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Titre: Uniformité Génrée

Abstract

Modern physics implicitly assumes that all fundamental phenomena belong to a single ontological regime. We show that this assumption is incorrect and that physical reality is structured by two distinct internal regimes.

This clarification reveals that the foundational statement of quantum gravity rests on an implicit ontological error: the assumption that gravitation belongs to the same regime as quantum phenomena and must therefore be quantized. In contrast, we demonstrate that gravity is an emergent NUG phenomenon, akin to pressure or viscosity, and thus has no vocation to be quantized.

The UG/NUG distinction resolves the apparent incompatibility between quantum theory and general relativity and provides a unified descriptive language for all physical reactions.

This ontological clarification dissolves the apparent contradictions between quantum theory and gravitation and restores a unified descriptive architecture for all physical reactions.

Introduction

Modern physics rests on two theoretical frameworks of remarkable effectiveness: quantum mechanics, which describes elementary phenomena, and general relativity, which describes gravitation and the structure of spacetime. Despite their success, their conceptual articulation remains problematic. Since the 1970s, the search for a quantum gravity has become a central objective, motivated by the idea that all fundamental interactions must be quantized.

This idea does not originate from empirical evidence but from a silent ontological assumption rather than from any physical necessity. This assumption was never demonstrated, yet it became a foundational principle that guided several decades of research.

In this work, we make explicit the ontological structure underlying physical phenomena and show that the apparent incompatibility between quantum mechanics and general relativity arises from a category error rather than from any physical contradiction.

We argue that gravitation is an emergent geometric phenomenon and therefore has no vocation to be quantized. This clarification restores conceptual coherence between existing theories and provides a unified framework for describing physical reactions across all scales.

Beyond the ontological clarification developed in this article, a forthcoming companion paper (Système-R) will extend this framework by formalising the universal structure of physical reactions. While the present work establishes the distinction between the UG and NUG regimes and resolves the conceptual status of gravitation, the Système-R article will show that reactions across all regimes can be expressed within a unified operational architecture. This second paper will demonstrate how the response of any physical system can be calculated from its internal organisation and its regime of existence, thereby consolidating the global structure introduced here.

1: Uniform Genderedness (UG - Uniformité Genrée)

Gendered uniformity refers to the remarkable property according to which certain material entities—elementary particles, atoms, simple molecules—are perfectly identical to one another.

Although fundamental, this property is almost never formulated explicitly in the scientific literature. It is considered self-evident, too trivial to be named, or diluted across disciplines that do not connect it to its ontological role.

Our idea of the world begins with the existence of the Arrow of Time. This directional structure precedes any notion of chronology, but not of duration, since duration has no ontological existence.

We know it just because a broken glass does not reassemble itself. This reality implies that the beginning of our Universe could not have occurred from a point in the middle of nowhere, but only from an **existing structure that imposed the longitudinal extension** we experience in the Universe along the direction of this arrow of time.

Here are the steps that form our framework:

1. From this initial governed configuration emerge the first objects—particles and nuclei—which underlie what we describe today as quantum phenomena, a kind of domain where human intuition is not truly at home, even though we have discovered this surprising reality that our brains are not able to fully decipher. Ontologically, the Universe begins by producing its foundational system first: the elementary components and operational rules that constitute quantum mechanics. This initial system precedes all structure and determines the possibilities of everything that follows.
2. When the objects of this first wave are ready, the evolution toward the first assemblies of matter begins, leading to atoms and simple molecules.
3. The last wave is everything that comes after.

UG

The first two waves form the regime we call **UG (Uniformité Genrée or Uniform Genderedness)**, in which objects are strictly identical by genre and where the creation of new objects is interrupted, frozen, definitive.

NUG

The third wave forms the regime we call **NUG (Non Uniformité Genrée or Non-Uniform Genderedness)**, where one never finds two identical objects—neither among manufactured items, nor among natural formations, nor among living beings.

No Time

In this universal context, it is impossible to speak of time counting or durations. The arrow of time is not a measure but a direction. The temporal indications used to describe these periods — including the so-called “age of the Universe”, often stated as 14 billion years — have no ontological relevance. These units belong to human periodicity, a cultural construction rooted in our circadian cycles. This periodicity remains useful and fully legitimate for human life and organization, but it does not reflect any universal temporal structure. This is why, in the waves described above, there is no question of time but of readiness: the capacity of objects to be modified, assembled, and directed toward their own future.

In summary:

- **UG**: the level of uniformity, grouping the objects initially created by the Universe — particles, atoms, simple molecules.
- **NUG**: everything that lies above — organised matter, natural artefacts, from astrophysical structures to the most ordinary biological objects.

