EN_7: Gravity as a Geometric Relation of Radii

Résumé

Il démontre que la constante gravitationnelle universelle G n'est pas fondamentale et ne nécessite pas de particules médiatrices. Elle émerge exclusivement de la géométrie de la masse confinée. Il définit deux rayons pour une même masse : le rayon de confinement VED ($R_{\text{VED}} = n\hbar/(Mc)$) et le rayon de Schwarzschild ($R_{\text{Sch}} = 2GM/c^2$). La masse est la même vue sous les deux géométries. En égalant les masses et en résolvant, on obtient $G(n) = (\pi c^3/(4\hbar)) \cdot (R_{\text{VED}} R_{\text{Sch}}/n)$. Pour $n = 2$ (confinement stable irréductible minimum), on obtient la G universelle. Pour les ondes libres ($n \to \infty$), $G(n) \to 0$, ce qui explique pourquoi l'énergie libre ne génère pas de gravité. La gravité est une propriété émergente de l'environnement holographique.

Einstein–VED Framework

10.5281/zenodo.17172925

---

1. Introduction

For a wave to be stable under confinement, it must contain an **exact number of waves**, $n \in \mathbb{N}^+$.

Any n that is not a positive integer generates a **destructive phase mismatch of the wave**, causing it to dissipate and become unstable.

All matter arises from confined waves, and energy corresponds to free or unconfined waves.
That is, **there are not two distinct entities**, only different states of the same wave:

- **Matter** = confined wave
- **Energy** = free wave

This confinement condition is **indispensable for stability**.
The content does not differ from the container (3S+T).
Every confined mass responds to the **geometric VED radius**.

> Notable consequence: for the proton, **four confined waves in four dimensions ($n = 4$)** generate unprecedented precision in the radius calculation, reproducing the experimental value with great accuracy.

In this work it is shown that the universal gravitational constant G **does not arise** from:

- fundamental fields,
- mediator particles (gravitons or bosons, including Higgs),
- unification of forces,
- or empirical adjustments.

Gravity **emerges exclusively** as a consequence of mass geometry, through the **relation between two radii associated with the same mass**, each defined in its own geometry.

The central principle is:

- **VED confinement radius**, internal to the wave that defines matter, with an integer number n of closed cycles.
- **Schwarzschild-like horizon radius**, which describes the external geometry of the same mass.

Gravity appears only when there is a **minimum stable confinement** ($n = 2$), and disappears for free waves ($n \to \infty$).

---

2. First radius: Geometric confinement radius (VED)

The confinement radius is defined as:

$$R_{\text{VED}} = n \cdot \frac{\hbar}{Mc}$$

where:

- $\hbar = 1.054571817 \times 10^{-34}\ \text{J s}$
- M is the mass of the particle or object
- $n \in \mathbb{N}^+$ is the number of closed waves for stable confinement

This radius **represents the internal geometry of the confined wave**, and **does not depend on** G.

---

3. Second radius: Horizon radius (Schwarzschild-like)

The horizon radius associated with the mass M is:

$$R_{\text{Sch}} = \frac{2GM}{c^2}$$

- $c = 2.99792458 \times 10^8\ \text{m/s}$

- G appears as an emergent parameter of geometry

  Key concept: **the radii are not equated**.
  The **same mass is constructed from two different geometries** and physical consistency is required.

---

4. Emergence of the gravitational constant

Starting from the equality of the **same physical mass constructed from both geometries**:

$$M_{\text{VED}} = M_{\text{Sch}}$$

Expanding both sides to show where n resides and where G resides:

$$\underbrace{\frac{\pi R_{\text{VED}} c^2}{2\hbar} \cdot n}_{\text{VED side: depends on } n \text{, not on } G} = \underbrace{\frac{c^2 R_{\text{Sch}}}{2G}}_{\text{Schwarzschild side: depends on } G \text{, not on } n}$$

We obtain:

$$G(n) = \frac{\pi c^3}{4\hbar} \cdot \frac{R_{\text{VED}} R_{\text{Sch}}}{n}$$

- The left side depends **only on** n (not on G)

- The right side depends **only on** G (not on n)

- The equality allows **extracting** G **as an emergent constant**.

