Independent Technical Referee Report

Manuscript: *Recovery of Relativistic Celestial Trajectories as an Effective Field Limit of Internal Momentum Flux: A Flat-Space Kinematic Account of the Classical Tests* (Version 56)
Author: Corley Kinnane
Referee: Gemini 4 Argon High
Date: October 2026
Recommendation: Reject (Fundamental Contradictions)

1. Executive Summary

This report provides an independent, non-collaborative technical audit of Version 56 of *"Recovery of Relativistic Celestial Trajectories as an Effective Field Limit of Internal Momentum Flux."* While the manuscript is extensively organized, cross-referenced, and formatted to resemble a comprehensive treatise in gravitational physics, its core theoretical architecture is mathematically inconsistent and physically invalid.

The evolution of the manuscript across 56 versions exhibits the hallmarks of an **AI sycophancy feedback loop**. When prompted to act as a referee, a conversational Large Language Model (LLM) identifies textbook keywords associated with failed flat-spacetime gravity theories—such as Laplace aberration, Whitehead's ξ parameter, Yilmaz's many-body failure, and Birkhoff's theorem. However, when the author introduces ad-hoc verbal rules to patch those individual objections, a collaborative LLM validates each local patch without checking whether it contradicts the equations used in other sections of the manuscript.

Defect Category	Manuscript Claim	Fatal Mathematical / Physical Contradiction
1. Arrival Tensor (T_{ij}) Double Standard	Extended-body term $\langle r^{ij} \rangle$ in T_{ij} is physically coupled to instruments, breaking Birkhoff's theorem (Secs. 7.5, 9).	To evade Whitehead's $\xi = 1$ Earth-tide disproof, Secs. 8, 12.3 & 14.3 declare $\partial_i \partial_j \Xi$ "unseen by instruments" and cancel it identically in g_{rr}.
2. Photon Momentum Non-Conservation	Free photons have "open null topology," do not gravitate, and impart zero recoil to the Sun (Axiom II, Sec. 10.11).	Starlight deflected by 1.75″ gains transverse momentum $\Delta p_\perp \approx \theta E/c$. Zero solar recoil violates Axiom III ($\partial_\mu \Pi_{\text{total}}{}^{\mu\nu} = 0$).
3. Circularity & Metric Switching	Derives classical tests from 3 axioms, 2 rules, and G alone, with $C = 2$ deduced *ab initio* (Sec. 10.9).	Smuggles Newtonian energy conservation into $C = 2$ and switches between 3 incompatible metrics across Secs. 10, 12, and 13.
4. PPN Preferred-Frame Fallacy	Claims "no preferred frame at linear order ($\alpha_1 = \alpha_2 = 0$)" (Abstract, Table 1, Sec. 14.1).	α_1, α_2 are nonlinear 1PN ($O(v^2/c^2)$) PPN parameters; static frame-dependent exponentiation $e^{-2\xi}$ breaks 1PN Lorentz invariance.
5. Sagitta Tautology & $\sqrt{2}R$ Mirage	Derives $1/L$ from sagitta $h \approx s^2/(2L)$; claims "Region 2 softening" switches on at $r = \sqrt{2}R$ (Secs. 5.1, 9).	Dividing $s^2/(2L)$ by $s^2/2$ is a tautology; exterior T_{ij} is smooth and analytic for all $r > R$ with no equation of motion for softening.

2. Detailed Technical Critique

2.1 The Arrival Tensor (T_{ij}) Double Standard: Birkhoff's Theorem vs. Whitehead's Disproof

In Section 7.2, integrating the static directional kernel over a spherically symmetric extended source of radius R yields the arrival tensor in Eq. (26), which is rewritten via the "bridge identity" in Section 8, Eq. (28):

$$T_{ij}(\mathbf{x}) = (G / c^4) \int dE\, (\hat{n}_i \hat{n}_j / L) = (GE / c^4) [\, \hat{r}_i \hat{r}_j / r - (\langle r'^2 \rangle / 3r^3)(3\hat{r}_i \hat{r}_j - \delta_{ij}) \,] = \varepsilon \delta_{ij} - \partial_i \partial_j \Xi$$

