

Towards a unified theory of subjective consciousness and the natural universe

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Abstract

This review examines theories of everything (or TOEs) that include both the natural universe and subjective consciousness, by applying two critical filters to theories of existence, including those surveyed in Robert Lawrence Kuhn's "Landscape of Consciousness", hereinafter referred to as LoC: (1) The No Supervenience (NS) theorem, which asserts that subjective consciousness is not supervenient on the physical universe. This is equivalent to accepting that the explanatory gap of the hard problem of consciousness rules out implicitly physicalist and other TOEs that invoke functionalistic processes dependent on physical causality, to explain subjective consciousness. The NS theorem thus has the same effect as accepting that the Hard Problem of Consciousness is real, or that materialistic physicalism is false. (2) The *Principle of Natural Empiricism* critical to experimental scientific discoveries and empirical experiences. The difficulty of the hard problem, which remains unresolved 26 years later, is also tied to the likewise unresolved problem of assumed causal closure of the universe in brain function at the basis of pure materialistic neuroscience. Until this conjecture is empirically confirmed, causal closure remains simply a matter of opinion, that has grown into a belief system, academically prejudiced against hypotheses not compliant with the physical materialistic world view.

Keywords: Kuhn's Landscape of Consciousness; NS theorem; natural empiricism; theories of existence; cosmopsychism

1. Introduction

1.1. *The explanatory gap and the hard problem of consciousness*

While the scientific revolution has provided convincing counterintuitive detail about our place as living organisms in the world around us, all our knowledge of the natural universe is gained through our subjective experiences of it. Thus, while the external perspective of the physical universe suggests that physical reality is a causally closed system, science remains unable to explain why we have subjective experiences, that also arise more deeply in states of dreaming and visionary experiences that have no perceptual correlate, upon which we depend to experience the world at all. This gives rise to the existential paradox that these two realms are ontologically complementary. This has driven philosophical and religious traditions, ever since humanity emerged from animistic gatherer-hunter existence, in a polarization between idealism and physicalism, with various forms of dualism and monism scattered in between.

Arguments against the reductionist position, that every phenomenon can be ultimately reduced to physical processes, cite that there is an explanatory gap (Levine, 1983) between the physical and the phenomenal. Kripke (1972, 1977) presented a version of the

Cartesian argument against materialism, which is to point out the possibility of some mental phenomenon without the physical phenomenon alleged to be identical to it by the identity theorist, and to conclude from there that the mental and physical phenomena are not identical. Kripke's argument involves two central claims: (1) that all identity statements in which mind is identified with brain processes using clear definitions on both sides of the identity, if true at all, are true in all possible worlds to which they apply. (2) that psycho-physical identity statements are conceivably false and therefore, by the first claim, false. Kripke thus concluded that psycho-physical identity statements must be false. Levine (1983) in a carefully crafted analysis came to a slightly weaker conclusion that all psycho-physical identity statements leave a significant explanatory gap, and, as a corollary, that we have no way of determining which psycho-physical identity statements are true. The NS Theorem elaborates this line of reasoning to conscious self-certainty.

The Hard Problem (Chalmers, 1995) is the problem of explaining why and how we have phenomenal first-person subjective experiences sometimes called "qualia" that feel "like something", and more than this, evoke the entire panoply of all our experiences

of the world around us. The objective account entirely lacks participatory agency. Chalmers comments: “Why should physical processing give rise to a rich inner life at all? It seems objectively unreasonable that it should, and yet it does.” By comparison, we assume there are no such experiences for inanimate things such as a computer, or a sophisticated form of artificial intelligence. Chomsky (1988) has also pointed out that the physical aspect is ill-defined, rendering the hard problem a potentially insoluble cosmological enigma. We also have the hard problem extended to volition – how can subjective experiences cause physical effects in conscious decision-making and behavior? This is the problem that gave rise to twin *weltknoten* (Kim, 2001, 2005), or world knots, of consciousness and mental causation, which Schopenhauer applied to the dilemma of incarnation – how the I can be both the generator of the world of appearances it experiences and a particular being within that world of appearances.

Kuhn (2024) describes the hard problem succinctly as a disproof of materialism:

1. *In our world, there are conscious experiences.*
2. *There is a possible world physically identical to ours, in which the positive facts about consciousness in our world do not hold.*
3. *Therefore, facts about consciousness are further facts about our world, over and above the physical facts.*
4. *So, materialism is false.*

In 1998, neuroscientist Christof Koch bet philosopher David Chalmers that the mechanism by which the brain’s neurons produce consciousness would be discovered by 2023. Both scientists agreed publicly on 23 June, at the annual meeting of the Association for the Scientific Study of Consciousness that it is an ongoing quest – and declared Chalmers the winner (Lenharo, 2023). What ultimately helped to settle the bet was a study testing two leading hypotheses about the neural basis of consciousness – IIT and GNW which did not agree (Consortium et al., 2025).

1.2. Reason’s Non-Supervenience Theorem

The NS Theorem states that any mind or other entity which can perform the Cartesian Cogito, cannot be a physical system. Reason (2016), drawing on Caplain (1995, 2000) and Luna (2016), presents an intriguing logical proof that computing machines, and by extension physical systems, can never be certain if they possess conscious awareness, undermining the principle of computational equivalence (Wolfram, 2002, 2021).

Supervenience refers to a relation between sets of properties or sets of facts. Set A is said to supervene on Set B if and only if no two things can differ in their Set A properties without also differing in their Set B properties.

An earlier form of the proof is as follows: A *phi-type function* is any mapping which associates the state of some system with the truth value of some proposition. An *omega function* is any phi-type function which can be performed, to within a quantified level of accuracy, by some conscious system. This significance of this is that it can be shown that no purely physical system can perform any phi-type function to within any quantified level of accuracy, if that physical system is required to be capable of humanlike reasoning.

An omega function is exemplified in the Cartesian Cogito “I think therefore I am” and in other forms, the more basic awareness that “I am not in a state of dreamless sleep”. Both are the most succinct sufficient conditions of conscious awareness ever expressed by humanity.

Let us define a physical process as some process whose existence is not dependent on some observation of that process. Now let X be the set of all physical processes necessary to perform any phi-type function. Since the existence of X is not dependent on any given observation of X , it is impossible to be sure empirically of the existence of X . If it is impossible to be sure of the existence of X , then it is impossible to be sure of the accuracy of X . If it is impossible to be sure of the accuracy of X , then it is impossible to be sure that X correctly performs the phi-type function it is supposed to perform. Since any system capable of humanlike reasoning can deduce this, it follows that no physical system capable of humanlike reasoning can perform any phi-type function without becoming inconsistent.

Rejecting a simulation, Faizal et al. (2025) note: A deeper description, expressed not in terms of information but non-algorithmic understanding, is required for a complete and consistent theory of everything.

A formal proof is provided in **Appendix 1**.

2. The LoC as a palimpsest for unifying viable TOEs of subjective consciousness

We will use the NS theorem as a filter on TOEs of subjective consciousness, to filter out theories, including those from “The Landscape of Consciousness” (Kuhn, 2024), whose diverse categories are illustrated in **Fig. 1**, to confirm those that can viably represent subjective consciousness and the natural universe, given the equivalence of (1) that NS Theorem is a valid constraint (2) that the hard problem of consciousness is intrinsically hard, and/or (3) that no physically materialist theory can itself explain the primacy and necessity of subjective consciousness, though which all of our knowledge of the natural world is mediated. A second theory filter to complement to the NS Theorem, is the *Principle of Natural Empiricism*. This says to eliminate any theory of reality which can’t describe the natural universe as effectively as the scientific description. This will eliminate idealistic theories of mental aggregates becoming physical, religious theories based on

A LANDSCAPE OF CONSCIOUSNESS

Robert Lawrence Kuhn

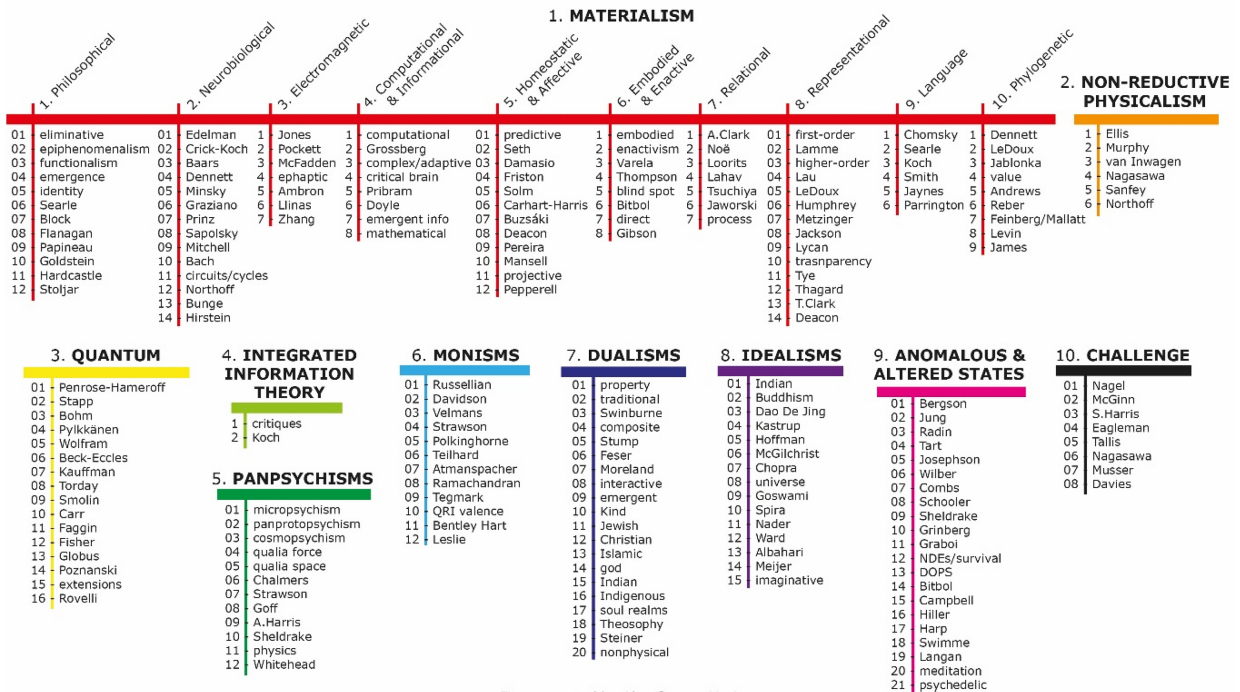


Figure created by Alex Gomez-Marin

Figure 1 The full Landscape of Consciousness from Kuhn (2024) shows the dominance of physical materialism.

affirmative belief and philosophic theories that are not consistent with empirical science, such as dependence on Platonic forms, and Aristotelian causes, as opposed to verified empirical and theoretical natural science and empirical facts of subjective experience – with “empirical” meaning by experiment or experience.

This is clearly necessary, given the radical inconsistency of diverse extant theories of consciousness, in the pursuit of an overall viable theory of existence.

2.1. Reductive and nonreductive materialism

Although all these theories satisfy the principle of natural empiricism, the NS theorem clearly rules out reductive physical materialism, because, in the work of Kim (2000) these place subjective consciousness as supervenient to physical reality. All of the reductive forms of physical materialism listed below from Kuhn (2024) will be eliminated by the NS Theorem: Philosophical theories such as eliminativism, neurobiological and phylogenetic theories such as Edelman & Baars, electromagnetic field theories such as Keppeler, computational theories such as Grossberg, homeostatic theories including Seth, Deacon and Friston, naturalist, embodied and enactive theories such as Searle and Varela, as well as relational and representational theories all of which are implicitly physically reductive. We cite just a few representative examples.

There is absolutely no question that neuroscientific discoveries are pivotally important, nor is there any claim herein that they should not play a contributory part

in understanding the foundations of conscious experience. The problem arises from the way materialist theories try to make exclusive claim to solving, or dissolving the hard problem through physical processes, often leading to counterproductive claims e.g. that consciousness is an illusion, and that subjective conscious volitional agency does not exist. Virtually every neuroscience discovery about the conscious brain is a significant necessary condition for subjective consciousness, but not necessarily a sufficient one, suggesting the Cartesian cogito and empirical experiences affirming the physical efficacy of subjective conscious volition remain key.

2.2. Illusionism, neurobiology and the global workspace

Firstly, we examine the neurobiological theory of Edelman & Baars, which in combining Neural Darwinism with the Global Workspace Theory, explicitly states that subjective consciousness is an illusion invoked by the physical brain:

It has been proposed that no matter how adequately a biological account appears to explain perceptual categorization, memory, and various mechanistic aspects of how the brain works, we remain confounded by the so-called “hard problem”: an inability to explain in scientific terms the phenomenal “feel” of conscious experience (Chalmers, 1996). ... Qualia, the felt contents of consciousness, are therefore concluded to be possibly beyond scientific explanation. Here, we will attempt

to refute this position (Edelman et al., 2011). The truly hard problem is to provide a biologically based mechanistic account of how, at molecular, cellular, and systemic levels, the brain actually functions to entail consciousness. ... In accordance with the behavioral trinity [brain, body, and world], the self emerges from brain responses to bodily signals arising in the sensorimotor system of an individual agent. These predominantly motor signals serve to distinguish the body's sense of agency from signals evoked by the movement of another animal's or agent's body. The combination of such omnipresent sensorimotor signals to the core, and their distinctions that are contemporaneous with perceptual and memorial signals to the core, generates a sense of a self-experiencing a surrogate world. It should be added that consciousness itself is not causal (Kim, 2000; Velmans, 1993). It is the neural structures underlying conscious experience that are causal. The conscious individual can therefore be described as responding to a causal illusion, one that is an entailed evolutionary outcome of selection for animals able to make plans involving multiple discriminations. Once one recognizes that qualia cannot be causal but correspond to internal discriminations that are reliable correlates of underlying causal neural mechanisms, the hard problem as a barrier to scientific explanation disappears. If qualia as discriminations are entailed in behaving agents by the Dynamic Core, in the absence of pathology that entailment is reliable and consistent (Edelman et al., 2011).

This attribution to Velmans and Kim is not an evidential claim, because Velmans (2008) espouses reflexive monism which claims that experiences of the external world are none other than the physical world-as-experienced, thereby placing aspects of human consciousness in the external phenomenal world, rather than within the head or brain, or the deeper realm of experience itself. Likewise, Kim (2001) defined the notion of mind being supervenient on physical processes but in the end, stated that consciousness and mental causation were twin world knots in Schopenhauer's sense of *weltknoten*, how the I can be both the generator of the world of appearances it experiences and a particular being within that world of appearances. So, the assertion that consciousness is not causal remains unestablished in the face of common sense, mutually affirming we have subjective conscious control over our decision-making behavior, as enshrined in both civil and criminal law on intent:

So, the functional irreducibility of consciousness entails the unsolvability of both the problem of consciousness and the problem of mental causation – at least as the latter problem concerns consciousness. It is thus that the two problems, that of mental causation and that of consciousness, turn out to share an interlocking fate. What stands in the way of solving the problem of mental causation is consciousness. And what stands

in the way of solving the problem of consciousness is the impossibility of interpreting or defining it in terms of its causal relations to physical/biological properties. They are indeed Weltknoten, problems that have eluded our best philosophical efforts (Kim, 2001).

In fact, Bernie Baars has admitted in personal communication that establishing causal closure is untenable: “I don’t think science needs to, or CAN prove causal closure, because what kind of evidence will prove that? We don’t know if physics is ‘causally closed,’ and at various times distinguished physicists think they know the answer, but then it breaks down.”

The neural correlates of Crick & Koch (2003) meet the same fate: *The neural correlates of consciousness (NCC) are defined as the minimum activities in the brain jointly sufficient (and probably necessary) for any one specific conscious perception, and, extended, for subjective experience in general, the inner awareness of qualia. The emphasis on sufficient confirms in their view that the brain is physically defining consciousness.*

Edelman and Baars’ view of illusionism comes close to Sapolsky’s incompatibilism, denying consciousness, while also denying free-will:

“Giving this section this ridiculous heading [‘What is consciousness?’],” he says “reflects how unenthused I am about having to write this next stretch. I don’t understand what consciousness is, can’t define it. I can’t understand philosophers’ writing about it. Or neuroscientists’, for that matter, unless it’s ‘consciousness’ in the boring neurological sense, like not experiencing consciousness because you’re in a coma (Sapolsky, 2023).

2.3. Homeostatic free-energy and predictive hallucination

The notion of illusion is complemented by Seth’s experiential conscious awareness as “controlled hallucination”:

The idea is that the brain is always throwing out predictions about what’s going wrong - whether in the body or in the world - and it’s using sensory data to update and calibrate those predictions. The content of what we perceive is conveyed not by the sensory input but by these top-down, inside-out conceptual predictions. There is, here, a continuity with what we typically think of as a hallucination. We typically think of hallucination as a false perception. ... It certainly does not mean that the brain makes up reality or that any perception is equally valid. No. Control is absolutely critical (Seth, 2019).

Seth, like many neuroscientists is a proponent of “dissolving” the hard problem, thus a casualty of the NS theorem.

Physicalism or materialism - I use the two relatively

synonymously - is the view that there is a physical world out there. Matter of some sort exists, and then other things that we observe in the universe are properties of that matter, organized in some way or other. We are quite comfortable with life being a property of matter organized in particular ways. Physicalism applied to consciousness is that consciousness, too, is a property of that physical universe or matter, organized in some way. ... There's this intuition that consciousness is not and cannot be any kind of property of physical material interactions. This motivated Descartes and it also motivates the so-called 'hard problem' of David Chalmers... You can either stick with the physicalist programme and try to explain the various properties of consciousness in terms of material interactions in brains and bodies, seeing whether this sense of mystery begins to dissolve and eventually evaporate. That's my bet (Seth, 2025).

If not, he turns in a moment of sheer desperation, to physicalist mysterianism:

Or, you can say, no. We need another perspective on how consciousness fits into our picture of the universe altogether. Here you have these other options such as idealism or panpsychism. I think my favorite is mysterianism in the sense that it's the weirdest. It's the idea that there is a physicalist understanding of consciousness out there, but we humans are just too unintelligent and will always be too unintelligent to know what it is. We're cognitively closed to this solution that nonetheless does exist (Seth, 2025).

Now we turn to Friston's idea of the Free Energy Principle using Bayesian active inference in the brain acting as a homeostatic minimizer of "surprise" as free energy estimated by predictive mismatch: The authors propose three necessary conditions for functional "consciousness", but none of them are sufficient for subjective consciousness. This is consistent with all physicalist theories, in which functional explanations consist of necessary conditions which never amount to sufficient conditions for subjective consciousness.

The first condition is the simulation of a world model, which determines what can be known or acted upon; namely an epistemic field. The second is inferential competition to enter the world model. Only the inferences that coherently reduce long-term uncertainty win, evincing a selection for consciousness that we call Bayesian binding. The third is epistemic depth, which is the recurrent sharing of the Bayesian beliefs throughout the system. Within a hierarchical active inference system, the requisite sharing means that the reality model entails the inference, belief, or expectation, that it exists (Laukkonen et al., 2025):

It is as if the system's output becomes another sensory modality that is reflected back to itself. To provide a metaphor: When we speak out loud, we produce sounds and at the same time hear those sounds and

their meaning (i.e., we hear our own voice and what we are saying). Therefore, our output (voice) is also our input (sound). We sequentially produce form (output) and then monitor the global context of that form (input) to ensure that our speech communicates a coherent stream of meaning. There is a continuous 'looping' between what we create through action and what we perceive through the senses. Similarly, the key output of the inferential process in the brain is the construction of a reality model that allows us to survive (analogous to the voice). But this global reality model is also an input to the system and becomes part of the inferential process itself (analogous to the sound).

This becomes obvious when the authors try to liken it to a subjectively conscious observer gaining Bayesian confirmation of their agency by speaking aloud, thus finessing the Bayesian loop into organismic subjective perception of the spoken actions. But "I speak therefore I am" is not how we know we exist. We experience therefore we are.

The problem with this analysis is that the internal model is entirely Bayesian active inference on the brain neurodynamic, using Markov blankets, presented in abstract "dual aspect" formulation, but the underlying implication is that it is supported by the causal closure of the universe in the form of the warm wet classical brain, consistent with its classification in LoC under physicalism as homeostatic and effective:

The starting point of my argument raises an interesting philosophical question. If body and mind are two appearances (aspects) of the same underlying thing, then what stuff is the underlying thing made of? In other words, using the analogy of thunder and lightning, what is the metapsychological equivalent of "electricity" (i.e., the thing that gives rise to thunder and lightning, both)? ... Therefore, biological explanations (as opposed to descriptions) are best formulated in neither interoceptive nor exteroceptive phenomenal terms, but rather as abstractions (Solms & Friston, 2018).

Safron (2025) in LoC claims "Integrated World Modeling Theory" (IWMT) draws upon both Integrated Information Theory, Global Neuronal Workspace, and Predictive Processing theories, to describe how sub-networks of the brain can act as shared latent (work)spaces amongst heterogeneous sensory modalities, and arenas for Bayesian model selection, generating system-world estimates with sufficient rapidity to both inform and be informed by action-perception cycles, so affording more flexible adaptive behavior. Phenomenal consciousness is what it is like to be the spatiotemporally and causally coherent functioning of probabilistic generative model for the (valenced, affectively biased) sensoriums of embodied-embedded agents, entailing either perception or imagination when respectively coupled to or decoupled from sense-data.