---

5. Universal gravity ($n = 2$)

$$G_{\text{universal}} = G(n = 2)$$

- Appears only for **minimum stable confinement**
- Is **independent of mass**, from protons to black holes

- For free waves ($n \to \infty$):

$$G(n \to \infty) \to 0$$

which explains why **free energy does not generate gravity**.

---

6. Numerical examples

6.1 Proton (hypothetical as a black hole)

$$M_p = 1.6726 \times 10^{-27}\ \text{kg}, \quad n = 2$$

$$R_{\text{VED}} = n \cdot \frac{\hbar}{M_p c} = 2 \cdot \frac{\hbar}{M_p c} \approx 1.321409 \times 10^{-15}\ \text{m}$$

$$R_{\mathrm{Sch}} = \frac{2GM_p}{c^2} \approx 2.484 \times 10^{-54}\ \mathrm{m}$$

$$G_p = \frac{\pi c^3}{4\hbar} \cdot \frac{R_{\mathrm{VED}} R_{\mathrm{Sch}}}{2} \approx 6.67430 \times 10^{-11}\ \mathrm{m}^3\,\mathrm{kg}^{-1}\,\mathrm{s}^{-2}$$

6.2 Proton with $n = 4$ in 4 dimensions (radius precision)

For the proton, the minimum number of complete waves for stable confinement is $n_{\min} = 4$. The intrinsic Compton wavelength of the proton is:

$$\lambda_p = \frac{h}{M_p c} \approx 1.321409 \times 10^{-15}\ \mathrm{m}$$

The minimum perimeter of the proton, considering $n = 4$ complete waves, is:

$$L_p = n \cdot \lambda_p = 4 \cdot \lambda_p$$

Assuming spherical confinement, the perimeter-radius relation is:

$$2\pi r_p = L_p \quad \Rightarrow \quad r_p = \frac{L_p}{2\pi} = \frac{4\lambda_p}{2\pi} = \frac{2}{\pi} \cdot \lambda_p$$

Numerical calculation

$$r_p = \frac{2}{\pi} \cdot 1.321409 \times 10^{-15} \approx 8.412 \times 10^{-16} \text{ m}$$

Comparison with experimental value

- Proton charge radius (CODATA 2022): $r_{\text{exp}} = 8.414 \times 10^{-16} \text{ m}$
- Difference: $\approx 0.002 \times 10^{-16} \text{ m}$ (~0.024%)

✅ Excellent agreement between the deterministic prediction and the experimental value.

6.3 Black hole of 100,000 solar masses

$$M_{BH} = 10^5 M_{\odot} = 1.9885 \times 10^{35} \text{ kg}, \quad n = 2$$

$$R_{\text{VED}} = n \cdot \frac{\hbar}{M_{BH} c} = 2 \cdot \frac{\hbar}{M_{BH} c} \approx 2.13 \times 10^{-42} \text{ m}$$

$$R_{\text{Sch}} = \frac{2GM_{BH}}{c^2} \approx 2.954 \times 10^8 \text{ m}$$

$$G_{BH} = \frac{\pi c^3}{4\hbar} \cdot \frac{R_{\text{VED}} R_{\text{Sch}}}{2} \approx 6.67430 \times 10^{-11}\, \mathrm{m}^3\, \mathrm{kg}^{-1}\, \mathrm{s}^{-2}$$

---

7. Observations

1. **Mass independence:** For both protons and black holes, emergent G is **exactly the same**.
2. **Minimum confinement $n = 2$:** Gravity appears only when the wave is stably confined.
3. **Free wave limit:** $n \to \infty \Rightarrow G \to 0$, explaining the absence of gravity for free energy.
4. **Micro ↔ Macro:** The framework connects **protons, black holes, and the universe** through the geometric proportion of radii.
5. **Holography:** The existence of $n = 2$ reflects that the universe effectively has **two geometric degrees of freedom** associated with the confined wave.

---

8. Conclusion

- Gravity **does not depend on mediator particles** (gravitons, bosons, Higgs) or empirical adjustments.
- G **emerges from pure geometry**, from the relation between the internal confinement radius and the external horizon radius.
- Its universality arises **only for $n = 2$**, the minimum wave stability.
- Every confined mass responds to the **VED radius**, while free energy does not generate gravity.
- This framework **reconciles micro and macro**, from protons to black holes, and explains gravity as a **geometric and holographic effect** of the wave.

9. Reference

10.5281/zenodo.17172925

End of EN_7

Fuente: EN_7_gravedad.md