The Cross Radial Force*

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Electric charges, electric & magnetic fields and electromagnetic energy are real physical entities (objects). Because, these entities possess momentum and energy and we could experience these entities with our sense organs. Now, all physical objects are subject to gravitation. Therefore, electromagnetic entities should similarly be subject to gravitation. In this letter, we have shown that classical physics with this simple consideration could explain a lot of hitherto unexplained puzzling physical phenomena.

1. Introduction

In classical physics, *cross radial force* acting on a planet in a central force field is always 0 as given in the standard text book

$$= \frac{1}{r}\frac{d}{dt}\left(mr^2\dot{\theta}\right) = 0\,, \qquad \text{(i)}$$

where m is the mass of the planet.

When a planet contains charges which have masses, the cross radial force should be written as per our analysis given in this letter in the section 4 as

$$= \frac{1}{r}\frac{d}{dt}\left[\left(\gamma^3 m_0 + m_p\right)\times r^2\dot{\theta}\right] = 0\,, \qquad \text{(ii)}$$

with $k = \sqrt{1-u^2/c^2}\,,\quad \gamma = 1/k\,.$

where m_p is the non-electromagnetic mass and $\gamma^3 m$ is the longitudinal electromagnetic mass of charges associated with the planet.

Now the radial force acting on the planet as per standard classical text book

$$\frac{-GM_s}{r^2} = \ddot{r} - r\dot{\theta}^2\,, \qquad \text{(iii)}$$

where M_s (electromagnetic as well as non electromagnetic) is the mass of the sun.

When $u \ll c$ and $m_0 \gg \frac{3}{2}m_p\frac{u^2}{c^2}$, Eq. (ii) will combine with Eq. (iii) to give

$$\frac{d^2U}{d\theta^2} + U \approx \frac{GM_s}{H^2} + \frac{3GM_s}{c^2r^2}\,, \qquad \text{(iv)}$$

$$U = 1/r\,,$$

which explains the advance of the perihelion of the Mercury.

We are presenting here a gist of our work. We request our NPA colleagues to send their comments on our classical deductions of the transverse Doppler's effect, increment of life spans of radioactive particles, Fizeau Experiment , Michelson-Gale Experiment, Sagnac Experiment and the explanation of the null result of the M-M type experiment as given in this letter. Our approach will at once explain planetary motion, gravitational red shift, the bending of light rays grazing the surface of the sun and why all electrodynamic phenomena (like reflection, refraction, diffraction, interference etc.) as observed on the surface of the moving earth are independent of the movement of the earth, observations of Bradley, Airy and Zapffe on aberration of light - classically.

2. Classical Physics

Heaviside (1888) [1, 2] first deduced the $\mathbf{E}$ field and $\mathbf{B}^*$ field of a steadily moving point charge as

$$\mathbf{E} = \frac{Qk^2\mathbf{r}}{4\pi e_0 r^3}\left(1 - \frac{u^2}{c^2}\sin^2\theta\right)^{-3/2}\,, \qquad (1)$$

$$\mathbf{B}^* = \frac{\mathbf{u}\times\mathbf{E}}{c^2}\,, \qquad (2)$$

where θ is the angle between r and $\mathbf{u}$.

Now, if a dipole and the source of the field which excites the dipole move together with a velocity u in the free space in any direction perpendicular to its direction of oscillations, the electric force and the magnetic force acting on the point oscillating charge in the dipole will be respectively from Eqs. (1) and (2) (when $\theta = 90°$), γF_0 and $-\left(u^2/c^2\right)\gamma F_0$ where F_0 is the force acting on the oscillating charge by the source field when the dipole is at rest in the free space. Therefore, the total electromagnetic force acting on the oscillating point charge inside the dipole moving perpendicularly to is its direction of oscillation is

$$\mathbf{F} = \gamma\mathbf{F}_0 - \frac{u^2}{c^2}\gamma\mathbf{F}_0 = \mathbf{F}_0 k\,. \qquad (3)$$

