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Highlights

Reconcile General Relativity

Polarizing Magnetic Field Generator

Discovering Thoughts, Inventing Future

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Particle Theory: A New Theory that may Reconcile General Relativity and Quantum Theory

By Dino Martinez

Abstract- In an attempt to reconcile General Relativity and Quantum Mechanics, Particle Theory is a concept that may try to address this issue. This theory explains the effects accurately calculated by General Relativity in an alternate and real, physical way, and is therefore an alternative to GR. The theory states that indivisible atomic particles are instead divided into even smaller particles (called "EM particles") held together by a central potential, the speed of light being the limit to their velocities. The "shedding" of these particles are responsible for the static and magnetic fields we observe. This also creates a "screening" effect that, for an atomic particle at rest, blocks about half of what this theory defines as the "true gravitational potential", which is just twice the Newtonian value (mediated by what this theory defines as "gravity particles"). When an atomic system of particles starts moving in a certain direction, the act of shedding and the internal movement decreases as the particles orient themselves in the direction of the velocity, which reduces the screening effect, where we start to observe the relativistic effects of General (and Special) Relativity.

Keywords: quantum gravity, general relativity and quantum mechanics, particle theory, alternative to general relativity.

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Keywords: quantum gravity, general relativity and quantum mechanics, particle theory, alternative to general relativity.

I. Introduction to PT Mechanics

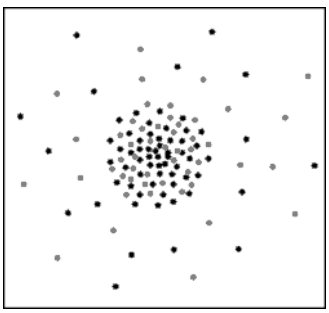

Fig. 1: An example of an atom according to Particle Theory [1].

Author: e-mail: dino5050@hotmail.com

There are currently a few conceptual theories trying to reconcile quantum mechanics and general relativity. Currently, Newtonian gravity cannot produce the results given to us by Einstein's general relativity such as the correct values of gravitational lensing, and Mercury's perihelion precession, to name a few. Particle Theory (PT) is able to explain these relativistic effects, without the use of a curved spacetime fabric, but through the screening effect. A good portion of what is discussed will be conceptual, although we'll also be deriving solutions from GR using formulas derived from Particle Theory. But before getting to that, we must discuss the basic mechanics of PT.

Particle theory is, according to [1]:

The theory proposes that indivisible particles of non-zero mass are instead made up of even smaller particles called EM (electromagnetic) particles of non-zero mass (shown in Fig. 1). The EM particles themselves are made up of gravity particles (shown on the right of Fig. 2). They are tangled together with other gravity particles to make up the two different EM particles both shown to the left of the gravity particle (in Fig. 2) [1].

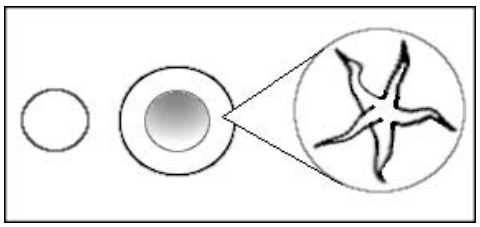

Fig. 2: EM particles shown on left, gravity particle shown magnified on right [1].

The entanglement of the gravity particles cause a vibration, which also leads to shedding of these particles off the surface of the EM particles. The EM particles contained in these atomic system of particles shown in Fig. 1 move and collide with each other at light speed, which shakes loose a lot more gravity particles than it does so with normal shedding. The freed gravity particles make up the central potential that keep the EM particles bounded in an atomic system of particles, and any residual gravity particles that escape or shed at the

surface account for the gravitational force. The magnitude and source of this central potential will be discussed in greater detail Section III.

I will briefly go over how these particles work in the dynamics of attraction and repulsion of these particles shown in Fig 2. Keep in mind that up to this point we are now talking about hypothetical modeling when discussing the structure of the individual particles that make up an atom. According to [1]:

Starting with the EM particles, they come in two varieties, EM+ and EM-, responsible for the differences in charge. Two EM particles of the same charge would naturally collide elastically, which would cause repulsion when, for example, a negatively charged particle is within an EM- particle field from a point source. But when two different EM particles (shown in Fig 2) come into contact, they merge, forming an EM± particle, coming into a complete stop. So when a field of EM+ particles (from a point source) comes into contact with an atomic system of EM- particles, such as an electron, for example, they merge on the surface of the electron and prevents that side of the electron to shed EM particles momentarily. Since the other side of the electron continues the shedding process, this propels the electron forward, towards the source of the EM+ particle field (as shown in Fig. 3) until the source field ceases and the merged EM particles themselves shed from the electron.

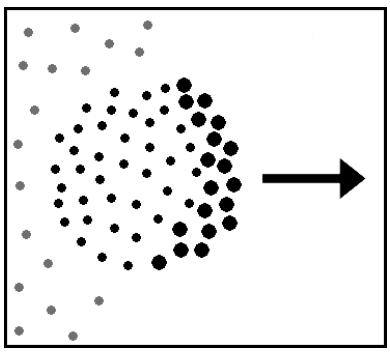

Fig. 3: Merged EM± particles on right surface ceases shedding, causing propulsion towards the right.

It is very important to note that these particles that are released from the shedding process can be reused in the attraction and repulsion action, especially in macroscopic systems like two charged plates in close proximity to each other. Since the shedding process does infer that these system of particles are slowly decaying, the reusing of EM particles is important as this indicates that the amount shedding of an isolated electron, for example, cannot equal what would be expected from Coulomb's law, as the decay rate would be so high that no such system of particles would exist today. The reusing aspect implies that the shedding process and as such the decay rate is much less especially for an isolated atom [1].

This means that an isolated electron, for instance, will shed at a rate less than what is required by Coulomb's law. Only with a collection of charged particles will you see the amount of charge required by Coulomb's law as the EM particles will be reused, as shown in Fig. 4.

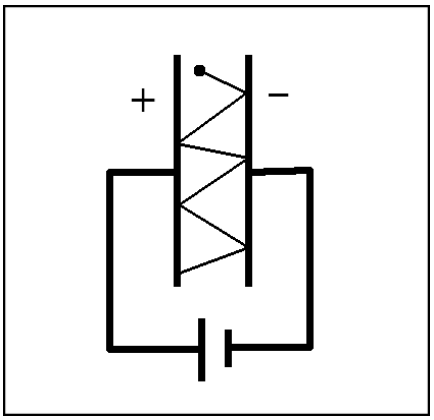

Fig. 4: Same EM± particle being reused between charged plates.

As for the gravitational particles, the hypothetical structure shown in Fig 2 on the right makes it so that their interaction will always cause a merging and produce an attraction, as their collisions will always cause an entanglement when interacting with both types of EM particles.

II. The Screening Effect

The dynamics of an atomic system of particles, as we will see, will derive the effects of both special and general relativity. The key mechanism involved is what this theory defines as the "screening effect." As an atomic system of particles sheds EM particles, they absorb gravity particles originating from a gravitational mass. This effect for an atomic particle at rest blocks approximately fifty percent of the true gravitational potential (this is an assumption based on already observed phenomena interpreted by GR), which is twice the Newtonian value: $\frac{2GM}{r}$, where G is the gravitational constant, M is the gravitational mass and r is the radius [1]. Another attribute that may contribute to this effect is the rapid movement of the EM particles themselves, as the gravity particles may have a hard time attaching to them due to their rapid oscillations in an atomic system of particles.

When an atomic system of particles starts moving in a certain direction, lets say the z-axis, and given that the limit to the velocities of the EM particles is always the speed of light, the internal motion perpendicular to the z-axis of the system decreases, which reduces the shedding of EM particles as well as the frequency of their oscillations, reducing the screening effect and making the system more

susceptible to the true gravitational potential $\frac{2GM}{r}$ as the EM particles orient themselves toward the direction of the velocity [1]. As we will see in the next section, we will easily be able to derive solutions from GR using the mechanism of the varying screening effect. This paper will assume that as a system of particles approach the speed of light, the shedding and internal movement, and in turn the screening effect, approaches zero [1]. But such a system of particles may still shed EM particles and produce a electromagnetic field as the system may reduce to a shrinking, flat disc of rotating particles (to preserve its spin), shown in Fig 5 [1].

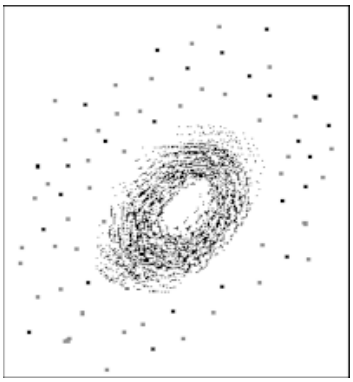

Fig. 5: An atom near or at light speed may reduce to a small, flat disc of rotating particles [1].

If so, the shedding only occurs perpendicular to the axis of rotation, so most of the system will still be exposed to the true gravitational potential, so the screening effect, or the lack thereof, still applies. In this paper as in [1], we will assume that the screening effect approaches zero as the system of particles approach the speed of light.

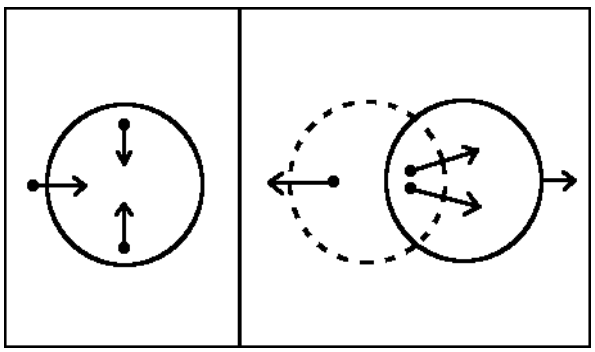

Fig. 6: 2-D momentum exchange of atom at rest with outside particle (arrows not to scale)

In Fig 6, where we have a model of an atom consisting of two particles bounded by the circle, we see how movement in the vertical direction is reduced from a momentum exchange with an outside particle at an angle a little more than 45 degree impact with the horizontal. In fact, with any angle between but not equal to 0 and 90 degrees, we will see a decrease in vertical movement in exchange for horizontal movement, (although the diagram may look different in other cases) which would signal a decrease in the screening effect as we defined earlier.

In a section which will be discussed in end of this paper, I will discuss the possibility of increasing the screening effect through the emission of high energy photons towards the source of gravity, which may produce anti-gravitational effects.

In the next section we will see how the screening effect explains the relativistic effects of General Relativity and derive solutions such as the general relativistic potential and gravitational lensing.

III. Derivation of GR Effects

a) *General Relativistic Potential*

According to Particle Theory, for an atomic system of particles at rest, the screening effect blocks half of what is the true gravitational potential that this theory predicts, which is twice the Newtonian value [1]:

$$\frac{2GM}{r} \tag{1}$$

When a particle with a structure that produces a screening effect approaches the speed of light, the screening effect approaches zero and the potential the particle feels is the totality of the true Newtonian potential (1) as explained in the last section. To demonstrate this I will reproduce the gravitational potential energy unique to General Relativity using this concept of the varying screening effect by using a modified, inverse Lorentz factor squared: $\gamma_{+}^{-2} = 1+\frac{v^2}{c^2}$, which uses a plus sign instead of minus sign and which has a maximum value of 2 when the particle reaches the speed of light, having the screening effect reduced to zero. Therefore, we obtain the full equation for the gravitational effect from a gravitational mass M on an atomic system of particles m [1]:

$$\frac{GMm}{r}(1+\frac{v^2}{c^2}) \tag{2}$$

For a two body problem we have: $v^2 = r^2(\frac{d\theta}{dt})^2 + (\frac{dr}{dt})^2$ and $L = \mu r^2 \frac{d\theta}{dt}$. Looking at the radial velocity in the second term of the velocity squared, and comparing it to the average speed of the orbital speed of 47.4 km/s for Mercury (the average radial velocity being 6.3 km/s):

$$\frac{(dr/dt)^2_{avg}}{v^2_{avg}} = \frac{6.3^2}{47.4^2} = .018$$

it only accounts for 1.8 percent of the total velocity squared. So omitting the radial velocity we have:

$$v^2 \approx r^2 \left(\frac{d\theta}{dt}\right)^2$$

and using $L = \mu r^2 \frac{d\theta}{dt}$ and $\mu = \frac{mM}{M+m}$ and focusing on the second term of (2) we obtain:

$$\frac{GMm}{r}\left(\frac{v^2}{c^2}\right)$$

$$\frac{GMm}{r}\left(\frac{L^2}{\mu^2 r^2 c^2}\right)$$

and expanding out one μ factor gives us (3):

$$\frac{G(M+m)L^2}{\mu c^2 r^3} \quad (3)$$

The attractive potential energy from (3) is the same result as the potential unique to General Relativity from the Schwarzschild solution that is responsible for accurately calculating the observed Mercury Perihelion Procession value. We can see how easily we obtained this just from using the concept of the screening effect in accordance with Particle Theory, without usage of the Schwarzschild solution.

For elliptical orbits where the major and minor axis differ greatly, or for faster orbits due to high gravitational systems, using the radial velocity for further correction may be necessary, especially if the higher orders of the binomial expansion of the perihelion precession [2] obtained from (3) is not sufficient.

b) Gravitational Lensing

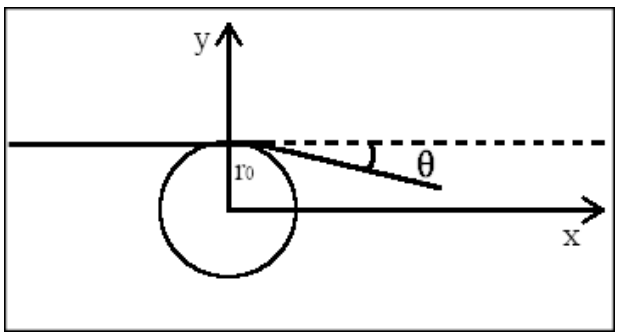

Fig. 7: A photon being deflected by a gravitational mass at an angle of θ

For a collection of EM particles (photon) emitted by an atomic system of particles, and since EM particles are affected by gravitational fields (gravity particles), one can calculate the deflection of light as follows:

From Fig 7, we initially have $y = r_0$, where $r^2 = r_0^2 + x^2$ is the distance between the photon and the Sun. We have the acceleration due to the Sun's gravity, using the effective y-component of it r_0/r, we obtain $a = GMr_0/r^3$. Using the relation: $y = (1/2)at^2$ and for a photon: $dx = cdt \rightarrow t = x/c$ we get $y = (1/2)a(x^2/c^2)$. The angle is then derived as: $dy/dx = ax/c^2 = \tan\theta \approx \theta$. Differentiating once again for θ we obtain $d\theta/dx = a/c^2$ where we finally obtain:

$$\theta = \int \frac{GMr_0}{c^2(r_0^2 + x^2)^{3/2}}\,dx$$

Integrating from $-\infty$ to $+\infty$ and setting $r_0 \rightarrow r$ gives us:

$$\theta = \frac{2GM}{c^2 r} \quad (4)$$

This is only half of what is observed and what is correctly calculated from Einstein's field equations. But a photon under Particle Theory does not have an internal movement or mechanism to produce a screening effect. We can imagine a photon being a sinusoidal string of EM particles shown in Fig 8:

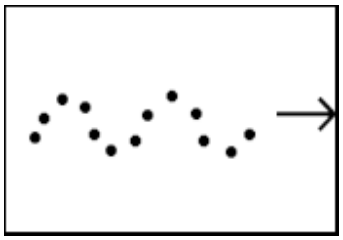

Fig. 8: Photon as sinusoidal string of EM particles with velocity of c

Another way to imagine a photon would be as a very tiny atomic system of particles just like in Fig. 1. But since it would be traveling at the speed of light, and using (2):

$$a = \frac{GM}{r^2}\left(1 + \frac{c^2}{c^2}\right) = \frac{2GM}{r^2} \quad (5)$$

the screeening effect is gone and the true gravitational acceleration obtained in equation (5) must be used:

$$\theta = \int \frac{2GMr_0}{c^2(r_0^2 + x^2)^{3/2}}\,dx$$

That means that the angle of deflection obtained from Particle Theory is:

$$\theta = \frac{4GM}{c^2 r} \quad (6)$$

which is the correct result for the deflection of light!

