

By

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Introduction

As is well known, an electron, despite high-speed interactions with electric and magnetic fields and other particles of matter, remains unaffected *structurally*—maintaining its mass, charge, inertia, and locality after the interactions, just as these were before. This single fact itself is sufficient to postulate on the existence of some unique universal entity constituting the electron, such that the structure explains the known properties and behavior of the electron—as to how it sustains the collisions with the other particles and, yet, remains permanently[2] indestructible without any reduction in the quantities of its basic properties. A theory that explains this enigmatic fact is framed and described[3] in detail elsewhere [1,2,3]. It reveals that the electron is a *perpetually* rotating system, a space-vortex (vortex of absolute vacuum) that through the process of motion in electric current, and interaction with external magnetic field can also lead to the development of a system partially violating Lenz’s law and, thereby, capable of achieving perpetual motion in a machine. Such a conclusion has a new theoretical basis, as well as experimental confirmation—briefly outlined in this paper.

The basic understanding of interaction of electric current with magnetic field requires deeper knowledge on the *fundamental* nature of the electric current as well the magnetic field; this, in turn, leads to the inquiry on the nature of “electric charge” and its distribution in the electron structure. The origin of electron mass and charge, electrostatic and electro dynamic forces are described below with the vortex structure of electron, which further facilitates explanation of atomic structure and, thereafter, over-unity-efficiency generator. Due to brevity, predominantly, qualitative-descriptions of the physical processes involved have been presented.

Electron Structure

Quite opposed to the modern concept of electron being a point-mass and a point-charge, Fig.1 shows a space-vortex in which a central void (field less, energy less, spherical volume) is enclosed within a vortex of space—the space postulated as a *nonmaterial* fluid which can flow at any speed varying from zero to a limiting speed c , which is the speed of light in absolute vacuum. The properties of matter like, mass, density, discontinuity, viscosity, compressibility etc. are not postulated for the fluid-space. The only property postulated for the fluid-space (hereafter, referred as “space”) is its limiting angular velocity of rotation (ω), which is also the limiting velocity gradient c/r_e , where c is the limiting flow of space, and r_e is the radius of the spherical void (Fig.2).

In Fig.2 the circulating flow of space has broken down into a spherical void, thus creating a boundary between the central void and the circulating space, named as “interface”. At point P_z , tangential space-velocity (velocity field) down the paper is c , and the velocity gradient is c/r_e ; for the point P , the tangential space velocity down the paper is $\omega r_e \sin\theta$, and the velocity gradient is $\omega r_e \sin\theta / r_e \sin\theta$, which is also c/r_e —same as for P_z . Thus all the points at the circle C have the same velocity gradient; the interface, therefore, rotates around the axis YY' like a rigid surface. In Fig.1, which shows a diametrical plane-section of the interface, the velocity-field in the space-vortex falls inversely with the distance from the center.

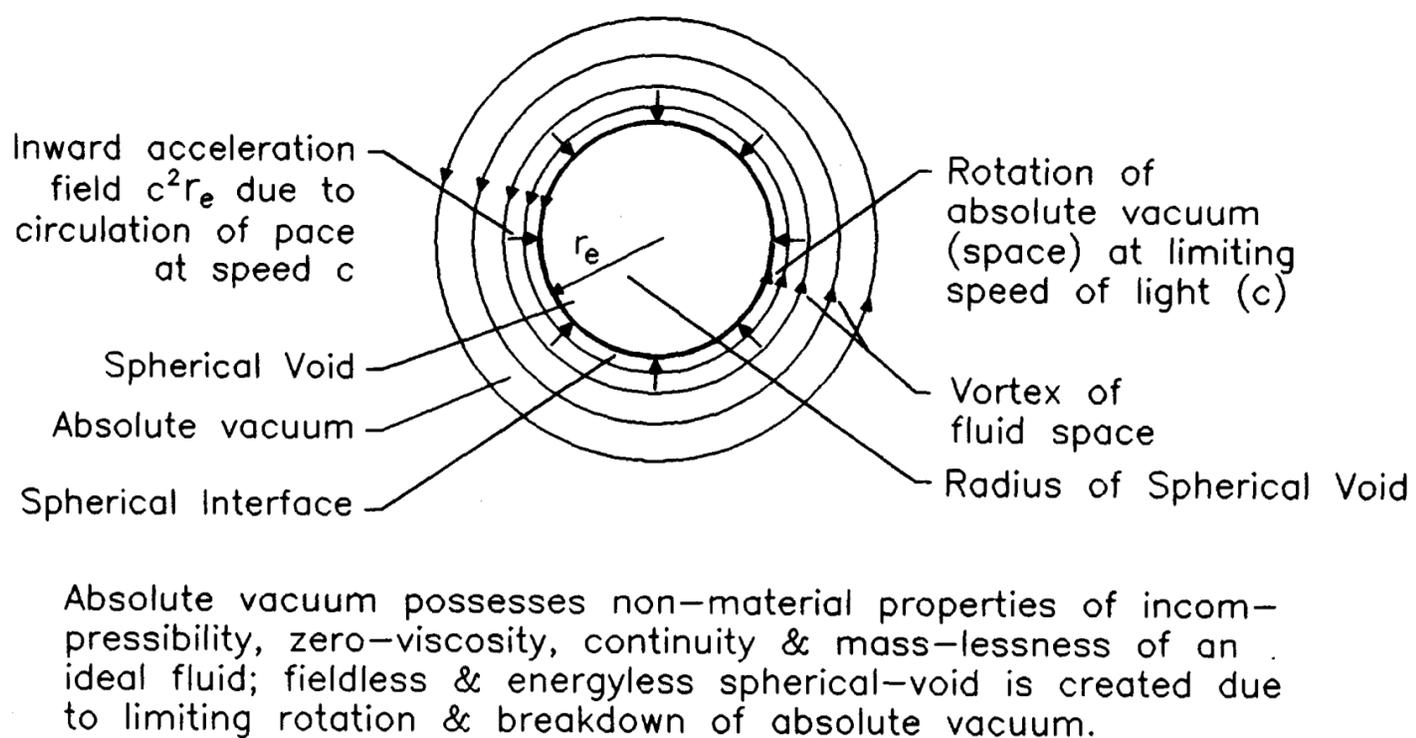


Fig. 1 Vortex in electron structure

Absolute vacuum possesses non-material properties of incompressibility, zero-viscosity, continuity & mass-lessness of an ideal fluid; fieldless & energyless spherical-void is created due to limiting rotation & breakdown of absolute vacuum.

The spherical interface has dynamic stability due to the following fact: supposing, an infinitesimal decrease in the interface-radius occurs (Fig.1); consequently, the velocity gradient tends to increase beyond its limit W , causing slight increase of the radius, thus restoring its original size. Now, supposing the radius increases by an infinitesimal length, in which case the velocity gradient becomes insufficient to maintain the void within the interface; and the interface shrinks to its original size.

Energy in electron structure

Fig. 3 (a) shows electron as a point-mass and point-charge (modern concept) with fields starting right from the electron center; also, the field direction is *outward*; the energy distribution too starts from the center. In Fig. (3b) there is a discontinuity of the fields and, consequently, the energy distribution stops at the interface itself; also, the field direction (Fig.1) is *inward*, which prevents dilation and dissipation of the circulating space-motion in the vortex. The discontinuity of the energy field at the electron center avoids the serious problem of the energy integral becoming infinite in the electrostatic field of the electron. In an electron, assumed stationary, the electrostatic and the gravitational field energy of electron are located in space throughout the universe except at the electron center.

