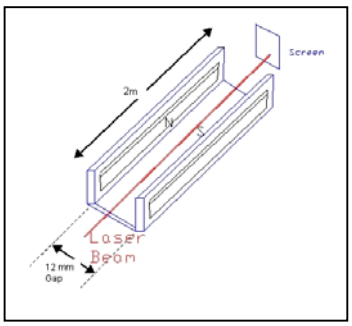

Gravity Generation and Link between Forces

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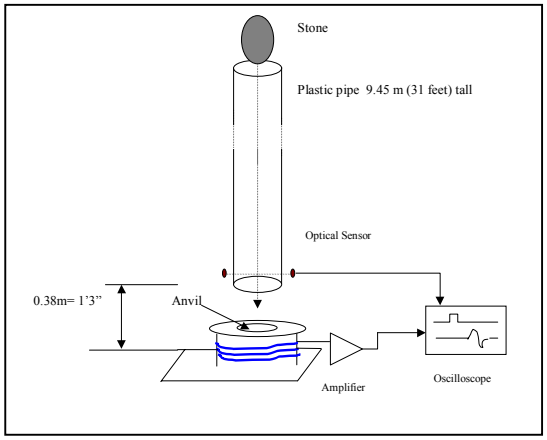

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Contents

Preface

Flying and Space Travel have always been the fantasy and challenge to man and he has taken great strides in the same.

Scientists and Physicists have been trying to probe into the subject of Gravity since centuries and some mileage has been achieved. However, there has not yet been what can be called a 'Breakthrough'. Many having tried to generate Gravitational Force or weight changes in the lab have claimed much yet there is no working portable prototype available in the whole world which would demonstrate a weight change.

A strong cause for this may be our mindsets and human bias. Present day Physics Stewards are not willing to investigate new theories which are deviating Modern/ Established Physics.

I had a knack for fundamental physics since my teenage. I was curious especially after the launch of Appolo 11 in 1969. The exorbitant fuel consumption used to puzzle me which made me ponder over the question "How can gravity be overcome?".

I started working on a theory of 'Origin of Gravitation' and 'Generation of Gravitational Force'. While experimenting, I developed prototypes which exhibited a minor weight change thrice. This research also led to certain important areas which were left out by Physics. This work was released in form of Technical Papers and submitted to the Physical Societies of India and America but was not accepted. Hence, a strong need was felt to release this document/ book so that those who can think with an open mind would be benefited and be able to contribute.

Rakesh Goel

PS: I suggest that the reader would first go through Chapter 8 '**Summary**' before reading the whole book.

Chapter 1

The Mystery of Gravitation

Sir Isaac Newton's wonderfully discovered the phenomenon of Gravitation and also formulated the same mathematically. Many Physicists contributed in the field but the 'Origin of Gravitation' is not clearly known till date and is not well established. Strange enough, this question is still not being seriously addressed.

In this pursuit by the author, a number of other unanswered questions have emerged which need attention:

1. How do we explain the origin of Gravitation?
2. Why is Gravitational Force so weak compared to Electrostatic Force?
3. Where is the Gravitational Potential Energy stored as a result of work done in sending an object in deep space?
4. Why is the force of Gravitation only attractive and not repulsive?
5. How do we explain the origin of magnetism?
6. Why magnetic poles cannot be separated like positive and negative charges?
7. Why does a moving charge generate a circular magnetic field?

The above questions have been answered as we read chapters ahead. Experiments to support the answers have been successfully conducted.

Chapter 2 discusses the theory of 'Origin of Gravitation' based on atomic Physics. The simple Hydrogen atom has been used to explain and the same results can be well derived using any other atom as an example.

Chapter 3 discusses the theory of 'Origin of Magnetism' and the link between major forces viz. Electric, Magnetic, Gravitational and Inertial.

Chapter 4 describes the practical method to generate gravitational force in a Laboratory. Design of the prototype which exhibited weight change is given. Though a number of prototypes were made, few exhibited a small weight change. Results of three of these prototypes are given along with the design parameters. Weight changes of 8 to 14 grams have been detected and recorded.

Chapter 5 describes 'The Laser Deflection Experiment' which proves the origin of magnetism defined in Chapter 3. That magnetism is flow of Ether or M4 is clearly seen from this experiment when a Laser Beam undergoes deflection along the

magnetic field. The images clearly show the shifting of the Laser Beam ('shifted from' turns greener and 'shifted to' turns redder).

Chapter 6 is another way to conduct the Michelson - Morley Experiment. As the earth rotates around the sun, there is no detectable shift in a Laser Beam. A shift would indicate that there is a relative motion between the Ether/ M4 and the earth. This experiment proves that the M4 moves with the earth and that there is zero relative velocity between the earth and the surrounding M4.

Chapter 7 is the description of 'The Stone Impact Experiment'. A decelerating object experiences Inertia. This Inertia is the outcome of M4 behavior at atomic levels when an object strongly decelerates or impacts head-on.

Chapter 8 is the **summary** of theories and experiments covered in Chapter 2 to 7.

Chapter 9 describes the Roadmap of this research work.

Appendix I is an example of how seemingly difficult things can be done/ solved in an easy way. This appendix is a paper giving the MOST simple method to calculate the value of π from its basic definition. This can be called as an area not addressed well in Mathematics. Similarly, the amount of area ignored in Physics is more.

Appendix II displays the spectrum of the author's research and development work in the past 25 years.

In case of any questions, the author would be willing to answer them at the earliest. rakeshji@nda.vsnl.net.in

Chapter 2

Origin of Gravitational Force

Origin of Gravitation is explained. Fundamental questions like 'Why Gravitational force is so weak compared to Electrostatic force'; 'Where is the energy stored which is generated as a result of work done in sending an object in deep space'; 'Why is Gravitational Force a force of attraction only and not of repulsion'; have been answered. The Gravitational Force is an electromagnetic force field which is generated by motion of charge in the matter.

Introduction:

The physical phenomenon of Earth's Gravitational Field was discovered by Sir Isaac Newton in 1686 which he gave to us mathematically as:

$$F = GM_1M_2/ r^2$$

Many attempts have been made to generate gravity or anti-gravity in the lab but the results nor the apparatus have found to be repeatable at all places. Further, those attempts have made use of superconductors and even extreme conditions.

This chapter discusses the Origin of Gravitational Force in nature.

The origin of Gravitation has been explained using a Hydrogen atom for sake of simplicity. However, the theory can be extended for all the elements.

We know that the gravitational force is significantly weak (10^{-36}) compare to Electrostatic Force. This was used as a starting point. If we calculate the Electrostatic force between two hydrogen atoms placed at sufficient distance (say 1 m) and try to compute the Resultant Force then we may get an answer. However we need to consider the distance between the atoms ' d ' and radius of atom ' r ' at high precision. If we neglect ' r ' in comparison to ' d ' then the resultant force will be Zero because effect of one atom on electron and proton of other atom will be same. However it leads to a problem that we need a Higher Language Software of math with very high accuracy.

Theory of Origin of Gravitational Force:

This part explains the Origin of Gravitational Force in nature.

Consider two Hydrogen atoms. F1 and F2 are forces of repulsion between proton- proton and electron-electron respectively. F3 and F4 are forces of attraction between the Electron-Proton pairs as shown in Fig 2.1.

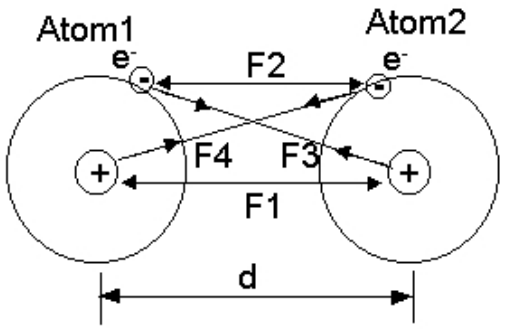


Fig 2.1

The resultant electrostatic force is given as:

$$F_e = F3 + F4 - F1 - F2$$

How do we explain F_e? This resultant force F_e is nothing but the electric force vector of Gravitational force. Similarly a resultant force F_m can be estimated which is the magnetic force vector of Gravitational force.

Gravitational Force, $F_g = F_e + F_m$

The probability of finding an electron in spherical co-ordinates is not uniform and changes significantly with distance, which effects the resultant force F_e. The probability of finding the electron is dependent on force applied on it, and the resultant force is dependent on its position.

The average value of resultant force F_e is not ZERO and is positive in all elements of matter. It was solved with certain assumptions for distance between atoms (d) ranging from 10^{-6} m to 10^{7} m by a special custom built software of mathematical accuracy greater than 200 digits. It was observed that the answer was never zero.

In many references, this force is designated/ referred to as atomic bonding, inter-atomic force, inter-molecular force etc. However, no reference has been able to explain this force at larger distances. Also this force is significantly larger than Gravitational force at 10^{-9} m, as specified in many references, and zero at larger distances which indicates that this force will be equal to Gravitational force at a particular distance, but it was not found solved for that particular distance in any reference to the best of our knowledge.

A simple analogy is that if we have a voltage source of 1000 V DC and another source of 1000V DC having a ripple of ±1 volt then average voltage of both the sources will be 1000 V. However, the RMS voltage in second source will be more than the first source and difference of these two voltage sources will not be zero. The RMS Value is greater or equal to Average Value. Therefore, the resultant force F_e will not be zero even at higher distances.

Results related to origin of Gravitation:

<u>255 digit Math software in Gravitational Force Estimation</u>

Only four positions of electron in each atom are considered for simplicity of calculation.

Total number of positions or combinations are 4 * 4 = 16

The probability is modified at 4 positions to match the gravitational force in which its value is assumed different compared to remaining positions.

Average Probability of finding electron is 1/16 (0.0625) which is applicable at remaining 12 positions.

Sample output of forces F1 to F4 and F_e at one set of electron positions from 255 digit fixed point Math Software.

F1	+00000000000000000000000000000000000000000000000000000000000000000000000000000000 000000000000000000000000000000000002303999880562.081020609868808624255227665061679 314214516422537877730031169161020944596375536598402221018956554279017438758465156 7830254742230
F2	+00000000000000000000000000000000000000000000000000000000000000000000000000000000 000000000000000000000000000000000002303999880562.081020609868808624255227665061679 314214516422537877730031169161020944596375536598402221018956554279017438758465156 7830254742230
F3	+00000000000000000000000000000000000000000000000000000000000000000000000000000000 000000000000000000000000000000000002303999880805.844210232014591398223077240810420 368626191666338092776522279039773871706294898610367383930810054521069232300668751 8014644185280
F4	+00000000000000000000000000000000000000000000000000000000000000000000000000000000 000000000000000000000000000000000002303999880318.317831026408244395634709729789479 352969769569555471847978905400913198976175475913928572483396426047217782390675865 9686008400380
Fe	+00000000000000000000000000000000000000000000000000000000000000000000000000000000 000000000000000000000000000000000000000000000000.000000038685218545347331640476541 093166928390817809164438846118645181489719301327491514376293372010252137174414304 2040143101200

Gravitation and matter:

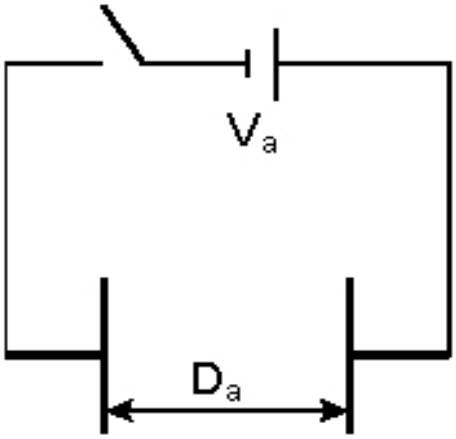
This brings the first conclusion that Gravity is related with matter. The three forces available at larger distances are:

Electrostatic Force
Magnetic Force
Gravitational Force

The Gravitational Force is an electromagnetic force field (and electromagnetic wave) which is generated by motion of charge in the matter.

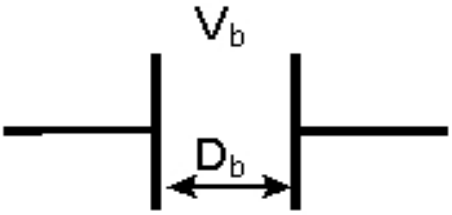
Gravity and Potential Energy:

Let us take a simple example of a capacitor:



C_a (Capacitance)

Fig 2.2 a



C_b (Capacitance)

Fig 2.2 b

Let us assume a parallel plate capacitor having capacitance C_a, and its plate's separation D_a, as shown in Fig 2.2(a). It is connected to a supply voltage V_a and then supply is removed.

Charge $Q = C_aV_a$

If plates are free to move then electrostatic force of attraction F tries to reduce the distance between plates.

Assume next distance between plates D_b , new capacitance C_b , and new voltages V_b, as shown in Fig 2.2(b).

If distance $D_b = {}^1/_2 D_a$ Then Capacitance $C_b = 2C_a$

The charge on capacitor will remain constant.

Hence $Q = C_aV_a = C_bV_b = 2C_aV_b$
i.e. $V_b = {}^1/_2 V_a$

Energy stored in a capacitor is given by ${}^1/_2 C V^2$

Thus,
$$E_a = {}^1/_2 C_aV_a{}^2$$
$$E_b = {}^1/_2 C_bV_b{}^2$$
$$= {}^1/_2 * 2 * C_a * ({}^1/_2 V_a)^2$$
$$= {}^1/_4 C_aV_a{}^2$$

$$\Delta E = E_a - E_b = {}^1/_2 C_aV_a{}^2 - {}^1/_4 C_aV_a{}^2 = {}^1/_4 C_aV_a{}^2 \text{ ----- Equation 1}$$

This is equal to work or energy output.

Therefore according to Equation 1:

"In a charged capacitor, if the distance between plates increases then its stored energy (say Potential Energy) also increases and is equal to the work done in increasing the distance against electrostatic force. Also if the distance decreases then its stored energy decreases equal to the work output".

Similarly in case of Gravitation, Potential Energy (PE) increases equal to the work done in going upward and decreases equal to work output in going downward.

Assume an object of mass 1 Kg is moved from earth surface to deep in space (say infinity). The energy required is equal to $^1/_2 mv^2$ where v is approximately escape velocity.

$$E_1 = {}^1/_2 * 1 * (11 * 10^3)^2 \quad \text{Watt}$$

$$= 16.8 \text{ kWh}$$

This is converted into Potential Energy and it can be converted back into work output when the object is carried back to earth surface.

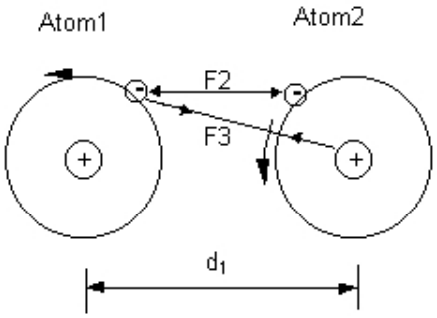
Therefore 16.8 kWh energy is stored (somewhere) in carrying an object of 1Kg mass and no change in the object is detected.

It is mentioned above that the probability of finding the electron in spherical co-ordinates varies with distance or height. Its variations are more at shorter distances, which means that motion of electron is more restricted at shorter distances. This reduces the Kinetic Energy of electrons at shorter distances. As the distance between atoms is increased, the kinetic energy of electrons is also increased because of more uniform probability of finding the electron. The difference in KE of electrons at different distances between atoms is the Gravitational Potential Energy.

The electron tends to avoid a path where it experiences a force of repulsion and tends to take a path where it experiences a force of attraction. When the mass is at some height i.e. distance between atoms is more , the overall velocity of electron increases and thus there is an effective increase in the KE of the electron which accounts for the Gravitational PE.

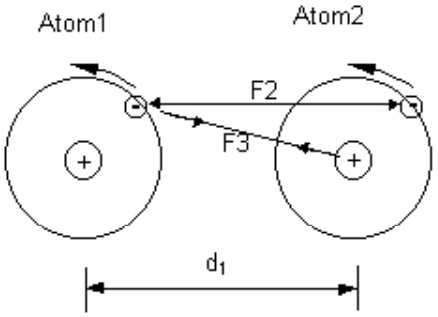
Gravity as a force of attraction alone:

It is concluded that the resultant force F_g is always positive (force of attraction). The first force between proton to proton is minimum, because there is no movement in their positions. Hence RMS and average value of this force will be same. While other three forces are higher. However the probability of finding electron at position shown in Fig 2.3a is relatively less and at position shown in Fig 2.3b is more. This makes resultant force F_g always positive thus it is a force of attraction.



