

## The Postulates of Special Relativity

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**First Postulate:** *The laws of physics are the same in all inertial frames of reference.*

In analyzing this statement, we see that it contains the concept of a set of laws that have universal application, and that these laws apply to each and every frame of reference. We may therefore identify two possibilities with respect to it:

1. That we have a universal super-ordinate or sub-ordinate continuum whose attributes influence every particle of matter.
2. That every distinct and separate particle is equally constituted (has the same basic characteristics).

Both interpretations are valid, but mutually exclusive. In order to qualify as **physics**, each **must exhibit physical characteristics**. Otherwise, we are dealing with **metaphysics**. The inability to distinguish this difference is the principle cause of the chaotic state in which physics finds itself.

From the light experiment of Hoek through to the present day, there have been innumerable attempts to find this universal frame of reference (the aether)<sup>1</sup> to no avail<sup>2</sup>. Einstein in his "*Electrodynamics*"<sup>3</sup> acknowledges this failure and concludes there are no properties in mechanics or electrodynamics conforming to the idea of absolute rest. However, this is perceived to run afoul of Maxwell's equations, which are presumed to require a universal fixed medium. This forces Einstein to introduce the second postulate, which he claims is "*only apparently irreconcilable with the former*"<sup>4</sup>.

Referring to Maxwell, we find his announcement, "... *that the properties of the electromagnetic medium are identical with those of the luminiferous medium.*" He then observes, "*To fill all space with a new medium whenever any new phenomenon is to be explained is by no means philosophical.*"<sup>5</sup> (Dark matter and energy proponents should take note.) However, his belief in an independent and universal electromagnetic medium was equally negated by the experiments mentioned, and one could have used his philosophical observation to preclude its existence at the outset.

Do we then dispense with Maxwell's equations? Not necessarily. The problem is completely resolved by identifying the electromagnetic field (Maxwell's medium) as a property of the particle and that field as an inertial frame extending to infinity. A fixed and infinite frame of reference is certainly sufficient to satisfy the equations mentioned and has the advantage of being experimentally verifiable. Furthermore, any observer may consider his inertial frame to be either fixed or moving, in perfect compliance with the first postulate.

Finally, the belief in an all-encompassing "unity" is not without foundation. However, we are not dealing with higher dimensions, abstraction, or any distinction between mind and matter. The laws are not distinguished, cannot be separate from existence, but that existence, (both noumena and phenomena) is the **embodiment** of the laws. As an example, a verbal expression intrinsically

contains them (subject, verb, object, - input, operation, output)! An attribute of a physical object of study may be abstracted, but is not distinct and separate from it. The object does not exist without it. In abstraction, a verbal or mathematical representation, and entity in itself, is created.

**Second Postulate:** *Light is always propagated in empty space with a definite velocity,  $c$  which is independent of the state of motion of the emitting body<sup>6</sup>.*

This is the expression for a universal continuum independent of the frame of reference a body occupies. However, the postulate is later modified to, "*Any ray of light moves in the "stationary" system of co-ordinates with the determined velocity  $c$  whether the ray be emitted by a stationary or by a moving body.*" Here, we are faced with two conflicting statements of principle that cannot be reconciled **in** principle. Although adopting relativism, his stated interest is to create a system in which Maxwell's equations relating to a universal frame of reference are true. In other words, rather than fit equations to reality, the purpose is to **fit reality to equations**. If we agree that principle conforms to reality, then this is an impossible task and the "apparent" reconciliation promised by Einstein cannot hold, and indeed, it does not.

I have not found in Maxwell's treatise where an absolute speed for light is supported, although it might be inferred. Based on the foregoing analysis on frames of reference, I propose that the following postulate be adopted.

*The speed of light [ $c$ ] is constant in equivalent inertial frames of reference but will vary according to the characteristics of the medium in which it propagates.<sup>7</sup>*

This is seen to be a **specific application of the first postulate**, and therefore a corollary. No limitation or universality with respect to the speed of light is implied. We can now logically derive the following:

- Light propagates independently in all inertial frames of reference (per experimental evidence).
- It exhibits compound velocities as measured by observers in relative motion to the system in which it is propagating.
- The existence of a medium specific to each reference frame is required.
- The speed is a **characteristic of the medium only!** This is consistent with all forms of waves.
- Its constancy defines the common attributes of the medium through which it moves.
- It is a disturbance of the medium. A localized "object" cannot simultaneously occupy multiple locations.
- The observed energy varies directly with relative motion between frames.
- There is no contiguity between frames of reference.
- Light cannot be seen in any reference frame but the observer's own!

By resolving the theoretical problems associated with light speed through the application of fundamental principles, it is evident that there is absolutely no reason for the theory of special relativity to exist. It remains only to show that its equations are redundant. In the following, no attempt will be made to refute the claims of relativistic modifications of time space and mass. This has been done in a previous paper<sup>8</sup>, and according to the G. O. Mueller initiative, in about 4 thousand scientific papers since the publication of Einstein's special theory. Rather, the experimental results will be explained in terms of classical electrodynamics.