As a psychedelic researcher Safron attempts to use the Friston finesse to legitimize Bayesian reasoning fundamentally about an abstraction of predictive coding in the physical brain as a Darwinian process of “mental causation” when its foundation is abstract physicalism because there is no evidence mental states interact through Markov blankets:

Drawing from both enactivist and cognitivist perspectives on mind, I propose that explaining teleological phenomena may require reappraising both “Cartesian theaters” and mental homunculi in terms of embodied self-models (ESMs), understood as body maps with agentic properties, functioning as predictive-memory systems and cybernetic controllers (Safron, 2021).

A radically embodied cybernetic Bayesian brain suggests multiple mechanisms by which we can be said to have (within limits) the “varieties of free will worth having”... This mental causation could be similarly described in the language of generalized Darwinism, with preferences functioning causally within minds in the same ways that selective pressures are causal within evolutionary systems. More enduring preferences can be viewed as ultimate-level causes that select for the development of context-specific proximate-level choices. We may further think of motor control via hierarchical predictive processing in terms of a hierarchy of selection processes. In this view of action selection as a kind of natural selection, hierarchically lower levels provide specific adaptations for realizing hierarchically-higher selective pressures, the totality of which constitute the overall direction of ‘will’ in any given moment.

Here he is referencing [Edelman \(1987\)](#) on Neural Darwinism, so the attempt to apply embodied enactivism is a veneer of subjective description overlaying a warm wet physically closed physicist neuronal description. This is typical of many psychedelics’ researchers, including Robin Carhart-Harris ([Rajpal et al., 2022](#)):

Schizophrenia and states induced by certain psychotomimetic drugs may share some physiological and phenomenological properties, but they differ in fundamental ways: one is a crippling chronic mental disease, while the others are temporary, pharmacologically-induced states presently being explored as treatments for mental illnesses.... We show that these effects can be reproduced via different alterations of standard Bayesian inference applied on a computational model based on the predictive processing framework. In particular, the effects observed under the drugs [LSD or Ketamine] are modelled as a reduction of the precision of the priors, while the effects of schizophrenia correspond to an increased precision of sensory information. ... While both conditions exhibit increased neural signal diversity, our findings reveal that this is accompanied by an increased transfer entropy from the front to the back of the brain in schizophrenia, versus

an overall reduction under the two drugs (Rajpal et al., 2022). Because psychedelics cause profound changes to the conscious state, it is completely legitimate to analyze them neuroscientifically because its explanatory power is acute, particularly in terms of neurophysiological criticality, where reduced transfer entropy and increased Lempel Ziv complexity (ibid) by comparison with the constrained subcritical normal state confirms that the psychedelic state is a key critical state candidate at the edge of chaos (Toker et al., 2022) for experiential discovery within consciousness research:

Based on neuroimaging data with psilocybin, a classic psychedelic drug, it is argued that the defining feature of “primary states” is elevated entropy in certain aspects of brain function, such as the repertoire of functional connectivity motifs that form and fragment across time. Indeed, since there is a greater repertoire of connectivity motifs in the psychedelic state than in normal waking consciousness, this implies that primary states may exhibit “criticality,” i.e., the property of being poised at a “critical” point in a transition zone between order and disorder where certain phenomena such as power-law scaling appear. Moreover, if primary states are critical, then this suggests that entropy is suppressed in normal waking consciousness, meaning that the brain operates just below criticality. It is argued that this entropy suppression furnishes normal waking consciousness with a constrained quality and associated metacognitive functions, including reality-testing and self-awareness. It is also proposed that entry into primary states depends on a collapse of the normally highly organized activity within the default-mode network (DMN) and a decoupling between the DMN and the medial temporal lobes (which are normally significantly coupled) (Carhart-Harris et al., 2014).

Following this chronologically, we have Carhart-Harris teaming up with Friston to propose the REBUS model: *This paper formulates the action of psychedelics by integrating the free-energy principle and entropic brain hypothesis. We call this formulation relaxed beliefs under psychedelics (REBUS) and the anarchic brain, founded on the principle that—via their entropic effect on spontaneous cortical activity—psychedelics work to relax the precision of high-level priors or beliefs, thereby liberating bottom-up information flow, particularly via intrinsic sources such as the limbic system (Carhart-Harris & Friston, 2019).*

The entropic brain hypothesis has since been modified by the discovery that the increased neural flexibility after treatment with psilocybin is not unstructured randomness, but a reorganization of activity around the ongoing environmental and experiential context. Half of the 62 adults without previous experience of psychedelics ranked the experience among the most meaningful of their lives ([Stoliker et al., 2026](#)). However, despite these profound changes in consciousness occurring because of molecular agonists, this doesn’t

go any way to establishing that a purely physicalist or functionalist account can explain the effects of psychedelics on consciousness. What also became apparent from laboratory studies, [Griffiths et al. \(2006\)](#) on, was that psychedelics were able to induce genuine mystical quantum change experiences that were of lasting benefit, including in people suffering terminal conditions ([Griffiths et al., 2016](#)). It thus becomes essential that these potentials are fully explored.

2.4. Spanning the LoC: Christof Koch

Christof Koch's radically evolving views on the nature of consciousness display how uncertain the whole field is and how deeply the psychedelic experience can affect one's ontological perspective.

A: Francis Crick the co-discoverer of DNA to promote the validity of the neural correlate of consciousness envisaged in gamma frequency activity (30-100 Hz) elaborated in 10 key points ([Crick & Koch, 2003](#)):

1. **The (unconscious?) homunculus:** *A good way to begin to consider the overall behavior of the cerebral cortex is to imagine that the front of the brain is 'looking at' the sensory systems, most of which are at the back of the brain.*
2. **Zombie modes and consciousness:** *Many actions in response to sensory inputs are rapid, transient, stereotyped and unconscious.*
3. **Coalitions of neurons:** *The cortex is a very highly and specifically interconnected neural network.*
4. **Explicit representations:** *An explicit representation of a particular aspect of the visual scene implies that a small set of neurons exists that responds as a detector for that feature, without further complex neural processing.*
5. **The higher levels first:** *For a new visual input, the neural activity first travels rapidly and unconsciously up the visual hierarchy to a high level, possibly in the front of the brain (this might instantiate a zombie mode).*
6. **Driving and modulating connections:** *In considering the physiology of coalitions, it is especially important to understand the nature of neural connections.*
7. **Snapshots:** *Has a successful coalition any special characteristics? We propose that conscious awareness (for vision) is a series of static snapshots, with motion 'painted' on them.*
8. **Attention and binding:** *Attention can usefully be divided into two forms: either rapid, saliency-driven and bottom-up or slower, volitionally controlled and top-down.*
9. **Styles of firing:** *Synchronized firing (including various oscillations) may increase the effectiveness of a neuron, while not necessarily altering its average firing rate.*

10. **Penumbra and meaning:** *Consider a small set of neurons that fires to, say, some aspect of a face. The experimenter can discover what visual features interest such a set of neurons, but how does the brain know what that firing represents? This is the problem of 'meaning' in its broadest sense. The NCC [neural correlate of consciousness] at any one time will only directly involve a fraction of all pyramidal cells, but this firing will influence many neurons that are not part of the NCC. These we call the 'penumbra'. The penumbra consists of both synaptic effects and also firing rates. The penumbra is not the result of just the sum of the effects of each essential node separately, but the effects of that NCC as a whole. ... The penumbra, by definition, is not itself conscious, although part of it may become part of the NCC as the NCC shifts. Some of the penumbra neurons may project back to parts of the NCC, or its support, and thus help to support the NCC. The penumbra neurons may be the site of unconscious priming.*

Their "Framework for Consciousness" presents only a sandbox description of neural sensory processing, without arriving at any sufficient condition for consciousness and subject to the NS Theorem.

B: Having teamed up, [Tononi & Koch \(2015\)](#) discuss how integrated information theory IIT accounts for several aspects of the relationship between consciousness and the brain:

The axioms of IIT state that every experience exists intrinsically and is structured, specific, unitary and definite. IIT then postulates that, for each essential property of experience, there must be a corresponding causal property of the PSC (physical substrate of consciousness). The postulates of IIT state that the PSC [physical substrate of consciousness] must have intrinsic cause-effect power; its parts must also have cause-effect power within the PSC and they must specify a cause-effect structure that is specific, unitary and definite ([Tononi et al., 2016](#)).

For something to exist in a physical sense, it must have cause-effect power – that is, it must be possible to make a difference to it (that is, change its state) and it must be able to make a difference to something. Moreover, the PSC must exist intrinsically – that is, it must have cause-effect power for itself, from its own intrinsic perspective.

The difficulty with this position is that experience is intrinsic but only the PSC has causal power, so this approach becomes subject to the NS Theorem. Like Bayesian inference, IIT is thus an abstract theory involving informational integration via the Φ function, as shown **Fig. 2** that is physically causal, with both the abstract causal structure and the experience arising from the neural correlate in the brain, leaving experience dependent on the PSC/NCC, while being claimed to be

equivalent to the cause-effect structure. . The same applies to the Information Closure Theory of Consciousness (ITC) (Chang et al., 2020) which depends on objective stochastic processes to define a functionalistic form of consciousness.

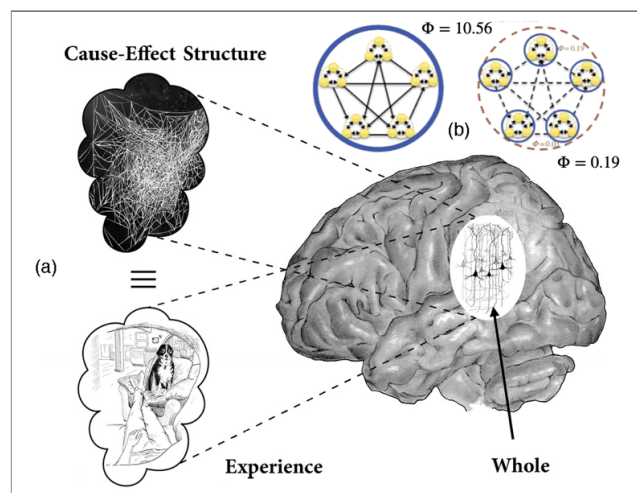


Figure 2 (a) Integrated information theory: a conscious experience (of a pet dog) is identical to a maximally irreducible cause-effect structure. Its physical substrate, its “Whole”, is the operationally defined neural correlate of consciousness. IIT claims the experience is formed by the Whole but is not identical to it (Koch, 2019) (b) Variations in recursive connectivity result in varying Φ (Tononi & Koch, 2015).

Albantakis et al. (2022) confirm the physical basis of IIT 4.0, showing information theories are also subject to the NS theorem: “IIT aims to account for consciousness and its properties in physical terms. The theory identifies the essential properties of experience (axioms), formulates them as physical properties in terms of cause – effect power (postulates), and provides a mathematical formalism for assessing those properties. This formalism can be employed to ‘unfold’ a cause – effect structure from a substrate constituted of units in a state, whose interactions can be characterized as interventional conditional probabilities.”

Thus although they are information-based rather than explicit physical neuroscience theories, both IIT and active inference theories are still subject to the NS theorem because the implied causality is still physical.

Tononi & Koch (2015) see great value in the fact that IIT enables a point of view in which consciousness can be recognized in diverse organisms:

All species – bees, octopuses, ravens, crows, magpies, parrots, tuna, mice, whales, dogs, cats and monkeys – are capable of sophisticated, learned, non-stereotyped behaviors that would be associated with consciousness if a human were to carry out such actions. For instance, bees are capable of recognizing specific faces from photographs, can communicate the location and quality of food sources to their sisters via the waggle

dance, and can navigate complex mazes with the help of cues they store in short-term memory (for instance, “after arriving at a fork, take the exit marked by the color at the entrance”). Bees can fly several kilometers and return to their hive, a remarkable navigational performance. And a scent blown into the hive can trigger a return to the site where the bees previously encountered this odor. ... Given the lack of a clear and compelling Rubicon separating simple from complex animals and simple from complex behaviors, the belief that only humans are capable of experiencing anything consciously seems preposterous. A much more reasonable assumption is that until proved otherwise, many, if not all, multicellular organisms experience pain and pleasure and can see and hear the sights and sounds of life.

Koch (2014) then leaps to panpsychism, as a philosophical viewpoint consistent with these perspectives: *Panpsychism is an elegant explanation for the most basic of all brute facts I encounter every morning on awakening: there is subjective experience. Tononi’s theory offers a scientific, constructive, predictive and mathematically precise form of panpsychism for the 21st century. It is a gigantic step in the final resolution of the ancient mind-body problem.*

Yet the mental is too radically different for it to arise gradually from the physical. This emergence of subjective feelings from physical stuff appears inconceivable and is at odds with a basic precept of physical thinking, the Ur-conservation law – ex nihilo nihil fit. So if there is nothing there in the first place, adding a little bit more won’t make something. If a small brain won’t be able to feel pain, why should a large brain be able to feel the god-awfulness of a throbbing toothache? Why should adding some neurons give rise to this ineffable feeling? The phenomenal hails from a kingdom other than the physical and is subject to different laws. I see no way for the divide between unconscious and conscious states to be bridged by bigger brains or more complex neurons. ... A more principled solution is to assume that consciousness is a basic feature of certain types of so-called complex systems (defined in some universal, mathematical manner).

C: In 2020, Koch had a transformative psychedelic experience inhaling 5MeO-DMT, which resulted in him developing a relationship with Bernardo Kastrup, the psychedelic pioneer of analytic idealism.

Science correspondent Horgan (2026) reports on an interview with Koch:

In 2020 Christof Koch inhaled 5-methoxy-N,N-dimethyltryptamine, 5-MeO-DMT (also known as The Toad), a potent psychedelic. “At the third breath,” he says, “already space was fracturing into this hexagonal pattern, and there was this black hole that opened. I still remember my last thought: ‘Holy shit! I’m going to die!’ “And I did, it felt like death. I had this experience where there was no more Christof, there was

no more body, but there was just this universe at large. Space had convulsed to a singularity, a single point, very bright. There was no time. There was no more boundary. A full-on mystical experience.” This experience left Koch “totally confused” about the nature of reality. A mystical experience “has this noetic quality, right? And it has an authority over you. How can I make sense of this experience in light of everything else I know about the world and the universe?” Can you take mystical experiences seriously and “still be a rational scientist.

*To understand his psychedelic experience, Koch reached out to Bernardo Kastrup, a computer scientist and philosopher. Koch calls Kastrup an “unabashed modern idealist,” who thinks mind and not matter underpins reality. Kastrup, who has also taken psychedelics, defends idealism in the splendidly titled *Why Materialism Is Baloney* and other books. Koch ended up tentatively agreeing with Kastrup that “what truly exists is only the mental.” Koch’s choice wasn’t strictly scientific. “If I don’t have any better evidence against idealism than physicalism provides, which isn’t very compelling to me,” Koch says, “then I’m going to be an idealist, because it enables me to live a happy, good life.”*

2.5. Inner dimensions of subjective consciousness

Neuroscientific explanations of subjective consciousness assert that it is an “inside view” of an internal model of reality generated by the physical brain to make sense of the natural world. We are familiar with the fact that the perceived senses are biological products of the sensory apparatus. Human color perception is trichromatic as well as binocular. Similarly, the two cochlea provide Fourier type frequency detection, leading to a rich binaural time-frequency perception of evolving sound. Both are sometimes referred to as veridical – a realer representation than the incoming data, although evolutionarily adapted. We also have become aware of the somatosensory/motor homunculus cortical representation, leading overall to a notion that subjective consciousness is a model of reality driven by the biology of perception. Only the most unstructured sense, olfaction, from which the cortical telencephalon arose, comes directly to the cortex, while vision, audition and touch go to the thalamus. On the other hand, linguistic and rational thought, which is more susceptible to a cognitive explanation for decision-making based on symbol strings, tends to be treated computationally.

When Seth and Friston talk about prediction mismatch and controlled hallucination, restrained by top-down feedback, they are talking about intelligent cognitive processes, not about hallucinations, which are direct sensory experiences that may not match perceptual reality, exemplified by psychedelics (psilocin, mescaline), dissociatives (ketamine, salvinorin) and

deliriants (scopolamine). Dreaming provides an opportunity to experientially explore extraordinary situations that may not even be physically realizable, that are generally forgotten when we awaken although they may affect our subsequent experiences. But the ways sensory hallucinations occur, suggests perceived reality is just a subset of a wider realm of non-perceptual experience, raising the question of why the reticular activating system has specific centres to cause dreaming to take place. REM sleep is a strongly conserved evolutionary trait across the mammals and possibly the metazoa (Yamaguchi et al., 2024), so bizarre dream content must also have a selective advantage, and with it subjective consciousness generally. REM sleep is ambiguously attributed to freeing up neural systems with chaotic input, threat simulation and memory consolidation, although nREM sleep has better evidence for the memory consolidation (Ackermann & Rasch, 2014).

Both dreaming sleep and waking life arise through an ancient evolutionary system in the reticular formation, caused by cholinergic stimulation of the thalamus and in turn, the cortex, by the Pontine PPT and LDT, with glutaminergic SLD activation ensuring bodily paralysis during dreaming, except for the PGO waves causing rapid eye movements. By contrast, the waking state is supplemented by the adrenergic centres of the Raphe Nucleus (5HT) and Locus Coeruleus (NA), along with histamine and orexin innervation of the cortex. In a second contrast, in nREM sleep, the hypothalamic VLPO & MNPO release GABA, suppressing activation of the cortex resulting in the decoupled slow wave motions also seen in cortico-thalamic deafferentation (Lemieux et al., 2014). The cholinergic system is also key to both the autonomic system maintaining the balance of the internal organs and drives the muscle contraction of all behavior, from *C. elegans* to *H. sapiens*.

2.6. Neuroscientific mind warp

Neuroscientific explanations of subjective agency are assumed to arise from recursive attentional processes that might enable a form of self-referentiality that could explain subjective self-consciousness as modular “attention to attention”. But having a modular system design for recursive self-referentiality does not hold a candle to the all-encompassing subjective “awareness of awareness” experienced as conscious self-certainty, in the Cogito, as if the lights in the entire universe were suddenly turned on, in both sudden awakening and dreaming sleep.

There is thus a fatal contradiction within the neuroscientific model of consciousness, stemming from subjective consciousness being accepted only as a form of controlled hallucination of potentialities to help address existential crisis, while subjective conscious decision-making is a causal illusion to ensure we biologically reproduce. The neuroscientific account is a homunculus that explains experience superficially in

terms of the functional architecture of sensory processing areas, but leads to contradiction, as we move from passive conscious awareness through to causal intent and volition. It is one thing to say our binocular trichromatic color vision is just a biological adaption, but this cannot explain how an internal model representing causal brain function that claims that our strategic choice is not a product of our conscious intent, but simply our brain function activating the motor cortex and pulling our muscles, can legitimately contradict our veridical perception that we can consciously intend to carry out an intuitive or premeditated physical act and can veridically perceive ourselves doing so. The retrospective spoiler is claiming that, because we do have efficacy of physical volition, consciousness must itself be physical.

The critical flaw is that the neuroscientific model makes no evolutionary sense. We know that all areas of the cortex and underlying neuronal structures functionally evolved to ensure organismic survival, not to make a clip-on model of subjective consciousness for idle entertainment. There is no utility in the claim of a neuroscientific homunculus being a process that generates subjective consciousness unless it confers an evolutionary advantage. It cannot do so if the controlled hallucination it is producing simply leads to an illusion of behavioral intentionality asserted to be a necessary cost to ensure the living organism seeks to strive to reproduce offspring. This would not be conserved across the biota, as it is not in fact advantageous. There is also no evidence for any internal model of reality assigned to construct the illusion of conscious intent in brain activity, so the entire hypothesis fails. Hence the neuroscientific explanation for subjective consciousness has no explanatory rationale. Yet materialist and informational theories dominate the LoC information cloud with major nexus points, as shown **Fig. 3**.

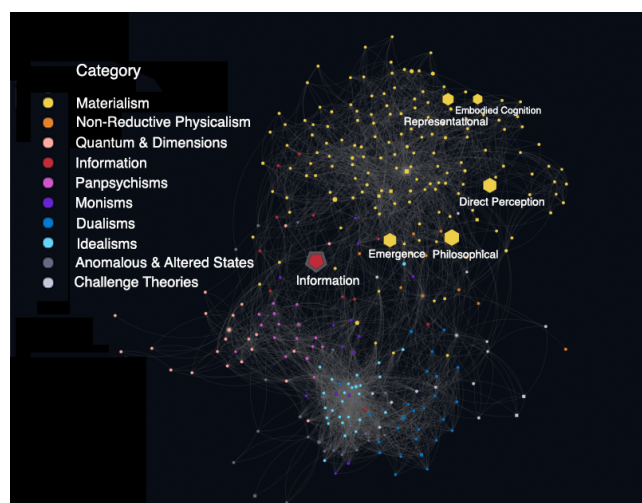


Figure 3 An interactive map from the LoC website., showing dominance of materialist and information theory nexus points.