Electromagnetic momentum $\mathbf{P}$ and the magnetic energy T of a steadily moving point charge could be written from the consideration of classical electrodynamics as

$$\mathbf{P} = \int_{\text{all space}}\left(\mathbf{D}\times\mathbf{B}^*\right)d\tau\,,$$

$$T = \frac{\varepsilon_0 c^2}{2}\int_{\text{all space}} B^{*2}d\tau\,,$$

where $\mathbf{D}$ and $\mathbf{B}^*$ are the electric induction vector and the induced magnetic field vector respectively, and $d\tau$ is the infinitesimal volume element in the free space.

Using Eq. (2) we have

$$\mathbf{P} = \frac{2T\mathbf{u}}{u^2}\,.$$

Searle in 1897 [3] followed Heaviside and calculated

$$T = \frac{q^2u^2}{16\pi\varepsilon_0 lc^2}\left\{\frac{a^2+l^2}{2l^2}\ln\frac{a+l}{a-l} - \frac{a}{l}\right\}$$

for a moving charged ellipsoid with the axes a: b: b, when $a^2 > k^2b^2$, where $l^2 = a^2 - k^2b^2$. Putting $a/l = S$, we have

$$T = \frac{q^2u^2S}{16\pi\varepsilon_0 c^2 a}\left\{\left(S^2+1\right)\left(\frac{1}{S}+\frac{1}{3S^3}+....\right)-S\right\}$$

$$= \frac{q^2u^2}{16\pi\varepsilon_0 c^2 a}\left(\frac{4}{3}+\frac{1}{3S^2}+...\right) = \frac{q^2u^2}{12\pi\varepsilon_0 c^2 kb}$$

when $S = \infty$. This corresponds to the Heaviside's Ellipsoid (i.e. a point charge as per an excellent analysis of Heaviside) for when $S = \infty$, $a^2 = k^2b^2$. Replacing b with δR, we get

$$T = \frac{q^2u^2}{12\pi\varepsilon_0 c^2 k\delta R}.$$

From these equations, we have in vector notation

$$\mathbf{P} = \frac{q^2\mathbf{u}}{6\pi\varepsilon_0 c^2 k\delta R} = m\mathbf{u}, \tag{4}$$

where $\frac{q^2}{6\pi e_0 c^2\delta R} = m_0 = \text{const}$, $\frac{m_0}{k} = \gamma m_0 = m$, $\gamma = \frac{1}{k}$.

We may find the alternative classical deduction of **P** in [4].

1. When the charge moves steadily in a direction parallel to the direction of the uniform electric field operating in free space

$$F_{\|} = \frac{d|\mathbf{P}|}{du}f_{\|} = \frac{m_0}{k^3}f_{\|} = \gamma^3 m_0 f_{\|}, \tag{5}$$

where $f_{\|}$ is the acceleration of the point charge in the direction parallel to u.

2. When the charge is moving at a direction perpendicular to the direction of the uniform electric field operating in free space

$$F_{\perp} = \frac{|\mathbf{P}|}{u}f_{\perp} = \frac{m_0}{k}f_{\perp} = \gamma m_0 f_{\perp}, \tag{6}$$

where $f_{\perp}$ is the acceleration of the point charge in the direction perpendicular to u.

From Eqs. (5) and (6), we have longitudinal electromagnetic mass of a steadily moving point charge

$$\gamma^3 m_0. \tag{7}$$

And transverse electromagnetic mass of a steadily moving point charge

$$\gamma m_0. \tag{8}$$

3. Applications of Classical Physics

3.1. Transverse Doppler Effect

As per classical electrodynamics, an elastic electromagnetic force acting on point charges inside matter causes electromagnetic radiation. Now if the matter moves, the dipole moves with it. Thereby the electromagnetic force inside matter changes and consequently, frequency and time- period of oscillation of the dipole change as per the following classical equations.

