Admissibility, Coherence, and Selection
On the Generator Beneath Geometry, Evolution, and Law

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Abstract

Foundational tensions in modern physics often persist despite mathematical consistency and empirical adequacy. This work argues that many such tensions arise not from incomplete formalism, but from a failure to identify the conditions under which a descriptive framework is admissible at all. Within the Quantum Collapse Geometry (QCG) framework, geometry, probability, and higher-level structure are treated not as primitives, but as emergent descriptions that become valid only when underlying operations satisfy coherence-preserving constraints.

We formalize this perspective by introducing the concept of admissible inputs: constraints on participation that preserve the stability of generative processes. These constraints are enforced through selection rather than prescription and are shown to operate across physical, biological, and epistemic domains. Biological evolution is examined as an explicit instance of selection acting on generative processes rather than static entities, illustrating how persistence depends on restricting operations that undermine coherent continuation.

Under a structural definition, these constraints correspond to ethics—not as moral prescription, but as the architecture regulating participation in consensus-building systems. We argue that ethics, so defined, is upstream of truth claims and law formation, governing which operations are permitted to function as attempts at description.

QCG is presented as a unifying framework without reduction: it does not seek to eliminate higher-level descriptions or derive all phenomena from a single ontology, but to identify a common generative principle governing the emergence and persistence of stable descriptions. This reframes the ambition of a theory of everything as an account of lawfulness itself, rather than a final inventory of fundamental entities.

Relation to the QCG Series

This paper forms part of the Quantum Collapse Geometry (QCG) series, which investigates the emergence of geometric, probabilistic, and classical structure from underlying collapse and relational processes. While other papers in the series develop formal models, mathematical constructions, and physical applications, the present work serves a distinct role.

Its purpose is foundational rather than technical. It clarifies the conceptual commitments of QCG by articulating the conditions under which any descriptive framework—geometric or otherwise—is admissible. In doing so, it provides a unifying perspective on why geometry, physical law, biological persistence, and epistemic consensus exhibit parallel stability conditions without reducing one domain to another.

This paper may be read independently of the rest of the series. Familiarity with QCG is not assumed, and no specific formalism from other papers is required. Readers interested primarily in conceptual foundations may treat this work as an orientation to the broader framework, while readers engaged with the technical development of QCG may regard it as an explicit statement of the selection principles that underlie the formal results presented elsewhere.

1 Introduction

Despite extraordinary empirical success, modern physics remains marked by persistent foundational disagreement. Quantum theory admits multiple incompatible interpretations. General relativity replaces absolute background structure with dynamical geometry, yet continues to rely on a differentiable manifold as a foundational arena. At their respective boundaries, classical, quantum, and relativistic frameworks remain mathematically well defined while their physical interpretation becomes ambiguous or contested.

Such tensions are typically addressed through formal refinement: quantization of geometry, extension of symmetry groups, enrichment of state spaces, or appeal to increasingly abstract mathematical structures. Less frequently examined is the possibility that these tensions arise not from insufficient formalism, but from extending descriptive languages beyond the operational regimes that support them.

The Quantum Collapse Geometry (QCG) framework begins from a different premise. It treats mathematics as a representational and coordinative tool rather than a generative source of physical law, and it regards geometry, probability, and classical structure as emergent descriptions whose validity is conditional rather than universal. From this perspective, breakdowns in interpretation signal failures of admissibility rather than failures of calculation.

This paper develops that premise at a structural level. It introduces the notion of admissible inputs—constraints on participation that preserve the coherence and continuity of generative processes—and argues that such constraints are enforced through selection across multiple domains. Geometry, biological persistence, and epistemic consensus are shown to arise under the same organizing principle: stable description is earned only when underlying operations restrict themselves in ways that preserve coherence.

By articulating this principle explicitly, the paper clarifies the type of unification QCG proposes. It is not a reductive theory of everything that seeks to eliminate higher-level structure, nor a pluralistic framework in which all descriptions are equally valid. Instead, QCG offers a unification without reduction: an account of how multiple descriptive layers coexist, stabilize, and fail, governed by a shared selection rule acting on admissible generators.

2 Framing the Problem: Description, Validity, and the Silent Assumptions of Physics

Modern physics has been extraordinarily successful at extending the predictive reach of mathematical formalisms across vast regimes of scale and energy. Yet this success has been accompanied by persistent foundational unease. Classical spacetime, quantum states, probabilistic collapse, background independence, and even the meaning of measurement remain subjects of deep disagreement despite overwhelming empirical adequacy.

A recurring feature of these debates is that failures of interpretation are often treated as failures of models, rather than as indicators that the conditions under which those models are applicable have been exceeded. The mathematics continues to function, but the physical meaning becomes ambiguous, contradictory, or contested.

This work proceeds from a simple but consequential distinction: mathematics is a representational and coordinative tool, not a generative source of physical law. Mathematical structures compress, organize, and stabilize patterns that arise from underlying physical operations, but they do not, by themselves, specify the conditions under which such patterns may legitimately be described.

The question, then, is not merely which equations apply, but under what conditions any equation is admissible as a physical description at all.

3 Geometry as a Selected Description Rather Than a Primitive

Within the Quantum Collapse Geometry (QCG) framework, geometry is not assumed as a fundamental substrate of reality. Instead, geometric structure is understood as an emergent description that becomes valid only when underlying physical operations exhibit sufficient coherence and stability.

Geometric description is meaningful only when physical interactions compose in a manner that supports stable, repeatable relational structure. When such coherence is present, geometry provides an efficient compression of physical behavior. When it is absent, geometry becomes inapplicable rather than merely ill-behaved.

Geometry, in this view, is not violated; it is selected.

4 Admissible Inputs and the Conditions for Coherent Description

Any physical description presupposes constraints on what may enter as a legitimate input. These constraints determine not outcomes, but participation. An admissible input is defined by its compatibility with the continuation of coherent description.

Operations that violate conservation, composability, or informational bookkeeping may exist transiently, but they do not stabilize into persistent structure. Where admissibility fails, description dissolves.

5 Selection, Persistence, and the Stability of Generative Processes

Evolutionary systems make explicit a principle already implicit in physical theory: persistence depends on restricting operations that undermine coherent continuation. Selection acts on processes of continuation rather than static entities.

This principle generalizes beyond biology. Wherever persistence is required, admissibility is enforced.

6 Constraints on Participation and the Architecture of Consensus

At the most general level, constraints on admissible participation correspond to ethics, defined structurally rather than normatively. Ethics governs which operations may count as attempts at description within consensus-building systems.

Ethics, so defined, is upstream of truth claims and law formation. It regulates participation rather than outcome.

7 Unification Without Reduction

QCG proposes a unification without reduction. It does not eliminate higher-level descriptions nor reduce all phenomena to a single ontology. Instead, it identifies a shared generative principle governing the emergence and persistence of stable descriptions.

Geometry, evolution, and knowledge formation are unified not by substance, but by selection over admissible generators.