# Was the light speed problem really solved by Einstein in 1905 ?

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## Abstract

I will try to invalidate the theory of relativity by presenting a compelling alternative theory. I hope that criticism of Einstein's theories will not be seen as offense.

## Introduction

I start by arguing that the failure of classical theories of light, ether theory and emission theory, wrongly led to the theory of relativity.One of the fallacious arguments usually presented in favor of relativity is the failure of classical theories and the lack of any competing alternative theory. The argument goes like: if classical theories fail and if no alternative explanation exists, then relativity must be a correct theory. Here I will present a compelling alternative explanation, thereby refuting this argument.

Next I will directly present some of the profound results of the new theoretical framework. A comprehensive presentation of the new theory, which describes the intricate relations of the different features of the nature of light, can be found in my papers at the Vixrasite. Listed below are some of them.

" *Absolute/Relative Motion and the Speed of Light, Electromagnetism, Inertia and Universal Speed Limit c - an Alternative Interpretation and Theoretical Framework* "

" *A New Theoretical Framework of Absolute and Relative Motion, the Speed of Light, Electromagnetism and Gravity* "

*" New Interpretation and Analysis of Michelson-Morley Experiment, Sagnac Effect, and Stellar Aberration by Apparent Source Theory "*

"*The Irrelevance of Abstract Reference Frames in Physics*"

## Einstein's "chasing a beam of light" thought experiment

Einstein correctly discovered his beautiful "chasing a beam of light" thought experiment, but gave it a wrong interpretation, i.e. the relativity of length and time. The new interpretation of constancy of light speed is as follows:

The *phase* velocity of light is always constant relative to the observer , irrespective of source or observer velocity, for uniform or accelerated motion. The *group* velocity of light behaves in a more conventional way: it is independent of source velocity, but varies with observer velocity. Einstein failed to make this distinction and this led to the special theory of relativity.

The constancy of the *phase* velocity of light is a direct consequence of the non-existence of the ether. Physicists were led astray when they tried to 'explain' the constancy of the velocity of light, by proposing the relativity of length and relativity of simultaneity. The phenomenon of constancy of the (phase) velocity of light isto be just accepted because it does not have any explanation for the same reason that there is no explanation for light being a wave when there is no medium for its transmission. Physicists naturally sought to 'explain' the constancy of the speed of light because their thinking was always implicitly based on the ether. Einstein did not truly succeed in eliminating the ether, and Einstein himself never realized this. Few, if any, physicists realize this. The ether always haunted the thinking of the physicists.

Imagine a stationary light source emitting a light pulse and an observer moving directly away from the source at (or near ) the speed of light. The new interpretation of Einstein's thought experiment is that the group will be 'frozen' but the phases will still move past the observer at the speed of light $c$ , relative to the observer.

For the phase velocity of light to be constant not only the frequency but also, unconventionally, the wavelength must change for a moving observer.

$$f\lambda = f'\lambda' = c$$

The change of wavelength for a moving observer is a unique, unconventional nature of light. This makes light distinct from classical waves, such as sound waves.

This should raise a question: then what is the Doppler effect law governing light that can satisfy the above condition ? The classical Doppler effect law obviously fails to satisfy this condition.

## Exponential Doppler Effect law of light

Searching for a function that can satisfy the above condition, I found a new mysterious formula governing the Doppler effect of light.

$$f' = f\, e^{V/c} \text{ and } \quad \lambda' = \lambda\, e^{-V/c}$$ , where *e* is Euler's constant

Now

$$f'\lambda' = f\, e^{V/c}\ \lambda\, e^{-V/c} = f\lambda = c$$

satisfying the constant phase velocity. No conventional formulas containing terms like c ± V can satisfy this condition.

Profoundly, the above formula not only satisfies the constant phase velocity condition, it can also explain the Ives-Stillwell experiment ! By applying Taylor expansion to the exponential function, we get exactly the same result as predicted by special relativity: $\Delta\lambda = \frac{1}{2}\beta^2\lambda$

The derivation can be found in my paper at Vixra:

