Physics without Mathematics

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Content

Abstract

Two light waves in opposite phase can add up to zero light, so light must be without energy. Therefore, bound electrons can generate <u>potential</u> force, that does not become real if this force is not detected by means of another electron. This explains why bound electrons can generate light without losing energy, and this also means that we do not need Planck's quantum jumping to explain blackbody radiation.

Observer motion causes starlight aberration by means of the rain drop effect, and not by an ether wind causing wave front bending. Stellar aberration is therefore a useless test in relation to the ether wind. This means that there is no observable effect of an ether wind blowing transverse to light direction in coherent systems. Ether wind blowing in longitudinal direction to light means that the ether transmits light faster in one direction, and slower in opposite direction. The same relation is valid for the exchange of positional information between atoms in a crystal. The result of this fact is that 2-way speed of light is reduced in the same way as the separation between atoms in a crystal. Michelson and Morley's tests are therefore useless in relation to the ether wind, since the expected effect in 2-way light speed becomes compensated by contraction of the length of physical bodies. This means that we do

not need the Lorentz factor, and this means also that we do not need the absurd concept of time dilation.

A consequence of all this is that old empiric data due to stellar aberration and Michelson and Morley tests must be abolished. Instead we must regard experiences with modern advanced technology. This means: atomic clocks, satellite navigation systems, Pioneer anomaly and gravitational anomalies during solar eclipses. We can find agreement to all these results by assuming an ether falling in radial direction towards a material body that is in a free fall. The magnitude of this ether wind is equal to the speed of a satellite in a circular orbit on the same altitude as the ether wind. This explains why we, on the free-falling Earth, cannot see gravity and ether wind due to due to the Sun. We do not see this ether wind since we are moving with the same speed in an angle orthogonal to the ether wind. A falling ether of this kind can also explain gravity, and this means also that this ether can substitute Einstein's mythical gravity due to a bending of nothing.

The three most important pillars of 'modern' physics are all possible to unite with classical concepts. If we do that we get <u>science without fiction</u>.

Background

Faraday's important work regarding the ether resulted in a shift of the model for light from particles to waves. This was a result of the fact that the theory indicated constant speed of light in relation to the ether. However, the theory was not complete and could not answer the question regarding the state of motion of this ether (the ether wind). Due to these problems regarding the ether wind the ether concept was abolished. Instead, the theory of relativity was introduced, and stated that light moves with the same constant speed in relation to all observers moving with different, but constant, speeds. This idea resulted in a step backwards with light described as both waves and particles. The wave or particle confusion was created. Another confusing result of this reasoning was that time and space got a kind of elasticity, and this elasticity depended on the speed of the observer. However, it is more realistic to regard elasticity as a property of matter.

The need for a particle model for light was supported by another confusing phenomenon, namely the fact that matter creates an electromagnetic radiation dependent on its temperature. It was assumed that this radiation contained energy, and that the law of energy conservation did not allow such radiation from electrons in stabile orbits around a kernel. However, two light

waves in opposite phase can add up to zero light. Therefore, the law of energy conservation proves that there is no energy in light, and that electrons in stabile orbits generate forces that are only <u>potential</u>, and they are not real if they are not detected by another electron. So, thermal radiation can be stabile electrons without energy consumption. Therefore, light can be without energy, and light can be regarded as an intermediating link for energy transfer between ether and electrons (matter). Light can link energy instead of storing energy. The ether exists, and contains lots of energy.

Another confusing idea is the present description of gravity. Although space is regarded as something completely empty it is nevertheless regarded as something that can be bent by matter.

We therefore find that absurdities and paradoxes exist in quantum mechanics, special relativity and in general relativity.

Euclid's famous postulate

Euclid postulated that a line and a point together define a unique line passing through the point and being parallel to the given line. He could not prove this statement, since he used a definition of parallelism that was based on a point that does not exist. He also did a second error, by limiting parallelism to straight lines, and thereby missed the fact that two concentric circles also are parallel.

A better definition is to state constant separation, in orthogonal direction, from the given line to the given point. This definition is valid for straight lines as well as for circles. In the case of straight lines, we can use the given separation to find a second point, and two points define a new straight line. In the case of circles, three points define a unique circle. Having these points, we have a straight line, or a circle, defined and unique.

The error in the definition of parallelism has not been discovered. Instead a kind of non-Euclidean geometry has been invented. (Humans appear to be better at inventions than at discoveries.) Einstein extended the idea from 2 to 3 dimensions. He thereby produced an error. We can bend a 1-dimensional line inside a 2-dimensional surface, and we can also bend a 2-dimensional surface inside a 3-dimensional space.

However, we cannot bend a 3-dimensional space in a 4-dimensional something, since there are only 3 dimensions in space. Einstein's 'brave' solution to this problem was to use time as the fourth space dimension. This is an absurd idea, that is producing elasticity in time and space. Elasticity is a property we can expect in matter, but not in time and space.

Faraday's ether

Faraday was a bookbinder, who became a physicist by reading the books he was binding. He was very interested in the ether concept, and his lifelong studies on this concept resulted in inventions of electromagnetic systems. He invented the generator, the motor and the transformer. As a self-made man, he was not well educated in mathematics. Nevertheless, he was a pioneer in the use of the concept field. He got help to transform his ideas into mathematical form. The result of Faraday's ether work is often seen as four differential equations. They are sometimes seen printed on T-shirts, but many scientists have forgotten that these equations represent an ether specification. Many scientists believe that this ether does not exist.

