Theory of Gravitulence

On stellar and terrestrial aberration, Doppler effect, experiments by Fizeau, Airy, Michelson Morley, Sagnac, Michelson Gale Pearson, Hammar, Lodge, Hafele Keating, Laser Resonators, GPS. Gravitulence as an alternative for Relativity.

Florian Michael Schmitt November 2022, Berlin

Abstract

Special and general relativity have proven to be powerful tools to explain and predict many, if not all applicable experiments and effects related to the speed and propagation of electromagnetic waves. Yet, for more than a hundred years, mankind has failed to find a connection between relativity and quantum physics, and one has to wonder which of the theories might be flawed. For nearly twenty years, I have put many of the consequences of relativity to the test and have concluded that something new must be introduced. I propose a Theory of Gravitulence that clears up relativity, the ether and Lorentz contraction, but explains all of the prominent phenomena. In the process it reveals some fatal misunderstandings about light propagation and gravity, most importantly that gravity would corotate with its inducing matter and that aberration, considering light coming as a beam, would only happen in the short vicinity of the observer.

Content

1. Introduction

The historical dispute, which began as early as the late 17th century and eventually led to the overwhelming success of the Theory of Relativity, centered on the light-bearing medium called the ether - static or entrained - and especially on stellar aberration, discovered by James Bradley [1] in 1725, and the (nonexistent) terrestrial aberration. Until the beginning of the 20th century, it was impossible to explain why aberration occurs in light from the stars but not in light from any terrestrial source. In general, static ether concepts explained stellar aberration but failed for terrestrial aberration, and the reverse was true for entrained ether concepts. A similar picture was given by the main experiments. Both the Sagnac effect [2] and the Michelson/Gale/Pearson [3] experiment disproved the entrained ether, while the Michelson/Morley [4] experiment proved the opposite. The Special Theory of Relativity, written by Albert Einstein in 1905 [5], resolved all contradictions by postulating the invariance of the speed of light, but at the expense of logical reason. The understanding of the nature of light was never completed when the special Theory of Relativity prematurely ended any further investigation on the subject. The purpose of this paper is to provide an alternative solution to the seemingly contradictory problems. In what follows, we develop a new theory that can solve all the problems while completely abandoning relativity and Lorentz contraction [6]. To do this, we first need to backtrack a bit, get clarity on the wave nature, and take stock of the problems and experiments.

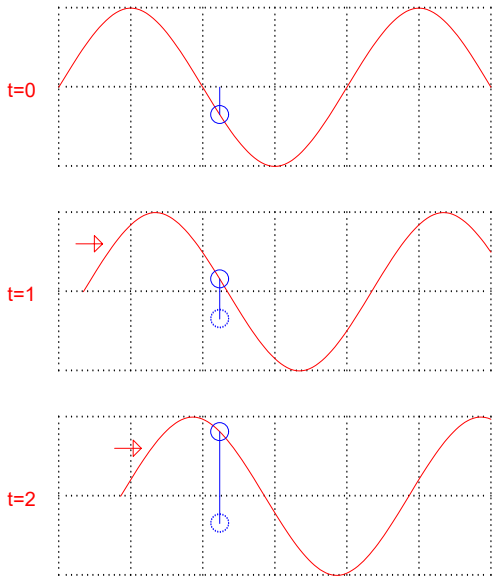
For clarification, in this paper we define the terms “static ether” and “entrained ether” as they were understood historically, i.e. static ether is fixed to the source’s position at the instant of emission, the entrained ether is dragged along the movement of the laboratory, i.e. observer. Entrained ether in this definition does not mean entrainment by gravity. Wehereas this is the case we use the term “Gravitulence”, since the Theory of Gravitulence makes a crucial and decisive difference in regard to Earth’s rotation. For simplicity, we will use the term light in the following, but it also always refers to the electromagnetic wave in general.

2. A short introduction to the electromagnetic wave and the ether

All ether theories of the 17th to 19th century assume that light needs a medium in which it can propagate similar to a sound wave in air. We will see later that such a medium is not necessary for the propagation of light and is superfluous to explain the phenomena.

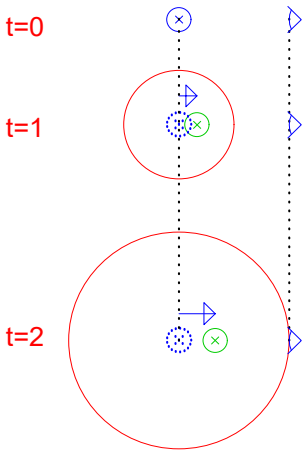
In the fundamentals of the wave nature today often different aspects are mixed up uncleanly, especially since the convenience of Theory of Relativity often does not require a differentiation anymore. First, however, some important principles should therefore be understood exactly, which distinguish a wave motion in classical physics from other forms of motion (we now consider water and air waves and pretend for the time being that light behaves analogously to them, as also the ether theories have understood this).

1. A wave does not represent a locomotion of material. Although the wave front of a water wave moves concentrically away from its starting point, the water molecules nevertheless only oscillate up and down. In analogy to the water, the ether, the medium of the propagation of the light wave, is therefore normally in rest concerning the direction of propagation.

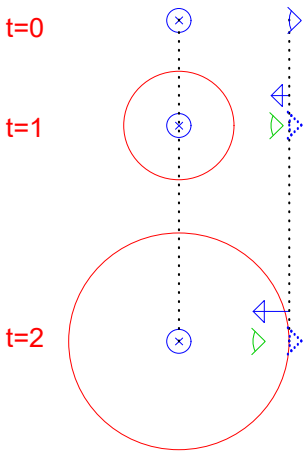


2. It is essential to distinguish between a wave and a single wave front. The wave front defines neither a wavelength nor an oscillation frequency. The latter is only produced by the source, which generates individual wave fronts with its pace and thus first of all only specifies a wave frequency. The wavelength, however, has nothing to do with the source, but arises from the typical characteristics of the propagation medium, namely the propagation speed.

