

Peer Review

Review of: "From Coherence to Control: A Non-Systematic Approach to Multi-Parametric Phenomena"

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Review of "From Coherence to Control: A Non-Systematic Approach to Multi-Parametric Phenomena"

Ion Sandu, National Institute for Laser Plasma and Radiation Physics, Bucharest *Qeios Preprint v2*, January 2026

Overview

This philosophical essay proposes a reframing of experimental epistemology, arguing that complex, far-from-equilibrium systems require scientists to abandon the classical imperative of control in favor of recognizing emergent coherence. The author draws on Prigogine, Turing, Haken, Varela, and others to articulate a vision of the experimenter as "selector of reality" rather than external controller.

Strengths

Conceptual Ambition: The essay tackles a genuine tension in experimental science—the Baconian tradition of isolating variables versus the reality that multi-parametric, nonlinear systems resist such treatment. The central claim that "coherence, rather than control, defines the frontier of understanding" is provocative and worth serious consideration.

Synthetic Scope: Sandu weaves together dissipative structures, Turing morphogenesis, synergetics, and enactivism into a reasonably coherent narrative arc. The progression from historical critique through non-equilibrium dynamics to methodological prescription has logical momentum.

The Three Principles: The articulation of ontological alignment, methodological reduction, and participatory observation (Section 5) provides useful conceptual handles for experimentalists working in complex domains.

Honest Acknowledgment of AI Assistance: The explicit description of GPT-5's role in "conceptual organization, linguistic refinement, and structural synthesis" sets an appropriate standard for transparency.

Significant Weaknesses

Title Inversion: The title promises movement "From Coherence to Control," but the argument runs the opposite direction—from control *toward* coherence. This suggests incomplete revision.

Underdefined Core Concepts: "Coherence" carries substantial argumentative weight but receives no rigorous definition. Is it thermodynamic? Informational? Phenomenological? Similarly, "non-systematic methodology" needs sharper articulation—how does it differ from intuition or post-hoc rationalization? The "spiral" methodology is gestured at but never operationalized.

Grafted Material: The nanophotonics references (Bekenstein et al., Kedia and Dennis) in Section 3 feel disconnected from the author's apparent experimental domain of colloidal crystallization and evaporative assembly. The section reads as if contributed by the AI assistant from outside the author's direct expertise.

Overreach in the Epilogue: The claims about human irreplaceability—"only humans can truly see and give sense to order in chaos"—are asserted rather than argued. Given that the manuscript credits GPT-5 with conceptual and structural contributions, the insistence that machines cannot participate in meaning-making creates an unresolved tension.

Missing Literature: Conspicuously absent:

- Von Foerster's second-order cybernetics (directly relevant to observer-as-participant themes)
- Bateson's ecology of mind
- Peirce on abductive reasoning (the "spiral" methodology appears to redescribe abduction without engaging the literature)
- The sociology of scientific knowledge tradition (Collins, Pickering) on experimental practice

Questions for the Author

1. How does "coherence" relate to Haken's order parameters? Are they synonymous, or is coherence a broader category?
2. The spiral methodology—is this essentially abductive inference? If so, why not engage with Peirce?
3. What distinguishes "participatory observation" from observer-expectancy effects that experimental design typically tries to eliminate?
4. Can the claimed human monopoly on "seeing" and "meaning" be reconciled with the acknowledged AI contribution to this very manuscript's conceptual structure?

Minor Issues

- Section 5 contains a typo: "experien" for "experience"
- Some quotations would benefit from page numbers
- The Galileo attribution ("Measure what is measurable...") is apocryphal—no primary source confirms it

Recommendation

A suggestive but undercooked essay that would benefit from another revision cycle. The core insight—that complex systems require accompaniment rather than domination—deserves fuller development with more rigorous definition of terms and deeper engagement with cybernetics and philosophy of science literature. The tension between the epilogue's human exceptionalism and the manuscript's own human-AI collaboration should be addressed directly rather than elided.

Declarations

Potential competing interests: No potential competing interests to declare.