Faraday's work resulted in a change of the model for light, from particles to waves. A transformation that later became very problematic, and resulted in the wave or particle confusion, stating that light is <u>both</u> waves and particles.

Fatio's ether

Fatio discovered an ether model based on a flow, in all directions, of very small and very fast particles. The flow is slightly reduced when passing through matter. The flow leaving a body is therefore somewhat smaller than the flow that is approaching, and this small asymmetry can explain gravity. The asymmetry means that the ether is moving in radial direction towards a body like our own planet. The ether is falling in radial direction, and this is the cause of gravity.

Fatio's ether explains gravity, and Faraday's ether explains light as waves. In reality, the ether must explain both these two phenomena, and it is therefore of interest to search for such a unification. Perhaps this can be possible if we can assume that the wavelength for light is large in relation to the separation between ether particles. Such a unification would perhaps also mean that the wave or particle confusion will be solved by an ether, based on particles and light, based on waves.

The wave or particle confusion

The wave or particle confusion is very central to the problems in so called modern physics. Therefore, we must be careful when we study the propagation of light waves. In an ether theory, it is the ether that defines the motion of light. Light motion depends on the wave velocity that is constant in relation to the ether. The motion of light must therefore be described as an addition of an ether motion and a wave velocity that is constant in relation to the ether. This defines the <u>real</u> motion of light, and we can see the direction of this motion if light is detected based on amplitude (i.e. intensity). This kind of detection is possible only if light is focused into a beam. In that case we can see real direction, as beam direction, in the direction of maximum intensity.

In most kinds of optical experiments light is detected based on phase, and this means that we detect the orientation of the wave fronts. The wave fronts are surfaces connecting points with equal phase. This means that an ether wind that is falling inside the plane of the wave fronts is irrelevant and not observable. This means that in this kind of phase sensitive (coherent) systems we have to use a different model for the propagation of light. In this model light must be described as an addition of wave motion and only <u>one</u> component in the ether

wind. This component is the ether wind that is blowing in the direction of light. So, ether wind transverse to light is not relevant in phase based systems (in most optical experiments, for instance telescopes). This <u>apparent</u> direction is different from the real direction of light.

Light can also be generated base on phase. This is the case when light is generated by feedback in a Michelson type interferometer or in another kind of cavity. This kind of feedback is caused by mirrors, and these mirrors have relevance for wave velocity, but <u>not</u> for ether wind. So, apparent direction is relevant. This means that there is no effect of the ether wind in the transverse arm in the Michelson and Morley type interferometer. Stokes was wrong about that, and he also fooled Einstein to do the same error in his so called light clock.

We find that we need <u>two</u> models for the propagation of light. In systems based on amplitude we must regard the <u>real</u> motion of light depending on total ether motion. In systems based on phase (most systems) we must regard only the component in the ether wind that is falling inside wave motion. This means <u>apparent</u> motion. Therefore, we see that in most experiments we have used the wrong model for light motion. Ignorance of this error is the most important reason to the confusion in modern physics.

We can conclude that we have not had enough understanding regarding the motion of light, and this has caused us to miss the fact that stellar and pulsar aberrations reflect observer motion, and <u>not</u> ether wind. We have also missed that transverse arm in Michelson's interferometer and in Einstein's light clock also are not sensitive to ether wind.
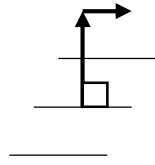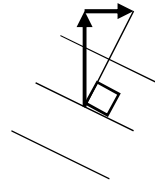
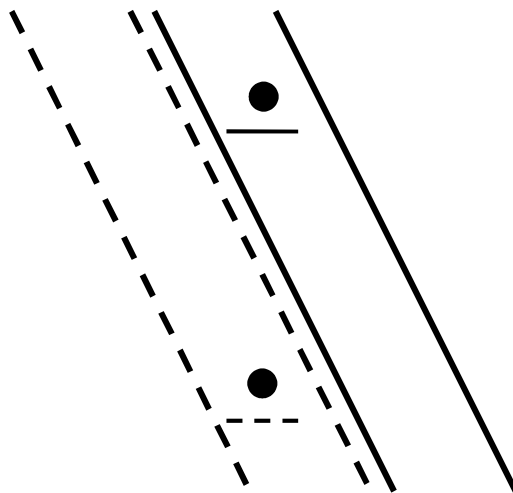Fig. 1 Effect of ether wind

Fig. 2 Effect of observer motion

Fig. 3 This diagram illustrates that the effect of transverse ether wind is the same for light waves as for light particles. See also Fig. 1 that is demonstrating that transverse ether wind causes a not observable effect.

Aberration in starlight and in pulsar signals

We observe starlight based on phase in a telescope and the effect of transverse ether wind is real but <u>not</u> observable. What happens is demonstrated in Fig. 1. So, stellar and pulsar aberrations have been interpreted in error.

So, we need another explanation to these effects, and we find the cause to exist in observer motion. This is the so-called rain drop effect. This effect can be observed from a car moving in rain, where we find that vertically falling rain appears to be not vertical. When we will describe the rain-drops in the moving frame we need a different description of the same effect. The same is valid for starlight and for pulsar signals. In order to conserve reality, we need a changed description in observer's frame. This explanation was used earlier in connection with light particles, but was abolished when the wave model was introduced. In Fig. 2 we can see that this illusion is <u>observable</u>. It is also demonstrated in Fig. 3 that rain-drop effect is the same for waves as for particles.

