Paper 037
Cogravitational Induction and Moving-Mass Observables

Rotation, translation, and time-dependent mass-current signatures in a Jefimenko-compatible field model

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Abstract

This proposal develops a moving-mass observable catalogue for Jefimenko-style gravity/cogravity. It derives leading expressions for translating point masses and rotating compact sources, classifies the sign behavior of candidate signals under reversal controls, and identifies induction-style loop observables from the equation curl g equals minus the time derivative of K. The paper emphasizes scale honesty: laboratory cogravity from ordinary rotors is expected to be extremely small, so near-term value comes from null discipline, artifact separation, and bridges to geophysical and astrophysical tests.

Status. Draft manuscript for review and revision. This paper is not an empirical claim of new physics or field-ready technology. It is a structured proposal, theory note, protocol, or application architecture intended to be auditable, falsifiable, and publishable with source.

Contents

1 Problem

The gravity/cogravity equations imply velocity-dependent fields from moving mass. The obvious temptation is to jump from that observation to propulsion or anomalous force claims. This paper takes the opposite route: build a catalogue of moving-mass signatures, parity rules, and scale estimates before any claim is allowed.

The target is a proposal paper that answers three questions. What cogravity field is produced by translating, rotating, and accelerating mass currents? Which observables change sign under source reversal? Which effects are already too small for direct laboratory detection but still useful as null-test templates?

2 Model

For a compact source, the cogravity field is

$$\mathbf{K}(\mathbf{x},t) = -\frac{G}{c^2}\int\left(\frac{[\mathbf{J}]}{R^3}+\frac{[\partial_t\mathbf{J}]}{cR^2}\right)\times\mathbf{R}\,\mathrm{d}^3x'. \tag{1}$$

For a point source of mass M with velocity $\mathbf{v}_s$ and acceleration $\mathbf{a}_s$, the leading retarded expression is

$$\mathbf{K}_s(\mathbf{x},t) = -\frac{GM}{c^2}\left(\frac{[\mathbf{v}_s]\times\mathbf{R}}{R^3}+\frac{[\mathbf{a}_s]\times\mathbf{R}}{cR^2}\right), \tag{2}$$

with all source quantities evaluated at $t - R/c$.

A test body with velocity $\mathbf{v}_t$ receives the velocity-dependent acceleration

$$\mathbf{a}_C = \mathbf{v}_t \times \mathbf{K}_s. \tag{3}$$

The sign is odd under reversal of the source velocity and odd under reversal of the detector velocity.

For a localized steady current, define the mass-current dipole

$$\mathbf{m}_G = \frac{1}{2}\int \mathbf{x}'\times\mathbf{J}(\mathbf{x}')\,\mathrm{d}^3x'. \tag{4}$$

The far-field cogravity is

$$\mathbf{K}(\mathbf{x}) \simeq -\frac{G}{c^2r^3}\left(3\hat{\mathbf{r}}(\mathbf{m}_G\cdot\hat{\mathbf{r}})-\mathbf{m}_G\right). \tag{5}$$

For a rigid rotor about a principal axis, $\mathbf{m}_G = \mathbf{L}/2$, where $\mathbf{L}$ is angular momentum. This gives the scale

$$|\mathbf{K}| \sim \frac{GL}{2c^2r^3}. \tag{6}$$

A laboratory rotor with $L \sim 10^4\,\mathrm{kg\,m^2\,s^{-1}}$ at $r \sim 1\,\mathrm{m}$ gives $|\mathbf{K}| \sim 4\times10^{-24}\,\mathrm{s^{-1}}$. Earth gives a near-surface dipole scale of order $10^{-14}\,\mathrm{s^{-1}}$. These scales set expectations before instrumentation is discussed.

3 Claims

Claim 1 (Moving-mass observables are parity objects)**.** *Every proposed cogravity observable should be classified by its sign under source reversal, detector reversal, spatial inversion, and time reversal. Without this parity ledger, cogravity signals are easily confused with vibration, thermal drift, magnetic pickup, or Newtonian multipole leakage.*

Claim 2 (Cogravitational induction is a loop observable)**.** *Equation* $\nabla \times \mathbf{g} = -\partial_t \mathbf{K}$ *implies*

$$\oint_C \mathbf{g} \cdot \mathrm{d}\boldsymbol{\ell} = -\frac{\mathrm{d}}{\mathrm{d}t} \int_S \mathbf{K} \cdot \mathrm{d}\mathbf{S}. \tag{7}$$

Time-varying mass currents should therefore be modeled as induction problems, not merely as instantaneous force calculations.

Claim 3 (Laboratory rotating-mass signals are expected to be tiny)**.** *Near-term tabletop searches should not be presented as likely discoveries. Their honest role is to develop reversal discipline, artifact ledgers, and upper-bound machinery that can be reused in stronger astrophysical or geophysical contexts.*

Claim 4 (Astrophysical checks are part of the same catalogue)**.** *Frame-dragging, translational gravimagnetism, and binary timing are not optional background. They are high-leverage comparisons for any Jefimenko-compatible moving-mass model.*

4 Evidence Plan

The paper should publish a source catalogue with analytic and numerical entries:

1. uniformly translating point mass;
2. counter-translating mass pair with zero net momentum;
3. rigid rotating sphere;
4. thin ring and counter-rotating ring pair;
5. accelerated mass-current pulse;
6. binary point-mass toy model.

Each entry should provide ρ, $\mathbf{J}$, the continuity residual, leading $\mathbf{g}$ and $\mathbf{K}$, parity signatures, and estimated magnitude.

A compact parity table should be part of the release:

Control	$\mathbf{g}_N$	$\mathbf{K}$	common artifact
source velocity reversal	even	odd	motor magnetic pickup odd/even mix
detector velocity reversal	even	force odd	readout phase error odd
source mass swap	scales with mass	scales with mass current	vibration may not scale
co- vs counter-rotation	Newtonian similar	cogravity changes	bearing heating changes

5 JMP0X1B Implementation Surface

A cogravity signature catalogue can be represented as source records with reversible controls:

```
record MovingMassSignature {
  source_family, rho, J, controls,
  predicted_g, predicted_K, parity, magnitude, artifacts
}
fn compare_controls(sig, run_pair) -> ResidualLedger
```

The catalogue feeds the finite-element solver, the laboratory protocol, and the observational-bounds paper.

6 Release and Review Plan

Release a PDF, LaTeX source, analytic notebooks, and machine-readable signature records. Review should reject any entry that does not specify source support, continuity, retarded-time convention, reversal parity, and ordinary Newtonian multipole background.

7 Open Questions

- Which moving-mass geometries maximize cogravity parity while cancelling Newtonian multipoles?
- Can atom interferometers provide useful bounds, or do seismic and Newtonian gradients dominate completely?
- Which astrophysical observables are cleanest for translational mass-current effects?
- Is there a useful reduced-order model for time-dependent cogravitational induction?

8 Conclusion

This paper turns one part of the gravity/cogravity idea into a named, reviewable work package. Its value does not depend on treating the framework as established physics. The value is the disciplined reduction of a speculative field analogy into equations, invariants, bounds, null tests, and release artifacts that can be audited and either extended or killed.

References

References

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