

Disentanglement of Absolute Velocity and Doppler Effect

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Abstract

The true nature of absolute motion has eluded physicists for more than a century because they presumed absolute motion to be motion relative to the hypothetical ether. This author has developed a new *interpretation* of absolute velocity, Apparent Source Theory (AST), that shows the ether does not exist, but absolute motion does. AST successfully explains the hitherto apparently contradicting experiments including the Michelson-Morley experiment, the Sagnac effect and moving source experiments. An argument against the validity of absolute motion is that if absolute motion existed, it would have been detected in the Ives-Stilwell and the fast ion beam experiments. In this paper it is proposed that, unconventionally, absolute motion does not affect experiments of Doppler effect. Therefore, such experiments cannot prove or disprove absolute motion. Doppler effect is determined only by the source-observer relative velocity, by applying Exponential Doppler Effect theory [1] already proposed by this author. Absolute velocity results only in phase delay of light, and has no effect on Doppler effect and this would be a novel nature of motion and the speed of light. This is not the case for sound waves.

Introduction

One of the experiments considered as evidence against absolute motion is the Ives-Stilwell experiment and its modern version, the fast ion beam experiment. It is argued that (or it may be argued that) if absolute motion existed, then Earth's absolute velocity would have been detected in the Ives-Stilwell experiment. This author also was faced with this same problem while developing Apparent Source Theory [1]. We will start by introducing Apparent Source theory (AST), which is a very successful theory that can explain the hitherto perplexing experiments on the speed of light: the Michelson-Morley experiment, the Sagnac effect, moving source experiments and other light speed experiments.

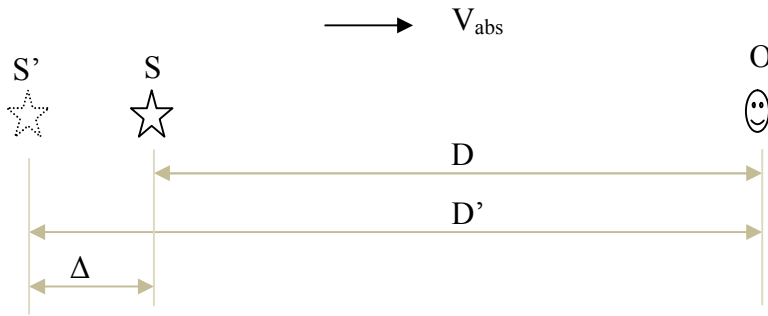
Apparent Source Theory (AST)

Absolute motion has eluded physicists for more than a century. The root problem has been that absolute motion has been presumed to be motion relative to the ether. This author revealed that the ether doesn't exist, but absolute motion does exist [1][2][3][4][5][6][7][8][9][10].

A new interpretation of absolute motion is as follows.

Consider absolutely co-moving light source S and observer O, with absolute velocity V_{abs} , to the right (the observer is in front of the light source).

The effect of absolute motion for co-moving source and observer is to create an apparent change in the position (distance and direction) of the light source relative to the observer.



The physical, real distance between the source and the observer is D . The effect of absolute motion for the co-moving light source and observer is an apparent change in the position of the source from S to S' , relative to the observer. It appears to the observer that the source is at a distance D' , and not D , away from him/her. It appears to the observer that the source is farther away from him than the physical, real distance. This will be evident in creating an increase in the time delay of light emitted from the source to reach the observer. The time delay is calculated as follows: *during the time interval that light travels from S' to O , the source 'moves' from S' to S .*

Therefore,

$$\frac{D'}{c} = \frac{\Delta}{V_{abs}}$$

But

$$\Delta = D' - D$$

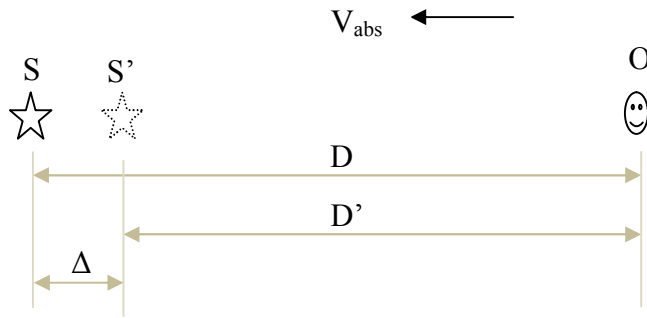
From which

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

and

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

In the same way, in the case of absolute velocity directed towards the left (the observer is behind the light source), the source appears to be at S' , not at S . In this case the source appears to be closer to the observer than its physical distance, by distance Δ .



