Gravity and Light Speed

by

Florian Michael Schmitt

January 2018, Berlin

Abstract

All relevant experiments that disagree with static or entrained ether and led to the historical breakthrough of Special Relativity [1] will be revised from the scratch. It will be shown that an alternative assumption, that simply gravity itself is the "luminiferous ether", is able to explain all the notorious phenomena, if rotational effects are properly interpreted. Invariance of light speed, time dilation and Lorentz contraction [2] will become obsolete. Focus is laid on the most problematic classic subjects as there are: Michelson/Morley experiment [3], Sagnac effect [4] and Michelson/Gale/Pearson [5] experiment, stellar and terrestrial aberration as well as anomaly of Mercury orbit shift. A series of fateful and fundamental misinterpretations will be disclosed.

1. Introduction

The historic dispute about ether theories was circling around the experimental evidence, most importantly the Sagnac and Michelson/Gale/Pearson experiment versus the Michelson/Morley experiment. The Sagnac effect [4] as well as the Michelson/Gale/Pearson [5] experiment were esteemed to be disproving entrained ether but being in accordance with static ether, the Michelson/Morley [3] experiment attested the opposite. A similar picture was given by the problem of stellar and terrestrial aberration. Generally spoken, static ether concepts [2] were explaining stellar aberration but failed on terrestrial aberration, entrained ether concepts [6] [7] vice versa. Special Relativity [1] solved all the contradictions by postulating invariance of light speed, but at the expense of logical reason, and understanding of the nature of light was never brought to an end, when Special Relativity [1] prematurely terminated any further investigation on this topic. This paper is aiming to positively test a **gravitational light drag theory**, whereby light is fully entrained by gravity, on most of the applicable experiments and on aberration. In the gravitational light drag theory, the following framework is given:

- Source's velocity relative to gravitational field does not affect speed of light propagation
- Observer's velocity relative to gravitational field adds up to speed of light propagation

2. The Michelson/Morley Experiment, tested on static and entrained ether

First of all there is the famous Michelson/Morley interferometer experiment, which is interpreted to be the mightiest of all arguments for Special Relativity.

The setup of this experiment simplified was as follows:

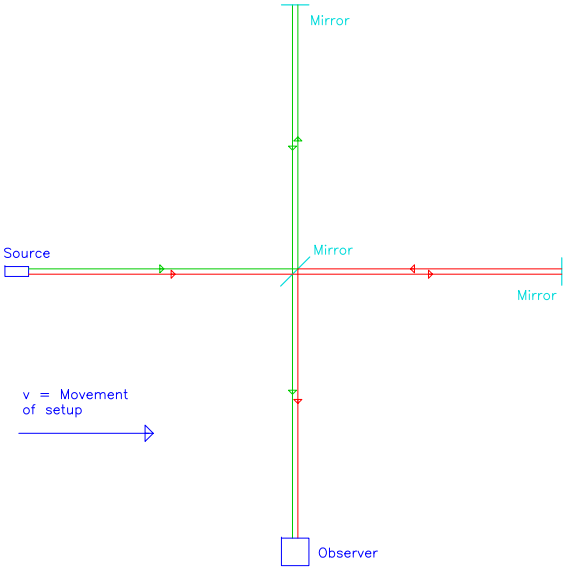

Fig. 1: Schematic setup of the Michelson/Morley experiment

By means of a 45° beam splitting mirror light was sent through two orthogonal pathes, joined together by the same mirror and projected on a screen or telescope, showing interference fringes once properly adjusted. According to the static ether concept that was originally targeted to be proven by the experiment, one of the rays would be in line with earth's motion und therefore should have to overcome a longer or shorter distance, the other orthogonal ray would not be affected by earth's movement at all. The expected difference of travel distance should have been according to Michelson's well known formula:

$$\Delta l = 2 \cdot L \cdot \frac{v^2}{c^2} \qquad (1)$$

Whereby L is the interferometer length of one limb, thus representing the travel length of light at rest. During its path to the right, the horizontal ray will have to catch up with the receding right hand mirror, on its way back the 45° mirror will move towards the ray, and for this reason the difference will have to be second order, i.e. depending on v^2/c^2. On an assumed interferometer arm length of 1m, movement velocity of earth around sun of approx. 30 km/s and light speed of approx.. 300.000 km/s, this would result to $2x10^{-8}$ m, equivalent to 0,04 times a wavelength (assuming 500nm as a wavelength), hence 0,04 fringes on the screen (all basically according to Michelson).

By turning the whole setup at 90° the fringes should shift now by 0,04, indicating the difference of travel distances of both rays. But the experiment gave a null result and was interpreted favoring the light speed to be invariant from the observer's movement.

It was never quite discussed to the end whether earth's orbital speed, earth's rotational speed, the solar system's speed around the galaxy or the total speed against CMB (cosmic microwave background) has to be called upon for calculation. Michelson obviously decided for the first. If he had opted (if he had known of) for the total speed against CMB, the difference to be expected would have been 4 fringes, and the null result becomes even more distinct.

To put things in order, it is necessary to compare the circumstances and all velocities that are relevant for the experiment setup, and have a model for clarification. We now try to test the experiment on both ether theories, starting with static ether. The maximum and minimum available speeds have to be considered, i.e. speed against CMB and earth's rotational speed, since the experiment only deals with utmost diurnal period. For simplification and to draw an even clearer picture we assume the following rounded speeds: Light speed 300.000 km/s, CMB speed 300 km/s, earth's rotational speed 0,5 km/s. Furtheron we assume all speeds to be in one line, the orthogonal ray is unaffected and we point our focus only on the ray that is fully affected, i.e. the horizontal (Earth being represented by the circle):

- v is the velocity of earth's rotation on equator
- V is the total velocity of earth against CMB

