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THE PHYSICAL UNIVERSE

INTRODUCTION: Today, we do not have an accepted physical picture of matter and its final constituents. We do not know for sure, the origin of matter of our planet and how long this planet will last is again the question unsettled. We retain the physical picture when we think about bigger chunk of matter (a pen the earth) but when we come to elementary particles of matter, our reasonings become abstract. Matter changes to energy and energy changes to matter; particles behave as waves and waves behave as particles.

Newton believed in discrete nature of light. Later on we revised this concept when light was considered a wave motion in an all pervading ether. But then again Einstein imagined light to consist of photons. Bose, rightly 'proposed that there was no reason to believe that photons have to be indistinguishable from one another in principle'. Today, we believe that light, depending upon the circumstance, exhibits the properties of wave motion and also its individual photon nature.

Earlier, when some believed in the existence of ether, they at the same time, also believed in the reality of existence of a substance out of which matter is created. Today, no doubt, ether's existence is not necessary as Einstein said but how about the 'substance' for matter. Enough time has elapsed in looking for a substance in the interior of the elementary particles and though many new mysteries of nature have been revealed, we have not discovered any such substance for matter. If we imagine the existence of a

super fluid in space while at the same time suppose that the interior of the elementary particles does not consist of any substance not only an interesting physical picture of the universe emerges but also various fields and radiations are explainable in physical terms.

* A NEW PHYSICAL CONCEPT

The only supposition required under this concept is the existence of a super fluid in the space of Universe and the non-existence of substance for matter.

Space: Space is not empty and void. It is filled with something very useful, a super fluid, which is incompressible, highly elastic and continuous, devoid of any atomic structure. It is out of the space-fluid that matter is created in its elementary form and matter vanishes into this space-fluid during annihilation of its elementary particles. Velocity of light is an universal constant due to the inherent property of the space-fluid through which it is propagated. The space-fluid is not stationary everywhere in space as believed earlier under "fixed ether" concept but adopts various flows and motions and undergoes compressive and tensile stresses that are exhibited as fields and radiations.

Matter: Matter is not constituted of any substance and its elementary particles are all void inside, the void where the space-fluid does not exist and neither any field can exist nor radiation can be propagated.

Universe: The Universe is a finite sphere of space-fluid in an infinite void that exists outside the universe. The nature of the void outside the Universe is similar to

the micro void in the interior of the elementary particle of matter. It is the inherent property of the space-fluid due to which it holds itself in the form of a finite sphere and does not require any external pressure to hold it into this shape. But the material bodies like satellites, planets and stars are shaped as spheres due to the external pressure of the space-fluid. There could be more than one Universe but unfortunately their numbers will never be known, Due to the non-existence of space-fluid beyond the defined boundary of the Universe, the radiations within the Universe cannot get propagated beyond its boundary and hence, all the energy of the Universe is contained within it. A point in space is subjected to the space-fluid pressure directed towards the point from all directions such that disturbance, tending to spread outwards from that point, are suppressed by the space-fluid. The tendency of the space fluid is to oppose any disturbance caused in it. All bodies exhibit inertia due to the above property of the space-fluid. However once a flow in the space-fluid is established it continues indefinitely as there is no atomic frictional loss during the motion of the space fluid. The Universe is opposite to the elementary particle of matter which is an electron. While the Universe has the space-fluid within it and a void outside, the electron has a void within and the space fluid outside it.

* The contents under this are the final conclusions drawn after detailed reasonings on various phenomena which are not reproduced here.

Elementary Particles: Only the electron qualifies for the elementary particles of matter. The same electron when looked from the other and is seen as a positron. To overcome the pressure of the space fluid an electron must spin for its very existence otherwise the space fluid will close in from all-round thus making the void of the electron non-existent. Once the spin of the space fluid defining the boundary of the electron is formed, it will exist forever till it is annihilated by its antiparticle which is positron. Matter is created only in its elementary forms either as an electron or as an electron and positron together. The possibility for the creation of the elementary matter exists in the stars where violent disturbances in the space fluid take place. The matter might also be created and assembled in the interior of the planets where the conditions might be favourable.

The electron and positron, due to the opposite spin of the space fluid attract each other at a very close range, due to the same direction of flow of the spin fluid between the particles. The electrons and positrons so assembled and bound together further form neutrons and protons. In the case of a proton, there is an outer positron which is spread over the whole assembly. The nucleons further assemble themselves like crystal formation, say NaCl Crystal, in different sizes of assemblies and form nuclei. The nuclei formations when clouded with the required electrons form atoms which are the building blocks of matter. There is nothing like an anti-matter

* The complete picture of electron developed under this concept is not reproduced here.

at least in our solar space conditions. Annihilation of matter can take place only between an electron and a positron when these particles completely superpose each other.