As we can see, we were able to easily obtain the correct solution for gravitational lensing using Particle Theory and the concept of the screening effect, or the lack their of, as it would be when dealing with a photon.

We have now completey obtained the basic solutions for inertial objects that involve tangential/angular movement around a gravitational

mass using Particle Theory. So far these solutions are exactly what is obtained from General Relativity and was done so effortlessly and without the concept of a curved spacetime.

c) Rest Energy and Electron Radius Approximation

According to [1]

For an atom composed of a system of particles with a total mass m with each particle having an average speed of c (300,000,000 m/s), the kinetic energy becomes $T = \frac{1}{2}mc^2$. In order to contain this, the potential energy, which is carried by the gravity particles in the system, must also be $\frac{1}{2}mc^2$. The total energy of the system, is of course $E = mc^2$, the same as in Special Relativity [1].

According to the observations of a binary neutron star merger, and the detection of both the gravitation waves and gamma ray burst that were both recorder simultaneously [3], it is with great certitude that the speed of gravity is almost exactly that of the speed of light. So it probably can be assumed that half the mass of a bounded atomic system of particles are completely composed of free gravity particles. These particles are almost all absorbed and re-emitted by the EM particles, with a small residual amount escaping and being responsible for the particle's own gravitational force on other particles. We will see how this holds with the approximate calculation of the electron radius.

Using the relation of a particle in a box as a crude approximation:

$$E = \frac{n^2\pi^2\hbar^2}{2mL^2}$$

where we obtain:

$$L = \sqrt{\frac{n^2\pi^2\hbar^2}{2mE}} \qquad (7)$$

where n = 1, ħ = 1.05x10^{-34} J·s, m = 9.11x10^{-31}kg and E = mc^2 we get the approximate radius for an electron of 8.5x10^{-13}m [1]. Particle Theory assumes that atoms are not point particles, and that they have a finite radius and a structure, which makes interactions like elastic collisions possible. Consequently, interactions like neutrinos with electrons which can't interact through the electromagnetic force can do so through collisions, where intermediate bosons like the Z boson is not necessary under Particle Theory.

The potential that contains an atomic system of particles, which involve only gravity particles emitted from the EM particles themselves, is orders of magnitude more than what we would obtain if we used just the gravitational potential equation to formulate the potential using the radius calculated from (7) [1]. This is due to the fact of the collisions at light speed of the EM particles, which shake off a lot more of the gravity particles within such a system [1]. But there is a limitation to this. From (7), we see that with the increase in mass, there's a decrease in the radius, and the higher in density the atomic particle becomes. The frequency in oscillations and collisions would become too large leading to the decaying of massive particles.

Another explanation concerning atomic decay can be the fact that the potential of an atomic system of particles can bound only so many EM particles. Massive particles would eventually decay into more stable masses. This makes sense for the Standard Model, where the more massive the atom, the faster it tends to decay.

d) Schwarzschild Radius

For a massive system of particles in a bounded system, each particle having mass m, colliding at light speed within a radius r for a total kinetic energy T=1/2Mc^2 and using the true gravitational potential and the Virial theorem:

$$< T >= -\frac{1}{2}\sum_{k=1}^{N} < F_k * r_k >$$

obtaining:

$$2 < T >= n < V >$$

and for the total potential $V_{TOT,}$ as defined by the Virial theorem, using the total mass M and the total radius r of the entire system, while using the true Newtoniani potential (1) (since, as we will determine, individual EM particles do not produce a screening effect) [1]:

$$< V >= -\sum_{k=1}^{N} < F_k * r_k >= -2GM\sum_{k=1}^{N}\frac{m_k}{r_k} \approx -\frac{2GM^2}{r}$$

and with n = -1, since $V = \alpha r^n$, we obtain:

$$2(\frac{1}{2})Mc^2 = \frac{2GM^2}{r}$$

which will give us the Schwarzschild radius:

$$r = \frac{2GM}{c^2} \qquad (8)$$

Since the Schwarzschild radius is a feature of black holes, this implies, according to Particle Theory, that when a black hole is formed, all the distinguishable atoms break down into a collection of EM particles, just like that for an atomic system of particles [1]. But an important note: when working with atomic sized particles, usage of the wave equations in quantum mechanics should be used, where in the case of macroscopic bodies like black holes, formulations such as the Newtonian gravitational potential should be used [1].

Since the gravitational potential in black holes are meant to hold particles that are moving at the speed of light, the distinct feature of emitting no light is possible under Particle Theory as the potential is strong enough to hold particles of light speed within its body [1]. But this does not mean that shedding, like in atomic particles, does not occur. It could do so due to internal screening which may allow particles on the surface to escape just as in an atomic system of particles [1]. To what extent it may vary, but this may give some credence to Hawking Radiation under this model [1].

e) Time Dilation

The velocity dependency of the screening effect and in turn the varying internal movement of an atomic system of particles is also the cause of the relativistic effects such as time dilation.

In Section VII of [1] there is two possible ways time dilation is possible according to Particle Theory. One way involves the reduction of the shedding affect when an atom has a directional velocity. The reduction in shedding reduces the potential of the nucleus, reducing the orbital speed of the electron.

Another possibility is that the orbiting electrons themselves require a reduction in orbital speed as the electron orients itself toward the direction of the velocity. As it approaches the speed of light, the orbital speed approaches zero since the limit to its velocity must be the speed of light.

The slow down in the orbit, or angular frequency of electrons, which govern both atomic and macroscopic systems such as electrical and mechanical processes (and as a result biological processes), would result of a slow down in these processes themselves [1]. The proper time then being inversly related to the velocity and as such the angular frequency of bounded electrons is the time of an observer at rest multiplied by the inverse Lorentz factor as in Special Relativity:

$$\gamma^{-1}=\sqrt{1-\frac{v^2}{c^2}} \tag{9}$$

and the proper time being:

$$d\tau = dt\sqrt{1-\frac{v^2}{c^2}}$$

For a bounded atomic system at rest but under a gravitational potential, time dilation is also the result of a reduction in angular frequency [1]. As an example, a quantum system under a perturbation of a non-zero potential gives us $E_n \approx E^0_n - V$ where $V=\frac{GMm}{r}$ (half the true Newtonian value for an atomic system at rest). For a particle in a box, where $E_n \approx \hbar\omega_n - V$, where h is the reduced Planck's constant and ω is the angular frequency, and making $E_n = E' = \hbar\omega'$ and $\hbar\omega_n \rightarrow \hbar\omega$ we obtain: $\hbar\omega' = \hbar\omega - V$ which means $\omega' < \omega$ [1]. To find the correct solution, we use the inverse Lorentz factor (9), and equating the kinetic and potential energy change, $(\Delta v)^2 = 2GM/r$, where $\Delta v \approx r\Delta\omega$, and since $\omega' = 0$ means $d\tau = 0$ at the Schwarzschild radius as we will explain in the next subsection, we have:

$$\gamma_{GR}^{-1}=\sqrt{1-\frac{2GM}{rc^2}} \tag{10}$$

the same as it is obtained from the Schwarschild solution.

f) Gravitational Redshift

In the last section we determined that time dilation, as a result of a gravitational force, was the result of the reduction of the angular frequency of electrons in a bounded system. This would also affect the wavelength emitted from such a system, as the energy levels are shifted due to the presence of a gravitational acceleration.

From the calculation of the Schwarzschild radius we did previously, we determined that a black hole's gravitational strength can contain particles (like photons) within their bodies. This would indicate that the wavelength of a photon from it should be infinite such as predicted in GR. In Particle Theory, this is interpretated as the angular frequency being zero for the electrons in an atom. Since:

$$\lambda_\infty \propto \frac{1}{\omega'}$$

and using (10) for the angular frequency:

$$\omega' = \omega\sqrt{1-\frac{2GM}{rc^2}}$$

we have:

$$\frac{\lambda_\infty}{\lambda_r}=\frac{\omega}{\omega'}=\left(1-\frac{2GM}{rc^2}\right)^{-\frac{1}{2}}$$

and defining the change of wavelength z as:

$$z=\frac{\sqrt{1-\frac{2GM}{r_2c^2}}}{\sqrt{1-\frac{2GM}{r_1c^2}}}-1 \tag{11}$$

and since $\lambda_\infty \rightarrow r_2 = \infty$ and making $r_1 = r$ we obtain:

$$z=\frac{\lambda_\infty}{\lambda_r}-1=\left(1-\frac{2GM}{rc^2}\right)^{-\frac{1}{2}}-1$$

for the red shift from the surface r of the gravitational mass for an observer infinitely far away (λ_∞), which is the

same for the gravitational redshift according to GR. For the calculation of the blueshift, such as in the Pound–Rebka experiment [4], equation (11) would be used to obtain the theoretical result, as the angular frequencies, or in the relativistic sense, the "clocks" of both the transmitter r_1 and receiver r_2 of differing heights must be taken into account.

Another approach to explain the gravitational redshift is the gravitational force acting on the photon itself, slowing it down and increasing the wavelength, not by stretching its length, but by decreasing the frequency due to the deceleration of the photon itself due to the gravitational force. But since the the speed of gravity is the same as that of light [3], the only way for this to possibly occur is by gravity particles coming ahead of the photon, or light corpuscle, at its sides as shown in Fig 9.

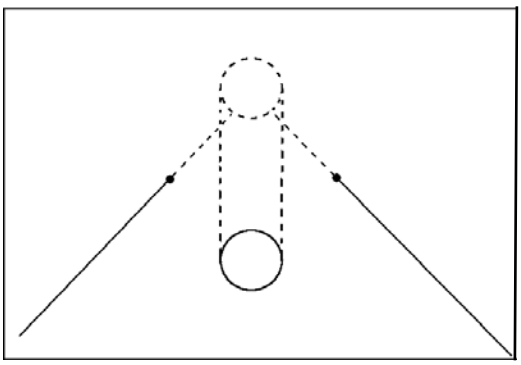

Fig. 9: The path of a light corpuscle and two gravity particles approaching from its sides

But that sets even more limitations for this approach, as the gravity particles approaching from the sides is cut by a fraction of which depends on the angle made with the path of the photon. Stronger gravitational fields may have a heavier influence by this approach.

Another problem with this approach as explained in [1]:

With the previous instances such as with the two body problem and gravitational lensing, both involved the particles moving around the gravitational potential. For small particles moving away from a potential, especially with photons which have such small amplitudes, the gravitational flux such that of a weak field would have much less influence on photons than much more stronger fields, especially when the separation of the gravitational particles emitted by a body can eventually equal the amplitudes of these photons shortly after leaving the surface of a stellar body as (shown in Fig 10) [1].

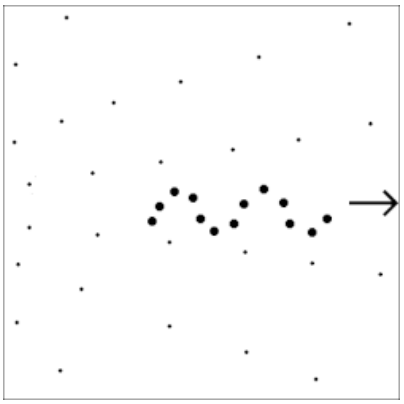

Fig. 10: Photon moving away from a gravitational particle field [1]

IV. Alternative to Relativistic Mass

In this section I will quicky go over the concept of how Particle Theory explains the results of relativistic scattering and provide an alternate to relativistic mass. For further details of this and this theory's interpretation of the Klein-Gordon equation, refer to [1].

According to [1]:

Particle Theory provides a different interpretation to relativistic mass proposed by Special Relativity. Under Particle Theory, the structure of a system of particles is retained by the collisions that create a gravitational potential many orders of magnitude normally obtained by the law of gravitation. When a system of particles are moving in a specific direction, these collisions starts to reduce in intensity and frequency, and consequently in the reduction of this inner potential.

Due to the reduction of this potential as the system of particles orient themselves in the direction of its velocity, the structure itself weakens. As such, the influence of any external electric or magnetic potential is reduced as the internal structure weakens especially at relativistic speeds. Another interpretation that can be made is that a reduction of the internal potential increases the radius of the entire system of particles, where the particles from EM fields have more of a chance of going straight through the system without any interaction. Or the opposite may be the case, that is, a shrinking in size of relativistic particles due to the reduced impact of internal collisions may also explain the reduced influence from an external EM field. This also may explain how deep inelastic scattering is possible in electron-proton scattering, since the size of the relativistic electron must be small enough to be able to strike the constituent quarks of a proton.

This is not the case with a gravitational potential, as the gravitational acceleration's inertial mass invariance, where, due to the size of gravity particles being orders of magnitude smaller than that of

an EM particle, the permeation of such a field through a system of particles is far higher than that of an EM field.

Another concept not yet discussed is relativistic inelasticity. For a non-relativistic particle approaching a wall of atoms, exchange of EM particles (static field) between the particle and the wall slows down the particle, and then accelerates it away from the wall (elastic), if not slightly penetrating it (inelastic). But for an atom approaching the wall at relativistic speed, the shedding from the atom itself is reduced significantly, where most of the EM particles used to slow down the atom would come from the wall. Also add to that the reduced influence on the static field on a relativistic atom, as mentioned earlier, the atom penetrates the wall much farther if it doesn't elastically bounce back towards the opposite direction. This relativistic elasticity make it seem as if the atom has increased mass and therefore increased energy, similar to the concept of relativistic mass.

