A novel solution to the century old light speed paradox; divorce of the light speed postulate from special relativity

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Abstract

From elementary algebra and common sense, we know that $C + V \neq C$, given that V is different from zero. Yet we have lived with one of the daunting paradoxes in the history of science "$C + V = C$", for more than one hundred years, where C is the speed of light and V is the velocity of an observer relative to the source. All known experiments, including those performed to disprove it, confirmed it.

Over a period of one hundred years, the scientific community has exhausted on three theories to resolve this paradox: the ether theory, the emission theory and special relativity. The former two have long been discarded decisively.

The majority of the scientific community assumes that this paradox has already been resolved by special relativity. Yet scientists outside the mainstream have always realized that relativity is not a true theory of nature, and thus looking back to the long rejected ether and emission theories in despair. Relativity has remained counterintuitive since its inception and has resulted in many unsolved paradoxes, producing many more paradoxes than it solved.

The scientific community has been stuck in relativity for over a century because of three factors: 1. The lack of any alternative theory that could explain the long standing problems of reference frames and solve the light speed paradox and the apparent success of special relativity in solving these paradoxes 2. The subtly unquestioned (yet false) bond between special relativity and the light postulate, which made relativity undefeatable 3. And the firm experimental foundation of the light (the second) postulate. Because of the perceived (and stated) link between the light postulate and special relativity, most attempts to disprove relativity focused on disproving the light postulate, and hence failed. No one ever thought of the possibility that the light postulate could be correct and relativity wrong. The internal link between the light postulate and special relativity has been shielded from inspection because of three factors. The first factor was that special relativity has always been perceived (and stated) as a logical consequence of the light postulate. The second factor was the apparent success of special relativity in resolving the existing

paradoxes. The third factor was that Einstein's light postulate and his special relativity theory were publicized simultaneously, in a single paper and by the same person Einstein. Therefore, a scientist who disliked relativity automatically rejected the light postulate also, which made attack on special relativity insurmountable. This paper introduces a new way to resolve the light speed paradox and hence divorcing Einstein's light postulate from his theory of special relativity. The absolute constancy of the speed of light is only a mysterious nature of light (electromagnetism) and is not due to the fancy of relativity of space and time. Here is the most striking discovery in this paper: Doppler effect AND the postulate of the absolute constancy of the speed of light result in the new theory being proposed in this paper!

Introduction

From elementary algebra we know that $C + V \neq C$, given that V is different from zero. Yet we have lived with the paradox "$C + V = C$" for more than one hundred years, where C is the speed of light and V is the velocity of an observer relative to the source. Many attempts and experiments have been made by scientists to disprove this equality; yet all experiments, including those performed by themselves, confirmed it. Not a single experiment so far showed any dependence of the speed of light on the speed of its source.

Over a period of more than one hundred years, the scientific community has exhausted on three theories to resolve this paradox: the ether theory, the emission theory and special relativity. The former two have long been discarded decisively, but many scientists today are looking back to them in despair because Einstein's relativity has remained counterintuitive and has been a source of many unsolved paradoxes. Despite this, relativity has remained the mainstream science todate because the majority of the scientific community assumes that the light paradox has already been resolved by special relativity.

Many attempts and experiments that had been performed to disprove relativity had failed to disprove it. Why did they fail?
In the next sections the reasons for these failures will be discussed and a new theory that will resolve the light paradox and hence divorce the light postulate from special relativity will be presented.

Discussion

As we know, the whole story of relativity theory begins with the light speed paradox,
"relative to what is the speed of light equal to C ? " .
Einstein's solution was, correctly, the light postulate:
" the speed of light must be the same for all observers"
Then, logically, he asked:
" how can the speed of light be the same for all observers ? "
To this problem, his hypothesis was, wrongly:
"space and time must be relative", then jumping to
"not only space and time but also mass must be relative"

Therefore, the theory we now know as special relativity is a bond between the light postulate and the speculation of relativity of mass, length and time.

