

**INPUT FROM STAGE I**  
Methodology Established:  
(No Hidden Assumptions, Relational Only)

Substantialism:  
"Energy is a fluid/stuff  
inside objects"

Violates Relational Origin  
Requires absolute background

Define "Energy"

T

**Definition 1.6: Energy**  
Relational measure of difference  
between states (Bookkeeping)

The Split:  
Container (Metric) + Content (Fields)  
 $G_{\mu\nu} = T_{\mu\nu}$

Violates Minimalism  
Creates hidden background artifact

Relation between  
Structure & Dynamics

T

**Principle 2.3: The Identity**  
 $\text{SPACETIME} \equiv \text{ENERGY}$   
(Structure IS Dynamics)

T

**STAGE II COMPLETE**  
Ontological Foundation Set:  
Unified Entity "WILL" Defined

**INPUT FROM STAGE II**  
Ontology:  $\text{SPACETIME} \equiv \text{ENERGY}$   
(One Relational Difference  $\Delta$ )

**Derived Constraints**

1. Closure (No leakage)
2. Conservation (Fixed budget)
3. Isotropy (Max symmetry)

Choose a **Closed** Bookkeeping Domain?

III-defined Domain:  
No boundary / no accounting  
⇒ Leakage undetectable

Violates Closure (No leakage).  
Problem is *bookkeeping*, not geometry.

**Theorem 3.4 (Minimal Direction Carriers):**  
Carriers encode *directions of relations* (not positions).

- 1) **Directional Relation** ( $A \rightarrow B$ ):  
Requires 1 DOF ⇒ Carrier:  $S^1$
- 2) **Omnidirectional Relation** (Center → Field):  
Requires 2 DOF ⇒ Carrier:  $S^2$

Define State  
on Carriers ( $S^1, S^2$ )?

Scalar Substance:  
"Energy as stuff"

Violates Relational Origin.  
A state needs internal/external reference.

**Lemma 6.1: Duality of Evolution**

State ≡ Superposition of Orthogonal Axes:  
1) **Amplitude** (External interaction)  
2) **Phase** (Internal existence)

**Thm 6.2: Orthogonal Conservation**

Fixed budget ⇒ fixed norm (no double counting)

$$S^1 \text{ (Kinematics): } \beta^2 \text{ (Motion)} + \beta_Y^2 \text{ (SpaceTime)} = 1$$

$$S^2 \text{ (Gravity): } \kappa^2 \text{ (Potential)} + \kappa_X^2 \text{ (TimeSpace)} = 1$$

**Lemma 10.1: Isotropy ⇒ Equal Budget per DOF**  
No preferred direction ⇒ no preferred DOF  
⇒ budget assigns equally per independent DOF

Derive Exchange Rate  
between Active Amplitudes?

**Theorem 10.2: Energetic Exchange Rate**

Equal budget per DOF ⇒

$$\mathcal{R} = \frac{\text{DOF}(S^2)}{\text{DOF}(S^1)} = \frac{2}{1} = 2$$

$$\kappa^2 = 2\beta^2$$

**STAGE III COMPLETE**

Geometry Established:  
Budget flows between Orthogonal Axes  
and between Direction Carriers ( $S^1 \leftrightarrow S^2$ )

**INPUT FROM STAGE III**  
Geometry Defined:  
Orthogonal Conservation Laws on  $S^1$  &  $S^2$

Define Physical Meaning of Vertical Projection ( $\beta_Y$ )

Independent Parameter  
(Mass as intrinsic substance)

Ontologically redundant

**Def 7.1 & Thm 7.2: Self-relation (Motion=0)  $\rightarrow$  Invariant Mass**  
Vertical Projection  $\equiv$  Rest Existence  
 $E \cdot \beta_Y = E_0 \equiv m$   
 $\gamma = 1/\beta_Y$

**Corollary 7.3: Energy-Momentum**

Apply Pythagoras to  $S^1$  Closure:

$$(E\beta)^2 + (E\beta_Y)^2 = E^2$$

Identify  $p \equiv E\beta$ ,  $m \equiv E\beta_Y$

$$E^2 = p^2 + m^2$$

Explain  $m_i = m_g$

Weak Equivalence Principle  
(Postulated as Axiom)

