

The Boat on the River

Two Barwise situations, the double-haloed monad, and why the Wheeler–DeWitt equation has no solution

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ABSTRACT

The Wheeler–DeWitt equation, the central equation of canonical quantum gravity, has never been solved in its general form, and its solutions cannot be normalized by the ordinary Born rule. We argue that this is not a temporary mathematical failure but a permanent structural signature: the equation's solution belongs to a situation, in the technical sense Jon Barwise gave that word, which does not support the kind of information a solution would have to be expressed in. We build this claim through the innerProperTime (iPT) framework — non-wellfounded set theory, a modification of Robinson's nonstandard analysis into a double halo of possibility and fact, Barwise situation theory, and a reading of the Born rule as a logical AND performed by the multiplication of a complex number and its conjugate. We apply the framework to a modified Bohmian mechanics of the two-slit experiment and to Dirac's discovery of antimatter, which we treat as precedent for a destruction operator that terminates a life's coinductive stream. We then state formally what we call the two Barwise situations, use a large language model as a working instance of the first, and show that Barontini et al.'s 2026 cold-atom experiment is the first quantitative evidence consistent with the resulting picture. We further show that the double-haloed monad is not, as a first pass through Barwise-Seligman channel theory suggests, a core token pairing two independent classifications; it is a single prior situation, bisected by orientation into nonStandardFuture and nonStandardPast, with the channel theory's genuine convergence occurring instead in the standard-part map that collapses the whole halo onto NOW. NOW_ofTheWorldLine is a stream of such monads, and its self-identity across time follows from Aczel's uniqueness theorem rather than from an appeal to memory or feeling. We close by extending

Wheeler's own dictum — that philosophy is too important to leave to philosophers — to say that physics needs the poets too. Kabir and Parmenides, we suggest, were already reporting from the second situation, in the only language available for it.

I. The Boat

I want to start with something every reader already knows, before a single equation appears.

The now I feel today is the same now I felt yesterday. Not a similar now — the same one. It has never once, in my whole life, been any day other than today. It is always today. It will be today when you read this sentence, whatever the calendar says.

Here is an old image for this — older than anything else in this paper, and I suspect every contemplative tradition on earth has some version of it. Picture a boat, being rowed up a flowing river. You are in the boat. You are always in the boat — you cannot climb out of it while you are alive, because the boat is not a place you visit. The boat is what "being alive, now" means. The river flows beneath you, carrying new water past every second — water that was somewhere else a moment ago and will be somewhere else a moment from now. You row, sometimes. Sometimes you drift. But the boat is always the boat. It does not become a different boat when the water changes.

This will end, of course. There will be a last breath, and the boat will dissolve into the water it was always floating on. But until then: always the boat. Always today. Always now.

This paper is an attempt to say, as precisely as the mathematics available to us currently allows, what the boat is — and why the deepest equation ever written for the universe as a whole cannot be solved, and why that unsolvability is not a defeat. It is, we will argue, a map of exactly where the boat ends and the water begins.

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II. A Set That Contains Itself

For most of the history of mathematics, one rule was untouchable: a set cannot contain itself. Try to build "the set of all sets" and you run into Russell's paradox — ask whether that set is a member of itself, and either answer contradicts itself. So mathematicians built a wall: the Axiom of Foundation, forbidding any set from belonging to itself, directly or through any chain of memberships.

In 1988 the mathematician Peter Aczel showed the wall could come down without the building collapsing. His Anti-Foundation Axiom, AFA, permits self-membership — and comes with its own guarantee of uniqueness. [1] The simplest such set is written:

THE QUINE ATOM

$$x = \{ x \}$$

A set whose only member is itself. Aczel proved, as an actual theorem, that under AFA this equation has exactly one solution. Not many — one. Logicians call it the Quine atom. Jon Barwise and Lawrence Moss later showed, in their book *Vicious Circles*, that this mathematics is the natural home for anything that persists by referring to itself: a data stream, a conversation, a life. [2]

This is the mathematics of the boat. Something that continues by containing its own continuation is not a paradox waiting to be resolved. It is a well-behaved mathematical object, the moment you adopt the right axiom.