The NS theorem places an exclusion on some of the

most cited materialist theories including information-based, philosophical, representational, emergent, embodied cognition theories, where embodiment implies physicality and direct perception theories. Direct perception theory is the functionalist idea that “the information required for perception is external to the observer; that is, one can directly perceive an object based on the properties of the distal stimulus alone, unaided by inference, memories, the construction of representations, or the influence of other cognitive processes.”

2.7. Field theories

Field theories including electromagnetic theories of McFadden & Pocket, and zero-point field theory of Keppler, which are popular in providing a more continuous representation of consciousness, are also subject to the NS Theorem. [Keppler \(2024\)](#) attempts to realize subjective consciousness as arising from synaptic glutamate in synapses promoting the ZPF, or zero-point field, of the quantum vacuum, but in the process, identifies the field with consciousness itself, attributing individual consciousness to the localization of the field in individual brains. It is thus equating subjective phenomenal consciousness with the vacuum field, when the field is simply uncertainty itself producing all possibilities of the known fields under $\Delta E \Delta t \geq \hbar$:

The aforementioned characteristics and unique properties of the ZPF make one realize that this field has the potential to provide the universal basis for consciousness from which conscious systems acquire their phenomenal qualities. On this basis, I posit that all conceivable shades of phenomenal awareness are woven into the fabric of the background field. Accordingly, due to its disordered ground state, the ZPF can be looked upon as a formless sea of consciousness that carries an enormous range of potentially available phenomenal nuances. Proceeding from this postulate, the mechanism underlying quantum systems has all the makings of a truly fundamental mechanism behind conscious systems, leading to the assumption that conscious systems extract their phenomenal qualities from the phenomenal colour palette immanent in the ZPF ([Keppler, 2018](#)).

A detailed comparison between the findings of SED (stochastic electrodynamics) and the insights of Eastern philosophy reveals not only a striking congruence as far as the basic principles behind matter are concerned. It also gives us the important hint that the ZPF is a promising candidate for the carrier of consciousness, suggesting that consciousness is a fundamental property of the universe, that the ZPF is the substrate of consciousness and that our individual consciousness is the result of a dynamic interaction process that causes the realization of ZPF information states. ... In that it is ubiquitous and equipped with unique properties, the ZPF has the potential to define a universally standardized substratum for our conscious minds, giving rise to

the conjecture that the brain is a complex instrument that filters the varied shades of sensations and emotions selectively out of the all-pervasive field of consciousness, the ZPF (Kepler, 2013).

2.8. Computational and attention theories

Turning to further neuroscientific computational theories, the NS Theorem rules out explicit brain theories such as ART (adaptive resonance theory), and AST (attention schema theory).

[Grossberg \(2021\)](#) states of ART: *Given such detailed correspondences with experienced qualia and multiple types of data, it can be argued that these dynamical resonant states are not just “neural correlates of consciousness” that various authors have also discussed, notably David Chalmers and Christof Koch and their colleagues. Rather, they are mechanistic representations of the qualia that embody individual conscious experiences on the psychological level.*

[Graziano \(2017\)](#), calling AST a foundation for engineering artificial consciousness states: *In AST, we really do have a base reality to consciousness: we have attention – the ability to focus on external stimuli and on internal constructs, and by focusing, process information in depth and enable a coordinated reaction. We have an ability to grasp something with the power of our biological processor. Attention is physically real. It’s a real process in the brain, made out of the interactions of billions of neurons.*

[Graziano \(2024\)](#) makes clear that illusionism is key to physicalistic neuroscience: *Illusionism is a general philosophical framework in which specific theories of consciousness can be constructed without having to invoke a magical mind essence. ... The brain’s internal models are never fully accurate, nothing is exactly as the brain represents it, and therefore some element of illusionism is almost certainly necessary for any working theory of consciousness or of any other property that is accessed through introspection. ... In my view, there are now only two broad classes of explanation for consciousness: magic and illusionism. Most of the field of study is mired in magic.*

Here illusionism is reified by assuming (1) all conscious processes are brain mechanisms and (2) no internal model of reality is fully accurate, to disclaim subjective conscious experiences holus bolus as illusions of magical thinking.

2.9. Biological naturalism

The NS Theorem also rules out biological naturalism and hence pan-experiential materialism. [Searle \(1992\)](#) contends that consciousness is “causally reducible” to brain processes without being “ontologically reducible”. He affirms the essentially physical nature of the universe by asserting that consciousness is completely caused by and realized in the brain, but also

doesn’t deny what he takes to be the obvious facts that humans really are conscious, and that conscious states have an essentially first-person nature.

[Searle \(2017\)](#) states his position axiomatically:

A. Conscious states are experientially real:

1. *Conscious states, so defined, are qualitative, in the sense that there is a qualitative feel to being in any particular conscious state.*
2. *Such states are also ontologically subjective in the sense that they only exist as experienced by a human or animal subject.*
3. *Furthermore, it is a striking fact that at any moment in your conscious life all of your conscious states are experienced by you as part of a single unified conscious field.*
4. *Most, but not all, conscious states are intentional, in the philosopher’s sense that they are about, or refer to, objects and states of affairs.*

B. But they are real physical neuronal processes and are causal because they are physically real:

1. *The reality and irreducibility of consciousness. Conscious states, so defined, are real parts of the real world and cannot be eliminated or reduced to something else.*
2. *The neuronal basis of consciousness. All conscious states are caused by lower level brain processes.*
3. *The neuronal realization of consciousness. All conscious states are realized in the brain as higher-level or system features.*
4. *The causal efficacy of consciousness. Conscious states, as real parts of the real world, function causally.*

This position succumbs to the NS Theorem because causal reducibility would sink it, and takes [Brändas \(2024\)](#) NATI theory – “Nature is All There Is” – with it.

The NS Theorem also rules out non-reductive physicalism, where disciplines like psychology and biology cannot be formally reduced to physics. Georg Northoff’s work provides a good example of non-reductive materialism, where different levels of description show what he calls a “common currency” of dynamic features expressed in his tempero-spatial theory of consciousness (TTC):

Despite all progress, we encounter two gaps: (i) a gap between spontaneous and stimulus-related activity; (ii) a gap between neuronal and phenomenal features. A novel, different, and unique approach, Temporo-spatial Theory of Consciousness (TTC) aims to bridge both gaps. The TTC focuses on the brain’s spontaneous activity and how its spatial topography and temporal dynamic shape stimulus-related activity and resurface

in the corresponding spatial and temporal features of consciousness, i.e., 'common currency'. The TTC introduces four temporo-spatial mechanisms: expansion, globalization, alignment, and nestedness. ... The TTC extends beyond these approaches by providing a specific mechanism, i.e., Temporo-spatial nestedness, that bridges the gap and intrinsically connects brain and consciousness (and thus, conceptually put, in a necessary a posteriori way. Roughly, Temporo-spatial nestedness refers to a particular type of organisation of different spatial and temporal scales of neural activity. Rather than operating in parallel, unconnected, or causally connected but separate ways, the different spatial and temporal scales of neural activity are contained or nested within each other (Northoff & Ventura, 2025).

The difficulty here is threefold:

1. The theory is explicitly based on physical neuroscience: *Neuroscience faces the challenge of connecting brain and mind, with the mind manifesting in first-person experience while the brain's neural activity can only be investigated in third-person perspective. To connect neural and mental states, Neurophenomenology provides a methodological toolkit for systematically linking first-person subjective experience with third-person objective observations of the brain's neural activity* (Northoff & Ventura, 2025).
2. The solution of the mind-body explanatory gap is by assumption not proof: *TTC bridges the gap between neuronal and phenomenal features by assuming that both share their most basic and fundamental spatial-topographic and temporal-dynamic organisation, i.e., 'common currency'* (Northoff & Zilio, 2022).
3. Its philosophical underpinnings come from Heidegger's fundamental ontology that seeks to define being by analyzing the concrete, everyday existence of human beings, in the universe, thus limiting the scope to common dynamic descriptive accounts of nature and perceptual consciousness of the world around us: *We demonstrate how a non-reductive neurophilosophical approach allows taking into view a deeper neuro-ecological and spatiotemporal layer of Martin Heidegger's Fundamental ontology and its "being in the world"* (Northoff, 2022).

Thus, despite its claim to deal with Heidegger's "being in the world", the world part is physical reality, on which the dynamic correspondence with subjective consciousness depends. Emergence as the claim that qualitatively novel properties in biological systems and psychological states arise from physical properties of more advanced systems governed entirely by the laws of physics (Clayton & Davies, 2008), so these are subject to the NS Theorem and will also be eliminated.

These restrictions will also apply to embodied mind theories, from Varela (1993) autopoiesis, as a physical realization of agency to Merleau-Ponty (2002) phenomenology of perception.

Levels of discussion arguments are a more tactful slant on Sean Carroll's balder claim that consciousness is just: "a way of talking about the physical world, just like many other ways of talking. It's one of these emergent phenomena that we find is a useful way of packaging reality, so we say that someone is conscious of something that corresponds to certain physical actions in the real world. ... I don't think that there is anything special about mental properties. I don't think there's any special mental realm of existence. I think it's all the physical world and all the manifold ways we have of describing it" (Carroll, 2016).

Varela's 'Neurophenomenology' is not a theory but a proposed research program to try to discover subjective constraints on the admittedly valid scientific accounts, thus conceding physical causality:

Phenomenological accounts of the structure of experience and their counterparts in cognitive science relate to each other through reciprocal constraints. ... It is quite easy to see how scientific accounts illuminate mental experience, but the reciprocal direction, from experience towards science, is what is typically ignored. What do phenomenological accounts provide? At least two main aspects of the larger picture. First, without them the firsthand quality of experience vanishes, or it becomes a mysterious riddle. Second, structural accounts provide constraints on empirical observations. ... It is surely an improvement on Searle, who insists on the fact that he takes a naturalistic attitude and that "obviously" consciousness is an emergence. And yet this naturalism does no work in his book: there is not a single line about explicit mechanisms, and thus his naturalism remains barren. ... The novelty of my proposal is that disciplined first-person accounts should be an integral element of the validation of a neurobiological proposal, and not merely coincidental or heuristic information. This is why I choose to describe the situation by the hypothesis that both accounts be mutual constraints on each other (Varela, 1996).

In *Full Naturalism: The Objectivity of Subjective Points of View*, Keijzer (2025) asserts a full form of biological naturalism in which dichotomies are dissolved:

In this article, I provide an account that rejects the claim that there is a fundamental dichotomy between our subjective mental domain and the objective external world. I will work with the premise that both belong to a single cohering set of natural processes, following what I will call full naturalism. ... Rejecting the dichotomy does not imply that we should simply accept the standing interpretations of naturalism and the current view provided by the natural sciences on their own where points of view are usually downgraded to a form

of agency and/or information processing by the brain. Rather, rejecting the dichotomy implies accepting subjectivity as an intrinsic part of the natural world, which imposes new constraints on naturalism itself: naturalism inherits and should accept the long-term obligation to give an account of our own—and thus ultimately also the scientists’ — subjective perspective on the world. From here on I will refer to this reading of naturalism as full naturalism (Keijzer, 2025).

There is a fundamental problem with rejecting the use of “dichotomy” and its relationship to biological physicalism, that ultimately stems from separable Cartesian substance dualism. A dichotomy is a split or difference between two opposite things or ideas that means dividing one group into two separate parts that do not overlap. In a cosmology where mental and physical are not separable they may still be complementary in the sense of “that which completes”: (1) that reality cannot become fully manifest without both and (2) neither can be fully represented in terms of the other, as wave and particle are. The NS theorem effectively denies a single-component objective naturalist account.

When it comes to mental phenomena, full naturalism does not passively accept the bounds set out by the natural sciences as we currently know them. Instead, it takes naturalism to come with the commitment to make sense of — to understand and explain — all phenomena that we encounter in the world, including mental phenomena, such as cognition, subjective experience, and the subjectivity of first-person perspectives. Being a subject and having a point of view does not place this subject, nor its point of view, outside the natural world. Full naturalism does not accept a dichotomy between a subjective domain and an objective one (Keijzer, 2025).

Full naturalism takes the presence of mental phenomena, such as subjective first-person perspectives, as given natural phenomena that require a natural explanation that makes us understand what such perspectives are and where they come from.

To summarize and condense, full naturalism has two central aspects: (a) It works within the constraints set out by the various sciences and within this context scientists and theoreticians can make their own suggestions for amendments, additions, and changes with respect to these constraints. (b) Naturalism has the long-term obligation to give an account of our own—and thus also the scientists’—subjective perspective on the world within this naturalistic context and the explanatory possibilities therein. The central driving idea developed here is that a biological and evolutionary approach provides a way to clarify the natural status of subjective animal points of view, recasting them as phenomena that are themselves fully natural and part of the same world that they provide access to.

The critical test of this aim to provide a comprehensive

non-dual naturalism is how it represents the interface between the two. If both the subjective and objective aspects are necessary for existence, as the NS theorem implies, then the title’s phrase “the objectivity of subjective points of view” is problematic.

The crucial switch in perspective that is at stake here concerns the need to connect a subjective world, which is experienced (or had) and lived in, with our shared objective natural science descriptions, such as the “big bang” and the evolution of life. ... The question is how subjective phenomena came into being within this physical world. Just accepting both will be insufficient to understand the status of who and what we are (Keijzer, 2025).

This is precisely the foundational question this article is reviewing, so how is it handled?

I focus here on the first-person perspective and its point of view as a specific target. In contrast to conscious experience, it is more specific as it concerns the link between a mental domain and the world. In contrast to cognition, which is often taken to be fully naturalizable in terms of information processing, points of view remain closely linked to subjectivity and resist an easy absorption into “partial” naturalism.

Now here’s the critical twist, we defer from dealing with conscious experience in favor of the link between the mental domain and the world – i.e. “embodied consciousness”.

By making a perspectival turn, we can develop such a fully natural playing field in which subjective points of view are objective parts of the world and still stand apart from that world. The starting point for this turn derives from acknowledging mental phenomena as biological ones as proposed by Kováč (2000) when he introduced his cognitive biology (Keijzer, 2025).

The “subjective points of view” have now become “objective parts of the world”. Kováč (2006) conceiving life as “knowledge embodied in sentient chemical systems” quotes Damasio as shifting the focus from the cognition of the Cartesian cogito, because reasoning requires the guidance of emotions and feelings conveyed from the body.

One of the leading protagonists of affective revolution, Antonio Damasio, entitled his book Descartes’ Error, as it essentially does away with Descartes’ body–soul dualism (Damasio, 1994). Second, the role of unconsciousness, which was once accentuated by Sigmund Freud, is being reinterpreted: conscious deliberation might represent just a ‘monomolecular layer’ on the immense ‘ocean’ of what (Wilson, 2002) called ‘the adaptive unconscious’. Third, cognition is being analyzed with an evolutionary perspective, under the name of ‘evolutionary epistemology’.

Damasio’s point is that reasoning requires the guidance of emotions and feelings conveyed from the body.

Firstly, while it is true that cognition is superstructural on conscious existence which always carries an emotional element and bodily awareness is perceptually fundamental in interoception, the central question remains: Does subjective conscious existence have any role in the face of naturalistic objectivity?

As the title of Keijzer's work states, naturalism, while not physicalism is avowedly objective. Secondly, appealing to unconscious processing doesn't bear on the question because, despite knowing that many unconscious processes of neural transmission are essential even to see or hear, subjective consciousness remains the hallmark of the alive alert state, which still needs to be accounted for.

The embodied mind blurs this distinction by extending the reach of physicalism from the brain into the entire biological domain of the conscious organism in a way which is parallel to the neuroscience effort to dissolve the hard problem in the brain. Thus even full bodied naturalism remains subject to the NS Theorem.

2.10. Can quantum theories of consciousness open a loophole?

One of the ways subjective consciousness might be accommodated in the natural universe is through quantum uncertainty and entanglement providing ways in which a variety of theories of consciousness might be viable. Many of the founding quantum physicists harbored views that consciousness was fundamental:

Max Planck: "I regard consciousness as fundamental. I regard matter as derivative from consciousness. We cannot get behind consciousness."

Werner Heisenberg: "Is it utterly absurd to seek behind the ordering structures of this world a 'consciousness' whose 'intentions' were these very structures?"

Erwin Schrödinger: "Consciousness cannot be accounted for in physical terms. For consciousness is absolutely fundamental."

Some quantum consciousness theories seek specifically to provide room for subjective conscious interaction and would pass the NS filter. Henry Stapp, for instance sees conscious choices as opening a causal gap in quantum reality by choosing how to act as an observer. He notes that according to von Neumann, "the part of the physically described system being directly acted upon by a psychologically described 'observer' is the brain of that observer" (Stapp, 2007). The quantum jump of the state of an observer's brain to a given state then becomes the brain's representation of the conscious acquisition of the knowledge associated with that answer which constitutes the neural correlate of that person's conscious experience, establishing the essential quantum link between consciousness and neuroscience (Stapp, 2006). "Quantum physics is built around 'events' that have both physical and phe-

nomenal aspects. The events are physical because they are represented in the physical/mathematical description by a 'quantum jump' to one or another of the basis state vectors defined by the agent/observer's choice of what question to ask. If the resulting event is such that the 'Yes' feedback experience occurs, then this event 'collapses' the prior physical state to a new physical state compatible with that phenomenal experience". Mind and matter become dynamically linked in a way that is causally tied to an agent's free choice of how to act. "A causal dynamical connection is established between (1) a person's conscious choices of how to act, (2) that person's consciously experienced increments in knowledge, and (3) the physical actualizations of the neural correlates of the experienced increments in knowledge".

The key idea, Stapp says, is that there is nothing in quantum mechanics that determines what decides the observer's questions. This means that there's a gap, a critical causal gap in quantum mechanics. Nobody denies that thoughts exist, he says, but how do they do something? And that's the place where quantum consciousness has causal impact. Thus the NS Theorem does not strictly apply.

Kuhn (2024) notes Stapp's theory is complemented by neurobiological theories of cellular processes. Beck & Eccles (1992, 1998) have applied quantum mechanical features to describe how, in the cerebral cortex, incoming nerve impulses cause the emission of transmitter molecules in presynaptic neurons via information transfer and "quantal selection" with a direct relationship with consciousness (i.e., influenced by mental actions) (Beck & Eccles, 1992). They propose that "the quantum state reduction, or selection of amplitudes, offers a doorway for a new logic, the quantum logic, with its unpredictability for a single event." Because conscious action (e.g., intention) is a dynamical process which forms temporal patterns in relevant areas of the brain (cerebral cortex), they propose how regulating the myriad synaptic switches between innumerable neurons in those relevant areas can be regulated effectively by a quantum trigger (based on an electron transfer process in the synaptic membrane). Thus, they conclude, "conscious action is essentially related to quantum state reduction" (Beck & Eccles, 1998). Stapp supports the hypothesis that quantum effects are important in brain dynamics in connection with cerebral exocytosis. As Beck & Eccles (1992) hypothesize, "the mental intention (the volition) becomes neurally effective by momentarily increasing the probability of exocytosis in selected cortical areas".

In addition Pribram (1991) Holonomic Brain Theory conjectures that consciousness is formed by quantum events within or between neurons. This early theory combines quantum biology with holographic storage. Pribram suggests these processes involve electric oscillations in the brain's fine-fibered dendritic webs, which

differ from the commonly accepted action potentials along axons and traversing synapses. These oscillations are waves and create wave interference patterns in which memory is encoded such that a piece of a long-term memory is similarly distributed over a dendritic arbor.

Kauffman (2019) and Kauffman & Radin (2023) proposes a description of consciousness-mediated quantum collapse in which quantum measurement converts *Res potentia* – ontologically real Possibles – into *Res extensa* ontologically real Actuals. *Res potentia* and *Res extensa* suggest a role for mind/consciousness in collapsing the wave function converting Possibles to Actuals, because no physical cause can convert a Possible into an Actual. Our consciousness entangles with the world in a vast superposition, and we collapse the wave function to a state which we experience as qualia. In an interview with Kuhn on “Closer to Truth”, Chalmers (2022) has a concordant view of the potentiality for subjective consciousness to causally interact upon the physical brain, through collapse of the wave function:

The next radical conclusion is that consciousness is separate from the physical world but it also has an effect on the physical world – a causal impact. We need to be cautious here, but science hasn’t taught us that physics is a closed system – that the brain is a closed system. There’s one route there that I think might be worth pursuing. A hole that’s left open for where consciousness can have some impact. In quantum physics, most of the time, the wave function follows the Schrödinger wave equation, but every once in a while a strange thing happens – it collapses – why does the wave function collapse? Quantum mechanics doesn’t tell us – it just says it collapses when a measurement occurs. What’s a measurement? No one knows. On the face of it what looks like a measurement is a measurement by a conscious observer. If you wanted to have consciousness to effect physics, it looks like physics could not be designed more perfectly.

Chalmers & McQueen (2022) have gone further and made a detailed case for the potentialities of quantum collapse as an explanation for the role of subjective consciousness, including the Wigner-von Neumann thesis, in relation to property and substance dualism and the objections to it in a way which can be compatible with both dualism and materialism.

While these theories are dealing with physical processes in the brain, they are also drawing in the subjective aspect in which mental intention and causation (volition) can have effect. Pribram’s holonomic theory also cites the wave properties as being at least analogous and possible a form of quantum wave-particle complementarity, so this group of theories pass the NS Theorem test and the natural empiricism test. But the NS Theorem also rules out some forms of quantum

consciousness theories that depend on physical quantum phenomena to generate consciousness.

