The Falling Ether

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Einstein postulated that the speed of light had the same value in relation to *all* inertial observers. This statement caused strong protests from many philosophers, since Einstein's idea was considered as an absurd philosophy and not physics. The history of physics shows that very often has many failures to confirm a postulate been regarded as a negation of the postulate and sometimes even as an evidence of nonexistence of a concept. Such conclusions are illegal in a scientific perspective. However, in our daily life we can often be forced to act in this way, in our fight for survival. In this article we see that many empirical results can be interpreted in new ways. As a result of new interpretations of results, even before Einstein, basic concepts can be changed. Light, gravity, inertia and Big Bang can be considered from a new perspective. The wave or particle confusion can be explained and light can be explained without quanta of light. The photoelectric effect is observed by means of discrete electrons producing quantization. We can therefore not conclude quantization to exist *before* detection. Einstein's quantization of light is therefore a postulation only, and not a logical fact.

1. Background

Theoretical physics has been in a chaotic state for about one hundred years. This fact is in a very sharp contrast to the enormous advancements in applied physics. We can measure positions on our planet and distance to the Moon with very high precision. Nevertheless, we cannot explain electromagnetic phenomena, gravity and inertia in a convincing way. Therefore, we have to be critical in relation to later theories as the theory of relativity and quantum physics. See [1]. The same critical attitude must be taken in relation to interpretations of empirical facts that have been used as a motivation for these theories.

2. Defining Parallelism

Two points can define a unique line. It is logical to assume that one point and one line also can do that based on the concept parallelism. However, it has been difficult to prove this postulate. Parallelism is a concept difficult to define. The concept has been defined by stating no common points between two lines. This means that an inequality has been used and applied to infinite lines. A correct definition should be based on finite concepts without containing any negation. We should state what the lines *really* are doing. Another indication of error is that the given point must be outside the given line. This means that coincident lines are defined as not parallel.

The essence of parallelism is equidistance and common points are only a consequence of parallelism. Equidistance between lines demands parallelism. Therefore equidistance between points has been used instead. This rendered a complex proof. Instead we should use the distance between a point and a line. We can state that two points on one of the lines should be on the same distance to the other line. This definition is valid even when the distances are zero. Based on this definition, it is easy to see, that one point and one line can define a unique line.

3. Blackbody Radiation

Atoms in a crystal interact with the ether. This interaction is described by Boltzmann's constant k. Electrons interact also with the ether. This interaction is described in the same way by Planck's constant h. The ether is also the link that controls the separation between atoms in a crystal. It is not easy to find an alternative. All electrons in an atom interact with each other in a self organizing manner, and search symmetric configurations to produce as low radiation as possible. Many different configurations are apparently possible, since many different frequencies can be generated. The two constants k and h are important parameters in Planck's radiation law.

The concept zero point energy is often described as an electromagnetic radiation. In this article it is instead assumed that zero point energy represents the energy in the ether. The ether is here assumed to be constituted by small and fast particles, moving in all directions with the speed c. These particles cannot be detected as individuals. It is therefore difficult to confirm the ether concept.

4. Photoelectric Effect

An effect of light on electrons in a crystal is demonstrated in the photoelectric effect. After corrections for a work function we find the maximal kinetic energy, provided by the ether to an electron, to be proportional to light frequency. The constant of proportionality is h. This phenomenon can be described as an interference between light waves and electron particles. Higher frequencies in light can be assumed to interact with electron particles that are faster even before the interaction. Interference is possible with bound electrons. We do not have to assume quantization in light since we are using discrete electrons as detectors. Discrete electrons produce quantization. Quanta in light can be an illusion.

The photoelectric effect can also explain the Crookes' radiometer. If the radiometer is well evacuated we can exclude the effect of remaining gas molecules. The explanation based on light particles with mass is than excluded by the direction of rotation. However, the direction of rotation can be united with recoil from electrons emitted due to the photoelectric effect.

5. Compton Effect

X-rays are produced by electrons colliding with a crystal. X-rays can be described as e/m waves concentrated into packets of short time duration due to a collision. The Compton effect can be considered as the reverse process in relation to the production of X-rays. The probability for the Compton process can be very low. The process can be described as an interference between X-ray waves and a bound electron particle without assuming X-rays to contain particles. The forming of packets of the waves can be caused in the moment when they are produced. The wave model alone can describe X-rays.

In explanations of Compton effect and photoelectric effect we only need the particle model for electrons and only the wave model for X-rays and light waves. These interactions can be considered as interference phenomena of the same kind that is observed in atomic clocks and in the Mössbauer effect. This means interactions between e/m waves and charged particles. Planck's constant must not necessarily imply quanta of action.

