Reality-Sucks, Really![*]

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(comments welcome)

2025-04-27

Abstract

I develop a unit-less unit-system which incorporates the special relativity theory. The so caled “dark matter” and “dark energy” are identified as calculation errors.

Contents

1 Introduction

Modern theoretical physics has a problem, or several problems. One is that we do *not* have scalars. While the physical equations might be correct, we have no thingies we can feed them. Another is that the special relativity theory *is* a variable speed of light theory but is not used as that. Since mass and energy are also untouched the result is dark matter and dark energy. In this article we will address some of the problems.

2 Scalars

A scalar is an element of a field which is used to define a vector space. A field is a set U together with two binary operations on U called addition and multiplication. We want to use unit-based numbers as field. A unit-based number is a real number attached to a unit, $U = \{x = r \cdot u \,|\, r \in \mathbb{R}, u \text{ unit}\}$. While the addition of elements of that set is

unproblematic, the multiplication is not. When we multiply two unit-based numbers $\boldsymbol{r_1} = r_1\,u$ and $\boldsymbol{r_2} = r_2\,u$ we get

$$\begin{aligned}
\boldsymbol{r_1} \cdot \boldsymbol{r_2} = &\quad r_1\,u \cdot r_2\,u && (1)\\
= &\quad r_1\,r_2 \cdot u^2 && (2)\\
\notin &\quad U && (3)\\
\in &\quad U^2 && (4)
\end{aligned}$$

The multiplication is a binary function with the domain U and the codomain U^2. Required is a binary operation with both domain and codomain U. A unit-based number can not be used as scalar. This is central to the argumentation. If you do not see the problem you will have problems with this article.

The problem must be addressed.

3 Ignore It

The first solution to the problem is simply ignore it. It is not that important and reality sucks, anyway. Mathematical we first divide the unit-based number by the unit and get a number which is a scalar. After the calculations we can multiply with the unit and get a unit-based number.

This is a mathematical correct solution. That does not mean that it is physical correct. Any physical correct solution must be mathematical correct but the reverse is not true. We already know that we must use a different method when handling *large* velocities but for small values this is a very good approximation.

4 Reality-Sucks

In Reality-Sucks we expect that any dimension U has a maximum c_U, not just velocities. We divide the value by the maximum and get a value in $[-1,1]$, first. To create a scalar this value has to be spread over $\mathbb{R}$, i. e., the interval $[-\infty,\infty]$. The special relativity theory is using the operation '$\theta_U(u) = \operatorname{artanh}(u/c_U)$' for this process.

After the values are thetaized the are fully featured linear. They are just numbers and we can use them as scalars. The light speed c_v resolves as infinity, i. e., effects occur instantaneous in Reality-Sucks.

To transform a result back into reality we first need the inverse operation of θ_u called $\theta_u^{-1}(\theta_u(u)) = \tanh(\theta(u)) \cdot c_U$. This first maps the result back into the range $[-1,1]$ and multiplies afterward with c_U. For small values we can assume $\theta_U(u) = \theta_U^{-1} = u$.

The maximum values must be calculated. If we require a maximum for every dimension we also require a minimum for every dimension. For every unit there exists an inverse unit. The inverse of the maximum of the unit becomes the minimum of the inverse unit. The maximum of each unit U is c_U and it's minimum q_U. The mapping to spread is called θ_U to indicate which maximum value is to use.

5 Maximum Values

Given are the maximum space c_x, the maximum velocity c_v, the minimum electrical charge q_Q, the gravitation constant G and the PLANCK constant h.

$$\begin{aligned}
c_x = &\quad 13.7870 \cdot 10^9\,Ly && (5)\\
= &\quad 1.30435 \cdot 10^{26}\,m && (6)\\
c_v = &\quad 299,792,458\,\tfrac{m}{s} && (7)\\
q_Q = &\quad e && (8)\\
= &\quad 1.602176634 \cdot 10^{-19}\,C && (9)\\
G = &\quad 6.67430 \cdot 10^{-11}\,\tfrac{m^3}{kg\,s^2} && (10)\\
h = &\quad 6.62607015 \cdot 10^{-34}\,\tfrac{kg\,m^2}{s} && (11)\\
& && (12)
\end{aligned}$$

