A Better Approach to an Old Concept

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Abstract:

All experiments carried out during the last century, by various methods, trying to detect an ether wind resulted null or inconsistent. The best explanation found at the time to cope with the null results was given by physicists George Fitzgerald and Hendrik Lorentz who have attributed the result to a hypothetical contraction of all material bodies in the direction of their movement. And that has been the view point up to now.
People need to understand that not always the word of authority is the best counselor. If the opinion issued seem weird, we should accept it with reserve but continue looking for a better explanation more appropriate for the context. Richard Feynman once said "*Science is the organized skepticism in the reliability of expert's opinion*".
Often, when an opinion is issued, there still does not exist an ample knowledge about the subject in question and the opinion emitted is just the best possible given the knowledge base at the time.
Academics often feel inhibited and discouraged to challenge the opinions of respected authorities and miss-interpretations keep propagating from generations to generations and end up being accepted as the final truth. Nobody argues about it anymore and any further knowledge that in some way derives from the flawed one will, necessarily, be flawed too.

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The above mentioned experiments have been described in innumerous papers that can be readily obtained from various sources elsewhere and I see no necessity to describe any of them here again. It suffices to show that, in those experiments, a light beam generated in the laboratory and propagating with velocity **c** in the same direction as the laboratory which, in turn, moves with velocity **v** in the direction of the Earth orbit around the Sun, and after traveling a distance **d** is reflected back to the origin, and should, intuitively, perform each trip in slightly different time.The transverse measurements, in those co-moving assemblages, have been senseless an need not be taken into account..

The expected result

$$\frac{d}{c+v}+\frac{d}{c-v}\neq\frac{2\cdot d}{c} \qquad (1)$$

came out to be

$$\frac{d}{c+v}+\frac{d}{c-v}=\frac{2\cdot d}{c} \qquad (2)$$

That implies that some mysterious correction factor **x** must be applied so that

$$\frac{d}{c+v}\cdot x+\frac{d}{c-v}\cdot x=\frac{2\cdot d}{c} \qquad (3)$$

solving Eq.3 for x we obtain

$$x = 1 - \frac{v^2}{c^2} \qquad (4)$$

applying **x** to Eq. 3 is obviously a tautology unless we find a good physical justification for it. The time delay effects first noticed in 1964 by Irwin I. Shapiro gave a clue to what might emulate factor **x** in Eq, 3

$$t' = t \cdot \sqrt{1 - \frac{2 \cdot G \cdot M}{R \cdot c^2}} \qquad (5)$$

Where

G = Universal gravitational constant
M = Mass of gravitating object
R = Distance from gravitating mass
c = velocity of light

So, let's plug actual physical values into Eq.(5) and compare the factor in it to Eq.(4):

$G = 6.67390 \cdot 10^{-11} \cdot \frac{m^3}{kg \cdot s^2}$ $\qquad M_s = 1.987864 \cdot 10^{30} \cdot kg$ <= Mass of the Sun (**gravitating mass**)

$R_{orb} = 1.49595 \cdot 10^{11} \cdot m$ <= Earth mean orbital radius (**distance from gravitating mass**)

$v = \sqrt{\frac{G \cdot M_s}{R_{orb}}}$ $\qquad v = 2.978 \times 10^4 \frac{m}{s}$ <= Earth mean orbital speed

Comparing **x** with the factor of **t** in Eq.(5)

$$\frac{\sqrt{1 - \frac{2 \cdot G \cdot M_s}{R_{orb} \cdot c^2}}}{1 - \frac{v^2}{c^2}} = 1.00000000000000$$

Let's make

$$\delta = \sqrt{1 - \frac{2 \cdot G \cdot M_S}{R_{orb} \cdot c^2}} \qquad (6) \qquad \text{so, as seen above} \qquad x = \delta$$

since length **d** has no relation with the outcome of the experiment you may attribute any value to it. Here I make it just d = meter to maintain dimensional coherence.

$$d = m$$

and

$$\left(\frac{d}{c+v} \cdot \delta + \frac{d}{c-v} \cdot \delta\right) - \frac{2 \cdot d}{c} = 0\,s \qquad (7)$$

or

$$\delta \cdot \left(\frac{d}{c+v} + \frac{d}{c-v}\right) = \frac{2 \cdot d}{c}$$

Quod **E**rat **D**emonstrandum

That's perhaps a better explanation!

References

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