6. Pushing Gravity

The concept pushing gravity assumes an ether with fast particles having very small mass and moving with high speed in all directions. Gravity is produced by absorption in celestial bodies. The effect of absorption is, that not so many particles are leaving a celestial body as the number of approaching particles. This very small difference produces a net average velocity, that is many orders of magnitude smaller than the speed of individual ether particles for bodies in the size of our planet. We get a *falling ether* that is the cause of gravity. The fact that the ether is falling can explain red shift observed in celestial bodies to be caused by the surrounding ether and not in the body itself. Big Bang can be an illusion. Since the vertical ether wind never can be higher than the speed of individual ether particles we can find a maximal value on the force of gravity. This fact can have relevance for the existence of black holes.

Pushing gravity is produced by a difference in the numbers of particles flowing in two opposite directions. For a stationary source this difference is constant and stationary in relation to the source of gravity. This fact explains why we cannot observe any aberration in the gravity from our sun. The Sun can be considered as stationary since its mass is very large in relation to the mass of our planet. If our sun and our planet had masses of about the same order of magnitude we would observe aberration due to motion in relation to a common center of mass. The stability in planetary motions is therefore explained by the planets having small masses in relation to our sun. We do not have to assume enormous speed in gravity propagation. Pushing gravity can therefore be explained by the speed c for individual ether particles and an ether wind, causing gravity, that is many orders of magnitude smaller than c for our planet. It was therefore a great mistake to use the lack of aberration in solar gravity to abolish the pushing gravity. Aberration is present only in *changes* of gravity due to a moving source or due to shielding by a moving body. Aberration should exist in the small shielding effect during a solar eclipse. This aberration due to the Moon's orbiting of only 1 km/s is too small to be observed. However the existence of a shielding effect can probably be observed in a sensitive interferometer.

7. The Generated Ether Wind

Theories based on autonomous ether, entrained ether and not existent ether have all demonstrated inconsistencies. It is therefore of interest to test an ether theory where the ether in itself is not entrained, but instead two properties of the ether are entrained by matter. These properties are gravity and an ether wind causing gravity. This implies a falling ether with a motion towards a body that is attenuating ether particles. This generated, vertical ether wind is much smaller than the speed c of individual ether particles. These ether particles can also transfer light by some other property like polarization. Since the ether particles can transfer gravity also they must have some (small) mass.

The vertical ether wind is an average velocity among these ether particles. Since we do not know the magnitude of this vertical ether wind we make a hypothesis and state preliminarily that the magnitude is equal to the speed of a satellite in a circular orbit at the same altitude as the ether wind. See [2]. The ether wind is the reference for the wave velocity c in vertical and horizontal directions. The vertical ether wind produces the force of gravity but no force is produced by the horizontal ether wind. The ether provides resistance towards acceleration but not to velocity. This can be explained by a generated wave function that adapts the ether's state of motion in such a way that the wave function hides surrounding ether wind. Close to a body only the body's own ether wind is observable. This ether wind produces zero total force due to spherical symmetry. Such a wave function is possible only if we assume a property of super fluidity to exist in the ether. The ether particles are assumed not to collide with each other. Therefore, the ether represents a separate state of (no) aggregation. This can mean that we perhaps must change our conception of energy interchange between light and charged particles and instead talk about energy interchange between *ether* and charged particles. The presence of light can instead be considered as a contribution of information needed for this interchange of energy. Maybe this kind of reasoning can help us to explain how two light waves in opposite phase can produce zero light.

A satellite in a circular orbit with radius r around a planet with mass m has a speed v equal to $v=(Gm/r)^{1/2}$ (G is gravitational constant). This relation together with earlier done hypothesis gives a vertical ether wind on our planet equal to 7.91 km/s. In a GPS satellite we also get a horizontal and a vertical ether wind of 3.87 km/s. Due to rotation of our planet we get a horizontal ether wind with a maximal value of 0.47 km/s. The orbital velocity of our planet (30 km/s) is not observable on our planet. On the Sun the vertical ether wind is 437 km/s.

Light is a wave motion propagating with constant wave velocity $\mathbf{c}$ in relation to the ether's state of motion $\mathbf{v}$. Light can therefore be described as a vector sum $\mathbf{c}+\mathbf{v}$. This vector sum would be of interest if we wanted to detect the center of a very sharp beam. However, in telescopes we do not detect the center of a beam. Instead we detect the normal to the wave fronts inside that beam. This means that we detect $\mathbf{c}(1+v_c/c)$ with v_c as component in $\mathbf{v}$ parallel to $\mathbf{c}$. Therefore, the telescope is blind to ether wind blowing transverse to wave vector $\mathbf{c}$. This is a very im-

portant distinction between real and observed directions of light. In an interferometer, we detect phase difference between wave fronts that always are parallel to mirrors in the equipment. The interferometer is sensitive in only one dimension, orthogonal to the wave fronts. This limitation in sensitivity means that ether wind inside the wave fronts is irrelevant. Interferometers are also blind to transverse ether wind. In interferometers we detect $\mathbf{c}(1+v_c/c)$ just as in telescopes. We cannot observe the vector sum in these instruments. A transverse ether wind cannot cause wave front bending. Production of wave front bending by the ether wind can only be done by a difference in the longitudinal component v_c of the ether wind. The longitudinal component must be changing over the wave front. v_c must have a gradient different from zero.

