

## Thermal gravity and quantum collapse

Terry Bollinger  
2023-02-09.00:00 EST Thu  
*Email Excerpt*

Date: Sat, 4 Feb 2023 23:31:13 -0500  
Subject: "Thermal" gravity and quantum collapse

...

This week I switched to gravity as playing a major role in quantum collapse. I explain why, using way too many words, below. :)

Cheers,  
Terry Bollinger

-----  
Question: Does spacetime exist absent energy and matter to measure it?

Nah, not in SR. Also, not really in QFT once you factor out how humans blissfully ignore that every QFT formula begins and ends with a single frame, which means QFT has nothing to do with the utterly featureless Nothing of special relativity.

[ADDED NOTE: The Nothing of special relativity is, as an absolute minimum, a KNS 5.9 — a Kuhn "Nothing Scale" level 5.9 — but more likely a KNS 8. KNS 5 is where the awful QFT misinterpretation lives and explodes or collapses the universe with exquisite rapidity, so that's out. However, an argument could be made that some extremely minimal but cumulative version of pre-spacetime pair production exists in the SR vacuum as the root source of the mass-energy pathway where all the action is. So that's worth noting.

However, I think it's far more likely the SR vacuum Nothing shoots all the way up to KNS 8 — a nothing so complete that even abstractions mean, well... Nothing. That's because if spacetime is nothing more than human-brain-biased interpretations of exceptionally restrictive relationships between bottom-up, self-observing (think spin) mass and energy units, then *all* abstractions are captured in those mass-energy relations, *not* in the vacuum, which becomes nothing more than an abstraction within the mass-energy path.

There still must be a root, but it cannot be SR vacuum any more than the "space" of relative closeness of friends listed in your personal address book is the "source" of the *existence* of those friends [1]. An evolving sequence of Penrose self-rescaling universes of gradually increasing persistence and complexity, traces of which would still exist, e.g., inside of protons and neutrons, strike me as a far more plausible path for root source of pair production [2]. Arguments of that type suggest that the SR vacuum is an extraordinarily high level of Nothing, most likely KNS 8.

[1] T. Bollinger, *There Is No Vacuum, Only Energy Relations*, Apabistia Notes (2022).  
<https://sarxiv.org/apa.2022-09-09.1740.pdf> ]

[2] T. Bollinger, *On Quantizing General Relativity: An Overview*, Apabistia Notes (2022)..  
<https://sarxiv.org/apa.2022-04-21.1039.pdf> ]

Once you stop grandfathering in Faraday's pre-quantum assumption that empty space has an infinite number of infinitely precise and thus infinitely energetic information points in it (all for free, whee!), things get a lot simpler. You get a finite universe with a finite internal computational capacity, one that it uses much more effectively than we use ours.

Lately, I've taken the calling this the taffy-pull model of the universe. You only have so much taffy, so it gets stretched. Everything between taffy strands, at all scales, is true Nothing. If you stretch your taffy too thin, it snaps and spaghettifies, leaving you with things like filaments of galaxies and cosmic voids.

Ah, but there's GR! How can one curve spacetime if spacetime is not a thing all by itself?

Simple: You curve the relationships between the things we call particles, creating a fabric at the macro scale that looks a whole lot like smooth, featureless space-time. However, when examined up close, it becomes much more like molecules of air in thermal equilibrium. Gravity is like temperature: An averaging effect.

After talking to someone this week about low-res, deep-Nothing, taffy-pull universes, I was struck by how I sounded like I was talking about the Roger Penrose idea of gravity causing quantum wave collapse.

After all, smooth, featureless space-time is pretty boring stuff, and not an obvious candidate for impacting quantum-scale events. However, the moment you make gravity into a thermal equilibrium that only approximates smooth spacetime at large scales, you also can't help but introduce a form of thermal noise into the less-than-smooth particle interconnections that it creates.

Surprise, surprise: That noise would arrive via ordinary gravity, which in a taffy-pull universe becomes a set of direct relationships between very large numbers of particles. No intermediate spacetime is needed, in some level of thermal-like noise at the finer levels of granularity becomes unavoidable.

I should emphasize that all of this is at the ordinary particle scales, not "Planck" scales. Planck foam is just one more of far too many examples of non-physics-based, faith-first mathematical elaboration of Faraday's pre-quantum field assumption. Thermal gravity thus would be a lot more like ordinary thermodynamics than anything exotic and impossibly energetic.

In any case, what I'm leaning toward at the moment is more like a supersaturated solution than a direct cause. The thermal gravity field would be there waiting to provide a random answer, but it would take something a bit more specific, like a photon of energy passing by, to trigger it into a collapse.

As I've noted before, in various places, collapse and "observation" are nothing more than momentum pair creation. Both entities accelerate and thus observe each other, duh, this is not hard! Seriously, why else would two atoms stick together if they weren't observing each other constantly? They should just drift off into quantum oblivion. They don't because they constantly exchange momentum through their bonding.

That makes bottom-up mutual observation the most common physics operation in the universe and the starting point for causal reality. We get that messed up because linear momentum doesn't quantize like angular momentum, so it can get incredibly thin while still observing absolute conservation.

Anyway, I'm not trying to convince you, but I am officially declaring I'm a lot more convinced of the validity of the gravity-and-quantum collapse idea this week than I was last week. Hmm.

I'll post some version of this email on my sarxiv dot org slash apa site this week, but not until after I get a fun little draft paper on temporal tachyon waves in moving objects out first.

[ADDED NOTE: At the time of posting this, I haven't posted the tachyon draft. Rather than expanding in detail on the math, parts of which I've already posted [3], I'm trying for a easy-to-read train example with superluminal flashing smartphones — sort of an update on Einstein's lovely trains-and-lighting no-simultaneity example, with twists.

[3] T. Bollinger, *Formulas and Google Equations for Converting SR Velocity Factors*, Apabistia Notes (2023). <https://sarxiv.org/apa.2023-02-08.2230.pdf> ]

Cheers again,  
Terry Bollinger  
(debugger and occasional taffy-puller)

-----  
Terry Bollinger [CC BY 4.0](#)  
2023-02-09.00.00 EST Thu  
PDF: <https://sarxiv.org/apa.2023-02-09.0000.pdf>