Intrinsic Absolute Motion Paradigm and Apparent Source Theory- Distinction Between Translational and Rotational Motions

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Abstract

One of the most confusing problems in physics is whether there is fundamental distinction between translational and rotational motions. The conventional view seems to be that there is no distinction. It is suggested in this paper that the failure to make this distinction is deeply rooted in 'ether thinking' because according to ether theory there is no distinction. Despite all claims that modern physics has got rid of the ether, physicists, including Albert Einstein, have never been able to truly escape the ether 'trap'. It is proposed in this paper that translational motion and rotational motion are fundamentally different and should be treated differently. It was years of struggle to explain the Michelson-Morley experiment and the Sagnac effect within the same theoretical framework that finally led to this conclusion. There are two possible interpretations of the Michelson-Morley experiment (MMX): the 'null' interpretation and the non-null interpretation. From the point of view of stationary ether theory, the MMX result is essentially null because the observed fringe shift is much smaller than the expected value. On the contrary, the MMX result is non-null from the perspective of relativity theories, mainly the classical emission theory and the Special Relativity Theory (SRT) because there was always a small but significant fringe shift observed, as in the Miller experiments. Therefore, the MMX disproves not only the ether theory, but also the emission theory and SRT. A correct theory of the speed of light, therefore, should account not only for the 'null' interpretation, but also for the non-null interpretation. To this date there is no such known, accepted theory of light. A new theory called Apparent Source Theory (AST) I have already proposed has resolved this century old puzzle, even though not yet known to the majority of the scientific community. AST predicts the small fringe shifts observed in MM experiments. In this paper it will be shown that AST predicts a maximum fringe shift of about 0.013 fringes for the 1881 Michelson experiment. Michelson measured a maximum fringe shift of about 0.018 fringes !The discrepancy may be reduced if more details of the dimensions of the original Michelson apparatus are obtained. AST successfully resolved the enigmatic contradiction between the Michelson-Morley experiment and the Sagnac effect. No known existing theory of light has truly achieved this. For years, I chose to treat the Sagnac effect basically as a translational motion. However, with this approach I could not develop a complete and convincing explanation of the Sagnac effect, leading to the conclusion that rotational motion must be distinct from translational motion, implying distinction between translational AST and rotational AST. On the other hand, Apparent Source Theory was found to be in conflict with stellar aberration, a simple analysis I overlooked for years. These apparent contradictions may be resolved by resorting to a new paradigm: Intrinsic Absolute Motion (IAM). The ether doesn't exist, as disproved by the Michelson-Morley experiment, but absolute motion does exist, as proved by the Silvertooth and other experiments. Absolute motion without the ether could be conceived only if absolute (translational and rotational) motion is intrinsic to physical entities. The application of AST to electrostaticsalso hinted at the need for the IAM paradigm. Mercury perihelion advance anomaly also hinted at the distinction between rotational and translational motions. Distinction between translational and rotational motions implies intrinsic nature of absolute motion. Therefore, Intrinsic Absolute Motion paradigm completes Apparent Source Theory. IAM paradigm makes distinction between *equal* velocities and *same* velocity of two bodies.

Introduction

According to the principle of relativity, no experiment (optical, electromagnetic or mechanical) exists that can detect absolute motion. This presumption has already been conclusively disproved experimentally, such as by the Silvertooth experiment. The failure of conventional first and second order experiments to detect absolute motion of the Earth was not because absolute motion doesn't exist, but because the experimental setups or their understanding were flawed or the sensitivity of the experiments was very small.

I have already developed a new theoretical frame work[1], of which Apparent Source Theory (AST) is one component, that can explain the outcomes of many experiments that have succeeded and failed to detect absolute motion.

Despite the successful application of Apparent Source Theory to many light speed experiments, electrostatic and gravitational phenomenon, some problems persistently kept popping up all the time. Some of these were:

- The explanation of Sagnac effect by Apparent Source Theory was not complete and convincing
- The explanation of Mercury's perihelion advance also seemed to be incomplete
- A contradiction existed between Apparent Source Theory with the phenomenon of stellar aberration.
- There was a conceptual problem with the application of Apparent Source Theory to a charge and observer in independent motions

Considering the successes of AST, therefore, these problems should be viewed as showing that AST is a correct but incomplete theory. It turns out all these problems may have been hinting at yet another profound mystery of the universe.

Apparent Source Theory (AST)

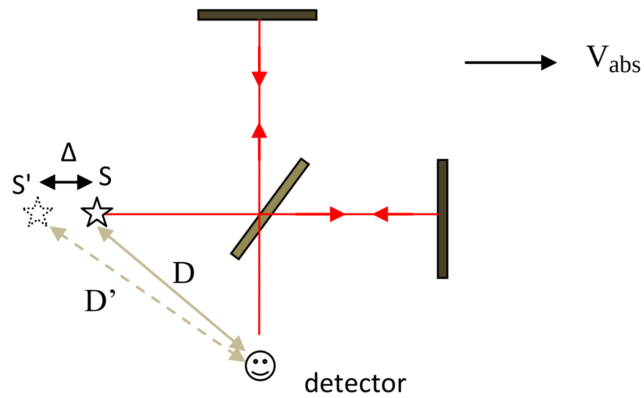
The new theory[1], Apparent Source Theory (AST), of the speed of light that successfully reconciled the Sagnac effect and the Michelson-Morley experiment is formulated below.

The effect of absolution motion for co-moving light source and observer/detector is to create an apparent change in position of the source relative to (as seen by) the observer. The apparent change in position of the source depends on the direct source-observer distance and the orientation of the source-observer line relative to the absolute velocity vector and the magnitude of the absolute velocity. The procedure of analysis of light speed experiments is:

1. Replace the real light source by an apparent light source
2. Analyze the experiment by assuming that the speed of light is constant relative to the apparent source. In other words, once the real source is replaced by the apparent source, we just assume conventional emission (ballistic) theory to analyze the experiment.

A comprehensive description of AST is found in my previous papers[1].

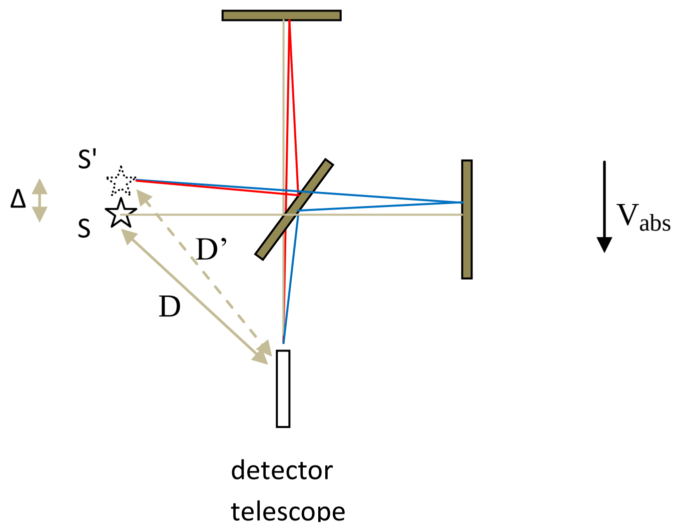
We will see that this theory (AST) can easily explain the Michelson-Morley experiment null result.



According to Apparent Source Theory, there will be an apparent change in position of the light source as seen by the detector. The apparent change in source position is determined by the source-detector direct distance D, the magnitude and direction of the absolute velocity V_{abs} .

As shown in the above figure, for absolute velocities directed to the right, the apparent change in source position (which is to the left) will not result in any fringe shift for the same reason that no fringe shift will occur if the source position was *actually, physically* shifted slightly because both the longitudinal and transverse (virtual) light beams would be affected (delayed or advanced) identically. We can see that, according to AST, for absolute velocities directed to the right or to the left, the Michelson-Morley experiment result is literally null.

In general, there may be small but significant fringe shifts for other directions of absolute velocities. For example, for absolute velocity directed downwards, there will be an apparent change of source position upwards as shown below. There will be difference in change of path length of the two light beams, the red and the blue. The path lengths are calculated by assuming an actual/physical change of source position from S to S' , which should result in a small fringe shift. The actual calculation of the difference of the two path lengths is a straightforward, elementary optics problem, but somewhat involved. Note that the law of reflection (angle of incidence equals angle of reflection) applies to the virtual light rays as for real light rays.



We can see from the diagram above that, according to AST, the effect of absolute motion is not only to create a change in path difference but also misalignment of the two light beams.

Next we will attempt to calculate the fringe shift in the 1881 Michelson ether drift experiment.