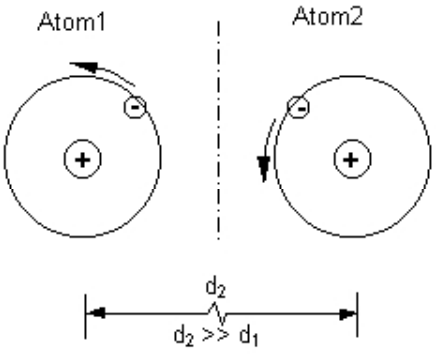
Resultant Force will be Negative
Less Probability

Fig 2.3 a



Resultant Force will be Positive
More Probability

Fig 2.3 b



Almost Uniform Probability

Fig 2.3c

Gravity as compared to Electrostatic Force:

It is explained above that resultant force F_e is sum of four electrostatic forces, in which two are positive and remaining two are negative. Therefore the resultant force is significantly weak compared to electrostatic force F1.

Mathematically, the Force F_g due to Gravitation between the two Hydrogen atoms is given by:

$$F_g = G (m_1 m_2)/d^2$$
$$= (6.673 * 10^{-11}) * (1.67 * 10^{-27})^2 / d^2$$
$$= (1.861 * 10^{-64}) / d^2 \quad N$$

The Electrostatic Force F_e between the two electrons is given by:

$$F_e = k (q_1 q_2)/d^2$$

$$K = 9 * 10^9 \quad Nm^2/C^2$$

$$F_e = (9 * 10^9) * (1.6 * 10^{-19})^2 / d^2$$

$$= (2.304 * 10^{-28}) / d^2 \qquad N$$

The ratio of both the forces is given by:

$$F_e/F_g = (2.304 * 10^{-28}) / (1.861 * 10^{-64})$$

$$= 1.2 * 10^{36}$$

Hence, the Gravitational Force is much weaker compared to Electrostatic Force

Gravity and the spectra:

As a second property of Gravitational field, it is a form of electromagnetic radiation at orbital frequencies of electrons. This is one of the reason that the value of G [Gravitational Constant] decays with time. G(t) is inversely proportional to t.

Consider a plane near an atom. There is an Electrostatic field experienced here as well as a magnetic field. Since the electron is moving, both these fields will have an alternating nature. The effect of these two fields taken together is an Electromagnetic field. Now there are N atoms with multiple electrons scattered everywhere in the matter. The resultant effect of all these atoms will be an Electromagnetic field.

Conclusion:

Origin of Gravitation has been verified by a custom built software having a 255 digit math accuracy. It was found that Gravitational Force is always non-zero and positive.

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1. The Feynman Lectures on Physics by Feynman, Leighton and Sands; Volumes I, II, III; Eighth reprint; 1995
2. McGraw-Hill Encyclopedia of Science & Technology, 7th Edition
3. Concepts of Modern Physics by Arthur Beiser; Fifth Edition
4. Einstein's Mirror by Tony Hey and Patrick Walters,1997

Chapter 3

Origin of magnetism and link between Forces

This chapter explains the 'Origin of Magnetism'. Fundamental questions like 'Why Magnetism exists'; 'Why magnetic poles cannot be separated as positive and negative charges'; 'Why does mass show the property of Inertia (Momentum and Kinetic Energy)'' have also been answered. The entire space is filled with a fourth state of matter named M4 which was previously called as 'Ether'. M4 is a very low mass and very high stiffness matter and flows like a fluid. M4 is transparent to solids, liquids and gases. The EM waves propagate as Transverse waves in M4. A moving charge generates circular turbulent or impulsive flow of M4 which is Magnetism.

An experiment conducted using a Laser Beam passing through a 2 m long magnetic field showed that the beam undergoes a partial deflection concludes that magnetism is flow of M4.

Keyword : M4

Introduction:

Applications of Electromagnetism principles are extensively being used in daily life in motors, transformers, loudspeakers (the earpiece of our telephone) etc. Without these life would not have been so comfortable.

In the past a number of Physicists have researched and explained the governing laws of Electromagnetism: (i) A moving electric charge produces a magnetic field and a charge moving in a magnetic field will experience a force (ii) The magnetic field at any point is related to the current, the shape of the conductor, and the magnetic properties of the medium around it by Ampere's Law (iii) Biot-Savart Law revealed that the magnetic flux produced by a current carrying conductor depended upon the intensity of the current and the distance from the conductor (iv) Faraday's Law states that when the magnetic field linking a circuit is varied, an emf is induced in the circuit (v) Lenz's law states that the induced emf opposes the change which produces it (vi) The four equations of Electromagnetism were completed by J.C. Maxwell in 1864 (vii) Lorentz gave the mathematical expression of the Force on a charge q moving with velocity v in the presence of an Electric and a Magnetic Field.

All these discoveries are wonderful. However, one important aspect that what brings about Magnetism or what is the origin of magnetism is still unknown. This chapter explains the theory behind the origin of magnetism and Link between major forces.

Origin of Magnetism and Link between Forces:

The explanation is based upon two important assumptions.

The First assumption is that all matter and empty space is filled with a different category of matter named as M4.

Assuming that Physics will not stop at M4 or Ether, there is a good possibility of more matters being discovered which can be further named in the increasing order. This is something similar to naming the different rays as α rays, β rays and γ rays.

There are different stable states of matter which can be identified as :

Solid	**Liquid**	**Gas**	**Ether or free space**
M1	M2	M3	M4

This M4 or Ether fills the whole universe and empty space. This matter M4 has a different particle size and all other forms of matter (M1, M2 and M3) are almost transparent for M4. However we can apply many theories of physics on it such as Fluid Mechanics and wave propagation theories as summarized below.

a. All universe and empty space is filled with a different category of matter named as M4.
b. This matter (M4) is transparent for other forms of matter, viz. M1, M2 and M3 .
c. It is a media for EM wave propagation. The EM waves propagate as Transverse waves in M4.
d. The M4 can also flow like gas or liquid. Therefore, Fluid Mechanics is applicable on it.
e. Velocity of Transverse wave propagation in M4 is equivalent to the speed of light. This indicates that 'M4' is a very low mass and very high stiffness matter.

Matter	Solid	Liquid	Gas	Ether
Identification	M1	M2	M3	M4
Velocity of wave propagation	4000 m/s in steel	1200 m/s in water	330 m/s in air	300,000 km/s
Attenuation	High	Medium	Low	Nearly zero
Viscosity	Not Applicable	High	Low	Nearly zero

It is this M4 which plays a very important role in Magnetism as well as Gravitation. It is a link between Magnetism, Gravitation and Inertia. It is M4 which discloses many hidden secrets, hidden since ages, about Magnetism and Gravitation and their origin. M4 is assumed to be everywhere even in vacuum and has a very tiny particle size (smaller than electrons). M4 is so small that all the existing matters appears transparent to it and it can penetrate through everything.

Therefore the existence of M4 is a simple assumption based on EM wave propagation at very high speed.

The Second assumption is that M4 interacts with moving charge, which subsequently originates Magnetism.

f. M4 interacts with the moving charge.
g. A moving charge generates circular turbulent or impulsive flow of M4, which is known as magnetism.

All fluids have :

1. Transverse wave propagation
2. Longitudinal wave propagation
3. Flow

Applying these three properties in M4, we get three basic properties of physics.

h. The EM waves including light propagate as Transverse waves in M4.
i. Gravitational field is the complex Longitudinal wave propagation in M4.
j. Magnetism is the Turbulent or Impulsive flow of M4.

Gravitational Field is longitudinal wave propagation in M4. It normally propagates in straight line which is the property of wave propagation. While the Magnetic flux always follows the shortest path and hence it is a fluid flow. As the charge is quantized, the fluid flow created by Magnetism is Turbulent.

When a body accelerates, there is a relative acceleration between stationary and moving M4 created by motion of body. This causes an imperial electric field around it and causes eddy-current damping at atomic scale due to magnetic induction.

k. Inertia is the property generated by magnetic induction due to acceleration in matter.

Explanation of Magnetism:

The M4 interacts with moving charge as mentioned in [f]. Let us assume that shape of an electron changes when it is in motion. It's shape is circular and small when stationary but changes similar to a twisted helix (like the structure of DNA) in motion along the direction of motion. Its interaction with M4 is similar to friction between a solid and air. Therefore moving electron generates a circular flow in M4, and electron spins in opposite direction as a reaction force. This circular flow of M4 is the magnetic field.

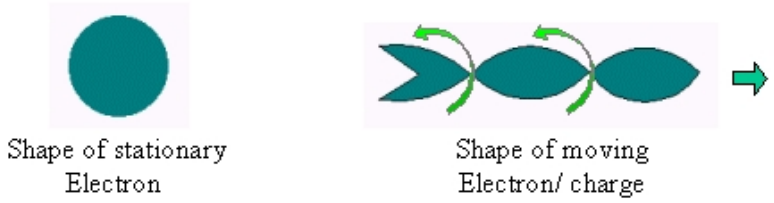


Fig 3.1a

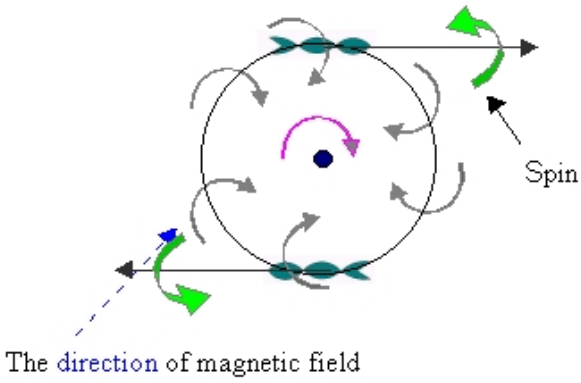


Fig 3.1b Moving Electrons

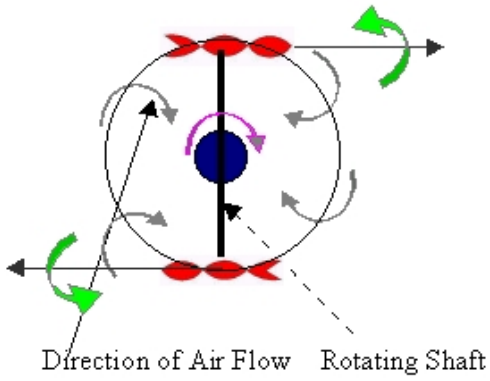


Fig 3.1c Mechanical Simulator

Moving electrons in circular path generate axial magnetic field which is flow of M4 caused by moving charge as shown in Fig 3.1. This can be simulated mechanically as follows:

Replace the electrons by two propellers shaped like the moving electron which are free to rotate along their axes. These propellers are rotated with the help of a mechanical shaft as shown in Fig 3.1. Then the air flows in the same direction as the M4 flow in case of charge movement as seen earlier.

Why like poles repel and unlike poles attract each other:

When the electrons are rotating in the same direction, they experience a force of attraction which explains why unlike poles attract each other. In between these electron pairs, very less or no M4 flows and thus there is a low pressure between the two pairs, which causes them to attract. This is shown in Fig 3.2. Notice the simulated poles as NS and NS.

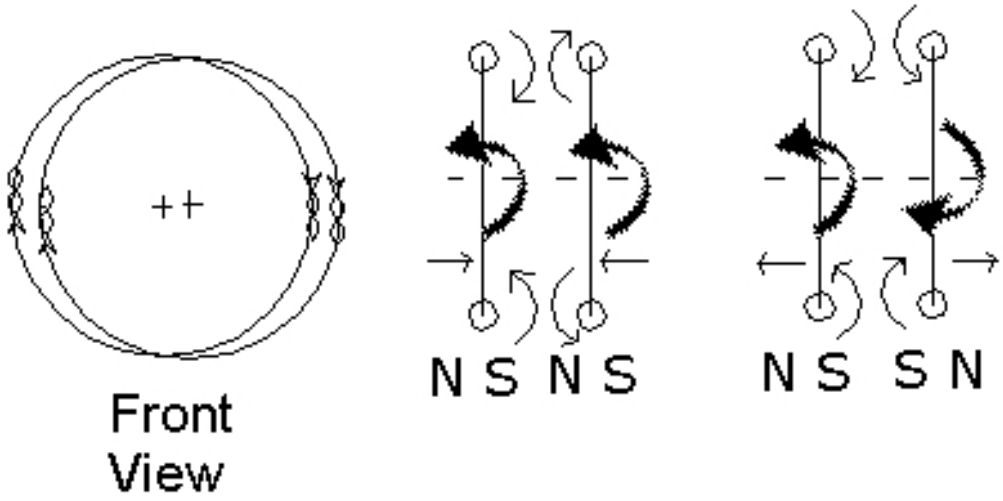


Fig 3. 2

When the electrons are rotating in the opposite direction, they experience a force of repulsion which explains why like poles repel each other. In between these electron pairs, much M4 flows and thus there is a pressure increase in between the two pairs, which causes them to repel. This is shown in Fig 3.2. Notice the simulated poles as NS and SN.

This can be tested on a mechanical model and the air flow would simulate the M4 flow.

Thus, we understand from the above : The origin of magnetism and the forces of attraction and repulsion. Also, it is concluded that poles cannot be separated from each other as they are regions of pressure gradient.

deductions from units:

Energy stored in an inductor :

$E_L = 0.5*L*I^2$ *{ I is the flow of charge }*

$= 0.5*K_1*\varphi^2$ *{ φ is the flow of M4 }*

{ $\varphi \propto I$ }

Now, KE is given as:

$E_{KE} = 0.5*m*v^2$ where m is the mass and v is the velocity of the object

Comparing these two expressions of E_L and $E_{KE,}$ we conclude:

The inductance L is analogous to mass m which is known commonly, therefore φ is analogous to velocity

φ is the flow of M4 (meter per second)

The first derivative of velocity w.r.t time is acceleration, similarly the first derivative of φ w.r.t time is also acceleration which is also the unit of gravitational acceleration or g.

$g = GM/R^2$ m/s^2 which the gravitational force for unit mass

Magnetic flux φ is the particle velocity of M4 and magnetic induction dφ/dt is the particle acceleration of M4. **This gives a starting clue that magnetic Induction, Inertia and gravitation are closely linked**.

Explanation of Magnetic Induction:

Electric current is nothing but charge current or flow of charge.

Magnetic current, in the same way, is the M4 current.

When charge current flows, M4 current is generated. In the same way, when M4 current flows, a M5 current is generated. It is this M5 current which is instrumental in the induction of the secondary current in the transformer. It is important to note that M5 flows only when there is a change in the flux i.e. when dφ/dt exists and only in that condition it generates an empirical electric field in the space. For this empirical Electrical field to exist, there is no need of a conductor as such. But when the flux changes, M5 flows and the conductor experiences this electric field and thus voltage is induced on the conductor.

We say that magnetism is flow of M4. Rate of change of M4 flow explains magnetic induction as above.

A straight conductor of length L and width dx immersed in a magnetic field and moving with a velocity v (has an emf induced across it given as e = dφ/dt) would have flux dφ = B.L.dx across the conductor. The rate of change of that flux dφ/dt is B.L.dx/dt which is nothing but B.L.v. Thus, the voltage induced in a conductor moving in a magnetic field is the same as the magnetic induction explained above.

Explanation of Gravitation:

Gravitational Field generates complex longitudinal vibration and it propagates as complex longitudinal wave propagation.

Mass generates gravitational field which propagates spherically and its strength is same in all direction. As it is a longitudinal wave propagation, it travels in straight line. It is almost transparent to all matters and its absorption coefficient in matter is very low. Therefore shielding of gravitational field is not easily possible.

Gravitational field is complex longitudinal vibration . It interacts with motion of charge in matter and changes probability of finding electron in the orbit. More uniform probability exists at low gravitational field resulting in high KE of the electrons. High gravitational field gives more synchronized motion of electrons, which has Non-uniform probability resulting in low KE of the electrons.

The difference in KE of electrons is Gravitational PE.

Matter always tries to attain minimum energy state. Hence, there is a force of attraction between the masses to minimize energy state.

A mass away from Earth has electrons in orbit with higher KE and that near the earth has electrons in orbit with lower KE. Thus, carrying a mass away from earth it results in

WORK DONE and when a body falls back to the earth it results in WORK OUTPUT according to the LAW OF CONSERVATION OF ENERGY.

As explained earlier, the gravitational field is complex longitudinal vibration which is UP-DOWN-UP-DOWN – All points at the same radius from a heavy object like earth are not in same phase. This means it can be of high frequency and phase and need not be synchronized at same radius. Motion of electron in matter automatically synchronizes with this complex longitudinal vibration.

Explanation of Inertia:

When a body moves at a velocity v, some percentage of M4 also flows with the same velocity in the same direction.

When a mass moves with a velocity it makes M4 flow, but not all the M4 covering the volume of the body moves with that velocity, only a certain percentage flows. Whenever velocity changes, acceleration occurs, the moving M4 and stationary M4 generates M5 flow or magnetic induction thus creates damping and justifying the phenomenon of Inertia.

