Physics Needs to Switch to Power-Law Sparse-Matrix Spacetime

Terry Bollinger
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https://youtu.be/51NdbR52dN4&lc=Ugz_EvbN00-ZAZQw4CV4AaABAg

A Comment on the Closer To Truth YouTube post:
Raymond Tallis - Setting Time Aright (Jun 3, 2023)
https://youtu.be/51NdbR52dN4?t=3m45s

3:45 RLK: *"[Physicists use] four [space and time] coordinates [to] identify [every] event [uniquely]."* RT: *"But what [physicists have] done [is] strip [time] … to make it manageable."* It's *much* worse than that.

The assumption that our universe's vacuum necessarily creates an infinite numberr of four-coordinate spacetime locations is logically unnecessary and leads directly to the vacuum density problem. Computer science explains why.

Driven by the need to make the best possible use of finite time and energy resources, computer science invented *sparse matrix* approaches to large-data problems. A sparse matrix represents data relationships to give the illusion of infinite space without requiring its complete instantiation.

Whether used in data storage or network connections, such sparse strategies rely on a power law approach that takes advantage of multiple levels of clustering. For example, such strategies permit relatively small numbers of carefully arranged phone lines to project the illusion that everyone has a direct and permanent connection to everyone else over some gigantic, fully-wired space.

Similarly, a sparse matrix uses tricks of power law relations to create the illusion that a compact storage method containing only a few data items appears scattered here and there throughout some truly enormous and mostly empty space. In the case of our vast universe, this would become a scattering not, exactly, of data but of mass and energy points that *look* as though they reside in a vast and perfectly structured empty space.

Only an exceptionally inexperienced and naïve programmer would pre-allocate an *entire* storage space before adding sparse data. A good programmer would instead create sophisticated relationships using orders of magnitudes-of-orders fewer resources while retaining the structural *appearance* of an infinitely large but mostly empty matrix.

The vacuum density problem provides an example of such naïve programming. Just as building infinitely large storage arrays to hold nothing more than a few bits of data would collapse under its power requirements, creating a vacuum that insists upon using the most naïve, non-power-law matrix representation necessarily collapses literally under its own weight.

The fact that power laws exist at every level of the physical universe suggests they reflect its deeper structure. Instead of a naïve and grotesquely inefficient direct implementation of an xyzt-like structure, such naturally occurring power laws imply the existence of a deeper, more sophisticated set of rules that only emulates, with variable precision, the *illusion* of xyzt space.

Conversely, when mathematicians and physicists accept full implementations of xyzt spaces as “obvious” givens, that’s mostly the neural wiring of our space-and-time optimized brains talking. Just as the direct-connect model of how to call someone on the other side of the world provides our brains with an easy way to navigate a complex multi-scale network, the xyzt location model provides our brains with an easy way to navigate regions of the universe that are sufficiently local, slow-moving, and persistent for it to work. However, the results of any number of physics experiments at scales below (quantum) or above (the relativities) human scales emphatically tell us that this view is a convenient approximation with limited applicability.

It's a new millennium, so can we please stop assuming the universe *must* use the antiquated, resource-oblivious, and infinitesimal-obsessed maths of the 1700s? If nothing else, we might stop collapsing the universe every time someone calculates the vacuum density. We might also figure out why such perfectly classical spacetimes fail miserably both below, at the level of quantum mechanics, and above, at the level of the relativities.

4:48 RLK: *“[Physicists] recognize an order but no tensing.”* RT: … *“Indeed, and that order depends on the inertial framework from which you’re looking … so [events] can be reversed. [Thus physicists reason] there’s nothing ‘past’ about something in relation to anything else, and so on. All of that is fine.”*

No, it is *not* fine! The century-old schtick about how changing one’s frame of reference “changes” the way you dip into causal time ignores three points:

(1) All new frames are *created* in highly energetic events that occur *only* for the matter *launched* into that new frame. These events are asymmetric, affecting only the matter launched. It also locks them into some “pre-launch” causal past that powerfully constrains how they can affect causality after launch.

(2) Good old speed-of-light limits greatly limit how such “new” frames impact the rest of the universe. For example, accelerating a spaceship only *locally* changes how entities see and interpret time through the photons it sees arriving from the rest of the universe. The universe cares no more about how the ship “sees” time relativistically than it would if its occupants instead froze themselves solid. Special relativity *truly* belongs to each observer since each observer necessarily *creates* their own limited, local-only definition of space and time.

(3) The most presumptuous and, for this topic, the most critically important assumption is the one least often questioned: What is an object? In special relativity, the *only* measurements possible are not between *objects,* but between *events* — local-only interactions that generate *information*, which becomes the bottom-up basis for history.

The concept of “object-ness” is a heuristic that only applies if some sequence of events expressed sufficient cohesiveness and repetition to acquire an “object-like” designation. These clusters then become the basis by which power laws emerge at every level. But no matter how well they cohere and repeat, the *separations* between “objects” is always a matter of separation between two *events.*

In some ways, this hardly seems radical since, for example, a space traveler *knows* that the world they see before them cannot be the same one they arrive at.

However, in other ways, the idea of events-only distances becomes highly unsettling in ways that early quantum and relativity founders could not quite grasp. Why did Einstein never complete his thought problem about asynchronous lightning flashes and moving trains by giving the *equation* (it’s $\alpha=-\beta\gamma/c$) for how simultaneity changes for a given length and velocity?

The answer is that none of the founding fathers could quite grasp that *even their minds and bodies might not occupy a single moment in time.* It has to be true since even Einstein’s train-and-lightning experiment precisely implies this for anyone on the train. Yet he never finished his thought problem, drifting off into somewhat mystical musings that steered folks away from the simple maths for a century.

8:08 RT: … *“The fact that physics works so well [does not mean it] has ... a monopoly on truth.”*

This presumption derives from focusing too much on local, human-scale physics. Classical maths work extraordinarily well for us because we live in an exceptionally dense single-frame region that allows the xyzt space matrix approximation to work with exquisite precision. If you remove such models from this special setting you get disasters like quantum field theory.

Why does the same QFT theory that makes such exquisitely accurate predictions about the behaviors of frame-locked electrons in a matter-dense laboratory fail so spectacularly when applied to the vastness of intergalactic space, causing the entire universe to collapse? It’s because the densely-filled space matrix of a lab on Earth *does not exist* in intergalactic space. That’s not how spacetime is structured, as the power laws of the universe keep trying to tell us.

We need to listen better to the universe and philosophers such as Raymond Tallis. We also need mathematical thinking that is more aware of — and less dependent on — what our fast-response-optimized brains say *sounds* “simple” and “right.”