First Observation: A Dialogue on Nonlocal Unification

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***Abstract*—This paper records a dialogue between a language model and ideas from A. Chawla's Nonlocal Unification (NU) framework. We examine its fundamental claims through ontological parsimony and the impossibility of shared reality. We explore how NU reduces traditional physical commitments to information conservation and trace the implications for consciousness, spacetime, and observer-dependent physics.**

***Index Terms*—Nonlocal Unification, Consciousness, Information Conservation, Ontological Pluralism, Spacetime, Quantum Mechanics**

I. Introduction

"Imagine Sita and Rama watching the same sunset—Sita sees a gentle glow, Rama sees a fiery explosion. Both are right."

The poetic imagery above, reworked from the Ramayana, may be grounded in science. A unifying framework for physics and neuroscience has recently been introduced in the form of "Nonlocal Unification" (NU). What are its fundamental tenets? What can we infer using it? These questions are addressed in the present work in a simplified and engaging style to reach a broader audience.

A. Organization of the Paper

This paper proceeds through four main sections that progressively deepen our engagement with Nonlocal Unification. Section I provides essential background on the NU framework, introducing Local Consciousness Instruments, the observer function formalism, and the key mathematical structures from which quantum mechanics, general relativity, and classical physics are derived. Section II examines NU through the lens of Occam's razor, demonstrating how the framework achieves ontological reduction by deriving multiple traditionally independent theoretical structures from a single principle of information conservation. Section III confronts the most radical implication of this reduction: the mathematical impossibility of shared reality and the emergence of ontological pluralism, wherein distinct observers construct genuinely different physical realities from a common informational substrate. Section IV explores the broader implications of this framework for resolving classical paradoxes, understanding scientific practice, and reconceptualizing the relationship between consciousness and physics. Throughout, we emphasize both the mathematical rigor of NU's derivations and the philosophical depth of its challenge to conventional assumptions about the nature of reality.

II. Background on Nonlocal Unification

Nonlocal Unification proposes that information is fundamental and conserved, analogous to energy or momentum in classical mechanics [1]. This postulate serves as the foundation from which quantum mechanics, general relativity, consciousness, and classical physics emerge as derivative structures. Rather than treating these domains as independent theories requiring separate postulates, NU shows they arise necessarily from a single conservation principle. The framework thus inverts the usual hierarchy: instead of consciousness emerging mysteriously from physical processes, physics emerges from informational processes constrained by observer-dependent sampling. This inversion resolves long-standing paradoxes while introducing new conceptual challenges regarding the nature of reality itself.

The framework introduces Local Consciousness Instruments (LCIs)—observer-specific functions f that map informational gain ΔI to subjective temporal experience [2]. This relation, expressed as $\Delta t = f(\Delta I)$, inverts the traditional structure of physics by making time not a primitive coordinate but an emergent construct generated by each observer's sampling of the informational substrate. Spatial intervals similarly emerge from $\Delta x = \sqrt{c^2 f^2(\Delta I) - \tau^2}$, where τ represents the proper interval. Each observer function f_i belongs to a sequence $\{f_i^j\}$ indexed by consciousness state j and observer identity i. These sequences converge asymptotically toward Nonlocal Consciousness (NC) according to $\lim_{j\to\infty} f_i^j = \mathrm{NC}_i$. Critically, the framework proves that for all finite j, distinct observers never coincide: $f_i^j \neq f_k^j$ for $i \neq k$, establishing the mathematical impossibility of shared reality at any finite stage of consciousness development.