L1 = 1.2m , L2 = 1.2m , H1 = 20cm , H2 = 10cm , λ= 575 nm

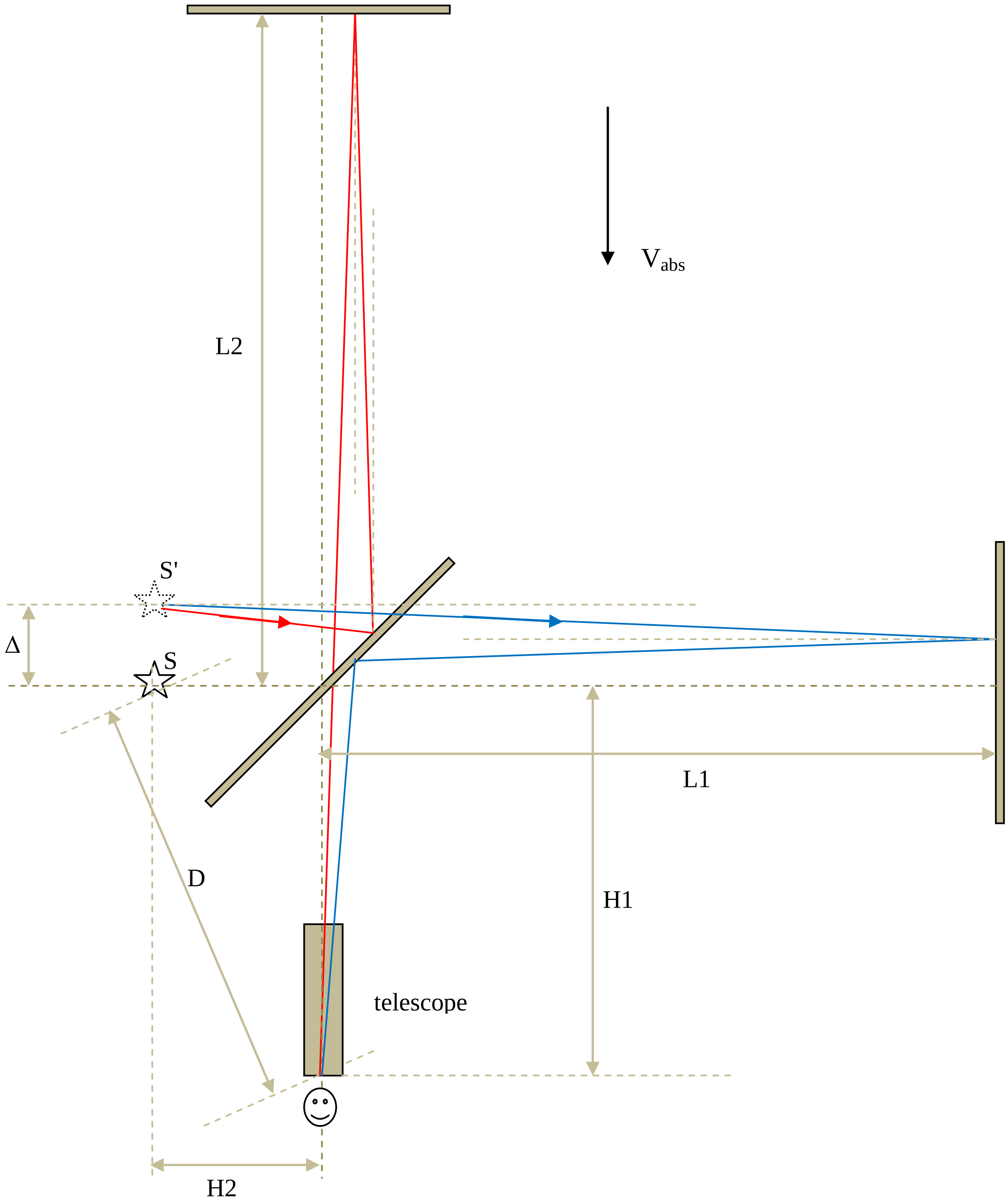
The values for H1 and H2 are just guessed.We will also assume the absolute velocity of the Solar System, which is about 390 Km/s .

The distance D is calculated as:

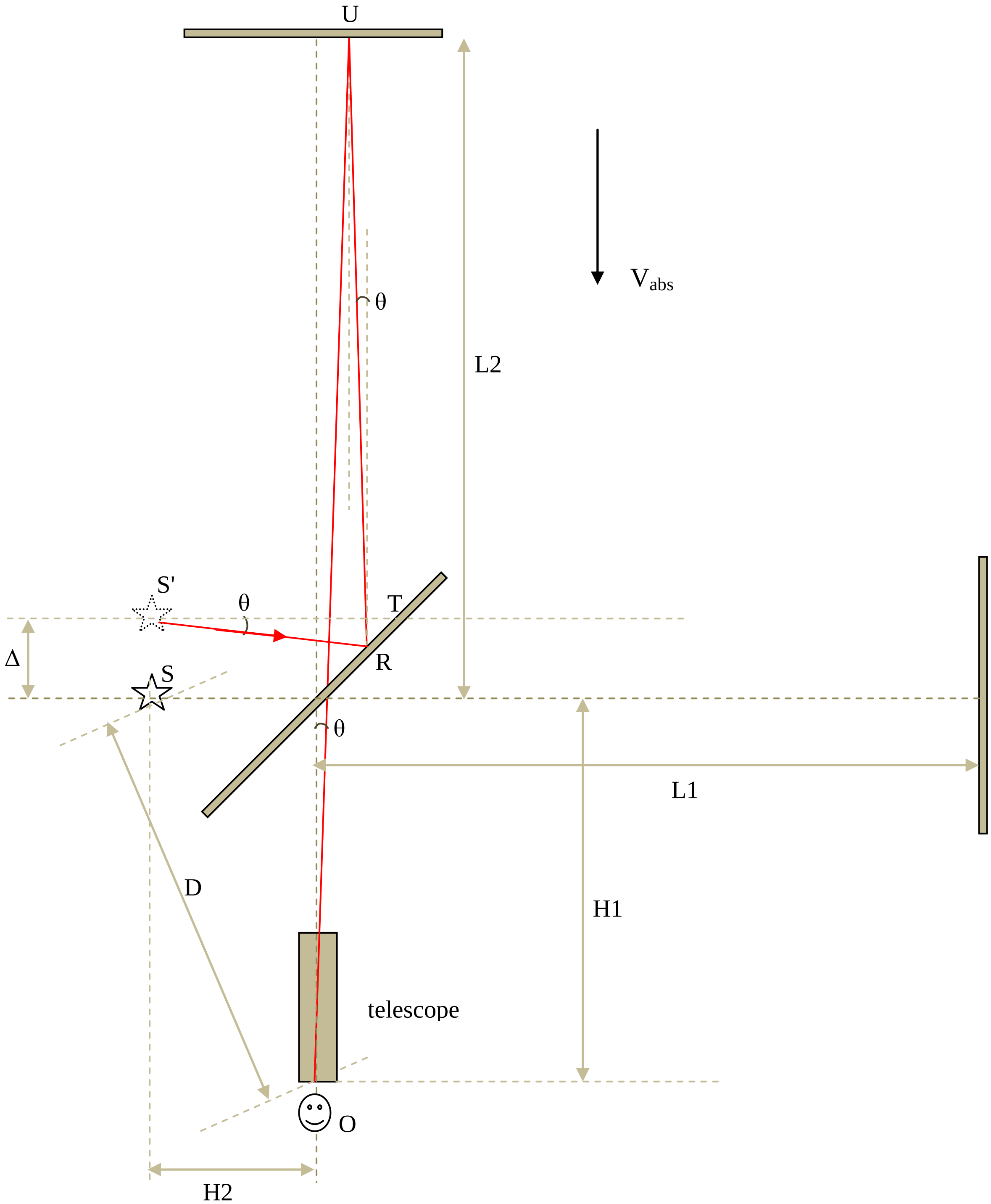
$$D = \sqrt{H1^2 + H2^2} \;\; = 10\sqrt{5}\;\; cm \;=\;\; 22.36\, cm$$

From my previous paper[1] Δ can be approximated by

$$\Delta \cong \frac{V_{abs}}{c}\, D \;=\; \frac{390\; Km/s}{300000 Km/s} * 22.36cm \;= 290.68\, \mu m$$

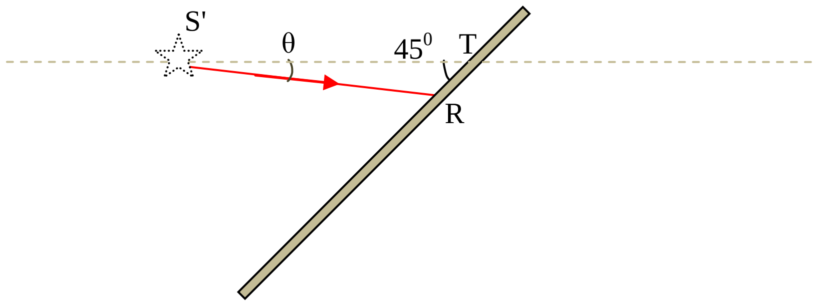


Next we determine the path length of the red light beam.



Note that the angles marked θ in the above diagram can be easily shown to be equal.

Consider the triangle S'TR .



We can determine the length of the red light beam, i.e. side S'R of the triangle as follows.

$$\frac{\sin(180^0 - 45^0 - \theta)}{S'T} = \frac{\sin 45^0}{S'R}$$

But

$$S'T = H2 + \Delta \tan 45^0$$

Substituting this value in the previous equation:

$$S'R = \sin 45^0 * \frac{S'T}{\sin(180^0 - 45^0 - \theta)} = \sin 45^0 \frac{S'T}{\sin(135^0 - \theta)}$$

From the previous diagram it is easy to figure out that:

$$(S'R \sin\theta + (L2 - \Delta)) \tan\theta + (L2 + H1) \tan\theta = S'R \cos\theta - H2$$

Substituting the previous value of S'R in the above equation:

$$\left(\frac{S'T}{\sin(135^0 - \theta)} \sin\theta \sin 45^0 + (L2 - \Delta)\right) \tan\theta + (L2 + H1) \tan\theta = \frac{S'T}{\sin(135^0 - \theta)} \cos\theta \sin 45^0 - H2$$

Since S'T is known (given H2 and Δ), the only unknown in the above equation is θ. Once θ is determined, the lengths of all the component parts (S'R , RU , UO) of the red light beam can be calculated as follows.

