Paper 041
Gravity-Cogravity Operators for Projection-Field Research

A bridge between JMP0X1B projection electromagnetism and conserved mass-current analogies

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Abstract

This proposal connects the JMP0X1B projection-electromagnetism track to Jefimenko-style gravity/cogravity through conserved effective mass-current operators. It requires every speculative coupling to supply both delta rho and delta J, preferably through an antisymmetric superpotential whose divergence is automatically conserved. Candidate bulk, boundary, electromagnetic-energy, and rotation operators are framed as admissible mathematical classes rather than empirical claims. The deliverable is an operator dictionary with conservation proofs, dimensional analysis, retarded signatures, stress-energy ledgers, and null-test controls.

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

JMP0X1B already has a projection-electromagnetism track with scalar readouts, boundary fluxes, operator bases, null ledgers, and conservation-first audits. Gravity/cogravity should not become a disconnected fringe branch. The problem is to define a bridge: speculative couplings may be explored, but only through conserved mass-current operators and stress-energy ledgers.

This paper proposes an operator grammar for coupling projection-field ideas to a Jefimenko-compatible gravity/cogravity model. The grammar is designed to reject mathematically invalid proposals early.

2 Model

Let the ordinary mass-current four-vector be

$$J_M^\mu = (c\rho, \mathbf{J}), \qquad \partial_\mu J_M^\mu = 0. \tag{1}$$

A speculative effective source δJ_M^μ is admissible at the linear level if it is conserved:

$$\partial_\mu \delta J_M^\mu = 0. \tag{2}$$

A sufficient construction is

$$\delta J_M^\mu = \partial_\nu M^{\mu\nu}, \qquad M^{\mu\nu} = -M^{\nu\mu}, \tag{3}$$

because $\partial_\mu \partial_\nu M^{\mu\nu} = 0$ for smooth fields. Boundary-supported versions can be handled distributionally if the surface terms are published explicitly.

The effective source is then inserted into the same retarded equations:

$$\nabla \cdot \mathbf{g} = -4\pi G(\rho + \delta\rho), \tag{4}$$

$$\nabla \times \mathbf{K} = -\frac{4\pi G}{c^2}(\mathbf{J} + \delta\mathbf{J}) + \frac{1}{c^2}\partial_t \mathbf{g}. \tag{5}$$

The conservation condition is not a philosophical preference; it is required by the divergence of the field equations.

Candidate operator families include:

$$\delta J_E^\mu = \partial_\nu \left[\chi_E u_{\mathrm{EM}} Q^{\mu\nu}\right], \tag{6}$$

$$\delta J_B^\mu = \partial_\nu \left[\chi_B \delta_\Sigma B_\Sigma^{\mu\nu}\right], \tag{7}$$

$$\delta J_\Omega^\mu = \partial_\nu \left[\chi_\Omega \Omega^{\mu\nu}(\rho, \mathbf{v})\right], \tag{8}$$

where u_{EM} is electromagnetic energy density, δ_Σ denotes a boundary-supported term, and $Q^{\mu\nu}$, $B_\Sigma^{\mu\nu}$, and $\Omega^{\mu\nu}$ are antisymmetric structures fixed by the model. These are placeholders for operator classes, not claims that nature realizes them.

3 Claims

Claim 1 (Conserved operators are the entry ticket)**.** *Any projection-to-cogravity coupling must define $\delta\rho$ and $\delta\mathbf{J}$ together. A scalar-only effective mass term that changes in time without a matching current violates the field equations unless the missing flux is supplied.*

Claim 2 (Boundary claims need distributional bookkeeping)**.** *If a mechanism localizes at capacitor edges, seams, apertures, or material interfaces, the paper must publish the boundary measure, normal/tangent convention, jump conditions, and conservation proof.*

Claim 3 (Electromagnetic energy couplings need stress-energy audits)**.** *Using u_{EM}/c^2 as an effective mass-density input is mathematically natural but physically dangerous. Any such coupling must be audited against ordinary stress-energy, support forces, thermal energy, and equivalence-principle constraints.*

Claim 4 (Operator degeneracy should be expected)**.** *Different conserved operators can produce the same detector channel under a limited control set. The correct output may be an equivalence class, not an identified mechanism.*

4 Evidence Plan

The first release should be an operator dictionary. Each operator entry should include:

1. mathematical definition of $M^{\mu\nu}$ or the equivalent conserved construction;
2. support: bulk, boundary, material interface, or time gate;
3. dimensional analysis and coupling constants;
4. induced $(\delta\rho, \delta\mathbf{J})$ pair;
5. retarded field signature;
6. controls that separate it from conventional artifacts;
7. known observational or laboratory constraints;
8. kill criteria.

The evidence is a set of conservation proofs and synthetic null experiments, not a claim of detected coupling.

5 JMP0X1B Implementation Surface

The operator grammar can become a shared library for speculative physics papers:

```
record ConservedOperator {
  name, M_antisymmetric, support, dimensions,
  delta_rho, delta_J, conservation_proof, controls
}
fn admit(op) -> AdmissionReport
fn project_to_gco(op, apparatus) -> SignatureLedger
```

This directly connects to operator-basis papers, boundary-flux papers, null-ledger infrastructure, and conservation-first audits.

6 Release and Review Plan

Release a PDF, LaTeX source, operator dictionary, symbolic conservation checks, and example signatures for capacitor, rotor, cavity, and cryogenic apparatus. Review should reject any coupling that lacks units, a conservation proof, a stress-energy ledger, or a declared null-test control.

7 Open Questions

- Which projection-electromagnetism operators have a meaningful conserved mass-current analogue?
- Can boundary-supported operators be made mesh-independent in finite-element simulations?
- What equivalence-principle tests already rule out naive electromagnetic energy-density couplings?
- How should operator equivalence classes be stored in NullLedger?

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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