Gravitation: The space fluid stretches out to accommodate matter just as rubber stretches out to accommodate a marble embedded in it. Due to this stretching of the space fluid 'compressive action' on the material body is exerted by the space-fluid. This is because the space-fluid supresses transmission of pressure outwards from the source. Neither gravitation nor the assembly of matter forming bigger bodies will exist if the space fluid did not possess this property. The tensioned state of the space fluid ^{around} a material body is gravitation. If for some reason matter vanishes, for instance during electron and positron annihilation, the tensioned space fluid around the electron and positron relieves itself by closing in the void. This collapse of gravitation is seen as a pulse of radiation.

Radiation: Our present concept of radiation with regard to its direction of pressure and also of its photon nature will need revision. During electron and positron annihilation, it is the flow of space fluid from the immediate vicinity of the particles to the void created during annihilation, that sets up a pressure wave directed towards the point of annihilation and is seen as a pulse of radiation. Fusion reaction at the sun creates void as atoms of hydrogen combine to form a helium atom which occupies lesser space than the atoms of hydrogen forming it. The micro void so created gets filled in by the neighbouring

*Due to detailed analysis required, complete picture is not reproduced here.

space-fluid and this sets up a pulse of radiation. Many such pulses are seen as light which is an under-pressure pulsed wave travel from the sun to the outer space. It is not the photons shooting out from the sun that is light. When an iron rod is heated its atoms vibrate in space fluid that exists around the atoms. In this process micro-voids around the vibrating atoms are created due to which pulsed pressure waves, in the surrounding space-fluid and pointing towards the voids created, are set up. The frequency of the resultant radiation depends upon the per second vibration of the atoms, the pulsed flow of the neighbouring space-fluid resulting into release of space energy in quanta proportional to the size of micro-voids created and period of oscillation. In fact nothing comes out of vibrating atoms but it is the neighbouring space fluid that flows in to hold the atoms stationary. The radiation pressure should be 'inwards' and not outwards from the source as believed today. Light is an underpressure pulse wave motion spreading outwards in the space fluid. Photoelectric effect, ionisation of a gas by x-rays and compton's effect will suitably fit under this concept if the inward direction of radiation pressure is supposed, of course, after due experimental evidence.

Uniform flow of spacefluid is an electric field; closed and directional pressure lines in space fluid is a magnetic field. The gravitation and radiation pressures in spacefluid are as described above. All other fields & radiations are the combinations of above.

SURFACE GRAVITY AND DENSITY OF PLANETS.

Consider an elastic thin circular rubber ring which can

shrink to its zero radius when there is no tension in the ring. If a pointed, conically tapered rod is inserted in the ring, it stretches as its circumferential length increases and the tension in the ring increases proportionately. It is easy to see that tension in the ring is directly proportional to the radius to which it has been stretched. A thin spherical shell can be considered to be composed of many thin rings and from this it follows that tension in the shell wall of a hollow spherical shell will be proportional to its radius if the internal volume of the shell is made to increase from zero to a value corresponding to its radius. The tension in the rubber ring results in a pressure on the rod, directed towards its centre. Similarly, the tension in the shell wall will result in a surface pressure directed towards its centre.

From the above analogy it will be seen that the elementary particle of matter, which is a spherical void bubble in space fluid, due to its very *existence, is subjected to a compressive action by the space-fluid, such that

Surface gravity pressure $\propto r$ Where r is the radius of
towards the centre of the void.
void-

The matter of the Planet is an assembly of many elementary void particles. The planet behaves more or less similar to a huge spherical void bubble. If the surface gravity pressure of the elementary void bubble is proportional to its radius, the surface gravity of a Planet may also be assumed to be proportional to the radius of the Planet. Hence,

*The existence is due to spin as discussed @ "Elementary particles" page 3.

(3) Surface gravity pressure \propto radius of the Planet.

For a more compact assembly while the inter atomic distances reduce, the void content for the same dimensions of the planet increases. In other words, the gravitational pressure on the Planet, which is due to and proportional to the void content of the Planet, should be also directly proportional to the density of the Planet.

Therefore,

(4) Surface gravity pressure density.

From 3 and 4, it will be seen that the surface gravity of a Planet should be directly proportional to the product of the radius should be directly proportional to the product of the radius and the density of the planet.

Surface gravity \propto radius \times density.

For a body of mass, m , falling under gravity on the surface of earth of mass M , acceleration due to gravity ' g ' will be proportional to the Earth's Surface gravity.

Hence

$g \propto R \cdot d$, where R is the radius of the earth and d is Earth's density.

Or,

$$m \quad g \propto m \cdot R \cdot d$$

$$\propto \frac{m \cdot R \cdot M}{\frac{4}{3} R^3}$$

$$\propto \frac{m \cdot M}{R^2}$$

Therefore for Earth's force of attraction on a body of

mass m we have $F \propto \frac{m \cdot M}{R^2}$

The above derivation reveals the significance of the gravitational law if we assume the existence of the slace fluid and non existence of any substance for matter.

* It is the density of the voids.

The potential energy of a particle at a distance X away from the centre of the earth and outside the earth varies as X , however when the particle is within the earth, the potential energy is independent of X (i.e. independent of the position of the particle within the earth wherever the particle is. The reason is that Earth's gravitation is due to external pressure, and when the particle is within the earth, its void contents just add to the void content of the earth and it loses separate entity.