8. Stellar Aberration

A hunter must compensate for the motion of a flying bird in relation to the speed of his shot. In the same way, a telescope observer must compensate for the telescope's motion in relation to the speed of light. We have seen, that ether wind transverse to light, is irrelevant. The stellar aberration can therefore only inform us about our own motion and cannot tell us anything about the ether wind. We can see this fact in a different, way by stating that the aberration is produced when we do a transformation of coordinates, from the frame of our sun to the frame of our planet. This transformation changes light vector by an angle arctg(u/c) when observer's motion u is transverse to light vector. This transformation is independent of v, and also independent of whether light is waves or particles. See Fig 1.

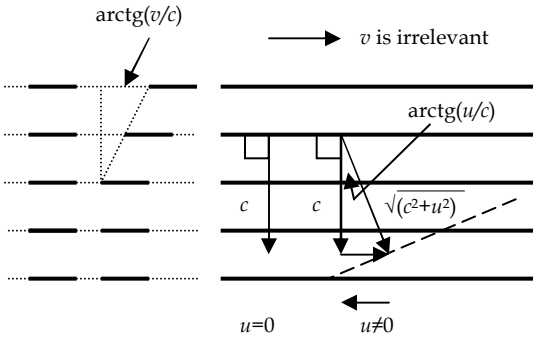

Fig 1 a Transverse ether-wind v does not change wave front normal

Fig 1 b Observer's motion u creates the *illusion* of a changed direction to a fix star (Bradley's idea)

Experiments have been done to see if water in a telescope could increase indicated aberration, by means of slower light speed in the telescope. However, refraction in the surface air to water reduces small angles, and compensates thereby the assumed effect. We can see this in another way by stating that, after transformation of frames the optical axis is in line with apparent wave front normal. Stellar aberration can therefore not tell us anything about the state of motion of the ether. This is independent of whether we have water in the telescope or not.

9. The Two-Way Speed of Light

The atoms in a crystal must have a method to control their separations. The ether is the only possible medium for this mission. This means that the ether is transferring positional information in two opposite directions between two nearby atoms in a crystal. Small changes of positions are transferred by the ether just like light waves. Light waves are also changes in the ether and the speed is c. The atoms are in a two-way communication based on the ether. Information moves with speed $c\pm v$ in two opposite directions in relation to the atoms. Due to this two-way communication the separation between the atoms is reduced by a factor $1-v^2/c^2$. These communications are simultaneous in the two directions. In experiments based on two-way speed of light communications of light are instead sequential in two directions. The two opposite effects add together in the same way independent of if the communications are sequential or simultaneous. The two-way speed of light is also reduced by a factor $1- v^2/c^2$. Since length and velocity are reduced by the same amount we get a constant time of propagation. Therefore, the two-way speed of light cannot be measured with a mechanical construction as a reference. The method used by Michelson and Morley is therefore useless in relation to the ether wind.

Experiments searching for a second order longitudinal effect have assumed this effect to be $1- v^2/c^2$. The ether is assumed to be the reference for the wave velocity $\mathbf{c}$. Light is described as a vector sum of $\mathbf{c}$ and $\mathbf{v}$. Logic demands vector sum to be valid even when $\mathbf{v}$ is transverse to $\mathbf{c}$. This means that transverse ether wind has no effect on the longitudinal speed of light. This is valid in telescopes as well as in interferometers. Therefore the common opinion that transverse ether wind has an effect that is half the longitudinal effect in second order is not correct. Since the interferometer detects $\mathbf{c}(1+v_c/c)$ we must change our interpretation of Michelson and Morley's experiment in accordance to Fig 2.