M4 surrounding one atom may flow and that in the nearby free space may not flow. Some portion of M4 attains the same velocity and rest is stationary. The one which flows and accelerates causes an empirical electric field around it and causes eddy-current damping at atomic scale.

Explanation of Link between Magnetism, Gravitation and Inertia:

Magnetism is flow of M4. Alternating flow of M4 causes longitudinal vibration in M4. Alternating flow of M4 at different phases in a plane at atomic distances generates complex longitudinal vibrations. The moving charge in a matter generates the above mentioned complex longitudinal vibration which is Gravitation. This is the link between magnetism and gravitation.

Parameter	Magnetic Field	Magnetic Induction	Gravitation	Inertia
Depends upon	φ	$d\varphi/dt$	$d\varphi/dt$	$F = K\, d\varphi/dt$
Field type	Flow of M4	Flow of M5	Complex Longitudinal Vibration	Flow of M5 at atomic scale

Conclusion:

1. Magnetism is the turbulent or impulsive flow of M4
2. Magnetism is linked with Gravitation and Inertia.

Reference:

1. The Feynman Lectures on Physics by Feynman, Leighton and Sands; Volumes I, II, III; Eighth reprint; 1995
2. McGraw-Hill Encyclopedia of Science & Technology, 7th Edition
3. Fundamentals of Physics, Fourth Edition by Halliday, Resnick and J. Walker
4. Fluid Mechanics by Dr. A.K. Jain, Eight Edition, 1998

Chapter 4

Generation of Gravitational Force

Introduction:

Theory, Design and parameters of the apparatus which generates Gravitational Force is given. Results of weight changes observed are recorded. A number of apparatus were fabricated to verify that results have a repetitive nature.

Gravitational Force can be generated in the lab using an apparatus called 'Gravity Motor'. The results have been repeated and the design has been made available to reproduce the apparatus elsewhere and thus prove the theory and the design.

The Gravity Motor works at ambient temperature without the employment of any superconductor nor radioactivity nor any extreme conditions.

Keyword: Capacito-Inductor

Theory of Generation of Gravitational Force:

Magnetism and Gravitation are closely related. Therefore the starting point is the theory of Magnetism.

A free charge moving in circular path in presence of radial magnetic field generates axial mechanical force.

Similarly, for gravitation:

A Dipole charge moving in circular path in presence of magnetic field generates axial gravitational force when it is subjected to impulse of current dipole.

The next paragraph gives one important clue in understanding the vibration of charge dipoles.

The elementary passive components of electrical engineering fall under three categories namely resistor R, capacitor C, and inductor L. If two components of same category are manufactured and added together then the resultant value can be approximately zero only in the case of the inductor due to mutual coupling. But it can not be close to zero in case of resistor or capacitor. To produce a high rate of change of magnetic flux on charge dipoles, the net inductance should be nearly zero. Therefore equal and opposite currents in closely wound two coils of high mutual coupling can generate very high rate of change of magnetic flux between these coils to produce desired effect on the charge dipoles.

Equal and opposite charge can have zero resultant but equal and opposite current can not have zero resultant. It is equivalent to two separate fields in opposite direction but still it is not zero field. Equal and opposite currents generate torque or moment of magnetic flux

between the currents. As an example assume a water tank with two pipes connected to two pumps. One pump is draining water at v liters/ min while second is filling water at same rate of v liters/ min. There is no resultant water flow but physically the water is flowing in two pipes at v liters/ min.

To explain this better assume that the pipes are connected [open] to each other at the line of their contact. If we place a small turbine with its center at the point of contact, the turbine will actually start rotating due to the torsional force exerted by the fluid. Refer Fig 4.1 to visualize the turbine and study the profile of the velocity of the fluid flow. However, there is no activity if we visualize from a longer distance.

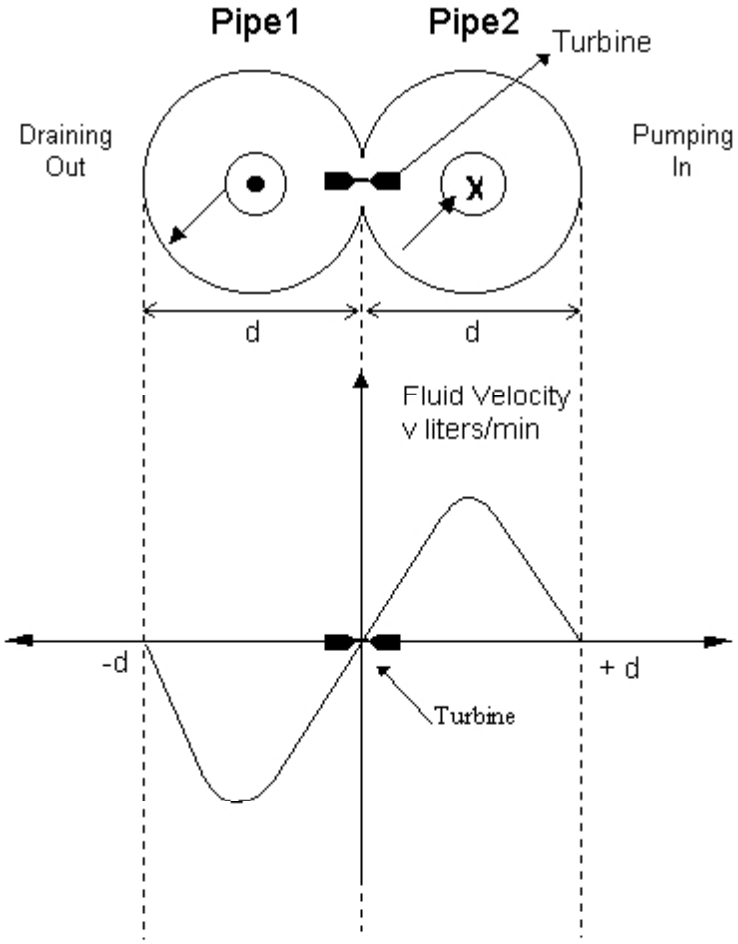


Fig 4.1

Electric current flow is similar to the water flow as described above, and the magnetic field is produced by flow of current which is physical movement of charge. Thus, the dipole charges in the dielectric between the conductors experience a torque due to the impulse of equal and opposite current [current dipole].

If two conductors are very close to each other and have equal but opposite current flows then we observe something only when we come very close. At the central line between the two conductors we have magnetic flux going into or out of the plane on which the conductors are placed. This generates torque on the charge dipoles.

Equal and opposite currents generate very high frequency broadband radiation. The current flow is quantized. GaAs diode (LED) generates light, Gun diode generates microwave, some LEDs generate laser also by flow of DC current because the current flow is quantized. Similarly current flow in thin conductor generates high frequency broadband noise.

GaAs diode would give a noise of 10^{15} Hz with a Band Gap of 1.1 V. A metal would give much higher frequency noise as there is no Band Gap. The higher the instantaneous current, higher is the frequency of the noise generated.

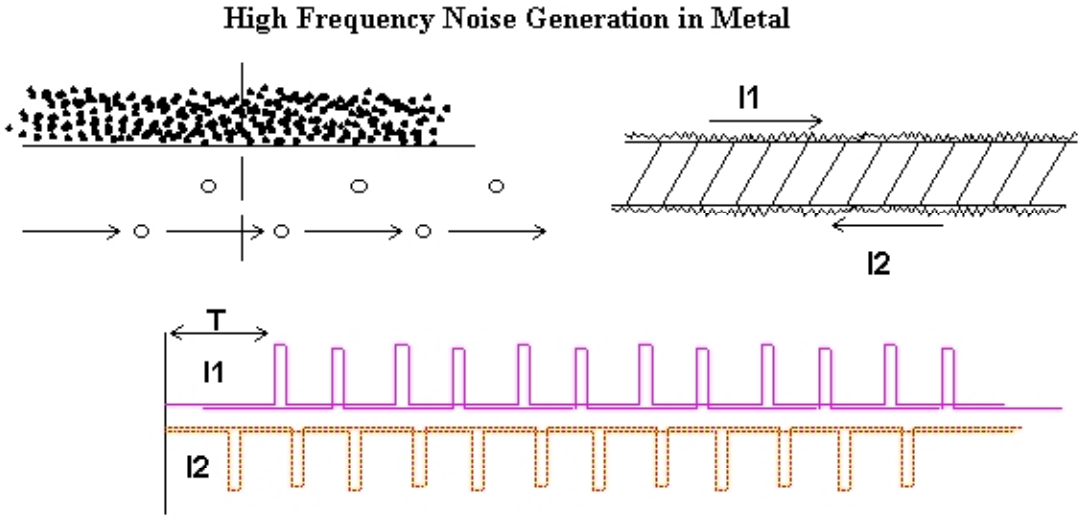


Fig 4.2

Let us try to observe the instantaneous current as shown in Fig 4.2. If the current is low, then the electron hopping is slow . If the current is high, then the electron hopping is high.

Each jump acts as a current spike. Many many hoppings take place. Thus, it appears like many spikes over the time scale. Hence, low current would imply low frequency signal and high current would imply high frequency signal.

Impulse current excitation generates transient response which covers broadband spectra including gravity band also. As the Vibration and Intensity of light are measured in RMS value, similarly 'g', the gravitational flux density, is also a RMS quantity.

Rotary motion is equivalent to Sinusoidal vibration in two axes with 90 degrees phase shift. Similarly, rotary motion in spherical co-ordinates is equivalent to sinusoidal vibrations in three axes. Therefore, vibration of charge dipole in one axis is equivalent to one component of orbital electron motion in that axis. As explained earlier, gravity is generated by motion of electron in orbit, which is equivalent to Sinusoidal vibration of charge dipole in three axes. Therefore, vibration and velocity of charge dipole generates gravity.

Design of Gravity Motor (Practically generating gravitational force)
(US Patent Pending, Application filed on Jan 23, 2001, US Patent Application Pub. No.: 2002/0018333 A1, Pub. Date: Feb. 14, 2002)

It makes use of the newly invented electric component Capacito-Inductor which is a four terminal device and generates combined effect of capacitance and inductance. In effect, the Capacito-Inductor is the heart of the Gravity Motor.

Voltage applied on Capacito-Inductor orients charge dipole in dielectric, impulse currents generate vibrations in charge dipole. Rotation of Capacito-Inductor in presence of radial and tangential magnetic field generates axial gravitation field.

The gravity generation is controlled by the following control parameters:
1. Applied voltage – V
   Function: To orient the charge dipoles inside dielectric
2. Current1 - I1 and Current2 - I2
   Function: To vibrate the charge dipoles
3. Angular frequency - ω
   Function: To give velocity to the charge dipoles
4. Radial and Tangential Magnetic flux Density - B
   Function: To tilt the charge dipoles
5. Design parameters of Capacito-Inductor :
   Dielectric Constant – K, Number of turns – N, Dielectric Thickness – d , Internal Diameter – ID, Outer Diameter – OD

Heart of the Gravity Motor:

The main component is Capacito-inductor as described below.
1. Symbolic representation of a Capacito-Inductor:

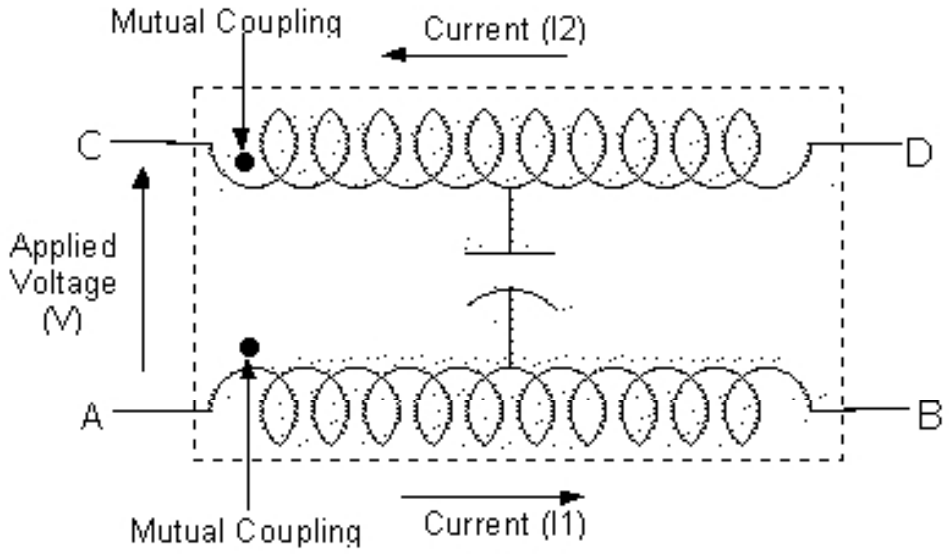


Fig 4.3

It is a four terminal device A , B, C and D which offers inductance L between A to B and C to D as shown in Fig 4.3. It also has sufficient capacitance between A to C or B to D. Its inductance is very small at A to C when B and D are shorted. It is used as the main component for generating Gravitational force.

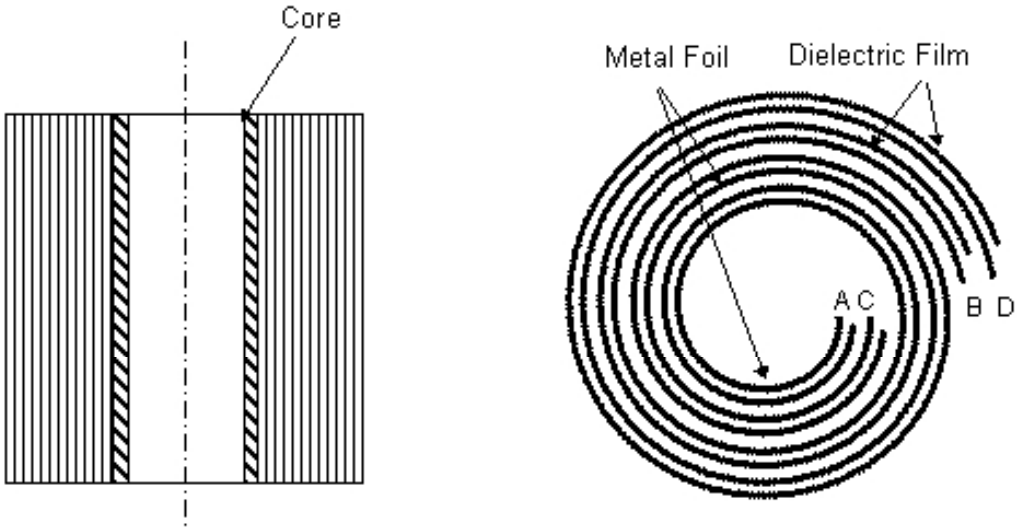


Fig 4.4

It is a four-layer device with metal foil – dielectric film – metal foil – dielectric film, wounded on a cylindrical core. The first layer of the metal film is having its ends as the two terminals of the device i.e. A and B while the second layer of metal has its ends as other two terminals of the device i.e. C and D. These two metal layers have dielectric film layers in between as shown in Fig 4.4.

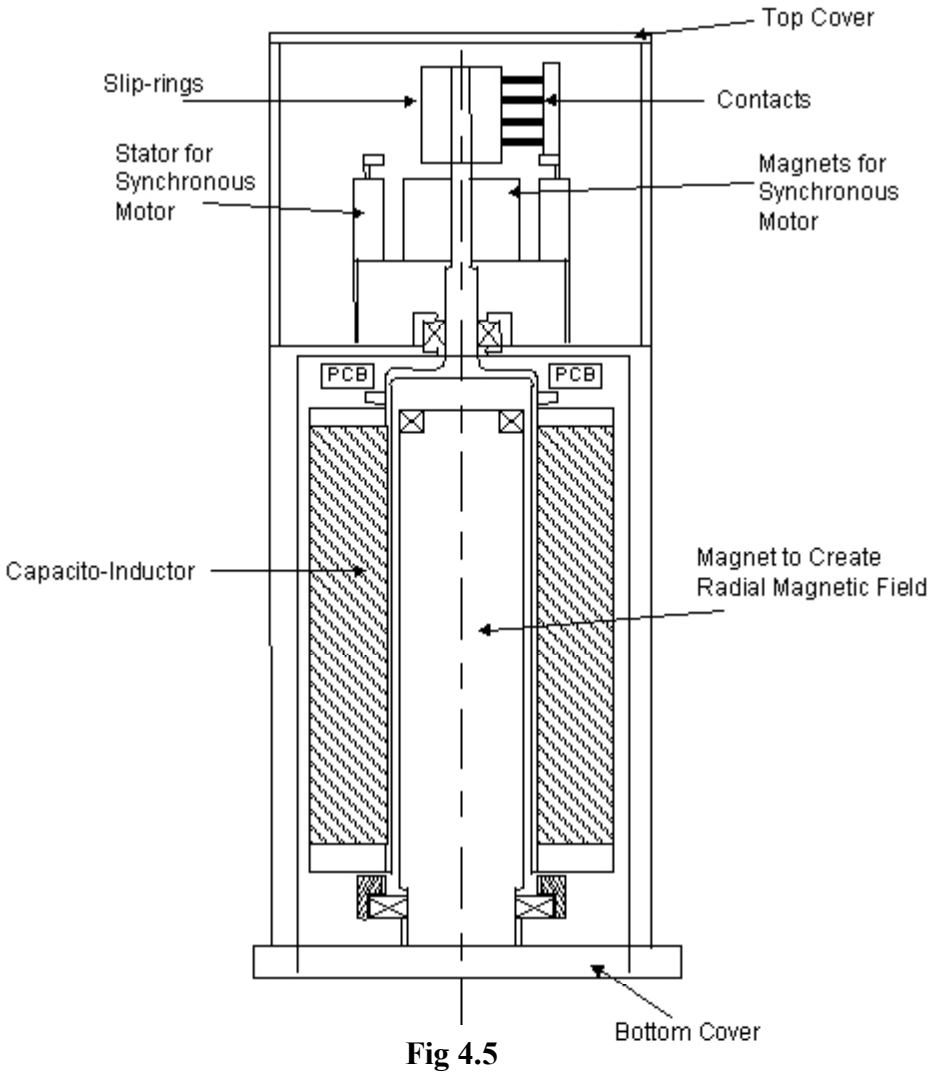


Fig 4.5

Fig 4.5 shows the design of gravity motor. The magnetic rotor of permanent magnet synchronous motor (PMSM) rotates all the moving parts including Capacito-Inductor, PCB and slip-rings. The magnet creates radial magnetic field. Electronic PCB is also mounted on the rotating system and optically couples the two current pulse generators. The slip-ring assembly is mounted above the PMSM to feed power to electronic PCB. The whole system is supported with the help of the Top and bottom covers.