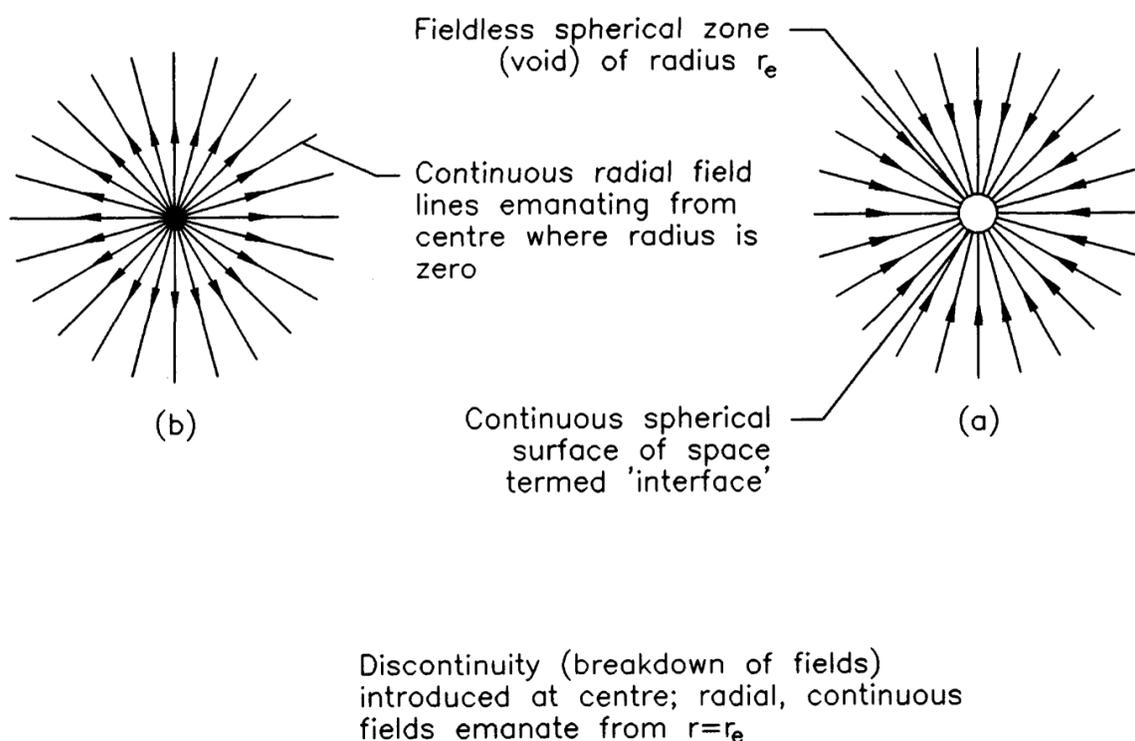
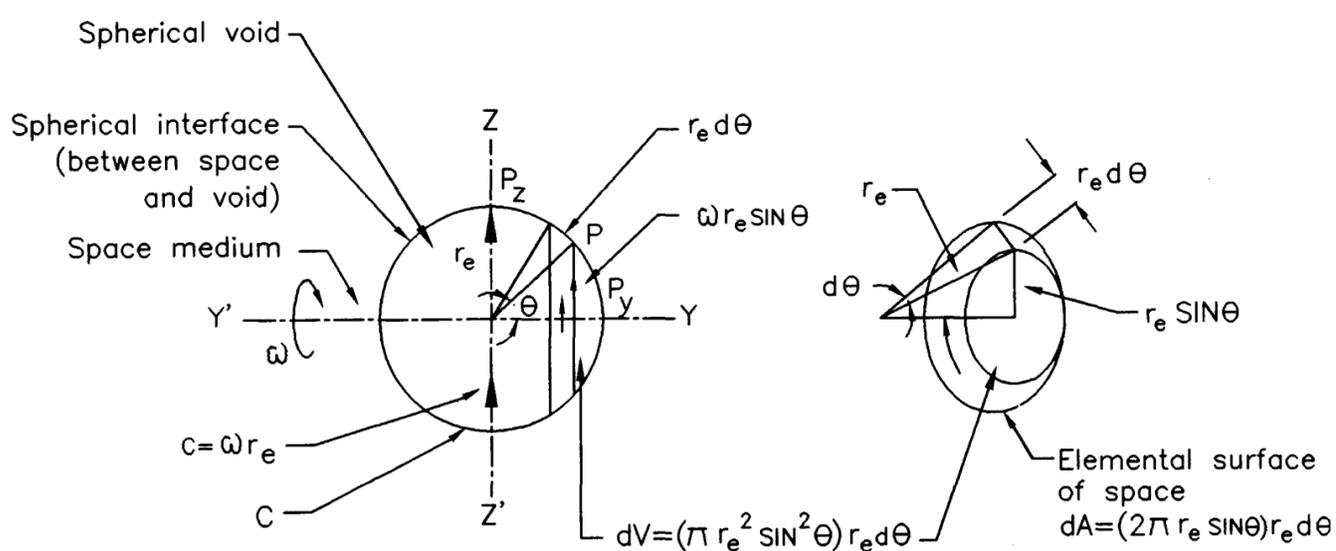


Fig. 3

Integrating, q varying from 0 to p , electron charge is:

Eq. (2) is referred further as charge equation. Using this relationship and the experimentally determined value of electron charge, the radius of the interface is determined as: $r_e = 4 \times 10^{-11}$ cm.

It has been shown that Coulomb's constant is directly proportional to c with electron as the unit of mass; and the gravitational constant, dielectric constant and permeability constant of the vacuum are inversely proportional to c . Coulomb's equation to calculate electrostatic force between two charges has also been derived. The calculations show that the energy required to create electron (which is the energy in its fields, electrostatic and gravitational) with the vortex structure, is: $(4/5) m_e c^2$; the coefficient $4/5$ appearing because the electron has axial symmetry, rather than spherical. (As per mass-energy equation it should be $m_e c^2$.)



ω = Angular velocity of spherical interface around $y-y'$

Void = Fieldless spherical hole in space

Void-radius $r_e \simeq 4 \times 10^{-11}$ Cm

Fig. 2 : Velocity Field on Interface

Mass and charge of electron

The creation of electron involves space-circulation at the limiting speed c within the spherical interface; as such mass is defined as the volume integral of the space-velocity on the interface (Fig.2). Considering an element of volume, mass of the elemental volume,

$$dM = (dV) \omega r_e \sin q = [(p r_e^2 \sin^2 q) r_e dq] \omega r_e \sin q.$$

Integrating, q varying from 0 to p , electron mass is:

$$m_e = (4p/3) r_e^3 c. \quad (1)$$

From the above relationship (hereafter, referred as mass-equation) it is seen that the mass of electron is proportional to the volume of its central void, and the speed of light, which is the maximum speed of space circulation in its vortex. Similarly, charge of electron is defined as the surface-integral of the space-velocity [4] in its vortex (Fig.2):

Charge of the elemental surface on the interface,

$$dQ = dA \times \omega r_e \sin q = [(2p r_e \sin q) r_e dq] \omega r_e \sin q.$$

