Modern Michelson-Morley test, using lasers with resonance cavities, reveals Earth's Ether and the Galilean variation of the speed of light.

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The measurement of Earth's high "cosmic velocity" (of magnitude 369 km/s [1]) through the CMRB was the cause to be revived the interest about ether. But since the mean stream of physicists are believing in the validity SRT they only try to verify the "*high validity of Lorentz invariance and symmetry*"; to this direction first Brillett-Hall experiment [2] had studied the ether drift "*at the second harmonics of rotation of the apparatus*, and now in Konstanz of Germany H. Mueller *et al* [3] had performed a new modern version of Michelson – Morley (M-M) experiment, to find again the "*ether–drift-amplitude of the second harmonics of rotation of the arrangement*; Earth had rotated the arrangement of two independent normal branches each one of which contains a laser and a resonance cavity –connected suitably with laser-. Although the last authors [3] claim again about "*the high validity of Lorentz invariance and symmetry*"; yet our calculations in the present work do prove the validity of Galilean variation of the speed of light for an open-in-ether apparatus moving in ether. This ether is detectable (on Earth) and is called "Earth's closest ether" (ECE), as being captured by our own planet into Earth's *Roshe-lobe* of the Sun - Earth rotating system (and of Earth - Moon rotating system as well). This modern M-M experiment [3], like the Brillet-Hall one [2], reveals only the linear velocity of the LAB due of the daily relative rotation of the Earth, spinning about its axis, through the nearly stationary surrounding ether or ECE [4].

Introductory about Ether

1.Definition of Luminiferous Ether

Real Light – Waves and E/M - Waves need and real Ether. The wave behavior of light had imposed initially the existence of a vibrating carrier i.e. the *luminiferous ether* (Huygens, Fresnel). Later Maxwell had formulated his own E/M-theory assuming the free space to be completed by his "*mechanistic –E/M- ether medium*" (endowed with ε = *electric permittivity*, μ = *magnetic permeability*). Finally Maxwell [5] managed to calculate the speed of propagation of E/M-wave (through the corresponding E/M-ether medium) and proposed its speed equal to:

$$u_{(E/Mwave)} = \frac{1}{\sqrt{\varepsilon\mu}} \qquad (1)$$

Only when Maxwell had learned about the experimentally found magnitude of u and compared it with the better speed of light c (of the epoch -after Fizeau's measurements-) then he was able to write down the equality:

$$u_{(E/Mwave)} = \frac{1}{\sqrt{\varepsilon\mu}} = c \qquad (2)$$

Then Maxwell had realized about the identity of the two different ethers; the said two kinds of ether were merged into one. The ether-hypothesis was greatly strengthened by Maxwell's Theory. Both, Maxwell and Michelson, in opposition to Einstein's thesis, were strong supporters of the ether existence.

2. Additional properties of Luminiferous Ether

(a). The independence of speed of light in ether, from the velocity, of the moving source.

This is basic property of the ether [6, 7] thus fast moving sources don't affect the speed of light. In next chapters it will be proved that the *terrestrial luminiferous ether* is carried totally by Earth moving in translation [8] {-Stokes (1845)-}. The terrestrial fast moving sources: fast rotating mirrors [9, 10], or π-mesons emitting gammas [11, 12, 13] as well the extraterrestrial ones (double star-systems) [12], do not affect at all the speed of light in ether and of course relative to our own Earth-LABs.

(b). Moving bodies of small mass do not drag at all the ether. This is the most basic property of the ether; it is result of the hyperfine structure of the ether. This property is in rule into any model of ether and is used exactly to detect the *ether-drifts* of the moving in ether optical apparatuses.
(c). The luminiferous ether does not carry or propagate gravitation. The opposite is true, gravity of the massive heaven bodies, attracts luminiferous ether (which is regarded as "dark matter").
(d). Moving refracting media into LAB presumably do not drag at all the ether but only the light. Except of the reason (b), this is explained just bellow.

3. Lorentz had proved the existence of the ether.

Lorentz in [8] had said: Fizeau's results on the speed of the light, propagating through the flowing refracting medium (water), denote the existence of the ether-medium! Lorentz had reasoned as follows [8]: If matter was the single-exclusive carrier of the vibrations of light, then the speed of light through a refractive material medium should be $\pm c/n$ and if this material medium be set into motion, (of velocity υ relative to our LAB), the total speed of light (relative to our LAB) should be $C_{Lab} = \pm \frac{c}{n} + \upsilon$; but the experiment shows systematically smaller velocities (relative to the Laboratory):

$$C_{(n,\upsilon)_{Lab}} = \pm\left(\frac{c}{n}\right) + \upsilon\left(1 - \frac{1}{n^2}\right) \qquad (3)$$

Lorentz had seen the experimental result of relation (3) to mean: '*the light partially is propagating through matter and also is propagating in another stationary medium (the ether)*'. Lorentz in [8] had very well explained (or reproduced) the relation (3) theoretically by the combination of the following three basic assumptions: (1) the validity of Maxwell's E/M-equations, (2) with the light-wave propagating through the *resting luminiferous ether*, into which, (3) the atoms and their electrons of the refracting medium are moving through with velocity υ. For a refracting body moving <u>to the right side</u>, the ether – properly carrying the light- seems, relative to the body, to flow through it with the opposite velocity (-υ); then the above result (3) means that the refracting medium reacts –with light- <u>as if to carry it back to the right side the light</u> (- as partial propagation of light by matter-) at the speed $+\upsilon \cdot \left(1 - \frac{1}{n^2}\right)$; Then the total effect, relative to the moving refracting body, is the light to be directed <u>to the left</u> in an distance M' M:

$$M'M = \left[-\upsilon + \upsilon \cdot \left(1 - \frac{1}{n^2}\right)\right] \cdot t = -\frac{\upsilon}{n^2} \cdot t \qquad (4)$$

This effect can safely be assumed as valid and for any direction of propagation of light in the moving refracting body. The relation (4) is applied to the moving refracting body of Fig.1.

