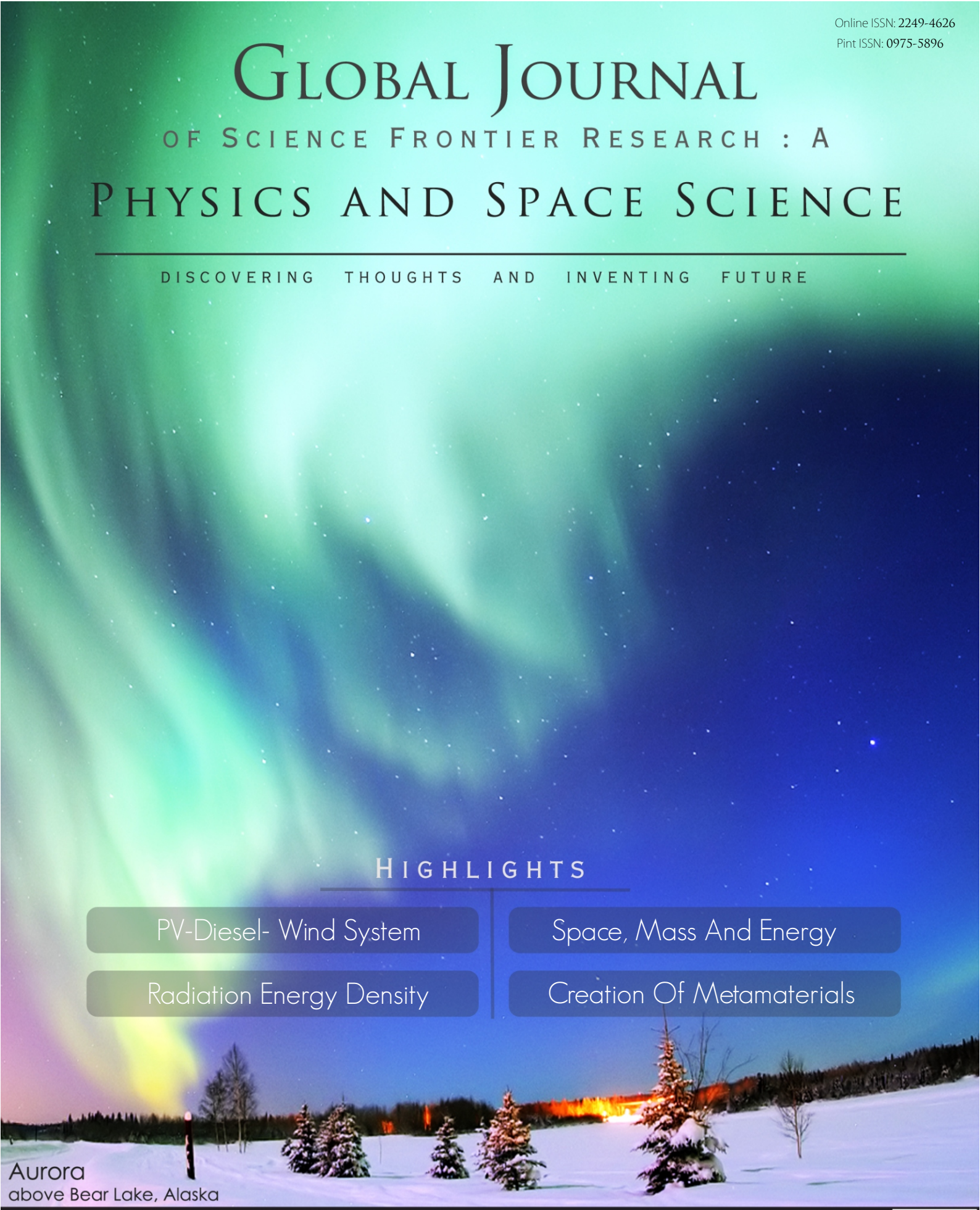
Online ISSN: 2249-4626
Pint ISSN: 0975-5896

Global Journal of Science Frontier Research : A Physics and Space Science

DISCOVERING THOUGHTS AND INVENTING FUTURE

Highlights

- PV-Diesel- Wind System
- Space, Mass And Energy
- Radiation Energy Density
- Creation Of Metamaterials



Aurora
above Bear Lake, Alaska

Volume 12 | Issue 5 | Version 1.0 ENG

Global Journal of Science Frontier Research: A
Physics & Space Science

Global Journal of Science Frontier Research: A
Physics & Space Science
Volume 12 Issue 5 (Ver. 1.0)

Open Association of Research Society

Incorporation No.: 0423089
License No.: 42125/022010/1186
Registration No.: 430374
Import-Export Code: 1109007027
Employer Identification Number (EIN):
USA Tax ID: 98-0673427

Global Journals Inc.

*(A Delaware USA Incorporation with "Good Standing"; **Reg. Number: 0423089**)*

Sponsors: Open Association of Research Society
Open Scientific Standards

Publisher's Headquarters office

Global Journals Inc., Headquarters Corporate Office,
Cambridge Office Center, II Canal Park, Floor No. 5th, ***Cambridge (Massachusetts)***, Pin: MA 02141
United States
USA Toll Free: +001-888-839-7392
USA Toll Free Fax: +001-888-839-7392

Offset Typesetting

Open Association of Research Society, Marsh Road, Rainham, Essex, London RM13 8EU
United Kingdom.

Packaging & Continental Dispatching

Global Journals, India

Find a correspondence nodal officer near you

To find nodal officer of your country, please email us at *local@globaljournals.org*

eContacts

Press Inquiries: *press@globaljournals.org*
Investor Inquiries: *investers@globaljournals.org*
Technical Support: *technology@globaljournals.org*
Media & Releases: *media@globaljournals.org*

Pricing (Including by Air Parcel Charges):

For Authors:
22 USD (B/W) & 50 USD (Color)
Yearly Subscription (Personal & Institutional):
200 USD (B/W) & 250 USD (Color)

Editorial Board Members (HON.)