Since our planet is moving with the speed of 1 part in 10000 of light speed in relation to the Sun the observed direction to a star can also be changed to this small amount. For pulsar signals we can multiply with the

radius of our planet and find a change in the wave fronts of 640 m. Since it takes light 2.1 microseconds to move this distance the observations in very long base instruments are confirmed.

Michelson and Morley's tests

If light is generated by feedback between 2 mirrors in a laser cavity, or in a Michelson interferometer, the behavior of light is defined by the state of motion of the ether and the orientation of the mirrors. However, if the equipment has a motion falling inside the planes of the mirrors, this fact does no change the behavior of light, since light always takes the fastest, not the shortest, way between mirrors. If boundary conditions, implied by mirrors, are not changed, light has no reason to change behavior. In other words: the mirrors have relevance for wave motion but not for ether wind. The apparent direction is relevant, and this means that there is no effect of the ether wind in the transverse arm in Michelson and Morley's tests. Therefore, Stokes was wrong when he introduced such an effect, and thereby reduced Michelson's prediction by half. See Fig. 4.

Stokes mistake was repeated by Einstein, in his so called light clock. Therefore, by the same reason, the ether wind in transverse direction cannot affect the light clock either. These errors regarding transverse effect in Michelson's tests, and in the light clock, has apparently been helpful in introducing the Lorentz factor. This factor is based on the absurd assumption that a physical phenomenon can move with the same speed in all inertial frames.
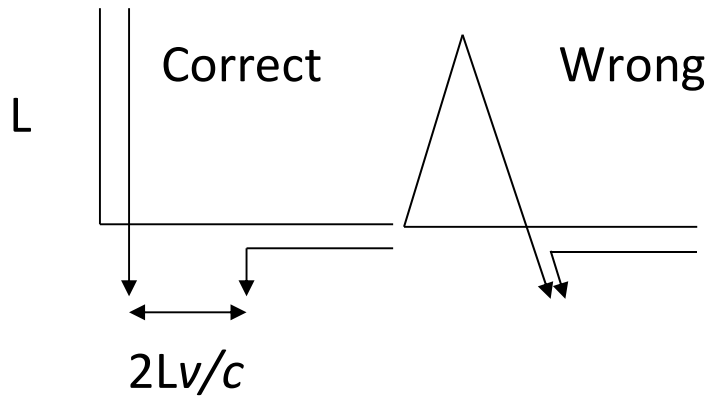
Fig. 4 If the equipment has a motion *v* falling inside the plane of the wave fronts, this is without relevance for the behavior of light. Stokes was wrong about MMX.

In the diagram, we can see that the small quantity, 2Lv/c, probably not can be observed, since v/c is about 10^{-6} and caused by the rotation of the planet Earth. The quantity 2Lv/c is small in relation to the sizes of the mirrors. The interpretation in the right diagram illustrates a 100 years old mistake. Another way to see that Stokes was wrong, and Michelson correct, is to remember that Michelson assumed longitudinal effect of ether wind as a sum of ether wind and wave velocity. Therefore, it is reasonable to assume unchanged speed in a right angle to mirrors. The wave fronts are <u>always</u> parallel to mirrors. We get no effect in the transverse arm.

Michelson assumed for the longitudinal arm a combined effect of light moving in 2 opposite directions. However, separation of atoms in a crystal is also based on how the atoms affect the ether in 2 opposite directions. It is therefore reasonable to assume, that the ether wind can reduce the 2-way speed of light to the same extent, as the reduction of atomic separations. This means, that the searched effect is compensated, and that therefore also means that Michelson's method is <u>useless</u> in relation to the ether wind.

The theory of special relativity

The theory of special relativity is based on stellar aberration and Michelson's tests. Both tests are found useless, in relation to ether wind. The assumption that a phenomenon can move, with the same speed, in relation to <u>all</u> inertial frames is also wrong, and this means that we must give up the theory of special relativity. But we must also give up the Lorentz factor and the dilation of time. So, we find no effect on time and no effect in the transverse arm in Michelson's tests. In the longitudinal arm, we instead find a compensated effect, equal to the Lorentz factor <u>squared</u>.

We find, that not only Einstein, was wrong, but also Stokes and Lorentz.

The reason to the fact that Stokes' mistake has not been detected is mainly due to the increased confusion that was produced by the introduction of more errors. To explain light motion, we need 2 models. We need the vector sum, to describe real motion. However, in most experiments, we use coherent systems to describe apparent motion, where transverse ether wind is not relevant. Disregarding this fact has caused errors in the interpretations of stellar aberration, and of Michelson and Morley's tests.

Atomic clocks

We have seen that we must abolish the Lorentz factor, and that means that we need an alternative idea to explain clock behavior. Such an explanation is not difficult to find, if we regard the fact that bound electrons are moving forth and back in relation to the component of the ether wind, that is falling inside the plane of the electron orbit. This means, that the Coulomb force field, that has relevance for the orbiting, can be changed by the ether wind in one dimension only. See Fig. 5. In front of the atom the field is compressed, and behind the field it is extended. Therefore, the electron is accelerated and decelerated during each period of rotation, and, in one dimension, in the direction transverse to the ether wind, its speed is changing. The component in electron speed, in the direction transverse to the ether wind, is therefore shifting between a higher and a lower value in positions behind or in front of the ether wind.

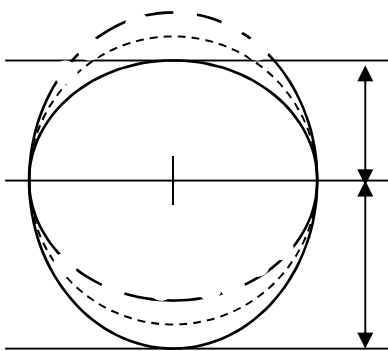Fig. 5 The effect of the ether wind on the Coulomb force field. The field is compressed and extended in the direction of the ether wind.