The maximum space is assumed to be the age of the universe at light speed. This is a distant, not a time. A time with this value means the age of the universe is infinite and the Big Bang has not happened. The maximum velocity c_v is the speed of light. This value is exact. The minimum charge q_Q is the elementary charge. This value is exact, too. The gravitational constant and the PLANCK constant are holding the system together. The PLANCK constant is exact.

5.1 Time

As a time minimum q_t we can assume the PLANCK time

$$q_t = \sqrt{\frac{hG}{c_v^5}} \tag{13}$$

This is the original formulation of the PLANCK time. A system with the reduced PLANCK constant is in section 9.

The maximum time c_t is computed by the fundamental equation $x = vt$ and calculated by the maximum space c_x divided by the maximum velocity c_v

$$c_t = \frac{c_x}{c_v} \tag{14}$$

5.2 Frequency

Frequency is the inverse of time and has the minimum q_f and c_f of

$$q_f = \quad c_t^{-1} = \quad \frac{c_v}{c_x} \tag{15}$$

$$c_f = \quad q_t^{-1} = \quad \sqrt{\frac{c_v^5}{hG}} \tag{16}$$

The maximum c_f is *not* used but the minimum q_f. Using the maximum frequency will lead to a system where the maximum space is equal to the minimum space and the equation $E = mc^2$ does no longer fit.

5.3 Space

The minimum space q_x is the minimum time q_t multiplied by the light speed c_v. Ordinary, one would multiply by the lowest velocity but we do not have a lowest velocity without a minimum space and have no minimum space without a velocity.

$$q_x = \quad c_v \cdot q_t \tag{17}$$

$$= \quad \sqrt{\frac{hG}{c_v^3}} \tag{18}$$

The maximum space c_x is given.

5.4 Velocity

The minimum velocity q_v is the minimum space q_x divided by the maximum time c_t

$$q_v = \quad \frac{q_x}{c_t} \tag{19}$$

$$= \quad \sqrt{\frac{hG}{c_v c_x^2}} \tag{20}$$

The maximum velocity is given as c_v.

5.5 Mass

The values for mass we get from the HEISENBERG's uncertainty principle.

$$\frac{\hbar}{2} \leq \delta_x \delta_p \tag{21}$$

with $\hbar = h/(2\pi)$ the reduced PLANCK constant, δ_x the uncertainty of the space and δ_p the uncertainty of the momentum.

First we set $\delta_p = \delta_m \delta_v$, to remove constants use h instead of $\hbar/2$ and use the equality operation instead of the less-or-equal relation and get

$$h = \delta_x \delta_m \delta_v \tag{22}$$

which results to

$$\delta_m = \frac{h}{\delta_x \delta_v} \tag{23}$$

for masses. This is allowed. The values can not get smaller, but we increase them.

If we insert the maximum space c_x and the maximum velocity c_v into (23) we get the minimum mass q_m

$$q_m = \frac{h}{c_v\, c_x} \tag{24}$$

If we insert the minimum space q_x from (17) and the minimum velocity q_v from (19) into (23) we get the maximum mass c_m

$$\begin{aligned} c_m &= \frac{h}{q_x\, q_v} && (25)\\ &= \frac{h}{\sqrt{\frac{hG}{c_v^3}}\sqrt{\frac{hG}{c_v\, c_x^2}}} && (26)\\ &= \frac{c_v^2\, c_x}{G} && (27) \end{aligned}$$

5.6 Gravitation

Before we discuss the electrical charge we want to test the system and look into the gravitation

$$F = G \cdot \frac{m_1\, m_2}{r^2} \tag{28}$$

with F gravitation force, G gravitational constant, m_1 and m_2 two masses and r the distance between the masses.

