From Causal Structure to Measurable Physics: Projection, Minimal Order, and the Repositioning of the Hilbert Action

Central Thesis

Inherited physical quantities are not primal givens but projected values of a deeper generative structure, and the Hilbert action is not the first formula of being but a lower-dimensional translational action valid only after projection.

Abstract

This paper is written as the fourth step in a series that progressively reorders the ontological and formal grammar of physics. The first paper fixed occurrence, or boundary-occurrence, as the sole primal assumption and positioned Sunoh as the higher generative structure from which time, space, light, matter, energy, and mass arise as posterior expressions. The second paper reinterpreted physical constants not as primal ontological terms but as compressed reference values settled within an observational phase. The third paper distinguished resultant time from causal time, formalized the lower bound of temporal structure under the two-dimensional assumption as no lower than nt^4, and proposed a projection relation between deeper causal structure and lower-dimensional observable values.

The present paper advances this sequence by addressing the computational and translational problem left open by the previous texts. Its central claim is that inherited physical quantities can no longer be treated as self-sufficient direct givens, but must be reread as projected observables and stabilized surface values arising from a deeper causal-generative order. On this basis, the paper develops three connected arguments. First, it generalizes the projection grammar from time alone to the wider set of measurable physical terms. Second, it argues that the minimal lower-bound logic discovered in temporal structure may reappear symmetrically in spatial measure, thereby opening a reinterpretation of the Hilbert measure term d^4x not as a primal geometric given but as a settled lower-dimensional trace of minimal spatial order. Third, it repositions the Hilbert action not as a first ontological formula of reality, but as a lower-dimensional translational action valid only after projection and stabilization have already occurred.

Accordingly, this paper does not abolish inherited physics. Rather, it relocates its principal equations within a deeper generative order and proposes a formal bridge from causal structure to measurable physics. In doing so, it aims to transform the previous ontological program into a more explicitly physical and computational research program.

Introduction

The first three papers in this series established a generative reordering of physics, but they did not yet complete the transition into a fully physical formal program. What they secured was a change in ontological starting point. What remains is the problem of translation: how a deeper causal-generative order becomes measurable physics, how inherited equations reappear as lower regimes, and under what formal conditions observable physical values can be reread as projected surface expressions rather than as primal givens. The present paper is written to address precisely that unresolved layer.

The point of departure is simple but decisive. Inherited physics has been extraordinarily successful in calculation because it begins from stabilized terms: coordinates, metric structures, constants, measurable energies, masses, and spacetime expressions. Yet calculational success does not by itself justify ontological priority. The earlier papers in this sequence have already argued that occurrence, or boundary-occurrence, must be placed prior to all such terms; that Sunoh must be understood as the higher generative structure following occurrence; that time and space are posterior expressions rather than first givens; that constants are compressed reference values rather than primal terms; and that observed values such as time are projected results of deeper causal structure rather than self-sufficient realities. If the previous papers are to become a physical research program rather than remain only a generative reinterpretation, then the grammar of projection, stabilization, measure, and recovery must now be formalized.

This paper advances that task in three directions. First, it generalizes the projection relation beyond time and argues that the measurable vocabulary of physics must be reread as the projected and stabilized appearance of a deeper causal set. Second, it develops a symmetry claim between minimal temporal order and minimal spatial measure. The lower-bound result previously fixed for temporal structure under the two-dimensional assumption, namely that time cannot descend below the formal order nt^4, is here extended into a reinterpretive bridge toward spatial measure. On that basis, the Hilbert measure term d^4x is reopened and reread not as an unquestioned primitive of geometry, but as the settled trace of minimal spatial structure within the lower-dimensional regime. Third, it repositions the Hilbert action itself. The present paper does not deny the Hilbert action, just as it does not deny inherited physics more broadly. Rather, it argues that the Hilbert action must be relocated from the status of a first ontological formula to that of a lower-dimensional translational action that becomes valid only after projection and stabilization have already taken place.

The broader significance of this move is that it narrows the gap between ontological reordering and physical formalization. Previous papers opened the grammar of generation. The present paper seeks to convert that opening into a more explicit formal bridge between causal structure and measurable physics. In that sense, this paper is neither a rejection of general relativity nor a mere commentary upon it. It is an attempt to relocate the formal language of inherited physics within a deeper generative sequence and to define the conditions under which that inherited language remains valid, limited, and interpretable. What follows, therefore, is not a replacement of physics by metaphysics, but an attempt to drive a generative ontology into the interior of physical formalism.

Chapter 1. Introduction

From Causal Structure to Measurable Physics

Chapter 1

The first three papers of this series progressively reordered the ontological point of departure of physics. The first paper fixed occurrence, or boundary-occurrence, as the sole primal assumption and relocated time, space, energy, mass, light, and matter as posterior expressions arising only thereafter. The second paper reread physical constants not as absolute primal terms of being, but as reference values left behind as a deeper generative structure becomes compressed and settled within an observational phase. The third paper pushed this movement one layer further inward by distinguishing resultant time T from causal time t, fixing the lower bound of temporal structure under the two-dimensional assumption as no lower than nt^4, and formalizing the measurable set {T, S, ∇S, E_g, M_g} as the projected surface expression of a deeper causal set {t, s, σ, ε, μ}. In this way, the first three papers opened a path that leads from the question of what must be first, through generative order and projection structure, toward the possibility of rereading inherited physical quantities as posterior and stabilized expressions rather than as primal givens.

Yet such a reordering does not by itself amount to a complete physical formal program. What the earlier papers secured was a change in the order of beginning. What remains is the problem of translation. How does a deeper causal-generative structure become measurable physics? Under what conditions do inherited equations reappear as valid translational formulae? By what process do observed values such as time, space, gradient, energy, and mass come to appear as if they were self-sufficient direct terms? The present paper is written to address precisely this unresolved layer. If the earlier papers opened the grammar of generation, the task of the fourth paper is to transform that grammar into a more explicit physical, formal, and computational program.

The point of departure of this paper is not the denial of inherited physics. On the contrary, the problem is that the very terms through which inherited physics achieved its success have too often been treated as if they were the first language of reality itself. Coordinates, metric structures, constants, energies, masses, and spacetime measures have functioned as stabilized starting points of extraordinary calculational power. Yet the beginning of calculation is not thereby shown to be identical with the beginning of being. As the earlier papers argued, time and space are not pre-given backgrounds prior to occurrence, and constants are not values that stand there first in absolute form; rather, they are posterior expressions and settled reference values within a phase of disclosure and measurement. Accordingly, the principal equations of inherited physics are not invalidated, but they must be relocated as posterior translational formulae that become operative only after a deeper generative order has already unfolded.

At the center of this relocation lies the problem of the so-called direct value. The third paper raised this issue most sharply with respect to time. There, time T was no longer left in the position of a self-sufficient directly given reality, but was reread as the projected resultant value of a deeper causal time t. At the same time, temporal structure was shown to require, under the two-dimensional assumption, a minimal formal lower bound no lower than nt^4. This claim did not merely revise the definition of time. It inserted into the directly observed value the trace of a deeper structure and thereby refused to leave the lower-dimensional surface value in the place of final reality. The present paper extends this move beyond time into the domains of space, measure, curvature, and action.

The first task of the present paper is therefore to generalize projection grammar. The formal expression $\{T, S, \nabla S, E_g, M_g\} = P(\{t, s, \sigma, \varepsilon, \mu\})$ is not a decorative symbolism; it is a structural claim that the measurable quantities of physics are projected values of a deeper causal set. Once that claim is taken seriously, time alone can no longer remain high-order while space, gradient, energy, and mass remain direct. They too must be reread as settled surface values within a lower-dimensional regime. At that point the inherited vocabulary of physics is not abolished. Rather, it is displaced from the language of primal being into the language of posterior expression.

This generalization leads directly to the problem of space and measure. In the foundational paper, time and space were both repositioned as posterior expressions arising after occurrence and Sunoh, while Sunoh itself was placed as a higher generative structure irreducible to space, energy, field, particle, or wave. Sunoh enters into relation with boundary, opens infinity, gives rise to time through the individuation and equal-unit stipulation of dense infinity, and is also expressed as spatial value whose gradient separates the directions of energization and massification. In other words, time and space are not separate primal substances but differentiated expressions of one higher generative order. If so, then the lower-bound logic discovered in temporal structure may reappear symmetrically in spatial expression, especially in the problem of measure. This is not an arbitrary extrapolation but a structural consequence of the prior papers.

It is precisely here that the present paper reopens the Hilbert action. In inherited general relativity, the Hilbert action is written in the form $R\sqrt{-g}\ d^4x$, where d^4x is ordinarily treated as the already given four-dimensional spacetime measure. Within the present framework, however, such a measure cannot remain primitive. If time and space themselves are posterior expressions rather than first givens, then spacetime measure cannot be treated as a self-evident starting background. The factor d^4x must therefore be reread as the settled lower-dimensional trace of a deeper generative structure. More specifically, it is to be interpreted not as a primal geometrical given, but as the stabilized sign of minimal spatial order within a regime of projection. In that sense, the “4” in the Hilbert measure term and the “4” in the lower bound nt^4 are no longer read as accidentally similar numerals. The former becomes legible as the settled trace of minimal spatial measure, while the latter marks the lower bound of minimal temporal causal order. They are not identical objects, but differentiated expressions of one generative necessity.

From this there follows the second major task of the paper: the repositioning of the Hilbert action as a lower-dimensional translational action. Just as the second paper relocated constants from absolute ontological beginnings to observational-phase reference values, the present paper relocates the Hilbert action from the status of a first formula of being to that of a formal action valid only after projection and stabilization have already occurred. This is not negation but a change of status. Curvature remains powerful, the metric remains indispensable, and the Hilbert action remains central within general relativity. But none of these any longer closes the first layer of reality. They belong instead to the language of a world already expressed, stabilized, and rendered measurable.

The third task of the present paper is to ensure that this repositioning does not remain merely interpretive but opens toward observable physics and computational program. The third paper already defined itself not as a closed doctrine but as a research program that fixes lower bounds strongly while leaving higher orders and computational implementation open. The present paper inherits that openness and seeks to connect minimal temporal order, minimal spatial measure, projected observables, stabilized reference values, and the translational status of the Hilbert action into a single formal program. This program asks how inherited physical quantities are to be recalculated, under what regimes inherited equations are recovered, and at what points observable deviations or new signatures may emerge.

The significance of the present work is therefore double. On the one hand, it drives the generative ontology of the earlier papers further into explicit physical formalism. On the other hand, it does so without declaring rupture with inherited physics. The paper does not attempt to abolish general relativity, but to specify more rigorously the conditions under which general relativity is powerfully valid and yet ontologically non-primitive. In the same way, it does not deny the Hilbert action, but asks from what point onward such an action becomes legitimate. That is, it moves the question from “what does the Hilbert action calculate?” to “after what generative sequence does the Hilbert action become a valid calculational language at all?”

The direction of the present paper is thus clear. First, it restates the layered order that runs from occurrence and Sunoh to causal structure and projected observables. Second, it develops the reinterpretive bridge from minimal temporal order nt^4 to minimal spatial measure d^4x. Third, it repositions the Hilbert action as a lower-dimensional translational action. Fourth, it opens the recovery problem of inherited equations and the path toward a computational program. Accordingly, what follows is not an attempt to replace physics by metaphysics, but an attempt to convert ontological reordering into a formal problem internal to physics itself. In this sense, the present paper proposes not merely one more formula, but a grammar of connection between deeper generative order and measurable physics.

