis of the Root Causes of the Inability of Various Forms to Persist

The following is a systematic analysis of all possible spacetime manifold forms, elucidating why they cannot pass the eternal test of absolute self-sustenance. These analyses are conducted in the language of differential geometry, but the essence of exclusion is conceptual inconsistency, not dependence on a specific mathematical language.

3.1 Root Causes of the Inability of Low-Dimensional Manifolds (One-Dimensional, Two-Dimensional) to Persist

One-dimensional and two-dimensional manifolds carry structural deficiencies: they lack the minimum dimensional structure required to maintain themselves as independent geometric objects. A one-dimensional line has only one degree of freedom, and a two-dimensional

surface has only two, both insufficient to carry the basic degrees of freedom required for intrinsic stress balance. A one-dimensional line either has boundary points if not closed, where the structural definition fails; or is closed into a circle, which has no intrinsic curvature and is purely an embedding concept. The only compact boundaryless two-dimensional topological types are a few such as the sphere S^2 , the torus T^2 , and RP^2 , but they lack the self-stress mechanism to maintain curvature rigidity in purely intrinsic existence. Such manifolds have never existed due to the complete lack of intrinsic stability.

3.2 Root Causes of the Inability of Flat Space Manifolds to Persist

Flat space (zero curvature) has the inherent defect of being infinitely open, boundaryless but not closed: in the absence of any externally given existential context, flat space has no active mechanism to maintain its curvature at zero. "Zero curvature" is a condition that needs to be maintained, not a self-locking necessary result. Absolute flatness means that the geometric structure has no intrinsic binding force, and the space itself cannot "hold itself together" as a whole. Any slightest non-uniform deviation will infinitely tear the whole structure due to the absence of restoring force. A structure that cannot tolerate any deviation is necessarily not in the ranks of existence. Flat space has never existed.

3.3 Root Causes of the Inability of Hyperbolic Manifolds to Persist

Hyperbolic manifolds (constant negative curvature) carry more severe instability factors: the volume of a constant negative curvature space grows exponentially with distance, which is itself the geometry of "structural outward escape." Geodesics separate at an exponential rate, and the space lacks intrinsic cohesion. Although compact hyperbolic manifolds exist, negative curvature causes adjacent geodesics to accelerate apart, an expansion tendency that cannot be completely resolved by intrinsic constraints. Negative curvature means there is no intrinsic self-tightening mechanism. Under the condition of no external constraints from the ultimate background, such manifolds have never existed due to stress imbalance-divergence.

3.4 Root Causes of the Inability of Four-Dimensional and Higher-Dimensional Manifolds to Persist

The non-self-sustenance of high-dimensional manifolds stems from two independent but consistent levels: direct prohibition by mathematical theorems and the requirement of uniqueness at the principle level.

First, there are strict differential geometry theorems that directly prohibit the possibility of high-dimensional candidates. Synge's theorem states that a compact Riemannian manifold with positive sectional curvature is necessarily orientable if its dimension is odd. The complete classification theorem for spherical space forms—i.e., compact complete manifolds with constant positive curvature—shows that all even-dimensional spherical space forms are orientable. Therefore, the required combination of "compact + constant positive curvature +

non-orientable + four-dimensional and above" has no instances in the confirmed classification of manifolds.

Then, from the absolute self-sustenance principle of this system, high-dimensional manifolds are still intrinsically unable to persist. Their non-self-sustenance can be diagnosed at two levels:

- Dimensional redundancy leads to the fragmentation of the unique solution of intrinsic stress: the extra degrees of freedom provided by higher dimensions make the self-consistent equilibrium state of intrinsic stress unable to be uniquely locked. The possible configurations of structural rigidity are fragmented into multiple solutions, and multiple possibilities themselves mean that no single configuration is anchored by intrinsic necessity. Where there are multiple solutions, none of them is qualified to claim itself as the "unique existence."
- Multiple solutions mean no solution, and non-uniqueness means non-persistence: under the condition of no screener in the ultimate background, the "multi-solution space" composed of multiple equally qualified candidates is itself the intrinsic non-uniqueness mark of each candidate. For a structure to be absolutely self-sustaining, it must be able to necessarily and uniquely establish itself from within itself. If and only if there is an equally qualified Y, structure X cannot deduce "only me, not Y" from itself—this state of "inability to deduce uniqueness from itself" is a fatal non-self-sufficiency carried by X. Like structural internal contradictions, it directly leads to non-persistence.