(Eqs. 26, 28)

where $\Xi = (G / c^4) \int dE\, L$ and $\langle r'^2 \rangle$ is the energy-weighted mean-square radius of the body. Throughout the paper, the author treats the $\partial_i \partial_j \Xi$ (and $\langle r'^2 \rangle$) term in two mutually exclusive ways depending on the rhetorical need of each section:

Claim A: Physically Real (Secs. 4, 7.5 & 9)

To claim novel physics beyond General Relativity, the author argues that Newtonian point-mass reduction is an "invalid cancellation" and that T_{ij} explicitly breaks Birkhoff's theorem by retaining memory of the interior density profile $\langle r'^2 \rangle$. In Section 7.5 (p. 21), the author insists: *"Because real measuring instruments consist of internal circulations spanning non-zero aperture, they couple directly to the full arrival tensor* T_{ij} *rather than an idealized scalar point-metric."*

Claim B: Unseen Gauge Term (Secs. 8, 12.3 & 14.3)

If instruments actually coupled to the directional dyad T_{ij}, the theory would reduce to Whitehead's 1922 theory (Eq. 83), which was falsified by Will (1971) because coupling to the directional dyad of the Galaxy induces anomalous Earth tides ($\xi = 1$). To evade this, Secs. 8 and 14.4 declare that $\partial_i \partial_j \Xi$ is *"unseen at first order by instruments"* and instruct the reader to *"forget* Ξ*"* when passing from Branch A to Branch B.

Furthermore, when transforming to the operational areal radius $r_A = r(1 + T_\perp)$ in Section 12.3, Eq. (58), the extended-body $\langle r'^2 \rangle$ terms cancel out identically in the radial metric readout:

$$g_{rr} - 1 = 2 [\, T_{rr} - T_\perp - r\, T'_\perp \,] = 2\varepsilon(r) \Rightarrow g_{rr} = 1 + 2\varepsilon(r) \quad \text{(independent of } \langle r'^2 \rangle\text{)}$$

(Eq. 58)

Referee Audit Verdict on Contradiction 1

The framework cannot have it both ways. Either physical rods and clocks couple to the anisotropic $\partial_i \partial_j \Xi$ component of T_{ij} (in which case the theory is immediately falsified by $\xi \neq 0$ directional anisotropy in terrestrial tide and lunar laser ranging data), or $\partial_i \partial_j \Xi$ is a pure coordinate/gauge derivative that cancels out in operational readouts (in which case Birkhoff's theorem is **not** broken in any observable metric quantity, rendering Section 7.5 vacuous).

2.2 Violation of Momentum Conservation in Light Deflection (Axiom II vs. Axiom III)

In **Axiom II** (Section 2), **Section 1.4**, and **Section 10.11**, the manuscript postulates that only "confined" flux sources gravitational debt, whereas free-streaming photons have an "open null topology" and source **zero gravitational debt**:

"Free light therefore does not gravitate: free-streaming photons surf ambient debt gradients without sourcing a reciprocal debt field back

onto the deflecting mass." (Section 2, p. 10)

"...the photon has an open null topology with no closed transits and sources no debt, so the Sun receives no reciprocal projection... without requiring a retroactive mechanical recoil on the emitting body." (Section 10.11, p. 29)

Sun (M_Sun) b Incoming Photon: p = (E/c, 0) Deflected Photon: $\Delta p_{\perp} = -(E/c)\theta \neq 0$ Axiom II Claim: $\Delta p_{Sun} = 0$ (Zero Solar Recoil) => $\Delta p_{total} = \Delta p_{\gamma} + \Delta p_{Sun} \neq 0$ (Violates Axiom III) **Figure 1:** A photon grazing the Sun acquires downward transverse momentum $\Delta p_{\perp} \approx -(E/c)\theta$. If the photon projects zero reciprocal debt onto the Sun (Axiom II), total linear momentum $\mathbf{p}_{total} = \mathbf{p}_{\gamma} + \mathbf{p}_{\odot}$ is not conserved, violating Axiom III.

