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The Light Speed Paradoxon

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Abstract

The light speed paradoxon which was and is not understood until now by means of classic physics, led Albert Einstein to the development of the Special Relativity Theory (SRT) and the notion of the space time continuum to explain it, but can be freely explained by the laws of classical physics. The explanation is extended to all other kinds of oscillations within or without a medium. Complex approaches like SRT and space time continuum are unnecessary to explain this phenomenon.

1 Introduction

Already at the end of the 19. century it was well known that the vacuum light speed in an unaccelerated coordinate system (CS) is isotropic with respect to direction and its value is constant, not depending on the relative speed between light source and receiver. This is in conflict with the experience that the velocities of a source and what it emits (e.g. the throw of a ball in a moving train, observed from an observer at the railway station) are summing up for a distant observer.

This fact not understood in accordance with classical physics has lead Albert Einstein to the idea of a relative time and a space time continuum which is the base of his Special Relativity Theory (SRT).

As detailed below, it is shown that this phenomenon can well be understood by the application of the laws of classical physics. This is why the space time continuum and the SRT are approaches which lack their base and therefore are unnecessary.

2 An Experiment of Thought

In an unaccelerated CS be a monochromatic light source and an observer, both at rest. The spread and the event speed of the emitted light shall be measured.

The spread speed of the light in vacuum (more precise description for vacuum light speed) is, by definition and as a measurement rule, the ratio of the wave lenght and the period duration [1], $c = \frac{\lambda}{T}$, and the event speed, characterized by an event like switching on or off the light source, $v_E = c \pm v_{Rel}$, with v_{Rel} as relative speed between light source and observer (in telecommunications known as group velocity). This is easily understandable: If the observer moves off the light source with v_{Rel} (-)/approaches it (+), the event reaches him later/earlier as if he had been at rest relative to the light source.

Now the wave lenght and the period duration at the locations of the light source and the observer are measured, and it turns out, not surprising, that both are identical at both locations. Hence, the spread speed of the light at both locations has the same value c and the event speed because of $v_{Rel} = 0$ is the same as the spread speed.

Next, we move the observer off the light source with some arbitrary speed. How is the situation now from the view of the observer? The observer moves off from the light source with the speed v_{Rel}. An event on the wave sent later (e.g. the next zero crossing) must travel a bigger distance than an event sent earlier (e.g. the zero crossing before) due to the observer moving off and therefore reaches the observer later compared with the result at $v_{Rel}=0$. This behaviour is the well known Doppler effect. The wave lenght is stretched, but the period duration by the same factor, and the observer measures once more the value c as the amount of the spread speed of the light. Merely the frequency of the received light, $\nu=\frac{c}{\lambda}$, is smaller than that of the emitted one due to the stretched wave length. The event speed, however, now is smaller than the spread speed due to the non zero relative speed between the light source and the observer. If the observer moves up towards the light, the relations are vice versa.

This proves that light in every unacceleated CS, coming from a light source moved or not versus the observer, always has a spread speed of the light with the value c, the event speed and the frequency, however, depend on the relative speed between light source and observer. To supply this proof, only the rules of Euclidian geometry and electromagnetic oscillations were applied. So, this phenomenon can be completely explained by the rules of classical physics.

3 Dualism of Light: Wave Versus Particle

Above light was interpreted as an electromagnetic wave or oscillation. An equal view is that of a particle flow. Can this view be explained by the discoveries found above for oscillations as well?

As is well known, a particle can be described as superposition of a base oscillation and (an infinite number) of harmonic oscillations, hence a package of electromagnetic oscillations with beginning and end (Fourier transformation). Beginning and end are events according to the previous chapter, and therefore for these light particles, which the light source "throws" towards the observer, the event speed is valid. This, however, just represents the experience of the summation of the speeds of the transmitter and the transmission.

4 Wave Spreading in a Medium

The discoveries made above concerning the light are valid just the same for other, even for medium bound oscillations, e.g. for a water or sound wave, no matter if the medium moves against the oscillation source and/or the observer or not. Regarding the speed it only matters if a (informationless) wave or one connected to an event (an information) is observed. The influence of the medium can be explained such that a medium at rest only transports the oscillation but does not influence the wave length or cycle duration of the oscillation if its refraction index has the value 1, on the other hand rather changes the light speed (both spread and event speed), which then does no longer correspond with the light speed in a vacuum, but with that in a medium, but the considerations made above are valid just the same. If the medium moves against the oscillation source and/or the observer, it rather changes the wave length of the oscillation, but at the same ratio its cycle duration, such that even in this case the spread speed of the oscillation keeps independent from the relative speed between source, medium and observer. On the other hand, the event speed is influenced: the event reaches the observer earlier/later if the medium moves towards/off of him.

5 Bibliography

[1] N.N: *Wellenlänge.* URL: hhtps://de.wikipedia.org/wiki/Wellenlänge (Call April, 2nd, 2026)