Why Time Is Directed: World Stabilization as an Ontological Condition

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Abstract

The direction of time is considered a fundamental yet unresolved problem in physics. While most fundamental equations are time-reversal symmetric, world nevertheless appears factually irreversible: structures emerge, bind existence, and cannot be undone in any real sense without losing their own conditions. Common explanations locate the direction of time in the entropic arrow, in cosmological initial conditions, or in emergent dynamics, without clarifying why world itself is not backward-viable.

The present contribution proposes an ontological shift in perspective. Time is not directed because physical processes are irreversible; rather, it is directed because world itself emerges in a directed manner. World formation is understood as a pre-ontological process in which possibility is condensed into viable existence. This condensation generates irreversible bindings—embodiment, relationality, and historical fixation—that cannot be undone without residue. The direction of time is the imprint of this binding.

From this perspective, time does not appear as a neutral parameter but as the effect of recurrent opening against complete condensation. It marks the space of possibility of life. Without a direction of time, there would be stable states, but no emergence, no condensation of complexity, no being in a living sense.

This ontological reading allows boundary concepts such as time travel or stable wormholes to be reassessed. They fail not because of technical deficits or logical paradoxes, but because they presuppose transportable, world-independent existence. The contribution does not formulate a physical model of time, but clarifies the ontological conditions under which the direction of time can meaningfully be addressed.

(This paper is an interface text. The author's primary research corpus employs an autistic, non-linear, rhythmically recursive writing mode that cannot be fully preserved in academic English without structural loss of epistemic function.)

1. Introduction

That time has a direction belongs to the most elementary experiences of human existence. Things come into being, change, disintegrate. Traces remain. Decisions cannot be undone without losing their conditions. This self-evidence stands in striking contrast to the formal structure of physics: the fundamental equations are largely time-reversal symmetric. Nothing in them enforces a preferred direction.

This discrepancy is usually treated as a technical or statistical problem. The direction of time is attributed to the entropic arrow, to cosmological initial conditions, or to emergent effects of underlying dynamics. Yet all of these approaches share an unspoken assumption: they presuppose a world in which time can already be meaningfully measured, compared, and experienced. The question of why this world itself is not backward-viable remains unanswered.

The present contribution sets in earlier. It proposes not to understand the direction of time as a derived property of physical processes, but as an effect of the way world itself comes into being. Time is not directed because processes are irreversible. Processes are irreversible because world enters into irreversible bindings. The direction of time is not an addition to world, but the imprint of its emergence.

This perspective requires a shift in the ontological point of departure. The observer is not understood here as a neutral object within a given spacetime, but as a space-constituting operation. World is not a background, but a condensation of possibility that must be held open in order to remain viable. Space and time, in this sense, are not external coordinates, but patterns of this condensation.

Time emerges where world does not completely collapse into itself. It is the recurrent opening against condensation, the space of possibility of life. Without time, there would be stable states, but no emergence, no condensation of complexity, no being in a living sense. A world without time would not be empty, but dead.

The aim of this contribution is neither a revision of physical models nor an alternative cosmology. It also does not formulate an empirically testable theory of time. Instead, it seeks an ontological clarification of the conditions under which the direction of time can meaningfully be addressed at all. The thesis is: time is directed because world emerges in a directed manner. Everything else follows from this setting.

2. Established Explanations of the Direction of Time

Classical physics knows no intrinsic arrow of time. The fundamental equations of motion in mechanics, electrodynamics, and quantum physics are time-reversal symmetric: if the time variable is formally inverted, the equations remain valid. The observed asymmetry between past and future therefore does not appear as a fundamental property of the laws of nature, but as a derived phenomenon.

The dominant explanatory approach to this asymmetry is the thermodynamic arrow of entropy. Entropy describes the statistical tendency of closed systems to evolve from less probable to more probable states. This statistical irreversibility provides a robust description of macroscopic time direction, but it does not explain why world appears at all in stable, embodied structures that are accessible to such a statistical description.