3. A possible movement of the source in the medium or relative to the wave has no influence on the propagation speed of the wave. We imagine that a stone falls into the water and triggers a wave front. From that moment on, the wave front propagates through the medium, no matter what state of motion the stone is in. Thus, the propagation speed of the wave is completely independent of the source's motion velocity and direction. The velocity of a source cannot add to the velocity of the wave in any form.



4. Also the state of motion of an observer changes per se nothing at the speed of propagation of the wave in its medium. But here it is already necessary to clear up the first big misunderstanding: Provided that the observer moves relative to the wave, he will need shorter or longer time to reach the wave. This duration is calculated by the classical velocity addition. But this does not mean at all, as it is often done sloppily and with fatal consequences, that the velocity of the observer is added in any way to the velocity of the wave.



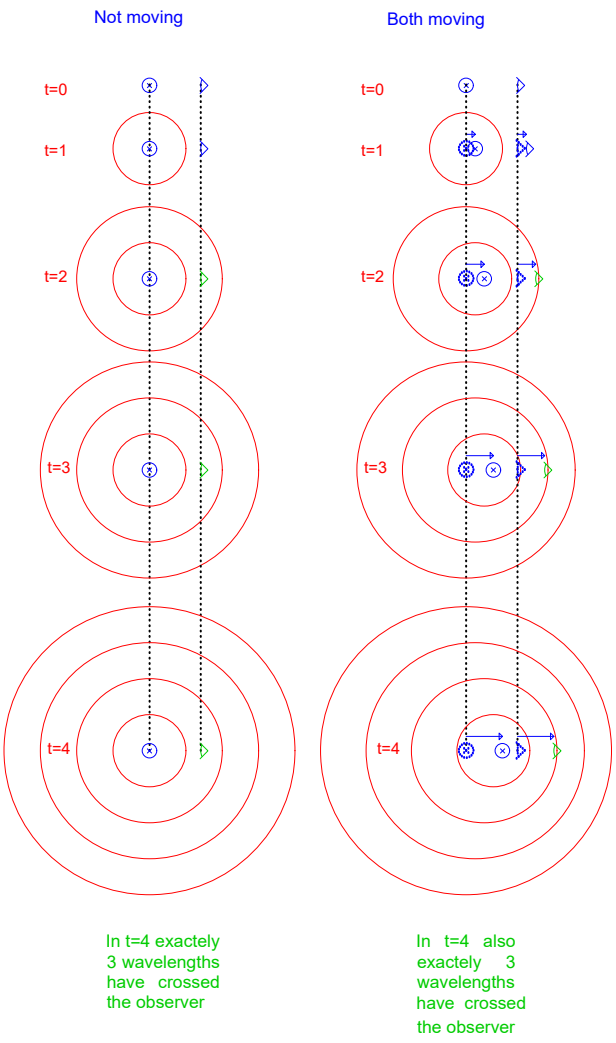
5. As can be seen from the pictures, it does make up a difference, if source or observer is moving, not regarding the wave propagation speed, but for the elapsed time from the observer's point of view. Nonetheless the velocity of the wave is independent of the velocity of the source as well as of the observer, so to say absolute or invariant. This sounds very much like Relativity, but we are completely in classical physics. We will see later that the Theory of Relativity still understands something different by invariance of light speed.

6. Waves are subject to the Doppler effect [7], and it is essential to distinguish between the Doppler effect of the source and that of the observer:

   - On the side of the source, the Doppler effect, as previously discussed, arises precisely because the first wave front moves undisturbed by the next wave front. The center of the first wave front is the location in the medium where the wave was initiated, not the location of the source. If the source moves, the center of the next wave will shift. This shift in the locations of origin of the wave fronts displaces the otherwise concentric image, and the wavelength shortens in the direction of motion of the source and lengthens on the opposite side. The Doppler effect on the side of the source is therefore a purely geometrical matter, which first of all has nothing to do with the oscillation frequency of the wave or the clock generator (the source).

   - On the observer's side, the Doppler effect is quite different. Here it is not about a shift of the geometry, but about the fact that the moving observer meets more or less of the wave fronts within the same duration depending on his direction of movement. For him the effect appears rather as a frequency change, which he can perceive as a change of the wavelength only by conclusion about the time.

   - As long as source and observer move in the same way, the change of wavelength on the source side exactly cancels out with the change of frequency on the



observer side. Unfortunately, this important aspect remains unaccounted for in many considerations.

Now we want to take a closer look at the ether theories. Both views (static and entrained ether) have their plausibility, and at first it is not easy to see which theory could be correct.

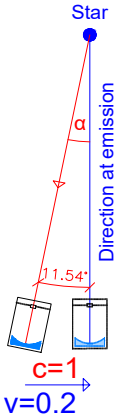
1. The so-called static ether assumes that the propagation medium of light lays immobile in an absolute space (i.e. in a kind of zero reference frame) and that the light propagates in this medium with a velocity relative to the stationary medium. All light sources moving in the medium as well as observers would feel that the medium flows past them. At this point we already have to point out the second fatal error of thinking: With this interpretation, the light would propagate with its velocity relative to the medium with the additional, supposed velocity of the medium relative to the observer. This is, of course, imprecisely thought. Rather, it is the case that the observer is moving toward or away from the light wave fronts, and the medium is not relevant to this at all. We might as well think it away altogether. The only thing we need is the absolute space. Because only at this we can fix the center and the point of origin of every single light wave front.