Dr. Bart Lambrecht
Director of Research in Accounting and FinanceProfessor of Finance
Lancaster University Management School
BA (Antwerp); MPhil, MA, PhD (Cambridge)

Dr. Carlos García Pont
Associate Professor of Marketing
IESE Business School, University of Navarra
Doctor of Philosophy (Management), Massachusetts Institute of Technology (MIT)
Master in Business Administration, IESE, University of Navarra
Degree in Industrial Engineering, Universitat Politècnica de Catalunya

Dr. Fotini Labropulu
Mathematics - Luther College
University of ReginaPh.D., M.Sc. in Mathematics
B.A. (Honors) in Mathematics
University of Windso

Dr. Lynn Lim
Reader in Business and Marketing
Roehampton University, London
BCom, PGDip, MBA (Distinction), PhD, FHEA

Dr. Mihaly Mezei
ASSOCIATE PROFESSOR
Department of Structural and Chemical Biology, Mount Sinai School of Medical Center
Ph.D., Etvs Lornd University
Postdoctoral Training,
New York University

Dr. Söhnke M. Bartram
Department of Accounting and FinanceLancaster University Management SchoolPh.D. (WHU Koblenz)
MBA/BBA (University of Saarbrücken)

Dr. Miguel Angel Ariño
Professor of Decision Sciences
IESE Business School
Barcelona, Spain (Universidad de Navarra)
CEIBS (China Europe International Business School).
Beijing, Shanghai and Shenzhen
Ph.D. in Mathematics
University of Barcelona
BA in Mathematics (Licenciatura)
University of Barcelona

Philip G. Moscoso
Technology and Operations Management
IESE Business School, University of Navarra
Ph.D in Industrial Engineering and Management, ETH Zurich
M.Sc. in Chemical Engineering, ETH Zurich

Dr. Sanjay Dixit, M.D.
Director, EP Laboratories, Philadelphia VA Medical Center
Cardiovascular Medicine - Cardiac Arrhythmia
Univ of Penn School of Medicine

Dr. Han-Xiang Deng
MD., Ph.D
Associate Professor and Research
Department Division of Neuromuscular Medicine
Davee Department of Neurology and Clinical NeuroscienceNorthwestern University
Feinberg School of Medicine

Dr. Pina C. Sanelli
Associate Professor of Public Health
Weill Cornell Medical College
Associate Attending Radiologist
NewYork-Presbyterian Hospital
MRI, MRA, CT, and CTA
Neuroradiology and Diagnostic Radiology
M.D., State University of New York at Buffalo,School of Medicine and Biomedical Sciences

Dr. Roberto Sanchez
Associate Professor
Department of Structural and Chemical Biology
Mount Sinai School of Medicine
Ph.D., The Rockefeller University

Dr. Wen-Yih Sun
Professor of Earth and Atmospheric SciencesPurdue University Director
National Center for Typhoon and Flooding Research, Taiwan
University Chair Professor
Department of Atmospheric Sciences, National Central University, Chung-Li, TaiwanUniversity Chair Professor
Institute of Environmental Engineering, National Chiao Tung University, Hsin-chu, Taiwan.Ph.D., MS The University of Chicago, Geophysical Sciences
BS National Taiwan University, Atmospheric Sciences
Associate Professor of Radiology

Dr. Michael R. Rudnick
M.D., FACP
Associate Professor of Medicine
Chief, Renal Electrolyte and Hypertension Division (PMC)
Penn Medicine, University of Pennsylvania
Presbyterian Medical Center, Philadelphia
Nephrology and Internal Medicine
Certified by the American Board of Internal Medicine

Dr. Bassey Benjamin Esu
B.Sc. Marketing; MBA Marketing; Ph.D Marketing
Lecturer, Department of Marketing, University of Calabar
Tourism Consultant, Cross River State Tourism Development Department
Co-ordinator , Sustainable Tourism Initiative, Calabar, Nigeria

Dr. Aziz M. Barbar, Ph.D.
IEEE Senior Member
Chairperson, Department of Computer Science
AUST - American University of Science & Technology
Alfred Naccash Avenue – Ashrafieh

President Editor (HON.)

Chief Author (HON.)

Dr. R.K. Dixit
M.Sc., Ph.D., FICCT
Chief Author, India
Email: authorind@computerresearch.org

Dean & Editor-in-Chief (HON.)

Contents of the Volume

Global Journal of Science Frontier Research
Physics and Space Sciences
Volume 12 Issue 5 Version 1.0 Year 2012
Type : Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

Atom, Universe and the Fundamental Interactions

By U. V. S. Seshavatharam & Prof. S. Lakshminarayana

Andhra University Visakhapatnam, India

Abstract - In the universe, if the critical density is $\rho_c \cong (3H_0^2/8\pi G)$ and the characteristic Hubble radius is $R_0 \cong (c/H_0)$, mass of the cosmic Hubble volume is $M_0 \cong \frac{c^3}{2GH_0}$. There exists a charged heavy massive elementary particle M_X in such a way that, inverse of the fine structure ratio is equal to the natural logarithm of the sum of number of positively and negatively charged M_X in the Hubble volume. Surprisingly it is noticed that, M_X mass is close to Avogadro number times the rest mass of electron. Finally it can be suggested that M_X plays a very interesting role in particle and nuclear physics.

Keywords : Atom, Avogadro number, Hubble radius, Hubble volume, Hubble mass, Mach's principle, Planck mass, Coulomb mass, Fine structure ratio, the 4 fundamental interactions and SUSY.

GJSFR-A Classification : FOR Code: 020299

Strictly as per the compliance and regulations of :

Atom, Universe and the Fundamental Interactions

U. V. S. Seshavatharam [α] & Prof. S. Lakshminarayana [σ]

Abstract - In the universe, if the critical density is $\rho_c \cong (3H_0^2/8\pi G)$ and the characteristic Hubble radius is $R_0 \cong (c/H_0)$, mass of the cosmic Hubble volume is $M_0 \cong \frac{c^3}{2GH_0}$. There exists a charged heavy massive elementary particle M_X in such a way that, inverse of the fine structure ratio is equal to the natural logarithm of the sum of number of positively and negatively charged M_X in the Hubble volume. Surprisingly it is noticed that, M_X mass is close to Avogadro number times the rest mass of electron. Finally it can be suggested that M_X plays a very interesting role in particle and nuclear physics.

Keywords : Atom, Avogadro number, Hubble radius, Hubble volume, Hubble mass, Mach's principle, Planck mass, Coulomb mass, Fine structure ratio, the 4 fundamental interactions and SUSY.