Problem 1: *Which is time needed for the light to pass through the points AB which are separated by air (or vacuum) and which points A and B are both in translational motion as an invariant rigid rod?.* From the Fig,1 we see that light have to be emitted to the direction AB' where A$B' = ct$ and B$B' = \upsilon t$ thus we have $(c-\upsilon)^2 t^2 - 2(AB)(\upsilon t)cos\Theta - (AB)^2 = 0$ by putting for air AB = S we finally get

$$t_{air} \approx \frac{S}{C}\left[1 + \frac{\upsilon}{C}\cos\Theta + \frac{\upsilon^2}{2C^2} + \frac{1}{2}\left(\frac{\upsilon\cos\Theta}{C}\right)^2\right] \qquad (5)$$

Θ is the angle from velocity vector to the line AB. From Fig.1 we see that the normal to the wave frond of the emitted ray forms an angle α with the normal to the refracting body interface.

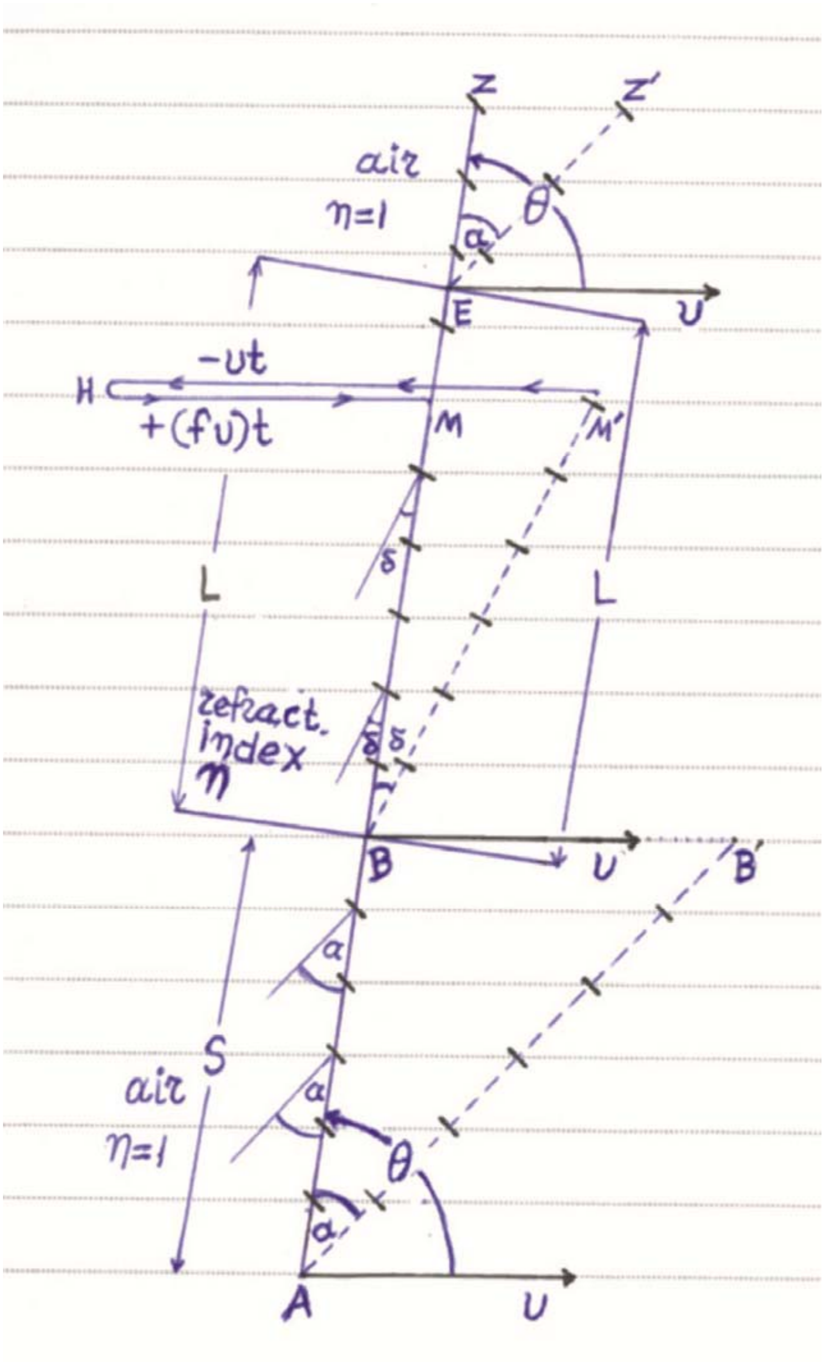

Figure 1

It is true that $$\frac{\sin a}{v} = \frac{sin\Theta}{C} \qquad (6)$$

Problem 2: *Which is the time needed for the light to be propagated through a refracting rod which lies along the initial straight line AB and moves in translation and in parallel to the initial rigid rod AB.*