Interconnections of the Apparatus for generating Gravitational Force [Fig 4.6]:

a. First Power Supply to feed power to PCB for current pulse generator 2.
b. Second Power Supply to apply voltage V on Capacito-Inductor.
c. Third Power Supply to feed power to PCB for current pulse generator 1.
d. Slip-rings to transfer power to rotating PCB.
e. Current Pulse Generator 2 to generate current pulses I2.
f. Current Pulse Generator 1 to generate current pulses I1.

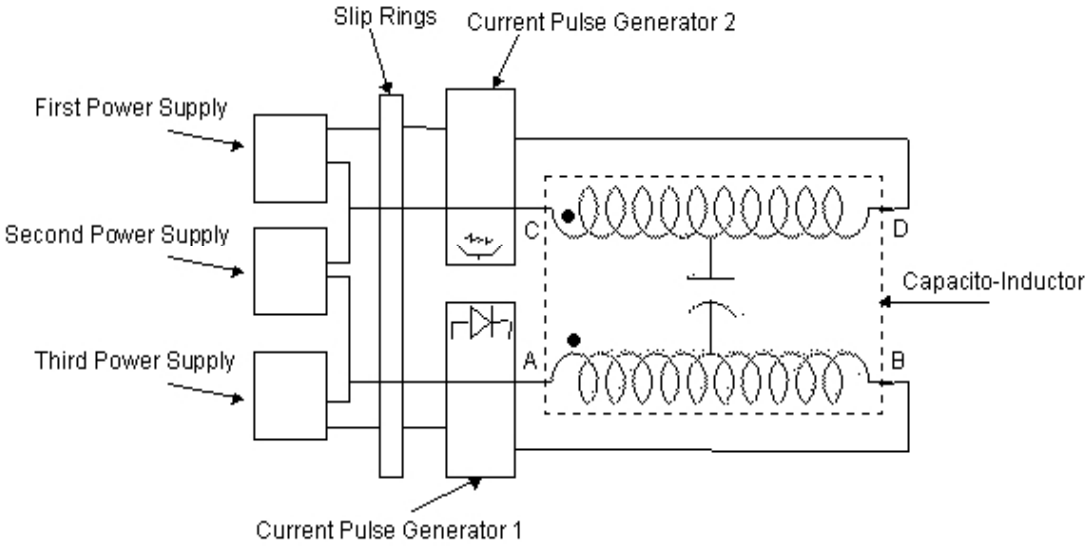


Fig 4.6

The Voltage is applied at the terminal A & C of the Capacito-Inductor through the power supply. Equal and opposite current pulses are applied at the terminals A-B and C-D of the Capacito-Inductor with the help of two Current pulse generators respectively. These two current pulse generators are opto-coupled to generate almost equal and opposite current pulses.

The second current pulse generator can be eliminated by short circuiting the terminals C & D. In this case due to high mutual inductance between the two coils A-B and C-D almost equal and opposite current is generated in both the coils with only one current pulse generator.

Description of the Gravity Motor:

The heart of the gravity motor is a four-layer device with metal – dielectric – metal – dielectric wound on an insulating cylindrical core. It is a four terminal device A, B, C and D which offers inductance L between A to B and C to D. It also has sufficient capacitance between A to C or B to D. However its inductance is very small at A to C when B and D are shorted. It has been titled as Capacito-Inductor. It is placed between a magnetic circuit of permanent magnet which creates radial magnetic field. When the Capacito-Inductor is rotated at high speed, voltage is applied between A and C, opposite current (dipole current) pulses are applied on A - B and C - D, it generates axial gravitational field. A PMSM used to rotate the Capacito-Inductor is operated with the help of a separate Electronic controller.

The applied voltage orients charge dipole inside dielectric in radial direction with negative and positive charge towards axis of rotation in alternate layers of dielectric. Rotation of Capacito-Inductor in presence of radial and Tangential magnetic field tilts all the charge dipole towards negative charge down or up parallel to axis of rotation

depending upon direction of rotation. Force vector on positive and negative charge is equal and opposite, therefore, the resultant effect is torque on charge dipole. The current dipole pulses generate vibration in charge dipole, and rotation of vibrating charge dipole generates gravitational force.

Parameters governing gravity generation:

Description	Symbol	Unit
Applied Voltage	V	Volt
Current in Terminal A-B	I1	Amp
Current in Terminal C-D	I2	Amp
Angular Frequency	ω	Rad/s
Magnetic Flux Density	B	W/m^2
Mean radius of Cap-Ind	A	Mm
Number of Turns in Cap-Ind	N	
Effective Width of Cap-Ind	B2	mm
Effective Thickness of Cap-Ind	C2	mm
Thickness of Metal foil	T1	mm
Thickness of Dielectric	T2	mm
Dielectric Coefficient	Kr	
Period of Current Pulses I1	Tp	ms

Test results of Prototype Gravity Motors:

Prototype P14 *[12May, 2000]*

ID=62 mm, OD=120 mm, 25 um Polyester, 4.5um Aluminum, N=453
R_{AB} =6.3E, C=32 uF
Weight of Prototype = 10 Kg
Deflection sensitivity of test stand = 17 gram/ mm
Rotation speed = 2800 to 2900 RPM
Current pulses of peak current 6 A approx., Radial magnetic field is applied
DC Voltage between A and C = 0 to 700 V

Speed (RPM)	0	2500	2860	3100
Pointer (mm)	151	151	152	152

Voltage (DC)	0	750	0	750
Pointer (mm)	151	151.5 to 152	151	151.5

This shows 0.5 mm deflection in the direction of weight decrease which is equivalent to 0.05% weight reduction (i.e. 8.5 GRAMS WEIGHT LOSS)

After 5 minutes of trials the deflection started reducing and within 3 to 4 hours of trials it reached to almost zero.

Prototype P24 *[17 July, 2000]*

ID=62 mm, OD=200 mm, 15 um Polyester, 6um Aluminum, N=1760
R_{AB} =30E, L_{AB} =0.256 H, Capacitance is not measurable correctly by simple capacitance meter because of high inductance.
Weight of Prototype = 18.9 Kg
Deflection sensitivity of test stand = 35 gram/ mm
Rotation speed = 800 to 2000 RPM
Current pulses of peak current 2.5 A approx., Radial magnetic field is applied
DC Voltage between A and C = 0 to 100 V

Deflection due to weight reduction = 0.4 to 0.5 mm (i.e. 14 GRAMS WEIGHT LOSS)

The deflection was reduced to 0.3 mm after trials of one day and then the prototype got damaged at 150 V DC. However it showed a weight reduction of 0.05%.

Prototype P28 *[21 August, 2000]*

Speed RPM	Voltage DC	Deflection	Δ weight
1900 CW	196 V	0.3 mm	Increase
1900 CCW	196 V	0.4 mm	Decrease
1900 CCW	195 V	0.4 mm	Decrease
1953 CCW	195 V	0.4 mm	Decrease
1900 CW	196 V	0.3 mm	Increase

Conclusion:

1 Weight Change is possible practically which has been demonstrated by the Gravity Motor which works in the (a) Weight Increase and (b) Weight Decrease modes.

2 The scope of further work which remains is to increase the amount of weight change from 0.05 % to 1 % , 5 % , 15%, 50% and 150 % which can be used for Lab Demonstration, Satellite Orientation and Accelerating vehicles in space respectively and this work is being continued.

References:

1. The Feynman Lectures on Physics by Feynman, Leighton and Sands; Volumes I, II, III; Eighth reprint; 1995
2. McGraw-Hill Encyclopedia of Science & Technology, 7th Edition
3. Fundamentals of Physics, Fourth Edition by Halliday, Resnick and J. Walker
4. A Text Book of Electrical Technology by B.L. Theraja, 1966.

Chapter 5

The Laser Deflection Experiment

Validating Magnetism as Flow of M4

[March 6, 2001]

An experiment was carried out with the setup described below. An iron channel was taken. Rare Earth magnets, NdFeB, were taken and stuck inside the channel for a length of 2m such that on one wall of the channel inside was simulated the North Pole throughout and on the other wall of the channel inside was simulated the South Pole throughout. In effect, it acted as a 2m long Permanent magnet. The field generated was measured as 3000 Gauss.

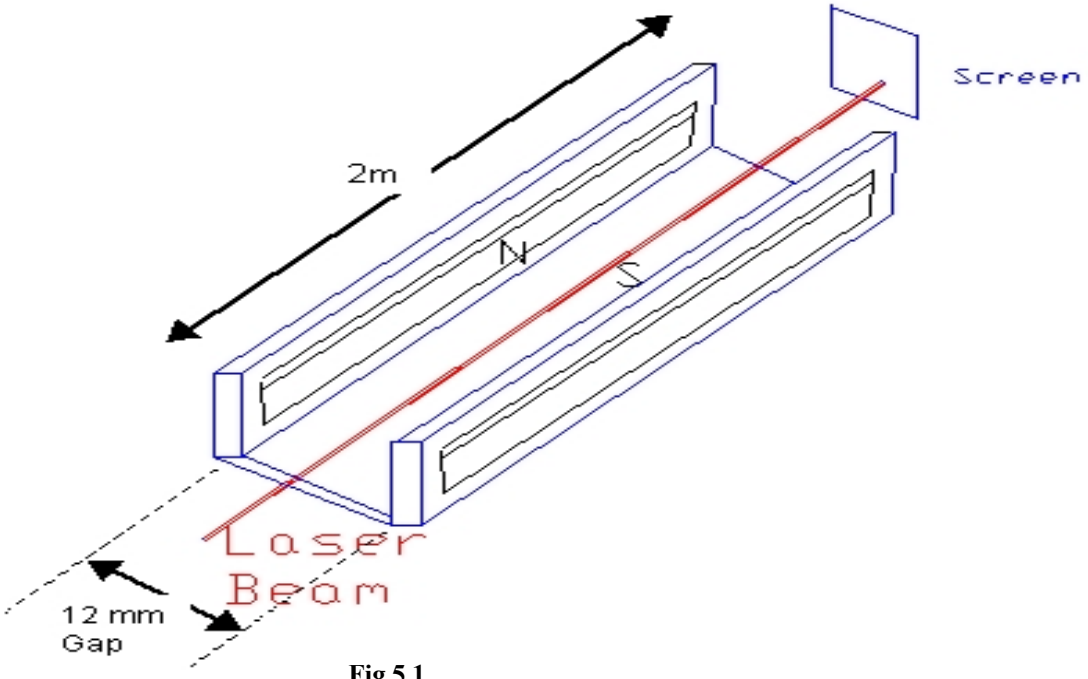


Fig 5.1

A laser beam was shot on the screen (not passing through the channel) and the red spot was observed. Then, the laser beam was shot passing through the channel, as shown in Fig 5.1, and it was found that the laser beam spot was found shifted and diffused on the smooth screen. This shift/ diffusion was approx. 0.1 mm as it was seen by the naked eye.

The time T required by the laser to pass all the magnets is:

T = 2m / c where 2m is the magnet length and c is the velocity of light.
= 6.6 ns

The velocity of M4 will thus be :

= 0.1 mm shift / 6.6 ns
= 16 KM/s for 3000 Gauss flux density

This is an approximate number and shows the order of M4 velocity.

[April 3, 2001]
The setup was further modified in that a Lego Mindstorms camera was placed behind the paper screen on which the Laser spot fell. This camera was interfaced to the USB port of a Compaq Laptop and the pictures of the screen were clicked as the experiment proceeded.

It was found that when passing through the magnets, the Laser beam undergoes a definite shift.

A special software was coded to carry out the image processing.

[Magnetic Flux flows from Left North Pole to Right South Pole]

Pic45.bmp : Beam passing through free air
Pic46.bmp : Beam passing through magnets
Pic47.bmp : Beam passing through free air
Pic48.bmp : Beam passing through magnets
Pic49.bmp : Beam passing through free air

The following process was carried out:
*(Picxx + Pic45INVERSE) * 2*

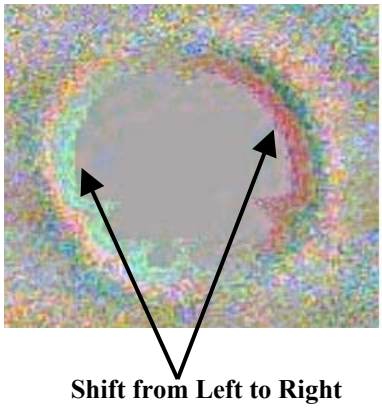


Fig 5.2: (Pic46 + Pic45INV)*2

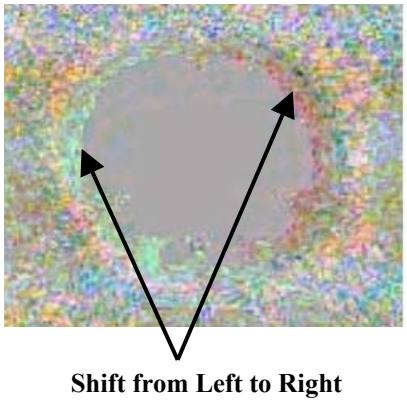


Fig 5.3: (Pic48 + Pic45INV)*2

Fig 5.2: (Pic46 + Pic45INV) * 2

It is easily seen with the naked eye that the Laser shifts towards the right. Thus you see more red on the right and more green on the left.

Fig 5.3 : (Pic48 + Pic45INV) * 2
The same result is again validated in Fig 5.3.

Fig 5.4 : (Pic47 + Pic45INV) * 2
It shows no shift as magnets are absent.

Fig 5.5 : (Pic49 + Pic45INV) * 2
It again shows no shift as magnets are absent.

Fig 5.4: (Pic47 + Pic45INV)*2

Fig 5.5: (Pic49 + Pic45INV)*2

Fig 5.6 and Fig 5.7 show images of pictures taken when the Laser Beam passes through the magnets and free air respectively. Visually not much difference can be observed.

Hence Fig 5.2 through Fig 5.5 show pictures which have been processed to point out the deflection of the Laser Beam.

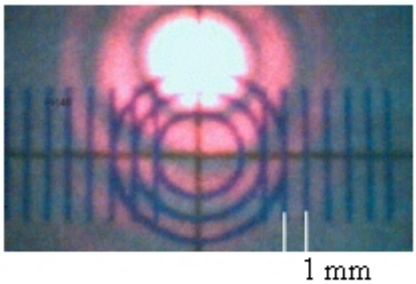


Fig 5.6 Pic46.bmp

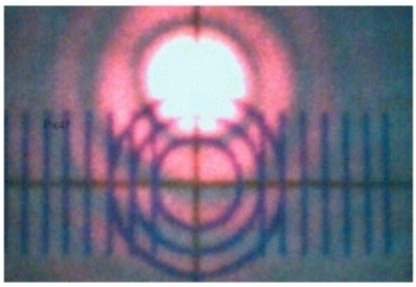


Fig 5.7 Pic47.bmp

Thus, the above results clearly validate that magnetism is a flow of a matter which has been named as M4.

