Derivation Chain Map

Methodological constraints:

↓(*Epistemic Hygiene+Relational Origin+Ontological Minimalism+Math Transparency*)↓

Closure + Causal Continuity + Isotropy Theorems

↓ (*apply to existing physics*) ↓

$$\textbf{Two Primitives: } \underbrace{\text{fixed manifold + metric}}_{\text{structure}} \;+\; \underbrace{\text{fields + constants}}_{\text{dynamics}}$$

↓ (*Ontological reduction by Relational Origin Principle — no background allowed*) ↓

$$\textbf{One Primitive: } \textbf{\textit{WILL}} \equiv \textbf{\textit{SPACE-TIME-ENERGY}} \implies \boxed{\text{SPACETIME} \equiv \text{ENERGY}}$$

↓ (*by Closure + Causal Continuity + Isotropy Theorems: derive primal relational carriers*) ↓

$$S^1 \textbf{ (1-DOF kinematic) } + S^2 \textbf{ (2-DOF potential)}$$

↓ (*by Duality of Relation Lemma*) ↓

$$\textbf{Relational Conservation: } \underbrace{\text{Amplitude}^2}_{\text{External Interaction}} + \underbrace{\text{Phase}^2}_{\text{Internal Existence}} = 1$$

$$\underbrace{\beta^2 + \beta_Y^2 = 1}_{\text{Kinematic}} \text{ on } S^1 \text{ and } \underbrace{\kappa^2 + \kappa_X^2 = 1}_{\text{Potential}} \text{ on } S^2$$

↓ (*by Conservation Theorem*) ↓

$$\textbf{Minkowski interval: } \underbrace{\beta^2 + \beta_Y^2 = 1}_{\text{irreducible primitive}} + \underbrace{x, y, z, t...}_{\text{coordinate inflation}} = \underbrace{c^2 d\tau^2 = c^2 dt^2 - dx^2 - dy^2 - dz^2}_{\text{mathematical scaffolding}}$$

$$\textbf{Schwarzschild interval: } \underbrace{\kappa^2 + \kappa_X^2 = 1}_{\text{irreducible primitive}} + \underbrace{x, y, z, t...}_{\text{coordinate inflation}} = \underbrace{c^2 d\tau^2 = c^2 (1 - (R_s/r))\, dt^2}_{\text{mathematical scaffolding}}$$

↓ (*by DOF-Indifference Lemma: equal quadratic weight to each independent DOF*) ↓

$$\textbf{Closure Theorem: } \underbrace{1\,\text{Amplitude}^2}_{\text{on } S^2} = \underbrace{2\,\text{Amplitude}^2}_{\text{on } S^1} \equiv \quad \kappa^2 = 2\beta^2$$

↓ (*by Relational Closure and Invariance Theorems*) ↓

$$\textbf{Energy Symmetry Law: } \Delta E_{A\to B} + \Delta E_{B\to A} = 0$$

$$\Delta E_{A\to B} = E_0(\kappa_{X,B}/\beta_{Y,B} - \kappa_{X,A}/\beta_{Y,A});\; \Delta E_{B\to A} = E_0(\kappa_{X,A}/\beta_{Y,A} - \kappa_{X,B}/\beta_{Y,B})$$

↓ (*check the required energy to close the ledger at boundaries*) ↓

$$\textbf{Speed of light: } \beta \to 1 \;\to\; \beta_Y \to 0 \;\to\; E_{\text{loc}} = E_0 \cdot \kappa_X/0 \to \infty \;\to\; \textbf{requires } \infty \textbf{ energy}$$

$$\textbf{Event Horizon: } \kappa \to 1 \;\to\; \kappa_X \to 0 \;\to\; E_{\text{loc}} = E_0 \cdot 0/\beta_Y \to 0 \;\to\; \textbf{requires } 0 \textbf{ energy}$$

↓ (*by Unified Relational Scaling Lemma*) ↓

$$\textbf{Equivalence Principle } \boxed{m_g \equiv m_i \equiv m = E_0/c^2}$$

↓ (*by collapsing two-point Energy Symmetry Law into a single-point approximation*) ↓

Classical, Lagrangian and Hamiltonian Mechanics

$$\underbrace{\Delta E_{A\to B} + \Delta E_{B\to A} = 0}_{\text{exact symmetry law}} \approx \underbrace{\tfrac{1}{2}\big(\kappa_A^2 - \kappa_B^2\big) + \tfrac{1}{2}\big(\beta_B^2 - \beta_A^2\big)}_{\text{first order approximation}} \approx \underbrace{T \pm V}_{\text{ontological collaps}}$$

↓ (*apply RG to orbital mechanics*) ↓

Relational Orbital Mechanics $\boxed{\textbf{R.O.M.}}$**: a closed algebraic system of equations**

↓ (*by Inverse Square, Closure and Causal Continuity Theorems*) ↓

$$\textbf{No Singularities: } \beta_{\max}^2 = 1 \;\to\; \kappa_{\max}^2 = 2 \;\to\; r_{\min} = R_s/\kappa_{\max}^2 \;\to\; r_{\min} = R_s/2$$

The point $r = 0$ is absent from the admissible relational range

↓ (*apply 2D to 3D translation interfaces*) ↓

$$\textbf{Geometric Field Equation } \boxed{\kappa^2 = R_s/r = \rho_{\text{field}}/\rho_{\max}}$$

↓ (*The ratio of spacetime geometry R_s/r equals the ratio of energy densities $\rho/\rho_{\max}$*) ↓

↓ Theoretical Ouroboros ↓

$$\boxed{\text{SPACETIME} \equiv \text{ENERGY}} \Leftrightarrow \boxed{\text{SPACETIME GEOMETRY} \equiv \text{ENERGY DENSITY}}$$

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