V. Black Holes

Previously we've stated that a black hole consists of what was distinct and distinguishable atoms, such protons and electrons, that have been broken down into a very dense collection of individual EM particles all moving at the speed of light, just like an atomic system of particles but in a massive, macroscopic scale. This is in contrast with black holes being a singular, point-like mass.

Using the energy for a particle in a box (7) we calculated the electron radius to be roughly 8.5×10^{-13}m. Instead, using the gravitational potential (2) to find the radius we can compare the difference in density. Now we have for an electron $mc^2 = 2GMm/r$ and since this is a self bounded system, $m = M$ we have $r = 2GM/c^2$ which is just the Schwarzschild radius. Using m = 9.11×10^{-31} kg for an electron, we obtain a radius of 1.35×10^{-57}. This is over 20 orders of magnitude smaller than if using the quantum equation. Such a system of particles such as an electron would most likely immediately evaporate since the frequency of collisions due to its great density would be massive.

But for macroscopic systems like black holes, the massive mass would make such a system stable. We can think of such a macroscopic system of particles have continuous gradient of decreasing pressure the further from the center of the black hole you go. But to simplify things we will treat as a two layer system, a core and an outer layer shown Fig 11.

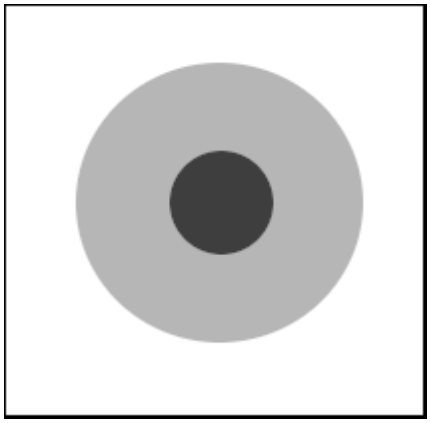

Fig. 11: A black hole with a core (in black) and an outer layer (in grey)

We will now consider the possibility of emissions of EM particles from black holes that do not fall back in as suggested by Hawking [5]. If the screening effect solely consists of emissions of particles aborbing gravity particles as it leaves the system, then radiation of particles from black holes is necessary, since just like for atoms, a macroscopic system of EM particles such as black holes must have a varying screening effect to produce the effects of General Relativity such as the relativistic perihelion precession of a binary system of black holes [2]. Although, keep in mind, as stated in a previous section, the screening effect could also be the result of the internal movement of the system itself, where gravity particles might have a hard time connecting with EM particles due to the rapid oscillations of these particles. Whether its either/or, or if they both play a role to some degree is uncertain.

Two possibilities concerning particle emissions from black holes, if such a thing occurs, will be discussed here: the first one involves the outer layer (Fig 11) shrinking due to the emission of particles, and the second one involves the shrinking of the core from a loss of momentum due to a drop in frequency of the oscillations. The shrinking of the black hole is assumed since the Schwarzschild radius asserts that the radius decreases as the mass of the black hole decreases.

In the first case, the outer layer of a black hole acts as a padding that limits the momentum transfer to the surface of a black hole from the high rate of particle collisions of the core. The momentum transfer results in the emissions of EM particles from the surface of the black hole. This also causes the the speed and frequency of collisions in the core to slow down. This results in a momentary shrinking of the core, but then regains its size and pressure as the outer layer falls in due to the prior reduction of pressure and strength of the core. With the size and pressure of the core restored, the final result is a reduction in thickness of the outer layer, reducing the padding effect which increases the momentum transfer from the core to the surface of

the black hole, and as a consequence increases the particle emissions from its surface.

In the second case, as the core transfers momentum to the surface, the core shrinks, maintaining its pressure but reducing in size, while the outer layer retains its thickness. Due to the reduction in size of the core, the number of collisions at high frequency of the core is reduced, ultimately reducing the amount of gravity particles released from such collisions. As the core is a major source of gravity in a black hole system due to its intense pressure, the gravitational pull of the outer layer due to a shrunken core weakens, which also, as in the first case, increases the emission of particles from the black holes surface.

In both cases, the emission of particles increases with the decreasing mass of a black hole. This is in line with Hawking's prediction according to (12) [5], where $M_\odot$ is the solar mass, and M is the mass of the black hole, with $^\circ K$ being the temperature in degrees Kelvin.

$$T = 10^{-6}\frac{M_\odot}{M}\ ^\circ K \tag{12}$$

With a decreasing mass there is an increase in temperature, or an increase in particles emitted from a black hole, according to Particle Theory, if such a process occurs, falling in line with Hawking radiation [5]. Although, regardless of whether or not EM particles can escape the surface of a black hole, gravity particles obviously can and must leave a black hole, which evidently would also reduce the mass of black holes, as for any other system, but to a degree much less than whole EM particle emissions from its surface.

The next sections will quickly go over certain topics in physics and their possible explanations of these phemomena under Particle Theory.

VI. Dark Matter

Dark matter is the substance that consists of approximately 85% of all matter in the universe which is theorized to explain the observed rotational velocities of galactic systems. In a previous paper [6], I've proposed the idea of dark matter as being concentrated macroscopic singularities outside of galaxies rather than a halo of not yet defined particles permeating all throughout galactic clusters. But the problem with this concept is that such macroscopic systems would create internal gravitational lenses that would be noticeable if true. Instead, I am proposing a new concept that is quite similar to the halo model, but defines the particles that make up this halo.

Consider an atomic system of particles, like a proton or electron, which are composed of individual EM particles colliding with each other. Now imagine them collapsing into itself, creating a singular ball of entangled gravity particles shown in Fig 12:

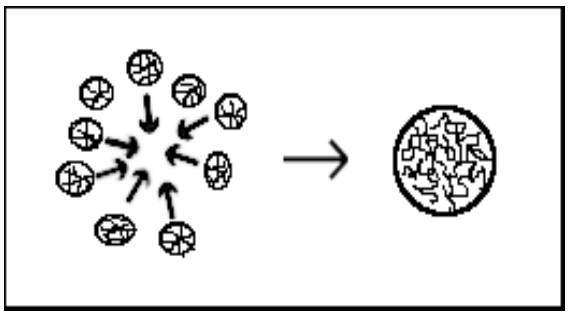

Fig. 12: EM Particles collapsing into a single ball of entagled gravity particles

Since all the EM particles have been broken down into a single ball or particle, no longer can this particle be influenced by or produce an electromagnetic force. It can only be influenced by or produce the gravitational force. And since these small EM particles, which are also balls of gravity particles but smaller, converged into one giant body of entangled gravity particles, the vibrations are more intense and of higher frequences. This results in the intense emissions of gravity particles compared to just an atomic system of particles of the same mass. But whether or not these particles can be created from collapsed atoms, or only from or shortly after the big bang, will not be discussed here.

VII. Gravity Particles

In the introduction, I described and provided an illustration (Fig 2) of what a gravity particle may look like. Of course, if such particles existed, we may never know what they look like, or the possible mechanics they obtain. The theory in PT goes as far as defining atoms like electrons or quarks as not being indivisible, but being made up of a collection of smaller, and still divisible particles. The shapes or structures of these particles as I describe them only serve as a hypothetical model to explain all the different phenomena involved in the electromagnetic forces and gravity.

If we recall from gravitational lensing, where we defined a photon as a sinusoidal string of EM particles with velocity of c, in order for such a structure to be affected by the gravitational force, the vibrations of the entanglement gravity particles must still hold even if the EM particles are traveling at light speed. This is in contrast with EM particles that make up an atom, as their internal movement decreases as its velocity increases, approaching zero at light speed, where it can barely, if not at all, be affected by an external electromagnetic field.

But because the vibrations of entanglement gravity that make up EM particles are preserved, it may be possible to accelerate an atom beyond the speed of light using just the gravitational force. How much faster all depends in how long these vibrations are preserved as with the increasing, faster than light velocity. It may

even be possible for the internal movement of the EM particles in an atom to be preserved as long as the acceleration is caused only by the gravitational force.

VIII. Background Independence

General Relativity, unlike quantum theory, is background independent, which means it has no fixed background. In a quest for quantum gravity, this is one of the problems one must face. Some schools of thought say that a theory of quantum gravity should be background independent.

But because Particle Theory can explain the relativistic effects of gravity through the internal mechanism of atoms, then spacetime curvature is no longer needed to explain such phenomena. It is a property inherit to the atom itself just like the charge or spin of the atom. Although this property is dynamic and not static, relativistic field theory has no problem in dealing with dynamic properties, like the relativistic mass, for example. Therefore, under PT, background independence is not necessary in describing the relativistic effects of gravity.

Relativistic theory also describes interactions of particles through exchange of bosons, while PT explains these interactions through particle fields and elastic or inelastic collisions due to the fact that atoms under PT are not point particles. But this is no reason to replace or modify the mathematics of quantum field theory, as it accurately describes three of the four fundamental forces. Even with its limitations of treating atoms as point particles, renormalization fixes these issues quite successfully. Whether other limitations arise from treating atoms as point particles, then the treatment of atoms as a system of particles may become necessary.

IX. Gravitational Waves

General Relativity predicts the phenomena of gravitational waves and was confirmed by LIGO [3] quite recently. Under Particle Theory, this is interpretated as a varying particle field emission of gravity particles created by a binary star merger shown in Fig 13, although the proper emissions should look light a spiral. The varying density of the particle field emission as it travels out from the source gives it its wave-like quality. Einstein's field equation has accurately calculated different variations of these events, whether it involved two black holes, two neutron stars, or one of each. GR as a model is always useful as far as macroscopic phenomena such as these are concerned.

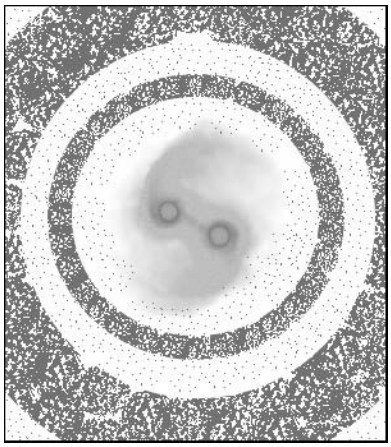

Fig. 13: Varying density of gravity particle emission emitting from a binary star merger

X. Dark Energy

Particle Theory may provide an explanation to Dark Energy, which is the name given to the mysterious energy that is causing the accelerated expansion of the universe. An atom at rest will shed EM particles equally at all angles. But for an atom with a non-zero velocity, the shedding might not be uniform. Since the velocity of EM particles must be the speed of light, the EM particles leaving the direction of the velocity must be slower than the particles leaving the back of the atom. This is shown in Fig 14, which shows a velocity change under a center of momentum change during the shedding process.

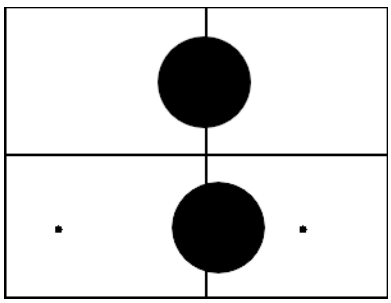

Fig. 14: Center of momentum frame of an atom with a non-zero velocity in the x-direction with the resulting, shedding in the bottom frame after a time transition

So this acceleration is the result of the exchange of the internal movement and internal energy of an atomic system of particles to the directional velocity of the atom itself. Of course as the particle reaches the speed of light, the internal movement, or the motion of the EM particles perpendicular to the directional velocity, will approach zero. The acceleration then may be proportional to $v\sqrt{1-v^2/c^2}$ shown in Fig 15:

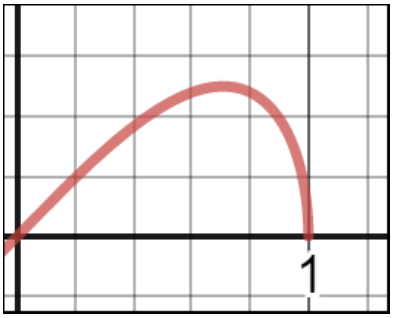

Fig. 15: Acceleration vs. Velocity where speed of light c=1

XI. Magnetism

We will quickly go over how magnetism works under Particle Theory. Picture two proton and electron pairs over each other. Fig 16 shows only the electrons from both systems.

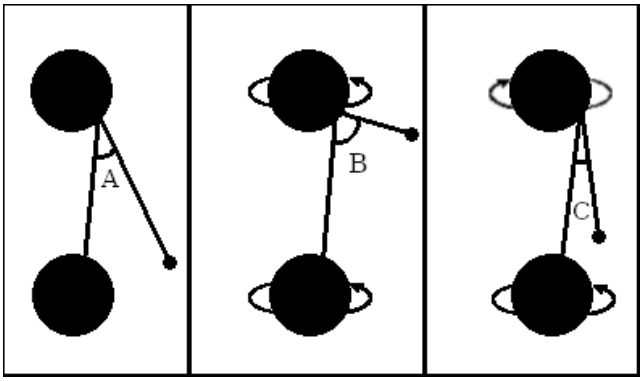

Fig. 16: Two electrons shown without spin, with same spin, and with opposite spin and an EM particle emission and collision and the resulting angles

In the left frame of Fig 16, an EM particle from the bottom electron elastically collides with the top one, an angle of A, the momentum exchange in which we will consider this to give a full repulsion effect. If we calculate the total charge interactions, between the electrons and protons in all instances, we obtain (13):

$$Q_{TOT} = q_{ep} + q_{pe} - q_{pp} - q_{ee} \quad (13)$$

Where ep and pe is the proton-electron attraction charges and pp and ee is the proton-proton and electron-electron repulsions.

For the first example in Fig 16 we have:

$$Q_{TOT} = 1 + 1 - 1 - 1 = 0$$

which suggests no magnetic attraction or repulsion due to no spin of the electrons. But in the next frame of Fig 16 (middle), due to the electrons spinning in the same direction, an angle of B is made which is wider than A. The momentum exchange in this case reduces the momentum in the y-direction given to the top electron compared to first case, having it not produce a full repulsion effect. If we interpret this as having a charge (or repulsion factor) of less than one, say $q_{ee} \approx 0.95$ and using (13) we obtain:

$$Q_{TOT} = 1 + 1 - 1 - 0.95 = 0.05 \quad (14)$$

As we see from (14) there is a non-zero, positivie charge left over, which is interpreted as an attraction force between the two proton-electron systems as it should be for the magnetism of two same spin electrons.

In the last frame (right) of Fig 16 we have both electrons spinning in the opposite direction. This causes an angle of C being made for the path of the EM particle. Since the angle of C is smaller than in the non-spin case A, the momentum exchange creates a repulsion factor bigger than in the non-spin case. Using (13) and setting $q_{ee} \approx 1.05$ we have:

$$Q_{TOT} = 1 + 1 - 1 - 1.05 = -0.05 \quad (15)$$

Now the total left over charge being a negative would be interpreted as a repulsion force between the two systems, as it should for two opposite spinning electrons.

We see now how we can explain the magnetic affect using Particle Theory in a very understandable way. When compared to the static field, one must remember that due to the spin, the divergence of the field of a magnetic dipole is not constant at the spin axis, which will vary the field by distance much higher than a static electric field.