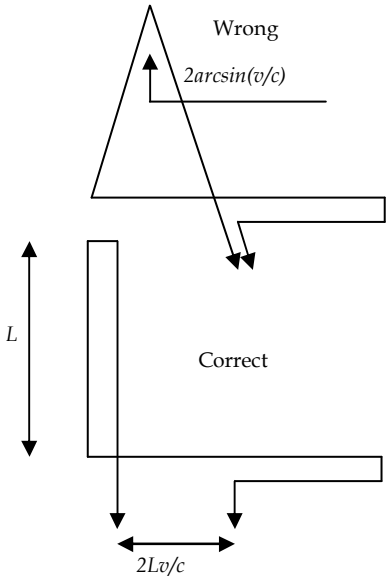

Fig 2 Wave-front normal is independent of transverse ether-wind in MMX.

10. The Sagnac Effect

To avoid the problem of synchronizing clocks Sagnac used a closed path of light. Light from one source traveled in two different ways to an interferometer. The same path of light was used in

two opposite directions. For simplicity, we assume vacuum and a circular path of light. The tangential velocity of the rotating equipment was changed from zero to a constant velocity u. When the two signals were united they had traveled different times. These times are $L(1+u/c)/c$ and $L(1-u/c)/c$. The length of the light path is L. The time difference is therefore $2Lu/c^2$. Since the light is distributed along a line and the interferometer is sensitive in one dimension only we can conclude that this is an effect of *translation*.

Due to geometrical relations this effect can alternatively be described based on enclosed area and angular velocity. However, it is the earlier description that has physical relevance. Since Sagnac changed detector position and not the speed of light the effect should be calculated in a not rotating frame. This means that we should not have the quadric term that is present in many derivations of the Sagnac effect.

The most important error regarding Sagnac effect is the classification of the effect as rotational. The effect is *translational* since it is distributed along a line. This means that the same effect must exist along a straight line. In the global positioning system (GPS) a compensation for this translational effect is done. The effect is caused by the rotation of our planet. The high precision in the GPS system demands this correction, when time stations on our planet are compared. This is an indication of an ether wind that is translated, but not rotated, by our planet. The GPS system cannot afford to ignore the ether wind. Einstein ignored this (first order) effect of ether wind and got absurd 'local' time as a result. Perhaps physicists should learn more from advanced technology. We can very easily get more confirmation of these GPS results by measuring the one-way speed of light. Dr C C Su in Taiwan has described in [3] how this can be done in an unambiguous way. Both vertical and horizontal ether wind can be measured.

11. Ether Wind Detection

Telescopes are blind to transverse ether wind. This is the simple, and important, reason to the fact that stellar aberration cannot tell us anything about the state of motion of the ether. The separation between atoms in a crystal depends on the ether wind to the same extent as the two-way speed of light. Therefore we cannot detect the two-way and second order effect of the ether wind with a mechanical construction as a reference. However, this second order effect in two-way light motion exists also in two-way electron motion. This second order effect is observed in atomic clocks but has been interpreted in error. The mechanical behavior inside atomic clocks has in a wrong way been explained as metaphysical concepts in time and space that are dependent on velocity and potential of gravity.

Interferometers are, like telescopes, blind to transverse ether wind. Interferometers are sensitive in only one dimension and Sagnac effect is therefore a translational effect, valid along a line. The effect, discovered in the GPS system, is not regarded in the theory of relativity, and this explains the production of multiple time concepts.

12. Atomic Clocks

The ether wind changes the two-way speed of light by a factor $1-\beta^2$ with β as v/c. Electrons circulating an atomic kernel move forth and back in relation to the ether wind in a plane inside the electron's orbit. It can be reasonable to assume that the electron moves faster in the direction of the ether wind, and slower towards the ether wind. If the electron's speed is proportional to the speed of light the factor $1\pm\beta$ can be valid for electron motion also. If so the factor $1-\beta^2$ can be valid for two-way electron motion and thereby also be valid for the speed of atomic clocks. However, in atomic clocks this effect is not compensated, as it is in Michelson and Morley's experiments, and therefore detectable. A documented behavior in atomic clocks can therefore be explained by a mechanism inside the atomic clocks. This explanation means that we do not need metaphysical elasticity in time and in space.

The speed of a satellite in circular orbit around our planet is 7.91 km/s in a low orbit and 3.87 km/s in a GPS satellite. The horizontal ether wind produced by motion can therefore explain the slowing of clocks by a clock mechanism instead of by a metaphysical (magical) concept in time itself. GPS clocks are also affected by the potential of gravity. We have explained gravity as an effect of the ether wind. It is therefore natural to substitute gravity by ether wind squared. This substitution means that we can explain another 'time property' by a clock property. Two metaphysical time concepts are thereby substituted by one clock property. This is a logical step since our experience of so called time dilation is observed just in atomic clocks. We have earlier made a hypothesis about the magnitude of the vertical ether wind by stating it equal to the horizontal ether wind in a satellite in a circular orbit at the same altitude as the ether wind. However, we must remember that this assumption is only a preliminary hypothesis.