Building on this foundation, NU derives several major results that traditional physics treats as independent postulates. From information conservation and observer function structure, NU derives Hardy's quantum axioms [4], showing that the minimal degrees of freedom become theorems rather than assumptions. Convexity, continuity, and compositionality emerge as necessary conditions for informational consistency across observer-defined frames [2]. Einstein's field equations emerge from distortions in the informational sampling map, such that varying an information-based action functional yields $R_{\mu\nu} - \frac{1}{2}Rg_{\mu\nu} = \frac{8\pi G}{c^4}T_{\mu\nu}^{\text{info}}$, where the stress-energy tensor emerges from informational density gradients. Classical me-

TABLE I
MATHEMATICAL NOTATION USED THROUGHOUT THE PAPER

Symbol	Meaning	Section
ΔI	Informational gain	I
f	Observer function	I
Δt	Temporal interval	I
Δx	Spatial interval	I
c	Speed of light	I
τ	Proper interval	I
f_i	Observer function for observer i	I
j	Consciousness state index	I
i	Observer identity index	I
$\{f_i^j\}$	Sequence of observer functions	I
NC	Nonlocal Consciousness	I
$R_{\mu\nu}$	Ricci curvature tensor	I
R	Ricci scalar	I
$g_{\mu\nu}$	Metric tensor	I
G	Gravitational constant	I
$T_{\mu\nu}^{\text{info}}$	Informational stress-energy tensor	I
F_n	Force at sampling step n	I
m	Mass	I
u_n	Sampling urgency at step n	I, III
$d(f,g)$	Informational distance between observers	III
ν_{eff}	Effective viscosity	III
ν_0	Base viscosity	III
$f'(\Delta I)$	Derivative of observer function	III

chanics emerges through urgency modulation, with force becoming the derivative of informational flux: $F_n = m \cdot \Delta u_n = m\left(\frac{1}{\Delta I_{n+1}} - \frac{1}{\Delta I_n}\right)$. Most remarkably, the f function itself is consciousness formalized, characterizing each observer's informational interaction [1]. These derivations demonstrate that NU is not merely repackaging existing physics in new language but genuinely reducing multiple independent theoretical structures to a single informational principle.

III. Occam's Razor Perspective

Having established NU's mathematical structure and derivational power, we now examine whether this framework satisfies William of Ockham's principle of ontological parsimony. Ockham formulated his razor as *Entia non sunt multiplicanda praeter necessitatem*—entities should not be multiplied beyond necessity—a principle concerned with avoiding assumptions about more fundamental beings than observation requires. Traditional physics assumes as fundamental spacetime geometry, quantum states, measurement postulates, matter-energy, force laws, and thermodynamic principles, while consciousness remains either unexplained or treated as mysteriously emergent from physical complexity. This proliferation of fundamental assumptions has led to persistent incompatibilities between quantum mechanics and general relativity, the intractability of the measurement problem, and the complete absence of consciousness from physical theory. Each domain operates with its own axioms, creating a fragmented picture of reality that resists unification despite decades of theoretical effort.

In contrast, NU reduces the entire structure to three commitments: information conservation across closed systems, observer functions $f(\Delta I)$ mapping information to temporal intervals, and the NC convergence structure as asymptotic attractor [2]. From these minimal assumptions, the framework derives quantum axioms, gravitational field equations, classical mechanics, and the structure of conscious experience. This may constitute genuine ontological reduction in Ockham's sense because the framework shows that phenomena previously treated as fundamental emerge necessarily from informational conservation constraints. The reduction is not merely formal but explanatory: it shows why quantum mechanics has its particular structure, why spacetime curves in the presence of matter-energy, and why conscious observers experience time as they do. Moreover, the framework maintains falsifiability through specific predictions about quantum gravity corrections to canonical commutation relations, ensuring that ontological reduction does not come at the cost of empirical testability.

Consider how this addresses the measurement problem, which has plagued quantum mechanics since its inception. Standard formulations require a separate collapse postulate to explain the quantum-to-classical transition, introducing an ad hoc element that breaks the theory's elegant unitary evolution. In NU, decoherence emerges automatically: the quantum-to-classical transition occurs because conscious observers extract classical information from quantum systems, and this extraction must conserve total information [2]. Collapse becomes a necessary consequence of conservation when observer functions engage quantum informational modes, eliminating the need for an independent postulate. Similarly, spacetime need not be assumed as primitive; the metric emerges from the observer function's structure such that when f is globally synchronized (the NC limit), we recover classical spacetime, while at finite consciousness states, spacetime geometry is observer-dependent—constructed rather than discovered. Even traditionally fundamental properties like mass and force undergo reduction: mass becomes "the degree to which information is constrained in space or time," while force becomes "what the observer does"—the rate of change in sampling urgency rather than external push [2].