### Kinematics:

We begin with the assumption of isotropic space and uniform time for equivalent frames of reference.

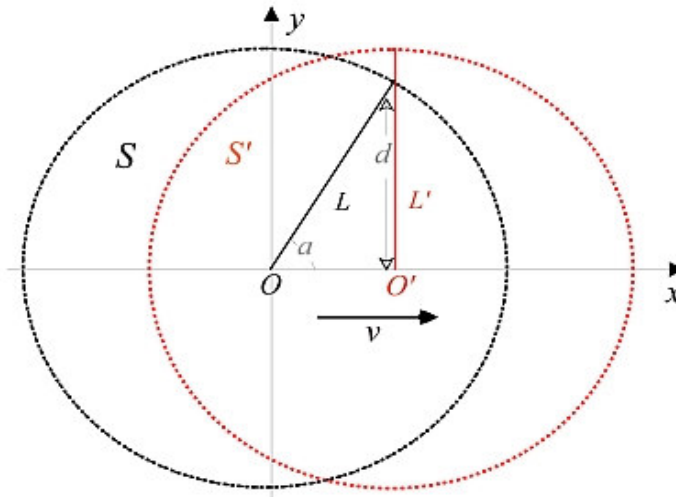


Figure 1

Assume an object travelling at  $v$  on the  $x$  axis emits a light beam in the  $y$  direction at  $t = t' = 0$ , at origin  $O$  in system  $S'$ , which is also observable in the fixed system  $S$  (Fig. 1). In time  $t_l$ , it has traveled a perpendicular distance,  $ct_l = L'$  in the moving system, which has reached point  $t_l v = O'$ . Light has also travelled the distance,  $L = L'$  in the fixed system, but at an angle of,  $a = \arccos(v/c)$  to the  $x$  axis<sup>9</sup>. Explicitly, there is no difference in the length travelled by the ray in either system, only in its direction. This is guaranteed by the constancy of light. However, the perpendicular distance  $d$  subtending angle  $a$  is shorter in the fixed system -

$$d = L \sin(a) \equiv L(1-v^2/c^2)^{1/2} \equiv L[(c^2-v^2/c^2)]^{1/2} \quad (1)$$

Thus, the “relativistic space contraction”, (since it is a second-order equation) can only be along the  $y$  axis rather than in the direction of travel (Pythagorean theorem). If we assumed a spherical distribution of light emitted at origin  $O$  (see dotted lines) at the same time as the light ray, the radius  $L$  would be the speed of light  $c$  and the distance  $d$  would represent the chord drawn perpendicular to the  $x$  axis from the moving object to the edge of the wave front in  $S$ . Obviously, the ray cannot exceed the distance of the wave front in the fixed system  $S$  as they both propagate at  $c$ .

If **radiation** were being emitted by the moving object, the ratio  $d/L$  would simply be the normal variation in wavelength and frequency calculated for a  $90^\circ$  Doppler effect measured in the fixed system of reference<sup>10</sup>. No modification in space, mass or time is required. It is merely the displacement of reference frames due to the constancy of light.

In the observer's "fixed" frame of reference, light has traveled on the  $x$  axis, the **simultaneous** distances of  $t(c-v)$  and  $t(c+v)$  relative to the moving object. **They can only apply to radiation and are nothing more than Doppler wavelengths.** In fact, as a previous paper<sup>11</sup> clearly shows, the inverted Lorentz time transformation equations along with those of space, result in the standard equations for frequency and wavelength.

$$f' = f / (1 [+ \text{ or } -] v/c)$$

$$\lambda' = \lambda (1 [+ \text{ or } -] v/c) \quad (2)$$

In case the diagram is difficult to follow, let's do it again. Space, time and mass are modified in relativity theory by multiplying or dividing with,

$$(c^2/c^2 - v^2)^{1/2} = [(c/c-v)(c/c+v)]^{1/2}$$

The bracketed terms in the second half of the equation represent a Doppler change in frequency, where the source is moving towards and/or away from a fixed observer. The root of their product is the change in frequency normal to the direction of motion.

### Application

It is obvious that (Fig. 1) provides the basis for **stellar aberration**<sup>12</sup> and its angular dependence on  $v/c$ . The only additional requirement is a discontinuous wavefront. The photon concept proposed by Einstein fills this requirement. Photons have a parallel in Huygens wavelets<sup>4</sup> used to explain the sharp demarcation of light waves at surface boundaries.