2. The entrained ether, on the other hand, postulates that the propagation medium moves with the observer and does not stand in absolute space. What sounds absurd at first, is relativized, if one assumes that the medium is simply subject to the attraction by gravity and is carried along by it, i.e. the entrained ether in the form of Gravitulence.

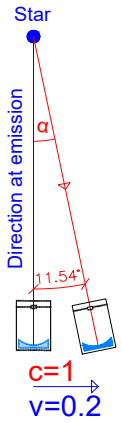
3. Problems of aberration

The term aberration describes the change of the observation angle to a star or celestial object, when the observer moves transversal to the propagation direction of the light. The aberration angle is not to be confused with the parallax, it is not a geometrical property but arises solely from the ratio of the speed of light and the velocity of motion of the observer. The aberration angle is always the same for all objects independent of their distance.

But first the attempt of an explanation in a world of static ether: We imagine a star observation with a telescope. The light ray from the distant star comes to us straightly and passes longitudinally through our telescope, while we, including the telescope, move laterally with the Earth's motion (in the static ether the light remains completely unimpressed by the Earth's motion). For the beam not to hit the wall of the telescope tube, so to speak, we tilt the telescope and catch the beam with the eyepiece. If the speed of light and the motion of the Earth are known, the theoretical angle can be calculated very easily by means of a



triangular geometry, and the result agrees excellently with the observations.



For this an analogy is often used, where a running walker must tilt his umbrella in his running direction, so that the vertically falling raindrops do not hit him. Unfortunately, this analogy obscures the view on the actual solution of the question. If we mirror the above picture, we realize that it is as plausible to imagine the telescope running away from the vertical star's position, and the raindrop metaphor would not make sense any more.

But we come now to the core of the problem of all ether theories: If the aberration angle exists in observations of distant celestial bodies, why should it not exist when we observe a distant object located on Earth? After all, the angle should be independent of the distance of the object. But such a terrestrial aberration does not exist, this is proved by all experiments and everybody could almost try it himself by directing a laser beam in eastern or western direction against a wall in his apartment and observing its point of impact for more than one year. With a distance of the wall of ten meters and an orbital velocity of the Earth of approx. 30 km/s, the laser point would have to shift by clearly perceptible 2 mm.

In the theory of static ether, the above explanation for stellar aberration is entirely plausible. Earth and telescope move relative to the ether in which the light propagates. But since the medium of light propagation is statically connected with absolute space, the aberration would have to occur in the same way for an object located on Earth. Since the terrestrial aberration does not exist, the theory of the static ether is here at its end.

On the other hand, the absence of terrestrial aberration in the world of the entrained ether is self-explanatory. Any propagation of the light beam wanders with the Earth movement, there can be no aberration. Only the light ray in the telescope wanders just the same with Earth, so that there should be also no stellar aberration after all. Here the theory of the entrained ether is in trouble.

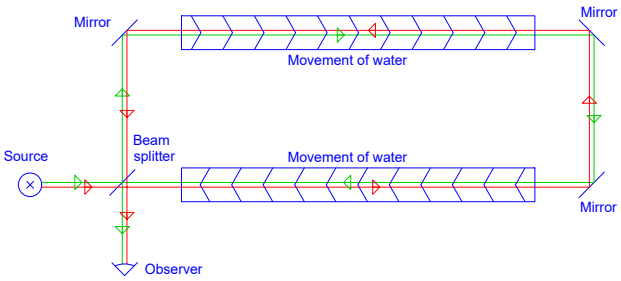
So, none of the two theories can explain all forms of the aberration plausibly. We will see later, however, that this is not quite true.

4. A look at the experiments within the framework of the ether

1. Experiment by Hippolyte Fizeau, 1851

The Fizeau experiment [8] fed the first doubts about the ether theories. In this experiment, two light beams are generated in opposite directions and propagate through two tubes of flowing water.

One ray always follows the flow, the other always against it, and at the end the rays are made to interfere. As a result, the flowing water obviously has an influence on the light propagation, but contrary to expectations, only with a part of its flow velocity. Hippolyte Fizeau also provided a mathematical derivation for the result, but it was based on an ad hoc hypothesis on light refraction by Augustin Jean Fresnel [9] in 1818.



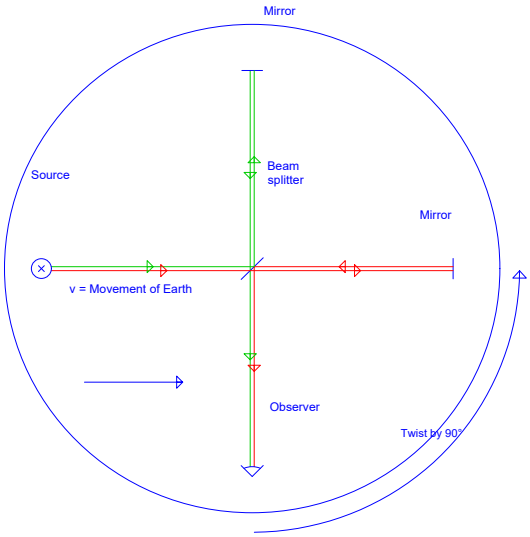
The static ether would postulate that the full velocity would be decisive, whereas the entrained ether would allow no influence of the velocity at all, because the light would have to be fully entrained by the water. Although the experiment is used again and again to justify the Theory of Relativity and to reject the ether theories, it does not give any information about existence and property of the light ether, only about the question how a moving medium influences the propagation of light. However, the experiment cannot be plausibly explained with classical physics until today, so that it is considered as a proof for the Theory of Relativity. We will see later that this is not correct.