The scientific community has been stuck in Einstein's relativity because of two factors:

1. There has been no alternative theory that could explain the long standing problems of reference frames and solve the light speed paradox
2. Einstein's relativity was bonded to his postulate of the absolute constancy of the speed of light, which has been confirmed repeatedly by the many well known experiments. It was this false (but subtly unquestioned) bond between the two that made Einstein's relativity undefeatable.

The light postulate has always been perceived as an inseparable part of special relativity theory because

1. Special relativity (relativity of mass, length and time) was historically an immediate consequence of the light postulate (and of course of the first postulate). It has always been perceived to be its logical consequence also.
2. Special relativity solved the existing paradoxes with apparent success
3. Both were publicized in a single paper, simultaneously, and by the same person Einstein.

Therefore, no one thought of the possibility that part of Einstein's proposal could be right (the light postulate) and part of it wrong (relativity of mass, length and time). Proponents of relativity accepted both with no attention to the internal consistency of the theory and anti-relativists rejected both without considering the possibility that the light postulate could be correct, despite the many experiments confirming it.

Thus no one questioned the internal link within the theory.
(One can guess that if the light postulate was proposed earlier than special relativity, perhaps by another scientist other than Einstein, this link would have been subjected to examination and special relativity might have been rejected early. But proposal of the light postulate in isolation without stating its implication might be thought of as unrealistic)

Once Einstein proposed his radical special relativity theory (as consisting of the two postulates and the relativity of mass, length and time), the theory diverted the attention of the physics community to itself and it became the subject of physics, whether by acceptance or by rejection.
Before Einstein's proposal the physics community worked on the puzzle:
" if the speed of light is C (as in Maxwell's equation), relative to what is it constant "
Once Einstein proposed his relativity theory (the two postulates and relativity of mass, length and time) as a solution to this puzzle and the existing problem of reference frames, the majority of the physics community never raised this puzzle again. This was because, for those who accepted special relativity, the light postulate solved it (of course correctly), but those who rejected special relativity rather worked on how relativity could be wrong or on the already existing emission or the ether theories. They rejected the light postulate, not only because it was counterintuitive but mainly because of its immediate perceived (and stated) implication: special relativity. Thus the link between the light postulate and special relativity was shielded from inspection in a subtle manner, making it unlikely for anyone to think of divorcing the two.

If the anti-relativist physics community restarted working on the original light speed puzzle (" relative to what is the speed of light constant ?"), by rejecting all of Einstein's proposals, they could have rediscovered the correct light postulate already proposed by Einstein, but then this would have been again perceived as the confirmation of relativity because the light postulate and special relativity were always perceived as one. The whole scenario was such that it was almost unlikely to accept the light postulate and reject relativity, or to reject the whole theory (the two postulates and special relativity) and restart working on the original light speed puzzle and make any progress, because of the trap of relativity. Thus Einstein gave us his correct and crucial light speed postulate by which we were bound to accept his wrong relativity theory for a whole century.

Thus most of the attempts to disprove relativity (relativity of space, time, mass, . . .) focused on disproving the light postulate because it has always been perceived as one of the two pillars of special relativity. But the firm experimental foundation of the light postulate made attack on relativity difficult. Therefore, all those attempts that were made to disprove relativity by rejecting the light postulate followed the wrong strategy. The light postulate has been the single crucial part of relativity which kept the whole relativity theory (both special and general) in science for over a century. Relativity has no other intuitive or observational basis todate.

Therefore, it seems that, after Einstein's proposal the course of physics during the last century was almost unavoidable.

Einstein's relativity is a false theory married to his correct light speed postulate. The absolute constancy of the speed of light is a correct hypothesis, but everything which was derived from it, including the relativity of space, time and mass, and the equivalence of mass and energy, the curvature of space-time, the four dimensions, etc are all wrong. Note that the conclusion "nothing moves at or above the speed of light" is also false. Therefore, from the whole theory of Einstein's relativity, the postulate of the absolute constancy of the speed of light is the only part we retain in this paper. Regarding the first postulate, I have discussed on my other papers [1].