Again from the diagram it can be seen that:

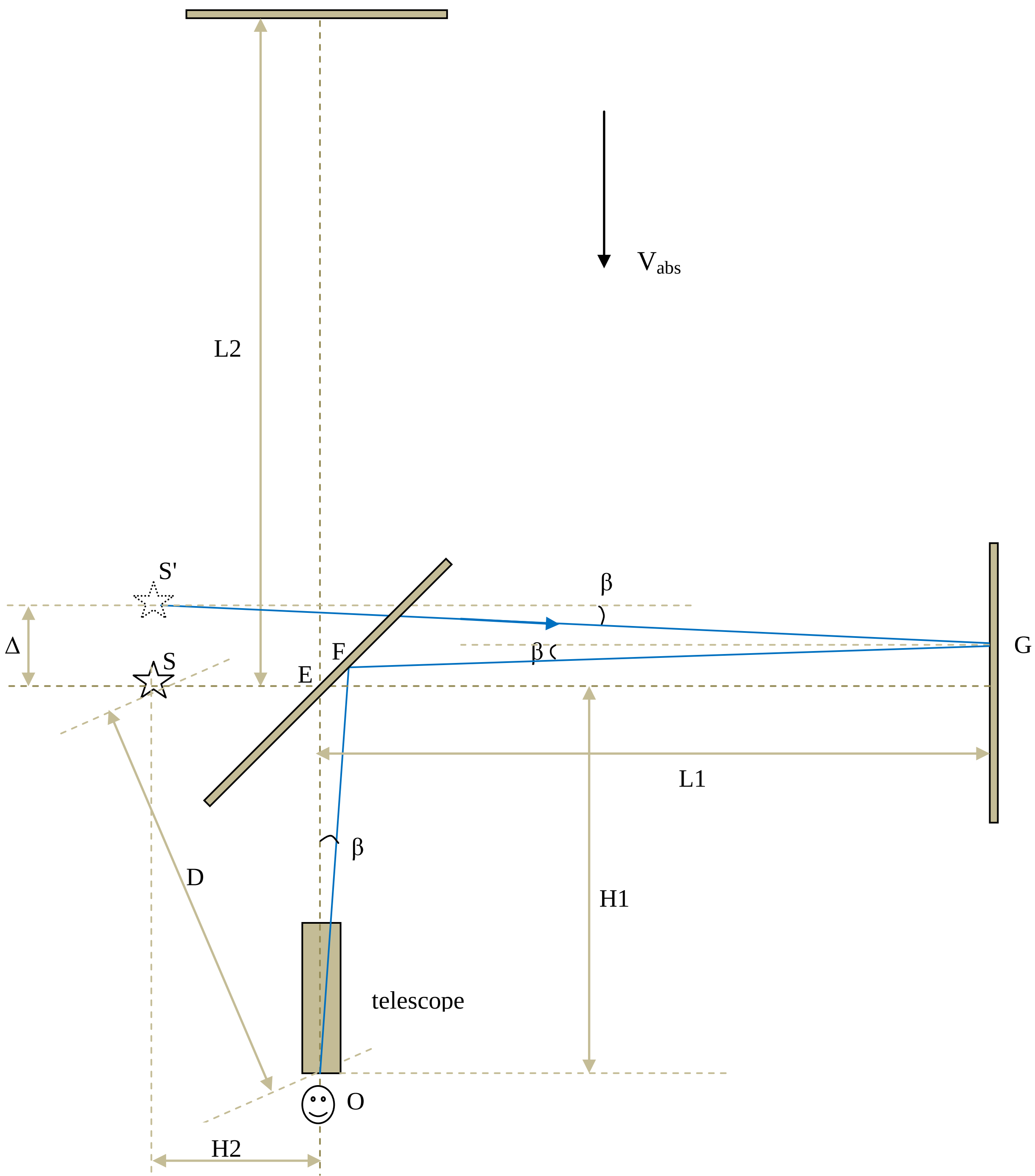
$$RU = S'R \sin\theta + (L2 - \Delta)$$

and

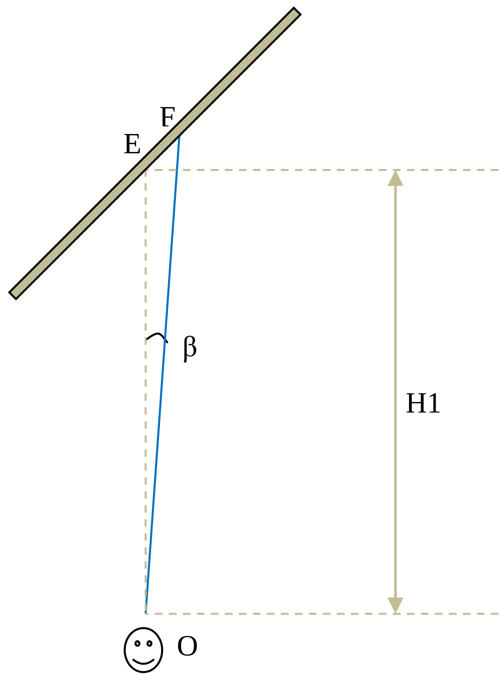
$$UO = \frac{L2 + H1}{\cos\theta}$$

We will not use analytical method here as it is very tedious; we will use Excel to solve the above equations.

Next we make these calculations for the blue light beam. Note again that the angles marked β can be easily shown to be equal.



Consider the triangle OEF below.



We can easily see that angle E is equal to 135^0 (because the beam splitter has 45^0 inclination). Therefore, angle F will be equal to $180^0 - 135^0 - \beta = 45^0 - \beta$.

To determine the length of the light ray OF we use the relationship:

$$\frac{\sin(45^0 - \beta)}{H1} = \frac{\sin 135^0}{OF}$$

From which

$$OF = \frac{H1}{\sin(45^0 - \beta)} \sin 135^0$$

With some thought we can see that:

$$(L1 - OF \sin\beta) \tan\beta + (L1 + H2) \tan\beta = (H1 + \Delta) - OF \cos\beta$$

We substitute the value of OF in the above equation:

$$(L1 - \frac{H1}{\sin(45^0 - \beta)} \sin 135^0 \sin\beta) \tan\beta + (L1 + H2) \tan\beta = (H1 + \Delta) - \frac{H1}{\sin(45^0 - \beta)} \sin 135^0 \cos\beta$$

The only unknown in the above equation is β .

Once β is determined, the lengths of all the three components of the blue ray (OF , FG , S'G) can be determined.

$$FG = \frac{L1 - OF\sin\beta}{\cos\beta}$$

Substituting the value of OF in the above equation:

$$FG = \frac{L1 - \frac{H1}{\sin(45^0 - \beta)}\sin 135^0 \sin\beta}{\cos\beta}$$

And

$$S'G = \frac{L1 + H2}{\cos\beta}$$

We will use Excel to solve the above equations.

Once the path lengths of the red and blue light beams is determined, we can calculate the fringe shift from the difference in path lengths.

I used Excel to solve the equations for θ andβ .

$$(\frac{S'T}{\sin(135^0 - \theta)}\sin\theta\sin 45^0 + (L2 - \Delta))\tan\theta + (L2 + H1)\tan\theta = \frac{S'T}{\sin(135^0 - \theta)}\cos\theta\sin 45^0 - H2$$

$$(L1 - \frac{H1}{\sin(45^0 - \beta)}\sin 135^0\sin\beta)\tan\beta + (L1 + H2)\tan\beta = (H1 + \Delta) - \frac{H1}{\sin(45^0 - \beta)}\sin 135^0\cos\beta$$

By substituting the values of the dimensions for L1, L2, H1, H2 we assumed earlier, i.e.

L1 = 1.2m, L2 = 1.2m , H1 = 20cm , H2 = 10cm, λ = 575 nm, Δ = 290.68µm

I obtained the values of θ and β using Excel.

θ =0.0001211 radians and β = 0.00012638 radians

from which I calculated the path lengths of components of the red and the blue light.

The components of the red light beam are:

S'R = 0.100280271247555m RU = 1.1997197292927m UO =1.4000000075424m

The total path length of the red light beam will be the sum of the above three components:

red light ray total path length = 2.70000000808265m

The components of the blue light beam are:

OF = 0.200021534877466m FG = 1.19997847323555m S'G =1.30000000753352m

The total path length of the blue light beam will be the sum of the above three components:

blue light ray total path length = 2.70000001564654 m

The difference in path lengths of the red and blue light beams will be:

path difference caused by absolute motion = 7.56388907063865 nm

The fringe shift will be:

fringe shift = path difference / wavelength = **7.56388907063865 nm / 575 nm**

= 0.01315 fringes

Note that Michelson in his 1881 experiment measured a maximum average fringe shift of 0.018 fringes ! The discrepancy might be because we used roughly estimated values for H1 and H2 .

We can see how complicated it would be to analyze (using AST) the 1887 Michelson-Morley experiment (MMX) in which the two light beams undergo many reflections before combining at the detector. In this paper we have analyzed the 1881 Michelson experiment.