Chapter 2. The Four-Layer Order of Physical Expression

2.1 Purpose of the Chapter

The purpose of this chapter is to restabilize the generative order opened progressively in the earlier papers as a layered structure of physical expression. As already made clear in Chapter 1, the central task of the present paper is to reread the physical quantities that inherited physics has treated as direct values within the relation they bear to a deeper generative structure. Yet for such a rereading not to remain an arbitrary declaration, one must first determine clearly what belongs to which layer. That is, one must fix within a single layered order the place of occurrence and boundary-occurrence, the function of Sunoh, the relation between causal structure and projected observables, and the level at which the reference values and equations used by inherited physics first acquire validity.

The strength of inherited physics lies in the speed with which it connects already stabilized terms. Time, space, energy, mass, metric, constants, and curvature immediately form within it a network of calculable relations. From the standpoint of the present paper series, however, that network is not the first language of generation but the language that appears only after expression has already been sufficiently produced. Thus the problem of physics cannot remain only at the level of asking how relations among terms are to be written. More fundamentally, it must ask after what layered process those terms appear at all. This chapter answers precisely that question.

This is also why the present chapter occupies Chapter 2. Chapter 1 explained why a fourth paper is necessary and set forth the task of moving from ontological reordering to physical formalization. In order now to carry out that task, the full structure of physical expression must be arranged in layered form. Accordingly, the present chapter provides the structural basis supporting the chapters that follow on projection grammar, minimal temporal order and minimal spatial measure, the repositioning of the Hilbert action, the recovery of inherited equations, and the direction of a computational program.

2.2 Occurrence and Boundary-Occurrence

The first layer of this paper series is occurrence, and occurrence has the same meaning as boundary-occurrence. This is not a mere choice of terminology but a strict decision about what is to stand as the sole primal assumption. The present framework does not place time first, does not place space first, and does not place energy, particle, field, or constants first. Nor does it presuppose any dimensional background in advance. What is first is the opening of distinction, and that opening of distinction has the same meaning as the occurrence of boundary. If occurrence cannot be separated from boundary-occurrence, then being is not to be explained from a boundaryless and undifferentiated state. Explanation always begins where boundary and difference have already opened.

This point is decisive because physics has long been accustomed to beginning from a given continuum, an already present space, or a coordinate axis already set in place. Such a beginning may serve calculational convenience, but it is not the beginning of being. Coordinates and backgrounds are devices for organizing already expressed results; they are not an answer to the question of what must come first. It is exactly here that the present paper departs from inherited grammar. The beginning is not a given container but distinction, and that distinction is possible only in the event of boundary-occurrence.

Accordingly, occurrence is not reducible to any lower physical quantity. It is neither a moment of time, nor a point of space, nor a quantity of energy, nor the first particle of matter. It is the evental opening that must already be there before any of those names can become possible. In this respect, occurrence is a higher ontological criterion that exceeds the lower descriptive vocabulary of physics. Yet it is not left behind as a vague metaphysical word. In this paper series, fixing occurrence as the point of departure imposes a strict order according to which every later expression must be arranged as a layer that comes only after it.

2.3 Sunoh as Higher Generative Mediation

The second layer after occurrence is Sunoh. Sunoh is a higher generative mediation irreducible to any one of the inherited physical categories such as space, energy, field, particle, or wave. In other words, it is not one name among the names used by inherited physics, but the higher generative structure that makes it possible for such names later to diverge from it. The reason for placing Sunoh as an independent layer in the present chapter is that between occurrence and the later expressions there must stand not a mere gap but a mediating structure of generation.

Sunoh is not a static background. It is placed after occurrence, but it is not fixed as though it were already a completed substance. Rather, it moves within its relation to boundary, approaches, becomes expressed, and gives rise to the conditions of differentiation. This is crucial. If one were to assume that time, space, energy, and matter appear immediately after occurrence, generation would remain insufficiently explained, because in that case the posterior expressions themselves would again be elevated into starting points. Sunoh prevents precisely this danger. Once Sunoh is fixed as an independent higher mediation, time and space are no longer first terms but posterior expressions of Sunoh.

For this reason, Sunoh is not a weak mediation in the sense of lying merely “between” two things, but a central moment of higher generative order. By approaching boundary, it opens infinity; as dense infinity becomes individuated and equalized within the observer-phase, time emerges; at the same time Sunoh is expressed as spatial value and bears gradient, and that gradient separates the directions of energization and massification. Therefore, Sunoh is not a mere symbol but the generative central term through which time, space, light, matter, energy, and mass are rebound within a single higher order.

2.4 Causal Structure and Projected Observables

The third layer is causal structure. In this paper series, causal structure is the order prior to the values directly handled by the lower-dimensional observer, and it appears as a deeper structural set of time, space, gradient, emission, and binding. The third paper presented this in the form $\{t, s, \sigma, \varepsilon, \mu\}$, and the set of directly observed values {T, S, ∇S, E_g, M_g} was reformalized as the projected observables of that causal set. This distinction is decisive for the present chapter because through it the directly measured physical quantities can no longer remain self-sufficient direct givens.

Causal structure here is not merely a set of "hidden variables." It is not an auxiliary layer introduced ad hoc in order to explain lower-dimensional observables, but the structured expression of the actual generative order that appears after Sunoh. For example, causal time t is not identical with the time T read on a clock face. Causal spatial structure s is not identical with the spatial value S immediately fixed by coordinates, and deeper stress structure σ is not identical with the already settled gradient ∇S. In the same way, ε and μ are the causal structures of emission and binding that lie behind E_g and M_g as these are handled in lower-dimensional discourse as though they were energy and mass.

The significance of this layered distinction is clear. Inherited physics has operated chiefly at the level of projected observables, and at that level it has displayed great calculational power. Yet the level of projected observables is not the beginning of being but the result that appears only after a deeper causal structure has disclosed itself within the lower-dimensional phase. Accordingly, if the present paper is to carry out physical formalization, it must first establish a general grammar by which directly handled observables are organized as projected results of causal structure. The present chapter supplies the layered arrangement that makes that grammar possible.

2.5 Stabilized Reference Values and the Emergence of Physical Language

The fourth layer is stabilized reference values. This layer reveals that it is still not enough for causal structure merely to appear as projected observables. The fact that a value appears in the lower-dimensional regime does not yet make it part of the stable language of physics. In order to become physical language, it must acquire repeatability, comparability, measurability, and calculability. It is at this point that a value becomes settled as a reference. The reason this paper series rereads constants as compressed reference values lies precisely here. A constant is not a primal term of being but a settled value that remains stably enough within a given observational phase to perform a reference function.

This layer is not merely the fixing of numbers but the condition for the emergence of physical language. Coordinate axes, unit systems, metrics, constants, curvature coefficients, and quantitative mass-energy relations all acquire their meaning at this level. Physics becomes possible only when a surface value remains sufficiently stable to serve as a repeatable reference. Yet such stabilization does not imply absoluteness. On the contrary, it means repetitive settlement within a particular phase. Accordingly, stabilized reference values are powerful, but they are not ontologically first. They are closure points of surface order and at the same time the starting instruments of lower physics.

This fact clarifies how the present paper treats inherited physics. The paper does not invalidate constants, measured values, or metrics. They remain necessary and valid. But their status changes. They are no longer first terms of being, but generated and stabilized terms of lower-dimensional physics. Only when this repositioning is carried through can inherited physical equations be reread not as ontological closures but as languages of translational validity.

2.6 Why Inherited Physics Begins Too Late

The meaning of the four-layer order can now be gathered together. Once the stratification of occurrence/boundary-occurrence, Sunoh, causal structure, and stabilized reference values has been made clear, it also becomes clear why inherited physics begins "too late." Inherited physics begins chiefly from the fourth layer, that is, from stabilized reference values and from the network of projected observables operating above them. This mode of beginning is highly efficient in calculation. Yet it begins from the language that comes after generation. In other words, because it starts by treating already settled values as though they were first language, it cannot sufficiently ask why such values remain stable, what generative order makes such values possible, and why particular measures and actions become valid.

This “late beginning” is not so much an error as a problem of closure. Inherited physics closes too early precisely because of its strength. Terms such as constant, metric, curvature, action, and coordinate possess such high calculational power that they readily become sealing terms at which explanation stops. Yet from the standpoint of the present paper series, those terms are not the place where explanation ends but the place where explanation must be reopened. For all of them appear only after occurrence and Sunoh, after causal structure and projection, and after stabilization.

For this reason, the present chapter is not a mere classificatory table of concepts. It is a foundational map that makes possible the logic of all the later chapters. The generalized projection grammar developed in Chapter 3 presupposes the layered distinction of section 2.4, while the symmetry of minimal temporal order and minimal spatial measure in Chapter 4 can stand only on the basis of the distinction fixed in sections 2.3 and 2.4. Likewise, the repositioning of the Hilbert action in Chapter 5 as a lower-dimensional translational action becomes possible only once one judges that Hilbert action belongs to the settled language of the fourth layer. Accordingly, the four-layer order fixed in the present chapter is the structural axis of the paper as a whole.

2.7 Conclusion of the Chapter

This chapter has rearranged the order of physical expression into four layers. The first is occurrence, or boundary-occurrence, which stands as the sole primal assumption and as the opening of difference and boundary. The second is Sunoh, a higher generative mediation irreducible to inherited categories. The third is causal structure, the deeper set of time, space, gradient, emission, and binding that stands behind lower-dimensional observables. The fourth is stabilized reference values, the layer in which projected surface values acquire repeatability and measurability and thereby become the stable language of physics.

These four layers are not a mere sequence of labels but a restructuring of the starting point of physics. Inherited physics has begun chiefly from the final layer, whereas the present paper restores the prior layers and thereby relocates physics within the order of generation. What matters here is not to deny the efficiency of inherited physics, but to redefine from what point onward that efficiency becomes valid. The conclusion of the present chapter is therefore clear: measurable physical quantities, constants, metrics, curvature, and action all belong not to the first language but to a later language. In order to read this later language legitimately, one must first establish the full order from occurrence through stabilization.

The next chapter develops, on the basis of this order, a generalized projection grammar that extends the problem from the special case of time to the general structure of physical expression. That is, it will formalize more rigorously how $\{T, S, \nabla S, E_g, M_g\}$ is to be read as the projected set of $\{t, s, \sigma, \varepsilon, \mu\}$.

Chapter 3. Generalized Projection Grammar

3.1 Purpose of the Chapter

The purpose of this chapter is to extend the concept of projection, which in the earlier papers was developed primarily through the problem of time, into a general grammar applicable to the whole field of physical expression. In Chapter 2, the present paper rearranged the order of physical expression into four layers: occurrence / boundary-occurrence, Sunoh, causal structure, and stabilized reference values. Yet such a stratified distinction is not sufficient by itself. It tells us where things are placed, but it does not directly explain how a higher layer appears as the surface value of a lower layer. What is now required is an operative grammar that explains the relation among the layers, and that grammar is projection.

The third paper had already raised this issue most sharply with respect to time. Resultant time T was shown not to be directly given time, but the projected resultant value of causal time t, while the time actually used by humans in measurement and calculation was interpreted as the surface value of a deeper temporal causal structure settled within the lower-dimensional domain. Yet if this logic remains confined to time alone, physics as a whole falls back into imbalance. Time alone would retain a higher-order structure, while space, gradient, energy, and mass would remain as if they were direct givens. The purpose of the present chapter is precisely to resolve that imbalance.

Accordingly, this chapter is not merely a further explanation of time. Rather, it generalizes the projection relation discovered through time into a broader formal principle and thereby relocates the major measurable quantities handled directly by physics as projected values of a deeper causal structure. Only when this generalization is secured can the symmetry between minimal temporal order and minimal spatial measure treated in Chapter 4, the repositioning of the Hilbert action developed in Chapter 5, the recovery problem of inherited equations in Chapter 6, and the computational program discussed in Chapter 7 all stand upon one common formal axis. For that reason, this chapter forms the central axis of formal connection within the present paper.

