

Frames of Reference

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© May 18, 2023

Abstract

A frame of reference can be defined as a system of geometric axes in relation to which measurements of size, position, or motion can be made. It is also defined as a set of criteria or stated values in relation to which measurements or judgments can be made, typically a cultural or religious reference frame. Common usage can blend and confuse both types of reference frames when cultural definitions influence how the first definition is perceived.

War criminals love to frame themselves as patriotic victims of criminal invaders when in fact they alone are now the aggressors. Putin, for example, uses rhetoric from the anti-Hitler reference frame of WWII to cast his own invaders as victims of Neo-Nazi Ukrainians.

It is easy for average thinkers to misconceive how all frame types work. Intellectual laziness affects all of us to some degree, including [some physicists who should know better](#) in their field. There is a very elegant escape from confusing reference-frames: logic and clear thinking. Every fine thought has musical qualities.

Newton employed in the 17th century 3D frames of reference for much of his physics, with fourth-dimensional acceleration less prominent. Einstein and some others over a century ago added

seriously relativistic fourth frames of angular wave momentum within branes of photonic time, thus yielding General Relativity's *spacetime*, an absurd but clever idea that still infects cosmology.

Einstein's contemporaries did not incorporate into their *as-if* "rubber-sheets" brane paradigms the *variety of all potential, and unseen, frames-of-reference vectors* we may encounter in both culture and physics. Nevertheless, even their simple vector maths could be used to *correlatively suggest*, when properly envisioned, seemingly infinite multiversal frames of reference.

Einstein built his Special and General Relativities on a simple model of "frames of reference." Even though he thought of no limits to spacetime frames, his seductive models relied on an "observer" at any initial point of acceleration. "Observer" status along any accelerating vector is explained in terms of the initial frame of reference, helping to simplify the fancy math. Observer is not necessarily a person, but it could be. It is easier for most laypeople to embrace cartoons with one human observing – than to envision a blizzard of moving, omnidirectional, sub-Planck dimensional "points of reference," each with its unique push/shadow frame.

Let us consider the origin of a "particle" photon, or even a photonic electromagnetic (EM) wave. Conventional physics does not explain just [how photonic "c" achieves its terminal vacuum velocity](#), only that it precisely does. I clearly explained the yin/yang mechanism some years ago. Furthermore, antique models of early-20th-century physics persist in key areas of astrophysics, due to the ease of designing *reverse-engineered math models* seemingly correlating data that cannot be causally explained.

Without any viable theory of everything (TOE) there persists a strange dissonance between detectable macro-dimensions and elusive sub-Planck (10^{-35} m, or smaller) physics. No confusion is necessary, as I have repeatedly explained in multiple essays. Negentropy (order) in all linear dimensions is elegantly eternal and unified, not a palette of possible physics flavors. Elegant

discussion does not need [psychedelic math models](#) hosting some 10^{500} string-theory (M-theory) 2D universes.

Consider the idea of *superluminal travel*. Photons can only achieve a certain initial speed in vacuums, as measured from their initial frame of existence. Their unique births establish their original frames of reference with axes x , y , and z all at the reference point's spatiotemporal zero. Then we factor what happens to the new photon/wave after the *extremely brief time* it takes to accelerate from its base to its maximum momentum.

The time a photonic particle wave takes to accelerate from its original yin/yang base to its terminal velocity can be expressed with one of the two most famous physics formulas. The most elegant formula, it could be argued, is Newton's $F=ma$ (or force equals mass times acceleration).

Famous formula #2 is Einstein's iconic $E=mc^2$. Both maths express the unity of matter and energy, with room for EM waves. Some quantum field physicists insist that an electron is just a disturbance with particular aspects in universal spacetime, and thus not needing mass. If so, then massless photons herein would absurdly have no force or energy, contradicting both Newtonian and Einsteinian physics.

A [proper causation needs more than a specious correlation](#) of what is happening, even if unknown. We therefore should rewrite $E=mc^2$, into $E=mc^2/AT$. The newly corrected formula does not contradict the original, only clarifies how the actual speed of light needs some time to achieve its terminal momentum. In this case $AT=acceleration\ time\ to\ achieve\ terminal\ momentum$.

Without some delay from zero to "c" within a frame, there would need to be an infinite force to instantly launch each simple photon wave of any frequency. Infinite force is more than even a big bang has, or all of them in total. If entangled quantum-level photon chains have no mass at all (defying the fundamental unity of mass and energy), then any terminal velocity without limits

could be achieved in zero time with minimal energy. Massless models still do not explain how and why "c" has its specific terminal velocity. Fortunately, I found the elegant answer to that bedrock mystery six years ago, as linked on page 2 above:

I explained how EM 3D photon chains of various frequencies are created and centrifugally launched, and why there is a precise acceleration rate/time with the available force energy to achieve always equal initial terminal vacuum velocity. This simple force-and-mass mechanism points toward a causal clarification for core foundations of physics, from sub-Planck up to huge cosmological dimensions. It opens the door for a fertile reconciliation between the standard model of particle physics, and models of quantum randomness and supersymmetry.