Cosmological approaches often link the direction of time to the initial conditions of the universe, for example to an extremely low-entropy initial state. These models likewise merely displace the problem: the direction of time is explained by delegating it to special initial conditions, without clarifying why such conditions are ontologically world-viable.

More recent emergence-theoretical approaches treat time as a derived quantity emerging from deeper, timeless structures. Although these perspectives provide important insights, they often remain at a formal-dynamical level. The question of why emergent structures are not really reconstructible backward in time—why emergence itself is directed—also remains unanswered here.

What these approaches have in common is that they explain the direction of time either statistically, cosmologically, or as formally emergent, without explicitly addressing the ontological status of world stabilization. It is precisely at this point that the present contribution intervenes.

The argument developed here does not stand in competition with physical explanations, but addresses a level that physical explanation already presupposes.

3. World Stabilization as a Pre-Ontological Process

In many physical and philosophical models, the concept of "world" is implicitly presupposed as given: as spacetime, as background, as a stage for processes and objects. This self-evidence, however, obscures a fundamental fact. World is not simply there. It must be carried, held open, and stabilized.

World does not designate a container for things, but an active nexus in which existence is possible at all. It is not a neutral exterior, but a structured condensation of possibility. World emerges where indeterminacy does not simply disappear, but is transferred into a viable form. This transfer is not a purely dynamical process, but a pre-ontological one: it decides whether anything can appear as anything at all.

A central aspect of this approach is the departure from the image of the observer as a neutral object within the world. The observer is not an isolated unit looking at already existing objects through a neutral lens. The observer is a space-constituting operation. World and observer are not separate; they emerge together. The space in which something appears is already the result of a folding, a local ordering of possibility.

In this sense, embodiment is not an addition to existence, but its condition. A body is not an object in space, but a condensation of world stabilization. Embodied existence is irreversibly bound to a specific world context: to material, energetic, historical, and relational conditions that are not arbitrarily interchangeable. This binding is not contingent, but constitutive.

World stabilization generates asymmetries. Where stability emerges, path dependencies, dependencies, and fixations arise. These fixations cannot be dissolved without residue without destroying the nexus that carries them. World is not reversible because it does not emerge additively.

Historical world states build structurally upon one another, since each emergence alters the space of possibility itself.
What emerges is more than the sum of its parts, because it is not an object, but a nexus that first

constitutes the parts as parts.
Such nexuses cannot be unwound without losing the world in which they are viable.

World can change, differentiate, or disintegrate—
but it cannot be really returned to a state in which its own viability was not yet given.

At this point, the role of time becomes visible. Time is not the medium in which world unfolds. It is the effect of a recurrent opening that prevents world from solidifying. Processes of condensation—submergence and indimergence (MNO theory)—would end in state-like stability without this opening. Time emerges where world does not completely collapse into itself, but keeps possibility open.

Time is therefore not a measure of movement, but a measure of openness. It marks the space of possibility in which life can persist. A world without time would be stable, but dead. Only the directedness of time allows emergence, not as mere object formation, but as a living condensation of complexity.

World stabilization and the direction of time are not separate phenomena in this sense. The direction of time is the imprint of a process in which world emerges, binds itself, and remains open. Time is not external to world, but its vital signature.

The terms used here are not metaphorical placeholders, but pre-ontological markers for those processes that principially elude object description.

4. The Central Thesis: Time Is Directed Because World Emerges in a Directed Manner

The central thesis of this contribution is: time has a direction because world emerges in a directed manner. This statement is not meant metaphorically, nor as an additional physical principle. It describes an ontological fact: world formation is not a neutral, reversible process, but a directed one that creates conditions which cannot be withdrawn without residue.

Emergence, in this context, is not to be understood as a mere change of state within an already existing world. It denotes the transition from unbound possibility to viable world. With emergence, not only new properties arise, but new conditions of existence: places, bodies, identities, relations.