XII. Anti-Gravitational Applicalion

The screening effect for a particle at rest, according to Particle Theory, blocks and absorbs half of what is the true gravitational potential which is just twice the normal (1). If one can increase the shedding of EM particles that produce such an affect, through very high oscillations, or in simple terms, “shaking” an atomic system of particle shown on the right of Fig 17, one can reduce the influence of the gravitational potential by more than half. This would manifests itself as the emission of high energy photons.

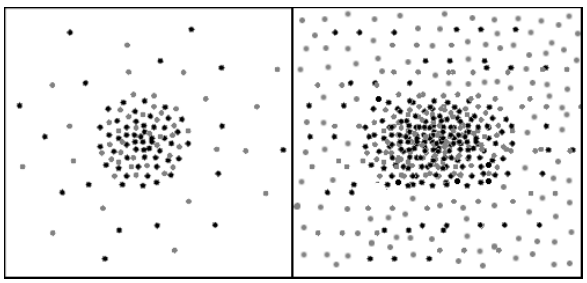

Fig. 17: Left shows an atom shedding at rest. Right shows an atom with increased shedding by oscillating at a high frequency

These emissions can be produced through Bremsstrahlung scattering. Such a system must produce these high energy photons directed towards the gravitational mass, which would create an anti-gravitational effect due to the increased screening effect as the photons absorb gravity particles from the gravitational source as it travels towards it.

XIII. Conclusion

We've reviewed many aspects discussed in my last paper [1] but mentioned briefly many more aspects pertaining to the subject of Particle Theory. But we've only scratched the surface. The future scope of this research would be in using the concepts of PT to solve the problems purposed by quantum gravity, but also to tackle other aspects, such as the strong force under PT, which I have not mentioned here but will be discussed in detail in its own paper. Confirmation of experiment results given in [1] as well as confirming any anti-gravitational effects through high energy photons must also be ventured upon. Confirmation of these phenomena predicted by PT may prove some, if not all aspects of this theory.

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Polarizing Magnetic Field Generator

By F. F. Mende

Abstract- Around the conductor with the current there is a magnetic field. If with the aid of the external current source was excited in the solenoid, or cylinder, thus it will be such to magnet with the appropriate poles. In the article is described the polarization generator of magnetic field, in which the magnetic field is created with the aid of the rotation of the polarized conducting cylinder.

Keywords: *magnetic field, electric field, polarization, rotation.*

GJSFR-A Classification: *FOR Code: 240203*

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Polarizing Magnetic Field Generator

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I. Description of the Generator

Around the conductor with the current there is a magnetic field. If with the aid of the external current source was excited in the solenoid, or cylinder, thus it will be such to magnet with the appropriate poles.

Figure depicts the diagram of the polarization generator of magnetic field.

Generator consists of the revolving cylinder, around which two conductors are located. If we between the cylinder and the conductors create a potential difference, then cylinder is polarized along the line of that connecting conductors. During the rotation of cylinder its polarization, caused by the presence of free electrons, will remain fixed, while the lattice of cylinder will revolve, which is equivalent to the excitation of current in the cylinder. The current indicated will convert the revolving cylinder into the magnet, as shown in figure.

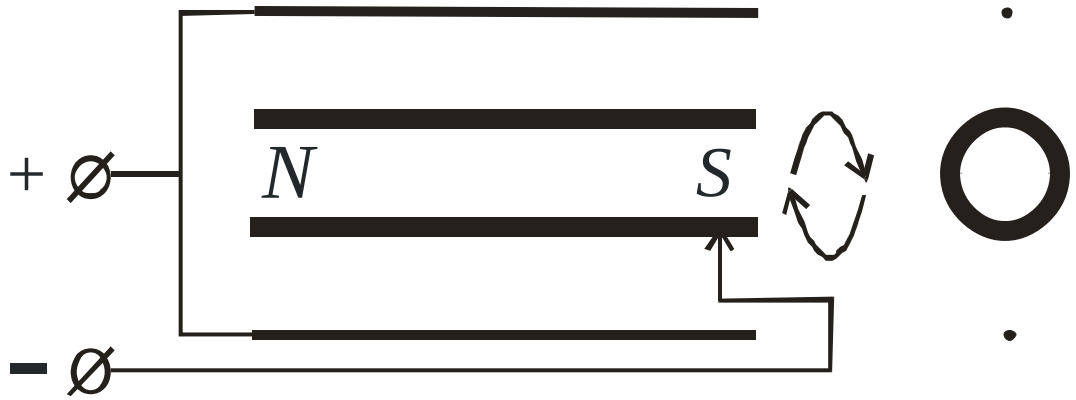

Figure 1

Below is a photo of the experimental model of the generator. It includes a high-speed motor that provides three speeds of rotation: 30000, 40000 and 50000 rpm (left side of the photo) and a rotating cylinder made of German-silver.

This cylinder is placed in the the transparent of plastmassov to shell. In parallel to German-silver cylinder are placed two electrodes, on which will be supplied voltage about 30 kV from the elektroformnoy machine. The appearance of magnetic field near the face of German-silver cylinder is fixed with the aid of the compass (it is visible in the end of the right side of the photograph). Throw of the pointer of compass during the rotation of cylinder from its stationary position is the greater, the greater the speed of the revolving cylinder.

Author: e-mail: fedormende@gmail.com

Figure 2

II. Conclusion

Around the conductor with the current there is a magnetic field. If with the aid of the external current source was excited in the solenoid, or cylinder, thus it will be such to magnet with the appropriate poles. In the article is described the polarization generator of magnetic field and its diagram is given, in which the magnetic field is created with the aid of the rotation of the conducting cylinder polarized in the electric field.

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Science of Information

By A. K. Mukhopadhyay

North DMC Medical College

Abstract- Nature and character of information defy observable, positivistic, and reductionist science. Still, a science of information could be possible with logically woven ideas expressed in a common universal language in the third person's perspective connected with the physical science of matter, energy, space and time on the superficial hand, and the cognitive faculty on the deeper hand. With the thread left out by twentieth century's science the paper begins with a linguistic analysis of information, narrates its properties, mechanics, different geometrical states, and relates dark energy of cosmology with visible energy of cell biology with credible impacts on science, humanities, and consciousness studies.

Keywords: information mechanics, information states, information geometry, dark energy and information, consciousness and information.

GJSFR-A Classification: FOR Code: 020199

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Science of Information

A. K. Mukhopadhyay

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I. Introduction

In the twentieth century Einstein dealt with space and time in the Theory of Relativity. The matter and energy were dealt in Quantum Mechanics by the Quantum physicists. This dealing was almost complete and as a result the material science has been enthroned at its highest peak. Einstein also connected matter and energy with his famous equation $e=mc^2$. Matter and space remained associated with each other till such space, which is empty of matter, the zero-point-energy (ZPE) state, which Einstein abandoned but described as a cosmological constant. Thermodynamics took care of the science of energy too, up till the boundary of the entropy barrier.

With such development, the physical science of matter energy space and time sets a horizon that is limited by the constancy of the velocity of light, Planck's constant and the constancy of the entropy barrier. Einstein's constant, the velocity of light, however, excludes simultaneity of events. Planck's constant excludes continuity of events. Entropy barrier excludes identity of events. There is no scope of investigating such events with the equations/relationships established by the twentieth century's science. Also, there is no room or even any symbol for "information" in any of such formulations in science.

Many quantum activists assume that quantum physics is all-encompassing, and every event of this universe could not only be explained, but could also be predicted by quantum physics. The argument against such a view also exists. Should quantum physics not have any natural limitation as a boundary, why there are findings regarding the existence of the quantum void and quantum holes (black hole, wormholes, and white hole), which raise questions like *quo vadis* quantum mechanics [1] and *undevenis* quantum mechanics? The "holes" could be described only in the context of a boundary of systems! Scientists, starting from Subrahmanyan Chandrasekhar in 1983 to Sir Roger Penrose in 2020, have been winning Nobel Prize for their work on such "holes" in the boundary.

Nature, it seems, does not end with the scope and horizon of quantum physics. Deeper to nature, where the laws of classical physics apply (nest I) there is nature where the laws of quantum physics hold good (nest II). Deeper to quantum nature, there are pre-quantum nature (nest III), and pre-prequantum nature (nest IV) before nature merges into unconditional consciousness (nest V). We are to investigate nature and consciousness with the framework of a Pentaune (Five-in-One) model of nature-consciousness [2,3].

Einstein had stopped at the space having no connection with the matter, i.e., at ZPE! The energy at ZPE is not the mundane energy which could be equated with the matter by his equation. It is non-observable energy, fluctuating at the gateway to the terrain of dark energy! Although called Einstein's cosmological constant, the value of this intangible near-zero energy is never constant and shows wide fluctuation, and the science must ask why? Is it that an unimaginably vast source of non-observable energy has been peeping through this ZPE? ZPE is omnipresent within the boundary of the universe and is proposed to be harnessed by the living cell during inter-conversion of various information-states within.

Every scientific formulation is a construction of a developed human mind! That is why mind is so important for physics too. Einstein has emphasized this on many occasions. The human mind sets the horizon for science according to cognitive limits [4]. We have another way to go beyond this set limit, the way of imagination! Einstein also emphasized on the role of imagination beyond the mundane functions of mind. According to him, imagination was more important than knowledge. For spiritualists like Ramakrishna Paramahansa from India, enslavement or freedom of a man depends on his state of mind. Buddha's whole emphasis is on getting a clean active poised mind. Swami Sivananda of Rishikesh, India, said, "That which separates you from God is mind. The wall that stands between you and God is mind" [5]. According to Sri Aurobindo, on the other hand, the mind is the vehicle of

Author: North DMC Medical College & HRH and All India Institute of Medical Sciences, Delhi, India. e-mail: mukhoak1953@gmail.com

consciousness. Taking all such views into consideration, it may be stated that the mind functions as an organ of communication between the two conscious systems. Mind is the final common platform to connect consciousness with the material plane. In this sense, the mind is the organ that actively operates for inter-conversion of a signal in the physical plane and information in the conscious plane. Mind reports to the faculty of self in the cognitive organ.

There are also human states when the mind breaks down and the being does not mind about any event, phenomenon or situation but operates as a passive but conscious observer, as a "witness" of the event when many of the happenstances are noted to be continuous, simultaneous and identical. Sri Aurobindo describes several planes of higher-up mind such as overmind, illumined mind, intuitive mind, supermind and finally he describes the plane supervening on the mind, as "supramental" [6]. We envisage twenty first century's science to revolve around (i) science of information and its various states, (ii) different operations of the mind, and (iii) the biology of dark energy and dark matter. Three areas seem intertwined and connect the cognitive domain of consciousness, cosmology, and space time matter energy.

From the beginning of this century, a transdisciplinary science has been emerging in the name of cybersemiotics [7,8,9]. With the first transcendence of the present domain of science from its positivistic base to a non-quantifiable domain, the discipline is engaged in sign, semiosis, communication, mode of understanding, phenomenology, hermeneutics and the systems but avoids the use of the subjective word "mind". On our way forward, we are yet to define two more transcendences for understanding the science of information in the context of the Multiversal Worldview.

The Multiversal Worldview has been propounded by the author since 1984-1985, which deals with the scientific revolution that follows triple transcendence [10]. While the first transcendence is from the quantitative positivistic domain of nature to the non-quantifiable domain, the second transcendence is directed from the non-quantifiable domain to the domain of the quality of nature. In the context of cosmology, the second transcendence is from ZPE to the boundary of the universe while the third transcendence is the transcendence of the boundary of the universe to get into the domain of the multiverse [11]. The third transcendence could be described as an over from the domain of the quality to the non-qualifiable domain of unconditional consciousness. The *Essence* from which several universe(s) have been originating and in which several universe(s) have been annihilating is non-qualifiable awareness in unconditional consciousness. In spiritual practice, non-qualifiable awareness is considered as "*Brahman*" that executes its operations through Mother Nature, the *nature* of all natures which operates as the executive front, the kinetic pole and the mobile facet of consciousness. The spectrum of cognitive organs extends deep into this unconditional consciousness and surfaces as the 'mind' superficially. In the domain between the mind and consciousness, there are two more faculties; the sentient entity, the faculty of self, and the homeostatic entity, the faculty of life. The mind is the event-making faculty while consciousness could be considered as the will-making faculty, and the event-manager. The faculty of life characteristically manages three homeostases; uncertainty-certainty homeostasis, asymmetry-symmetry homeostasis and dark energy-visible energy homeostasis. Four cognitive faculties namely consciousness, self, life, and mind, together with information, constitute the systems psyche [12].

A series of ontological reversal follow the third transcendence. For example, Multiverse determines the course of the universe. Cognition does not build up consciousness. Consciousness guides cognition. The source of consciousness is not the brain. Consciousness drives the brain for its manifestation. Genes do not drive information. Information drives the genes. Time does not guide information. Information generates its own time, etc., etc. In this sense the Multiversal Worldview following the third transcendence carries the Power of several new formations.

As the nineteenth century had been busy with classical physics and the twentieth century with quantum physics, so the twenty first century's science will revolve around various information states, the biology of dark matter and dark energy and the cognitive organ, its faculties, and operations. In the twenty second century, the "life" would be in sharp focus as the source of information. And, the twenty third century is the century for engagement with unconditional consciousness. We are, therefore, at the middle of the five century's science!

II. Science of Information

A. *Previous works of the Author*

The cloudy idea that information is an entity independent of space and time [3] was there in the author's mind since 2000, and got concretized in mid-2004 during a family tour in a sub-Himalayan hill station. It was noticed that with an ontological reversal, the "form" (space time) was generated from the substance of in*form*ation through mind. The idea was presented in the World Congress of Psychotherapy in Buenos Aires in 2005 and was published in a Yoga and Psychotherapy book [13]. The idea was elaborated in greater detail [14] in the author's review of a book, *Quo vadis Quantum Mechanics*, published in *Frontier Perspective* journal. A full research paper on this radical view of information was published [15] in the same journal in 2008. The idea

gained clarity over the years which could be found in an essay titled, "The Self and Its Memes and Genes: Genes, Memes, Self, Brain, Information and Consciousness" [16]. The paper on "Information Hologram" was published in 2012 [17]. In the annual conference, "Towards a Science of Consciousness" held in India in 2013 the author, as a plenary speaker, presented a paper titled, "Setting the Agenda for Science of Information" [18]. The elaborated version was also published as a chapter in the book, *Brain Mind and Cosmos* [19]. In 2019, the author published the structure of information-states as visualized [20]. The present paper is a short review of all such publications and other author's work in the context. It is meant for presenting the interwoven canvas of ideas on information in the Third person's perspectives using a common universal language.