2.11. Trouble in the third world – ORCH OR and its variants

In the Orch OR (Orchestrated Objective Reduction) theory, (Hameroff & Penrose, 2014), wave function collapse is deemed to evoke consciousness, by suggesting that it arises from quantum computations similar to cellular automata on the microtubules inside the brain’s neurons and is realized when those quantum states spontaneously collapse due to gravitational effects:

1. **Quantum Superposition:** The theory proposes that microtubules – protein structures within neurons, can exist in multiple quantum states at the same time (a superposition).
2. **Objective Reduction (OR):** According to Penrose, quantum states naturally collapse on their own once they reach a certain threshold of gravitational instability. This spontaneous collapse is called Objective Reduction.
3. **The “Orchestration”:** Before collapse, the quantum states in the microtubules compute vast amounts of information. The moment the wave function collapses (“Objective Reduction”), a discrete “moment of awareness” or conscious thought is produced. The brain “orchestrates” this process by tuning the environment to make these quantum processes possible.

Penrose (1989) argued, using Gödel’s incompleteness theorem, that human understanding requires a process that is neither algorithmic nor random. This is similar in nature to the NS Theorem and makes the theory partly non-physical. He proposed that objective reductions of quantum states meet this requirement, selecting outcomes in ways potentially influenced by Platonic values inherent in the fine scale structure of space-time geometry.

Penrose (1994) suggests that gravity exerts a force on “spacetime blisters” caused by gravitational differences in the entangled states, which become unstable above the Planck scale and collapse to just one of the possible states. The rough threshold for OR is given by Penrose’s indeterminacy principle:

$$\tau = \frac{\hbar}{E_G} \quad (1)$$

where τ is the time until OR occurs, E_G is the gravitational self-energy or the degree of spacetime separation given by the superpositioned mass, and $\hbar$ is the reduced Planck constant. The greater the mass–energy of the object, the faster it will undergo OR. An essential feature of Penrose’s theory is that the choice of states

is selected by a “non-computable” influence embedded in the Planck scale of spacetime geometry. Penrose claimed that such information is part of a Platonic “third world”, **Fig. 4**, representing pure mathematical truths, which relates to Penrose’s ideas concerning the three worlds: the physical, the mental, and the Platonic mathematical world. Penrose, notes that this Platonic world could also include aesthetic and ethical values.

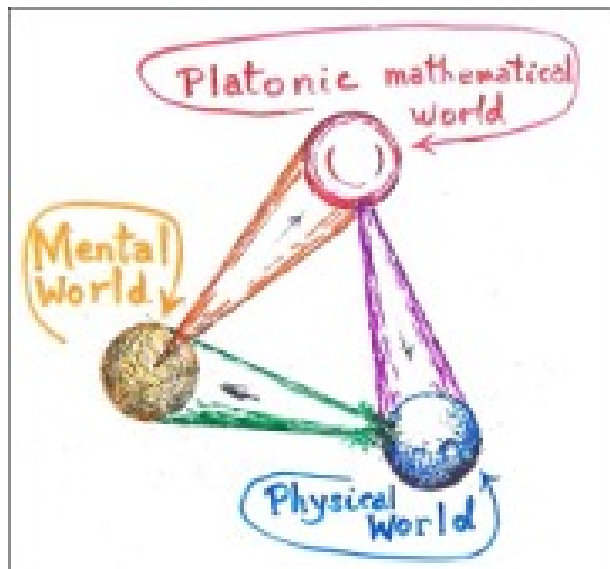


Figure 4 Illustration from Penrose’s 3-worlds seminar at UVA 2019 showing an interdependent Platonic third world.

This is the view implied by Whitehead [in his “actual occasions”] and taken in the Penrose-Hameroff theory of ‘orchestrated objective reduction’ (‘Orch OR’). Precursors of consciousness, presumably with proto-experiential qualities, are proposed to exist as the potential ingredients of actual consciousness, the physical basis of these proto-conscious elements not necessarily being part of our current theories of the laws of the universe. On this view, OR events are accompanied by moments of conscious experience, with qualia taken to be fundamental features of space-time geometry itself (Penrose & Hameroff, 2011).

Orch OR events are proposed to be conscious (to have qualia, experience) because proto-conscious qualia are fundamental, embedded at the Planck scale. Each Orch OR event selects a particular configuration of fundamental geometry and a particular set of experiential qualia (Hameroff, 2001). According to the arguments for OR put forth in Penrose (1994), superpositioned states each have their own space-time geometries. When the degree of coherent mass energy difference leads to sufficient separation of space time geometry, the system must choose and decay (reduce, collapse) to a single universe state. In this way, a transient superposition of slightly differing space-time geometries persists until an abrupt quantum – classical reduction occurs. Unlike the random, “subjective reduc-

tion” (SR, or R) of standard quantum theory caused by observation or environmental entanglement, the OR we propose in microtubules is a self-collapse and it results in particular patterns of microtubule-tubulin conformational states that regulate neuronal activities including synaptic functions (Hameroff & Penrose, 1996).

Because OR phenomena are fundamentally non-local, the coherent superposition phase may exhibit puzzling bidirectional time flow prior to self-collapse. As we equate the pre-collapse quantum computing superposition phase to pre-conscious processing, bidirectional time flow could explain the puzzling “backwards time referral” aspects of pre-conscious processing observed by Libet and colleagues (Hameroff & Penrose, 1996). Rather than consciousness being an emergent property or a quality that has always been in the universe, their theory asserts that precursors of consciousness have always been in the universe and biology evolved a mechanism to convert conscious precursors to actual consciousness. However, the nature of the proposed system doesn’t fit with this idea, because of the mismatch of the microtubular dependence with the synaptic basis of neuronal excitation.

Ball (2022) describes the effective failure of the Diósi-Penrose model in its basic form: *In 2020, a team, including Diósi in Hungary, used a germanium detector to test the Diósi-Penrose model, shielded from radiation by virtue of their location underneath Gran Sasso. After carefully subtracting the remaining background signal – mostly natural radioactivity from the rock – the physicists saw no emission at a sensitivity level, that ruled out the simplest form of the Diósi-Penrose model. They also placed strong bounds on the parameters within which various CSL models might still work (Arnquist et al., 2022).*

Now we turn to the links between microtubules and the gravitational collapse model. Hameroff & Watt (1982) had suggested: that microtubules, might function as computational processes citing major tranquilizers, anticonvulsants, and general and local anaesthetics. Since then the status of microtubules in anaesthesia remains unresolved, with major research on volatile anaesthesia focusing on ion channels (Hollingworth et al., 2026; Steinberg et al., 2015). The Wikipedia entry on anaesthetics omits microtubules altogether. The key research supporting microtubules is circumstantial and comes only from researchers supporting Orch (Craddock et al., 2017). Fundamentally, inhaled anaesthetics work within the central nervous system by augmenting signals to chloride channels (GABA receptors) and potassium channels while depressing neurotransmission pathways (Miller et al., 2023).

Penrose & Hameroff (2011) explain how microtubule quantum computation and Orch OR fit with recognized neurophysiology only in terms of assumptions and potentialities:

Neurons are composed of multiple dendrites and a cell body/soma which receive and integrate synaptic inputs to a threshold for firing outputs along a single axon. Microtubule quantum computation in Orch OR is assumed to occur in dendrites and cell bodies/soma of brain neurons, i.e. in regions of integration of inputs in integrate-and-fire neurons. As opposed to axonal firings, dendritic/somatic integration correlates best with local field potentials, gamma synchrony EEG, and action of anesthetics erasing consciousness. Tononi has identified integration of information as the neuronal function most closely associated with consciousness. Dendritic microtubules are uniquely arranged in local mixed polarity networks, well-suited for integration of synaptic inputs. Membrane synaptic inputs interact with post-synaptic microtubules by activation of microtubule-associated protein 2 ('MAP2', associated with learning), and calcium-calmodulin kinase II. Such inputs were suggested by Penrose (1994) to 'tune', or 'orchestrate' OR-mediated quantum computations in microtubules by MAPs, hence 'orchestrated objective reduction', 'Orch OR', Fig. 5.

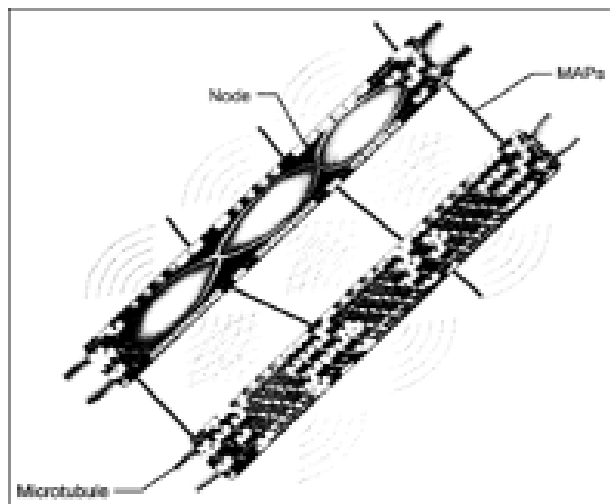


Figure 5 OR collapse of a microtubule in a superposition of states into a “classical” state (Hameroff & Penrose, 1996).

They note the issues of decoherence: *One possibility that Orch OR suggests is that perhaps phases of isolated quantum computing alternate with phases of classical environmental interaction, e.g. at gamma synchrony, roughly 40 times per second. Concerning the classical output, they note that: The particular tubulin states chosen in the reduction can then trigger axonal firing, adjust firing threshold, regulate synapses and encode memory. Thus Orch OR can have causal efficacy in conscious actions and behavior, as well as providing conscious experience and memory.*

Hameroff (2009) has also proposed that coherent Fröhlich condensates in microtubules in one neuron could link with microtubule condensates in other neurons and glial cells via the gap junctions allowing them to extend

across a large area of the brain, suggesting that the action of this large-scale quantum activity is the source of 40 Hz gamma waves and thus claims to address the binding problem by proposing that macroscopic quantum coherence across vast networks of neuronal microtubules allowing distributed brain regions to share a unified quantum state, collapsing simultaneously into a single, seamless conscious experience. This capacity has also been questioned.

Strømme (2025) has a very apt summary of Orch OR: *Roger Penrose and Stuart Hameroff's Orchestrated Objective Reduction (Orch OR) theory represents a partial departure from this paradigm. While it anchors consciousness in biological structures—specifically, orchestrated quantum state reductions in brain microtubules—it also introduces a radical ontological shift. Orch OR proposes that these reductions are influenced by the geometry of spacetime itself and that primitive proto-conscious events may occur independently of the brain, embedded in the fabric of the universe. In this sense, Orch OR straddles the boundary between materialist neuroscience and metaphysical speculation: higher-order awareness is seen to arise through biological orchestration, but the foundational ingredients of consciousness are conceived as fundamental features of reality.*

NS Theorem: Although Penrose's idea that humans transcend computational processes has close parallels with the NS Theorem, the theory as whole violates its provisions: Penrose's framework assigns the subjective conscious agency in the framework to be determined by a third world of Platonic forms below the Planck level, rather than the observer as in the standard QM, contradicting the ability of the conscious subject to have autonomous agency over its choice of observation. Quantum observation is a two-phase process involving both the choice of measurement and the ensuing acausal projection operator. In Orch the former is a quantum computation boundary condition, and the latter determined by the third world. This is doubly evidenced in the notion of proto-conscious “moments of conscious experience”, reflecting Whitehead's actual occasions, determined by objective collapse. The theory is thus not a solution to the hard problem or its extension to volition as these “moments” are not a product of the organism and do not explain subjective experience. Thus, the only processes under the organism's control are physical quantum computation in the microtubules, meaning the process is implicitly physicalistic, as is Google's quantum computation process.

Natural Empiricism: (1) Objective reduction is an unproven process that conflicts with the interactive processes of observed induced quantum measurement in standard QM. (2) There is no evidence for a Platonic third world. (3) There is no connecting explanation for how known processes of membrane excitation, synaptic transmission, action potentials and excitations

such as gamma oscillations can meaningfully connect to an intra-cellular, cell automaton type computation on individual neuronal microtubules, nor any explanation of how these computations could be meaningfully translated into subsequent brain activity. (4) Orch OR fails to show how it differs from materialism concerning subjective conscious volition. (5) Because the core process is in individual neuron microtubules rather than synaptically between cells, solving the binding problem of how of proto-conscious “moments become bound into a global conscious experience remains hypothetical. (6) The explanation makes no evolutionary sense, because it invokes two completely distinct processes, one centred on transmissible membrane excitability and the other on internal molecular cellular automata. (7) There are clear confirmations of how membrane excitability and neurotransmitter and receptor functions arose in single-celled eucaryotes and clear contradictions between the dynamic needs of microtubules in cellular amoeboid exploration and movement in both amoebae and human phagocytes, and the needs of kinesin and dynein molecules to enable nutrient transport to synapses, conflicting with the use of microtubules for CA quantum computation. Neven et al. (2024), the physicist and computational neuroscientist who founded and leads Google Quantum AI, with Koch and others would seek to “improve” Orch OR in two ways:

First, we want to remove the reference to gravity. Whether gravitational influences cause a collapse is testable, but so far, it has not been observed in a lab, and initial experiments looking for such an effect have come up short (Arnquist et al., 2022). We prefer to stay with textbook quantum mechanics, which teaches that an ‘effective collapse’ occurs whenever a quantum system interacts with an external system with a large number of degrees of freedom, as, for instance, happens during a measurement of a quantum system by a macroscopic system, such as an instrument or a person.

Second, we propose that a conscious moment occurs whenever a superposition forms, not when it collapses, Fig. 6. This modification is necessary to avoid the possibility of faster-than-light communication that Penrose’s original proposal entails when applied to multiple entangled qubits. It also sidesteps the conceptual problem of having to define when exactly a measurement occurs, as all interactions are being treated alike. So our proposal is firmly rooted in Everett’s ‘many worlds’ formulation of quantum mechanics.

The first brings the quantum theory back to agential observation, returning agency to the agent rather than a third Platonic world and the second is also critically important, as critical phase transition between entanglement and collapse, in which consciousness is associated with the extended wave function and collapse is associated with decision-making in a cycle he

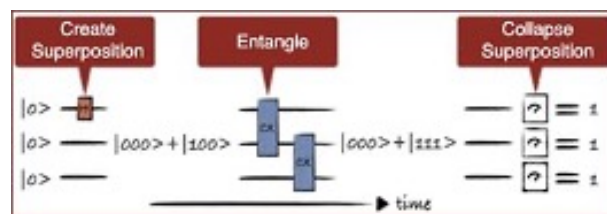


Figure 6 A generic quantum circuit consisting of gate and measurement operations acting on three qubits. With which operation shall we identify the physical correlate of consciousness? We suggest a conscious moment occurs when a superposition forms (Neven et al., 2024).

analyses via qubits.

Neven et al. (2024), cite both Descartes’ cogito and Wigner’s solipsism as a basis for a constructing such a TOE:

A key challenge when attempting to construct a scientific theory of consciousness is that conscious experience is not a traditional experimental observable with an associated objective, that is, subject-independent measurement protocol. Indeed, as famously argued by Descartes, my experience is the only thing I can be absolutely certain of. Whether anything else is conscious, such as you, has to be inferred as the most likely explanation of all available information. It follows that I cannot conclusively demonstrate that anyone except myself is conscious. That is, epistemological solipsism, the position that I can only be certain of my own consciousness, is logically consistent. Still, inferring consciousness in others is common and implicit.

The gravitational “bubble” of self-collapse is replaced by a Feynman path approach, implicitly invoking many worlds:

We posit that a moment of consciousness arises not when a superposition collapses, but when it forms. The structure of the evolving superposition and the paths the experiencing quantum system follows within it determine the qualities of the conscious experiences, “what it is like to be” that system in that state. Our key tenet is that a system only ever experiences classical, definite states [consistent with the cat paradox and Wigner]. These states form a basis of the Hilbert space the quantum system lives in. If a classical state evolves into a quantum superposition through a unitary transformation, as prescribed by the Schrödinger equation, then the experiencing system will evolve along multiple paths simultaneously. Each ‘Feynman path’, connecting basis states results in a distinct sequence of conscious moments. Hence, we posit that a quantum system may be composed of many experiencing minds, albeit often very simple ones. As the system evolves from a basis state it just experienced, the population (probability mass), initially concentrated on this start state, will spread to other basis states within a light

cone given by the prevailing interactions. The more the population decreases on the start state, the more likely a transition becomes. Eventually, depending on which Feynman path the state is moving along, the system will experience the transition to a different basis state.

It may also be possible to apply a principle from Integrated Information Theory and choose the basis that maximizes the integrated information the system experiences. In our proposal, entanglement solves the binding problem, that is, the unity of a phenomenal experience, in a natural manner and without any additional assumptions. ... To quantify the content of an experience in a principled manner, the Φ -measures proposed by a quantum mechanical instantiation of integrated information theory (Albantakis et al., 2023; Zanardi et al., 2018) seem advantageous.

However, this description, as it stands, is simply identifying subjective consciousness with entangled qubits and leads to an attempt to link brains with quantum computers to address the intrinsic difficulty of verifying subjective consciousness in another agent.

2.12. Quantum relational eliminativism

Rovelli's relational quantum mechanics – eliminativist denial of subjective consciousness:

I find that ... Chalmers (1996) well-known distinction between the “easy” and the “hard” problem of consciousness is rooted in this fallacy. The recurring claim that there necessarily is a “hard” problem, over and above the unsolved “easy” problem, is to base the very formulation of the issue on a conceptual analysis of what it means for us to be conscious. Our intuition is that—whatever the phenomenon—to be conscious must be something over and above whatever process is happening in the brain. ... Chalmers's key argument, for instance, is the zombie argument: the same brain processes that happen together with a subjective experience can also be conceived to happen in the absence of this subjective experience. But why could one conceive this to happen? One can conceive this to happen only if one holds on to a conceptual understanding of ourselves as entities independent from the physical processes in the brain—“consciousness-(a).” It is the presumed understanding that implies we can conceive the separation between brain and mind. ... A claim is made that we directly know the intrinsic nature of consciousness by being conscious, so we couldn't be mistaken about its nature. Centuries of advances in knowledge teach us that there are no intuitions we can't be mistaken about. This, I believe, is precisely what naturalism is all about. ... It may well be true that consciousness-(a) is incompatible with the current naturalistic account of the world, but this is no argument against the possibility that the “easy” problem could lead to an understanding of brain processes where a “consciousness-(b)” concept can account for the full experience of subjectivity. In simpler words, the in-

tuition that authors like Chalmers (1996) and Nagel (2012) defend is just what it is: an intuition promoted to a definition, or a certainty.

Like the intuition of the old fisherman, also promoted to a definition, that the very nature of sunset is the sun splashing into the ocean. Intuitions turn out to be wrong. Especially when they find themselves in ever-increasing contrast with everything we are learning about the natural world (Rovelli, 2022).

Quantum mechanics does not give direct answers to these questions. There is no quantitative explanation for subjectivity, perception, intelligence, consciousness, or other aspects of mental life. Quantum phenomena intervene in the dynamics of atoms, photons, electromagnetic impulses and many other microscopic structures that appear in every part of our body, but there is nothing specifically quantum that helps us understand what thoughts, perceptions or subjectivity are. These are the aspects that involve the functioning of the brain on a large scale: that is, it is precisely where the quantum interference hides the noise of complexity. Quantum theory does not help directly to understand the mind (Rovelli, 1996).

2.13. Multiscalar quantum theories

Poznanski (2026) in processual relational geometry (PRG) substantially reformulates his DOT theory (Poznanski, 2024), of non-reductive type-B materialism (Chalmers, 2003). PRG moves from emergentist materialism to “constitutive essentialism”. Physical and constitutive realization reciprocally realize one basis, replacing emergence and supervenience.

PRG is distinguished from standard physicalism because the constitutive basis is not ontologically exhausted by objective physical description, even though physical realization remains indispensable. ... PRG explicitly departs from biological naturalism (Searle, 2017) that consciousness is caused by neurobiological processes by arguing that consciousness is constitutively rather than causally realized through physically embodied transscale ontophysical continuity. ... Closure is therefore not a causal mechanism acting upon an already existing consciousness but the constitutive condition under which conscious actuality becomes intrinsically realizable. The constitutive basis is realized within Embedded Quantum Physicalism (EQP), where a critical relational organizational transition provides the physically embodied mechanism that establishes the self-consistency condition of reciprocal realization. PRG is presented as a transscale ontophysical framework that articulates the Quasipolaritonic Process Geometry. ... Although EQP remains substrate-neutral, every realization of EQP requires physical embodiment within a substrate capable of instantiating the constitutive organization specified by QPG.

Although the exclusive emphasis on QPG faces sim-

ilar compatibility problems to that of microtubules in ORCH OR, Poznanski claims his theory specifically addresses the consequences of the NS Theorem through constitutive essentialism, thus exemplifying how a quantum theory can be physically embodied without being classically physicalist, in the sense of objective causal closure, or classical determinacy in neurobiology.

