Slope Traversal and Time

A Minimal Statement of Gravitational Phase-Cancellation Theory (gPCT)

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Notation

$$
\begin{aligned}
u^\mu &= dx^\mu/d\tau \\
a^\mu &= u^\nu \nabla_\nu u^\mu \\
D &= u^\mu \nabla_\mu
\end{aligned}
$$

ϕ_g : gravitational phase potential (scalar functional of g_{00})
$s = D\phi_g$ (local gravitational-phase slope)
G : scalar gravitational amplitude (local curvature scalar in weak-field limit)

In the weak-field approximation, $\phi_g \propto \frac{c^2}{2}\ln(-g_{00})$, so that $D\phi_g \approx \dot{\Phi}$ with Φ the Newtonian potential.

Postulate I — Slope Memory

$$\sigma(\tau) = \sqrt{a^\mu a_\mu}, \qquad \Sigma[\gamma] = \int_\gamma \sigma \, d\tau$$

Clocks accumulate slope memory; cancellation occurs only if traversal is symmetric with respect to the dominant field.

Postulate II — Dual Recursion

Let the local slope be $s \equiv D\phi_g$, derived from the gravitational phase potential ϕ_g. Then curvature recursion reads:

$$G \equiv D\big(t\, DG\big), \qquad t \equiv D\big(G\, Dt\big)$$

$$\mathcal{H} = \frac{DG}{-GD^2G - (DG)^2}$$

Postulate III — White Equation (Conjecture)

$$\mathcal{H} = \frac{DG}{-GD^2G - (DG)^2} \quad \longrightarrow \quad \frac{1}{2\pi}$$

Slope Domain

$$s = 2\left|\mathrm{normalize}(D\phi_g)\right|, \quad s \in [0,2]$$

(with normalize($\cdot$) evaluated over one complete phase cycle)

Prediction

$$P(|1>) = \cos^2\!\left(\tfrac{\pi}{2}(s - 0.5)\right)$$

Note: This is not a restatement of the Born rule. Here, the $\cos^2$ law arises from gravitational slope recursion (Postulate II), so collapse probabilities must be modulated by slope phase. Standard QM predicts no such dependence.

Weak-field: $D \approx \dfrac{d}{dt}$ and $s \propto \dot{\Phi}$, where Φ is the Newtonian potential. Thus ϕ_g tracks the local gravitational-phase slope (tidal derivative).

Corollary — Temporal Balance

$$\oint_\gamma \sigma \, d\tau = 0 \qquad \text{for closed worldlines or complete phase cycles.}$$

This condition defines the universe as a cyclic, self-referential system whose local asymmetries sum to global neutrality.