

**A hypothetical interpretation of the bending of spacetime as local differences
in the expansion velocity of space, leading to an attempt at a unified field
theory**

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1. Introduction

In the course of my life to date I have often worked with the aim of creating a uniform field theory. In particular at the end of the 1980s, when I was a student at the University of Zurich, I rarely thought of anything else. It seems impossible that a young person who had not yet finished his education, not to mention without any professional experience, could have success with an issue where even the most capable physicists of modern time have failed. In spite of this I was able to collect at least a few ideas which I put down in a manuscript in 1989. I originally called this a "theory", but later realised that I could not sufficiently prove it. As a result my new title is: "A hypothetical interpretation of the bending of spacetime as local differences in the expansion velocity of space, leading to the application of a uniform field theory". This means that I have attempted to explain the bending of spacetime (in accordance with Albert Einstein's general theory of relativity of 1915) differently than before. I assumed that the universe is expanding (in accordance with Edwin Hubble in 1929) and thereby the space at each point of the universe is also expanding. Now my hypothesis is based on the presumption that space does not expand everywhere at the same velocity and that in some places (inside particles with a positive or neutral electrical charge) it actually shrinks. The differences in the expansion velocity of space at diverse places are my description of the bending of spacetime, which at least causes gravity and the deflection of light by mass. As a result I soon obtained new explanations about various phenomena in physics, which I will attempt to describe below in this thesis. You may perhaps reject my hypotheses, but how much does the small hope that I might be right mean to me?

2. An alternative to 4-dimensional Minkowski spacetime

From 1989, when I first wrote down my hypotheses, we now move to the end of 2009. I now began to think of a possible follow-up to my assessment of spacetime. The comparison of normal spacetime (as per Hermann Minkowski in 1908) with the coordinate axes of x, y, z for space and t for time (time arrow) and my depiction as the expansion velocity of space (coordinate axes x, y, z and $\frac{1}{t}$ and the expansion velocity of space $\frac{d(x,y,z)}{dt}$) led me to the assumption that the time coordinate axis is proportionately inverse to a congruent line coordinate axis and vice versa. ($s \sim \frac{1}{t}$?) Is each distance inversely proportional to a time variable and vice versa?

With the 4-dimensional Minkowski spacetime model we represent time graphically or with our imagination – where possible – as a line. Are we therefore that bad at depicting the 4-dimensional Minkowski spacetime and its bending in graphics? When depicting spacetime as the expansion velocity of spacetime with the coordinate axis $\frac{1}{t}$ we are, however, able to

create a graphic illustration. This strengthened my assumptions. I think, however, that the Minkowski spacetime and my interpretation certainly show the same thing.

But now let us go back to 1989. My thoughts at this time were concerned with the composition of matter and I was able to hypothetically establish at least a part of the following model which describes reality based on my assumptions about the expansion velocity of space, which I will explain in the following chapters. To do so I first looked at the three most well known elementary particles, the neutron, proton and electron.

3. The neutron

In my considerations about local differences in the expansion velocity of spacetime I came to the assumption that an elementary particle does not consist of one particle and one gravitational field, one electromagnetic field, fields for strong and weak interactions and perhaps even more fields, but just consists of one field and nothing else. For the neutron I assumed that the expansion velocity of spacetime inside the neutron is negative, so that the space there shrinks, and increases from the inside to the outside. On the surface of the particle the expansion velocity of spacetime would be 0 and outside the particle it would increase hyperbolically. We can establish two representations of the expansion velocity of spacetime:

The first version would be to look at the velocities at which the points move away from the centre of the neutron, caused by the expansion of space, or alternatively the velocity at which they move inside the particle towards the centre. I call this the linear expansion velocity of spacetime $v(r)$ or just $v(r)$. (r or r is the radius from the centre of the particle to the point in space observed.)

With the second version we view the 3-dimensional expansion velocity of spacetime, which the individual points experience due to the expansion or shrinking of space. I call this the cubic expansion velocity of spacetime $U(r)$. (Here r is the radius from the centre of the particle to the point in space observed.)

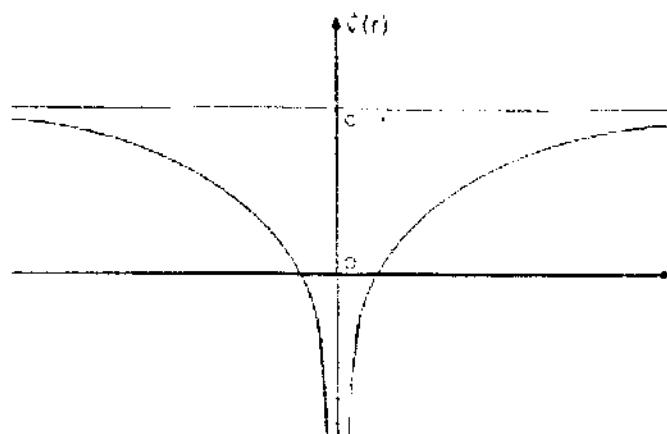
The following applies:
$$U = \frac{d(xyz)}{dt}$$