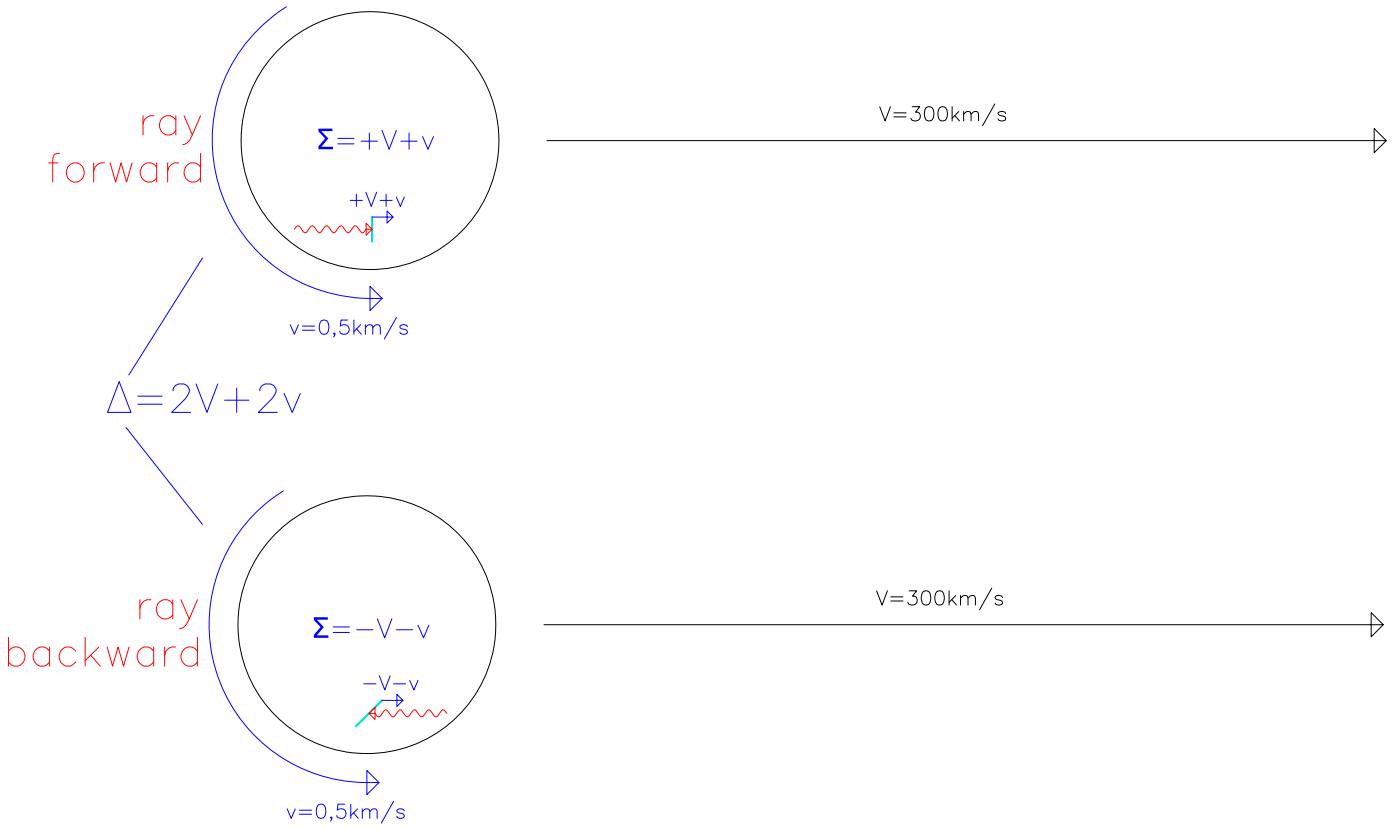

Fig. 2: Relevant velocities on Michelson/Morley experiment in static ether

We obtain the following situation regarding the relevant speed that the mirrors move with or against the lightray:

First ray in direction of CMB:
+V+v

Second ray against direction of CMB:
-V-v

The difference of both rays now is:
+V+v-(-V)-(-v) = **2V+2v**

Obviously, the total speed against CMB is adding up and earth's rotation as well to:
300 km/s + 0,5 km/s = 300,5 km/s

Therefore the result of the experiment, according to (1), would have to be expected to be 4,013 times a fringe shift. **The experimentally obtained null result therefore is evidence that static ether is in contradiction with the Michelson/Morley experiment.** Many attempts have been made to find corrective processes such as deviated deflection on moving mirrors [8], deviations due to beam width, Lorentzian length contraction [2] etc. to explain the issue, according to the author's overview none of them being satisfactorily.

Now we come to the gravitational light drag theory, where the picture becomes different:

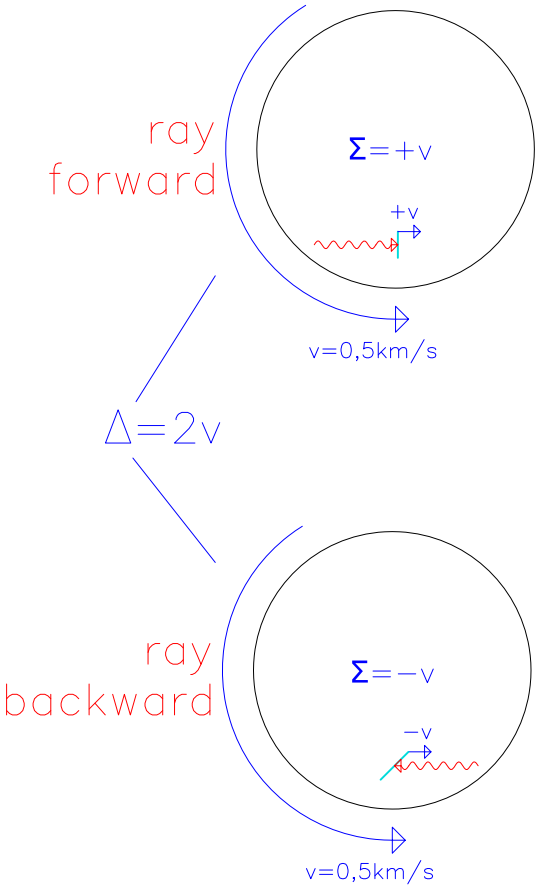

Fig. 3: Relevant velocities on Michelson/Morley experiment in fully entrained ether

The speed against CMB does not account, because light is being fully entrained by earth's movement through space. Also the orbital speed around sun is irrelevant for the same reason.

Someone might say now that sun's gravitational influence must have to be taken into account, but at any place on earth's surface the effect is smaller by $6x10^{-4}$ than earth's gravity. Sun's gravity thus is negligible and let alone earth's rotational speed will be relevant. Someone might say now, why of all the lowest speed? And if light is fully entrained by earth, should not no speed at all be relevant? And for both cases, would not

actually centrifugal force partly or fully cancel out the gravitational effects? And even further, would then light not have been accelerated to earth's rotational speed as well? At this point it is necessary to put right a couple of fundamental misunderstandings on the whole issue and to do a brief gedankenexperiment:

If one person is standing on earth, of course he/she will be already accelerated to the earth's rotational speed on surface, indeed we all become born already accelerated. But nevertheless there would be no such acceleration if there was no physical grip of the body to be accelerated (person) to the rotating body (earth). If someone would be hovering on top of a rotating carousel, he would under no circumstance acquire the carousel's speed, though he would still fall down to earth due to gravity! And of course it must be the same with light, travelling in or against earth's rotation, earth would just move away under its feet! And even centrifugal force, being a furious force, may cancel out gravity only if again a physical grip is there for centrifugal force to become effective. Gravity obviously does not need such grip, therefore, assuming light being fully dragged by gravity, light will be dragged along with earth's movement around the sun, around the galaxy and also the CMB, but not along earth's rotation!

Insofar the assumption that only rotational speed remains relevant is plausible. And then the Michelson/Morley experiment has to deal solely with the tiny rotational speed of earth, and also only on the second order effect thereof, giving an even tinier result. According to (1) the difference then should be only $1x10^{-5}$ of a fringe shift, and the most accurate interferometer experiments ever done give no less than $4x10^{-4}$ of a fringe! **Therefore the gravitational light drag theory holds good for explaining the Michelson/Morley experiment result quite well.**

3. The Sagnac effect and Michelson/Gale/Pearson Experiment, tested on static and entrained ether

First we will test the Sagnac experiment on the basis of a static ether concept. The setup of the Sagnac experiment simplified was as follows:

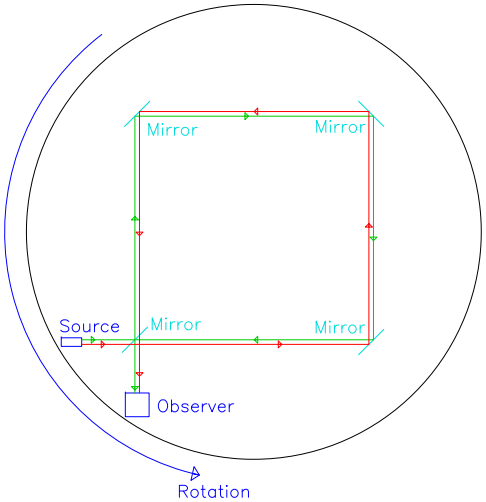

Fig. 4: Schematic setup of the Sagnac experiment

Contrarily to the Michelson/Morley experiment the two rays were forced into a full roundtrip rather than a back and force path. Additionally the interferometer was mounted on a spinning disc and the angular speed

would have to cause the movement of the mirrors with or against the light rays. The expected difference of light traveling time and distance should have been, deriving from Sagnac's well known formula:

$$\Delta t = 4 \cdot A \cdot \frac{\omega}{c^2} \qquad (2)$$

Whereby Δt is the time difference, A the area enclosed by the light ray's roundtrip and ω the angular speed.