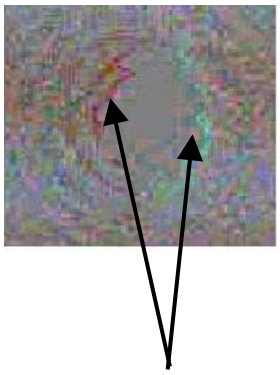
[April 5, 2001]
The experiment was conducted again for further verification.

[Magnetic flux flows from Right North Pole to Left South Pole]

Pic81.bmp : Beam passing through magnets
Pic82.bmp : Beam passing through free air
Pic83.bmp : Beam passing through magnets
Pic84.bmp : Beam passing through free air

A different process was now carried out on the images:

*PicXX * 4 – Pic82 – Pic84 – Pic86 – Pic88*

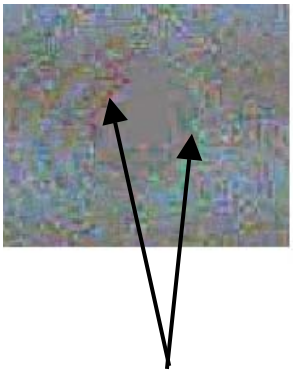


Shift from Right to Left

Fig 5.8: Pic81*4 – Pic82 – Pic84 – Pic86 – Pic88

No deflection of the Laser Beam

Fig 5.9: Pic82*4 – Pic82 – Pic84 – Pic86 – Pic88



Shift from Right to Left

Fig 5.10: Pic83*4 – Pic82 – Pic84 – Pic86 – Pic88

No deflection of the Laser Beam

Fig 5.11: Pic84*4 – Pic82 – Pic84 – Pic86 – Pic88

Fig 5.8 : Pic81*4 – Pic82 – Pic84 – Pic86 - Pic88

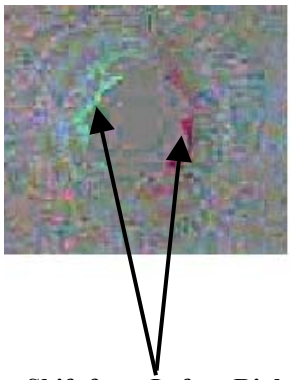
Fig 5.9 : Pic82*4 – Pic82 – Pic84 – Pic86- Pic88

Fig 5.10: Pic83*4 – Pic82 – Pic84 – Pic86 – Pic88

Fig 5.11: Pic84*4 – Pic82 – Pic84 – Pic86 - Pic88

[Magnetic flux flows from left North Pole to right South Pole]

Pic85.bmp : Beam passing through magnets
Pic86.bmp : Beam passing through free air
Pic87.bmp : Beam passing through magnets
Pic88.bmp : Beam passing through free air

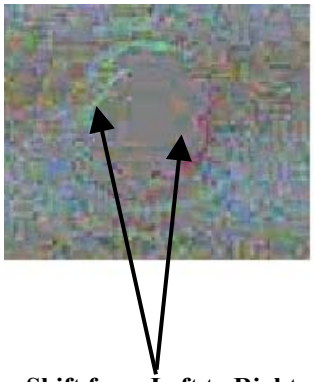


Shift from Left to Right

Fig 5.12: Pic85*4 – Pic82 – Pic84 – Pic86 – Pic88

No deflection of the Laser Beam

Fig 5.13: Pic86*4 – Pic82 – Pic84 – Pic86 – Pic88



Shift from Left to Right

Fig 5.14: Pic87*4 – Pic82 – Pic84 – Pic86 – Pic88

No deflection of the Laser Beam

Fig 5.15: Pic88*4 – Pic82 – Pic84 – Pic86 – Pic88

Fig 5.12: Pic85*4 – Pic82 – Pic84 – Pic86 - Pic88

Fig 5.13: Pic86*4 – Pic82 – Pic84 – Pic86 - Pic88

Fig 5.14: Pic87*4 – Pic82 – Pic84 – Pic86 - Pic88

Fig 5.15: Pic88*4 – Pic82 – Pic84 – Pic86 - Pic88

Fig 5.16 shows an image of the picture when the Laser Beam passes through the magnets.

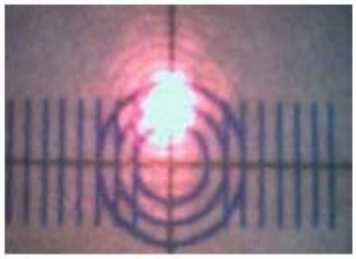
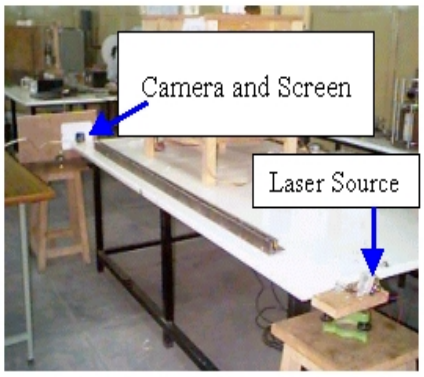


Fig 5.16

This also shows that only a part of the light shifts (not 100 %) because Magnetic Field is turbulent flow of M4 and it does not cover 100 % path of Laser Beam at 3000 Gauss Flux Density.



The Laser Deflection Experiment setup
Fig 5.17

Fig 5.17 shows the photograph of the laser experiment setup.

Important Note:

1. The white light which is focussed on the screen should be flicker free i.e. it should be operated from a ripple free DC source. The Intensity should be optimum, hence few trials may be required for best readings.

2. The Camera should be of best input resolution so that the video signal does not saturate.

Interpretation of Michelson – Morley Experiment :

The Michelson-Morley experiment assumed :

a. Ether is absolute stationary
b. Ether fills the whole universe and is even present in vacuum but other properties of Ether were not known when this experiment was conducted.

Why Michelson-Morley experiment failed?

If Ether was stationary then there would be definite relative motion between the Earth and Ether. If this was true then we would be experiencing changing magnetic field in the East-West direction every 12 hours as the earth revolves around its axis and around the sun.

The fact is that most of the Ether or M4 moves along with a large mass like Earth and the relative motion between the two is not detectable. This is the reason of the failure of Michelson-Morley Experiment.

Conclusion:

Flow of M4 is magnetism which has been validated by 'The Laser Deflection Experiment'.

References:

1. The Feynman Lectures on Physics by Feynman, Leighton and Sands; Volumes I, II, III; Eighth reprint; 1995
2. McGraw-Hill Encyclopedia of Science & Technology, 7th Edition
3. Concepts of Modern Physics by Arthur Beiser; Fifth Edition
4. Fundamentals of Physics, Fourth Edition by Halliday, Resnick and J. Walker
5. A Text Book of Electrical Technology by B.L. Theraha, 1966
6. Understanding Lasers by Jeff Hecht, Second Edition, 1993

Chapter 6

Validation of flow of M4 along with moving object

Re-conducting Michelson-Morley Experiment in a new way

Introduction:

The entire space is filled with a fourth state of matter called M4. M4 is a very low mass and very high stiffness matter and flows like a fluid. M4 is transparent to solids, liquids and gases. The EM waves propagate as Transverse waves in M4. A moving charge generates circular turbulent or impulsive flow of M4 which is Magnetism.

Part of M4 associated with an object moves with the object when the object moves. That part of M4 moves with the same velocity.

In an aircraft, the air inside moves with the same velocity as that of the aircraft and thus there is zero relative velocity between the aircraft and the air inside. The Ether surrounding the Earth is like the air inside the aircraft.

The beliefs of certain earlier scientists

Scientists had to invent a medium to propagate the light wave. This medium was called Ether and it had particularly strange properties: it filled the universe and it penetrated transparent solids such as glass. Furthermore, it didn't impede objects such as stars and planets that moved through the universe, so it had to be tenuous, like a gas. Yet it had to vibrate rapidly to transmit light waves, so it had to be rigid. One of its more acceptable properties was that it had to be immobile. In essence the ether had to be at rest, which pleased scientists. They therefore had something they could use as a frame of reference. The ether filled the universe and was at rest in it; therefore, any motion through it was absolute. The above was believed during the period of 19^{th} century.

Experiment described in this chapter:

The chapter discusses the experiment which proves that M4 (the fourth state of matter) or Ether is not stationary. Rather, most of it moves with the earth or any moving object.

The Michelson-Morley Experiment:

In 1887 attempts were made by Michelson and Morley to determine the absolute velocity of the earth through the hypothetical 'Ether' that was supposed to pervade all space. The experimental setup enabled to visualize interference fringes and on rotation through 90

degrees, a shift was being sought for in the interference fringes to prove that the earth had an absolute velocity w.r.t. Ether. The velocity of the earth through Ether could not be detected. The result of the experiment was null, puzzling and very disturbing.

Einstein's Explanation:

Einstein said that all motion in the universe is relative. Only relative motion makes sense. But this was in conflict with the concept of absolute stationary ether. Since Einstein rejected absolute motion he also had to reject ether. He referred to it as superfluous.

Experiment conducted to validate that M4 moves with moving object:

Setup:

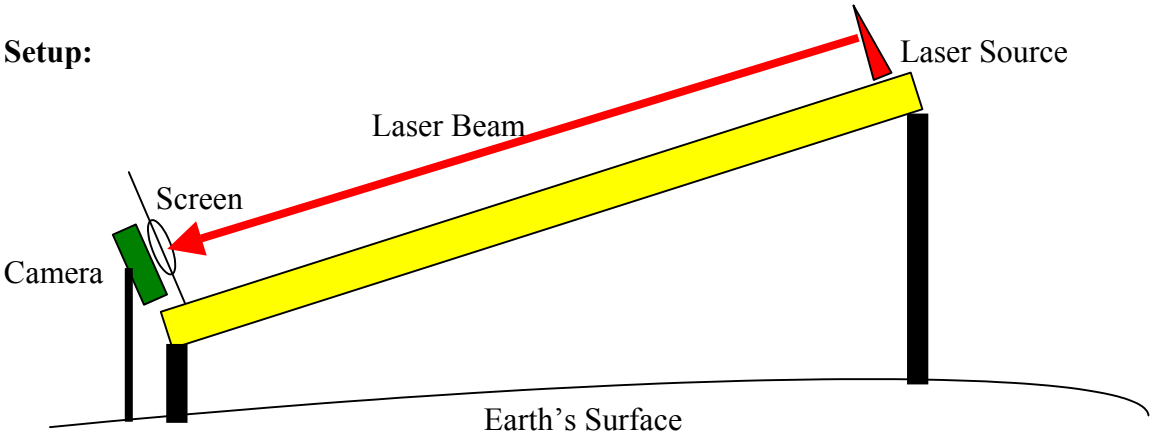


Fig 6.1

A Laser source and a screen are mounted on a common platform (yellow) which is inclined as shown and the setup was kept in a room at Roorkee, India. A camera, operating automatically interfaced with a Laptop was taking pictures of the Laser beam every 15 minutes. The platform of length 244 cm was kept in North – South to point towards North Star.

The experimental setup at SKD was kept active for 24 hours once and then 36 hours for a second observation.

This experiment was conducted to see if there is any detectable relative motion between the Earth and the M4 surrounding it.

In case, the M4 was absolute stationary then the Laser beam image on the screen would found undergoing some deflection every 12 hours i.e. if the beam deflects from left to right after 12 hours, it would later deflect from right to left after the next 12 hours.

If M4 was absolute stationary:

The Earth has a velocity of 30 KM/s.

The Laser has a velocity of 300,000 KM/s. It travels across the platform of length 244 cm in 8.13 x 10^{-9} seconds

This would mean a deflection of 0.24 mm (30 KM/s * 8.13 x 10^{-9} sec) every 12 hours.

It was found that the Laser beam undergoes no detectable drift to the best of accuracy available in the SKD factory setup.

Measurements:

The following files were dumped automatically :

Measurement I:

Image005.bmp	24 April 2001	06:01 hrs
Image075.bmp	24 April 2001	11:59 hrs
Image145.bmp	24 April 2001	17:57 hrs
Image225.bmp	25 April 2001	00:46 hrs

Measurement II:

Image010.bmp	28 April 2001	00:43 hrs
Image040.bmp	28 April 2001	10:55 hrs
Image070.bmp	28 April 2001	21:07 hrs
Image100.bmp	29 April 2001	07:20 hrs

The following images conveys that there has been no shift in the beam as in the case when the beam was passed through magnets (refer Chapter 5). The image on the left side is the actual dumped file. The image on the right side is a processed one. The processing formula is:

Measurement I:

Processed Image = (Unprocesssed_Image * 4) – (Image005 + Image075 + Image145 + Image225)

Measurement II:

Processed Image = (Unprocesssed_Image * 4) – (Image010 + Image040 + Image070 + Image100)

Results:

Measurement I

Fig 6.2 Image005.bmp ; April 24, 2001; 06:01 hrs

Fig 6.3 Image075.bmp ; April 24, 2001; 11:59 hrs

Fig 6.4 Image145.bmp ; April 24, 2001; 17:57 hrs

Fig 6.5 Image255.bmp ; April 25, 2001; 00:46 hrs

Measurement II

Fig 6.6 Image010.bmp ; April 28, 2001; 00:43 hrs

Fig 6.7 Image040.bmp ; April 28, 2001; 10:55 hrs

Fig 6.8 Image070.bmp ; April 28, 2001; 21:07 hrs

Fig 6.9 Image100.bmp ; April 29, 2001; 07:20 hrs

Observation:

There is no detectable shift in the Laser beam spot after duration of 12 hours. The processed image color varies due to varying intensity of the daylight.

Conclusion:

Most of the M4 associated with the earth moves with the earth. Thus, amount of M4 moving with a moving object depends upon the mass and the density of the object. This experiment supports the assumption of Michelson-Morley experiment with a difference in interpretation that M4/ Ether is not absolute stationary but M4 moves with the earth with the same velocity.

References:

1. The Feynman Lectures on Physics by Feynman, Leighton and Sands; Volumes I, II, III; Eighth reprint; 1995
2. Understanding Lasers by Jeff Hecht, Second Edition, 1993
3. McGraw-Hill Encyclopedia of Science & Technology, 7th Edition
4. Einstein's Mirror by Tony Hey and Patrick Walters,1997

Chapter 7

The Stone Impact Experiment

Link between Magnetism and Inertia:

There is a link between the magnetism and inertia. An accelerating object generates magnetic field inside and nearby the object and this magnetic field is responsible for inertia. A new experiment was conducted to validate the same.

Keyword : dφ/ dt

Introduction:

By definition, Inertia is the property of matter because of which it continues to be in rest unless a force acts on it or continues to be in motion unless a force acts on it.

The major forces in nature are Electric, Magnetic, Inertial and Gravitational which are applicable at larger distances. Among these forces, the link between Electricity and Magnetism are well known, but there is no established link of electricity or magnetism with Inertia. It is assumed that Magnetism and Inertia are closely linked. Whenever an object is accelerated, it generates rate of change of magnetic flux dφ/ dt which in turn generates eddy-current damping at atomic scale. This eddy current damping opposes the dφ/ dt and the object experiences a drag. This is Inertia. Effect of this magnetic field can be observed near the accelerating / decelerating object which is validated by "Stone Impact Experiment" described in section II.

Experiment:

Equipment/ Items Used

1. Tektronix TDS 210 Digital Scope
2. An AC Amplifier used for tests conducted on May 28 and 29, 2001 to check existence of pulse generated in the coil. A better DC amplifier was used for tests conducted on June 4 and 5, 2001.
3. Ordinary Laser pointer as light source facing the optical sensor/ Photo Transistor connected to Channel 1 of the Scope
4. Stones of average diameter 81 mm and mass 820 grams approximately (multiple stones were used)
5. Plastic pipe of inner diameter 133 mm to guide the stone
6. Coil : SWG 30, 1000 Turns, 200 mm diameter

The following experiment is named as “Stone Impact Experiment” which validates the link between Magnetism and Inertia. The Impact generates very high acceleration / deceleration for a short duration. Therefore an impact of free falling stone on a wooden cylindrical core generates sufficiently high acceleration pulse which subsequently generates rate of change of magnetic flux $d\varphi/ dt$. This can be captured by a coil surrounded the wooden core.

Setup:

A hard plastic pipe 9.45 metres (31 feet) long was mounted well with supports as shown in Fig 7.1. The pipe ended just around a feet above the wooden core approximately. A coil connected via an amplifier to the second channel of a 2 channel Digital Scope. This coil is placed on a sponge disc on the ground to isolate vibrations. This coil has a larger diameter than the pipe to provide sufficient clearance during the stone impact. A wooden cylinder is placed at the center of the coil which acts as an anvil so that the stone impacts upon the wood.

An optical sensor is connected to Channel 1 of the Digital Scope. The sensor is placed above the coil to deliver a Synchronizing pulse (SYNC) for the scope.