What emerges here is not an object among objects, but a nexus that first constitutes the parts as parts.
These conditions are not interchangeable. They bind existence to a concrete world context.

This binding is irreversible. A world that has once emerged cannot be really returned to the state prior to its own stabilization without dissolving itself. Earlier states can certainly be formalized, reconstructed, or simulated, but all such operations remain within the already established world. They generate models, not a return.

From this follows the direction of time. Time is not the parameter along which emergence takes place; it is the imprint of this emergence. Where world binds, time direction arises. Not because processes become statistically more probable or because complexity becomes unmanageable, but because world binding is not a relation among relations.

Binding cannot be withdrawn without losing the conditions under which withdrawal would be meaningful at all. Time marks precisely this boundary: the non-withdrawability of world itself. Time does not mark the irreversibility of processes, but the irreversibility of world viability.

What is to be unwound already presupposes the world that would be lost in the process. One can invert relations—but not the condition that allows them to carry anything.

In this sense, time is not a measure of movement, but of fixation. It indicates that something has occurred that cannot be undone without destroying the conditions of its occurrence.

By "conditions" no causes or states are meant here, but that irreducible stabilization through which something can appear as world at all.

If condition were graspable like a thing, there would be no space of possibility. Time is the trace of ontological decision: that possibility has been transferred into world.

In what follows, the concept of condition is not used in a causal or mechanical sense. It denotes a non-objectifiable stabilization of possibility. In this sense, condition can also be understood as an operator—not as a formal mapping, but as a pre-ontological mode of operation through which world becomes viable at all.

Condition is openness as enablement.
Time is openness as course.

Condensation produces a difference between "still possible" and "no longer possible." A condensation without direction would not be a condensation, but a state. Emergence without time direction would not be emergence, but object formation.

Condition and time are, in this sense, structurally related. Both are neither things nor states, but forms of keeping-open. Condition keeps possibility open so that world can emerge; time keeps possibility open so that world does not congeal.

Being in time is not mere presence, but a condensation of possibility. This condensation is not a symmetrical process, but a process of difference: it distinguishes between what is still possible and what is no longer possible. This difference cannot be withdrawn without dissolving the condensation itself.

Time direction is the trace of this difference. Without direction, there would be no condensation, no emergence, and no being, but only state. That world is directed therefore does not follow from movement, but from the necessity of binding possibility without completely closing it.

Time marks the ontological decision in which possibility has become world. This perspective reverses the common explanation. Processes are not irreversible because time has a direction; time has a direction because world enters into irreversible bindings. Entropic descriptions capture dynamics within a world, but already presuppose its stability. The irreversibility meant here lies prior to all statistics.

An emergence without direction would not be world, but object formation. It would produce stable states, but no space of possibility. Without time direction, there would be no condensation of complexity, no life, no being, but merely configurable structures. Time is therefore not an optional feature of world, but its condition.

From this perspective, it becomes intelligible why assumptions of real time reversal—such as physically realizable time travel—remain ontologically empty. They presuppose that world

binding is neutral and reversible. This presupposition is rejected here. Whoever would reverse time would have to undo world—and thereby the conditions of their own existence.

Time is directed because world emerges in a directed manner. The direction of time is not an addition to world, but its unavoidable expression.

Time-reversal symmetry is a property of equations, not of world—it arises where the conditions of embodiment and world binding are removed from the description.

5. Temporal Symmetry and the Category Error of Reversibility

The time-reversal-symmetric formulation of physical equations is often taken as an indication that the underlying reality is itself temporally symmetric in principle. This assumption, however, rests on a category error. It conflates formal reversibility with ontological reversibility.

Time-reversal-symmetric equations operate within already stabilized worlds. They presuppose that identities, relations, bodies, and states exist in a viable and distinguishable manner. The formal invertibility of a time variable therefore describes a property of the model, not the ontological retractability of the conditions under which the model is meaningful at all.