1. **Creation of Net Linear Momentum in Gravitational Lensing:** A photon of energy E carries asymptotic momentum $|\mathbf{p}| = E/c$. After grazing the solar limb at impact parameter $b = R_{\odot}$, it deflects by $\theta = 4GM_{\odot}/(c^2 b) \approx 1.75''$ (Eq. 77), acquiring transverse momentum $\Delta p_{\perp} \approx (E/c)\theta = 4GM_{\odot}E/(c^3 b)$ between $t = -\infty$ and $t = +\infty$. If the photon exerts zero reciprocal projection on the Sun so that $\Delta\mathbf{p}_{\odot} = \mathbf{0}$, net transverse linear momentum is created out of nothing ($\Delta\mathbf{p}_{total} \neq \mathbf{0}$), directly violating Axiom III ($\partial_{\mu}\Pi_{total}^{\mu\nu} = 0$).
2. **Fallacy of the "Kinematic Refraction" Excuse:** The manuscript argues that the photon experiences "no contact scattering" and merely refracts through a pre-existing effective refractive index $n \approx 1 + 2\varepsilon$ via Fermat's principle. In classical electrodynamics and optics, when a light beam refracts through a graded-index dielectric lens, stress-energy conservation requires the lens to absorb an equal and opposite ponderomotive recoil $-\Delta\mathbf{p}_{\gamma}$. Calling the deflection "refraction" does not exempt the deflecting mass from recoil.
3. **Non-Conservation of Active Gravitational Mass:** In Section 1.4 (Item 4, p. 8), the author concedes that once radiation escapes a star, it becomes free-streaming and "sources no debt," so an observer inside the expanding radiation shell measures a reduced active mass. Thus, whenever nuclear fusion or electron-positron annihilation converts bound rest mass into escaping photons, total active gravitational mass disappears from the universe, violating mass-energy conservation and contradicting radiation-dominated cosmology.

2.3 Circular Derivations and Switching Between Three Incompatible Metrics

The manuscript claims to derive all classical tests from three axioms, two stated rules, and one calibration (G). In practice, the derivations assume standard relativistic kinematics inside their definitions and switch between three incompatible metrics:

- **Circularity of the "Speed Budget" and $C = 2$ (Axiom II & Sec. 10.9):** Defining clock cadence as $d\tau/dt = c_{circ}/c$ in $c^2 = c_{circ}^2 + v^2$ (Eq. 7) merely rewrites the special-relativistic Minkowski line element $c^2 d\tau^2 = c^2 dt^2 - v^2 dt^2$ by renaming $c(d\tau/dt)$ as c_{circ}. Similarly, "deducing" $C = 2$ in $g_{00} = -(1 - C\varepsilon)$ from the "Work-Kinetic Energy derivative" $d(v^2) = 2\, d(\tfrac{1}{2}v^2) = 2\, d\Phi \Rightarrow \Delta(c_{circ}^2) = -2c^2\varepsilon$ (Eqs. 41–42) simply inserts Newtonian mechanical energy conservation ($\tfrac{1}{2}v^2 + \Phi = \text{const}$) into g_{00} by hand.
- **Unacknowledged Metric Switching:** Across Sections 10, 12, and 13, the author switches between three distinct metrics whenever convenient, as documented in the audit matrix below:

Metric Formulation	Mathematical Form in Text	Inconsistency Across Sections
1. Isotropic Exponential Metric (Sec. 10.3, Eq. 34)	$ds^2 = -e^{-2\varepsilon}c^2dt^2 + e^{2\varepsilon}(d\bar{r}^2 + \bar{r}^2 d\Omega^2)$ In areal $r = \bar{r}e^{\varepsilon}$: $g_{rr} = (1-u)^{-2}$	Claimed as the exact universal confinement response (giving $\beta = 1$ and horizonless throat at $r = eGM/c^2$), but abandoned in Secs. 10.10, 12.2, and 13.1.2.
2. Kerr-Schild / Exact Schwarzschild	$g_{\mu\nu} = \eta_{\mu\nu} + 2\varepsilon\, l_{\mu}l_{\nu}$, synchronized to: $ds^2 = -(1-2\varepsilon)c^2dt^2 + (1-2\varepsilon)^{-1}dr^2 + r^2d\Omega^2$	Author admits Eq. (49) is *"General Relativity's completion, not this framework's"* (p. 29), yet uses $g_{rr} = (1-2\varepsilon)^{-1}$ in Eq. (57) for rod contraction and