2. Experiment by George Bidell Airy, 1871

Another confusion concerning stellar aberration was this experiment [10], where a telescope was filled with water. It was already known that light propagated much slower in water than in air and vacuum. According to the thesis explaining stellar aberration, the light ray in the telescope should propagate slower while the telescope moves sideways unchanged at the velocity of the Earth, which should lead to an increase of the aberration angle. However, the experiment did not result in the slightest change of the aberration angle. The concept of static ether, which was until then able to explain the aberration, was thus in trouble. The entrained ether, however, can explain the experiment, as well as the Theory of Relativity. We will recognize later that also here a fundamental error of thinking is at work.

3. Experiment by Albert Abraham Michelson and Edward Williams Morley, 1881 and 1887

The experiment [4] was designed to determine the motion of our Earth relative to the ether, respectively to prove the existence of the ether at all. Strictly speaking, however, it is just a very sensitive measurement of the terrestrial aberration. Thereby the course of a light beam is examined along the direction of motion of the Earth, which thus runs behind a mirror, so to speak, in order to be brought afterwards in opposite direction against the motion of the Earth with a reference beam to an interference in form of concentric rings. After collimation the setup has to be twisted by 90° to show at all the difference between the vertical and the horizontal beam.

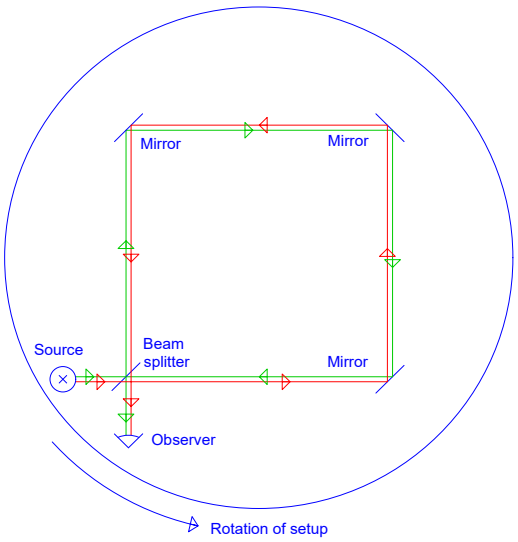


Only at first sight one would like to assume that the deviations of the running time on the outward and return way balance out to zero, but this is wrong, because a so-called second order effect remains, which is measured by the squares of the velocities and is relatively small. Thus, according to the theory of static ether, both an angular deviation between beam and reference beam and a different travel time would be expected, which would show up in a shift of the interference fringe.

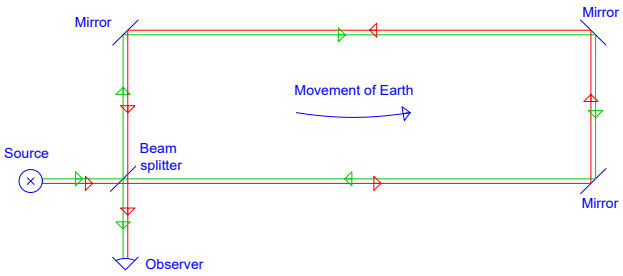
The experiment could not find any deviation within the measurement accuracy, the displacement of the interference rings was far below the calculated 0.04 times of a displacement. This result only allowed the conclusion that there is no ether and also no terrestrial aberration. However, as reference velocity of the Earth, its orbital velocity around the Sun was assumed. If one would apply according to today's knowledge the about 10-fold larger velocity compared with the CMB (cosmic microwave background), a shift of approx. 4 interference fringes would have to be expected, which makes the zero result even more distinct. However, if one were to look for a signal for the approximately 100 times smaller velocity of the Earth's self-rotation, the interference shift would be one 10,000th smaller, i.e. 0.000004 interference fringes, and even today's technology could not identify them. It is often claimed that gravitational wave telescopes like LIGO should be able to detect such a small shift. Also here a thinking error: This gigantic interferometer would have to be rotatable for this purpose, in order to map the effect theoretically at all. Because otherwise it stands always in the same direction to the alleged flow of the ether and can make out no difference at all. In summary, it becomes clear that the experimental result does not fit with the theory of static ether. However, the entrained ether is different, because this aptly predicts a zero result as well as the non-existence of terrestrial aberration.

4. Experiment by Georges Sagnac, 1913, and Experiment by Albert Abraham Michelson, Henry Gordon Gale, Gerald Leondus Pearson, 1925

Unlike the Michelson Morley experiment, here two light beams traveling in opposite directions on a rotating disk are brought to a closed route and then to interference [2]. The (much bigger) effect of first order, thus caused by the simple relation of the velocities, is here not cancelled out by the mathematics. It differs from the Michelson Morley experiment because no forward/backward movement is at work. Surprisingly, the experiment gives a positive result, namely the travel times of the two beams change depending on the rotation velocity of the disk and there are significant interference shifts. Modern laser gyroscopes also show exactly this effect.



A systematically similar experiment was the Michelson Gale Pearson experiment [3]. Here two light beams were brought in opposite directions on a several kilometers long closed track, which was fixed on the Earth. Again, a positive result was obtained, which this time corresponded to the intrinsic rotational velocity of the Earth. In other words: Earth itself replaced the rotating disk. An investigation concerning higher velocities e.g. the orbital velocity of the Earth in a yearly course was never accomplished to my knowledge at this experiment. However, in my work "Gravity and light speed" I could prove that all higher velocities are mathematically cancelled out in this experiment.