Descriptive physics  
(Coincidence)

**Theorem 12.2: Unified Scaling**  
Kinematics ( $S^1$ ) and Gravity ( $S^2$ )  
act on the SAME invariant  $E_0$ .

$$m_i \equiv m_g \equiv E_0$$

**STAGE IV COMPLETE**

Physics Derived:  
SR/GR effects are geometric projections  
of invariant Rest Energy

$$\theta_1 = \arccos(\beta), \quad \theta_2 = \arcsin(\kappa) \\ \kappa^2 = 2\beta^2 \text{ (Closure)}$$

Algebraic Form	Trigonometric Form
$\beta = v/c$	$\beta = \cos(\theta_1)$
$\kappa = \sqrt{R_s/r}$	$\kappa = \sin(\theta_2)$
$\beta_Y = \sqrt{1 - \beta^2}$	$\beta_Y = \sin(\theta_1)$
$\kappa_X = \sqrt{1 - \kappa^2}$	$\kappa_X = \cos(\theta_2)$

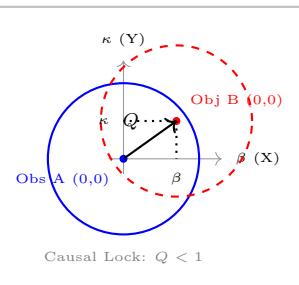
**INPUT FROM STAGE IV**  
Physics Derived:  
Invariant Mass & Unified Scaling Established

Define Interaction Measure  
(Distance/Difference)

Spatial Distance  
(Metric  $ds^2$  in background)

**F**

Violates Relational Origin  
(Sec 10)



Define Interaction Mechanism  
(Dynamics)

Forces / Potentials  
(Newton, Lagrange, Hamiltonian)

**F**

Ontologically "dirty" approximations  
Collapse 2-point relation to 1-point  
(Sec 15)

**Theorem 14.1: Energy-Symmetry Law**  
Causal Continuity:  
 $\Delta E_{A \rightarrow B} + \Delta E_{B \rightarrow A} = 0$   
Transfers must sum to zero

Define "Zero Point"  
(Reference System)

Hypothetical Observer  
at Infinity ( $\infty$ )

**F**

Idealized/Non-existent.  
leads to Gauge Ambiguities

**Self-Centring Principle**  
Zero is ALWAYS the state of  
a local relational frame (A or B)

Formalisms  $L, H$   
Energy as intrinsic scalar  
at a single point

**F**

Ontologically "murky".  
Mathematically inflated.  
(Collapse of 2-point relation)

Formalize Energy Description

**Explicit Transition Cost**  
Energy as Work of Translation  
from State A to State B  
 $\Delta E_{A \rightarrow B}$

**T**

**STAGE V COMPLETE**  
Dynamics Defined:  
Motion is the payment of energy cost  
to maintain Causal Symmetry

**INPUT FROM STAGE V**  
Dynamics Defined:  
Motion is Algebraic Necessity

If Method F was chosen

Result of Method T

**EFFECTS OF BAD PHILOSOPHY**  
(Descriptive Physics)

1. Inflated Formalism: Equations multiply to hide ontological errors.
2. Loss of Transparency: Meaning hidden behind coordinates.
3. Fragmentation: Separate constants for every domain.

**EFFECTS OF GOOD PHILOSOPHY**  
(Epistemic Hygiene)

1. **Simplicity**: Complexity collapses into geometry.
2. **Transparency**: 1 Symbol = 1 Idea.
3. **Unity**: Scale invariance from Quantum to Cosmic.

