

## Dilatory Dilation

John-Erik Persson  
Fastlagsvägen 2  
S-12648 Hägersten  
SWEDEN  
Email: johnerikpersson@yahoo.com

The behavior of light is analyzed and the use of sound waves as a model of light waves is abolished. Light is described by the wave model only. Time dilation is not needed.

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### Background

The theory of relativity has got lots of negative critique, mostly from mathematical aspects. An example is the writing of  $r^2 - c^2 t^2 = R^2 - c^2 T^2 = 0$  and then manipulate the first equality and ignore the second one. The theory has got hard critique from philosophical view, for instance by Dingle and Nordenson [1]. The definition of multiple time concepts is one example. From a physical point of view more critique appears to be needed. This is the reason to the fact that this article is focused on the interpretations of empirical results constituting the base for time dilation in special relativity.

### Behavior of light

Sound waves have often been used to model light waves, but there are many differences between waves of light and waves of sound. The wave speed  $c$  of light is a constant in free space and in a homogenous medium. The speed of sound is a variable dependent on several parameters. The speed of light is also about one million times the speed of sound. The very important property of polarization in light does not exist in sound. Sound waves oscillate and propagate in the same direction. Light oscillates inside the plane of propagation (as demonstrated by polarization) and generates a motion in a right angle to these oscillations.

Many differences imply that sound waves cannot be used to describe light. Propagation of light is generated by oscillations and must have a longitudinal reference velocity that only the ether can provide. Since the oscillations are oriented *inside* the wave front they are not changed by ether-wind *inside* the wave front. The value of the ether-wind *inside* the wave front is the same over the wave front and is therefore *irrelevant* for the orientation of the wave front. The wave motion of light depends therefore on the ether-wind in *one* dimension only. The constant wave speed  $c$  has therefore the component  $v_c$  in vector  $\mathbf{v}$  that is parallel to vector  $\mathbf{c}$  as a reference. We must therefore describe the wave motion as  $\mathbf{c}(1+v_c/c)$ . *The orientation of the wave front is independent of ether-wind inside the wave front.* In qualified light experiments based on telescopes and interferometers the *orientation* of wave fronts is detected and not *motion* of particles. In this kind of experiments we cannot represent light by the vector sum of  $\mathbf{c}$  and  $\mathbf{v}$ . Instead we must do a scalar addition of only longitudinal component in ether-wind. Constant  $c$  and  $v_c$  imply constant wave front orientation, since

all points on the wave front are *individually* defined by the *same* definition. Transverse ether-wind is irrelevant for wave motion.

### Time dilation

The irrelevance of transverse ether-wind means that stellar aberration and Airy's test cannot tell us anything about the state of motion of the ether. Stellar aberration is an illusion revealing only the state of motion of the observer. Bradley's interpretation regarding light particles is valid for light waves as well, as long as we use equipment detecting wave front normal. Stellar aberration cannot refute the entrained ether.

Stokes was wrong when he reduced Michelson's prediction by 50% due to transverse ether-wind, since this effect does not exist as long as wave front normal is detected. In a laser cavity generated wave fronts are parallel to the cavity independent of ether-wind in the cavities plane. The derivation of time dilation by a so called light clock is also based on a transverse effect that does not exist. This means that we *do not need* time dilation.

### Light bending

Since wave motion depends on longitudinal ether-wind  $v_c$  only we find that ether-wind can bend the wave front only if  $v_c$  is different in different points on the wave front. The gradient in  $v_c$  must be different from zero and we can find the bending by an integration of this gradient along the normal to the wave front. We get  $\int \nabla v_c(\mathbf{r}) dr$ . Changes in *transverse* ether-wind in stellar light cannot cause light bending. However, differences in *longitudinal* ether-wind in light tangential to our sun can explain the bending of light near our sun. This is possible if we assume gravity to be produced by a falling ether directed towards the Sun. Such a vertical ether-wind has a longitudinal component in tangential light near our sun that first is positive and later negative. Since this effect is strongest nearest to the Sun we get a bending, first away from the Sun, and later back to the same direction. Light returns to the same orientation, but not to the same position. The change in longitudinal ether-wind is in the order of  $10^{-3}$  of  $c$ . The size of the Sun is about  $10^{-2}$  of the distance to our sun. This gives very roughly an effect of  $10^{-5}$  radians, as observed. This estimation is based on an assumption done in [2] that gravity is caused by a vertical ether-wind with the same magnitude as a satellite in circular orbit on the same altitude as the ether-wind. See Fig 1.