A stone is dropped from the top of the pipe. The stone has a smaller diameter than the pipe so that it does not interfere or drag against the inner walls of the pipe. Before striking the wooden anvil, the stone first crosses the optical sensor giving SYNC and then impacts the anvil within the coil area. The impact of the stone generates high retardation and a signal is induced in the coil.

The experiment has been conducted to validate whether the induced signal is related to the impact or is the induced signal zero. If the signal is not zero, this indicates that an EMF has been induced in the coil by applying high acceleration/ retardation of an object (stone).

It was observed that an EMF has been induced in the coil and the induced signal has been displayed on the Channel 2 of the Scope.

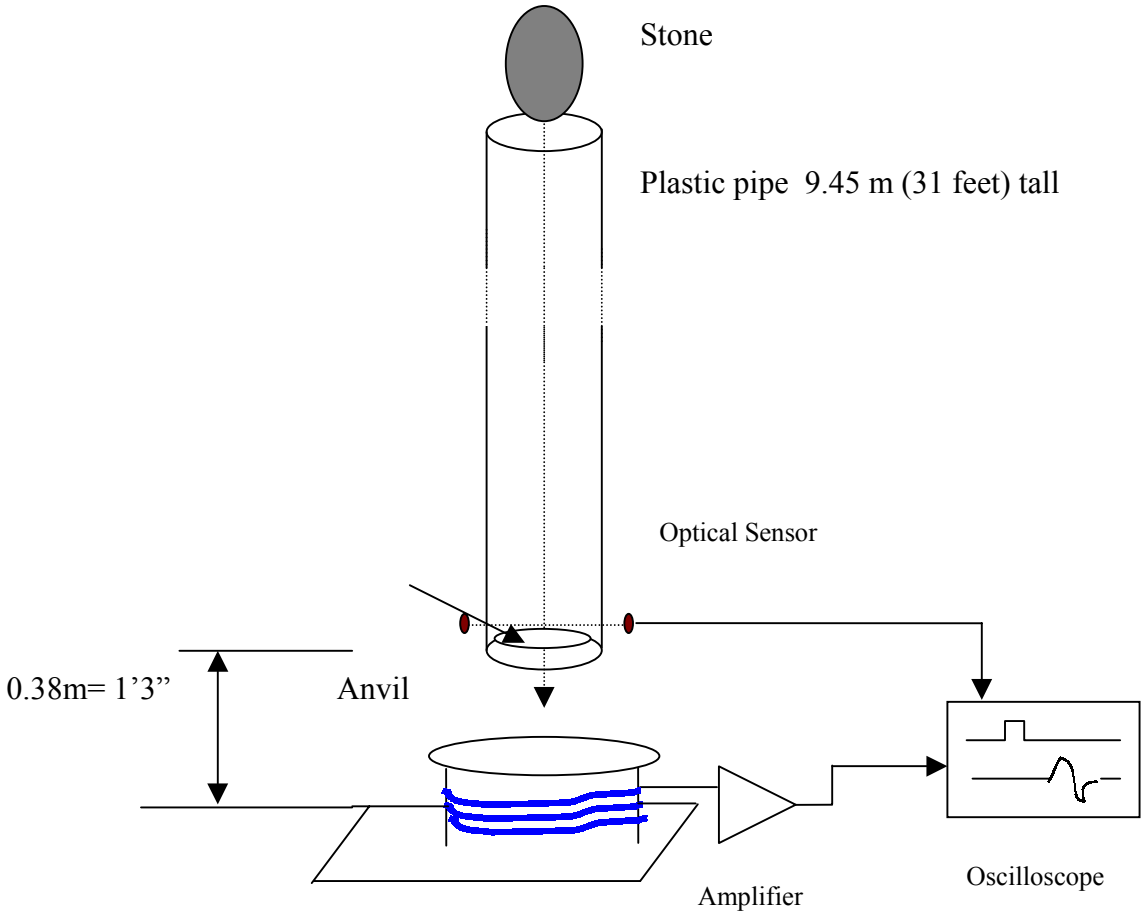

Stone
Plastic pipe 9.45 m (31 feet) tall
Optical Sensor
0.38m= 1'3"
Anvil
Amplifier
Oscilloscope

Fig 7. 1 Setup

Observations on May 29, 2001:

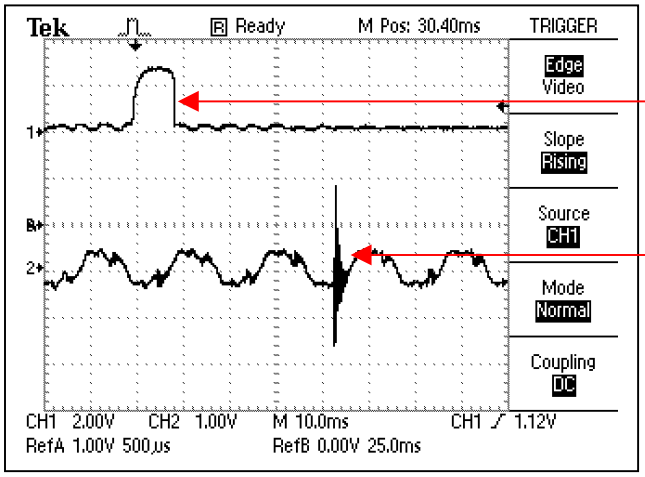


Fig 7.2 29051125.bmp

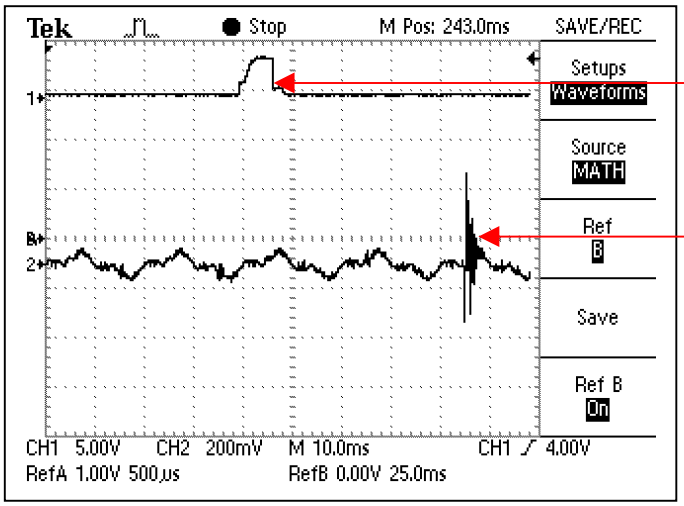


Fig 7.3 29052856.bmp

Each picture shows the SYNC pulse from the Optical Sensor when the stone passes it and a signal on Channel 2 after striking the anvil within the coil. In first case, the wooden anvil was placed on a rubber disc.

In another case, the rubber disc was removed and still the results were similar i.e. the induced signal was observed.

Observations on June 4, 2001:

The distance between the sensor and the anvil was reduced.

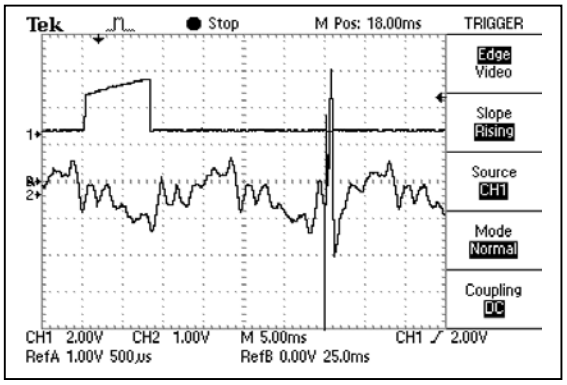


Fig 7.4 04061658.bmp

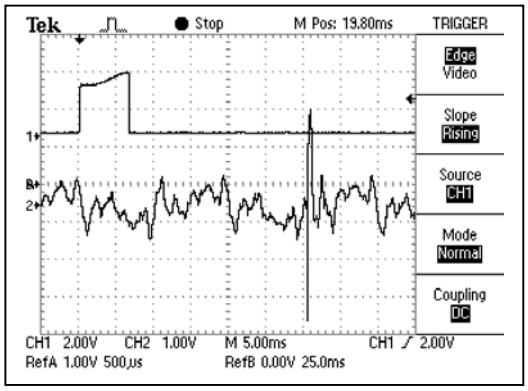


Fig 7.5 04063915.bmp

Observations on June 5, 2001:

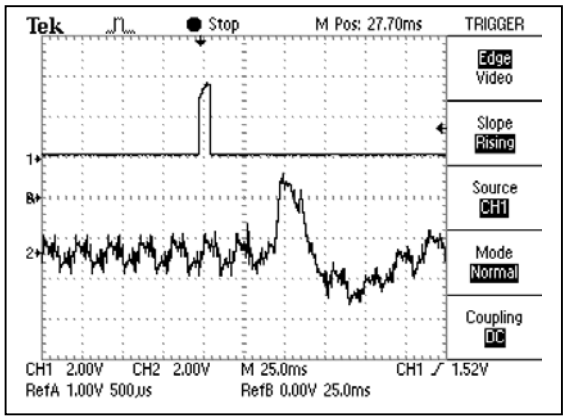


Fig 7.6 05064344.bmp
Weight of stone = 800 grams

This particular stone related to Fig 7.6 had some permanent magnetism.

The large size pulse is generated due to flux linkage between the stone and coil.

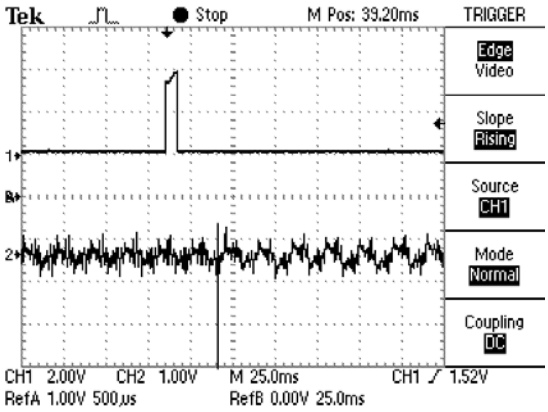


Fig 7.7 05064944.bmp
Weight of stone 870 grams
Polarity of coil Reversed

.
Note: The noise seen in Channel 2 induced signal is from the 50 Hz mains

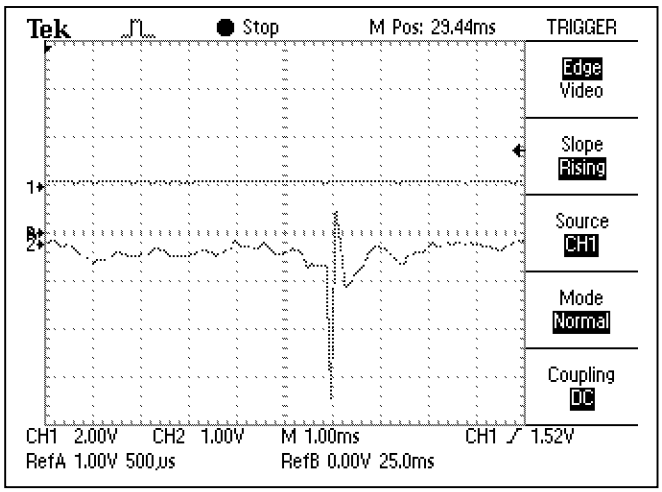


Fig 7.8 Expanded view of the induced signal shown in Fig 7.7

Inferences:

Velocity just before impact

$$v^2 = u^2 + 2gh$$

u = 0 (nearly)
g = 9.8 m/s^2
h = 32' 3" = 9.75 m + 0.0762 m = 9.83 m

v = 13.88 m/s

It is found that the Channel 2 signal seen on the scope is average 4V peak and having a pulse duration of 1 ms average. Thus dt = 0.5 ms. The amplifier before the scope has a gain of 100. The input signal to the amplifier that is coming from the coil is 4/ 100 = 0.04 V = 40 mV peak.

Estimating ϕ and $d\phi/dt$ generated due to stone impact by comparison method:

The same coil was used now referred to as secondary coil (Secondary Coil L2). In the inner empty space of the coil another coil was placed which is referred to as Primary Coil (Primary Coil L1) which has 8.5 cm diameter which is close to the value of the stone diameter.

The Primary Coil L1 is placed within the Secondary Coil L2 as shown in Fig 7.9 with a suitable current limiting resistor in series with the Primary Coil L1 and excited by DC current of 333 mA.

The magnetic flux density measured on Primary Coil L1, axially, was found to 6.5 Gauss approximately.

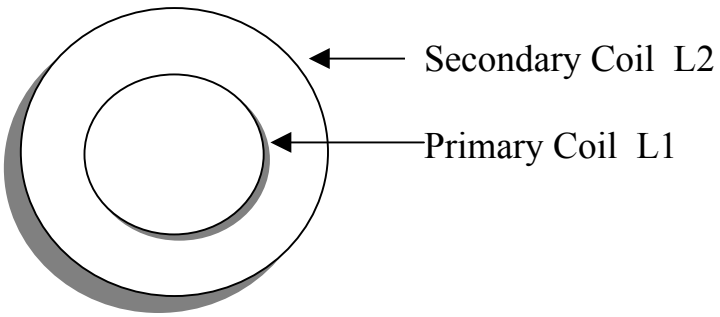


Fig 7. 9

Thereafter, a half Sine Pulse was fed to Primary Coil L1 and similar pulse was induced in Secondary Coil L2 (similar to that after the stone impact). The current measured in the Primary Coil L1 was 3 mA approx. to induce similar pulse.

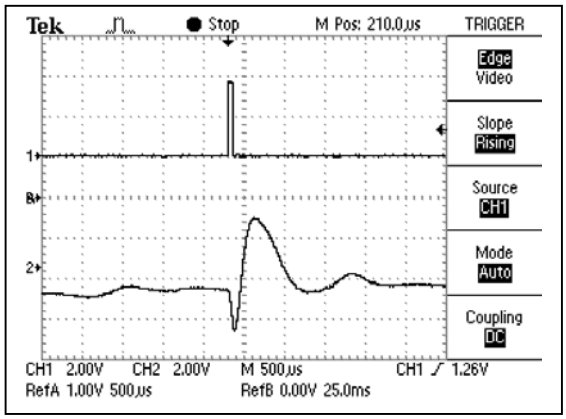


Fig 7. 10

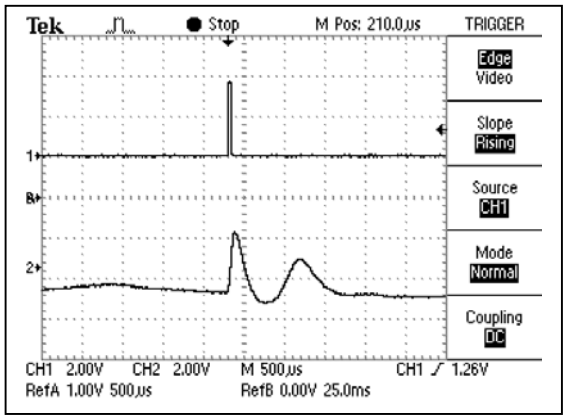


Fig 7. 11 (Polarity Reversed)

The upper trace in Figures 7.10 and 7.11 shows the input to the Primary Coil L1 and the lower trace shows the signal induced in the Secondary Coil L2.
It is measured that the current pulse of 3 mA induces signal in the Secondary Coil L2 similar to the signal generated by stone impact.

Proportionately, for 3 mA, the magnetic flux density in L1 would be

$B = 6.5 * (3/ 333) = 0.059$ gauss

A = Area of Primary Coil L1 = $\pi * r * r$ where r is the radius of L1

r = 8.5 / 2 = 4.25 cm = 0.0425 m

A = 0.0057 sq. m

$\varphi = A*B$ Wb
$= 0.0057 * 0.059$
$= 0.000336$ Wb

$d\varphi / dt$ = 0.000336 Wb / 0.5 ms (An impact will generate a similar duration pulse, generally)

, = 0. 672 Wb/s

is the rate of change of flux which is brought about by the sudden deceleration of the stone (inertia) which causes voltage to be induced in the Secondary Coil L2.

To get an idea of the deceleration value:

As calculated above, the velocity just before the impact is 13.88 m/s. This is suddenly reduced to zero due to the impact in approx. 500 us.

As per Newton's law of motion:

$v = u + at$

$0 = 13.88 + a(0.5 * 10^{-3})$

a = 27760 m/s^2

= 2832 g

Thus 2832 g deceleration generates a flux of the order of 0.000336 Wb and the rate of change of flux is of the order of 0. 672 Wb/s.

Conclusion:

When the stone impacts the wooden anvil, there is a voltage pulse induced in the coil. The impact of the stone is nothing but sudden deceleration (Inertia). The stone impact causes rate of change of magnetic flux, which induces the voltage pulse in the coil. This establishes a link between magnetism and inertia.

