

# **A new insight explains both the Michelson-Morley experiment and stellar aberration- Apparent change of light source position relative to an absolutely moving observer**

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## **Abstract**

In this paper we propose a profound connection between the Michelson-Morley ( MM ) experiment and the phenomenon of stellar aberration. A new crucial insight can explain both the MM experiment and stellar aberration: *apparent change of light source position relative to an absolutely moving observer*. We call this Apparent Source Theory (AST ).The apparent change in star position in Bradley's stellar aberration is because of *observer's absolute motion*, not because of relative motion. Likewise, the effect of absolute motion of the observer/detector in the MM experiment is to create an apparent change in position of the light source relative to the observer/detector. In AST the observer is the human observer or a device that directly detects the light. This is unlike the theory of relativity in which the observer is the person doing the experiments. Apparent change in position of the light source will result in only a small fringe shift for the same reason that an actual, physical change of source position will result in a small fringe shift. This new interpretation requires a significant revision of the current understanding of stellar aberration which has its basis in the classical law of addition of velocities. The direction of apparent change in star position is not in the same direction as the observer's absolute velocity, but in the *opposite* direction !

## **Introduction**

The behavior of light in the different experiments and observations had puzzled physicists before the advent of Einstein's special relativity theory. The Michelson-Morley experiment and Bradley's stellar aberration are two of these experiments, the former being a second order effect and the latter a first order effect. The Michelson-Morley ( MM ) interferometer experiment was carried out in 1881 and 1887 to detect Earth's absolute motion through the hypothetical ether. However, the experiment did not detect the expected fringe shift, which was interpreted to be a null result. The 'null' result of the MM experiment, together with the null results of previous first order experiments, such as the Arago and the Airy star light aberration and refraction experiments, was a great puzzle that defied conventional thinking. Classical theories of light, emission theory and ether theory, failed to account for many of the observations and experiments on the speed of light.

The phenomenon of stellar aberration is an apparent periodic change of star position over the course of a year, first discovered by James Bradley in 1727. The current explanation has its basis in the classical law of addition of velocities. It is a universally accepted fact that for a moving observer the star position will apparently change in the direction of observer's velocity. An analogy of a person moving in the rain is often used that he/she has to tilt the umbrella slightly in the forward direction to avoid the rain droplets.

Thus scientists resorted to exotic ideas such as length contraction and time dilation in an attempt to solve the puzzle of (absolute) motion and the speed of light. These ideas developed into the Lorentz's ether theory, the Lorentz transformation equations and Einstein's special relativity theory (SRT), which are the mainstream theories today. SRT presumes that absolute motion cannot be detected in principle, which is known as the principle of relativity. Therefore, the validity of SRT continues only until absolute motion is detected in some experiment, as admitted by Einstein himself, not to mention logical and conceptual consistency tests.

Despite all claimed successes of Einstein's special relativity theory, however, absolute translational motion has been detected in multiple experiments such as the Silvertooth experiment and the CMBR experiment. Therefore, more than one hundred years after the original Michelson-Morley experiment the paradox of the speed of light and (absolute) motion remains unresolved. The theory of relativity is still a subject of controversy.

In this paper, we propose a new insight that can explain both the phenomenon of stellar aberration and the Michelson-Morley experiment. The new theory is called Apparent Source Theory (AST).

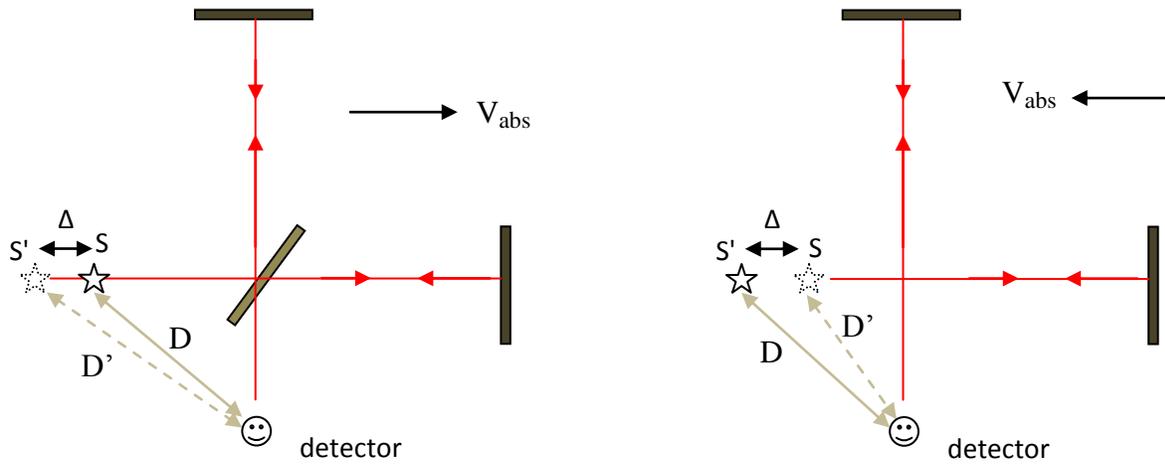
## **Apparent Source Theory**

Apparent source theory is formulated as follows [1].