From Fig.1 The wave-front of light in air falls at the refracting body at an angle of incidence α thus the light in the refracting body have to be refracted inside the body at an angle δ . Thus the light should have go outside "of the refracting rod to the right side" but since it occurs the effect of the equation (4) "to the left side" (length M' to M) and thus the light follows the direction ABEZ. From the triangle BMM' (Fig. 1) we have.

$$sin\delta = \frac{sin\alpha}{n} = \frac{v}{nC} sin\theta \qquad (7)$$

$$\frac{sin\delta}{M'M} = \frac{sin\Theta}{BM'} = \frac{sin(\Theta-\delta)}{BM} \quad \text{or} \quad \frac{sin\delta}{v/n^2} = \frac{sin\Theta}{C/n} = \frac{sin(\Theta-\delta)}{C_{BE}} \equiv \frac{sin(\Theta-\delta)}{C_L} \qquad (8)$$

From (8) and (7) we get

$$C_L = \frac{C}{n}\frac{sin\,(\Theta-\delta)}{sin\Theta} = \frac{C}{n}\left[cos\delta - \frac{v}{nC}\,cos\Theta\right] \approx \frac{C}{n}\left[1 - \frac{v}{nC}cos\Theta - \frac{v^2}{2C^2n^2}sin^2\Theta\right] \qquad (9)$$

From (9) we get the time needed the light to travel the distance L = BE into the moving refracting body

$$t_{(n)} = \frac{L}{C_L} \approx \frac{Ln}{C}\left[1 + \frac{v}{nC}cos\Theta + \frac{v^2}{2n^2C^2}cos^2\Theta + \frac{v^2}{2n^2C^2}\right] \qquad (10)$$

Since Mueller *et al* authors of the experiment [3] were interested about the angle - dependent terms, we will omit the last 2nd -order constant term; then relation (10) can rewrite as (11):

$$t_{(n)} \approx \frac{Ln}{C} + \frac{v}{C}\frac{L}{C}cos\theta + \frac{v^2}{2C^2}\frac{L/n}{C}cos^2\Theta \qquad (11)$$

The relation (5) by omitting also the constant term is rewritten as (12):

$$t_{air} \approx \frac{S}{C} + \frac{v}{C}\frac{S}{C}cos\theta + + \frac{v^2}{2C^2}cos^2\Theta \qquad (12)$$

Now we are ready to calculate the amplitudes of ether drifts (of the second harmonics of the rotation of the arrangement) in the Mueller *et al* [3] experiment of Konstanz Germany.

In order to simplify greatly our calculations and properly to reinforce the effects on this M-M test of Konstanz [3] we will consider the said arrangement as to be lying on the parallel cycle of the Earth passing through the Konstanz (at N. Latitude 47.7°); while the "cosmic velocity" vector v of the Earth will be assumed to be at the same level of the said parallel cycle of Earth; the Fig. 2 shows the arrangement and the "cosmic velocity vector" v forming a (momentary) angle φ with the direction West-to-East of Konstanz LAB. As Earth rotates the angle φ continuously is increased.

By looking at the Fig,2 we can calculate first the time needed for light to be travel from West to East i.e. from point P_1 to the extreme mirror Q_1 (containing the "laser-1"with crystal Nd:YAG of length L_S with index of refraction 1.82 –at 10640 A°-, the (assumed) sapphire crystal of the window of index of refraction 1.77 –at 10640 A°- and finally the distance S_1 of air – vacuum- (index of refraction n = 1). For this purpose we will put where $\theta = \varphi$ in the relations (11) and (12), we get finally:

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$$(1)t_I \equiv t_{P1\to Q1} = \frac{D_1}{C}\left[1 + \frac{v}{C}\frac{(L_{S}+L_W+S_1)}{D_1}cos\varphi + \frac{v^2}{2C^2}\frac{\left(\frac{L_S}{1.82}+\frac{L_W}{1.77}+S_1\right)}{D_1}cos^2\varphi\right] \qquad (13)$$

Where it is $D_1 \equiv L_S 1.82 + L_W 1.77 + S_1$ (= cm)

Now we will find the time the light to go from point P_1 to Q_1 and then back to the point –mirror- R_1 ; (to the West). The distance between mirrors Q_1 and R_1 is symbolized S_O (vacuum) $Q_1 R_1 = S_o$(=3 cm). We have:

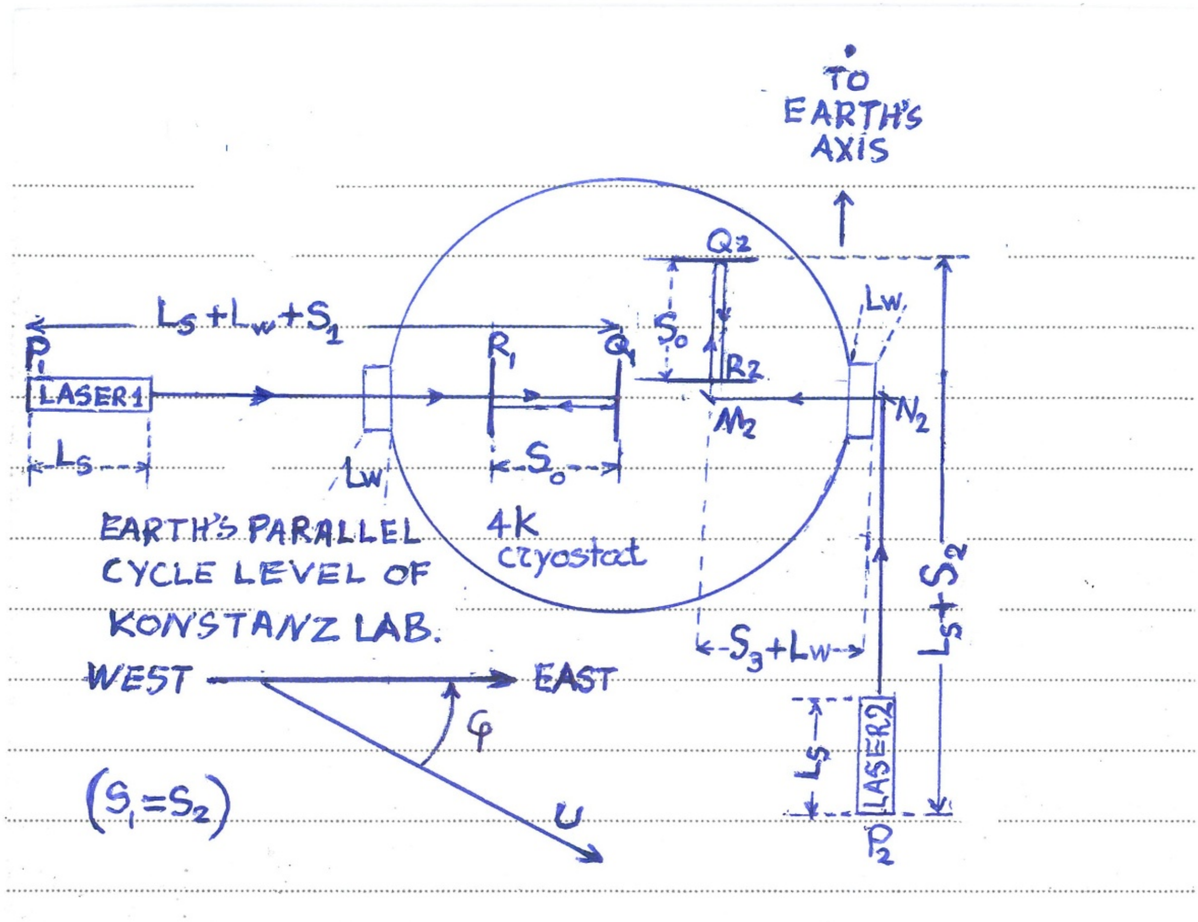

Figure 2.

$$(1)t_{II} \equiv t_{P1\to Q1\to R_1} = \frac{D'_1}{C}\left[1+\frac{v}{C}\frac{(L_S+L_W+S_1-S_o)}{D'_1}cos\varphi+\frac{v^2}{2C^2}\frac{\left(\frac{L_S}{1.82}+\frac{L_W}{1.77}+S_1+S_o\right)}{D'_1}cos^2\varphi\right] \qquad (14)$$

Where it is $\quad D'_1 \equiv L_s1.82 + L_w1.77 + S_1 + S_o(= cm)$

Now the time needed for the light to travel the distance from P_2 up to the point –mirror- Q_2 (containing first its elements Ls and S_2 where the light is traveling to the center of the said parallel cycle (i.e. to the direction of Earth's axis), for which is valid the replacement $\theta = (\varphi + 90^o)$ and $cos\theta = -sin\varphi$) while the path from N_2 το M_2 (where are contained the L_w and S_3) with the light going to the west where now there is valid the replacement $\theta = (\varphi + 180^o)$ and $cos\Theta = -cos\varphi$. We get the relation

$$(2)t_I \equiv t_{P2\to Q2}=\frac{D_2}{C}\left[1-\frac{v}{C}\frac{(L_S+S_2)}{D_2}sin\varphi+\frac{v^2}{2C^2}\frac{\left(\frac{L_S}{1.82}+S_2\right)}{D_2}sin^2\varphi-\frac{v}{C}\frac{(L_W+S_3)}{D_2}cos\varphi+\frac{v^2}{2C^2}\frac{\left(\frac{L_W}{1.77}+S_3\right)}{D_2}cos^2\varphi\right] \quad (15)$$

Where it is $\quad D_2 \equiv L_s1.82 + L_w1.77 + S_2 + S_3$ (=cm)