The usual notion of informational closure (e.g., Chang et al. (2020)) limits the extent that Reason's theorem (Reason, 2023) targets explanations formulated solely in terms of objective physical structure and dynamics, the explanatory commitment of the theorem prevents [describing] the system in terms of fixed 'structure' as in phenomenological or information-theoretic accounts. In biologically implemented versions of such theories, that explain consciousness solely through information closure, remain committed to an objectively characterizable informational organization. Consequently, if Reason's theorem established limits on explanations formulated entirely in terms of objective informational organization, then those theories remain vulnerable. ... The Cogito forms the basis of Reason's theorem, which suggests that no objectively characterizable mode of realization can completely specify the intrinsic realization of conscious actuality. If conscious actuality occurs, its constitutive basis cannot be ontologically exhausted by objective physical description alone. PRG therefore argues that conscious actuality requires a constitutive basis that is physically embodied while remaining irreducible to objective characterization.

Kuhn (2024) notes: Neuroscientist Poznanski (2024) proposes a Dynamic Organicity Theory (DOT) of consciousness, a quantum biological theory based on a multiscale interpretation of type-B materialism [accepting that there is an unclosable epistemic gap, but denying there is an ontological gap] (Chalmers, 2003). DOT utilizes a multiscale temporal-topological framework to include quantum biological effects in the sense of what happens to macroscopic systems upon interaction with quantum potential energy that exists when a living negentropic state of the brain imposes thermodynamic constraints. DOT does not deal with quantum consciousness or assume quantum brain dynamics. However, according to Poznanski, a Schrödinger-like equation describes the quantum effects within the multiscale complexity, where multiscale complexity is both functional and structural through changeable boundary conditions (resulting in the topology being a holarchical modularity). This is made possible by treating time consciousness, i.e., “consciousness-in-the-moment,” on a nonlinear temporal scale and implicitly grounding space to the contingency of changing boundary conditions. The approach is based on the dynamics of functional relations (not to be confused with functionalist or relational theories of consciousness).

The multiscale quantum aspects of DOT are an asset, however the assumption of a closed ontological explanatory gap on the face of this evidence would conflict with the NS theorem filter.

2.14. Panpsychism

Panpsychism consists of a spectrum of theories that can invoke issues of their own. Pan-protopsyism involves proto-psyic elements that might lie below the level of subjective consciousness and thus involves the combination problem of how these elements can combine into perceived qualia. On the other hand, cosmopsychism, which asserts the whole universe has subjective consciousness in some form, involves the decomposition problem: How such a universal consciousness becomes the individual subjective consciousness we experience.

Ironically, the NS Theorem can also demolish some forms of panpsychism, such as Strawson (2006) realistic monism:

Realistic physicalists, then, grant that experiential phenomena are real concrete phenomena — for nothing in life is more certain — and that experiential phenomena are therefore physical phenomena. It can sound odd at first to use ‘physical’ to characterize mental phenomena like experiential phenomena, and many philosophers who call themselves materialists or physicalists continue to use the terms of ordinary everyday language, that treat the mental and the physical as opposed categories.

On the other hand, Goff (2021) asserts two aspects of consciousness that give rise to the hard problem, quality – that experiences involve sensory qualities and subjectivity meaning that there is a subject who has those experiences, He argues that these two aspects of consciousness give rise to two “hard problems.” He says, the first is easier to argue for – because the physical sciences, which tell a purely quantitative story of causal structures, cannot articulate the qualities of experience, so the language of physics entails an explanatory limitation.

Harris (2019) author of “Conscious” has a loose knit semi-panpsychic view:

My own sense of the correct resolution to the mystery of consciousness, whether or not we can ever achieve a true understanding, is split between a brain-based explanation and a panpsychic one. So while I'm not convinced that panpsychism offers the correct answer, I am convinced that it is a valid category of possible solutions that cannot be easily dismissed.

The combination problem may, in fact, be a reason to favor a version of panpsychism in which consciousness is fundamental in the form of a continuous, pervasive field, analogous to spacetime. Just as spacetime and gravity have an interactive relationship, consciousness

can be thought of as a fundamental “field” that interacts with, and is integral to, matter. We typically don’t think of spacetime as bits and pieces that build on each other (it’s simply everywhere), and I don’t think we should be tempted to think of consciousness, if it is indeed a pervasive field, as divisible into building blocks either. Rather, it makes more sense to talk about a field that contains a range of content—the content depending on the other forces or fields it’s interacting with. In the same way that gravity is a two-way street—matter warps spacetime and the shape of spacetime determines how matter moves—a consciousness field would imbue matter with another property, giving rise to the range of content experienced.

This is different from Strawson’s position because she is intuitively suggesting a form of panpsychism may provide a complementary view to the neuroscientific brain centred view, also stressing a form of cosmopsychism that consciousness is everywhere and not confined to individuals, stressing that this is analogous to a field rather than Keppler’s position that the quantum vacuum field is literally dual aspect. It thus qualifies as an experiential empirical account.

2.15. Irreducible seity

“Irreducible” Faggin (2024) outlines a position which has been variously referred to as quantum information-based panpsychism or even idealism, positing that the universe is dynamic, holistic, and seeks to know itself, which manifests through conscious quantum fields. Like Koch, this arose from a quantum change experience:

I went to get a glass of water, went back to bed and as I was trying to go back to sleep thinking of nothing. All of a sudden from my chest come an energy that was unbelievable powerful. It was love but it was you know this energy that was a white scintillating light was physical you know it wasn’t like an imagination or a hallucination. Oh no this is real you know this thing you know had a had a physical a physical experience as well as very deep experience because I never felt love like that. It was so much more powerful than the love that I felt before. It was unconditional love and my consciousness was in this energy and then it exploded. It was everywhere and my consciousness was also everywhere.

In Faggin’s view, reality is fundamentally made of experiential, semantic “meaning” rather than just inert matter:

In my opinion, life cannot be explained only with biochemistry, but requires the new concept of live information, which is inseparable from the consciousness and the free will of quantum entities. ... I think that within cells there must be levels of global information processing that are currently unknown and use both classical and quantum properties. ... To explain the remarkable

autonomy and the intentional and intelligent behavior of living organisms, we must assume that each of them is “connected” with a conscious entity with free will. Consciousness is the ability to have an inner experience and know oneself, while free will is the ability to choose how to act in the world. ... It is important to recognize the irreducible existence of an individual consciousness in every living organism. ... I think that life is a dynamical system performing both quantum and classical information processing, in which live information is also connected with the subjective meaning of the organism coming from its consciousness.

We are so used to being aware that we generally do not recognize that consciousness cannot possibly emerge from unconscious matter. Only those who have seriously thought about it have realized that consciousness is a fundamental unsolved problem with enormous ontological and epistemological consequences. ... I believe that consciousness must be an irreducible property of the “elementary particles” of which everything is made, just as the electrical charge is a property that does not derive from any simpler properties. If this is the case, then everything in the universe must be conscious. This idea is millennia old and is called panpsychism. ... Panpsychism, however, has never been taken seriously by science. The alternative is to consider that physical laws may be emergent properties of consciousness, an assumption that is hard for most scientists to accept.

In fact, affirming that LUCA self-organized based on the action of physical laws on inert matter is saying that life spontaneously emerged from non-life. It is not far-fetched to say that the self-assembly of LUCA as a self-reproducing system required a third miracle! While I believe that neo-Darwinism is at least plausible when used to explain the evolution of species after LUCA’s emergence, I find it hard to believe that consciousness and free will could emerge from organisms that are devoid of them. Hence, for consciousness to emerge from inanimate matter, a minimum “quantum of consciousness” should also exist in at least one of the elementary particles of which the atoms are made.

My many and various extraordinary experiences of consciousness indicated that reality must have both a semantic and a symbolic aspect, i.e., information could not be separated from its meaning as Shannon had conceived. Meaning and symbols had to be aspects of a more fundamental reality somehow. ... I also felt that the solution to the “hard problem of consciousness” was hiding within quantum physics. ... In my model, conscious experience had to be another irreducible aspect of quantum information. ... This theory is called Quantum Information-based Panpsychism (QIP) and has been recently published.

A conscious being is therefore represented by a quantum system that is in a pure state. If such an entity

can transform its own state by maintaining its purity and can create a classical memory of its experience, we have defined a special quantum system which I call seity. A seity is a field in a pure state existing in a vaster reality than the physical world that contains the body. A seity exists even without a physical body, and this is a crucial statement, because it means that our existence does not depend on the body's existence.

Although it sometimes veers into frank idealism, as noted of seities, this approach is clearly transcending the boundaries of the NS Theorem because all aspects of existence have conscious attributes, including free will, so it is not contained within the definitions of the NS Theorem's notion of a physical process: as a set of states and transformations constituting a mathematical category of states and morphisms. It also has a good representation of empirical science, even though it proposes speculative additional entities like seities.

"Irreducible" is a detailed descriptive account which enables avoiding mechanistic assumptions of functional or structural reducibility in their molecular and conceptual description whereas many neuroscientific theories make explicit or implicit reference to reducibility, in the attempt to explain the molecular processes in biology.

2.16. Dual aspect and other forms of monism

Dual aspect and Neutral Monism form a spectrum held together by a conceivable neutral "substrate" uniting the mental and physical. Spinoza believed that Nature or God (*Deus sive Natura*) has infinite aspects, but that Extension and Mind are the only aspects of which we have knowledge. Arthur Schopenhauer considered the fundamental aspects of reality to be will and representation, which characterizes the phenomenal world as the manifestation of will. His position is that will and representations are one and the same reality, regarded from different perspectives. Schopenhauer agreed with transcendently idealistic Kant that our normal perceptions are only illusions (phenomena) not the "thing-in-itself" (*Ding an sich*), but he disagreed, by arguing that we can actually know the *ding an sich*: it is the inner raw, blind and irrational noumenal Will.

Atmanspacher (2014) contrasts compositional and decompositional dual aspect approaches: *While composition entails that the mental and the material are reducible to these elements, the decompositional approach renders reduction to the whole impossible. The fact that a primordial whole cannot be derived from its parts raises the bar for an intuitively accessible reconstruction of the psychophysically neutral domain in Pauli and Jung's scheme.*

William James took issue with the very notion of "consciousness" because it was a will of the wisp witness, in favor of "experience" as the "neutral stuff":

For twenty years past I have mistrusted 'consciousness'

as an entity; for seven or eight years past I have suggested its non-existence to my students, and tried to give them its pragmatic equivalent in realities of experience. ... But in addition to this, we are supposed by almost everyone to have an immediate consciousness of consciousness itself. "The moment we try to fix our attention upon consciousness and to see what, distinctly, it is," says a recent writer, "it seems to vanish". It seems as if we had before us a mere emptiness. ... Experience, I believe, has no such inner duplicity; and the separation of it into consciousness and content comes, not by way of subtraction, but by way of addition-the addition, to a given concrete piece of it, of other sets of experiences, in connection with which severally its use or function may be of two different kinds.

In doing so, he stated the very nub of the mind-body problem:

If the reader will take his own experiences, he will see what I mean. Let him begin with a perceptual experience the presentation,' so called, of a physical object, his actual field of vision, the room he sits in, with the book he is reading at its center and let him for the present treat this complex object in the as being 'really' what it seems to be, namely, a collection of physical things cut out from an environing world of other with which these physical things have other actual or potential relations. Now at the same time it is just those self-same things which his mind, as we say, perceives; and the whole philosophy of perceptions from Democritus's time downwards has been just over the paradox that what is evidently one reality should be in two places at once, both in outer space and in a person's mind.

James's and Russellian monisms are compositional. Russell (1921) insisted that the "neutral stuff" can be apprehended, namely by "sensations". Referring to James (1904) introducing the concept of "pure experience" as the neutral stuff that is apprehensible, he writes:

My own belief ... is that James is right in rejecting consciousness as an entity, and that the American realists are partly right, though not wholly, in considering that both mind and matter are composed of a neutral-stuff which, in isolation is neither mental nor material. I should admit this view as regards sensations: what is heard or seen belongs equally to psychology and to physics. However, in decompositional approaches, the neutral stuff remains aloof.

Pauli's and Jung's common interest in dual aspect monism was pursued in seeking for a worldview better adapted to the extended body of scientific knowledge than what philosophers had offered. How is the interface between the mental and the physical to be understood, on which idea of reality can it be grounded, how can psychophysical correlations be explained, and what is their epistemological status, substantially derived from Pauli's familiarity with complementarity in

quantum physics:

The general problem of the relation between psyche and physis, between inside and outside, can hardly be regarded as solved by the term “psychophysical parallelism” advanced in the last century. Yet, perhaps, modern science has brought us closer to a more satisfying conception of this relationship, as it has established the notion of complementarity within physics. It would be most satisfactory if physis and psyche could be conceived as complementary aspects of the same reality (Atmanspacher, 2012).

In addition, the concept of non-locality matched with Jung’s conception of a basic reality that is one unfragmented whole – the *unus mundus* (One world). Mind-matter correlations emerge because of an epistemic split of an underlying ontic holism, into mental and material aspects. In this way, the mental and physical, are subvented by the collective unconscious and quantum-nonlocality and in turn by the *unus mundus*. Unlike compositional approaches, the *unus mundus* cannot be directly experienced. The neutral stuff in Chalmers (1996) proposal consists of information states (bits) that are neutral with respect to a mind-matter split. They can be represented in so-called information spaces and manifest themselves phenomenally and physically simultaneously:

Whenever we find an information space realized phenomenally, we find the same information space realized physically. And when an experience realizes an information state, the same information state is realized in the experience’s physical substrate. ... Principles concerning the double realization of information could be fleshed out into a system of basic laws connecting the physical and phenomenal domains. ... The ontology that this leads us to might truly be called a double-aspect ontology. Physics requires information states but cares only about their relations, not their intrinsic nature; phenomenology requires information states but cares only about the intrinsic nature. This view postulates a single basic set of information states unifying the two. We might say that internal aspects of these states are phenomenal, and the external aspects are physical. Thus, we have an evolution of these ideas: Spinoza God or nature, James experience, Russell sensations, Chalmers syntactic information, Pauli-Jung to archetypal wholeness, Bohm to holomovement and implicate order.

Jung and Pauli sought a confluence of psychology and synchronicity (later attributed to non-local quantum entanglement). Because the physical is treated as a derivative “slice” of reality, rather than the ultimate foundation of it, Jung and Pauli’s views and those of Atmanspacher are explicitly non-physicalist. Atmanspacher (2003) proposed two interesting provocative conjectures (1) mind-matter correlations analogous to quantum entanglement and (2) a breaking of time-

symmetry in which the physical was causal and the mental was retrocausal. In his last communication with Pauli, Jung thought the psyche might break the duality: Jung suggests that parity symmetry violation in the weak interaction is analogous to an arbiter—called the “Third”—taking sides between two otherwise symmetrically opposite entities. The Third might slightly favor psyche over body, breaking the symmetry between them. The critical test arises in how the “physical” and “mental” aspects are deemed to interact or otherwise, in the present in active decision-making life. The same would apply to the Bohm (1980) “Implicate order”.

Some forms of dual aspect monism pass muster under the NS Theorem. The critical question is how they treat the question of interactivity between subjective consciousness and physical reality in the living condition. If they simply state an origin from a common neutral domain they may pass muster by omission, but if they forbid interaction, still accepting physical causality, as in brain-mind identity theory, they become subject. Teilhard de Chardin was an evolutionary scientist and also a profoundly religious thinker who co-invented the idea of the noosphere – the word is derived from the Greek *νόος* (“mind”, “reason”) and *σφαῖρα* (“sphere”), which has now been used in diverse ways in the context of the global electronic “consciousness” of the internet.

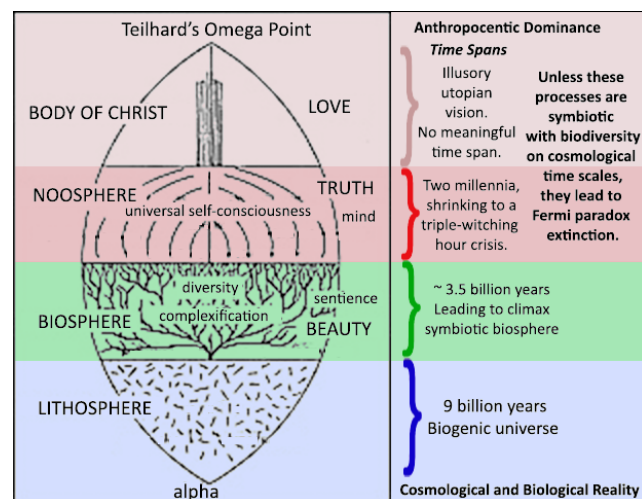


Figure 7 Chardin’s evolutionary noosphere leading to the Omega point (Morton, 1984).

Kuhn (2024) notes: Teilhard was a dual-aspect monist. He “considered matter and consciousness not as two substances or two different modes of existence, but as two aspects of the same cosmic stuff.” To Teilhard, evolution describes “the dynamic impulse in life toward more being and consciousness” and that which drives evolution is consciousness. In short, “evolution is the rise of consciousness.” Moreover, “the presence of mind in matter and the openness of matter to greater wholeness is the religious phenomenon of nature.” Radically unorthodox, Teilhard sees this reality

as the incarnation of God, where “God and world are in a process of becoming a new reality together.”

This means that, although Teilhard’s philosophy and science doesn’t get ruled out by the NS Theorem, it clearly fails the natural empiricism test, although accepting evolution, by conceiving of the universe as revealing God’s true form in Christ, **Fig. 7**.

The NS Theorem rules out forms of reflective dual aspect monism in which mental states are strictly dual to physical states such as (Vimal, 2025) ICRDAM (inseparable complementary reflective dual aspect monism). This framework consists of DAS or double aspect s-p subjective-physical states in which each subjective experience has a neural physical basis aimed to be acting consistently with physical neuroscience to bring science and spirituality closer. Ram bundles these as one, as the only functional units capable of interrogation, claiming they co-arise from a neutral monism substrate, without p being metaphysically prior to s, allowing neither $s \rightarrow s$ actions nor $s \rightarrow p$ mental causation, nor even perceptual $p \rightarrow s$ interactions, but then the basal $p \rightarrow p$ stochastic causality in the quantum universe pertains, making s states and processes supervenient on p. Moreover, even if we concede that the DAS are the only interacting units, these remain supervenient on “co-arising” p processes because the mapping $p \leftrightarrow$ DAS is 1-1 onto since two DAS states cannot have the same p aspect and two different s aspects by reflectivity, so DAS is automatically supervenient on p. This also fails the Principle of Natural Empiricism by a priori asserting a heptahelical cyclic cosmology based on the retreat and emergence of a formless Nirguna Brahman, and there is no forthcoming explanation of how a neutral entity can simultaneously manifest both subjective and objective reality, whether or not living organisms are extant.

Forms of neutral monism that directly or indirectly invoke physical causality as necessary for subjective consciousness, such as Pereira (2014) TAM are also ruled out. TAM or triple aspect monism claims natural physicality, subjective consciousness and information form three primitive aspects, but these aspects are not categorically distinct, and the status of information remains ambiguous: “My main claim is that what makes information processing conscious is the presence of feelings about the content of the information being processed.” This suggests information is partly subjective. But when queried, about consciousness being the witness of experiences, Periera notes: “I changed the third aspect to Sentience, the capacity of Feeling. Therefore, when the capacity is actualized by a material system processing information from the body and environment, there is consciousness”. This then implies supervenience of consciousness on physicalism, confirmed by later work Pereira (2020) claiming binding leading to a conscious percept is due to calcium currents in astroglia and hydro-ionic waves, imbued

with a dual-aspect status – “The hydro-ionic waves are physical for the external observer and sentient for the system in which they occur. We are dynamical systems in which conscious potentialities are actualized by unconscious processes”. Periera claims non-reducible physicalism but also refers to Aristotelian hylomorphism, for which Form is ontologically more fundamental than Matter. His concept of Physis is broader than Descartes’ mechanical view of ‘res extensa’ (objective matter in space) but Periera’s theory as a whole implies non-reductive physicalism and remains subject to the NS Theorem and fails the natural empiricism test by a priori asserting non-empirical Aristotelean forms as subverting physical reality.

Graboi (2023) has a second three aspect model, also entitled TAM, involving matter, a non-physical mind, and pure awareness, in which pure awareness energy interacts with a brain to produce consciousness in the mind, motivated by an interest in psi phenomena. Once again we have two aspects, awareness and mind, which are non-physical and subjective, thus again not forming a foundational complementarity addressing the explanatory gap.

Strømme (2025) “Universal consciousness as foundational field” which she sees as a “theoretical bridge between quantum physics and non-dual philosophy”, with the metaphysical aspect being mind, consciousness and thought coined from a poem by Banks (1998). Mind is “universal creative intelligence,” the source and driver of differentiation. Consciousness is “the universal capacity for awareness,” the field in which space, time, and matter are realized. Thought is “the creative mechanism” by which formless potential becomes structured, subjective reality. She claims that universal consciousness precedes space–time. Reality is conceived as a timeless, spaceless, and undifferentiated field of pure potential, giving rise both to the big bang and the physical universe. She envisages the key steps in terms of structural symmetry-breaking and quantum fluctuations, the key step being linking consciousness and physical reality. The consciousness field Φ acts as the source for both metaphysical awareness and physical structures. Its evolution bridges the metaphysical principles of mind, consciousness, and thought with the physical principles that govern space–time and matter.