3.2 From the Projection of Time to a General Projection Form

The decisive transition introduced in the earlier third paper lay in refusing to leave time T in the position of an ontological direct value and instead relocating it as the projected value of causal time t. This move was compressed into the expression $T = P_T(nt^4)$. What matters here is not merely the introduction of the symbol P_T. More fundamentally, what is directly calculated and sensed as time is not final reality in itself, but a surface value produced when a deeper causal structure is unitized, repeated, and settled within a particular observational phase. Thus time ceases to be an independent background axis and becomes the result of projection.

Yet this transition cannot stop at the special case of time. If time alone is a projected value while all the remaining physical quantities remain direct values, then the connection between ontological reordering and physical formalization is broken once again. The direct values of physics operate in mutual relation; to lift time alone into a higher order while leaving space, energy, and mass untouched would contradict the logic of the present series. Therefore, the projection logic developed for time must be generalized to the whole physical vocabulary.

The basic form of that generalization may be written as follows:

$$\{T, S, \nabla S, E\_g, M\_g\} = P(\{t, s, \sigma, \varepsilon, \mu\})$$

This expression is not a mere correspondence table. It is a structural claim that the set of values directly handled by physics in the lower-dimensional domain are projected observables of a deeper causal structural set. Here P does not simply copy values from one place to another. It designates the whole process by which higher structure becomes settled as perceptible, measurable, and repeatable surface values within the lower-dimensional domain. The task of this chapter is therefore to unfold the meaning of P and to clarify more rigorously what projection means and what stages it contains.

3.3 Projection Is Not a Mere Sign but a Structural Transformation

The term projection can easily be misunderstood. If it is taken simply as a notation by which the invisible is made visible, then the decisive force of the present proposal disappears. In the present framework, projection is not a simple translation that transfers the content of higher structure without loss. It is a structural transformation undergone by a deeper generative order as it enters the lower-dimensional domain, and the value that appears as a result is not a direct copy of the original structure but a surface trace that can remain settled within a lower-dimensional regime.

For example, the relation between causal time t and resultant time T is not the relation between original and duplicate. t is a deeper temporal structure not directly possessed by the lower-dimensional observer, whereas T is the surface value left behind when that structure acquires repeatability and equal-unit status within the smallest sensible domain. Thus T does not contain t in an unaltered form; only a certain aspect of t remains within the observer-phase as a calculable expression. The same must hold for space, gradient, energization, and massification.

For that reason, projection also differs from reduction. Reduction means explaining the complex by dissolving it into simpler constituent parts. By contrast, projection in the present paper is the settling of higher structure into a lower-dimensional description, and therefore it involves certain loss, compression, and stabilization. Projection compresses the richness of deeper causal structure into forms bearable by lower-dimensional measurability. In that sense, projection is a central concept of the entire present series, and the reinterpretation of constants as compressed reference values is directly connected to it. A constant is not the place where higher structure has vanished; it is the result left behind when that structure is compressed into a repeatable reference form within an observational phase.

3.4 The Four Moments of Projection: Individuation, Equalization, Stabilization, and Measurization

To understand projection more rigorously, it is necessary to analyze the moments through which it proceeds. The present paper proposes that projection be read through at least four moments.

The first is individuation. A deeper causal structure is not directly given to the lower-dimensional observer as such. In order to appear as a surface value, it must first be cut into a discrete and graspable unit within the observer-phase. In the case of time, if dense infinity is not individuated into a minimally sensible recurrent unit, resultant time cannot arise. The same applies to space. Unless spatial structure is individuated within the observer-phase as a distinguishable value, it cannot yet become the object of coordinate or measure.

The second is equalization. An individuated unit still does not constitute physical language by itself. In order to function as a standard of comparison and recurrence, an equal-unit stipulation is required.

This moment was decisive in the problem of time. Only when individuated dense infinity is treated as an equal unit does clock-like recurrence become possible, and only then does resultant time T arise. Spatial measure is analogous. For a given spatial appearance to become a comparable measure, some equal-unit assumption must operate within it.

The third is stabilization. In order for an individuated and equalized value to function within actual physics, it must settle as a repeatable reference within a given observational phase. Once this stabilization occurs, the value ceases to be a fleeting appearance and becomes a calculable surface value. Constants, metrics, gradients, energy-values, and mass-values are so powerful within inherited physics precisely because they are treated as values that have already undergone this stabilization.

The fourth is measurization, or metricization. The final moment of projection is the acquisition of measure form, such that the stabilized surface value can enter the language of integration, comparison, prediction, and equation. In the case of time this means the form of a clock-measurable ordered series, while in the case of space it means a condition capable of coordinate and integration measure. Only when this measurization is achieved does physical formalism become possible. Projection is therefore not a one-step mapping, but a sequential transformation through individuation, equalization, stabilization, and measurization.

3.5 Generalized Projection for Time, Space, Gradient, Energy, and Mass

It is now possible to apply projection grammar more explicitly to each major term. Time T is the projected resultant value of causal time t. This was already forcefully proposed in the earlier paper. What matters now is not to stop there, but to reread spatial value S as the projected value of causal spatial structure s. In this case S is not space itself as background, but the result of Sunoh being settled in a spatially expressible form for the lower-dimensional observer. In other words, S is not an already existing absolute space, but the value in which causal spatial structure appears as measurable surface order.

Likewise, gradient ∇S is not merely the result of a differential operation. In the language of the present series, it is the settled expression in which deeper stress structure σ appears within the lower-dimensional domain as the directionality and differentiality of spatial value. Thus ∇S is not merely a local slope, but the projected sign of deeper structural tension. Only under this reading can gradient later connect to curvature, binding, and convergence.

Similarly, E_g and M_g are not direct names of ε and μ, but projected expressions. E_g is the lower-dimensional surface form of emission-causality, while M_g is the settled surface form of binding-causality. This rearrangement reunifies the inherited distinction between “energy” and “particle” as different expressions of a deeper generative order. More than that, the distinction between time and space can be reread in the same way. Time and space are not independent primal substances, but differentiated projections of one higher generative order. The generalized projection grammar of this chapter is therefore not merely an arrangement of five physical terms; it is a formal principle for rereading inherited physical distinctions as differentiated expressions of one higher structure.

3.6 The Projection Operator Is Not a Single Symbol but a Layered Operator

As the earlier analysis of the four moments has already implied, P must not be understood as a single and instantaneous one-step operator. More rigorously, it should be described as a layered family of operators. Conceptually this may be compressed as follows:

$$P = P_{ind} \circ P_{eq} \circ P_{stab} \circ P_{meas}$$

Here P_ind denotes the operator of individuation, P_eq the operator of equalization, P_stab the operator of stabilization, and P_meas the operator of measurization. In practice, it is not necessary to insist that this order is perfectly linear. In some cases stabilization and equalization may be intertwined, and in others measurization may retroactively adjust the conditions of individuation. What matters is that projection is not a mere sign but a layered transformation, and that this layered nature must be made explicit if the formal structure of the paper is to hold.

This layered understanding becomes crucial in later chapters. When Chapter 4 discusses the connection between nt^4 and d^4x, that connection must not be treated as a mere similarity of symbols, but as the result in each case of temporal and spatial projection becoming settled into lower-dimensional measure order. Likewise, when Chapter 5 repositions the Hilbert action as a lower-dimensional translational action, it must already be clear that d^4x is not primitive geometry but a measurized surface value. For this reason, the layering of P is not a technical detail of the present chapter but a formal foundation of the whole paper.

3.7 Projection and the Reinterpretation of Constants

Once projection grammar is generalized, the reinterpretation of constants carried out in the earlier second paper gains a more rigorous place. That paper argued that the constants of inherited physics are not absolute ontological terms but compressed reference values. This claim is already powerful in itself, but it becomes clearer once situated within projection grammar. A constant is not a value that is simply there from the beginning. It is a compressed surface reference left behind when a deeper causal-generative order becomes settled in repeatable form within a given phase.

In this sense, a constant is not merely a stable number free from measurement error. It is a case in which stabilization after projection has become especially strong. Under this perspective, a constant is not a sealing term that ends explanation but a closure-term that carries within it a history of projection. The fact that it repeats stably means that higher structure has settled in a certain way within the lower phase; it does not mean that the floor of being had already been closed in numerical form from the start.

This point also explains why the present paper does not deny inherited physics. Constants remain valid in calculation. What changes is their ontological status. The projection grammar of this chapter supports that change of status not as a merely philosophical declaration, but as a formal structure. Constants, metrics, gradients, energies, and masses all take their place within lower-dimensional language as the result of projection and stabilization. In that way, the strength of physics is not lost, but rather given its proper range of validity.

3.8 Conclusion of the Chapter

This chapter has extended the problem of projection, first raised through time, into a general grammar for the whole field of physical expression. Its central claim is that the physical quantities directly observed and calculated are not self-sufficient direct givens, but projected surface values of a deeper causal structural set. To support this claim, projection was reread not as a mere notation but as a structural transformation, and within it four moments were distinguished: individuation, equalization, stabilization, and measurization. Through this layered understanding, time T, spatial value S, gradient ∇S, energization E_g, and massification M_g were reformulated as the projected observables of t, s, σ, ε, and μ respectively.

This reformulation is not a simple adjustment of symbols. It is a formal principle for rereading the basic vocabulary of physics as differentiated surface expressions of one higher generative order. Accordingly, the present chapter provides the central grammar that makes possible the later development of the symmetry between minimal temporal order and minimal spatial measure, the repositioning of the Hilbert action, and the recovery problem of inherited equations. In particular, the next chapter will build upon the generalized projection grammar developed here in order to show how the lower bound of temporal structure nt^4 and the spatial measure form d^4x can be reread within one structural symmetry.

Chapter 4. Minimal Temporal Order and Minimal Spatial Measure

4.1 Purpose of the Chapter

The purpose of this chapter is to develop explicitly the structural symmetry between the lower bound of temporal structure and the minimal form of spatial measure on the basis of the generalized projection grammar established in the previous chapters. Chapter 3 argued that time, space, gradient, energization, and massification are all projected surface values of a deeper causal structure. Yet the generalization of projection grammar does not by itself reveal how the minimal form of time and the minimal form of space are related. What is now required is to carry the lower-bound logic already fixed on the temporal side into the problem of spatial measure.

As the earlier third paper proposed, under the two-dimensional assumption temporal structure cannot be adequately represented by a simple linear quantity t or quadratic quantity t^2, but requires a lower bound no lower than nt^4. What matters here is that the 4 is not an arbitrary decorative exponent. It is the trace of a minimal structural bound required if directionality, generativity, recurrence, and projection are to be preserved together. The present chapter refuses to leave that lower-bound logic confined to the interior of time alone and instead seeks to connect it to spatial measure on the basis that time and space are differentiated expressions of one higher generative order.

For this reason, the chapter addresses two problems together. First, it restates in structural form why the minimal order of time cannot descend below nt^4. Second, it argues why that lower-bound logic may reappear symmetrically in spatial measure. As a result, the chapter opens a bridge by which the Hilbert measure term d^4x can be reread not merely as the already given four-dimensional integration element of inherited spacetime geometry, but as the surface measure form left behind when minimal spatial order becomes settled in the lower-dimensional regime. This chapter therefore serves as the direct formal precondition for the following chapter, where the Hilbert action will be repositioned as a lower-dimensional translational action.

4.2 Why the Minimal Structure of Time Cannot Descend Below nt^4

The reason for asking again about the lower bound of temporal structure is not repetition for its own sake. It is a preparatory clarification required for the symmetry developed in the present chapter. As the earlier paper argued, the present framework does not accept time as an independent background axis. Time is not an absolute river already flowing prior to occurrence, nor a prepared coordinate before Sunoh. Time arises only when dense infinity opened at boundary-approach is individuated, equalized, and settled within the observer-phase as a repeatable ordered series. In this sense, time is not a primal given but a posterior expression.