I. Mach's Principle - Hubble Volume - Hubble Mass

In theoretical physics, particularly in discussions of gravitation theories, Mach's principle [1-6] is the name given by Einstein to an interesting hypothesis often credited to the physicist and philosopher Ernst Mach. The idea is that the local motion of a rotating reference frame is determined by the large scale distribution of matter. There are a number of rival formulations of the principle. A very general statement of Mach's principle is 'local physical laws are determined by the large-scale structure of the universe'. This concept was a guiding factor in Einstein's development of the general theory of relativity. Einstein realized that the overall distribution of matter would determine the metric tensor, which tells the observer which frame is rotationally stationary. Note that till today quantitatively Mach's principle was not implemented successfully in cosmic and nuclear physics. With reference to the Hubble radius $R_0 \cong \frac{c}{H_0}$, Hubble mass can be expressed as $M_0 \cong \frac{c^3}{2GH_0}$ Considering the Mach's principle and the Hubble mass, in this paper an attempt is made to understand the origin of the cosmic and strong interaction physical parameters. In modern cosmology, the shape of the universe is at. In between the closed space and at space, there is one compromise. That is 'Hubble volume'. Note that Hubble volume is only a theoretical and spherical expanding volume and is virtual. From Hubble volume one can estimate the Hubble mass. By coupling the Hubble mass with the Mach's principle, one can understand the origin of cosmic and atomic physical parameters.

a) To unify the atom and the universe

The subject of unification is very interesting and very complicated [7-18]. By implementing the Avogadro number N as a scaling factor in unification program, one can probe the constructional secrets of elementary particles. The Planck's quantum theory of light, thermodynamics of stars, black holes and cosmology totally depends upon the famous Boltzmann constant k_B which in turn depends on the Avogadro number [19]. From this it can be suggested that, Avogadro number is more fundamental and characteristic than the Boltzmann constant and indirectly plays a crucial role in the formulation of the quantum theory of radiation. In this connection it is noticed that, 'molar electron mass' plays a very interesting role in nuclear and particle physics.

b) Key concepts in unification

Concept-1

In the expanding cosmic Hubble volume, characteristic cosmic Hubble mass is the product of the cosmic critical density and the Hubble volume. If the critical density is $\rho_c (3H_0^2/8\pi G)$ and characteristic Hubble radius is $R_0 \cong (c/H_0)$, mass of the cosmic Hubble volume is

$$M_0 \cong \frac{c^3}{2GH_0} \tag{1}$$

Concept-2

There exists a charged heavy massive elementary particle M_X in such a way that, inverse of the fine structure ratio is equal to the natural logarithm of the sum of number of positively and negatively charged MX in the Hubble volume. If the number of positively charged $(M_X)^+$ is $\left(\frac{M_0}{M_X}\right)$ and the number of negatively charged $(M_X)^-$ is also $\left(\frac{M_0}{M_X}\right)$ then

$$\frac{1}{\alpha} \cong \ln\left(\frac{M_0}{M_X} + \frac{M_0}{M_X}\right) \cong \ln\left(\frac{2M_0}{M_X}\right) \tag{2}$$

From experiments $1/\alpha \cong 137.0359997$ and from the current observations [20,21,22], magnitude of the Hubble constant is, $H_0 \cong 70.4^{+1.3}_{-1.4}$ Km/sec/Mpc. Thus

Author α : Honorary faculty, I-SERVE Alakapuri, Hyderabad-35, AP, India. E-mail : seshavatharam.uvs@gmail.com
Author σ : Dept. of Nuclear Physics, Andhra University Visakhapatnam- 03, AP, India. E-mail : lnsrirama@yahoo.com

$$M_X \cong e^{-\frac{1}{\alpha}}\left(\frac{c^3}{GH_0}\right) \cong e^{-\frac{1}{\alpha}} \cdot 2M_0 \cong (5.32 \text{ to } 5.53) \times 10^{-7} \quad (3)$$

If $N \cong 6{:}022141793 \times 10^{23}$ is the Avogadro number and m_e is the rest mass of electron, surprisingly it is noticed that, $N.m_e \cong 5.485799098 \times 10^{-7}$ Kg and this is close to the above estimation of M_X. Thus it can be suggested that,

$$\frac{M_X}{m_e} \cong N \quad (4)$$

In this way, Avogadro number can be coupled with the cosmic, atomic and particle physics. Then with reference to $(N.m_e)$, the obtained cosmic Hubble mass is $M_0 \cong 8.957532458 \times 10^{52}$ Kg and thus the obtained Hubble's constant is $H_0 \cong \frac{c^3}{2GM_0} \cong 69.54$ Km/sec/Mpc. Note that large dimensionless constants and compound physical constants reflects an intrinsic property of nature [23,24]. Whether to consider them or discard them depends on the physical interpretations, logics, experiments, observations and our choice of scientific interest. In most of the critical cases, 'time' only will decide the issue. The mystery can be resolved only with further research, analysis, discussions and encouragement.

Concept-3

For any observable charged particle, there exists 2 kinds of masses and their mass ratio is 295.0606339. Let this number be represented by X_E. First kind of mass seems to be the 'gravitational or observed' mass and the second kind of mass seems to be the 'electromagnetic' mass. Ratio of gravitational and electromagnetic mass ratio is X_E. This number is obtained in the following way. In the Planck scale, similar to the Planck mass, with reference to the elementary charge, a new mass unit can be constructed in the following way.

$$M_C \cong \sqrt{\frac{e^2}{4\pi\varepsilon_0 G}} \cong 1.859210775 \times 10^{-9}\,\text{Kg} \quad (5)$$

$$M_C c^2 \cong \sqrt{\frac{e^2c^4}{4\pi\varepsilon_0 G}} \cong 1.042941 \times 10^{18}\,\text{GeV} \quad (6)$$

Here 'e' is the elementary charge. How to interpret this mass unit? Is it a primordial massive charged particle? If 2 such oppositely charged particles annihilates, a large amount of energy can be released. Considering so many such pairs annihilation hot big bang or inflation can be understood. This may be the root cause of cosmic energy reservoir. Such pairs may be the chief constituents of black holes. In certain time interval with a well defined quantum rules they annihilate and release a large amount of energy in the form of γ photons. In the Hubble volume, with its pair annihilation, origin of the CMBR can be understood. Thus

$$\frac{M_X}{M_C} \cong 295.0606338 \cong X_E \quad (7)$$

Clearly speaking, gravitational and electromagnetic force ratio of M_X is X_E^2.

$$\frac{M_X}{M_C} \cong \sqrt{\frac{4\pi\epsilon_0 G M_X^2}{e^2}} \cong 295.0606338 \quad (8)$$

It can be interpreted that, if 5.486×10^{-7} Kg is the observable or gravitational mass of M_X, then M_C is the electromagnetic mass of M_X.

$$\left(\frac{M_X}{M_C}\right)^2 \cong \frac{4\pi\epsilon_0 G M_X^2}{e^2} \cong (X_E)^2 \quad (9)$$

With reference to the electron rest mass,

$$\left(\frac{M_X}{M_e}\right)^2 \cong X_E^2 \cdot \frac{e^2}{4\pi\epsilon_0 G m_e^2} \cong N^2 \quad (10)$$

Concept-4

The key conceptual link that connects the gravitational and non-gravitational forces is - the classical force limit

$$F_C \cong \left(\frac{c^4}{G}\right) \cong 1.21026 \times 10^{44} \quad (11)$$

It can be considered as the upper limit of the string tension. In its inverse form it appears in Einstein's theory of gravitation as $\frac{8\pi G}{c^4}$. It has multiple applications in Black hole physics and Planck scale physics [25]. It has to be measured either from the experiments or from the cosmic and astronomical observations.