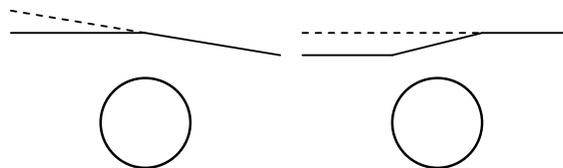


Fig 1 a) Gravitational bending of the path for a mass particle and b) the bending of a wave front by the ether-wind longitudinal to light.

### Entrained ether

Light produced by optical feedback in light clocks, lasers and interferometers has wave fronts parallel to mirrors. This parallelism is not disturbed by an ether-wind inside the plane of the mirrors. The irrelevance of transverse ether-wind means also that light from fix stars have unchanged wave front

normal independent of transverse ether-wind. The use of stellar aberration against entrained ether and the invention of time dilation are caused by the fact that the wave model for light has not been followed consequently. The fact that orientation of wave fronts (and not motion of particles) is relevant has been ignored. The entrained ether was abolished on false grounds. See [3].

The autonomous ether is disproved by the fact that planets can move without retardation although frictional forces between ether and matter exists. This existence is demonstrated by the capacity of the ether to produce gravity on a body. These frictional forces must add up to zero which is an indication of spherical symmetry in the ether-wind. Gravity can thereby be explained by a falling ether.

It is demonstrated in the global positioning system (GPS) that data from satellites around our planet must be handled in an inertial frame centered by our planet. It is also demonstrated in very long base interferometers (VLBI) that data from very distant pulsars must be handled in an inertial frame centered by our sun. This indicates that every heavenly body needs its own inertial frame in its own neighborhood. We can conclude from this that these preferred frames are not real frames, but only approximations to one *preferred field* dependent on the distribution of matter. Therefore we call the ether-wind entrained. This is also a strong indication about an intimate relation between ether-wind and gravity. Both phenomena appear to be generated by the distribution of matter. See [4]. Gravity can be considered as a stationary asymmetry in the ether, and light as propagating vibrations in the ether.

The important fact that planets can move without retardation has not got enough attention. The experiences from GPS and VLBI are also very important supports for the entrained ether. Of great importance is also the fact that the Sagnac effect has been classified as an effect of rotation due to the fact that the effect was discovered in a rotating equipment. Sagnac effect is caused by a translating line and not by a rotating area, since light is distributed along a line and no light exists in the area enclosed. A mathematical identity caused a physical ambiguity. See [2] and [5].

## Discussions

The best way to describe light is by the wave model alone. The particle model for light is not needed. This fact is described earlier in [2] and [5]. These articles demonstrate that the photoelectric effect in the experiment with Crooke's radiometer supports the wave model for light. Quantization of binding energy in electrons implies quantization in emission, but not in existence of light. Compton effect can be explained by an interference between light waves and electron particles. This is plausible since Compton effect has been explained by a particle to particle relation as well as by a wave to wave interaction. Faster photo electrons from higher light frequencies can depend on the fact that these electrons were faster before emission.

Wave motion depends on the component in ether-wind longitudinal to light only and transverse ether-wind is irrelevant. This means that we get no information about the ether-wind from stellar aberration and also that we do not need time dilation. The wave motion is individually defined in every point on the wave front and as long as wave motion  $c$  and longitudinal ether-wind  $v_c$  are constant over the wave front we can conclude that wave front orientation is conserved. This is caused by the fact that these definitions are equal over the wave front. The ether-wind can bend the

wave front only if  $v_c$  is different in different points on the wave front. The relation between ether and wave motion is in one dimension only.

The fact that Sagnac effect is a translational effect is experimentally demonstrated by R Wang in [6]. A method for further verification regarding this fact is presented by C C Su in [7].

### Conclusions

In experiments with light where wave front normal is relevant we must describe light by a scalar addition as  $c(1+v_c/c)$ .  $v_c$  is the component in  $\mathbf{v}$  that is parallel to  $c$ .

The entrained ether is not ruled out by stellar aberration, but supported by planetary motion and experiences from GPS and VLBI.

We do not need time dilation.

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