The Theory of Relativity [5] has difficulties with the explanation of the Michelson Gale Pearson experiment until today and retreats to the point of view that it is a non-inertial (thus accelerated) system. This is in principle correct (even if the acceleration by the centrifugal force of the Earth rotation is extremely small, whereby the effect is quite strong), on the other hand I have not seen yet any elaboration which could have explained the experiment accordingly from the general Theory of Relativity conclusively and tangibly.

The results of these experiments were otherwise interpreted to the effect that the concept of static ether is compatible, but that of entrained ether is not. Because in the latter case, at the Michelson Gale Pearson setup, the light would have had to be carried along with the Earth rotation, and a zero result would have been expected. That here another fatal error of thinking is committed, we will see later on.

5. Experiment by Gustaf Wilhelm Hammar, 1935

This experiment [11] is similar to the Michelson Gale Pearson experiment, but on a laboratory scale. In addition, however, a section of the light path was covered with heavy lead blocks. The experiment was intended to show that, contrary to the theories of entrained ether, the light travel time is not affected by the gravitational effect of the lead blocks. The result was negative, and so again a proof against the entrained ether was brought into play.

6. Experiment by Oliver Lodge

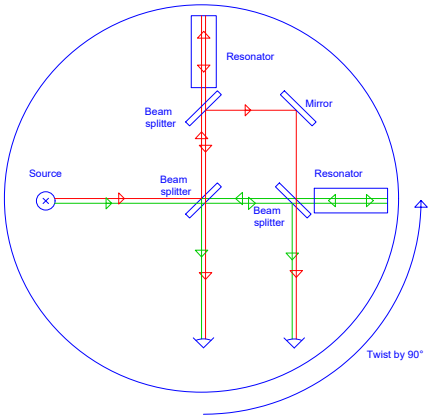
Oliver Lodge's experiment [12] was also intended to prove that light is not carried along by gravity. However, the experiment was more similar to that of Sagnac, in that Lodge let two beams run in opposite directions between two heavy lead disks, which in turn rotated against each other. Again a proof against the entrained ether. The interpretations of the Hammar and the Lodge experiment are nevertheless based on a further error in thinking, as will be shown later.

7. Experiment by Joseph C. Hafele and Richard E. Keating, 1971

In this experiment [13], four atomic clocks, previously synchronized with another atomic clock on Earth, were brought aboard a commercial airliner. The airplane then flew around the Earth in an easterly direction for two days, then in a westerly direction for two days, and in each case the time measurements were compared with the reference clock. The result was indeed a positive or negative deviation of the clocks depending on the direction of the flight. The experiment is considered as a further proof of the Theory of Relativity. We will see that it can also be different.

8. Experiments with laser resonators

Experiments with laser resonators are ultimately highly refined variants of the Michelson Morley experiment. A two-part light beam is sent back and forth in a so-called resonator tens of thousands of times in order to generate the longest possible path. The light beam is in resonance within the resonator, i.e. wave crests and troughs of the forward and backward traveling light wave add up on top of each other.



A possible frequency change of the light beam to the reference beam is then measured. More precisely, it is not the frequency change per se that is identified, but the so-called beat, a higher-level oscillation that is much larger than the light frequency and occurs when the waves do not resonate exactly. Examining the beat instead of the frequency increases the resolution of the measurement result many times over. The results of these experiments suggest a speed change only by less than cm/s in relation to the speed of light, so that an actual zero result can be assumed. In other words: The ether and the terrestrial aberration do not exist.

9. GPS technology

In satellite-based navigation (GPS), several satellites must communicate with each other and also with points on Earth by means of electromagnetic waves. The question to what extent the movement and rotation velocity of the Earth and also of the satellites must be taken into account in the travel times of the radio waves or the synchronization of the atomic clocks on board and on Earth are decisive for the precision of the system. The travel times must be corrected, and for this purpose the center of the Earth is always used as the zero point of the coordinate system. Surprisingly, attempts to use, for example, the Sun as the center of the coordinate system have failed. The technology is regularly cited as evidence for the Theory of Relativity, which is correctly able to determine the required adjustments.

5. Theory of Gravitulence

As we can see from the above, there is great confusion concerning the ether theories. The Theory of Gravitulence will bring order to the findings and many new insights. First, let us define the basic assumptions that set the framework for the Theory of Gravitulence:

1. The light waves are subject to gravity. Gravity deflects them and carries them along. A weakening of the entrainment by gravitation occurs not by the distance from the gravitation-giving mass per se, but the sphere of influence of all existing gravitations. Gravity likewise influences or bends the electromagnetic fields.

2. Gravity is at the place of the mass generating it, with its center at the center of the mass. Gravity moves with the movement of the mass, with one exception: The gravitational field of a rotating mass does not also rotate with the mass, but behaves resting in the reference frame of the center of mass.

3. We assume that light propagates in the form of concentric, spherical waves. A beam of light does not normally occur, or must first be produced by appropriate measures of focusing by diffraction or reflection.

4. Light does not need a medium for its propagation. The light propagation in media like water occurs with reduced speed, as if the light propagation is slowed down or hindered by the medium.

5. We assume that there is an absolute, resting space in the universe, in which the matter develops, moves and expands since the beginning of the time. The Theory of Gravitulence is not developed far enough at present to make statements about big bang and fate of the material universe. However, according to the current state of the science it is probable that an absolute space must be postulated indeed again, in which the cosmic background radiation is anchored, against which our cosmic home moves with approx. 368 km/s according to the current state of research.

6. The place of origin of a light wave front is and remains that point in the coordinate system of the resting space, at which the wave front has taken its origin. The movement of the source is not relevant for the propagation of the light.

