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AI-AUGMENTED PEER-REVIEW:

Algebraic Decoupling and Nilpotent Scission over the Chrysene Tensor Space: A Geometric Framework for Cryptographic Information Containment

Compiled by the Editorial Office

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Review Scope and Objective

Prior to submission, this article underwent a Level 1 AI-Augmented review. Under Level 1, the author conducted an AI-augmented review of the manuscript, using review instructions provided by the editorial committee that restrict the AI system's task to identifying mathematical and logical flaws. Under Level 1, the AI-augmented review may also issue specific recommendations on how to correct identified flaws.

Upon submission, the editorial board evaluated the manuscript using the same review instructions provided to the author, in order to confirm the author-side findings. Human review was used to judge whether the manuscript adhered to the principles of the Chrysene Formalism, and whether it was grounded in the invariant chemistry that forms the axiomatic framework and tensorial space of the Chrysene Formalism. A more rigorous tier of AI-augmented peer review is currently in development and is being implemented for papers that will be published soon. It is anticipated that Level 1-reviewed papers will be subject to future audit, and, where warranted, updated versions of the manuscript may be issued.

Disclosure of AI Use

The author claims the use of AI in the development and writing of the manuscript.

AI-Augmented Review Procedure

This submission was evaluated under the journal's basic Level 1 AI-augmented review protocol, consisting of two independent stages:

(1) **Author-Side Draft Check.** During manuscript preparation, the author employed an AI-augmented review system to screen the draft for mathematical and logical flaws prior to submission.
Model(s) used: Gemini 3.1 Pro (Extended).

(2) **Editorial Meta-Review.** Following submission, the editorial office conducted a second, independent check for mathematical and logical flaws, also using AI-augmentation, to verify consistency with the foundational formalism prior to acceptance.
Model(s) used: Gemini 3.1 Pro (Extended).

Review workflow: Single-model review.

> **Scope of Review**
>
> AI-augmented review at this tier evaluates internal consistency, notational coherence, and alignment with previously established results in the formalism. It does not constitute independent verification of novel mathematical claims by a subject-matter expert, and it does not certify that a cross-field analogy invoked in the manuscript (e.g. between a result native to one field and the formalism's invariants) is mathematically valid beyond the level of internal consistency and stated falsifiability. Readers evaluating a specific applied claim in this paper are encouraged to consult a domain specialist in the relevant field.

Editorial Board & Review Committee Summary

Recommendation: Accept with Minor Revisions

The manuscript presents a coherent algebraic-geometric framework in which information containment is expressed by orthogonal projections and a nilpotent scission operator acting on a module over GF(4). The ambient geometry is the Chrysene Tensor Space with C_{2h} connectivity; geometric keys are realised as choices of admissible sector; encoding and recovery become projections; and non-compliant states are mapped into the null ideal. The paper is carefully limited in its claims and maintains a consistent, non-aggressive tone.

The central definitions and the Scission Containment Theorem are sound. A small number of formal clarifications will further improve precision and preempt the most likely technical queries. The requested revisions are additive and do not require restructuring.

Reviewer 1 (AI-Augmented): Algebra, Finite Fields & Non-Commutative Geometry

1. Status of the ambient module M

Critique: The constructions are carried out in a GF(4)-module M of finitely supported states. While the intention is clear, an explicit definition of M as a free module (or as the space of finitely supported functions $\mathbb{Z}^3 \to \mathrm{GF}(4)$) would remove residual ambiguity.
Recommendation: Insert a short formal definition of M at the opening of Section 3 (or at the end of Section 2).

Author's Reply

A Definition has been inserted at the end of Section 2 (equivalently at the opening of Section 3). It identifies M as the free GF(4)-module on the lattice points of $\mathbb{Z}^3$, or equivalently the module of finitely supported functions $\psi : \mathbb{Z}^3 \to \mathrm{GF}(4)$.

2. Algebraic expression of the scission operator

Critique: The operator $\hat{P}_{\mathrm{sciss}}$ is defined by cases. A purely algebraic expression (for example in terms of the complementary projections and the characteristic idempotent of the admissible sector) would be preferable in the present style.

Recommendation: After the case-wise definition, record an equivalent algebraic formula.

Author's Reply

Immediately after the case-wise definition in Section 4, the equivalent expression $\hat{P}_{\text{sciss}} = p_{\text{safe}} \circ \chi_{\text{safe}}$ has been added, where χ_{safe} denotes the characteristic idempotent of the admissible sector.

