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Title

Système-R

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Glossary

Fundamental	Provided by the universe, unproducible, indestructible
Fundamentality	The universe unproducible indestructible essence and objects
UG.NUG reality	The universal reality described in the work
UG regime	Uniform Genderedness fundamental regime Objects are strictly identical by genre
NUG regime	Non-Uniform Genderedness geometric regime Objects are not identical by genre

Abstract

This article develops the metrological consequences of the **UG/NUG** reality established in [reference to your first article]. In this reality, **UG** (Uniformité Genrée) designates strictly identical entities whose reactions are perfectly reproducible, while **NUG** (Non-Uniformité Genrée) designates structured and non-identical entities whose reactions depend on organisation and geometry.

Building on this distinction, we introduce two universal units of reaction that structure the metrological framework.

R is the elementary response characteristic of the UG regime, defined from the electron and applicable to all strictly uniform systems.

Rilo is the emergent response characteristic of the NUG regime, defined from structure, organisation, R, and the quantity of existence O. These two responses provide a unified descriptive and operational language for expressing how matter reacts to solicitations across both regimes.

We formalise the standardisation of reactions through a single equivalence principle, ensuring continuity with existing metrological practices while extending them to emergent phenomena. This reality shows that the foundational statement of quantum gravity rests on a categorisation error: gravitation is an emergent NUG phenomenon, geometric in nature, and therefore has no vocation to be quantized. The UG/NUG distinction restores conceptual coherence between quantum mechanics and general relativity and provides a unified metrological foundation for all physical reactions.

Introduction

In the UG regime, the response of an entity is entirely determined by its genre: all identical entities react in the same way. In the NUG regime, the response depends on internal structure, local configuration, and more generally on the organisation of the system. It is precisely this dependence on structure that makes it necessary to introduce a standardised measure of emergent reaction.

Fundamental Reality assumed

The present article assumes the UG/NUG distinction established in [reference to your first article].

In this reality:

- **UG (Uniformité Genrée)** designates strictly identical entities whose reactions are perfectly reproducible (elementary particles, atoms, simple molecules).
- **NUG (Non-Uniformité Genrée)** designates structured, historical and non-identical entities whose reactions depend on organisation and geometry.

This fundamental distinction is taken as given and is not re-derived here.

The purpose of the present article is to examine its **metrological consequences**, namely the definition, standardisation and operational use of two universal responses: **R**, characteristic of the UG regime, and **Rilo**, characteristic of the NUG regime.

Purpose of this article

On the basis of the UG/NUG reality, we introduce:

- **R**, the elementary response defined from the electron and characteristic of strictly uniform systems;
- **Rilo**, the emergent response defined from structure, organisation, R, and the quantity of existence O.

These responses do not modify any existing physical equation.

They provide a **unified descriptive and metrological language** for expressing how matter reacts to solicitations depending on whether it belongs to the uniform or non-uniform regime.

We show that the standardisation of reactions in both regimes can be achieved through a single equivalence principle, ensuring continuity with existing metrological practices while extending them to emergent phenomena.

Finally, we demonstrate that the foundational statement of quantum gravity rests on a categorisation error: gravitation is an emergent NUG phenomenon, geometric in nature, and therefore has no vocation to be quantized. The UG/NUG distinction restores conceptual coherence between quantum mechanics and general relativity and provides a unified reality for describing all physical reactions, from the most elementary to the most emergent.

1. Formal definition of R and Rilo

The distinction between the UG and NUG regimes makes it possible to introduce two types of fundamental responses, corresponding to two levels of organisation of reality. These responses do not constitute new physical quantities, but a unified framework for expressing how matter reacts to solicitations depending on whether it belongs to the uniform or non-uniform regime.

The operational aspects related to the measurement of the quantity of existence O, as well as the protocols for conversion, uncertainty and recording, are recalled in **Appendices A and B**, adapted from our article *The world is ONE, physics too*.