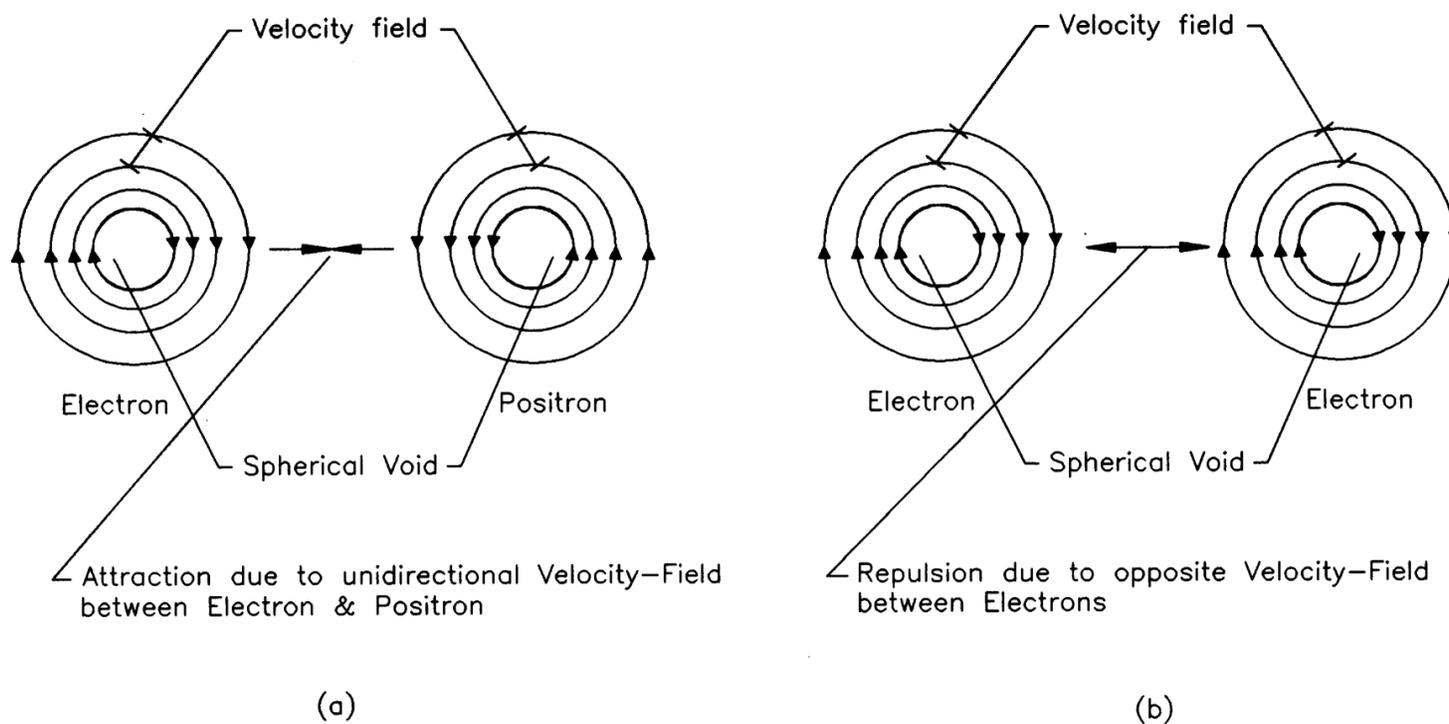
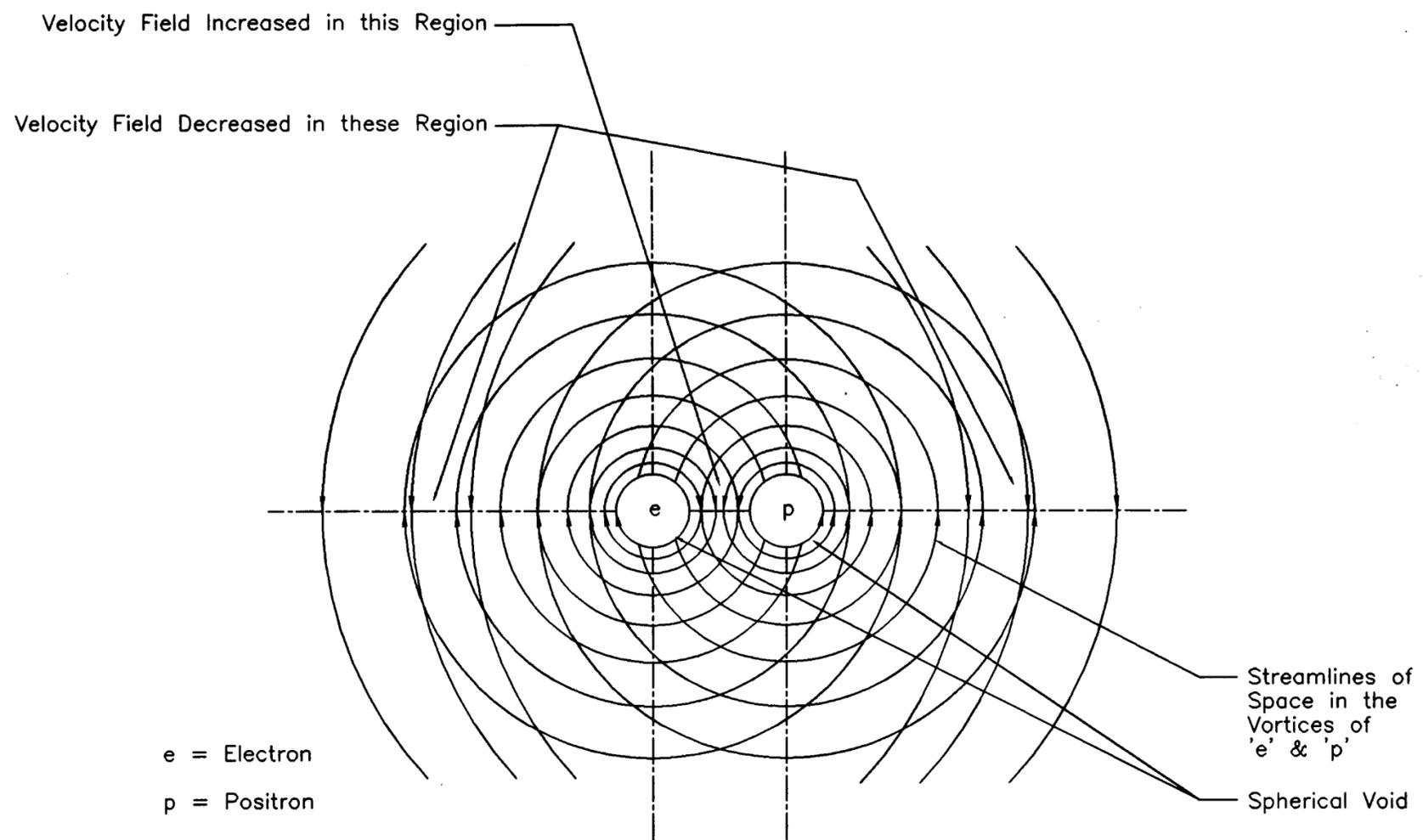


Fig. 4 Attractive & Repulsive Forces due to Velocity Fields

Indestructibility of electron vortex

In Fig. 4(b) two electrons are shown side by side. The electrostatic force of repulsion between the electrons is determined by Coulomb's equation, while the qualitative description—the actual process of creation of the repulsive force in space is as follows: It is seen that the velocity field in between the particles are oppositely directed; this creates a decrease in the strength of the velocity field there, causing an increase in pressure^[5] in the irrotational flow of the incompressible fluid space; thus creating a repulsive electrostatic force through the interaction of the velocity fields. In Fig. (4a) one of the particles is a positron^[6] on account of its opposite spin. The unidirectional velocity fields in between the particles produce increased velocity field, decreased-pressure there and, consequently, electrostatic attractive force. The possibility exists for annihilation if the particles continue to come closer and superpose each other (Fig.5). But as long as the annihilation does not take place, any nos. of interactions between these particles (between electrons or between positrons) does not lead to the permanent reduction of the strength of the velocity field in their vortices. This is because the repulsive and attractive electrical forces of interaction, described above, are produced due to an increase of the velocity field on one side of each of the particle, and a decrease by an equal amount, on the other side; there being no overall increase or decrease of the velocity-field in the vortex on a permanent basis. Barring the phenomenon of annihilation, the vortex structure of electron is eternal; it can neither dissipate the strength of its velocity fields, nor can emit any energy, since, within the central interface, energy (space circulation) is non-existent.



- 1) Absolute properties of Space: Non-Material, Non-Viscous, Incompressible, Zero-Mass Fluid, with Limiting flow equal to the Velocity of Light.
- 2) Due to Electrical Force of Attraction, the particles get Annihilated.

Fig. 5 Annihilation

[The quantum physics explains the process of electric repulsion between two electrons by postulating exchange of virtual photons; Interaction between matter particles are supposed to be carried out by *emission* and *absorption* of force carrying particles. Whereas, interactions between particles, or field and a particle, through velocity-field, do not involve emission or absorption of energy.]

Magnetic Field, Electric Current –the Physical Aspects

The distribution of velocity-field in the space-vortex of electron, as discussed earlier, is a maximum within the diametrical plane at right angles to the axis of rotation (Figs.1, 2). These circular streamlines in the vortex, during electron's linear motion (say, along the axis of rotation) relative to space, are converted into magnetic field lines as shown in Fig.6. In this figure, a train of electrons, abbreviated as e_1, e_2, e_3 , etc. moving at velocity v relative to the medium of space along X-axis create in the transverse plane ZY magnetic fields represented by the concentric circles. The circular pattern of the magnetic fields is the space-reaction from the circular streamlines in the vortex of the electron as it passes through the YZ plane, due to which the direction of B is opposite to the direction of the velocity field on the electron's interface. The streamlines in the electron vortex have either steady velocity-field (producing electric field), or *varying magnitudes* of velocity-field due to motion of electron, that produce magnetic field. The magnetic field is the *effect* produced at a space point due to *decreasing magnitude* of the velocity-field there. As the electron passes through YZ, its velocity field in that plane dies out, thus producing the magnetic field.