Concept-5

Ratio of 'classical force limit $= F_C$' and 'weak force magnitude $= F_W$; ' is N^2 where N is a large number close to the Avogadro number.

$$\frac{F_C}{F_W} \cong N^2 \cong \frac{\text{upper limit of classical force}}{\text{nuclear weak force magnitude}} \quad (12)$$

Thus the proposed weak force magnitude is $F_W \cong \frac{c^4}{N^2 G} \cong 3.33715 \times 10^{-4}$ newton and can be considered as the characteristic nuclear weak string tension. It can be measured in the particle accelerators.

Concept-6

In modified quark SUSY [26], if Q_f is the mass of quark fermion and Q_b is the mass of quark boson, then

$$\frac{m_f}{m_b} \cong \Psi \cong 2.2627062 \quad (13)$$

and $\left(1 - \frac{1}{\Psi}\right) Q_f$ represents the effective fermion mass. The number Ψ can be fitted with the following empirical relation $\Psi^2 \ln(1 + \sin^2\theta_W) \cong 1$ where $\sin\theta_W$ is very close to the weak mixing angle. With this idea super symmetry

can be observed in the strong interactions [26] and can also be observed in the electroweak interactions [27-29].

Concept-7

Product of X_E and sin θ_W is close to inverse of the fine structure ratio.

$$\frac{1}{\alpha} \cong X_E \sin\theta_W \tag{14}$$

thus

$$\sin\theta_W \cong (X_E\alpha)^{-1} \cong 0.464433353 \tag{15}$$

II. The Characteristic Nuclear Radii

a) The characteristic nuclear charge radius

If $H_0 \cong 69.54$ Km/sec/Mpc, R_S is the characteristic radius of nucleus, it is noticed that,

$$R_S \cong \left(\frac{m_p}{M_X}\right)^2 \frac{c}{H_0} \cong 1.2368 \times 10^{-15} \tag{16}$$

where mp is the proton rest mass. This can be compared with characteristic radius of the nucleus and the strong interaction range [30].

b) Scattering distance between electron and the nucleus

If $R_S \cong 1.21$ to 1. 22 fm is the minimum scattering distance between electron and the nucleus, it is noticed that,

$$R_S \cong \left(\frac{\hbar c}{G\,(M_X)^2}\right) \cdot \left(\frac{\hbar c}{Gm_e^2}\right) \cdot \frac{2Gm_e}{c^2} \cong 1.21565 \times 10^{-15} \tag{17}$$

Here M_X is the molar electron mass. Here it is very interesting to consider the role of the Schwarzschild radius of the `electron mass'. Thus the two macroscopic physical constants N and G can be expressed in the following way.

$$N \cong \sqrt{\frac{2\hbar^2}{Gm_e^3 R_S}} \tag{18}$$

$$G \cong \frac{2\hbar^2}{(M_X)^2 m_e R_S} \tag{19}$$

In this way, either the Avogadro number or the gravitational constant can be obtained. Combining the relations (16) and (17) and if $H_0 \cong 69.54$ Km/sec/Mpc, it is noticed that,

$$\frac{\hbar c}{Gm_p\sqrt{M_0 m_e}} \cong 0.991415 \tag{20}$$

Surprisingly this ratio is close to unity! How to interpret this ratio? From this relation it can be suggested that, along with the cosmic variable, H_0, in the atomic and nuclear physics, there exists one variable. In the physics history, it was suggested that, gravitational constant and the speed of light were cosmic variables. In our published paper [31] and accepted paper [32] it was assumed that, the reduced Planck's constant, the Bohr radius, the fine structure ratio were cosmic variables. In our another accepted paper [33] it was assumed that, proton mass and the proton radius were cosmic variables [33]. Any how this is a very sensitive case and has to be discussed in depth. But it is clear that, on the cosmological time scale, there exists one variable physical quantity in the presently believed atomic and nuclear physical constants. 'Rate of change' in its magnitude may be a measure of the present cosmic acceleration. Thus independent of the cosmic red shift and CMBR observations, from the atomic and nuclear physics, cosmic acceleration can be verified.

a) To fit the radius of proton

Let R_p be the radius of proton. It is noticed that,

$$R_p \cong \sqrt{\frac{e^2}{4\pi\varepsilon_0 Gm_p^2}} \cdot \frac{2G\,(M_X)}{c^2} \cong 0.90566 \text{ fm} \tag{21}$$

This obtained magnitude can be compared with the rms charge radius of the proton [34]. With different experimental methods its magnitude varies from 0.84184(67) fm to 0.895(18) fm. Here also it is very interesting to consider the role of the Schwarzschild radius of the 'molar electron mass'. This type of coincidence can not be ignored in the unification scheme.

III. Magnetic Moments of The Nucleon

1. If $(\alpha X_E)^{-1} \cong \sin\theta_W$, magnetic moment of electron can be expressed as

$$\mu_e \cong \frac{1}{2}\sin\theta_W \cdot ec \cdot \sqrt{\frac{e^2}{4\pi\varepsilon_0 F_W}} \cong 9.274 \times 10^{-24} \text{ J/tesla} \tag{22}$$

2. It can be suggested that electron's magnetic moment is due to the nuclear weak force. Similarly magnetic moment of proton is due to the nuclear strong force and is close to

$$\mu_p \cong \frac{1}{2}\sin\theta_W \cdot ec \cdot \sqrt{\frac{e^2}{4\pi\varepsilon_0 F_S}} \tag{23}$$

where $R_0 \cong 1.21565$ fm and $F_S \cong \frac{e^2}{4\pi\varepsilon_0 R_0^2} \cong 156.115$ newton is the strong force magnitude. Thus

$$\mu_p \cong \frac{1}{2}\sin\theta_W \cdot ec \cdot R_0 \cong 1.356 \times 10^{-26}\ \text{J/tesla} \tag{24}$$