1.1. The elementary response R (UG regime)

In the UG regime, entities are strictly identical. Their reaction to a given solicitation is therefore itself strictly identical.
We call R the elementary response characteristic of a given category in the UG.
To fix this response in a universal manner, we choose the electron as the standard.
This choice is motivated by its universality, its stability, its experimental accessibility, and its already central role in several metrological domains.
The response R is therefore defined as the elementary reaction of a uniform system, measured relative to the electron.
Any device operating in the UG must be calibrated in terms of R, through a single equivalence experiment specific to its mode of solicitation.

1.2. The emergent response Rilo (NUG regime)

In the NUG regime, entities are no longer identical: their reaction depends on their structure, their organisation, and their history.

We call **Rilo** the emergent response characteristic of this regime.

The term *"Rilo"* is a nostalgic reference to the former kilogram standard. This symbolic continuity highlights that Rilo plays, for non-uniform systems, a role analogous to that once played by the kilogram for masses: a practical, universal unit allowing the comparison of intrinsically different objects.

Unlike **R**, the response **Rilo** is not defined directly by a material standard, but relatively to **R** and to **O**, the quantity of existence defined in System-O.

The functional dependence is written as:

$$R_{\text{ilo}} = f(\text{structure, organisation, } R,\, O)$$

where :

- **R** provides the elementary basis inherited from the UG regime,
- **O** encodes the total quantity of existence involved in the structure,
- the structure and organisation introduce the emergent deviations specific to the NUG regime.

1.3. Articulation between R and Rilo

The relationship between **R** and **Rilo** can be summarised as follows:

- **R**: elementary response, specific to uniform entities (UG), defined by the electron.
- **Rilo**: emergent response, specific to non-uniform entities (NUG), defined relative to **R** and **O**.

This hierarchy ensures that:

- elementary physics remains anchored in a universal standard;
- emergent physics can be expressed in a common unit despite the diversity of structures;
- devices operating in both regimes can be calibrated in a coherent manner;
- the operational aspects (conversion, uncertainty, recording) are treated in Appendices A and B, ensuring continuity with System-O.

This architecture prepares the standardisation of the measurement of reactions in the NUG regime, which is the subject of the next section.

1.4. What R replaces in Human Physics

In the standard model, human physics uses a wide variety of heterogeneous quantities to describe how a system reacts to a solicitation, because this reaction is interpreted through mass-based concepts that are not fundamental.

- intensities
- amplitudes
- cross-sections
- transition probabilities
- coupling constants

- response factors
- instrument-specific coefficients
- arbitrary instrumental units

These quantities differ from one domain to another, from one instrument to another, and from one experimental tradition to another.

The elementary response **R** replaces this heterogeneity with a **single universal unit of reaction**, defined from the electron and applicable to all uniform systems.

R does not replace a physical quantity; it replaces the *multiplicity of human conventions* used to express elementary reactions.

2. Standardisation of reaction measurement in the UG and NUG regimes

The distinction between the UG and NUG regimes makes it possible to introduce two types of fundamental responses, **R** and **Rilo**, but their physical usefulness depends on the possibility of measuring them in a reproducible manner.

The present section establishes the standardisation protocol that allows any reaction — elementary or emergent — to be expressed in a universal unit, independent of the material, the context, or the instrument.

The operational aspects related to the quantity of existence **O**, to conversions, uncertainties and recording procedures are detailed in Appendices A and B, which provide the common metrological foundation for both regimes.

2.1 — The equivalence experiment: foundation of all standardisation

The standardisation of the responses **R** and **Rilo** rests on a fundamental requirement:

any device operating in a given regime must perform at least one equivalence experiment with a universal standard.

In the UG regime, this standard is the electron.
The equivalence experiment consists in applying a controlled solicitation to an electron, then adjusting the instrument until its reading matches the elementary response **R** defined in Appendix A.

This calibration needs to be performed **only once per device**, not for each measurement.
Once the equivalence is established, the instrument can measure any UG entity in units of **R**.
This principle is analogous to the calibration of a balance:
the instrument does not need to be recalibrated for each object, but only when it is put into service.

In the NUG regime, the equivalence experiment consists in establishing the functional relationship between the instrumental reading and the emergent response **Rilo**, by making explicit the relevant structural and organisational parameters.
Here again, **a single equivalence experiment per device is sufficient**.