Also we have: $\omega = \frac{v}{r}$ and $A = r^2 \cdot \pi$ thus:

$$\Delta t = 4 \cdot A \cdot \frac{\omega}{c^2} = 4 \cdot A \cdot \frac{v}{r \cdot c^2} = 4 \cdot \frac{A}{r} \cdot \frac{v}{c^2} = 4 \cdot r \cdot \pi \cdot \frac{v}{c^2}$$

and $\Delta l = \Delta t \cdot c$ thus:

$$\Delta l = 4 \cdot r \cdot \pi \cdot \frac{v}{c} \qquad (3)$$

So the difference of traveling distances should be amounting to a first order relation, i.e. v/c. Usually the Sagnac effect is interpreted to deal with disc's rotational speed only, which is at first not reasonable within a static ether, since this speed is the smallest of all involved. We have to put this right, as per following image:

- v is the rotational velocity of disc on disc's rim
- V is the total velocity of earth against CMB

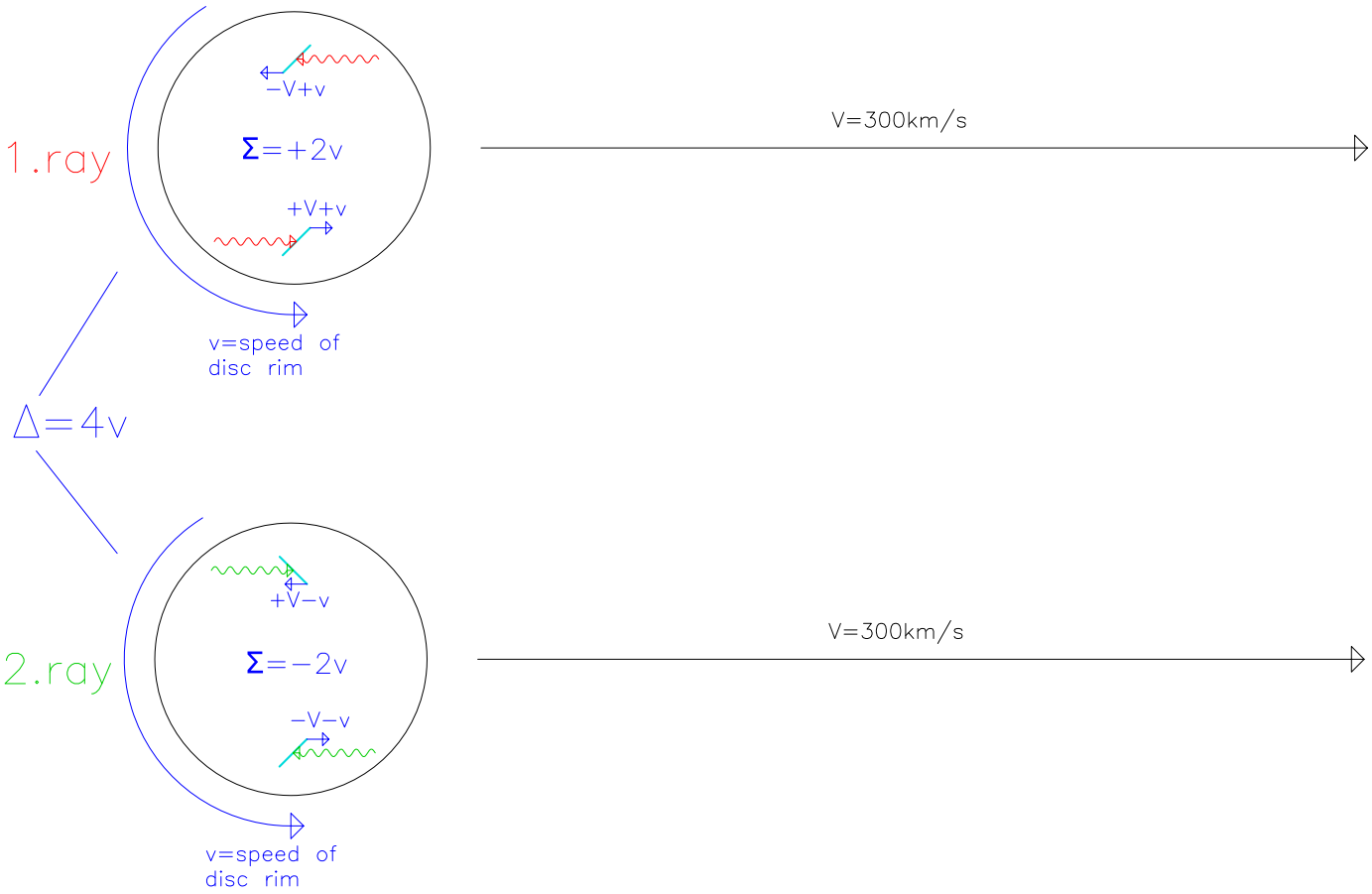

Fig. 5: Relevant velocities on Sagnac experiment in static ether

Assuming one light ray circling around the disc counterclockwise (red), we obtain for one cycle:

On the upper section:
-V+v

On the lower section:
+V+v

Adding up to +2v. All additions of speed perpendicular to CMB speed (i.e. orthogonal direction) are cancelling each other. Most important: V (speed against CMB) is shown to be cancelling out in general.

For the second ray (clockwise, green):
On the upper section:
+V-v

On the lower section:
-V-v
Adding up to -2v. V again is cancelling out.

The difference for both rays now is:
+2v-(-2v)= **4v**

Indeed the Sagnac experiment gave a positive result with a difference as to be expected by (1) and (3). **The effect is in accordance with static ether** and shows the difference of light travel distances due to the movement of the observer towards one or the opposite direction on the disc against the light ray. The CMB speed is always cancelling out, a roundtrip route of the two light rays is required for this cancellation and consequently both rays will have to enclose an area. Commonly though it is surmised due to a somewhat automatic reflex that the effect therefore must be in contradiction with entrained ether.