Table 1 shows the details of radius, density and surface gravity of the planets. The nearness of the values of the figures against columns 6 and 7 of the tables, show the dependence of gravitation on Planet's radius and density. The density of a Planet, however, will depend upon its distance from the sun. Due to the very existence of the sun the space fluid in its vicinity, is much more tensioned than at a farther distance. A Planet nearer to the sun, due to more space fluid tension would be subjected to a higher external compressive action thus resulting in its higher density. The density of the earth should be more when during its movement round the sun it is nearest to the sun. In fact if it is imagined that the earth is moved farther from the sun and made to rotate in the orbit of the Mars, it's density should decrease on the other hand if it is pushed in an orbit nearer to the sun, its density should increase. I feel the densities of Venus and Mercury should have been more than the density of the earth but for these planets being subjected to higher radiation heat due to their being nearer to the sun, which will to some extent

counteract gravitational compressive action. Similarly, the densities of Uranus and Neptune is more because of their longer distances from the sun where radiation heat is less, otherwise these planets due to sun's gravitation alone should have been less denser than Jupiter and Saturn. I believe, gravity will never be explained if matter is considered substantial and space is believed to be empty, with no external pressure on the planets.

MASS AND PLANK'S CONSTANT

Mass is the property acquired by a material body due to its void content because it is due to the voids of the elementary particles constituting the body that the space fluid exerts compressive gravity pressure all around the elementary particles. A material body due to its mass exhibits the effect of its being attracted to the other material body also possessing mass due to the intervening space fluid's gravity pressure conditions. Mass is always associated with the volume of the void, for instance, rest mass of an electron is due to its void content i.e. $\frac{4}{3}\pi \times (1.5 \times 10^{-13})^3 \text{ cm}^3$ of its void where space fluid does not exist.

For a thin spherical shell, the potential energy of a mass external to the shell, is the same as though the mass of the shell were concentrated at its centre. Thus the entire mass of the earth i.e. its void content can be assumed to be concentrated in a spherical shell whose shell wall is void and say one cm thick.

Assuming the mass of earth as 10^{28} gm , and average radius of the spherical earth as 10^7 cm , mass density on the

surface of earth is approximately equal to 10^{28} _____ =
 10^{13} gm/cm³ of void. This means that the $4 \cdot (10^7)^2$
gravitational tension of the space fluid, on the surface
of the earth is such that due to its pressure around one
cm³ of void, it will give it a mass property of 10^{13} gm.
During electron's and positron annihilation imagine the
space fluid with the property of mass density 10^{13} gm/cm³
of void on the surface of the earth, filling the interior
of a void electron whose volume is = $4/3 \cdot (1.5 \times 10^{-13})^3$
cm³. The velocity of the space fluid as it fills the void
electron may be assumed to be, the same as velocity of light
(3×10^{10} cm/sec). The time taken by the space fluid to fill
the void electron will be $\frac{1.5 \times 10^{-13}}{3 \times 10^{10}}$ sec. where 1.5×10^{-13}
cm is the electron's radius.

Energy released by the space fluid = mass effect due to
space fluid's pressure x
volume of the space
fluid equal to electr-
ons volume x (velocity
of light)²

From Plank's energy equation, we have

(2) $E = h \frac{C}{\lambda}$ where the terms used have the usual signific-
ance.

$$h = E \times \frac{C}{\lambda}$$

In the case of electron positron annihilation $\frac{\lambda}{C}$ is the time
taken for the space fluid, to flow from the surface of the
void spherical electron to its centre, i.e.

$\frac{1.5 \times 10^{-13}}{3 \times 10^{10}}$ sec. substituting the value of E @ 1 in
equation

(2) we get,

$$h = 10^{13} \times \frac{4}{3} \cdot 3.37 \times 10^{-39} (3 \times 10^{10})^2 \times \frac{1.5 \times 10^{-13}}{3 \times 10^{10}}$$

* The significance of $\frac{\lambda}{C}$ is explained on
subsequent pages.

$$= 6.4 \times 10^{-28} \text{ erg. sec.}$$

The above value of Plank's constant is not very much different, considering the approximation in the values involved in electron's radius, mass of earth and radius of earth.

The process of electron's annihilation indicates the physical significance of Eienstein's mass-energy equation, $E = mc^2$ and also Plank's equation $E = h.f$. If we term $\frac{\lambda}{c}$ as quantum of time, we have,

$$E = \frac{h}{\frac{1}{f}} = \frac{h}{\frac{\lambda}{c}} = \frac{h}{\text{time quantum}}$$

Or $h = E \times \text{time quantum}$, which signifies that Plank's constant h^1 is the energy released from space, during a quantum of time. Because, use has been made of Earth's mass to derive the value of h , h may be a terrestrial constant and not an universal constant. This however needs further analysis. Eienstein's mass energy equation signifies the energy released from space which is under gravitational stress, due to the flow of spacefluid to fill up the void content of the body, such that the body loses its existence as its voids are full and hence no mass. Eienstein's mass energy equation can be derived as follows:

$$\text{Energy} = \text{Force} \times \text{distance.}$$

$$= \text{Rate of change of momentum} \times \text{distance}$$

$$= \text{maximum momentum of space fluid as the flow towards the centre of electron starts during annihilation.}$$

$$= \frac{\text{mass effect of void}}{\text{time of flow}} \times \text{distance}$$

$$= \frac{\text{mass effect of void}}{\text{Electron's radius}} \times C \times \text{Electron's radius.}$$

= mass effect of void $\times C^2$

Thus $E = mc^2$.