The quantum world is thus only a constituent of the **UG** regime and does not define any boundary between two distinct worlds: there is only one world, structured according to the **UG** and **NUG** regimes.

2. Conceptual consequences of the UG

The UG and NUG regimes are not a competing theory of modern physics.

They introduce no new equations, modify no existing symmetries, and contradict neither quantum mechanics nor general relativity.

The UG/NUG boundary entirely recontextualises the question of unification and shows that the founding statement of quantum gravity rests on an implicit assumption that mistakenly divided the world into “quantum” and “macroscopic”, whereas it is simply and naturally structured by a UG/NUG reality.

This section presents the consequences of this clarification.

Historical origin of the founding statement of quantum gravity

Einstein (1915–1930) : gravitation is not a force

General relativity introduces a major conceptual rupture:
gravitation is **not** a force in the Newtonian sense, but a **deformation of spacetime**.

It is:

- geometric,
- continuous,
- emergent,
- collective.

Einstein never speaks of quanta, never of a field, never of a mediator.

For him, gravitation is a **phenomenon outside the quantum domain**.

1930–1970 : the golden age of quantum fields

Quantum mechanics triumphs.

Physicists quantise:

- electromagnetism,
- the weak interaction,
- the strong interaction.

They discover:

- photons,
- gluons,
- the W and Z bosons.

Everything works. Everything is renormalisable. Everything is local.

And so an implicit idea takes hold:

All known forces are quantum. Therefore gravitation must be quantum as well.

👉 **This is where the logical error is born.**

Although Einstein is universally praised, one of his most explicit positions — that gravitation is not a quantum phenomenon — was progressively set aside. Recognising this historical fact does not imply that Einstein was necessarily right, nor that the present work claims to inherit or validate his position. It simply reopens a question that seems to have been prematurely closed.

1970 : the founding statement emerges

The statement that structures all modern research is formulated as follows:

“General relativity and quantum mechanics are incompatible when one attempts to quantise gravitation as a local field.”

This statement contains a hidden assumption:

👉 **that gravitation is a UG phenomenon,**

and therefore must be quantised like the other forces.

- This assumption has never been demonstrated.
- It has never been justified.
- It has never been questioned.

1970–2020 : fifty years of attempts to solve a non-existent problem

Since quantisation fails (infinite divergences), physicists invent:

- strings,
- branes,
- supersymmetry,
- extra dimensions,
- loop gravity,
- spin networks.

None of these approaches has produced:

- a verifiable prediction,
- an experimental observation,
- a graviton,
- a gravitational superposition.

The problem is not technical. It is ontological.

These efforts were not misguided; they were built upon an assumption that remained unexamined.

The UG/NUG regimes restore the real

UG: granularity, symmetries, quantisation

The UG regime is the regime of:

- elementary processes,
- quantum fields,
- local symmetries,
- superposition,
- renormalisation.

It is the domain of particle physics and chemistry.

NUG : emergence, geometry, continuity

The NUG regime is the regime of:

- emergent processes,
- collective phenomena,
- emergent properties,
- geometry,
- continuity.

It is the natural domain of phenomena beyond chemistry.

Gravitation

Gravitation, as a spatio-geometric phenomenon, does not exist in the UG regime. It is not merely weak in this regime — **it is absent**.

Gravitation appears exclusively in the NUG regime, in the same way as:

- pressure,
- temperature,
- viscosity,
- the push from a slope.

These analogies are not metaphors but ontological parallels.

Within this framework, the properties of gravitation are naturally interpreted:

- No graviton → expected.
- No superposition → expected.
- No renormalisation → expected.
- Universal attraction → expected.
- Disappearance at the quantum scale → expected.

The founding statement of quantum gravity becomes invalid.

It is no longer a matter of:

“General relativity and quantum mechanics are incompatible when one attempts to quantise gravitation as a local field,”

but rather:

The error arises from attempting to quantise a phenomenon that, by its very nature, does not belong to the UG regime and therefore has no reason to be quantised.

It follows that the sought-after “theory of everything” is no longer something to be constructed:

it already exists.

Consequences for unification

Since the early 1920s, physicists have pursued a single overarching ambition:
to unify gravitation with the other fundamental interactions.

From Weyl to Kaluza, from Einstein's late work to the rise of quantum field theory, the dominant intuition has been that all forces must ultimately belong to one universal framework.

This ambition shaped an entire century of research.

But it also introduced a silent assumption:

that gravitation must be treated like the other interactions — that it must be **UG**, granular, quantisable, and compatible with the language of quantum fields.

The UG/NUG distinction reshapes the question of unification at its foundations.

The apparent incompatibility between quantum mechanics and general relativity does not arise from their mathematical structures, but from a category error: gravitation and quantum fields do not belong to the same ontological regime.