2.2 Standardisation in the UG regime: the elementary response R

In the UG regime, entities are strictly identical. Their reaction to a given solicitation is therefore itself strictly identical.

The elementary response **R** is defined by the electron, chosen as a universal standard because of its stability, universality, and central role in quantum and electromagnetic phenomena.

Standardisation in the UG rests on three principles:

- **Uniqueness of the standard:** any device operating in the UG must be calibrated through an equivalence experiment with the electron.
- **Reproducibility:** the same solicitation applied to two UG entities must produce the same value of **R**.
- **Independence from the substrate:** **R** does not depend on the material, the geometry, or the experimental context.

Thus, **R** constitutes a natural unit, in the same sense as the photon or the fundamental frequency of an atomic oscillator.
It requires no intermediate scale.

2.3 Standardisation in the NUG regime: the emergent response Rilo

In the NUG regime, entities are no longer identical: their reaction depends on their structure, their organisation, and their history.
The emergent response **Rilo** makes it possible to express this diversity within a common unit.
The operational definition of **Rilo** relies on the relation:

$$R_{\text{ilo}} = f(\text{structure, organisation}, R, O)$$

where:

- **R** provides the elementary basis inherited from the UG regime,
- **O** encodes the total quantity of existence involved in the structure,
- and the structure and organisation introduce the emergent deviations specific to the NUG regime.

Standardisation in the NUG regime rests on three principles:

- **Reduction to UG:** any measurement of **Rilo** must be reducible to a combination of **R** and **O**.
- **Structural decomposition:** the contribution of structure and organisation must be made explicit in the measurement protocol.

- **Universality of expression:** two different systems that are equivalent from the point of view of the function *f* must yield the same value of **Rilo**.

Thus, **Rilo** plays for non-uniform systems a role analogous to that once played by the kilogram for masses: a practical unit allowing intrinsically different objects to be compared, but this time grounded in universal quantities.

2.4 Role of Appendices A and B in standardisation

Appendices A and B provide the metrological infrastructure required for standardisation:

- **Appendix A** defines the fundamental units (O, Os, R, Rilo) and the conversion conventions.
- **Appendix B** provides the recording templates that allow any measurement — whether UG or NUG — to be documented.

The new records **R-001** and **Rilo-010** extend this structure to elementary and emergent responses, ensuring perfect continuity between System-O and the present UG/NUG reality.

2.5 Continuity with existing experimental practices

Although the UG/NUG reality is presented here as a new conceptual formalisation, it fits naturally within the continuity of already-established experimental practices. In particular, the experiments conducted at CERN over several decades constitute exemplary cases of measurements performed in the UG regime.

Elementary-particle collisions, event reconstruction, signature comparison, and the systematic use of universal standards (electron, muon, photon) are all procedures that already belong, de facto, to UG metrology. The present framework does not modify these practices: it **formalises** them, **generalises** them, and **extends** them to the entirety of physical phenomena, including those of the NUG regime.

Thus, CERN's experimental methods appear as a highly refined instance of a more general principle: **any physical reaction can be expressed in a unified language based on O, R, and Rilo**, whether it is measured in a large accelerator or in a modest laboratory instrument.

2.6 Metrological unification

The standardisation of **R** and **Rilo** makes it possible to express any physical reaction in a single language, independent of:

- the material,
- the geometry,
- the scale,
- the experimental context.

This metrological unification constitutes the operational foundation of the UG/NUG reality.

It ensures that elementary and emergent phenomena can be described within the same conceptual architecture, preparing the transition toward a unified physics in which structure, organisation, and quantity of existence are expressed in a common language.

2.7 Practical accessibility of the R standard: a universal and low-cost calibration

The operational definition of the elementary response **R** relies on the electron. This dependence might suggest that calibrating an instrument in the UG regime requires heavy infrastructure or high-energy-physics facilities. This is not the case.

The electron is extraordinarily accessible: it appears in virtually all electronic, optical, and quantum phenomena. Thus, the calibration of a device in units of **R** can be performed using very low-energy phenomena available in any standard laboratory.