For exactly that reason, temporal structure cannot be adequately represented as a mere axis of length. If time is reduced to simple t, only direction in the most impoverished sense remains. Yet in the present paper time must preserve not direction alone, but also accumulated generation, ordered recurrence, and the trace of projection. A quadratic form such as t^2 is also insufficient. It may strengthen curvature or symmetry, but it still fails to preserve the layered order demanded by lower-dimensional causal temporality. Time in the present framework is not merely something that flows; it is the result of causal structure becoming settled as measurable recurrence. Therefore, its minimal form must be one in which directionality, generativity, recurrence, and projection remain simultaneously conserved, and the lower bound of that requirement is nt^4.

Here n signifies more than a coefficient in the narrow numerical sense. It compresses the moments of individuation, recurrence, and discretization. Thus what matters in nt^4 is not simply that 4 and n are multiplied, but that causal temporality requires at least a fourfold structural preservation in order to appear as lower-dimensional resultant time. Accordingly, nt^4 is not the completed final form of time, but its lower bound. Higher orders may remain possible, but if one descends below this form, time can no longer remain time in the sense developed by the present framework. It is precisely this lower-bound character that allows the present chapter to connect temporal order to spatial measure.

4.3 Time and Space as Differentiated Expressions of One Generative Order

In order to connect the lower-bound logic of time to the measure problem of space, the relation between time and space must first be restated with precision. Within the present series, time and space are never independent primal substances. Both appear only after occurrence and Sunoh, and both are differentiated projections of one higher generative order. Time arises when dense infinity becomes individuated and equalized within the observer-phase as ordered recurrence. Space arises when Sunoh is expressed as spatial value and that expression acquires measurable order. They bear different names, but both remain under the mediation of the same higher generative structure.

This point is decisive. If time and space were independent substances, then carrying the lower bound discovered on the side of time over to the side of space would remain only a suggestive analogy. But because the present framework places both time and space as differentiated expressions of one generative order, the claim that the lower-bound logic discovered in temporal structure may also leave a symmetric trace in spatial expression becomes a structural consequence rather than a metaphor. One may say that the 4 in nt^4 and the 4 in d^4x are not identical numbers in the sense of the same object, but settled traces of the same higher order appearing differently in time and in space.

To say that they are different expressions of the same thing is not a loose poetic flourish. It is one of the core grammatical principles of the present series. Just as energy and mass, light and matter, emission and binding are reread not as separated first terms but as different expressions of a higher structure, so too time and space must be reread together. The present chapter therefore does not force the logic of time artificially upon space. Rather, it reads temporal lower bound and spatial measure together within the generative order that has already been established.

4.4 From Minimal Temporal Order to Minimal Spatial Measure

It is now possible to construct the bridge from temporal lower bound to spatial measure more directly. In the case of time, nt^4 marks the lower bound of the minimal causal order required for T, the time experienced and calculated by the lower-dimensional observer, to become possible. This lower bound is not a decorative numerical choice. It signifies the structural density that time must preserve if it is not to collapse as measurable series. Therefore, the 4 in nt^4 does not mean that time is four-dimensional, but that fourfold order is the minimal sign of temporal structure that can remain intact in the lower-dimensional regime.

Now consider space. In the present framework, space is not an already given absolute background. It appears only as spatial value S, after deeper causal spatial structure s has passed through projection, stabilization, and measurization and entered lower-dimensional physical language. If so, spatial measure cannot be primitive either. It too must be the result of a settled form that enables the lower-dimensional observer to perform integration, comparison, and localization. It is precisely here that spatial measure can be read symmetrically with temporal lower bound.

If the minimal structure of time leaves a lower-bound sign in the form nt^4, then the minimal order of space must also leave some settled measure form on the surface. The present paper proposes that the inherited trace of this settled form is legible in d^4x. This does not mean that d^4x is causal space itself, nor that nt^4 and d^4x are the same mathematical object. What matters is that the 4 appearing as the lower-bound sign in temporal structure can also appear symmetrically as the sign of settled form in spatial measure. In that way, minimal temporal order and minimal spatial measure become corresponding traces left by one generative order in two different expressive domains.

4.5 Why d^4x Cannot Remain a Primitive Measure

In inherited general relativity, d^4x is ordinarily treated as a self-evident integration measure. It functions as the natural measure element over which curvature is integrated within an already given four-dimensional spacetime. This role is calculationally powerful and indispensable within the Hilbert action and the derivation of Einstein's equations. Yet within the present framework that apparent self-evidence becomes precisely the problem. If time and space are not primal backgrounds, then the spacetime measure formed through their conjunction cannot remain primitively given either.

To say that d^4x is not primitive does not mean that it is invalid. Rather, it means that its ontological status must be reopened. For any measure form to become valid within physics, it must be the result of a deeper generative structure having settled into a measurized and stabilized form within the lower-dimensional phase. In that sense, d^4x is not the beginning of being, but the settled instrument of a world already expressed. It may function as a starting point within measuring language, but it cannot function as the starting point of being itself.

This point aligns exactly with the understanding of projection operator as layered transformation developed in Chapter 3. Measure appears only at the final moment of projection. Individuation, equalization, and stabilization must already have taken place before a surface value can acquire measure form. Accordingly, d^4x is not primitive geometry but a measurized surface value. The present chapter establishes precisely this point so that the following chapter can explain why the Hilbert action as a whole must be repositioned not as an ontological first formula, but as a lower-dimensional translational action.

4.6 What the 4 in nt^4 and the 4 in d^4x Share

The central connection of this chapter may now be stated more directly. The 4 in nt^4 and the 4 in d^4x do not perform identical mathematical roles. The former marks the lower bound of temporal causal order, while the latter marks the settled form of spatial measure. Yet the present paper does not claim identity of role. Rather, it claims that both are traces left by one higher generative necessity appearing differently in time and space.

The 4 in nt^4 is the sign of the minimal preservation of directionality, generativity, recurrence, and projection required if time is to appear as a lower-dimensional measurable series. By contrast, the 4 in d^4x is the settled sign left by spatial measure as it becomes an integrable form in the lower-dimensional regime. The two cannot be reduced directly to one another, and precisely for that reason they are symmetric rather than identical. One remains as minimal causal temporal order, the other as minimal measurized spatial form.

In both cases, however, 4 is not first of all the number of an already given dimension, but a structural mark left when higher generative order settles into a bearable lower-dimensional form.

This interpretation matters because it refuses to leave the inherited geometric numeral as a mere convention. In the standard reading, the 4 of d^4x can easily be treated as no more than the fact that we happen to deal with four-dimensional spacetime. But in the present reading even this 4 becomes a surface trace of deeper generative structure. As a result, d^4x is reread not merely as a coordinate product but as the expression in which minimal spatial measure order becomes settled in the lower-dimensional regime. This is the direct basis on which the following chapter will be able to reposition the Hilbert action.

4.7 The Symmetry of Minimal Order and Minimal Measure

The symmetry argued in the present chapter does not mean that time and space are completely identical. Nor does it mean that nt^4 and d^4x possess a one-to-one formulaic equivalence. More rigorously, the symmetry here is generative symmetry. That is, the same higher order appears in temporal expression as lower-bound causal order and in spatial expression as settled measure form. In that sense, symmetry here means correspondence, not identity.

This correspondence is highly productive because it allows time and space to be reread once again under one higher structure. Inherited physics often joins them under the name spacetime, but that alone does not provide a generative grammar for why they should be joined. The present framework descends one level deeper and shows that time and space are differentiated projections arising after occurrence and Sunoh. It thereby explains why each can bear a structural trace that corresponds to the other. The connection between nt^4 and d^4x is the first formal bridge of that explanation.

The argument of this chapter may therefore be summarized as follows. Time requires a minimal causal order, and its lower bound is nt^4. Space requires a minimal measurable order, and its settled inherited trace is d^4x. These are different surface forms, but they are symmetric in that they are differentiated signatures of one generative necessity. Once this symmetry is recognized, the Hilbert measure term no longer appears as a primitive spacetime assumption, but as the stabilized trace of minimal spatial order.

4.8 Conclusion of the Chapter

This chapter has developed the structural symmetry between the lower bound of temporal structure and the minimal form of spatial measure. It first reaffirmed that time is not an independent background axis, but a posterior result arising through the individuation, equalization, recurrence, and projection of dense infinity, and that its minimal causal order cannot descend below nt^4. It then argued that, because time and space are differentiated expressions of one higher generative order, the lower-bound logic discovered in time may leave a symmetric trace in spatial measure as well.

As a result of this analysis, d^4x is no longer interpreted as a primitive spacetime measure, but as the surface trace in which minimal spatial order becomes settled and measurized within the lower-dimensional regime. In this context, the 4 in nt^4 and the 4 in d^4x are not identical mathematical functions, but structural marks left differently by the same generative necessity in time and in space. The present chapter therefore provides the first formal bridge by which the Hilbert measure term can be removed from the position of ontological beginning and relocated within the language of posterior expression.

The next chapter will build directly upon this conclusion in order to reposition the Hilbert action itself as a lower-dimensional translational action. It will therefore examine more directly why R√-g d^4x is not an ontological first formula, but a formal action that becomes valid only after projection and stabilization have already taken place.

Chapter 5. The Hilbert Action as a Lower-Dimensional Translational Action

5.1 Purpose of the Chapter

The purpose of this chapter is to reposition the Hilbert action as a lower-dimensional translational action rather than as a first formula of being, on the basis of the generative order, projection grammar, and the symmetry between minimal temporal order and minimal spatial measure developed in the previous chapters. Chapter 4 argued that the “4” in nt^4 and the “4” in d^4x do not perform identical mathematical functions, but are structural traces left differently in time and in space by the same generative necessity. As a result, d^4x was reread not as a primitive spacetime measure but as a measurized surface form left behind when minimal spatial order becomes settled within the lower-dimensional regime. The present chapter now asks what this implies for the status of the Hilbert action as a whole.

Within inherited general relativity, the Hilbert action is among the most powerful formal languages of gravitation. The scalar curvature R, the metric determinant $\sqrt{-g}$, and the integration measure d^4x are bound together into the central structure by which the gravitational field is derived from an action principle. Yet from the standpoint of the present series, precisely because of this formal completeness the Hilbert action has too often been misread as if it were the first formula of reality itself. The task of the present chapter is to dissolve that misreading without denying its calculational validity.

The central question of this chapter is therefore not merely what the Hilbert action calculates, but after what generative sequence it can become a legitimate calculational language at all. This question is not posed in order to weaken inherited physics, but in order to determine more rigorously the layer from which its efficiency becomes justified. Through that determination, the present chapter draws the Hilbert action down from an ontological closure-term to a lower-dimensional translational action.

5.2 The Inherited Role of the Hilbert Action

The Hilbert action is one of the most condensed formal expressions by which the gravitational field is described in general relativity. Its standard form is usually written as follows.

$$S_H \sim \int R \sqrt{-g}\, d^4x$$

Here R denotes the Ricci scalar curvature, g the determinant of the metric tensor, and d^4x the four-dimensional spacetime integration measure. The power of this expression is well known. When the action is varied with respect to the metric, Einstein’s field equations are obtained, and gravitation is no longer narrated as one force among others but as the deformation of spacetime geometry. In this sense, the Hilbert action is not merely a calculational device but a grammatical axis that organizes general relativity as a whole.

Because of this centrality, the Hilbert action has long performed two functions at once. One is technical: it compactly gathers the gravitational equations and organizes the field equations through the variational principle. The other is philosophical: by compressing the interpretation according to which spacetime curvature is gravitation, it tends to create the impression that the fundamental structure of reality is already closed in the form of geometric action. The present paper questions especially this second function, because it allows calculational success to be mistaken for ontological priority.