Ontological reversibility would mean that a once-stabilized world could be transferred back into a state in which its own stability was not yet given—*without* losing its viability in the process. This, however, is precisely what is impossible. World stabilization generates world-bindings that are not neutral. They determine what exists, what is distinguishable, and what can exert effects. These determinations cannot be annulled without residue.

Temporal symmetry is therefore not a property of world, but an abstraction. It arises where embodiment, historical binding, and material embeddedness are removed from description. This abstraction is epistemically necessary in order to render dynamics calculable. Ontologically, however, it is limited. It allows states to be compared, but not world itself to be meaningfully folded back.

The assumption of real time reversal implicitly presupposes that world-binding is a contingent addition that could be separated from the existence of world as such. In this perspective, existence and world appear separable—as if states could be shifted without carrying along the conditions of their existence. It is precisely this separation that is rejected here.

Time reversal would therefore not mean that processes merely proceed differently, but that the bindings which first constitute these processes *as processes* would have to be dissolved. Such a dissolution would not be a reordering, but an ontological collapse. What would remain would not be an earlier world state, but the loss of world.

This clarifies why temporal symmetry can be formulated consistently within physics without manifesting itself in reality. The symmetry resides in the model, not in the world. The direction of time is not a deficit of physical theories, but an indication that their ontological presuppositions are not symmetric.

Time is directed because world is not ontologically retractable. Whoever conceives time as reversible conceives world as neutral. Whoever conceives world as neutral loses sight of the fact that existence is always bound. The direction of time marks precisely this binding.

The non-reversibility of world asserted here denotes neither a logical nor a physical impossibility. It is categorical in nature. Ontological reversal would require that world as a nexus be suspended without losing the very conditions under which reversal could be meaningful at all. Since every reversal is itself an operation *within* a stabilized world, such a withdrawal is excluded in principle.

6. Wormholes, Time Travel, and the Illusion of Transportable Existence

Concepts such as stable wormholes or realizable time travel are often regarded in physics as extreme, yet in principle conceivable, consequences of spacetime theory. They are based on the assumption that spacetime is topologically manipulable, while that which moves within it—particles, information, or observers—remains ontologically unchanged. Existence appears in these models as a transportable something that can be guided through differently configured spacetime structures.

This assumption is ontologically untenable. Embodied existence is not an object that can be displaced independently of its world context. It is a local condensation of world stabilization. A body—whether understood biologically or physically—is not simply localized in spacetime, but bound to specific material, energetic, relational, and historical conditions. These conditions cannot be transported without carrying world itself along.

Wormhole and time-travel models implicitly presuppose that world is neutral: that different points in time or regions of space merely represent different addresses within the same ontological structure. In this perspective, the eighteenth century appears just as "available" as the twenty-first, as if both worlds could be folded, connected, and traversed without altering the conditions of their respective stability.

It is precisely here that the paradox lies. Historical world states are not places, but world configurations. They carry specific forms of embodiment, materiality, orders of knowledge, and relationality. An existence that is stable in one world is not necessarily stable in another. A transition into another time would therefore not be a movement, but a confrontation with a world state that does not sustain one's own stability.

From this perspective, the instabilities of wormholes frequently noted in physics can be reread. They appear not primarily as technical problems—such as the absence of exotic matter—but as expressions of ontological incoherence. Models that postulate direct connections between already emergent world states bypass the processes of minimal world binding under which transitions could be viable at all.

Time travel fails in this perspective not because of logical paradoxes, but because of the illusion that existence is context-free. The familiar paradoxes arise only secondarily, when an ontologically non-viable assumption is further elaborated formally. The actual rupture lies earlier: in the idea that world could be traversed without carrying itself along.

Wormholes and time travel are thus not indications of hidden possibilities of physics, but boundary figures at which what models can accomplish—and what they cannot—becomes visible. They mark the point at which formal description encounters ontological conditions. That they remain physically unstable is not accidental, but a structural symptom.