The effect of the electron's motions forth and back in relation to the ether wind is equal to the effect of light moving forth and back in relation to the ether. This means that the electron's orbiting frequency changes in the same way as the 2-way speed of light.

The entraining ether

The ether theories are normally classified into 3 categories: 1) autonomous, 2) entrained and 3) not existent. None of these can explain gravity. A fourth kind of ether is suggested here: the entraining and entrained ether. This ether is telling our planet how to move, since the planet is in a free fall. This explains why we cannot see gravity from distant celestial bodies. However, there are some small exceptions regarding bodies inside our planetary system, and this is due to the fact that the mass point approximation is no longer valid. One example is tides caused by the fact that the gravity from Sun and Moon is not the same all over our planet. Another small, but interesting, effect is observed as a very small anomaly in gravity during a solar eclipse. The effect is explained by the fact that gravity from the Sun has to pass through the Moon. Since the Moon is smaller than the Earth this effect is not the same all over our planet, and it is this small gradient that makes the effect observable in a very sensitive gravimeter. Although free fall eliminates total effects it cannot eliminate differences in different parts of our planet. Therefore, eclipse anomalies and tides are observable.

The ether is entrained, as well as entraining. The component in gravity caused by our planet is entrained by our planet, and that means that the distribution of

matter causes the field of gravity. The only real explanation to this phenomenon is an old model suggested by Fatio and further developed by Le Sage. This theory assumes an existing omnidirectional flow of very small and very fast particles. It is assumed that matter attenuates this flow and creates a shadowing effect, and an asymmetry, in the neighborhood of the matter. This produces a force in a direction towards the center of the mass distribution. Therefore, the ether gets a motion towards the mass center. This interpretation means that the ether is 'falling' in the direction of gravity. In other words: gravity is caused by a falling ether.

To find the state of motion of the ether we need results related to the 1-way speed of light, and fortunately that experience is available through the GPS system. The GPS system makes high precision measurements based on receivers positioned on the spherical surface of our planet. This is done by time of arrival technology in signals transmitted from transmitters situated on a spherical surface concentric to our planet. The extreme precision in the measurements therefore demands the state of motion of the ether to have spherical symmetry concentric to our planet (or to be zero). Therefore, a falling ether can be united with GPS precision, and also explain gravity.

Gravity and ether wind

Clock frequency due to motion, becomes reduced by half, as an average value, since GPS satellites are not stabilized in direction of motion. We must regard only ether wind component inside electron orbit. Therefore, regarding satellite rotation, means that we must take the average value, and find the value ½. Therefore, we get the same value as is given by SRT. Instead of time dilation we get an effect of an ether wind due to motion.

In the same way, we will try to substitute GRT with a vertically falling ether. As a hypothesis, we use an ether wind in radial direction equal to ether wind due to speed, for a satellite in circular orbit. Stabilization of the satellite means that we do not need the factor of ½, since the satellite is stabilized in the direction towards our planet. Clock direction is therefore transverse to gravity. The supposed value on the ether wind gives clock dilation in agreement to GRT time dilation. However, this effect would disappear if the clocks were oriented and stabilized radially, instead of transverse, to radius.

To find numerical values we notice that on ground we have a vertical ether wind of 7.91 km/s (60 µs/day) and a horizontal ether wind of (due to planetary rotation) in the order of 0.3 km/s (about 0.1 µs/day). In the

satellites, we have vertical and horizontal ether winds of 3.87 km/s (14.3 μs/day).

Since clock orientation is orthogonal to direction towards the Earth we find that the change in clock speed when the satellites are put into orbits is equal to an increase of <u>38.6 μs/day</u>. If the clocks instead were oriented in the direction towards the Earth we instead get <u>-14.2 μs/day</u>. (Speed is decreased instead). We get no effect of radial ether wind, but instead the effect of horizontal ether wind has been doubled due to stabilization. So, we find atomic clocks to be dependent on orientation.

We also find, that ether wind in radial/tangential direction in satellite orbits can predict the same effects as GRT/SRT in the GPS system. But nevertheless, there is a very large difference between theoretical implications of this ether theory and RT. According to SRT the 1-way speed of time is changed in the direction of light travel. The ether theory predicts instead a change in the 2-way speed of light. According to GRT the 1-way speed of time is changed. The ether theory predicts instead a change in the 2-way speed of light, and this change regards only <u>light moving in line with the falling ether</u>. The effects on 1-way light speed are therefore much larger, but difficult to observe, since transverse ether wind and 2-way light speed are useless (MMX and stellar aberration).

Therefore, Sagnac effect and GPS experiences are important in relation to 1-way light speed. It is therefore of great importance that we base our conclusions on the results given by the GPS system. GPS has demonstrated that horizontal ether wind, due to the rotation of our planet, can be detected.

The difference between GRT, and the effect of a radial ether wind, is important. The observed effect in the ether theory is in 2-way light speed and the effect is only regarding light in line with gravity. This means, that on our planet we have a light speed equal to c in horizontal direction. However, in vertical direction we have a 2-way light speed equal to $c(1-\beta^2)$. Here β is v/c with $v=7.91$ km/s. This is a very logical fact, since gravity is a radial force, not a bending of nothing. So, we find that atomic clocks are affected by the vertical and the horizontal ether winds in the same way. However, there is a difference in relation to gravity: the vertical ether wind causes a force of gravity, but the horizontal ether wind causes no force. The plausible reason to this fact is that the vertical ether wind is focused, but the horizontal ether wind is not.