Of course by doing so we are not accounting for the complexity of the actual elementary particles together with their interactions. As a result I assume that the fields could be distorted by the influence of other particles and therefore the calculation of this "system" would be impossible – also due to the immense number of particles. Consequently for my model I assume that I am allowed to view each particle as if it were alone in the universe and cannot be deformed by other particles. I also allocate each of the particles its own inertial system with an axis intersection in the middle of the particle. In addition I assume that the linear expansion velocity of space strives to the value c for light speed with an increasing radius, and does so because, in my opinion, the movement of the points is responsible for the transportation of photons at light speed.

What does this now mean for the neutron? Initially I assumed that the field of the neutron could have the form of a hyperbola:

With the formula: $v(r) = c - \frac{a_n}{r^\lambda}$, whereby a_n is a constant especially for the neutron and λ is an unknown exponent, which I have been unable to calculate to date.

This results in the following graph:



Here, however, we have to allow points which are almost in the middle of the particle to move at a speed greater than the speed of light to the centre of the particle. The question is whether points – without mass – can exceed the speed of light. If not, we can assume that the curve would have the form of a bell standing on its crown, whereby the linear expansion velocity of space could possibly be $-c$ at the crown. In addition the depiction of the particle as a bell curve could possibly fit its wave nature better, which has already been described by quantum physics using its representation as probability waves. On the other hand the hyperbolic curve could perhaps explain the concentration of energy/mass inside the particle better, which is why I would like to stick with this option at the same time. When the electron is described (below) we will have to assume that speeds greater than the speed of light, and thereby the hyperbolic curves, are possible.

4. The proton

The proton is similar to the neutron but has a positive electrical charge. In my view this is expressed by the gradients in the hyperbola or bell curve being steeper than with a neutron. We will see why this is the case later on in the section "The electron". The formula for the

hyperbolic curve of the proton would be: $v(r) = c - \frac{a_p}{r^\lambda}$, whereby a_p is a constant especially for the proton and λ is an unknown exponent, which I have been unable to calculate to date.

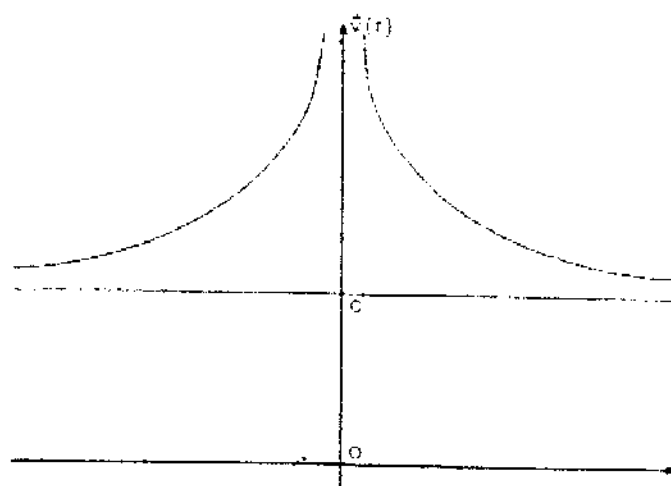
We can apply the graph for the neutron to the proton and imagine that it has steeper gradients than the neutron. Here the space inside the particle also shrinks and the expansion velocity of space is zero on the surface.

5. The electron

The electron, which has a negative electrical charge, differs considerably from the neutron and proton according to my hypothesis, as although the expansion velocity of space moves towards c when the distance to the centre of the electron is increased, as with the neutron and proton, when you get closer to the centre it increases hyperbolically infinitely or as per the bell graph up to a particular value. I assume that this is the characteristic of the negative electrical charge. As a result the adding (superposition) of a negative electrical charge causes the graph to level out if the particle has a positive charge. We can now understand why in my model the curve for the proton is steeper than that for the neutron.

The hyperbolic formula for the electron would be: $v(r) = c + \frac{\alpha_e}{r^\lambda}$, whereby α_e is a constant especially for the electron and λ is an unknown exponent, which I have been unable to calculate to date.

The following graph shows the hyperbolic curve of the electron:



We can see that the expansion velocity of space here is never zero or below zero. The electron therefore has a definable radius, no surface and the contours are diffuse.

With the electron we therefore have to assume that massless points in the particle can move faster than light. This is of course irritating, as who can actually disprove that?

6. Forces between the elementary particles

If the fields of two elementary particles overlap, forces have an effect. As we are considering each particle here as consisting of just one field, the fields also overlap with the inside of the other particle.