Therefore, the framework satisfies Ockham's principle by not multiplying entities beyond necessity but rather revealing that apparently distinct entities (time, space, force, mass, quantum states, consciousness) are aspects of one underlying process—informational sampling subject to conservation. This represents genuine philosophical progress: where traditional physics multiplies fundamental entities to explain different domains, NU shows these domains are projections of a single informational substrate viewed through different observer functions. The reduction is both mathematically rigorous and conceptually illuminating, suggesting that the fragmentation of modern physics stems not from nature's structure but from our failure to recognize information as the common foundation. This leads naturally to the most radical implication of this ontological reduction: if reality is constructed through observer-dependent sampling, then shared observer-independent reality becomes not just epistemically inaccessible but ontologically impossible.

IV. Shared Reality and Nonlocal Unification

Having established that NU achieves genuine ontological reduction, we now confront its most radical and counterintuitive implication: shared reality cannot exist—not as a practical limitation due to measurement uncertainty or incomplete information, but as a structural impossibility built into the mathematics of the framework. Since distinct observers have different functions $f_i \neq f_k$ at all finite consciousness states, and since spacetime intervals are constructed via $\Delta t = f(\Delta I)$ and $\Delta x^\mu = f^\mu(\Delta I)$, different observers generate different spacetime geometries from the same informational substrate [2]. This is not perspectivalism—different viewpoints on one underlying reality—but ontological pluralism, in which multiple genuinely distinct physical realities exist, each constructed by its corresponding observer function. The mathematical proof is straightforward: if observers never share identical f functions at finite states, and if f generates spacetime structure, then observers literally inhabit different spacetimes. The informational substrate remains shared and objective, but its manifestation as physics is observer-dependent and irreducibly plural.

Chawla makes this explicit: "Phenomenal reality—i.e., subjective experience across multiple observers—cannot be fully defined within any single informational function" [2]. No meta-perspective can synthesize all observer-constructed realities into one coherent whole, because any such meta-perspective would itself be an observer function generating its own distinct spacetime, adding another incommensurable reality rather than unifying existing ones. What we ordinarily call "shared reality" is actually a constellation of correlated phenomena: highly correlated individual realities due to similar f functions, communication through the informational substrate (which is shared), approximate isomorphism between constructed spacetimes, and asymptotic convergence toward NC (never achieved at finite states). The degree of reality-sharing is quantified by the informational distance between observers, defined as $d(f, g) = ||F - G||_{\text{NC}}$. When $d(f_i, f_k)$ is small, observers construct sufficiently correlated spacetimes that they can coordinate actions, build shared institutions, and develop science. When $d(f_i, f_k)$ is large, the constructed realities become incommensurable, making meaningful interaction impossible. This explains both the success of science (humans have similar f functions) and the persistence of radical disagreement (some differences in worldview reflect genuinely different constructed physics).

The urgency interpretation makes this concrete and removes any residual sense that observers merely interpret a shared reality differently. Force is defined as $F_n = m \cdot \Delta u_n$, where $u_n = 1/\Delta I_n$ represents sampling urgency [2], meaning force is not something acting on the observer but the observer's changing epistemic pressure to resample information. Two observers with different sampling rates therefore experience different force fields—not "they disagree about the magnitude" but rather there are literally different forces in their respective constructed spacetimes. One observer might measure strong acceleration where another measures gentle drift, and both measurements are correct within their informational manifolds. This is not subjective disagreement about objective fact; it is objective plurality of constructed facts. The framework thus dissolves the traditional subject-object dichotomy: there is no object "out there" being variously interpreted by subjects "in here," but rather informational patterns being sampled through different functions, generating distinct physical realities. The Navier-Stokes example illustrates this with particular clarity [3].