I was one of those who disliked Einstein's relativity because of its counter intuitive nature. I have been swinging between the three theories (with emission theory by far the most favoured and relativity by far the least), shifting from one theory to the other as I always hit the wall in one theory. I followed the same wrong strategy of attacking the light speed postulate and finally gave up, accepting the absolute speed of light postulate after a tremendous resistance and after reading the many historical experiments [2] which always confirmed it , with the results of those known experiments giving me repeated blows on my resistance to the light postulate. After a break of despair, I came across an idea that finally led me to develop the theory presented in this paper and to follow the strategy of divorcing the light speed postulate from the theory of relativity of length, time and mass.

Therefore, accepting of Einstein's light speed postulate AND rejecting special relativity were the crucial steps in the development of the new theory proposed in this paper. The crucial question was : ***how else*** can the absolute constancy of the speed of light be explained ?

The new solution

The solution proposed in this paper is an apparently counterintuitive mystery of nature of light, but which is strikingly consistent with our existing knowledge : the Doppler effect and the absolute constancy of the speed of light.

We start by accepting Einstein's crucial light postulate as the correct solution to the light speed paradox.

The speed of light is the same for all observers moving relative to each other.

Then how else can the absolute constancy of the speed of light be explained? How can two observers moving relative to each other measure the same speed of the *same* light beam?

While working on this puzzle, I got an intuitive hint which was key to arrive at the new solution to the paradox : *no two observers moving relative to each other observe the same beam in the same way.*

So we see a subtle wrong assumption in the above question:

'. . . two observers . . . ***same*** light beam '.

If the two observers observe the same light beam differently, there may be some possibility to solve the paradox. Observing the same speed of the same beam in the same way is counterintuitive.

At least we can intuitively think that the wave will appear to be either spread over a larger space or be compressed into a smaller space as we move away or move towards the source respectively. Doppler effect supports this view! Now it is this idea that we have to develop.

Starting from this idea how can we solve the paradox? After repeated trials I arrived at the following simple solution.

Imagine (Fig.1) a light (or electromagnetic) source S emitting light pulses, and two observers, observer O and observer P at the same point (X=O=P) on the X-axis at t = 0. Both points O and P are the same point on the X-axis (they are named differently only for convenience). Suppose that at this instant (t=0) observer O is at rest relative to the source and observer P is moving with velocity V towards the source.

The new theory proposed in this paper states that the two observers O and P will not observe the same light beam in the same way. Observer O observes the red wave and observer P observes the blue spatially compressed wave.

The red diagram shown is the spatial distribution of the wave at an instant of time as observed by the stationary observer O (i. e the "snapshot" of the wave in space as taken by the stationary observer O, at an instant of time), the blue diagram is the wave as observed by observer P as he/she is moving towards the source with velocity V and the purple diagram is the wave as observed by observer P as he is moving away from the source with velocity V. The orange wave is the wave as observed by an observer R at point R (X=R=Q) moving towards the source with velocity V1.

We can obtain the diagram of the blue wave by compressing the red wave towards the source by fixing the end point of the red wave at the source.
Therefore, the wave just gets compressed *back to its source*, as observed by the moving observer P, with its end point at the source fixed.
Thus, peak point A on the red wave for observer O corresponds to peak point A' on the blue wave for observer P.
At $t = 0$, both observers O and P are at the same point (X=O=P) on the x-axis, but observer P is moving with velocity V to the left at this instant. Suppose that the light (EM) source is emitting the peak point A on the red wave at $t = 0$ as observed by observer O. After a delay of time ΔT, the peak point A will arrive and be observed by observer O.
During the same interval of time (ΔT) that the pulse travels from the source to point O (observer O), observer P would have advanced to the left by an amount ($V.\Delta T$), to meet the corresponding peak point A' on the blue wave, which lags behind point A on the red wave, by an amount ($V.\Delta T$).