Now we draw the equivalent picture based on the assumption that light is being fully entrained by gravity:

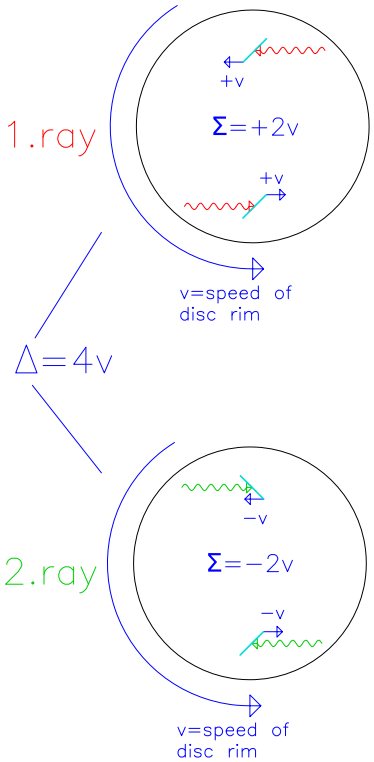

Fig. 6: Relevant velocities on Sagnac experiment in fully entrained ether

Contrarily to the previous speculation we obtain the same situation as per static ether, i.e. difference amounts to 4v, but for different reason. Total speed against CMB is not cancelling out, but does not account at all since light is fully dragged by earth's gravity (not rotation), and only the speed of the observer on the disc's rim is playing a role, i.e the movement speed of the observer relative to the gravitational field, as already defined in chapter 1. Therefore the difference of light traveling distance due to the movement of the observer on the rotating disc towards one or the opposite direction is still existing and in accordance with the experiment.

One might say now that in case of the Sagnac effect, centrifugal force on the rotating disc could become easily stronger than gravity, both light rays would be accelerated and glued towards the disc's rim, and the Sagnac experiment would have to give a null result. We have already pinpointed this argument before, again there is no reason why light should be accelerated by a rotating disc unless having a physical grip to it, which is not the case. **Therefore the Sagnac effect is also in accordance with the gravitational light drag theory.**

Finally we have to look at the Michelson/Gale/Pearson experiment:

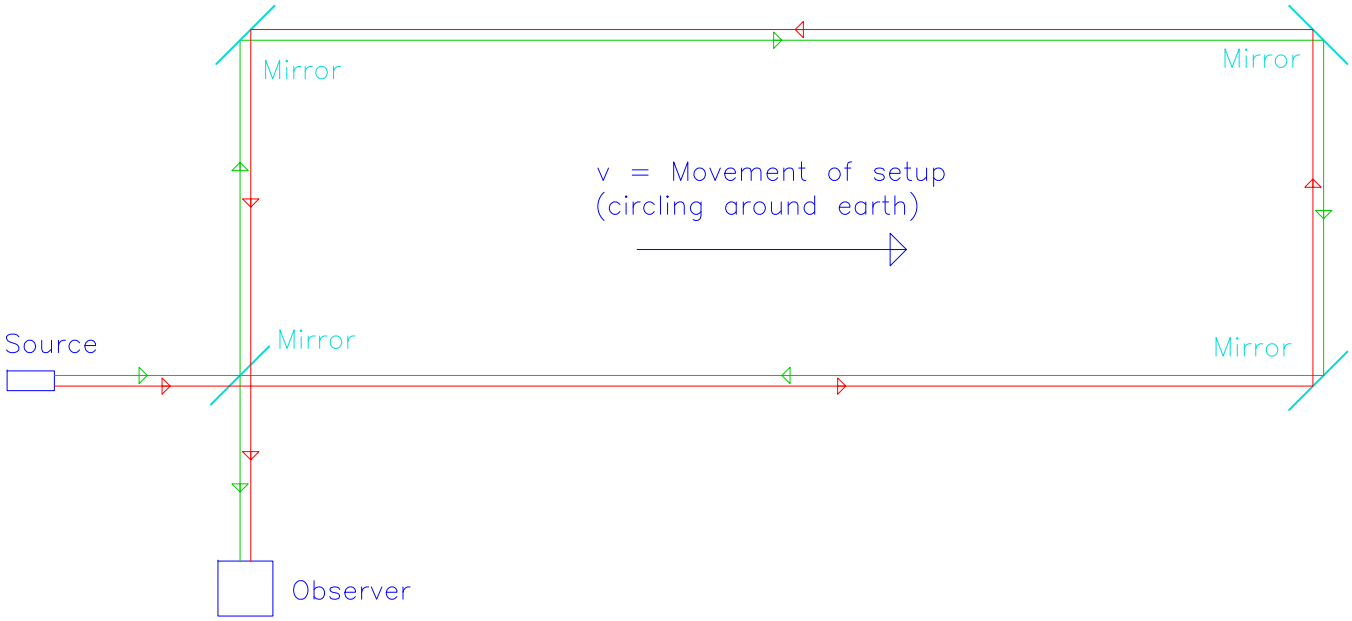

Fig. 7: Schematic setup of the Michelson/Gale/Pearson experiment

The difference to the Sagnac effect is none but the following:

- Size of the setup is in the range of a kilometer
- The rotating disc is earth itself
- The lengths of the horizontally and vertically interferometer arms vary decisively in order to obtain as much of a result as possible.

Accepting the gedankenexperiment we made before, i.e. that light is entrained by earth's gravity but not its rotation, it becomes clear **that also the Michelson/Gale/Pearson experiment is in accordance with the gravitational light drag theory.**

4. Stellar and terrestrial aberration

Now there is one thing left to clarify, obviously the most difficult of all. Aberration was leading the discussion on ether theories from the very beginning to the end. Several attempts have been successful [9] to explain the interferometer problems with entrained ether. But stellar aberration is still esteemed to be fundamentally incompatible with entrained ether concepts. We will show that this is by far not the case, but we will also reveal another basic misunderstanding, that might shudder our whole cosmic coordinate system.

First we will assume a static ether and purely wave nature of light in order to clarify the aberrational phenomena, i.e. movement of light source does not affect light propagation.

The classic explanation of stellar aberration [10] was, that similar to the falling rain drop, the telescope would have to be twisted in order to follow the light ray since the telescope itself was moving sidewise by earth rotation or earth orbiting respectively. If the ether on the other side was fully dragged by earth, no such aberration could occur at all, because the light ray would always follow earth's movement. On the other hand it was found difficult to explain aberration at all assuming a pure wave nature of light. Additionally the explanation was tacitly based on the idea that light is always coming as a directed beam rather than an undirected series of concentric spheres.

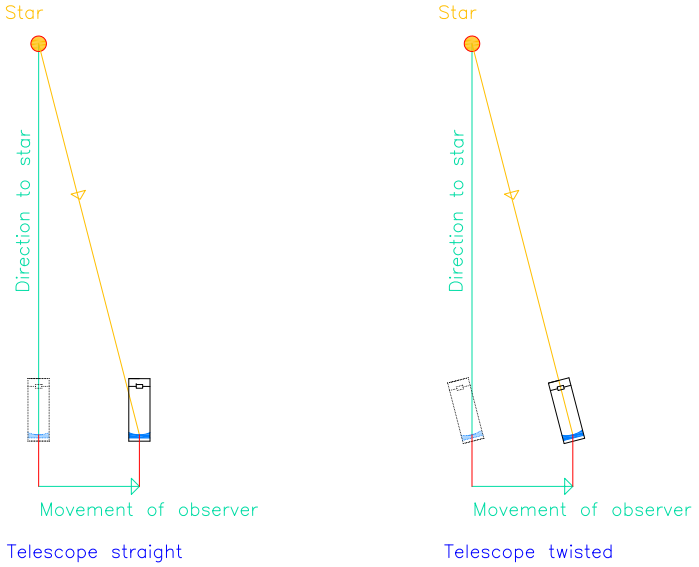

Fig. 8: Stellar aberration by classic explanation

The aberration angle was then calculated upon the distance that the telescope would move whilst the light ray is traveling from the telescope's lens to its mirror. The great misunderstanding is, that stellar aberration in truth does not have anything to do with the telescope having to follow the light path within the short distance inside the telescope nor the still short distance within earth's atmosphere nor even the short distance within the gravitational influence of earth or even the solar system, but the whole distance that light travels from its source, i.e. the distance from stars being billions of lightyears away.