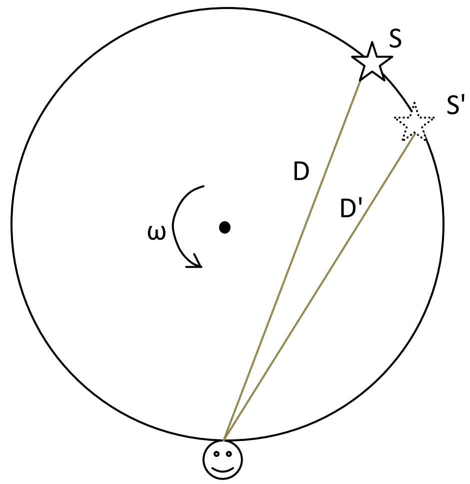
I would like to refer the reader to a modified Michelson-Morley experiment I proposed [3] which is many orders of magnitude more sensitive than conventional MMX.

The Sagnac effect

Despite the fact that I got the initial insight of AST while pondering the Sagnac effect, for years I found it hard to apply AST to the Sagnac effect as formulated above. The key problem was that I could not conceive of any idea how to determine the apparent position of the light source in the case of a rotating Sagnac device. Using the direct source-observer distance as in the Michelson-Morley experiment would lead to wrong and complicated result which is not compatible with the simple Sagnac formula we know. In hind sight, the correct approach would have been to treat the Sagnac effect differently from the Michelson-Morley experiment. This means that Apparent Source Theory should be applied differently for absolute translational motion and for rotational motion. I always avoided this approach because I was stuck with the view that a good theory is one that treats both with the same procedure. I thought that experiments involving rotational motion should basically be treated as translational motion problems. However, despite several years of work, I couldn't develop a convincing explanation of the Sagnac effect by this approach. There were always flaws found in those explanations.

This led to the final conclusion that the Sagnac effect should be treated somewhat differently. However, it should be noted that even if we use different procedures, the two experiments are still treated within the same theoretical framework: Apparent Source Theory. Therefore, there would be two forms of Apparent Source Theory: translational AST and rotational AST.

Next we formulate rotational AST. Consider a light source and observer rotating about a common center in the counter-clockwise direction.

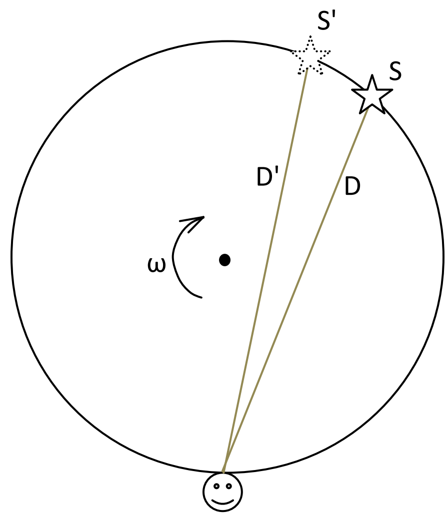


The actual and apparent positions of the light source relative to the observer are related by:

$$D' = D \frac{c}{c + \omega R}$$

whereD is the actual distance of the light source (S) relative to the observer, D' is the apparent distance of the (apparent) source (S')relative to the observer and R is the radius of the circular path of the source.

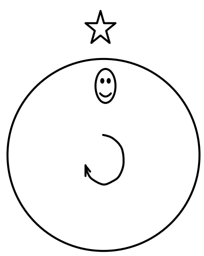
In the case of a light source and observer rotating about a common center in the clockwise direction, the situation will be as follows.



The actual and apparent positions of the light source relative to the observer are related by:

$$D' \ = \ D \ \ \frac{c}{c - \omega R}$$

Now consider a hypothetical Sagnac interferometer, with light propagating in a circular path by continuous reflection from a circular mirror.



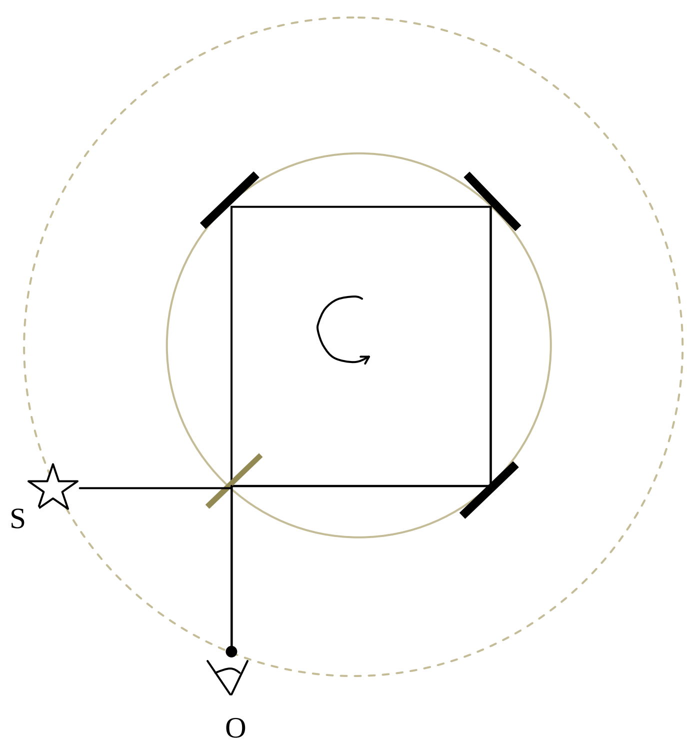
Since the light source and the observer are located at almost the same point (D = 0), the position of the apparent source will be the same as that of the real source. Once the real source is replaced by the apparent source, we analyze the experiment by assuming that the *group* velocity of light is constant relative to the apparent source. Now we can see that the light emitted in the forward direction will have to travel longer path than the light emitted in the backward direction. However, since the (group) velocity of light emitted in the forward direction is c + V and the group velocity of light emitted in the backward direction is c - V, the two light beams will reach the observer simultaneously. According to conventional thinking, therefore, there would be no fringe shift.

I have already proposed a crucial distinction between the *phase* velocity and the *group* velocity of light, that the phase velocity of light in vacuum is always constant *c* regardless of the motion of the source or the observer, whereas the group velocity of light behaves in a conventional way: it is independent of source velocity, but varies with observer velocity. There is no such distinction for classical, material waves, such as string waves, sound waves, water waves.

In the above analysis of the hypothetical Sagnac experiment, therefore, the group delays of both the forward and backward light beams is equal. This means that rotation of the apparatus has no effect on the *time of flight* of the forward and backward beams. However, the Sagnac effect is based on phase delay, not on group delay.

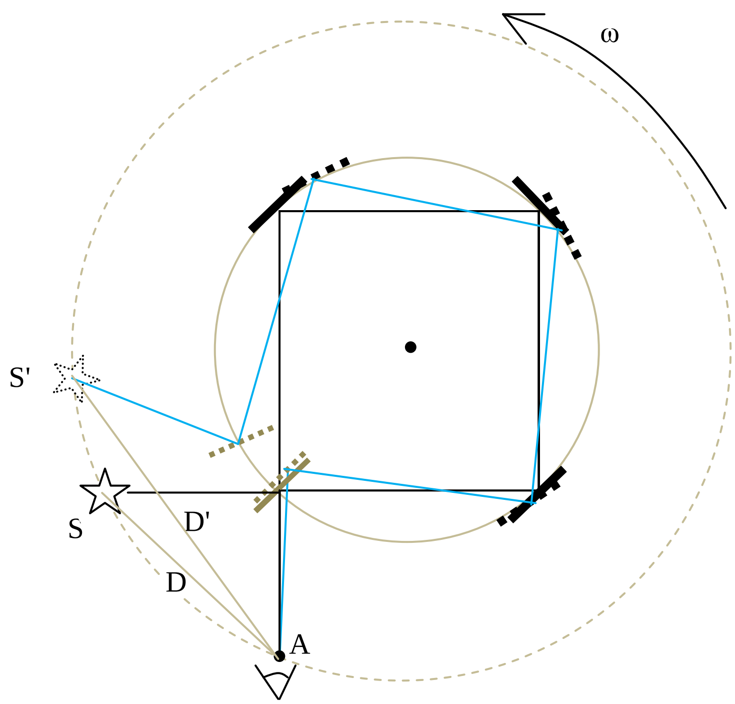
Although the group delay of both beams is equal, their path lengths are different. The light emitted in the forward direction will have to travel longer distance than the light emitted backward. It is this difference of path lengths that gives rise to shift of interference patterns with rotation of the apparatus.

Now let us consider the real Sagnac device, as shown below.



For years, I treated the Sagnac effect as a translational problem. With this approach, it was easy to analyze the simple hypothetical Sagnac experiment discussed above. The complete application of AST to the real Sagnac device, however, in contrast to the hypothetical case, has been difficult. This difficulty led me to the conclusion that absolute translational motion and absolute rotational motion must be fundamentally different. Both the Michelson-Morley experiment and the Sagnac effect are analyzed within the same theoretical framework: Apparent Source Theory (AST). However, they will be treated differently : translational AST and rotational AST.

