Paper 039
Null Experiments for Laboratory Cogravity with Symmetry-Matched Moving Masses

A falsification-first protocol for rotating, translating, and modulated dense sources

JMP0X1B Research Group
Working paper draft / June 14, 2026

Abstract

This proposal designs laboratory cogravity experiments as null-bounding and artifact-classification studies. It gives a signal model with an effective amplitude β_C, explains why the strict Jefimenko-scale signal from ordinary rotors is far below near-term tabletop sensitivity, and defines a reversal-controlled run matrix for rotating and translating source masses. The deliverable is not a breakthrough claim; it is a signed likelihood over β_C, nuisance templates, and failed controls suitable for a JMP0X1B null ledger.

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

Laboratory cogravity claims are vulnerable because the expected signal from ordinary moving masses is extraordinarily small while mundane artifacts are plentiful. The problem is not to design a sensational experiment. The problem is to design a null protocol that would make any future claim legible: controls first, signal model first, bounds first.

This proposal treats the laboratory as a falsification and artifact-classification platform. A positive result is not expected. A useful negative result is expected if it improves upper bounds on effective cogravity amplification or eliminates a family of apparatus mistakes.

2 Model

Let $y(t)$ be a force, torque, phase, or acceleration readout. The proposed analysis model is

$$y(t) = \beta_C S_C(t) + \sum_i \theta_i N_i(t) + \epsilon(t), \tag{1}$$

where $S_C(t)$ is the cogravity signature exported by the solver, β_C is an effective amplitude parameter, $N_i(t)$ are nuisance templates, and $\epsilon(t)$ is residual noise. In the strict Jefimenko normalization $\beta_C = 1$. A laboratory search can instead report an upper bound on $|\beta_C|$ relative to the model.

For a rotor of angular momentum L at distance r, the natural cogravity scale is

$$K_{\text{lab}} \sim \frac{GL}{2c^2 r^3}. \tag{2}$$

For $L = 10^4\,\mathrm{kg\,m^2\,s^{-1}}$ and $r = 1\,\mathrm{m}$, this is approximately $4 \times 10^{-24}\,\mathrm{s^{-1}}$. A detector moving at $1\,\mathrm{m\,s^{-1}}$ would therefore see an acceleration scale near $10^{-24}\,\mathrm{m\,s^{-2}}$. This is far below ordinary tabletop backgrounds.

The experimental goal is therefore not detection at $\beta_C = 1$. The goal is to constrain large effective deviations, validate reversal methods, and publish artifact ledgers.

3 Claims

Claim 1 (Symmetry matching is mandatory). *A cogravity laboratory protocol must include source reversal, counter-rotation, dummy-mass runs, detector reversal where possible, distance modulation, vibration monitors, magnetic monitors, thermal monitors, and blind analysis. Omitting these controls makes the result uninterpretable.*

Claim 2 (Newtonian multipole leakage is the first enemy). *Moving masses create time-dependent Newtonian gradients through imperfect balancing, eccentricity, bearing motion, and building vibration. A cogravity channel is not credible until Newtonian multipoles have been measured, bounded, or cancelled below the claimed residual.*

Claim 3 (Nulls should be published as likelihoods). *A null experiment should report a likelihood or posterior over β_C and nuisance parameters, not a binary statement that nothing happened. The null result then becomes useful input for a Bayesian null ledger.*

Claim 4 (The kill criterion is quantitative)**.** *If nuisance templates explain the reversible channel with stable coefficients across blind runs, or if the inferred β_C changes under apparatus relocation, the candidate signal is killed unless a new pre-registered mechanism predicts that behavior.*

4 Evidence Plan

A first experiment can use two symmetry-matched source modules: co-rotating, counter-rotating, and dummy-loaded states with equal mechanical power and matched thermal paths. The detector may be a torsion balance, accelerometer stack, atom-interferometer channel, or other precision inertial readout. The exact sensor is less important than the control schedule.

The minimum run matrix is

Run class	source state	expected cogravity parity	primary nuisance
A	rotor forward	+	vibration, magnetic pickup
B	rotor reverse	−	bearing asymmetry
C	counter-rotating pair	cancellation or selected gradient	motor heating
D	dummy inertia	0	thermal and acoustic
E	source displaced	distance scaling	floor coupling
F	blinded mixed order	model-defined	analyst bias

The analysis should fit all runs simultaneously and report the posterior for β_C. A result is publishable even when the posterior is wide, provided the apparatus metadata and nuisance ledger are complete.

5 JMP0X1B Implementation Surface

This protocol can be encoded as a typed experiment plan:

```
record CogravityNullRun {
  source_state, reversal_id, detector_state,
  environmental_channels, blind_label, signature_digest
}
record BetaBound { beta_C_interval, nuisance_model, controls_passed }
fn analyze_null(runs, signature) -> BetaBound effects{Audit, Statistics}
```

The result should feed NullLedger and the formal verification protocol for frontier physics experiments.

6 Release and Review Plan

Release the apparatus diagram, source mass ledger, motor state schedule, raw time series, environmental channels, blind labels after unblinding, solver signature, analysis code, and posterior over

β_C. The paper should state explicitly that the expected $\beta_C = 1$ signal is below near-term laboratory sensitivity unless the apparatus has an independently justified amplification mechanism.

7 Open Questions

- Which sensor class gives the best bound on large effective deviations from the Jefimenko normalization?
- Can source modules be designed so Newtonian multipoles cancel while cogravity parity survives?
- What environmental channels best predict false reversal-odd signals?
- How should failed apparatus designs be published so later groups do not repeat them?

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

[1] O. D. Jefimenko. *Causality, Electromagnetic Induction, and Gravitation: A Different Approach to the Theory of Electromagnetic and Gravitational Fields*. Electret Scientific, 2nd ed., 2000.

[2] O. D. Jefimenko. *Gravitation and Cogravitation: Developing Newton's Theory of Gravitation to its Physical and Mathematical Conclusion*. Electret Scientific, 2006.

[3] O. Heaviside. A gravitational and electromagnetic analogy. *The Electrician*, 31:281–282 and 359, 1893.

[4] M. L. Ruggiero. A note on the gravitoelectromagnetic analogy. arXiv:2111.09008, 2021.

[5] S. M. Kopeikin and E. B. Fomalont. Gravimagnetism, causality, and aberration of gravity in the gravitational light-ray deflection experiments. arXiv:gr-qc/0510077, 2005.

[6] C. W. F. Everitt et al. Gravity Probe B: Final results of a space experiment to test general relativity. *Physical Review Letters*, 106:221101, 2011. arXiv:1105.3456.

[7] JMP0X1B Research Group. Twelve Five-Dimensional Projection Models for Maxwell-Compatible Electromagnetism. Working paper, 2026. `https://research.jmp0x1b.com/papers/twelve-5d-projection-electromagnetism.html`

[8] JMP0X1B Research Group. Weak-Field Radion Electrogravity from Maxwell-Compatible Five-Dimensional Projections. Working paper, 2026. https://research.jmp0x1b.com/papers/weak-field-radion-electrogravity.html

[9] JMP0X1B Research Group. Conservation-First Stress-Energy Audits for Closed Electromagnetic Devices. Working paper, 2026. https://research.jmp0x1b.com/papers/conservation-first-stress-energy-audits.html

[10] JMP0X1B Research Group. A Research Program for Maxwell-Compatible Projection Electromagnetism. Working paper, 2026. https://research.jmp0x1b.com/papers/a-research-program-for-maxwell-compatible-projection-electromagnetism.html