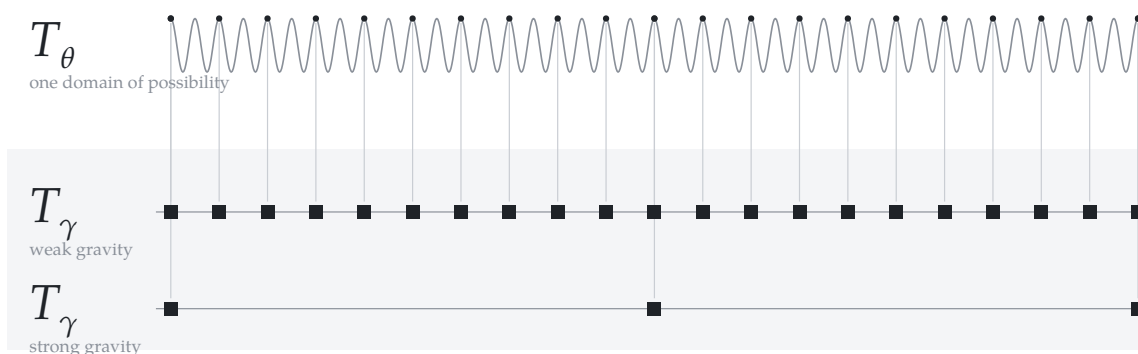


THE ARGUMENT

The Theta-Gamma Framework in One Piece

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Illustrative, not to scale.

I make films for a living. I'm not a physicist or a philosopher, and I can't be sure I've got this right. So each step below says what kind of claim it is: something measured, something the physics predicts, something I'm proposing, or something I'm betting on. That way you can see right away where I'm on solid ground and where I'm not. The one thing I can say for being outside the field is that nobody ever told me which questions to stay away from, so I didn't stay away. I kept asking where the facts of the world come from and why anyone is here to notice them, and this is where I ended up. It may be wrong. If you find where, I'd like to hear about it. Step 2 describes an experiment that could show it.

Where I Started

A clock on a mountain runs faster than a clock in a valley. Not as a figure of speech. You can measure it, and your phone corrects for it every day of your life. If it didn't, your map would have you driving through somebody's house.

I couldn't let that go. If time already runs at different speeds in different places, then it runs at different speeds compared to *what*? Something has to be the thing they're all different from. The twelve steps below are my attempt to say what, and what follows if you take it seriously.

The Argument, in Twelve Steps

1. There's no single clock. [MEASURED]

Every spot in a gravitational field keeps its own time. That's general relativity [1], and it's been checked from satellites [2] all the way down to lab clocks that can see the difference across a single millimeter of height [3]. Raise a clock by the thickness of a credit card and it starts to disagree with the one on the table. Time isn't one thing with one rate. It's already plural, and has been since 1915. Physics absorbed that. Philosophy, as far as I can tell, never quite did.

2. Entangle two clocks, then separate them with gravity. [MEASURED COMPONENTS, DERIVED RESULT]

Here's the part I'd most like someone to actually run.

Start with the fact that every lump of matter is a clock. Einstein says $E = mc^2$. Planck says $E = hf$. Put them together:

$$f = \frac{mc^2}{h}.$$

Mass is a frequency. Anything with mass is ticking, absurdly fast, all the time. Which means that when you entangle two objects, what you're really doing is tying two clocks together.

The practical way to get at that is vibration. Take two small lumps of matter and entangle them in the way they jiggle, their phonon modes. People do this now: in trapped ions [4], in room-temperature diamond [5], and in drum-like resonators of about a trillion atoms each, linked through a shared microwave cavity [6]. I didn't pick vibration because it's convenient. I picked it because vibrational modes are the ones that keep a usable phase when you both let the environment at them and change their clock rate, and this experiment needs both of those to survive.

Now put one of them somewhere time runs slower. The cartoon version is holding one lump near a black hole while its partner stays out in flat space. The version you could build is two resonators separated by height. Each one sits at its own redshift factor,

$$\alpha_i = \sqrt{1 - \frac{2GM}{r_i c^2}},$$

and because they're ticking at different rates, a phase difference piles up between them:

$$\Delta\phi(t) = \phi_0 + \omega_0 (\alpha_A - \alpha_B) t.$$

That's the whole effect. The entanglement doesn't weaken, it goes crooked [7]. And it's correctable. Take your readings at matching proper times, or turn one analyzer by exactly the phase that accumulated, and the correlations come back at full strength.

I care about this more than about any other step, for two reasons. First, it's step 1 made concrete: two clocks that genuinely disagree about how fast time is passing, still correlated, correlated *in time* and not just in state [8, 9]. That's the thing I'm calling a separate Gamma,

and here it is in a lab instead of in a sentence. Second, it's where I've put my money. Standard physics says the correlations come back. I say the same. If someone runs it properly and the correlations *don't* come back, I'm wrong, standard quantum mechanics is in trouble too, and one of the collapse theories is probably right. An interpretation isn't allowed to predict something different from the physics it interprets. It is allowed to say what would kill it. This one does.