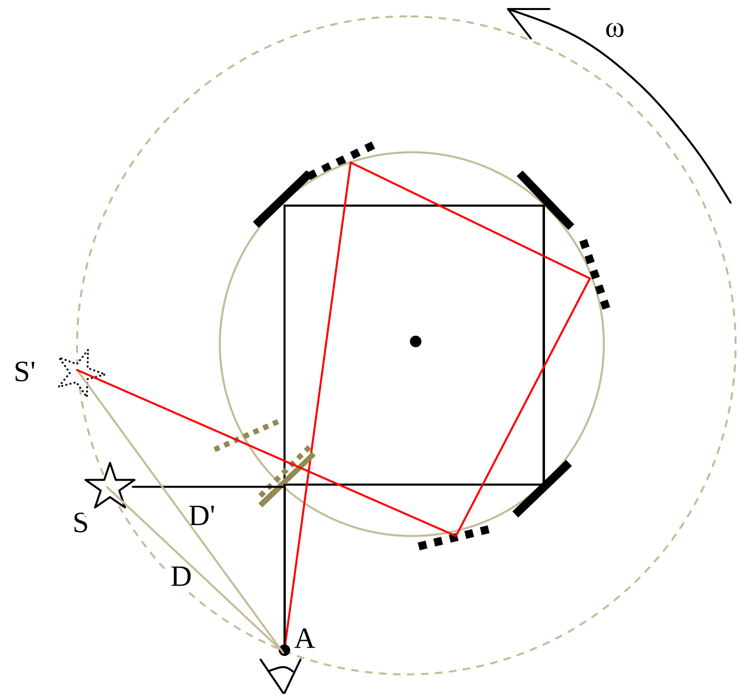
Consider a Sagnac interferometer rotating in the counterclockwise direction, as shown below. The blue lines represent the path of the light beam emitted in the backward direction.



The apparent position of the light source is determined from:

$$D' = D \frac{c}{c - \omega R}$$

The red lines represent the path of the light beam emitted in the forward direction, as shown below.



$$D' = D \frac{c}{c - \omega R}$$

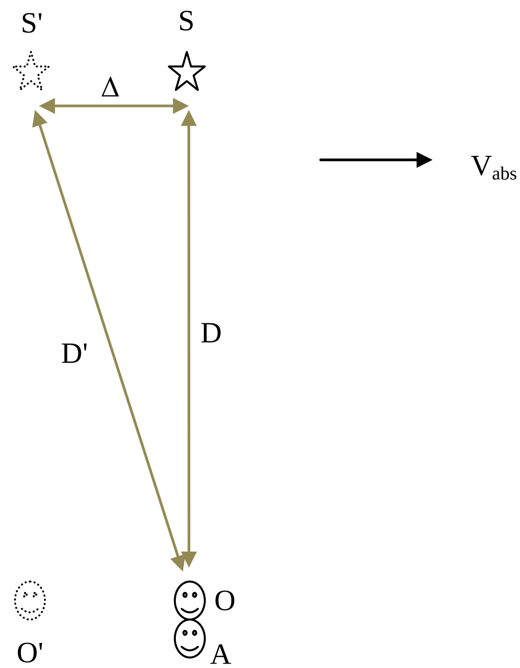
We can see that the light emitted in the forward direction (redrays) travels longer distance than the light emitted in the backward direction (blue rays) . As discussed in the case of the circular hypothetical Sagnac device, the groups will arrive (almost) simultaneously at the detector. Therefore, there will be no difference in time of flight of the forward and backward beams. In fact, the time of flight of both beams will be the same as when the device is at rest. However, the light emitted in the forward direction will have to travel longer distance (red path) than the light emitted in the backward direction, which would result in a fringe shift.

Contradiction between Apparent Source Theory and the phenomenon of stellar aberration

I have recently discovered a contradiction between Apparent Source Theory and the phenomenon of stellar aberration, which I overlooked for years. Since AST has a firm logical and experimental foundation, this contradiction is seen here as the incompleteness of AST, rather than as a disproof of AST.

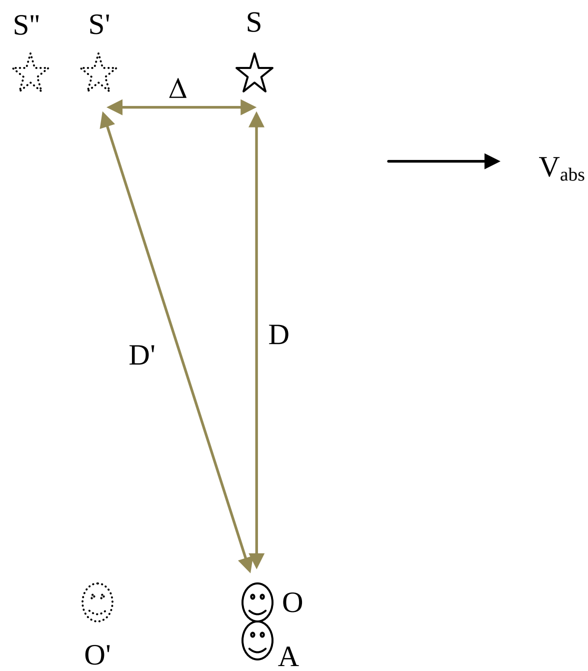
<u>Contradiction of AST with stellar aberration</u>

Imagine absolutely co-moving light source S and observer O. Assume also another observer A who is at absolute rest.



Assume that the source emits light at the instant when it is at position S' and the co-moving observer is at position O'. The observer A is always at absolute rest at position A. Assume that moving observer O detects the light just at the instant that he/she is passing through the location of stationary observer A. According to Apparent Source Theory (AST), the co-moving observer O has to point his telescope towards point S' to see the light, due to apparent change in position of the light source for absolutely co-moving source and observer[1]. Since moving observer O and stationary observer A are at the same point at the instant of light detection, observer A will also detect the light at that instant. However, we know that the stationary observer A should also point his telescope in the direction of S', the point in space where light was emitted. We see that both the stationary observer and the moving observer would point their telescopes in the same direction to see the light. This is in contradiction with the phenomenon of stellar aberration and is a real challenge to Apparent Source Theory, because, according to the theory of stellar aberration, co-moving observer should point his telescope towards current position (S) of the source, which contradicts AST.

As another related contradiction, suppose that at the instant of light detection, the co-moving observer O instantaneously starts moving to the left with velocity V_{abs} relative to the source. This would make observer O to be stationary at the point where observer A is located because the forward absolute velocity V_{abs} of observer O to the right will be cancelled by the backward velocity $V_{abs}$of O relative to the source. Since observer A and observer O are now both stationary at almost the same point in space, both should observe the light in exactly the same way. We know that stationary observer A has to point his telescope towards point S', the point where the source was at the instant of emission. But, according to the theory of light aberration, if observer O had to point his/her telescope towards S' when co-moving with the source, he should point to the direction of S" when moving relative to S (relative to S'), as shown below. Although observers A and O are at the same point in space and also both at absolute rest (therefore, at rest relative to each other), observer A has to point his telescope in the direction of S' , while observer O has to point his telescope towards direction S", which is a contradiction.



Since both observers are at the same point in space and are at rest relative to each other, the light should come from the same direction for both observers. Which direction is correct ?

Astronomical observations of binary stars shows that stellar aberration depends only on the absolute velocity of the observer and is independent of absolute velocity of the light source[2]. This disproves the theory that observer O will see light coming from direction of S".

This is another related contradiction of AST with the phenomenon of stellar aberration.

Apparent Source Theory - a theory implying intrinsic nature of absolute motion

The above contradiction between AST and the stellar aberration phenomenon was a challenge to AST. The proposed solution to this enigmatic problem required not only a new theory, but a new paradigm: intrinsic nature of absolute motion.

Intrinsic Absolute Motion(IAM) theory

The contradiction of Apparent Source Theory with stellar aberration led to the theory of intrinsic absolute motion paradigm. Intrinsic Absolute Motion theory introduces a new scientific paradigm. It introduces a new distinction between *equalmotions* and *samemotion* and between *translational* and *rotational* motions.

Two physical objects may have *equal* motions (equalvelocities, equal accelerations, equal rates of change of acceleration, ...) . This paper introduces a new paradigm into physics: *equal* motion vs *same* motion. Two physical objects may have *equal* motions, but not *same* motion. Therefore, co-moving light source and detector will be at rest relative to each other, and will have *equalvelocities*, but may or may not have *samevelocity*. A light source and a detector with *equal* absolute velocities do not necessarily have *sameabsolute* velocity. Only they are at rest relative to each other, i.e. only their relative velocity is zero. In applying Apparent Source Theory, we use the common (*same*) absolute velocity, but not the individual, separate absolute velocities, of the light source and the observer.

Many questions may arise. What makes the distinction between a light detector that has only *equal* velocity as the source and a detector that has the *same* velocity as the light source ? Should the light source and detector have rigid mechanical connection ? Is there a continuum of coupling (unification) of the separate absolute velocities ? i.e. is there a degree to the *unification* of the separate absolute velocities ?

If the theory of intrinsic absolute motion is correct, then these questions are to be answered.

Modified Emission Theory

We present modified emission theory as an alternative (as a complement) to Apparent Source Theory. Apparent Source Theory and Modified Emission Theory can both be part of a new theoretical framework. Modified Emission Theory can explain the null result of the Michelson-Morley experiment. However, as is known, the Michelson-Morley experiment always gave a small but significant fringe shift, and not completely null result. Since modified emission theory predicts completely null result, strictly speaking, it cannot explain the Michelson-Morley experiment. However, modified emission theory can explain, for example, the fact that the speed of light is independent of the speed of the source.

<u>Independence of the speed of light from the velocity of the source</u>

So far our discussion was confined to the case of light source and observer sharing the *same* motion, i.e. intrinsic absolute motion. Now, we will consider the case of light source and observer with independent motions.