References:

1. Fundamentals of Physics by Halliday, Ressnick and Walker
2. The Feynman lectures on Physics by Fenman, Leighton, Sands Volume 1
3. A Text Book of Electrical Technology by B.L. Theraja, 1996

Chapter 8

Summary

Clues to find out link between forces:

1. The starting point was the existence of ether (M4) based on old Indian Science which explains the existence of matter M4 in the whole universe since last 5000 years.
2. Next step was to define its properties. The EM wave propagates in M4 similar to wave propagation in liquid or air, therefore it is assumed that M4 acts as a fluid and laws of fluid mechanics are applicable on it.
3. Considering few properties of Magnetism together [a] lines of magnetic field follow shortest (curly) path, [b] its poles can not be separated [c] the unit of magnetic flux φ is analogues to velocity, it indicated that magnetism should be flow of M4. Therefore "Laser deflection experiment" was designed to prove magnetism as flow of M4.
4. The Laser deflection experiment showed positive results. It also showed Laser deflection along the magnetic field which can not be explained by established physics because there is no phenomenon in magnetism which acts along the magnetic field (excluding magnetic poles attract / repel along the magnetic filed).
5. Michelson-Morley experiment showed no relative velocity between M4 and earth. This itself proves that most of the M4 moves with the moving object.
6. The next interpretation was that if an object is stationery or moving then its associated M4 will also be stationery or will move with the velocity of object respectively. However, if an object is accelerating then there can be a relative velocity between object and its associated M4 because the associated M4 may not pick same velocity and acceleration immediately. This may generate a flow of M4 nearby an accelerating object. Since the flow of M4 is magnetism, there is a possibility to detect magnetic induction near accelerating /decelerating object. Therefore "Stone impact experiment" was designed to prove link between magnetism and inertia "inertia-magnetic effect".
7. The results of "Laser deflection experiment" and "Stone impact experiments" were positive but small in magnitude. This can be explained with the argument that any new phenomenon will give only small signals because all phenomenon having strong signals / results are already discovered.

Nature is simple if we understand it. The link between major forces (Magnetism, gravitation and Inertia) will be explainable in a simple manner in next few years. However, sometimes simple solutions are missing. The method to calculate value of Pi (shown in Appendix I) is an example to indicate this fact. The method shown in Appendix-I calculates the value of Pi by successive approximation using the properties of equilateral triangle and Pythagoras Theorem.

In the previous chapters we have tried to answer the following questions.

1. How do we explain the origin of Gravitation?
2. Why does a moving charge generate a circular magnetic field?
3. Why magnetic poles cannot be separated like positive and negative charges?
4. Is there any simple link between Magnetism and Inertia?
5. Can gravitational force be generated?

The outcome of previous chapters is summarized as below:

Origin of Gravitational Force:

- The Gravitational Force is an electromagnetic force field which is generated by motion of charge in the matter (supported by a software of 255 digit math accuracy)
- The gravitational force is the resultant force of the electric force vector and magnetic force vector between two atoms.

Origin of Magnetism and Link between forces:

- All universe and empty space is filled with a different category of matter named as M4 (ether).
- This matter (M4) is transparent for other forms of matter, viz. Solid (M1), Liquid (M2) and Gas (M3).
- It is a media for EM wave propagation. The EM waves including light propagate as Transverse waves in M4.
- The M4 can also flow like gas or liquid. Therefore, Fluid Mechanics is applicable on it.
- Velocity of Transverse wave propagation in M4 is equivalent to the speed of light.
- M4 interacts with the moving charge and moving charge acts like a propeller in M4
- A moving charge generates circular turbulent or impulsive flow of M4, which is known as magnetism (supported by "Laser Deflection Experiment").
- The magnetic poles cannot be separated from each other as they are regions of pressure gradient in M4.
- Gravitational field propagates as complex Longitudinal waves in M4.
- Inertia is the property generated by magnetic induction due to acceleration and retardation in the object (supported by "Stone Impact Experiment").

Generation of Gravitational Force (Gravity Motor):

- A Dipole charge moving in circular path in presence of magnetic field generates axial gravitational force when it is subjected to impulse of current dipole (supported by a series of prototypes. Three prototypes exhibited weight changes of the order of 8 to 14 grams amounting to 0.05 % weight change)
- When a DC voltage is applied between two metal layers of Capacito-Inductor, opposite current (dipole current) pulses are applied on its inductors, and is rotated at specific speed in presence of magnetic field, it generates axial gravitational field.

There are different stable states of matter which can be identified as :

Solid	Liquid	Gas	Ether or free space
M1	M2	M3	M4

Deductions from units:
Energy stored in an inductor :

$$E_L = 0.5*L*I^2 = 0.5*K_1*\varphi^2$$

Now, KE is given as:

$E_{KE} = 0.5*m*v^2$ where m is the mass and v is the velocity of the object

Comparing these two expressions of E_L and $E_{KE,}$ we conclude:
The inductance L is analogous to mass m which is known commonly, therefore φ is analogous to velocity

φ is the flow of M4

The first derivative of velocity w.r.t time is acceleration, similarly the first derivative of φ w.r.t time is also acceleration.

Magnetic flux φ is the particle velocity of M4 and magnetic induction dφ/dt is the particle acceleration of M4. **This gives a starting clue that magnetic Induction, Inertia and gravitation are closely linked.**

Results of Gravity Motor Prototypes:

Prototype P14 *[12May, 2000]* weight change 0.05% (8.5 gram)
Prototype P24 *[17 July, 2000]* weight change 0.05% (14 gram)
Prototype P28 *[21 August, 2000]* weight change 0.04% (9 gram)

Results of Laser Deflection Experiment:

The Laser beam passing through 2 m long magnet having flux density of 3000 gauss partially deflects by 0.1 mm.

The time T required by the laser to pass all the magnets is:

$T = 2m / c = 6.6$ ns

The velocity of M4 will thus be 16 KM/s for 3000 Gauss flux density. This is an approximate number and shows the order of M4 velocity.

Results of Validation of flow of M4 along with moving object:

There was no detectable shift in the Laser beam spot after duration of 12 hours. Therefore this experiment supports the assumption of Michelson-Morley experiment with a difference in interpretation that M4/ Ether is not absolute stationary but M4 moves with the earth or any moving object with the same velocity.

Results of Link between Magnetism and Inertia:

Whenever an object is accelerated, it generates rate of change of magnetic flux dφ/ dt which in turn generates eddy-current damping at atomic scale. This eddy current damping opposes the dφ/ dt and the object experiences a drag. This is Inertia. Effect of this magnetic field can be observed near the accelerating / decelerating object.

$$v = 13.88 \text{ m/s}$$

Stones of average diameter 81 mm and mass 820 grams approximately
Coil : SWG 30, 1000 Turns, 200 mm diameter
Induced signal strength = 0.04 V = 40 mV peak.
Equivalent Magnetic field B = 0.059 gauss
Equivalent Magnetic Induction dφ/ dt = 0.672 Wb/s
Equivalent acceleration on stone a = 2832 g

These values are approximate numbers and shows the order of magnitude. However, it establishes a link between magnetism and inertia.

Scope of future experiments:

The Laser Deflection Experiment should be re-conducted in strong magnetic field (preferably 10000 gauss) and also complete assembly should be placed in vacuum.

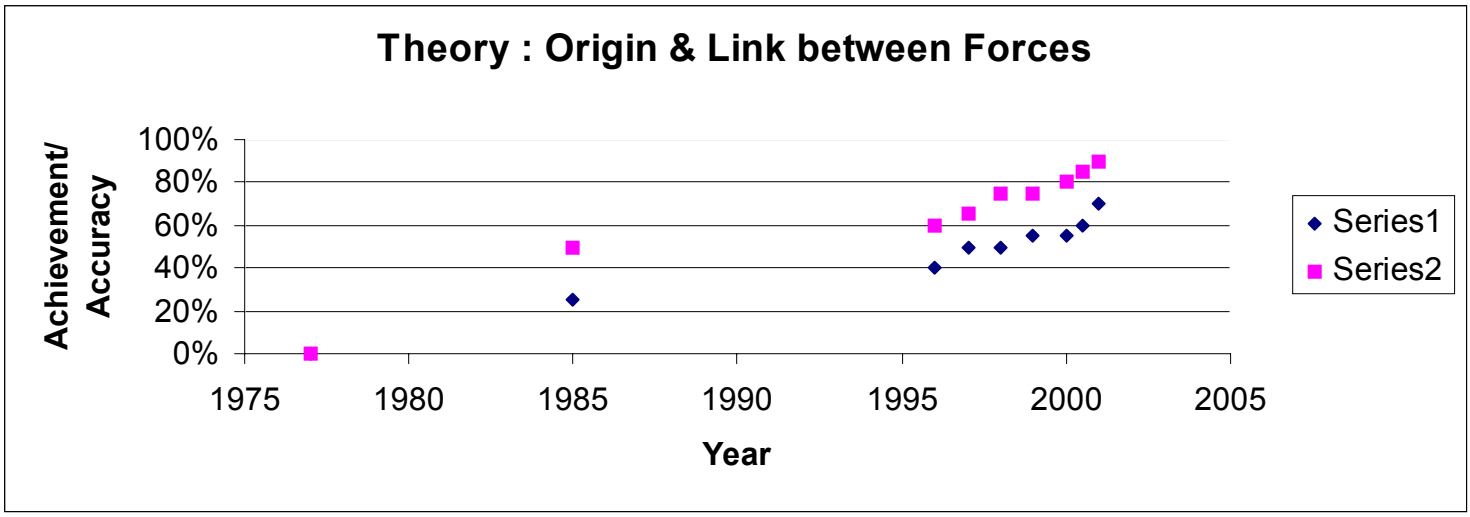
The Stone Impact Experiment should be re-conducted with higher free fall, "Pass through the coil" and "Impact on anvil". Also different materials should be used as anvil and object. One accelerometer should also be mounted on side of anvil to compare the timings between induced EMF and retardation.

Chapter 9

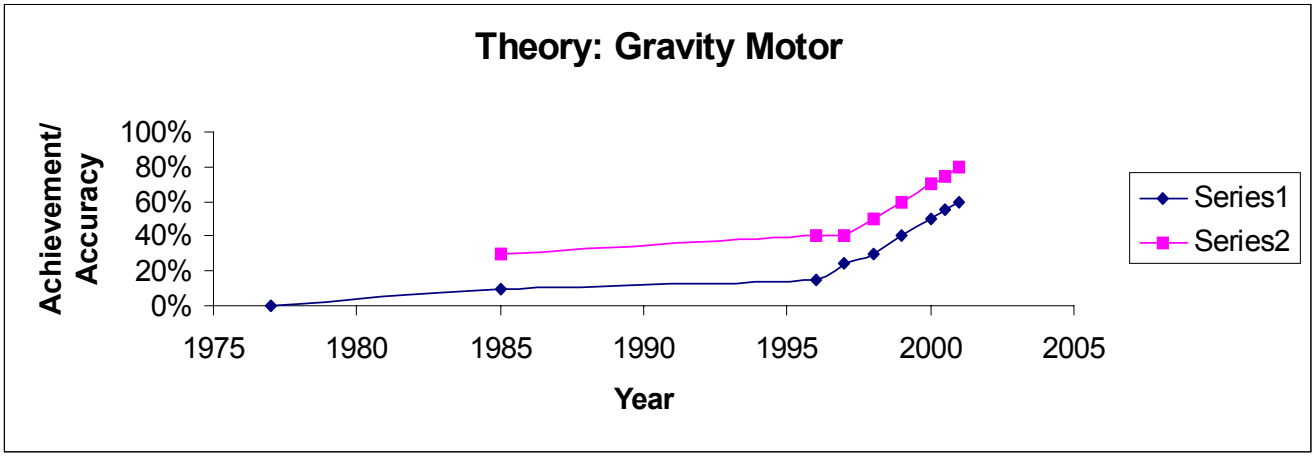
The Distance Covered and further Roadmap

Year	Origin and Link between forces		Gravity Motor Theory		Gravity Motor Prototype	
	Achievement	Accuracy	Achieve-ment	Accuracy	Achievement	Accuracy
1977	0%	0	Started work to establish a correct Theory on Gravitation			
1985	25%	0.5	10%	0.3		
1996	40%	0.6	15%	0.4	-	
1997	50%	0.65	25%	0.4	5%	0.1
1998	50%	0.75	30%	0.5	15%	0.3
Oct-99	55%	0.75	40%	0.6	15%	0.6
4 May'00	55%	0.8	50%	0.7	25%	0.7
19 Jul'00	60%	0.85	55%	0.75	52%	0.8
30 Jun'01	70%	0.9	60%	0.8	55%	0.8

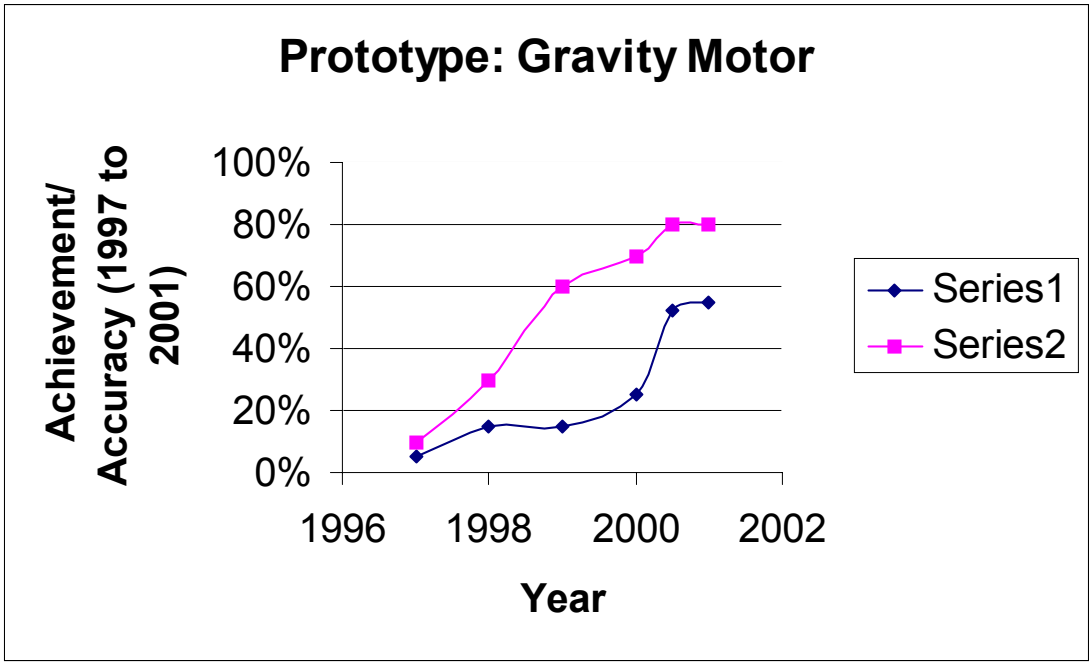
Theory: Origin and Link between Forces		
Year	Achievement	Accuracy
1977	0%	0
1985	25%	0.5
1996	40%	0.6
1997	50%	0.65
1998	50%	0.75
1999	55%	0.75
2000	55%	0.8
2000.5	60%	0.85
2001	70%	0.9
Graph 1	Series 1	Series 2
Graph 2	Series 1	Series 2



Theory: Gravity Motor			
Year	**Achievement**	**Accuracy**	
1977	Started work on Theory of Origin of Gravitation		
1985	10%	0.3	
1996	15%	0.4	
1997	25%	0.4	
1998	30%	0.5	
1999	40%	0.6	
2000	50%	0.7	
2000.5	55%	0.75	
2001	60%	0.8	
Graph 1	**Series 1**	**Series 2**	
Graph 2	**Series 1**	**Series 2**	



Prototype: Gravity Motor			
Year	**Achievement**	**Accuracy**	
1977	Started work on Theory of Origin of Gravitation.		
1985			
1996			
1997	5%	0.1	
1998	15%	0.3	
1999	15%	0.6	
2000	25%	0.7	
2000.5	52%	0.8	
2001	55%	0.8	
Graph 1	**Series 1**	**Series 2**	
2003	65%	0.85	Target Weight Change = 0.5 %



Appendix I

Calculate the value of π

I. Abstract: π is a constant extensively used in Mathematics and application of mathematics in Physics etc. In fact, π is considered to be the most important constant in Physics. However, a simple way to calculate π is not available in standard math's textbooks of XII Class or lower whereas π is used right from VIII class onwards in the calculation of area of circles etc. The author has devised a simple way based on First, Second, Successive approximation method to calculate the value of π. The method simply uses the Pythagoras Theorem and the property of an equilateral triangle to calculate the value of π by definition which is the ratio of the circumference of the circle to its diameter. The paper also includes a software code which uses this algorithm to calculate the value of π.