**GENERAL CONSEQUENCE:**

**"Mathematical complexity is the symptom of philosophical negligence."**

Once ontological symmetry is restored, **Nature's laws reduce to algebraic self-consistency.**

**INPUT FROM STAGE VI**  
Energy Symmetry Law Established  
( $\Delta E_{A \rightarrow B} + \Delta E_{B \rightarrow A} = 0$ )

Define Orbital Mechanics

Input: Mass ( $M$ ) & Constant ( $G$ )  
Mechanism: Forces or Metric Curvature  
Method: Differential Equations

Violates Operability.  
 $M$  and  $G$  are not direct observables.  
(Sec 16)

**Relational Orbital Mechanics (R.O.M.)**  
Inputs: Direct Optical Projections  
1.  $\beta$  (Doppler Shift)  
2.  $\kappa$  (Gravitational Redshift)

**Theorem 16.2: Geometric Eccentricity**  
Eccentricity is the measure of "Closure Defect" ( $\delta$ ):

$$e = \frac{1}{\delta_p^2} - 1$$

"Eccentricity  $\equiv$  Energy Deviation"

Derive Precession ( $\Delta\varphi$ )

Solve Geodesic Equation  
 $\frac{d^2 x^\mu}{d\tau^2} + \Gamma^\mu_{\nu\lambda} \cdots = 0$

High Mathematical Inflation.  
Requires Metric Tensor.

**Sec 16.5: Universal Precession Law**  
Pure Algebra of light "Red vs Blue" at perihelion

$$\Delta\varphi = \frac{3\pi}{2} \frac{\kappa_p^4}{\beta_p^2}$$

Ratio of Potential (Red) to Kinetic (Blue) at perihelion

**STAGE VII COMPLETE**

"Mass" is obsolete.  
Gravity is solved via Algebra of Light.  
Predictions verified (Mercury, S2, S4716)

**INPUT FROM STAGE VII**  
 Dynamics is Geometric.  
 Pure Algebra of Projections ( $\kappa, \beta$ )

Define "Matter" Density ( $\rho$ )  
 Connect 2D Geometry to 3D Data

**"The Cannonball Principle"**  
 Assumption: Mass is "stuff" filling a 3D volume uniformly.  
 $\rho = M/V$

Violates Minimalism.  
 Assumes a priori 3D container.  
 "Cultural Artifact" of Newton.

**Sec 17.1: The Translation Interface**  
 No new assumptions.  
 Translate 2D Surface Data ( $S^2$ ) to 3D Proxy.  
 Normalization by sphere area ( $4\pi$ ):  

$$\rho = \frac{1}{4\pi} \left( \frac{\kappa^2 c^2}{2Gr^2} \right)$$

**The Density Identity**  
 Local Density  $\equiv$  Relational Projection  

$$\rho = \frac{\kappa^2 c^2}{8\pi Gr^2}$$
  

$$\kappa^2 = \frac{\rho}{\rho_{\max}}$$

**Sec 17.3: Intrinsic Pressure**  
 If Density is Geometry ( $\kappa^2$ ),  
 then Pressure is Geometric Tension.  

$$P = -\rho c^2$$
  
 (Analogue to Surface Tension)

**STAGE VIII COMPLETE**  
 Matter is not "stuff" in a box.  
 Matter is the intensity of relational curvature.

**INPUT FROM STAGE VIII**

Density Identity Established:

$$\kappa^2 = \rho / \rho_{\max}$$

**Sec 18: Unified Geometric Field Equation**Combine Geometry ( $R_s/r$ ) and Density Ratio:

$$\kappa^2 = \frac{R_s}{r} = \frac{\rho}{\rho_{\max}}$$

Geometry  $\equiv$  Energy State**Mathematical Singularity**

$$r \rightarrow 0 \implies \rho \rightarrow \infty$$

Breakdown of Theory

Artifact of coordinate systems.  
"Bad Philosophy" result.

**F****Determine Behavior at Limits  
(High Energy/Small Radius)****T****Sec 19: Natural Bounds**Geometry is closed ( $S^2$ ).

$$\kappa^2 \leq 1 \text{ (Horizon Limit)} \implies \rho \leq \rho_{\max}$$

$$\rho_{\max} = \frac{c^2}{8\pi G r^2}$$

No Singularities, only Saturation

**T****STAGE IX COMPLETE**

Field is finite and self-limiting.

Black Holes are non-singular  
saturated energy states.