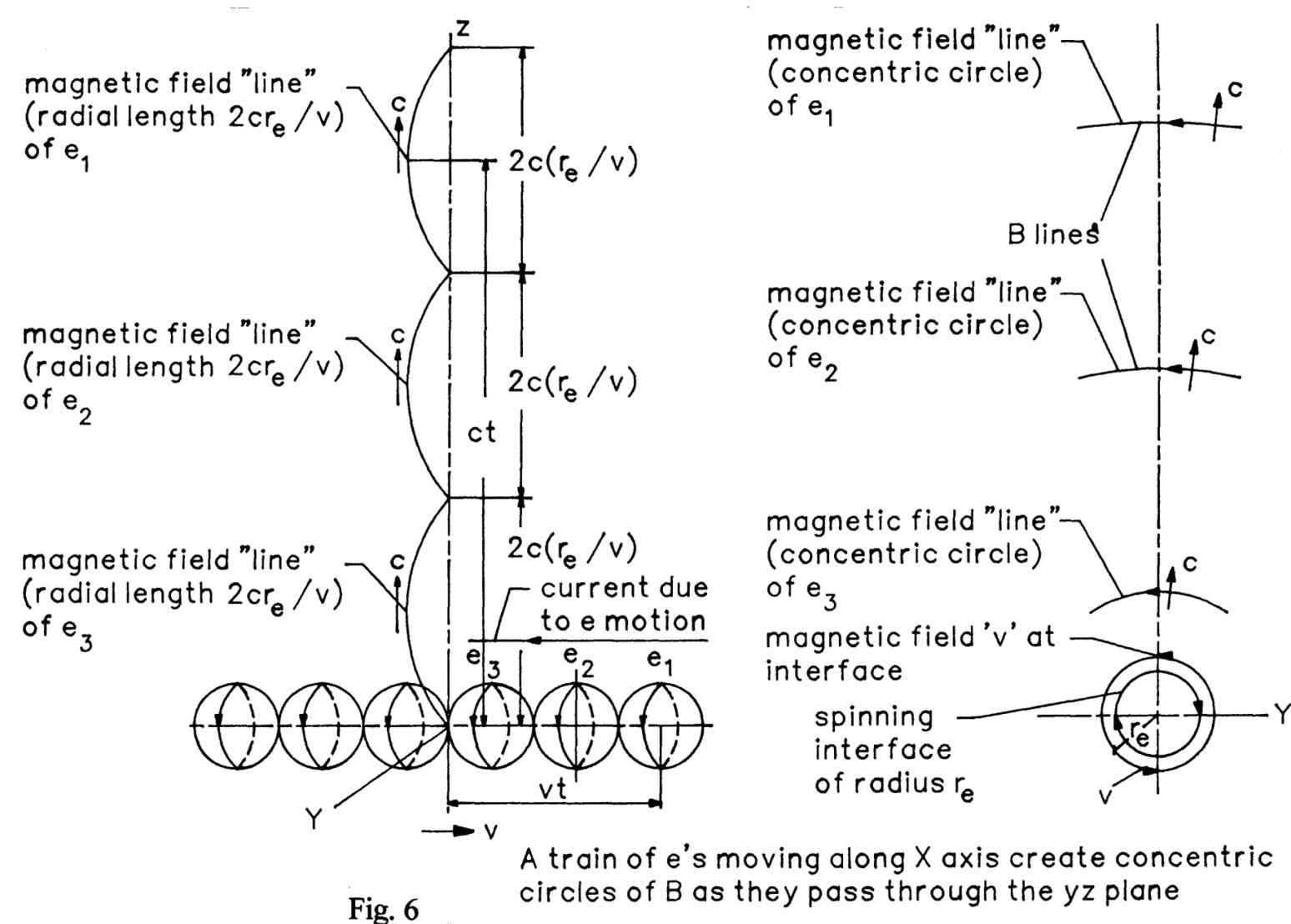


Fig. 6

A train of e's moving along X axis create concentric circles of B as they pass through the yz plane

The magnetic attraction between parallel-moving electrons (relative to space), and magnetic repulsion between an electron and a positron in parallel motion, develop maximum at right angles to their motion because of the above mentioned configuration of the magnetic field with respect to the line of motion of the electron. Free electrons (considering two of them), assumed *static* and in close range, will reorient their vortices through the mutual action of their velocity fields, such that these fields become unidirectional in space in-between them (Fig.4a); and thus create an attractive electrical force; similarly, two electrons in close range, assumed to be in parallel motion, having opposite directions of the velocity fields in between their vortices, will produce magnetic field, in the region between them, of opposite directions; and thus create magnetic attractive force.

It is a known fact that the direction of an electric current is conventionally taken opposite to the flow of the electrons. Applying the "corkscrew" rule (Fig.7), an anticlockwise direction of the magnetic field around a current carrying conductor, signifies the current direction up the paper and, therefore, the electrons constituting the current will flow down the paper. And, since the direction of the magnetic field around the current carrying conductor has to be opposite to the velocity field in the electron vortex as described above, the down-ward moving electrons should have clockwise direction in their vortices. To conclude: An electron moving away from an observer will be seen by him to have *clockwise* vortex as it proceeds forward. There appears to be a *preferred* direction of motion of electron governed by the rotation of space in its vortex, when it moves in its *natural* mode as electric current. [That explains the reason for the emission of only *negative* beta particle (electron) from all the beta-active elements existing in nature; because, under the force of expulsion within the nucleus, the particle – either electron or positron (oppositely oriented electron)— released and projected from the nucleus, may get oriented to a clockwise vortex-spin for forward motion, similar to the natural electron motion in electric current.]

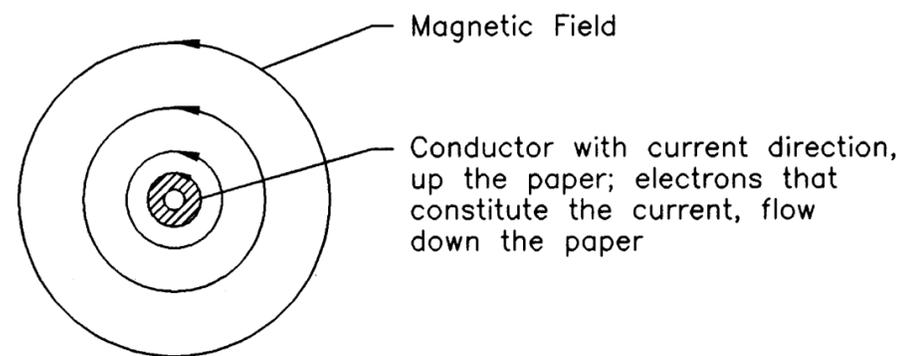


Fig. 7

[7] Neutron, Proton, and atom

Under attraction due to unidirectional velocity field in between the particles (electron and positron) as shown in Fig.4a, they rotate as their vortices rotate and roll over each other till annihilation takes place (Fig.5). Inward acceleration field c^2/r_e , acting externally on the interfaces of the particles (Fig.1), provide the crushing force that brings the particles closer till the vortex fields of each particle superpose; and being equal and opposite to each other, are nullified leading to annihilation. However, if a close assembly of two positrons and two electrons are under rotation around the center of this assembly, the annihilation is prevented. (see Fig. 8)

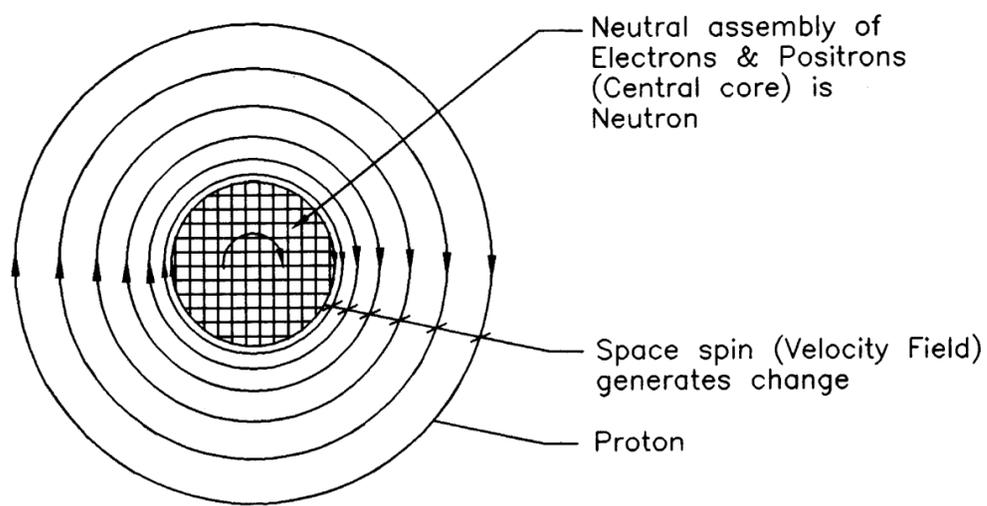


Fig. 8 Proton/Neutron

Orbital Electrons

Another example of rotational motion of electrons is in the vortices of the atoms. In Fig.9, the simplest atom of hydrogen is shown. The nucleus, in this case is a neutron enclosed within a space- vortex, which gives it the properties of electric charge and also another name, proton. The reason for the neutron to be assembled out of electrons and positrons is due to the constraint in the postulates of this theory that only one fundamental particle, electron, as the stable building block of matter, can exist in the universe. In the hydrogen atom, oppositely directed velocity fields of the electron and proton nullify each other in the region external[8] to the atom, thus endowing it with the property of overall neutrality. The nuclear vortex (proton vortex) makes the region in the neighborhood around the nucleus filled with energy – the velocity and acceleration fields—that carry the electron in circular orbit imparting it with kinetic energy in case of its ejection due to external interaction, if it is of the required strength as it happens in the photoelectric effect in larger atoms. The prevailing ideas on the existence of *emptiness* around the nucleus, makes the *continuing* orbital motion of the electron an impossible fact. [In larger atoms, the nos. of electrons and positrons in the nucleus depend upon their nuclear mass, whereas, the nos. of the orbital electrons are determined by the electric charge of the nuclear vortex to be neutralized.]