II. Calculating the value of π:

By definition:

$$\pi = \frac{\text{circumference of a circle}}{\text{Diameter of the circle}}$$

$$= \frac{2\pi r}{2r}$$

$$= \pi$$

First Approximation:

Assume a circle of unit radius (radius = 1) and divide it into six segments. Now join segment lines at intersection of circle and diameter lines of 60 degrees each. This makes 6 equilateral triangles within the circle.

As a first approximation, the sum of 6 segments is considered as the circumference of the circle.

Referring to Figure 1:

π = Circumference/ Diameter

= (6*A1) /(2*1) { now A1 = 1 because it is a side of the equilateral triangle}

= 6/ 2

= 3

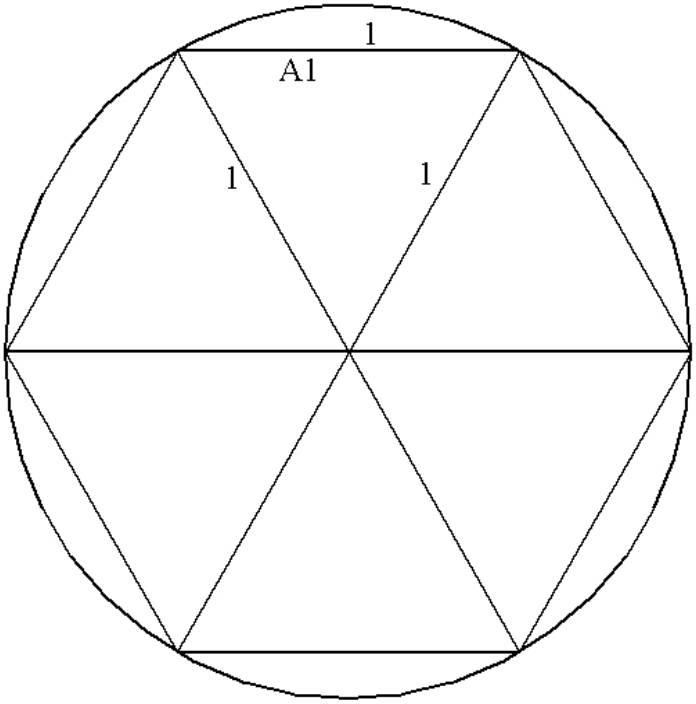


Fig 1 [First Approximation]

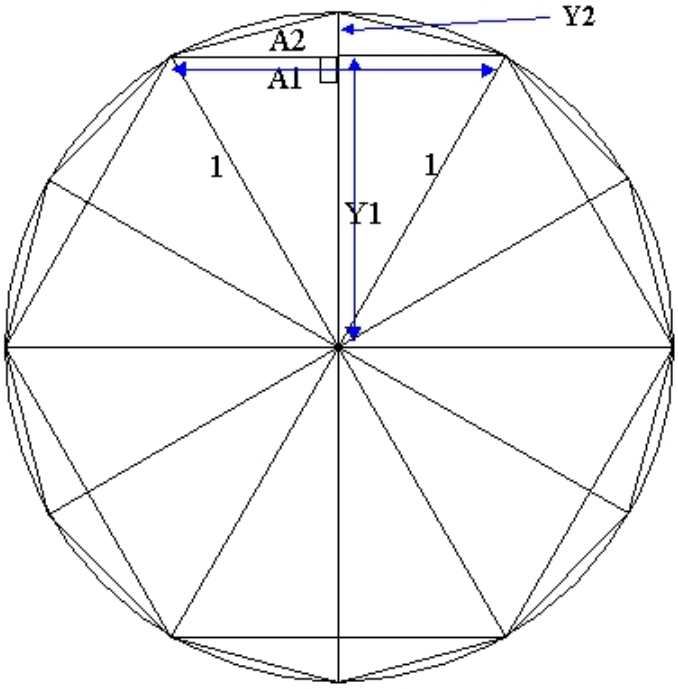


Fig 2 [Second Approximation]

Second Approximation:

This circle is also having unit radius but divided into twelve segments.

We know that A1 = 1 from the Fig 1 (First approximation method).

Y1 + Y2 = 1 where Y2 , (A1)/2 and A2 form the sides of a right triangle and so also Y1, (A1)/2 and 1 form the sides of a larger right triangle as shown in Fig 2. Now the value of A2 is calculated as follows:

$$Y1^2 + (A1^2)/ 4 = 1$$

$$Y1^2 = 1 - ¼$$

$$Y1^2 = ¾$$

$$Y1 = 0.8660$$

Therefore,

$$Y2 = 1 - 0.8660$$

$$= 0.134$$

Further,

$$A2^2 = ((A1)/2)^2 + Y2^2$$

$$= 1/ 4 + (0.134)^2$$

$$= 0.267956$$

$$A2 = 0.51764466$$

Now,

$$\pi = \text{Circumference/ Diameter}$$

{The sum of equivalent segments is the approximation of the circumference where A2 is one of the 12 equivalent segments}

$$= (12*A2) /(2*1)$$

= 3.10586796

Third Approximation:

The unit circle is divided into 24 segments. One sixth portion of the circle is shown in Fig 3.

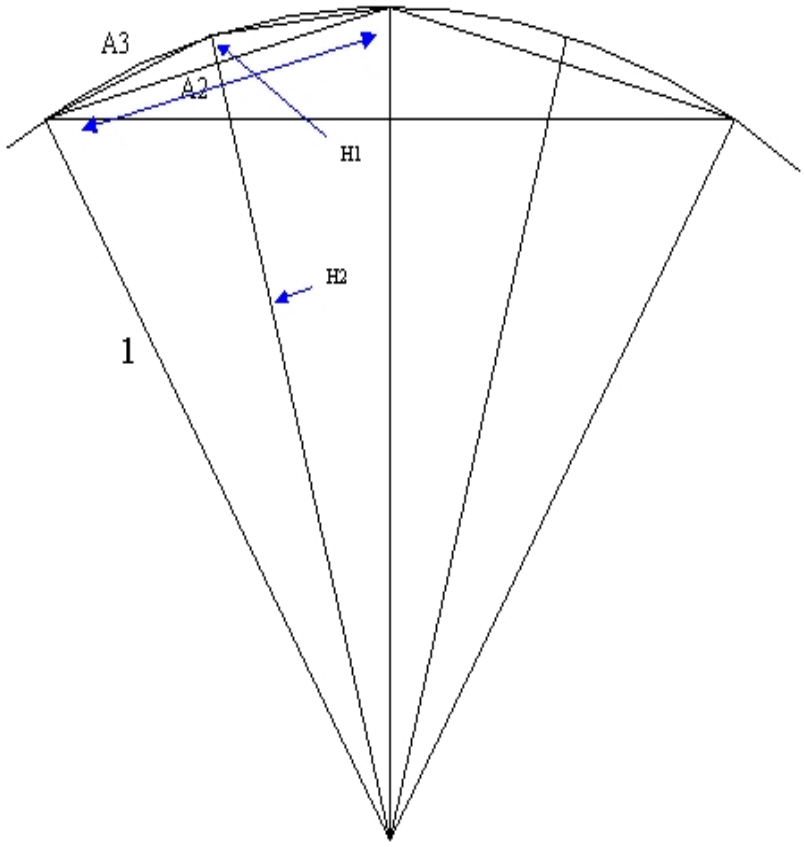


Fig 3 [Third/ Successive Approximation]

$H1 + H2 = 1$

$H2^2 = 1 - ((A2)/2)^2$

$= 1 - (0.51764466/ 2)^2$

$= 0.933011001$

$H2 = 0.965924946$

Therefore,

$$H1 = 1 - 0.965924946$$
$$= 0.034075053902$$

Now,

$$A3^2 = ((A2)/ 2)^2 + (0.034075053902)^2$$
$$= (0.51764466/ 2)^2 + 0.0011611092$$
$$= 0.066988998 + 0.0011611092$$
$$= 0.0681501077$$
$$A3 = 0.2610557559$$

Now,

$$\pi = \text{Circumference/ Diameter}$$
$$= (24*A3) /(2*1)$$
$$= 3.13266907121$$

III. Successive Approximation Method

This is a general method for better accuracy for the value of π and is an extension of the approximation methods seen above. (The circle can be further divided into 48, 96 etc segments to get more and more accuracy for the value of π). The same Fig 3 is referred here.

From the Third Approximation method:

$$A3 = \sqrt{\{ ((A2)/ 2)^2 + [1 - \sqrt{(1 – ((A2)/ 2)^2)}]^2 \}}$$

Generalizing:

$$A(J+1) = \sqrt{\{ (A(J)/ 2)^2 + [1 - \sqrt{(1 – (A(J)/ 2)^2)}]^2 \}} \quad \text{---------- Equation 1}$$

Thus,

$$\pi = 2^{(J-1)} * 3 * A(J) \quad \text{---------- Equation 2}$$

where A(1) = 1

e.g.:

Consider J = 3

$A(1) = 1$

$A(2) = \sqrt{\{ (A(1)/2)^2 + [1 - \sqrt{(1 - (A(1)/2)^2)}]^2 \}}$ from Equation 1

$= 0.5176446658$

$A(3) = \sqrt{\{ (A(2)/2)^2 + [1 - \sqrt{(1 - (A(2)/2)^2)}]^2 \}}$ from Equation 1

$= 0.2610557590$

$\pi = 2^2 * 3 * A(3)$ from Equation 2

$= 12 * 0.2610557590$

$= 3.132669108$

which confirms the general relation obtained when we compare with value of π obtained from the Third Approximation Method.

IV. Source Code in QBasic to calculate the value of π using Successive approximation method

```
DEFDBL A-Z
        ' Calculating value of PI by Successive Approximation
        ' A(1)=1
        ' PI = (2 ^ (J - 1)) * 3 * A(J)
        ' A(J+1)=   SQR( (1-SQR(1-(A(J)/2)^2))^2 + (A(J)/2)^2 )
        CLS
        NN = 26   ' Number of loops
        A = 1
        FOR J = 1 TO NN
        PI = (2 ^ (J - 1)) * 3 * A
        PRINT J, A, PI
        X1 = (A / 2) * (A / 2)
        X2 = SQR(1 - X1)
        X3 = (1 - X2) * (1 - X2)
        A = SQR(X3 + X1)
        NEXT J
```

Results (values of π obtained by running the above code)

No. of Loops (J)	A(J)	π PI
1	1	3
2	.5176380902050416	3.10582854123025
3	.2610523844401032	3.132628613281239
4	.1308062584602862	3.139350203046868
5	.0654381656435523	3.14103195089051
6	3.272346325297357D-02	3.141452472285463
7	1.636227920787426D-02	3.141557607911858
8	8.181208052469581D-03	3.141583892148319
9	4.090612582328191D-03	3.141590463228051
10	2.04530736067661D-03	3.141592105999273
11	1.022653814027395D-03	3.141592516692159
12	5.113269237248348D-04	3.141592619365385
13	2.556634639513095D-04	3.141592645033692
14	1.278317322367663D-04	3.141592651450769
15	6.391586615102209D-05	3.141592653055038
16	3.195793307959091D-05	3.141592653456105
17	1.597896654030544D-05	3.141592653556372
18	7.989483270216469D-06	3.141592653581439
19	3.994741635116202D-06	3.141592653587705
20	1.997370817559097D-06	3.141592653589272
21	9.986854087796732D-07	3.141592653589663
22	4.993427043898521D-07	3.141592653589762
23	2.49671352194928D-07	3.141592653589786
24	1.248356760974643D-07	3.141592653589792
25	6.241783804873215D-08	3.141592653589794
26	3.120891902436608D-08	3.141592653589794

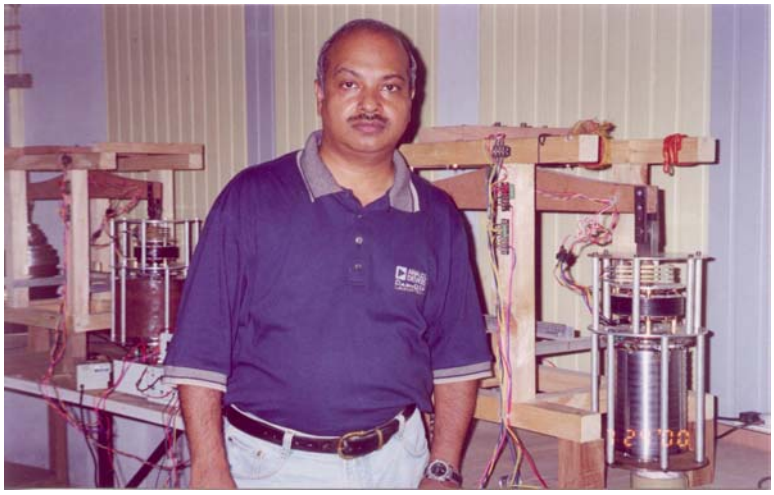
The value of π remains unchanged after the 25th approximation,. The resolution of the computer software is limited to 19 digits. Further, accurate values of π can be obtained using any other High Level Language having higher digit math accuracy and by increasing the number of loops.

V. Conclusion

It is concluded that the value of π can be calculated by simple algorithm using the properties of equilateral triangle and Pythagoras Theorem.

Appendix II

About the Author



Rakesh Goel [member IEEE] received his Bachelor of Engineering in Electronics & Communication, Gold Medallist, from the University of Roorkee, India in 1977. He had a special knack for Electromechanical Engineering supported with Control Hardware and Software and a desire to probe into the Gravitation area even before his engineering. He worked as a Technical Director and Partner in an engineering firm from 1978 to 1992 and developed many Test Equipment and Control Systems e.g. Electrodynamic Shakers, Digital Random Vibration Controller, Centrifuge Machines, Piezo-Electric Accelerometers, Optical Encoders and many more.

He established his own company SK Dynamics P. Ltd., a full fledged R&D organisation and gave unique motor control solutions to Analog Devices Inc. USA. He received two US Patents in the area of Motor Control Technology. Rakesh Goel is currently involved in delivering a prototype of Gravitational Force Generator.

Contribution in Physics:

1. Origin of Gravitation
2. Origin of Magnetism
3. Gravity Motor (Generation of Gravitational Force)
4. Laser Deflection Experiment
5. Stone Impact Experiment
6. Reconducting Michelson-Morley Experiment in a new way
7. A method to calculate the value of π in THE most simple way

Developments done in the past:

1974: Vibration Meter (First Commercial Product)
1976:
1. Universal Amplifier
2. Galvanometric Recorder
3. Variable Reluctance Accelerometer
4. Velocity Pickup

1977: Potentiometric Recorder
1979:
1. SCR based variable speed drive for 3 HP DC Motor
2. Galvanometric Rectilinear Recorder

1980:
1. 8080 Learning Kit including monitor
2. Four Channel Master/ Slave recorder for electrologging
3. 40 KgF ED Shaker System for Vibration Testing
4. Seismograph

1982: 300 KgF ED Shaker System
1983: 8085 based Wave Propagation Meter with readout
1984:
1. Vibrosinker for Pile Sinking
2. Strain Gauge based Transducer for Pressure and Load Cell
3. Z80 based Sine Vibration Controller for Vibration Tests

1985:
1. 700 KgF ED Shaker System
2. Eight Channel recorder for Satellite Tracking

1986:
1. Vibrating Wire pore pressure transducer with Z80 based readout
2. Digital multi-channel recorder for Electrologging

1987:
1. Z80 based Ultrasonic Concrete Tester with CRT display
2. Piezoelectric Accelerometers
3. 500 mm radius Centrifuge machine

1988:
1. PC based Operation Analyser to test circuit breakers
2. Linear Optical Encoders
3. PC based Data Logger for Soil Dynamic Testing
4. Bump Test Machine

1989:
1. 2000 KgF ED Shaker System
2. 12 KVA Amplifier to drive the Shaker

1990:
1. DSP based Sine Vibration Controller
2. 4.5 m radius Centrifuge Machine

1991:
1. Transmission Line Damper Testing Machine with Software
2. DSP based Shock Controller

1992: DSP based Random Vibration Controller
1993: Microphone Testing Equipment
1994: ADSP 2100 based Motor Control
1995:
1. DSP plus FPGA based Sensorless PMSM Control
2. Contribution in world's first Motor Control Processor Design (ADMC315)

1997:
1. Gun Control for 155 mm Field Howitzer Gun
2. Electric Bicycle
3. SR Motor Control
4. Stable Platform and Electronic Compass
5. Started Design for Gravity Motor Prototype

1998:
1. ACIM Slip Compensation control for washing machine
2. ACIM vector control

1999: Completion of Washing Machine Control
2000:
1. Air Conditioner Control (Indoor: PMSM Sensorless Control; Outdoor: vector Control)
2. Gravity Motor Breakthrough (first weight change experienced)

2001:
1. Experiments on Laser Deflection and Stone Impact conducted successfully
2. Motor and Control for Avionics Application (High Performance and Light Weight motors for Electrical Transmission based VTOL vehicle)