7. The speed of the light is always the same and invariant with respect to the resting space. The motion of the observer does not change the speed of propagation of light. However, the time for the observer after which he arrives the light changes according to the movement of the observer.

8. The Doppler effect behaves according to the classical physics, in relation to light source as well as observer.

Now we want to try to treat all problems and experiments described in the world of the ether and to illuminate the respective interpretation misunderstandings. Thereby the Theory of Gravitulence must assert itself in every single point and explain all effects of the light.

1. Stellar aberration

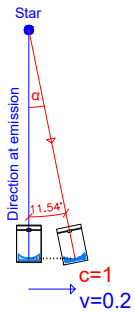
All considerations about stellar aberration made above are based on two fatal errors in thinking:

1. It is assumed that the light comes from an observed object as a beam. In fact, according to all what we know, the light wave fronts are spreading in concentric spheres, so there is no question of a beam. The model of the tilted telescope could not be represented under this premise at all.

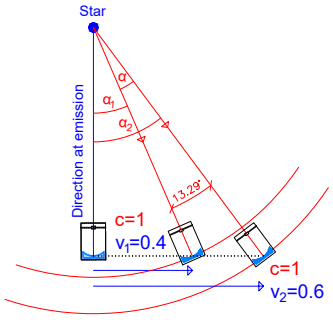
2. Implicitly it is assumed that the aberration takes place on the way of the telescope length. In view of the dimensions in the universe, this is simply nonsense.

In my work "Gravity and light speed" [14] I have developed a concept which takes into account the spherical propagation of light as well as the total travel time and distance of light from the observed star to the observer. The calculation is much more complicated than the classical one. It involves two systems moving at different velocities. A circle increasing with speed of light (the light wave front with its center of origin at the place where the star is at the moment when the wave front is sent out) and the planet Earth from where the observation takes place. The meeting point of the circle and the motion vector of the Earth is calculated.

Classic aberration



Correct aberration



The aberration angle α has to be defined as the difference of two much greater angles α_2-α_1. Only v_2=0,6 minus v_1=0,4 represents the v=0,2 of classic interpretation. The deviation from the classic formula's result is minor with realistic speeds.

Classic formula:

$$\sin(\alpha) = \frac{v}{c}$$

Formula by Gravitulence:

$$\alpha = \alpha_2 - \alpha_1$$

Whereby

$$\sin(\alpha_1) = v_1 \cdot \frac{1}{\sqrt{v^2 + c^2}} \qquad \sin(\alpha_2) = v_2 \cdot \frac{1}{\sqrt{v^2 + c^2}}$$

v is the speed against CMB, v_1 is the speed against CMB minus Earth's orbital speed and v_2 is CMB plus orbital speed

The result is a somewhat more complex formula, which already here contains a term of second order (squares of the velocity addition) and in the result gives very exactly the empirically observed angle (the formula would become still more complex, if one considered in addition the circular form of the Earth orbit). Yet it agrees with the relativistic aberration formula up to the ninth decimal place of the arcseconds of the aberration angle. It turns out that the known aberration angle represents only the motion of our Earth around the Sun, i.e. only the difference in velocity during one year. If one applies realistically our velocity against the CMB for this, the actual aberration angle becomes more than ten times larger. According to the above sketch, this angle is represented by the angle between the blue vertical line and the red lines.

The actual dimension of the aberration is such that the observer has not moved sideways by the telescope diameter, but already maybe a few times around the whole galaxy, until the event of the aberration takes place, which has started at the star millions or billions of years ago. And also the star may have moved already thousands of light-years since then, when its light reaches the observer. But this perspective opens completely new interpretations: If the aberration takes place all the way between the star and the Earth, it becomes quite irrelevant if the light was still entrained by the Earth's gravity during the last meter in the telescope. Likewise, the total entrainment distance by gravity in the vicinity of star or observer is so small that it becomes negligible, and for the Theory of Gravitulence in this case we are de facto dealing with a consideration in terms of a static ether. By the way, this thesis was already developed by George Stokes [15] in 1845, unfortunately, however, with regard to the spherical light propagation, it was not thought to the end and unlike in my work "Gravity and light speed" [14], it was also not formulated mathematically. In other words: The stellar aberration is explained by the Theory of Gravitulence gaplessly.

2. Terrestrial aberration

In my paper "On Aberration of Light and Reflection from Moving Mirrors" [16] I could prove that also in a system of static ether all supposed terrestrial aberration is always cancelled out (at least concerning the angle, not the transit time difference) by the so far not considered change of the reflection angles at moving mirrors. Consequently, a light beam, which must always be focused by means of lenses, parabolic mirrors or lasers (which is also generated in a mirror resonator), will also be subject to this deflection. According to the Theory of Gravitulence, the light is carried to almost 100% in an experiment at the Earth's surface - also considering the attraction of the Sun - so that no terrestrial aberration can occur. The absence of the terrestrial aberration is completely explained by the Theory of Gravitulence.

3. Fizeau experiment

As already stated above, the experiment is not suitable to make more profound statements about the propagation of light, and also no proof or refutation of the Theory of Gravitulence. However, the experiment remains interesting, because classical physics until today is not able to give a physically plausible explanation for it. In my paper "Fizeau Experiment revisited and physical meaning of the refractive index" [17], however,I succeeded in providing a solid explanation. It is based on the plausible assumption that there is a significant empty space between the water molecules. In this space the light moves with the vacuum speed of light, while in the area of the molecules it moves with a much lower speed, which together with the vacuum speed results in the measurable speed of light in water in total. The results and formulas derived from this according to classical physics, taking into account the specific wavelength in different media, correspond exactly to the experimental findings.