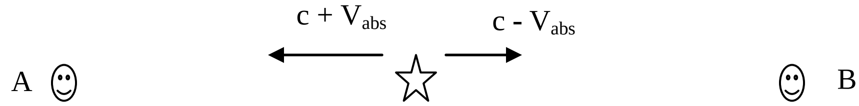
That the speed of light is independent of the source motion is an experimentally and observationally verified fact. This has been confirmed by the A Michelson moving mirror experiment, Q Majorana's moving source experiment and the De Sitter binary star experiment.

However, since the ether has been disproved by the Michelson-Morley experiment, a question follows: how can the speed of light be independent of source velocity if the ether doesn't exist?

We propose the following theory:

The velocity of light <u>*relative to a light source*</u> *in absolute motion will change so that the velocity of light relative to an observer at absolute rest will always be equal to c .*

To clarify this idea, consider a light source in absolute motion and two observers at rest, one in front of the moving source and the other behind it.



The speed of light emitted in the forward direction will be $c - V_{abs}$ *relative to the source* and the speed of light emitted in the backward direction will be $c + V_{abs}$ *relative to the source.*

Therefore,

the speed of light relative to observer A =

the speed of light relative to the source - the speed of the source relative to the observer

$$= (c + V_{abs}) - V_{abs} = c$$

and

the speed of light relative to observer B =

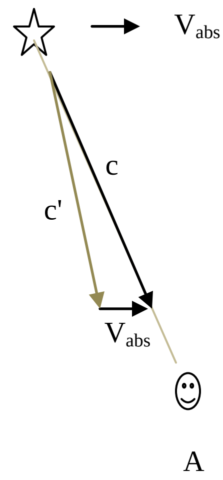
the speed of light relative to the source + the speed of the source relative to the observer

$$= (c - V_{abs}) + V_{abs} = c$$

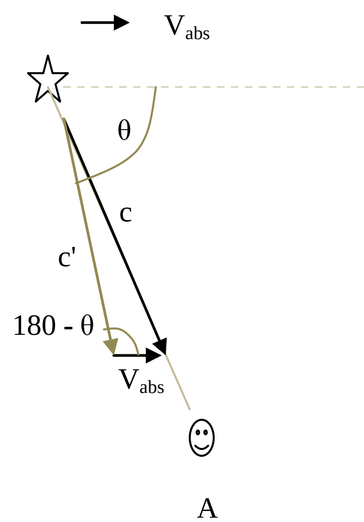
Therefore, the speed of light is *c* relative to both observers, irrespective of source motion.

In other words, the effect of absolute motion (of the source) is to change the velocity of light *relative to the source*.

This can also be shown for the case of an observer located in the lateral directions relative to source velocity.



c' is the speed of light relative to the source (in the reference frame of the source) , and c , which is the resultant of c' and V_{abs} , is the usual speed of light relative to the stationary observer A.



θ is the angle between the velocity vectors $\boldsymbol{V_{abs}}$ and $\boldsymbol{c'}$.
$\boldsymbol{c'}$ is the (group) velocity of light relative to (in the reference frame of) the source.

From the above diagram,

$$c^2 = c'^2 + V_{abs}{}^2 - 2\,c'V_{abs}\cos(180 - \theta)$$

$$\Longrightarrow c^2 = c'^2 + V_{abs}{}^2 + 2\,c'V_{abs}\cos\,\theta$$

$$\Longrightarrow \ c'^2 + \ 2\,c'V_{abs}\cos\ \theta + \ {V_{abs}}^2 - c^2 = 0$$

$$\Longrightarrow \ c' = \frac{-2V_{abs}\,cos\theta + \ \sqrt{4{V_{abs}}^2 cos^2\,\theta - 4\,({V_{abs}}^2 - c^2\,)}}{2}$$

$$\Longrightarrow \ c' \ = -V_{abs}\,cos\theta + \ \sqrt{{V_{abs}}^2 cos^2\,\theta - \ ({V_{abs}}^2 - c^2\,)}$$

$$\Longrightarrow \ c' \ = -V_{abs}\,cos\theta + \ \sqrt{c^2 - {V_{abs}}^2 sin^2\,\theta}$$

We can see that the (group) velocity of light emitted by an absolutely moving source will be distorted in the reference frame of the source (relative to the source), depending on the angle θ .

For example, the velocity of light relative to the source in the forward direction ($\theta = 0^0$) will be:

$$c' \ = -V_{abs}\,cos0^0 + \ \sqrt{c^2 - {V_{abs}}^2 sin^2 0^0} \ = \ c - V_{abs}$$

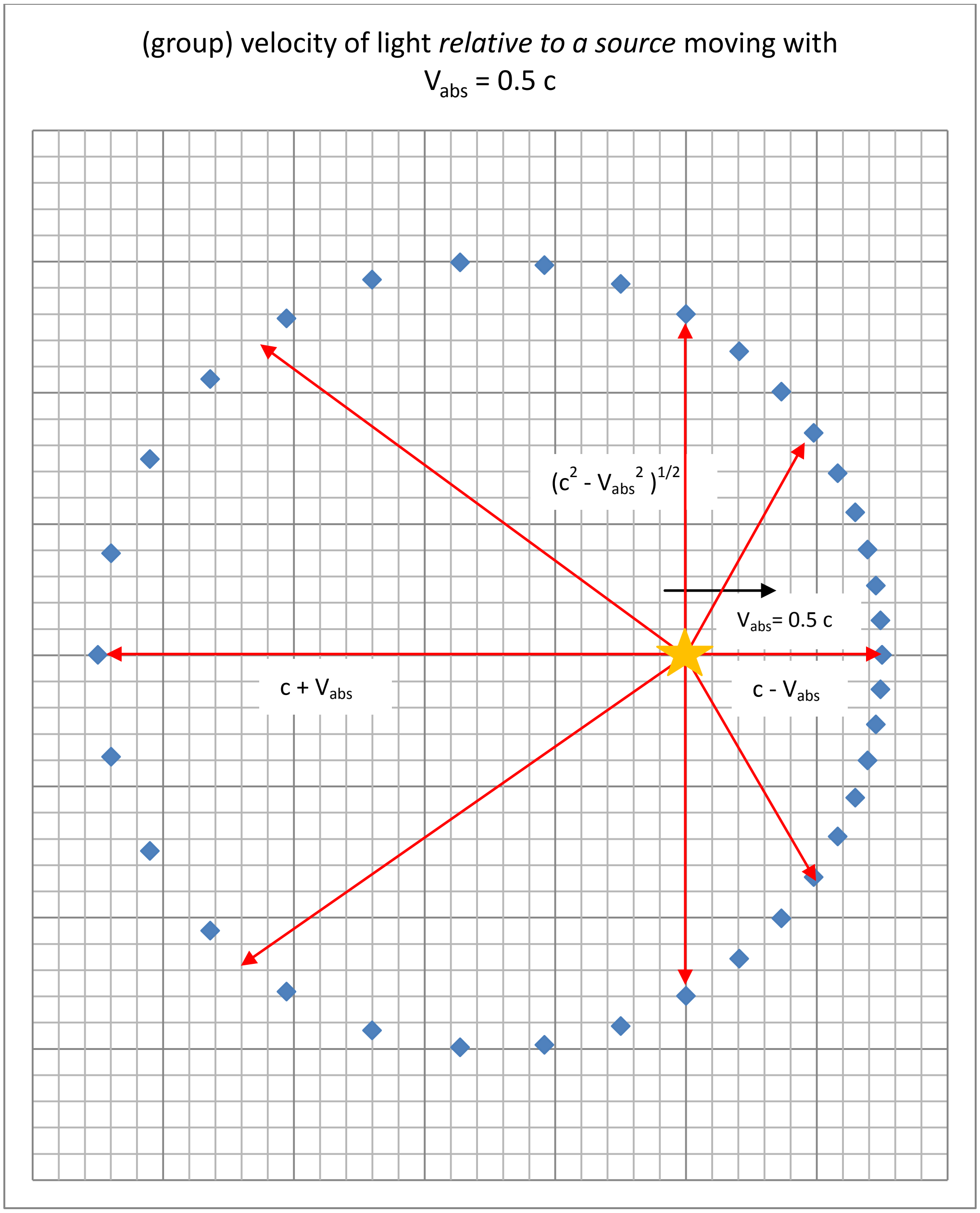
In the backward direction ($\theta = 180^0$) :