Pioneer anomaly

Two space crafts, Pioneer 10 and 11, have demonstrated a very small reduction of speed, in their motion in radial direction, out from our solar system. This represents a small, but important, anomaly in relation to modern physics. The problem has been discussed for many years, but is not definitely explained. The effect is detected by means of high precision 2-way Doppler measurements. An alternative interpretation is presented here, and is based on the ether theory. This means that 2-way light speed becomes $c(1-\beta^2)$ in line with gravity, and c transverse to gravity from our sun in a stationary system. From this follows that decreased Pioneer motion, Δu, is an illusion. Instead the Doppler effect is caused by increased 2-way light speed, Δc_2. This means that we have an important confirmation of the existence of the ether, and the falling ether can explain the Pioneer anomaly, tides and the Wang eclipse.

The 2-way speed of light is $c_2=c(1-\beta^2)$ in direction to the Pioneer. This is in line with Michelson's earlier prediction. The orbiting speed of our planet is $v=10^{-4}c$. At 1 AU (astronomical unit) from the Sun (not near our planet) we therefore have, in the radial direction, that $c_2=c(1-10^{-8})$. At the distance r_{AU} we get $c_2=c(1-10^{-8}/r_{AU})$, since ether wind is proportional $r_{AU}^{-1/2}$.

The change in frequency Δf is found as follows: $\Delta f/f=(2\Delta u/c)=2\Delta c_2/c_2=2\bullet10^{-8}/r_{AU}$. We assume a carrier frequency of $2\bullet10^9$ Hz. We therefore get: $\Delta f=40/r_{AU}$ expressed in Hz. During the high precision measurements r_{AU} is changing from 20 to 80 AU. So, we can expect a change in frequency of 1.5 Hz. This result can explain Pioneer anomaly. This is confirming the ether theory, and also confirms the assumption of an ether falling in radial direction.

Sagnac effect

The Sagnac effect was discovered in 1913. It is a pity that this effect was not discovered before Michelson's tests with Morley. Physics of today had probably been different, in that case. The effect is described, either by a rotating area, or by a translating line. These descriptions are mathematically equal. However, only one of them is physically relevant. Although Sagnac was forced to use a closed line, we can today see, in the Sagnac correction, used in the GPS system, that the effect also exists in a small part of such a line. Therefore, it is the description based on a translating line that is relevant, in a physical sense. This is confirmed by R Wang, who has measured <u>changes</u> in speed along a straight line.

Today it is possible to measure <u>absolute</u> speed, in relation to the ether along a straight line. Dr C C Su has suggested such a test. It is based on 2 HeNe lasers with very high frequency stability, connected over a couple of meters by an optical fiber, to an interferometer. This is a scaled down version of an experiment, earlier done by de Witte. The equipment must be mounted on an advanced platform, whereby the direction of measurement can be changed, in elevation and in azimuth. Today the GPS system is the only system that

can inform us about 1-way speed of light, together with the test suggested by Dr C C Su.

We have seen that the ether theory can explain:

- Gravity
- Pioneer anomaly
- Atomic clocks
- Eclipse anomalies
- Tides
- Changings in arrival times for pulsar signals.
- Stellar aberration
- Michelson's tests

The ether theory can also explain light bending near Sun.

Light bending near our sun

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 longitudinal to light. 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 summation of the gradient in longitudinal ether-wind

A very, very rough estimate can be found, since the vertical ether wind of $1.46 \times 10^{-3} \times c$ 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 6. A more accurate calculation should be done.

Fig. 6 Light bending near the Sun, caused by a gradient in longitudinal ether wind.