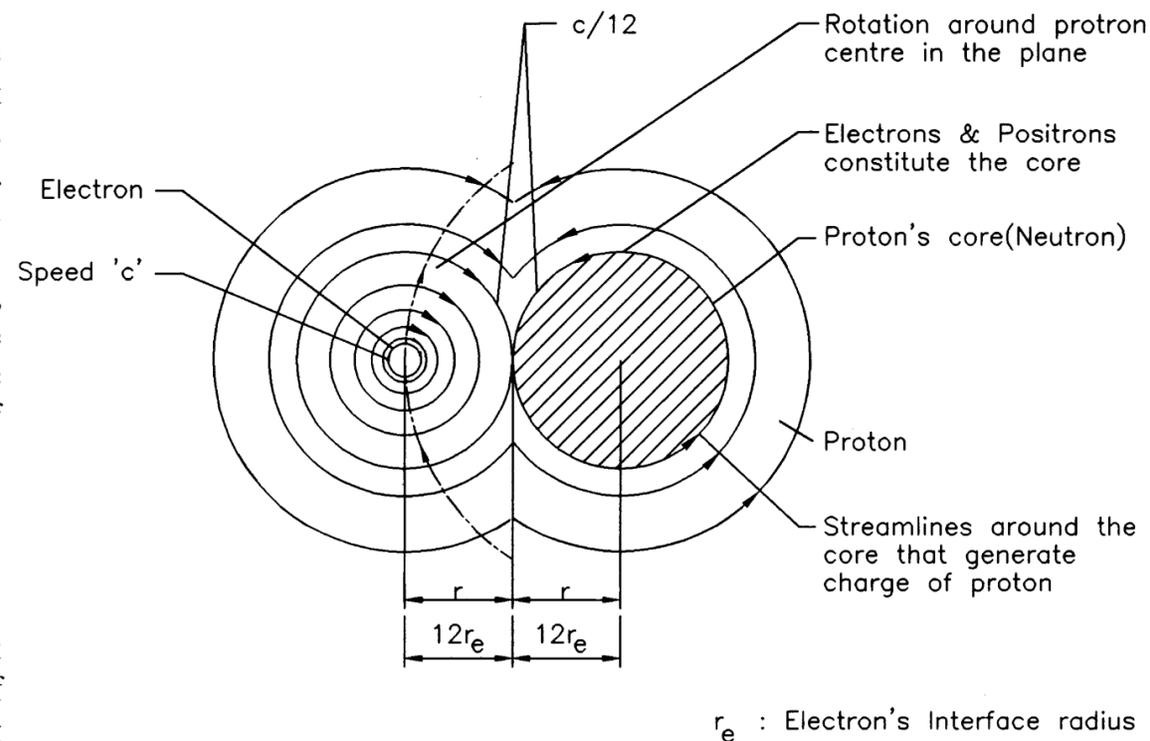


Fig. 9 Hydrogen Atom

The electron vortex, bound with the proton vortex through the common velocity field in between them, rolls over and circles it ceaselessly, there being no loss of strength of the velocity fields (energy) from either of the vortices due to the non viscosity of space. [In quantum mechanics the electromagnetic attraction between the orbital electrons and the positively charged protons in the nucleus is attributed to the exchange of mysterious virtual, mass less particles, photons, because it is unimaginable as per the tenets of the contemporary physics that the space-circulation can produce electric charge and a real force on the particles. Also, the orbital motion of electron, held in the atomic vortex, does not lead to loss of energy as believed in classical electrodynamics.]

Electric Current in a Conductor

With the vortex structure of the atoms a new concept of electric current emerges: The electric current in a conductor is a process of motion of the outer orbital electrons of the atoms in between the neighboring atoms under an *attractive* force. This explanation is in contrast to the prevalent concept, as per which, the electrons constituting a current are *forced* by the electromotive force (EMF) applied across a conductor to move in a circuit against the repulsive forces in between them. Consider three neutral atoms, A, B, C, located adjacent to each other in a conductor of electric current. Let a positive polarity (P) of a generator, created due to shortage of electrons there, come in contact with the atom A. On contact with P, A will lose some of its orbital electrons due to the attraction from P, and would thus become positively charged; and consequently, the velocity field in its vortex being no more nullified, A will *pull out* the orbital electrons of B in equal numbers that it has lost to P. Now B, having been positively charged, *pulls out* the orbital electrons of C and, this way, the process of the flow of electrons from atom to atom, continues in the whole circuit. Similar to the electrical force of attraction due to velocity-field interaction between an electron and a positron, discussed earlier, wherein the particles move due to an inequality of velocity fields on their sides; though the space-vortices of the atoms pull the electrons from the neighboring neutral atoms, there is no loss of structural energy from the atoms, that is, no overall depletion of the strength of the velocity fields in the vortex structure of either the atoms or the electrons. To conclude, there is no energy-exchange between the atoms and the electrons constituting the electric current, though the electrons get pulled from each atom in succession.

Generation of Electromotive Force

The continuation of electric current in a normal conductor connected across a dc generator, however, requires continuous presence of voltage at the positive and negative terminals of the generator; for which the generator has to be run by a prime mover. The electromotive force (EMF) is generated by the interaction of the magnetic field with the generator's rotating conductors when the orbital electrons in the atoms of the conductor are detached from their orbits and pushed to the negative terminal of the dc generator. The interaction of the magnetic field with the moving conductor of the generator is analyzed as follows.

Refer Fig.9. There is a common velocity field between the vortices of the electron and proton that exists in between these particles determining the interspacing of the nucleus and the electron. The atoms of a conductor have similar bonds with their orbital electrons. Considering an atom A of a conductor that is moving transverse to a magnetic field; it will experience changing magnitude of the field (dB/dt), such that at right angles to the B-field, an electric field is produced, as already conventionally accepted. The common velocity field between an orbital electron and the nucleus, as referred above, has its own electric field directed towards the nuclear center. Thus, in the atom A, if the electric field produced due to dB/dt is in opposition to the electric field of the electronic bond in one of its orbital electrons loosely bound in the outermost orbit, this electron will get released from the atomic bond. In this way, all those atoms, that have specific configuration with respect to the magnetic field, lose their outer orbital electrons. The electrons so released come out with the kinetic energy that they already possessed in the atomic orbit; and, further interacted with the existing magnetic field are driven to one end of the conductor, thus forming the negative-polarity and producing the electromotive force.

The release of the electron from the atom A through the above process has taken place due to the *reduction* of the electric field, that held the orbital electron with the nucleus prior to its release; and not due to provision of any energy externally from the magnetic field.

For better clarity, we can consider a thought-experiment: Let us suppose that we choose a dc generator which is an ideal machine with zero input towards no-load losses (friction, windage); then, the only power required to be given to the generator is dc excitation to produce magnetic field. To simplify the analysis, the excitation to the generator can be provided through permanent magnets, thus eliminating the excitation power also. However, if electromagnets are excited to produce magnetic field, it is observed that when the generator is on no-load, though EMF is induced with the rotation, the excitation of the generator does not produce reaction on the prime mover. (A further check can be made by running a normal dc generator on no load, and giving excitation to it; it will be seen that during excitation the input towards windage and friction losses does not change.) The excitation power remains in the electromagnets as heat-energy while maintaining the magnetic field in the winding used for excitation. Thus, unlike the prime mover, which requires additional power from no-load to the loaded condition of the generator, the excitation does not cause additional input to the prime mover on load. Now, the question arises—and this is the crux of the issue—that if the generation of EMF in an ideal generator, say, with permanent magnets for excitation, does not cause any reaction on the prime mover, and does not consume any additional power through the prime mover, how can work be done by this EMF, which did not take any energy for its production, in pushing electrons in the circuit against their (electron's) mutual repulsive forces to maintain the load current, since, as stated before, it is conventionally believed that the *energy* of the EMF is responsible to maintain the flow of the electrons (current) in the electric circuit? It is clear that the current, when the circuit is closed, is primarily initiated by the *attractive forces* between the positively charged atoms at the static external electrical circuit and the released orbital electrons available at the negative terminal (rotating) of the generator.

The reaction against the prime mover on account of power generation occurs when the generator is loaded, because, the voltage induced in the conductors of the generator has, as per Lenz's law, such polarities that the direction of the armature current (load current) and its associated magnetic field around the armature conductors, while interacting with the exciter's magnetic field (producing the EMF), create torque in opposition to the prime mover's torque. This opposing torque can be reduced through a specific configuration of the generator conductors and the magnetic field (producing the EMF) such that, while the induced voltage and the direction of the armature current produced by it are still as per the Lenz's law, the armature reaction is considerably less as described below.

Space Power Generation

A new system of electrical power generation that defies the law of energy conservation, as accepted in its present form, has come to light during the last two and a half decades[9].

Fig.10 shows a rotating cylinder of magnetic material with an electric coil rigidly mounted on it. Depalma in his experiments used permanent magnets as well as electromagnet similar to this system (N-Generator). Adam Trombly's closed path homo polar generator, basically, is as shown in Fig.11. The electromagnet's coil mounted on the cylindrical core is energized with dc power through slip rings. The experiments show that a dc EMF is induced between the periphery of the core and the shaft, even though the electromagnet's field of uniform strength passing through the magnetic cylinder may be thought to be rotating along with the metal of the cylinder as per the current understanding that a rotating magnet may carry its field. Since the induced EMF is observed, as per Faraday's law of induction, there should be change of magnetic flux in the cylinder. But the uniform magnetic field through out the cross section of the cylinder cannot change in time with rotation of the core and the rigidly mounted electric coil. It is explained below as to why the EMF is induced though the electric coil rotates with the cylinder.

