A Relativity Theorem, with Huge Consequences

David V. Connell
Apartado 23, Alvor, 8501-906 PORTUGAL
e-mail: dvconnell@iol.pt

Previously missing, but not conspicuous by their absence, local and universal constants are now defined, and a standard test for them based on relativity is created, resulting in three universal constants, all having the same dimensions. From this and little else, a valid set of relativistic changes for each of the two types of reference frame, agreeing exactly with sets previously derived from laws of physics, is derived in only a few lines. A different set, adopted by SR and GR, disagrees with the laws of nature, which invalidates those theories, and more than a dozen consequences are given to illustrate how much some physics theories have been diverted from Nature's truths.

1. Introduction and Definitions

By considering the dimensions of universal constants and generalized relativistic changes to *M, L, T*, sets of Nature's changes are derived for each of two types of frame of reference in less than a quarter of a page, whereas text books require tens of pages to derive them. Changes to *L* and *T* are derived in terms of the change in mass.

We observe that there are two types of reference frame, stationary and moving, supposedly to accommodate gravitational and speed relativistic effects. The "stationary" frame, actually a chosen frame, is often referred to as the home frame, where the measuring instruments are calibrated against standard units. In both types a mass increase is properly explained by the energy applied (force x distance, or resulting kinetic energy), the law of conservation of total energy (CTE) and the equivalence of mass and energy, whereas no physics is known for gravity or speed to cause the mass to increase. That is, neither gravity nor speed is responsible for relativistic changes.

It is instructive to see that, in the Pound and Rebka experiment [1], for a difference in gravitational field strength between vertical points A and B, the theory is manipulated to predict the same change in frequency that would be caused by the energy required to move an object from A to B in the *average* field strength. This confirms that applied energy causes the change, not gravity (via the difference in field strength).

Next, we define local and universal constants, as most physicists have not yet met the former, and apparently do not have a proper definition for the latter. Natural philosophers of old selected only a few factors of proportionality to be universal constants, so what classification did they assign to the others? They must have suspected that others did not stay constant.

We hereby define universal constants as factors of proportionality in physics equations always having the same value (in home frame units) in all inertial frames of reference, under the same physical conditions, in spite of valid relativistic changes having occurred to their individual dimensions. Other factors, having new values in moving frames, are local constants.

We also define a set of relative changes caused by relativistic circumstances, as being the change in each of the basic dimensions M,L,T of massive objects, in terms of the relative change in mass, i.e. sets of relative changes in terms of γ are of the form:

$$M = \gamma M_0 , \quad L = \gamma^x L_0 , \quad T = \gamma^y T_0 ,$$

where the subscript '0' denotes the original value in the stationary frame.

A valid set of relative changes is one that, when applied to the dimensions of a *known universal constant,* predicts no change in its value (that set of dimensions is independent of γ), and, because any number of sets can be created to that specification, it must also conform to a principle of relativity pertinent to the type of reference frame being considered. See Section 3 below, for examples.

Thus, in a moving frame, if the value of a constant (in home frame units) differs from its home frame value due to *valid* relativistic changes, it is a local constant.

An invalid set of changes is of no use in physics (its predictions offend known laws of physics).

2. The Source of Gravity

Testing four claimed universal constants, using the above definitions and valid sets of relative changes, revealed that two of them did not qualify as universal constants, and the other two, the fine structure constant α, which is based on the natural constant *hc,* and the Coulomb force constant *C*, have the same basic dimensions M,L^3,T^{-2}.

Surprisingly, the "universal" gravitational constant *G*, which has dimensions M^{-1},L^3,T^{-2} failed the test by γ^2.

From Newton's law of gravity,

$$G = Fd^2 / M_1 M_2 \qquad (1)$$

where *d* is the distance between the two masses. Clearly, the dimensions of *G* need increasing by M^2 for *G* to comply with the very strong expectations of natural philosophy of being a universal constant, and this can only be achieved by removing the masses from the equation. That is, the source of gravity cannot be mass *and G* be a universal constant. The masses $M_1 M_2$ in Eq. (1) are therefore replaced with the ratios of the weight of the objects to the standard weight $(w_1 w_2)$, these clearly being directly proportional to their actual attractive potentials, in which case the law of gravity becomes force

$$F = G w_1 w_2 / d^2 \qquad (2)$$

which takes exactly the same form and dimensions as Coulomb's force law [2]. So there is no such thing as gravitational mass, and it has never existed. Since F does not depend on mass, g $(= F/m)$ cannot be constant.

The new dimensions of G are ML^3T^{-2}, *independent of altitude or substance variations* of the objects (F is not independent of substance variations)

A new theory of gravity, based on the modified gravitational force law (eq. (2)), was outlined in "The Physics Puzzle" [3], where a new source of gravity based on electrostatic attraction and repulsion, was proposed by Kopernicky and Hughes [4] and confirmed by Spears' work [5] as being a very good candidate.

The change to the dimensions of G creates a third universal constant. A fourth, the magnetic force constant, could be added, all having the same basic dimensions.

The fourth claimed constant, Boltzmann's constant k, failed the test and has the dimensions of energy ML^2T^{-2}, so is only a local constant.

Increasing the dimensions of G by M^2 makes the Planck mass [6] (from hc/G) a dimensionless number and the principle of relativity is not then violated, confirming the change to Newton's law. The Planck units become useless and physics theories must be re-visited where Planck units have been involved.

3. Relative Changes

Two sets of changes are required (one for each type of frame) because a displacement made against a resisting force without resulting motion causes different relativistic changes compared to unrestricted motion for the same applied energy [1, 7].

Sets of valid changes derived in the past from physics equations were first derived in 2005 in "Natural Relativity" (NR) [8], and again in "The Physics Puzzle" [3] by different methods.