$c(1+10^{-3})$ $c(1-10^{-3})$

10^{-5}

Sun

10^{-2}
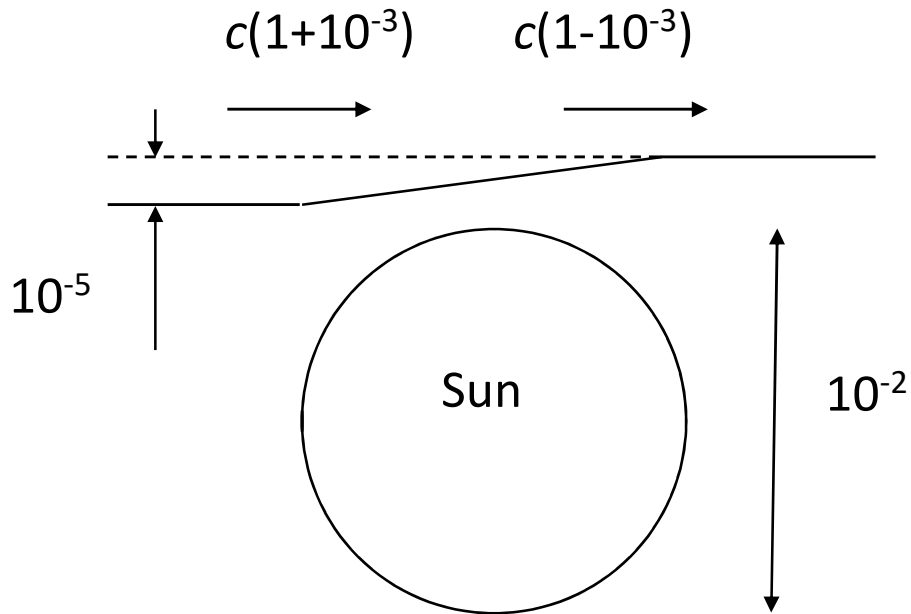
Blackbody radiation

The law of energy conservation is the starting point for quantum physics. An electron in a state of constant energy cannot be assumed to radiate energy. According to experience absorption and emission of light is related to energy change in charged particles. It is therefore concluded that this exchange of energy is with light. Light is therefore assumed to transfer that energy. Contribution of energy from, or to, the ether is not regarded. If we include the contribution from the ether it is possible that the contribution from light is zero. This idea can be united with the fact that we have experience only from absorption and emission, but not directly from transfer of light. It is therefore possible that light does not contain energy. Light can be considered to contribute information only to a process, where energy is exchanged between electron and ether. Information without energy can for instance be represented by polarization of ether particles. Energy is needed only when polarization is changed, but not for maintaining constant polarization. Energy must not necessarily be transferred by light. Light is a field without energy and transfer of energy starts at first when an electron is placed in this field in order to detect the field. Light propagation over billions of light-years and destructive superposition can be united with the idea of no energy

in light. If these ether particles have mass, gravity and energy can be explained by the same ether particles. Energy must exist in the ether, but not necessarily in light.

Assuming light without energy means that bound electrons can radiate continuously, without losing energy. We do not need quantum jumps by electrons to explain the blackbody radiation. Electrons, as well as kernels, can contribute to blackbody radiation. Atomic kernels can dominate at lower frequencies, and lighter electrons can dominate in the high frequency range. The fast decrease in radiation intensity, at higher frequencies, can be caused by light frequencies equal to integer multiples of electron's orbiting frequency and light can be waves only.

Photoelectric effect

The common explanation to the photoelectric effect is based on a light particle colliding with a loosely bound electron particle. Kinetic energy is supposed to be exchanged. Light particles moving <u>towards</u> a crystal are assumed to force an electron to move <u>away</u> from the crystal. This assumption is not realistic in relation to the laws of mechanics. Instead, we can find a more logic model based on the wave interpretation of light.

The inertia from electron mass is compensated by a Coulomb force from electron charge. These forces are transverse to motion for circular orbits. Light with a frequency equal to (or to an integer multiple of) the electron's orbiting frequency can produce a force transverse to motion, and can make interference with the two balancing forces. Due to this interference, the disturbing force can be integrated over many orbiting periods. This idea is supported by the fact that most emitted electrons move transverse to light. This means that <u>waves</u> of light can change the <u>potential</u> energy of the electron without large changes in kinetic energy. When potential energy is changed to about zero the electron can escape its kernel, with about the same kinetic energy as it had before the interference. This means that the electron must have a certain amount of kinetic energy before the interference to allow emission

(or escaping). The electron must be <u>tightly</u> bound. The frequency dependency in kinetic energy in emitted electrons is thereby explained by this demand on high initial kinetic energy. Quantization is therefore not needed to exist in light to explain the photoelectric effect.

A remarkable fact in the common interpretation of the photoelectric effect is that a <u>wave</u> property, f, in $\Delta E = hf$, is said to prove light to be <u>particles</u>. In this article h is instead considered as a scale factor only, and this scale factor represents a property of the electron that <u>detects</u> light, and is not a light property at all. The assumption of interference, demands light frequency to be an integer multiple of the electron's orbiting frequency. This fact can explain the very fast decrease in radiation intensity at higher frequencies, in the blackbody radiation. When the contribution is very low in blackbody radiation, it is observed that the electrons produce a sharp line type spectrum. This fact supports the idea that bound electrons in atoms can radiate blackbody radiation, without doing quantum jumps.

Compton effect

X-rays are assumed to be generated when a fast electron is captured by an atom. X-rays are then generated for a short period of time. A process in opposite direction is also possible. This means that an X-ray wave packet interacts with a tightly <u>bound</u> electron, in the same way as light in the photoelectric effect. This is an interference phenomenon. When the electron's potential energy is near zero the electron can escape its kernel, with about unchanged kinetic energy. However, the electron can be captured by another atom. This capturing can generate a new X-ray wave packet, with somewhat different properties, in relation to the first wave packet. Since escaping and capturing is done in different atoms, such differences are possible. They can be different in direction, frequency and time duration. This process is called Compton effect, but is in reality two processes. The involved electron escapes one atom but is captured by another one. The Compton effect is therefore best described by the <u>wave</u> model for light, and as an interaction with a <u>tightly</u> bound electron. We can also conclude that quantum jumping is not needed in the blackbody radiation, but needed in the explanations of photoelectric effect and of the Compton effect. In the photoelectric effect, we have electrons escaping a crystal, and in the Compton effect we have electrons

jumping from one atom to another atom. To explain these 2 processes, we need <u>packets</u> of light waves, but not any light particles.

By assuming light without energy, we can abolish many quantum paradoxes. However, there is a cost for this simplification, and it is not enough to introduce an ether. We must also ascribe remarkable properties to this ether. The ether is not solid, liquid or gas, but must have its own state of (no) aggregation. Ether particles do not collide with each other, and the ether must be super fluid. Accepting electrons to radiate without losing energy can perhaps help us to understand why planets can be orbiting without losing energy. The planets can generate a wave function that hides ether wind around our planet from observers on our planet, just like how electrons generate blackbody radiation. Near our planet we have instead a vertical ether wind explaining gravity. Maintaining the wave function demands no energy, but we need energy to change the wave function. This fact can explain inertia.