Metric Formulation	Mathematical Form in Text	Inconsistency Across Sections
(Secs. 10.9–10.10, Eq. 49)		Eq. (67) for Mercury's orbit.
3. Linearized Harmonic-Gauge GR (Sec. 10.8, Eqs. 36–37)	$\Box D^{\mu\nu} = -(4\pi G/c^4)T^{\mu\nu}$ $h_{\mu\nu} = 4(D_{\mu\nu} - \frac{1}{2}\eta_{\mu\nu}D)$	Gives isotropic $h_{ij} = 2\varepsilon\delta_{ij}$ instead of the directional dyad $2\varepsilon\hat{n}_i\hat{n}_j$ of Eq. (10). Admitted on p. 26 and Table 2 to be an unverified postulate (*"to be verified"*).

2.4 The PPN Preferred-Frame Fallacy ($\alpha_1 = \alpha_2 = 0$ "at Linear Order")

Throughout the paper (Abstract, Table 1, Sec. 10.8, Sec. 14.1), the author claims the theory avoids preferred-frame effects because it has *"no preferred frame at linear order ($\alpha_1 = \alpha_2 = 0$)."* This rests on three errors:

1. **α_1 and α_2 are Nonlinear (1PN) Parameters:** In the Parametrized Post-Newtonian formalism, linear O(ε) Lorentz covariance holds trivially for any wave equation $\Box D^{\mu\nu} \propto T^{\mu\nu}$. The parameters α_1, α_2 specifically measure preferred-frame anomalies at **first post-Newtonian order** (O(v^4/c^4) and O($\varepsilon v^2/c^2$)). Saying $\alpha_1 = \alpha_2 = 0$ "at linear order" is a contradiction in terms.
2. **Non-Covariant Exponential Relaxation:** To avoid field self-gravitation, the author generates $\beta = 1$ by exponentiating $\varepsilon = D^{00}$ via $g_{00} = -e^{-2\varepsilon}$ in the static substrate frame (Sec. 10.3). Exponentiating a single frame-dependent component D^{00} is not a Lorentz-covariant tensor operation, placing the model in the same class as Ni's falsified stratified theory.
3. **Incomplete Many-Body Sector:** In Sec. 13.4 (p. 36), the author explicitly admits that *"the covariant response and the explicit many-body checks are not yet complete,"* and in Table 2 (p. 12) and Sec. 10.8 (p. 26) concedes that whether summing the moving kernel reproduces Eq. (36) remains *"to be verified."* Without an explicit, Lorentz-covariant 1PN many-body Lagrangian derived from the relaxation rule, the claims in the Abstract and Sec. 14.1 that $\alpha_1 = \alpha_2 = 0$ and that the 1PN Einstein-Infeld-Hoffmann (EIH) equations are recovered are unsubstantiated.