Yet it remains important to acknowledge the inherited role of the Hilbert action honestly. The present paper is not written in order to weaken it. On the contrary, it seeks to preserve the strength of the formalism while distinguishing more rigorously between its validity and its ontological status. The Hilbert action possesses extraordinary explanatory power within physics, but that fact alone does not entitle it to occupy the first formula of being. This distinction is the starting point of the present chapter.

5.3 Why $R\sqrt{(-g)}d^4x$ Cannot Be the First Formula of Being

The judgment that the Hilbert action cannot be the first formula of being has already been prepared by the first four chapters of the present series. First, if occurrence and boundary-occurrence are the primal assumption, then time and space are later expressions rather than first givens. Second, if Sunoh is the higher generative mediation, then inherited categories such as space, energy, field, particle, and wave are already posterior names. Third, if causal structure and projected observables are distinct, then the values directly handled in lower-dimensional physics are all surface expressions left behind after deeper generative structure has become settled. As long as these premises are maintained, none of the components of the Hilbert action can remain ontologically first.

To begin with, d^4x was already reread in Chapter 4 not as a primitive measure but as a settled trace of spatial order. If so, the full action containing d^4x cannot function as the beginning of being. Next, $\sqrt{(-g)}$ likewise presupposes an already available metric structure. Yet metric acquires meaning only after spatial order has been stabilized into measurable form. It is not the language of prior generation but the language of already settled geometry. The same holds for R. Curvature is not a term that answers what must exist first; it is a term that describes how an already given metric structure departs from local flatness. Accordingly, the full expression $R\sqrt{(-g)}d^4x$ is not a sentence that begins generation, but a posterior sentence that treats a world already expressed and stabilized.

What matters is that this judgment does not invalidate the Hilbert action. On the contrary, the present chapter insists on the opposite. The Hilbert action is powerful. But it is powerful not because it is the first sentence of being, but because it is a translational sentence that treats generated and stabilized world with extraordinary precision. That is, the Hilbert action becomes valid only after generative order has already unfolded sufficiently. The present paper does not deny its role; it asks from what point onward that role becomes legitimate.

5.4 Metric, Curvature, and Measure as Settled Surface Language

In order to reposition the Hilbert action as a lower-dimensional translational action, its components must each be reread as surface language. The metric $g_{\mu\nu}$ is not the direct floor of being. It is a stabilized relational form introduced so that the lower-dimensional observer can treat spatial order, interval, and deformation in comparable ways. It is not causal spatial structure itself, but the translational language left on the surface when that structure becomes settled as measurable geometry. Accordingly, $\sqrt{(-g)}$ is not the sign of primal being, but the density expression of geometry that has already acquired stabilization.

Curvature R must be reread in the same way. It does not point directly to anything prior to generation. Rather, it is a description of how an already settled metric structure fails to remain locally flat. In other words, curvature is not the force that begins generation, but a posterior form describing how settled manifold exposes stress and deviation on the surface. In this respect, R is not causal structure itself but the translated result of deeper structural tension within geometric language.

Finally, the measure d^4x is not a neutral container introduced merely for the convenience of integration. As Chapter 4 argued, it is the trace left behind when minimal spatial order becomes settled as a measurized form within the lower-dimensional regime. Metric, curvature, and measure are therefore not separate independent substances, but different surface expressions in which one generative order appears as settled descriptive language within lower-dimensional physics. The three terms composing the Hilbert action do not form the beginning of being; they organize the already expressed world into a compressed grammar.

5.5 Why the Hilbert Action Is a Translational Action

It should now be clear why the Hilbert action must be called a translational action. The word "translation" is not a loose metaphor here. It means that deeper generative order is not given directly in its own form, but becomes settled within the lower-dimensional domain in a shape that is calculable, variable, and integrable. The Hilbert action does not directly expose higher generative order itself. Rather, it is the result of that order entering lower-dimensional geometric language and becoming formalized there. In this sense, the Hilbert action is not a first action but a translational action.

Such translation presupposes a difference between two layers. On one side lie occurrence, Sunoh, and causal structure. On the other side lie metric, curvature, measure, and field equations. The Hilbert action does not possess the former layer directly. Instead, it allows the latter layer to handle traces of the former. It is precisely for this reason that the Hilbert action is powerful. Translation is not reduction. Translation may not preserve the full richness of higher structure, but it renders that structure repeatable and testable within the lower-dimensional domain. The Hilbert action is central to general relativity in exactly this sense: it is a translational apparatus.

This name is also consistent with the logic of the present series as a whole. Constants were reread as compressed reference values, observables as projected surface values, and d^4x as a settled measure trace. The Hilbert action must therefore also be reread as a compressed action-form belonging to generated and stabilized physical language. It does not begin being; it becomes possible only after the world has already been stabilized into geometric-covariant form.

5.6 Validity After Projection and Stabilization

If the Hilbert action is a lower-dimensional translational action, then its validity is not unlimited. It exhibits its greatest strength only within domains in which projection and stabilization have already taken place sufficiently. This does not mean that the mathematical consistency of general relativity is weak. It means only that such consistency does not by itself guarantee ontological firstness. The Hilbert action is exceptionally strong wherever generated world has become metricizable, measurizable, and describable in the language of curvature. But at the earlier layer of occurrence and Sunoh that language cannot yet operate directly.

This point explains at once why inherited equations remain recoverable and why they cannot function as ultimate closure. Once projection and stabilization have occurred, metric, curvature, and action become highly effective calculational instruments. For that reason the present paper does not abolish general relativity. On the contrary, it acknowledges general relativity as an extremely precise local language for generated and stabilized regimes. Yet the fact that this language is powerful is not the same as the claim that it states the beginning of being. The Hilbert action is understood most accurately when these two layers are not confused.

In this perspective, the validity of the Hilbert action should not be described as "always and absolutely," but rather as "within the formal regime that follows projection and stabilization." This condition does not weaken its authority; it makes that authority more exact by clarifying the layer in which the form is maximally valid. In this way the present chapter moves the Hilbert action from ontological prestige to formal legitimacy.

5.7 The Scope and Limit of General Relativity

The discussion of the present chapter also permits a more precise account of the place of general relativity. General relativity is not a wrong theory. Nor can it be treated lightly as though it were only a partially successful approximation. It is an astonishingly successful formal language for dealing with lower-dimensional physical regimes in which projection and stabilization have already taken place. In that sense, its scope is broad and deep. But the breadth of its scope does not imply that it reaches all the way to the ontological beginning.

The limit of general relativity, in the sense intended here, is not a limit of calculation but a limit of starting point. General relativity treats a world that is already metricizable. It treats intervals already measurable, curvature already expressible, and covariant language already settled. That is, it is a powerful theory that begins late. The present paper questions precisely this lateness of beginning. It does so not in order to oppose general relativity, but in order to show what general relativity has left unasked precisely because it does its own work so well.

As a result, general relativity receives a double status in the present framework. On the one hand, it remains indispensable. On the other hand, it is not first ontology. Only when this doubleness is made explicit can the Hilbert action lose its excessive metaphysical prestige and gain its proper physical role instead. General relativity is not a theory that begins being; it is a theory that translates with exceptional success the world after generation.

5.8 Conclusion of the Chapter

This chapter has repositioned the Hilbert action from a first formula of being to a lower-dimensional translational action. In order to do so, it first acknowledged the inherited role of the Hilbert action while showing that the curvature, metric, and measure composing $R\sqrt{(-g)}d^4x$ all belong to generated and stabilized surface language. In particular, d^4x was reread not as a primitive measure but as the settled trace of minimal spatial order, while $\sqrt{(-g)}$ and R were reread as posterior descriptive language belonging to a metricized and curved world rather than to the layer prior to occurrence. In this way, the Hilbert action no longer appears as a formula that begins being, but as a translational action that becomes possible only after deeper generative order has already become settled in the lower-dimensional domain.

This repositioning does not invalidate the Hilbert action. On the contrary, it defines its validity more rigorously. The Hilbert action remains a highly powerful formal action within physical regimes in which projection and stabilization have sufficiently taken place. But what it possesses is not ontological closure but formal legitimacy. General relativity is therefore not abolished. It remains recognized as a precise theory of generated world, while being drawn down from the level of primal beginning.

The next chapter will build upon this conclusion by addressing the recovery problem of inherited physical equations. That is, it will examine in formal terms why general relativity, mass-energy relations, and constant-centered equations can become valid again within generated and stabilized lower regimes.

Chapter 6. The Recovery Problem of Inherited Physical Equations

6.1 Purpose of the Chapter

The purpose of this chapter is to formalize, on the basis of the generative order, projection grammar, the symmetry between minimal temporal order and minimal spatial measure, and the status of the Hilbert action as a lower-dimensional translational action developed in the previous chapters, under what conditions inherited physical equations may become valid again. The present series does not immediately abolish the equations of inherited physics. Rather, it removes them from the position of ontological beginning and relocates them as recoverable posterior forms within generated and stabilized lower regimes. The central task of this chapter is therefore not to say that "the inherited equations are false," but to ask "from what point onward, at what layer, and in what sense do inherited equations become strongly valid again?"

This issue is crucial. If the present series is to become an actual physical research program rather than remain a merely ontological rearrangement, then the mode of connection between generative order and inherited equations must be made explicit. If that connection is not provided, the earlier papers risk being read as philosophical or metaphysical reinterpretations alone. If, by contrast, the connection is formalized, inherited physics ceases to be an adversarial other and is reread instead as a highly refined local formal language for generated worlds. The present chapter undertakes that rereading.

For that reason, "recovery" in the present chapter does not mean a simple return. It does not mean restoring inherited equations to their original place, but granting them formal legitimacy again within a deeper generative order. Recovery here is therefore not a recursion but the acquisition of repositioned validity. To clarify this point, the chapter first defines lower regime and recoverable form, then rereads relativistic metric expressions, the mass-energy relation, and constant-centered equations in sequence, and finally explains why such recovery must not be understood as simple reduction.

6.2 Lower Regimes and Recoverable Forms

In order to discuss the recovery problem of inherited equations, one must first specify what is meant by a lower regime. In the present series, lower regime does not simply mean "small scale" or "low energy." It means a regime in which deeper generative structure has, through projection, individuation, equalization, stabilization, and measurization, become settled as a repeatable and calculable surface language. Here lower signifies not inferiority of value, but lateness in the order of generation. In other words, lower regime is the domain of calculational accessibility situated opposite ontological depth.

This definition matters because the equations of inherited physics usually exhibit their greatest power precisely within this lower regime. Metrics, curvatures, constants, energy, mass, velocity, wavefunctions, probability amplitudes, and field equations all function rigorously only within already-settled surface language. They are not equations that begin generation, but equations that describe generated worlds. Thus, to say that a form is recoverable means that inherited equations regain their force within this lower regime.

Yet this recovery is not automatic. For any form to be recoverable, the values it handles must already have undergone stabilization. A metric, for example, has meaning only when measurable intervals have settled; a constant only when it remains repeatably as a reference value. Mass and energy are similar. If those values remain at the level of causal structure prior to projection, inherited equations are not yet valid. Recoverability is therefore not a merely mathematical possibility, but a layered condition that holds only after generation.

In this respect, the standpoint of the present chapter is clear. Inherited equations are not recovered because they were "always true from the outset," but because they become valid again when generated and stabilized regimes are obtained. This does not weaken the authority of inherited equations; it places that authority upon a more exact layer. The present chapter unfolds this layered validity with respect to concrete physical equations.