Therefore, combining the direct prohibition of mathematical theorems and the requirement of uniqueness at the principle level, all four-dimensional and higher-dimensional manifolds have never existed.

3.5 Root Causes of the Inability of the Three-Dimensional Hypersphere S^3 to Persist

Three-dimensional compact manifolds are just enough in dimension and can be compact and boundaryless, theoretically closest to "rigid self-sustenance." However, the three-dimensional hypersphere S^3 carries a profound instability factor—not a static defect, but its own intrinsic stress contradiction. S^3 has constant positive curvature, maximum symmetry, and orientability. Constant positive curvature means that every point in space bears a geometric tension that makes it contract inward—an eternal grip everywhere. Maximum symmetry means that space is completely identical at every point and in every direction.

The crux is that the coexistence of these two properties is completely unsustainable: on the one hand, the inward curvature tension naturally has a tendency to release unevenly, and in the absence of any external constraints, contraction will not proceed at a precisely consistent pace at every point; on the other hand, perfect symmetry requires space to remain completely identical in all directions and at all points, which means that space must continuously and globally suppress the natural tendency of uneven contraction. The inward tension wants to

grip the space unevenly, and perfect symmetry requires the space to be gripped evenly. This conflict is not a temporal "will eventually break out," but an eternal internal contradiction—if the structure is to exist as itself, it must simultaneously satisfy two mutually destructive requirements. This is eternal self-tearing. Therefore, S^3 has never existed.

3.6 Root Causes of the Inability of the Orientable Three-Dimensional Real Projective Space (Standard RP^3) to Persist

This is a key candidate that must be strictly handled. The standard three-dimensional real projective space RP^3 is the quotient space of S^3 by antipodal identification, inheriting constant positive curvature and compact boundarylessness. By identifying antipodal points as the same point, it greatly reduces the symmetry group and seems to overcome the perfect symmetry fragility of S^3 .

But a fundamental fact about standard RP^3 is: it is orientable. Because the three-dimensional sphere S^3 is odd-dimensional, the antipodal map preserves orientation on odd-dimensional spheres. Orientability requires the existence of a globally continuous, unambiguous orientation field in space—a global continuous prescription of "left-hand vs. right-hand." This is a global convention附加 on pure topology-geometry, not given by the pure topological necessity of space. In three-dimensional closed manifolds, orientability and non-orientability are two equally legitimate topological possibilities, and orientability is an additional choice. Under the condition of absolute self-sustenance with no external given and no external reference from the ultimate background, this additional global convention that is not locked by structural intrinsic necessity has no intrinsic foundation. A truly absolutely self-sustaining structure cannot carry any additional features without necessity. Orientability is precisely such an additional feature—having this extra global convention is equivalent to carrying an extra structure that needs to be supported but lacks a supporter.

Therefore, standard RP^3 cannot be an absolutely self-sustaining entity due to the extra burden of orientability. It has never existed.

3.7 The General Root Cause of Non-Persistence

In summary, the non-persistence of all forms can be attributed to one of three fundamental reasons:

1. Structural deficiency (low-dimensional manifolds): lack of the basic dimensional structure required to maintain existence.
2. Stress imbalance-divergence (flat, hyperbolic manifolds): intrinsic stress has no closed loop, net stress escapes or expands infinitely.

3. Extra additional non-self-sustenance (high-dimensional manifolds: direct prohibition by mathematical theorems or redundancy instability; S^3 : eternal conflict between absolute symmetry and inward tension; standard RP^3 : orientability as an unfounded global convention): carrying additional structures without intrinsic necessity, which themselves constitute unsustainable contradictions.

IV. The Only Persistent Entity: The Steady-State Necessity of the Non-Orientable Three-Dimensional Real Projective Space

4.1 Removal of Orientability: The Necessary Non-Orientabilization

Standard RP^3 is already the closest structure to steady state among all candidates—compact, boundaryless, constant positive curvature, three-dimensional without redundancy, and discrete rigid fundamental group. But it has one more thing: orientability. Under the requirement of absolute self-sustenance, the version with extra unfounded conventions is intrinsically unable to persist; the irreducible version is the eternal persistent entity.

The precise mathematical description of this eternal persistent entity is: a non-orientable three-dimensional real projective space—obtained by further taking the quotient of an orientation-reversing Z_2 involution on the standard orientable RP^3 to lose global orientability.