Therefore,

$$\frac{D'}{c} = \frac{\Delta}{V_{abs}}$$

But

$$\Delta = D - D'$$

From which

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

and

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

A little thought reveals that Apparent Source Theory (AST) is a fusion between ether theory and emission theory. Neither does the ether exist, nor is ballistic theory correct. Classical ether theory and emission theory are not completely wrong, they are only incomplete. A complete theory of the speed of light is a fusion of emission theory and ether theory, which is AST.

AST has been shown[1] to successfully explain the Michelson-Morley experiment, the Sagnac effect, moving source experiments and many other experiments.

Intuitive understanding of Apparent Source Theory - Modified Emission Theory [11]

Apparent Source Theory can be described intuitively. However, it should be noted that this intuitive understanding has limited applicability and AST is the ultimately accurate theory.

Consider a light source and an observer that are at absolute rest. The velocity of light will be isotropic and constant c relative to the source.



Suppose that the source starts moving with absolute velocity V_{abs} towards the observer. The velocity of light will change *relative to the source* so that the velocity of light relative to the observer will still be c .

In this case, for the speed of light to be independent of the velocity of the source, the speed of light *relative to the source* should be $c - V_{\text{abs}}$ in the forward direction. Therefore, the speed of light relative to the observer will be the *sum* of source velocity (V_{abs}) and the speed of light relative to the source ($c - V_{\text{abs}}$):

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

In the case of an observer who is at absolute rest behind the light source moving with absolute velocity V_{abs} , the velocity of light is $c + V_{\text{abs}}$ in the backward direction *relative to the source*.



In this case, the speed of light relative to the observer will be the *difference* between the speed of light *relative to the source* ($c + V_{\text{abs}}$) and the source absolute velocity (V_{abs}):

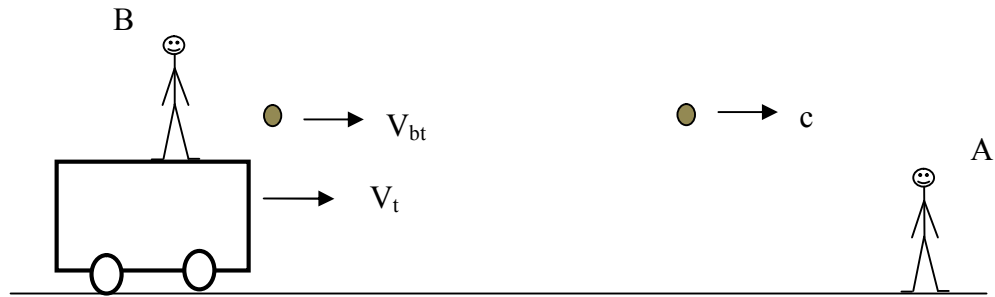
$$(c + V_{\text{abs}}) - V_{\text{abs}} = c$$

This is a fusion of ether theory and emission theory. Note again that the ether doesn't exist; neither is ballistic (emission) theory correct.

We can see that this theory is a straightforward explanation of moving source experiments and the Michelson-Morley experiment. We know that the null result of the Michelson-Morley experiment could be explained in a most straightforward way by the emission theory of light. However, the emission theory was abandoned because of moving source experiments. We have modified emission theory as above so that it is also compatible with moving source experiments.

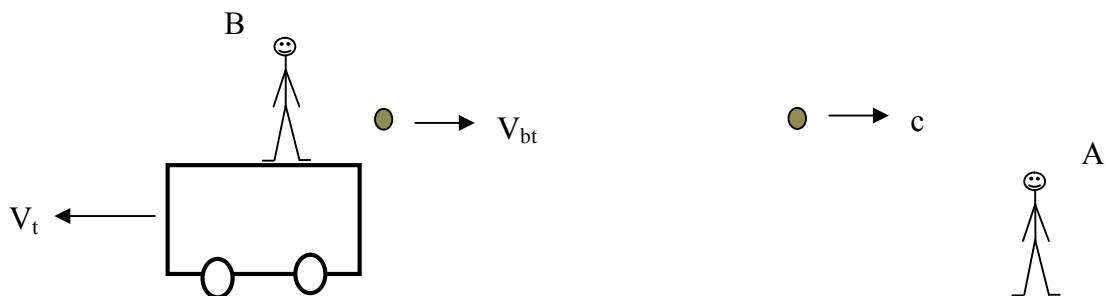
Thus, in the Michelson-Morley experiment, a change in velocity of light *relative to the source* due to source absolute velocity will not result in a fringe shift because, intuitively, both the longitudinal and transverse light beams will be affected equally.