The gravitational constant G is a compound value

$$G = |G| \cdot \frac{m^3}{kg\, s^2} \tag{29}$$

When we transform this into Reality-Sucks we get

$$\begin{aligned} \theta_G &= G \cdot \frac{1}{c_x^3}\frac{c_v^2\, c_x}{G}\frac{c_x^2}{c_v^2} && (30)\\ &= 1 && (31) \end{aligned}$$

For the m^3 we divide by c_x^3 for kg^{-1} we multiply by c_m from (27) and for s^{-2} we multiply by c_t^2 from (14) and the result is 1.

This result should be obtained by the gravity force in Reality-Sucks, too. The gravity force in Reality-Sucks is for small values

$$F = \theta_G \cdot \frac{\theta_m(m_1)\,\theta_m(m_2)}{\theta_x(r)^2} \cdot c_F \tag{32}$$

with the approximation $\theta_u(u) \approx u/c_u$. We want equation (28) equal to (32) and get

$$\begin{aligned} G \cdot \frac{m_1\, m_2}{r^2} &= \theta_G \cdot \frac{\theta_m(m_1)\,\theta_m(m_2)}{\theta_x(r)^2} \cdot c_F && (33)\\ G &= \theta_G \cdot \frac{c_x^2}{c_m^2} \cdot \frac{c_m\, c_x}{c_t^2} && (34) \end{aligned}$$

Transformed to θ_G this is

$$\begin{aligned} \theta_G &= G\frac{c_m\, c_t^2}{c_x^3} && (35)\\ &= G\frac{c_v^2\, c_x\, c_t^2}{G\, c_x^3} && (36)\\ &= \frac{c_x^2}{c_x^2} && (37)\\ &= 1 && (38) \end{aligned}$$

Both results are equal. The gravitation law is part of the system. For large values G does not change but may be the masses or the distance.

5.7 Electrical Charge

The minimum electrical charge is given as the elementary charge $q_Q = e$.

For the maximum electrical charge we use COULOMB's law. In real reality it is

$$F = k_Q \frac{Q_1\, Q_2}{r^2} \tag{39}$$

with F force, $k_Q = 1/(4\pi\epsilon_0)$ a constant with ϵ_0 the electric constant, Q_1 and Q_2 two charges and r the distance between those charges.

In Reallity-Sucks there should be $\theta_{k_Q} = 1$, i. e., (39) is

$$F = \theta_F^{-1}\left(\frac{\theta_Q(Q_1)\,\theta_Q(Q_2)}{\theta_x(r)^2}\right) \tag{40}$$

in Reality-Sucks.

The equations (39) and (40) should be equal. We get with the approximation $\theta_u(u) \approx u/c_u$ for small values

$$k_Q \cdot \frac{Q_1\,Q_2}{r^2} = \frac{\theta_Q(Q_1)\,\theta_Q(Q_2)}{\theta_x(r)^2} \cdot c_F \tag{41}$$

$$k_Q = \frac{c_x^2}{c_Q^2} \cdot \frac{c_m\,c_x}{c_t^2} \tag{42}$$

Resolved to c_Q

$$c_Q^2 = \frac{c_v^2\,c_x\,c_m}{k_Q} \tag{43}$$

$$= \frac{c_v^4\,c_x^2}{G\,k_Q} \tag{44}$$

and with $k_Q = 1/(4\pi\epsilon_0)$ and $\epsilon_0 = q_Q^2/(2\,\alpha\,h\,c_v)$ and α the fine-structure constant this leads to

$$c_Q^2 = \frac{c_v^4\,c_x^2\,q_Q^2}{2\pi\,h\,G\,\alpha\,c_v} \tag{45}$$

$$= \frac{c_v^3\,c_x^2}{2\pi\,h\,G\,\alpha} \cdot q_Q^2 \tag{46}$$

$$c_Q = \sqrt{\frac{c_v^3\,c_x^2}{2\pi\,h\,G\,\alpha}} \cdot q_Q \tag{47}$$

$$= \frac{c_x}{q_x}\sqrt{\frac{1}{2\pi\,\alpha}} \cdot q_Q \tag{48}$$

All other dimensions are a compound of time, space, mass and electrical charge. The maxima can be produced by multiplying or dividing the maxima according to the compound.