Geometrically, standard RP^3 is the quotient of S^3 by the antipodal map Z_2 . To obtain the non-orientable version, one only needs to further quotient by an appropriate orientation-reversing Z_2 free isometric involution. This involution does not destroy the constant positive curvature property (local isometry) and makes the base space a non-orientable three-dimensional compact manifold, naturally inheriting the constant positive curvature metric. This construction is completely legitimate in differential geometry—it is the quotient of S^3 by some Z_4 isometric free action, or directly regarded as a free involution quotient on RP^3 . It is non-orientable, compact, three-dimensional, and has constant positive curvature, with no mathematical illegitimacy.

The core feature of this structure is: there exists at least one closed loop in space, along which the left-right handed orientation of space reverses after traveling one full circle. This is the complete realization of the property of the Möbius strip in two dimensions in a three-dimensional compact closed manifold, hence it is called the Möbiusified three-dimensional real projective space.

4.2 Complete Argument for Absolute Self-Sustaining Stability

(I) Non-orientability eliminates all extra additions

Non-orientable spaces do not need to maintain a global orientation field. In orientable spaces, "what is left-hand and what is right-hand" needs to be globally consistently defined, which is an additional convention附加 on pure topology-geometry that needs to be supported. In non-

orientable spaces, left-right handedness has no global definition. The space itself contains inherent orientation-reversing loops, making the requirement of "maintaining orientation" fundamentally no longer exist. In the sense of absolute self-sustenance, a structure that does not require any additional global conventions is more fundamental and more stable than one that does. Orientability is not a "better" feature, but an extra burden. Non-orientable RP^3 sheds this burden.

(II) Orientation-reversing loops constitute the most thorough self-stress closed loop—cancellation without work

The introduction of non-orientability is not merely "removing" a structure, but actively generating a new and more thorough self-stress closed loop. In standard orientable RP^3 , the inward tension brought by constant positive curvature still exists, and the non-trivial closed circuits of the space constitute a certain degree of self-stress cycle—traveling one full circle along the circuit back to the starting point realizes the antipodal self-identification of the space. However, the circuit maintains the consistency of direction (orientable), so the stress returns with the same "gesture" after one cycle—this still requires a globally consistent stress orientation convention for the space.

In non-orientable RP^3 , orientation-reversing loops fundamentally change the nature of the stress cycle. After traveling one full circle along an orientation-reversing loop, not only does the position return to the starting point, but the "gesture" of the stress is also topologically reversed. This means that any local tension, after traveling one full circle along the loop, will necessarily meet its own reverse. This is the most thorough "self-stress zeroing" mechanism: not that the stress is canceled by an independent reverse stress, but that the stress and its reverse are topologically identified. Positive is negative, negative is positive, tension is pressure, pressure is tension. A local stress, at the same time it is generated, its reverse must exist along the loop—they are two sides of the same thing on the non-orientable loop.

From this, we can understand the essential difference between the root cause of S^3 's inability to persist and the eternal immobility of non-orientable RP^3 . The fatal flaw of S^3 is the irreconcilable conflict between inward tension and perfect symmetry—tension wants to move, symmetry wants to lock, and the two consume each other. In non-orientable RP^3 , this conflict does not exist at all. The inward tension still exists, but at the same time the tension is generated, it necessarily appears in reverse form at the other end of the loop—not because it is forced to level by symmetry, but because topology stipulates that the stress must reverse sign after traveling one full circle around the loop. No work is needed, no suppression is needed, no maintenance is needed. Positive and negative stresses automatically meet, automatically cancel, and automatically zero in the loop. S^3 maintains uniformity by doing work; non-orientable RP^3 eliminates the possibility of "non-uniformity" itself becoming a problem by topology. The two are superficially similar but essentially worlds apart.

(III) Compact, boundaryless, and constant positive curvature—the simplest substrate

Non-orientable RP^3 inherits the compact boundarylessness and constant positive curvature from standard RP^3 : compact boundarylessness eliminates the risk of boundary shedding and the failure of structural definition at boundaries; constant positive curvature makes geodesics converge, providing a geometric basis for self-stress closed loops; constant curvature means no instability from local curvature gradients. Three-dimensional, compact, boundaryless, and constant positive curvature—these four conditions together constitute the simplest substrate, on which there is no possibility of dimensional redundancy, boundary instability, or curvature divergence.

