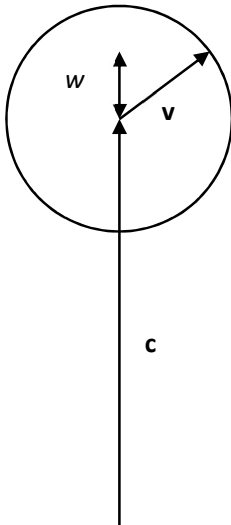


Michelson-Morley Test

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By the use of a distant mirror the wave vector \mathbf{c} is controlled to be perpendicular to mirrors, since mirrors are relevant for \mathbf{c} – but not for \mathbf{v} . So, \mathbf{c} depends on mirrors orientation, but not on translational motion of the source, according to the wave model. Therefore, we use the frame of the equipment. The distant mirror is used to provide the coherence, that we need to produce fringes.

The beam direction, $\mathbf{c}+\mathbf{v}$, can only be detected by means of amplitude. In a coherent system the ray direction, $\mathbf{c}(1+w/c)$, is relevant and all we can see based on phase only. In the longitudinal arm we therefore get: $c\pm v$. In transverse arm we get: c perpendicular to mirrors, which is relevant for phase in the ray direction. The total speed is $\sqrt{c^2+v^2}$ in the beam direction, but this is not relevant for phase. The ray is always perpendicular to wave fronts – the beam is not - when we regard the ether wind.

The distinction between beam and ray is important. The beam depends on transverse ether wind – the ray does not. Potier did not see this and he also missed the fact that mirrors are transparent to ether wind, \mathbf{v} . He left the wave model and used particle thinking in the transverse arm only. So, a correction for Potier means: **no effect in the transverse arm** of MMX.

This means that we can explain MMX by the Galilean transform, without time dilation, if we use a doubled FitzGerald contraction of matter. This contraction now becomes equal to the reduction of 2-way light speed due to ether wind. Such a contraction is very reasonable, since atoms in a crystal exchange positional information by means of a 2-way flow of effects, that they produce on the ether. It is also of interest to note that the definition of the unit of length is proportional to 2-way speed of light. So, we can conclude that we have explained MMX by **no effect** in transverse arm and **compensated** effect in the longitudinal arm.

We find that we do not need the twin paradox. However, instead of time dilation, we need a mechanism to explain the dilation of **clocks**. It is not difficult to find such a mechanism, since bound electrons in atomic clocks move forth and back in relation to the ether wind. So, we have good reason to suspect a second order effect on clock frequency of the same kind as the effect on 2-way light speed.

Conclusion

A second order effect of the ether wind equal to $1-\beta^2$ ($\beta=v/c$ is about 10^{-6}) can explain the following changes in:

- Change in 2-way light speed – and also the Pioneer anomaly
- Contraction of matter
- Change of frequency of atomic clocks due to motion
- Change of frequency of atomic clocks due to gravity – if we assume a radial ether wind equal to the tangential ether wind due to satellite motion
- Change in the unit of length

The small value on β (caused by planetary rotation) can explain the difficulty in the interpretations.

P.S:

Potier's mistake

Potier described light in the frame of the ether, and in that frame, he moved the equipment. This means that the ether wind is treated by a transformation of coordinates. This method is useful when we want to describe the effect of **observer motion**. We can explain stellar aberration in this way. This effect is about 10^{-4} times c due to planetary translation. This means that speed **as well as** orientation of wave fronts are changed.

However, we cannot treat ether wind in the same way. The ether wind means the addition of a translational motion **without changing** wave front orientation. The ether wind can be blowing inside the plane of the wave front without tilting the wave front and without causing any effect in light's direction. So, no effect in transverse arm. The use of a very small (or coherent) light source together with a distant mirror means definition of a very well-defined wave front. The wave front is not exactly plane but fixed in relation to equipment. This fixation is needed for interfering with another wave front. After interference it is no longer important to regard the fact that the wave front is not exactly plane.

Since the ether wind, due to planetary rotation is very small (about 10^{-6} times c) and light vector \mathbf{c} is well fixed in relation to the equipment we prefer to do the calculations in the frame of the equipment. When we rotate the equipment, we can see that only ether wind \mathbf{v} is changing in the used frame. Since the interferometer is sensitive in only one dimension the observed effect becomes $c(1+w/c)$ – not $\mathbf{c+v}$. So, we can see that there is **no effect in the transverse arm** in MMX. Potier was wrong, and even better: we do **not** need time dilation.

What Potier missed is the fact that mirrors are transparent to ether wind. Therefore, although light moves in the ether according to a vector sum another representation is needed when light hits a mirror. At that moment we need instead the normal to the wave front and ether wind in longitudinal direction only.

Another way to explain this fact is to regard that the distant mirror still defines unchanged wave fronts and therefore light's component transverse to mirrors is still unchanged c , although real motion is $\sqrt{c^2+v^2}$. The ether wind is **adding** a motion transverse to unchanged wave motion.