6 Electro-Magnetic Wave

The energy of an elecro-magnetic wave is according to the PLANCK relation

$$E = h \cdot f \tag{49}$$

In Reality-Sucks it is written as

$$E = \theta_E^{-1}(\theta_h \cdot \theta_f(f)) \tag{50}$$

Since we do not always expect small values we can not use the approximation $\theta_u(u) \approx \theta_u^{-1}(u) \approx u$.

We first have to determine θ_h. The PLANCK constant is a compound value

$$h = |h| \cdot \frac{kg\,m^2}{s} \tag{51}$$

i. e., the thetaized θ_h is with (14), (27) and the given c_x

$$\theta_h = h \cdot \frac{c_t}{c_m\,c_x^2} \tag{52}$$

$$= h \cdot \frac{G\,c_x}{c_v\,c_v^2\,c_x\,c_x^2} \tag{53}$$

$$= \frac{q_x^2}{c_x^2} \tag{54}$$

For the maximum energy c_E we have two possible methods and both should get the same result. One is using the EINSTEIN-relation $E = mc^2$. We immediately get from (27)

$$c_E = c_m\,c_v^2 \tag{55}$$

$$= \frac{c_v^4\,c_x}{G} \tag{56}$$

The other is using the compound

$$c_E = \frac{c_m c_x^2}{c_t^2} \tag{57}$$
$$= \frac{c_v^4 c_x}{G} \tag{58}$$

Both methods get the same result.

For small values (50) should be equal to (49). We use $\theta_u(u) \approx \theta_u^{-1}(u) \approx u$ and get from (50)

$$E = \theta_h \cdot \theta_f(f) \cdot c_E \tag{59}$$
$$= \frac{hG}{c_v^3 c_x^2} \cdot \theta_f(f) \cdot \frac{c_v^4 c_x}{G} \tag{60}$$
$$= \frac{h c_v}{c_x} \cdot f\, c_t \tag{61}$$
$$= h \cdot f \tag{62}$$

For small values both equations are equal, but for larger values Reality-Sucks strucks.

7 Historical Data

Historical data is a misnomer. It is data received from a distance. The space is important, not the time.

The general relativity theory *is* a variable speed of light theory. We do a mind experiment and watch a photon coming from a source of light. After one second the distance between source and photon is 1 Ls. The general relativity theory expands the space by distance. We go at a point where the space is doubled. Now the photon has a distant of 2 Ls and the light speed is 2 c. You can not expand the space, leave the time untouched and expect velocities stay the same. Everyting is relative.

The dimensions are a combination of h, G, c_v, c_x and q_Q, any of which are given. We can tie the change to any of those and choose c_v to apply a function ϕ. The function ϕ is a function of space and returns a number. It represents the change Reality-Sucks produces. Measured in space this is

$$\phi(r) = \frac{\theta_x(r)}{\frac{r}{c_x}} \tag{63}$$
$$= \frac{\theta_x(r)\, c_x}{r} \tag{64}$$

Velocities and the PLANCK constant change with ϕ and the gravitational constant G is a constant in space and time.

$$c_v = \phi \cdot c_v \tag{65}$$
$$h = \phi \cdot h \tag{66}$$
$$G = G \tag{67}$$

The maximum space is given, but we can compute the change with the minimum q_v from (17)

$$q_x = \sqrt{\frac{\phi h G}{\phi^3 c_v^3}} \tag{68}$$
$$= \phi^{-1} \cdot q_x \tag{69}$$

The change for the maximum c_x also should be ϕ^{-1}. This might seem as a contadiction, on one hand we increase the space by an amount in (64) and then by a different amount in (69). The changes we provide in equation (64) are in Reality-Sucks while the changes we provide in (69) are really in real reality.