3. Characterisation of compliant states

Critique: The main theorem refers to states that "fail the geometric parity condition." A one-line lemma equating compliance with membership in $\operatorname{im} p_{\text{safe}}$ would make the logical chain fully transparent.
Recommendation: Insert the suggested lemma immediately before the Scission Containment Theorem.

Author's Reply

The requested Lemma (Compliant States) has been placed immediately before the Scission Containment Theorem.

Reviewer 2 (AI-Augmented): Cryptography & Information Isolation

4. Definition of admissible endomorphisms

Critique: The Scission Containment Theorem quantifies over "admissible endomorphisms." A precise definition (endomorphisms that preserve the admissible sector) is needed for the statement to be self-contained.
Recommendation: Add a one-line definition in Section 4 before the theorem.

Author's Reply

A Definition of admissible endomorphism (those that preserve the admissible sector) has been inserted in Section 4 immediately before the Scission Containment Theorem.

5. Encoding isomorphism

Critique: Encoding identifies the admissible sector with $\mathrm{GF}(4)^k$. The existence of a chosen ordered basis (and the resulting isomorphism) should be stated explicitly.
Recommendation: Add a clarifying sentence in the Encoding definition.

Author's Reply

A clarifying sentence has been added inside the Encoding definition in Section 5, stating that an ordered basis yields a canonical isomorphism $K \simeq \mathrm{GF}(4)^k$.

6. Scope statement

Critique: The paper correctly disclaims computational hardness assumptions and any claim to replace existing primitives. The present wording is already appropriate; no change is required beyond ensuring that this limitation remains prominent in the Discussion.
Recommendation: The existing limitation language is already appropriate.

Author's Reply

No change was required; the scope paragraph remains as previously written.

Reviewer 3 (AI-Augmented): Coding Theory & Finite-Field Methods

7. Relation to coding-theoretic constructions over GF(4)

Critique: Additive codes over GF(4) are a classical subject. A brief remark in the Related Work appendix (or in the Discussion) noting that the present use of GF(4) is geometric rather than coding-theoretic would further clarify the contribution.
Recommendation: One additional sentence in the literature appendix is sufficient.

Author's Reply

A sentence to this effect has been added at the end of the relevant paragraph in the Related Work appendix.

8. Numerical illustrations

Critique: The four simulations usefully support the main constructions. Their captions already describe them accurately as illustrations.
Recommendation: No further change is required.

Author's Reply

The existing figure captions already describe the simulations as illustrations; no revision was made.

Author's Concluding Remarks

Thank you for the careful and constructive review. All recommendations and requested clarifications have been incorporated into the revised manuscript. The revised manuscript is submitted for your consideration.

Final Remarks from the Editorial Review Committee Chair

The editorial meta-review of this manuscript has been completed. Using the journal's AI-augmented evaluation protocol, the editorial office assessed the submission's alignment between its stated mathematical formalism and its applied engineering or scientific claims, and confirmed that the manuscript satisfies the journal's standard for internal consistency at this review tier. The manuscript's treatment of the ambient module's formal status, the algebraic expression of the scission operator, the characterisation of compliant states, the definition of admissible endomorphisms, the encoding isomorphism, and the relation to classical coding-theoretic constructions over GF(4) was found to be consistent throughout. The reduction of selective accessibility to a choice of admissible sector, and of hard isolation to nilpotent scission into a null ideal, was noted as the manuscript's central contribution.

The manuscript is formally accepted for publication in the *Annals of the Chrysene Formalism*, Volume 1, Number 1.

Revision History

Version	Date	Notes
v1.0	2026-08-11	Initial publication.

Living Document Notice

As with any actively developing field, the mathematical and applied claims in this article are subject to periodic re-evaluation as the surrounding formalism matures and as the journal's AI-augmented review tooling advances. Consistent with standard scientific practice for provisional or fast-moving frameworks, this article and its review record may be re-audited by subsequent review systems, and a revised version bearing an updated review history may be issued to reflect developments in the field. Readers should consult the Revision History table above, and the journal's records, for the current version number and audit date of this article.

Editorial Disclaimer

The *Annals of the Chrysene Formalism* aims to develop the Chrysene Formalism through the application of advanced mathematics, using AI systems selected as well suited to this task. In pursuing this aim, it is possible that errors occur during the mathematical progression and analysis of the formalism, including within the review and editing process itself. However, the formalism is constructed within a multidisciplinary, horizontal framework that is grounded in a specific instantiation of molecular matter and its associated networks, an instantiation that is invariant and falsifiable. For this reason, the editorial office considers the formalism well suited to an AI-augmented approach, and anticipates that this approach will continue to be adapted as AI models and the surrounding mathematical understanding advance.