Fundamental Journals
International Journal of Fundamental Physical Sciences (IJFPS) ISSN:2231-8186
IJFPS, Vol 3, No 3, pp 50-53, Sept , 2013 *A.L. Guillen Gomez*
DOI:10.14331/ijfps.2013.330054
http://dx.doi.org/10.14331/ijfps.2013.330054

On The Absolute Motion in the Inertial Systems

Alfonso Leon Guillen Gomez

Independent scientific researcher, 127A Street 53A68 Flat 514, Bogota, Colombia

Email: aguillen@gmx.net

(*Received July 2013; Published Sept 2013*)

ABSTRACT

Through a mental experiment, the mechanics' theory, about of the relative motion, is reexamined because the vacuum, frame of the movement, has a physical reality, which allows test the absolute motion, by the Doppler Effect induced by means of a decelerator of photons, affecting an electromagnetic wave in the direction of the motion of an inertial system. This Doppler does not exist in the nature because the source of the electromagnetic wave is in rest respect to system. But, in each cycle, due to which the wave propagates inside the decelerator, the speed of the system combined with the speed of the wave, respect to vacuum, provokes the induced Doppler. The result is that an observer, inside an inertial system, fully insulated from the outside, may determine whether his system is in rest or in motion and measure its speed, in absolute terms.

Keywords: Laser application, Classical Mechanics, Inertial Systems, Absolute Motion

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INTRODUCTION

In the Classical Physics exists the contradiction between the concept of Newton of space as the structure that contains the Universe, by which it would be possible determine the absolute motion of the bodies, and the principle of relativity of Galilee that establishes the covariance of the laws of the Mechanics, in the inertial systems. Since to an observer inside an inertial system, completely isolated from the outside, he cannot through any mechanical experiments prove the absolute motion, prevails the Galilee's postulate of relative motion. When, Huygens introduced the aether (Schaffner, 1972) (no Aether, exists quantum vacuum) he made possible, that an electromagnetic experiment will prove the absolute motion, since the aether (the vacuum is its perfect replacement) used as a universal frame (Ranzan, 2008), permits measure absolute speeds.

As the Earth orbits the Sun through of the aether (truly through the vacuum), Michelson and Morley (Gross, 1993) tried to measure the absolute speed of the Earth relative to the stationary aether. In this experiment, using optical interference methods, they found that the speed c, of electromagnetic wave in vacuum, is a universal invariant of the nature. The aim of this work is prove the existence of the absolute motion, complementarily the rest absolute, for inertial systems. It is true that the Michelson-Morley experiment failed to prove the absolute motion, using the speed of the electromagnetic wave. But, as an inertial system may be in motion in the vacuum, then it can induce the Doppler Effect, using an electromagnetic wave that it propagates in the direction of the motion of the system, and that passes across of a decelerator of photons. If an internal observer detects this Doppler Effect then he can prove that its system is in absolute motion. Under that the vacuum is something because if the vacuum is anything then the vacuum does not would exist (Grant, 1981).

THE THOUGHT EXPERIMENT

An observer in rest, inside an inertial system, according to Minkowski metric (Minkowski, 1910), in the event that his system, it moves, does not drag the vacuum. Then, by means of the Doppler Effect of an electromagnetic wave, generated inside the system, in address of the motion, using a Decelerator, to reach an interior point, the observer may determine his state of rest or absolute motion, measure the speed of his system and know the wavelength, first laser beam with Doppler Effect(d). Also, it must generate a perpendicular electromagnetic wave to the longitudinal wave; with the object of know the emitted wavelength, second laser

