

# Discrete Proper Time and a Tempo Field: A Retranslation Essay

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## Preface

The reflections that follow stand as the counterpart to a mathematical article (doi: [10.5281/zenodo.17012407](https://doi.org/10.5281/zenodo.17012407)). That paper presents a formal framework in mathematical language; this essay retranslates the same structure into philosophical prose. It does not advance a new theory; rather, it receives the mathematics in another key, letting its resonances be heard in words.

## Prologue: Time and Retranslation

We ordinarily believe that time flows without cease. Morning follows night, the hands of the clock advance without rest, and the heart does not stop beating. In daily life there seems no reason to doubt this sense of flow. Yet by replacing the language of physics only a little, the visible landscape changes greatly.

Such replacements of words are usually called “transformation” or “substitution.” I call something else *retranslation*: not a mere swap of terms, but a shift by which the landscape itself changes, the form of recognition is altered, and the system of words acquires a new contour. Retranslation is not the creation of a new theory; it is the act of moving an existing theory into another language, and receiving anew the difference of viewpoint. There, structures once hidden come into relief, and a new road is added to the map of thought. This is the core of retranslation.

Seen through this lens, probability and freedom, time and being, singularities and dark components, and even the scientific image of “unification” appear in a slightly different guise. What I have presented in mathematical form is this framework. Here I redraw it in words. More important than the framework itself is the fact that, by the practice of retranslation, I looked at nature and discerned what had been hidden. From the difference in appearance, a different image may arise. That is my expectation.

## Probability and Freedom—Determinacy and Human Finitude

Classical determinism is typified by Laplace's demon: if one knew the positions and momenta of all particles at an instant, both future and past would be calculable. This picture is unsettled by the uncertainty of quantum mechanics, and further by chaos theory, which shows that minute differences can yield large divergences over time. Even if the equations are deterministic, practical prediction is limited.

Yet as a mathematical image one can still depict the world as advancing inertially in unitary increments. This resembles classical determinism, but it does not immediately entail a denial of freedom. The crucial issue is scale. Suppose proper time is discrete at intervals of  $10^{-40}$  s. Then the gap to the smallest interval accessible to human perception (on the order of  $10^{-2}$  s) is astronomical. Within the brief instant we feel as "now," a countless number of unitary ticks has already passed.

During this span, unitary evolution proceeds inertially. This does not mean, however, that at each tick it enforces a binary yes-or-no. When a judgment actually occurs, the evolution advances, without contradiction, along a path that includes that judgment. Unitary evolution, in this sense, provides the venue in which judgment occurs, and while enveloping judgment it continues to flow inertially. Freedom, in that sense, has not vanished.

Freedom is not an arbitrary power to choose capriciously within microscopic ticks. It appears in experience as a response—as the resultant of many possible paths bound together. Consider a market chart: prices seem probabilistic, yet the pulsation of the economy rises as fact behind the movement. Beneath the apparent randomness, a structural necessity breathes.

From another angle, one might insist this is still "deterministic." Then you drop a pen from your desk on purpose and ask: "Was even this predetermined from the start?" In the terms of the present account, the very act of dropping the pen to prove your freedom can be said to be something that occurred as it was to occur. Yet in the moment itself there was a branch: to drop it or to hold it back. Within the unitary ticks there existed a freedom that became definite.

By determinacy I mean this inertial character of the unitary progression. It is neither predestination, in which the future is promised to a single point, nor superdeterminism, in which everything is fixed by initial conditions. Rather, it is a progression that inherits "the fact that a judgment occurred," carrying it forward as inertia. From our perspective, the result of a choice appears to be settled prior to the subsequent motion; the flow proceeds, without contradiction, while already containing the judgment prior to its recognition.

## The Rhythm of Time—Harmony of Discreteness and Continuity

To say that time is discrete may evoke a staircase with many steps. That is not the image I intend. Not a line of stones, but a field that bears fluctuations. By a *tempo field* I mean a space in which fluctuations overlap, interfere, and at times take on a particle-like aspect. There, time manifests as rhythm.

Human perception is not exact. We cannot register very fine ticks as such; the brain fills in coarse information and lets the whole feel smooth. This is not mere illusion but an active completion performed by finite cognition. Think of music: each stroke of a drum is a point, yet the ear hears the entire melody. The heartbeat, too, is discrete from beat to beat, yet is felt as a continuing rhythm of life. Even digital audio is heard by the ear as flow rather than as interruption.