For the time we have both, the minimum time q_t in(13) and the maximum time c_t in (14)

$$q_t = \sqrt{\frac{\phi h G}{\phi^5 c_v^5}} \tag{70}$$
$$= \phi^{-2} \cdot q_t \tag{71}$$
$$c_t = \frac{\phi^{-1} c_x}{\phi c_v} \tag{72}$$
$$= \phi^{-2} \cdot c_t \tag{73}$$

Both get the same result.

The maximum velocity c_v is given but we can calculate the change for the minimum velocity q_v

$$q_v = \sqrt{\frac{\phi h G}{\phi c_v \phi^{-2} c_x^2}} \tag{74}$$
$$= \phi \cdot q_v \tag{75}$$

which is also the change presumed for c_v.

For the mass we have both, the minimum mass q_m and the maximum mass c_m.

$$\begin{aligned} q_m &= \frac{\phi h}{\phi c_v \phi^{-1} c_x} && (76)\\ &= \phi \cdot q_m && (77)\\ c_m &= \frac{\phi^2 c_v^2 \phi^{-1} c_x}{G} && (78)\\ &= \phi \cdot c_m && (79) \end{aligned}$$

Both get the same result. This will produce dark matter and, multiplied with $\phi^2 c_v^2$, dark energy.

The electrical charge changes as the minimum electrical charge changes. The minimum charge q_Q is given.

For the PLANCK constant we get

$$\begin{aligned} h &= |h| \cdot \frac{\phi\, kg\, \phi^{-2}\, m^2}{\phi^{-2}\, s} && (80)\\ &= \phi \cdot h && (81) \end{aligned}$$

as already mentioned above.

Finally, the gravitational constant G stays constant

$$\begin{aligned} G &= |G| \cdot \frac{\phi^{-3}\, m^3}{\phi\, kg\, \phi^{-4}\, s^2} && (82)\\ &= G && (83) \end{aligned}$$

The change of historical data can be used to determine the distance of objects. But there is a problem even the general relativity theory can not explain. If you receive an growing of the wave length for distant objects, the size of distant objects must grow, too. Both are lengthes.

We do not see a growing of the wave length but a decreasing of the speed of light and an increasing of frequency. The *effect* is a growing of the wave length. The wave length of an electro-magnetic wave is

$$\lambda = \frac{c_v}{f} \tag{84}$$

with f the frequency. In Reality-Sucks this becomes

$$\begin{aligned} \lambda &= \frac{\phi c_v}{\phi^2 f} && (85)\\ &= \frac{c_v}{\phi f} && (86) \end{aligned}$$

and we receive a wave length

$$\phi\lambda = \frac{c_v}{f} \tag{87}$$

Once we have a red-shift z, we have to solve

$$1 + z = \phi \tag{88}$$

to get the distant.

8 Some Critics

The general relativity theory and the ΛCDM have some properties that are at least argueable. The ΛCDM is expecting a Big Bang. The center of the explosion *must* be visible. Nothing moves faster than light, i. e., if the center of the explosion is out of the visible space all objects including the earth must move with more than light speed, even today. If the space expands the electro-magntetic waves in the space must expand accordingly. A center outside the visibility is a lie. If the Big Bang has happened we have to see a kind of globe. The matter must be outside and the center should be either empty or a black hole. If there is no such globe-like structure the Big Bang has not happened, yet, and we have to think again. The possibility has to be kept open. However, we can not assume that the objects disperse. The red-shift is (mainly) a property of the space. The effect of moving objects is small.

Nowadays, modeling is customary. As long as extreme states are not involved there is no problem. But when a high mass or a high density is involved we have *no* reliable way to simulate it. The reasons are our equations. It might be that the gravitational law is exactly

$$F = G\frac{m_1\, m_2}{r^2} \tag{89}$$

but that *must* not be. It is even more probable that we need adjustments when applying it to extreme states. If we are precautious we better write

$$F = \sum_{i=1}^{\infty} G_i \left(\frac{m_1\, m_2}{r^2}\right)^i \tag{90}$$

with $G_1 = G$ the gravitational constant and G_2 and following very small numbers. Since G_2 and following are very small it usually does not get effective after the first summand. But if we use very high masses or very small distances we see an effect. The same can be said for COULOMB's law. Both may produce a black hole which is farting some excess presure. Quasars are a candidate for this effect.