beam without Doppler, since it has no component in direction of the motion, either transversely(e). Alternatively this experiment can be performed with two longitudinal laser beams, one subjected to the effect of a Decelerator (with wavelength d) while the other does not (with wavelength e). In conditions of laboratory (to a distance of few meters), the source and the observer are almost instantly connected through the electromagnetic wave, but with the introduction of the Decelerator, the source and the observer (system) move away, in direct proportion to the fall of speed of the wave, while the Decelerator effect lasts, to be connected again almost instantly. Although the source of the waves is maintained in rest with respect to the observer, always to a constant distance, but as, during the time, in that the wave propagates in the Decelerator, always that the system moves in the vacuum with a speed greater than the wave (there is not Cerenkov radiation as they travel in different mediums), the wave propagates according to its speed combined with the system speed. Thus, the process of absorption-emission of the photons of the wave, those is taken from the vacuum and are delivered to the vacuum, by the electrons of the condensed state of Bose-Einstein, occurs according the coordinates of the space-time of the vacuum, which change in function of the system speed and the wave speed, its consequence is the Doppler. Due to this induced Doppler, the longitudinal wave will suffer blue shifted due to the increase or red shifted due to the decrease of photons that are arriving to the observer, as result that system and wave are moving, in same address and sense or contrary sense.

The absolute speed of the inertial system is measured in relation to coordinates of an interior point in rest (allocated to the observer). The detected wavelength d and the emitted wavelength e, are obtained by interferometry in the Detector. The resulting speeds in Newtonian and Lorentzian cases respectively are

$$v = c\left(\frac{e}{d} - 1\right) \tag{1}$$

and

$$v = c\left[\frac{\left(\frac{e}{d}\right)^2 - 1}{\left(\frac{e}{d}\right)^2 + 1}\right] \tag{2}$$

The two laser beams are generated in a different time with the same device (a dye laser is required, for its integration with the Decelerator) therefore they are generated with the same wavelength and frequency. In a time is measured e of the perpendicular laser beam and in other time is measured d of the longitudinal laser beam. The two wavelengths are obtained with High Accuracy Interferometry (Detector instead of observer) where the yard-stick, that is, the length-scale of the measurement is the wavelength of light itself. The measurement accuracy reaches levels smaller than the radius of a hydrogen atom, below 0.5 or 50 picometers, 50 trillionths of a meter.

For example, using EXFO's WA-4550 Pulsed Wavemeter laser wavelength meter (Goldberg & Naulleau, 2001). With the objective of induce the Doppler, between the source of the longitudinal laser beam and the Detector will be used a Decelerator of Photons (closed stop the photons) according to the scheme source of the longitudinal laser beam-Vacuum-Decelerator of Photons-Vacuum-Detector.

THE DECELERATOR OF PHOTONS

To induce the Doppler effect, must be used a Decelerator of Photons of the class of Lene Hau , tuned closed stop the photons, configured such that upon entering, in the decelerator, the laser beam longitudinal (probe beam) should produce the effect of extreme fall of the speed of electromagnetic wave 'Both coupling and probe beams are derived from the same dye laser'. The probe beam is launched along the z axis, therefore, must be rotated until the z axis of the Decelerator coincides with the x axis, of the inertial system. A good value to the speed of the probe beam may be $17\,ms^{-1}$ that Hau reached in 1999, for pulse propagation in an atom cloud initially prepared as an almost pure Bose-Einstein condensate. The Decelerator generates a process of production of Doppler for any speed of the inertial system greater than the speed of the electromagnetic wave, while it propagates in its interior, during a maximum of 1.5 seconds. Due to the motion of the inertial system, in each cycle, inside of the Decelerator before that the electromagnetic wave reaches a wavelength the system moves in the vacuum to a position advanced of more of a wavelength besides, it produces the combined effect of the speeds of the system and the wave. The group of electromagnetic waves radiated from different distances of the vacuum, inside of the Decelerator, produces the induced Doppler on the Detector.

THE INDUCED DOPPLER EFFECT

The wave radiated by the source of the longitudinal laser beam, propagates in the vacuum, independently of the inertial system, its coordinates space-time change with respect the vacuum according ct, and the wave enters almost instantly to the Decelerator. In this is reduced its wavelength in equal proportion to the fall of its speed c' during a time maximum of 1.5 seconds. Inside the Decelerator the electromagnetic wave propagates in the condensed state of Bose-Einstein although also its coordinates change according its positions in the vacuum t, but in function of the combined speeds of the wave c' and the system v. Upon exiting the Decelerator, the wave propagates again in the vacuum until entering in the Detector, their coordinate's change again according ct. Always that the system is in rest, in each cycle, the wave enters to the Decelerator at all time $(t_1, t_2, t_3 \ldots)$ from the same position p_1 of the vacuum. To exit, of the Decelerator of Photons, the wave returns to the vacuum, and almost instantly, enters in the Detector without suffering any change. Therefore, conserves its frequency, recovers its speed c and its wavelength, since the coordinates space-time do not change between cycles, neither in each cycle, while the wave passes inside the Decelerator. Therefore, if the system is in rest the electromagnetic wave does not present Doppler.