The following images show, how a spherical wave of light will be emitted by its source deliberately far away, whereby the observer is travelling by deliberate speed, and the task will be to find the point, where the sphere, not the beam, meets the observer. From above we also must realize that the true position of the star is unknown and we have to start from a hypothetical middling angle of all observed angles, though this middling angle would show a position of the star that is never visible, because observation angles are always

circling and ellipsing around this point. We will see later, that this interpretation makes up an important difference. For convenience the following model values were chosen:

- Light speed c: 1,5 km/s
- Earth movement speed v: 0,6 km/s (on a range of 0,4 to 0,6 km/s) against static ether on orbital path
- Distance of earth path to light source: 1,5 km
- Middling angle of observation at 0,5 km/s towards source: 60° degree (the angle between the true position of star and observer at the time of observation, 46,10° in this case, is actually unknown)

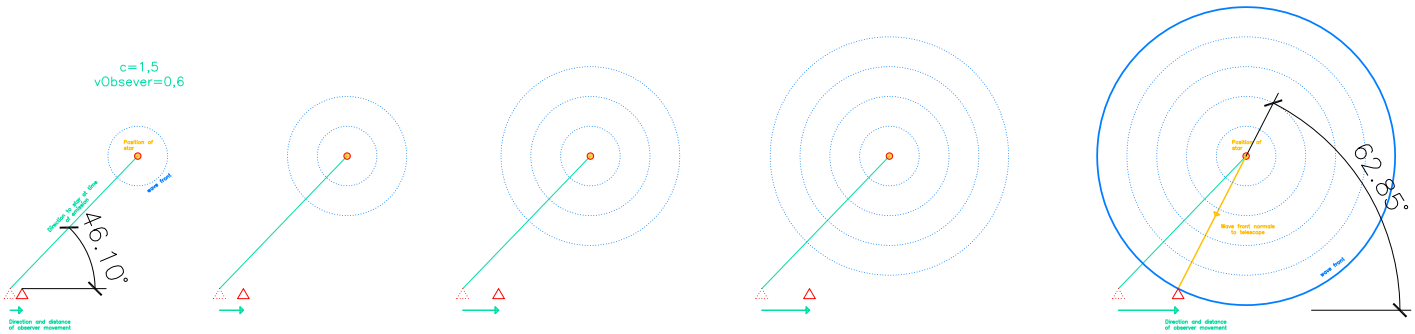

Fig. 9: Light propagation from source with 0,3 seconds steps, earth's speed 0,6 km/s

It can be seen, that the observer is moving sidewise during the complete period that the light wave front travels from the source to meet the observer. It is important to mention that at this instant the light wave front hits the observer as a wave normal, and all subsequent wave fronts do as well. Only now we have established the angle, under which the light ray meets the observer, and we add a telescope for better understanding:

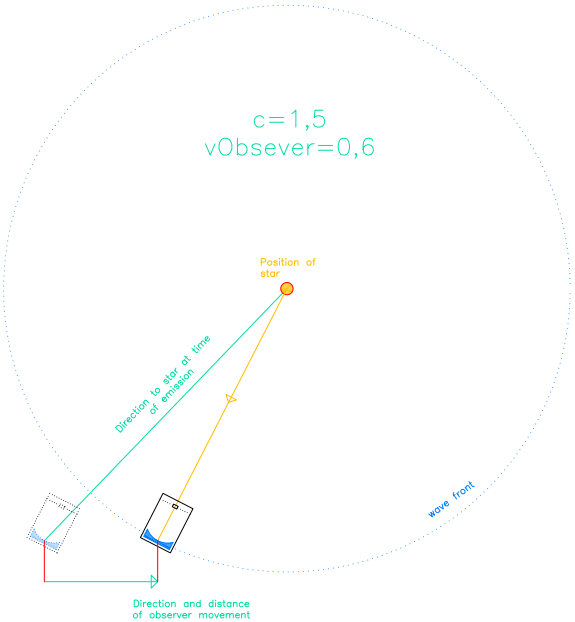

Fig. 10 Telescope directed to source.

In this model the observation angle will amount to 62,8542°, as shown per calculation later. All distances, angles and relations of speeds are on scale at the model, verified by means of cad.

Now the same procedure with 0,4 km/s earth's movement speed:

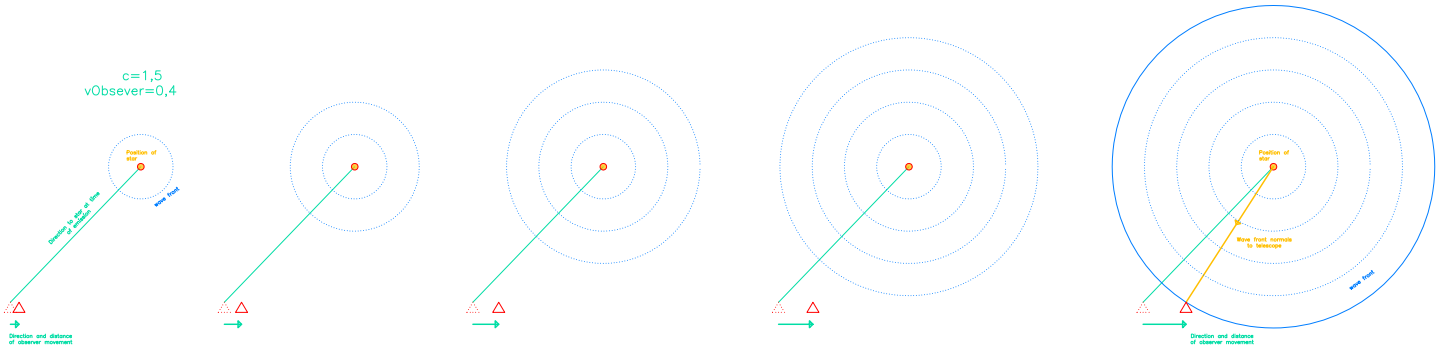

Fig. 11: Light propagation from source with 0,3 seconds steps, earth's speed 0,4 km/s

Of course, as before, again the meeting point represents a series of wave normals. But as can be seen by adding the telescope, the observation angle this time is 57,1806°. Now the two images of both earth's movement speeds will be overlayed:

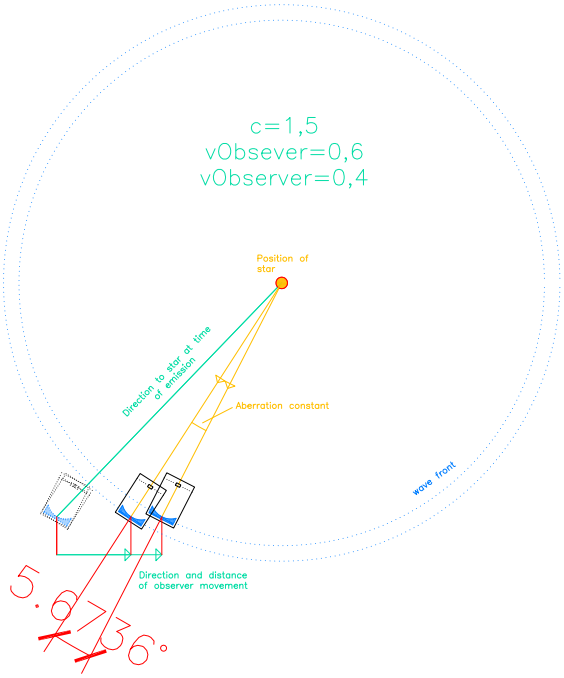

Fig. 12: Overlay both situations 0,6 and 0,4 km/s

The angle between the two light rays now, in this case 5,6736° is deemed to be the common aberration angle. It is most important that this angle is deriving from the difference of the total earth's speed against the static ether e.g. CMB (Cosmic Microwave Background), but not necessarily the earth's speed on the orbit (being 0,2 km/s in this model).