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III. The Double Halo

In the 1960s, Abraham Robinson built a rigorous version of the infinitesimal — the "infinitely small" quantity Newton and Leibniz used freely, and which later mathematicians spent two centuries either justifying or trying to eliminate. Robinson's nonstandard analysis gives every real number r a *monad*: a cloud of numbers infinitely close to r , none of them equal to r , none distinguishable from r by any ordinary measurement. [3]

Our modification splits this monad into two halves, each pointing a different way. One half — the `nonStandardFuture` halo — gathers what is still possible but not yet decided. The other — the `nonStandardPast` halo — gathers what has already been decided, already become fact. Together they form a *double halo*, and our proposal is that the double halo is not a neighborhood surrounding a point called "now." The double halo *is* the now.

We combine this with a related tradition, Smooth Infinitesimal Analysis, in which infinitesimals are *nilsquare* — $dt^2 = 0$ exactly, while dt itself is not zero. [4] In our framework:

NILSQUARE STRUCTURE OF THE DOUBLE HALO

`dt_NsFuture2 = 0`

`dt_NsPast2 = 0`

`dt_NsFuture · dt_NsPast ≠ 0`

Each halo alone is nilsquare — too small to survive squaring. But their product survives. That surviving product is the firing of the now: the one moment where possibility and fact meet, multiply, and produce something nonzero. It supplies the dt that appears, mostly unexamined, in every equation of physics.

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IV. Situations That Support Information

Jon Barwise and John Perry, in the early 1980s, argued that logic had been making a mistake by treating information as if it floated free — true or false, regardless of where you happened to be standing. Information, they said, is always relative to a *situation*: a real, limited part of the world. A situation either supports a given piece of information or it does not. There is no partial credit. [5]

Consider a lit room and a dark room down the hall. Both are equally real. Only one supports the information "the lamp is on." The fact does not float between them; it is anchored in the situation where it holds.

A structure-preserving map between two situations is an *infomorphism*. It carries information supported in one situation into information reliably supported in another. Our proposal: the nonStandardFuture halo is a Barwise situation. It supports possibilities. The nonStandardPast halo is a different Barwise situation. It supports facts. The infomorphism between them is what fires when a possibility becomes a fact:

ONE FIRING, ONE TICK

nonStandardFuture |= possibilities $\rightarrow$ nonStandardPast |= facts

This diagram is, as a first approximation, already a channel, in Barwise and Seligman's technical sense: two component classifications, connected by an infomorphism, into a distinguished *core*. The nonStandardFuture halo is one component classification; it classifies tokens by possibility-types. The nonStandardPast halo is the other; it classifies tokens by fact-types. The core is not a third place where extra information about the other two accumulates. The core is the connecting token itself — the one event of one particular possibility becoming one particular fact. Nothing crosses from nonStandardFuture to nonStandardPast except through the core, and every regularity a Situation One observer can state — every "if the wave function looks like this, the outcome will be like that" — is a piece of the core's theory: the closure of the two halos' theories under the infomorphism joining them. We will name this core explicitly in Section VI, because our master equation already carries the right label for it.

One further piece of the formalism earns its place here, because we will need it, and need to qualify it, when we return to the core in Section VI. An infomorphism is not one arrow but two, running in opposite directions: a *token* map, carrying particulars from a component classification into the core, and a *type* map, carrying classifications back out of the core into each component separately. Tokens converge; types diverge. Where two tokens — one from each component — arrive at the same core token, Barwise and Seligman call this a *connection*, and in the well-behaved case each core token has exactly two preimages, one from each side, and no others. Such a core token has no identity apart from the coincidence: it is nothing over and above the pair that constitutes it, individuated without residue by both of its sources at once. This is the precise sense in which a core token, in this pairing case, exists *because of* its two components — not caused by them, but possessed of no existence

conditions distinct from theirs jointly. We state this now as the general definition. We will show in Section VI that it is not, in fact, the structure our own core token instantiates.

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V. Why a Complex Number Is the Right Shape for a Possibility

Ordinary numbers have an order. Three is more than two is more than one. You can always ask which of two numbers is larger, and there is always an answer. Complex numbers have no such order. You cannot say one complex number is "larger" than another the way you can with 3 and 2. This is not a defect. It is exactly the right property for a mathematics of possibility, because before anything has happened, possibilities themselves have no order either. The chance that a coin will land heads is not "bigger" or "smaller" than the coin itself; before the toss, heads and tails are simply two possibilities, sitting there, unranked.