Once this distinction is made explicit, the unification problem dissolves:

- there is no contradiction between quantisation and geometry,
- there is no need to quantise gravitation,
- there is no missing interaction,
- there is no "fourth force" to bring into the quantum domain.

Unification is not achieved by forcing all phenomena into a single regime, but by recognising that **both regimes coexist within a single operational architecture.**

UG and NUG are not competing descriptions; they are complementary layers of the same physical reality.

In this sense, the unification sought for a century is not a new theory to be invented, but a **clarification of the domains to which existing theories apply.**

Reformulating the problem of gravitation

The traditional formulation of the quantum-gravity problem assumes that gravitation is a UG phenomenon that must be quantised like the other interactions. This assumption is incorrect. Gravitation is a NUG phenomenon.

It emerges from collective, continuous, geometric structures, not from elementary reactions. It has no quanta, no mediator, no local field, no superposition, and no renormalisation — not because of technical obstacles, but because these concepts do not apply to the NUG regime. The correct formulation is therefore:

The difficulty does not lie in quantising gravitation, but in having assumed that gravitation belongs to a regime in which quantisation is meaningful.

Once this is recognised, the "problem of quantum gravity" disappears.

There is no incompatibility between general relativity and quantum mechanics.

There is no missing theory.

There is no paradox to resolve.

The UG/NUG framework shows that the so-called "theory of everything" is not a future construction but an already existing structure:

a unified physical architecture in which **elementary granularity (UG)** and **emergent geometry (NUG)** coexist, interact, and remain conceptually distinct.

Implications for cosmology

The UG/NUG distinction reshapes the foundations of cosmology.

Cosmological dynamics — expansion, curvature, structure formation — belong entirely to the NUG regime. They arise from collective, geometric, emergent properties, not from elementary reactions.

This has several consequences:

- the early universe is not a quantum-gravitational system,
- the Big Bang does not require a quantum description of spacetime,
- singularities are artefacts of applying UG mathematics to NUG phenomena,
- inflation does not require a quantised gravitational field,
- large-scale structure emerges from NUG dynamics, not from UG fluctuations.

Cosmology becomes the study of **NUG geometry evolving under collective constraints**, not the extrapolation of quantum fields to Planck scales.

Ontologically, the Universe begins by producing its foundational system first — the elementary components and operational rules that constitute quantum mechanics. Cosmologically, the earliest describable state is a high-density NUG configuration, where geometry is continuous and emergent.

This removes the need for:

- quantum gravity in the early universe,
- Planck-scale physics,
- spacetime foam,
- quantised curvature.

Once the UG/NUG boundary is restored, cosmology becomes coherent, continuous, and free of paradoxes.

Implications for black holes

Black holes have long been considered the ultimate testing ground for quantum gravity.

This assumption rests on the idea that extreme curvature must correspond to a quantum-gravitational regime.

Within the UG/NUG framework, this assumption becomes unnecessary.

Black holes are **purely NUG objects**.

They arise from collective, geometric, continuous dynamics — not from elementary reactions.

Their properties follow naturally from this classification:

- the event horizon is a geometric boundary, not a quantum surface,
- Hawking radiation does not require a quantised gravitational field,
- the information paradox is an artefact of applying UG concepts to a NUG system,
- singularities reflect the breakdown of UG mathematics, not of physical reality.

In this framework:

- there is no need for a graviton near the horizon,
- no need for quantum superpositions of spacetime,
- no need for Planck-scale discretisation,
- no need for a quantum theory of curvature.

Black holes behave like other NUG emergent structures:

they are continuous, geometric, and collective.

The so-called "quantum-gravity puzzles" associated with black holes dissolve once gravitation is recognised as a NUG phenomenon.

The paradoxes do not reveal a failure of physics, but a misclassification of regimes.

Implications for measurement

The UG/NUG distinction also reshapes the foundations of measurement theory. Measurement has long been interpreted as a quantum-classical interface, a mysterious boundary where superposition "collapses" into definite outcomes. Within the UG/NUG framework, this boundary is reinterpreted in operational terms.

UG phenomena involve:

- discrete, granular behaviour,
- quantised fields,
- local symmetries,
- superposition,
- reversible dynamics.

NUG phenomena involve:

- collective behaviour,
- geometric continuity,
- macroscopic stability,
- irreversible dynamics,
- emergent organisation.

A measurement is not a metaphysical transition between "quantum" and "classical".

It is an **interaction between a UG system and a NUG apparatus**.

The apparatus is NUG by construction:

it is continuous, geometric, stable, and emergent.

It cannot sustain UG superpositions.

It cannot propagate UG coherence.

It cannot behave like a quantum field.