The mechanism in an atomic clock depends on orientation. In searching for clock behavior we must therefore make assumptions about satellite stabilization. Demands from the communication system imply stabilization in relation to Earth. We assume here that the clock is orthogonal to this direction. The influence from vertical ether wind is therefore $1-\beta^2$. In horizontal direction we get only $1-\beta^2/2$ since we assume no stabilization in relation to motion. The rotation of the satellite causes the reduction by a factor of 1/2. We find this value by taking the average value of a squared cosine function. These assumptions render an *increase* in clock speed by 38.6 μs/day when a satellite is put into orbit. If we instead assume the clock to be oriented along the direction of gravity we get zero effect from vertical ether wind. Instead the effect from horizontal ether wind is changed to $1-\beta^2$. When this satellite is put into orbit we get a *decrease* in clock speed of 14.4 μs/day. The behavior of atomic clocks has earlier been described in [2].

13. Relativity and Quantization

The theory of relativity is based on observations of stellar aberration and experiments done by Michelson and Morley. Both these two kinds of empirical results are interpreted in error and contain no information about the state of motion of the ether. It is also unhappy that the *first order* effect of the ether wind that was detected by Sagnac in an equipment with a light path going along *four* straight lines not was accepted to be valid in *one*

straight line. Such a generalization of results by Sagnac would have helped us to avoid multiple time concepts.

The theory of relativity assumes mysterious effects of velocity and gravity. These effects are assumed to produce elasticity in time and in space without any mechanism that explains the effects. These effects are magical. Instead of elastic time we can find an explanation in a mechanism inside an atomic clock. Instead of elastic space we can find an explanation in an elastic mechanism inside a solid body. The state of motion of the ether can therefore explain properties of atomic clocks as well as properties in solid bodies.

By assuming light as a wave motion (without mass) and the electron as a particle we can explain photoelectric effect and Compton effect as an interference between light waves and electron particles. We do not have to assume quantization to exist in light. The particle light behavior in light is explained as packets of light waves due to short time quantum events. The wave like behavior in electrons can be explained by a wave function in the ether produced by a *moving* electron. Light speed related to observer motion and quanta of light were both produced in 1905. Both these ideas can be avoided if we accept the ideas presented in this article.

14. Wave Front Bending

We have seen that ether-wind inside the wave front cannot bend the wave front and not explain stellar aberration. However wave front bending is possible due to a gradient in the longitudinal component in the ether-wind. The observed bending of light near our sun can be explained in this way if we assume the falling ether radial to our sun. This ether-wind becomes equal to 437 km/s according to the same assumption earlier done for our planet. For light tangential to our sun we first get a positive component, and later a negative, from the ether-wind. Since the effect is strongest nearest to the Sun we get a bending first away from the Sun and later back to the same direction. The bending is not to the same position and we can calculate the difference as an integration of the gradient in longitudinal ether-wind v_c. We can describe this as $\int \nabla v_c(\mathbf{r})d\mathbf{r}$.

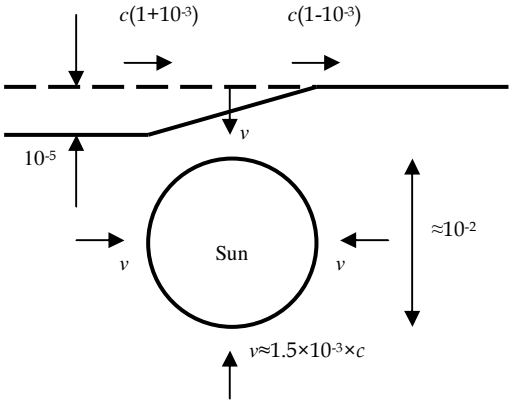

Fig 3 Light bending near the Sun caused by a gradient in longitudinal ether-wind.

A very, very rough estimate can be found since the vertical ether-wind of $1.46\times10^{-3}\times c$ produces a longitudinal component of about $10^{-3}\times c$, maximal value. Apparent size of the Sun is about 10^{-2} radians. We get an estimate in the order of 10^{-5} radians as observed. This is described in Fig 3. A more accurate calculation should be done according to the earlier described integration.

15. Gravitational Shielding

Pushing gravity is assumed in this article. This assumption implies a very small difference in relation to Newton's gravity. Newton's theory is based on superposition and this means that gravity on the surface of a homogenous sphere increases linearly with radius. Pushing gravity implies a very, very small nonlinearity since gravity increases according to an exponential function and has a maximal value. This follows from the fact that the ether wind, that is the cause of gravity, never can have a value greater than the speed of individual ether particles c. However, this maximal value is many orders of magnitude greater than the value of gravity on our planet. The shielding effect can probably be detected during a solar eclipse when the combined effect of gravity from our sun and our moon is to a small extent less than the sum of their individual effects.

