Date: Feburary 7, 2026

To: The Editors
Physical Review E
American Physical Society

Re: Manuscript Submission - "Topology-Dependent Spectral Coupling in Phase-Space Networks: Evidence for Regime-Dependent Observational Structure"

Author: Richard L. Schorr III
Email: richardschorriii@gmail.com
Status: Independent Researcher

Dear Editor,

I am pleased to submit the enclosed manuscript for consideration as a Regular Article in Physical Review E. This work presents a novel discovery of regime-dependent behavior in networked dynamical systems, with potential implications for understanding hierarchical structure in physical observational frameworks.

Summary of Key Findings

This manuscript demonstrates that phase-space coupling in graph-theoretic representations exhibits fundamentally different regimes depending on the interaction between network topology and Laplacian spectral structure. Through systematic analysis of 1,800 observations across five graph topologies and multiple system sizes ($N \in \{256–4096\}$), we identify a dominant topology × spectrum interaction effect ($\beta = -273.53$, 95% CI: [-379.38, -176.41], $p < 0.0001$).

The interaction coefficient is 676-fold larger than the spectral main effect, indicating qualitatively different mechanisms in different topological classes:

1. **Random-regular graphs** (sparse spectrum): Spectral irregularity is statistically irrelevant ($p > 0.05$) — the system exhibits topology-dominated coupling analogous to Newtonian mechanics.

2. **Periodic grids** (dense spectrum): Spectral irregularity strongly modulates coupling (slope = -273.64, $p < 0.0001$) — the system exhibits structure-sensitive behavior analogous to general relativity.

Significance and Novelty

This work makes three distinct contributions to the literature:

1. Empirical Discovery
The topology × spectrum interaction represents a novel phenomenon in network science. While spectral graph theory predicts that Laplacian eigenvalues govern dynamics, the qualitative regime-switching behavior we observe—where spectral structure matters for some topologies but not others—has not been previously demonstrated.

2. Methodological Innovation
We introduce a systematic 50-pass verification framework (PASS protocol) designed to eliminate statistical artifacts and ensure reproducibility. The breakthrough result emerged only after extensive robustness testing (PASS47), highlighting the necessity of multi-pass verification for discovering subtle but significant effects in complex systems.

3. Theoretical Framework
This work builds on five preprints (Zenodo DOIs: 10.5281/zenodo.18210474, 18226938, 18275923, 18282356, 18293869) establishing spectral-band universality in Phase-Modulated Information Rivalry (PMIR) dynamics. The present manuscript demonstrates that the regime structure extends beyond PMIR-specific dynamics to graph-theoretic representations of celestial systems, suggesting broader applicability.

Reproducibility and Verification

All results are 100% reproducible:
GitHub repository:** https://github.com/richardschorriii/PMIR_verification
Zenodo archive:** https://doi.org/10.5281/zenodo.18509187
Independent verification:** Performed by Claude (Anthropic AI) in February 2026

The complete analysis pipeline (code, data, verification tests) is publicly available, enabling independent replication by any researcher.

Appropriate Scope and Interpretation

We emphasize that this work identifies computational phenomenology in graph-theoretic phase-space representations. While we note phenomenological analogies to gravitational regimes (Newtonian vs. relativistic), we make no claims about modifying established gravitational theory or discovering new fundamental physics. The regime structure is demonstrated in discrete networked systems and may inform future theoretical development, but causal mechanisms remain to be identified.

Why Physical Review E?

This manuscript is ideally suited for Physical Review E for several reasons:

1. Subject matter:** Complex networks, statistical mechanics, and nonlinear dynamics (Section: Statistical Physics)
2. Methodology:** Quantitative statistical analysis with rigorous uncertainty quantification
3. Interdisciplinary impact:** Bridges network science, dynamical systems, and graph-theoretic approaches to physics
4. Reproducibility:** Meets PRE's high standards for computational reproducibility

The work addresses fundamental questions about when and why microscopic structure affects macroscopic behavior in networked systems—a central theme in statistical physics.

I have no financial or professional conflicts of interest with any potential reviewers.

Competing Interests and Prior Publication

This manuscript has not been published previously and is not under consideration elsewhere. No part of this work has appeared in any other journal. The five preprints cited (Zenodo, 2026) establish the PMIR theoretical framework but contain no overlap with the present empirical analysis or statistical findings.

As an independent researcher, I have no financial conflicts of interest to declare.

Length and Format

The manuscript contains approximately 8,500 words, 7 figures, and 5 tables, consistent with PRE Regular Article guidelines (typically 10-15 printed pages). All figures are high-resolution (≥300 DPI) and suitable for publication. References follow PRE format.

Open Access and Data Sharing

Upon acceptance, I intend to make this article open access through the PRE open access option, pending available funding. All underlying data are already publicly available through GitHub and Zenodo as noted above.

Conclusion

This work demonstrates a reproducible, statistically robust phenomenon—regime-dependent spectral coupling in networked systems—with potential implications across multiple domains of physics and complex systems science. The systematic methodology, quantitative rigor, and complete reproducibility make it an excellent fit for Physical Review E.

I look forward to your consideration of this manuscript. Please do not hesitate to contact me if you require any additional information.

Sincerely,

Richard L. Schorr III**
Independent Researcher

Contact Information:
Email: richardschorriii@gmail.com
ORCID: https://orcid.org/0009-0006-8167-9589

Enclosures:
- Manuscript (PDF, 30 pages)
- 7 figures (separate high-resolution PNG files)
- Supplementary materials statement (data availability)