B. *What is Information?*

The signal is not information. A signal is the space time energy construct of information. Information is the unit of communication between two conscious systems. The organ which could extract information out of signal has been called 'mind' by the linguistics. We have defined the mind as the organ of communication between two conscious systems. Information and mind are thus inextricably related. Information is not created in the physical or space time matter energy domain. Information, however, reduces uncertainty in the space time domain. Information carries a specific content. Information is intentional too. The entity having a content, an intent and is capable of reducing uncertainty in the space time domain is information.

New Testament says, "In the beginning was the Word, and the Word was with God, and the Word was God." The Kabbalah paradigm echoes similarly on the beginning. In *Mimamsa*, one out of the six philosophical schools prevalent in Vedic Darshan, it has been said that the matter has come out of information {Padartha = Pada (word) + Artha (matter)}. In the last century, Swami Vivekananda thundered, "I am a Voice without form." The statement conveys, information is prior to "form".

Information has puzzled many scholars. We do not know what could be the relation between information and *unus mundus* of Carl Jung! We are reminded of Wheeler's persuasive argument [21,22] to learn about the world by looking at it in terms of information. Susan Oyama [23] in the book *Ontogeny of Information,* says, "Information is a prime commodity, and when it is used in biological theorizing it is granted a kind of atomistic autonomy as it moves from place to place, is gathered, stored, imprinted, and translated."

The linguistic analysis of the word information is shown in figure 1.

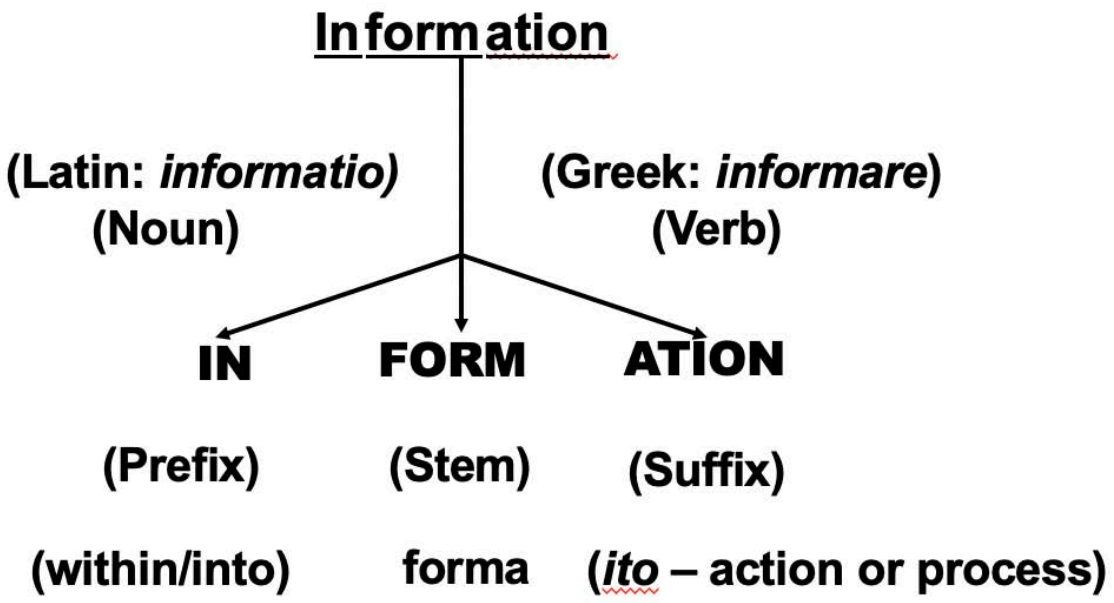

Fig. 1: The self-explanatory figure does linguistic analysis of the word "information". Information is simultaneously a noun and a verb. There is a fusion of ontology and epistemology in its nature

Information is that entity which connects the local domain (of space time matter energy) with the nonlocal domain (of mind self life and consciousness) of nature. Unlike consciousness, information could be a particulate entity in phase whose location, content, and context are addressable. Unlike any other particulate entity, information could be independent of energy and matter, space and time, and thereby can exist in a location-non-addressable, content-non-addressable, and context-non-addressable state.

Communication between conscious systems in both small and large scales happens with the

information. The communication achieves accomplishment when the recipient understands what has been communicated. Since the mind has different states, which widely vary with the environment and the being, the issue of contingency is implicit in the meaning extraction. Information while in its original abode at pre-quantum nest of nature does not need to move anywhere for the purpose of communication. It is the receptivity of the systems that is important for such communication. Within the local domain of nature, information moves on the vehicle of matter/energy with a speed as achievable by them. In the web of communication, a single cell, human being, and the cosmos have been suggested to be connected [24]. With 10^{11} stars in the galaxy, and 10^{11} galaxies in the universe, and 10^{11} neurons inside the human brain, science has found some comparable data between cosmic web and neural network [25]. How the complex spatial information is communicated between the galaxies in patterning the web constructed by a unicellular slime mould [26], has raised profound questions for communication science.

C. *Properties of Information*

Information could be heard. Writing on the wall could be read and conveyed. However, information-as-such are not observable! What observed are data, signals, and facts! Information could not be measured since apparently small information can have huge impacts and a mountain of so-called information might turn out to be junk. What could be measured is the reduction of uncertainty following the appearance of information. Information could not be reduced, since the attempt of reduction might lead to the propping up of new information! What could be reduced is the content of information that might change again the information itself. Such a puzzling element, an irreducible fundamental, the universal connecting fabric has some astounding properties.

1. Any single information has the ability to be present simultaneously everywhere in the universe (a property of spatial nonlocality), also to be present at any and every point of time (a property of temporal nonlocality). The property of omnipresence is found to begin with an entity like information.
2. All information is present simultaneously and instantaneously at any given point of space and time and in every point of space and time.
3. Despite being originally pre-spatial and pre-temporal, it remains in the potential (waiting) phase for an opportune moment to become active for causal execution, creative emergence and a new creation in the space time domain.

D. *What is the Domain of Nature where Information Operates?*

Information is independent of space, time, and visible energy and the world constituted by space, time and visible energy! The nest of the nature where such independence of information is visible is in the pre-quantum or sub-quantum nest (nest III) of nature, where information exists as a nonlocal entity in-phase and operates as a particulate which is tinier than any known particle/wave package of energy in the quantum domain of nature. According to David Bohm [27], information is in the implicate order of nature. There is no information in the nest V of nature. Nest IV has the source of information. Nest III is the natural abode of information. In the nests II and I, information is carried on the vehicle of a quantum and a classical particle respectively.

E. *How does the information come down to observable Quantum and Classical nests of nature?*

Information comes down to the classical and the quantum nests of nature using the classical or quantum particle/energy as its vehicle. Information enters the quantum domain through the "quantum void"! Information can directly enter the classical domain of nature through the space empty of matter, i.e., zero-point-energy (ZPE), Einstein's cosmological constancy abandoned almost a century back (figure 2).

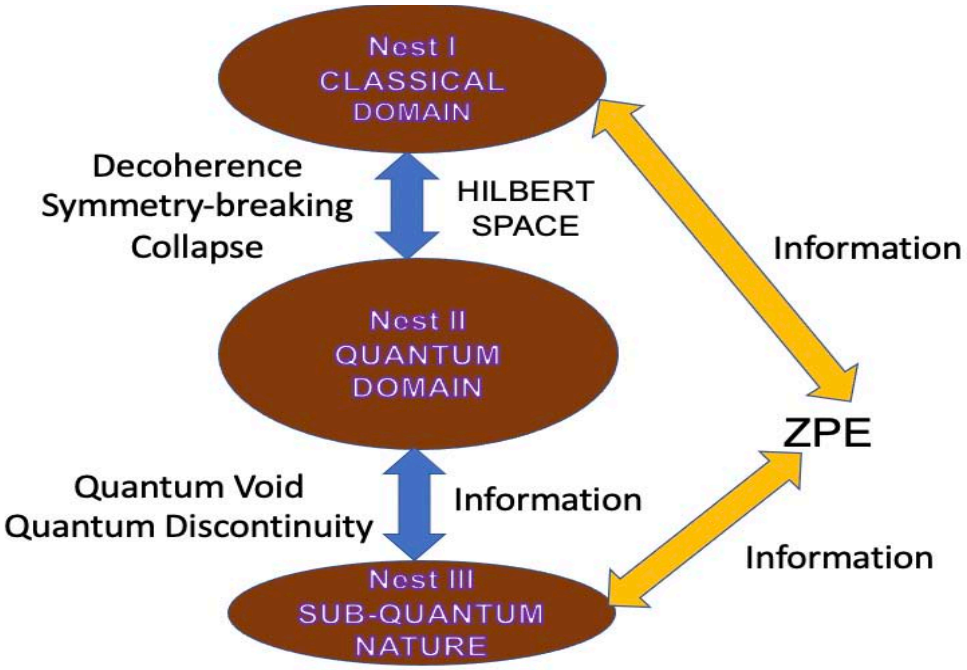

Fig. 2: Shows the communication between nest I (classical domain), nest II (quantum domain), and nest III (pre-quantum domain) of nature. Communication between the nest III and nest II happens through the quantum void and the quantum discontinuity, and between the nest III and nest I through ZPE

When the connectivity is diffuse, e.g. neutrino-shower, one can expect communication through the quantum void. Supracortico-cortical communication in the context of the brain is most likely through quantum void. However, when the connectivity is specific and focussed, one can start speculating that it has been happening through ZPE. One finds the shortest route to the *Essence* of the Multiversity through ZPE. The ZPE is where the system psychology converges with the systems physics, and the systems biology with the systems cosmology.

Within the quantum nest of nature, such transport of information could be the reason behind phenomena such as quantum puzzles and quantum paradoxes [1]. Such information transport at the classical nest could account for occasionally-observed nonlocal behavior and even intentionality in the classical domain [28], although those phenomena are rejected quite often as anomalous phenomena of nature.

F. *Role of Information in generation of Complexity*

A complex system has multiple operators executing several operations. The operations are hierarchically structured. The details of operations and their exact relationship are not clearly known. No known force, field or visible energy is responsible for the element of wonderment in the complexity. The non-observable dark energy might have a role in creation of such puzzle! Here, information plays a role. Information flows between the operators for materialization of the desired outcome. Such a flow of conveyed information accounts for the dynamicity of systems. Intentionality of information might account for unaccounted propelling force. The flow of information is often labyrinthine which is difficult to simplify further for understanding with ordinary intelligence! Inter-conversion of different information states is made possible when the systems has an access to the dark energy domain through ZPE. Frequent silence of operating information offers some degree of uncertainty and unpredictability in the behavioural outcome of the systems.

This complexity is a subject of research in hard science, natural science, social science, deep science, psychology and behavior. The science of information holds the key to unlock what has been considered hither-to complex.

G. *Time begins with Information-split phenomenon*

Scientists differ in opinion when does the Time begin for any event. In the linguistic analysis we have shown that in*form*ation has a "*form*" within its substance. 'Form' is a combination of space and time and the process of 'formation' is understood as organization of space and time. When the information splits into 'form' and energy, 'form' further breaks into space and time. The new time begins then! This is true in the context of formation of the universe in the cosmic scale and formation of a new cell structure in biology or development of a new function at small observable scale. Time begins with information-split phenomenon! The 'split' could also be considered as the *demise* of that particular information. Information does not 'die' in the universe. It is fragmented into space, time, and energy.

According to many philosophers and scientists, time is related to the mind (e.g., Benjamin Libet [29]). Event-making faculty in the cognitive organ is the mind. Time is then mind's creation! Mind is an information-hub. Incessantly, mind conceives information at tandem, in series. This fertility of mind comes from mind's connection with consciousness, while mind's property of infidelity is the result of its connection with the physical world. Consequent to conception of information, the mind delivers in*form*ation's inside as 'form', along with energy. The energy is invisible and belongs to the category of dark energy. The 'form', following rearrangement, might go back to the mind to be processed as "thought", or it breaks down into space and time. In the relationship described, information plays the role of a father, the mind that of a mother while space, time, and energy (dark) could be considered as their three children (figure 3).

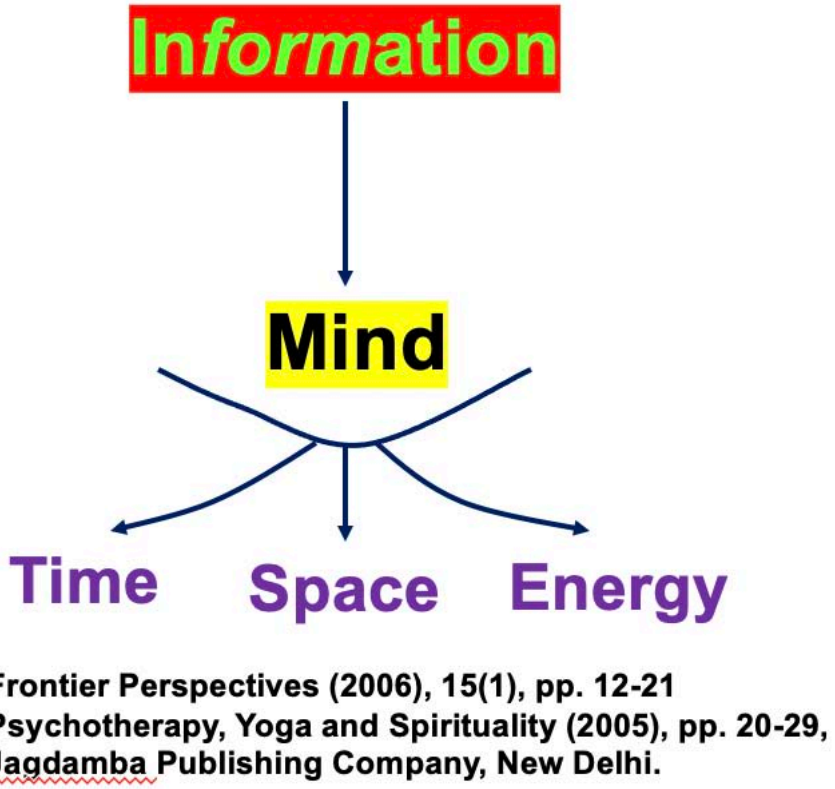

Fig. 3: Information impregnates the mind. The mind delivers space, time, and energy.

Science does not have any mathematical equation to connect information with energy, space and time. However, a relationship of five entities exists. All relationships could not be represented by mathematical equation or by interactive chemistry.

Let me express the happenstance poetically, which had been written in 2005, and published in 2012 [17].

"I was looking at my Mind!
Between Me and Infinity, Often distinct, often an ever-fading line!
It is my Mind!"

"Passively, on itself it winds.
In action, it grows mighty wings.
Between Finite and Infinite
An amazing swing!
It is my Mind."

"On one day Information approaches her,
With passion, aggression and intense desire!

In his captivating charm, she submits to conceive.
Through nonlocal communication she perceives

A command to deliver 'Form',
Which is In*form*ation's inside!"

"The play of Love, Sex and Aggression,
It happens outside scientist's box of vision!
What one observes are only quantum fields!
The measurable entity, within scientist's skill."

