

## The Proof Of (C+V) , (C-V) VELOCITY OF LIGHT IS RELATIVE

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### INTRODUCTION

The data obtained from GPS (GLOBAL POSITIONING SYSTEM), a very comprehensive satellite communication project developed by United States of America, has clearly demonstrated that light may travel with  $(c+v)$  and  $(c-v)$  velocities. It would be incorrect to consider that this experimental result obtained from GPS project makes the two physics postulates of Albert Einstein discussible. These postulates are the basis of modern physics and are extremely strong and binding with respect to physics laws.

Alice Law accommodates these two postulates, expresses easily that the light travels with  $(c+v)$  and  $(c-v)$  velocity and strongly protects these two postulates on which its own proof of existence is based. Alice Law is a new physics law. Proof of existence for this new physics law is presented on this page.

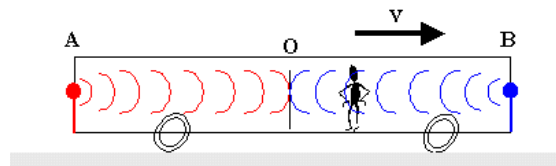
### EXPERIMENT 1

#### TWO PHYSICS POSTULATES OF ALBERT EINSTEIN

Proof of existence for Alice Law is completely based on the two postulates of Albert Einstein. We disclose the development of proof depending on these postulates.

**EXPERIMENT 1 :** There is a box covered from all sides and a man inside of it. The box moves while the man is sleeping. It moves on a straight direction with constant velocity. The box was made in such a way that it does not produce any noise and shake that reveal its movement. The man does not understand that the box is moving when he wakes up. The objective of the experiment is just this. Man should not know whether the box is moving or not moving.

Man starts his experiment. He marks the centre point (point O) of the box. He emits two lights from points A and B which represent the front and back sides of the box at the same time and measures the time they arrive in point "O". Both lights arrive in point "O" at the same time.



Reference Figure

Man writes down the result of his experiment:

**MEASUREMENT 1 :** For the experiment I made in the box, I measured the velocity of light as "c". The lights I emitted from points "A" and "B" simultaneously, arrived in point "O" simultaneously. The result I obtained within the box is identical with the results of measurement I made outside.

The event illustrated above, is the first postulate of Albert Einstein. The first postulate is as follows:

**Principle of Relativity: The same laws of electrodynamics and optics will be valid for all frames of reference for which the equations of mechanics hold good.**

We will develop this event in all we will explain below. **The result of measurement obtained by the man inside the box, is referred as "MEASUREMENT 1" since it constitutes a reference point for proof of Alice Law.**

Man notifies the results he obtained within the box to his friend outside via phone and says; "With the experiments I made in the inactive environment, I found the velocity of light as "c". This value is identical with the one I measured outside". His friend replies that "The box where you are, is not inactive. It travels with a constant velocity and on a straight direction."

Man in the box got surprised when he learned that the box was moving. He is sure that he made the experiments accurately. However there is a strange state that he can not explain. If the box is moving, the lights emitted from the points A and B simultaneously, should arrive in the centre of the box at different times. But this was not the case. Man does not believe his friend due to his trust in the results of the experiment but he has suspicions. He opens a big window on the wall of the box and sees that the box is actually moving. Then he decides to repeat his experiment. But this time, before he starts the experiment he opens a number of windows on the walls of the box. Then he repeats his experiment perfectly while the box is moving. He obtains the same results with his first experiment.

Man writes down the result he obtains:

"The velocity of propagation of light in the box, is independent of the velocity of box. Additionally, inside or outside of box is irrelevant for our case since that opening a number of windows on the walls of box had no effect on the result. Consequently, I

can say that the velocity of light is independent of the velocity of objects."

Postulate 2, presented by Einstein:

**Universal Velocity of Light: The light is always propagated in empty space with a definite velocity  $c$  which is independent of the state of motion of the emitting body.**

## EXPERIMENT 2

### THE PROVING OF ALICE LAW $(c+v)$ , $(c-v)$

It is impossible to change the result as shown by this theoretical experiment. Theoretical experiment is made assuming the centre points of both boxes as reference points. Therefore, putting forward the length contraction of objects does not change the result arisen due to equal velocities of boxes.

Problem has arisen in this way: There are two identical boxes in all respects, with a man inside of each. There are also small holes in the front and back parts of the boxes through which light may enter.

