Paper 015

Screened Scalar Readout in Electrostatic Energy Geometries

Range-dependent null predictions for radion-style projection models

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Abstract

Weak-field radion electrogravity turns electrostatic energy density into a scalar-source term and then asks whether gravity-like readout is constrained by null experiments. This paper extends that model to screened scalar responses. A scalar may be short-range, material-screened, geometry-screened, or environment-screened. Each case changes which capacitor dimensions and dielectric boundaries dominate the predicted residual. The output is a null-test map over scalar range, screening length, and geometry scale.

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.

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1 Problem

A scalar sourced by electrostatic energy density can look trivial if its range is either much shorter or much longer than the device. Existing weak-field bounds are useful, but experimental design needs range-specific observables. The problem is to decide which apparatus scales and material substitutions constrain which scalar regimes.

2 Model

We introduce a scalar s with source u_E, mass m_s, material coupling q(x), and optional screening term S(s,rho_m). The linear regime yields a Green-function convolution; the nonlinear screened regime is treated by conservative envelopes. Scale pairs and dielectric swaps are the key controls.

$$(\nabla^2 - m_s^2)s = -\alpha_E q(\mathbf{x}) u_E(\mathbf{x}) - S(s, \rho_m), \qquad u_E = \frac{\epsilon E^2}{2}.$$

$$F_s \sim \gamma_s c^2 \int_B \rho_B(\mathbf{x}) \nabla s(\mathbf{x})\, d^3x, \qquad \Lambda = \{\lambda_s, \lambda_{\text{screen}}, L_{\text{device}}, L_{\text{edge}}\}.$$

3 Claims

1. **Claim 1.** Scalar projection searches should report exclusion as a surface over range and screening assumptions.
2. **Claim 2.** A single device scale cannot rule out both edge-local and device-scale scalar regimes.
3. **Claim 3.** Dielectric swaps are as important as voltage scans because material weighting can imitate or suppress scalar sourcing.
4. **Claim 4.** Symmetric thrust nulls do not eliminate local scalar energy-density gradients; they constrain only the net readout channel.

4 Evidence Plan

The first study solves the linear scalar equation on canonical capacitor geometries and reports scale-pair ratios. The second defines conservative screened envelopes without claiming a microscopic theory. The third proposes experiments at room temperature, cryogenic temperature, and varied dielectric composition to test whether bounds are material-sensitive.

5 JMP0X1B Implementation Surface

A JMP0X1B simulation package should track units, geometry scale, material priors, mesh digests, and solver tolerances. The implementation can emit a range-screening exclusion grid suitable for the Bayesian null ledger.

Illustrative JMP0X1B-style contract

```
record ScalarRun { geometry: GeometryDigest, lambda_s: Length, screen: ScreenModel, material_ma
fn solve_scalar(run: ScalarRun) -> ScalarBound effects{FEM, Units, Deterministic, Audit}
```

6 Release And Review Plan

Release canonical mesh geometries, parameter sweeps, exclusion grids, and a reviewer checklist requiring every claim to specify range, screening model, and material assumptions.

7 Open Questions

- Which scalar range is most constrained by existing UHV balances?
- Can cryogenic dielectric behavior reduce nuisance thermal channels enough to improve scalar bounds?
- How should nonlinear screening be bounded without adding arbitrary parameters?
- What is the cleanest geometry for separating edge gradients from volume energy density?

8 Conclusion

Range and screening turn scalar readout from a vague electrogravity idea into a structured null program. The paper emphasizes exclusion surfaces, not positive claims.

References

References

[1] 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`

[2] JMP0X1B Research Group. *Ultra-High-Vacuum Null Tests of Electrostatic Projection Couplings with Symmetry-Matched Capacitors*. Working paper, 2026. `https://research.jmp0x1b.com/papers/uhv-electrostatic-null-tests.html`

[3] JMP0X1B Research Group. *Finite-Element Discrimination of Boundary-Flux, Scalar, and Conventional Artifact Forces in Asymmetric Capacitors*. Working paper, 2026. `https://research.jmp0x1b.com/papers/fem-capacitor-force-discrimination.html`

[4] T. Kaluza. Zum Unitätsproblem in der Physik. *Sitzungsberichte der Preussischen Akademie der Wissenschaften*, 966–972, 1921.

[5] O. Klein. Quantentheorie und fünfdimensionale Relativitätstheorie. *Zeitschrift für Physik*, 37:895–906, 1926.

[6] J. M. Overduin and P. S. Wesson. Kaluza-Klein gravity. *Physics Reports*, 283(5–6):303–380, 1997.