The Michelson Tragedy

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Abstract

The Michelson-Morley tests, that were done in 1881 and 1887, are still questioned. So, we have reasons, even today, to discuss what does these experiments mean. The dispute between Michelson and Potier is discussed in this article.

Michelson's tests

Michelson had a remarkable skill in doing practical experiments with high precision. We have Michelson to thank for the fact that the unit of length can be defined accurately by means of light waves. In his experiments, together with Morley, he wanted to detect very small changes in the 2-way speed of light, due to the effect of an ether wind. Since the unit of length also is proportional to 2-way light speed, we have reasons to worry about this idea. If the older mechanical meter model also is proportional to the 2-way speed of light, than the effect Michelson searched will be compensated by contraction of matter.

We have strong reason to assume such a compensation. The atoms in a crystal are controlling their separations by effects that they produce on the ether. So, ether-based effects are transferred forth and back, in 2 opposite directions, between atoms, probably by the speed of light, *c*. Therefore, it is reasonable to assume that 2-way ether-based information is moving between *atoms,* in the same way as information is moving in 2 directions between *mirrors* in Michelson's equipment. So, we have strong reason to assume that the searched effect is compensated by contraction of matter. The test can therefore be useless.

Describing light

When regarding the ether wind we find that light no longer moves in a right angle to wave front, since the ether wind can be blowing inside the wave front. Therefore, we have to make a distinction between *total* motion of light as a vector sum, **c**+**v**, and the *apparent* motion of light, **c**(1+*v**cosA/*c*), where A is angle between **c** and **v**. Amplitude detection gives total motion, or beam direction, and phase detection gives apparent direction, or ray direction. So, it is important to discriminate between beam and ray when we will regard the ether wind. In most experiments it is the apparent direction that is of interest, since reflectors and refractors are transparent to the ether wind in coherent systems. Mirrors imply boundary conditions, that are relevant in relation to the moving wave font, but **not** in relation to the ether wind inside the wave fronts. Therefore, we have no direct relation between a mirror and the ether wind. We have only an indirect relation, by means of the light, in **one** dimension only. In MMX we must use the ray direction. So, when we use the law of reflection in MMX, we must use **c** – not **c**+**v** in relation to mirrors. Therefore, the use of a distant mirror in MMX means that wave front orientation, or **c**, is defined as fixed in the frame of the equipment. A strong fixation of **c** is of fundamental importance for the functionality of MMX. These assumptions give a behavior of MMX according to Fig 1. A small shift **inside** the wave front is **irrelevant**.

When regarding stellar aberration due to observer motion **u** we can do a transformation of coordinates and change speed and direction of light. We cannot do the same when regarding the ether wind **v**, since **v** cannot change the orientation of the wave fronts.

The transverse arm of MMX

The experiment demands a perpendicular arm as a reference. Due to the fixation of wave fronts as **c** we find that there is no effect of the ether wind in the arm transverse to ether wind. This was also Michelson' s opinion, since small changes *inside* the same wave front are not observable in an interferometer. These facts are in agreement to the wave model for light.

However, in 1882 another interpretation, regarding the transverse arm, was presented by Potier. Potier respected the wave model's demand only for the *speed* of light. However, he introduced a new idea stating that the *direction* of light should depend on source motion. He appears to have used a tacit assumption that light somehow must hit *exactly* the same point as where it started. This demand is not founded and is probably caused by a kind of particle-based thinking. This peculiar idea violates the fact that wave fronts are fixed in the MMX equipment. So, apparently, Potier contributed somewhat to the wave or particle paradox also.

It is the opinion of this author that Potier was wrong and also that this mistake caused the introduction of the concept dilation of time. Potier's mistake was to use **c**+**v**, instead of **c** only in relation to mirrors in MMX. He did not see that a fixation of **c** is the basic idea behind MMX. Therefore, several relativity theories were invented to cover up for Potier's mistake. Michelson resisted at first, but gave up after 5 years and one nervous breakdown, since most scientists were on Potier's side. So, Potier's idea was a tragedy, not only for Michelson – but also for science. Later versions of MMX have been done by means of 2 resonators defining wave fronts to be parallel to mirrors in 2 perpendicular directions. This method provides a much higher precision and this means that we get relevance not only in relation to planetary *motion*, but also in relation to planetary *rotation*. Indications from the GPS system hints about such a high precision demand. Therefore, we must regard these later experiments to tell us what MMX really means. Assuming no effect in the transverse arm of MMX means that we can use the Galilean transform together with a doubled FitzGerald contraction – and we do **not** need the concept dilation of time. Potier gave us the twin paradox.

Atomic clocks

The behavior of atomic clocks in the GPS system needs another explanation, when we no longer can blame the effect on elastic time. Instead the dilation is *inside* the clocks. This effect is not difficult to explain, since bound electrons in the clocks move forth and back in relation to the ether wind. So, a second order effect of ether wind is plausible.

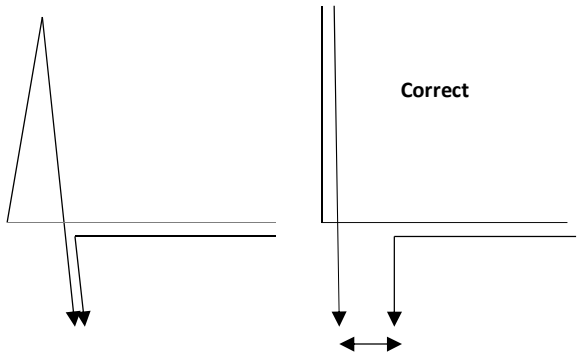

Fig 1 Interpretations of Michelson and Morley's tests