Let an electric force $\mathbf{F}_0$ (originating from a small charge inside a dipole) drive a point charge back and forth from one end to the other end of a radiating dipole stationary in free space. Then, as per classical equation

$$\mathbf{F}_0 = -m_0\omega_0^2\mathbf{S}, \tag{9}$$

the velocity of oscillation being small, where m_0 is the electromagnetic mass of the charge in the stationary dipole, ω_0 is the radian frequency of oscillation of the charge, $\mathbf{S}$ is the separating distance of the dipole.

Now, when the above dipole moves perpendicularly to its direction of oscillation and radiates, we have

$$\mathbf{F} = -m\omega^2\mathbf{S}, \tag{10}$$

where $m(=\gamma m_0)$ is the transverse electromagnetic mass of the charge in the moving dipole as defined by the equation (8), ω is the frequency of oscillation of the charge which is moving with a velocity $\mathbf{u}$ in free space with the dipole and $\mathbf{F}$ is the electromagnetic force acting on the moving charge.

Comparing Eqs. (9) and (10) and using Eq. (3) for the dipole moving with an uniform velocity in any direction perpendicular to its direction of oscillation we have

$$\omega = \omega_0 k. \tag{11}$$

The equation explains transverse Doppler's effect classically.

3.2. So-called Time Dilation

Now if the frequency changes, time period too changes. For a radiating dipole stationary in free space

$$t_0 = 2\pi/\omega_0, \tag{12}$$

where t_0 is the oscillation period and ω_0 is the radian frequency. If the same radiating dipole moves with a velocity u in free space in a direction perpendicular to its direction of oscillation, then for the moving dipole the oscillation period t and radian frequency ω satisfy

$$t = 2\pi/\omega. \tag{13}$$

Comparing Eqs. (12) with (13), using eq. (11) we have

$$t = \gamma t_0, \tag{14}$$

or the period of oscillation of the above moving dipole increases with its velocity in free space.

3.3. Lifespan Increments of Moving Radioactive Particles

A radioactive particle decays when electric and magnetic forces inside the particle act to disintegrate the particle. When the radioactive particle moves, the electric and magnetic forces acting inside the particle change. And consequently, the disintegration process in the moving radioactive particle changes as per the following classical equations:

The equation of decay of the stationary radioactive particles

$$N = N_0 e^{-\lambda F_0 t_0}, \tag{15}$$

where λ is the proportionality constant, F_0 is force acting inside a radioactive particle to disintegrate a particle N and N_0 retain usual meanings.

Now if the radioactive particles move with a velocity u in free space in any direction perpendicular to their direction of acting disintegrating force, after a time t we will find N untransformed particles such that

$$N = N_0 e^{-\lambda F t}, \tag{16}$$

where F is the magnitude of force acting on the charge to be detached in the moving particle. Comparing Eqs. (15) with (16) using Eq. (3), we have

$$t = \gamma t_0 . \tag{17}$$

This analysis at once destroys 'here is one time', 'there is another time'-concept as well as the twin paradox of relativity.

Now, if the source be stationary in the free space and the observer moves, from the consideration of Maxwell, there should be no transverse Doppler effect and no time increment. If transverse Doppler effect and time increment are confirmed experimentally in such cases, only then some special theories could be held superior in this regard.

3.4. Fizeau Experiment

The result of Fizeau experiment has already been explained by Lorentz [5, 6] by the application of classical electrodynamics which is given below.

The equation of Polarization **P** for a dielectric moving with velocity **v** in the free space could be written in terms of the electric field vector **E** and magnetic field vector **B** as follows [7]:

$$\mathbf{P} = \varepsilon_0 \left(n^2 - 1\right)\mathbf{E}', \tag{18}$$

$$\mathbf{E}' = \mathbf{E} + \mathbf{v} \times \mathbf{B}, \tag{19}$$

where ε_0 is the absolute permittivity of the free space and $n = \sqrt{K}$, where K is the dielectric constant of the medium.