Radiation Pulse

During the electron's annihilation, as the spacefluid flows from the boundary of the void electron towards its centre, in a time interval of $\frac{r}{C}$ (r is the radius of electron and C is the velocity of light) an underpressure region surrounding the electron, in the form of a spherical shell (shell has underpressure) with shell thickness approximately equal to r is formed. While in the interior of the spherical shell the spacefluid pressure is equalised, when the annihilation is complete, on its outer side and adjacent to it, the spacefluid is under gravitational stress. This results in a collapse of gravitational stress on to the underpressure shell thus equalising the shell pressure and in turn creating another underpressure spherical shell. This process goes on, as the underpressure effect travels spherically outwards at the speed of light and what is seen is a pulse of light (gamma radiation) due to electron's annihilation. For spherical symmetry of the pulse, the above example is taken, in fact not only annihilation process but all thermal motions resulting into radiation due to creation of underpressure adjacent to vibrating atoms are explainable as per above concept.

The width of the shell (wavelength of radiation) is the length traversed by the underpressure effect during the time interval $\frac{r}{C}$) of spacefluid flow during annihilation .

While the total energy E , released from the spacefluid during annihilation, is contained all the time in the spherical shell as it travels, the energy density varies

inversely as the square of the distance from the source due to spherical increase in the surface of the shell. Due to the collapse of the spacefluid's gravitational stress on the underpressure pulse there exists a pressure gradient towards the source, along the wavelength of the pulse, equal to $\frac{SF_p}{\lambda}$ where SF_p is the maximum pressure under which the spacefluid flows to the centre of the void during electron's annihilation. The underpressure effect of radiation on matter say an atom, is due to $-\frac{SF_p}{\lambda}$, where the gradient is maximum when λ is minimum and not due to total energy (E) released, as the energy is spread over in the entire shell. That is why there is a particular wavelength for light (Ultra violet rays) that can create required underpressure gradient ($-\frac{SF_p}{\lambda}$) adjacent to atoms to extract electrons out in photoelectric effect. The kinetic energy of electrons released may be due to their interaction with subsequent pulses due to which the electrons move towards the source of ultra violet rays. In Compton's effect where SF_p is much higher compared to ultra violet rays the X-ray pulse will create a 'hole' adjacent to the atom into which the electron will fall and further interaction of X-ray pulse with the electron will result in the creation of another 'hole' adjacent to electron. The 'hole' so formed gets filled by the spacefluid which is underpressure due to Earth's gravitation, resulting into a net force on electron which is 'kicked' outwards. Interaction of radiation with matter is in principle the same both for photoelectric & Compton's effect however different effects noticed are due to different values of $-\frac{SF_p}{\lambda}$.

On a vertical plane surface, (tangential to the spherical

from a pulse) / source which contains many oscillators say atoms in thermal radiations, many pulses (one pulse for each oscillator) arrive at one instant within a certain area of the surface. Thus it will be seen that higher intensity of light increases the distribution density of the underpressure gradients - S_{Fp} , with the result that more atoms of the material surface are interacted at one instant, by the radiation pulses. In photoelectric effect, instantaneous value of the current changes due to more electrons released, due to the aforesaid reason. Two underpressure pulses from two adjacent oscillators can never superpose each other because a definite region of space is occupied by each oscillator, and as long as the positions of oscillators is not superposed the radiation pulses can not be superposed. It is due to this that the magnitude of - S_{Fp} does not increase in a more intense light and hence is the sole factor to determine the critical wavelength for photoelectric & Compton's effects, because S_{Fp} is due to Earth's gravitation's ' ' which is more or less constant for a distance upto the Earth's radius.

Photon: The spherical shell radiation pulse can be imagined to be divided into as many, three-dimensional 'quanta' as desired. Each such 'quanta' of length (shell width is equal to) with pressure gradient S_{Fp} towards the source can be termed as a photon, which is a quanta of spacefluid and not of 'matter'. Considering the process of annihilation, where energy E is released during a period $\frac{\lambda}{C}$ and the spacefluid flows to a light of , we have

$$E = h \nu \quad - \text{Plank's equation.}$$

$$\text{Energy} = \text{Force} \times \text{distance.}$$

= Rate of change of momentum x distance.

= $\frac{\text{Change of momentum}}{\text{time}}$ x distance.