If the system is moving, the near $4.48 \times 10^{14}\ Hz$ of the wave (for example, Red Laser with wavelength=$670nm$), during the time of its pass by the Decelerator (maximum 1.5 seconds), are subject to the process of the induced Doppler then in each cycle, the wave enters to the Decelerator from

different positions p_i of the vacuum, its speed is $(c' << c)$ and between cycles changes its coordinate of position during its propagation inside the Decelerator according to its speed combined with the speed of the system. Meanwhile the system changes its coordinate p_i in the vacuum according to its speed by the time that uses the wave to pass inside the Decelerator (vt'). In each cycle, to the exit of the Decelerator the electromagnetic wave recuperates its speed c, but the wave changes its frequency and wavelength, and the wave enters almost instantly to the Detector, where it is detected, like Doppler because the cause of the change of the frequency are the changes of the coordinates space-time of the wave in the vacuum due that while this reaches one wavelength, the system moves in the vacuum to a position advanced of more of one wavelength and, to the combined motion of the system and the wave according to one of following two cases:

Case 1: the system (observer) is moving in contrary sense to the wave motion, therefore the system moves to left according negative positions while the wave moves to the right according positive positions. In each cycle, this wave comes to the Decelerator, in a different time from a different position $(p_1t_1, p_2t_2, p_3t_3, \dots)$. From the instant of entry of the wave, to the Decelerator, its total displacement T in the vacuum, is equal to the sum of their speeds (system speed more wave speed) by the time of the wave inside the Decelerator $(v + c')t'$, displacement by cycle D is $(v + c')ms^{-1} \times 4.48 \times 10^{-14}s$ and instantaneous displacement (dI/dt) is $d((v + c')t')/dt$. When the wave enters in the Detector, this was moving to the encounter with the waves because the speed of the wave in the Decelerator was $(v + c')$ while the speed of the Detector (system) always was v, surely the distance that the wave traveled $(v + c')t'$ greater than distance that the system traveled vt' and as a consequence, it is detected blue shift.

Case 2: the system (observer) is moving in same sense to the wave motion, therefore the system and the wave moves to the right according positive positions. In each cycle, this wave comes to the Decelerator, in a different time from a different position $(p_1t_1, p_2t_2, p_3t_3, \dots)$. From the instant of entry of the wave, to the Decelerator, its total displacement T in the vacuum is equal to the difference of their speeds by the time of the wave in the Decelerator $(v - c')t'$, displacement by cycle D is $(v - c')\ ms^{-1} \times 4.48 \times 10^{-14}\ s$ and instantaneous displacement (dI/dt) is $d((v - c')t')/dt$. When the wave enters in the Detector, this was moving far away of the waves because the speed of the wave in the Decelerator was $(v - c')$ while the speed of the Detector (system) always was v, surely the distance that the system traveled (vt') greater than the distance that the wave traveled $(v - c')t'$, and as a consequence, it is detected red shift.

In both cases, inside the Decelerator, the coordinate of position p_i changes according to $(p_i + nD + (dI/dt))$, p_i is the position of the wave in the vacuum to the entry to the Decelerator, n is the iteration number of the cycle during its propagation inside the decelerator, in the input $n = 0$ to (T/D), in the output.

Surely the waves group propagating inside the Decelerator is a sui generis group with respect its coordinates. Between the source and the Decelerator and between this and the Detector, the wave coordinates change only according to the speed of wave in vacuum while inside the Decelerator, the coordinates change, in the vacuum, in function of the speeds of the wave and inertial system, addition of the known effect of the speed of the system greater than the speed of the wave. Undoubtedly, if the system is in motion the electromagnetic wave will present Doppler.

