

General Relativity For Teletubbies

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Geometry & Relativity

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The “Geometry” of Space-Time is a virtual mathematical, behavioural model to account for observations on an “as-if” basis.

The Geometry” of Space-Time cannot and does not physically explain any physical mechanism for the behaviour of physical objects.

Geometry

Geometry is a branch of mathematics, not physics

<https://en.wikipedia.org/wiki/Geometry>

Geometry does not contain any physical facts whatsoever, however it may be used describe physical facts.

Geometry is based and defined on arithmetic and logic. *Physical reality forms no part of geometry.* It's an "all in the mind" endeavour, by definition.

For example, geometry, defines a triangle, purely mathematically. *Whether or not a triangle physically exists in the universe is not relevant, or even if a straight line physically exists.* Thus if one observes a physical object with the properties of a triangle, geometry cannot possible be an explanation for the triangle's existence itself or that it has those specific properties attributed to triangles. Geometry can only *describe* the properties that such a discovered object has, when it is discovered, *if it satisfies the axioms of geometry.*

*This is the root cause of the **false** statements such as phrases:*

"The Geometry of Space-Time explains why clocks taken on round trips read different from the reference clock".

The word "geometry" has been hijacked, then used in a manner that gives an incorrect meaning to the situation. There is a conflation of geometric properties with physical properties. Physical properties requires physical measurements and real physical objects, geometric properties do not.

This can be summarised by:

If a physical measurement is required to determine a property, that property is not a geometric property (geometric fact), it is only a property that may be describable by geometry.

Without real objects, such as clocks and rulers, geometry has no meaning in a real physical universe. Geometry is a virtual concept. Objects in the physical world have to exist that satisfy the axioms of geometry. That is not a-prior, a fact.

Physical Reality

Physical Objects

A physical object is an observation attributed to an entity, that in principle, would make the needle of a dial move its position from that which it would not have been in

Space

Space is the concept that is used to account for the fact that ***real physical, measurable objects do not all merge into one object.*** It expresses the fact that ***there are discrete, separate objects that can be identified from other objects.*** *Without individual physical objects, space does not exist.* That is, "space" is how *separation* of physical objects is accounted for.

Time

Time is the concept that is used to account for the fact that ***real physical, separate measurable objects change their state such as position and momentum.*** If no individual mass-energy objects changes their state, including the quantum vacuum, time does not exist. That is, "time" is how *change* of a physical object's state is accounted for.

Laws Of Physics

The notion of physical objects, space and time, result in an inherent circularity of their definitions. This is unavoidable. Objects are required to define whether other objects exist.

This circularity and identification of objects, time and space, mandate that the laws of physics are strictly only relational.

That is, *laws of physics are strictly due to the result of interactions of objects and therefore cannot exist in an empty universe.*

An empty universe has no mechanism for which statements such as:

$$E = mc^2$$

can be made.

Such a relation is simply meaningless when there is no actual mass that can travel from point A to point B to give meaning to “c”. *An empty universe knows nothing.*

This trivially obvious fact is not understood by many professionals, and forms the basis as to astounding nonsensical claims that “geometry explains physical behaviour”.

There is a relentless search by many professionals to discover global laws of physics describing behaviour of physical objects, with the viewpoint that such laws exist independently of those physical objects.

Such ideas are truly those of a crackpot. It’s a belief in magic and gods.

MF Of An ASSUMPTION

In an empty universe, there are no straight lines.

In an empty universe, there are no properties at all.

The almost universal inability of professionals to not understand these statements and distinguish virtual mathematical concepts from actual physics, has resulting in the most stunning denial of reality.

For geometry to have physical meaning in an empty universe the line:

$$Y = mX + C$$

Must be able to define all the points X_i , Y_i along the line. This cannot be done. There is no way to locate any points in an empty universe.

There is an inherent, yet astoundingly ignored *assumption that virtual geometric straight lines are the default position in a “real” empty universe*. This is false. Geometry has no meaning in an empty universe. Meaning can only be attributed to geometric concepts when there are physical objects to do so. Its only physical objects that can define paths that physical objects can traverse.

<https://www.youtube.com/watch?v=oqrO1RtN4gA> – Under Siege 2 - “Did you see the body?”

Speed Of Light

The fundamental assumption of Special Relativity is that *the Speed of Light (SOL) is an invariant c , in a vacuum*, where by assumption *the vacuum is referring to a completely empty universe*.

However, this is impossible. There is no way to assign speed, distance and time in an empty universe, other than magic.

If the assumption that the vacuum is that it is not truly empty, then the claim that Special Relativity is simply geometry and coordinate transforms is false, it would be the physical objects giving meaning to the SOL.

That is, Laws of Physics, such as the invariance of speed of light, can only exist by its physical relation to other physical objects.

Thus, the apparent measured fact that the speed of light in the apparent vacuum is an apparent invariant, requires that the vacuum is not empty, and that it is the physical objects in the vacuum that is the cause of the apparent invariance in the speed of light.

In 1905, this physical state of the vacuum was called an Ether. It was considered equivalently to the workings of cogs, gears pulleys and levels.

Since the 1930s this physical state of the vacuum is called a “Quantum Field” from QFT. It’s much more complicated than cogs and wheels, but is nevertheless, an Ether.

It is only a physical background that can give meaning to the points X_i , Y_i along a line, and what “line” actually means.

The depths that which such hidden assumptions are made to erroneously support the Special Relativity worldview of the Lorentz Transform is illustrated here:

Axiomatic Derivation Of Special Relativity

A “State of the Art” axiomatic, geometric, derivation of Special Relativity is given here:

[Axiomatic SR](#)

Its fatal flaw is that it inherently *assumes that the vacuum is empty*, but that that vacuum *still* has properties such as X & T, because experimentally in our universe the axioms appear to be an accurate account of observations. The analysis fails to understand that *our universe is not empty thus there is no observational basis for the claim that an empty universe can have properties such as X & T*.

It assumes that which it is claiming to dispense with. That is, it assumes from the outset that an empty universe can have properties, then does a tour-de-force to show that such properties lead to the Lorentz Transform, then claims that implies the Lorentz Transform doesn't need a non-empty universe to explain its real physical implications on clock readings. That the Lorentz Transform is an accurate description of observations is not in question, the issue is that the Lorentz Transform when applied to real physical objects, requires real physical objects to give meaning to any and all of its terms, not magic.

This is addressed in more detail here:

[Special Relativity Background](#)

[Fields & Ether](#)

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Website last modified 1st January 2023

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