

A Tragedy in Physics

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Abstract

This article is about the not observed difference between the *beam* direction, representing the motion of light, and the *ray* direction, representing the orientation of the wave fronts. Disregarding this difference has delayed development of physics for a long time.

The beam direction

The beam direction represents the *real* motion of light as a process inside the ether. Since the ether is assumed to move with a speed, equal to the ether wind, in relation to an observer, we can conclude that the beam direction is defined by a vector sum of wave velocity and ether wind. The beam direction can only be observed in *focused* light, where we can see it as the direction of maximum intensity, or amplitude. It is important to remember that the wave velocity is many orders of magnitude larger than the ether wind, and also that these 2 concepts are very different, although vector addition of them is relevant.

The ray direction

The ray direction is an important tool for describing wave front orientation, and this direction is defined as orthogonal to the wave fronts. The wave fronts have a physical reality, but the rays are abstract concepts.

An ether wind transverse to wave velocity is falling inside the plane of the wave front. This means that changes in transverse ether wind cannot change orientation of wave front, since all points on the wave front are affected equally. Transverse ether wind is therefore *irrelevant* in relation to the ray direction, but *relevant* in relation to the beam direction. Transverse ether wind can change motion of light, but *not* orientation of wave fronts. This fact is *important*, and means that in systems sensitive to phase only the component in ether wind parallel to wave velocity is relevant.

In coherent systems, where light is detected, or generated, based on *phase*, we must use the ray concept, since wave front orientation is all we can see based on phase. Only in focused systems we also can observe the beam direction, based on *amplitude*. The relevance of the ray concept in coherent systems means that wave front orientations are conserved, in relation to changes in transverse ether wind, in these systems. Change of wave front orientation, or ray direction, is possible by a gradient in the longitudinal ether wind, but *not* by changes in transverse ether wind.

Stellar aberration

A telescope is a coherent system, and the ray concept is relevant. Therefore, ether wind transverse to light direction is irrelevant and stellar aberration is *useless* in relation to the ether wind. Instead, stellar aberration is a result only due to light motion and observer motion. In other words: stellar aberration is a rain drop effect as Bradley said long time ago. He used light in the form of a track of a moving particle, but his conclusion is valid for the ray concept of light from a fix star, and also for pulsar signals.

Stellar and pulsar aberrations can be regarded as a result of transformations of coordinates from the frame of the Sun to the frame of the Earth, when our planet is assumed to be moving in a direction transverse to light. After this change of velocity, we must regard light as coming from a *moving* source. This means that light is coming from a point *behind* the present position of the source. This fact explains stellar and pulsar aberrations in the same way. Pulsar aberration is confirmed by observations with very long base interferometry. These results show that signals to the leading VLBI telescope arrive 4.2 micro-seconds earlier than signals to the other telescope. This means that ray directions, and wave fronts, are tilted 10^{-4} radians, just as in stellar aberration, due to the transformation of coordinates. This delay does *not* depend on the ether wind, instead it is caused by observer motion only. Aberration has been interpreted in error.

Michelson and Morley

In laser cavities and in Michelson and Morley interferometers (MMX), the ray direction is defined by mirror orientation. The mirrors in the equipment define boundary conditions that are relevant in relation to the wave motion, but *not* in relation to the ether wind. Moving the mirrors inside their own planes does *not* change boundary conditions and not the behavior of light. The wave fronts are therefore *always* parallel to the defining mirrors, and transverse ether wind has no effect in the transverse arm in MMX. This means that Stokes was wrong when he introduced an effect of ether wind in the transverse arm equal to half the effect in the longitudinal arm. Einstein repeated the same error in his light clock. Transverse motion of the clock introduces therefore no reason for light to change its behavior.

The somewhat better interpretation of MMX, earlier introduced by Michelson, is easily united with traditional Galilean transformation. We do not need time dilation, but we need a contraction of solids that is 2 times the Lorentz contraction. Such a contraction is possible to explain by the fact that atoms in a crystal use the ether to control their separations. Information about atomic positions are transferred by the ether between atoms. The 2 times higher contraction is also large enough to compensate for the reduction of 2-way light speed by the ether wind. This contraction means that the expected effect is compensated in the longitudinal arm. Although the effect, predicted by Michelson, is real, it is not observable due to this compensation. Stated in another way: Michelson's meter standard, based on light, contracts due to the ether wind, just as much as the older mechanical standard in Paris.

Compensated effect in the longitudinal arm and *no* effect in the transverse arm means that MMX is a *useless* method in relation to the ether wind. MMX has been interpreted in error.

The special theory of relativity

Special relativity (SRT) was based on stellar aberration and MMX. It is therefore a tragedy that both these 2 tests are useless in relation to the ether wind. This error has not been observed due to disregarding the distinction between light ray and light beam, and therefore it was not discovered that transverse ether wind is irrelevant for ray direction. Later Einstein did not see these significant errors.

Stokes was wrong

He assumed that an ether wind transverse to light propagation can change wave front orientation. This error produced a false dependency on ether wind in MMX and in Stellar aberration. Another consequence was the mysterious concepts of time dilation and Lorentz factor. Based on Stokes' and Lorentz' mistakes Einstein was able to produce more errors.

Corrections to Stokes' and Lorentz' mistakes are very important for the future of physics. According to this author it is just as important to avoid errors as defining goals in the search for the truth. Goals are not enough.

Ether wind detection

An ether wind detection is possible by measuring the 1-way light speed. This is demonstrated by Sagnac, Ruyong Wang and by experiences from the global positioning system (GPS). The GPS system works on the assumption of a local, and not rotating, frame. However, according to common sense this must indicate a local *field*, and not a frame; since we cannot assume our planet to entrain the ether in the whole Universe.

The GPS transmitters are located on a large spherical surface, and the receivers are on a smaller sphere, that is concentric to the first one. Due to the high precision in the GPS system, based on 1-way light speed, we have reason to assume that the ether wind is best represented by a spherically symmetric function of position. That means a field. The ether can therefore be falling towards the Earth. This fact can explain *gravity* and be united with an old gravity model by Fatio. This idea is also supported by tidal effects, and by observations during solar eclipses.

An interesting method for finding changes in 1-way speed of light has been suggested by Dr C C Su. He suggested the use of 2 HeNe lasers separated a couple of meters, and connected them to an interferometer. The equipment was placed on an advanced platform, with possibility for changing direction of measurement.

No time dilation

Electrons in atomic clocks move forth and back in relation to the ether wind. This means a possible effect of ether wind on electron orbiting of the same kind as is assumed for light in the longitudinal arm in MMX. The behavior of atomic clocks in the GPS system can therefore be explained by a dilation of *clocks*, instead of the metaphysical concept dilation of time. A radial ether wind instead of GRT, and a tangential (to satellite orbits) ether wind instead of SRT, can explain clock behavior in GPS. *One* model instead of 2 can explain dilation of clocks, instead of dilation of time.

Conclusions

- By regarding the distinction between ray and beam we can find a way to avoid mysterious concepts, like time dilation and Lorentz transformations.
- We find also that Faraday's ether not only exists; the ether can explain gravity as well, and also the Pioneer anomaly and other effects.
- Stokes, Lorentz and Einstein have produced much, not only for science, but also for science fiction.

Link

See my CNPS blog at www.naturalphilosophy.org/site/johnerikpersson. In the post, *Wave or Particle Confusion* you can find links to my articles at GSJournal and CNPS. There you can find *Physics without Paradoxes* and *The Radial Ether Wind*. These articles describe, in more detail, ideas presented here.