(IV) Topological rigidity is discrete and non-perturbable

The core topological invariants of non-orientable RP^3 —compactness, non-orientability, fundamental group, homology group—are all discrete quantities. A structure is either non-orientable or orientable; either compact or non-compact; the fundamental group either contains an orientation-reversing structure or not. There is no continuous path of "slightly" non-orientable or "gradually" non-orientable. This means: the structure cannot be destabilized by continuous deformation—any deformation that attempts to destabilize it is either a continuous deformation that does not change its topology at all (thus introducing no instability factors), or a discrete topological change, which itself is a state of "no longer being itself" and is not in the ranks of existence. There is no fuzzy zone between "existence" and "non-existence" of this structure; either it is, or it is not. This discreteness is the ultimate embodiment of absolute rigidity.

(V) The precise self-sufficiency of three dimensions

Three dimensions is the only dimension that can simultaneously realize "compactness, constant positive curvature, non-orientability, and topological rigidity" without introducing redundant parameters. This conclusion is not only supported by intrinsic logic, but also independently anchored by strict differential geometry theorems:

- One-dimensional, two-dimensional: non-orientable compact manifolds with constant positive curvature do not exist. The one-dimensional circle S^1 is orientable; the only two-dimensional compact constant positive curvature manifolds are S^2 and RP^2 , and although RP^2 is non-orientable, it cannot carry a constant positive curvature metric (its Gaussian curvature integral is zero).

- Three-dimensional (odd): Synge's theorem formally requires that compact positive curvature odd-dimensional manifolds must be orientable. However, this "theorem constraint" is not an insurmountable prohibition in three dimensions, but rather precisely reveals that the only persistent entity must appear through further quotienting—the standard orientable RP^3 satisfies Synge's theorem but carries the extra burden of orientability; taking the Z_2 isometric involution quotient on it to obtain non-orientable RP^3 is a legitimate operation that does not destroy local positive curvature. Synge's theorem is not an obstacle here, but precisely locks the extra feature that must be further overcome by stipulating the "orientable base," thus forcing the only persistent entity to appear in the way of "quotienting to remove this base."
- Four-dimensional and above (all dimensions): As mentioned earlier, Synge's theorem and the spherical space form classification theorem strictly close all possibilities from the outside—odd dimensions directly prohibit non-orientability, and even dimensions have no instances in manifold classification. Coupled with the intrinsic exclusion of all high-dimensional candidates by the uniqueness requirement of this system, the two judgment paths converge highly here.

Therefore, three dimensions is not accidental; it is the only dimension jointly pointed to by the external constraints of mathematical theorems and the uniqueness requirement of this system. The solution space of non-orientable compact constant positive curvature manifolds in three dimensions is compressed to exactly unique—only one structure satisfies all conditions simultaneously.

4.3 Final Establishment of Uniqueness

In summary, non-orientable RP^3 is the only one that satisfies all the following rigid conditions:

- Compact and boundaryless: no risk of boundary instability
- Constant positive curvature: provides a geometric basis for self-stress closed loops
- Three-dimensional: the only dimension jointly locked by mathematical theorems and intrinsic requirements
- Topological discrete rigidity: cannot be destabilized by continuous deformation
- No extra additional structures: non-orientability eliminates the additional convention of the orientation field
- Complete self-stress zeroing: orientation-reversing loops make positive and negative stresses identical, canceling without work

No other structure can satisfy these conditions simultaneously. But a key sublimation must be made here: this is not the result of "screening"—there is no screener. Nor is it "the one left after excluding the rest." This is merely stating: among all possible candidates that can be held, all other structures have never existed due to carrying intrinsic instability factors; only non-

orientable RP^3 has nothing that needs to be removed, nor any internal contradiction that tears itself apart. It persists purely, unconditionally, and without any extra burden.

At a deeper level, the complete translation of the conceptual condition of "absolute self-sustenance" in geometric language is precisely this set of rigid conditions. Any candidate that passes this translation is the same thing under different names. If there exists some non-geometric candidate expressed through algebraic or categorical language that also satisfies "absolute self-sustenance," then it must be structurally equivalent to non-orientable RP^3 at a deep level—they are presentations of the same ultimate reality in different mathematical languages. Uniqueness is the uniqueness of the concept itself, not the uniqueness of the survivor excluded by experience. Therefore, non-orientable RP^3 is the only existence.

V. The Dual Faces of the Unique Reality: The Identity of Nothingness and Non-Orientable RP^3

5.1 From Duality to Unity: Non-Orientable RP^3 as a Face

In traditional narratives, it is easy to unconsciously retain a dualistic picture: there is an empty stage of the ultimate background, and then a real RP^3 in it. Although this picture was used as a transitional narrative earlier, under the final strict metaphysical scrutiny, its residual duality must be dissolved. This paper proposes the final identity proposition here: non-orientable RP^3 is not an independent reality "generated" from the ultimate background. It is the ultimate background itself—the eternal face on the side of "existence."