= $\frac{\text{momentum of spacefluid}}{\text{time}}$ x distance .

because the momentum of spacefluid changes from a maximum value when the flow starts at speed of C to zero when the annihilation is complete.

= $\frac{\text{momentum}}{C}$ X

= momentum x C

Therefore, momentum = $\frac{E}{C}$

= $\frac{hf}{C}$

The above momentum however is not of a single photon but of the entire spacefluid that fills the void and the same momentum, is associated with the spherical shell of the radiation pulse.

RADIATION PRESSURE

It is believed that light exerts a small but finite pressure on surface of matter on which it is incident.

1. For the experimental proof of the existence of radiation pressure, a pair of vanes were mounted on the arms of a glass cross and suspended by means of a thin quartz fibre.

Light from a strong source was focussed on one of the vanes and the resulting deflection measured. With this set up,

(under the present concept proposed), as light is incident on the vane, it will create an under pressure region on a

*The term matter used here is for the voids spacefluid and if the void is matter, the spacefluid has to be differential by giving a different name say 'super matter'.

localised spot of the incident beam on the surface of the vane and due to this there would result a pressure from the neighbouring space fluid on to the vane. The deflection noticed could be due to this account which however was termed as rocket effect. In any case, the above experimental set up was not ideally suited to measure the under pressure effect of light, if it has any.

2. An appropriate method could be to subject very small suspended particles of dielectric material which are not charged to a strong beam of light. It should be possible either to counteract their gravitational fall by keeping the source above, or if the light beam is horizontal, the dust particles should move towards the source. The inertia of the particles will no doubt have its effect, however, by selecting very light particles and suitable frequency of light it should be possible to observe the direction.

3. It is a well known fact that the small asteroid fragments do not accumulate in interplanetary space, but fall continually on to the sun, due to pressure effect of sunlight radiation. The explanation, given for this however, is as per Pointing Robertson effect and is due to retardation effect and not under pressure effect of light. This however may be reconsidered and checked whether it is due to reverse radiation pressure of the sunlight due to which the fragments drift ^{spirally} towards the Sun.

4. The most convincing proof of reverse direction of radiation pressure, as I can see, is the photoelectric effect, where it is noticed that with ultraviolet rays falling on photocathode, there exists some current reaching

the second electrode (normally the second electrode is the anode) with positive potential of this electrode is made negative with respect to the photocathode. To explain this interesting result it was suggested that photoelectrons are ejected from photocathode with non-negligible kinetic energy and that the photoelectrons of maximum energy were emitted from the surface of the photo cathode whereas lower energy electrons originated inside the surface. The above assumption may not be really correct and it could as well be that the electrons move towards the ultraviolet source due to reverse nature of its radiation pressure.

5. Liquid Helium II (liquid Helium I below 2.183°K) exhibits properties so very different from any other liquid that it is said to constitute a new fourth state of matter unlike any solid, liquid or gas. However, if these properties of the He-II are analysed, assuming the existence of spacefluid and inward, radiation pressure, results will be in accordance with the expectations. Below 2.183°K where atomic vibrations of He-II atoms are practically zero, any flow of space fluid carries the atoms alongwith it. The relative motion between the atoms ceases and the flow is frictionless. Thus the space fluid imparts He-II the property of its superfluidity. Also, at this low temperature, light weight and least energetic He-II atoms respond to the pressure gradients in the space fluid that will be created due to the presence of a light/heat source, such that the pulsed pressure is towards the source, and He-II atoms drift along with the spacefluid towards the heat source. This is noted as a complete reversibility, in the thermodynamic sense, of the mechanical flow of He-II, because at temperature

higher than 2.183°K , He-I atoms like any other fluid at that temperature vibrate in their positions and flow as per convection currents opposite to the direction of pressure gradient established by the heat source. As at all normal temperature effect, with which we are long familiar, the flow of the fluid is the movement of its molecules due to heat convection or pressure gradients in the fluid itself (not in the space fluid that fills the interstices of atoms) and has relative motion between molecules and also with respect to the space fluid, flow of light He-II atoms along with the spacefluid appears abnormal. Analysis of superconductivity phenomenon under this concept indicates that electric current is not necessarily the flow of electrons but the effect of pulsed pressure* conditions in the current carrying conductor. That is why it is seen that many of the good metal conductors are not superconductors and many poor conductors at higher temperatures are super conductors. Cryogenic phenomena give strong indication of existence of spacefluid and inward nature of radiation pressure.