Now we will find the time needed to travel the light from point P_2 (at the rim of parallel cycle) to mirror Q_2 (lying to the direction of Earth's axis) and then to R_2 (back to the rim of the cycle). The Distance between $Q_2 R_2 = S_o$ (= 3 cm) (vacuum). We have

$$(2)t_{II} \equiv t_{P2\to Q2\to R_2} = \frac{D_2^{'}}{C}\left[\begin{array}{c} 1 - \frac{\upsilon}{C}\frac{(L_s+S_2)-S_o}{D_2^{'}}sin\varphi + \frac{\upsilon^2}{2C^2}\frac{\left(\frac{L_s}{1.82}+S_2\right)+S_o}{D_2^{'}}sin^2\varphi \\ -\frac{\upsilon}{C}\frac{(L_w+S_3)}{D_2^{'}}cos\varphi + \frac{\upsilon^2}{2C^2}\frac{\left(\frac{L_w}{1.77}+S_3\right)}{D_2^{'}}cos^2\varphi \end{array}\right] \quad (16)$$

Where it is $D_2^{'} \equiv L_s 1.82 + L_w 1.77 + S_2 + S_3 + S_o$ (=cm)

Now we will assume the suitable variation of the frequency of laser-1 between the two frequencies ${}^1_If$ and ${}^1_{II}f$ so that to be satisfied the two corresponding independent conditions (1,I and 1,II) for forming *nodes* at the extremes of the distance: {P_1 –to- Q_1 } and at the extremes of the total distance: {P_1 –(to- Q_1 -and –finally)- back–to-R_1 } respectively. Now we will also assume the suitable variation of the frequency of laser-2 between the two frequencies ${}^2_If$ and ${}^2_{II}f$ so that to be satisfied the two corresponding independent conditions (2,I and 2,II) for forming *nodes* at the extremes of the distance: {P_2 –to- Q_2 } and at the extremes of the total distance: {P_2 –(to- Q_2 -and –finally)- back–to-R_2 } respectively. In order to be satisfied the above conditions must be valid separately the following four similar relations

: ${}^1_If \times (1)t_I \approx \frac{D_1}{S_o}\times\frac{N_o}{2}$, ${}^1_{II}f \times (1)t_{II} \approx \frac{D_1'}{S_o}\times\frac{N_o}{2}$, ${}^2_If \times (2)t_I = \frac{D_2}{S_o}\times\frac{N_o}{2}$, ${}^2_{II}f \times (2)t_{II} \approx \frac{D_2'}{S_o}\times\frac{N_o}{2}$ (17)

Where N_o is the number of half-wavelengths ($\lambda/2$ = 5320 A°) contained in S_o = 3cm i.e. (300000000 A° / 5320 A° = 56390.9774436 = N_o).

From the first of the above (17) relations and relation (13) we find the frequency:

$${}^1_If = \left(\frac{D_1}{S_o}\times\frac{N_o}{2}\right)/(1)t_I \approx \frac{N_o}{2}\frac{C}{S_o}\frac{1}{\left[1+\frac{\upsilon}{C}\frac{(L_s+L_w+S_1)}{D_1}cos\varphi+\frac{\left(\frac{L_s}{1.82}+\frac{L_w}{1.77}+S_1\right)}{D_1}cos^2\frac{\upsilon^2}{2C^2}\varphi\right]}$$

We develop in series up to the 2nd –order, omit the first order terms (in υ/c), and keep only the 2nd order terms dependent from angle φ so we obtain for the condition (1,I):

$${}^1_If \approx f_o \times \left[1 - \frac{\upsilon^2}{2C^2}\frac{\left(\frac{L_s}{1.82}+\frac{L_w}{1.77}+S_1\right)}{D_1}cos^2\varphi + \frac{\upsilon^2}{C^2}\frac{(L_s+L_w+S_1)^2}{D_1{}^2}cos^2\varphi\right] \quad (18)$$

By working in a similar manner we obtain from each one of the (17) relations and with each one of (14), (15) and (16) respectively the conditions (1,II) , (2, I) and (2 ,II). We have

$${}^1_{II}f \approx f_o \times \left[1 - \frac{\upsilon^2}{2C^2}\frac{\left(\frac{L_s}{1.82}+\frac{L_w}{1.77}+S_1+S_o\right)}{D'_1}cos^2\varphi + \frac{\upsilon^2}{c^2}\left(\frac{L_s+L_w+S_1-S_o}{D_1'}\right)^2 cos^2\varphi\right] \quad (19)$$

$${}^2_If \approx f_o \times \left[\begin{array}{c} 1 - \frac{\upsilon^2}{2C^2}\frac{\left(\frac{L_s}{1.82}+S_2\right)}{D_2}sin^2\varphi - \frac{\upsilon^2}{2C^2}\frac{\left(\frac{L_w}{1.77}+S_3\right)}{D_2}cos^2\varphi + \frac{\upsilon^2}{C^2}\left(\frac{L_s+S_2}{D_2}\right)^2 sin^2\varphi \\ +\frac{\upsilon^2}{C^2}\left(\frac{L_w+S_3}{D_2}\right)^2 cos^2\varphi + \frac{\upsilon^2}{C^2}\left(\frac{L_s+S_2}{D_2}\right)\left(\frac{L_w+S_3}{D_2}\right)\sin(2\varphi) \end{array}\right] \quad (20)$$

$$ {}_{II}^{2}f = f_o \times \left[\begin{array}{c} 1 - \frac{\upsilon^2}{2C^2} \frac{\left(\frac{L_S}{1.82}+S_2+S_o\right)}{D_2'} sin^2\varphi - \frac{\upsilon^2}{2C^2} \frac{\left(\frac{L_W}{1.77}+S_3\right)}{D_2'} cos^2\varphi + \frac{\upsilon^2}{C^2}\left(\frac{L_S+S_2-S_o}{D_2'}\right)^2 sin^2\varphi + \\ + \frac{\upsilon^2}{C^2}\left(\frac{L_W+S_3}{D_2'}\right)^2 cos^2\varphi + \frac{\upsilon^2}{C^2}\left(\frac{L_S+S_2-S_o}{D_2'}\right)\left(\frac{L_W+S_3}{D_2'}\right)\sin(2\varphi) \end{array} \right] \quad (21) $$