Our moon produces a force of gravity on our planet, that is about 3.4×10^{-6} times the gravity from our planet. In accordance to earlier assumptions we have a vertical ether wind on our sun of about 1.5×10^{-3} in relation to c. We can therefore assume that the flow of ether particles passing through our sun is reduced by a factor $1\text{-}1.5\times10^{-3}$. A very rough estimation of the shielding effect can therefore be found by multiplication of the two earlier given values. The shielding effect is therefore in the order of 5×10^{-9} in relation to gravity on our planet. An advanced gravimeter can probably detect such a small effect.

During daytime a reduction in the combined gravity from Sun and Moon should have a small positive effect on the gravimeter. However we cannot expect to observe this effect since the same effect is acting on nearby parts of our planet. Our planet and the gravimeter mass are both free falling bodies in relation to gravity from Sun and Moon. However, just before and just after the eclipse, when the effect in the gravimeter has disappeared, we may still have some effect in our planet near the gravimeter. A mechanical coupling between different parts of our planet can explain such an effect. This effect can reach the point where the gravimeter is. We can therefore expect two negative bumps in the registration instead of one positive bump that would be expected if only gravimeter mass was affected. See Fig 4.

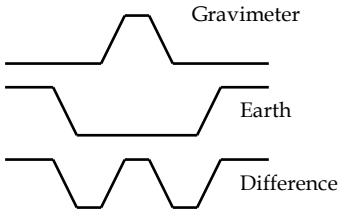

Fig 4 The shielding effect from the Earth is registered as negative by the gravimeter. The registration contains therefore the difference between effect on the radiometer and effect on the Earth.

Anomalies, related to solar eclipses, have been detected by Allais in 1954 and 1959. These registrations were done by pendulums and gave no values on the size of the effect. The registration in 1954 is not symmetric, and strong only during the first half of the eclipse. The effect is very different from the effect in 1959. The reaction of a pendulum is complex and not linear. We can therefore not relate time of gravity effect to time of optical eclipse with high precision. Allais' registration supports the existence of shielding but provides no numerical results.

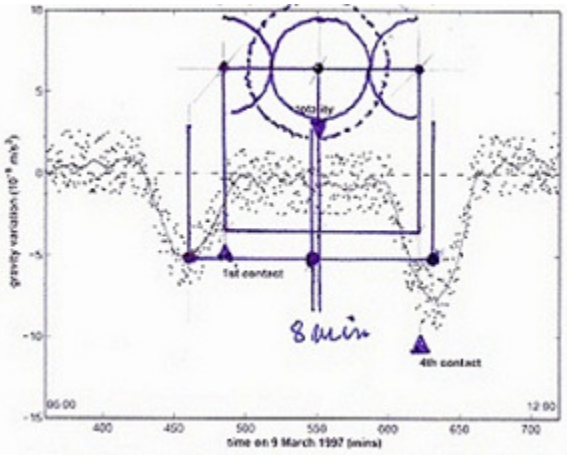

Fig 5 describes measurements of the total eclipse of the Sun on 9 March 1997. The solid curve is the averaged variation over a moving 10-minute window. The Moon's and Sun's positions are marked by hand drawing for the beginning and end of the optical eclipse.

An anomaly in gravity related to an eclipse was registered in China in 1997. See [4] and Fig 5. This registration was done with a gravimeter and gave a numerical value on the shielding effect. The registration demonstrated symmetry in relation to time. This can be expected, since spherical bodies are involved. The symmetry means that we can accurately compare time of arrival with time of arrival of the optical eclipse. In the diagram in Fig 5 we can see that the shielding effect arrives about 8 minutes before the optical effect. This is in agreement to the theory presented here, since the optical effect is produced on the surface of our sun but the gravitational effect is produced inside the Moon. This is done when a local condition in the gravity field is changed. We have thereby got a confirmation regarding the speed of light but not regarding the speed of gravity. As we expected, two negative bumps are registered. The separation between the centers of the two bumps is about as large as the optical eclipse. This is indicating that parts of our planet, larger than the size of our moon, are involved. The registration was done in low elevation angles between 20 and 30 degrees. We can therefore expect a vertical component in the shielding effect of about 2×10^{-9} in relation to gravity on Earth. The observed effect is about three times that value. However, uncertainties exist whether the horizontal component in the shielding effect can have some influence on the registration. We must also remember that this rough estimation only provides the order of magnitude. This result is very interesting and more registrations should be done when it is possible since Le Sage's gravity provides an ontology that can explain gravity. Newton's and Einstein's theories cannot do that.