From the overlay it can be seen also, that both rays do not meet at the same time, since wave fronts do not have equal diameters.

Now the task will be done to show what happens if the middling observation angle is 90°, i.e. the object's / source's position is on the zenith. Only the final overlay is being shown, again the ray turns out to be defined by consecutive wave front normals:

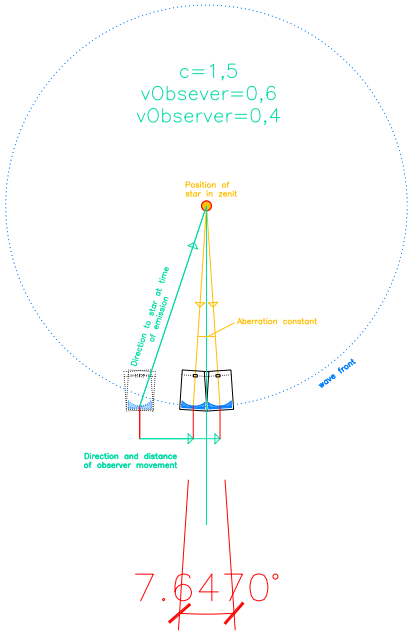

Fig. 13: Overlay 0,6 and 0,4 km/s but on 90° middling observation angle

Obviously even with the small relation of values for c and v, the diameters of both wave fronts are very close and no more visible on this scale image.

Now it might be also interesting, how the concept behaves when the light source is moving:

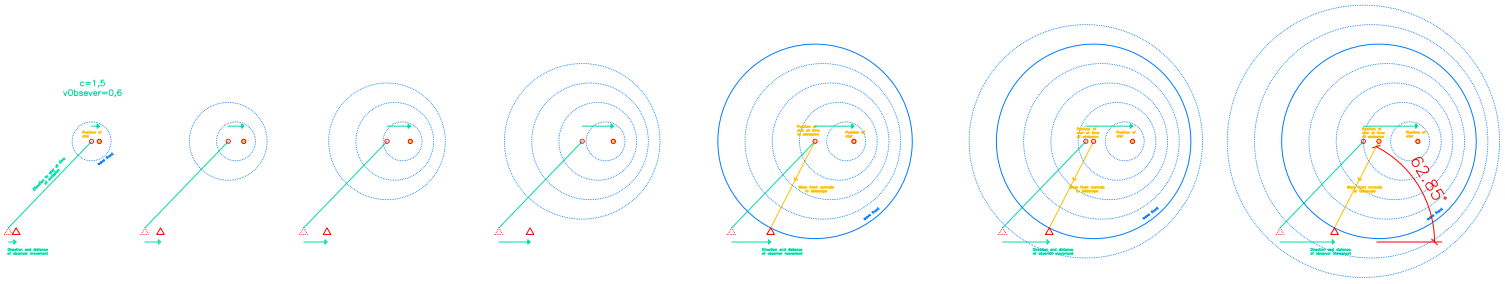

Fig. 14: Light propagation from source speed 0,6 km/s with 0,3 seconds steps, earth's speed 0,6 km/s

It becomes clear that the aberration produces the same angle as if the source was not moving. The observer still receives only wave normals, but in this case from ever different source's position. The Doppler effect [11] behaves strictly in the classical way. Movement of source is irrelevant for aberration, and behavior of binary stars is fully plausible.

The determination of the aberration angle is done geometrically upon the aforementioned scale model. First the angle between observer at time of emission and the source will be calculated:

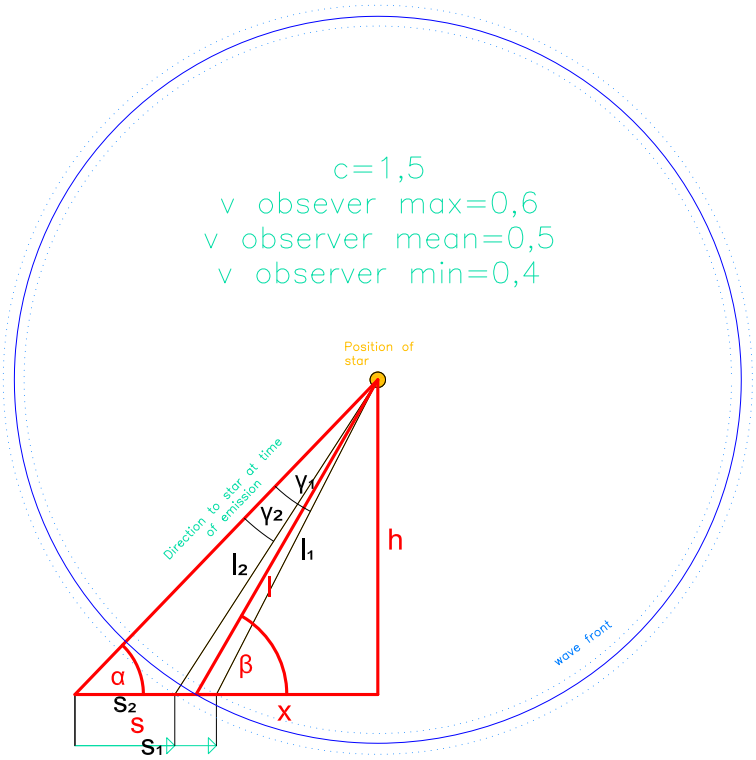

Fig. 15: Geometric model of 60° observation angle at mean speed

(1) $\tan(\alpha)=\frac{h}{s+x}$

(2) $\tan(\beta)=\frac{h}{x}\Rightarrow h=\tan(\beta)\bullet x$

(3) $\cos(\beta)=\frac{x}{l}\Rightarrow x=\cos(\beta)\bullet c$

Now insert (3) in (2)

(4) $h=\tan(\beta)\bullet\cos(\beta)\bullet c=\sin(\beta)\bullet c$

Now insert (4) and (3) in one:

$$\tan(\alpha)=\frac{\tan(\beta)\bullet\cos(\beta)\bullet c}{s+\cos(\beta)\bullet c}\Rightarrow\tan(\alpha)=\frac{\sin(\beta)\bullet l}{s+\cos(\beta)\bullet l}\Rightarrow\tan(\alpha)=\frac{\sin(\beta)}{\frac{s}{l}+\cos(\beta)}\Rightarrow\boxed{\tan(\alpha)=\frac{\sin(\beta)}{\frac{v}{c}+\cos(\beta)}}$$