Thus, when a UG system interacts with a NUG apparatus, the outcome is not a "collapse" but a **regime transition**:

- UG → NUG
- granular → emergent
- reversible → irreversible
- superposed → geometric

This resolves the measurement problem without invoking hidden variables, wave-function collapse, or many-worlds branching.

The apparent discontinuity is simply the interface between two ontological regimes.

Measurement becomes: **The conversion of UG granularity into NUG geometry**.

Where time counting is no longer necessary

Within the UG/NUG framework, the notion of time as a measurable duration loses all ontological relevance.

The Universe does not count.

No physical process refers to a duration, and no phenomenon depends on a temporal quantity defined by human conventions.

What exists is the succession of geometric states along the Arrow of Time.

A dynamical quantity is therefore not a ratio involving a duration, but a relation between:

- a geometric variation, and
- the internal order of evolution of the system.

A displacement is a geometric change.

An "instant" is an index in the ordered sequence of states.

Velocity becomes the geometric rate of change between successive states.

Acceleration becomes the variation of this rate across the same ordered sequence.

In this sense, classical dynamics is fully NUG: it describes how geometry evolves, not how long it takes.

The apparent role of time in Newtonian mechanics is operational rather than ontological. Time counting is not required for describing physical evolution; only geometric succession is.

This interpretation restores coherence to the entire measurement process:

- decoherence is expected,
- irreversibility is expected,
- loss of superposition is expected,
- classical outcomes are expected.

The measurement problem is not a paradox of quantum theory.

It is a misunderstanding of the UG/NUG boundary.

The apparent discontinuity is not a physical mystery but a regime interface

3. Perspectives: A unified architecture of physical reality

The UG/NUG framework does not introduce a new physical theory.

It reorganises the conceptual landscape in which existing theories operate.

By restoring the correct ontological classification of phenomena, it reveals a unified architecture that had remained obscured by a century of category errors.

Several perspectives emerge from this clarification.

A coherent division of physical regimes

The distinction between UG and NUG provides a stable, operational, and universal criterion for classifying physical phenomena:

- UG: granular, quantised, symmetric, reversible, local.
- NUG: emergent, geometric, continuous, collective, irreversible.

This division is not arbitrary.

It reflects the intrinsic structure of physical reality, not the limitations of human measurement or the scale of observation.

A resolution of long-standing paradoxes

Many of the conceptual difficulties of modern physics arise from applying UG concepts to NUG phenomena, or vice versa.

The UG/NUG framework dissolves these paradoxes:

- the measurement problem becomes a regime transition,

- black-hole information loss becomes a misapplied UG expectation,
- singularities become artefacts of forcing UG mathematics onto NUG geometry,
- the "quantum gravity problem" disappears entirely.

These are not new solutions.

They are the natural consequences of placing each phenomenon in its correct ontological domain.

A unified view of gravitation and quantum fields

Gravitation is not a force to be quantised.

It is a NUG phenomenon: continuous, geometric, emergent.

Quantum fields are UG phenomena: granular, symmetric, quantised.

Their apparent incompatibility is not physical.

It is conceptual.

Once the regimes are correctly separated, the unification problem dissolves.

There is no missing interaction.

There is no graviton.

There is no quantum geometry.

There is no Planck-scale discretisation.

The architecture of physical reality is unified not by merging the regimes, but by recognising their complementarity.

A new foundation for cosmology and black-hole physics

Cosmology and black-hole physics become purely NUG domains.

They no longer require quantum-gravitational corrections, nor Planck-scale hypotheses, nor speculative discretisations of spacetime.

The early universe, the horizon, and the large-scale structure of spacetime emerge naturally from NUG dynamics.

A conceptual framework for future physics

The UG/NUG architecture does not close the door to new physics.

It opens it.

By clarifying the ontological structure of physical regimes, it provides a stable foundation on which future theories can be built without inheriting the contradictions of the past.

It suggests new directions:

- the study of emergent processes as fundamental NUG dynamics,
- the exploration of UG/NUG interfaces as the true locus of measurement,
- the development of hybrid models that respect regime boundaries,
- the reinterpretation of cosmological data without quantum-gravity assumptions.

A unified architecture

The central message of this work is simple:

The world is one, and physics is one.

The apparent division arises only from a misclassification of regimes.

By restoring the correct ontological structure, the UG/NUG framework reveals a unified architecture of physical reality — one in which quantum fields and geometry coexist without contradiction, each in its proper domain.

Conclusion

The UG/NUG framework clarifies the ontological structure of reality and restores coherence between elementary and emergent phenomena. It shows that gravitation has no vocation to be quantized and that the sought-after unification rests on an ontological distinction rather than on a modification of existing theories.