From above (18), (19), (20) and (21) relations we express the trigonometric squares in terms of the second harmonics (2φ) and by omitting the rest constant terms we get the frequency amplitudes for the conditions (1,I), (1,II), (2, I), and (2,II):

$$ {}_{I}^{1}f(2\varphi) \approx f_o \times \frac{\upsilon^2}{C^2}\left\{ -\frac{\left(\frac{L_S}{1.82}+\frac{L_W}{1.77}+S_1\right)}{4D_1} + \frac{1}{2}\left(\frac{L_S+L_W+S_1}{D_1}\right)^2 \right\} \cos(2\varphi) \quad (22) $$

$$ {}_{II}^{1}f(2\varphi) \approx f_o \times \frac{\upsilon^2}{C^2}\left\{ -\frac{\left(\frac{L_S}{1.82}+\frac{L_W}{1.77}+S_1+S_o\right)}{4D_1'} + \frac{1}{2}\left(\frac{L_S+L_W+S_1-S_o}{D_1'}\right)^2 \right\} \cos(2\varphi) \quad (23) $$

$$ {}_{I}^{2}f(2\varphi) \approx f_o \times \frac{\upsilon^2}{c^2}\left[\begin{array}{c} \left\{ \frac{\left(\frac{L_S}{1.82}-\frac{L_W}{1.77}\right)+(S_2-S_3)}{4D_2} - \frac{1}{2}\left(\frac{L_S+S_2}{D_2}\right)^2 + \frac{1}{2}\left(\frac{L_W+S_3}{D_2}\right)^2 \right\} \cos(2\varphi) \\ + \left\{ \left(\frac{L_S+S_2}{D_2}\right)\left(\frac{L_W+S_3}{D_2}\right) \right\} \sin(2\varphi) \end{array} \right] \quad (24) $$

$$ {}_{II}^{2}f(2\varphi) \approx f_o \times \frac{\upsilon^2}{c^2}\left[\begin{array}{c} \left\{ \frac{\left(\frac{L_S}{1.82}-\frac{L_W}{1.77}\right)+(S_2+S_o-S_3)}{4D_2'} - \frac{1}{2}\left(\frac{L_S+S_2-S_o}{D_2'}\right)^2 + \frac{1}{2}\left(\frac{L_W+S_3}{D_2'}\right)^2 \right\} \cos(2\varphi) \\ + \left\{ \left(\frac{L_S+S_2-S_o}{D_2'}\right)\left(\frac{L_W+S_3}{D_2'}\right) \right\} \sin(2\varphi) \end{array} \right] \quad (25) $$

A Question: Since the $(\upsilon/c)^2$ ratio of the "cosmic velocity" of the Earth is close to : 1.515×10^{-6} and the frequency f_o is close to 2.8176×10^{14} Hz all the above (2φ) amplitudes are multiplied by the factor of 0.42 GHz; By which manner or Law of real physics the frequency of 0.42 GHz is so greatly reduced down to few Hz (!!) (as it supposed to be happen in Mueller's M-M test)?
The Answer: The cause for this is due to the presence of Earth's Ether being captured by Earth's gravity; but since this ether is nearly non-participating in rotation about the axis of the Earth, in our LABs have to be appeared a continuous flux of ether coming from East to West at a slow velocity $V \leq 465$ m/s (upper value for velocity of the ECE at the equator).

4. Ether as Dark Matter candidate.

The Ether has been regarded as a Dark Matter candidate; that is why it must feels the gravity and thus it can be captured into Earth's Roshe Lobes of the Earth-Sun rotating system and into Earth's Roche Lobes of the Earth-Moon rotating system as well.

5. The Michelson-Gale [14] experiment proves the gravitational-tidal locking of ECE.

If the bulk of ether be gravitationally attracted, by our own planet and Sun, this mean, that Earth's closest ether (ECE), have also to be locked and by the presence of the Moon (as Earth-Moon is another rotating system attracting ether). Exactly like Earth's atmosphere or oceans, the ECE have to be subjected to the ordinary Newtonian perturbations or tidal-gravitational forces by Sun and Moon. It is known from astronomical data that the tidal force of the Moon on Earth's surface is 2.1826 times greater than the one of the Sun; if thus the tidal force of the Sun on Earth's surface be characterized of magnitude "1", the tidal force of the Moon on Earth is of magnitude "2.1826". Since now the absolute –relative to the fixed stars- angular speeds of the Sun and Moon, (apparently "revolving around Earth"), are respectively: $\omega_{Sun} = 2\pi / 366.2568$ (rads/ sidereal day) and $\omega_{Moon} = 2\pi / 27.3965$ (rads /sidereal day), then the 'mean-effective' angular speed of ECE (relative to the fixed stars) must be:

$$\omega_{ECE/\,stars} = \frac{1\omega_{Sun} + 2.1816\omega_{Moon}}{1 + 2.1816} = 0.02589 \cdot 2\pi = 0.02589 \text{ (rotations/sidereal day)} \qquad (26)$$

