## Derivation Chain Map

**Methodological constraints:**

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

**Closure + Causal Continuity + Isotropy Theorems**

↓ *(apply to existing physics)* ↓

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

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

**One Primitive:** ***WILL*** $\equiv$ ***SPACE-TIME-ENERGY*** $\Longrightarrow$ $\boxed{\text{SPACETIME} \equiv \text{ENERGY}}$

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

$S^1$ **(1-DOF kinematic)** + $S^2$ **(2-DOF potential)**

↓ *(by Duality of Relation Lemma)* ↓

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

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

↓ *(by Conservation Theorem)* ↓

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

**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)* ↓

**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)* ↓

**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)* ↓

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

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

↓ *(by Unified Relational Scaling Lemma)* ↓

**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**

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

↓ *(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)* ↓

**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)* ↓

**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** ↓

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

 DOI: 10.5281/zenodo.17115270