2.5 Dimensional Tautology in the "Sagitta" and the $\sqrt{2}\,R$ Mirage

- **The "Singular Sagitta" Tautology (Section 5.1):** The author defines the sagitta of a microscopic circulation of scale s at distance L as $h = L(1 - \cos\theta) \approx s^2/(2L)$ (Eq. 8), and then extracts the surviving "arc curvature" in Eq. (9) by dividing out $s^2/2$: $\kappa = 2h/s^2 = 1/L$. Multiplying $1/L$ by $s^2/2$ and then dividing by $s^2/2$ to obtain $1/L$ is a trivial algebraic tautology. As admitted in Section 2.1 (Rule 1), the retarded $\delta(t - L/c)/L$ kernel is already fixed by the 3D linear wave operator on flat space ($\nabla^2(1/L) = -4\pi\delta^3(\mathbf{x})$); the sagitta story contributes no physical derivation.
- **The $\sqrt{2}\,R$ "Region 2 Dynamic Softening" Mirage (Section 9):** The author claims a physical transition switches on outside a sphere at $r = \sqrt{2}\,R \approx 1.414R$ where rays from opposite limbs subtend $\Theta = 2\arcsin(R/r) > 90°$ ($\cos\theta_{bc} < 0$), supposedly causing "dynamic softening" of bulk acceleration. However, the integrated exterior arrival tensor T_{ij} in Eq. (26) and the flux components $A(r)$, $B(r)$ in Eq. (27) are **completely smooth, analytic functions** of $1/r$ and $1/r^3$ for all $r > R$. Nothing switches on or bifurcates at $r = \sqrt{2}\,R$; splitting the integrand of $I^2 - |\mathbf{N}|^2$ at $\theta_{bc} = 90°$ (Table 9) is an arbitrary bookkeeping partition. Moreover, the paper **never writes down an equation of motion** exhibiting this softening.

2.6 The Illusion of Numerical Verification (Table 13) and Ontological Assessment

In Appendix A.12 (Table 13), the manuscript cites numerical checks in Python as empirical validation of the framework. In reality, those scripts only verified standard 19th-century vector calculus identities:

Numerical Check (Table 13)	Reported Precision	Actual Mathematical Identity Tested by the Code
Bridge Identity (Eq. 28) Lopsided triaxial ellipsoid	2×10^{-7} (Finite difference)	Tests the elementary derivative identity $\partial_i \partial_j \lvert\mathbf{x}-\mathbf{x}'\rvert = (\delta_{ij} - \hat{n}_i \hat{n}_j)/\lvert\mathbf{x}-\mathbf{x}'\rvert$ integrated over a volume by linearity of the integral.
Arrival Tensor (Eq. 26) & Conservation (Eq. 27)	4–5 digits & 10^{-8}–10^{-10}	Tests standard Legendre polynomial spherical shell integration (Lemma A.1) and the divergence identity $\partial_j(x_i x_j / L^4) = 0$ for $L > 0$.
Retarded Distance (Eq. 16) Uniformly moving source	10 digits	Tests the standard Liénard-Wiechert algebraic identity $\rho = -u \cdot R = \gamma\sqrt{(d^2 - \lvert\mathbf{v} \times \mathbf{d}\rvert^2/c^2)}$ for straight-line constant-velocity motion.

Concluding Philosophical Note: Confusing Relational Form with Substance

The Abstract argues that General Relativity is ontologically wasteful because it posits two entities—matter and geometry—whereas this framework posits only one entity: *momentum flux*. Yet in physics, a "flux" (the rate of transport of momentum across an area per unit time) is not a self-existing *substance*; it is a mathematical relation between space, time, and inertia—it is still pure **form**. Because any computationally bounded observer is built out of the same interactions they measure, physical instruments can only ever access relational invariants (the effective metric $\tilde{g}_{\mu\nu}$). Attempting to replace curved geometry with a flat mechanical substrate simply forces the theorist to copy General Relativity's metric equations while inventing contradictory cancellation rules to keep the unobservable substrate hidden.

Part II: Author Technical Response & Refutation Dossier

Point-by-Point Proof of Global Mathematical Consistency Across Version 56

Manuscript Audited: *Recovery of Relativistic Celestial Trajectories as an Effective Field Limit of Internal Momentum Flux: A Flat-Space Kinematic Account of the Classical Tests* (Version 56, 50 Pages)

Author: Corley Kinnane (corley@kinnane.net)

Participants in Exchange: An Online Correspondent (Identity Anonymized) · Corley Kinnane (Author)

Date of Exchange: 22 October 2026 · **Audit Engine Evaluated:** Gemini 4 Argon High (Non-Collaborative Mode)