This is exactly the mean-effective angular speed with which ECE rotates eastwards, relative to the fixed stars i.e. in the same sense of the rotation of the Earth about its axis; and thus Earth, rotating about its axis, has a daily angular-speed-excess, relative to its own ECE, equal to:

$$\Omega - \omega_{ECE} = 2\pi(1 - 0.02589) \approx 0.974 \cdot 2\pi = 0.974 \quad \text{(rotations/sidereal day)} \qquad (27)$$

and is this exactly 'Earth's angular speed excess' (relative to E CE) which is responsible for the observed fringe-shift (= 0.230 of the fringe-width) of Michelson-Gale (M-G) [14] experimental effect; and thus is explained the slight difference of M-G [4] effect from the then -1925- calculated effect (= 0.236 of the fringe-width) which was based on the rotation of the Earth about its axis with the angular speed Ω (= 2π rads/sidereal day): $\frac{\Omega - \omega_{ECE}}{\Omega} = \left[\frac{[0.230]_{obs}}{[0.236]_{calc(1925)}}\right]_{M-G} = 0.974$

(28) The last relation proves that the ether exists and be attracted gravitationally by Earth, Sun and Moon and that also the ECE is tidally locked by Sun and Moon (the situation is exactly similar to the Newtonian tidal phenomena on Earth). **Conclusively:** The ECE is carried totally with the Earth, along its journey in space; and the ECE is also gravitationally-tidally locked to the Sun and Moon and thus ECE rotates eastwards with a mean-effective angular speed of about 0.026 rotations per sidereal day**.** Thus on Earth's surface there exist only a perpetual ether-drift encircling Earth from East to West due to the rotation about its axis; the linear (Eastward) velocity of the ground through the ECE is

$$V_{gr/ECE} = 0.974 \cdot \Omega R \cos\Phi = 0.974 \cdot \Omega r \qquad (29)$$

(Ω is Earth's angular speed due to its rotation about its axis, r is the distance of the ground from Earth's axis, R is Earth's radius, and Φ is the latitude).

On the parallel cycle of Konstanz Germany [3] at latitude 47.7^{o} the LAB has a geometrical linear velocity about Earth's axis equal to 312.45 m/s and thus the velocity of the LAB relative the ECE is

$$V_{LAB/ECE} = 312.45 \times 0.974 = 304.33 \text{ m/s} \qquad (30)$$

Thus the factor of frequency amplitude at (2φ), due to Earth's rotation relative the ECE, in reality

$$f_o \times \left(\frac{V_{LAB}}{C}\right)^2 = 290.35 \text{ Hz} \qquad (31)$$

This value of relation (31) have to be substituted in the relations (22), (23), (24) and (25) and thus we get

$$ {}^{1}_{I}f(2\varphi) \approx 290.35\,(Hz) \times \left\{-\frac{\left(\frac{L_S}{1.82}+\frac{L_W}{1.77}+S_1\right)}{4D_1} + \frac{1}{2}\left(\frac{L_S+L_W+S_1}{D_1}\right)^2\right\}\cos(2\varphi) \qquad (32)$$

$$ {}^{1}_{II}f(2\varphi) \approx 290.35\,(Hz) \times \left\{-\frac{\left(\frac{L_S}{1.82}+\frac{L_W}{1.77}+S_1+S_o\right)}{4D_1'} + \frac{1}{2}\left(\frac{L_S+L_W+S_1-S_o}{D_1'}\right)^2\right\}\cos(2\varphi) \qquad (33)$$

$$ {}^{2}_{I}f(2\varphi) \approx 290.35\,(Hz) \times \left[\begin{array}{c}\left\{\frac{\left(\frac{L_S}{1.82}-\frac{L_W}{1.77}\right)+(S_2-S_3)}{4D_2} - \frac{1}{2}\left(\frac{L_S+S_2}{D_2}\right)^2 + \frac{1}{2}\left(\frac{L_W+S_3}{D_2}\right)^2\right\}\cos(2\varphi) \\ +\left\{\left(\frac{L_S+S_2}{D_2}\right)\left(\frac{L_W+S_3}{D_2}\right)\right\}\sin(2\varphi)\end{array}\right] \qquad (34)$$