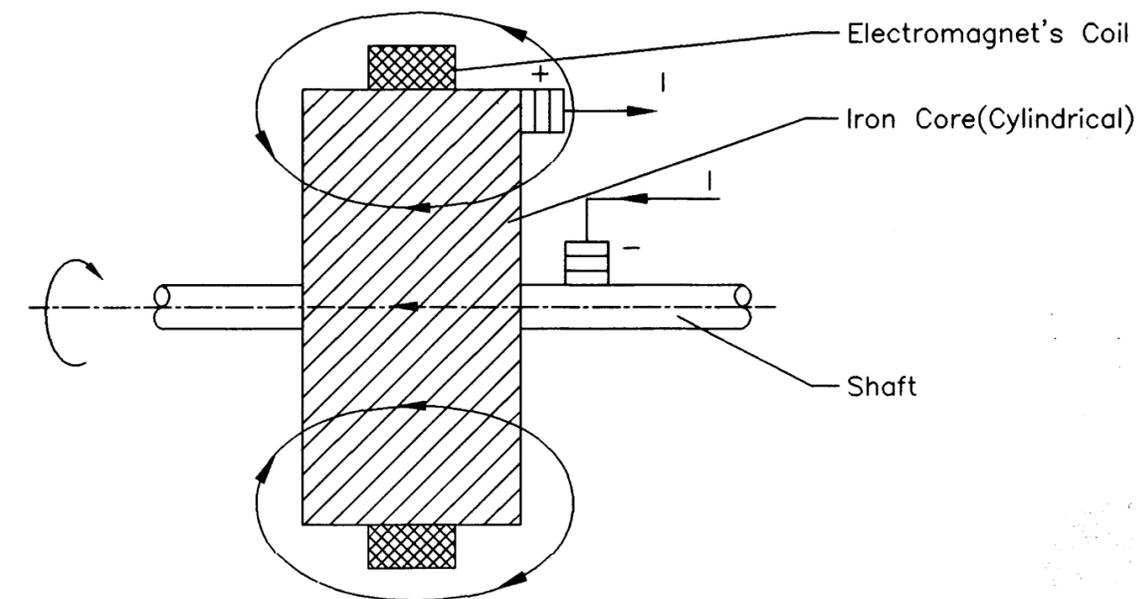


Fig. 10

As explained earlier, an electron in motion relative to space carries its vortex field, while its interface leaves behind at the tail-end the magnetic field—concentric circles of space reaction to the circular velocity field of the electron vortex created around the line of motion—which gets fixed in space with no relative motion with it if several electrons follow each other continuously along a line of motion (Fig.6). In other words, the magnetic field created by an electron in a plane transverse to its line of motion does not move with the electron. Similarly, the magnetic field in the cylindrical core, created by the electrons constituting the current in the electromagnet's coil, is fixed in space, irrespective of the fact whether the electric coil on the cylinder rotates with it or is stationary with respect to space. Therefore, the stationary magnetic field parallel to the axis of the cylinder cuts through the radial elements in the circular cross section of the cylinder as it rotates. The above conclusion that the magnetic field remains fixed in space is partially different from my earlier thinking discussed in an article "Rotation of Magnetic Field of a Rotating Magnet".[10]

Imagine a magnetic field line, stationary with respect to space, and passing through the inter-atomic spaces and the structures of the atoms of a magnetic core, which is being traversed at right angles by the atoms in the rotating core. Since the atoms in their structure have independent

voids of electrons, while sweeping through the magnetic field, they will introduce reluctance in the path of the magnetic field (because void medium within electrons in the atomic structure cannot sustain any field), thus varying the magnetic field strength for an infinitesimal duration (electron diameter/velocity of atom) in inverse proportion to the rotational velocity of the atoms, and thereby EMF is induced at all those points where atoms interact with the magnetic field line. However, the net strength of the magnetic field remains steady and constant because, though, it enters the atomic structures at certain locations, it also comes out of the atoms on other points at the same instant, thus keeping the total reluctance and therefore the magnetic field constant. Though the changes in the magnitude of the magnetic flux remain imperceptible to measurements, nevertheless the EMF is

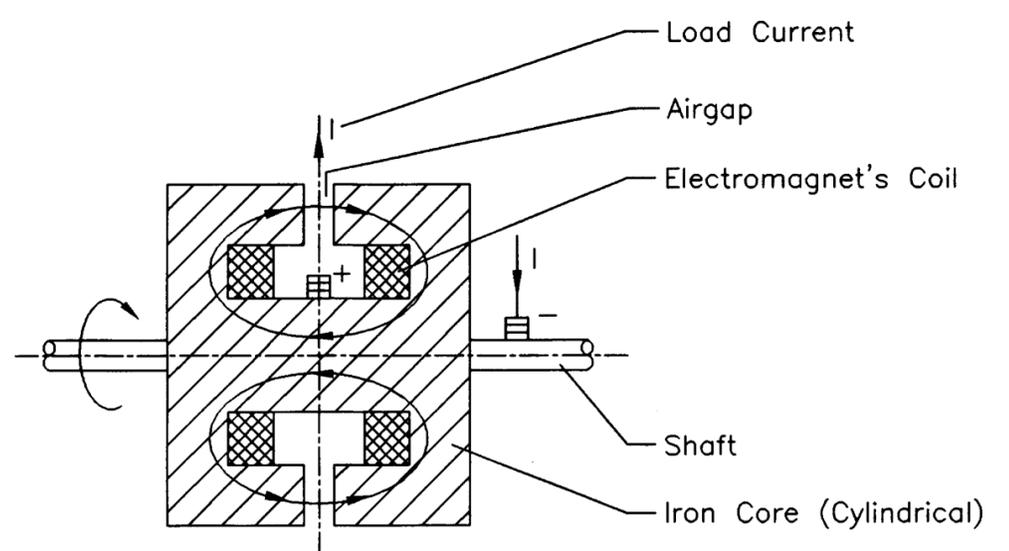


Fig. 11

induced on account of the above-mentioned varying magnitudes of reluctance.

Faraday's experiments can be described through Figs.12a, 12b, and 12c. In Fig.12a the magnet is rotating but the EMF in the disc-conductor is not induced, because the conductor is not rotating. In Fig.12b the magnet is stationary but the EMF is induced because the conductor is rotating. Fig.12c shows co-rotation of the magnet and the conductor, in which EMF in the disc-conductor is induced. In Fig.10, the flux return path is through the air and, therefore, doubt arises whether the stationary lead of the voltmeter used to measure the voltage at the periphery of the rotating cylinder is being cut with the return-flux[11] to show voltage in the instrument.

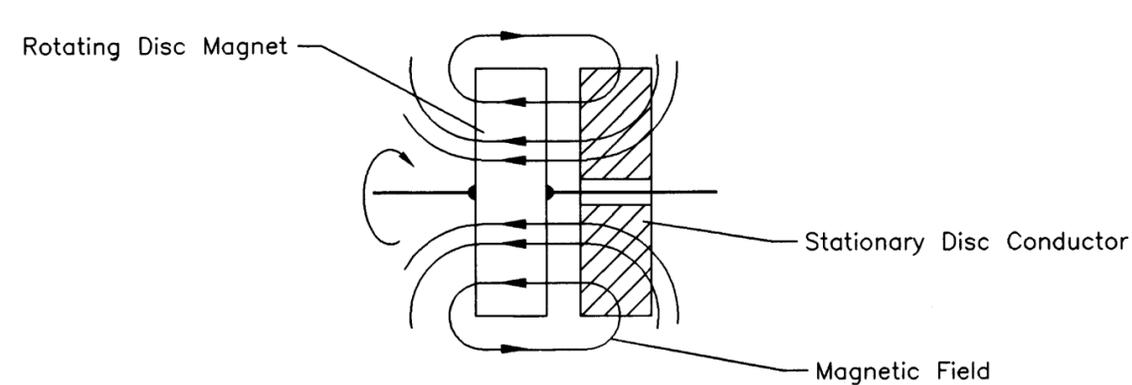


Fig. 12a

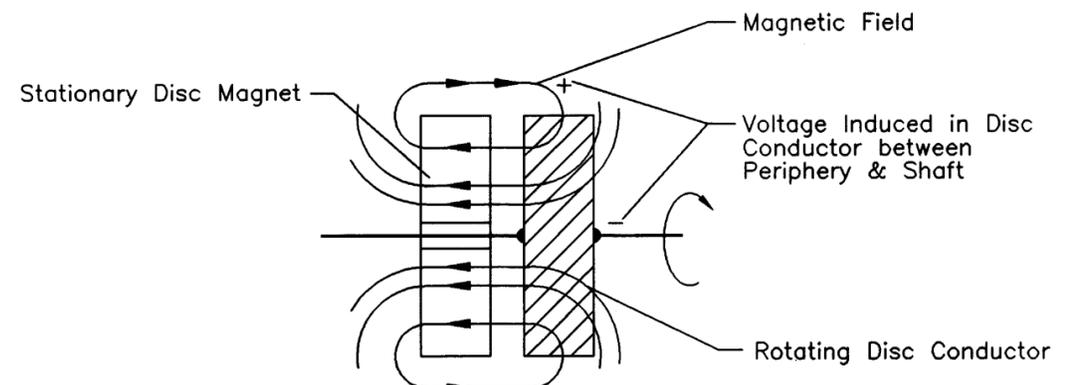


Fig. 12b

Such a problem exists with the voltage measurement also in the system shown in Fig.11. To overcome this problem, a scheme (Fig.13a) in which the return flux is confined to a stationary magnetic path, was adopted.

The EMF induced follows the relation:

$$V = (1/2) w B R^2 / 10^4$$

where B is the magnetic field in the core, in Tesla; w is the angular velocity of rotation, 2p rps; R is the radius of the cylinder in cm; V is in volt. This relationship is easily found as follows.