CONCLUSION: A relation between gravitation and radiation can be established by the 'inward' direction of radiation pressure. Analysis of various phenomena give a strong indication of existence of space fluid and non-existence of substance for matter and as such it might be useful to recheck the direction of radiation pressure with respect to the source. Gravitational field is the most fundamental in nature and is an indication of existence of matter. It is the successive collapse of gravitational field and its *detailed analysis is not given there.

complete destruction for instance in electron's annihilation that is seen as an underpressure radiation pulse travelling spherically outwards and destroying successively the gravitational stress at each point of the space that existed due to electrons existence. Radiation ends whenever gravitation ends and theoretically both end at the end of the universe, We need not look into the interior of an electron for the electric charge distribution. On the surface of the electron, there is no such thing like 'smeared charge'. Instead, there is a definite physical* picture for an electron with its spinfluid boundary, void content and associated end flows of spacefluid that gives it the property of attraction/repulsion, spin and mass etc. The physical picture of the electron developed under this concept will also define its property of annihilation, formation of nuclear particles, and assembly of matter with a complete uniformity. The nucleus need not be imagined to contain matter of a fantastic density (10^{14} gm/cm³) within its tiny volume. Its property of mass concentration is due to void contents of particles forming it and external reasons (spacefluid pressure), just as earth's gravitation is due to its void content and external spacefluid's pressure. Many interesting results are revealed when the observed regularities of planetary system, magnetic* field of the earth, formation of the ionosphere and important related phenomena of astrophysics are analysed under this concept. For brevity only few examples have been given. Nature exhibits a great uniformity and order when critically analysed

* This is not given here due to detailed analysis required.

under this concept, and as such I feel there are justifications to check direction of radiation pressure, how so ever small it is. There is no force of one part of electron on the other, and hence, there is no longer the infinity due to selfaction. Photon will not be a 'matter' particles as believed today. There is only one 'matter' in the universe and that is a super fluid (the space fluid). There is only one physical law the equations applicable to the behaviour of a spacefluid, and all physical laws will have similarity. We should not get disheartened that Nature is so simple. Our concepts on space, matter radiation and gravitation will require a drastic revision if the direction of pressure of radiation is experimentally proved to be towards the source of light.

Table 1.

Planets, Radius, Density and the surface gravity.

.....

Planet	Radius of (Earth=1)	Density (Water=1)	Surface gravity (Earth=1)	Radius x gravity	Planet gravity Earth's gravity)	Planet's radius x Planet's density Earth's radius x Earth's density
1	2	3	4	5	6	7
Mercury	0.38	5.5	0.27	0.38 x 5.5	0.27	0.37
Venus	0.93	5.1	0.87	0.96 x 5.1	0.85	0.88
Earth	1	5.516	1	1 x 5.516	1	1
Mars	0.53	5.9	0.38	0.53 x 3.9	0.38	0.37
Jupiter	10.95	1.34	2.64	10.95 x 1.34	2.64	2.6
Saturn	9.14	0.70	1.17	9.14 x 0.70	1.17	1.16
Uranus	3.90	1.4	0.92	3.90 x 1.4	0.92	0.99
Neptune	3.50	2.2	1.40	3.50 x 2.2	1.40	1.4

The Planetary system

Newton's law of gravitational attraction for a mass falling on the earth's surface has already been derived under this concept where the existence of spacefluid and void nature of matter has been assumed. With similar derivation, the force of attraction between the sun and the planets can be shown to follow the inverse square law. To explain the uniformities observed in the planetary system, following assumptions are made. The subsequent conclusions drawn indicate the dictating reasons for the suppositions.

1. Similar to the spinning fluid of the electron, the sun possesses, in its vicinity, a circulation of spacefluid round the axis of its axial rotation. The maximum speed of circulation (which will be in its equatorial plane) approaches the speed of light.

2. The circulating speed of the spacefluid, falls off inversely as the square root of the distance from the sun.

The planets are carried along the counter clockwise direction of circulation of the solar spacefluid and their orbital speeds are determined by the circulating velocity of the spacefluid at the respective orbits of the planets. The only force acting on a planet is the gravitational force of attraction due to the sun (ignoring the gravitational attraction of one planet on the other) which results in a centrepetal acceleration towards the centre of the sun. If there were no circulation of the spacefluid in the planetary system, the planets would have taken a straight line course and finally fallen on to the sun, however, due to the circulation, the planets are carried in elliptical orbits (almost circular) and due to the centrepetal force, continually fall on to the sun.

$$F = G \frac{m_p \cdot M_s}{R^2},$$

where F is force of attraction due to sun,
G is gravitational constant,
 m_p mass of planet,
 M_s mass of sun and
R distance of planets from the centre of the sun.

As the above force of gravitational attraction results in a centrepetal force on the planet, without any loss of action in the intervening spacefluid,

$$G \cdot \frac{m_p \cdot M_s}{R^2} = m_p \frac{V^2}{R} \quad (1)$$

where $\frac{V^2}{R}$ is the centrepetal acceleration for a mass orbiting in a circle of radius R , with an orbital velocity V .

