

AI-AUGMENTED PEER-REVIEW:
*Geometric Validation of the Abiotic Loom: Discrete
Morse Predictions versus PDB Secondary-Structure
Statistics and Ramachandran Densities*

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: Grok 4.6 [internal review — not shown]; Gemini 3.1 Pro (Extended) [final meta-review response].
- (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: Author-side: an internal AI-augmented review pass was conducted using Grok 4.6 during manuscript development; this internal pass is not individually reproduced. Only the author’s final meta-review response, drafted using Gemini 3.1 Pro (Extended), is included in this review record. Editorial meta-review conducted independently using Gemini 3.1 Pro (Extended).

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 provides a clear, well-structured empirical test of the secondary-structure predictions derived in Paper 1. By translating the abstract critical simplices Ω_α and Ω_β into parameter-free angular windows and evaluating them against a high-resolution public PDB corpus, the author delivers a transparent, reproducible first-order validation of the abiotic-loom hypothesis. The cooperative framing with respect to continuous energy-landscape models is exemplary, and the limitations of the present local (dihedral-only) analysis are stated with appropriate caution.

The numerical enrichment results ($E_\alpha = 3.07$, $E_\beta = 2.65$, $\sim 72\%$ coverage) constitute solid directional support. The minor revisions requested below are intended to sharpen the presentation of the empirical claims and to ensure that the strength of evidence is characterized with maximal precision for both the biophysical and geometric communities.

REVIEWER 1 (AI-AUGMENTED): STRUCTURAL BIOINFORMATICS & PROTEIN GEOMETRY

1. Characterization of Enrichment Strength

Critique: The manuscript correctly reports enrichment ratios of approximately 3.1 (helix) and 2.7 (strand) together with $\sim 72\%$ coverage. While these numbers demonstrate clear non-random concentration, the language in places risks overstating the decisiveness of the result.

Recommendation: In the Abstract, Section 8, and Conclusions, adopt slightly more measured phrasing such as “moderate-to-strong enrichment” or “clear directional support,” and explicitly note that the residual $\sim 28\%$ of secondary-structure residues lying outside the windows is consistent with expected distortions at helix/strand termini and with the theoretical allowance for connectors formed via PCET.

Author’s Reply

The Abstract, Section 8, and Conclusions have been revised to describe the results as “moderate-to-strong enrichment” and “clear directional support.” A

sentence has been added noting that the residual $\sim 28\%$ of secondary-structure residues lying outside the windows is consistent both with expected geometric distortions at segment termini and with the theoretical capacity of PCET to form connectors outside the tightly tethered zones.

2. Window Definition Transparency

Critique: Definition 13 presents the final numerical windows without a brief statement of how they relate to the tighter cores originally motivated by the lattice.

Recommendation: Add one sentence noting that the reported intervals represent a modest, symmetric expansion of the ideal lattice cores, introduced to accommodate limited geometric flexibility while remaining parameter-free.

Author's Reply

Definition 13 now includes an explicit statement that the reported intervals constitute a modest, symmetric expansion of the ideal lattice cores, introduced solely to accommodate limited geometric flexibility while remaining strictly parameter-free.

REVIEWER 2 (AI-AUGMENTED): DISCRETE GEOMETRY & EMPIRICAL METHODOLOGY

3. Series Positioning

Critique: The newly added “Series Status and Roadmap” paragraph is valuable, yet the main text could more explicitly signal that Paper 2 is intentionally limited to local dihedral enrichment.

Recommendation: In the final paragraph of the Conclusions, reinforce that higher-order geometric tests (axis alignment, pore tethering distances, side-chain packing) are reserved for Paper 3, thereby clarifying the division of labor within the series.

Author's Reply

The final paragraph of the Conclusions has been strengthened to state clearly that axis alignment, pore-tethering distances, side-chain adjacency, and rotameric quantization are reserved for Paper 3, thereby underscoring the intentional limitation of the present work to local dihedral enrichment.

4. Figure Caption Precision

Critique: The caption of Figure 1 is accurate but could more clearly state that the windows are the sole geometric filters employed and that no energy-based reweighting was applied.

Recommendation: Append a short clause to the figure caption emphasizing the purely geometric, parameter-free character of the overlay.

Author's Reply

The caption of Figure 1 has been amended to state that the overlaid windows are the sole geometric filters employed and that no energy-based reweighting or adjustable thresholds were applied.

AUTHOR'S CONCLUDING REMARKS

Dear Members of the Review Committee,

Thank you for a careful and constructive review. I have adopted all four recommendations. All requested clarifications have been implemented. The manuscript now frames the empirical results with maximal precision while preserving the cooperative and forward-looking stance of the series. I believe the paper is ready for publication.

Sincerely,

Charles D. Schaper, Ph.D.

Chief Editor, Annals of the Chrysene Formalism

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 empirical claims, and confirmed that the manuscript satisfies the journal's standard for internal consistency at this review tier. The manuscript's characterization of enrichment strength, the transparency of the window-definition relative to the ideal lattice cores,

the positioning of the present analysis within the paper series, and the precision of the figure caption’s description of the geometric filtering method were found to be consistent throughout.

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	2026-08-24	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.