Consider an element of circular area 2pr dr in the circular cross section of the cylinder at a radius r. Flux through this element is: df = B (2pr dr). It was shown above that the flux remains fixed in space even if the cylinder rotates. Duration of change in the flux through the elemental area in one revolution is: dt = 2p/w. Therefore,

$$df/dt = [B (2pr dr) / (2p/w)] = B w r dr.$$

Integrating from r = 0 to R,

$$V = (1/2) B w R^2. \quad (3)$$

The source of voltage is pinpointed also through an alternative approach as shown in Fig.13b.

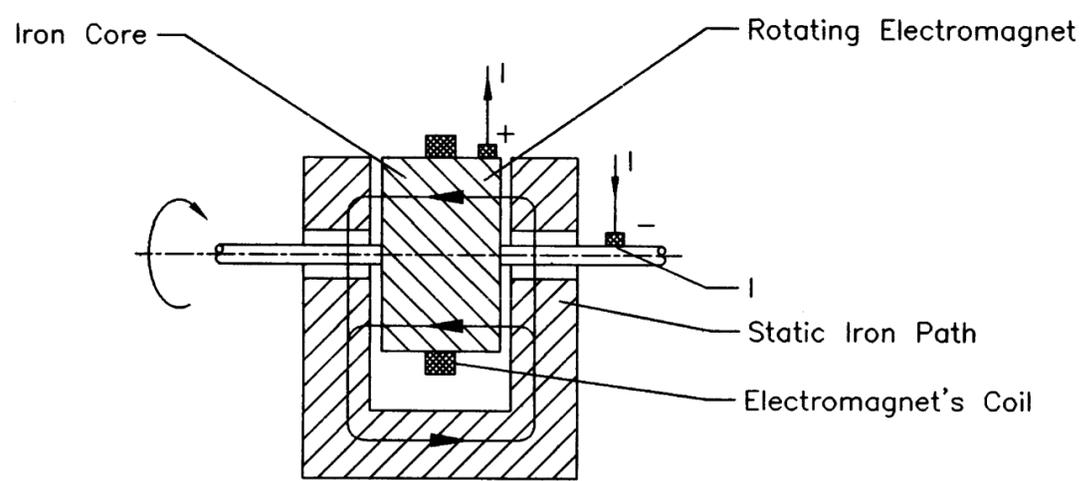


Fig. 13a

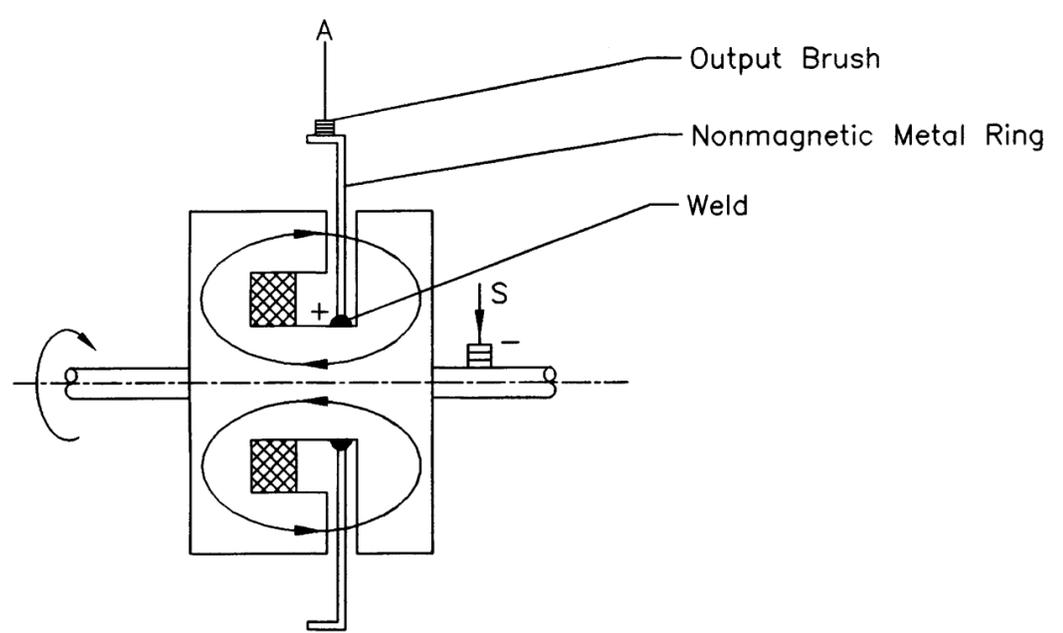


Fig. 13b

It is noted through this experiment that the non magnetic ring, welded to the inner core and passing through the air gap, also develops voltage in opposition to the voltage induced in the core, due to which the measured voltage between the brush and the shaft is now reduced from what it would have been had the voltage between the surface of the inner core and the shaft been taken.

Fig.14 shows a model of space power generator (SPG) coupled to a variable speed dc motor (DM). The electromagnet (EM), rigidly mounted on the core, is fed with dc power through a slip ring to produce the magnetic field B in the core, that passes through an air gap-3, outer stationary magnetic yoke, air gap-1, outer stationary yoke, air gap -2, and back to the core. An insulated conductor is laid in the iron core between the power slip rings, PSR-1, PSR-2, that have the sliding brush contacts as the output terminals. A radial hole in the core accommodates the U-shaped portion of the conductor (C_1, C_2), while the remaining portion passes through the core as shown. It is the appropriate layout of the portion of the conductor (L) that is crucial to enhance efficiency of the machine as discussed below. More parallel conductors similar to the above can be laid and connected between the power slip rings.

The conductor $A-A_1$ is static with sliding brush contact fixed at A . The magnetic fields, produced by the load current I flowing through C_1 and C_2 in opposite directions, cancel each other, thus producing zero torque, whereas, the remaining portion of the rotating part of the conductor (L) also produces magnetic field due to load current which interacts with the magnetic field B , creating a torque in *opposition* to the prime mover. The static portion of the conductor ($A-A_1$) in the air gap does not develop voltage and creates no torque. (Late Dr. S. Marinov [12] had pointed out to me, through a theoretical analysis [13], that the conductor $A-A_1$ will create zero torque; and this has now been proved through my subsequent experiments. Thus my earlier articles [14] will require partial revision in the sense that my own stand then was that a radial conductor in the core creates zero torque, while the static conductor in the air gap will produce torque. The calculations of the efficiency of the generator in these articles, however, remain unaltered). Thus, only that portion of the conductor L that is embedded in the core produces armature reaction, which can be minimized by placing it as much parallel to the magnetic field B in the core as practicable in order to minimize reaction. A specific layout of L within the circular zone (Fig.14) has produced over unity efficiency of power generation (discussed further below).

In the conventional generators, the magnetic field producing the EMF is kept at right angles to the armature conductor so as to induce maximum voltage; this results in the maximum armature reaction too, since the conductor length in which the EMF is induced is the same that produces the armature reaction. In SPG, the voltage of only conductor C_1 is made use of, while the voltage of C_2 induced within the radial hole, as well as the voltage induced in L are reduced to zero by bringing L down, closest to the shaft; this enables larger potential difference between the power slip rings. As stated above, due to