Now let the axis of z be taken parallel to the direction of motion of the dielectric, which is supposed to be direction of propagation light. Consider a plane polarized wave. Let the axis of x parallel to the Electric field so that magnetic field parallel to the axis of y.

Now the fundamental equations in this system will take the following forms:

$$\nabla \times \mathbf{H} = \frac{\partial \mathbf{D}}{\partial t} \quad => \quad -\frac{\partial H_y}{\partial z} = \frac{\partial D_x}{\partial t} + v\frac{\partial P_x}{\partial z} \tag{20}$$

$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t} \quad => \quad -\frac{\partial E_x}{\partial z} = \frac{\partial B_y}{\partial t} \tag{21}$$

$$D_x = \varepsilon_0 E_x + P_x \tag{22}$$

$$E'_x = E_x - vB_y \tag{23}$$

Therefore
$$P_x = \varepsilon_0 \left(n^2 - 1\right)\left(E_x - vB_y\right). \tag{24}$$

Eliminating D_x, P_x, H_y and neglecting v^2/c^2, we have

$$\frac{\partial^2 E_x}{\partial z^2} = \frac{n^2}{c^2}\frac{\partial^2 E_x}{\partial t^2} + \frac{2v}{c^2}\left(n^2 - 1\right)\frac{\partial^2 E_x}{\partial t \partial z} \tag{25}$$

Substituting
$$E_x = e^{n(t - z/V)\sqrt{-1}}, \tag{26}$$

where V denotes the velocity of light in the moving dielectric with respect to the free space. Therefore

$$c^2 = n^2 V^2 - 2v\left(n^2 - 1\right)V . \tag{27}$$

Neglecting v^2/c^2, we get

$$V = \frac{c}{n} + \left(1 - \frac{1}{n^2}\right)v . \tag{28}$$

The factor associated with v in the right hand part of the equation is Fresnel drag coefficient verified by Fizeau Experiment.

We may find the alternative classical deduction in [8].

4. Interaction of Electromagnetic Entities with Gravitation:

We know that electric charges possess momentum and energy just like all other physical objects and we could experience momentum and energy of charges with our sense organs. Therefore, charges are real physical entities (objects). All objects are subject to gravitation and they have the same acceleration towards the centre of gravity in the same gravitating field. Therefore, charges should similarly be subject to gravitation and the acceleration of a point charge should be the same as the acceleration of a point object and that should be directed towards the interacting gravitating field (unlike its acceleration during its interaction with the electric field).

This implies that the gravitating mass of a point charge is proportional to its longitudinal electromagnetic mass. Transverse electromagnetic mass should have no role in this interaction. If it had any role in the interaction, charges should not have the same acceleration towards the interacting gravitating field as those of the material bodies in the same gravitating fields. Thus, in a gravitating field, a point charge acts a mass point; mass of the mass point is proportional to the longitudinal electromagnetic mass of the point charge.

4.1. Exact Equation of Planetary Motion

Thus, when a planet moves in a gravitating field, by dint of our above analysis, we have for the **Radial force**:

$$-\frac{GM_s}{r^2} = \ddot{r} - r\dot{\theta}^2 , \tag{29}$$

where G is the gravitational constant, M_s is the total mass (non-electromagnetic mass & mass originating from charges in the gravitating body) of the gravitating body concentrated at the origin and the planet passes the point (r, θ) in the plane of motion in the polar coordinate.