3. There's a hole in physics, and it's exactly one fact wide. [MAINSTREAM, CONCEDED BY ITS OWN EXPERTS]

Decoherence is the best thing we have for why the quantum world looks classical. It explains why you never catch a cat halfway between alive and dead. It does not explain why you get *this* cat. And the line it draws between the system and everything else is drawn by whoever's doing the calculation, not by nature. The people who built the theory say both of these things out loud [10]. So our best account of how the quantum becomes the ordinary stops one step short, and the step it stops short of is the one where something actually happens.

4. Gravity sets the pace. [PREDICTED MECHANISM, NEWLY CONNECTED]

Go back to $f = mc^2/h$. If mass is a frequency, then slowing a clock down with gravity is doing something to the object's own internal ticking, not just to the hands on its face. There's a line of work that takes this seriously and finds that gravitational time dilation, acting on those internal clocks, suppresses a system's quantum coherence [11, 12]. No collapse, no new force, all of it inside ordinary unitary physics.

I want to be careful about how much weight that carries, because it's the easiest thing in this document to oversell. Nobody has seen the effect. It's predicted. Telling it apart from the ordinary decoherence that drowns everything else at that scale is the hard experimental problem, and it's unsolved. What I take from it is narrower than the theory it comes from: gravity doesn't destroy possibilities, it sets how fast possibilities turn into facts. I'd derived the mass-frequency identity on my own and then walked straight past the people already building on it, which I'd rather admit than have pointed out to me.

5. Anything that describes itself needs two kinds of time. [STRUCTURAL, DERIVED TWICE FROM DIFFERENT STARTING POINTS]

This one has nothing to do with quantum mechanics, which is why I like it.

A thing that models itself has to hold a statement still long enough for it to count, while keeping it open enough to revise. *I am*, and *am I*? If both of those live in one frozen state, you get either a loop that locks up or a flat contradiction. So you need a settled now and a next one that reopens it. Two jobs for time, minimum.

Come at it from somewhere else and you land in the same place. Any theory that wants to describe everything eventually has to include the one doing the describing [13]. Once it does, it has to account for both the throwing up of candidate descriptions and the settling on one of them. Exploring, then committing. Same two jobs.

I'd love to call that two independent derivations. It isn't, quite. Both start from a system modeling itself, and both were written by a man who already knew what answer he wanted. What I'll actually claim is smaller: the split isn't an artifact of how I set it up the first time, because it survived being set up a second way. That's a sanity check, not a confirmation. It's worth something, and it isn't worth what I first thought it was.

6. Naming the two. [PROPOSED]

Theta-Time is the one shared field of what's lawfully possible. The quantum state taken literally, as a real thing rather than a bookkeeping device. It's nonlocal by nature, and it doesn't care about anybody's local clock.

Gamma-Time is where possibility hardens into record, and there are many of them, one for every gravitational situation, each running at its own tempo [14].

One field of possibility. Many places where things get written down. The many-Gammas half is just step 1 restated, and it's measured. Taking Theta to be real is the interpretive bet, and it's the same bet anyone makes who thinks the wave function is a thing rather than a rumor.

7. Paying the no-go theorems up front. [PROPOSED, THEOREM-COMPLIANT]

Bell says you can't have local hidden processes [15]. Fine: Theta is nonlocal from the start, which is the same bill de Broglie and Bohm paid [16], and Bell's theorem allows that kind of account. Kochen and Specker say you can't have answers written down in advance waiting to be read off [17]. Also fine: what hardens depends on the whole arrangement it hardens in, settings included. Nothing was pre-written.

That second concession costs me my favorite image, and I'd rather say so than quietly keep using it. I've described superposition as motion blur, a shutter too slow for what it's photographing. The blur part survives. The photograph part doesn't. There's no crisp picture sitting behind the blur that a faster camera would catch, because there's nothing there before the exposure. What the metaphor still carries is a claim about *rate*: exploring outruns settling. It no longer carries a claim about a hidden original.

Which leaves me owing a distinction, since three different things are getting called the same thing. *Already decided* means the answer exists before the setup and independent of it. Kochen-Specker rules that out and I don't want it. *Indeterminate* means there's no fact of the matter even once the full setup is in place. *Unresolved* is neither. It's a claim about timing, not about hidden answers: the setup is part of what the hardening happens inside, and hardening takes time. The blur is that interval. What I can't yet tell you is whether the setup plus the history fixes which record you get, or only the odds. That's the debt in step 8, and until I pay it, "unresolved" means *not finished yet*, not *secretly already settled*.