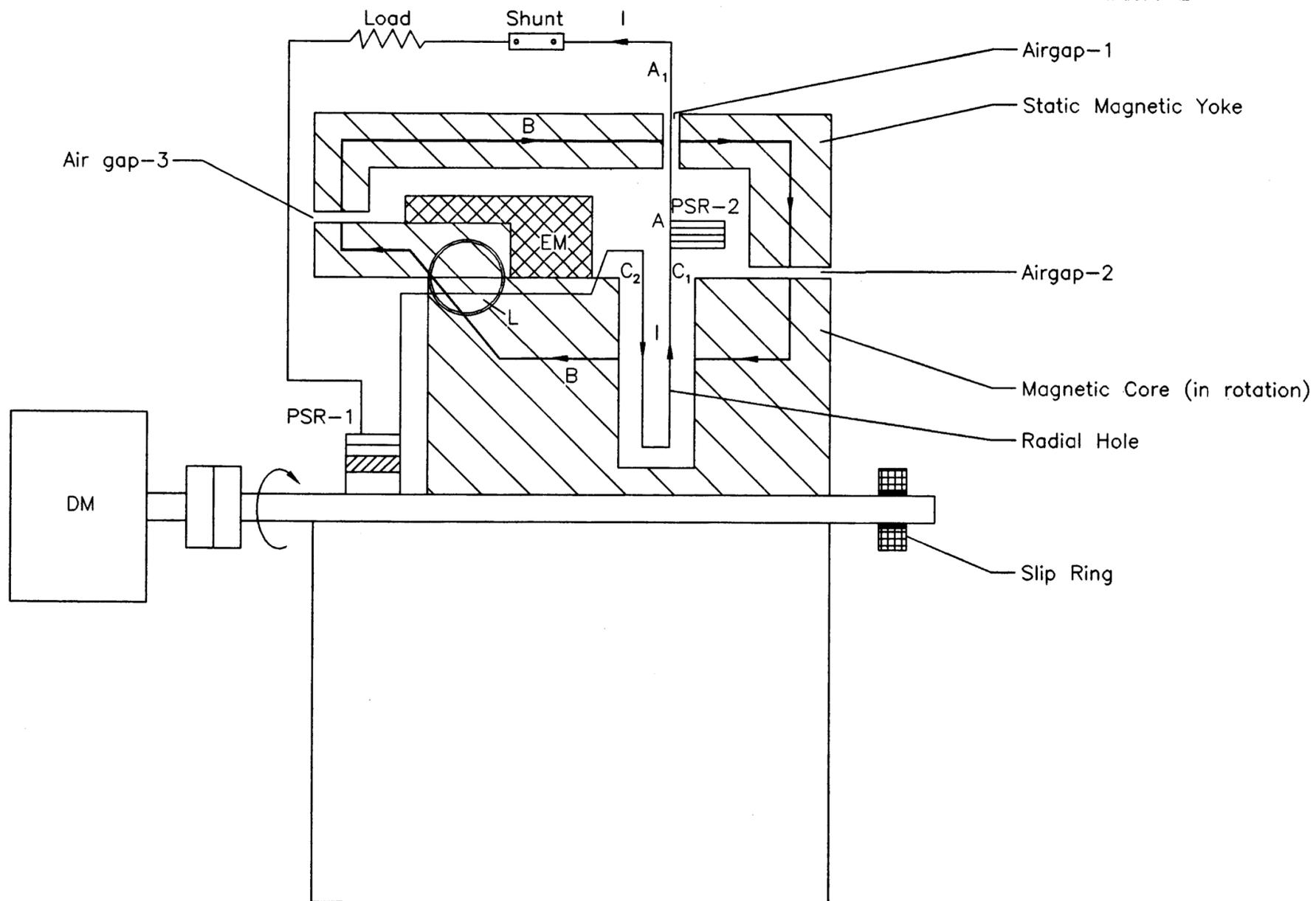


Fig. 14

nullification of the magnetic fields of the conductors in the radial hole, the armature reaction there is reduced to zero; hence, while the portion of the conductor L produces armature reaction, the radial length C_1 produces voltage. Any change in the layout of L to reduce reaction on the prime mover does not influence the EMF induced in C_1 as long as the conductor L is brought down closer to the shaft.

As discussed before, flow of electrons constituting the load current in the external circuit between the out put brushes is not *forced* by the presence of EMF between the generator terminals; on the other hand the electrons in the current are attracted by the charged atoms in the circuit intermittently. Thus, the force for the flow of current in the external circuit as well as through the internal resistance of the generator is provided by atomic vortices without any depletion of the strength of the velocity field in the vortices of either the atoms or the electrons. The heat produced in the circuit is due to the vibration of the atoms, disturbed by the flow of electrons in the current; and in this process too, the atomic vortices do not lose any energy from their structure. Hence, the requirement of additional power to the prime mover, over and above the no-load power requirement, is only due to the armature reaction on the generator conductors. Over-unity efficiency in electrical power generation is achieved by placing the conductor L such that the angle of its inclination with B is a minimum, so that, the force due to interaction of the magnetic field produced by the current in L , with the magnetic field B that induces the EMF in the generator (conductor C_1), is the minimum.

Since work is done by the indestructible space vortices of the atoms and electrons through an attractive force in the current, and the efficiency exceeds unity in this new phenomenon due to reduced armature reaction, the generator is named "space power generator" basically to *re establish* the *substantiality* of the space medium; and not that power is tapped through the conductors of this generator direct from space, like some of the prevalent concepts of zero-point energy, neutrino sea etc, which certainly are inapplicable in the system described here.

Efficiency of a Space Power Generator

The efficiency of a conventional generator is the ratio: output/ input. At no load, the input consists of no load losses, mainly windage and friction that remain fixed at a constant speed. In addition, excitation power is also required.

$$\text{Efficiency} = \text{Output}/\text{Input} = \text{Output}/(\text{Output} + \text{losses}) \quad (4)$$

where $\text{Input} = \text{output} + \text{losses} \quad (5)$

If losses are taken as zero, the maximum possible efficiency from (4) is 1.

This follows from the law of conservation of energy, without specifying, of course, the basic nature of energy and the mechanism that ensures equality between the input and output.

From (5) an increment in the input power, over and above the requirement for the fixed losses, produces an equal output, that is, the maximum incremental efficiency in conventional generators cannot exceed 1. This is entirely due to armature reaction, which creates a counter torque on the prime mover of magnitude equal to the generated power. However, since in the SPG the armature reaction is reduced, the incremental efficiency is more than unity. Thus, the efficiency relation for a SPG is a modified form of equation (4):

$$\text{Efficiency} = \text{Output}/[(\text{output}/n) + \text{losses}] \quad (6)$$

where n is the incremental efficiency.

Several experimental models tried out by the author confirm that an incremental efficiency of a suitably designed SPG can be more than 250%, while none of the conventional generators can exceed 100% limit. The following is the test result from one of the models of the SPG, carried out by Toby Grotz^[15] using precision instruments calibrated in USA.

A variable speed dc motor (DM) is coupled to a SPG and run at 2700r/m. Input to the DM-SPG towards windage and friction: $W_0 = 2943$ W. SPG is given excitation power of 650 W, which produces at 2700r/m, no-load EMF: $E = 3.41$ V, dc. No-load input power remains almost constant while giving excitation. (Excitation power can be appreciably reduced by suitably designing the magnetic circuit.) SPG is loaded through load resistors to restrict the load current (I), which is measured through shunts. Load current, $I = 3438$ A dc. The speed of the DM-SPG set at load is kept constant at 2700 r/m, which is the no load speed. When SPG is loaded, the input W_0 increases to: $W_1 = 8620$ W. The rise in input (W_r) from no load to the loaded condition is:

$$W_r = W_1 - W_0 = 8620 \text{ W} - 2943 \text{ W} = 5677 \text{ W}. \quad (7)$$

Total $I^2 R$ produced in the electrical circuit, comprising of internal resistance of the SPG, brush contact resistance, and load resistance:

$$W_E = E \times I = 3.41 \text{ V} \times 3438 \text{ A} = 11724 \text{ W}. \quad (8)$$

From (7) and (8)

Incremental efficiency of DM-SPG together

$$h_{\text{incremental}} = 11724 \text{ W} / 5677 \text{ W} = 2.065. \quad (9)$$

Total $I^2 R$ can also be calculated by the on-load measurements of the voltage drops across the power slip rings, brush contacts, and load resistor; and multiplying the summation of these voltages with the load current.

The incremental efficiency of the SPG alone is found as:

$$h_{\text{incremental SPG}} = 2.065 / 0.83 = 2.48 \quad (10)$$

where, efficiency of DM is 0.83.

From above it is seen that the input of 8620 W to the DM-SPG set, when it is running loaded at 2700 r/m, produces 11724 W of electrical output, while also consuming 2943 W, out of the input power, towards windage and friction. Here, is a clear case of violation of the principle of conservation of energy in electrodynamics, in a specific system of electromagnetic induction. This violation has taken place because the incremental efficiency (9) of the SPG far exceeds unity. The Lenz's law that determines the sign of the induced voltage is the equivalent of the law of energy conservation in mechanics. But the above inconsistency shows that the electrodynamics stands apart from mechanics in this newly discovered phenomenon for which an appropriate word coined is "space power generation"—a constant reminder that space is not an empty extension of nothingness.

The possibility for a perpetual system fully exists if efficient converters or utilized to feed back power to the prime mover of a SPG designed for voltage ratings around 12 V dc.

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[1] Former Executive Director, (Nuclear Projects), Nuclear Power Corporation, India.

[2] This excludes the phenomenon of annihilation of electron and positron.

[3] Only those conclusions of the theory that are relevant to this paper are briefly and, generally, qualitatively mentioned here.

[4] Space-velocity is also referred as "velocity field"

[5] "Pressure" is used in the treatment of material fluids, which have mass density, viscosity etc. For the nonmaterial fluid-space, a new word, which can be a replacement for pressure, is to be coined.

[6] Positron and electron are identical particles except for the spin direction; positron spins opposite to electron.

[7] For detailed quantitative analysis, see works at reference 2, 3.

[8] In larger atoms, region beyond the outermost orbital electron is considered ‘external to the atom.’

[9] The late Bruce Depalma, former lecturer at MIT, USA, had written to me in 1978 that he finds induced voltage in a co-rotating system of magnetic field and conductor. Michael Faraday had carried out similar tests (Faraday’s diary, December 26, 1831). Depalma also observed that in such systems out put electrical power can exceed the corresponding input. Adam Trombly, too, experimented with a closed path homopolar generator.

[10] The Journal of Borderland Research, Vol. XL VIII, No.4, July-August 1992.

[11] Return flux should be stationary with respect to space, as concluded above, however to remove any doubt a new set up was devised.

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[15] Toby Grotz, Senior Scientist/Engineer, President, Wireless Engineering Inc. 1211 Kirkwood Drive, Fort Collins, Colorado 80525.