

Communication Tool with Infinite Speed? Possible!

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Abstract

Idea about communication tool that transmits information with infinite speed follows rules of the Complementary Special Relativity Theory (CSRT). This theory is derived from Einstein's Special Relativity Theory (SRT) using of the criterion of logical independence of its postulates.

In this article we show that the communication with infinite speed is possible, no matter how the idea sounds strange. Since the CSRT is really simple, the reader needn't to study articles listed in references because every essential attributes, postulates and rules can be found in this paper. On the other side, our previous articles on the CSRT show several successful and unexpected application on issues where the SRT fails [1]. For example at the case of the so-called Pioneer spacecraft acceleration [3] or in the case of Opera experiment and neutrinos time of flight [2].

Essential attributes of the CSRT

- Every mass body absorbs electromagnetic radiation – waves or photons - by the speed “c” regardless relative motion between source and receiver. For better understanding we can modify this statement by this way: Every electromagnetic wave, which will be in future absorbed by a mass body (receiver), approaches to this receiver by speed c . This is verified fact. What we cannot hitherto verify directly, is the one-way speed of light as it is seen by the observer in frame of reference “Source”. That is why we establish the one-way speed of electromagnetic waves axiomatically:
- If, in the reference frame of the receiver, the source is moving away with velocity \vec{v} with its norm v , at the angle θ relative to the direction from source to the receiver at the time when an electromagnetic signal is emitted, its speed as seen by observer attached to the source S is $u = \sqrt{c^2 + v^2 - 2cv \cos \theta}$. It means that the coordinate time intervals $\Delta t'$ and Δt for light overcoming the distance from the source S to the receiver R, assigned to observers attached to the source and receiver, respectively, are equal, i.e. $\Delta t = \Delta t'$. The speed c is universal constant in other meaning than it is in Einstein's Special Relativity Theory (SRT).

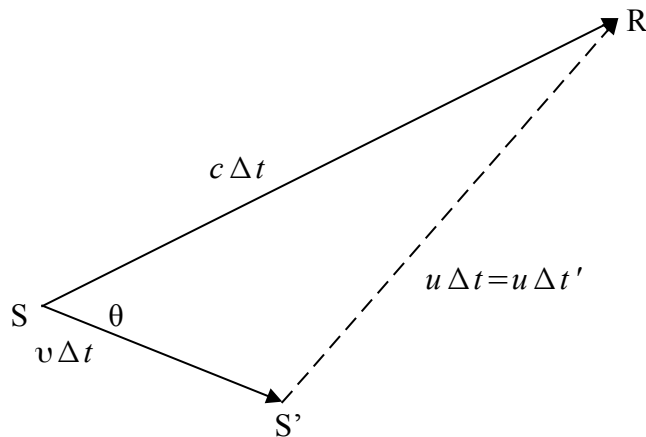


Figure 1. Let the source of light S moves in frame of reference attached to the receiver R by velocity v . Both of observers, attached to the receiver at R and to the moving source S , respectively, know that the photon emitted from the spot S approaches the receiver R on trajectory $S - R$ by speed " c ". The observer attached to the frame of reference of moving source S describes this movement of the photon receding away from himself exactly as if photons were ordinary physical objects. Since in the CSRT theory the coordinate time intervals for this action are equal, i.e.

$$|SR|/c = \Delta t = |S'R|/u = \Delta t' \quad , \quad \text{the} \quad u = \sqrt{c^2 + v^2 - 2cv \cos \theta}$$

Frequency transformation

Let the source S moving relative to receiver R with velocity \vec{v} , $|\vec{v}|=v$, produces electromagnetic signal with frequency ν' , and let frequency of this signal recorded by receiver R is ν .

$$\text{Then} \quad \frac{\nu}{\nu'} = \frac{c}{u} = \frac{c}{\sqrt{c^2 + v^2 - 2cv \cos \theta}} \quad \text{or} \quad \nu = \nu' \frac{c}{\sqrt{c^2 + v^2 - 2cv \cos \theta}} \quad (0)$$

Particular cases:

- if $\theta=0 \rightarrow \cos \theta=1$ formula (1) reduces into $\nu = \nu' \frac{c}{c-v}$ (1)

- if $\theta=\pi \rightarrow \cos \theta=-1$, formula (1) reduces into $\nu = \nu' \frac{c}{c+v}$ (2)

- if $\theta=\pi/2 \rightarrow \cos \theta=0$ formula (1) reduces into $\nu = \nu' \frac{c}{\sqrt{c^2 + v^2}} = \nu' \sqrt{1 - \frac{v^2}{c^2}}$ (3)

Corresponding Einstein's SRT formulae regard to the CSRT formulae above are:

1*)

$$\nu = \nu' \sqrt{\frac{c+v}{c-v}}$$

2*)

$$\nu = \nu' \sqrt{\frac{c-v}{c+v}}$$

3*)

$$\nu = \nu' \sqrt{1 - \frac{v^2}{c^2}}$$

Let us compare frequency predictions between CSRT and SRT for $v=12.24 \text{ km/s}$ and $\nu'=2.11 \times 10^9 \text{ Hz}$, that are the barycentre spacecraft receding velocity and frequency used for navigation of the Pioneer 10 spacecraft, respectively.