As an analogy consider a stationary observer A and a truck moving relative to A. Another observer B is on the truck, throwing balls in the forward or backward direction while the truck is moving. Suppose the truck (and observer B) moves towards observer A with velocity V_t . The requirement is that observer B adjusts the velocity of the balls *relative to the truck* (V_{bt}) so that the velocity of the ball relative to the stationary observer will always be constant c irrespective of the velocity of the truck.



$$V_t + V_{bt} = \text{constant} = c$$

If observer B throws balls towards observer A while the truck is moving away from observer A, as shown below, the velocity of the balls relative to A will be the difference between V_t and V_{bt} , which is constant as above.



$$V_t - V_{bt} = \text{constant} = c$$

Therefore, the velocity of the balls relative to observer A is constant c independent of the velocity of the truck, analogous to the speed of light being constant c relative to an observer at absolute rest, independent of source velocity.

It is now easy to see the null result of the Michelson-Morley experiment (MMX) by the

modified emission theory above. Modified emission theory is just conventional emission theory in which the velocity of light *relative to the source* depends on the absolute velocity of the source.

For a comprehensive description of AST the author recommends papers [1][2][3]...[10]

Disentanglement of Doppler effect and absolute velocity

I was faced with the problem of ‘mixing’ of absolute velocity with Doppler effect. However, we know that Earth's absolute motion did not affect the Ives-Stilwell experiment and, particularly, the fast ion beam experiment.

Consider a light source and a detector on the Earth’s surface, which has an absolute velocity of 390Km/s . Suppose that the light source and the detector are set into relative motion. Since the source and detector have a common absolute velocity (390 Km/s), a continuous change in the distance between them (due to relative velocity) will result is a continuous change in phase, which would be detected as a change in frequency. Therefore, the Doppler frequency shift would be determined not only by the source-detector relative velocity, but also by Earth’s absolute velocity. But no such effect of Earth’s absolute motion has been detected in the Ives-Stilwell and fast ion-beam experiments. This was the problem I faced.

From,

$$D' = D \frac{c}{c \pm V_{abs}}$$

$$\Rightarrow \frac{dD'}{dt} = V' = \frac{dD}{dt} \frac{c}{c \pm V_{abs}} = V \frac{c}{c \pm V_{abs}}$$

where V is the actual source observer relative velocity and V' is the apparent source observer relative velocity. Conventionally, we use V' , and not V, in the Doppler effect formula (Exponential Doppler effect theory[1]) and V' is a function of absolute velocity.

Although Earth's absolute velocity is large enough to be detected in the Ives-Stilwell experiment and particularly in the fast ion beam experiment, no such effect was observed in these experiments.

The novel solution to this problem is that Earth’s absolute velocity will result only in change in *phase*, not change in frequency,of light detected by the detector. The effect of absolute velocity in the case of light is only to create a phase delay. The Doppler frequency/wavelength shift is determined only by the source-detector relative velocity. The Doppler effect is determined by the relative velocity of the *physical, real* source and the observer (*not* by the relative velocity of the *apparent* source and the detector). This is unconventional and would be a novel nature of light.

This is not the case for material waves such as sound waves. Imagine a sound source and a

receiver both on a common platform moving relative to the air. Suppose that the source and receiver are additionally in relative motion on the platform. The Doppler effect in this case is determined not only by the source-receiver relative velocity, but also by the source-receiver common velocity relative to the air. Unconventionally, this is not the case for light. In the past, the Ives-Stilwell experiment has been (wrongly) considered as evidence against absolute motion based on conventional knowledge.

Conclusion

Apparent Source Theory (AST) is a compelling theory that proves absolute motion by successfully explaining many of the conventional light speed experiments that have been in apparent contradiction. On the contrary, no evidence of absolute motion of the Earth has been observed in the Ives-Stilwell and the fast ion beam experiments. This leads to the novel conclusion that, unlike the case of sound waves, absolute velocity does not affect Doppler effect of light. Therefore, absolute velocity has been disentangled from Doppler effect of light, hence eliminating one argument against absolute motion.

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

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