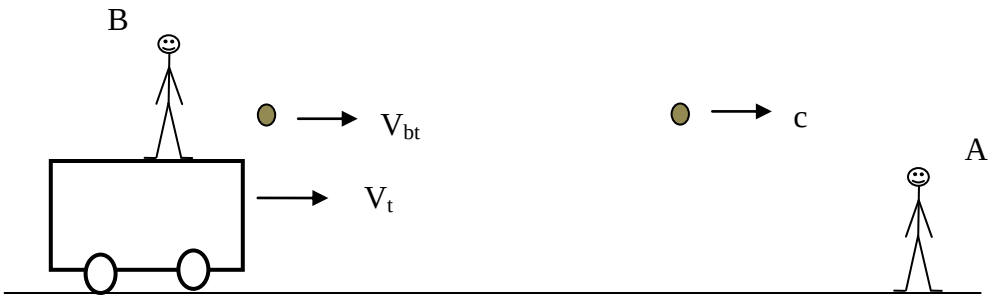
*" Exponential Law of Doppler Effect of Light – an Explanation of Ives-Stilwell Experiment "*

Moreover, the new formula is defined for all values of velocity V: $0 \leq V \leq \infty$ , whereas the relativistic formula (and classical formulas) become undefined for $V \geq c$ . Therefore, the existence of superluminal velocities (as already observed) by itself disproves the relativistic and classical formulas, implying the need for a new law of Doppler effect of light.

## The Michelson- Morley experiment

Let us first see a possible explanation for the Michelson-Morley experiment, as a precursor to the ultimate theory called Apparent Source Theory. This is just to demonstrate that explanations exist that do not require us to invoke length contraction and time dilation.

Consider the following analogy. Consider a stationary observer A and a truck moving relative to A. Another observer B is on the truck, throwing balls towards observer A while the truck is moving relative to A. Suppose the truck ( and observer B ) moves towards observer A with velocity $V_t$ . Suppose that the velocity of the truck is not constant. Let there be a requirement that observer B always adjusts the velocity of the balls *relative to the truck* ( $V_{bt}$ ) so that the velocity of the ball relative to observer A will always be constant *c*, irrespective of the velocity of the truck. In this case, observer B should decrease the velocity of the balls*relative to the truck*in such a way that the velocity of the ball relative to observer A is always constant *c*. In the case of the truck moving away from the observer A, the velocity of the balls relative to the truck should be increased by the right amount.




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

By observing the balls coming from the truck, an observer deduces that the velocity of the balls *relative to the truck* is c - V in the forward direction and c + V in the backward direction.

When the truck is moving towards stationary observer A:

*velocity of light relative to observer A* $= (c - V_{abs}) + V_{abs} = c$

When the truck is moving away from stationary observer A:

*velocity of light relative to observer A* $= (c + V_{abs}) - V_{abs} = c$

Thus, the velocity of the balls relative to observer A is always 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.

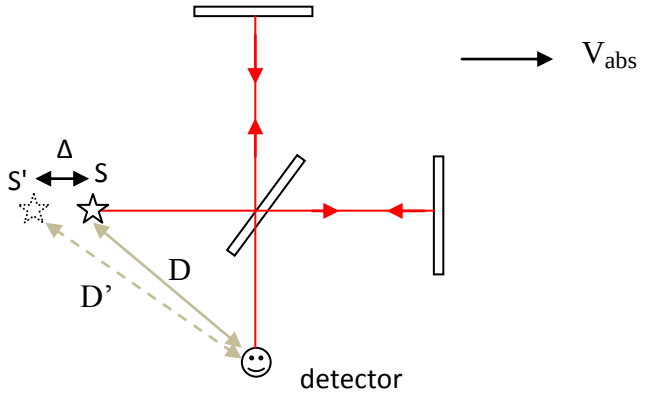
It is now easy to see the null result of the Michelson-Morley experiment ( MMX ) by the modified emission theory above. Modified emission theory is just conventional emission theory in which the velocity of light *relative to the source* depends on the absolute velocity of the source. In the case of the Michelson-Morley experiment, therefore, any change of the speed of light relative to the light source will not cause a fringe shift because both the longitudinal and transverse beams will be affected ( delayed or advanced ) by equal amount. Note that we have not made any reference to the ether in the above theory.

The above theory is just an attempt to present the ultimate theory ( Apparent Source Theory ) in an intuitive way. It is fundamentally not correct.

**Apparent Source Theory**

Now we will see the trick of nature that has eluded physicists for centuries.

Consider the Michelson-Morley experimentshown below.




Apparent Source Theory is formulated as follows.