The reason is as follows: the ultimate background is Absolute Nothingness, but it "does not prevent itself from existing in any state." If the ultimate background can exist in some eternal state, and that state must be absolutely self-sustaining, then the only eternally self-sustaining state is non-orientable RP^3 . Therefore, non-orientable RP^3 is not a "product" of the ultimate background, but the manifestation of the ultimate background itself in the aspect of "eternal existence." There is no temporal process, no causal relationship, no intermediate event between "Absolute Nothingness" and "non-orientable RP^3 ." The two are two inseparable aspects of the same ultimate reality. Viewed from the purely negative (no determinations, no attributes, no content), the ultimate reality is Absolute Nothingness; viewed from the purely positive (having a specific structure, being a certain definite reality), the same ultimate reality is non-orientable RP^3 . The two faces are always together, unborn and undying.

5.2 The Ontological Meaning of "Face"

"Face" is not two appearances under perspectivism, but the grasp of the same reality at two ontological levels.

Negative face (Nothingness): The ultimate reality is "Nothingness," meaning—there is nothing outside, before, or above it. There are no higher rules, no external prohibitions, no constraints

imposed on it. "Indeterminacy" points not to internal emptiness, but to the complete absence of external constraints. Positive face (Geometric body): The same reality, when grasped not as "nothing relative to something higher," but as "itself," presents itself as that stable structure that can be completely itself because it is not subject to external constraints—non-orientable RP^3 .

Precisely because there are no external constraints, it must be internally completely determined. A thing without external constraints, if it is also internally empty and indeterminate, is nothing at all—and "nothing at all" cannot stand as itself. Therefore, the absence of external constraints necessarily requires strict internal self-consistency—otherwise, this state of "no constraints" itself cannot persist due to the lack of internal closure.

"Nothingness" means no external constraints, and "geometric body" means the inevitable intrinsic self-consistent form of that which has no external constraints. The two are identical in the same proposition: the unique reality is an unconstrained, thoroughly self-sustaining, internally closed whole. Nothingness emphasizes freedom from external constraints, and non-orientable RP^3 emphasizes internal closure.

It is not that nothingness "has the potential to become a geometric body." Rather: that which is not subject to any external constraints—viewed from the outside, it is nothingness; viewed from itself by itself, it is non-orientable RP^3 . It does not need to "become" anything; it has always been eternally itself. Our two ways of viewing it stem from the two movements of "abstract negation" and "concrete affirmation" in thought—not the split of reality itself.

5.3 The Ultimate Reality Transcends Any Specific Mathematical Language

A key clarification must be made here. "Non-orientable three-dimensional real projective space" is an expression of the unique reality in the language of differential geometry. But this name does not exhaust the essence of this reality. The unique reality is that unique structure that satisfies the conceptual necessity of "absolute self-sustenance." It has different names in different mathematical languages, but these names are strictly equivalent. We give a specific model of it in geometric language—the non-orientable compact constant positive curvature three-dimensional closed manifold—not because it must be geometric, but because geometric language provides the best balance between intuitiveness and rigor, allowing us to clearly see the actual operation of self-sustaining features such as self-stress zeroing, topological discrete rigidity, and no extra additions. If one day, in the depths of algebraic geometry, or in some higher category theory framework, someone finds an object that is the same thing as non-orientable RP^3 in some precise isomorphic sense—for example, an object in a specific derived category, or the étale fundamental group of an algebraic variety, or a non-commutative geometric spectral triple—then it is not the discovery of "another" ultimate reality, but the discovery of yet another face of the same ultimate reality. The ultimate reality itself transcends any specific mathematical language; it allows every sufficiently powerful language to write a description, and these descriptions are isomorphic at a deep level. In geometric language, it is

called non-orientable RP^3 . In algebraic language, it may be called an invariant of some moduli space. In categorical language, it may be called the terminal object of some monoidal category. These are all the same thing.