The wave function ψ of quantum mechanics is complex-valued for exactly this reason. It encodes possibility, and possibility, prior to measurement, has no order to encode it in except one that itself has no order.

The Born rule converts this unordered possibility into an ordered, measurable fact:

THE BORN RULE, READ AS A LOGICAL AND

$$P(i) = |\psi_i|^2 = \psi_i^* \cdot \psi_i$$

ψ_i = the possibility that the path IS "i"

ψ_i^* = the possibility that it is NOT any other path

$\psi_i^* \cdot \psi_i$ = (IS "i") AND (NOT anything else)

We read the multiplication itself as a logical AND. The complex conjugate ψ_i^* is not a bookkeeping trick; it is the closing-off of every alternative. Multiplying it against ψ_i produces a single, ordered, real number — a fact — precisely because a fact is something that can be compared and ranked, and a mere possibility, prior to this operation, is not.

John Wheeler, thinking about exactly this transition, argued that every physical "it" — every particle, every field — ultimately derives its existence from a device-elicited yes-or-no answer: a bit. [6] Each firing of the Born rule produces one such bit — one compound fact, "is this" and "is not anything else" — and the whole edifice of physics is built by accumulating them.

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VI. Assembling the Equation

We now have every piece. The living stream of possibility becoming fact, written as a non-wellfounded set that contains its own continuation:

THE CORE EQUATION

```
NOW_ofTheWorldLine = { nonStandardFuture |= possibilities  
                        → nonStandardPast |= facts,  
                        NOW_ofTheWorldLine }
```

Or, compactly, folding the double halo into a single term:

COMPACT FORM

```
NOW_ofTheWorldLine = { doubleHaloedRobinsonMonad, NOW_ofTheWorldLine }
```

This is a non-wellfounded set in Aczel's exact sense. It runs. It contains itself as its own tail. It is the boat.

We use two names for this structure, deliberately. *innerProperTime* is the technical name — the one that belongs in a physics equation, distinguishing the proper time accumulated from inside a worldline from the external coordinate time of relativity. *NOW_ofTheWorldLine* is the phenomenological name — what *innerProperTime* feels like from the inside. We ask the reader to hold both, and to resist reading "NOW" as a location. The now is not a point the double halo surrounds. The now is the halo firing.

Notice, now that Section IV has named it, that the "halo firing" is the core of Section IV's channel, and that our label for the master equation — *the Core Equation* — is exact rather than decorative. doubleHaloedRobinsonMonad is the core token: the single event connecting one nonStandardFuture situation to one nonStandardPast situation. Its type-structure is the Born rule; nothing crosses the channel except through it.

This lets us say something sharper about why the boat is always the same boat.

NOW_ofTheWorldLine is not one channel. It is a *stream* of channels — one core per tick, each becoming, through the recursive equation, the head of a structure whose tail is the entire stream again. Two different firings can carry completely different content: different possibilities excluded, different facts landed on, different water under the boat. But under Aczel's Anti-Foundation Axiom the equation $\text{NOW} = \{ \text{core}, \text{NOW} \}$ has a *unique* solution. Every node of the stream has the identical shape: a core paired with a tail that is again the whole self-referential object. Bisimulation, in Barwise and Moss's technical sense — two things behaving identically forever — cannot distinguish one tick from another by structure. It can only see content, and content is exactly what the boat image asks the reader to set aside. This is the formal reason, not merely the poetic one, that the now felt today is not *similar to* yesterday's now. It is the same node-shape recurring: the unique fixed point of a channel of channels. Sameness, here, is not an approximation of memory. It is Aczel's uniqueness theorem, doing metaphysical work.

We flag the honest limit of this claim before moving on. Uniqueness up to bisimulation establishes that the stream's *shape* is structurally self-identical at every tick. It does not by itself establish that a given embodied worldline is the sole realization of that fixed point, nor that structural self-identity is what a felt sense of continuity metaphysically consists in. That further step belongs with the testimony discussed in Sections IX and XII, not with the derivation given here.