Now, as per the old physics, **Cross-radial Force**, in a central force field is always 0. Therefore for the planet with charges, **Cross Radial Force**

$$\frac{1}{r}\frac{d}{dt}\left[\left(\gamma^3 m_0 + m_p\right) \times r^2 \dot{\theta}\right] = 0 , \tag{30}$$

or
$$A = \left(\gamma^3 m_0 + m_p\right) r^2 \dot{\theta} = \text{const} . \tag{31}$$

In case the planet of non-electromagnetic mass m_p contains 'Q' amount of positive and negative charges in total (ignoring the sign of the charges) and for simple calculation let us assume that the positive and negative charges are concentrated separately near the centre of the planet. Let M_s be the total mass (non-electromagnetic mass and mass originating from the charges associated with the sun).

When $u \ll c$ and $m_0 \gg \frac{3}{2} m_p \frac{u^2}{c^2}$,

$$A = \frac{\left(m_p + m_0\right) r^2 \dot{\theta}}{\left(1 - u^2 / c^2\right)^{3/2}}$$

or

$$\gamma^3 r^2 \dot{\theta} \approx H = \text{const}. \tag{32}$$

Therefore, the equation of motion of a planet in the sun's gravitating field should be (noting that for circular motion)

$$u = r\dot{\theta}$$

$$\frac{d^2U}{d\theta^2} + U \approx \frac{GM_s}{H^2} + \frac{3GM_s}{c^2 r^2} \tag{33}$$

$$U = 1/r$$

This explains the advance of the perihelion of Mercury.

4.2. Equation of Motion of Light Rays in the Gravitating Field of the Sun

Light-rays possess electromagnetic momentum and electromagnetic energy. Many people believe that an electron and a positron "coming together, could annihilate each other with the emission of light or gamma rays" [9] and "light also acts like electrons" [10]. If that be so, a point light will similarly be subject to gravitation as in the case of a point charge. Now, the equation of motion of a point charge in a gravitating field could be calculated from the Eqs. (30) and (31) putting $m_p = 0$. The resultant equation will be the same as given in the Eq. (33).

But in this case, m_0 for a point light being 0, H for the point light will be infinity, and the equation of motion of a point light in a gravitating field is

$$\frac{d^2U}{d\theta^2} + U \approx \frac{3GM_s}{c^2 r^2}, \tag{34}$$

which will at once explain the bending of light rays grazing the surface of the sun.

4.3. Gravitational Red Shift

Suppose that a ray with the radian frequency ω is coming from the surface of a star of radius R_t and of mass M_t to the surface of the earth which is x distance away from the centre of a star. As per our previous discussion, electromagnetic energy has the same acceleration as that of material bodies as well as point charges in the same gravitational field.

Let $f(R_t)$ be the gravitational acceleration of a ray on the surface of a star and $f(x)$ be the gravitational acceleration of the same ray when it is on the surface of the earth. Then, we have from the law of gravitation [11]

$$\frac{f(x)}{f(R_t)} = \frac{R_t^2}{x^2}, \tag{35}$$

and remembering $f(R_t) = g = \frac{GM_t}{R_t^2}$,

whence

$$f(x) = \frac{GM_t}{x^2}. \tag{36}$$

Now, for the rectilinear motion of the ray towards OX direction we have

$$f(x) = \frac{dv}{dt} = \frac{dv}{dx}\frac{dx}{dt} = v\frac{dv}{dx}. \tag{37}$$

Therefore, the differential equation for the velocity of the ray should read, from Eqs. (36) and (37)

$$\int_c^v v\,dv = -GM_t \int_{R_t}^x \frac{dx}{x^2}, \tag{38}$$

where c is the velocity of the ray on the surface of the star and v is the velocity of the same ray on the surface of the earth. From which we have

$$v = \left[c^2 - \frac{2GM_t}{R_t}\left(1 - \frac{R_t}{x}\right)\right]^{1/2}. \tag{39}$$

Therefore

$$v = c\left(1 - \frac{GM_t}{R_t c^2}\right), \tag{40}$$

when x is large. From which we have

$$\frac{\omega'}{\omega} = 1 - \frac{GM_t}{R_t c^2} \tag{41}$$

(ω' is the radian frequency of the same light ray at the surface of the earth) as the number of complete waves passing through a point (i.e. frequency) must be proportional to the velocity of the waves.