We know that a proton and an electron will usually become a hydrogen atom. Only if we use high energy it may become a neutron. That is, there must be a repelling force on nuclear level which can be overcome. It might the strong and the weak interaction but it can also be the result of the second parameters of the gravitational and COULOMB's law. Both are valid solutions. If we get any smaller there may be additional parameters which either leads to new forces or an adaption of the equations. We can not really simulate a black hole since we have never enough parameters.

It is of human nature that we want to be shure. There should be one solution and that should live forever. Modern science is unfit for that. We have our equations and want to evolve the future, as best to an infinite future. Often we forget that our equations are only a picture of reality painted in math, not reality itself. Reality is as reality is, nothing more can be said. The PTOLEMAIC system comes to the right solutions if enough parameters are used. It is nothing more than a FOURIER transformation of the heliocentric model. There is no reason to hit your heads about that. Since you need more parameters it is not longer used, anymore, but that has only practical and no dogmatic reasons. We can even accept a creational god, you have to accept that there may be other reasons having nothing to do with gods of any kind. A god is always so unsatisfying, you never know what comes next.

Even the quatum theory is *not* real. There are no waves running around and making strange things. It is nothing but a mathematical trick to calculate natual by using real numbers. When we use standing waves on intervals we divide the intervals into *any* possible division representable as natural number. A scheme which uses that for it's equations calculates naturally the *possibilities* a solution exists, not the solutions itself. Reality does not know anything about the duality of matter and wave. We might have a state where we need the matter model to get one result and the wave model to get another. Math is not the reality but the picture of reality painted in math. In math there is always more than one way to get the result. Reality is reality, nothing more can be said.

This article has impact to particle accelerators, too. A particle accelerator is a machine that uses electromagnetic fields to propel charged particles to very high speeds and energies to contain them in well-defined beams. The kinetic energy of each particle is usually assumed as

$$E_{kin} = \frac{1}{2} m v^2 \tag{91}$$

where m is the mass of the particle and v it's velocity. The energy $mv^2/2$ seems too large, which is correct. The energy must be computed in Reality-Sucks and is

$$E_{kin} = \theta_E^{-1}\left(\frac{1}{2}\theta_m(m)\theta_v(v)^2\right) \tag{92}$$

which is less than in (91). If you change the addition in a field by adding something like a θ_U, the multiplication must change, too.

9 Reduced PLANCK Constant

If you like the reduced PLANCK constant better it is no problem to define a system. We just have to adjust all equations in sections 5 and 6 which depend on h. Given are the values in section 5 and the reduced PLANCK constant $\hbar = h/(2\pi)$.

The minimum time q_t in (13) is reduced to

$$q_t = \sqrt{\frac{\hbar G}{c_v^5}} \tag{93}$$

as is the minimum space q_x in (17)

$$q_x = \sqrt{\frac{\hbar G}{c_v^3}} \tag{94}$$

The minimum velocity of equation (19) becomes

$$q_v = \sqrt{\frac{\hbar G}{c_v\, c_x^2}} \tag{95}$$

For the minimum mass q_m in (24) we write equation (23) as

$$\delta_m = \frac{\hbar}{\delta_x \delta_v} \tag{96}$$

and get a minimum mass q_m in (24) of

$$q_m = \frac{\hbar}{c_v\, c_x} \tag{97}$$

The maximum electrical charge c_Q in (48) does change as the space does change.

10 Conclusion

It is not very difficult to build a field out of unit-based numbers. The five base constants h, G, c_v, c_x and q_Q are enough to produce a system where every other unit can be developed. Inside the system the light speed c_v becomes ∞ and effects will occur instantaneous. Dark matter and dark energy will vanish.