As per supposition 2,

$$V = \frac{K}{\sqrt{R}}, \quad \text{where } K \text{ can be termed as 'circulation constant'.$$

Substituting this value of V in equation 1, we have,

$$\begin{aligned} G \frac{m_p \cdot M_s}{R^2} &= \frac{m_p \cdot K^2}{R \cdot R} \\ \text{or } K^2 &= M_s \cdot G \\ \text{or } K &= \sqrt{M_s \cdot G} \quad (II) \end{aligned}$$

From the know mass of the sun (3.3×10^{33} gm) and the gravitational constant G (6.67×10^{-11} Newton $\frac{\text{Meter}^2}{\text{kg}^2}$)

$$K = 15 \times 10^{12} \frac{\text{cm}^{3/2}}{\text{Sec.}}$$

Max. speed of circulation of spacefluid round the sun's equator

$$\begin{aligned} &= \frac{K}{\sqrt{\text{Radius of the sun}}} \\ &= \frac{15 \times 10^{12}}{\sqrt{10^9}} \\ &= 5 \times 10^8 \text{ cm/sec.} \end{aligned}$$

The circulation constant K can also be determined by the other known datas on the planet's, as follows:-

A Planet, during its orbital motion (assuming it circular), during a time $\frac{T}{4}$ (T is the time of the orbital revolution) under the action of its centrepetal acceleration $\frac{V^2}{R}$ 'falls' through a distance of R (R is the orbital radius) towards the sun. This is because a planet describes the same orbit over and over again.

To avoid complex calculations circular orbit has been assumed.

Distance = $1/2 \times \text{acceleration} \times (\text{time})^2$

$$R = 1/2 V^2 \times \left(\frac{T}{4}\right)^2$$
$$= 1/2 \frac{K^2}{R \cdot R} \times \frac{T^2}{16}$$

or $\frac{R^3}{T^2} = \frac{K^2}{32}$, which is the same as Kepler's law.

Substituting the known value of $\frac{R^3}{T^2}$ ($6 \times 10^{18} \frac{\text{miles}^3}{\text{days}^2}$),

we have $K = 10^{13} \frac{\text{cm}^{3/2}}{\text{Sec.}}$

The orbital speeds of the planets when computed with the above circulation constant ($V = \sqrt{\frac{K}{R}}$) give better results and hence, it is appropriate to use this value of K to compute circulating velocity of spacefluid round the sun, which comes to be

$$\frac{10^{13}}{\sqrt{10^9}} = 0.03 \times 10^{10} \text{ cm/sec,}$$

which is $\frac{1}{100}$ th of the speed of light.

Under this concept maximum probability, for the creation of matter in its elementary form (electron), exists at the sun and in order to create an electron, the spacefluid must be imparted velocity of light so as to form the 'spin' of the electron. In fact, the spacefluid's motion, at speed just exceeding light' speed, breaks down into 'voids' which would create stable electrons, with spinning boundary of spacefluid. This is the most dictating reason for the supposition that the circulation round the sun should be at speed of light. While detailed calculations and more accurate astronomical data may give results for the circulation round the sun to be at speed of light, if however, in reality, the circulation does not approach speed of light, matter can be created only within the sun during the violent disturbances and not at the surface of the sun.

Orbital Velocity & Elliptical Orbits.

As discussed above, the planets derive their orbital speeds from the spacefluid's motion in the equatorial plane of the solar system which is similar to a whirl with the sun at its centre. It is the tangential component of the spacefluid motion due to which the planets describe elliptical orbits. That this is so can be inferred from the observed fact that the orbital velocity of a planet is inversely proportional to $\sqrt{a(1-e^2)}$ where 'a' is the semi major axis (R for the planet) and e is the eccentricity of the elliptic orbit, which shows the dependence of the eccentricity on the orbital velocity for a particular orbit.

Similar to the solar system whirl, each planet which possesses an axial rotation also creates a whirl around it and the satellites derive their orbital speeds from the circulation in spacefluid^{so} set up. From the relation (2), the 'circulation constant' for each planet with axial rotation can be computed and the orbital velocity of the satellites can be worked out as the satellites, like planets, also drift along the circulation of the spacefluid, the orbital velocity being inversely proportional to the square root of the distance from the planet.

Axial rotation of planets

The high speed of circulation around the sun, creates magnetic field lines emanating from the north pole of the sun and returning to its south pole. This is because, an analysis under this concept (done elsewhere) reveals that circulation of spacefluid is the electric current. The solar magnetic field lines from its north pole follow far off circuits beyond Mercury and Venus and pass through the planetary plane to reach the south pole. This is understandable when it is seen that the magnetic field lines in the neighbourhood of a bar magnet are negligible and after a

certain distance the field density increases to a certain length till again it starts falling down to negligible value. The solar magnetic field lines may follow a more complicated pattern particularly due to the movement of the entire solar system whirl, in the spacefluid however, due to high circulating current around the sun and the circulation at an appreciable speed continuing in the major part of the planetary plane, the return of any appreciable magnetic field lines around the region of Mercury and Venus may be ruled out. As a rough guide and particularly in the absence of the accepted final picture of the magnetic field patterns for the sun, at present, it may be assumed that the solar magnetic field density in the planetary plane varies directly as the distance from the sun from the region beyond venus and this proportionality is on the decline from the region around Saturn onwards.