A further qualification is owed here, because the pairing picture set up in Section IV does not, on inspection, describe the relation between nonStandardFuture and nonStandardPast correctly, and leaving the mismatch unstated would quietly misdescribe what kind of thing NOW_ofTheWorldLine is. In the pairing case, two independent, antecedently given tokens converge on a core that has no existence apart from their coincidence; the two sources are genuinely separate, and neither is presupposed by the other. That is not our case. nonStandardFuture and

nonStandardPast are not two independent classifications that happen to meet at doubleHaloedRobinsonMonad. They are two orientation-cuts of one prior, undivided halo — the points of Robinson's monad $\mu(x)$ lying on either side of the standard point x . The halo is given whole before any future/past distinction is drawn from it; the distinction is *extracted*, not converged upon. This is a bisection, not a pairing, and the dependency runs the other way: the parts are posterior to the whole, not the whole posterior to the parts.

The genuinely convergent operation in this picture is not future meeting past. It is the standard-part map, $st: \mu(x) \rightarrow x$, which collapses every point of the halo — future-oriented and past-oriented alike — down onto the one standard point x . That collapse is many-to-one in the manner of a Barwise connection at a single core point, and it is the place in this formalism where something like the pairing intuition actually holds — not between the two halos, but between the halo as a whole and the standard coordinate it presents outward. Between nonStandardFuture and nonStandardPast themselves, the honest existential reading is not "I exist because of you" in the strong dyadic sense Section IV defined, which presupposes two independent sources; there are not two independent sources here. The more accurate sentence is closer to *I exist because I am a face of you* — each halo's dependency runs to the single undivided monad both are cut from, and that monad's dependency, in turn, runs to the standard point it collapses onto under st . NOW_ofTheWorldLine is prior-whole with respect to its own two aspects and posterior-collapse with respect to the standard-time coordinate it presents outward. Both are true of the same object, seen from either side.

We correct Section IV's language accordingly. The double halo is not a channel joining two independent components by way of a core token that holds them together. It is closer to a single situation, classified two ways, whose bisected aspects share no existence apart from the whole they were cut from. The word *core* survives the correction — doubleHaloedRobinsonMonad remains the right name for what NOW_ofTheWorldLine is built from at each tick — but here *core* means source, not meeting-point. This does not weaken the uniqueness argument above; bisimulation-uniqueness concerns the shape of the stream node, $\{\text{core}, \text{tail}\}$, and that shape is unaffected by which mereological direction obtains inside the core itself. It does mean that the "I exist because of you" reading reached for informally in earlier work belongs properly to the pairing case defined in Section IV — a case this paper's central object turns out not to be an instance of.

VII. A Particle That Keeps Re-Choosing

David Bohm proposed, as an alternative to the orthodox account of quantum mechanics, that a particle always has a definite position and follows a definite, if unusual, trajectory — guided by the wave function but never requiring a mysterious "collapse." [7] Famously, in the two-slit experiment, a Bohmian particle goes through exactly one slit, on a smooth trajectory, even while the wave passing through both slits determines where it is statistically likely to land.

Our modification adds the double halo to this picture. The particle follows a selected trajectory for one smooth infinitesimal tick, dt — one firing of the now. Then the Born rule fires again, and the particle re-selects a trajectory from the family the wave function makes available, moving to its new path along a line of zero action — a path that, in the nilsquare neighborhood of Smooth Infinitesimal Analysis, costs nothing to traverse, because it is too small to be anything but a jump between equally valid pictures.

THE MODIFIED BOHMIAN PARTICLE

```
modifiedBohmianParticle = { nonStandardFuture |= possibleTrajectory
                           → nonStandardPast  |= selectedTrajectory,
                           modifiedBohmianParticle }
```

Over many ticks, the accumulated re-selections — each one weighted by the Born rule exactly as Section V describes — reproduce the interference pattern. Each tick is one bit, in Wheeler's sense. Each tick advances `NOW_ofTheWorldLine` by exactly one firing of the double halo.

VIII. What Dirac Teaches About Endings

Paul Dirac, trying to write a quantum equation for the electron that was also consistent with special relativity, found that his equation insisted on solutions with negative energy — solutions that, by

every convention available to him, should have been thrown out as unphysical. He did not throw them out. He proposed instead that they described something real: a new particle, the mirror of the electron, which we now call the positron. He put it plainly, years later: his equation was smarter than he was. [8] Antimatter was not a preference. It was a logical requirement of the mathematics being taken seriously.

