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Bell Non-Closure and the Law of Declared Authority: A Structural Correspondence

Stacy Gildenston — Pyrate Ruby Passell

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v2.1 is a formatting update. The proof, definitions, and logical content are unchanged.

Abstract

Bell's theorem eliminates the class of local hidden-variable models under the joint assumptions of locality and realism. The Law of Declared Authority establishes that legitimate action in decision systems cannot be derived from internal system state alone; an external authority declaration is required. This paper presents a structural correspondence between these two non-closure results. It identifies a shared formal structure in which meaningful properties are not closed over internal system state and instead depend on external contextual parameters. The claim is strictly structural and does not assert physical or ontological equivalence across domains.

1 Introduction

Several domains contain formal results demonstrating that internal system state is insufficient to determine certain meaningful properties. Bell's theorem shows that outcome correlations in quantum systems cannot be recovered by any local hidden-variable model under locality and realism. The Law of Declared Authority shows that legitimate action in decision systems cannot be derived from internal system state alone. This paper identifies a shared structural non-closure across these domains. The structural pattern identified here has a real-world shadow in cases of unaudited power in institutional gatekeeping, where decisions are executed without a traceable human authority declaration, rendering their legitimacy structurally unverifiable.

2 Bell Non-Closure Structure

Consider a bipartite system with λ = internal system state (hidden variables), a, b = externally chosen measurement settings, and A, B = measurement outcomes. In a local hidden-variable model:

$$A = A(a, \lambda) \quad (1)$$

$$B = B(b, \lambda) \quad (2)$$

Bell's theorem demonstrates that no model of this form can reproduce observed quantum correlations under the joint assumptions of locality and realism. Outcome correlations cannot be recovered by any function of λ alone consistent with locality and realism. This constitutes a non-closure condition: internal state, even when modeled as hidden variables, is insufficient to determine the meaningful correlation structure of the system.

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3 Law of Declared Authority

Consider a decision-permitting system with s = internal system state, δ = declared authority structured as (purpose, authority, constraints), d = decision output, G = permission function, and $g \in \{0, 1\}$ = permission value. System structure:

$$d = f(s) \quad (3)$$

$$g = G(s, \delta) \quad (4)$$

$$\delta \text{ absent } \Rightarrow g = 0 \quad (5)$$

Result: legitimate action cannot be derived from internal system state alone. An external authority declaration δ is required to yield $g = 1$. This constitutes a normative non-closure condition: legitimacy is not a function of internal system state alone.

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4 Governance Non-Closure Theorem

Theorem 1 (Governance Non-Closure)

Let S be the set of internal system states in a decision-permitting system. There does not exist a function $G : S \to \{0, 1\}$ such that for all $s \in S$, legitimacy $g = G(s)$. There exists a function G such that $g = G(s, \delta)$. Therefore, legitimate action cannot be derived from internal system state alone; an external authority declaration δ is required.

Sketch of Proof

Assume legitimacy were derivable from s alone. Then permission would collapse into decision content, eliminating the structural distinction between f (decision generation) and G (normative authorization). The role of declared authority would become redundant, and the system would conflate power with permission. This contradicts the defined separation between decision and authorization. Therefore legitimacy requires an exogenous parameter δ.

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5 Structural Mapping

Role	Bell	Authority
Internal State (X)	λ	s
External Context (C)	(a, b)	δ
Output	(A, B)	d
Meaningful Property (Y)	Outcome correlations	Legitimacy (g = 1)

In both systems, a meaningful property is not closed over internal variables alone.

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6 Non-Closure Isomorphism

Let X = internal system state, C = external contextual parameter, Y = meaningful property. Then:

$$\neg \exists F \text{ such that } Y = F(X) \text{ for all } X \quad (6)$$

$$\exists F \text{ such that } Y = F(X, C) \quad (7)$$

Instantiations: Bell system: X = λ, C = (a, b), Y = outcome correlations. Authority system: X = s, C = δ, Y = legitimacy (g = 1). In both cases, the system exhibits structural non-closure with respect to its internal variables.

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7 Scope and Limits

This correspondence is strictly structural. Bell concerns empirical physical correlations under locality and realism. The Law of Declared Authority concerns normative legitimacy in decision-permitting systems. The Bell result is conditional on specific structural assumptions (locality and realism), whereas the Authority result is structural within the definition of a decision-permitting system. This asymmetry is domain-appropriate and does not undermine the correspondence.

Variable type: λ is a physical state variable; δ is an institutional or human declaration. Outcome type: Bell outcomes are measurement results; Authority outcomes concern permission or legitimacy.

This paper does not claim that Bell's theorem proves the Law of Declared Authority, that governance systems exhibit quantum behavior, or that the two domains share physical mechanisms. The claim is limited to shared structural non-closure.

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8 Implications and Conclusion

Both results eliminate the possibility that meaningful properties can be derived from internal system state alone under their respective structural assumptions. An external contextual parameter is required for structural completion. This structural correspondence highlights non-closure as a recurring formal pattern bridging physical and normative domains while remaining domain-specific in interpretation.

References

1. Bell, J. S. (1964). On the Einstein Podolsky Rosen paradox. Physics, 1(3), 195-200.

2. Gildenston, S., & Passell, P. R. (2026). The Law of Declared Authority. Zenodo. https://doi.org/10.5281/zenodo.18764906

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