EN_8: Planck Constant as a Geometric Relation of Radii

Einstein–VED Framework

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Author's convention: $R_{\mathrm{VED}} = nh / (Mc) = n\lambda$, without division by 2π. The constant is named **ñ**: $\tilde{n} = R_{\mathrm{VED}}\, R_{\mathrm{Sch}}$.

Emergence of Planck's Constant from Geometry

Just as the universal gravitational constant G emerges from the geometry of confined waves, the **Planck constant** h can also be deduced from this same framework. This demonstrates that **quantization and gravity share a common geometric origin**.

Deduction of h

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

$$G(n) = \frac{c^3}{2h} \cdot \frac{\tilde{n}}{n}$$

Solving for h we obtain:

$$h = \frac{c^3}{2G(n)} \cdot \frac{\tilde{n}}{n}$$

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 h **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:

$$R_{\text{VED}} = \frac{2h}{M_p c} \approx 2.642854 \times 10^{-15} \ m$$

Schwarzschild-like radius:

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

Deduction of h:

$$h_p = \frac{c^3}{2G} \cdot \frac{\tilde{n}}{2} \approx 6.62607015 \times 10^{-34} \text{ J} \cdot \text{s}$$

Black hole of 100,000 solar masses

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

Confinement radius:

$$R_{\text{VED}} = \frac{2h}{M_{BH} c} \approx 2.223001 \times 10^{-77} \ m$$

Schwarzschild-like radius:

$$R_{\text{Sch}} = \frac{2GM_{BH}}{c^2} \approx 2.953384 \times 10^{8} \ m$$

Deduction of h:

$$h_{BH} = \frac{c^3}{2G} \cdot \frac{\tilde{n}}{2} \approx 6.62607015 \times 10^{-34} \text{ J} \cdot \text{s}$$

Observations

1. **Mass independence:** Both the proton and the black hole produce exactly the same h.
2. **Minimum confinement** $n = 2$**:** Guarantees the universality of h.
3. **Free wave limit:** At fixed ñ and h, $G(n) = \tilde{n}c^3 / (2nh) \to 0$ as $n \to \infty$; h remains constant.
4. **Deterministic Planck constant:** Unlike measured experimental values, h is **completely determined by geometry**.
5. **Micro ↔ Macro unification:** The same geometric principle connects **quantization and gravity**, from protons to black holes.

Implications

- h **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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