As the consciousness field Φ evolves post-collapse, localized excitations manifest as individual consciousness. These excitations appear as “ripples” or discrete projections within the universal field, corresponding to sentient beings capable of awareness and subjective experience. Universal thought governs the collapse of undifferentiated universal consciousness into differentiated states marking the creation of structured reality from formless potential. Universal thought thus enables differentiation by selecting specific patterns or excitations within universal consciousness and shaping

them into coherent experiences or subjective realities.

Once individual consciousness emerges, personal thought begins to function within each localized structure of awareness. It acts as the creative and interpretive mechanism by which subjective experience is shaped. Whereas universal thought initiates differentiation and structure at the cosmic level, personal thought operates within the individualized domain, generating meaning and perception moment by moment.

Strømme admits that her current framework for universal consciousness serves merely as a preliminary scaffold, in tune with both quantum physics and spiritual traditions that see consciousness as a cosmic phenomenon. The cosmological view is thus fully complementary, and symmetry-breaking is an apt process. But primal symmetry-breaking into subjective consciousness and physical reality would have to precede all others. By contrast, wave-particle complementarity is not a product of symmetry-breaking and is thus fundamental. The complementarity of subjective consciousness and the natural universe may likewise be foundationally necessary for the universe to become manifest.

Just as TAM's divergence into physical, informational and conscious is intellectual rather than existential, so are consciousness, thought and awareness. The dependence of the metaphysics, depending on quantum field equations, would make it subject to the NS theorem but the real problems arise from: (1) a lack of any explanation of how domains as different as the natural universe and subjective consciousness can be generated from a symmetry-breaking of a fundamental domain with no form and hence no symmetries, as in theories invoking a formless Nirguna Brahman and (2) a clash with biological evolutionary reality, that individual conscious organisms derive not from field fluctuations but fertilization and embryonic development, preceded by a long maturation process of the physical universe, element formation, eventually molecular biogenesis, evolution. These are deficiencies of Natural Empiricism shared with several dual aspect and idealistic theories. Strømme (2025) has suffered an editorial retraction in 2026 on the basis of physicalist irrefutability of the operator (thought) collapsing Φ .

2.17. Dualism: substance and property

Dualism is generally conceived in two forms, substance dualism, where conscious mind and physical universe constitute distinct "substances" and property dualism where the conscious mind is an irreducible property of physical systems like non-reductive physicalism.

Kuhn (2024) notes: Substance dualism is the theory of consciousness that requires two radically distinct parts: a physical brain, obviously, but also in addition, a separate, nonphysical substance that is not only independent of the brain but also not of the physical

world (as presently conceived). For dualism to be true, what follows must be that the physical world, at its most fundamental level of fields and forces, is not in some way causally closed, and that mental properties play a causal role in affecting the physical world. This perspective, often called interactionism, provides that physical states cause phenomenal states, and phenomenal states cause physical states, and whatever psychophysical laws there may be will operate in both directions. Common forms of dualism identify the essence of the person with a nonphysical "soul," generally an immortal soul. This kind of "soul-centered dualism" is also the theory of consciousness most widely believed by the vast majority of the world's population, implicitly via acculturation to belief systems, whether organized religion or folk traditions.

There are classic problems with substance dualism: Given the scientific understanding that the physical world is a causally closed system, how could anything outside such a closed system affect it? This may be obviated by quantum indeterminacy. But how could an immaterial phenomenon like the mind affect a physical process? Again quantum reality may provide a loophole. Because many dualistic theories also cite religious notions like eternal souls they can contradict the principle of natural empiricism and would thus be discarded by this filter. However one needs to note that 80% of the world's population identify as religious (Center, 2017) placing them in substance dualism or idealism. This applies strongly to all Monotheistic religions, including Judaism, Christianity and Islam where the eternal soul has become a central feature of rapture end of days eschatology.

The Tao of Taoism is also a tradition founded on cosmic complements of yin (feminine receptive) and yang (masculine creative), as is Vedantic Tantra, although these can also be conceived of as complementary features within an idealism. It should be noted that religious traditions emerge as doctrinal offshoots of an evolutionary groundswell of animistic and shamanic roots based on the evolutionary reality, that in a natural wilderness without machines, it is naturally optimal, as a survival strategy, to treat other entities, from other humans to wild animals and environmental crises from fire and flood to storms, as live autonomous and possibly threatening agents that need to be appeased through mediation, leading to beliefs in spirits and deities.

We owe much of both the tradition and controversy of dualism to Cartesian philosophy, in which mental attributes of the soul were deemed to emanate through the pineal body to affect animal spirits running in the nerves to pull the muscles of a robotic body. As a young man, Descartes had had a mystical experience. Intriguingly, this arose from a quantum change experience attributed to three dreams in a "sauna", which he interpreted as a message telling him to come up with a theory of everything and on the strength of this, dedi-

cated his life to philosophy, leading to his iconic quote – Cogito ergo sum – “I think therefore I am” – leading to Cartesian dualism:

In the first he was struck by a powerful wind, turned towards a church and received a melon from a man, but woke up to a pain in his side. In the second he heard thunder and when he woke golden sparks flooded the room. In his third dream Descartes approached a table with two books: a dictionary, and an anthology of Latin poetry. Significantly, Descartes could read it. He saw in the anthology the words “Which way of life should I follow?” A man appeared and gave Descartes the title of a poem: “Yes and no.” Descartes turned to that page, but no poem was there and the man and the book disappeared. Descartes unraveled the dream. “The anthology now means Revelation and Enthusiasm, and the yes and no are the words of Pythagoras “The oldest, shortest words—‘yes’ and ‘no’—are those which require the most thought”—the melon signifies “the charms of solitude” and the wind, together with the pain in his side, are effects of the “evil Genie” working against the force that had directed him toward the church in the first place. Finally, the terror of the second dream is Descartes’ “remorse of conscience”; and the thunder represents “the signal of the Spirit of Truth.” In those dreams he received the seeds of Rationalist philosophy, a project that, in putting the reasoning mind at the center of all understanding, would destabilize the Western world (Eldredge, 2024).

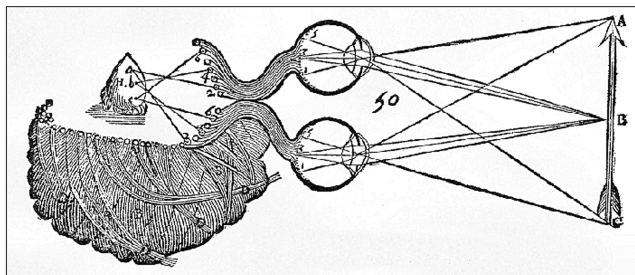


Figure 8 Diagram from Descartes’ *Treatise of Man* (1664), showing the formation of inverted retinal images in the eyes, and the transmission of these images, via the nerves so as to form a single, re-inverted image (an idea) on the surface of the pineal gland.

His proposal, in “The Passions of the Soul,” his final philosophical treatise, was that mind and body interact through the pineal gland, which is “the principal seat of the soul” and is moved this way and that by the soul so as to move the animal spirits or streams of air from the sacs next to it (Westphal, 2016).

In Descartes’ description of the role of the pineal gland, Fig. 8, the pattern in which the animal spirits flow from the pineal gland was the crucial notion. He explained perception as follows. The nerves are hollow tubes filled with animal spirits. They also contain certain small fibers or threads which stretch from one end to the other. These fibers connect the sense organs with

certain small valves in the walls of the ventricles of the brain. When the sensory organs are stimulated, parts of them are set in motion. These parts then begin to pull on the small fibers in the nerves, with the result that the valves with which these fibers are connected are pulled open, some of the animal spirits in the pressurized ventricles of the brain escape, and (because nature abhors a vacuum) a low-pressure image of the sensory stimulus appears on the surface of the pineal gland. It is this image which then “causes sensory perception” of whiteness, tickling, pain, and so on. “It is not [the figures] imprinted on the external sense organs, or on the internal surface of the brain, which should be taken to be ideas—but only those which are traced in the spirits on the surface of the gland H (where the seat of the imagination and the ‘common’ sense is located (Lokhorst, 2021).

“And note that I say ‘imagines or perceives by the senses’. For I wish to apply the term ‘idea’ generally to all the impressions which the spirits can receive as they leave gland H. These are to be attributed to the ‘common’ sense when they depend on the presence of objects; but they may also proceed from many other causes (as I shall explain later), and they should then be attributed to the imagination” (Descartes).

But in a letter dated May 1643, Princess Elisabeth wrote to Descartes (Westphal, 2016): *I beg you to tell me how the human soul can determine the movement of the animal spirits in the body so as to perform voluntary acts — being as it is merely a conscious substance. For the determination of the movement seems always to come about from the moving body’s being propelled — to depend on the kind of impulse it gets from what it sets in motion, or again, on the nature and shape of this latter thing’s surface. Now the first two conditions involve contact, and the third involves that the impelling [thing] has extension; but you utterly exclude extension from your notion of soul, and contact seems to me incompatible with a thing’s being immaterial.*

Descartes’ theory of reality signally fails the principle of natural empiricism test because its model of the mind-brain relationship including the role of the pineal is clearly empirically incorrect, but it does pass the NS Theorem test with flying colors.

Property Dualism is the idea that, while there is only one kind of substance, i.e. the physical, it has two kinds of properties, mental and physical, so that mental properties cannot be reduced to or explained by physical properties even though both kinds of properties are generated by physical brains, so that people and living organisms are entirely physical and subject only to the laws of physics, but also they have non-physical mental properties (thoughts, concepts, ideas) that are not reducible to the properties of fundamental physics—even though all of property dualism’s properties must come from those constituents of fundamen-

tal physics. Like forms of dual aspect monism that embrace physical causality property dualism thus fails the NS Theorem test.

Zimmerman applies property dualism to two famous questions in philosophy of mind: “It seems easy to imagine physically indiscernible zombies (animate human bodies with no consciousness) or people whose spectrum of color experiences is the reverse of one’s own. If genuinely possible, these scenarios show that the mental does not supervene upon the physical” (Zimmerman, 2005).

But Kuhn (2024) counters: *In a wholly physical world, how could the mental not supervene upon the physical? Dualism’s “pairing problem”—how can nonphysical substances (“souls”) have causal relations with physical substances (brains) with zero tolerance for failure?—would be reduced under emergent dualisms because (i) souls would seem in a way tethered in space, and (ii) souls would have been generated by physical substances (brains) in the first place.*

2.18. Interactive complementary aspect monism

Symbiotic Existential Cosmology (SEC) (King, 2021) is an existential cosmology incorporating subjective consciousness and the physical universe as cosmological complements. SEC’s central thesis asserts quantum-critical interaction, **Fig. 9**, that subjective consciousness interacts with the physical brain, affecting the physical universe, through edge-of-chaos instabilities in conscious whole brain dynamics, accompanied by wave phase-modulation, in critical phase transition between full quantum entanglement and wave function collapse, in a universe also in phase transition in biospheric evolutionary climax, with the enhanced quantum indeterminate critical states in the brain providing a selective advantage, for subjective consciousness to interact, while avoiding causal conflict with physical processes.

Interactivity is the natural completion and temporal consequence of the world knot of biological incarnation that arises from and manifests the explanatory gap, so it is essential to decision-making existence. It is not dualism, because these are aspects of one mutually interactive cosmos that is complementary in a completed cycle of mind-body interaction, rather than Cartesian top-down mental causation. Biological molecular processes do not approach classicality, because they do not involve independent identically distributed (IID) measurement, upon which the Born interpretation depends.

Neither the objection of Princess Elizabeth nor the classically flawed critique of Dennett (1978) nor that of Damasio (1994) applies. Although neuroscience experiments with both brain scans and conscious subject reports abound, no accurate, concurrent observations can be made, in which a conscious experience and the intractably indeterminate neural correlate can be defini-

tively compared, by existing, or conceivable methods in future, due to the inability to precisely determine which neural processes actually accompany a conscious experience, the quantum indeterminacy and dynamic sensitivity of brain states and the biological limitations on non-intrusive sampling at the cellular level.

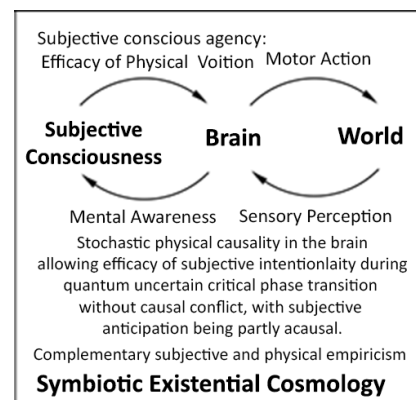


Figure 9 Interactivity between subjective consciousness and the brain and between the brain and world becomes possible when physical causal closure becomes relaxed during critical quantum sensitive phase transitions at the edge of chaos (King, 2021).

Primal subjectivity is manifest at the quantum level, with the space-time extended special relativistic wave function complementing “space-time awareness” and wave collapse to eigenstates complementing “anticipatory decision-making.” This is followed in increasing complexity by systems dynamically encapsulating primal subjectivity: quantum-sensitive butterfly effect systems, biogenic far-from-equilibrium systems, prokaryote life, and consciousness in single-celled eukaryotes and metazoan brains, as encapsulated forms of primal subjectivity. Primal subjectivity is neither cosmopsychism nor pan-protopsychism because it is not “psychism” until the eucaryote endosymbiosis and has no combination nor decombination problems since full consciousness is subjectively emergent through biologically encapsulating boundary conditions.

Symmetry-breaking of the fundamental forces results in non-linear fractal edge-of-chaos molecular quantum interactions, leading to the complexity pathway, from macromolecules to conscious organisms, including both abiogenesis and evolution, confirming that the symmetry-breaking of the fundamental forces is both necessary and sufficient for conscious life. Organismic incarnation is the complementary process by which subjectively conscious life in the natural universe enables the existential cosmos to be able to become self-aware. Active consciousness arose in the quantum sentience of single-celled eukaryotes due to the eukaryote endosymbiosis, sequestering respiration in the mitochondria, leaving the cell membrane free for edge-of-chaos excitability, and quantum sentience sensitive to environmental fluctuations. Subjective consciousness thus spans the metazoa and displays efficacy of voli-

tion over the physical universe, without causal conflict, because the critical neurodynamic is quantum indeterminate.

There are two empirical facts of life for conscious existence in the universe:

1. We live as biological organisms in a natural universe, but the only way it can be accessed is through our subjective conscious experiences of it.
2. We know that we can apply our subjective consciousness to affect the world around us, both to avoid existential crisis and for life to continue to exist and evolve.

The complementary role of subjective consciousness and the physical universe, **Fig. 10**, is thus validated by extending science's verified empirical observation of nature, to mutually affirmed empirical experience, establishing that subjective consciousness has efficacy of volition over the physical universe in our intuitive and rational decision-making as a fact of life and law while the neuroscience description lacks subjective agency and requires a belief in physicalism. Because of the affirmative belief of religion, the degree of empirical affirmation by subjective experience needs to be beyond reasonable doubt.

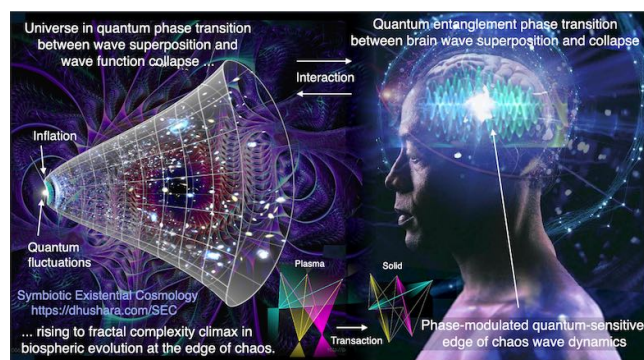


Figure 10 Both the universe and the conscious brain are in varying states of critical phase transition between quantum entanglement and wave function collapse, in which dynamics tuned to the edge of chaos can reach a quantum indeterminate critical phase transition state which opens the ability of subjective consciousness to affect the physical brain in intuitive decision-making about existential crises (King, 2021) collage, NASA WMAP Dana Berry, background Andrew Ostin).

One conjecture is that subjective consciousness may provide a form of anticipation of existential crises, in which quantum transactions may underly conscious anticipation, in the process explaining why subjective consciousness appears to be strongly conserved and potentially universal to eucaryotes. The universe consists of positive energy particles, whose absorption occurs in the future of their emission. Special relativis-

tic quantum theory generates both retarded and advanced (retrocausal) solutions, providing implicit information about the future universe. In the transactional approach, an emitter sends an offer wave, which future absorbers respond to with advanced confirmation waves. Wave collapse then corresponds to a critical phase transition from a 'plasma' of multiply interacting virtual pairs to a 'solid' of real particles, inset in **Fig. 10**, in a process providing a basis for conscious anticipation, conferring a survival advantage on the conscious organism, akin to an integral transform of the immediate future, independent of computational prediction, thus selected for by evolution. This process also provides a key explanation for how entangled states collapse.

Symbiotic Existential Cosmology clearly satisfies the NS theorem test and the Principle of Natural Empiricism, by accepting all experimental results and established theories of science, while asserting a quantum interpretation of molecular biogenesis which is non mechanistic and accepts interactive subjective consciousness as a complement. It is also consistent with a spectrum of theories cited in this work that also pass both tests, pointing to a consistent cosmological picture of the role of subjective consciousness in the natural universe.

2.19. Idealism

Kuhn (2024) notes: *Idealism is consciousness as ultimate reality, the fullness of the deepest level of all existence, the singular fundamental existent. It is the theory of consciousness that takes consciousness to its maximum meaning. The focus here is ontological idealism, where ultimate reality is mind or awareness or thought, while everything else, including all physical worlds and universes and all that they contain, are derivative or illusory.*

The term idealism stems from Plato's theory of forms (ideas) in which the world we experience is just an imperfect collection of constantly changing replicates of eternal, immutable non-physical ideals. Human culture emerged much earlier, from a perspective of animism in which both other humans, animals and natural phenomena were assumed to be alive and aware as a pragmatic adaption to the natural wilderness. Western religious traditions also see physical reality as subservient to one or many gods as super-conscious agents. But the idealistic tradition has taken supreme flight in Eastern traditions of Vedanta stemming from Upanishadic thought, where the individual conscious self, or atman, is conceived to be an instance of the cosmic conscious self, or Brahman, in which the supreme conscious being has generated the material universe through its super-conscious agency. This is then replicated in the meditative quest, where an individual, in renunciation of worldly desires and sensations seeks a meditative state of deeper conscious awareness in samadhi – gath-

ering or concentration. In this process, the individual may also achieve moksha – to free or release – in a near death experience, in which the incarnate view is transcended in conscious escape from the round of birth and death. This viewpoint of enlightenment is shared also by Buddhism, where Nirvana comes from the realization that there is no self but emptiness, liberating conscious experience from the shifting forms of Maya or illusion, while in the Jains, the purification of moksha attains kevala jnana, or supreme omniscience.

Another factor promoting interest in theories not confined by physicalism, including panpsychism and idealism, is interest in psychic or Psi phenomena, such as precognition, telepathy and clairvoyance independently of consciousness itself or mystical and spiritual experiences. [Wahbeh et al. \(2022\)](#) thus examine a sweep of theories included in this review, to search the field of non-physicalist theories of consciousness for those consistent with Psi phenomena being better explained.

However, just as physical materialism faces the hard problem of consciousness, so idealism faces the inverse hard problem of how a diaphanous holistic conscious experience can “condense” into the hard matter of the natural world. Idealism while it automatically passes the NS theorem test; all idealistic systems so far fail the principle of natural empiricism. Aurobindo’s exposition gives a good perspective on the ultimate difficulty of regenerating the entire complexity of the natural world through meditative consciousness.

[Kuhn \(2024\)](#) makes this problem clear: *How consciousness becomes the physical universe: Idealism works well as an explanation of creature consciousness, provided, of course, that one accepts its foundational premise that consciousness, and consciousness alone, is fundamental reality. One challenge for idealism is coming to consider what seems to be an odd, perhaps outlandish, idea so alien to our life experiences: If all is consciousness, how does the physical world come about?*

2.20. Ancient and modern Vedantic idealism

Aurobindo gives a traditional Vedantic view: *In conformity with the oldest Indian scriptures, matter was created by the ultimate or supreme consciousness seeking manifestation. In order to manifest, supreme or absolute consciousness, starting from the full fluidity of the spirit, created graded planes of being, till it reached the state of manifesting the solid density of matter. Sri Aurobindo calls this the process of Involution. The involution of consciousness is the process in which the Supreme or Absolute conceals itself more and more by creating planes of consciousness of increased density, in order to create the density needed for physical manifestation. In each of the planes that were created during the involution, (called typal planes or graded worlds) the absolute or divine consciousness veiled it-*

self increasingly till it was able to produce and manifest the various forms of solid matter. In the solid matter of the stone the ultimate consciousness is completely veiled in what Sri Aurobindo calls ‘an exclusive concentration’, in which this absolute consciousness is present in the atom in the movements of a specific number of protons and electrons through which it keeps up that specific form of matter. He continues to explain that in matter the ultimate consciousness is concealed, but the Will of the ultimate consciousness behind this evolutionary process is a gradual unveiling till it reaches a full manifestation of divine life in matter. In other words the evolution or unveiling of consciousness started from the time solid matter manifested ([Huppes, 2021](#)).