Now it is important to acknowledge that the angle of aberration at maximum speed against the mean speed is different form the angle at minimum speed against mean speed, i.e. the full aberration angle is not simply double of one of the angles. First we calculate one of the angles:

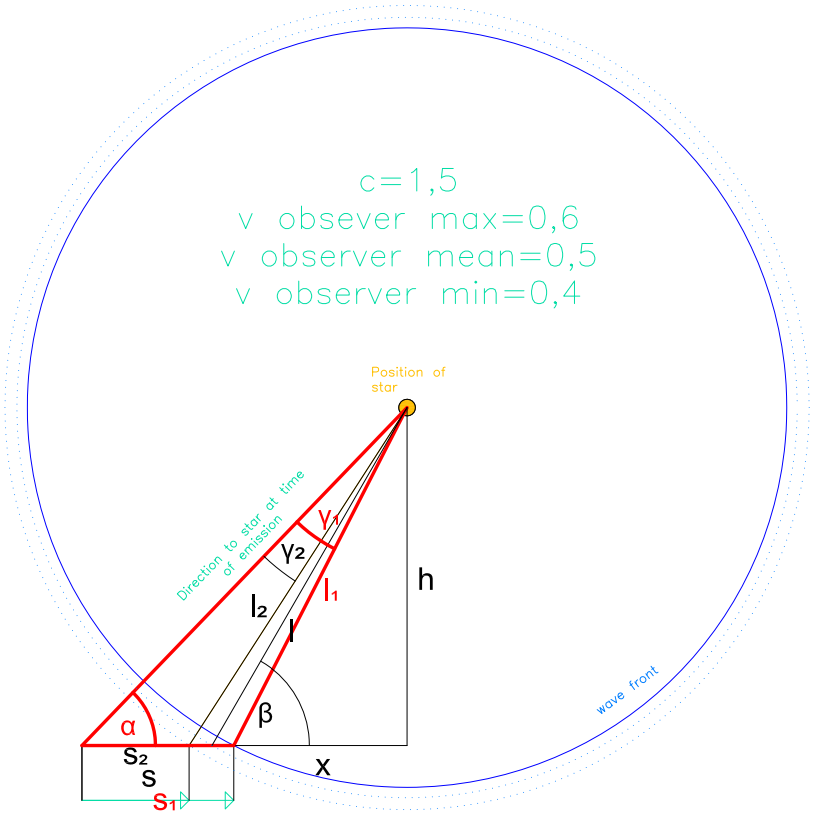

Fig. 16: Geometric model of 60° observation angle at maximum speed

(1) $\sin(\gamma_1) = \frac{s_1}{l_1} \cdot \sin(\alpha) = \frac{v_1}{c} \cdot \sin(\alpha)$

(2) $\tan(\alpha) = \frac{\sin(\beta)}{v/c + \cos(\beta)} \Rightarrow \alpha = \arctan\left(\frac{\sin(\beta)}{v/c + \cos(\beta)}\right)$ (from above)

Now insert (2) in (1):

arbitrary observation angle β at speed v1

$$\sin(\gamma_1) = \frac{v_1}{c} \cdot \sin\left(\arctan\left(\frac{\sin(\beta)}{v/c + \cos(\beta)}\right)\right)$$

arbitrary observation angle β at speed v2

$$\sin(\gamma_2) = \frac{v_2}{c} \cdot \sin\left(\arctan\left(\frac{\sin(\beta)}{v/c + \cos(\beta)}\right)\right)$$

For 90° observation angle sin(β)=1 und cos(β)=0

$$\sin(\gamma_1) = \frac{v_1}{c} \cdot \sin\left(\arctan\left(\frac{c}{v}\right)\right)$$

$$\sin(\gamma_1) = \frac{v_1}{c} \cdot \frac{\frac{c}{v}}{\sqrt{1 + c^2/v^2}} = \frac{v_1}{c} \cdot \frac{\frac{c}{v}}{\sqrt{1 + c^2/v^2}}$$

90° observation angle at speed v_1

$$\sin(\gamma_1) = \frac{v_1}{v} \cdot \frac{1}{\sqrt{1 + c^2/v^2}}$$

90° observation angle at speed v_2

$$\sin(\gamma_2) = \frac{v_2}{v} \cdot \frac{1}{\sqrt{1 + c^2/v^2}}$$

And the full aberration angle is the difference of the above angles.

On the basis of above formulae it is convenient to produce an excel sheet to play with different speeds, distances and angles. The following values were set:

Light speed c: 299.792 km/s

Earth movement speed v: 300 km/s +/- 29,78 km/s on orbital path

Distance of earth path to light source: 20 million lightyears

Middling angle of observation at 300 km/s towards source: 90° degree

	higher speed km/s, Grad	mean speed km/s, Grad	lower speed km/s, Grad	
c	299.792,00000	299.792,00000	299.792,00000	
v Earth 368 km/s (+/- 29,78 km/s on orbit)	397,78000	368,0000000000000	338,22000	
Incident angle light ray degree	90,00569	90,00000	89,99431	0,011383014335 Difference low/high values is aberration angle x 2
Radian	1,57090	1,57080	1,57070	0,00569150716732 0 aberration angle
				20,4894258024 Aberration angle arcsec
Distance earth path to source km	1,8908481E+20	1,8908481E+20	1,8908481E+20	
lightyears		20.000.000,00000		
angle difference observer-star to incident angle	0,07602305829156	0,07033155077724	0,06464004395692	0,0113830143346
Angle observer to star at emission degree	89,92967	89,92967	89,92967	
Radian	1,56957	1,56957	1,56957	
pathlength earth	2,508878E+17	2,321050E+17	2,133221E+17	3,756568E+16 Difference low/high values
pathlength light	1,890848E+20	1,890848E+20	1,890848E+20	3,080192E+06 Difference low/high values
part				1,629000E-14

Fig. 17: Calculation sheet with realistic values

The resulting aberration angle is 20,4894", properly matching the observations. Interestingly there is still a time lack between both wave front spheres of approx. one part of a trillion at 90°, amounting to a distance deviation of approx. 35.000 km in this case that could be responsible for observed irregularities of planet's orbits. The deviation is progressively increasing on flat observation angles. **On the scale of mercury, observed under 60° the deviation would be approx. 10.000 km, well explaining the anomaly of Mercury orbit deviation:**

	higher speed km/s, Grad	mean speed km/s, Grad	lower speed km/s, Grad	
c	299.792,00000	299.792,00000	299.792,00000	
v Earth 368 km/s (+/- 29,78 km/s on orbit)	397,78000	368,00000	338,22000	
Incident angle light ray degree	60,00493	**60,00000**	59,99507	0,00985 Difference low/high values is aberration angle x 2
Radian	1,04728	1,04720	1,04711	0,00493 aberration angle
				17,73348 Aberration angle arcsec
Distance earth path to source km	92.000.000,00000	92.000.000,00000	92.000.000,00000	
lightyears		0,00001		
angle difference observer-star to incident angle	0,06580	0,06087	0,05595	
Angle observer to star at emission degree	59,93913	59,93913	59,93913	
Radian	1,04614	1,04614	1,04614	
pathlength earth	140.947,87888	130.402,21696	119.855,50904	21.092,36983 Difference low/high values
pathlength light	106.227.177,09255	106.232.449,53094	106.237.723,27750	**-10.546,18495 Difference low/high values**
part				-0,0000992697