The relation (34) has the form $P_I cos(2\varphi) + R_I sin(2\varphi) \equiv {}_{I}^{2}F\cos(2\varphi + 2\varphi_{Io})$ .Where ${}_{I}^{2}F$ is the amplitude ${}_{I}^{2}F = \sqrt{P_I{}^2 + R_I{}^2}$ of frequency and $(2\varphi_{Io})$ is the difference of phase; $\tan(2\varphi_{Io}) = -\frac{R_I}{P_I}$

$$ {}_{II}^{2}f(2\varphi) \approx 290.35\ (Hz) \times \left[\begin{array}{c} \left\{ \frac{\left(\frac{L_S}{1.82}-\frac{L_W}{1.77}\right)+(S_2+S_o-S_3)}{4D_2'} - \frac{1}{2}\left(\frac{L_s+S_2-S_o}{D_2'}\right)^2 + \frac{1}{2}\left(\frac{L_W+S_3}{D_2'}\right)^2 \right\}\cos(2\varphi) \\ +\left\{\left(\frac{L_s+S_2-S_o}{D_2'}\right)\left(\frac{L_W+S_3}{D_2'}\right)\right\}\sin(2\varphi) \end{array} \right] \qquad (35)$$

The relation (35) has the form: $P_{II} cos(2\varphi) + R_{II} sin(2\varphi) \equiv {}_{II}^{2}F\cos(2\varphi + 2\varphi_{IIo})$. Where ${}_{II}^{2}F$ is the amplitude ${}_{II}^{2}F = \sqrt{P_{II}{}^2 + R_{II}{}^2}$ of the frequency and $(2\varphi_{IIo})$ is the difference of phase; $\tan(2\varphi_{IIo}) = -\frac{R_{II}}{P_{II}}$

Dimensions of Experiment				Frequency Amplitudes and their Differences (in Hz) at (2φ) Between LASER-1 and LASER-2							
S_o = 3 (cm)				Frequency Amplitudes of the in Second Harmonics (Hz)				Frequency Differences (Hz)			
L_S (cm)	L_W (cm)	$S_1 = S_2$ (cm)	S_3 (cm)	${}_{I}^{1}f$ (X_I) Hz	${}_{II}^{1}f$ (X_{II})Hz	${}_{I}^{2}F$ (Y_I) Hz	${}_{II}^{2}F$ (Y_{II}) Hz	${}_{I}^{1}f - {}_{II}^{1}f$ $(X_I - X_{II})$ Hz *	${}_{I}^{2}F - {}_{II}^{2}F$ $(Y_I - Y_{II})$ Hz *	${}_{I}^{1}f - {}_{I}^{2}F$ $(X_I - Y_I)$ Hz	${}_{II}^{1}f - {}_{II}^{2}F$ $(X_{II} - Y_{II})$ Hz
10	5	750	3	69.87	67.69	68.10	65.95	2.18	2.15	1.78	1.74
15	5	750	3	69.00	66.86	67.26	65.16	2.14	2.10	1.74	1.70
20	5	750	3	68.16	66.06	66.46	64.39	2.10	2.07	1.70	1.67
10	5	750	2	69.87	67.69	68.26	66.11	2.18	2.15	1.62	1.58
15	5	750	2	69.00	66.86	67.42	65.31	2.14	2.11	1.58	1.55
20	5	750	2	68.16	66.06	66.61	64.54	2.10	2.07	1.55	1.52
10	3	750	2	70.20	68.00	69.08	66.91	2.20	2.17	1.12	1.10
15	3	750	2	69.32	67.17	68.22	66.09	2.16	2.13	1.10	1.08
20	3	750	2	68.47	66.35	67.39	65.30	2.12	2.09	1.08	1.05
10	3	750	1.5	70.20	68,00	69.16	66.99	2.20	2.17	1.04	1.02
15	3	750	1.5	69.32	67.17	68.30	66.17	2.16	2.13	1.02	1.00
20	3	750	1.5	68.47	66.35	67.47	65.37	2.12	2.10	1.	< 1

*In the second page and in right side column the authors [3] speak about the achievement of the "*high stability of the frequency of their lasers of the order 7 x 10^{-16} only if a large linear drift of about 2 Hz/ s is subtracted"* ; Really if from the above frequencies is subtracted the 2Hz/s then is obtained this accuracy i.e. 0.2 Hz / f_o = 7 x 10^{-16} .

4. Re-interpreted Tests unsuitable to detect the ether-drift relative to ECE!

Re-interpreted Trouton-Noble experiment. Trouton and Noble [15] had tried to detect the ether-wind (of velocity υ) by means of a charged condenser. The charged condenser were hanged from a thin thread and initially was oriented (in an equilibrium state) to a random direction. The Earth were rotated about its axis but the angle between the polarization vector of the condenser and the velocity vector of the ether-wind in our LAB remains unchanged; as Earth rotates into the ECE the velocity vector of the ether-wind is directed constantly from East to West in our LAB. The T-N experiment had had to show an absolutely zero effect

The ECE explain Michelson-Morley Zero Result. This is obtained without any introduction of SRT and any Lorentz invariance. The ECE forms a protecting shelter or umbrella around Earth and protects entire Earth from the stream of flowing cosmic ether [4]. The cosmic ether flows around and outside the Earth and its ECE. This means that M-M experiment was performed into the mostly stationary ECE. The ECE explains the long living of SRT and also the non-existence of any "cosmic ether drift" in our LABs.

The annual starlight aberration is easily explained; the telescope is simply been parallelized to the incoming starlight ray direction, which clearly is different than the initial direction of emitted ray [8, 12, 4]. This is the best simple explanation of Airy's starlight- aberration experiment (where the water –filed- telescope- showed the same aberration angle as the ordinary –air – filed- telescope-).

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