The following methods all allow an equivalence with the electron to be established:

- photoelectric effect,
- tunnelling effect (STM microscopes),
- Hall effect and quantum Hall effect,
- Josephson effect,
- electronic atomic transitions,
- cathodic emission,
- thermal electronic currents,
- laser spectroscopy,
- Zener diodes,
- photodiodes,
- MOSFET transistors,
- electron microscopes,
- vacuum tubes,
- LEDs and semiconductors.

These devices are already present in:

- university laboratories,
- metrology centres,
- instrument manufacturers,
- the electronics industry,
- private laboratories.

UG calibration therefore requires neither accelerators, nor collisions, nor heavy infrastructure.
It relies on a controlled electronic interaction whose physics is perfectly known and reproducible.
The cost of such a setup is comparable to that of a standard laser or electronic calibration system: a few thousand euros for a simple setup, a few tens of thousands for an industrial one. This is a standard investment for any instrument manufacturer.

Thus, the unit **R** is not only universal, but also **accessible, industrial, and scalable.**

3. Conceptual consequences of the R-System

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.

3.2. Historical origin of the founding statement of quantum gravity

3.2.1. 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**.

3.2.2. 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.**

3.2.3. 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, justified, or even questioned.

3.2.4. 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, but fundamental.

3.3. The UG/NUG regimes restore the real

3.3.1. UG: granularity, symmetries, quantisation

The UG regime is the regime of:

- elementary reactions (R),
- quantum fields,
- local symmetries,
- superposition,
- renormalisation.

It is the domain of particle physics and chemistry.

3.3.2. NUG : emergence, geometry, continuity

The NUG regime is the regime of:

- emergent reactions (Rilo),
- collective phenomena,
- emergent properties,
- geometry,
- continuity.

It is the domain of phenomena beyond chemistry.

Conclusion

The UG/NUG reality clarifies the fundamental structure of physical reality and restores coherence between elementary and emergent phenomena. Within this structure, the responses **R** and **Rilo** provide a unified metrological language applicable to all physical reactions, independently of scale, material, or organisation.

By distinguishing uniform from non-uniform regimes, the reality clearly shows that gravitation is an emergent NUG phenomenon and therefore has no vocation to be quantized. The long-standing tension between quantum mechanics and general relativity arises not from a failure of the theories themselves, but from a categorisation error.

Système-R formalises the operational consequences of this clarification and establishes a continuous metrological architecture linking elementary reactions, emergent structures, and the quantity of existence **O**. It thus provides a coherent foundation for a unified description of physical reactions across all regimes.

Appendix A - Conventional bridge

This appendix defines the purely conventional mapping between the universal unit O and the anthropic unit kg. It lies entirely outside the fundamental core of Système-O and must not be used in axioms or fundamental equations.

The unit O is fundamental: it belongs to the universal descriptive layer of Système-O.
The kilogram is anthropic: it is defined by human convention within the SI system.
No physical principle relates O to kg. Any mapping between them must therefore be conventional.

The responses R (UG) and Rilo (NUG), introduced in Section 3, depend on O for their operational definition. Their measurement protocols follow the same conventions of conversion, rounding, and uncertainty described in this appendix.

Elementary Table

Symbol	Name	Definition
O	Elementary unit	Elementary indivisible unit of existence (1 O)
Q_o	Quantity of existence	$Q_0 = N_0 \cdot O$
O_s	Osilo scale	Human convenience scale: $1O_s = 10^{12}O$
kg	Kilogram reference	Conventional human unit; see Appendix A
R	Elementary response	Response of an entity in UG, defined from the electron
Rilo	Emergent response	Response in NUG, defined from structure, organisation, R, and O

The Osilo scale

For practical use, a human-scale intermediate unit is introduced:

$$O_s = 10^{12}\,O$$

This choice has no physical meaning. It is selected because it produces values of convenient magnitude for laboratory-scale measurements. Smaller exponents would yield impractically small numbers; larger exponents would yield impractically large ones.

Conventional bridge: $1\,\text{kg} = (O_s)^3 = 10^{36}\,O$. This mapping is not derived from physical principles; it is a purely conventional scaling choice external to the fundamental core.