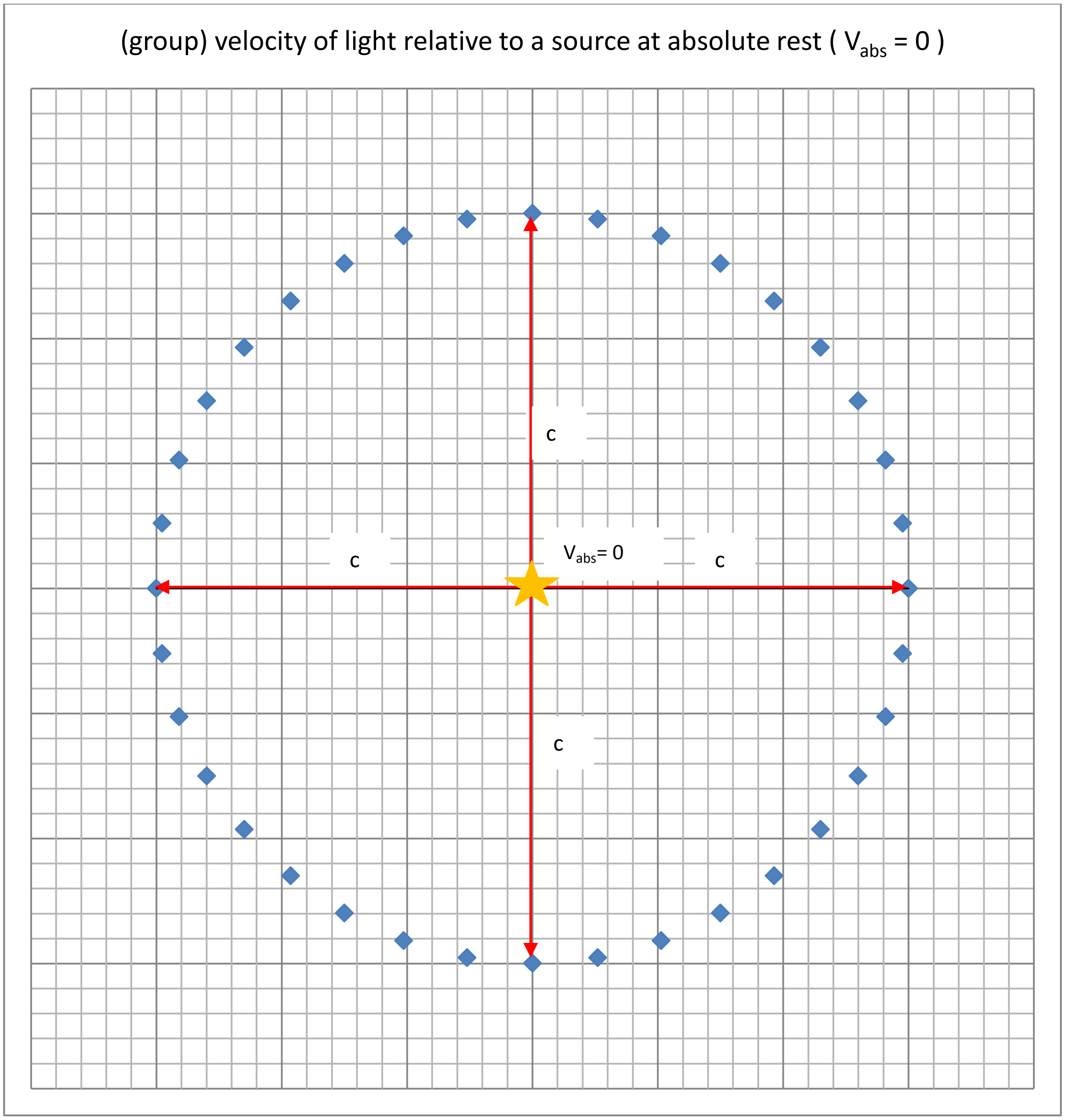
$$c' \ = -V_{abs}\,cos180^0 + \ \sqrt{c^2 - {V_{abs}}^2 sin^2 180^0} \ = \ c + V_{abs}$$

For $\theta = 90^0$

$$c' \ = -V_{abs}\,cos90^0 + \ \sqrt{c^2 - {V_{abs}}^2 sin^2 90^0} \ = \ \sqrt{c^2 - {V_{abs}}^2}$$

The next diagram show the group velocity of light *relative to a source* that is in absolute motion. We can see the distortion of the speed of light relative to the source with increasing absolute velocity. The velocity of light relative to the source that is at absolute rest is equal to *c* in every direction, as shown in the second diagram.


(group) velocity of light relative to a source moving with
V_abs = 0.5 c
(c^2 - V_abs^2)^1/2
V_abs= 0.5 c
c + V_abs
c - V_abs


(group) velocity of light relative to a source at absolute rest (V$_{abs}$ = 0)
c
c
V$_{abs}$= 0
c
c

Reflection of light from a moving mirror

According to modified emission theory, the *group* velocity of light is independent of source velocity, but varies with observer velocity. The group velocity of light also varies with mirror velocity.

Consider a stationary source and a mirror moving with velocity V towards the source, as shown below.

The velocity of reflected light will be c + 2V , in the reference frame of the source. For a mirror moving away from the source with velocity V, the velocity of reflected light will be c - 2V , in the reference frame of the source.

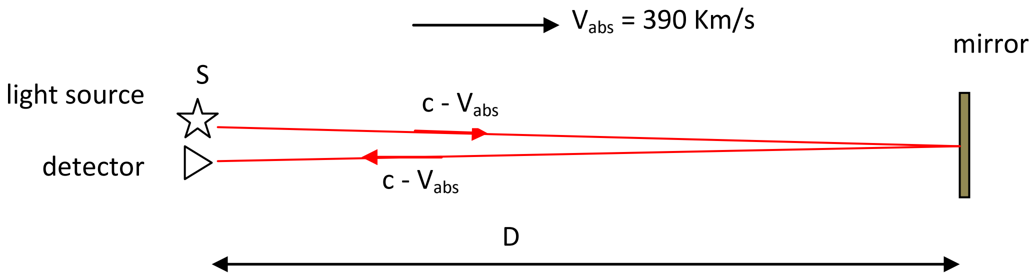
According to both Apparent Source Theory and modified emission theory, the *phase* velocity of light in vacuum is absolutely constant *c* , irrespective of source, observer and mirror velocity.

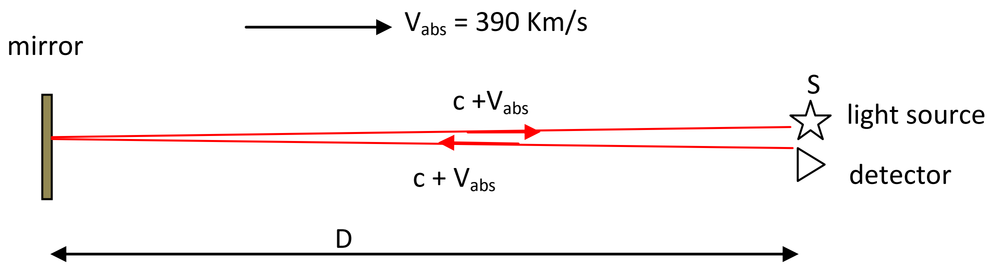
Proposed experiments to test Apparent Source Theory and Modified Emission Theory

The following two experimental setups could be used to test modified emission theory and Apparent Source Theory. The experiment will be performed when Leo is just on the horizon, with the axis of the experimental setup directed towards Leo. We know that the Earth moves with absolute velocity of about 390 Km/s towards constellation Leo, as discovered by the Silvertooth experiment and the NASA CMBR experiment.

<u>Experiment 1</u>

Two experimental setups will be run simultaneously, as shown below.





The experiments works as follows. Each system will be started simultaneously by each detector device initially triggering the respective light source. The light source S then emits a very short light pulse towards the mirror. The light will reflect back on itself and be detected by the detector. The detector, upon detecting the light pulse, immediately triggers the source again to emit another light pulse, which will travel to the mirror again and reflected back to the detector and detected. The detector again triggers the source and so on. Every time the detector detects a light pulse, a counter will count. The system will be stopped after some time and the two counters will be compared.

According to modified emission theory, the group velocity of light *relative to the source* will be equal to c - V_{abs} in the first setup and c + V_{abs} in the second set up.

The round trip time in the first setup will be:

$$\frac{2D}{c - V_{abs}}$$

The first counter value after time T will be:

$$C_1 = \frac{T}{(\frac{2D}{c-V_{abs}})}$$

The round trip time in the second setup will be:

$$\frac{2D}{c + V_{abs}}$$

The second counter value after time T will be:

$$C_2 = \frac{T}{(\frac{2D}{c+V_{abs}})}$$

The difference in the two counter values after time T will be:

$$C_2 - C_1 = \frac{T}{(\frac{2D}{c+V_{abs}})} - \frac{T}{(\frac{2D}{c-V_{abs}})} = \frac{T}{2D} 2V_{abs} = \frac{T\,V_{abs}}{D}$$

Therefore, according to modified emission theory, after sufficiently large time T, there will be a significant difference in the values of the two counters.

Let D = 10 m = 0.01 Km, V_{abs} = 390 Km/s , T = 10 seconds

$$C_2 - C_1 = \frac{T\,V_{abs}}{D} = \frac{10\ s\ * 390\ Km/s}{0.01\ Km} = 390000$$

Therefore, according to modified emission theory, the difference in the two counter values will be 390,000 , only 10 seconds after the systems are started.

To determine the required modulo of the counters, we first determine the round trip times involved.

The round trip time is approximately:

$$\frac{2D}{c + V_{abs}} \cong \frac{2D}{c - V_{abs}} \cong \frac{2D}{c} = \frac{2 * 0.01\ Km}{300000\ Km/s} = 66.7\ ns$$

Therefore, in a period of 10 seconds, the counters will count about

$$\frac{10\ s}{66.6\ ns} = 150,150,150$$

Since

$$2^{28} = 268{,}435{,}456$$

we need a counter of at least 28 bits.

Practically, the experiment can also be done with, say, a 16 bit counter.

For example, if we take much less time T, say T = 2ms, the counters will count about:

$$\frac{2\ ms}{66.6\ ns} = 30,030$$

A 16-bit counter will have:

$$2^{16} = 65{,}536$$

states, and hence will be enough for the experiment.