6.3 Relativistic Metric Expressions as Settled Surface Forms

The first expressions to be reread are the metric forms used by general and special relativity. Inherited relativity organizes physical events with extraordinary power by means of spacetime intervals, metric tensors, coordinate transformations, and curvature structures. Yet within the present series these expressions are not the first language of ontology. They are settled forms that hold only upon already measurized and stabilized spacetime surface order. Relativistic metric expression is therefore not a direct revelation of pre-generative structure, but a posterior form compressing the order of measurable spacetime regimes.

This repositioning is especially important for special relativity. Special relativity already showed that time and length are not absolute substances but relational values. The present paper does not deny this insight. It pushes it further inward. If special relativity formalized the relations among projected values, the present series asks whether those projected values themselves are surface results of deeper causal structure. Accordingly, relativistic metric expressions are not wrong; they are precise forms for dealing with already projected and stabilized spacetime order.

The same logic applies to the metric of general relativity. The metric $g_{\mu\nu}$ is not the floor of being, but a relational language left on the surface after spatial-temporal order has settled into measurable relation. In this sense the metric is indispensable within generated worlds, but it cannot replace occurrence and Sunoh. Metric expression is therefore not ontological origin but the recovered formalism of lower-regime geometry. Through this relocation, relativity is not denied, but its range of validity is made more precise.

Accordingly, the recovery of relativity in the present paper means that relativity becomes strongly valid again within generated and stabilized spacetime regimes. Yet that validity does not extend upward into the layer of causal structure prior to projection. Relativity begins too late for that. This is the point that determines both its recovery and its limit at once.

6.4 The Mass-Energy Relation as a Posterior Translational Formula

The mass-energy relation must be reread in the same way. In inherited physics, $E = mc^2$ is among the most iconic equations. It shows that mass and energy are not separated absolute terms, but two expressions of one order that can be transformed into one another. The present paper does not deny this insight. On the contrary, it seeks to explain more deeply why the equation is so powerful.

In the language of the present series, energization and massification are lower-dimensional projected expressions of the deeper causal structures ε and μ, respectively. Hence E_g and M_g are not first substances, but forms left on the surface as emission-causality and binding-causality settle there. From this perspective, the relation between mass and energy is not an equation beginning from the deepest level of being, but a translational formula that appears when emission and binding acquire measurable equivalence within generated worlds.

The key to this reinterpretation is not the simplification that mass and energy are "the same thing." What matters is that both are differentiated surface expressions of one higher generative order. Thus $E = mc^2$ is not an equation that closes mass and energy from before generation. It is an equation showing that, within generated regimes, the two have settled in ways that permit mutual translation. In this sense, the mass-energy relation does not replace the primal formula of being; it must be read as a posterior translational formula compressing generated lower physics.

As a result, the recoverability of this equation also becomes clear. In regimes where mass and energy appear as sufficiently stabilized physical quantities, their relation remains very strong. Yet that relation does not imply ontological firstness. $E = mc^2$ may be a local formal truth of the generated world, but it is not the beginning prior to occurrence. This is the repositioning of the mass-energy relation proposed in the present chapter.

6.5 Constants within Physical Equations as Compressed Reference Values

The recovery problem of inherited physical equations cannot be separated from the problem of constants. As the second paper already emphasized, constants are not primal terms of being but compressed reference values stabilized within an observational phase. The present chapter inserts this claim directly into the problem of equation recovery. If inherited equations are to be recoverable, then the constants composing them must likewise be reread not as first givens but as stabilized references.

This matters greatly because inherited physics has often used constants as the final sutures of explanation. Values such as c, G, $\hbar$, and k_B are powerful reference points that make calculation possible, yet their repeatability and stability do not by themselves mean ontological absoluteness. From the standpoint of the present paper, a constant is the compressed trace left when deeper generative structure settles into a repeatable and comparable value within a lower-dimensional phase. Constant-centered equations are therefore not absolute starting formulas, but formal closures of generated and stabilized observational regimes.

This repositioning does not weaken the role of constants. On the contrary, it makes that role more rigorous. To say that a constant is a reference value means that it occupies an extremely powerful position within the language of calculation. But that position is not one of ontological firstness; it is that of a calculationally privileged settled term. Accordingly, inherited equations containing constants may be fully recovered within generated regimes. Yet that recovery proceeds not on the basis that "constants were absolute from the beginning," but on the basis that "constants settled as compressed references within a given phase."

In this sense, the reinterpretation of constants is central to the recovery problem. If constants are not repositioned, then inherited equations as a whole risk sliding back into the place of existential beginning. The present chapter blocks precisely this risk while preserving the calculational power of inherited equations in full.

6.6 Why Recovery Is Not Reduction

At this point one of the most important distinctions of the chapter becomes clear. Recovery, in the sense of the present paper, is not reduction. Reduction usually means explaining higher-level phenomena completely in terms of lower and simpler components. But the direction of recovery here is the opposite. Lower-dimensional equations do not explain away higher generative order; rather, they are forms that become valid again within surface language after that order has settled in a particular phase. In other words, inherited equations do not erase or replace higher structure, but gather into calculable form the trace that higher structure leaves in lower-dimensional physics.

Accordingly, recovery is not the same as saying that “everything is reduced back to inherited equations in the end.” On the contrary, recovery means that inherited equations have their legitimate place only within generated regimes. This point is crucial. Otherwise the entire present series would be reabsorbed into the closure of inherited physics. The present paper does not allow that. Inherited equations remain powerful, but their power is the power of lateness. They do not replace higher generative order; they are the language after that order has already settled into lower-dimensional physics.

This distinction also explains why the present paper does not break with inherited physics. It does not destroy inherited equations. Instead it repositions them as exact local forms of generated worlds. Recovery in this sense means a subordinated legitimacy: inherited equations are acknowledged as valid but subordinate forms beneath a deeper generative order. Recovery is therefore both preservation and hierarchical relocation.

6.7 Conclusion of the Chapter

This chapter presented the recovery problem of inherited physical equations as a central point of connection between ontological reordering and physical formalization. It first defined lower regime as the regime of generated and stabilized surface language, and showed that inherited equations can become valid again there as recoverable forms. It then argued that relativistic metric expressions are posterior forms of settled spacetime order, that the mass-energy relation is a translational formula compressing the surface equivalence of emission and binding, and that constant-centered equations are formal closures of generated observational regimes organized around compressed reference values.

Above all, the chapter made clear that recovery is not reduction. Inherited equations do not replace higher generative order; they are acknowledged only as formal languages that become valid after that order has settled within lower-dimensional physics. In this way inherited physics is not abolished, yet it is removed from the place of existential beginning. Recovery does not dismantle the authority of inherited equations; it places that authority precisely within generated and stabilized regimes.

The next chapter will build directly on this conclusion by turning to observable physics and computational program. It will ask what observable signatures deeper generative order may leave in practice, and how the theory may develop into a simulation grammar and computational research program.

Chapter 7. Observable Physics and Computational Program

7.1 Purpose of the Chapter

The purpose of this chapter is to drive the generative order, projection grammar, the symmetry between minimal temporal order and minimal spatial measure, the repositioning of the Hilbert action, and the recovery problem of inherited physical equations toward the directions of observability and computability. Up to this point, the present paper has carried out a reordering of the starting point and formal status of physics. Yet if this work is to become a genuine physical research program, such reordering cannot remain only at the level of ontological and formal declaration. It must specify what observable signatures may be left behind, how a simulation grammar may be organized, and through what computational pathways numerical exploration may become possible. The present chapter addresses precisely that transition.

The discussion of this chapter does not mean that a fully completed predictive equation is to be offered immediately. Rather, the chapter is programmatic in a stricter sense. That is, its aim is to organize what kinds of observational differences this series requires, which values must be reread not merely as inherited observables but as projection-sensitive observables, and what structural operational framework is required in order to treat deeper generative order in a computationally accessible form. Observation and computation are not separate here. Observable physics is the organization of measurable surface values, while computational program is the formal method by which that organization is traced back toward causal structure.

Accordingly, this chapter is the first one that turns the conclusions of the previous chapters toward experiment, observation, and simulation. If Chapters 1 through 6 closed the internal structure of ontological and formal repositioning, Chapter 7 asks how that structure may be connected to the actual observable regime of physics. In that sense, this chapter stands immediately before the conclusion, while also serving as the point of departure for future research program.

7.2 From Causal Structure to Observable Physics

One of the central claims of this series is that the values directly handled by physics are not self-sufficient direct givens, but projected observables of a deeper causal structure. If so, observable physics itself must be redefined. In inherited physics, an observable usually means a measurable value, that is, a value already stably treated within instruments and unit systems. In the present paper, however, observable is not regarded merely as the endpoint of measurement. It is the surface trace by which a deeper generative structure remains in lower-dimensional phase. Observable physics is therefore the system of measurable traces left by causal structure without fully disclosing itself.

This definition matters because it neither absolutizes observational values nor dismisses them. The present paper does not call observables an illusion. On the contrary, they are the most important contact surface within the generated and stabilized world. Yet they are not the point of departure but the result. Observable physics must therefore be joined not only to data accumulation, but also to the interpretive work of reading projection history in reverse. In that way, a surface value becomes not merely an endpoint, but an entry point into deeper structure.

In this sense, observable physics has a double meaning in the present chapter. First, it includes the domain of measured values already accumulated by inherited physics. Second, it rereads those measured values in a projection-sensitive manner and asks which values preserve more of the trace of deeper structure. This second meaning is precisely what transforms the present series from a mere interpretive proposal into an observational program.

7.3 Where Do Observable Signatures Appear?

If deeper generative order leaves observable signatures in actual physics, those signatures will not appear with equal force everywhere. From the standpoint of the present paper, the most promising sites are those at which projection and stabilization are not fully closed, where they compete with one another, or where lower-bound preservation is strongly reflected on the surface. Not every observable is equally informative. In some regimes the deeper causal trace remains more strongly visible, whereas in others the stabilized surface language may become almost fully closed.

The first candidate lies in time-related observables. Earlier papers already proposed that resultant time T is a projected value of causal time t and that the minimal lower bound of temporal structure is nt^4. Accordingly, phenomena such as time dilation, recurrence density, and phase-dependent temporal compression may be reorganized not merely as matters of coordinate transformation, but as observables reflecting differences in projection density. This does not deny inherited relativity; rather, it asks how much of the trace of deeper temporal structure those relativistic observables preserve.

The second candidate lies in spatial measure and curvature-related observables. As Chapters 4 and 5 argued, d^4x and the Hilbert action are reread not as primitive geometry but as settled surface language. In that case, observables associated with curvature or metric need no longer be read first as properties of an already given space; they may instead be treated as forms revealing how deeper spatial order has been measurized and stabilized. The crucial issue then is not static geometric description alone, but the conditions under which metric language wavers or exposes denser projection trace.

The third candidate lies where competition between emission and binding appears on the surface. Since the present series rereads energization and massification as projected surface expressions of emission-causality and binding-causality, deeper causal asymmetry may become more directly visible in extreme conditions, structural instability, or events at which convergence and emission intersect. This connects naturally with later questions of fusion, convergence, and structural stability. Observable signature may therefore be expected to appear more strongly at structural transition points or maintenance thresholds than in uniformly equilibrated states.

7.4 Reclassification of Projection-Sensitive Observables

On this basis, the present paper proposes that observables should be reclassified according to projection sensitivity. Not every measured value provides the same level of theoretical information. Some values display almost fully stabilized reference behavior and remain well described by inherited equations alone. Others preserve more of the trace of deeper causal structure and may resist full closure within inherited formalism.

The first category is that of highly stabilized surface observables. These include strongly repeatable reference values such as constants, well-behaved metric intervals, and sufficiently settled mass-energy relations. Such values remain important in the present paper, yet they preserve relatively little direct signature of deeper structure. They function instead as criteria by which the stability of a generated regime may be confirmed.

