

Supplementary Material

Coarse Transport, Central Twist, and Finite-Scale Coercivity
for Yang-Mills Wilson-Tube Hamiltonians
Audit and Reproducibility Archive

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This supplementary document reproduces the frozen Paper I audit and reproducibility archive accompanying the citation-authoritative release. It records the citation canon, mathematical nonmutation checks, source authority, certificate inventory, and downstream handoff boundaries. It does not alter or strengthen any theorem in the main article.

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AUTHOR DECLARATIONS

Conflict of interest. The author has no conflicts to disclose.

Author contributions. J. Scott Little: Conceptualization; Formal analysis; Investigation; Methodology; Software; Validation; Writing—original draft; Writing—review and editing.

DATA AND CODE AVAILABILITY

The accompanying source and supplement include machine-readable $SU(3)$ center projectors and graph matrices, exact characteristic-polynomial checks, cofinal three-sector profile certificates, Casimir and endpoint checks, the reference–transport–collar mixing split, marked-source and Wilson-quotient interface data, compilation records, and checksum manifests. The complete historical $j \leq 1$ $SU(2)$ Galerkin witness, independent verification script, constants ledger, JSON certificate, and recorded outputs have also been restored to the present source package.

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Part II

**Audit, Ownership, and Reproducibility
Archive**

Chapter 1

Citation Canon and Key Closure

1.1 Canonical key policy

Every work has one active citation key. The Paper-I source now uses `LittlePaperII` and `LittlePaperIII`; the historical aliases `LittleII2026` and `LittleIII2026` are retained only in the provenance crosswalk. The active article contains 12 citation commands, 20 citation-key occurrences, 10 distinct cited works, and 10 bibliography records. There are no missing or unused active entries.

1.2 Citation ownership firewall

External references support standard lattice-gauge, functional-analytic, spectral-graph, and representation-theoretic background. Papers II and III are cited only at the downstream handoff. No theorem from a later paper is used to prove a Paper-I statement.

Chapter 2

Mathematical Nonmutation Certificate

2.1 Source invariants

The active v0.9.3 and v0.9.4 source graphs each contain 24 files. Their ordered sequences of 125 labels and 61 cross-reference commands are identical. All 63 theorem-family and proof blocks are byte-identical. The only changed active files are `main.tex` and `sections/12_scope.tex`, and their changes are confined to date/version metadata, bibliography-key canonicalization, bibliography notes, and the reproducibility notice for the restored $SU(2)$ certificate.

Scope Firewall 2.1 (Protected mathematical content). *The 80 displayed-math environments, all theorem and proof bodies, the $SU(2)$ value $\widehat{\kappa}_G^{SU(2)} = 0.657490679870\dots$, the exact $SU(3)$ sector gaps, the cofinal profiles, the common floor κ_{cof} , and the marked source certificate $\text{Hol}_{\mu,n}^I(m) = \omega^m$ are unchanged.*

Chapter 3

Source and Reproducibility Registry

3.1 Controlling source set

Role	Controlling object
Mathematical article	Paper I v0.9.3 citation-and-notation canon; v0.9.4 is its citation-only derivative.
Selected $SU(3)$ packet	Paper-I v0.2.0 selected- $SU(3)$ finite-packet augmentation, integrated into v0.9.3.
Independent $SU(2)$ control	Complete $j \leq 1$ Galerkin witness and verification scripts from the July-16 source package.
Historical long form	July-16 content-preserving audit baseline, retained as provenance and audit evidence only.

3.2 Build reproducibility

The article compiles by three deterministic `pdflatex` passes with zero undefined citations, zero undefined references, zero duplicate labels, and no box warnings. The packaged long-form source rebuilds the article and this audit wrapper from a clean directory.

Chapter 4

Paper-I Handoff and Scope Firewalls

4.1 Exported packet

Paper I exports the finite positive-thickness source packet: the gauge-invariant Wilson quotient, selected center grade, complete-ground projection, marked time-zero carrier, meridional class, actual sectorwise ultraviolet–infrared–mixing profiles, common coercive floor, and non-surjective refinement/coarse-compression arrows with independently certified endpoints.

4.2 Downstream ownership

Paper II owns admissible scale-bordism selection and branch descent. Paper III owns positive-thickness regional and spacetime reconstruction. Paper IV owns thick-to-thin reconstruction and selected hyperbolic energy. Paper V owns the full translation representation, joint spectral measure, no-light-cone leakage, and invariant-mass isolation. None of these downstream results is imported into Paper I.

Scope Firewall 4.1 (No premature mass-gap claim). *Paper I proves finite-scale, time-zero coercivity and its selected source packet. It does not prove a zero-thickness limit, continuum observable net, Poincaré covariance, spectrum condition, confinement, scattering, or the Yang–Mills existence and mass-gap theorem.*

Chapter 5

Release Disposition

Audit Verdict 5.1 (Citation-layer completion). *Paper I is citation-closed and audit-ready. The authoritative article, canonical bibliography, selected-SU(3) and independent SU(2) evidence, source diff, placement ledger, nonmutation audit, and reproducible long-form wrapper are frozen in the release bundle.*