In this case (i.e., for T = 2 ms), the difference in values of the two counters will be:

$$C_2 - C_1 = \frac{T\ V_{abs}}{D} = \frac{0.002s\ * 390\ Km/s}{0.01\ Km} = 78$$

But it is also possible to use 16-bit counters, store the difference in their values just before one counter resets to zero, reset the other counter simultaneously and start the counting from zero and repeat the above procedure. After the system has run for sufficiently long time, the system will be stopped and the stored differences of the two counters will be added together.

The required speed of the counters is:

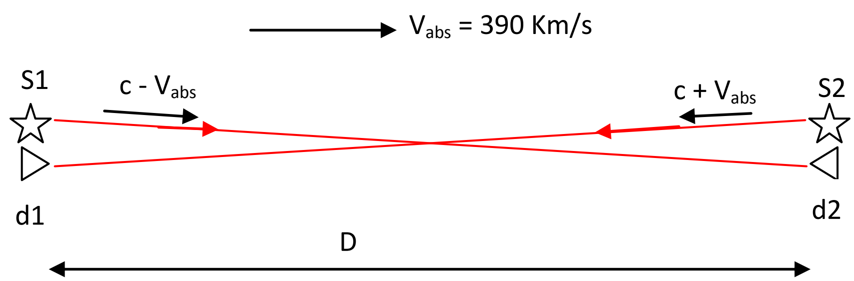
$$\frac{1}{66.6ns} = 15\ MHz$$

So far we have seen the prediction of modified emission theory.

On the other hand, Apparent Source Theory (AST) predicts almost no difference between the values of the two counters, because according to AST, the velocity of light will always be c relative to the detectors. This is because the source and the detector are almost at the same point in space[1].

Experiment 2

Let us see another possible experiment.



In this case, the mirror in the previous experiment has been replaced by a light source and a detector.

The experiment works as follows. Initially, detector d1 triggers light source S1, which emits a very short light pulse. The light pulse will be detected by detector d2. Immediately, upon detecting the light pulse, d2 triggers S2, which will emit a short light pulse. The light pulse will be detected by d1. Upon detecting the light pulse, d1 immediately triggers S1, which emits another light pulse, and so on. A counter will count at detection of each pulse.

We will first analyze the experiment based on modified emission theory.

The time taken for the light pulse to travel from S1 to d2 will be:

$$t_1 = \frac{D}{c - V_{abs}}$$

The time taken for the light pulse to travel from S2 to d1 will be:

$$t_2 = \frac{D}{c + V_{abs}}$$

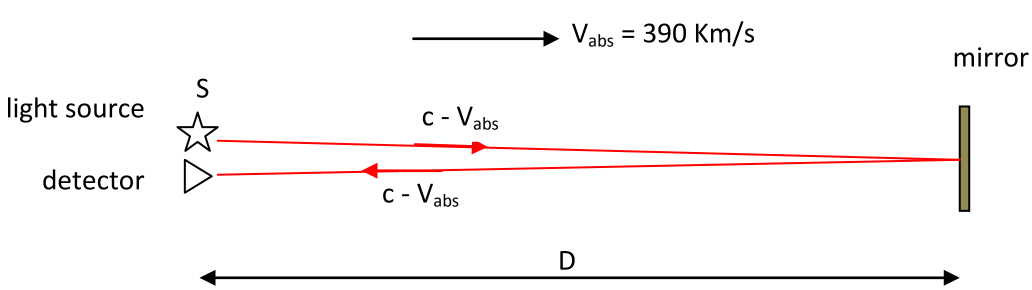
The round trip time will be:

$$t_1 + t_2 = \frac{D}{c - V_{abs}} + \frac{D}{c + V_{abs}} = 2D \frac{V_{abs}}{c^2 - {V_{abs}}^2}$$

The counter value after a time delay of T will be:

$$C_1 = \frac{T}{t_1 + t_2} = \frac{T}{2D \frac{V_{abs}}{c^2 - {V_{abs}}^2}}$$

A second setup, similar to the previous one, is run simultaneously.



The round trip time will be, as discussed already:

$$\frac{2D}{c - V_{abs}}$$

The counter value after time T will be:

$$C_2 = \frac{T}{\left(\frac{2D}{c - V_{abs}}\right)}$$

The difference in the values of the two counters will be:

$$C_1 - C_2 = \frac{T}{2D\,\frac{V_{abs}}{c^2 - V_{abs}{}^2}} - \frac{T}{\left(\frac{2D}{c - V_{abs}}\right)} = \frac{T}{2D}\left(\frac{c^2 - c\,V_{abs}}{V_{abs}}\right)$$

Let D = 10 m = 0.01 Km , T = 1ms , V_{abs} = 390 Km/s , c = 300000 Km/s

$$C_1 - C_2 = \frac{T}{2D}\left(\frac{c^2 - c\,V_{abs}}{V_{abs}}\right) = \frac{0.0001}{2 * 0.01}\left(\frac{300000^2 - 300000 * 390}{390}\right) = 11{,}523{,}461$$

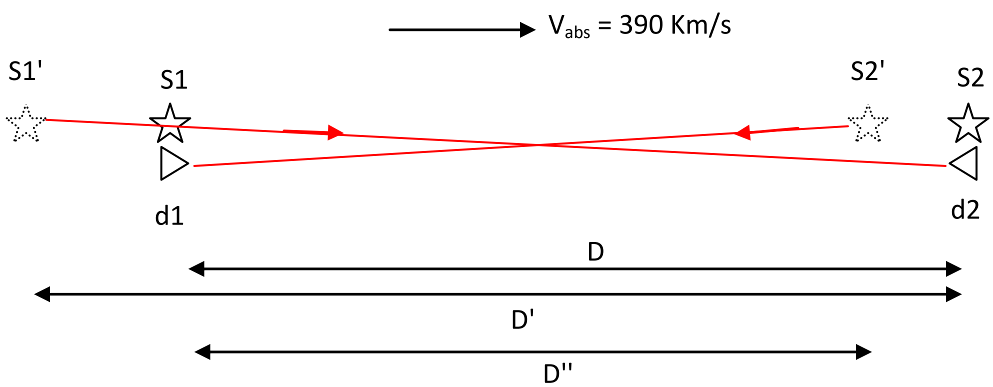
To determine the required number of bits for the counters, we use the round trip time of C_1 :

$$\frac{T}{2D\,\frac{V_{abs}}{c^2 - V_{abs}{}^2}} \cong \frac{T}{2D\,\frac{V_{abs}}{c^2}} = \frac{0.01}{2 * 0.01 * \frac{390}{300000^2}} = 115{,}384{,}615$$

This will require a counter of 27 bits.

$$2^{27} = 134{,}217{,}728$$

Next we will analyze the experiment using Apparent Source Theory (AST).



D' is the distance of apparent source S1' relative to detector d2 and D" is the distance of apparent source S2' relative to detector d1.

$$D' = D \, \frac{c}{c - V_{abs}}$$

and

$$D'' = D \, \frac{c}{c + V_{abs}}$$

The time of flight from S1' to detector d2 will be:

$$t_1 = \frac{D'}{c} = \frac{D \, \frac{c}{c - V_{abs}}}{c} = \frac{D}{c - V_{abs}}$$

The time of flight from S2' to detector d1 will be:

$$t_2 = \frac{D''}{c} = \frac{D \, \frac{c}{c + V_{abs}}}{c} = \frac{D}{c + V_{abs}}$$

The round trip time will be:

$$t_1 + t_2 = \frac{D}{c - V_{abs}} + \frac{D}{c + V_{abs}} = D \, \frac{2c}{c^2 - {V_{abs}}^2}$$

The value of the counter in time period T will be:

$$C_1 = \frac{T}{D \, \frac{2c}{c^2 - {V_{abs}}^2}}$$

Applying AST [1] to the second experimental setup, the round trip time will be:

$$\frac{2D}{c}$$

The value of the counter in time period T will be:

$$C_2 = \frac{T}{\frac{2D}{c}}$$

The difference in the two counter values will be:

$$C_2 - C_1 = \frac{T}{\frac{2D}{c}} - \frac{T}{D \, \frac{2c}{c^2 - {V_{abs}}^2}} = \frac{T}{2D} \, \frac{{V_{abs}}^2}{c}$$

Discussion

It should be noted that AST and modified emission theory may not necessarily be mutually exclusive. Confirmation of, for example, modified emission theory in the above experiments does not necessarily disprove AST. We have already seen that AST successfully explains the Michelson-Morley experiment and the Silvertooth experiment. Modified emission theory predicts a completely null result for the Michelson-Morley experiment and fails in this case because the Michelson-Morley experiment always gave a small fringe shift. Modified emission theory cannot explain the Silvertooth experiment at all. However, modified emission theory may apply to moving source experiments.

Conclusion

Absolute motion is defined only for physical entities, a system of physical objects and subsystems existing as a *unit*. Hence, absolute motion is intrinsic. The existing 'mechanistic' , 'extrinsic' scientific paradigm makes no such distinction. The successes of Apparent Source Theory, in combination with its apparent contradictions with experiments, led to the new theory proposed in this paper: intrinsic nature of absolute motion.

Thanks to God and the Mother of God, Our Lady Saint Virgin Mary

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

2. Stellar Aberration and Einstein's Relativity, by Paul Marmet

3. An Interferometer Experiment that can be Many Orders of Magnitude MoreSensitive than the Michelson-Morley Experiment, by Henok Tadesse, Vixra