A barycenter or an expansion of space?

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All galaxies in the universe appear to be moving away from us, and the *measure* of the rate at which galaxies move away from us is not dependent on direction, making it seem as though we are at the spatial center of the universe.

In the "expansion of space" model of the universe, for which spacetime (traditionally) provides the framework, the universe has no actual spatial or gravitational center, and the Big Bang wasn't an explosion from a single point in space, rather an expansion of space itself (popularly – spacetime itself).

What does the above expansion of space mean? It involves another dimension and a mathematical model that is impossible to visualize – unless we subtract one dimension, creating a two-dimensional membrane of space as a replacement for our three-dimensional experience.

That type of Big Bang is an anchor for totality in any case – just as we have with a Big Bang at the barycenter (gravitational center) of a universe that is three-dimensional and Euclidean.

If one holds to the "expansion of space" model – whether finite or infinite universe – with no center, one can and should, all the same, recognize that the vector components representative of momentum in the broadest (mattergy) sense would sum to zero. That still leaves one with an absolute frame of reference which provides a baseline for motion.

There is an "ether" in that sense, providing us with standards for our clocks and rods. This, Einstein himself made abundantly clear at Leyden in 1920.

See: Einstein at Leyden

Finite or infinite universe?

The notion of a universe of infinite mass or scale would seem to be absurd, since mass and spatial dimensions seem to have meaning only with comparative context. An infinite universe provides no maximum for spatiality or mass (or energy). In contrast, an object's speed is a percentage of light-speed. Doesn't the mass of an object need to be a percentage of the total energy and mass of a finite universe?

One possibility to consider is a universe of infinite energy and mass, but with a finite portion that is within a (conceived of) cosmic event horizon, which constitutes the "totality" that imparts our inertial properties.

Also: energy and matter seem to exist simply as mathematical relationships, and math is definitely infinite. We'll never get to the bottom of it. Fine with me.

With a non-spactime approach to relativity and cosmology, one can – just as with the spacetime approach – regard the universe as either infinite or finite (or both, as described two paragraphs ago). We can consider a Euclidean, three-dimensional, universe of finite energy and mass, with cycles of expansion and contraction (the Big Crunch), and with a barycenter from which the Big Bang originated within the three-dimensional geometry.

If the speed – in absolute terms – at which a galaxy is receding has a certain linear relationship to its absolute distance from the barycenter, we could perceive ourselves to be at the spatial center of the universe.

It would work in conjunction with the fact that an observer at or near the edge of a finite universe would have all or nearly all gravitational source on one side of him, causing a bending of his line of sight into the interior of the universe. He could not peer out into the void.

For ease of visualization, I stick with a finite universe and a barycenter whenever I talk about the universe serving as the absolute frame of reference – the judge of the matter regarding motion.

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The status quo position among physicists is that there is no meaning to be attached to a person being the de facto traveler in relation to totality, as they claim that it is just as meaningful to consider that totality does the traveling in relation to a stationary person.

To adopt any other position would be to admit to an absolute frame of reference as an explanation for the effects of special relativity. They can't bear the thought.

But reunited clocks do show a disparity in their recorded time. And only one clock can run slower than the other.

The position to which these physicists hold dictates that a clock that is moving in relation to the universe can run both faster and slower than a clock that is at rest with the universe.

A classic example is Martin Gardner's “there is no truth of the matter” in his book on relativity, which sold more copies than any other book written on the subject. In fact, he specifies the exact double scenario as laid out four paragraphs ago as a means to illustrate his claim of “no truth of the matter” regarding motion.

Of course, he left out the part about a clock being able to record both more and less total time than another clock over the course of a given interval.

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Strict relativists reject any sort of absolute frame of reference, as it seems to them that such frame of reference is incompatible with symmetry of measure. They are conflating "symmetry of measure" with "no truth of the matter". Or they will simply claim that an absolute frame of reference is somehow ad hoc – in a reality-upside-down take on the matter.

Many also reject the notion that totality is the imparter of clock-functioning and length by noting that matter is not evenly distributed throughout the universe.

Imagine that. Two clocks traveling at plainly different speeds relative to totality (a clock on the surface of the earth and a clock on a satellite) have kinematical clock-rates that are different from each other, yet have not been imparted their kinematical clock-rates by totality?

Yet, it seems most relativists do acknowledge that mass is imparted by totality, as they try to have it both ways.

And light doesn't need a universe of uniformly distributed matter in order to uniformly communicate the adjustment of inertial properties. Light keeps track of all things by virtue of its absolute nature. Its awareness encompasses the cosmos.

In fact, one can actually regard unaltered light (actually, energy) itself to be the absolute frame of reference for inertial motion, and, therefore, for clock-rates.

Specifically, when one considers that energy and matter can be converted to each other, one might consider that matter is what is separated out from the absolute and all-encompassing reality – light (or energy). That is, something must be less than light in order to exist as an object of mass. Without mass, you are simply absorbed back into light.

Secretly, I suspect that all "elementary" particles are composed of massless particles. Others have theorized that as well.

In my view, this means that what we call matter is multi-directed (actually directionless) energy (massless points) in a particular region – such as in an atom.

In fact, the relationship between directionless energy in an atom and kinetic (uni-directional) energy is key to understanding $E=mc^2$ when developing that equation in absolute terms, which I have done.

The current standard model of quantum physics runs contrary to the theory of massless particles as the constituent parts of "elementary" particles – though that does not fundamentally change the understanding $E=mc^2$ in absolute terms.

Again, why do relativists regard mass as an inertial property, but not include clock functioning and length as inertial properties?

Specifically:

How is it they recognize that gravitational fields are established at the speed of light (massless theoretical gravitons), but don't recognize that clock-functioning and length are dependent on the speed of light?

From where do they think inertial properties come?

All inertial properties come from totality (or from energy, as I see it), just as does gravitational mass. Gravitational mass and inertial mass are equivalent. They both necessarily depend on totality for the definition of their magnitude.

It is remarkable that relativists recognize the structure of space in the context of general relativity, but not in the context of special relativity, with its purely inertial motion considerations.

From where do they think the structure of space comes? It is inseparable from the energy and matter that constitute totality (or the totality within a conceivable cosmic event horizon).

Mach nevers goes away.

See sitemap for my other articles:

Symmetry of measure – Journal article preprint

Fallacy of strict relativism – in relativity

Replacing Einstein's postulates

Einstein at Leyden – Standards for clocks and rods

Spacetime curvature - Why it works in GR

Computing GR and SR time-keeping dilation – with discussion

Spacetime – is a mathematical construct

Twins paradox animation – and simple equation

Citation and annotation for the book *Relativity Trail*