5. Puzzling Electrodynamic Phenomena

Maxwell's equations of electromagnetic fields are applicable only in free space and inside systems stationary in free space. One would then expect some corrections/ modifications of Maxwell's equations when the electromagnetic phenomena are studied on the surface of the earth which is moving with a high velocity in the free space. But those corrections are not needed!

All electrodynamic phenomena like reflection, refraction, diffraction, interference etc., as observed on the surface of the earth, either with star light or with earth light are independent of the movement of this planet. That is, the earth's surface is exactly equivalent to free space for our description of electromagnetic phenomena on it.

5.1. Michelson-Morley Type Experiments in Air & Water

Just like electric charges and electromagnetic energy, electromagnetic fields possess momentum and energy which we could experience with our sense organs. Therefore, electromagnetic fields, too, are real physical entities (objects). All physical objects

at the surroundings of the earth are carried with the earth. Therefore, the earth should carry electric and magnetic fields along with it at the vicinity of its surface. This will at once explain the null results of all the Michelson-Morley type Experiments in air and the Mascart-Jamin type Experiment in water at rest on the earth's surface; and may give us some insight to understand why all electromagnetic phenomena as observed on the surface of the earth are independent of the motion of this planet.

5.2. The Kennedy–Thorndike Experiment

Electromagnetic radiation is the propagation of vibration of electric and magnetic fields. In the Kennedy – Thorndike experiment, it is observed that the velocity of light on the surface of the earth is independent of spinning, contra the Michelson-Gale Experiment, or translation and rotation of the earth in its orbit.

5.3. The Tomaschek (1924) and Miller Experiments (1925)

The Michelson-Morley experiment has been performed with starlight and sunlight, similar null results have been confirmed. This can only happen if the electric and magnetic fields originating either from the earth, stars or from the Sun and existing at the near vicinity of the earth's surface, spins, translates and rotates with the earth, exactly in the same way as other physical objects on earth do.

5.4. The Trouton-Noble Experiment (1904)

In a laboratory, when a charged condenser moves, the electric field around it changes and thereby a magnetic field is created. If the electric field originating from the condenser would move along with the condenser, there would be no change of electric field around the condenser and thereby, there would be no magnetic field around it.

Now, a condenser at rest on the earth's surface moves with the earth. But the electric field around the condenser, too, moves with it. And therefore, the Trouton-Noble Experiment (1904) fails to detect any magnetic field around the condenser. This implies that the earth carries the condenser along with its electric field.

5.5. Sagnac Experiment

As per classical electrodynamics, light signals, divided in two parts and sent in opposite directions around a fixed circuit on a spinning disk, should not return to the point of division at the same instant. Because, the speed of light on a spinning disk is $\mathbf{c}-\mathbf{w}$ when the light beam travels towards the direction of spinning of the disk, and $\mathbf{c}+\mathbf{w}$ when the light beam travels in the opposite direction, $\mathbf{w}$ being the spinning velocity of the point on the disk where the speed of light is being measured. This effect is the *primary* effect of spinning. The actual experiment confirms this. This effect of light on a spinning disk was observed by G. Sagnac in an *interferometer fixed on the disk* in 1913, and is known as the Sagnac effect. But the earth's motion seems to have no effect on the result. The implication is the same as stated in the previous examples.

5.6. The Observations of Bradley (1728), Airy (1871) and Zapffe (1992) on Aberration of Light

When a light beam comes from a star and reaches the surroundings of the sun, it is carried with the sun. Then the ray moves towards earth which is moving with respect to the sun with a velocity 30 Km/ sec. Therefore, the angle of aberration of the astral ray is v/c where v is the velocity of the earth with respect to the sun, but not with respect to the star. But when the beam reaches the surface of the earth, its direction is no more apparent. It will be the real direction of the beam near the surface of the earth as the earth carries the beam with it! Therefore, there will be aberration for the astral rays relating to the relative velocity of the earth and the sun as observed by Bradley (1728), but there will be no further aberration (when the telescope is filled with water) as observed by Airy (1871) and there will be no aberration of a light beam coming from a mountain –top as reported by Zapffe (1992) [12].