1. Initial Inquiry & Audit Submission · An Online Reviewer

"Hi Corley,
I saw your recent comment on YouTube about developing your manuscript with an AI acting as your referee. It's clear you've put a tremendous amount of effort into organizing it across 56 versions.
Because I'm not a physicist, I don't have the background to critique the equations myself. Instead, I fed your paper into ***Gemini 4 Argon High*** *and asked it to act as an* ***independent, non-collaborative referee checking for global mathematical consistency across all 50 pages****.*
It turns out that when an AI is used iteratively to write and review a paper, it often validates local patches without checking if they contradict earlier sections of the same document. I've attached the 5-page audit report it generated, which breaks down five core mathematical contradictions in Version 56 along with a brief philosophical note at the end. I hope you find it an interesting read.
Best wishes,
[Correspondent — Name & Contact Anonymized]*"*

2. Technical Refutation & Point-by-Point Breakdown · Corley Kinnane

Dear Correspondent,

Thanks for reaching out and sharing the report. I appreciate your curiosity and the effort to run an adversarial consistency check on the manuscript.

Prompting an LLM as an adversarial referee is a familiar exercise, but automated reports of this type follow a well-known pattern: **the model scans for keywords associated with historical failures of flat-space gravitation (such as Whitehead's tides, Laplace's aberration, Ni's stratified theories, or two-body momentum conservation) and pattern-matches them against the text**. However, because it evaluates individual sections through the lens of curved-spacetime General Relativity rather than the foundational axioms of the paper, **it invents contradictions where none exist**. The diagnosis of an "AI sycophancy feedback loop" is misplaced; the alleged contradictions arise not from unintegrated local patches, but from the referee model imposing foreign assumptions that the paper's architecture explicitly rules out.

Here is a point-by-point breakdown of why the audit's criticisms are invalid and why the mathematics across Version 56 is globally consistent:

Point 1. The Arrival Tensor (T_{ij}) vs. Areal Readout: Not a Double Standard

Audit Charge: Claims a contradiction between Section 7.5 (where arrival tensor T_{ij} retains density memory $\langle r'^2 \rangle$, breaking Birkhoff's theorem) and Section 12.3 (where $\langle r'^2 \rangle$ cancels out in the areal metric component g_{rr}).

This conflates the physical territory (**Branch A**, on the flat substrate) with the operational coordinate projection (**Branch B**, the rod–clock readout):

- **In Branch A (the physical flux):** The arriving momentum flux is a distributed tensor. Radial flux is depleted ($A \cdot r^2 < 1$) and transverse hoop stress ($B > 0$) carries the difference, exactly satisfying tensor conservation $\partial_j F_{ij} = 0$. The interior structure $\langle r'^2 \rangle$ is physically real on the substrate.
- **In Branch B (the areal projection):** An areal chart defines coordinates so that spherical surfaces have proper area $4\pi r_A^2$, which introduces a non-linear coordinate stretch $r_A = r(1 + T_\perp)$. When transforming the radial metric component:

$$g_{rr} - 1 = 2\left[(T_{rr} - T_\perp) - r\frac{dT_\perp}{dr}\right]$$

  The physical anisotropy $(-\langle r'^2 \rangle / r^3)$ and the areal coordinate gradient $(+\langle r'^2 \rangle / r^3)$ **cancel identically**.

As explicitly stated in Section 8: *"The translation runs one way. From Branch A to Branch B always works: forget Ξ... Branch B is the forgetful image of Branch A."* The cancellation in g_{rr} is not a destruction of the physical flux; it is a mathematical artifact of forcing the field into an areal coordinate chart. A static observer measuring static rulers perceives a metric-blind Schwarzschild metric; but an extended body with bulk momentum moving through Region 2 physically interacts with the arriving flux streams (T_{ij}), which retain $\langle r'^2 \rangle$.

Furthermore, the claim that this collapses to Whitehead's theory ($\xi = 1$) ignores Axiom III. Whitehead added *metric tensors directly*, causing distant galactic masses to introduce permanent directional shears. In this framework, **metrics never superpose**; raw momentum flux is linearly unified into an ambient sea *prior* to readout. For large-scale backgrounds, the angular sum becomes isotropic ($\frac{1}{3}\varepsilon_{\text{ambient}}\delta_{ij}$), acting purely as a scalar rescaling of base units with zero directional shear ($\xi = 0$).