Formula by Gravitulence:

$$4 \cdot \Delta fringe = 4 \cdot \frac{\lambda_0}{\lambda_{Medium}} \cdot \frac{v_{Medium}}{c_{Medium}} \cdot \left(x - \frac{y}{n^2}\right)$$

Whereas x represents the length of the molecule, y represents the length of space between molecules:

$$x = \frac{1}{\frac{1}{n^2} + 1}$$

and

$$y = \frac{1}{n^2 + 1}$$

Nevertheless, the Fizeau experiment can, systemically conditioned, also deliver no statements about the Theory of Gravitulence.

4. Airy experiment

As already explained in the section about stellar aberration, at the distance ratios between star and observer it can also not be relevant, if the light propagates with lower speed in the negligible distance of the telescope tube. An effect would only occur if the light had to travel through water on a significant part of the entire path from star to Earth. The Airy experiment is therefore completely explained by the Theory of Gravitulence.

5. Michelson Morley experiment

Up to now apparently little thought was given to why the Michelson Morley interferometer does not even show the orbital velocity of the planet let alone larger velocities, while the Michelson Gale Pearson experiment makes only the rotation velocity readable, but not the much larger orbital velocity. In my work "Gravity and light speed" [14] I could already prove mathematically that for the experiment in the world of the static ether the velocity against CMB as well as that of the intrinsic rotation of the Earth are mathematically cancelled out. For the Theory of Gravitulence, however, only the rotation velocity of the Earth remains relevant from all velocities. According to my remarks in "On Aberration of Light and Reflection from Moving Mirrors" [16] no angular deviation of the interfering beams is to be expected also on basis of this smallest velocity. Nevertheless, a small transit time difference should be discernible, which, however, exceeds the accuracy requirement of the existing instruments by a factor of 10000. The Michelson Morley experiment is thus explained by the Theory of Gravitulence for the time being.

6. Sagnac experiment

The confusion concerning the velocities at the Michelson Morley experiment versus the Sagnac effect actually already suggests that for all experiments, whether first or second order, consistently that velocity should be investigated which obviously can lead to results at all, namely the intrinsic rotation of the Earth. Concerning the Sagnac effect, we must now first uncover a fundamental error in thinking, with the aim to rehabilitate the concept of the entrained ether for a whole series of

experiments, but even more to support the Theory of Gravitulence. I refer here again to my detailed analyses on the subject in my paper "Gravity and Light Speed". The gravitational effect of the Earth moves with the Earth. This is true of its velocity relative to the CMB, the Milky Way, and the Sun. But its gravity does not rotate with the Earth's own rotation. The best and simplest proof of this is that there could be no weather on Earth if gravity rotated with the Earth, because the atmosphere would experience no motion at all relative to the Earth's surface. For this reason also with the Theory of Gravitulence exclusively the velocity of the Earth's own rotation is relevant. The light is not carried along by this as only. Just as little the light is naturally carried along by a rotating disk which the Sagnac experiment represents. We imagine an analogy to this: would a person hovering over a merry-go-round assume its rotation velocity, if he does not touch the merry-go-round at all? Certainly not, nevertheless the person would fall down by the gravity of the Earth. The same must happen to the light, so that the Theory of Gravitulence must predict a transit time deviation corresponding to the rotation of the disk. The Sagnac effect is thus explained by the Theory of Gravitulence gaplessly.

7. Michelson Gale Pearson experiment

As again explained in detail in my paper "Gravity and Light Speed" [14], the Theory of Gravitulence predicts also for this experiment a transit time change according to the rotation of the Earth. Also the rotating "disk" of Earth's surface moves away under the feet of the light, while on the other hand its gravity keeps the light at place. The Michelson Gale Pearson experiment is therefore explained by the Theory of Gravitulence gaplessly.

8. Hammar experiment

Provided that the experiment takes place on the Earth, the Earth's gravity becomes so dominant that a weight of generously estimated 500kg accounts for an additional gravitational effect of 10^{-7} of the Earth's gravity. The rotational velocity of the Earth, which is only a fraction of about 10^{-7} of the speed of light, would thus have an influence of another fraction of 10^{-7}, in total only 10^{-14} of the speed of light. Translated to the Michelson Morley experiment with its high sensitivity, which could resolve already at the orbital velocity of the Earth not much less than 0.04 interference shifts, this would correspond there to an interference shift (due to the square) of $0.04 \cdot 10^{-17}$. But even at an experiment of the first order as the Hammar experiment represents it, the interference shift would be only 10^{-7} of an interference fringe, everything else than a measurable effect thus. The Hammar experiment is therefore unsuitable to make any statements, unless the Earth's gravitation would be at least five orders of magnitude smaller. The Hammar experiment therefore can make systemically also no statements about the Theory of Gravitulence.

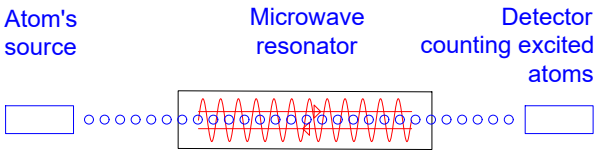
9. Lodge experiment

The Lodge experiment has at first the same systemic problem as the Hammar experiment, the gravitational influence of the rotating, heavy disks is much too small. In addition, however, the further mistake of thinking is committed that the gravitational force generated from the mass of the disks should also rotate with the disks. This is just as nonsensical as the assumption that the Earth's gravity would rotate with the Earth. Therefore, the experiment is unsuitable systemically to make any statements, also not to the Theory of Gravitulence.

10. Hafele Keating experiment

The deviating time recording on both flights was interpreted in the sense of relativistic time dilation.