Time therefore holds both tick and flow. Discreteness and continuity are not a rupture but a harmony. A collection of ticks generates flow, and flow envelops the ticks. Human recognition functions as an instrument that levels this rhythm. What we imagine as discreteness is constructed under the presupposition of our own coarse-graining; yet we cannot recognize it as such and experience it only as flow, as rhythm.

## Cosmic Singularities—Shadows at the Edge of Theory

The universe is often said to be boundless, and indeed the equations, extended to their limits, run into infinity. The centers of black holes and the beginning of the universe are called singularities, upon which mystery has been projected. Yet the word “infinite” in many cases points not to the depth of nature but to the shadow that appears at the edge of a theory.

A singularity is like the blind spot of vision: stare at it and the image vanishes, while the mind fills the gap on its own. What lies there is not a presence but a lack. If time is discretely ticked, the room for genuine divergence is small from the outset; the evolution does not diverge to infinity. The singularity is a blind spot signaled by mathematics, not a necessity of nature—a shadow cast where a theory has been stretched too far.

Physics has met such walls before: the infinite reach of Newtonian gravity, the point charge in electromagnetism, divergences in quantum field theory—each became a spur to conceptual revision. A singularity is not the summit of explanation but a signpost toward correction. To strip away mystery is not to lose reverence; it is to recover a respect that accords with reality.

## Dark Components—A Surplus of Temporal Fluctuation

Observations of the cosmos demand a surplus beyond visible matter. These surpluses have been hypothesized as dark matter and dark energy. But where, and how, are we to place

entities that neither shine nor interact in ordinary ways? To situate the unknown wholly outside recognition is to walk the edge of logic.

Suppose instead that time is discrete and flows, and that there exists a field that endows time with fluctuations. On cosmic scales, time would then present itself as varying across the fabric of existence. Such variation could distort appearances as if a new form of energy were present in the universe. Without positing novel external particles, the unknown may dwell not in an outer darkness but within an inner trembling.

Consider viscosity. No single molecule possesses viscosity, yet when many gather and flow, viscosity emerges. We may think of dark components analogously. The sum of temporal oscillations may contain a structural surplus at cosmological scales, and we name that surplus “dark.”

## Being and Time—A World Woven by Time

How is being sustained? My answer is: by time. This is not a slogan. It does not deny space or matter; it is a retranslation that shifts the axis to time. Once time is taken as the axis, causality, the upper bound on speed, and the structures we assume appear natural—and by the same shift, time itself may come to appear natural.

Think of the support that time gives to existence as a fabric. A fabric is formed by the crossing of warp and weft; patterns gradually appear on the loom, and likewise experience rises from discrete ticks. The cosmos and we ourselves are motifs floating upon that cloth. The course of time and the occurrence of phenomena arise necessarily from the crossings; both are structural elements sustaining the whole. Complexity rises from the loom of time, and being is inscribed in its weave.

The phrase “Being and Time” is recalled from philosophy, yet the present sense differs. Time is neither container nor mere parameter; it is an active weaving—the cloth itself. Existence does not simply subsist; it is woven as a temporal imprint.

## Conclusion: Physics as Retranslation

The unified theory of physics is often pictured as a tower: solid, grand, and overwhelming. The unification I imagine resembles an anthill: innumerable small chambers and passages connect; if one collapses, another is dug; as a whole it functions. When theories are retranslated into a shared vocabulary, passage becomes easy and concepts dwell in the same nest. What matters here is not magnificence but habitability. Retranslation is the practice that shapes such habitability.

It is rare that logic itself directly alters consciousness. Yet new words borne by logic act as lenses that change how the world appears. The moon seen through a telescope is no longer a white disk. The sea and sky in a fisheye lens alone can recall the Earth. The object is the same; when the angle of view shifts, so do questions and designs. The change is quiet, yet it reaches far.

My work is not to raise a new flag. It is to move existing theories into other words and to verify nature as nature. This is not a flamboyant claim, but the labor of confirming the obvious as obvious. Yet within that confirmation, the world of yesterday appears subtly altered. Physics as retranslation is not a new theory; it is a practice for receiving nature as it is.