Also the **Sagnac effect** is a direct consequence of compound velocities<sup>13</sup>. Whether linear or uniform circular motion is involved, the distance ( $d$ ) (or  $d = 2\pi R$ ) gives the time taken as,

$$t_1 = d/(c-v) \quad t_2 = d/(c+v) .$$

$$t_1 - t_2 = 2dv/(c^2 - v^2) \quad (3)$$

Notice that the distance represented by  $2\pi d$  in Figure 1, when applied to a sub-atomic particle in motion gives precisely the magnitude required by **de Broglie's matter wave**,  $\lambda = h/mv$  (relativistic) that would be effective, for example, when passing through a diffraction grating according to Bragg's law. Obviously, there is no mysterious "matter wave", but only a field displacement that varies with velocity due to the finite speed of light. As the velocity increases, the intensity of radiation emitted in the forward direction results in the so-called headlight effect<sup>14</sup>. The observed effect through the medium of electromagnetic radiation would **imply** an increase in mechanical energy when in fact it is merely a Doppler (field) effect.

### Dynamics

What about the relativistic increase in mass? It is only necessary to observe that since there is no change in time or space, there cannot be any change in mass. The only assumed mass increase experiments that existed at the time, were Kaufmann, 1901, and Bucherer 1908, where electrons were accelerated in a magnetic field, resulting in a curved trajectory. In none of these, including Compton's (1923), were induced fields considered, even though electromagnetism was known to contain inertial effects<sup>15</sup>. A mass that increases with speed and decreases with its lack identifies it as a magnetic field. Finally, the interpretation of the results of "mass spectroscopy, as it is currently called", is demonstrably false as the formula is not dimensionally correct. In order to equate, the dimensions of time space and mass must be equal!

The force equation (fundamental units-CGS sys) is,

$$F_m = evB/c = mv^2/r$$

Where  $e$ =charge,  $B$ =magnetic field,  $r$ & $v$ =first Bohr radius, velocity

The center term (based on the Bohr equivalence,  $e^2=mv^2r$ ) equals,

$$e^2v^2/c^2r^2 = mv^4/c^2r$$

which does not equal the third term.

## Conclusion

It should now be patently obvious that the required kinematics of relativity theory are duplications of electromagnetic field displacements already explained in classical physics. Variations in **energy(s)** are entirely due to the angular dependencies of the Doppler effect and induction. In addition, an explanation for many well-documented effects is given that were inexplicable in relativity, but follow quite naturally from the above. Nothing new has been introduced. If the independent propagation of light in each frame of reference appears counter-intuitive, it is only because of the authoritative imposition of Maxwell's and Einstein's universals for over a century<sup>16</sup>.

Unless there is serious objection to the demonstrations and claims of this presentation, special relativity must be considered superfluous since it has served no conceivable purpose. The interminable arguments as to its validity or its errors and omissions should cease.

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<sup>1</sup> See <http://wbabin.net> for a list of historical documents on the aether, (provided by Tom Miles, et al.)

<sup>2</sup> Dayton Miller is the one dissenting voice.

<sup>3</sup> On the Electrodynamics of Moving Bodies, A. Einstein, The Principle of Relativity, Dover Publications 1952, p37.

<sup>4</sup> Ibid 3, p38.

<sup>5</sup> A Treatise on Electricity and Magnetism, James Clerk Maxwell, Dover Publications, 1954, [781], p431.

<sup>6</sup> Ibid 3, 41.

<sup>7</sup> This assumes light speed of  $c$  in each reference frame. Dependency on source is proposed by G&V. Sokolov, <http://wbabin.net/sokolov/sokolov11.pdf> and S. Byers, [http://home.netcom.com/~sbyers11/litespd\\_vs\\_sr.htm](http://home.netcom.com/~sbyers11/litespd_vs_sr.htm)

<sup>8</sup> Analysis of the Theoretical Foundations of Special Relativity, Walter Babin <http://wbabin.net/babin/webdoc1.htm>.

<sup>9</sup> Triangle of Velocities, A. Vukelja, <http://wbabin.net/physics/vukelja2.pdf>

<sup>10</sup> Ibid, 5

<sup>11</sup> Sub-Atomic Particle Interactions, Walter Babin, <http://wbabin.net/babin/dyna2.htm>. Also, Relativistic Transformation Equations, Walter Babin, <http://wbabin.net/babin/transform.pdf>

<sup>12</sup> See section on aberration, Walter Babin, <http://wbabin.net/fizeau1.pdf>.

<sup>13</sup> The Sagnac Effect, Walter Babin, <http://wbabin.net/babin/sagnac.htm>. See also, the logical conclusions derived from the second postulate at <http://wbabin.net/babin/wd6.htm>.

<sup>14</sup> Physics in the Twentieth Century, MIT Press, Selected Essays, V. Weisskopf, p 245.

<sup>15</sup> "Thus, the oscillation of the electricity proves the inertial property of the field, which exactly corresponds to the inertia of the mass of the pendulum bob ", Max Born, Einstein's Theory of Relativity, p209, Dover Publications, 1962.

<sup>16</sup> An analogous situation for light exists with sound propagating in air. If air travels with a moving system, then sound travels **in that system** at normal speed, but would be calculated (not heard) as moving at  $c+v$  or  $c-v$  relative to a fixed system. If the same sound were audible in the fixed system at origin, it would travel at normal speed, but with greater compression and higher frequency.