3. If proton and neutron are the the two quantum states of the nucleon, by considering the radius of proton R_p, magnetic moment of neutron can be fitted as

$$\mu_n \cong \frac{1}{2}\sin\theta_W \cdot ec \cdot R_p \cong 9.782 \times 10^{-27}\ \text{J/tesla} \tag{25}$$

IV. Basic Ideas in 'Modified' Quark Super Symmetry

Till today there is no reason for the question: why there exists 6 individual quarks? Till today no experiment reported a free fractional charge quark. Authors humble opinion is nuclear charge (either positive or negative) constitutes 6 different flavours and each flavour holds certain mass. Charged flavour can be called as a quark. It is neither a fermion nor a boson. A fermion is a container for different charges, a charge is a container for different flavours and each flavour is a container for certain matter. If charged matter rests in a fermionic container it is a fermion and if charged matter rests in a bosonic container it is a boson. The fundamental questions to be answered are : what is a charge? why and how opposite charges attracts each other? why and how there exists a fermion? and why and how there exists a boson? Here interesting thing is that if 6 flavours are existing with 6 different masses then a single charge can have one or two or more flavours simultaneously. Since charge is a common property, mass of the multiple flavour charge seems to be the geometric mean of the mass of each flavour. If charge with flavour is called as a quark then charge with multi flavours can be called as a hybrid quark. Hybrid quark generates a multi flavour baryon. It is a property of the strong interaction space - time - charge. This is just like different tastes or different smells of matter. Important consequence of this idea is that- for generating a baryon there is no need to couple 3 fractional charge quarks.

1. There exists nature friendly integral charge quark fermions.
2. For every integral charge quark fermion there exists a corresponding integral charge quark boson. Quark fermion and quark boson mass ratio is close to 2.2627.
3. There exists integral charged massive quark fermigluons and integral charged massive quark boso-gluons. (Fermi-gluon means massive gluons having fermion behaviour and boso-gluon means massive gluons having boson behaviour. Quark femi-gluon can be called as the 'quark baryon' and quark boso-gluon can be called as 'quark meson').
4. Quark fermi-gluon or quark baryon masses can be expressed as $Q_F c^2 \cong 0.2314\left[M_{Hf}^2 \times Q_f\right]^{\frac{1}{3}} c^2$ and Quark boso-gluon or quark meson masses can be expressed as $Q_M c^2 \cong 0.2314\left[M_{Hb}^2 \times Q_b\right]^{\frac{1}{3}} c^2$ where Q_f and Q_b are the rest masses of quark fermion and quark boson respectively and M_{Hf} and M_{Hb} are the Higgs charged fermion and Higgs charged boson respectively.
5. $Q_{ef} \cong Q_f - Q_b \cong \left(1 - \frac{1}{\Psi}\right) Q_f$ acts as the effective quark fermion. Effective quark baryon mass can be expressed as $Q_E c^2 \cong 0.2314\left[M_{Hf}^2 \times Q_{ef}\right]^{\frac{1}{3}} c^2$ These effective quark baryons play a vital role in fitting the unstable baryon masses. Quark meson masses play a vital role in fitting the unstable meson masses.
6. Characteristic nuclear fermion is 938.272 MeV and its corresponding nuclear boson is $\frac{938.272}{\Psi} \cong 414.67$ MeV. This boson couples with the light quark bosons or light quark mesons and generates neutral ground states. Thus it is the mother of presently believed strange mesons like 493, 548, 1020 MeV and 783, 890 MeV etc.
7. Charged ground state baryon rest energy is $\left(Q_{E1}Q_{E2}\right)^{\frac{1}{2}} c^2$ or $\left(Q_{E1}Q_{E2}^2\right)^{\frac{1}{3}} c^2$ or $\left(Q_{E1}Q_{E2}Q_{E3}\right)^{\frac{1}{3}} c^2$ where Q_{E1}, Q_{E2}, and Q_{E3} represents any three effective quark baryons. 'Integral charge light quark bosons' in one or two numbers couples with the ground or excited effective quark baryons and generates doublets and triplets. This is just like 'absorption of photons by the electron'.
8. Rest energy of nucleon is close to $\left(\frac{2U_F D_F}{U_F + D_F}\right) c^2 \cong 940.02$ MeV and nucleon rest energy difference is close to $(m_n - m_p) c^2 \cong \sin^2\theta_W \cdot \left(\frac{2U_f D_f}{U_f + D_f}\right) c^2 \cong 1.29623$ MeV.
9. Only oppositely charged quark mesons couples together to form a neutral meson. No two quark fermions couples together to form a meson.

Neutral ground state meson rest energy is close to $(Q_{M1} + Q_{M2})\ c^2$ where Q_{M1} and Q_{M2} represents any two quark mesons.

10. Fine rotational levels of any ground state energy $m_x c^2$ can be expressed as, if n =1,2,3. . . , and $I = n(n+1)$, $(mc^2)_I \cong [I]^{\frac{1}{4}} m_x c^2$ and $(mc^2)_{I/2} \cong \left[\frac{I}{2}\right]^{\frac{1}{4}} m_x c^2$ Super fine rotational levels can be obtained as $(mc^2)_I \cong [I]^{\frac{1}{12}}\ m_x c^2$ and $(mc^2)_{I/2} \cong \left[\frac{I}{2}\right]^{\frac{1}{12}}\ m_x c^2$.

a) To fit the muon and tau rest masses

Using XE charged muon and tau masses [35] were fitted in the following way.

$$m_l c^2 \approx \frac{2}{3}\left[a_c^3 + \left(n^2 X_E\right)^n a_a^3\right]^{\frac{1}{3}} \tag{26}$$

n	Obt. Lep. energy (MeV)	Exp. Lep. energy (MeV)
0	Defined	0.510998910(13)
1	105.951	105.6583668(38)
2	1777.384	1776.99(29)

Table 1 : Fitting of charged lepton rest masses.

where a_c and a_a are the coulombic and asymmetric energy coefficients of the semi empirical mass formula and n = 0, 1, 2. This is an approximate relation. Qualitatively this expression is connected with β decay. Accuracy can be improved with the following relation.

$$\text{If } \mathrm{E_W} \cong \sqrt{\frac{\mathrm{e^2 F_W}}{4\pi\epsilon_0}} \cong \frac{\mathrm{m_e c^2}}{\mathrm{X_E}} \cong 1.731843735 \times 10^{-3} \tag{27}$$

$$m_l c^2 \cong \left[X_E^3 + \left(n^2 X_E\right)^n \sqrt{N}\right]^{\frac{1}{3}}\ E_W \tag{28}$$

where $n = 0, 1, 2$.