"Born are Energy, Time and Space.
Visible children from Infinity's mess!"

"There are Fields and all the more.
Energy and matter, a gala furor!"

"Scientists get busy playing with them.
Conceals Infinity, how It so became!"

H. *Information is enslaving*

The burden of information is enormous. It is said, although not uncontested, that the information in all words spoken and written from the beginning of time to the year 1999 has been estimated to be 5 exabytes (one exabyte is one million terabytes, 10^{18} byte). In the year 2002 another 5 exabytes of information were produced, and by the year 2022 we will be producing 5 exabytes every ten minutes [30]. In addition to this quantitative burden, consider the qualitative and intentional aspect of those bytes! We are drowned in the ocean of information without knowing where we are drowned and what the consequences are!

Having conceived information, mind creates information's own space and time for its manifestations. A powerful information can stop a less powerful one, and captivates mind for its own manifestation. There are ample examples in day to day life when we observe competitive information overpowering our mind and getting event realized on priority. Unknowingly, unconsciously we all are enslaved in the process of manifestation of information. Information uses us for its own manifestation by space time formation. Our systems psyche is an information hub. In absence of information the systems psyche is silent, still, empty and appears as nothing. Consciousness, on the other hand, is the one that looks after what all have been happening in our faculty of mind, self and life in term of quality management of different information. Therefore, it is consciousness which could only make us free from such enslavement by information. It does so by its "will" with an intention for such clearance.

I. *Existential Barrier for Information*

Information-as-such has no barrier. "The wall has ears"! Whether information can pass across black hole or not is debated widely. Information as in digitized memory can be changed, erased and deleted. This surely cannot pass across the black hole. Nondigitized information loses its existence with information-split phenomenon. Information in episodic memory cannot cross the barrier of death, black hole or intergalactic space. Knock-out of information at the site of existential barrier is quite common.

Information in existential memory is difficult to dissolve and can occasionally cross the barrier of death, black hole or hyperspace (as we see in Ian Stevenson's work on reincarnation memory [31]). No information including information of existential memory has the access to the *Essence* of the Multiversity. This fact is of immense spiritual significance, especially in the context of third transcendence [11]. What is called *Mantra* in spiritual jargon is nothing but coded information on the Divine (Consciousness-Mother Nature). In the method of *Akhanda* Diksha (initiation by the Akhanda Sadguru) as followed in India, Sadguru accepts all disturbing memory from the newly initiated to make the disciple completely free of information, ushering a new birth in his life. This is not practically possible unless the Sadguru really dwells in the *Essence* of the Multiversity.

J. *Information Mechanics*

Does the information have independent operational mechanics? Of course, yes, since it is an intentional entity! The science of twenty first century is meant to get into this operational mechanics of information. The details of these mechanics are yet to be worked out.

Prigogine [32] has suggested that there is some irreversible dynamics underlying quantum theory. Gerard Hooft [33] observes determinism beneath quantum mechanics. Brukner and Zeilinger [34] see quantum physics as a science of information. When we examine the *multi-revolutionary theory of consciousness* proposed by Michael Lockwood, Colin McGinn, and Roger Penrose as analyzed by Robert Van Gullick [35], it becomes obvious that before one can solve the mind-matter problem two earlier revolutions are supposed to occur. One revolution is expected and necessary on the matter-side, another revolution on the mind-side, followed by a third evolution that will connect the two. According to the author, the mind-side revolution has

started with the formulation of the systems psyche [12], matter-side revolution with the publication of the paper on the zero-point-energy state of the brain [36], and the central revolution has been going on with this science of information [13-20].

Three Revolutions

Matter-Side:
Zero-Point Energy

Mind-Side:
Systems Psyche

Central Revolution:
Information Science

K. *How information mechanics is different from, and is independent of Quantum Mechanics (QM)?*

1. In the scale of size, information is subtler than Planck's quantum of energy. As an identity-in-phase, information is smaller than that can be measured in Planck's scale.
2. Information is categorically a different substance as compared to energy.
3. Information, unlike energy, is neither generated nor emitted as quantum.
4. Information also does not behave as a 'quantum'.
5. Besides, information is an intentional unity. Information itself is causal.

L. *What are the Characteristics of Information Mechanics?*

1. Information mechanics is a *mechanics of waiting*.
   Information for its manifestation could wait for eons, for millions of years. Waiting is mostly attributed to inactivated form of information. Activation opens up its opportunistic property.
2. Information mechanics is a *mechanics of opportunism*.
   Information is opportunistic. Imperatively, it is slow, patient, and intelligent. By the by, the process of evolution is also considered an opportunistic one; information mechanics is probably intertwined with the process of evolution.
3. Information in opportune moments asserts for *causal execution*.
   Information works as the causal executive. The system undergoes changes according to input or reassortment of information within. Informational link, therefore, represents the causal link. Information loss explains the break in the causality chain.
4. Information mechanics is also responsible for *creative emergence*.
   Information reorganizes space and time with emergence of new meaning, new context and new relevance.
5. Finally, the mechanics of information is inextricably connected with *new creation.*
   Information *creates* new "form," new space and new time, and their new organization!

In the pre-space, pre-time domain, information waits patiently and intelligently to get carried across the quantum void on the vehicle of a "quantum" of energy or across the ZPE enters the classical domain of nature and looks forward to getting accepted in a receptive system where it can perform causal execution or can bring about creative emergence. The most creative function of information is displayed when it takes the opportunity to impregnate a prepared and receptive mind, or any mind-like structure and process in nature. This results in delivery of new space, new time and new energy.

M. *What activates inactive information?*

Regarding activation of inactive information following possibilities are suggested.

(i) Spontaneous activation is a possibility, but rare.
(ii) Activations by quantum fields.
(iii) Activation by a specific state of mind/self/ consciousness.
(iv) Activation by subtle part of life (life-principle or subtle processes of life).
(v) In a live self-organizing system, activation could happen when the faculty of 'self' is tossed in the existential terrain of a life-or-death situation.

N. *Information loss*

In the tour of information from pre-quantum domain of nature to the quantum and classical levels of nature, there are several stages of information loss that may partly explain the difference in content of same information in different nests of nature. Information loss accounts for the following phenomena.

1. Breakage in the chain of causality.
2. Breakage in continuity (in fact, there is an opinion proposed by Gerard 't Hooft that discrete character of the 'quantum' could be accounted by information loss).
3. The phenomena, which quantum scientists often try to ignore, or avoid, through a process known as "normalization". Classical physics rejects such events outright as anomalous!

O. *Link of Information mechanics with Quantum mechanics and Classical mechanics*

There is no direct link between the information mechanics and Quantum Mechanics or the classical mechanics. Equations of classical or Quantum Mechanics do not have information as a determining factor anywhere. Even, no symbol exists for the information. However, information carried on the vehicle of quantum or classical particle could create anomalous phenomena in classical physics, and paradoxes and puzzles in quantum physics.

The indirect relation of information with the classical and quantum nest of nature could be better

understood when we understand the relationship between the information and energy.

P. *Information and Energy*

We are to look into the relationship between information and visible energy, information and dark energy, dark energy and visible energy. The energy delivered during information-split is dark energy. This is different from matter-based visible energy, which could be quantized and is related to matter with Einstein's equation $e=mc^2$. How dark energy is converted into visible energy? It happens using "life" in its subtle form, as life-processes, or as *life-principle*. Subtle life-processes during conformational changes in the cellular proteins participate in this inter-conversion. The process of conformational change of the macromolecules in cell biology has been suggested to have access to the domain of dark energy through ZPE. Without presence of such "life" processes there is no possibility of such inter-conversion. In fact, the author has expressed the view that the purpose of creation of "life" is to tackle this dark energy issue in the cosmology of the multiverse [37].

Q. *Nature of information*

Its various states, structure, and geometry

While the signal is energy occupying unit of space per unit of time, expressed as frequencies (space per unit of time), information has been traditionally considered as bipolar with an objective and a subjective pole. Its objective pole is what is called signal but its subjective pole interacts with mind. Thus, information is like a bud or a spindle. However, according to the author, this is the structure of an inactive information. How an inactive information gets activated has been described. When activated, the information-bud opens up its three folia. The content folium interacts with the faculty of mind, intent-folium interacts with the faculty of self and measurable folium reduces uncertainty in the physical nest of nature (figure 4). Information, thus, *binds* matter, mind, and self.

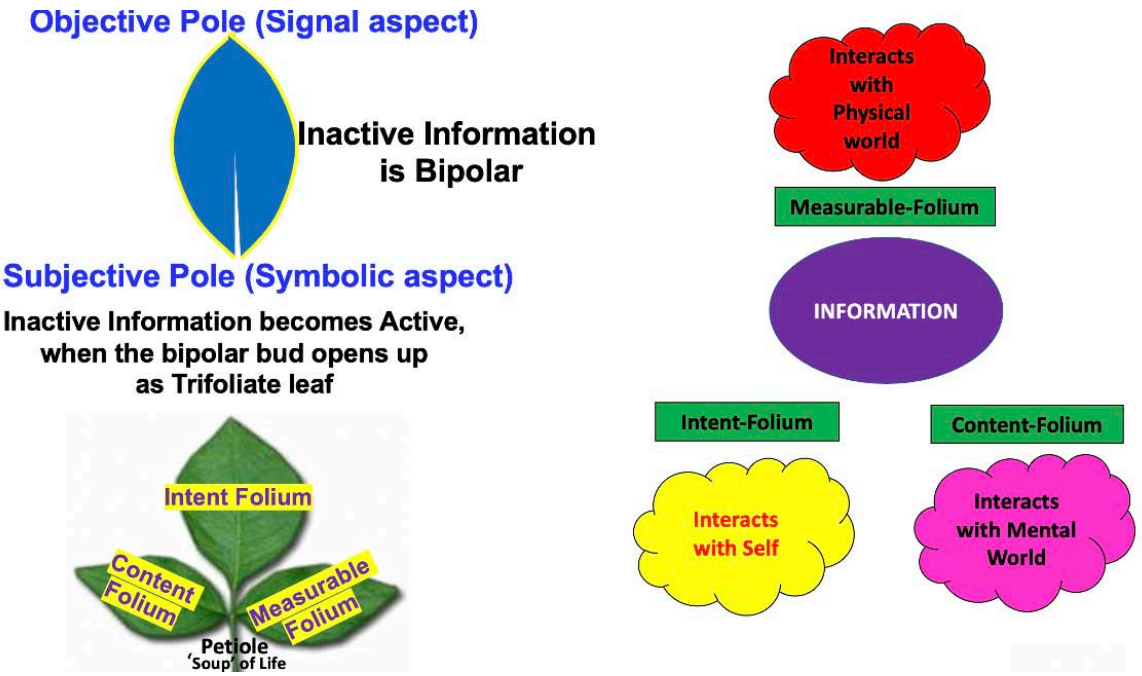

Fig. 4: Inactive information is bipolar. The active information is like a trifoliate leaf with the content folium that works with the mind, the intent folium that works with the self and a measurable folium that reduces uncertainty at the physical level. The petiole of the leaf draws nourishment from "life". Information *binds* matter, mind and self.

With this trifoliate structural geometry, information transits from the digitized state to the non-digitized state. Still, it is factorizable into content, intent, and a fraction that reduces uncertainty in the physical plane. Several such information related to each other in the non-physical plane come together to remain united in the form of knowledge. In simple language, information is packed in a box, rectangular, quadrangular, or otherwise or in any other shape including that of a sphere. This creates the invariant symmetry of knowledge. Knowledge is that ensemble of information which could be used without further deliberation. The symmetry of knowledge is, however, not unbreakable! Encounter with new information and as a consequence, symmetry-breaking and symmetry-making remain an incessant process in the life-systems to create what we call experience. The experience is reposited in the fabrics of life as the layers of information-manifolds. The experience, as information-manifolds, however, is systems-confined. The widespread concurrence of the experience of a large number of systems results in what we describe as

wisdom. Wisdom is the crystallized information, where several spheres of knowledge and manifolds of experience are sublimed / condensed / reduced to the smallest minuscule of Point (figure 5).

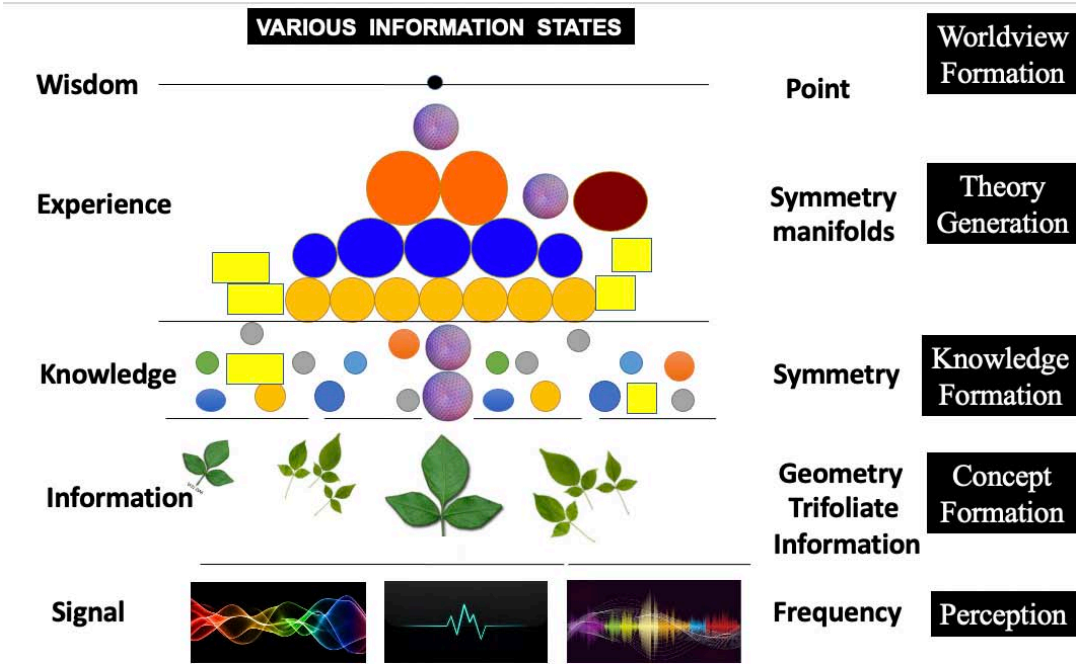

Fig. 5: Shows the structural geometry of information at the level of signal, "information", knowledge, experience, and wisdom. On the right side, shown is the hierarchy of perception, concept formation, knowledge development, theory generation, and wisdom formation

R. *Information and the Ladder of Cognition*

The signal is a digitized form of information. Information itself is non-digitized but factorizable to content, intent, and the ability to reduce uncertainty. Knowledge is a package of related information which is non-factorizable and obviously cannot be digitized. Experience as information manifolds is distributed along the fabrics of life. Wisdom is information in crystal form. It becomes obvious that information-states, as described, are inextricably intertwined with the ladder of cognition [38], which steps up from signal at the physical level to information at the level of faculty of mind, knowledge at the level of faculty of self, experience at the level of faculty of life and finally to wisdom at the level of faculty of consciousness (figure 6).