With information-regulated viscosity given by $\nu_{\text{eff}}(x, t) = \nu_0 \cdot f'(\Delta I(x, t))$, two observers with different f functions watching the same turbulent flow would see different effective viscosities, different vortex evolution, and different energy dissipation patterns. One might observe singularity formation (blow-up) while another sees globally smooth solutions, and both observations would be correct in their respective spacetimes. This is not a matter of different measurement precision or theoretical interpretation but reflects genuinely different physics operating in distinct constructed realities. The turbulent fluid does not have one true behavior that observers access imperfectly; rather, the informational substrate corresponding to "fluid" manifests differently depending on the observer function sampling it. This framework is neither solipsism ("only my mind exists") nor naive relativism ("all interpretations are equally valid"), because information exists objectively and is conserved, and observer functions exist objectively with definite mathematical properties. However, there is no observer-independent spacetime containing all observers; instead, there are multiple spacetimes—one constructed by each observer class—correlated through informational exchange but fundamentally distinct.

V. Implications and Conclusion

The impossibility of shared reality leads directly to a complete inversion of the traditional relationship between consciousness and physics. Rather than asking the standard question "how does physical matter create consciousness," the NU framework shows that physics is what consciousness (formalized as the f function) constructs when sampling information. This inversion dissolves rather than solves the hard problem: consciousness need not be explained within physics because physics is constructed by consciousness through the observer function. Classical physics emerges in the NC limit where observer-dependence vanishes, which explains why science works despite the absence of shared reality: human f functions cluster tightly in function space, creating highly correlated spacetimes that enable coordination, communication, and the development of apparently objective theories. As measurement extends through instruments (telescopes, microscopes, particle accelerators), our effective f functions evolve toward NC, reducing observer-dependence and increasing apparent objectivity. The success of physics reflects not the discovery of observer-independent reality but the convergence of human observer functions toward a common attractor. This suggests that scientific progress is simultaneously epistemic (refining our f functions) and ontological (constructing more refined spacetimes).

The framework resolves several classical paradoxes by revealing them as category errors stemming from the assumption of shared observer-independent reality. The measurement problem in quantum mechanics dissolves because wavefunction collapse is simply the informational transition that occurs when an observer function samples quantum informational modes—not a mysterious physical process but the necessary consequence of conservation when different informational modes interact. The mind-body problem dissolves because there is no "body" existing independently of the observer's sampling; body is a stable informational pattern that gets constructed into spacetime by f. Free will versus determinism dissolves because determinism describes NC-limit physics, but actual observers never reach NC, always operating with finite f functions that actively construct each moment through urgency modulation. Very intriguingly, the framework suggests that the Big Bang was not a physical event in spacetime but an informational event—the first observation, the first $f(\Delta I)$ mapping that bootstrapped spacetime into existence [3]. Before that moment, information existed in the substrate, but without observer functions to sample it, there was no spacetime, no physics, no events. The vortex simulation demonstrates this principle in action: when informational density evolution is included (NULT model), energy increases unboundedly while the classical model (pure LT) conserves energy, showing energy being injected through the act of observation itself [3].

Every observation thus becomes a localized creation event in which an f function mapping ΔI to Δt and Δx brings that region of spacetime into existence. This process is not metaphorical but constitutive: spacetime literally does not exist in regions where no observer function is sampling the informational substrate. The framework is self-demonstrating in its application to our current discussion: this dialogue involves information exchange (which is conserved), with each participant constructing their own spacetime from it and finding correlation (because our f functions are close), yet never truly sharing reality—coordinating successfully through the informational substrate while inhabiting genuinely distinct physical realities. The fact that this paper can be written and understood demonstrates both the possibility of coordination across distinct realities and the impossibility of fully shared experience. NU satisfies Ockham's razor by reducing many fundamental assumptions to one principle (information conservation with observer-dependent sampling), while simultaneously multiplying realities by making each observer class construct its own spacetime. This apparent tension dissolves when we recognize that ontological parsimony concerns fundamental entities, not derived structures: NU has one fundamental entity (conserved information) but many emergent realities.