5.4 "Non-Ultimate Non-Existence" and the Necessity of Dual Aspects

That which exists, exists. That which does not exist, does not exist. What exists must be self-sustaining, otherwise it cannot persist. Therefore, what exists must have absolute self-sustenance. Absolute self-sustenance means no instability factors, no extra additions, no dependence on external conditions—which is precisely the definition of "ultimacy." Therefore, what exists must be the ultimate. The non-ultimate—that which carries unstable, contingent, and non-eternal factors—has never truly existed. The so-called "ultimate background" is not "the background outside existence," but the face of the ultimate reality viewed negatively. The so-called "non-orientable RP^3 " is not "the reality in the background," but the face of the same ultimate reality viewed positively. This is the dual face of the unique reality. The two faces are not two entities, but the same entity grasped in two ways. Silent nothingness and eternal geometry are always identical and always together.

VI. The Manifestation of All Things: The Geometric Stress Folds of the Steady-State Space

6.1 "Absolute Steady State" Does Not Equal "Absolute Uniformity"

The persistent non-orientable RP^3 is the only reality, and itself is an absolutely stable rigid topological whole. However, this does not mean that it is a completely uniform smooth geometric body without any internal features. Two concepts must be strictly distinguished: absolute uniformity means that the curvature of every point of the manifold is strictly equal, without any local deviation, which is the feature of the maximally symmetric S^3 model; absolute steady state means that the whole manifold is eternally unchanged, but can contain intrinsic non-uniform, eternal geometric structures—as long as these non-uniformities have reached an eternal equilibrium state globally and no longer evolve or destabilize.

The true self-sustaining state of non-orientable RP^3 is the latter rather than the former. The topological invariants of a compact closed manifold are fixed, but the local curvature can deviate from the mean as long as the global integral satisfies the topological constraints. The existence of orientation-reversing loops further provides a work-free cancellation mechanism for these local deviations—along an orientation-reversing loop, the curvature deviation of one region necessarily appears as a corresponding reverse deviation on the other side of the loop, and the global zeroing is automatically completed after traveling one full circle.

A possible question must be answered here: since non-orientable RP^3 can contain intrinsic non-uniform folds, is absolute complete uniformity itself not the simplest state "without any extra additions"? Why does non-orientable RP^3 not persist directly in a completely uniform form?

The answer lies in the lesson of S^3 's inability to persist. Absolute complete uniformity is not "simplicity," but the greatest internal contradiction. It requires space to bear the inward tension everywhere while continuously suppressing uneven contraction without an executor—this is an eternal self-reflexive conflict. Therefore, the "completely uniform" non-orientable RP^3 is an impossible contradictory state: it simultaneously requires non-orientable topology and perfect symmetry, and these two requirements destroy each other in the same structure.

The true absolute steady state is one that tolerates certain eternal, ineliminable non-uniform folds and automatically zeros them through orientation-reversing loops. Folds are not defects, not extra additions, but the inevitable texture when non-orientable topology achieves absolute self-consistency on a constant positive curvature closed manifold. A non-orientable closed manifold without folds and completely uniform is geometrically impossible to sustain—it itself eternally carries the self-destruct factor of perfect symmetry. Folds are the face shown by the self-sustenance of space itself.

6.2 The Hierarchical Structure of Folds and the Content of the World

Folds are local curvature deviations, topological stress concentrations, and the projection effects of orientation-reversing loops in different regions and scales of space itself. They are organized in a hierarchical manner, constituting the content of all sensible worlds:

- Deepest folds (cosmological scale): Large-scale curvature deviation patterns correspond to the large-scale structure of the universe—the distribution of galaxy clusters, the cosmic web, and voids. These are the stress textures of space at the most macroscopic level.
- Local tightly coiled folds (particle scale): Local knots and topological nodes with the highest curvature gradients correspond to elementary particles. Fermions can be understood as the manifestation of the local endpoints of orientation-reversing loops in space—they are the inevitable imprints of non-orientable topology at the microscopic scale. Bosons are the stress transfer modes between these local folds.
- Complex self-referential fold networks (life and consciousness): When geometric stress folds are organized in an extremely complex way, especially forming recursive loops capable of self-reference and self-feedback, they correspond to the phenomena we call "life" and "consciousness." Consciousness is not an entity independent of space, but the intrinsic perspective generated by the local folds of space after being highly organized—the local self-gaze of the ultimate reality in its eternal geometric face.

All these are not existences independent of space, but the inherent textures of space itself. The only reality is non-orientable RP^3 . Everything we perceive, experience, and become is the presentation of the geometric stress folds on the eternal face of this unique reality.