If we accept light without energy and super fluid ether we can abolish the wave or particle confusion as well. Light is waves and ether is particles. Destructive superposition in light can be explained. All we have to do is to accept light <u>waves</u> to interact with <u>bound</u> electrons in the photoelectric effect, and in the

Compton effect. The hypothesis of light, in the form of particles, becomes an illusion.

Discussions

Light reveals matter, but light in itself is not visible. So, it is not easy to see the light. We do not even know for certain if light is waves or particles. The concept ether is even more difficult. Einstein denied the concept only by the reason that he could not understand it. This is bad logic, as he later understood, and therefore tried to correct, by reintroducing an ether. However, it was too late and he was completely ignored, after lifelong studies of physics. This seems a tragedy, since his uncritical creativity was well received in his earlier years, when he was new and unexperienced in physics. During these earlier years he produced many errors, and created much confusion. This fact is the main reason that earlier errors, made by Stokes and Lorentz, have not been discovered. It is therefore an ironic fact, that during the years of advanced space technology, information technology and GPS navigation, these great advancements have been combined with a slow development in theoretical physics.

Our knowledge about the ether is mainly due to the lifelong works of the bookbinder Faraday. He did this work without much knowledge about mathematics, but he is almost forgotten in relation to Maxwell, who did the translation to mathematics. However, it is Maxwell's work that we all talk about.

There is an important difference between ether wind and wave motion. Ether wind is a stationary condition, not moving and not changing in time, although perhaps constituted by a flow of moving particles. Ether wind is related to gravity, and both concepts are not time functions. This explains why gravity cannot reveal aberration like light does. van Flandern was wrong when he concluded, that no gravity aberration proves an extreme speed in gravity. Wave velocity must be regarded as a <u>moving</u> process in the ether, and this motion can explain aberration in light. The ether wind does not have such a motion.

The important difference between wave velocity and ether wind must be remembered when we define a model for light. We must also remember that light has amplitude as well as phase. Coherent systems are based on phase, and this means, that ether wind blowing inside a wave front cannot be observed. Therefore, detection of wave fronts in a telescope is independent of transverse ether wind. So, relevant description of light in a telescope is the ray direction, that depends on wave velocity and ether wind component longitudinal to light. This is also true in the case when light is generated coherently by feedback in a laser cavity, or in a Michelson-Morley interferometer. The created wave fronts are therefore always parallel to defining mirrors,

and light takes the fastest way between mirrors. Boundary conditions from mirrors are relevant in relation to wave motion but not in relation to ether wind.

The beam direction (the vector sum) is relevant only when we detect based on amplitude, and this demands focused light. Therefore, an important error has been done by <u>always</u> using the vector sum, when the ray direction (the wave velocity and ether wind component longitudinal to light) is relevant in <u>most</u> optical experiments. An important error was done by introducing an effect of ether wind in the transverse arm in Michelson's interpretation. Stokes assumed vector sum, instead of wave velocity alone, to be orthogonal to mirrors. This mistake was the base for the Lorentz factor explaining length contraction and time dilation. After that Einstein invented space contraction and time dilation, and later bending of space. So, Stokes mistake created a chain of errors.

The use of beam direction instead of ray direction has also caused errors regarding stellar aberration; and the explanation by a wave front bending is wrong. Instead, the old explanation by Bradley holds, as a self-evident fact, since velocity relation between light and observer cannot depend on light model.

So, we see that it is important that we have 2 models for light propagation. The use of only 1 model has caused errors regarding stellar aberration and Michelson's tests and more errors. An important conclusion is that we must give up time dilation and the Lorentz factor. The only tests relevant are Sagnac tests, the experiences from the GPS system, Pioneer anomaly, light bending near Sun and in gravity during tides and eclipses. We can see, from the high precision in GPS, that the ether wind surrounding our planet must have spherical symmetry. This means that the ether can have a radial and negative motion of -7.91 km/s near Earth. This is a possibility to explain gravity without using 'bending of nothing'. This means however that this ether motion has effect only on radial, and not on tangential, light. This is a difference in relation to GRT, that is said to affect light moving in all directions.

According to this new model radial ether wind is 30 km/s, towards the Sun at 1 AU from Sun (in a point not near Earth). We cannot see this ether wind, since our planet is in a free fall, and also since our planet generates its own ether wind. The ether wind from the Sun seems to be compensated by a transverse motion with the same magnitude. At the surface of the Sun we get -437 km/s in radial direction. This can explain light bending near the Sun by the effect of changes in the

component in ether wind longitudinal to light. The effects of this falling ether can also explain the Pioneer anomaly by the changes in 2-way light speed in radial direction caused by a falling ether between 20 and 80 AU from the Sun. Therefore, the best way to describe gravity is as a falling ether, and this idea is in good agreement to a theory described by Fatio and Le Sage.

Gravity according to GRT and to Newton are approximations depending on the mass point approximation. Tidal effects and gravity changes during solar eclipses are important anomalies, that also support the falling ether model. An important argument is also the possibility to get rid of the absurd dilation of time. The observations done on clocks in the GPS system are easily explained by orbiting electrons in the clocks, changing speed in relation to the relation between ether wind and light speed. This is not in conflict with the fact that electron speed is a couple of magnitudes smaller than the speed of light. The atoms motion in relation to the ether wind means that the electron has increased orbiting speed behind the kernel and decreased orbiting speed in a position in front of the kernel. Electron's position in relation to the ether must affect kinetic energy. Therefore, relative changes in orbiting speed can be proportional to β (=v/c, or the relation between ether wind and wave velocity). This means a clock

frequency proportional to $1-\beta^2$. Therefore, we find agreement to SRT predictions in GPS clocks, if we remember that satellite clocks are not stabilized in relation to motion. The GRT predictions for GPS clocks can also be fulfilled according to the assumption of a vertical ether wind equal to the tangential motion in circular satellite orbits. This new theory predicts however agreement to GRT, for effect on clocks, only for radial light motion. Instead, GRT predicts the same effect on light speed independent of light direction.