Consider how "c" is a singular acceleration limit, which was cleverly discovered in the 19th century. Einstein developed this one data point for each photon into his theories. Primarily, it was determined that the vacuum speed of light is similar everywhere. When a photon's original source is identified as that photon's original frame of reference this model is easy. When we correctly add in all the ubiquitous 4D frames associated with all the many photonic 3D strings everywhere, then the "observer mind game" transforms.

Our local visible universe is the dynamic product of our local big bang, improperly called THE Big Bang. There are a large and forever unknowable number of juxtaposed local 4D universes within the multiversal community, each with a finite life span. Bubble-like local universes pop in and out of existence roughly similar to what happens inside a bubble bath. Each birth-to-expiration universal cycle takes many billions of years, not the few seconds among soapy bathtub denizens.

An interesting similarity is how both local universes and bath bubbles leave a *local void* that is filled by expanding juxtaposed matter. This improved model thus generally answers the question of what was "here" before our local big bang.

We live inside the 4D multiverse, which is the real universe of universes. Critical to our local universe's push/shadow gravity is the omnidirectional, inter-universal flow of extremely small 3D yin/yang particles and strings, most of which we can call *dark matter* elements. These are quantitatively and qualitatively very different in size, mass, and EM characteristics from the crude billiard-balls model that Fatio proposed during Newton's time in the 17th century.

The reference frame for all frames is therefore the multiverse itself. Some would say it should be a "god," but that idea opens the door to asking about the scientific origin and nature of any discrete god or gods. It is best to equate ideas of god to the *negentropic "creative god essence"* in the total multiverse. Only at this level does the so-called Second Law of Thermodynamics fail. At the multiversal level negentropy dialectically persists as creation among *entropic (chaotic)* dissipation.

Our species is an ephemeral aspect of this unique blue planet's biosphere. Unanticipated global biosphere damages from our *hyperkeystone* cultural lust for easy energy will persist for many centuries after we are gone. Each photon in contrast is virtually immortal in the sense that its energy does not perish, but can be transformed. The full multiversal mass is unknown, since we have no way to know the full size and origin of the universe of universes; but in any sense the number of possible photonic multiversal frames of reference is beyond huge.

Next, let's discuss the concept of *hyperluminal speed*. For Einstein's simple equation of $E=mc^2$ to not clearly account for time of acceleration we either guess why, or ignore it at our peril when we model photons as mere massless waves. Instantaneous acceleration (assuming available infinite energy) of any rest mass leads toward infinite kinetic mass, which is impossible. If the mass of a single yin/yang, sub-Planck dimension particle with a tiny amount of rest mass were accelerated instantly in zero time to any momentum, then that particle would absurdly have infinite kinetic mass, or simply more mass than the 4D multiverse itself.

[Note that each tiny yin/yang fundamental particle is about 10^{-37} m in size, or one linear dimension smaller. It is shaped spherically, which is nature's most efficient shape, but it can temporarily elongate under certain conditions. Even though it has a dynamic *dipolar EM* interior – and can also express *primary EM* embracing both poles – its “shell” is virtual, unlike that of a bird's egg. Each sphere is held together by Coulombic force.]

Today's big physics is somewhat reliant on the Large Hadron Collider in Europe. That equipment [has approached its discovery limits](#), so that making another one even more powerful will not qualitatively help. This limit is because there is only so much energy available to accelerate elementary particles from a single launch point. The problem with all such machines is that there is only one frame of reference for an accelerating gun that is stuck on Earth inside the collider – which brings about the increasing mass problem described in 1905's Special Relativity.

Consider the idea of a spaceship with internal nuclear energy pulses going hyperluminal relative to Earth. In this case each sequential pulse has its own reference frame. Assuming there is a sufficient energy source, there could be achieved incremental acceleration away from the Earth's first frame of reference, to where the space ship is going away faster than any continuous light link between it and Earth. For this spacecraft's denizens, light links with the Earth would, after a sufficient number of incremental pulses, shift toward the extreme red, and eventually disappear.

The cosmic microwave background suggests, but does not prove this model. Two thoughts apply: *First*, both the earliest post-BB photons and our Earthly photons can be traced back to our similar primal universal reference frames, so this relationship we see is subluminal. *Second*, beyond the visible cosmic microwave background is more accelerating photonic mass away from our increasingly distal universal mass toward other more proximal push/shadow masses, all via the *real dark energy* which is really another aspect of universal push/shadow gravities.

The expanding local universe is likely much larger (but NOT infinitely larger) than our local visible universe. Within our local universe's case, hyperluminality is associated with the big bang's pre-photonic energy burst (with "c" photons forming thereafter). Today's not visible portion of our local universe could thus persist within one primal hyperluminal cosmic frame of reference.

In sum, the *real relativity* idea of "frames of reference" is very much more fertile than the quaint *Relativity* models that Einstein promoted over a hundred years ago. I don't blame him for limiting his mathematical theory. It is impossible to calculate and correlate his physics model with the vast number of individual photonic frames of reference within the real 4D multiverse.

Einstein's clever correlating model was *so seductive* that today most cosmologists faithfully follow early 20th-century cosmology; and quantum theorists are confused too. There is no theoretical synthesis, but there could be. A case could thereby be made that Einstein is today's Ptolemy. Ptolemy's Roman model lasted 1,200 years. Einstein's model should last about 120 years.