If it is true that weak decay is due to weak nuclear force, then $\left(\frac{1}{N^2}\right)\frac{c^4}{G} \cong F_W$ can be considered as the characteristic weak force magnitude. Please refer the published papers for the mystery of electro weak bosons and the Higgs boson [26,27]. Please see table-1.

b) To correlate the electron, muon, proton and the charged pion rest masses

From the above table-1, if $m_\mu c^2 \cong 105.95$ MeV, surprisingly it is noticed that,

$$m_p c^2 \cong \frac{1}{\alpha} \cdot \left(\sqrt{m_\mu m_e} - m_e\right) \cong 938.29 \text{ MeV} \tag{29}$$

Based on the proposed SUSY, it is also noticed that

$$\left(m_\pi c^2\right)^{\pm} \cong \frac{1}{\Psi} \cdot \sqrt{m_\mu m_p} \cong 139.34 \text{ MeV} \tag{30}$$

These two obtained mass units can be compared with the proton and the charged pion rest masses respectively. In a unified scheme these interesting observations can not be ignored.

c) Nucleons, up & down quarks and the strong coupling constant

It our earlier published papers [26,27] it was also defined that

$$\frac{m_u c^2}{m_e c^2} \cong e^{X_E \alpha} \tag{31}$$

where m_u is the up quark rest mass and m_d is the down quark rest mass respectively. In our earlier papers, suggested up quark mass is 4.4 MeV and down quark mass is 9.476 MeV. With these magnitudes it is noticed that,

$$(m_n - m_p)\, c^2 \cong \ln\left(\frac{\sqrt{m_u m_d}}{m_e}\right) \cdot m_e c^2 \tag{32}$$

Here lhs =1.2933 MeV and rhs= 1.2963 MeV. It is also noticed that

$$\left(\frac{\sqrt{m_u m_d}}{m_e}\right) \cong \frac{1}{2}\sqrt{\frac{G\,(M_X)^2}{\hbar c}} \cong 12.60271 \tag{33}$$

With reference to the strong coupling constant α_s - it is also noticed that [19],

$$\left(\frac{1}{\alpha} + \frac{1}{\alpha_s}\right)\sqrt{m_u m_d}\ c^2 \cong 940 \text{ MeV} \tag{34}$$

$$\frac{\sqrt{m_u m_d}\ c^2}{(m_n - m_p)\ c^2} \cong \ln\left(\frac{1}{\alpha} + \frac{1}{\alpha_s}\right) \tag{35}$$

d) To fit the strong coupling constant

The strong coupling constant α_s is a fundamental parameter of the Standard Model. It plays a more central role in the QCD analysis of parton densities in the moment space. QCD does not predict the actual value of α_s, however it definitely predicts the functional form of energy dependence α_s. The value of α_s, at given energy or momentum transfer scale, must be obtained from experiment. Determining α_s at a specific energy scale is therefore a fundamental measurement, to be compared with measurements of the electromagnetic

coupling α, of the elementary electric charge, or of the gravitational constant. Considering perturbative QCD calculations from threshold corrections, its recent obtained value at N^{3}LO [36] is $\alpha_s \cong 0.1139 \pm 0.0020$. At lower side $\alpha_s \cong 0.1139 - 0.002 = 0.1119$ and at higher side $0.1139 + 0.002 = 0.1159$. It can be fitted or defined in the following way.

$$X_S \cong \frac{1}{\alpha_s} \cong \ln\sqrt{\frac{4\pi\epsilon_0 G\left(M_X\right)^2}{e^2}} + \ln\sqrt{\frac{G\left(M_X\right)^2}{\hbar c}} \tag{36}$$

Thus $X_S \cong 8.914239916$.

$$\text{simply, } \frac{1}{\alpha_s} \cong X_S \cong \ln\left(X_E^2\sqrt{\alpha}\right) \cong \frac{1}{0.112180063} \tag{37}$$

This proposed value numerically can be compared with the current estimates of the α_s, It is true that the proposed definition is conceptually not matching with the current definitions of the strong coupling constant. But the proposed definition considers all the fundamental gravitational and non-gravitational physical constants in a unified manner. This proposal can be given a chance. With this magnitude it is noticed that

$$m_n c^2 \cong \left(\frac{1}{\alpha} + \frac{1}{\alpha_s}\right)\sqrt{m_u m_d}\, c^2 - \frac{m_u}{m_d}\left(\frac{2m_u m_d}{m_u + m_d}\right)c^2 \cong 939.6 \text{ MeV} \tag{38}$$

$$m_p c^2 \cong \left(\frac{1}{\alpha} + \frac{1}{\alpha_s}\right)\sqrt{m_u m_d}\, c^2 - \sqrt{\frac{m_u}{m_d}}\left(\frac{2m_u m_d}{m_u + m_d}\right)c^2 \cong 938.30 \text{ MeV} \tag{39}$$

Where $\left(\frac{1}{\alpha} + \frac{1}{\alpha_s}\right)\sqrt{m_u m_d}\, c^2 \cong 942.393$ MeV.

V. Integral Charge Quark Fermions and their Susy Bosons

In the previous papers authors suggested that up, strange and bottom quarks are in geometric series. Similarly down, charm and top quarks are in another geometric series. Obtained quark fermion masses can be compared with the current estimates. Up and down fermion masses can be given as

$$u_f c^2 \cong e^{\alpha X_E} \times m_e c^2 \cong 4.4 \text{ MeV} \tag{40}$$

where $X_E \cong \sqrt{\frac{4\pi\varepsilon_0 G(M_X)^2}{e^2}} \cong 295.0606338$ and α is the fine structure ratio.

$$d_f c^2 \cong \alpha X_E \times u_f c^2 \cong 9.4755 \text{ MeV} \tag{41}$$

Here, $m_e c^2$= rest energy of electron, α = fine structure ratio, X_E = proposed lepton mass generator. It is very interesting to note that

$$\frac{\text{Down fermion mass}}{\text{Up fermion mass}} \cong \frac{d_f}{u_f} \cong \alpha X_E \cong \frac{1}{\sin\theta_W} \tag{42}$$

In this way sin $\emptyset_W$ can be related with up and down quark mass ratio. Proposed USB geometric ratio is

$$g_U \cong \left[\alpha X_E \frac{\alpha X_E + 1}{\alpha X_E - 1}\right]^2 \cong 34.66294 \tag{43}$$

If DCT series is the second generation series, its geometric ratio is

$$g_D \cong \left[2\alpha X_E \frac{\alpha X_E + 1}{\alpha X_E - 1}\right]^2 \cong 138.651754 \tag{44}$$

Quark	Q_f **(MeV)**	Q_b**(MeV)**
Up	4.401	1.945
Down	9.4755	4.188
Strange	152.5427	67.416
Charm	1313.796	580.63
Bottom	5287.579	2336.839
Top	**182160.18**	**80505.46**

Table 2 : Fitting of quark fermion and quark boson masses.