After a delay of ΔT (at $t = \Delta T$), observer O (at X=O) observes peak point A and observer P (at X=P') observes the corresponding point A' . Thus points A and A' are observed by observer O and observer P respectively, ***simultaneously*!** Even though observer O and observer P are at different locations, they observe points A and A' simultaneously.
Although slightly counter intuitive, this should not cause us much trouble because the two observers are not observing the same form of the light pulse afterall.

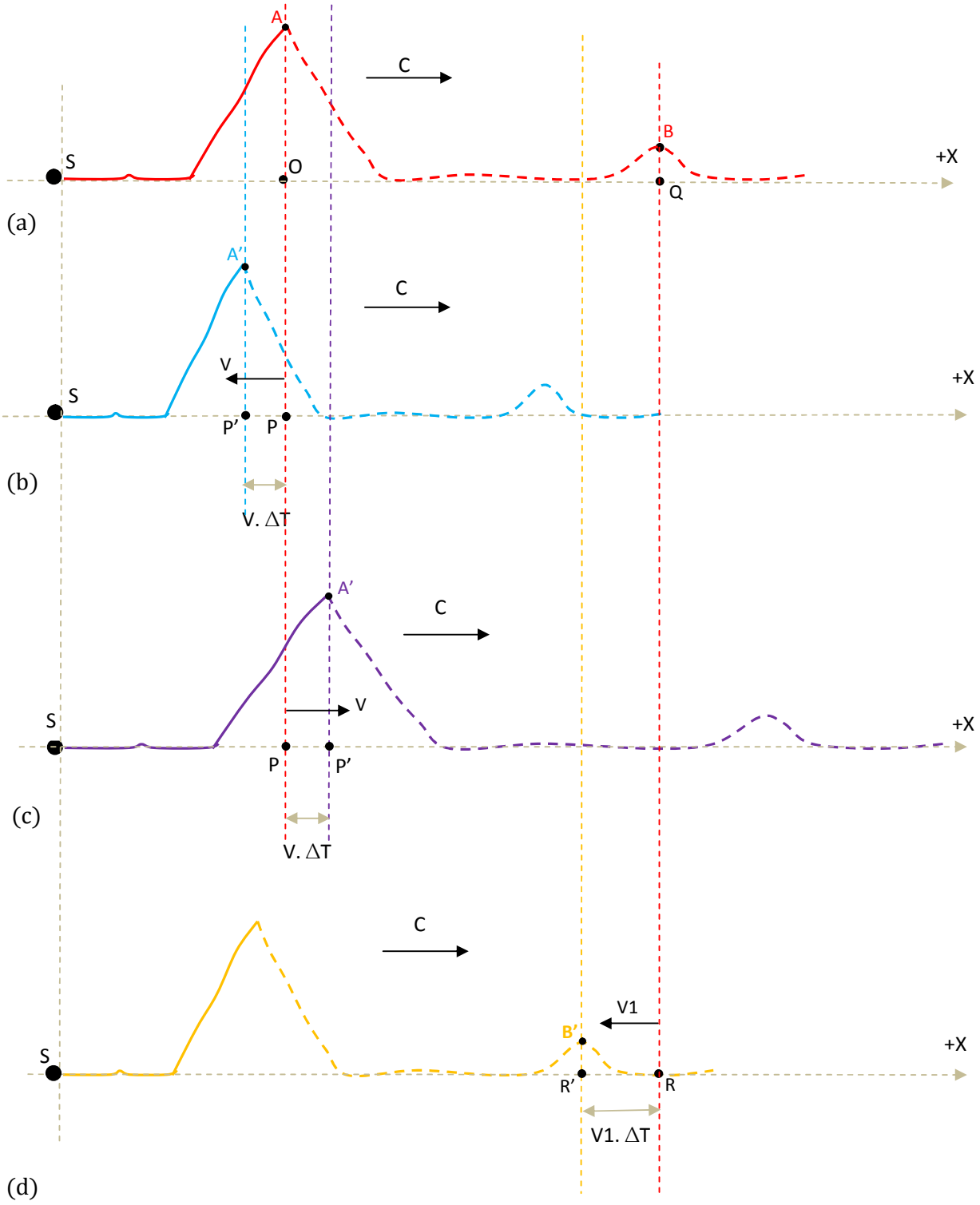

Fig. 1

Therefore, **even if P is moving towards the source with velocity V, he/she will not observe peak point A' earlier than O observes the corresponding peak point A !**
Observer O and observer P observe peak points A and A' respectively, at different points X=O and X=P ' respectively, simultaneously ! ***Thus both observers observe the velocity of light to be the same!***
This satisfies the requirement of the light postulate.

The amount by which the wave gets compressed back to the source (as observed by observer P) depends on the velocity V of the observer P and on the delay ΔT, and is equal to $(V.\Delta T)$. Note that ΔT always means the time it takes a point on the wave to travel from the source to the observer.

If different observers are moving towards the source with different velocities, each moving observer observes different (differently compressed) forms of the red wave. Here the red wave is the wave an observer at rest relative to the source observes and this wave is always the wave we compress (or expand) to obtain what any moving observer observers. Two moving observers observe the same wave only if they are moving with the same velocity. Each moving observer observes 'his/her' wave which depends on his/her velocity. For example, assume a stationary observer Q at X=Q and another observer R at the same location (X=R=Q) moving with some velocity V1 towards the source at point R (Fig.1d), at some instant of time t_o. Observer Q observes the red wave and observer R observes the orange wave (*not the blue wave that observer P is observing*). What observer R observes after a delay of time ΔT (at $t = t_o + \Delta T$), at X=R', can be obtained, as before, by calculating $V.\Delta T$ and compressing the red wave back to the source by this amount, where ΔT is the time delay of point B on the red wave to travel from the source to the stationary observer Q. Thus at the same instant that observer Q observes point B (at X=Q), observer R observes point B' (at X=R'). This is just to stress that each observer observes only 'his/her' wave.