*The effect of absolute motion for co-moving light source and observer/detector is to create an apparent change in position ( distance and direction ) of the source relative to ( as seen by ) the observer/detector. The apparent change in position of the light source is determined by the source-observer direct distance and the magnitude and direction of absolute velocity.*

The easiest way to understand Apparent Source Theory is to ask a simple question: what is the effect of actually/physically changing the light source position of the Michelson-Morley interferometer (instead of setting it in absolute motion) on the interference fringes ? For example, what is the effect of actually moving the light source slightly backwards (to the left), as shown above, on the interference fringes ? Obviously, there will not be any fringe shift because, intuitively, both the longitudinal and transverse light beams will be affected ( delayed ) identically. There will not be any fringe shift also if the source is slightly moved forward (to the right ) because both light beams will be advanced equally. There will be a small fringe shift for other positions of the source, for example if the source is moved upwards or downwards.

The new interpretation is that an apparent change of source position (caused by absolute motion ) will not create any significant fringe shift ( no fringe shift or a small fringe shift ) for the same reason that an actual/physical change of source position will not createany significant fringe shift. This explains the 'null' result of the Michelson-Morley experiment. This is the subtle nature of light that completely eluded physicists for centuries.

The procedure of analysis of the Michelson-Morley experiment is :

1. Replace the real source by an apparent source

2. Analyze the experiment by assuming that light is emitted from the apparent source position, not from the real source position.

The real source is replaced by an apparent source in order to account for absolute velocity. Once this is done, the experiment is analyzed by assuming that light is emitted from the apparent source and by using elementary geometrical optics. Once we replace the real source with an apparent source, we can assume emission theory, i.e. the speed of light is constant relative to the apparent source.

We re-formulate Apparent Source Theory for the Michelson-Morley (MM )experiment as follows.

1. The effect of absolute motion of the Michelson-Morley interferometer is to create an APPARENT change in light source position relative to the detector
2. This apparent change of source position creates a (small) fringe shift AS IF it is an ACTUAL / physical change of source position.

Small fringe shifts can be produced in the Michelson-Morley experiment in two ways:

1. By setting the Michelson-Morley apparatus in absolute motion
   OR
2. By slightly changing the position of the light source ( 1mm for example ) about its initial position.

The fringe shift for every absolute velocity of the MM apparatus is equal to the fringe shift for a *corresponding*ACTUAL change in source position. For every absolute velocity ( magnitude and direction ), there is a corresponding change in source position that will produce the same fringe shift.

The corresponding change in source position is determined according to the AST procedure. It is determined by the source detector distance, the magnitude and direction of absolute velocity and the orientation of the source detector line with respect to the direction of absolute velocity.

Apparent Source Theory can be seen as a seamless fusion of ether theory and emission theory.

**Relation between constancy of phase velocity and Apparent Source Theory**

The constancy of the phase velocity of light ( and Exponential Doppler Effect theory ) governs the wavelength, frequency and phase velocity of light. Apparent Source Theory governs the phase delay and group delay of light.

**Some of the profound findings of the new theory**

- The ether does not exist but absolute motion does exist. Physicists wrongly concluded that absolute motion didn't exist when they failed to detect the ether. The Michelson-Morley experiment (MMX) was designed to detect the ether and was capable to detect the ether, if the ether existed. The MMX is flawed in that it was designed to detect the non-existent ether. The Michelson-Morley experiment is not fully capable to detect absolute motion. Absolute motion is not motion relative to the ether. Absolute motion is motion relative to all matter in the universe.

- The reference frame concept is wrong and should be eliminated from physics as a paradigm. The true natures of light and electromagnetism always elude the third 'observer' ( the reference frame ). The new definition of observer is the object ( particle, atom or device ) *directly* sensing or detecting light, electromagnetic and gravitational phenomena.

- One of the profound, unexpected findings concerns the phenomenon of stellar aberration. The current, universal understanding is that a telescope needs to be tilted forward in the direction of observer's velocity in order to see the stars. Apparent Source Theory predicts that the telescope should be tilted *backwards*, not forwards !

- The same law governs the Michelson-Morley experiment and the phenomenon of stellar aberration: *apparent change of light source position relative to an absolutely moving observer* ! See my paper at Vixra:

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

- Dual natures of light, electromagnetism and gravity. The speed of electrostatic and gravitational fields has dual nature: infinite and finite ( light speed *c* ) ! Static fields act as if they are both transmitted at the speed of light *c* and instantaneously. Light acts as if it travels both in straight line and in curved path ! For absolutely co-moving light source and observer, light follows curved path if we assume it as coming from the real source, whereas light always follows straight path if we assume it as coming from the *apparent* source. For co-moving charge (mass) and observer, the electric (gravitational) lines of force follow a curved path if we consider the real charge (mass), whereas the electric (gravitational ) lines of force always follow a straight path if we consider the apparent charge (mass).