16. Summery

The ether has been described as a flow of particles, and light has been described as moving waves in the polarization of these ether particles. Wave to particle dualism is not needed. Quantization in light is not needed. Moving charged particles can generate electromagnetic ether waves. Boltzmann's constant k represents the effect of atomic kernels and Planck's constant h represents the effect of electrons in the same way. This is demonstrated in the law of blackbody radiation. Interaction in the opposite direction (electromagnetic waves changing the motion of charged particles) is demonstrated in the photoelectric effect and in the Compton effect. This demonstration does not demand quantization in light. The ether described here is not autonomous and not entrained in itself. However, two properties of the ether are entrained. These properties are gravity and a *generated ether wind* that is the cause of gravity. Absorption of ether particles in celestial bodies explains how a falling ether (vertical ether wind) is generated. The ether particles move with the speed c but the generated ether wind is many orders of magnitude smaller than c for bodies of the size of our planet.

Gravity is a local relation among moving particles, and this relation does not move in relation to the cause of gravity. This means that the speed c of individual ether particles has no relevance for *constant* gravity. We can therefore not observe aberration in gravity from our stationary sun. We can consider the Sun as stationary due to its large mass in relation to the mass of our planet. The speed of ether particles c is relevant only for *changes* in gravity. This means that gravity from a moving source or shielding of gravity due to a moving body can demonstrate aberration. The lack of aberration in gravity from the Sun does *not* imply enormous speed of gravity as commonly is assumed. A preliminary hypothesis has been assumed saying that generated, vertical ether wind is of the same magnitude as the speed of a satellite in a circular orbit at the same altitude as the ether wind.

The real motion of light can be described as a vector sum $\mathbf{c}+\mathbf{v}$ of wave velocity and ether wind. However, in telescopes and interferometers we find the ether wind inside the wave front to be irrelevant. In these instruments relevant light motion is instead $\mathbf{c}(1+v_c/c)$ (v_c is component in $\mathbf{v}$ parallel to $\mathbf{c}$). As a consequence stellar aberration is silent in relation to the ether wind. This means also that Bradley's interpretation of stellar aberration in relation to light particles is valid for light waves as well. It is logical to conclude that observer motion has the same effect when we observe different phenomena. The interpretation of the Michelson and Morley experiments should also be changed in accordance to Fig 2. The irrelevance of ether wind inside the wave front is a very important fact that has not been observed. It is also important to realize that the Sagnac effect detected in four straight lines also must be valid in one straight line. The Sagnac corrections made in the GPS system demonstrates this translational and first order effect of the ether wind. By regarding this effect we can avoid multiple time concepts.

Michelson and Morley searched an effect of the ether wind in two-way ether based communication. The separation between atoms in a crystal is controlled by two-way ether based communication. Physical objects are therefore contracted to the same amount as two-way speed of light. Experiments of the Michelson

and Morley type can therefore not detect the second order effect of the ether wind. By regarding this elasticity in solids we can avoid elasticity in space as described in the theory of relativity. The effect, searched by Michelson in two-way light motion, can also exist in two-way electron motion. Such an effect can exist inside the plane of the orbit in bound electrons. The behavior existing, but not observable, in light motion can be observable in electron motion. This means that we do not need elasticity in the time concept due to motion and gravitation. Instead of two time concept we can explain the behavior with only one mechanism inside an atomic clock. This mechanism depends on the ether wind as we easily can test. Changing the clock orientation from horizontal to vertical should increase clock speed by a factor of about 7×10^{-10}, caused by the vertical ether wind of 7.91 km/s on our planet.

The ether demonstrates resistance to acceleration and produces gravity but demonstrates no resistance to velocity. This can be explained by assuming celestial bodies to generate a wave function, adapting surrounding ether to the velocity of the body. The free falling body will therefore only experience its own gravity field and ether wind. This means spherical symmetry and no resistance to speed. Such an adaptation demands super fluidity in the ether. Energy is needed only when the wave function is changing. This explains inertia. The constant wave function adapts the state of motion of the ether without consuming energy. Apparently the ether particles do not collide with each other. The ether is therefore not a common gas but a separate state if (no) aggregation. This fact can perhaps help us to explain why two light waves in opposite phase can produce zero light. If light is represented by polarization of ether particles destructive superposition can be explainable. This can also mean that we perhaps should change our conception of the interchange of energy between charged particles and light. Instead we should talk about interchange between charged particles and *ether*. The presence of light can instead be viewed as a contribution of information needed for the interchange. This interpretation means that we can avoid a violation of the rule of energy conservation.