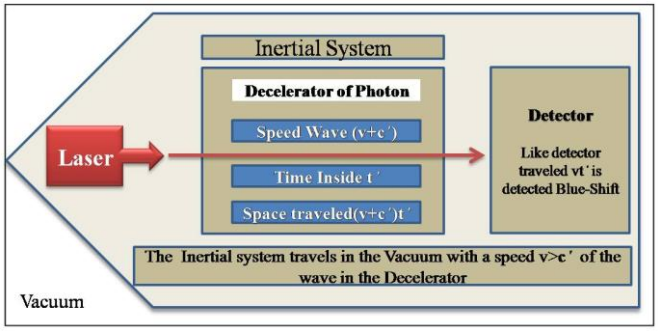

Figure 1. Inertial System and Electromagnetic wave move in contrary sense

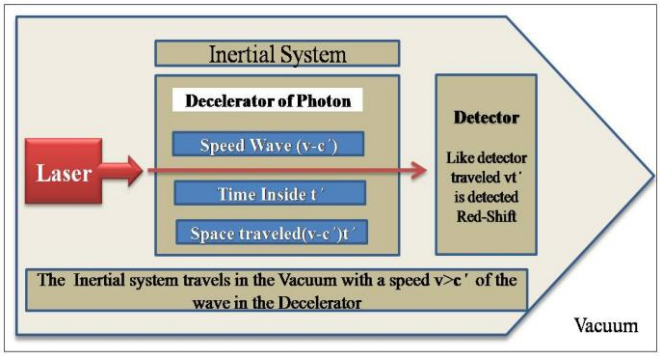

Figure 2. Inertial System and Electromagnetic wave move in the same sense

THE CHANGE OF THE FREQUENCY

In this section we consider the two cases as follow.

Case 1: When the system is moving in opposite sense of the longitudinal laser beam, the photons arrive to the Detector, with $f_d = f_e g(v + c')/c'$, therefore $f_d > f_e$ and the energy that arrives to the Detector is greater than the energy radiated by the laser, the result is the blue shift. Where: v is speed of the system, c' is the speed of the wave in the Decelerator, g is the factor of Lorentz, f_e is the frequency in enter and f_d is the detected frequency.

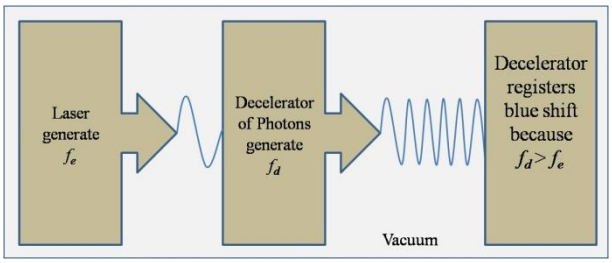

Figure 3. Change of frequency to blue shifted$(f_d > f_e)$

Case 2: When the system is moving in the same sense of the longitudinal laser beam, the photons arrive to the Detector with $f_d = f_e g(v - c')/c'$ therefore the $f_d > f_e$ and the energy that arrives to the Detector is less than the energy radiated by laser and therefore the result is red shifted.

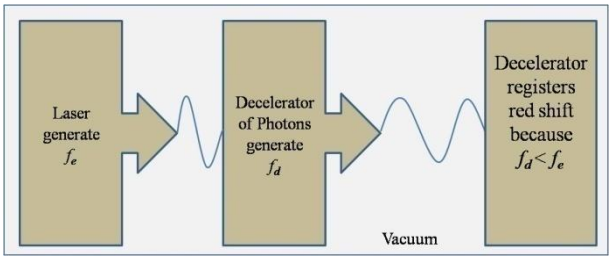

Figure 4. Change of frequency to red shifted($f_d < f_e$)

CONCLUSIONS

The results of this work are contraries to the theories relativists about of motion, since Galilee until Einstein, passing also by Poincare and Lorentz, and in summary are;

1) There is a privileged frame of the motion. The vacuum (as space-time dressed), inasmuch as we can establish the motion of an inertial system with the vacuum. 2)The equivalence between rest and rectilinear uniform motion does not exist, inasmuch as we can establish if an inertial system is in rest or in motion by the absence of the Doppler Effect or its existence. 3) The motion is absolute, inasmuch as we can establish if an inertial system is in motion without relating it to other inertial systems.

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