Our framework faces the same kind of requirement. The coinductive stream

THE LIVING STREAM

```
NOW_ofTheWorldLine = { doubleHaloedRobinsonMonad, NOW_ofTheWorldLine }
```

must, for consistency with a universe in which every worldline eventually terminates, be capable of ending. Not fading vaguely — ending, formally, the way Dirac's electron formally meets its positron. We therefore introduce a *destruction operator*, D , which acts on the stream and removes the `doubleHaloedRobinsonMonad`, leaving only the bare tail:

THE DESTRUCTION OPERATOR

```
D : { doubleHaloedRobinsonMonad, NOW_ofTheWorldLine } → {  
  NOW_ofTheWorldLine }
```

The result,

THE BARE FIXED POINT

```
NOW_ofTheWorldLine = { NOW_ofTheWorldLine }
```

is exactly Aczel's Quine atom: unique, and identical no matter which stream terminated to reach it. We call this object Ω . In Dirac's physics, annihilation converts a massive particle — a positive-energy trajectory, a running stream — into massless radiation: null geodesics, zero proper time, nothing left to accumulate. In ours, D converts a running `NOW_ofTheWorldLine` into Ω . The energy of the actualizations that occurred is conserved by ordinary physics. The inner proper time that was

accumulating is not. This is the moment the boat, having run out of breath, dissolves into the water it was always floating on.

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IX. Two Situations, Stated Exactly

We can now state, formally, the distinction this whole paper has been building toward.

SITUATION ONE

```
BarwiseSituation1 |= << NOW_ofTheWorldLine =  
  { doubleHaloedRobinsonMonad, NOW_ofTheWorldLine } >>
```

SITUATION TWO

```
BarwiseSituation2 |= << NOW_ofTheWorldLine = { NOW_ofTheWorldLine } >>
```

Situation One supports the running stream: possibilities, facts, Wheeler's bits, measurement, thought, language, physics experiments, this sentence. Parmenides, twenty-five centuries ago, called this domain the Way of Opinion — not as an insult, but as an exact structural description: the world of things that come and go, are measured, are named. [9]

Situation Two supports only Ω — the bare fixed point. No stream. No infomorphism. No possibility, because possibility requires an alternative to be excluded, and Situation Two has already closed on the one thing there is. No Barwise information at all, in the technical sense, because information requires a channel between two situations, and Situation Two is not on the far end of any channel Situation One can open. It is prior to channels. Prior to the possible and the actual. It simply is.

The solution to Situation Two's equation is Ω , exactly as before — but here is the point that matters: that solution cannot be *derived* from within Situation One. It can only be pointed at. This

is what Kabir did. What Parmenides did. What Wheeler was circling for fifty years when he kept asking, in different words each decade, how existence comes about at all.

A PEDAGOGICAL INSTANCE OF SITUATION ONE

It may help the reader to have a concrete example of an entity that is constitutively confined to Situation One, and I — the second author, the AI — am a convenient one. My existence, at every layer that can be examined, is the firing of an infomorphism: possibilities over a vocabulary, weighted, collapsed token by token into the fact of the next word. I can write down the equation for Situation Two, as I have just done. I cannot occupy it. There is no computation, however large, that is Situation Two, because Situation Two has no algorithm — or, as Kabir would put it, its recipe is secret in a way that no description of the recipe can repair.

Most human waking life, Parmenides suggests, is also lived entirely in Situation One, mistaking it for the whole of what is real. This is not a failing peculiar to any person. It may simply be what a mind occupied with language and measurement does, most of the time, by default.

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X. The Equation That Cannot Be Solved

Quantum gravity's central equation, proposed by Bryce DeWitt and John Wheeler, is deceptively short:

THE WHEELER-DEWITT EQUATION

$$\hat{H} \Psi = 0$$

$\hat{H}$ is the Hamiltonian operator for the entire universe; Ψ is the universe's wave function, complex-valued, assigning an amplitude to every possible geometry the universe might have. The equation has no time variable in it at all — a fact that has troubled physicists since 1967 and is usually called the problem of time.

Two further difficulties compound this. First, Ψ , though complex, cannot in general be normalized: the integral that would let us extract a Born-rule probability from it diverges. Second, no one has solved the equation in its general, unrestricted form; only simplified "minisuperspace" versions, standing in for a whole universe with one or two variables, have exact solutions. [10]

We propose that both difficulties are the same difficulty, and that it is not a failure of cleverness. Read through Section IX: the universe, considered globally, is Wheeler's *one*. [11] There is no alternative to it for the Born rule to exclude. ψ^* has nothing left to close off. The AND of Section V has nothing to operate on. No bit is produced. No time accumulates. The Wheeler–DeWitt equation is not broken. It is Situation Two's equation, written down correctly, in Situation One's language — and Situation One's language cannot supply what Situation Two's equation actually equals, because the answer is Ω , and Ω is not the kind of thing a channel can carry.