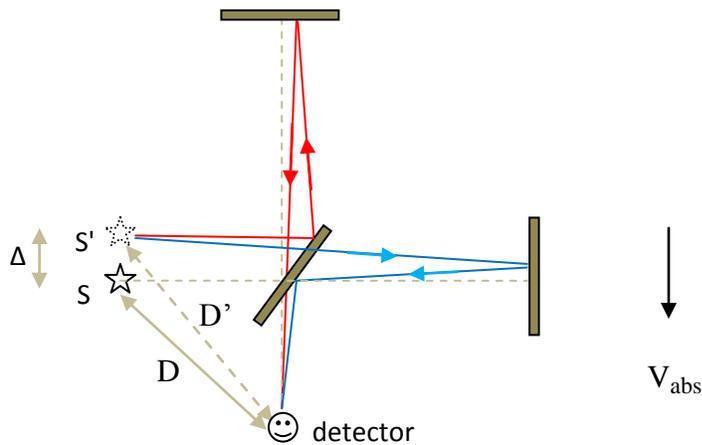
*The effect of absolute motion of an inertial observer is to create an apparent change in position of the light source relative to the observer/detector. The apparent change in position of the light source is determined by the magnitude and direction of observer's/detector's absolute velocity and the orientation of the line connecting the source and the observer/detector with respect to the absolute velocity vector. The light speed experiment is analyzed by assuming that light is emitted from the apparent source position, and not from the actual/physical source position.*

In order to analyze Michelson-Morley experiment, therefore, we replace the actual/physical source with an apparent source and analyze the experiment by assuming that light is emitted from the apparent source position, not from the real source position. For example, if the interferometer is absolutely moving to the right as shown below (left figure), the source position will apparently change from S to S' relative to the detector. Intuitively, there will not be any

fringe shift because both the longitudinal and transverse light beams will be delayed by exactly the same amount. Obviously, this is unlike the prediction of ether theory. In the case of absolute velocity directed to the left (right figure), both light beams are advanced by the same amount.



If the absolute velocity is directed downwards, as shown below, there will be an apparent change of source position in the upward direction. In this case there will be a small fringe shift due to unequal path lengths of the red and blue 'virtual' light rays. This can explain the small fringe shifts observed in the Miller's repetitions of Michelson-Morley experiment.



## **Apparent Source Theory reconciles the absolute velocity directions determined in the Miller experiments with that of the Silvertooth and CMBR experiments**

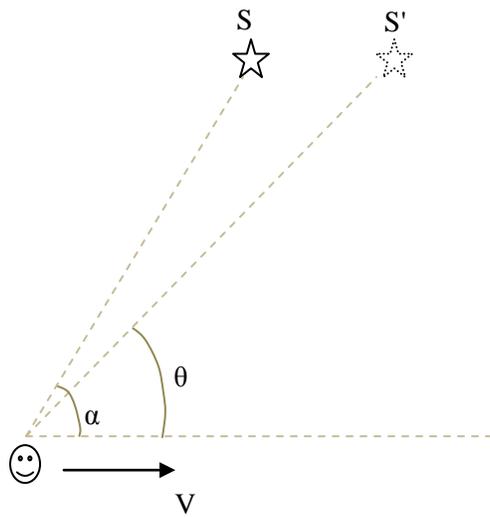
From the Silvertooth experiment and the CMBR anisotropy experiment, the absolute velocity of the Earth is directed towards Leo constellation. However, from the Miller experiments, the direction has been determined to be towards Dorado constellation, at ninety degrees to the former. Apparent Source Theory reconciles these conflicting results. As we have seen above, in the case of the MM interferometer absolutely moving to the right, the fringe shift is null. There will be a fringe shift for absolute velocity directed downwards or upwards. Therefore, Apparent Source Theory gives a new interpretation regarding the direction of absolute velocity detected in the Miller experiments. Therefore, the Michelson-Morley and the Miller experiments also suggest that the Earth's absolute velocity is directed towards Leo constellation, in agreement with the Silvertooth and the CMBR experiments.