For my model I have attempted to derive a uniform formula for all forces. To do so we have to consider each individual particle as if it were alone in the universe, without taking the partial superposition (whereby "partial" is not really the correct expression, as even if the particles/fields lie apart from each other, they still overlap with each other in a displaced, yet complete manner) of the two fields into account. The idea behind this is that each particle/field exhibits energy in the form of elastic tension, which holds it together so that it has the tendency to retain its form. (Perhaps the total energy in the form of this elastic tension of a particle/field is the same as the total energy of the particle/field, equivalent to its mass (?))

This tension would be the same for both particles which exert force on each other, in spite of the "partial" superposition of the fields, as if we were not taking the superposition into account (conservation of energy). We do not initially observe any deformation (local displacement of energy in the form of elastic tension) of the individual fields/particles by superposition in the model, as explained above.

If we look at one point which lies under the influence of 2 fields/particles, then we notice that depending on which field you look at 2 different values are given for the cubic expansion velocity of space. In reality and in my model this is certainly not the case. Both cubic expansion velocities of space converge at an average point. As a result of this, however, the particles/fields which had been stabilised by energy in the form of elastic tension are deformed.

The strength of the deformity depends on the difference between the 2 cubic velocities of the expansion of space viewed independently from each other. I have taken this difference as the first factor for my formula. The second factor is the gradient of the original curve – not taking into account the overlapping of the two fields - measured for the first particle. On this curve the viewed point would move along until the difference between the two original expansion velocities of space is 0, if this is even possible in the system of the two particles. By doing so we have calculated the force which the first particle exerts on this point. In order to calculate the force exerted by particle 2 on this point, we replaced the gradient of the curve of the first particle with that of the second particle at this point.

If we add both forces which are exerted by the two particles on the point (vector addition) then we arrive at the resulting force which the particles exert on the observed point.

This is illustrated by the following formulae:

$$\vec{F}_1 = K (U_1(\vec{r}_1) - U_2(\vec{r}_2)) \vec{U}'_1(\vec{r}_1)$$

$$\vec{F}_2 = K (U_1(\vec{r}_1) - U_2(\vec{r}_2)) \vec{U}_2'(\vec{r}_2)$$

$$\vec{F} = \vec{F}_1 + \vec{F}_2 = K (U_1(\vec{r}_1) - U_2(\vec{r}_2)) (\vec{U}_1'(\vec{r}_1) + \vec{U}_2'(\vec{r}_2))$$

In order to measure the total force between the two particles, we calculate the integral space for all the points in the universe using the latter of the three formulae above. We can also look at the force which one particle exerts onto the other, separately, by calculating the same integral space for one of the first two formulae.

(\vec{F}_1 : the force which particle 1 exerts on the point; \vec{F}_2 : the force which particle 2 exerts on the point; U_1 : the cubic expansion velocity of space at the observed point, measured as if particle 1 was completely uninfluenced on its own in the universe; U_2 : the cubic expansion velocity of space at the observed point, measured as if particle 2 was completely uninfluenced on its own in the universe; \vec{r}_1 : The vector of the distance from the centre of particle 1 to the observed point; \vec{r}_2 : The vector of the distance from the centre of particle 2 to the viewed point; K: constant not yet calculated.)

Depending on which parts of the fields (internal, external, facing or averted parts) overlap, different forces are caused. I am not ruling out that they could be the 4 known forces (gravity, electromagnetic forces, strong interactions and weak interactions). This could possibly be the case if my model were to agree with reality, but I cannot conclusively confirm this, at least not at the moment. On the other hand, I do not believe the theories which state that forces are caused by particles which transfer messages like small soldiers.

The forces are also responsible for the elementary particles staying together, instead of making them disperse from each other at (virtually) the speed of light, as one could assume in view of the velocities of the expansion of space.

7. Electromagnetic waves, photons

The electromagnetic waves/photons are created in this model by the parts of the shrinking inside of elementary particles being accelerated so quickly by the forces described above in the opposite direction to the acceleration of the rest of the particle/field, that they leave the inside of the particle and the external parts of the elementary particle move (in wave-form(?) and) at (virtually) the speed of light (linear expansion velocity of space). The energy of the particle in the form of elastic tension is thereby reduced by the energy of the electromagnetic wave/photon emitted and the field/particle loses mass. The procedure described here (emission) is reversible (absorption). To date I have not been able to make measurements or more detailed descriptions.

8. Matter in movement

I explain the movement of elementary particles as an addition to the infinitely large amount of velocity vectors of the linear expansion velocity of space with just as many (infinite) velocity vectors for locomotion velocity. This could cause the matter to become deformed, which could possibly agree with the length contraction as per the special theory of relativity (Albert Einstein in 1905).

9. Conclusion

Due to my successive hypotheses I have therefore been able to establish a model, although I cannot prove that it actually agrees with reality. In spite of that I think that my model could at least serve as an approach to a unified field theory which still has to be verified. This would have to be researched further by me or another person, which all depends on the reaction of the professional world to my hypotheses.