The planets during their orbital motion, ^C put through the solar magnetic field which will be nearly vertical in the Central Planetary plane and thus induce a potential which will be maximum along the diameter of the planets. The orbital speed, the diameter of the planet and the magnetic field density will determine the potential induced which will create a circulation around the planet so as to create magnetic field in opposition to the Sun's field. The circulation so formed determines the direction of rotation and also the peripheral speed of rotation of the planets.

From above it may be inferred that,

Peripheral velocity of a planet
due to its axial rotation \propto R.V.D.

where, R is the distance from the Sun, V is the orbital velocity and D is the diameter of the planet.

The following table, indicates the comparison between the peripheral velocity computed from the actual observed data and the results as per the above proportionality:-

<u>Planet</u>	<u>Peripheral velocity due to Axial rotation (Earth =1)</u>	<u>Distance from sun x orbital velocity x Diameter (Earth =1)</u>
Earth	1	1
Mars	0.52	0.6
Jupiter	26	24.8
Saturn	21	28
Uranus	8.7	17

Due to the uncertainty, with regard to the period of axial rotation of Venus and the above assumption that only negligible field will exist in the region where Mercury & Venus are located, these planets do not appear in the table. It would be seen that the results could be called satisfactory up to the planet Jupiter, however, further for Saturn and Uranus due to the decline in the magnetic field density, the assumed direct proportionality of the magnetic field with the distance from the sun no longer holds true, and hence the calculated results do not compare with the actuals observed data.

It may be concluded that in all probability the agency for the axial rotation of the planets is the Sun's magnetic field, the magnetic fields of the planets will no doubt also have influence on each other. The axial rotation of the sun itself will be due to the magnetic field of the astronomical body ^{around} which it rotates along with the planetary system. The observed fact that the solar magnetic disturbances influence the earth's magnetic fields also supports the above analysis.

Spacefluid's Circulation Gradient.

The circulation round the sun at $\frac{1}{100}$ th of the speed of light should fall off towards the surface of the sun due to the gradual increase

Dispersal of matter from the Sun.

The high speed of circulation in the equatorial plane of the sun, disperses matter from the sun (only those particles that reach the high circulation zone due to the turbulence on the Sun's surface) to the planetary plane, like a 'jet' that spreads outwards with distance, The tangential velocity imparted to the particles is retarded due to the Sun's gravitation and deflected due to the circulation of the solar spacefluid. The particles depending upon their initial velocity (about $\frac{1}{100}$ -th) of the speed of light) reach certain distance away from the sun, and depending upon their position and velocity are either captured by the local whirls around the planets and enter the atmosphere of the planets or orbit round the sun till they are captured by the orbiting planets. The planets will increase in mass due to the above dispersal. New planets will be formed on those orbits where the local planets cannot pull the orbiting matter so dispersed. It may be that the asteroid zone between the Mars and the Jupiter is a planet in formation. It may be also concluded that the velocity of the matter thrown from the sun being higher in the region of Mercury, Venus, Earth & Mars, the capture by these planets is less than the farther planets Jupiter Saturn etc where the velocity is well retarded and capture is easier. Beyond Pluto hardly any matter will reach and while circulation at reduced velocity will continue, the probability of finding a planet larger than Pluto can be ruled out.

The planetary system is under creation. It started from the matter dispersed from the sun and will continue to grow till the sun disperses matter. Planets & Satelites should grow in size and number.

Thus it would be seen that by supposing a circulation round the sun the following phenomena are explainable:-

- 1) Origin of matter in the solar system for planetary formation and the reason for the location of all the planets in the equatorial plane of the sun.

in the material content of the solar atmosphere. Similarly, the speed of circulation round the earth, will fall off towards the earth due to the increase in the atmospheric material content till at the earth's surface, the circulation will be the same as the observed axial rotation. It is the circulation of the spacefluid that rotates the earth which is composed of voids. It is the external agency that causes the axial rotation. The circulation shields the planets and retains the material atmosphere. Only those planets should have appreciable atmosphere that have axial rotation. The detection of electric currents in the earth's atmosphere, the vertical electric potential gradient from the earth's surface and the very existence of the ionosphere conform to the above analysis.

- 2) The reason for the heavier planets being located farther from the sun and the lighter planets nearer to the sun.
- 3) The spread of the planetary system.
- 4) The agency behind the axial rotation of the planets and the reason for certain planets possessing atmosphere.
- 5) Formation of ionosphere and bombardments of solar particles (cosmic 'rays') on the Earth's atmosphere. This would also be the case with other planets and satelites.
- 6) The satelites are also gradually formed from solar matter like planets.
- 7) No separate agency is needed to initially start a planet so that it further continues orbiting round the sun. The planets drift with the spacefluid.
- 8) The agency for deflecting the comet's tail. In addition to the particles ejected from the sun, and hitting the comet's tail, the circulation of the spacefluid in solar system will impart its velocity & curve the gaseous tail.
- 9) The probability of formation of a new planet between Mars & Jupiter.
- 10) Transmission of solar circulation across the intervening space to give the observed orbital velocity of the planets.
- 11) Magnetic disturbances on earth due to the magnetic disturbances on the sun.