8. The record is real. [POSTULATE, THE CENTRAL ONE]

In each Gamma there is one actual history of what happened. Not one branch among equals, not true-for-you, not true-relative-to-a-frame. One record, definite, full stop.

That's an addition to physics and I'm not going to pretend otherwise. It's the same kind of move Bohm made when he put particles back into the wave function [16], and for the same reason: unitary evolution plus decoherence, left to themselves, never produce one outcome, so anybody who wants one world has to say what the world is made of. Bohm said positions. I'm saying records, meaning stabilized phase structure sitting in a particular gravitational regime, in the family of what Bell called local beables [18].

What I owe along with that is a law: which candidate structure stabilizes, and with what probability. I don't have it. Bohm didn't have his either until the guidance equation showed up, and Everett's people are still arguing about theirs, which is a consolation but not an excuse.

And the Bohm comparison has a seam I should point at rather than lean on. Bohm's beables get pushed around by the wave function and he can write down how. In my version, what does the pushing isn't settled: it might be the record, it might be the gravitational arrangement doing the pacing. So the parallel holds for the move of adding ontology, and stops short of being the same machine. That repair is on the list, not done.

9. The universe kept records long before anything could read one. [COROLLARY]

Thirteen billion years of definite history happened with nobody watching. Which elements came out of which dead stars. The speckle in the microwave background. Rock laid down in order, bottom to top. If you think facts only become facts when something observes them, all of that needs a very long explanation. On my account it needs none, because it's where the story starts. Records first. Readers showed up at the last minute, and immediately started arguing about whether the records were there before they arrived.

10. Experience is what record-keeping feels like from the inside. [POSTULATE, STAKED ON FRUITFULNESS]

A system that has to keep reconciling fast possibility against its own slow record has to do that from somewhere. There's a place the reconciling happens, a center. That much is just structure, and I don't think it's controversial.

The next sentence is the one I'm betting on, and it is a bet, not a proof: that center isn't only there, it's *felt*. Experience is that reconciliation seen from inside [19]. Every theory of consciousness that doesn't simply deny the phenomenon makes a leap about this size somewhere. Mine has to earn its keep by what it buys, and what it buys is three things. Why being aware of yourself feels like a question you can't finish answering, since the loop can't close, which is the same reason Gödel gave for why no system that describes itself ever gets to the end of describing itself [20]. Why the present moment slips away when you reach for it, since the reaching happens in the exploring and the catching happens in the record. And why felt time has a direction at all.

One thing this does not do, and I want it on the record because the idea attracts the opposite reading like a magnet: the arrow runs physics first, feeling second, always. Stabilization happens everywhere, almost all of it with nobody home. Experience doesn't steer anything.

It's a seat with a view, not a hand on the wheel.

11. Two famous problems, one hole. [THE CLAIM ABOUT THE WHOLE]

The measurement problem asks what makes something a fact. The hard problem of consciousness [21] asks why there's anybody home to notice. For a century these have been filed in different buildings as two separate embarrassments.

My claim, the one the whole thing stands on, is that they're the same hole looked at from two sides. Possibility hardening into record, described from outside, is what a fact is. The same process, described from inside by something that has to keep doing it, is what a point of view is. One process, two ways of being described. That's the theory. The rest is scaffolding holding it up.

12. What I still owe. [THE DEBTS]

A law for the record, including where the Born rule comes from. The repair of the Bohm seam in step 8, which is where any decision about what the beable really is will have to land. And some independent fruit: a phenomenon this picture predicts or organizes that the competing pictures don't, because right now it explains and doesn't yet earn.

I also owe a proper accounting of the three neighbors I'm closest to. Whitehead had the two-phase shape of this a century ago, with no physical pacing and no way to stop it sliding into panpsychism. Penrose made gravity the maker of definiteness [22, 23] but paid for it with collapse, and the experiments are coming to collect on that [24]. The decoherence people own the actual mechanism [10] and decline, on principle, to say what a fact is. I've ended up in the corner those three leave open. That might be because it's a good corner. It might be because it's empty for a reason.

What I'm Not Claiming

No new forces. Nothing collapses. No prediction that differs from standard quantum mechanics, and I'm not apologizing for that, since Bohm, Everett, and relational quantum mechanics are all quiet in exactly the same way and all three changed the field anyway. Consciousness doesn't cause, choose, or collapse anything here. Time doesn't want, seek, or notice anything either, and if you catch me writing a sentence where it does, that's a draft I failed to clean up.

This is not a solution to the hard problem. It's a relocation of it, onto ground where I think it can be worked on. The Born rule isn't derived. The Bohm seam in step 8 is open and I don't know where the beable lives. The gravitational effect in step 4 is predicted and nobody has seen it. The edges of a Gamma are fuzzy, and I can't yet tell you exactly where one ends and the next begins.

I'm listing all of that because the list is the reason to take the rest seriously. If I were willing to hide these, you'd have no way of knowing what else I was hiding.

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