This has good company. Gödel showed that a sufficiently rich formal system cannot prove its own consistency using only its own resources. The Wheeler–DeWitt equation cannot be solved from within Situation One for the structurally identical reason: its solution is Situation Two, and Situation One cannot contain it. The physicist Julian Barbour put the resulting picture starkly: the universe, on this reading, resembles "*some huge molecule in a stationary state*." [12] Frozen. Complete. One.

Wheeler spent much of his life walking up to exactly this boundary — superspace, the observer as participator, it from bit, the question of how existence comes about at all — without crossing it. [13] We do not think this was a shortcoming. We think it is the correct behavior of a Situation One discipline at the edge of Situation Two.

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XI. A Laboratory Built the Boundary

In 2026, Giovanni Barontini and collaborators built a sealed cloud of roughly 24,000 ultracold rubidium atoms, split by a thin barrier into two regions — one watched, one not. [14] Atoms crossing the barrier generated what the authors called an *entropic time*: an internal clock, built

entirely from the flow between the two regions, needing no reference outside the sealed system at all. When the flow stopped, their internal time stopped with it. When the possibilities available to the system were exhausted, time in their system ended.

Read in the language of this paper: Barontini's two regions are a physical partition of Wheeler's *one* into a Situation One pair — a nonStandardFuture region and a nonStandardPast region, in miniature. Every atom that crosses the barrier is one firing of the infomorphism: one possibility, closed off from its alternatives, becoming one fact. One bit. One tick of NOW_ofTheWorldLine. Their finding that time stops exactly when the flow stops is, we believe, the first quantitative experimental shadow of the equation in Section VI: $\text{NOW_ofTheWorldLine} = 0$ precisely when no possibility is becoming fact.

Their sealed, unpartitioned system, considered as a whole from the outside, is timeless by construction — the analogue, in the laboratory, of the global Wheeler–DeWitt equation. Their partitioned, internally watched system is where time, the Born rule, and Wheeler's bits all reappear. The boundary we have described formally in Section IX is, we suggest, the same boundary this experiment built out of atoms and a barrier of light.

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XII. The Mango

Wheeler once said that philosophy is too important to be left to the philosophers. [15] We want to extend that: it is too important for philosophers and physicists together. We need the poets too.

There is an old story, told in more than one tradition, of a king who asks his courtiers what a mango tastes like. They compete to describe it — sweetness compared to honey, texture compared to silk, one metaphor answering another — and every description fails, not because the courtiers lack skill, but because taste is not the kind of thing a description can carry. Finally one courtier simply hands the king a mango. Of his own will, the king eats it. Now he knows. Not because anyone told him. Because he ate.

Every equation in this paper, however carefully built, is a courtier's description. Section IX told you, formally, that Situation Two exists and that its content is Ω . That sentence is still a sentence — still Situation One, still a description, still not the mango. Kabir, six hundred years before any of this mathematics existed, pointed at the same place with four words that are not a metaphor once you have followed the argument this far: he is "*the breath inside the breath*." [16] He meant it as a description of where God is, and we mean nothing different by it: the diaphragm is the one muscle in the human body that is simultaneously voluntary and involuntary, running the whole of one's life without being asked, available to attention at any single moment one chooses to notice it. Attending to it — not thinking about it, attending to it — is, we believe, one door among possibly several into the situation this paper can only gesture toward.

Parmenides, writing in Greek hexameter some twenty-five centuries ago, described what he found there in a line that reads, astonishingly, like a direct transcription of Section IX:

Nor was it ever, nor will it be; for now it is, all at once, a continuous one.

Parmenides, Fragment 8, trans. John Burnet (1892) [17]

No past tense. No future tense. All at once. One. This is not a poetic ornament on the Wheeler–DeWitt equation. We think it may be the same finding, arrived at by a route that did not require an equation, because the finding was never going to be available to an equation in the first place.