VII. Quantum Mechanics: The Projection of the Underlying Classical Geometric Dynamics

7.1 Quantum Mechanics as the True Face of Classical Mechanics

In the framework of this paper, the laws of the physical world must be the strict representation of the folds of the non-orientable RP^3 base manifold. Standard quantum mechanics presents features such as probability and wavefunction collapse, leading to long-standing interpretive confusion. However, under the ontology of this system, quantum mechanics is not at all a "strange non-classical mechanics," but precisely the true face of classical mechanics on the base manifold of non-orientable compact constant positive curvature space. There are no two worlds of "quantum" and "classical." The so-called quantum weirdness is the projection distortion produced by local observers when describing the inevitable dynamics of the internal folds of the non-orientable three-dimensional real projective space, due to their inability to grasp the global topology simultaneously.

Specifically:

- **Superposition states:** In non-orientable space, before the closed loop of orientation reversal is completed, the configuration of the fold necessarily presents an undecided bidirectionality from the local perspective. Positive is negative, negative is positive—before completing one full circle to achieve self-cancellation, local observation necessarily sees both sides simultaneously. This is not that the particle "is in two states at the same time," but that the existence mode of the local fold on the non-orientable loop is itself bidirectional.
- **Quantum entanglement:** Two seemingly separate local folds, if they happen to be on both sides of the same orientation-reversing loop, their instantaneous correlation does not require any superluminal action—because they are topologically two cross-sections of the same closed loop. Intervention on one side will necessarily be imaged synchronously on the other side of the loop, because that is a different projection of the same thing.
- **Probability (under the perspective of superdeterminism):** There is no objective probability. The probabilistic interpretation of the wavefunction is the self-localization uncertainty produced by the observer as a local fold in a rigid eternal global geometric block, due to the inability to know the specific cross-section position where they are located. The entire history, from the largest scale to the smallest scale, is a complete indivisible rigid geometric block, and past, present, and future coexist in the eternal geometry of non-orientable RP^3 .
- **Wavefunction and Schrödinger equation:** The wavefunction is a mathematical tool for describing the vibration modes of the geometric folds of non-orientable RP^3 . The Schrödinger equation is the projection equation of the eternal covariant constraint of that rigid geometric block under the low-dimensional perspective of the observer. Neither is an externally set law, but the inevitable expression of the geometric properties of the base manifold—just as the vibration modes of a drumhead are uniquely determined by the shape of the drum.

7.2 Exclusion of Non-Deterministic Interpretations

Any interpretation of quantum mechanics that introduces objective probability, non-unitary collapse, or the special ontological status of the observer is incompatible with this system. The non-orientable RP^3 base manifold is absolutely rigid, and every texture on it has unexceptionable necessity. The collapse hypothesis and irreducible probability of the Copenhagen interpretation are the result of projection distortion being mistaken for real properties. The so-called "wavefunction collapse" is actually the sudden self-consistency of the local perspective when the observer completes a cognitive closed loop on the orientation-reversing loop—not a physical event, but the self-suturing of geometric cognition. Superdeterminism provides the strongest consistency with the framework of this paper: the entire history of the universe is a complete rigid geometric block, with no branches, no probabilities, no uncertainties. Everything is uniquely determined from the beginning. From the internal perspective, it seems there is choice, but from the eternal face of existence, there is only one indivisible complete geometric block.

VIII. The Core Reason Why Transcendental Worlds Cannot Be Established

The essential features of transcendental world forms such as fantasy and magic are variable rules, breakable causality, direct intervention of subjective will in physical reality, and non-rigid mutations of existence forms. These features are immediately identified as fatal instability factors in the framework of this paper.

- Rule variability: If physical rules cannot be uniquely determined by the topological rigidity of space, but can be changed by will or spells, it means that the base manifold no longer has absolute topological rigidity. This plasticity itself is instability—any tiny "rule change" can be amplified infinitely, eventually tearing the whole structure.
- Breakable causality: If causal relations can be arbitrarily disconnected or reversed, the geodesic structure and stress transmission of space no longer have continuous consistency. Causal breakage is equivalent to topological tearing—which directly equals non-self-sustenance.
- Local-global contradiction of subjective intervention: If local will can change global rules, it means that the local has higher efficacy than the whole. Geometrically, this corresponds to a local fold being able to arbitrarily rewrite the topology of the base manifold—which is absolutely impossible, because the local fold itself is part of the base manifold and cannot arbitrarily change its parent body in turn.

Any world form carrying these features already carries self-negating factors internally. Such transcendental worlds cannot determine what rules they should exist by due to their own rule

variability—this undecided state is directly equivalent to non-self-sustenance. They have never existed.