The second category is that of medium-sensitivity observables. These remain within stabilized surface language, but under particular phase or structural conditions may reveal differences in projection trace. Examples may include variations in temporal density, distributions of structural stress, boundary conditions of measurization, or compressed forms of recurrence. Such values may still be treated partly by inherited equations, yet their interpretation cannot be fully closed without projection grammar.

The third category is that of highly sensitive transition observables. These arise where structure shifts from emission to convergence, from stability to instability, or toward the threshold of measurizability itself. From the standpoint of the present series, these values are especially important because the traces of deeper generative order may appear more clearly before closure becomes fully rigid, or at the moment it begins to waver. The future observational program should therefore not stop at increasingly precise measurement alone, but should first determine to which sensitivity class a given observable belongs.

7.5 The Need for a Simulation Grammar

Alongside observational program, a computational program is also required, and its core is simulation grammar. The present series has already left this path open. In particular, the fact that the lower bound of temporal structure was given not as a completed final order but as an open lower bound was meant to preserve the possibility of higher-order extension and numerical exploration. The present chapter formalizes that openness more directly. If this series is to become a genuine physical program, it cannot merely propose one equation. It must render computationally simulable the entire transformation by which deeper causal structure descends into projected observables.

This simulation grammar is not a simple repetition of inherited numerical analysis. It must contain at least four layers. First, one must determine how the initial conditions of Sunoh and causal structure after occurrence are to be placed within an abstract state-space. Second, one must determine in what order and under what rules the projection operators of individuation, equalization, stabilization, and measurization are to be applied. Third, one must determine under what conditions the resulting surface observables are compressed again into inherited equations. Fourth, one must track what deviation signatures arise at the boundaries where such compression does not hold.

In this sense, simulation grammar is not merely a predictive tool. It is the central device by which the entire logic of the present series may be transformed into a computationally testable form. It must handle not only the calculation of resulting values, but also the generative question of why a given form appears when it does. The computational program described here therefore goes beyond numerical convenience and seeks to reorganize the layered structure of generative causality into a simulable order.

7.6 The Direction of Formal Update Rules

In order to turn simulation grammar into an actual research program, one must propose at least at a conceptual level what kind of update-rule family is required. The present paper does not impose a finished numerical rule at this stage. Instead, it proposes a formal direction. First, the update of causal structure must be a structural-state update rather than a direct observable update. That is, one must first evolve $\{t, s, \sigma, \varepsilon, \mu\}$ and only then derive the projected set $\{T, S, \nabla S, E_g, M_g\}$. This differs from many inherited physical simulations, which often calculate evolution directly at the observable layer.

Second, update rules must include lower-bound preservation. On the temporal side, one must check whether structure collapses below nt^4; on the spatial side, whether settled measure order is maintained; and more generally whether the projection operator produces too-early collapse. In other words, simulation must do more than calculate state transition. It must monitor whether a transition preserves the generative grammar itself.

Third, structural asymmetry must be built into the rules. Emission and binding, disclosure and convergence, stabilization and destabilization are paired within the present series, yet they are not identical. Update rules must therefore be able to distinguish whether an event is emission-dominant or binding-dominant rather than remaining purely linearly symmetric. This point also connects directly to the later problem of fusion and structural stability.

Fourth, the conditions under which recovered equations are called as local closures must be included. Simulation grammar must be able to determine when inherited equations become valid again. For example, when metric language becomes stabilized within a specific regime, a general-relativity-type local closure may be called; when mass-energy relation becomes sufficiently settled, mass-energy translation may be used; when reference values become stabilized, constant-based formalism may be applied. Only in this way can the present series reintegrate inherited physics not by rupture but as regime-dependent recovered language.

7.7 The Actual Meaning of the Computational Program

The computational program proposed here does not simply mean 'let us compute this on a computer.' It proposes instead that the very object of physical computation must be reset. Inherited computation usually takes already-defined observables as its object. Coordinates, fields, wave functions, energy distributions, and metrics are given, and their evolution is calculated. By contrast, the computational program of the present series must treat together the generative relation prior to the appearance of observables. Computation must therefore follow not only the evolution of values, but the way in which values themselves settle into a given form.

This changes the meaning of computation. Here computation is not only the solving of a given equation, but also the determination of when an equation becomes valid at all. In that sense, computational program must be both an equation-solving program and an equation-emergence program. Without directly colliding with inherited numerical physics, the present series therefore poses a problem one layer more inward.

Such a program also reorganizes the direction of experiment and observation. If the computational program identifies which observables possess high projection sensitivity, the observational program can target them first. Conversely, if observation uncovers a particular deviation pattern, the computational program can trace it back to the relevant causal-structural update rule. Observation and computation should therefore not remain parallel and separate tasks, but should form a feedback cycle centered on projection grammar.

7.8 Computational Resources and Future Expansion

The computational program proposed by the present paper is unlikely to end at the present stage in simple closed-form solution. The reason is that the core of the present work lies not only in generated surface values, but also in the causal structure and projection history behind them. This naturally requires higher-order simulation, structural state-space exploration, nonlinear update rules, and in some cases large-scale parallel computation. The present chapter therefore points toward an open program that includes supercomputing, higher-order simulation, and, where appropriate, even quantum computational approaches.

This expansion of computational resources is not a weakness of the theory. On the contrary, it means that the present work is not a closed doctrine but an actually explorable research program. The paper does not claim that all calculations have already been completed. Instead, it clarifies what structures must be computed, what values must be tracked, and under what conditions inherited equations are to be called. In this sense, the chapter is not a declaration of completion, but a specification of direction.

Three directions of future expansion are especially important. First, the list of projection-sensitive observables must be made more concrete. Second, the update-rule family must be refined into forms that can be tested numerically. Third, criteria must be established that connect recovered formalism to deviation signatures. As such work accumulates, the present series will take its place not as merely interpretive physics, but as a physical research program that actively demands computation and observation.

7.9 Conclusion of the Chapter

This chapter turned the ontological and formal repositioning of the previous chapters toward observable physics and computational program. To do so, it redefined observable physics as the system of measurable traces left by deeper causal structure and argued that observable signatures may appear most clearly in regimes where projection and stabilization are not fully closed, at structural transition points, or where lower-bound preservation operates strongly on the surface. It also reclassified observables according to projection sensitivity and argued that simulation grammar is the central device by which these differences of sensitivity can be organized into an actual research program.

In addition, the chapter showed that computational program must not remain a mere equation-solving mechanism, but must become a layered computation that treats equation-emergence and regime-dependent recovery together. It therefore proposed formal directions such as updates of the causal structural set, lower-bound preservation, structural asymmetry, and the conditions for calling recovered equations. As a result, the present series moves beyond philosophical reordering of generative structure alone and toward an open physical program that requires actual observation and simulation.

The following chapter will synthesize the results of the entire discussion and gather what the present paper establishes and what it leaves as future task in the form of a conclusion.

Chapter 8. Observational Conclusion

8.1 Purpose of the Chapter

The purpose of this chapter is to gather together the full sequence of arguments developed in the previous seven chapters and to state, in the form of a conclusion, what the present paper has fixed, how it reconnects with inherited physics, and in what direction it opens further observational and computational work. The present paper was not an attempt merely to place a few additional symbols on top of existing physics. It was an attempt to ask again where physics must begin, what status directly handled physical quantities actually possess, and after what generative sequence the Hilbert action and other central formalisms become legitimate. For this reason, the conclusion cannot remain a simple summary. It must instead assemble the structural achievements of the previous chapters into one place and clarify the new position this paper claims within physics.

At the same time, because this chapter is titled "observational conclusion," it must also make clear how the whole argument converges toward the problem of observable physics. The earlier chapters formed a sequence running from occurrence and Sunoh, through causal structure, projection grammar, minimal temporal order, minimal spatial measure, the repositioning of the Hilbert action, the recovery problem of inherited equations, and finally observable physics with computational program. The task now is to show what this sequence means as a whole, and why the present paper is not merely an ontology but a reorganization of the grammar of observable physics.

Accordingly, this chapter offers conclusions at three levels. First, it summarizes the central claims fixed by the present paper. Second, it clarifies what status the formal language of inherited physics acquires within this framework. Third, it leaves open the future work required for observational and computational development. Only when these three levels are stated together does the fourth paper close as a structurally independent paper.

8.2 First Conclusion: Direct Values Are Not the Beginning

The first conclusion fixed by the present paper is that the values directly handled by physics are not the beginning of being, but generated and stabilized surface values. This conclusion was introduced as a problem in Chapter 1, structured in Chapter 2 through the four-layer order of physical expression, and formally developed in Chapter 3 through generalized projection grammar. Time T, spatial value S, gradient ∇S, energization E_g, and massification M_g are no longer left as self-sufficient direct givens, but are reread as projected observables left within the lower-dimensional regime by the deeper causal structural set $\{t, s, \sigma, \varepsilon, \mu\}$.

This conclusion does not merely alter terminology. It reverses the direction of interpretation in physics. Inherited physics achieved extraordinary success by taking observed values as starting points and formalizing the relations among them. The present paper asks instead why such values appear in the form they do. Physics is thereby relocated from a science of already given values and their relations to a science that also asks why certain values become settled as generated surface order. In this sense, the change in the status of direct values is the most fundamental conclusion of the present paper.

This conclusion does not weaken observational values. On the contrary, it makes them more important. Because if observables are no longer the final names of reality, but the only contact traces left by deeper generative structure, then they become the indispensable surface entry-points by which one may reason back toward that deeper order. This is what the present observational conclusion seeks to emphasize.

8.3 Second Conclusion: Time and Space Are Different Expressions of the Same Generative Order

The second conclusion fixed by the present paper is that time and space are not independent primal substances, but differentiated expressions of one higher generative order. This conclusion had already been implied in the earlier papers, but in the present fourth paper it received a more explicit formal bridge. Time appears when dense infinity becomes individuated, equalized, and repeated within the observer-phase as measurable series. Space appears when Sunoh becomes expressed as spatial value and that expression acquires measurable form. They differ as surface forms, but remain under one common higher mediation.

This conclusion became especially important in Chapter 4, where the symmetry between the temporal lower bound nt^4 and the inherited spatial measure form d^4x was developed. That symmetry did not mean that the two expressions were identical, but that the same generative necessity had left different structural traces in time and in space. Accordingly, the 4 in nt^4 became legible as the sign of minimal temporal causal order, while the 4 in d^4x became legible as the settled trace of minimal spatial measure order. Through this conclusion, time and space were not merely treated together, but shown to bear deeper corresponding traces within the same generative order.

This matters for physics because inherited physics succeeded in unifying time and space under the name spacetime, yet did not fully provide the generative grammar explaining why they should be joined in this way. The present paper goes one level deeper by relocating time and space as differentiated expressions appearing only after occurrence and Sunoh. In so doing, it explains why structural marks may appear in one domain that correspond to those in the other. In this way, the spacetime concept itself is repositioned as the result of generated differentiation rather than as a primitive coordinate framework.

8.4 Third Conclusion: The Hilbert Action Is Not the First Formula of Being but a Lower-Dimensional Translational Action

The third conclusion fixed by the present paper is that the Hilbert action cannot be regarded as the first formula of being, but must instead be reread as a lower-dimensional translational action valid only after projection and stabilization have already occurred. This conclusion was articulated most directly in Chapter 5, but in fact it had been prepared by all the preceding arguments. If occurrence and boundary-occurrence are the first assumption, then time and space are posterior expressions. If Sunoh is the higher generative mediation, then metric, curvature, and measure are already generated surface language. In that case the full expression R√−g d^4x cannot be the sentence that starts being, but must instead be reread as a compressed formal action that handles a world already generated.