Fig. 18: Results on mercury perihelion shift

Now for checkup the distance is set to 1.000 km and again 90°, resulting in again 20,4894”

	higher speed km/s, Grad	mean speed km/s, Grad	lower speed km/s, Grad	
c	299.792,00000	299.792,00000	299.792,00000	
v Earth 368 km/s (+/- 29,78 km/s on orbit)	397,78000	368,0000000000000	338,22000	
Incident angle light ray degree	90,00569	90,00000	89,99431	0,011383014335 Difference low/high values is aberration angle x 2
Radian	1,57090	1,57080	1,57070	0,005691507167320 aberration angle
				20,4894258024 Aberration angle arcsec
Distance earth path to source km	1,0000000E+03	1,0000000E+03	1,0000000E+03	
lightyears		0,00000		
angle difference observer-star to incident angle	0,07602305829156	0,07033155077724	0,06464004395692	0,0113830143346
Angle observer to star at emission degree	89,92967	89,92967	89,92967	
Radian	1,56957	1,56957	1,56957	
pathlength earth	1,32685329149042	1,22751774563691	1,12818221189572	0,198671079594692000 Difference low/high values
pathlength light	1.000,00000493362000	999,99999999995000	1.000,00000493360000	0,000000000162572178 Difference low/high values
part				0,000000000000162572

Fig. 19: Calculation sheet with realistic values but unrealistic short distance

Obviously distance is irrelevant for the aberration angle, as it should be.

The fact that it has been herewith proved that the aberration is resulting from the whole distance between source and observer alone, makes it almost irrelevant if the light ray is entrained on the short piece in close distance of source or observer. Since the influencing distance is vanishingly short against the distance between observer and source, the aberration must have already happened on its way. Also experiments with water filled telescopes (by George Bidell Airy, [12]) or the like therefore cannot but have a null result.

The same applies for the source. As for any wave, movement of source is irrelevant for the wave front that was emitted at one time. If emitted waves are dragged by gravity of the source star, the influence would be again vanishingly because of the comparably very short distance that light might be dragged by the gravity of source. **The reverse argument though is, that light entrained by gravity still causes stellar aberration as usual and the gravitational light drag theory remains fully suitable to explain stellar aberration.**

As well the lack of any observable terrestrial aberration is explainable. It was shown by the author that due to reflection on moving mirrors and refraction on moving lenses terrestrial aberration is prevailingly cancelled out [8]. With the involved speeds (light speed and solely rotational speed of earth), the terrestrial aberration angle to be expected would have to be, if existing at all, below 10^{-5} arcseconds, according to the formulae being obtained in the afore- mentioned paper [8].

4. More empiric evidence esteemed to disprove the gravitational light drag theory

The Hammar [13] experiment with a setup consisting of differing length interferometer arms partially cladded with heavy lead blocks also gave a null result, although, under the terms of entrained ether, a positive result was expected due to gravitational attraction of light by the lead blocks. The obtained null result is everything but significant. It is implausible why any lightray that is already fully entrained by gravity, should be even more than fully entrained by additional gravity, and even if so the assumptive 500kg weighing lead blocks could only achieve an additional gravitational acceleration in the negligible range of 10^{-7} of earth’s gravitational acceleration on the one interferometer limb directly cladded, but also have an influence of 10^{-9} on the other limb 1m apart. Also arguments of the sort that mass and gravity of the rotating disc of Sagnac type experiments could influence the light propagation are irrelevant for the same reason, and additionally

gravity is again confused with centrifugal force, as if gravity would be somehow rotating along with the disc's motion.

Setups with glass fiber laser gyroscopes plausibly show the Sagnac effect on the basis of classic physics. GPS technology is functioning only with earth as the inertial reference frame, if sun was used as the reference frame, computations based upon Relativity fail to produce correct results, thus favoring the gravitational light drag theory outlined in this paper. Laser resonator setups that allegedly result in much smaller possible light speed anisotropy deal with frequency changes only, but in the gravitational light drag theory the Doppler Effect behaves strictly classical, i.e. the effect caused by the source moving against the gravitational field is fully cancelled out by the effect caused by the observer moving with the same speed against the gravitational field.

5. Conclusion and Perspective

We have seen that understanding of the nature of light propagation is until today underlying some fundamental misinterpretations that we brought into order with this paper. In fact there is no reason why light should not be fully entrained by gravity in general, at least on the foundation of the above discussed experiments.

Based on the finding that electromagnetic waves and probably also electromagnetic fields are being influenced and entrained by gravity it could be fertile to further investigate into the question if simply electromagnetic fields are bent by gravity rather than spacetime.

References and Acknowledgments (in order of appearance):

[1] Einstein, Albert, Zur Elektrodynamik bewegter Körper, Annalen der Physik und Chemie. 17, 1905, S. 891–921, 1905.

[2] H. A. Lorentz, Versuch einer Theorie der electrischen und optischen Erscheinungen in bewegten Körpern. E.J. Brill, Leiden 1895..

[3] Michelson, A. A., Morley, E.W, On the Relative Motion of the Earth and the Luminiferous Ether, Bde. %1 von %21887, 34 (203): 333–345 1881, American Journal of Science, 1887.

[4] G. Sagnac, „L'éther lumineux démontré par l'effet du vent relatif d'éther dans un interféromètre en rotation uniforme.," In: Comptes Rendus. 157, S. 708–710., 1913.

[5] A. A. Michelson und H. G. Gale, „The Effect of the Earth's Rotation on the Velocity of Light, II," Astrophysical Journal. 61: 140. Bibcode:1925ApJ....61..140M. doi:10.1086/142879., 1925.

[6] Fresnel, Augustin, Lettre d'Augustin Fresnel à François Arago sur l'influence du mouvement terrestre dans quelques phénomènes d'optique, Bde. %1 von %2Oeuvres complètes d'Augustin Fresnel /

publiées par MM. Henri de Senarmont, http://visualiseur.bnf.fr/CadresFenetre?O=NUMM-91937&I=633&M=tdm, Gallica, 1818.

[7] Stokes, George, mathematical and physical papers, Vol.1, Cambridge University Press, 1880.

[8] F. M. Schmitt, „On Aberration of Light and Reflection from Moving Mirrors," viXra:1303.0110, Berlin, 2013.

[9] A. Kelly, Challenging Modern Physics, Boca Raton: Brown Walker Press, 2005.

[10] Bradley, James, A Letter from the Reverend Mr. James Bradley Savilian Professor of Astronomy at Oxford, and F.R.S. to Dr. Edmond Halley Astronom. Reg. &c. Giving an Account of a New Discovered Motion of the Fix'd Stars, Bde. %1 von %2Philosophical Transactions 35, 1727-1728, doi:10.1098/rstl.1727.0064, The Royal Society, 1727.

[11] Doppler, Chrisitan, Über das farbige Licht der Doppelsterne und einiger anderer Gestirne des Himmels, Böhmische Gesellschaft der Wissenschaften, 1842.

[12] Airy, George Bidell, On a Supposed Alteration in the Amount of Astronomical Aberration of Light, Produced by the Passage of the Light through a Considerable Thickness of Refracting Medium, Bde. %1 von %2Proceedings of the Royal Society of London, Volume 20, January 1, 1871 20 35-39; doi:10.1098/rspl.1871.0011, The Royal Society, 1871.

[13] G. W. Hammar, The Velocity of Light Within a Massive Enclosure, Physical Review, 1935.