- Light is not only a local phenomenon, but also a non-local phenomenon. Light is a *dual* phenomenon: local and non-local! All the confusion in physics during the last century is rooted

in considering light like ordinary, local phenomena. The Michelson-Morley experiment was conceived and designed based on such a fallacious view. The special theory of relativity is a mistake built on previous mistakes. If the scientists had not considered light like ordinary local phenomena ( by considering light as an ether wave ), there would have been no need to speculate ' length contraction and time dilation ' .

- There is a fundamentally flawed view of light like ordinary local phenomena, such as the sound wave. If one thinks of a light wave as some objectively existing peaks and troughs fixed out there in space ( although time varying), then one is thinking in terms of the ether. Physicists avoided the word ether, but couldn't avoid thinking in terms of the ether. If one rejects the new theory that wavelength changes for a moving observer, then one is accepting the ether. Special relativity (SRT ) tacitly and wrongly assumes the ether and then applies length contraction and time dilation to make up for that (i.e. to get a null fringe shift of the MM type experiments ). If SRT didn't assume the ether, there would be no fringe shift in the first place and hence no need for length contraction and time dilation.

- The group velocity of light can be seen both as constant and variable. For co-moving light source and observer, for example, the group velocity of light is always constant *c* if we assume that light is emitted from the apparent source position. If we assume that light is emitted from the real/physical source position, the group velocity of light will be variable. However, it is the constant group velocity interpretation that is fundamental.

- Unlike classical fields and waves, *there is no mixing of absolute and relative motion effects in the case of light and electromagnetism*. This is why no absolute motion effect has been observed in the Ives-Stilwell experiments. Einstein's magnet conductor argument against the existence of absolute motion is wrong because magnetism is a relative motion effect, not an absolute motion effect.Weber's electrodynamics is the ultimate law governing electromagnetism, rather than Maxwell's.

- Light speed limit exists, but it is not universal.
1. It applies only to physical objects that have mass. Electrostatic and gravitational fields can be transmitted instantaneously.

2. Even for physical bodies, it applies only locally. A physical body cannot move at superluminal velocities relative to local matter in the universe, but it can move superluminally relative to distant matter in the universe. We know that superluminal galaxies have already been observed.

- The cosmic microwave background radiation may be just Doppler shifted light from receding galaxies.

- Gravity is a difference between electrostatic attraction and repulsion forces. In fact, this idea was first proposed by Michael Faraday. Apparent Source Theory has independently also led to the same conclusion. Gravity is a net electrostatic force and inertia is a net 'magnetic' force.

**Proposed time of flight light speed anisotropy experiment**

Despite the null result of the Michelson-Morley experiment, absolute motion has already been detected in several experiments such as the Silvertooth, the CMBR anisotropy and the Marinov experiments. Many of the 'ether' drift experiments used interference method because of the difficulty of measuring extremely small differences in time of flight and because of the problem of clock-synchronization ( this problem does not existin the new theory).

Here I will propose a novel light speed anisotropy experiment that is based on the time of flight method. The experiment consists of two light transponders, say transponder A and transponder B, each fixed to the two ends of a rigid rod. Each light transponder consists of a light detector unit and a light emitter unit. The light detector, upon detecting a light pulse, triggers the light emitter, which emits a short light pulse.

Suppose that, initially, transponder A is somehow triggered to emit a short light pulse. This pulse is detected by the detector of transponder B, which triggers the emitter of transponder B, which in turn emits a light pulse, which will be detected by the detector of A, which triggers the emitter of A, which emits a light pulse, and so on. The process can continue indefinitely.An electronic counter counts the pulses emitted.

Suppose that the rod is aligned with the direction of absolute velocity of the Earth. Because of light speed anisotropy, light will take more time, say, from A to B than from B to A. The novel feature of this experiment is that it accumulates the extremely small time of flight differences, over several minutes or hours. The number of pulses counted in a given period of time will depend on the orientation of the rod with respect to the direction of Earth's absolute velocity.By using this effect, the direction and magnitude of Earth's absolute velocity can be determined, theoretically, with any desired accuracy.