For the case of an observer receding away from the source (Fig. 1c), the wave just expands spatially away from the source (i. e with its end point at the source fixed), as observed by the moving observer P. In this case, as observer P is moving to the right with velocity V, in the same direction as the wave, he observes the purple wave (an expanded form of the red wave that the stationary observer O is observing).

As before, assume that at t=0 both observers O and P are at the same location (X=O=P), but observer P is moving away from the source with velocity V at this instant of time (t = 0). Suppose that at the same time t = 0 the source radiates the

peak point A on the red wave as observed by observer O. The peak point A will be observed by O after some time delay ΔT. During this time, observer P will have advanced to the right by a distance of $(V.\Delta T)$ (Fig. 1c), where he/she meets (observes) the corresponding point A' on the purple wave.
Therefore, as before, although P is moving in the same direction as the wave, ***he will not observe peak point A' later than O observes point A, and both observe points A and A' respectively, simultaneously,***. In this case also ***observers O and P observe the same speed of the light beam.***

The correctness of this new theory

The new theory = Doppler effect + absolute constancy of the speed of light

Doppler effect AND the absolute constancy of the speed of light demand that observer O and observer P observe points A and A', respectively, simultaneously !

This proves the correctness of this theory.

Conclusion

If the theory proposed in this paper proves to be correct, it will change the course of physics during the last century, and this will be deeply impressive.
I believe the discovery of this theory is a divine revelation; I believe to think of a possibility other than the three theories (the emission, the ether and special relativity) is almost impossible otherwise. Always thanks to God and His Mother, Our Lady Saint Virgin Mary.

References

1.
2.

Acknowledgments

I admire and thank all those who have performed their well known, historical and rigorous experiments that always confirmed the constancy of the speed of light.