## **Apparent Source Theory and the phenomenon of stellar aberration**

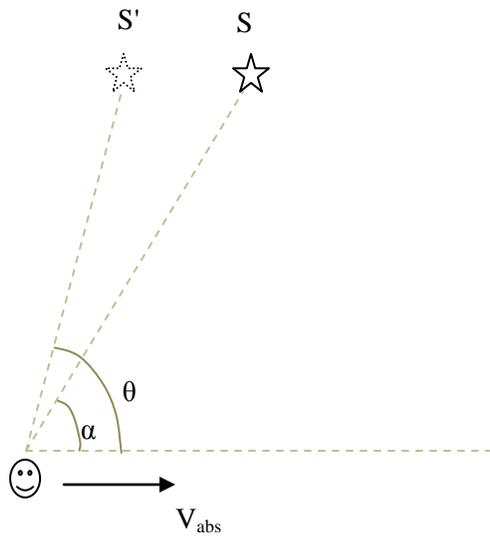
The new insight of *apparent change in source position relative to an absolutely moving inertial observer* gives an unexpected, profound interpretation of the phenomenon of stellar aberration. According to current understanding of stellar aberration, the direction of apparent change in source position is in the direction of the observer's velocity, in accordance with the classical law of addition of velocities.

Apparent Source Theory predicts that the apparent change in the position of the source is not in the same direction as the observer's absolute velocity, but in the *opposite* direction !

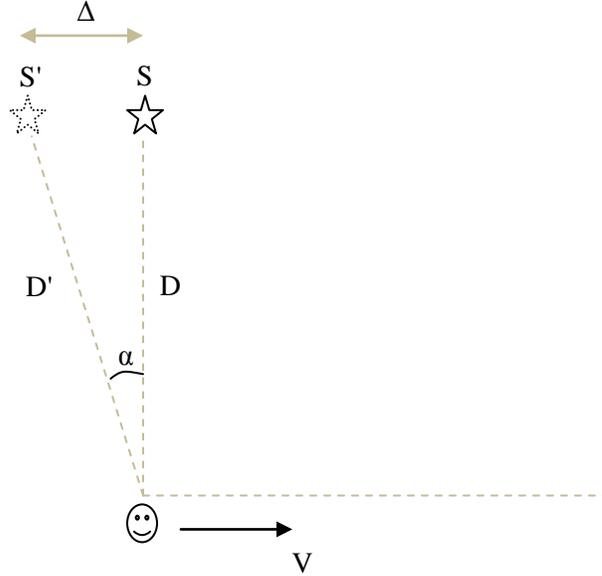
current, universally  
accepted understanding of  
stellar aberration



stellar aberration  
according to Apparent  
Source Theory



The quantitative expression of the angle of aberration for a star directly overhead is determined as follows [1].



Using previous results based on Apparent Source Theory:

$$D' = D \frac{c}{\sqrt{c^2 - V_{abs}^2}} \text{ and } \Delta = D \frac{V_{abs}}{\sqrt{c^2 - V_{abs}^2}}$$

$$\sin \alpha = \frac{\Delta}{D'} = \frac{D \frac{V_{abs}}{\sqrt{c^2 - V_{abs}^2}}}{D \frac{c}{\sqrt{c^2 - V_{abs}^2}}} = \frac{V_{abs}}{c}$$

which agrees with the conventional and experimentally confirmed formula.

### Absolute motion and the ether

Absolute motion has been universally presumed to be motion relative to the ether, by proponents and opponents of ether theory alike. In this paper we have introduced a new insight (AST) that reveals the *effect* of absolute motion that has eluded physicists for centuries. We have not said so

far anything regarding what absolute motion *is*. However, we assert here what absolute motion *is not*. Absolute motion is *not* motion relative to the ether. The Michelson-Morley experiment disproves the ether. The Michelson-Morley experiment was designed based on a wrong conception of absolute motion, i.e. that absolute motion is motion relative to the ether. The Michelson-Morley experiment was designed to detect the non-existent ether. It is not capable detect absolute motion because it has only a small sensitivity to absolute motion, as indicated in the small fringe shifts observed. I have proposed other highly sensitive experiments in [1].

A question arises: if absolute motion is not motion relative to ether, then what is absolute motion? In this paper we will not address this question. However, we propose that absolute motion can be thought of as motion of an object relative to all other physical bodies in the universe.

## **Conclusion**

In this paper, a profound connection between the Michelson-Morley experiment and the phenomenon of stellar aberration has been revealed. The solution to the paradox of the Michelson-Morley experiment is found in the well-known, but wrongly understood, phenomenon of stellar aberration[2]. The crucial insight that has eluded physicists is this: *the effect of observer's absolute motion is to create an apparent change in source position relative to (as seen by ) the observer.*

Thanks to God and His Mother Our Lady Saint Virgin Mary

## **Notes and References**

1. Absolute/Relative Motion and the Speed of Light, Electromagnetism, Inertia and Universal Speed Limit  $c$  - an Alternative Interpretation and Theoretical Framework, by Henok Tadesse, vixra:1508.0178
2. However, the insight of apparent source was initially discovered based on the Sagnac effect, not stellar aberration.