Disregarding first order effect of the ether wind produced multiple time concepts. Disregarding second order effect of the ether wind in atomic clocks produced elastic time. Disregarding second order effect in solid bodies produced elastic space. The force of gravity is also a second order effect of the ether wind. The bending of light near our sun is demonstrated as a first order effect of the ether wind. The falling ether, explained here, can also explain an anomaly during a solar eclipse observed in China 1997. This means that the theories of gravity presented by Newton and Einstein are only approximations to the theory presented by Le Sage and Fatio. The ether wind can therefore explain many phenomena. It was therefore a gigantic mistake to abolish the ether concept. Many phenomena have been interpreted in error and unification between light and gravity has been impossible. The introduction of light waves produced a misunderstanding of stellar aberration. The reintroduction of light particles was also a great mistake that produced the wave or particle confusion and denial of ether. It was also wrong to conclude quanta of light based on observations on discrete electrons. Planck's constant h can be just a constant of proportionality just like Boltzmann's constant k.

17. Discussions

The theory of relativity seems to be produced by too much faith (and little knowledge) in mathematics, and too little respect for philosophical arguments. The idea that a wave (or a particle) could propagate with the same speed c in relation to *all* inertial frames was denied by most philosophers. The theory of special relativity is based on an absurd idea. The philosophers were ignored by arguments like "philosophy has not produced anything in physics". We should not expect philosophy to produce physical theories. Instead philosophy is an important tool for sorting out inconsistent theories. Another controversial idea is the conclusion of quantization in light based on observations on material particles in the photoelectric effect.

It is a remarkable fact that a teenager starting to dream about surfing on a light wave produced the special theory of relativity after a decade. After another decade the general theory of relativity was produced. It is also very remarkable that the same scientist, after many decades of study, was completely ignored when he wanted to reintroduce an ether in order to unite light and gravity. He also wanted to introduce causality in quantum physics. No ether and no quantum causality are conclusions based on failure to confirm the opposite. No existence from lack of data is bad logic. Other examples of the same kind are Euclid's fifth postulate and Michelson's prediction. The time for a quantum process is not proved to be zero just because we are forced to use that approximation since we fail to measure such a short time. Remember that before Römer the time for light propagation was considered as zero. Glorification of inventors and ignorance about whistle blowers seems also to cause mistakes in physics. Young Einstein was regarded as a genius and an inventor but old Einstein was ignored as a whistle blower when he had gained experience and wisdom. Another important reason to mistakes in physics is the lack of knowledge about how the test equipment really works. In experiments with telescopes and interferometers it is important to know that *only one component* in the ether wind is relevant. This is important in many experiments and not only in the stellar aberration.

Light is a difficult subject that has been given magical properties, and this has produced local time and elasticity in space and time. Local time is avoided by considering translational Sagnac effect to be valid in a straight line. Therefore the theory of relativity had probably been avoided if Sagnac effect had been discovered before Michelson and Morley's experiments. Elastic space and time are avoided by the interpretations of Michelson and Morley's tests and of behavior in atomic clocks given here, based on physical mechanisms. The falling ether, presented here, is not an entrained ether. Instead absorption in matter generates a vertical ether wind, which is the cause of gravity. The vertical ether wind explains also the bending of light near our sun without assuming mass or quanta of light. The ether wind can also explain red shift in celestial bodies without assuming "big bang". We can also explain an anomaly in gravity during a solar eclipse by an extremely small difference between pushing gravity and Newton's gravity. The ether resists acceleration but not velocity and light demonstrates destructive superposition. To explain this we have to assume the ether to be in a state of (no) aggregation and demonstrate super fluidity and light to contain no energy.

18. Conclusions

- *The ether* can be described by particles moving with the speed *c* in all directions.
- *The generated ether wind* is many orders of magnitude smaller than *c*. This falling ether is the cause of gravity. This vertical ether wind can also explain the red shift, observed in celestial bodies without assuming a "big bang".
- *Transverse ether wind* cannot be detected in a telescope, or in an interferometer.
- *Longitudinal ether wind of second order* cannot be detected with a mechanical structure as a reference, but can be detected in an atomic clock. Gravity is also a second order effect of the ether wind.
- *Longitudinal ether wind of first order* is detected in Sagnac's experiment, and in the corrections for translational effect done in the GPS system. Wave front bending near our sun can be explained by the ether wind.
- *Pushing gravity* is demonstrated in the Wang eclipse in 1997. A very, very small deviation from Newton's gravity is demonstrated.
- *Inertia* can be described by a wave function demanding energy only when changed.

19. Testing

- The vertical and horizontal ether winds can easily be measured by Dr Su's method. See [3].
- The speed of atomic clocks is dependent on orientation. This can easily be tested.

20. Questions

- Can the falling ether help us to understand the Pioneer anomaly?
- Can light without energy help us to explain destructive superposition?

References

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