An invalid set predicts universal constants to change, or disagrees with principles of relativity, and is of no use in physics.

It is shown in the theorem below, only two valid sets of relative changes, one for each type of reference frame, can exist and are derived below *without recourse to physics equations*.

Theorem: To prove that there is only one valid set of relativistic changes for each type of reference frame and to obtain those changes in terms of γ :-

It is observed that known universal constants have the same basic dimensions $\left(M, L^3, T^{-2}\right)$. Sets of relative changes in terms of γ were given above. Thus, the generalized value of a universal constant U in any frame of reference is

$$\gamma M_o\ \gamma^{3x} L_o^3\ \gamma^{-2y} T_o^{-2} = \gamma^{(1+3x-2y)} U_o$$

where U_0 is the home frame value.

Application of valid sets of relative changes to the dimensions of universal constants must result in no overall change, otherwise they are not universal constants. Thus, since $\gamma^0 = 1$, $1 + 3x - 2y = 0$. Therefore

$$y = (1 + 3x)/2 \qquad (3)$$

In the home frame, constants of proportionality (such as c) have fixed values, therefore L/T is constant, so $x = y$, and, from Eq. (3) $y = -1$, therefore $T = \gamma^{-1} T_0$, and $L = \gamma^{-1} L_0$, the frequency increase being confirmed by experiments [1, 9]).

In a moving frame, the principle of relativity demands that the properties of matter and therefore the density of mass M/L^3 is constant, hence $L = \gamma^{1/3} L_0$ ($x = 1/3$), so, from Eq. (3), $y = 1$, and $T = \gamma T_0$, (or $f = \gamma^{-1} f_o$) the frequency decrease being confirmed by experiments [7, 10, 11] .

And only one solution is obtainable for each type of frame. QED.

The above theorem agrees exactly with the two sets of relative changes derived earlier from physics equations in [3,8], that dictate how the values of all quantities in physics involving mass change with energy level and motion.

4. Nature Obeys Common Sense

With the help of Newton, by expressing laws of physics in the form of mathematical equations containing factors of proportionality, many laws have been discovered through experiment and logic, and the rules of relativistic changes derived from the apparent variable nature of those laws in different frames of reference. The variability of those laws has been found to be only due to a change in the values of the factors of proportionality, now described as local constants.

That is, the laws of physics are proportional relationships; a fact that seems to have escaped most people. Therefore the equations keep the same *form* in all inertial frames of reference, as required by the principle of relativity, but the value of the factor of proportionality depends on where the measuring instruments are located. It seems Einstein attempted to keep factors of proportionality independent of the location of the measuring instruments, perhaps interpreting the principle of relativity too stringently, keeping all factors (mathematical constants) fixed.

When measured *in* the moving frame, everything seems to be unchanged, because the measuring instruments have changed in exactly the same ways as the things being measured; only when measured from the home frame are the real values found.

The author is amazed how Nature could evolve such a system without mathematics; the parts fit together perfectly. Different derivations of the same things always produce the same results. And the requirements of the principles of relativity for a logical universe have been shown to be necessary for cohesion between the discovered laws of physics.

By promulgating SR and GR [12,13], the common sense views of space and time have been poisoned, and must now be given the antidote herein.

5. Conclusion

Definitions of local and universal constants have been created, enabling derivations of valid sets of relative changes to be made. An invalid set employed in a theory of relativity is solid evidence of the failure of that theory to agree with the laws of nature. SR disagrees with the valid set of relative changes for moving frames, hence disagrees with the laws of nature, and is,

therefore, not a useful theory on which to advance our knowledge of physics.

- Gravity does not spring from mass.
- Gravitational mass does not exist.
- Speed and gravity do not cause relativistic effects.
- The Planck Units are junk.

In moving frames, the valid set of changes gives the value of the speed of light as $\gamma^{-2/3}c_o$, so it is not a universal constant, and all theories based on the opposite postulation, such as SR and GR, are in conflict with the laws of physics, causing all manner of distortions and false predictions. SR even expects lengths to change only in the direction of motion, whereas Bohr's [14] equations assume a change in the diameter of atoms.

Since hc is a universal constant, the moving frame value of h is $\gamma^{2/3}h_o$, and with the above value of c, causes the two energy equations, $E=mc^2$ and $E=hf$, to predict the same value for a unit of energy, a feat impossible in SR, where c is proclaimed a universal constant. This confirms the derivations made above and in [3, 8] are correct.

So SR has no valid basis for its existence, and should be replaced as soon as possible with the above facts. The SR mass-velocity equation should also be replaced (from [8]), as it was originally derived by Einstein using the constant c assumption.

GR assumes the SR error of a constant speed of light in its concept of "spacetime" [13] [6, p. 59], upon which its gravity theory heavily depends.

GR is also based on the postulation that the acceleration of gravity g is the same for all substances [6, p. 8], but mathematical logic denies this possibility. As gravity does not emanate from mass, the force of attraction F cannot be proportional to mass m. Hence, by Newton's second law of motion, $g=F/m$, g cannot be the same for all substances, although bodies containing a mixture of many different substances could produce a near constant value for g. It is widely claimed that g is the same for all substances, so this should be a subject for investigation.

Thus, GR theory is shown to be heavily dependent on false assumptions, so has no valid basis for its existence, and should also be replaced as soon as possible.

- The Lorentz/Einstein transformations are junk.
- Einstein's limiting speed probably only exists for particles accelerated by electric fields.
- The 'light cone' is junk. The Big Bang is junk.
- Time dilation is merely an apparent effect of slow running clocks.
- The principle of co-variance is junk.
- Space is not distorted by nearby mass.
- And many more.

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