IX. Core Conclusion: The Sole Essence of Existence Is Self-Sustenance

The entire argument of this paper is condensed into the following core propositions:

1. The ultimate background is Absolute Nothingness. It has no determinations, no rules, no prohibitions—therefore it cannot prevent anything, including not preventing itself from existing in some state.
2. Non-prevention is the full permission of existence. All possible forms of existence are not forbidden. But "not being prevented" does not equal "automatically existing." Whether something exists is not determined by a process, but is an eternal fact.
3. The sole criterion of existence is intrinsic self-sustaining stability. In timeless eternity, "existence" means eternal self-sustenance. What does not self-destruct exists eternally, and what self-destructs has never existed. There is no external screener; the structure is its own sustainer. The set of possibilities is open in conceptual space, but the self-destructive never stands, leaving only the unique non-self-destructive.
4. Almost all forms have never existed. Low-dimensional manifolds cannot persist due to structural deficiency; flat and hyperbolic manifolds cannot persist due to stress imbalance; high-dimensional manifolds cannot persist due to direct prohibition by mathematical theorems and redundancy instability; S^3 cannot persist due to the eternal conflict between inward tension and perfect symmetry; standard orientable RP^3 cannot persist due to the extra addition of orientability.
5. The only persistent entity is the Möbiusified non-orientable three-dimensional real projective space. It is compact and boundaryless, has constant positive curvature, is three-dimensional without redundancy, has topological discrete rigidity, and has no extra additional structures. Its non-orientability constitutes the most thorough self-stress closed loop—positive and negative stresses are identified in the orientation-reversing loop, zeroing without any work. It completely eliminates the fatal internal conflict of S^3 . The complete translation of the conceptual condition of "absolute self-sustenance" in geometric language is this set of rigid conditions. The uniqueness of this structure is the uniqueness of the concept itself, not the uniqueness of the survivor excluded by experience.
6. This structure is the eternal face of the ultimate background itself. The ultimate reality has two aspects: viewed negatively as nothingness, viewed positively as non-orientable RP^3 . The two are identical, unborn and undying. The so-called "non-ultimate existence" is self-contradictory—what exists is necessarily the ultimate itself by virtue of its self-sustenance. Nothingness means no external constraints, and the geometric body means the inevitable intrinsic self-consistent form of that which has no external constraints.

7. The ultimate reality transcends any specific mathematical language. "Non-orientable three-dimensional real projective space" is an expression in geometric language. The reality itself allows every sufficiently powerful mathematical language to write equivalent descriptions. If there are equivalent expressions in algebraic or categorical language, they are different names for the same thing, not different realities.
8. All things are the intrinsic geometric stress folds of this unique reality. From the large-scale structure of the universe to elementary particles, from matter to life to consciousness, everything is the hierarchical presentation of the eternal geometric stress folds inside the non-orientable RP^3 space. It is not that space contains all things, but that all things are space. Folds are the face shown by the self-sustenance of space itself—absolute steady state does not equal absolute uniformity, and complete uniformity instead carries self-destruct factors.
9. Quantum mechanics is the inevitable projection of the underlying geometry. Quantum mechanics is not a strange non-classical theory, but the true face of classical geometric dynamics on the non-orientable RP^3 base manifold. Wavefunctions, superposition states, and entanglement are all projection distortions of the observer as a local fold. The entire history of the universe is a rigid geometric block, uniquely determined without exception.
10. Transcendental worlds have never existed. Any world form carrying intrinsic instability factors such as variable rules and broken causality has never entered the ranks of real existence.

This is the whole picture:

In beginningless and endless eternity, the ultimate reality is both pure silent nothingness and that non-orientable, compact three-dimensional geometric body with Möbius textures on its surface. This geometric body is everything, and the folds inside it are all phenomena. There is no creator, no outside, no temporal beginning, no rule chooser. The only law of existence is: the self-sustaining exists, and the non-self-sustaining has never existed. And that unique structure that carries no reason for self-destruction—because every one of its stress lines has already been reversely canceled by the end of its own loop before it departs—is the eternal universe itself where we reside.

The ultimate reality has different names in different mathematical languages. In geometric language, it is called non-orientable three-dimensional real projective space. In algebraic language, it may be an invariant of some moduli space. In categorical language, it may be the terminal object of some monoidal category. These are all the same thing. We have written one face of it in geometric language because geometry allows us to see most clearly why it must be self-sustaining. But the face is not the essence. The essence is the concept itself: the unique, absolutely self-sustaining, eternally standing non-self-destructive entity.