1) Both boxes approximate to each other with EQUAL VELOCITIES from opposite directions and a light beam approximates each box from its back. (Figure 1)

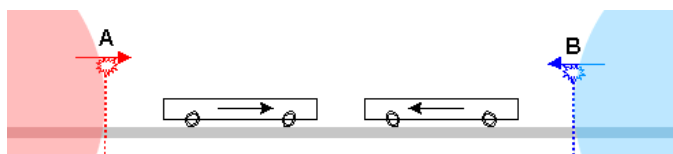


Figure 1

2) Let's assume that, the arrival time of lights beams to the back side of boxes are when the centre points ( $O$  and  $O'$ ) of boxes intersect while boxes pass side by side. That is, when the light beam  $B$  enters into box from behind, the other light beam  $A$  approximating from the opposite direction, enters the same box from the front. This is relevant for the other box. (Figure 2).

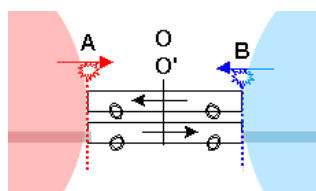


Figure 2

(In reality, the condition in Figure 2, can never be met. But the way the problem is presented, is sufficient to lead us to a conclusion. The reason why the condition in Figure 2 can never be met, is again included in the result of this theoretical experiment.)

## RESULTS OF EXPERIMENT

We may logically think about the picture of the lights in the boxes as follows:

When the light entering from the front part of boxes reaches behind boxes, the lights entering from the back parts of boxes, have not reached their front parts yet. (Figure 3)

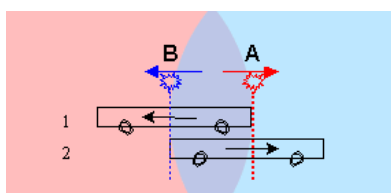


Figure 3

But physics laws tell us, this opinion does not reflect the truth of nature, because due to MEASUREMENT 1, if the men in the boxes determine that two lights enter from back and front holes at the same time, the lights must arrive other part of the boxes at the same time. (Evidence: Reference Figure)

Let us illustrate the events occurring upon arrival of lights in boxes, with figures.

Lights arrive in boxes. Both men determine the lights entering from back and front part of their boxes simultaneously (Figure 4 - 1)

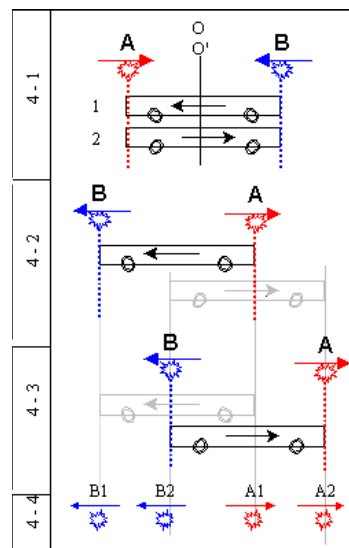
While lights travel within the boxes, the boxes move on their travel directions.

Due to MEASUREMENT 1, the man in box 1, determines that the lights entering into the box simultaneously, arrive in the opposite side of the box simultaneously. (Figure 4 - 2).

Due to MEASUREMENT 1, the man in box 2, determines that the lights entering into the box simultaneously, arrive in the opposite side of box simultaneously (Figure 4 -3).

RESULT : As it is seen, when we consider the positions of both boxes in space, the same light beam is in two different places in space (Figure 4 - 4)

Due to Measurement 1 since observations by both men are correct, there should be a valid reason correcting both cases. The hint giving us solution for  $(c+v)$   $(c-v)$  which we seek and want to see, is here.



Figur 4-1, 4-2, 4-3, 4-4

### COMPLETING THE PROOF

In this theoretical experiment, it is not possible to claim that the result of experiment is wrong based on the Special Relativity.

1) For a single box, the condition of figure 2 is always satisfied.

2) Let us define front and back parts of both boxes as A', A'' and B', B''. Even if we assume that there exists length contraction in both boxes, it must be equal for both. When O and O' intersect, A' and A'', B' and B'' will intersect, too. (Figure 5)

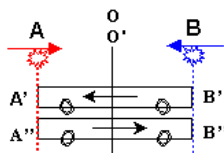


Figure 5

3) If for the condition of "Figure 5", any man in the boxes, has perceived the lights at the space positions of A and B, the other man can not perceive these lights due to Special Relativity (Let's remember the famous train example of Albert Einstein). Relative to the latter man, the lights are not at space positions of A and B.

4) If both men in boxes have perceived the lights, the boxes can not be at the same space position in movement direction due to Special Relativity. We reach the same conclusion here. The lights are at different space positions for each man.

