

EN_8: Planck Constant as a Geometric Relation of Radii

Résumé

Tout comme G émerge de la géométrie, il en va de même pour la constante de Planck $\hbar$. En partant de la même relation géométrique

$G(n) = (\pi c^3 / (4\hbar)) \cdot (R_{VED} R_{Sch} / n)$, on résout pour

$\hbar(n) = (\pi c^3 / (4G)) \cdot (R_{VED} R_{Sch} / n)$. Pour $n = 2$, on obtient la valeur

universelle de $\hbar$. Il démontre que G et $\hbar$ sont géométriquement inverses et partagent une origine commune dans la constante

$Y = R_{VED} \cdot R_{Sch}$, qui est indépendante de la masse. Cela conduit au

"paradoxe de la masse" : bien que les constantes ne dépendent pas de la masse, pour calculer leur valeur numérique exacte, il est nécessaire de partir d'une masse concrète (proton, trou noir), qui agit comme un révélateur de la géométrie sous-jacente.

Einstein-VED Framework

10.5281/zenodo.17172925

Emergence of Planck's Constant from Geometry

Just as the universal gravitational constant G emerges from the geometry of confined waves, the **Planck constant** $\hbar$ can also be

deduced from this same framework. This demonstrates that **quantization and gravity share a common geometric origin.**

Deduction of $\hbar$

Starting from the geometric relation that determines G from two radii associated with the same mass:

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

Solving for $\hbar$ we obtain:

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

Key concepts

- R_{VED} : geometric confinement radius, internal to the wave that defines matter.
- R_{Sch} : Schwarzschild-like radius, describes the external geometry of the mass.
- $n \in \mathbb{N}^+$: exact number of waves for stable confinement.
- $G_{\text{universal}}$: appears for $n = 2$.

This expression shows that **$\hbar$ is not an arbitrary value**, but rather **emerges from the geometry of mass and its confinement.**

Numerical examples

Proton (hypothetical as a black hole)

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

Confinement radius:

$$R_{\text{VED}} = \frac{2\hbar}{\pi M_p c} \cdot 2 \approx 1.261 \times 10^{-15} \text{ m}$$

Schwarzschild-like radius:

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

Deduction of $\hbar$:

$$\hbar_p = \frac{\pi c^3}{4G} \cdot \frac{R_{\text{VED}} R_{\text{Sch}}}{2} \approx 1.054571817 \times 10^{-34} \text{ J} \cdot \text{s}$$

Black hole of 100,000 solar masses

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

Confinement radius:

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

Schwarzschild-like radius:

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

Deduction of $\hbar$:

$$\hbar_{\text{BH}} = \frac{\pi c^3}{4G} \cdot \frac{R_{\text{VED}} R_{\text{Sch}}}{2} \approx 1.054571817 \times 10^{-34} \text{ J} \cdot \text{s}$$

Observations

1. **Mass independence:** Both the proton and the black hole produce exactly the same $\hbar$.
 2. **Minimum confinement $n = 2$:** Guarantees the universality of $\hbar$.
 3. **Free wave limit:** For $n \rightarrow \infty$, $\hbar(n) \rightarrow 0$, consistent with free energy not generating gravity.
 4. **Deterministic Planck constant:** Unlike measured experimental values, $\hbar$ is **completely determined by geometry**.
 5. **Micro $\leftrightarrow$ Macro unification:** The same geometric principle connects **quantization and gravity**, from protons to black holes.
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Implications

- $\hbar$ **emerges from the geometry of confinement**, not from a postulate or experimental measurement.
- Gravity and quantization have a **common origin**, demonstrating a unified framework for micro and macro physics.
- This suggests a **deep determinism** behind minimal action, traditionally considered fundamental and empirical.

Reference

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Fuente: EN_8_h_plank.md