World cannot be skipped. Whoever attempts to traverse time treats existence like an object. Yet existence is a folding of world. If this folding is undone, no traveler remains.

7. Discussion: Direction of Time as an Ontological Boundary

The present contribution does not formulate a new physical theory of time. It makes no claim to empirical predictions and does not compete with existing models. This clarification is necessary—yet it must not obscure the fact that a substantial shift of the ontological point of departure is undertaken here. The thesis that time is directed because world emerges in a directed manner does not concern the dynamics within physics, but the conditions under which physical description becomes meaningful at all.

Physical theories operate within stabilized worlds. They presuppose that identities exist, that states are distinguishable, and that processes can be traced. These presuppositions are not trivial, but the result of ontological stabilization. Entropy, symmetry, and dynamics describe what happens within a world—but they do not explain why this world exists as a viable nexus in which such descriptions are possible.

The approach developed here makes this implicit presupposition explicit. It shifts the question of the direction of time from the level of process description to the level of world formation. Time thus appears not as one physical quantity among others, but as an expression of the fact that world is not neutral, not interchangeable, and not reversible. This shift explains why the direction of time can be relativized or formally suspended in models, while remaining unavoidable in the experience of world.

A possible objection to this perspective is to dismiss it as purely conceptual or philosophical. Such an objection, however, misunderstands the status of ontological clarifications. Ontology does not provide competing models, but determines the scope and limits of what models can meaningfully accomplish. The question of whether time is reversible cannot be decided by equations alone if it remains unclear what a reversal of world would even mean.

It is precisely at boundary figures such as time travel or wormholes that it becomes visible that physical modelability cannot be equated with ontological viability. The reading proposed here explains this discrepancy without introducing additional hypotheses. It interprets the instability of such models not as a provisional technical deficit, but as an indication of a categorical boundary: world cannot be skipped without losing its conditions.

The strength of this approach lies in the fact that it postulates no new entities and adds no metaphysical assumptions. It merely withdraws an implicit assumption: the idea that time is a neutral parameter existing independently of world formation. Once this assumption is abandoned, time becomes visible as what it is: the trace of irreversible binding.

Time is not that which orders world. It is what remains because world cannot be undone.

8. Conclusion: Time as the Signature of World

This contribution has not attempted to explain the direction of time physically. Rather, it has shown that the attempt to explain time direction exclusively in physical terms fails due to an unspoken assumption: the assumption that world is neutral, interchangeable, and reversible. It is precisely this assumption that has been rejected here.

Time has a direction because world does not emerge arbitrarily. World formation is not a reversible process, but a directed condensation of possibility. With each stabilization, bindings,

embodiments, and fixations arise that cannot be undone without dissolving their own conditions of existence. The direction of time is the imprint of this binding. It is not the medium in which world occurs, but what remains visible because world has occurred.

By understanding time no longer as an external parameter, but as an effect of world stabilization, the notion of real time reversal loses its ontological ground. Time travel, reversible worlds, or topological shortcuts no longer appear as unresolved technical problems, but as categorical misconceptions. They fail to recognize that existence is not transportable, because it is world-bound.

In this sense, time is not an abstract arrow, but the signature of life. It marks the space of possibility in which emergence is more than object formation. Without time, there would be stable states, but no openness, no condensation of complexity, no being in a living sense. A world without time would be complete—and dead.

The perspective advanced here does not go beyond physics, but beneath it. It serves as a reminder that every theory already stands within a world whose directedness it does not itself generate. Time is not a riddle that must be solved, but an indication that world cannot be undone without losing itself.

Time is directed because world emerges in a directed manner.
Not as a law, but as a boundary.

Approaches to relational time (Rovelli), temporal symmetry (Price), or agential ontology (Barad) address important aspects of the problem of time. The present contribution, however, sets in at an earlier level by investigating world viability itself as the condition of time direction.

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