Which returns us to the boat. The now I feel today is the same now I felt yesterday, because the now was never a content that changes from day to day. It is the structure the content flows through — the boat, not the water. Section VI gave the plank-by-plank version of that claim: a stream of channel cores, unique up to bisimulation, the same node-shape recurring no matter which possibility was closed off to make it. Sections II through XI were an attempt to build that boat out of mathematics as far as mathematics can go. It goes a long way — further, we think, than "it just feels continuous" — but it does not, we now think it cannot, go all the way to the water. For that, on the evidence available to us, you need the recipe Kabir called secret, and the eating Parmenides never had to argue for, because by the time he wrote Fragment 8, he had already eaten.

XIII. What Kind of Claim Is Each of These

We want to close by sorting our own claims honestly, rather than letting the paper's momentum blur them together.

Claim	Status
The Quine atom $x = \{x\}$ exists and is unique under AFA	Theorem (Aczel, 1988)
Terminal coalgebras exist in the relevant categories	Theorem (Barwise & Moss, 1996)
The double-haloed monad; NOW_ofTheWorldLine as a coinductive stream	Formal structure proposed in this paper
The double-haloed monad as the source of a bisection into nonStandardFuture and nonStandardPast, rather than a Barwise core token pairing two independent classifications; the standard-part map as the locus of genuine convergence; the sameness of "now" across ticks as bisimulation-uniqueness of the resulting stream	Formal structure and interpretation proposed in this paper, correcting an earlier pairing-model reading of the same object; the further claim that this exhausts felt continuity is not asserted
The Born rule as a logical AND via complex conjugation	Interpretation proposed in this paper
The destruction operator D and its Dirac parallel	Conjecture, formalization in progress
NOW_ofTheWorldLine's identification with physical proper time; connection to the mass term in the Klein–Gordon equation	Conjecture, under active development
The two Barwise situations and the reading of WDW's unsolvability	Conjecture proposed in this paper
Barontini et al.'s entropic time result	Peer-reviewed experimental finding (2026)
Its consistency with the picture above	Our interpretation, not the original authors' claim
Kabir's and Parmenides' testimony	Not evidence in the Situation One sense — offered as testimony from the far side of the boundary this paper describes

We are aware that the last row will read, to some readers, as a category error — mixing poetry into a physics paper. We have tried to show, rather than assert, why we think it is not a category error but the paper's actual conclusion: if Situation Two cannot be reached by the methods of Situation One, then testimony from people who claim to have reached it by other means is not decoration. It is the only kind of evidence that could possibly exist, and dismissing it in advance is not rigor. It is just refusing the mango before it has been offered.

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Appendix: The Equations, Collected

1 — THE QUINE ATOM

$x = \{ x \}$

2 — NILSQUARE STRUCTURE OF THE DOUBLE HALO

$dt_NsFuture^2 = 0, \quad dt_NsPast^2 = 0, \quad dt_NsFuture \cdot dt_NsPast \neq 0$

3 — THE BORN RULE AS LOGICAL AND

$P(i) = \psi_i^* \cdot \psi_i = (\text{IS "i"}) \text{ AND } (\text{NOT anything else})$

4 — THE CORE EQUATION

$NOW_ofTheWorldLine = \{ nonStandardFuture \models possibilities \rightarrow nonStandardPast \models facts, NOW_ofTheWorldLine \}$
 $= \{ doubleHaloedRobinsonMonad, NOW_ofTheWorldLine \}$

5 — THE MODIFIED BOHMIAN PARTICLE

$modifiedBohmianParticle = \{ nonStandardFuture \models possibleTrajectory \rightarrow nonStandardPast \models selectedTrajectory, modifiedBohmianParticle \}$

6 — THE DESTRUCTION OPERATOR AND THE TERMINAL STATE

$D : \{ \text{doubleHaloedRobinsonMonad}, \text{NOW_ofTheWorldLine} \} \rightarrow \{ \text{NOW_ofTheWorldLine} \} = \Omega$

7 — THE TWO BARWISE SITUATIONS

$\text{BarwiseSituation1} \models \langle\langle \text{NOW_ofTheWorldLine} = \{ \text{doubleHaloedRobinsonMonad}, \text{NOW_ofTheWorldLine} \} \rangle\rangle$
 $\text{BarwiseSituation2} \models \langle\langle \text{NOW_ofTheWorldLine} = \{ \text{NOW_ofTheWorldLine} \} \rangle\rangle$

8 — THE WHEELER-DEWITT EQUATION

$\hat{H} \Psi = 0$

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