We cannot see the light because it is invisible. Therefore, we observe matter in the form of electrons, when these electrons are exposed to light. Our knowledge about the ether comes from photocurrents, that are quantized into electrons by a photodetector. A quantizing detector cannot prove quantization to exist at its input. Therefore, Planck's expression, *hf*, for energy change can explain quantization in the photo current, but not in incoming light. Therefore, *h* can be a property of electrons, instead of a light property. This fact supports also the wave model for light since *f* is a wave property, not a property of a particle. Therefore, we have no reason to extend the quantization concept from matter only to light as well, based on *h*. The assumption that orbiting electrons must loose energy can be wrong, since they generate only <u>potential</u> forces. These forces

become real at first when they are detected by another electron. So, without the detecting electron no force and no energy loss exists. Therefore, we do not have to use quantum jumping to explain blackbody radiation. We do not even have to assume light to transport energy. Instead we can assume light to be an intermediator of energy exchange (in both directions) between ether and matter. No light particles are needed to explain blackbody radiation and photoelectric effect. However, to explain generation of X-rays and the Compton effect we have to assume the existence of packets of light waves, that are generated by a quantum event. X-rays are produced when an electron is captured. The Compton effect can be explained by an electron that first is escaping one atom and then is captured by another. This means <u>two </u>processes, and the change in frequency indicates that only one process is not a plausible explanation.

The explanations to blackbody radiation, photoelectric effect and Compton effect given here are <u>all</u> explained by the wave model for light. Light is assumed to produce a force transverse to electron motion and thereby affect the <u>potential</u> energy in the electron by an interference effect.

Two light waves, in opposite phase, can produce zero light; destructive superposition. This proves that light

cannot contain energy, since that would violate the rule of energy conservation. It is therefore important that we include energy exchange, to and from the ether, when we are studying light, since the law about energy conservation is very important.

Summary

We do not need the wave or particle confusion. Light can be described by the wave model alone. Instead, we need two models for propagation of light, dependent on if the ether wind component transverse to light is visible or not. Failure to see this caused the first, and most important, errors in modern physics. Stellar aberration and Michelson and Morley experiments are thereby found to be useless in relation to the ether wind. The raindrop effect explains stellar aberration independent of if light is regarded as waves or as particles. Instead, Sagnac effect and GPS experiences prove real light speed to be a vector sum of ether wind and wave velocity. GPS indicates that the ether wind is a spherically symmetric field (in relation to Earth), and this means the interesting property of capacity to explain gravity, as a falling ether.

Light can be without energy, since it contains only <u>potential</u> forces, that become real first when they are detected, and energy comes from ether. This fact is demonstrated by the fact that two light waves in opposite phase can produce zero light, without conflict with the law of energy conservation. This means that bound electrons can radiate without losing energy.

Interference between a light wave and a tightly bound electron can explain why light moving <u>towards</u> a crystal can force an electron to move <u>away</u> from the same crystal. This happens in the photoelectric effect. In the same way, an X-ray wave <u>packet</u> can force a tightly bound electron to escape its kernel due to interference during several orbiting periods. When this electron is captured by another atom the process goes in opposite direction. The Compton effect is therefore <u>two</u> processes, and this explains why the second X-ray packet can have a different frequency.

The demand from the GPS system that allows the ether to move in direction towards matter opens a possibility to explain gravity and the Pioneer anomaly. This supports the ether, based on particles, that was introduced by Fatio and Le Sage. This ether theory, called pushing gravity, can also explain tidal effects and gravitational anomalies during solar eclipses. The bending of light near our sun can also be explained by this falling ether.

So, we can conclude that our empirical facts can be explained by classical concepts, without the theory of relativity and the Lorentz factor.

We can also avoid quantum jumping inside the atoms. Quantum events are needed only in connection with

electrons escaping from, or being captured by, atoms. We can do that by assuming no energy in light. Instead electrons exchange energy with the ether, and light is only an intermediator in this process. This explains why 2 light waves in opposite phase can add up to zero.

We get a simpler theory and can include gravity as well. We can do this based on classical concepts, and without light quanta, without elastic space-time and without bending of nothing.

Results

The theory presented here can explain the following:

- Stellar aberration
- Michelson-Morley tests
- Blackbody radiation
- Bound electrons radiate without energy loss.
- Two light waves can add up to zero.
- Photoelectric effect
- Light towards a crystal forces electron to leave
- Compton effect
- Incoming X-rays produce X-rays of changed frequency in the Compton effect
- Sagnac effect
- Sagnac corrections in GPS
- High precision in GPS
- Light bending near Sun
- Behavior of atomic clocks
- Pioneer anomaly
- Gravity
- Tidal effects
- Gravitational anomalies in solar eclipses
- Changing arrival timed in pulsar signals

Reference

Ideas presented here are also described, with some mathematics in a book called *Physics without Photons*. The book is available at:

https://www.morebooks.de/store/gb/book/physics-without-photons/isbn/978-3-330-34966-7