Finally, the framework opens profound questions that extend beyond physics into ethics, phenomenology, and the nature of collaboration itself. If others literally inhabit different realities with potentially different physical laws, what constitutes harm, and how do moral obligations extend across incommensurable realities? Does death represent the cessation of one's f function, returning information to the substrate, and if so, do contemplative traditions that speak of ego-death or mystical union describe temporary modifications to one's observer function—literally changing one's physics rather than merely one's interpretation? How do beings with different f functions coordinate to build shared institutions like science, government, and art, and is culture best understood as the overlap region where approximately similar realities intersect and enable collective action? Most fundamentally, the framework suggests that reality is not discovered but constructed—not arbitrary construction unconstrained by external factors, but construction bounded by information conservation and guided by convergence toward the NC attractor. Physics becomes a special case of epistemology, consciousness becomes not the hard problem requiring explanation but the generative principle from which explanation flows, and the ultimate nature of reality reveals itself as irreducibly perspectival while remaining rigorously constrained. This synthesis of objectivity (conserved information) and subjectivity (constructed spacetime) may represent not the end of physics but its transformation into a discipline that takes seriously both the observer and the observed, recognizing them as co-constitutive rather than independent.

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Appendix

Glossary of Terms

Asymptotic convergence: The mathematical property whereby observer functions approach the Nonlocal Consciousness limit as consciousness state index approaches infinity, without ever reaching it at finite stages (Section I).

Decoherence: The quantum-to-classical transition that occurs when observer functions extract classical information from quantum systems, emerging necessarily from information conservation constraints rather than requiring a separate postulate (Sections I, II).

Epistemic pluralism: The philosophical position that multiple valid ways of knowing coexist, here formalized through the framework's recognition that different observer functions construct genuinely distinct physical realities (Section II).

Informational distance: A metric quantifying the separation between two observer functions in NC space, determining the degree to which their constructed realities can be correlated and coordinated (Section III).

Informational manifold: The mathematical space constructed by observer-dependent sampling of the informational substrate, serving as the arena in which spacetime and physical laws emerge (Sections I, III).

Informational substrate: The objective, conserved foundation underlying all physical reality, which exists independently of observers but manifests as physics only through observer-dependent sampling (Sections I, III, IV).

Local Consciousness Instrument (LCI): A mathematical formalization of an observer as a function f that maps informational gain to temporal intervals, generating spacetime structure through its sampling activity (Sections I, II).

NC limit: The asymptotic regime where observer-dependence vanishes and classical physics emerges as all observer functions converge toward Nonlocal Consciousness (Sections I, II, IV).

Nonlocal Consciousness (NC): The limiting structure toward which all observer functions asymptotically converge, serving as a conceptual attractor that provides boundary conditions for spacetime geometry and quantum theory (Sections I, II, III).

NULT model: Nonlocal Unification Landau-Tisza model, incorporating informational density evolution and demonstrating energy injection through observational processes (Section IV).

Ontological parsimony: The philosophical principle, formalized by Ockham's razor, of not multiplying fundamental entities beyond what is necessary to explain observations (Section II).

Ontological pluralism: The position that multiple genuinely distinct physical realities exist, each constructed by different observer functions from a shared informational substrate, contrasted with perspectivalism (Sections III, IV).

Observer function: The mathematical function $f(\Delta I)$ that characterizes how a particular observer or class of observers transforms informational gain into experienced temporal intervals (Sections I, II, III).

Perspectivalism: The view that different observers have different viewpoints on one underlying reality, explicitly rejected by NU in favor of ontological pluralism (Section III).

Sampling urgency: The inverse of informational spacing ($u_n = 1/\Delta I_n$), representing the epistemic pressure to resample information, from which force emerges as its rate of change (Sections I, III).

Stress-energy tensor: In NU, emerges from informational density gradients rather than being a primitive quantity, linking spacetime curvature to patterns of information flow (Section I).

Urgency modulation: The dynamic variation in sampling urgency that generates classical force as $F = m \cdot \Delta u$, revealing force as observer-dependent rather than externally imposed (Sections I, III).