Conventional time of flight experiments use spatially separated light emitter and light detector. A single pulse is emitted by the emitter and detected by the detector. Because of the extremely small time of flight involved, it is difficult to detect light speed anisotropy by using this method using a single pulse. The new method circumvents this and any clock synchronization problem by using a continuous exchange of a short light pulse between spatially separated transponders, thereby accumulating (integrating ) the small differences in time of flight of light in two directions.

A detailed description of the experiment is found in my paper at Vixra:

*" Proposal for a new light speed anisotropy experiment based on time of flight method by continuous exchange of a short light pulse between two light transponders "*

**Summary**

Two components of a new theoretical framework have been presented:

1. Constant phase velocity and variable group velocity of light.Exponential Doppler Effect law of light

2. Apparent Source Theory

The new theoretical framework can be seen as a seamless fusion of classical and modern theories: ether theory, emission theory and constancy of the speed of light. Apparently contradicting natures co-exist in the phenomena of light, electromagnetism and gravitation. In effect, special relativity and all associated concepts such as Lorentz transformation, time dilation, length contraction ideas have been invalidated.

With respect to Apparent Source Theory, we have seen only the case of inertial motion. Extension of this special case to the general case of accelerating observers, such as in the Sagnac effect, has been a daunting task that took several years to complete.

Thanks to God and Our Lady Virgin Mary

APPENDIX I

I was asked on www.scienceforums.net to formulate the equation of the light wave front for two observers, Observer 1 and Observer 2 .

*https://www.scienceforums.net/topic/120134-a-new-theory-of-motion-and-the-speed-of-light/page/2/#comments*

Observer 1 is located at the origin O of the coordinate system x,y,z,t.

Observer 2 is located at the origin O' of a second coordinate system x',y',z',t'.

As the second system origin O' passes through and is coincident with the first system origin O,

it happens that observer 1 emits a pulse of light.

Observer 1 sees a spherical light front travelling out from his source in all directions and obeying the equation

$x^2 + y^2 + z^2 = c^2t^2$

The question is : what is the light front equation for Observer 2

This was my response.

I will explain the light wave front equation for moving Observer 2 below.

Let a light source and Observer 1 be at the origin O of coordinate system ( x, y, z) . Observer 2 is located at the origin O’ of coordinate system ( x’, y’, z’). +x and +x’ are aligned and parallel.

We assume that Observer 1 is at absolute rest and Observer 2 is moving with (absolute) velocity V in the +x direction in the coordinate system (x, y, z). Any velocity relative to the ( x, y, z ) frame is absolute velocity.

As the second system ( x’, y’ , z’ ) origin O' passes through and is coincident with the first system ( x, y, z ) origin O, it happens that observer 1 emits a pulse of light, at time t = 0.

The problem is to find the equation of the light front as seen by Observer 2.

Let us first consider the problem only in one dimension, (x, y, z ) = (x, 0, 0).

Observer 1 , who is at absolute rest, sees a light front travelling out from his source in the +x and –x directions and obeying the equation:

$$x^2 = c^2t^2 \qquad ( y = z= 0 )$$

To find the equation of the light front as seen by Observer 2 , we consider two observers co-moving with observer 2 , one at x' = +D1 and the other at x' = -D2 . That is, the observer at x' = -D2 is behind Observer 2 ( and behind the source ) and the observer at x' = D1 is in front of Observer 2, with respect to the direction of absolute motion.

We determine the time of detection of light by these observers, from which we get the light front equations as 'seen' by Observer 2.

<u>For the observer at x' = +D1 :</u>

This observer has the same absolute velocity (V) as Observer 2 because both are co-moving. The light source is behind him, with respect to the direction of absolute velocity.

*At the instant of light emission*, the actual/physical distance of the source from this observer is D1.

Apparent Source Theory states that the effect of absolute motion of an inertial observer is to create an apparent change in point of light emission <u>relative to that observer</u>. *The group and phase velocity of light relative to that point and relative to the observer is always equal to c*. This means that once the apparent point of light emission relative to the observer is determined, the experiment is analyzed by assuming that the speed of light is constant relative to that point. Note that we are only considering light coming directly from source to observer.

Therefore, since this observer is in absolute motion and since the source is behind him, the apparent point of light emission will be at a distance of D1' behind him where,

$$D1' = D1\, c / ( c – V )$$

Note that the point of light emission apparently shifts away from the observer because D1' >D1 .