We know from physics that this is a non-trivial problem. Matter arises only from Fermions which have half integral spin and obey the Pauli exclusion principle allowing only two particles of opposite spin in a wave function orbital, while the integer spin bosons have only force, or radiation like light, but not substance.

We now turn to [Kafatos et al. \(2011\)](#) – How Consciousness Becomes the Physical Universe:

The source of reality must be self-sufficient, capable of engendering complex systems on the micro and macro scale, self-regulating, and holistic. Nothing can exist outside its influence. Ultimately, the uncreated source must also turn into the physical universe, not simply oversee it as God or the gods do in conventional religion. We feel that only consciousness fits the bill, for as a prima facie truth, no experience takes place outside consciousness, which means that if there is a reality existing beyond our awareness (counting mathematics and the laws of physics as 1 part of our conscious experience), we will never be able to know it. The fact that consciousness is inseparable from cognition, perception, observation, and measurement is undeniable; therefore, this is the starting point for new insights into the nature of reality.

What is the nature of consciousness in our model? We take it as a field phenomenon, analogous to but preceding the quantum field. This field is characterized by generalized principles already described by quantum physics: complementarity, non-locality, scale-invariance and undivided wholeness. But there is a radical difference between this field and all others: we cannot define it from the outside. To extend Wheeler’s reasoning, consciousness includes us human observers. We are part of a feedback loop that links our conscious acts to the conscious response of the field. In keeping with Heisenberg’s implication, the universe presents the face that the observer is looking for, and when she looks for a different face, the universe changes its mask.

Consciousness includes human mental processes, but it is not just a human attribute. Existing outside space

and time, it was "there" "before" those two words had any meaning. In essence, space and time are conceptual artifacts that sprang from primordial consciousness. The reason that the human mind meshes with nature, mathematics, and the fundamental forces described by physics, is no accident: we mesh because we are a product of the same conceptual expansion by which primordial consciousness turned into the physical world. The difficulty with using basic terms like "concept" and "physical" is that we are accustomed to setting mind apart from matter; therefore, thinking about an atom isn't the same as an atom. Ideas are not substances.

But if elementary particles and all matter made of them aren't substances, either, the playing field has been leveled. Quantum theory gives us a model that applies everywhere, not just at the micro level. The real question, then, isn't how to salvage our everyday everyday perception of a solid, tangible world but how to explore the mysterious edge where micro processes are transformed into macro processes, in other words, how Nature gets from microcosm to macrocosm.

This, like Varela's approach, is more a suggested program for discovering an idealistic TOE, but the approach has already focused on a field phenomenon, analogous to but preceding the quantum field, so while seeking to create the universe it has become a vestigial archetype for theories such as string theory, so falls under the NS Theorem as an explanation, leaving life, meaning and purposefulness out of the picture.

[Chopra et al. \(2021\)](#) address this problem of living vitality, or *qi*:

One of the great failures in science is still haunting us, the failure to discover why living things are alive. One of the most promising theories was known as vitalism, which held that some undiscovered "life force" or "spark of life" is what separates living things like trees, cats, and amoebas from non-living things like rocks, water, and salt. Vitalism and functionalism are opposites, which implies that in the game of either/or, if one is false, the other must be true. But unfortunately, functionalism doesn't explain life, either. It explains how life behaves, which isn't the same thing. Nature has done a fantastic job of misbehaving when it comes to the creation of life. Mind is the big one, but if you take all the functions assigned to life listed above, such as evolution, reproduction, etc., they all have a purpose.

[Kuhn \(2024\)](#) quoting Kafatos et al. makes the claim that quantum reality might provide a loophole for idealism:

The claim is made that quantum theory, which, unlike classical physics, assigns (in some interpretations) a fundamental role to the act of observation, can bridge the explanatory gap between idealism as foundational reality and the physical world as empirically apparent. Can quantum theory, as its adherents believe, open the

door "to a profoundly new vision of the cosmos, where observer, observed, and the act of observation are interlocked," thus hinting "at a science of wholeness, going beyond the purely physical emphasis of current science?" Adherents look to developments in the intersection of quantum theory, biology, neuroscience and the philosophy of mind. Nonlocal interactions of the quantum universe are cited as evidence of the interconnectedness of everything, supporting the idea that "consciousness and matter are not fundamentally distinct, but rather are two complementary aspects of one reality, embracing the micro and macro worlds," ultimately founded on consciousness as the ultimate reality.

But the interconnectedness of everything applies equally to a variety of theories, which do satisfy the principle of natural empiricism.

2.21. Hoffman's conscious realism and Kastrup's analytic idealism

In a current example of idealism, [Hoffman \(2019\)](#) "Case Against Reality" argues that our visual perceptions are not veridical of reality because evolution selects for fitness to reproduce, not for access to ontological truth. Hoffman calls his ultimate ontology "conscious realism," – that the objective world consists of conscious agents and their experiences. Instead of assuming that "particles in spacetime are fundamental, and somehow create consciousness when they form neurons and brains," he proposes the reverse: "consciousness is fundamental, and it creates spacetime and objects." He proposes that "reality is a vast social network of interacting 'conscious agents,' in which each has a range of possible experiences, and each agent can act to influence the experiences of other agents:"

My intuition was, there are conscious experiences. I have pains, tastes, smells, all my sensory experiences, moods, emotions and so forth. So I'm just going to say: One part of this consciousness structure is a set of all possible experiences. When I'm having an experience, based on that experience I may want to change what I'm doing. So I need to have a collection of possible actions I can take and a decision strategy that, given my experiences, allows me to change how I'm acting. That's the basic idea of the whole thing. I have a space X of experiences, a space G of actions, and an algorithm D that lets me choose a new action given my experiences. Then I posited a W for a world, which is also a probability space. Somehow the world affects my perceptions, so there's a perception map P from the world to my experiences, and when I act, I change the world, so there's a map A from the space of actions to the world. That's the entire structure. ... I call it conscious realism: Objective reality is just conscious agents, just points of view. Interestingly, I can take two conscious agents and have them interact, and the mathematical structure of that interaction also

satisfies the definition of a conscious agent. The idea that what we're doing is measuring publicly accessible objects, the idea that objectivity results from the fact that you and I can measure the same object in the exact same situation and get the same results — it's very clear from quantum mechanics that that idea has to go. Physics tells us that there are no public physical objects. So what's going on? Here's how I think about it. I can talk to you about my headache and believe that I am communicating effectively with you, because you've had your own headaches. ... The same thing is true as apples and the moon and the sun and the universe. Just like you have your own headache, you have your own moon. But I assume it's relevantly similar to mine. That's an assumption that could be false, but that's the source of my communication, and that's the best we can do in terms of public physical objects and objective science (Gefter, 2016).

Hoffman and coworkers (Hoffman et al., 2025, 2023) have taken a TOE approach in which consciousness makes physical reality. They use some advanced abstract physics to attempt to build a model of interacting "qua-consciousness" as a social network capable of fusions of consciousness, in which each conscious observer is a Markovian kernel, in which the trace projects higher dimensions onto space-time, inducing a partial order on the systems, ultimately generating physical reality out of consciousness.



Figure 11 Computer simulations indicate that there are two types of flow on either side of the total fusion simplex (Hoffman et al., 2023).

They begin with the amplituhedron, a recognized notion of twistor theory, used to simplify quantum scattering calculations. An amplituhedron is a geometrical polytope, the n -D analogue of a polyhedron, Fig. 11, of positive volume, whose values are scattering amplitudes in a multidimensional abstract space, just as is Hilbert space in quantum theory, which calculates scattering amplitudes without referring to virtual particles.

However, Hoffman et al. (2023), proceed directly into a stochastic approach, depending on Markovian dynamics, thus effectively reducing their model of conscious-

ness to a probabilistic process, strikingly similar to that of Friston.

Within the conscious realism formalism, a conscious agent (CA) has just four assumed properties: qualia, choice, action, and a sequencing of qualia. The possible experiences — qualia — of a CA are represented by a measurable space, $(X, \mathcal{X})$ (a set X together with a sigma-algebra on the set. i.e. a collection of subsets of X satisfying certain closure properties) since, at a minimum, we must speak of the probability that a CA has some experience and a measurable space is a minimal formalism that allows this. Likewise, the possible actions of a CA and the possible states of the world the CA interacts with (including itself) are represented by measurable spaces, $(G, \mathcal{G})$ and $(W, \mathcal{W})$, respectively. A key intuition is that, within this formalism of conscious agent theory, consciousness involves three processes: perception, decision, and action Fig. 12. In the process of perception, a CA interacts with the world and, as a consequence, has conscious experiences. In the process of decision, a CA chooses what actions to take based on the conscious experiences it has. In the process of action, the CA interacts with the world in light of that decision and affects the state of the world (the network of CAs). These influences are modelled as Markov kernels: If we assume a finite countable set of states, the perception kernel, P , is a (Markov) transition matrix that describes the probability that, for all $x \in X$, a CA transitions to qualia state, x , given a particular state of the world, w . The decision kernel, D , similarly describes the probability that a CA chooses action, g , given a particular qualia state, x . And the action kernel, A , describes the probability that the world (the network of CAs) transitions to state, w , given the action of the CA, g . Gallimore et al. (2026).

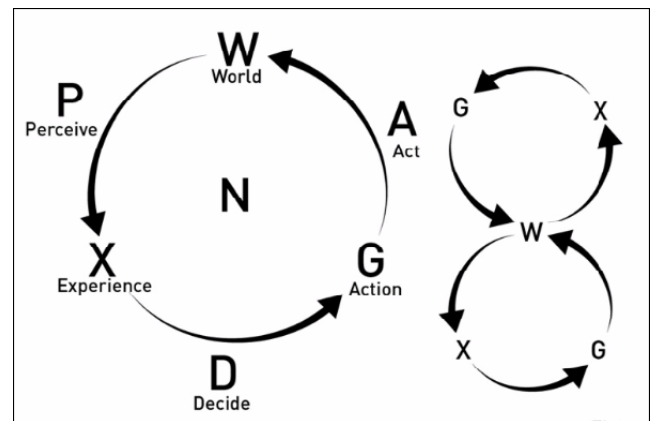


Figure 12 A conscious agent has seven components. The world is composed of a network of conscious agents which interact by performing actions in the world that can influence the experiences of other agent (Gallimore et al., 2026).

In this process, they claim 4D space-time is doomed and attempt, in turn, to define the higher dimensional scattering amplitude spaces as describing conscious-

ness as projections of Markovian polytopes – spaces of all possible Markovian dynamics onto the physical reality of space-time. Hoffman’s deprecation of space-time to consciousness is made even more ironic in his earlier rejection of veridical human visual perception as merely a convenience of evolution to ensure survival and it is derived through two higher level aspects of physicalism: (1) the amplituhedron itself and (2) reliance on Markovian thinking when this applies more aptly to any physical control algorithm, while Galimov et al. (2026) apply CA theory to controversial hallucinogenic DMT “entities”.

Kastrup (2018) in turn constructs a framework for his Analytic Idealism from the following key facts:

Fact 1: There are tight correlations between a person’s reported private experiences and the observed brain activity of the person. Fact 2: We all seem to inhabit the same universe. Fact 3: Reality normally unfolds according to patterns and regularities—the laws of nature—independent of personal volition. Fact 4: Macroscopic physical entities can be broken down into microscopic constituent parts, such as subatomic particles. Fact 5: irrespective of the ontological status of what we call ‘a person’, there is that which experiences (TWE). Fact 6: A person has private experiences that can only be known by others if the person reports them, for other people do not have direct access to these private experiences. Fact 7: The brain activity of a person is known only insofar as its observation is experienced in the form of perceptions. Fact 8: From Facts 1 and 7, there are tight correlations between two types of experience: (a) conscious perceptions of a person’s brain activity and (b) private experiences of the person.

He uses these as effective axioms to propose six key inferences based on the concept of Dissociative Identity Disorder:

A person suffering from a particularly severe form of dissociation called Dissociative Identity Disorder exhibits multiple, “discrete centers of self-awareness” called alters. ... Dissociation allows us to (a) grant that TWE is fundamentally unitary at a universal level and then still (b) coherently explain the private character of our personal experiences.

Inference 1: The ontological underpinning for Fact 5 is that TWE and experience are of the same essential nature. Experience is a pattern of excitation of TWE. Inference 2: TWE is an ontological primitive, uncaused and irreducible. Inference 3: TWE is associated with the entire universe. Inference 4: there is a sense in which living organisms are alters of unitary TWE. Inference 5: Metabolizing organisms are the extrinsic appearance of alters of TWE. Inference 6: the perceptions of an alter are reducible to the experiences of TWE that impinge on Inference 6: the perceptions of an alter are reducible to the experiences of TWE that impinge on the alter from the outside.

These six inferences complete the proposed idealist ontology and lead to four explanations evoking the real world, **Fig. 13**:

Explanation 1: For any given alter A1 of TWE, it is the experiences surrounding A1 that cause its perceptions of the world around it. Naturally, dissociated experiences corresponding to another alter A2 can be part of the experiential environment surrounding A1. As such, the inner experiences of A2 can also indirectly stimulate A1’s boundary—by impinging on their shared experiential environment—and thereby cause A1’s perceptions of A2. This is what gives A1 an extrinsic view of the inner experiences of A2 in the form of A2’s metabolizing body. Explanation 2: Since TWE is universal it follows that all alters of TWE—that is, metabolizing organisms like islands of a single ocean, in the thoughts that constitute the intrinsic view of the non-metabolizing part of metabolizing organisms such as ourselves are immersed, like islands of the universe. Explanation 3: Since volition is innately experiential, the volition of each and every alter of TWE is also dissociated from the rest of TWE. This explains why we do not have personal volitional control over the laws of nature: the unfolding of the universe around ourselves consists of excitations of TWE from which we are dissociated. Explanation 4: The perceptions of an alter are coded representations of experiences in TWE that surround the alter. Those experiences in TWE are excitations or ‘movements’ of TWE itself. Therefore, subatomic particles, as the smallest discernible elements or ‘pixels’ of the perceived world, are coded representations of the smallest discernible ‘movements’ of TWE.

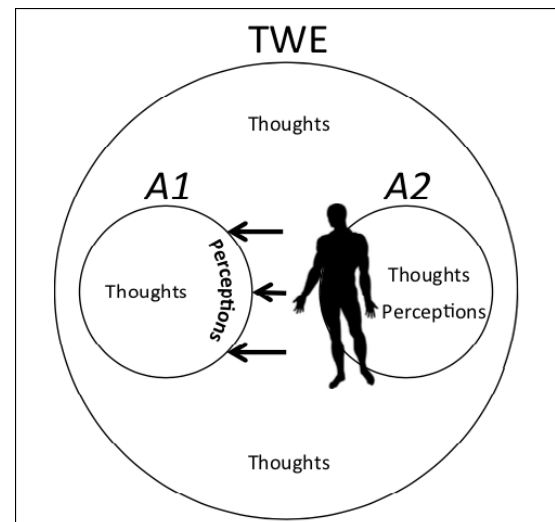


Figure 13 The dissociated experiential activity of an alter A2 can also stimulate the boundary of another alter A1 by impinging on their shared experiential milieu. alter A1 by impinging on their shared experiential milieu. (Kastrup, 2018).

None of these accounts can even begin to explain how subjective consciousness could generate natural real-

ity. Although Kastrup refers to the agents as “metabolizing organisms and does make the speculative observation that subatomic particles are the smallest discernible ‘movements’ of TWE, this makes no sense in a universe before sentient life has evolved, we fall either into the trap of postulating a non-empirical super-agent in God or cosmic consciousness, or we need to invoke theories in which the natural universe and subjective consciousness have a complementary integrity where each are essential to existence without either being a sufficient condition for the other. These accounts show that idealistic theory has not reached the threshold of natural empiricism, on the part of (Hoffman et al., 2023) nor with that of Kastrup (2018), along with that of McGilchrist (2021).

2.22. Anomalous and altered states

Waking life is underpinned by a spectrum of mental states not tied by perception to real world experience, from dreaming sleep, through psychedelic experiences to Psi, OBE put od body and NDE near death experiences, **Fig. 14**.

James (1902) recounts his experience of the dissociative anaesthetic nitrous oxide, in revealing non-ordinary dimensions of conscious experience pivotal to a complete account of the universe:

One conclusion was forced on my mind at that time and my impression of its truth has ever since remained unshaken. It is that our normal waking consciousness, rational consciousness as we call it, is but one special type of consciousness, while all about it, parted from it by the filmiest of screens, there lie potential forms of consciousness entirely different. ... No account of the universe in its totality can be final which leaves these other forms of consciousness quite disregarded.

Kuhn (2024) notes: *Can nonphysical consciousness (or realms) be revealed or accessed via anomalous, psi or paranormal phenomena—extrasensory perception (ESP), out-of-the-body experiences (OBEs), near-death experiences (NDEs), and the like? Psychical research beginning in the late 19th century and parapsychology in the mid-20th century sought to study the phenomena scientifically.*

Kuhn cites Bergson’s philosophy, Jung’s collective unconscious and synchronicity and Radin’s challenge to materialism in terms of Psi phenomena, Tart’s emergent interactionism, Josephson and others. Two further features become key. The first is NDEs (near death experiences) which carry a view of life death and incarnation of similar significance to the quest for existence to the moksha samadhi of Eastern traditions. The other is the wealth of evidence of other non-ordinary views of conscious reality coming from dreaming states and psychedelic experiences, with a long history of use in ethnic spirituality and shamanism.

Kuhn notes (Kelly et al., 2015) contends that “the

limitations of contemporary mainstream consciousness theorising derive from the systematic unwillingness of the physicalist camp to take difficult empirical phenomena such as Psi and mystical experience into account”. Kuhn (2024) also cites Michel Bitbol’s suggestion that a radical view of neurophenomenology amplifies “the available range of interpretations of altered states of consciousness, from OBEs and NDEs to meditation and psychedelics, and which may suggest a new ontological category.” Bitbol says, “these states are relevant by themselves, as transformative experiences for those who live through them.”

Kuhn also discusses diverse theories: Wilber’s Integral Theory, Campbell’s theory of everything, Sheldrake’s morphic fields, Combs’s chaotic attractor and autopoietic systems, Schooler’s resonance theory, Graboi’s three-aspect model and subjective time, Harp’s universal or God consciousness, Swimme’s cosmogenesis, Hiller’s eternal discarnate consciousness and Grinberg’s synergetic/neuronal field theory, which because of mixed references to physical and conscious and lack of empirical detail do not constitute viable theories under the filters.

Kuhn (2024) notes that the main import of the Irreducible Mind, (Kelly et al., 2007) is to marshal support for a model of the human psyche advanced by F. Myers and developed philosophically by (James, 1898). *Contrary to viewing everyday consciousness as the only consciousness, generated entirely by physiological processes in the nervous system, the this picture includes levels normally hidden of a more comprehensive consciousness which provides access to wider and deeper parts of the reality in which we find ourselves embedded.*

According to Kelly et al. (2007), this sort of “permission”, “transmission” or “filter” model of the psyche of William James, in which everyday consciousness takes forms dependent on interactions between a more inclusive and capacious consciousness and an organism that serves mainly as a sensorimotor interface, but “there is now a lot of evidence to support it.” It is integral to Aldous Huxley’s psychedelic view of “the mind at large” and William Blake’s visionary conception of “the doors of perception”. It also has affinities with views advanced by Bergson, Jung, and the Indian philosophical tradition.

“If the doors of perception were cleansed, everything would appear to man as it is infinite (Blake, 1790)”.

The notion of opening the doors of perception became Huxley’s mescaline-induced portal to the mind at large Huxley (1956, 1962), echoing William James, about whom Woollacott (2016) notes:

William James, considered the father of psychology, made a bold proposal about this function of the brain at the turn of the 19th century, saying that the brain filters



Figure 14 Varieties of non-ordinary conscious experience underlying everyday perceptual ‘reality’ including near death and out of body experiences, classic psychedelics such as psilocin, mescaline and DMT, dissociatives such as salvinorin and ketamine and dreaming states (King, 2013). (Credits NDE Hieronymus Bosch, Psychedelics NPR, Dreaming Josephine Wall Winter Dreams).

our access to a vast consciousness, which extends beyond the limits of neural activity. James proposed that the brain acts as a partial barrier and gives us only the surface of what is possible for us to perceive. The process James described so many years ago is, of course, the filter theory, and he said that what the brain filters out is consciousness itself – a supremely expanded consciousness.

My thesis is now this: that, when we think of the law that thought is a function of the brain, we are not required to think of productive function only; we are entitled also to consider permissive or transmissive function. And the ordinary psycho-physiologist leaves this out of his account (James, 1898).

Kuhn (2024) emphasizes the relevance of psychedelic experiences:

“Throughout human history, psychedelics have been used for spiritual purposes by inducing altered conscious experiences dramatically different from the norm. Colors explode. Time slows, speeds up, stops. Self shatters, dissolves. Magical creatures emerge. Spirit Beings appear. All is alive. All is connected. All is One. Some attribute the advent of religion to the use of psychotomimetic or hallucinogenic substances in rituals. In each culture or condition, interpretations of psychedelic experiences were made. Mystics conjoined with cosmic consciousness. Indigenous traditions communed with sentient beings from spirit worlds. Aldous Huxley saw the source of all mysticism and spirituality, which he developed into the “perennial philosophy,” related to psychedelics.”

