THE VELOCITY OF LIGHT IS DIRECTION DEPENDENT*)

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Performing the so-called by us "coupled-mirrors" experiment, we have established that velocity of light measured along a given track on the earth’s surface is different during the different hours of the day.

In the last decades the Einstein postulate about the constancy of light velocity along all directions in any inertial frame of reference has gained such a large popularity that for a great part of the physicists this problem is closed as, say, the problem about the impossibility to construct a perpetuum mobile. However, until now an experimental proof of this Einstein postulate within first order accuracy in \( v/c \) does not exist. The historical Michelson experiment, favouring the constant light velocity dogma, gives an accuracy of second order in \( v/c \), but the effects of first order, as a matter of fact, are there unobservable. And we must emphasize that the null effects of second order (which, according to us, are connected with the Einstein-Lorentz time dilation, considered by our theory as an absolute phenomenon [1]) cannot be treated as a decisive proof of the “first-order-constancy” of light velocity. On the other hand, the historical Harress-Sagnac-Pogany experiment has shown that velocity of light in a non-inertially moving frame of reference is direction dependent and this dependence is of first order in \( v/c \).

Recently we have performed an experiment which offers the possibility to establish whether the velocity of light is direction dependent also in an inertial frame of reference. This so-called by us "coupled-mirrors" experiment, although too crude in its first performance, can be considered, according to our firm opinion based on the absolute space-time theory elaborated by us in the last years [2], as the first experimental disproof of the Einstein constant light velocity dogma and of his principle of relativity.

In [3] the opinion is defended that until now a first-order in \( v/c \) experiment for the establishment of the light velocity direction dependence in an inertial frame of reference is neither proposed nor it is shown that such an experiment cannot be invented at all. In this report we show that a first-order in \( v/c \) experiment can be not only theoretically proposed, but such an experiment was performed and it has favoured the anti-relativistic dogma for the direction dependence of light velocity.

For the sake of simplicity and better visualization, we shall perform the necessary calculation for the adjustment presented in fig. 1.

*) Editorial note: The idea of the experiment seems to be of some interest, notwithstanding the author's experimental results are too crude to be convincing.
Let us have two disks driven always exactly with the same phase difference (imagine the wheels of a bicycle). On each disk two antipodal facets are cut and the one is made a mirror, while the other and the rest of the disk’s rim are not light reflecting. The distance between both disks, called further rotating mirrors RM₁ and RM₂, is \( d \). Intensive light from the source \( S₁ \) (respectively, \( S₂ \)) is reflected by the semi-transparent mirror \( M₁ \) (resp., \( M₂ \)) and, after passing through the semi-transparent mirror \( N₁ \) (resp., \( N₂ \)), is incident on the mirror facet of RM₁ (resp., RM₂).

![Fig. 1. The “coupled-mirrors” experiment.](image)

The light beam reflected further by the semi-transparent mirrors \( N₁ \) and \( N₂ \) (resp., \( N₂ \) and \( N₁ \)), whose distance from the rotating mirrors is \( p \), is incident on the mirror facet of RM₂ (resp., RM₁). If the rotating mirrors are at rest, the light beam reflected further by the cylindrical mirror CM₂ (resp., CM₁) will illuminate screen S from the right (from the left) at an arbitrary point. The light path from the rotating mirrors to the cylindrical mirrors is \( D \) and from the cylindrical mirrors to the screen is \( d/2 \).

If the rotating mirrors are put in motion, then, because of the slit T, only the light which is reflected by RM₁ (resp., by RM₂) when the latter is perpendicular to the incident beam will reach RM₂ (resp., RM₁). However, for the time spent by light to cover distance \( d + 2p \), the facet of RM₂ (resp., RM₁) which is parallel (an exact parallelism is not necessary!) to the corresponding facet of RM₁ (resp., RM₂) will rotate by a certain angle \( \delta = 1/c (d + 2p) \Omega \), where \( \Omega \) is the angular velocity of the rotating mirrors.