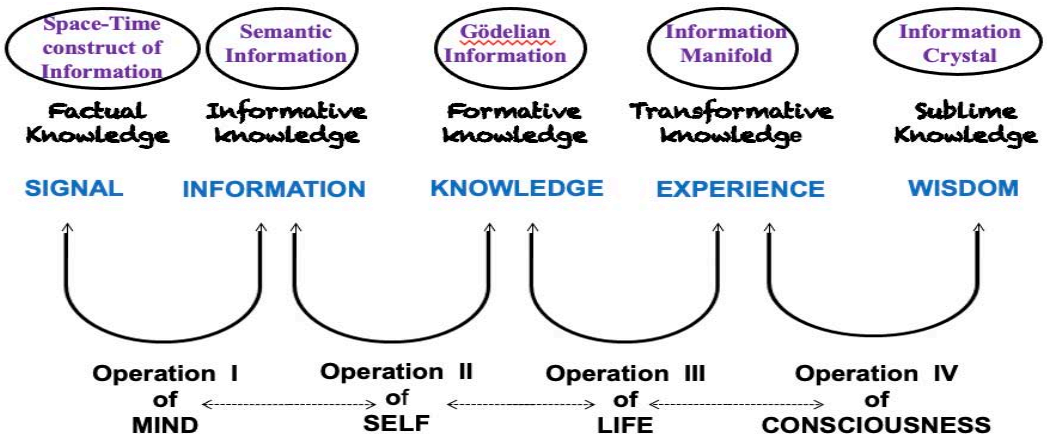

Fig. 6: The hierarchy of signal, information, knowledge, experience and wisdom is shown in the ladder of cognition. Four successive operations by mind, self, life and consciousness are also indicated

The faculty of the cognitive organs such as mind, self, life and consciousness are four operators in this ladder. Mind, the event-making faculty, is primarily involved in signal-information inter-conversion. Self, the sentient faculty gets engaged in inter-conversion of information and knowledge. Life, the homeostatic faculty of cognitive organ, actively participates in knowledge-experience inter-conversion. Consciousness, the will-

making faculty in the cognitive organs, is engaged directly in cognition during inter-conversion of experience and wisdom. The cognitive faculties do not operate by any force or energy or field. Their operations are based on intention and will. The "will" is a prerogative of consciousness. The intention is an elaboration on the purpose, and is therefore coupled with the will. The hierarchy of operative faculties in the cognitive organ is labyrinthine. The Pair of faculty of self and life maintain a tangled hierarchy.

The process of cognition following the ladder, as described, could happen only in a living system since the process of cognition entails utilization of visible energy during ascent from signal to wisdom, and utilization of dark energy during descent from wisdom to signal along the ladder.

S. *More on Wisdom*

In the ladder of cognition, wisdom is the sublime experience. In the language of information science, wisdom is the information crystal. The platform for assertion by wisdom is at the boundary of the systems. However, there is distributed wisdom in the fabrics of life throughout nature. The greatest wisdom could be located at the border of transition of nature into consciousness. Identity of the signal and the wisdom is supposed to happen at type IV Multiverse [39]. In the cognitive science, the identity of the signal and the wisdom is found in the revealed truth through an illumined mind. In a colloquial sense, the wisdom is an outcome of the process of intuition.

T. *Uncertainty Faith Information and Evidence*

Science is evidence-based. However, that does not make science faithless. The stimulus for scientific enquiry is an encounter with an uncertainty. In medicine, the situation of such ignorance and uncertainty is described as "idiopathic"; idiocy on the part of us and pathetic on the part of the patient. Faith is the drive to open such a knot. An active dynamic faith leads to several hunches to overcome this uncertainty. The success of such inquiry is not a chanced solution! Success comes in getting precise information. The correct information stands as evidence. Deeper the abyss, graver is the uncertainty, and more profound is the requirement of faith to get into the hunches. When success arrives, the science becomes richer in knowledge and stronger is the signal of evidence in the space-time world!

U. *Source of Information*

At the ground level, information is that which reduces uncertainty. The source of information is the uncertainty encountered between the masculine and feminine faculty of cognition. It originates following the principle of *Simila similabus*! Uncertainty following tension between consciousness and Mother Nature, uncertainty in the relationship between self and life, uncertainty in the relationship between life and its masculine materialistic processes opens up the generative source of information. According to the source, therefore, the information could be of different quality. Without going into details at this stage, the source of information remains "life". A non-living entity cannot generate information. Wherever there is any new information, one has to search hands of "life" in the process.

V. *Information and Consciousness*

Quality management of information within the faculty of self, life, and mind is the function of consciousness. No information is there in the unconditional consciousness. The presence of information in consciousness is characteristic of the conditioned consciousness. There are three competing theories about information in the science of consciousness, namely IIT of G. Tononi [40], Global Neural Workspace Theory of Bernard Barr [41], and Hameroff-Penrose's Microtubular Theory [42] of Consciousness. All of the three theories lose way when presupposes information as the source of consciousness, or when not clear about the layers leading information to consciousness. Their attempt, however, is one-step higher as compared to the neural network theory that supposes signal pattern as the source of consciousness. Crick's proposition of neural correlates of conscious experience, however, will remain here always.

Intentionality of information is a property borrowed from consciousness in general, and from the CEO (the "self") within the cell systems. Consciousness remains the source for all manifested entities including information.

W. *Protein, Information, and Consciousness*

In the cell biology, signalosome, the supramolecular organizing center (SMOC), has been visualized by the author as the center for union of automated signalling of the molecular robots and the autonomy of the cognitive faculties of a cell. The configurational change of structure of protein molecules is suggested to have role in this connectivity. As shown in figure 7, the protein with its primary structure could be a signal molecule, a folded protein with secondary structure operates as informed protein (e.g., receptor protein). Protein in tertiary structure could work as knowledgeable protein (e.g., enzymes). Protein with its quaternary structure (e.g., perforin, DNA-repairing enzyme) is an experienced protein. Spherical protein (e.g., histone winding round DNA in the nucleus) could operate as wisdom protein [43].

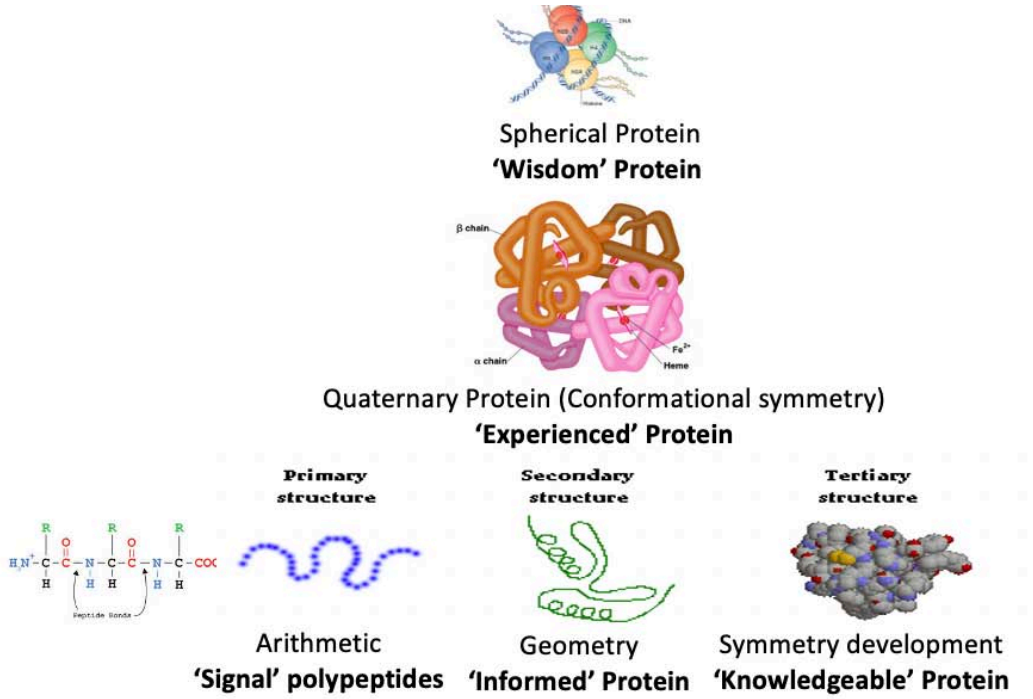

Fig. 7: Acquisition and organization of information by protein molecules are associated with conformational change. There are signal protein (primary structure), informed protein (secondary structure), knowledgeable protein (with tertiary structure), experienced protein (with quaternary structure), and wisdom protein (having spherical structure)

X. *Cell Biology, Information, and Dark Energy*

Structural configuration change of macromolecules is complex and requires activity of conformational energy, which is suggested to be dark energy that accesses the source through the ZPE, and quantum holes (quantum void, black hole, wormhole and white hole). Interrelation of the science of information with the cell biology on one hand, and the cosmology on the other hand is shown in the figure 8.

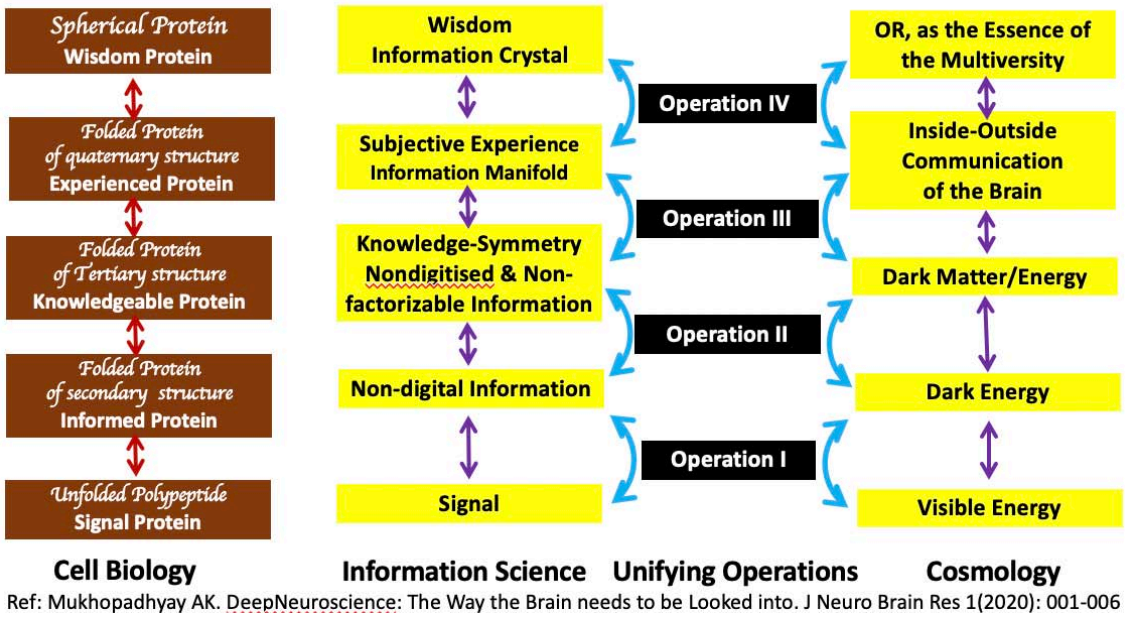

Fig. 8: Four bidirectional operations connect the science of information with the cell biology on one hand and the cosmology on the other hand. There is conversion of visible energy into dark energy during the ascent over the ladder. On the left side, different protein structures such as primary, secondary, tertiary, quaternary, and spherical are shown, which during conformational changes utilize dark energy.

Y. *Different Hierarches in Science of Information*

We encounter several forms of hierarchy while doing science of information. Consciousness cognition and behavior make a three-tier hierarchy. Bottom-up, when behavior forms the broad base for consciousness operating from the top, one gets a pyramidal hierarchy. Top-down, when consciousness is supposed to form the broad base for a focussed observable behavior, inverted pyramidal hierarchy is the outcome. Different cognitive faculties maintain a labyrinthine hierarchy. Tangled hierarchy is observed between the faculty pair of self and life within the cognitive organ. Tangled hierarchy is often observed between space and time as well. All consciousness cognition and behavior is within the nested hierarchy of nature-consciousness. Such a skeleton requires much flesh and blood to get into its final shape.

Z. *Information Science is Transdisciplinary*

Information science is transdisciplinary but involves physics and psychology, cosmology and cell biology, cognitive science, and life science. It will have a profound impact on the neuroscience, in the form of immersive neuroscience, multiversal neuroscience, ontologically reversed neuroscience, and multiversal neuroeconomics (Fig 9).

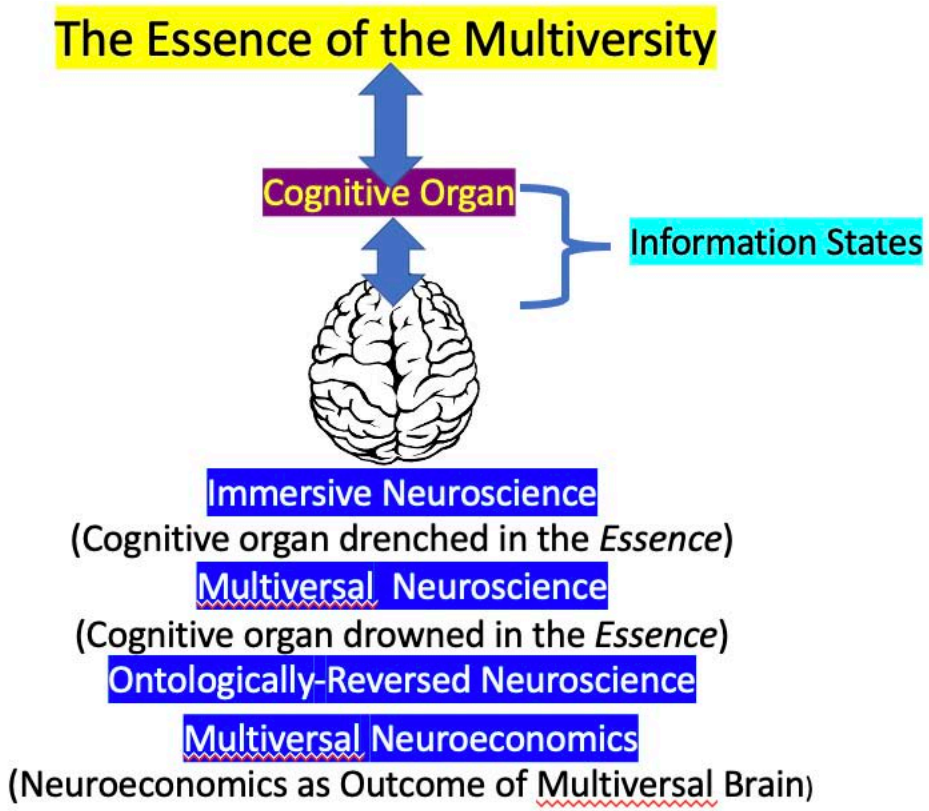

Fig. 9: Shows the hierarchy of consciousness cognition and the brain as a behavioral organ. When the brain becomes aware of its access to the *Essence* of the Multiversity, immersive neuroscience, multiversal neuroscience, and multiversal neuroeconomics begin

III. Conclusion and Perspectives

In this paper, we have developed the foundational framework for a science of information to complete the central revolution as required for developing a science for consciousness. The science of information is on how the cosmic free will rolls on the Newtonian wheel. There is no field of science which will not be illuminated by the development of a science of information. Humanities, social science and the spiritual science will also not be left out from its influence.