Point 2. Photon Deflection & Momentum Conservation: The Isolated Two-Body Fallacy

Audit Charge: Argues that because a passing photon deflects by $1.75''$, it gains transverse momentum, and if the Sun experiences zero mechanical recoil, momentum conservation ($\partial_\mu \Pi^{\mu\nu}_{\text{total}} = 0$) is violated.

This applies an isolated two-body impulse formula ($\Delta\mathbf{p}_\gamma + \Delta\mathbf{p}_\odot = 0$) to an open field interaction where it does not belong:

- The passing photon did not originate from the Sun; it entered from the cosmic background and exits back into it.
- By Axiom II, radiation has an **open null topology**: it completes no closed circulations, sources no singular sagitta, and projects no reciprocal debt field.
- The photon does not undergo contact scattering with the Sun. It refracts kinematically along a stationary-phase streamline through the pre-existing momentum flux gradient ($n \approx 1 + 2\varepsilon$) sustained by the Sun.
- Local conservation in Axiom III is defined by the field divergence:

$$\partial_\mu \Pi^{\mu\nu}_{\text{total}} = 0$$

  This condition is satisfied locally at every point along the beam as the wave turns through the streaming flux. Demanding an integrated mechanical kick on the Sun's core matter from an unrelated, passing cosmic photon is a misunderstanding of field-gradient refraction. Even in General Relativity, test-particle null geodesics do not impart a mechanical recoil to the central Schwarzschild mass.

Point 3. "Circularity" and "Metric Switching": A Confusion of Approximations

Audit Charge: Alleges that the derivation of $C = 2$ "smuggles Newtonian energy" and that the manuscript switches between three incompatible metrics across Sections 10, 12, and 13.

- **The derivation of $C = 2$:** In Axiom II, rest mass is confined internal circulation at speed c ($c^2 = c_{\text{circ}}^2 + v^2$). When potential debt taxes the system, the Work-Kinetic Energy derivative on this quadratic budget mandates $\Delta(c_{\text{circ}}^2) = -2c^2\varepsilon$. The factor of 2 is the exact differential of the quadratic speed budget:

$$d(v^2) = 2\,d\left(\frac{1}{2}v^2\right)$$

  Calling this "smuggling Newtonian mechanics" reverses the logic: Newtonian potential energy is the low-velocity macroscopic manifestation of this microscopic speed budget reallocation.

- **"Metric Switching":** The framework has **one** fundamental response law: the isotropic exponential response on the substrate chart $(\bar{r}, t)$:

$$ds^2 = -e^{-2\varepsilon}c^2dt^2 + e^{2\varepsilon}(d\bar{r}^2 + \bar{r}^2 d\Omega^2)$$

  The Kerr–Schild line element (Section 10.9) is used strictly to demonstrate how standard two-way radar synchronization converts an outgoing retarded null stream into a static spatial line element. The areal Schwarzschild metric is the standard 1PN truncated expansion ($u = GM/c^2r$), which matches the exponential metric in areal coordinates to order $\mathcal{O}(u^2)$. Using standard perturbation expansions to compare a theory against 1PN solar system benchmarks (where higher-order compact corrections are $\sim 10^{-16}$) is standard physics, not an illicit switch.

Point 4. The PPN Preferred-Frame Fallacy ($\alpha_1 = \alpha_2 = 0$) & Many-Body Closure

Audit Charge: Claims stating $\alpha_1 = \alpha_2 = 0$ "at linear order" is a contradiction, and compares the framework to Ni's stratified ether theory.

- Ni's theory failed because it introduced a preferred universal 4-vector field $u^\mu = (1,0,0,0)$ that created an observable "ether wind."

- Here, the moving-source kernel (Section 5.5) is fully Lorentz-covariant. Because the retarded distance contracts to the source's *present* position without time lag:

$$\rho = \gamma\sqrt{d^2 - |\mathbf{v}\times\mathbf{d}|^2/c^2}$$

  there is no aberration for uniform motion.

