

Why the Planck Scale is Irrelevant

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<https://youtu.be/SN8nTQiWOYY&lc=Ugzj404SErQEUdaJQWR4AaABAq>

A Comment on the PBS Space Time (Matt O'Dowd) post:

Are Space And Time Real? (Feb 23, 2023)

<https://youtu.be/SN8nTQiWOYY>

16:11 "... general relativity breaks down on very small scales ... [so] it's meaningless to define durations shorter than the Planck time." The biology equivalent is: "protein synthesis breaks down in large nuclear explosions, so it's meaningless to define DNA transcription below the level of the forces that bind protons and neutrons in nuclei."

Both assertions are true, but does either one mean anything?

As proposed in Einstein's 1905 papers, time was a gentle beast: the ticking of a clock. If one accepts, as Einstein did in 1905, that non-abstract time is *defined* by such clock-tick cycles, then the shortest time scales available to most of the universe have nothing to do with the Planck scale and everything to do with quantum mechanics since it is the latter that determines a system's shortest experimentally detectable cycle time.

At present, the shortest quantum cycle time ever observed was set by the oscillation frequency required to explain double-slit interference in molecules with over 2000 carbon atoms worth of mass. For most phenomena, that level of clock precision is unlikely and unnecessary. Quantum mechanics, in combination with bonding, defines the highest clock frequencies needed for everyday physics. That frequency varies by the situation but is typically vastly lower than in the complex molecule interference experiment. The lack of visible quantum interference in most classical systems demonstrates the irrelevance of extreme clock rates. One could define the boundary between the quantum and classical worlds by this casual brushing-off of the need for exceptional clock frequencies.

One can, of course, argue that only the most extreme limits of physics can tell us more about the deep definition of time in the universe. However, to take that approach, one must ask how a fellow named Einstein gained such remarkable insights by fretting about nothing more than the mechanical clocks of his era. Just lucky, perhaps?

QFT describes the universe as an exquisitely balanced pairing of nearly infinite negative and positive energies that happen, somehow and someday, cryptically and inexplicably, to cancel each other out just enough to give our almost-flat space. With such horrifyingly high energies in constant conflict, the Planck scale *must* be where the real game plays out. QED!

Even if one accepts the notoriously absurd QFT vacuum density prediction as anything more than a subtle math error, there's another problem: QFT is frame dependent and thus aether-like, making it irrelevant to understanding the utterly featureless vacuum of Einstein's 1905 special relativity.

Think about a Feynman diagram, which provides an excellent visual model of the QED subset of QFT. It begins with an assumed set of particles and potentials and ends with a probability prediction for use in a detector. Where did those beginning states and ending detectors come from? They are certainly not part of Einstein's featureless 1905 vacuum. They come from the laboratory of an *assumed* observer, that is, some specific frame of reference.

Recognizing that QED and QFT maths always begin and end with finite, frame-dependent collections of matter and energy puts a very different spin on the nearly infinite number of quantum vibration modes that energy-indifferent maths say could occur in between. If even one mode in one location requires more energy than exists going in or coming out, *that mode does not exist* and thus should not enter into the calculation.

Similarly, if you partition the entire QFT space into regions, the vibration modes "funded" in these regions must still add up to the starting and ending energies. The variety of modes possible in any one region stays vast. The difference is that a zero-sum game now limits the contribution of each mode to each region, with smaller, more intense peaks in one region resulting in lower energy budgets for other regions.

Despite QFT's current lack of explanation for why the universe does not explode or collapse, observable reality keeps the total mass and energy within a QFT region finite and entirely determined by how much mass and energy goes in and out of that region. This concept, better known as the conservation of mass and energy, somehow got lost in the lattice math.

My point is this: While it's encouraging that physicists [\[1\]](#) are returning to Einstein's 1905 focus on experimentally meaningful definitions of space and time, this new path will, in time, veer back to the same pointless peat-bog of experimentally unencumbered paper production if it does not also explicitly discard the relation-incinerating impacts of Planck overshoot thinking. Recognizing that ordinary classical physics fully demonstrates the emergence of space and time is the only path that restarts Einstein's 1905 insights and leads theoretical physics out of half a century of math-first, physics-never wandering.

The first step in re-analyzing everyday spacetime is to eliminate reflexive xyzt thinking, which is inherently hyperclassical and leads to all sorts of math noises, e.g., Planck foam, that have no more to do with how ordinary time works than nuclear explosions have to do with mRNA transcription.

[1] Feynman also merits inclusion in relationist circles since his fields emerged only by summing all possible histories of *direct* particle interactions.

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PDF: <https://sarxiv.org/apa.2023-02-26.0018.pdf>