Although light was physically emitted from point x' = 0 , for this observer light behaves as if it was emitted from x' = - Δ = D1 – D1'

It can be shown that:

$$\Delta = D1\, V / ( c –V )$$

The time elapsed for the observer to detect the light pulse is:

$$t = D1' / c = D1 / ( c – V )$$

To get the time elapsed, we divided the apparent distance by the speed of light *c*. We are applying the AST postulate that the velocity of light relative to the observer is always constant *c* , irrespective of absolute or relative motion of the observer. Note that, crucially, *observer* in AST is the *detector* of the light. The observer/detector is the person, device, particle or atom directly detecting the light. This is unlike SRT in which the 'observer' is not necessarily the detector of light. In SRT the 'observer ' is an inertial reference frame. This distinction is crucial.

Therefore, the equation of the light front as 'seen' by Observer 2 ,for any point x' on the positive x' axis , is obtained as follows:

$$t = D1 / ( c - V ) \Rightarrow t = x' / ( c - V ) \Rightarrow x' = ( c - V ) t$$

Note that I have quoted 'seen' above ; I will explain the reason at the end.

<u>For the observer at x' = -D2</u>

This observer also has the same absolute velocity V as Observer 2 . For this observer the light source is in front of him. Even though light was emitted from physical distance D2 in front of him ( from x' = 0 ), light behaves as if it was emitted from distance D2' in front of him, for this observer, where

$$D2' = D2\, c / ( c + V )$$

In this case the point of light emission apparently shifts towards the observer, since D2' < D2 .

Although light was emitted from x' = 0 , it appears for this observer that light was emitted from x' = - Δ , where

$$\Delta = D2 - D2' = D2\ V / ( c + V )$$

Therefore, the time taken by light to be detected by this observer is:

$$t = D2' / c = D2 / ( c + V )$$

From the above equation, the equation of the light front as 'seen' by Observer 2 , for any point x' on the negative x' axis , will be obtained as follows:

$$t = D2 / ( c + V ) \Rightarrow t = - x' / ( c + V ) \Rightarrow x' = - ( c+V ) t$$

<u>Summary :</u>

Therefore, the equation of the light front as seen by Observer 2 will be:

$x' = ( c - V ) t$ ( for $x' > 0$ )

$x' = - ( c + V ) t$ ( for $x' < 0$ )

This means that, in the absolutely moving (x', y' , z' ) frame, an observer behind the light source will detect the light before an observer in front of the source , even if their physical distances from the light

source are equal . As ‘seen’ by Observer 2 , light moves faster in the backward direction relative to the source than in the forward direction, with respect to the direction of absolute motion.

Let us consider the problem again in one dimension, this time for ( x, y, z ) = ( 0, y, 0 ) , i.e. x = z = 0.

Let an observer be at y’ = +D .This means that the line connecting this observer with the source is orthogonal to the direction of absolute velocity. This observer also has the same absolute velocity ( V ) as Observer 2 .

Again, although the physical distance of the source from this observer is equal to D , light behaves as if it is at a distance of D‘ relative to this observer, where :

$$D' = D\,c \,/\, \mathrm{sqrt}\,( c^2 - V^2)$$

In this case, the point of light emission will apparently shift backwards in the –x’ direction. The line connecting the observer and the apparent point of light emission is no more orthogonal to the direction of absolute velocity. That is, although light was physically emitted from point ( x’,y’ ) = ( 0,0), the apparent point of light emission for this observer will be (x’, y’) = (-Δ , 0 ) , where

$\Delta = \mathrm{sqrt}( D'^2 - D^2 ) = D\,V/ \mathrm{sqrt}\,( c^2 - V^2)$

The time taken by light to be detected by the observer will be:

$t = D'/c = D / \mathrm{sqrt}\,( c^2 - V^2)$

From the above equation, the equation of the light front as ‘seen’ by Observer 2 is obtained as follows:

$t = D / \mathrm{sqrt}\,( c^2 - V^2) \;\Rightarrow\; t = y' / \mathrm{sqrt}\,( c^2 - V^2) \;\Rightarrow\; y' = ( \mathrm{sqrt}\,( c^2 - V^2) )\; t$

Due to symmetry, the result is the same for an observer at y‘ = -D. The light front equation for an observer on the negative y’ axis will be:

$y' = - ( \mathrm{sqrt}\,( c^2 - V^2) )\; t$

According to AST the light wave front is no more spherical as ‘seen’ by absolutely moving Observer 2. Spherical wave front can be ‘seen’ only by an observer at absolute rest.