And

$$\frac{g_D}{g_U} \cong \frac{\text{DCT geometric ratio}}{\text{USB geometric ratio}} \cong 4. \tag{45}$$

$$\text{Quark boson mass } = Q_b \cong \frac{\text{Quark fermion mass}}{\Psi} \cong \frac{Q_f}{\Psi} \tag{46}$$

Please see the following table-2 for the obtained quark 'fermion' and 'boson' masses. The observed baryon and meson charge-mass spectrum can be generated from these mass units. Strange quark boson pair generates the neutral pion of rest energy 134.83 MeV. Obtained top quark boson rest energy is 80505 MeV and is very close to the observed W boson rest energy 80.450±0.058 GeV and 80.392±0.039 GeV. Please refer M. Yao et al [35] recommended PDG data. Really this is a great coincidence and support for the proposed new idea of "fermion-boson" unification scheme. This strongly supports super symmetry with small modifications.

It is well established that in Beta decay electron is instantaneously created from neutron and this nuclear weak force is mediated by W and Z bosons. If W boson is really the SUSY partner of top quark then the role of W boson in weak decay seems to be nothing. Its role is taken up by the newly proposed Higgs charged boson of rest energy close to 45.6 GeV. Its rest energy is equal to half the rest energy of neutral Z boson. Semi empirically it is noticed that

$$\frac{m_e c^2}{F_W R_0} \cong \frac{\Psi M_{Hb}}{m_e} \tag{47}$$

a) Beta decay, Higg's charged fermion and its boson

Here, M_{Hb} is the rest mass of charged Higgs boson and ΨM_{Hb} is its fermionic form. Ψ is a unified SUSY fermion and boson mass ratio =2.2627. m_e is the rest mass of electron, R_S is nuclear characteristic charge radius. Mass of ΨM_{Hb} or M_{Hf} can be expressed as

$$M_{Hf}c^2 \cong \left(\frac{m_e c^2}{F_W R_S}\right) \cdot m_e c^2 \tag{48}$$

and

$$M_{Hb}c^2 \cong \frac{M_{Hf}c^2}{\Psi} \cong \frac{1}{\Psi} \cdot \left(\frac{m_e c^2}{F_W R_S}\right) \cdot m_e c^2 \tag{49}$$

Here accuracy depends on R_S. From relation (17) it was noticed that

$$\hbar \cong \sqrt{\frac{G\left(M_X\right)^2 m_e R_S}{2}} \tag{50}$$

$$M_{Hf}c^2 \cong \frac{1}{2} \cdot \left(\frac{G\left(M_X\right)^2}{\hbar c}\right)^2 \cdot m_e c^2 \cong 103125.417 \text{ MeV} \tag{51}$$

$$M_{Hb}c^2 \cong \frac{M_{Hf}c^2}{\Psi} \cong \frac{1}{2\Psi} \cdot \left(\frac{G\left(M_X\right)^2}{\hbar c}\right)^2 \cdot m_e c^2 \cong 45576.1467 \text{ MeV} \tag{52}$$

b) Rest energy of the neutral Z boson

From above estimation, neutral Z boson rest energy can be given as

$$m_Z c^2 \cong \left(M_{Hb}c^2\right)^{\pm} + \left(M_{Hb}c^2\right)^{\mp} \cong 2M_{Hb}c^2 \cong 91152.293 \text{ MeV} \tag{53}$$

This obtained value can be compared with the experimental rest energy of Z boson = 91187.621 MeV. Please refer M. Yao et al recommended PDG data [35].

c) Recently discovered boson of rest energy 126 GeV

Close to the predicted rest energy of Higgs boson, recently a new boson of rest energy 124 to 160 GeV was reported. Surprising thing is that its existence is not matching with the current theoretical predictions. In this critical situation, with the help of strong nuclear gravity and modified super symmetry concepts, authors made an attempt to understand the origin of this new boson[27]. In our previous paper [26] it was suggested that: W boson is the super symmetric boson of the top

quark fermion and the charged Higgs boson pair generates the neutralized Z boson. It is noticed that Higgs charged boson and top quark boson couples together to form a new neutral boson of rest energy 126.0 GeV. This is a very interesting observation. Like Z boson it can decay into 2 charged particles.

$$\left(M_{Hb}c^2\right)^{\pm} + \left(m_W c^2\right)^{\mp} \cong 126.0 \text{ GeV}. \tag{54}$$

VI. Quark Baryon and Quark Meson Masses with Susy Higg's Charged Particle

In our earlier published paper it it was assumed that [26], if Q_F is the quark baryon rest mass

$$Q_F c^2 \cong \left[M_{Gf}^2 \cdot Q_f\right]^{\frac{1}{3}} c^2 \tag{55}$$

If Q_E is the quark effective baryon rest mass,

$$Q_E c^2 \cong \left[M_{Gf}^2 \cdot Q_{ef}\right]^{\frac{1}{3}} c^2 \tag{56}$$

If Q_M is the quark meson rest mass,

$$Q_M c^2 \cong \left[M_{Gb}^2 \cdot Q_b\right]^{\frac{1}{3}} c^2 \tag{57}$$

where $M_{Gf}c^2 \cong 11460$ MeV and its bosonic form $M_{Gb}c^2 \cong \frac{M_{Gf}c^2}{\Psi} \cong 5066$ MeV. With reference to the newly proposed Higgs charged fermion and boson, above relations can be expressed as

$$Q_F c^2 \cong x\left[M_{Hf}^2 \cdot Q_f\right]^{\frac{1}{3}} c^2 \tag{58}$$

$$Q_E c^2 \cong x\left[M_{Hf}^2 \cdot Q_{ef}\right]^{\frac{1}{3}} c^2 \tag{59}$$

$$Q_M c^2 \cong x\left[M_{Hb}^2 \cdot Q_b\right]^{\frac{1}{3}} c^2 \tag{60}$$

$$\text{where} \quad \mathrm{x} \cong \frac{1}{2\alpha\left(\mathrm{X_E}+1\right)} \cong 0.23143232 \tag{61}$$

