

Aberration and Sagnac effect

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Aberration in starlight and in VLBI observations

Ptolemais observed planetary positions and described them by combining two circular motions into epicycles. He did not see that one of these two motions was an *illusion* caused by his own motion. We have an almost analogous situation when we observe stellar aberration. We must namely regard that we are observing a *moving* phenomenon, the light. Therefore, the phenomenon we observe is a combination of light velocity, c , and own velocity, u . Therefore, when light is moving with velocity, c (vector) in relation to the Sun, and our own motion in relation to the Sun is u , our perception becomes $c-u$. In the case when c and u are orthogonal to each other we find that light is approaching us with the speed $(c^2+u^2)^{1/2}$, and with a direction that is changed by $\arctg(-u/c)$. This follows from the fact that we must describe light in our own frame of reference.

We have seen that our problem of understanding stellar aberration is a parallel to Ptolemais' problem. We must compensate for speed where Ptolemais should have compensated for position. This reasoning, about stellar aberration, can also be applied to the VLBI observations. In both cases we find the same result, namely a change in observed direction, equal to $\arctg(-u/c)$ approximately -10^{-4} . Therefore, we have no real tilting, but an *illusion of* tilting caused by our own motion, in a direction transverse to light propagation. This is true for stellar aberration, as well as for VLBI observations.

The fact that tilting cannot be real follows also from an alternative reasoning, by regarding that the ether's state of motion has the same effect in all points on a flat wave front. So, the *value* on ether wind is irrelevant for the orientation of flat wave fronts, and instead a *gradient* in ether wind is needed to change wave front orientation.

Stellar light and VLBI signals emanate from deep space, and when they are approaching our planetary system, they must relate to the ether defined by the Sun and *surrounding* our planet, since the wave fronts are *fixed* in that frame. So, the ether wind on the surface of our planet is not appropriate reference in the case where we are searching for the Sagnac effect. Instead, we must use u to represent how much we *change* the ether wind due to own motion in relation to the Sun.

When explaining stellar aberration, we must regard detector motion. During the time when light is moving through the telescope with focal length, f , the point that is focused is moving on the detector a length fu/c in relation to the detector in the orthogonal case we have assumed. This causes a pointing error equal to $\arctg(-u/c)$, or about -10^{-4} .

When explaining VLBI observations we must regard the Sagnac effect.

Sagnac effect

The Sagnac effect has been disregarded in relation to the ether wind on false grounds. The motivation has been that finding a numerical value on light speed, c , demands the use of 2-way light propagation. This fact is correct, but not relevant, since we can observe *relative* changes in u also in 1-way light by observing u/c and assume c as a fact. So, we can observe the Sagnac effect – or the first order effect of the ether wind. Disregarding this fact has been devastating to physics.

Another mistake regarding the Sagnac effect is done by using a *mathematical* identity to explain Sagnac effect in two different ways, either as distributed along a line, or as distributed over an area. However, a physical phenomenon has only one cause, and therefore only one distribution. The distribution along a line is in this case the correct distribution, and it is also irrelevant whether the line is bent or straight, since light has no mass. The line must not be closed either, since this is not a demand in principle, but only caused by the specific method used by Sagnac. *These facts mean that Sagnac detected an artificially caused change in ether wind in 1913.*

The VLBI application is the best thinkable tool for confirming Sagnac effect. We have two synchronized clocks on opposite sides of Earth, in the case where we regard one telescope in sunset and the other in sunrise, and observe in a direction away from the Sun. The time for information flow (based on light) between the two telescopes is c times the diameter of Earth, giving $4.2 \cdot 10^{-2}$ s. Therefore, by regarding the Sagnac effect we get $4.2 \cdot 10^{-2}(1 \pm u/c)$ s = $4.2 \cdot 10^{-2} \pm 4.2 \cdot 10^{-6}$ s, for the case when motion is orthogonal to observation. (u is the change in ether wind.) This is in agreement to observations.

So, we find that *VLBI observations can be united with Sagnac's idea and thereby confirm the existence of an ether, since u represents a change in the ether wind.*

Remarks

The mistake of regarding an *illusion* of tilting as real has also influenced the interpretation of Michelson and Morley's tests, and in 1882 Potier suggested a tilting in the reference arm in MMX. He did not see that we must use the *same* wave front orientation in both arms in MMX. This follows from the fact that the assumption of transverse wave fronts in the measuring arm *implies* that the reference arm falls *inside* the wave fronts, and this means that ether wind becomes irrelevant, and therefore cannot change behavior in the reference arm. So, Potier made two mistakes, and these errors gave us the absurd concept of multiple time concepts. Potier seems to be influenced by particle thinking in the wave model and he thereby started a confusion regarding wave or particle description for light, that is still not corrected.

Someone said: If Sagnac's tests had been done before MMX we would have a different physics today.

Results

- Physics went wrong in 1882-1887 (not 1915, 1905 or 1900).
- Artificially produced changes in the ether motions were detected in 1913, thereby confirming the existence of an ether.
- Sagnac's ideas are confirmed by observations on stellar aberration and with VLBI.

Reference

The scandalous Sagnac effect (contains background information for this paper)

<https://www.gsjournal.net/Science-Journals/Research%20Papers/View/8719>