From Studiot’s question, I think SRT requires that the wave front ‘seen’ by Observer 2 is also spherical , as for Observer 1 , because SRT postulates that the velocity of light in all inertial frames is constant *c*.

We have considered one dimensional problem only, to explain the distinction between AST and SRT. The general equation for the light wave front in two or three dimensions is a bit involved but can be derived by using the AST procedure.

Crucial difference between AST and SRT.

According to SRT, the velocity of light is the same constant *c* in all inertial reference frames.

According to AST, the (apparent) velocity of light is constant relative to all inertial *observers*.

In AST , unlike SRT , an *observer* is the person, device, particle, atom, e.t.c directly *detecting* the light !

In SRT , the observer is the reference frame.

In AST , the velocity ( both phase and group ) of light is always constant relative to all inertial observers.

According to AST , the velocity of light in an absolutely moving reference frame is not constant ! But the (apparent) velocity of light relative to all inertial *observers* ( light detectors) is alwaysconstant , whether they are in absolute or relative motion or not.

Therefore, since the reference frame ( x', y' , z' ) above is in absolute motion, only light coming to Observer 2 (to the origin O' ) has constant (apparent) velocity.

The reference frame concept is deeply flawed and is the source of all confusions regarding the problem of motion and the speed of light in physics during the past century. It is the reference frame approach that predicted a large fringe shift for the Michelson-Morley experiment, leading to length contraction and time dilation theory. Reference frames can be used accurately enough as an approximation. For example, they are used in classical physics, such as in Newton's laws of motion and gravitation. The reference frame paradigm ( including the absolute reference frame) is fundamentally wrong and cannot be used to formulate the most fundamental laws of nature, such as in light and electromagnetism and gravity. Light, electromagnetism and gravitation phenomena are so subtle that their real nature simply eludes the 'third' observer, that is the reference frame.

The reference frame concept should be replaced by Apparent Source Theory.

Please kindly read my paper on Vixra:

*The irrelevance of abstract reference frames in physics*

**APPENDIX 2**

Let there be a light source S and an observer O at distance D from S. Both S and O are at rest, so there is no relative motion.

The source emits a light wave

$$A \sin \omega t$$

Observer O sees

$$A' \sin \omega (t - D/c)$$

The wave equation will be:

$$- A' \sin ( Kx - \omega t)$$

Let there be another observer O' who is at the same point as O at the instant of light emission, but moving with relative velocity *V* away from the source. In this case the absolute velocity of O' is the same as the relative velocity *V*.

$$V_{abs} = V$$

The question is : what is the wave seen by O' ?

Since O' is in absolute motion, according to AST, there will be an apparent change in the point of light emission ( in other words, an apparent change of past position of the source) relative to (as seen by) O' . The distance of the apparent source from O' is:

$$D' = D c / ( c - V_{abs} )$$

Also, since O' is in motion relative to the source, there will be Doppler effect.

$$f' = f e^{-V/c}$$ ( *e* is Euler's constant, *e* is base, -*V/c* is exponent)

Now the wave seen by O' will be :

$$A'' \sin \omega' (t - D'/c)$$

$$= A'' \sin (\omega' t - \omega' D'/ c)$$

$$= A'' \sin (\omega' t - K' D' )$$

where

$$\omega' = \omega\, e\, (-V/c)\ ,\ \omega = 2\pi f\ ,\ K' = K\, e^{-V/c}$$

$$K' = 2\pi / \lambda'$$

Remember that, in this case :

$$\lambda' = \lambda * e^{V/c} \quad \text{and}$$

$$f' = f\, e^{-V/c}$$

The virtual wave equation for observer O' will be :

$$-A'' \sin (K' x' - \omega' t)$$

where x' is relative to the apparent source. It can be seen that the virtual phase velocity and the virtual group velocity are both equal to *c*.

Therefore, for the case of $D = 0$ (the problem you asked me to solve) , $D' = 0$ and observer O' will see :

$$A'' \sin (\omega' t - K' D') = A'' \sin \omega' t$$

whereas the light emitted by the source (as seen by an observer close to the source and at rest relative to the source) is:

$$A \sin \omega t$$

$A$, $A'$ and $A''$ can be assumed to be equal for this discussion.

The amplitude $A$ is a function of time. For example, $A$ can be a square or a Gaussian pulse.

$$A = A(t)$$