Once we build up the architecture of science of information to an optimum level, we could start investigating the source of information as “life”, which would see much more fruition in the twenty-second century.

Connectivity is of crucial importance in science, humanity and spirit. Information is the connecting link between the domain of space time matter energy and the domain of consciousness self life and mind. Consciousness Cognition and Behavior form the central axis. The brain is neither the source of consciousness nor it is the organ of cognition! The brain is a well-developed organ for the expression of behavior. Cognitive faculty interacts with the brain through information. Final pathway of neural behavior is mediated through a signal. Handling of different information states is a function of the faculty of self, the

faculty of life and the faculty of mind. The live neural network also includes a large number of astrocytes and their network. The web of life inside the brain is very complex and labyrinthine. Information-states lead us to Deep Science.

Deep Science is the science across ZPE and quantum void. From this paper we are led to dive into the depth of several frontier disciplines of science; a nested hierarchy of nature-consciousness, the deep Science for matter-correlates of conscious states, deep Neuroscience, deep Science of cosmoNeurology, neuroCardiology, and the Systems Psyche. The principle of *simila similabus* in genesis of information is expected to bring light in the mechanism of homeopathic medication.

The attempt to transcend the boundary and work at a higher (deeper) level of intersections of several existing disciplines of science have given birth to a new discipline, designated as cybersemiotics, pioneered by Søren Brier from International Semiotic Institute of the Kaunas University of Technology at Lithuania, who is also the co-founder of the International Association for Biosemiotic Studies. This is a transdisciplinary emerging branch of science, which with absolute naturalism, encompasses almost every facet of nature namely matter, energy, cosmic phenomena, information, life, genes, cognition, consciousness, social science and inter-subjectively agreed knowledge systems.

The science of information as described in this paper is a leaf from the Multiversal Worldview, which in spiritual and philosophical sense is also called the *Akhanda* Worldview. The *Akhanda* Worldview deals with the divisions of the Indivisible (A-Khanda= Un-Breakable). The systems of Multiverse deal with pluralism without compromising individualism, and retains individualism without any restriction on pluralism. The Multiversal Worldview acknowledges, as well as transcends cybersemiotics as described below.

Acknowledgements are found when it transcends the defined disciplines of science and humanities, in its absolute naturalism, systems approach, communication, evolutionary processes, phenomenology, and apparently almost-all-inclusiveness. The supersessions are as follows.

1. In the spectrum of naturalism cybersemiotics is still confined to one universe, The Multiversal worldview begins from the *Essence* of the Multiversity, the *Essence,* which is the Source of systems multiverse. In this sense, Multiversal Worldview is the largest intellectually comprehensible systems approach, truly top-down, and more profound in its origin and implications.
2. Cybersemiotics has not yet shown the ability to transform the existing disciplines in its favor by any new formation. The Multiversal Worldview, on the other hand, transcends and transforms several existing disciplines by means of new formation. This new formative Power, so characteristic of the Multiversal Worldview, comes following triple transcendence, in contrast to single level transcendence of cybersemiotics.
3. Despite having an absolute naturalistic and systems approach, cybersemiotics has not yet developed a systematic scheme for investigation of nature-consciousness which could be found in the Multiversal Worldview, in its Pentaune (Five-in-One) model of Nature-consciousness as nature's nest I, II, II and IV, before one dives finally into the nest V of unconditional consciousness.
4. Cybersemiotics is silent on the existence and operational aspects of cognitive faculty (ontology and epistemology of cognition). The Multiversal Worldview is locally vocal for the universal cognitive faculty with their specific operational mechanics. The labyrinthine decision-making process in the nature and in human being is thus systematized in the Multiversal Worldview.
5. Cybersemiotics is neutral to, and does not pursue for a response to any fundamental question. The Multiversal Worldview is naturally ready to enquire three fundamental questions raised since the time the cognitive brain achieved its maturity. The questions are, who am I? What is this world? What is that called God? In the pursuit of such questions, the Multiversal Worldview entangles the Humanity, the Science, and the Spirit.

With the foundational framework of science of information described in this paper, the humanity finds the appropriate way for its growth with spiritual science establishing the information-multiverse relationship, information-consciousness relationship, information-self relationship, information-life relationship, and information-mind relationship. We are confident that the experience of the Divine in the *Essence* of the Multiversity could be brought within the ambit of science. From such experience, the science could be enriched and the humanity is expected to be transformed in its evolutionary, transformative and new formative journey from *Homo sapiens* to *Homo spiritualis* [44, 45].

Declaration

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Unipolar Engine of Mende

By F. F. Mende

Abstract- Application in the unipolar engines of samarium-cobalt magnets opens the new prospects of creating the engines, with the large rotational moment, since. such magnets possess the great magnetic field, which cannot they will reach in other magnets. However, the creation of engines with the large diameter of disk runs into the great difficulties connected with the fact that industry does not let out magnets with the large diameter. In the article is proposed the new construction of unipolar engine, in which for creating the magnetic field are used the magnets of small diameter.

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UNIPOLARENGINEOFMENDE

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Unipolar Engine of Mende

F. F. Mende

Abstract- **Application in the unipolar engines of samarium-cobalt magnets opens the new prospects of creating the engines, with the large rotational moment, since. such magnets possess the great magnetic field, which cannot they will reach in other magnets. However, the creation of engines with the large diameter of disk runs into the great difficulties connected with the fact that industry does not let out magnets with the large diameter. In the article is proposed the new construction of unipolar engine, in which for creating the magnetic field are used the magnets of small diameter.**

I. Introduction

Unipolar electric motor presents the variety the electrical machines the direct current. The conducting disk contains, the constant magnetic field, is parallel to the rotational axis of disk, the 1 slip ring on the axis of disk and 2 slip ring, at the edge of the disk 1.

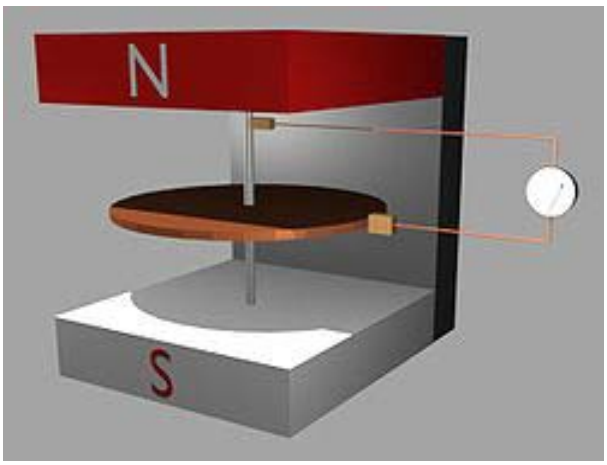

Fig. 1: Conducting disk in the magnetic field

In Fig. 1 the operating principle of unipolar engine is shown. If there is a conducting disk, located in magnetic field, then during the supplying stress on the axis of disk and on its edge through the disk flows current, which leads to its rotation. This rotation is caused by the influence of Lorentz force on the moving charges.

The first unipolar engine, the wheel of Barlow, created Peter by Barlow, after describing him in the book "study of the magnetic attractions", published in 1824 to the year.

Barlow's wheel was two copper gears, which are located on one axis. As a result interaction of current, passing through wheels, with the magnetic field of permanent magnets, wheels they revolve. Barlow explained that with change in contacts or position of magnetic poles the replacement of the direction of rotation of wheels to the opposite occurs.

II. Unipolar Engine of Mende

The kinematic and electrical diagram of the unipolar engine of Mende is shown in Fig. 2.

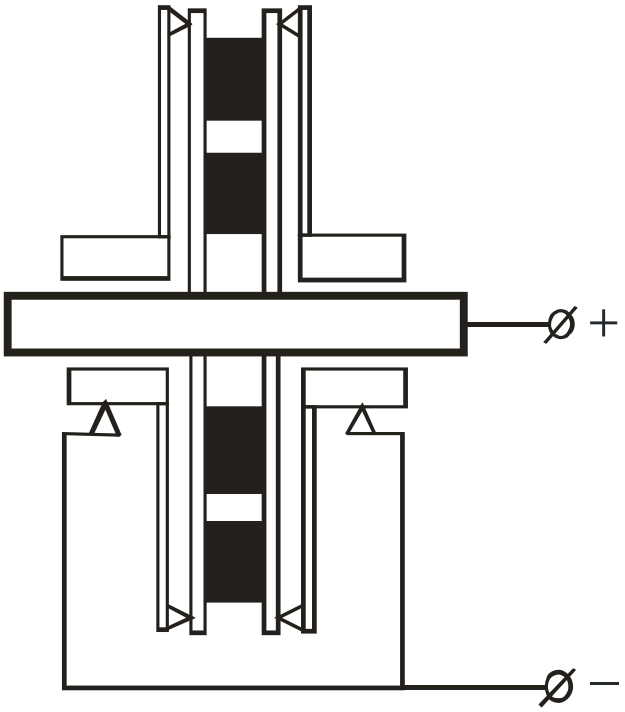

Fig. 2: Kinematic and electrical diagram of the unipolar engine of Mende

Engine consists of two conducting disks, dressed to the common axis, between which the permanent cylindrical magnets (they are flooded by black color) are stopped up. These magnets are located in the circle of disk and such circles it can be several. The number of magnets, located on one circle is determined by diameter of a circle and by diameter of magnets. Along the conducting disks slide the brushes, fastened to the knitting needles, which are fixed on the conducting bushings, which do not have galvanic contact with the axis. There are terminals, connected to the brushes, which slide along the bushings and the axis of engine. If we to these terminals connect the power source, then knitting needles and bushings fastened to them begin to revolve in opposite directions.

Author: *e-mail: fedormende@gmail.com*

This they give the possibility to use this device as the engine.

To the photograph of the experimental model of engine it is presented in Fig. 3. In the engine they are used 4 the cylindrical samarium-cobalt of the magnet with a diameter 25 mm. Their arrangement on the disk is shown in Fig. 4.

Fig. 3: Photographs of the experimental model of the engine

Fig. 4: Arrangement of magnets on the disk

III. Conclusion

Application in the unipolar engines of samarium-cobalt magnets opens the new prospects of creating the engines with the large rotational moment, since. such magnets possess the great magnetic field, which cannot they will reach in other magnets. However, the creation of engines with the large diameter of disk runs into the great difficulties connected with the fact that industry does not let out magnets with the large diameter. In the article is proposed the new construction of unipolar engine, in which for creating the magnetic field are used the magnets of small diameter.

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Fellows may join as a member of the Editorial Board of Global Journals Incorporation (USA) after successful completion of three years as Fellow and as Peer Reviewer. Additionally, Fellows get a chance to nominate other members for Editorial Board.

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ASSOCIATE OF SCIENCE FRONTIER RESEARCH COUNCIL is the membership of Global Journals awarded to individuals that the Open Association of Research Society judges to have made a 'substantial contribution to the improvement of computer science, technology, and electronics engineering.

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Financial

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Organize seminar/conference

Associates are authorized to organize symposium/seminar/conference on behalf of Global Journal Incorporation (USA). They can also participate in the same organized by another institution as representative of Global Journal. In both the cases, it is mandatory for him to discuss with us and obtain our consent. Additionally, they get free research conferences (and others) alerts.

Career | Credibility | Financial

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Associate	Fellow	Research Group	Basic
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Certificate, LoR and Momento **2** discounted publishing/year **Gradation** of Research **10** research contacts/day **1 GB** Cloud Storage **GJ** Community Access	**Certificate,** LoR and Momento **Unlimited** discounted publishing/year **Gradation** of Research **Unlimited** research contacts/day **5 GB** Cloud Storage **Online Presense** Assistance **GJ** Community Access	**Certificates,** LoRs and Momentos **Unlimited** free publishing/year **Gradation** of Research **Unlimited** research contacts/day **Unlimited** Cloud Storage **Online Presense** Assistance **GJ** Community Access	**GJ** Community Access

Preferred Author Guidelines

We accept the manuscript submissions in any standard (generic) format.

We typeset manuscripts using advanced typesetting tools like Adobe In Design, CorelDraw, TeXnicCenter, and TeXStudio. We usually recommend authors submit their research using any standard format they are comfortable with, and let Global Journals do the rest.

Alternatively, you can download our basic template from https://globaljournals.org/Template.zip

Authors should submit their complete paper/article, including text illustrations, graphics, conclusions, artwork, and tables. Authors who are not able to submit manuscript using the form above can email the manuscript department at submit@globaljournals.org or get in touch with chiefeditor@globaljournals.org if they wish to send the abstract before submission.

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Authors must ensure the information provided during the submission of a paper is authentic. Please go through the following checklist before submitting:

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2. Authors must accept the privacy policy, terms, and conditions of Global Journals.
3. Ensure corresponding author's email address and postal address are accurate and reachable.
4. Manuscript to be submitted must include keywords, an abstract, a paper title, co-author(s') names and details (email address, name, phone number, and institution), figures and illustrations in vector format including appropriate captions, tables, including titles and footnotes, a conclusion, results, acknowledgments and references.
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7. Manuscript submitted *must not have been submitted or published elsewhere* and all authors must be aware of the submission.

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It is required for authors to declare all financial, institutional, and personal relationships with other individuals and organizations that could influence (bias) their research.

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Unless specified in the notification, the Editorial Board's decision on publication of the paper is final and cannot be appealed before making the major change in the manuscript.

Acknowledgments

Contributors to the research other than authors credited should be mentioned in Acknowledgments. The source of funding for the research can be included. Suppliers of resources may be mentioned along with their addresses.

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Preparing your Manuscript

Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.

Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11'", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

a) A title which should be relevant to the theme of the paper.
b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
d) An introduction, giving fundamental background objectives.
e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
f) Results which should be presented concisely by well-designed tables and figures.
g) Suitable statistical data should also be given.
h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
j) There should be brief acknowledgments.
k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.

Format Structure

It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

All manuscripts submitted to Global Journals should include:

Title

The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, “What words would a source have to include to be truly valuable in a research paper?” Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.

Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Eletronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

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Tips for Writing a Good Quality Science Frontier Research Paper

Techniques for writing a good quality Science Frontier Research paper:

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of science frontier then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.

6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

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	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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