1)CSRT.....2110086151,1148811026616839674191 Hz

SRT2110086149,3561816783683937054513 Hz

The difference CSRT frequency– SRT frequency prediction = 1,7586994 Hz

2)CSRT2109913915,5122471003183070130739 Hz
 SRT.....2109913913,7561235494283251292944 Hz
The difference CSRT frequency– SRT frequency prediction = 1,7561235508899818837 Hz

3)CSRT.....2109999998,2438048021925745802545 Hz
 SRT2109999998,2438047992691418049582 Hz
The difference CSRT frequency– SRT frequency prediction = 0 Hz

We can see that the frequencies 1) and 2) calculated by CSRT formulae are blue shifted with compare to Einstein’s formulae predictions. This is in accordance with JPL discovery that radio signals from every spacecraft, receding or approaching Earth, are slightly blue shifted.

New communication tool

In the CSRT theory, every mass body bears its own space with itself, i.e. Cosmos is in the sense of the CSRT ideas atomized.

An electromagnetic signal emitted from a point source toward two receivers that fly in space regard to a source by different velocities, is pushed or pulled at the same coordinate time interval as seen in system “Source” into two different distances from the source.

In a vacuum, there is in CSRT no more such situation as we can see on a water surface where after throwing a rock there is only one circular wave front.

For better understanding is inevitable to describe action of emission and absorption of electromagnetic waves. Let the source S emits electromagnetic waves by a frequency f_s . Let the receiver R stands without motion relative to the source S. Then in both theories the one way speed of light is c , it follows $\lambda_s = \frac{c}{f_s}$.

We stress once again, that the length of emitted electromagnetic wave is real physical quantity, and that it in the SRT depends only from frequency produced by the source, while in CSRT also from relative velocity between the source and the receiver.

If the CSRT is valid theory, this piece of knowledge makes us possible to construct new communication tool which could transmit information by infinite speed.

Idea for such apparatus is simple: Let we have a source S, which will emit electromagnetic waves by constant frequency toward a mass body (receiver) able to move both, toward to and away from the source, respectively. Let we have a device – the “detector D”, rigidly attached to the source S, placed on the abscissa source S – receiver R, and between them.

Let the detector D will be able to measure wavelength without their destruction, or without other harmful interaction. As it follows from known attributes of the CSRT, the wavelength measured by this device will be bigger, when receiver will move away from the source, and shorter, when the receiver will move toward the source. The length of emitted waves will be changed immediately and synchronously with a movement of the receiver R.

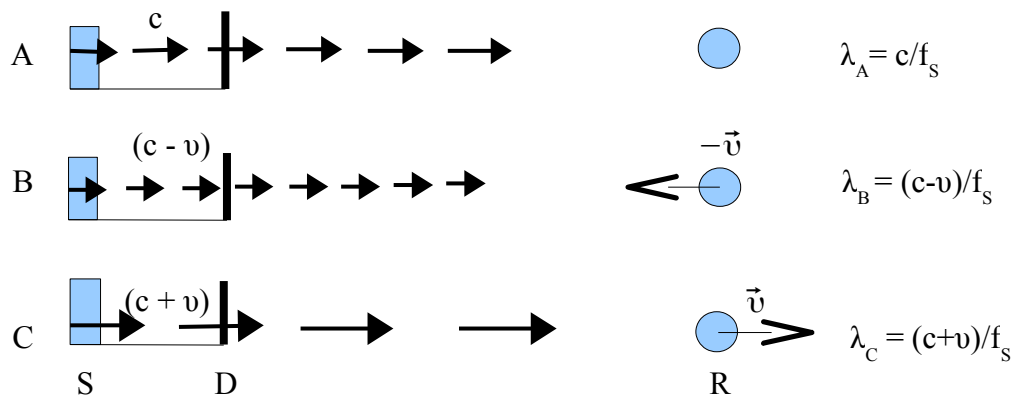


Figure 2: S = sources of light, D = wavelength detectors rigidly attached to the sources, R = receivers: A stationary, B and C moving in relation to the sources with velocities $-v$ and v , respectively. $|\vec{v}|=v$ The c , $(c - v)$, $(c + v)$ are the one-way speeds of corresponding photons as seen in the frames of references attached to sources.

As a method for communication between receiver R and detector D could be used Morse code. The longer wavelength = 0, the shorter = 1, for example. The reader surely noticed that this kind of communication goes from receiver to source, what is an inverse principle compare to those known up to this day.

If we realize, that the present day radio communication is based on the speed of the light, and that the interstellar communication made by SETI Institute, using classical radio broadcasting needs several (thousand ?) years to reach another possible extraterrestrial intelligence, the CSRT, if valid, opens up qualitative new communication tool.

References

[1] Valent, Pavol. (2007). Complementary Special Relativity Theory and Some of Its Applications. The New and Old Concepts of Physics, Volume 4, No. 4/ 2007, 609-631, Versita. DOI: 10.2478/v10005-007-0027-6.
Alternative source of this article is <http://www.ideaconnection.com/docs/350/>

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[3] John D Anderson, Philip A.Laing, Eunice L.Lau, Anthony S.Liu, Michael Martin Nieto, Slava G. Turyshev, "Study of the Anomalous Acceleration of Pioneer 10 and 11", arXiv:gr-qc/0104064 v4