If one looks more closely at the technology of an atomic clock, one finds out that there a microwave beam excites atoms in a resonator and counts their excited states. The conclusion that the running time of the microwave beam is shortened or lengthened by the velocity of movement of the apparatus should therefore be permissible.



Basically, the experiment merely confirms the findings from the Sagnac effect. The measured time deviations are indeed in agreement with the Sagnac effect, and for the experiment what has already been mentioned there is true.

11. Laser Resonators

In my paper “Anisotropy of Light Speed Due to Earth's Own Rotation” [18] I did an evaluation of the five known resonator experiments that have a rotatable setup and therefore could show an anisotropy at the scale of Earth’s rotation at all. In all five experiments, a great variety of spurious signals, some of them three orders of magnitude higher than the sought signal, are averaged or factored out. Consequently, the data evaluations finally ignored Earth’s rotation in order to receive any outcome. These experiments therefore do not provide any results that would contradict nor confirm the Theory of Gravitulence.

12. GPS technology

The GPS technology, which works only with the center of the Earth as reference system and has to compensate exclusively the smallest of all velocities to be considered, namely that of the Earth's own rotation, is the most solid support of the Theory of Gravitulence at all. It is claimed that the times at the atomic clocks of the satellites have to be corrected exclusively relativistically for reasons of time dilation. But we have already stated concerning the Hafele Keating experiment that also an atomic clock is subject to the peculiarities of light propagation. Therefore, a time shift of the clocks must be due to the change of the light travel times by the movement velocity of the clock. Moreover, relativistic mathematics obviously fails if the center of the Sun is chosen as the zero point of the reference system. Actually, the GPS technology is thus a strong argument against relativity, because according to the relativistic point of view the choice of the reference system should not be relevant at all. So the GPS technology contradicts the Theory of Relativity as well as the static and entrained ether (if this is not understood in the form of the Theory of Gravitulence). If one looks more exactly at the corrections in the GPS system, one finds out, however, that it is to some extent a question of the compensation of the well-known Sagnac effect, the other part has to do with the distance to the gravitational center of the Earth. In my work "Newtonian explanation of GPS clock correction" [19] I

could prove mathematically precisely that the Theory of Gravitulence predicts the exact correction values of the GPS technology, for the dynamic as well as the gravitational part of the correction.

Formula by Gravitulence:

$$\Delta t = \frac{2l}{c} \cdot \frac{\left(v_{orbit} + v_{gravitycomponent}\right)^2}{\left(c^2 - \left(v_{orbit} + v_{gravitycomponent}\right)^2\right)} \quad \text{whereby} \quad v_{gravitycomponent} = v_{CMB} \cdot \frac{a_{sun}}{a_{earth}} \cdot \frac{2}{\pi}$$

6. A word to the Theory of Relativity

In the second chapter we have already discussed how in classical physics the invariance of the speed of light is to be understood, namely that it is always the same independent of the motion of source and observer with respect to the resting space. The movement of the observer leads only to the fact that the light waves will reach him sooner or later. Relativity goes one step further in this regard, and this is the core problem of the theory, in addition to logical and mathematical errors, as I have already identified in my paper "Logical Errors of Special Relativity" [20]. According to relativity, even the elapsed time does not change, which the observer would have to gain or lose as he moves toward or away from the light wave. That this must be balanced by a construct of length contraction and time dilation is actually obvious.

7. Conclusion and Perspective

Finally, we want to summarize now all aspects of the light propagation mentioned above concerning the ether theories, the Theory of Relativity and the Theory of Gravitulence in a matrix. A “+” denotes here that a theory can explain the experiment.

Problem / Experiment	Static ether	Entrained ether	Relativity	Gravitulence
Stellar aberration	+	-	+	+
Terrestrial aberration	-	+	+	+
Fizeau experiment	-	-	+	+
Airy experiment	-	+	+	+
Michelson Morley experiment	-	+	+	+
Sagnac effect	+	-	o	+
Michelson Gale Person experiment	+	-	o	+
Hammar experiment	+	+	+	+
Lodge experiment	+	+	+	+
Hafele Keating experiment	+	-	+	+
GPS technology	+	-	-	+
Laser resonators	-	+	+	+

Obviously, only the Theory of Gravitulence can solidly represent all aspects listed above. In particular, it is also compatible with the aspects of stellar aberration and all phenomena similar to the Sagnac effect, where the theories of the entrained ether had always failed. I also would like to express my respect to the late Al Kelly [21], an engineer from Dublin, who as well found the relationship of light and gravity in principle. Also Monty Frost from Palo Alto CA./USA accurately described this very concept in one of his papers [22]. If the Theory of Gravitulence proves to be correct even after further tests, this would have great consequences on the status quo of physics. Alone by the readjustment of the universal sky dynamics the questions about dark matter and energy would have to be asked again or not at all because of the aberration angles erroneous by a whole order of magnitude. Theories about the big bang, size and age of the universe would also have to be put to the test. At present, it is still speculation that gravity not only influences the propagation of light, but also bends electromagnetic fields per se. For this case field models would have to be investigated, whose results would possibly often agree with the predictions of the general Theory of Relativity, but could open completely new possibilities for a unification with quantum physics. Unfortunately, my mathematical expertise is not sufficient to cope with such a task, and I would like to motivate others to do so.

Of course, the question has to be asked, which experiment could be done to get clarity about the theories. From my point of view a simple Michelson interferometer at a Lagrangian point would be the ideal experiment. The point would move with CMB- velocity inertially to the absolute space, but would be uninfluenced by gravity, whereby also bypassing the question of light being influenced by centrifugal force. Provided that also here a zero result would arise, the Theory of Gravitulence would be disproved, otherwise the Theory of Relativity.

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