5.7. The Experiments of Michelson-Gale and Bilger, et al

The earth just like all other physical objects carries light with it at the vicinity of its surface. Therefore, Coriolis force due to the rotation of the earth must act on the direction of propagation of light on the surface of the earth. This will explain the experiments of the Michelson-Gale and the experiment of Bilger, et al.

Let us choose a point O on the surface of the earth at the latitude α^0 North and construct a tangential plane at this point. Now let us fix a Cartesian coordinate system in the plane such that OY represents the North and OX represents the East. Now suppose that the earth is not rotating and an element of light beam is arranged to move from a point P in the OY axis at the instant $t=0$ in a small circular motion in the clockwise direction such that at the time t it touches the point Q in the OX axis and say $OP=OQ=r$. That is, when $t=0$, $x=0$, $y=r$ and when $t=t$, $x=r$, $y=0$.

Now suppose that the earth rotates with an angular velocity Ω. Then the Coriolis force due to the rotation of the earth should deflect the beam mainly eastwardly and the beam will not touch the point Q. Instead it will touch a point R very adjacent to the OX axis. Now for a rough calculation of the distance OR, let us consider the motion of the beam on the OY axis with a velocity c from the point P to the point O. In this case, we may write

$$F_x = -2\Omega(-c)\sin\alpha = 2\Omega c\sin\alpha \tag{42}$$

$$\frac{d^2x}{dt^2} = 2\Omega c\sin\alpha \tag{43}$$

$$\frac{dx}{dt} = 2\Omega c\sin\alpha\cdot t + C_1 \tag{44}$$

$$x = \Omega c\sin\alpha\cdot t^2 + C_1 t + C_2 \tag{45}$$

Remembering the initial condition and taking into account

$$t = \frac{r}{c}, \tag{46}$$

we have

$$x = \frac{\Omega r^2}{c}\sin\alpha, \tag{47}$$

which is the deflection of the beam towards OX axis for a small circle. Therefore, in that case we have

$$OR = r + \frac{\Omega r^2}{c}\sin\alpha. \tag{48}$$

For the beam moving in the anticlockwise direction, this distance will be

$$r - \frac{\Omega r^2}{c} \sin\alpha \tag{49}$$

From the last two equations we have for one complete rotation

$$\Delta t = \frac{4\Omega A}{c^2} \sin\alpha \tag{50}$$

where A is the area of the circle. The fringe shift relevant to Δt seems to be verified by the Experiments of Michelson-Gale [13] and Anderson and Bilger, et al. [14]. The result will remain more or less the same when the circle is large.

6. Conclusion

The analysis establishes classical physics and overthrows the special and general relativity from the domain of physics at a stroke.

Anybody watching a physics book or a physics journal should at once conclude that the subject he is watching is the subject of pure metaphysics, not a subject dealing with rational interpretation of this physical world. But he still goes to understand the subject with the conviction that the subject is the epitome of physical knowledge and the nineteenth century physics is either obsolete or an imperfect world view of the predecessors. What is the cause behind it?

This is the age of technology. Monopoly and the State govern contemporary technology that needs secrecy for the sustenance and development of its governors. The best way of maintaining secrecy is the metaphysical interpretation for the production and working of the technological products. Therefore monopoly and state encourage metaphysical interpretations of the production and the working of their products and extend it to the interpretations of the physical world. Here lies the success of the relativity theory. Any scientific debate or any outstanding experiment will hardly be able to demolish the relativistic metaphysics without exposing the sociological content of contemporary theories.

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