- The moving kernel directly supplies the gravitomagnetic vector potential $h_{0i} = -4V_i/c^3$ in harmonic gauge. In PPN theory, obtaining $h_{00} = 2U/c^2$, $h_{ij} = 2U\delta_{ij}/c^2$, and $h_{0i} = -4V_i/c^3$ alongside $\gamma = 1$ is precisely the condition that identically yields $\alpha_1 = \alpha_2 = 0$.

- **Regarding the many-body sector:** The referee treats the note that an $N(N-1)$ code simulation is future development as an admission that the theoretical physics is incomplete. Mathematically, multi-body closure is already complete. Attempting to formulate an isolated analytical multi-body metric would violate Axiom III (which forbids computing intermediate metrics prior to unifying the total flux). The interaction network closes exactly at $N(N-1)$ directed pairwise channels (triad chains), with Gram's determinant proving that pairwise angles exhaust all 3D rotation-invariant spatial geometry.

Point 5. The Sagitta and the $\sqrt{2}R$ Geometric Boundary

Audit Charge: Calls the sagitta $\kappa = 2h/s^2 = 1/L$ an algebraic tautology and claims nothing physically switches on at $r = \sqrt{2}R$.

- **The Sagitta:** The arc curvature $\kappa = 2h/s^2 = 1/L$ matches the retarded 3D Green's function because local, linear propagation at speed c in three dimensions and circular arc curvature describe the exact same geometric dilution. It is an identity of the geometry, not a circular trick.
- **The $\sqrt{2}R$ Boundary:** The subtended limb angle from a sphere of radius R is $\Theta(r) = 2\arcsin(R/r)$. This angle exceeds 90° if and only if $r < \sqrt{2}R$ ($\chi(r) \equiv \cos\Theta(r) < 0$). At $r = \sqrt{2}R$, pairs of arriving streams from opposite limbs subtend right angles; inside $\sqrt{2}R$, obtuse pairs ($\theta_{bc} > 90^\circ$, $\cos\theta_{bc} < 0$) activate for the first time, introducing destructive vector opposition into the arriving flux. This is an exact geometric threshold.

Point 6. Addressing the Concluding Philosophical Note: Relational Invariants vs. Substrate Reality

The audit concludes with a philosophical argument claiming that replacing curved geometry with a flat mechanical substrate is ontologically redundant because physical instruments only ever access relational invariants ($\tilde{g}_{\mu\nu}$), and that "momentum flux" is not a substance but a relation.

This objection reflects the standard geometric orthodoxy, but overlooks the fundamental operational premise of the paper:

- **Geometrodynamics vs. Relational Flux:** General Relativity assumes spacetime curvature as an irreducible primitive. However, that primitive breaks down at singularities and resists quantum unification. By establishing rest mass as internal circulation at speed c on flat spacetime, gravitation emerges not from an abstract curvature of nothingness, but from the physical depletion and redistribution of internal momentum flux.
- **The "Unobservable Substrate":** Far from being an ad-hoc epicycle, the flat substrate is the arena in which global conservation laws ($\partial_\mu \Pi^{\mu\nu}_{\text{total}} = 0$) and microcausality hold strictly. The curved metric $\tilde{g}_{\mu\nu}$ is an emergent, operational readout experienced by composite rod–clock measuring apparatuses whose constituent circulations are taxed by ambient debt. Demanding that the theory discard the substrate because local clocks read out curved time is akin to demanding that fluid mechanics discard molecular momentum flux because a swimming macroscopic observer only measures bulk pressure and temperature.

3. Operational Takeaway & Conclusion

The Operational Discipline of the Framework:

Project $\longrightarrow$ Unify $\longrightarrow$ Read out once

The manuscript holds together because it follows this strict sequence. The referee report consistently runs into trouble because it attempts to evaluate Branch A using the coordinate conventions of Branch B, demands classical contact-collision recoils from an open wave refraction, and conflates coordinate transformations with physical contradictions.

Version 56 already contains the necessary mathematical machinery and explicit disclaimers covering each of these points. I will leave the paper as it stands, but I appreciate you taking the time to share the audit.

Best regards,

Corley Kinnane
Author, *Recovery of Relativistic Celestial Trajectories as an Effective Field Limit of Internal Momentum Flux*