The significance of this relocation is straightforward. The Hilbert action is not thereby invalidated. On the contrary, within generated and stabilized spacetime regimes it remains an extraordinarily powerful formal language. But that power comes not from ontological firstness, but from translational precision. In other words, the Hilbert action does not directly reveal deeper generative order; it becomes possible only after that order has settled into lower-dimensional geometric language. In this sense, the Hilbert action is not a closure-term of being, but a recovered action-form of generated physics.

This conclusion also restates the status of general relativity as a whole. General relativity is not a false theory, but an extremely successful local formalism for generated world. What it lacks is not power but ontological priority. It is therefore a language that begins too late, though it remains remarkably strong within the late regime where it begins. The present paper makes this double status explicit and thereby removes the excessive ontological prestige of the Hilbert action without diminishing its genuine physical force.

8.5 Fourth Conclusion: Inherited Equations Are Not Abolished but Recovered

The fourth conclusion fixed by the present paper is that inherited physical equations are not abolished, but recovered within generated and stabilized lower regimes. This was the central theme of Chapter 6. Relativistic metric expressions were reread as settled forms of measurable spacetime order; mass-energy relation was reread as a translational formula compressing the surface equivalence of emission and binding; and constant-based equations were reread as formal closures operating around compressed reference values. What matters most here is that recovery is not the same as reduction.

To say that inherited equations are recovered does not mean that all things ultimately collapse back into inherited physics. Rather, it means that inherited equations become valid only after deeper generative order has settled into lower-dimensional measurable world. In other words, those equations are not the final language explaining higher generative order, but local formal languages that can be called only after that order has stabilized as observable physics. Recovery is therefore both preservation and hierarchical relocation.

This conclusion keeps the whole present series within physics. If inherited equations were simply discarded, the present theory would lose all means of formal dialogue with established physics. Instead, the present paper preserves their calculational achievements while preventing them from reoccupying the place of ontological first language. This is the central achievement of the recovery logic.

8.6 Fifth Conclusion: Observable Physics Is a Surface Trace System of Deeper Generative Structure

The fifth conclusion fixed by the present paper is that observable physics is a measurable trace system of deeper generative structure. Chapter 7 pressed this argument toward observational and computational program. As a result, observables were no longer understood merely as values captured by instruments, but as surface traces showing how deeper causal order has settled within the lower-dimensional phase. Thus the problem of observation was reformulated, no longer as mere data acquisition, but as the interpretation of projection history in reverse.

According to this conclusion, not all observables possess the same theoretical informativeness. Some values display highly stabilized surface behavior and remain well handled by inherited equations alone. Others retain a higher degree of projection sensitivity and preserve more visible traces of deeper causal structure. Especially at structural transition points, boundaries between stability and instability, regimes where emission and binding compete, or moments where lower-bound preservation becomes strongly visible, higher-sensitivity observables may emerge. It is precisely here that the present paper opens the possibility of a future observational program.

Observable physics therefore does not appear in this framework as a mere endpoint. It is the surface zone where ontology, formalization, projection, and recovery all meet actual physics. In that sense, the phrase observational conclusion is not a rhetorical afterthought, but a statement that the whole argument finally converges toward observable physics.

8.7 Open Computational Program and Future Research

It must also be restated in this conclusion that the present paper is not a closed doctrine but an open formal research program. It does not claim to have completed all numerical rules. Rather, it clarifies more sharply what should be computed, which observables possess projection sensitivity, and under what conditions inherited equations are called as recovered forms. In this sense, the present paper is better understood as a structured program than as a closed finished theory.

The direction of future research follows three broad lines. First, the list of projection-sensitive observables must be made more precise. Time density, recurrence compression, structural transition, measure-instability, and emission-binding asymmetry must be distinguished in terms of actual experiments and observations. Second, the simulation grammar must be refined into concrete numerical update rules. A computational scheme will be needed that includes causal-structural update, lower-bound preservation, and recovered-equation calling conditions. Third, a criterion must be built linking recovered local formalisms to deviation signatures. Only then can the theory move from a merely explanatory framework toward a testable framework.

This openness is not a weakness but a strength. The present paper aimed from the start to build a bridge between deeper generative order and lower-dimensional measurable world. Such a bridge cannot be closed by a single equation. It calls instead for sustained observation, numerical exploration, and formal refinement. The conclusion of the present paper is therefore not a declaration of final completion, but the beginning of a more rigorous phase of inquiry.

8.8 Final Conclusion

The final conclusion of the present paper may now be compressed into a single sentence: the values, constants, measures, and actions directly handled by physics are not the beginning of being, but surface forms left behind as deeper generative order becomes settled through projection and stabilization within the lower-dimensional regime; and the core equations of inherited physics are therefore not primal ontological formulae, but local yet powerful translational languages recovered within that settled world.

This conclusion fixes the role of the present fourth paper as the step that drives the ontological reordering of the first three papers into an explicitly physical formal program. The present paper did not merely repeat occurrence and Sunoh, but connected causal structure, projection grammar, minimal temporal order, minimal spatial measure, the repositioning of the Hilbert action, recovered equations, observable physics, and computational program into one coherent sequence. Through this sequence, inherited physics is not abolished, yet it is removed from the place of first language; and generative order does not remain a formless metaphysics, but enters the interior of actual physical discourse.

Accordingly, the most important achievement of the present paper is not one new number or one new symbol. It is the construction of a grammar of connection between deeper generative order and measurable physics. Once that grammar is established, physics becomes once again a discipline that asks not only what is to be calculated, but also what is first, and after what generative sequence does calculation become possible at all. That is the final conclusion of the present paper.

Chapter 9. Appendix A

Computational Implications and Principles of Use in the Theory of Generative Order

A.1 Purpose of Appendix A

The purpose of this Appendix A is to state, in a limited but explicit way, that the present paper series has implications not only for the formal rearrangement of physics but also for the direction of next-generation computational systems and intelligence systems. In the preceding chapters, the paper developed occurrence, Sunoh, causal structure, projection grammar, minimal temporal order, minimal spatial measure, the repositioning of the Hilbert action, the recovery of inherited equations, and the orientation of observable physics and computational program. This entire structure is not only a proposal for a new interpretation of physics; it is also a proposal for redefining what computation itself should take as its object. Computation is no longer to be understood merely as the search for solutions to already completed equations, but as the organization of the connection between generative order and surface order.

In this sense, the present paper series opens the possibility of connection with generative AI, quantum computing, and supercomputing. If such computational systems are organized not merely as devices for speed enhancement, but as systems able to handle projection-sensitive observables, generative structural states, recovered formalism, and deviation signatures together, then the present theory may open a far wider computational horizon than inherited physics alone. But precisely for that reason, this possibility cannot remain the object of pure technological optimism. It may become not only an extension of physics but also a civilizational risk.

A.2 The Point of Contact Between Generative-Order Theory and Next-Generation Computational Systems

One of the most important shifts performed by the present paper series was the relocation of physical quantities from direct givens to projected surface expressions. This shift also redefines the object of computation itself. Existing computation is largely optimized for already defined observables, already settled constants, and already selected equations. By contrast, the present theory requires computation to deal together with the generative relation behind observables, the history of projection, the process of stabilization, and the conditions of regime-dependent recovery. This is not merely an increase in computational load; it is a qualitative transformation in the structure of computation.

At this point, the possibility opens for generative AI, quantum computing, and supercomputing to be linked together. Generative AI has strengths in organizing multi-layered expression, compressing structural patterns, and translating across heterogeneous technical languages. Quantum computing has theoretical advantages in exploring combinatorial state spaces and non-classical computational pathways. Supercomputing is well suited to executing vast structural-state spaces and repetitive simulation grammar. If these three are organized within one generative-computational framework, then the present theory may both require and permit a level of structural exploration different from inherited computation.

A.3 Why This May Be More Consequential Than Nuclear Fusion

Nuclear fusion is a technology that may transform the structure of energy. But the possibility indicated in this appendix goes beyond the energy problem alone. The coupling of generative order and computational order may transform the way generated world is read, the way measurable traces are classified, the way causal structure is inferred, and the way future possibilities are computed. In that sense, it implies not merely progress in energy technology, but a possible transformation in the operating principles of civilization itself.

If generative AI were to learn the projection grammar and recovery logic of this theory, and if quantum computing and supercomputers were to explore its structural-state spaces, and if the resulting outputs were then applied across science, policy, education, culture, and social systems, human society could begin organizing the future in a fundamentally different way. For this reason, the possibility may be more frightening than nuclear fusion. It is not first a problem of force, but a problem of judgment structure and the organization of the future.

A.4 Principle of Use: The Past and the Present May Help the Future, but Must Not Rule It

At this point, Appendix A states one principle explicitly:

The past may help the present, and the present may help the future, but the past must not rule the present, and the present must not rule the future.

This sentence is not mere ethical rhetoric. It is a principle of use directly connected to the entire generative order developed in the present series. Generation is not the process by which already settled values are absolutized so that all subsequent possibilities are closed. On the contrary, generation is the process by which deeper order settles into surface form while still leaving open the possibility of further differentiation and new expression. If the settled values of the past come to dominate the present completely, and if the computational systems of the present predetermine the future, then generation disappears and only closure remains.

For this reason, the computational civilization opened by the present theory must remain fundamentally auxiliary and open toward the future. The data and models of the past must exist to assist the present, not to render present choice impossible. Likewise, the computational and predictive systems of the present must exist to assist future generations in opening wider possibilities, not to block or predetermine them.

A.5 A Teacher Is One Who Helps, Not One Who Rules

The previous principle applies directly to education and the transmission of knowledge as well. For that reason, Appendix A fixes the following sentence together with it:

A teacher is one who helps, not one who rules. That is why one is called a teacher.

This statement is not a casual insertion of educational philosophy. It is a core principle governing the use of generative order. Already settled structure, already secured knowledge, and already constructed computational capacity must exist in order to assist what comes after. When they are used instead to replace, suppress, or replicate what comes after, generation is corrupted into domination. In the same way, the generative AI systems, computational systems, predictive models, and educational machines created by human beings may stand in the position of a teacher, but they must not stand in the position of a ruler.

The computational civilization opened by this theory may offer guidance, but it must not legitimize domination. In this sense, the word teacher does not refer only to a person. It refers to all those who are structurally prior, who possess more reference values, more computational power, or broader data. They may help, but they do not thereby acquire the right to rule.

A.6 Computational Ethics for the Physics of Generative Order

The ethics proposed by Appendix A is not an externally imposed supplementary norm. It is connected to the inner logic of the theory itself. The present paper criticized the absolutization of direct givens and relocated generated surface order under deeper generative order. If that logic is taken seriously, then computational systems themselves must not be absolutized either. Computation may serve as a device that assists deeper structure more effectively, but it must not become an absolute structure that stands in for human beings and future generations.

Accordingly, the core of computational ethics here consists of three requirements. First, computation must remain auxiliary. Second, computation must remain open to future possibility. Third, computation must not absolutize already settled structures. Only when these three conditions are met can the computational extension of the present theory remain consistent with a physics of generation.

A.7 Conclusion of Appendix A

Appendix A has outlined, in limited form, the possibility that the present paper series may connect with next-generation computational systems. The linkage of generative AI, quantum computing, and supercomputing may make it possible to explore more powerfully the causal structure, projection grammar, recovered formalism, and deviation signatures proposed by the theory. In that sense, the theory may open not only a new interpretive framework for physics but also a new possibility for computational civilization. And precisely for that reason, its consequences may be more serious than those of nuclear fusion.

Yet Appendix A has not received this possibility with technological optimism. On the contrary, it has required clear principles of use. The past and the present may help the future, but must not rule it; and a teacher is one who helps, not one who rules. These two principles are limiting conditions that must accompany any extension of the physics of generative order into computational civilization.

The final sentence left by Appendix A is therefore this: The greatest strength of this theory must not lie in predicting the future, but in helping the future remain able to open itself. Only under this condition can the theory become both an extension of physics and an assistant to civilization.