The Cubic relation

The kilogram is mapped to the cube of the Osilo scale:

$$1\,\text{kg} = (O_s)^3$$

The exponent 3 has no physical significance. It is simply the **smallest integer exponent** that produces a human-scale reference unit when combined with $1O_s = 10^{12}O$. Lower exponents fail to reach the kilogram range; higher exponents overshoot it. The cubic relation is therefore the **minimal functional choice**.

Derivation of the factor 10^{36}
From the definitions above:
$1\,\text{kg} = (10^{12}\,O)^3 = 10^{36}\,O$
The value 10^{36} is not chosen; it is **mathematically determined** by the Osilo scale and the cubic bridge. It has no physical meaning and does not appear in the fundamental structure of the theory.

Alternative values, $10^{30,}$ 10^{40} , would require redefining the Osilo scale and would break the human-scale structure of the system without adding any physical insight.

The value 10^{36} is simply the **unique value compatible** with:

- the Osilo scale 10^{12} O,
- the cubic bridge,
- and the requirement of human-scale practicality.

Conversion rule: For a measurement x in kilograms, $N_0 = x \cdot 10^{36}$.
This conversion is strictly conventional and external to Système-O. It does not influence the universal equations, which are written solely in O.

Appendix B - Data templates and example records

Measurement record template

Record A-001

Method: *conventional balance reading*
Primary reading: 0.004237 kg
Conversion used: Appendix A
$\text{Converted value } x \text{ in } O: \; 4.237 \times 10^{33}\,O$
Rounded value $\tilde{N}_O$: $4.237 \times 10^{33}\,O$
Residual: $\Delta N_O : \; 0$
Instrument uncertainty U_instr: $1 \times 10^{29}\,O$
Decision: noncritical

Comments: residual within instrument uncertainty

Record B-010

Method: spectrometric particle proxy
Primary reading: $2.3456 \times 10^{18}\,O$
Conversion used: none (instrument outputs directly in O)
$\text{Converted value } x \text{ in } O: \; 2.3456 \times 10^{18}\,O$

Rounded value $\tilde{N}_O$: $2.3456 \times 10^{18}\,O$
Residual ΔN_O : 0
Instrument uncertainty U_{instr} : $5 \times 10^{14}\,O$
Decision: noncritical

Comments: rounded to nearest integer

Record C-100

Method: assembly of three components measured separately

Primary readings:

- $\text{comp1} = 1.0 \times 10^{-12}\,\text{kg}$
- $\text{comp2} = 2.0 \times 10^{-12}\,\text{kg}$
- $\text{comp3} = 3.0 \times 10^{-12}\,\text{kg}$

Converted values in O:

- $\text{comp1} = 1.0 \times 10^{24}\,O$
- $\text{comp2} = 2.0 \times 10^{24}\,O$
- $\text{comp3} = 3.0 \times 10^{24}\,O$

Rounded values: identical to converted values
Residuals: 0
Instrument uncertainty U_{instr} : $1 \times 10^{20}\,O$
Additivity: confirmed

Total: $6.0 \times 10^{24}\,O$

***Record* R-001**

Mesure d'une réponse élémentaire (UG)

Method: UG-calibrated response device
Primary reading: $4.237 \times 10^{33}\,O$
Conversion used: Appendix A
Computed response $R = 4.237 \times 10^{33}\,R$
Residual: 0
Instrument uncertainty $U_{\text{instr}} = 1 \times 10^{29}\,R$
Decision: noncritical
Comments: response expressed in R using the electron-based equivalence

Record **Rilo-010**

Mesure d'une réponse émergente (NUG)

Method: structural-response probe

Primary reading: $2.3456 \times 10^{18}\, O$

Structural parameters: $(s_1, s_2, \ldots)$

Organisational parameters: $(o_1, o_2, \ldots)$

$R_{\text{ilo}} = f(\text{structure, organisation, } R\text{, } O)$

Rounded value: $2.3456 \times 10^{18}\, R_{\text{ilo}}$

Residual: 0

Instrument uncertainty $U_{\text{instr}} = 5 \times 10^{14}\, R_{\text{ilo}}$

Decision: noncritical

Comments: emergent response expressed relative to R and O