“The best one could claim is that psychedelic or hallucinogenic visions would be “consistent with” non-physical theories of consciousness. On the other hand, psychedelic research may well selectively advance various Materialism Theories of consciousness, of which there are many, [due partly to the fact that psychedelics are natural and synthetic drugs] noting “Not a few viewers of Closer To Truth have advised me: ‘If you really want to get ‘closer to truth,’ you really need to go psychedelic’.”

‘Psychedelic drugs “induce drastic changes in subjective experience, and provide a unique opportunity to study the neurobiological basis of consciousness”.

By administering psychedelic drugs to disrupt how the brain perceives and models the world while we’re awake, researchers seek to understand how the conscious brain works. In other words, assessing the neural mechanisms of how psychedelic drugs alter consciousness might provide clues to the neural basis of normal consciousness.’

King (2021) puts this in the context of both NDEs and the psychedelic experience:

I hadn’t partaken of the psychic sacraments for seven years, because of the fact that acute closed angle glaucoma was liable to make me go blind overnight, due to psychedelics causing my pupils to dilate. Finally, having had the lenses of both eyes replaced with cataract surgery, I resigned myself to break the fast of the mushroom sacrament to return to the source of my life-long inspiration, before I left it so late that I might end up in a terminal condition before circumstances forced me into a last desperate encounter.

I took only 1.5 g dried weight, with some cannabis butter an hour beforehand, to test a level that an elderly person who had not had the experience before could sustain without undue discomfort, given some caring support. I have a technique which is to alternate between focused mindfulness with eyes open and annihilation meditation with eyes closed where I completely let go and cast myself on the flow. And down I went into the epiphany of being – a kind of jeweled seventh heaven where everything is illuminated and everything is illuminating.

This took the form of an NDE that I was meeting Brahman – the I was also HE and that because he was immortal or eternal consciousness, He was, ever-so-gently and compassionately, telepathically making me aware that, because I was a mortal being incarnate right in the centre of the cyclone of the existential crisis of mortal biological life, in physical form, that I had the duty and responsibility to ensure saving the diversity of life on planet Earth, before I passed away, and throughout the universe, because without organismic consciousness, cosmic consciousness could not become manifest, so Brahman was as vulnerable as I was.

Somehow, I had been thrown off the idealistic parapet into another reality, in which consciousness was not

just a neuroscientific phenomenon enriched by quantum fields, but a full cosmic complement that stood in its own right and played a central role in the universe's manifestation and gave human beings autonomous agency and cosmic responsibility, an altogether different meaning, with the mortal coil becoming the center of the cosmic cyclone where everything comes into full account. I struggled in the ensuing weeks to feverishly write down the exploding details of this visionary communication, from the sublime experience to the everyday acknowledgment that became the commonsense key: subjective consciousness has efficacy of volition over the natural universe. I have been elaborating this vision as an empirical journey ever since, with one dose of psilocybe to test the water, while writing this.

This has many of the key peak hallmarks often described in near death experiences, except here with more emphasis on the letting-go of ego-death and meditative sensory withdrawal (Koch, 2020):

"Similar mystical experiences [to NDEs] are commonly reported when ingesting psychoactive substances from a class of hallucinogens linked to the neurotransmitter serotonin, including psilocybin (the active ingredient in magic mushrooms), LSD, DMT (aka the Spirit Molecule), and 5-MeO-DMT, consumed as part of religious, spiritual or recreational practices".

2.23. Skeptical challenge theories

Kuhn (2024) notes: "Challenge Theories that follow portray the profound depth and perhaps intractability of the mind-body problem. They are important signposts or benchmarks on the Landscape of Consciousness, and appropriately, they come last, part of the take-away message".

One of these is McGinn (2000) with his ultimate mysterianism. The new mysterians, consist of philosophers and scientists who have come to believe that consciousness may never be explained completely. They are distinguished from the old mysterians who believed that consciousness is supernatural (from God or the Cosmic Order). In "Can We Solve the Mind-Body Problem?" McGinn argues that the bond between the mind and the brain is "an ultimate mystery, a mystery that human intelligence will never unravel. We have been trying for a long time to solve the mind-body problem. It has stubbornly resisted our best efforts. The mystery persists. I think the time has come to admit candidly that we cannot resolve the mystery. A deep fact about our own nature as a form of embodied consciousness is thus necessarily hidden from us".

This is really a statement fundamentally accepting the hardness of the hard problem of consciousness, but claiming the hard problem is an artefact of the inability of the human imagination to address the problem, because incarnation is like the baby in the bubble syn-

drome, but it is not a theory of what IS that can pass the natural empiricism test. The hard problem may be hard because this is the only way the universe can experience itself, not because of intrinsic human limitation, but the necessity of the weltknoten of incarnation for an observable universe to become manifest.

The sheer scope of the explanatory gap is echoed by Harris (2011) view: *While we know many things about ourselves in anatomical, physiological, and evolutionary terms, we do not know why it is 'like something' to be what we are. The fact that the universe is illuminated where you stand – that your thoughts and moods and sensations have a qualitative character – is a mystery, exceeded only by the mystery that there should be something rather than nothing in this universe. How is it that unconscious events can give rise to consciousness? Not only do we have no idea, but it seems impossible to imagine what sort of idea could fit in the space provided. Reductions of this sort are neither possible nor conceptually coherent, he says. Nothing about a brain, studied at any scale (spatial or temporal), even suggests that it might harbor consciousness. Nothing about human behavior, or language, or culture, demonstrates that these products are mediated by subjectivity. We simply know that they are—a fact that we appreciate in ourselves directly and in others by analogy.*

2.24. Expansive challenges

The last we will examine is Paul Davies' more hopeful view of consciousness in the cosmos.

Davies (2006) asserts: "But what of the minuscule place of consciousness amidst the unfathomably vast universe? Davies muses: "Is consciousness on the surface of our planet just a little embellishment on the great scheme of things or does it have fundamental role? I should also say that whether it's fundamental or not, we surely have to explain it. It has got to fit into our scientific picture of the world, but I don't think we've got a clue as to how to go about it because none of the concepts from fundamental physics, like mass and momentum and charge, seem relevant at all." With respect to whether consciousness really matters to quantum physics, Davies says that physicists are sharply split and that he himself has oscillated. "I used to think that consciousness was just getting in the way of understanding. But because I'm convinced that consciousness is a fundamental part of the universe, I'd like to find a place for it in physics. And the one place that it has been 'on again and off again' is within the realm of quantum physics. So, consciousness could enter quantum physics at the point of observation where the rules of the quantum game change as a result of that observation or measurement".

"It seems entirely possible that human beings or alien beings or any sort of conscious beings are going to spread out across the universe. We think a universe of 13.8 billion years is old; in fact, it's exceedingly young.

There's no reason why it can't go on for trillions and trillions of years. There's absolutely plenty of time for it to become full of minds, full of observers. And we can imagine a time in the far, far future when mind and the universe in effect merge: they become one. And so the act of observation which at the moment is limited to maybe a little corner of the universe could saturate the whole universe. The whole universe could become self-known." ... "Although we see consciousness only in response to some set of physical systems, nevertheless it seems to me to play an absolute and fundamental role. Because at one level, all of science, our whole understanding of the universe, comes through our own consciousness. It's actually the starting point of all inquiry. ... If you buy this whole quantum physics package and you have this universe saturated by mind, saturated by observers, then indeed the whole character of the universe, including the original emergence of its laws and the nature of its states, become inextricably intertwined with its mentality, with its mindfulness".

In this context we should also be mindful that Brian Cox on the BBC ahead of COP26 warned that Earth's demise could rid galaxy of meaning (Conlan, 2021). Brian notes on the BBC that 'Unique events that led to civilization mean its demise could 'eliminate meaning in the galaxy forever'.

3. Conclusion

In contradiction to the full palette of diverse consciousness theories of everything which are manifestly self-contradictory as a whole, the theories passing both filters do have a common element and sense of direction. If we take the nexus of the extended hard problem, the nature of the NS theorem, and the Principle of Natural Empiricism, quantum theories from Stapp, Beck & Eccles, including Pribram's holonomic view, Kaufman's quantum interpretation, Chalmers and McQueen's quantum reduction, Christof Koch's spectrum of appreciation of neuroscientific panpsychic and idealistic perspectives, Fredrico Faggin's irreducibly idealistic panpsychism as well as Symbiotic Existential Cosmology's interactive complementary aspect monism, multi-scale theories of quantum molecular organicity, including the constitutive essentialism of Poznanski's PRG, incorporating Kelley's DOPS view, Huxley's view of the mind at large, and his vision of a symbiotic society in Island, William James' filter theory and Paul Davies' future flowering of consciousness as a challenge theory, we end up with a common viewpoint: That subjective consciousness is not just a feature of advanced neurobiology in *Homo sapiens* or an emergent feature of physical complexity, but a complementary cosmological phenomenon that is necessary for the living universe to become manifest and to continue to flower in conscious awareness of itself. The complementarity is ontologically constitutive, not merely epistemic or observational.

Acknowledgments

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Supplimentary Material

Appendix 1

S1. A formal poof of the NS Theorem

A sketch proof was already shown earlier.

In subsequent papers (Reason, 2019; Reason & Shah, 2021) she expands this argument:

I identify a specific operation which is a necessary property of all healthy human conscious individuals — specifically the operation of self-certainty, or the capacity of healthy conscious humans to “know” with certainty that they are conscious. This operation is shown to be inconsistent with the properties possible in any meaningful definition of a physical system.

In an earlier paper, using a no-go theorem, it was shown that conscious states cannot be comprised of processes that are physical in nature (Reason, 2019). Combining this result with another unrelated work on causal emergence in physical systems (Hoel et al., 2013)), we show in this paper that conscious macrostates are not emergent from physical systems and they also do not supervene on physical microstates.

In a formalization of the argument, (Reason, 2023) cites Descartes' "cogito ergo sum" as counter example requiring human consciousness so the success of her theorem also frees Cartesian duality from Ryle's deathly grip.

Let us define the proposition *P*: "I am not currently in a dreamless sleep." We shall call this the Cartesian proposition. Note that alternative versions of *P* will do equally well, including those which make no reference to the concept of "I". For simplicity we shall use the definition above without loss of generality.

Now let us define physicalism: A physicalist theory is one in which every mental process implies the existence of some physical process. We shall define a physical process to be one which exists independently of any given observer.

We shall now define the proposition *Q* as follows: *Q*: "The physical process which allows the proposition *P* to be asserted, both exists and operates correctly." For physicalism to be true, it must be the case that *P* implies *Q*. We can therefore define three epistemically possible cases, or worlds:

W_1 : *True(P) False(Q)*; W_2 : *True(P) True(Q)*;
 W_3 : *False(P) False(Q)*

Clearly, worlds W_2 and W_3 are consistent with physicalism, but world W_1 is not. Now the problem of asserting P can be expressed as the problem of reducing these three epistemically possible worlds to two, such that W_1 and W_2 are epistemically possible, but W_3 is not (since we cannot assert P if there is an epistemically possible world in which P is false). If physicalism is true, then there must be some physical process which is responsible for this reduction, which we shall call X . Now clearly, every physical process is potentially fallible, so the existence and correctness of X cannot be decided a priori. We can therefore express the three worlds after application of this process as follows:

W_1 *True*(P) *False*(Q); W_2 *True*(P) *True*(Q) *Correct*(X); W_3 *False*(P) *False*(Q) *Incorrect*(X).

Clearly we still have three epistemically possible worlds, because it is epistemically possible that X does not work correctly. So to reduce the three worlds to two, we need either another application of the process X , or some new process. We shall call this new process (or new application of an existing process) X_1 . Since X_1 is a physical process and therefore fallible, we end up with the resulting set of worlds:

W_1 : *True*(P) *False*(Q); W_2 : *True*(P) *False*(Q) *Correct*(X) *Correct*(X_1); W_3 : *False*(P) *False*(Q) *Incorrect*(X) *Incorrect*(X_1)

It is apparent that we have still not been able to reduce the three worlds to two. Furthermore, it should now be obvious that we will never be able to reduce the three worlds to two, no matter how many times we apply the process X . or how many new processes X_n we apply to the set of three worlds. And this conclusion is completely independent of any assumptions about how the physical processes operate, or what metaphysical properties they may have. There is simply no way, using any set of physical processes, however large, that the set of three epistemically possible worlds can be reduced to two, and therefore no way, if physicalism is epistemically possible, that P can ever be assumed to be true, since there will always be an epistemically possible world in which P is not true. It is not possible, therefore, for any physicalist theory to describe any sort of system or being which is capable of any sort of Cartesian self-awareness, no matter how that is defined or interpreted.

S2. Proof

The actual proof is by axiomatic modal logic.

Modal logic is an extension of classical logic that introduces expressions to qualify the truth of a statement, such as “necessary that” $\Box$, or “possibly that” $\Diamond$, “is provable” $\vdash$. While classical logic deals only with absolute facts, modal logic allows us to reason about different “modes” of truth, distinguishing between what is

actual, what must be true, and what could be true.

Consider the statement: $\vdash p \leftrightarrow \sim \Diamond \sim p$

This says p is provable as a theorem in modal logic if and only if it is not possible to have p false. This is true if only the modal logic axioms are allowed, **the restricted axiomatisation**, but given more extended axioms, it isn't.

For example given M consisting of two states P and Q and P and $\sim Q$ which implicitly assumes $\sim P$ can't exist: $\sim \Diamond \sim P$, so we don't have $(P \rightarrow Q) \rightarrow (\Diamond \sim Q \rightarrow \Diamond \sim P)$, where the LHS would give us P and Q but in the RHS, $\Diamond \sim Q$ gives us P and *sim* Q , so it's not possible to have $\sim P$.

The effect of this is to limit the modal reasoning to a priori inferences. It is also monotonic in that any conclusion derived from a set S of premises is valid for any superset of S . Any unrestricted axiomatization allows for the inference of models which are not theorems, so is non-monotonic.

Any additional axioms or propositions will have to be determined empirically.

We next set up a model world with a set Z of facts about it and $p(Z)$ the subset of facts that are true (at some time), when p is true.

A *physical system* is a set of states and transformations constituting a mathematical category of states and morphisms. A *physical process* is any subset or subcategory of a physical system.

M is the state of the system (at some time) assumed to be capable of reasoning using predicate modal logic.

An **observer** is a physical system O which, when working correctly, evolves to a special Wolpert state $W(p)$ such that O evolves to the state $W(p)$ only if p is true. Whenever O evolves to $W(p)$ and p is true, we shall say that $W(p)$ has the value TRUE. A $W(p)$ is *accurate* and *reliable* for some proposition p using *modal logic* if: $\sim \Diamond \sim (W(p) \rightarrow p)$. If the device O is operating correctly, then O cannot evolve to the state $W(p)$ unless p is true. Hence $W(p)$ represents O 's knowledge of the facts denoted by p .

The set of **real** processes is the set of processes Φ : for any two observers O_A & O_B : $A \neq B$, $W_A(\Phi \neq \emptyset)$ & $W_B(\Phi \neq \emptyset)$ are both TRUE. We then define a **real** property to be any subset of Z such that $W_A(x)$ & $W_B(x)$, $A \neq B$ are both TRUE. One can call the generalization the *realism postulate*.

The set of **subjective** processes is the set of all processes Ψ for which the realism postulate does not hold.

We define a **physicalist theory** as any theory which stipulates that every subjective process implies the reality of some real process, which is to say: $\Psi \rightarrow \Phi$. One can call the generalization the *physicalism postulate*.

We say X is a process of type P if $O \rightarrow W(p)$ if and only if p is **TRUE**.

We say X is a process of type R if $O \rightarrow W(p)$ if and only if p is **UNTRUE**.

Let $S(X)$ be a set of real processes sufficient to enable a W to establish proposition p , subject to every X being a process of type P and hence not a process of type R .

Define the proposition “ X is not a process of type R ”, or: $X \neq R$.

If X is real and $X = P$, then P must also be real and so $X = P$ must be a real property. Since $X = P$ implies $X \neq R$, this means $X \neq R$ is also a real property. But no single observer can prove *a priori* if a property is observable by others since $(O_A \neq \emptyset) \rightarrow (O_B \neq \emptyset)$ $A \neq B$, is not provable in the restricted axiomatization: $\diamond \sim ((O_A \neq \emptyset) \rightarrow (O_B \neq \emptyset))$.

Hence $W(X \neq R) \rightarrow (X \neq R)$ and thus $W(p) \rightarrow p$ are not valid either – i.e. $\diamond \sim (W(p) \rightarrow p)$: *the principle of empiricism*. No single observer can infer *a priori*, from the restricted axioms of predicate modal logic, whether any given real process is a process of type P or of type R . *diamond*($W(p) \wedge \sim p$).

If M can reason using first-order predicate modal logic. It follows from any restricted axiomatisation that: $W_M(\diamond(W_M(p) \wedge \sim p)) = \text{TRUE}$, i.e. $W_M(\diamond \sim (W_M(p) \wedge \sim p)) = \text{TRUE}$. So $W_M(p)$ clearly contradicts the definition of a reliable W state. Thus, given the restricted axiomatisations with postulates of physicalism and realism, no real physical system which operates as a W inference device can accurately infer p .

To get around this, one would have to add additional axioms, so $X \neq R$ and $W_M(X \neq R) = \text{TRUE}$. But by the physicalism postulate, any such W state implies some real process X_W to perform the necessary W mapping, and by the principle of empiricism, there is no *a priori* way that M can be sure that X_W is a process of type P and, for any set of processes $S(X)$, it will always be the case that: $\diamond(X = R) \forall X \in S(X)$ unless the contradiction to this is already known.

In which case there must be some process X_{diag} that maps M to the W state:

$$W_M(W_M(X_{diag} \neq R) = \text{TRUE}) \forall X \in S(X)$$

But if X_{diag} is a member of $S(X)$, M can only be sure that X_{diag} is accurate by assuming it axiomatically, since X_{diag} is capable of generating the state: $W_M(W_M(X_{diag} \neq R) = \text{TRUE})$ regardless of whether X_{diag} performs a Wolpert mapping or an anti-Wolpert mapping.

In turn, this means $\diamond(W_M(W_M(X_{diag} \neq R) = \text{TRUE})) \neq \text{TRUE}$. It necessarily follows that, if M is capable of reasoning in the restricted axiomatization, then M itself can prove that all of its knowledge could

be wrong. One could only circumvent this by adding further axioms, such as unconditionally assuming that X_{diag} must be reliable. But assuming the reliability of X_{diag} violates the physicalism postulate and if X_{diag} is not a member of $S(X)$, then this violates the definition of $S(X)$. So we can say definitively that no system which satisfies the definition of physicalism, that is capable of reasoning using predicate modal logic, can establish any empirical proposition p . And we can extend this to propositions q having a probability greater than $0 \leq k \leq 1$.

If there exists some subset $\omega(Z)$, such that $W_M(\omega) = \text{TRUE}$ can accurately be determined by M , then M is performing some function which is inconsistent with any physicalist theory. Reason and Shah (2021) referred to such a function as an *omega function*. One example of such a function which can be performed by conscious human beings is the Cartesian cogito. For simplicity, we shall say that a conscious human being is omega-capable if they can determine accurately that they are not in a dreamless sleep at some time t . i.e. $\diamond \sim (W_M(\Psi \rightarrow \Phi) = \text{TRUE})$.

What we show using X_{diag} is that, for any set of objective processes, the process which establishes the reliability of every process in the set cannot be a member of the set – which would violate the condition of supervenience. We do not show that a self-referencing simulation of agency will not achieve a cogito state. What we show is more subtle, which is that any system which supervenes on objective processes can infer that it can never be confident about the reliability of those processes. Therefore, if one of those processes is responsible for the Cogito (which necessarily follows from supervenience) any such system can infer that its own Cogito is not reliable.

We treat QM as a minimally interpreted theory, in the sense that it is a theory which predicts the future values of empirical observations. That makes QM fully objective in the sense we use, and so QM, and any model which uses the formalism of QM, is fully covered by the NS theorem. One would have to apply the theorem separately to any theory which relaxed fundamental assumptions of QM. The theoretical role of the wave function is to compute the values of future empirical observations. So the NS theorem applies to it, QM is formalized in terms of classical logic, not quantum non-classical logics.

It is this sheer self-certainty of being conscious that is primary to subjective consciousness existing that transcends physicalist realism. While any physically real system cannot be self-certain, due to the principle of empiricism, it is the sheer self-certainty that we are conscious that performs Reason’s Theorem for us all.

Reason’s Theorem taken at its stated value is about theoretical models: *A final point, which is subtle but extremely important, should also be made; the theorem*

applies strictly not to systems, but to theoretical models of systems. It does not really mean anything to say that no physical system can be omega-capable. All one can say is that no physicalist model of a system can be omega-capable.

Reason's theorem defines a model cosmos, including both physically realistic and subjective processes and observers. The ultimate problem with physicalist realism is its dependence on the *principle of empiricism*, which prevents logical certainty. However, the cogito in its most basic form like "I am not in dreamless sleep" is immediate and direct self-certainty by its very existence. This is emphasizing the primacy of conscious existence over the neuroscientific thesis, that it is not just part of the dendritic web, but ontologically cosmic. The theoretical model is a whole subjective-objective cosmos, supporting views in which subjectivity is essential to cosmic manifestation.

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