5) If it is claimed that length contraction will not be same for both boxes (in other words, although both are moving, one of the boxes is assumed as nonmoving reference system), we have a situation as expressed in Figure 6 since the condition of figure 2 was met for one box. The question in here is: Which man has perceived the lights? In this case, lights are at different space positions for two men if one or even both men perceived them. (Figure 6)

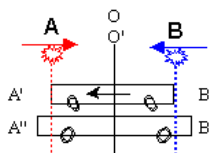


Figure 6

As it is seen, it is impossible to change the result brought by Experiment 2, based on Special Relativity. **Thus we have proven that a light beam can exist at different space positions at the same time. This proof has brought a basis for explanation of  $(c+v)$ ,  $(c-v)$ .**

### EXPERIMENT 2 (CONTINUE)

#### ACTUAL CASE IN NATURE $(c+v)$ , $(c-v)$

Procedure of Experiment: There are two boxes which are identical in all respects. There is one hole on the front and back parts of each box through which light may pass and an observer in each boxes. They move toward each other with constant and equal velocity. When centre points of the boxes come to the same line (point O), two light sources A and B with equal distance from point O are emitted (Figure 7).

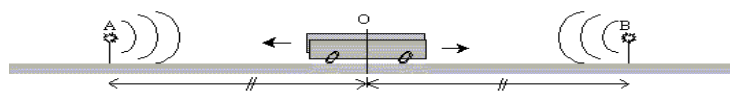


Figure 7

For both boxes, the event develops as shown in the figure below: Graph is a position-time graph and represents the only case which satisfies all conditions of both postulates. (Figure 8)

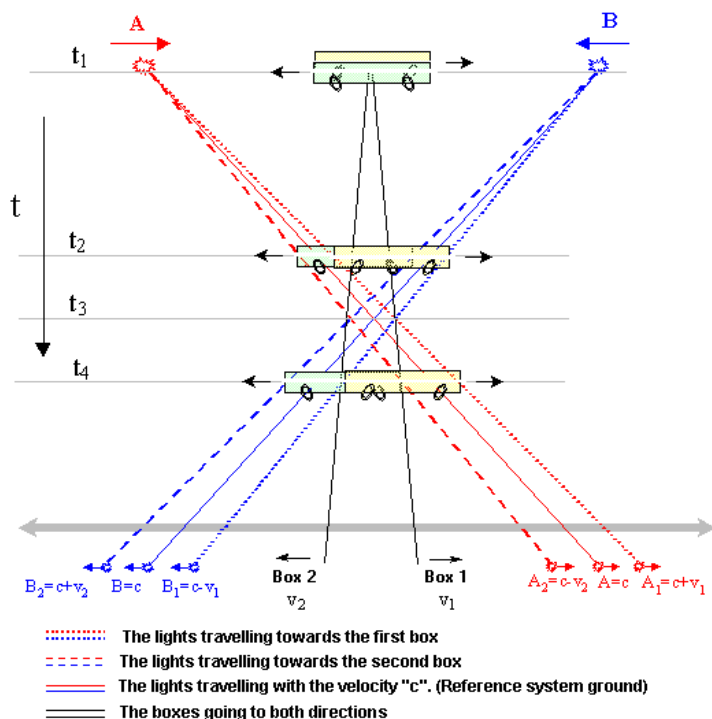


Figure 8

Development of events:

t1 - When centre points of boxes come to same line, light sources A, B are emitted at the same time.

t2 - Lights arrive the front and back parts of boxes at the same time. At this time, positions of boxes in space are different. Observers inside of boxes, determine the lights entering into boxes from front and back parts at the same time.

t3 - The lights arrive in the centre points of the boxes at the same time.

t4 - Lights arrive in opposite parts of boxes at the same time.

The proof of existence of Alice Law is the confirmation of Postulates 1 and 2. Both men measure the velocity of light as "c" in their boxes. In addition, if both men in the boxes will see both lights at the same time, there is only one alternative for emitting time of lights. When the centre points of boxes come to the same line (point O), two light sources A and B with equal distance from point O must be emitted. The outcome is (c+v),(c-v).

Experiment 2 is the proof of existence of Alice Law.

There is (c+v) (c-v) in the nature.

Velocity of light is RELATIVE.

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You can find many new articles about  $(c+v)(c-v)$  mathematics at [aliceinphysics.com](http://aliceinphysics.com) which are not placed in Alice Law version 5. In addition, Alice Law version 6 is launched since October 2009 (book format. pdf file).

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Paul Marmet, Professor, Physics, Laval University, Québec, Canada 1962-83, Senior Research Officer, National Research Council of Canada 1983-90

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H. Muller [1,2], S. Herrmann [1,2], C. Braxmaier [3], S. Schiller [4], A. Peters [1]

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**Alice Law Version 7 has been published (May 7, 2012)**

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