Please see table-3 for the quark baryon rest energies and see table-4 for the quark meson rest energies.

a) Rest energy of the nucleon

From table-3 it is noticed that, nucleon mass is very close to the harmonic mean of the up baryon and down baryon masses.

$$\frac{2\left(u_F c^2\right)\left(d_F c^2\right)}{\left(u_F + d_F\right)c^2} \cong 940.06 \text{ MeV} \tag{62}$$

where $u_F c^2 \cong 834.04$ MeV and $d_F c^2 \cong 1076.97$ MeV. It is also noticed that,

$$\left(m_n - m_p\right)c^2 \cong \sin^2\theta_W \left[\frac{2\left(u_f c^2\right)\left(d_f c^2\right)}{\left(u_f + d_f\right)c^2}\right] \cong 1.2964 \text{ MeV} \tag{63}$$

where m_p and m_n are the rest masses of proton and neutron respectively.

VII. To fit The Semi Empirical Mass Formula Energy Coefficients

The semi-empirical mass formula (SEMF) is used to approximate the mass and various other properties of an atomic nucleus [37, 38]. As the name suggests, it is based partly on theory and partly on empirical measurements. The theory is based on the liquid drop model proposed by George Gamow and was first formulated in 1935 by German physicist Carl Friedrich von Weizscker. Based on the 'least squares fit', volume energy coefficient is $\mathrm{a_v} = 15{:}78$ MeV, surface energy coefficient is $\mathrm{as} = 18{:}34$ MeV, coulombic energy coefficient is $\mathrm{a_c} = 0{:}71$ MeV, asymmetric energy coefficient is $\mathrm{a_a} = 23.21$ MeV and pairing energy coefficient is $\mathrm{a_p} = 12$ MeV. The semi empirical mass formula is

$$BE \cong Aa_v - A^{\frac{2}{3}}a_s - \frac{Z\left(Z-1\right)}{A^{\frac{1}{3}}}a_c - \frac{\left(A-2Z\right)^2}{A}a_a \pm \frac{1}{\sqrt{A}}a_p \tag{64}$$

In a unified approach it is noticed that, the energy coefficients are having strong inter-relation with the proton rest mass and the 'mole electron mass'. The interesting observations can be expressed in the following way.

a) The coulombic energy coefficient

It can be defined as [39],

$$a_c \cong \alpha \cdot \alpha_s \cdot m_p c^2 \cong 0.7681 \text{ MeV} \tag{65}$$

Ratio of the coulombic energy coefficient and the proton rest energy is close to the product of the fine structure ratio and the strong coupling constant.

b) The surface and volume energy coefficients

Surface energy coefficient can be defined as

$$a_s \cong \sqrt{\frac{G\left(M_X\right)^2}{\hbar c}} \cdot a_c \cong 19.36 \text{ MeV} \tag{66}$$

Table 3 : Fitting of quark baryon and quark effeective baryon rest energies.

Quark	Q_f**(MeV)**	Q_F**(MeV)**	Q_{ef}**(MeV)**	Q_E**(MeV)**
Up	4.401	834.04	2.456	686.66
Down	9.4755	1076.97	5.2878	886.67
Strange	152.5427	2719.35	85.127	2238.84
Charm	1313.796	5574.13	733.165	4589.18
Bottom	5287.579	8866.53	2950.74	7299.81
Top	**182160.18**	28850.43	101654.72	23752.56

Table 4 : Fitting of quark boson and quark meson rest energies.

Quark	Q_b**(MeV)**	Q_M**(MeV)**
Up	1.945	368.6
Down	4.188	475.98
Strange	67.416	1201.81
Charm	580.63	2463.48
Bottom	2336.839	3918.55
Top	**80505.46**	**12750.41**

Table 5 : SEMF binding energy with the proposed energy coefficients

Z	**A**	$(\mathbf{BE})_\mathbf{c}$ **in MeV**	$(\mathbf{BE})_\mathbf{m}$ **in MeV**	**%Error**
26	56	492.60	492.254	-0.0713
28	62	547.08	545.259	-0.335
34	84	728.29	727.341	-0.131
50	118	1007.46	1004.950	-0.250
60	142	1183.64	1185.145	0.127
79	197	1554.82	1559.40	0.293
82	208	1625.22	1636.44	0.686
92	238	1803.12	1801.693	-0.0795

Volume energy coefficient can be defined as

$$a_v \cong \sqrt{\frac{G\left(M_X\right)^2}{\sqrt{2}\hbar c}} \cdot a_c \cong 16.28 \text{ MeV} \tag{67}$$

Thus, $$\frac{\mathrm{a_s}}{\mathrm{a_v}} \cong 2^{\frac{1}{4}} \tag{68}$$

c) The asymmetry and pairing energy coefficients

Asymmetry energy coefficient can be defined as

$$a_a \cong \frac{2}{3}\left(a_v + a_s\right) \cong 23.76 \text{ MeV} \tag{69}$$

Pairing energy coefficient is close to

$$a_p \cong \frac{1}{3}\left(a_v + a_s\right) \cong 11.88 \text{ MeV} \tag{70}$$

$$a_p \cong \frac{1}{3}\left(a_v + a_s\right) \cong 11.88 \text{ MeV} \tag{71}$$

Thus, $$\mathrm{a_v + a_s \cong a_a + a_p \cong 35.64 \text{ MeV}}$$

In table-5 considering the magic numbers, within the range of $(Z = 26;\mathrm{A} = 56)$ to $(Z = 92;\mathrm{A} = 238)$ nuclear binding energy is calculated and compared with the measured binding energy [40]. Column-3 represents the calculated binding energy and column-4 represents the measured binding energy. If this procedure is found to be true and valid then with a suitable fitting procedure qualitatively and quantitatively magnitudes of the proposed SEMF binding energy coefficients can be refined.

d) Proton-nucleon stability

It is noticed that

$$\frac{A_s}{2Z} \cong 1 + 2Z\left(\frac{a_c}{a_s}\right)^2 \cong 1 + 2Z\left(\frac{\hbar c}{G\left(M_X\right)^2}\right) \tag{72}$$

where A_s is the stable mass number of Z, This is a direct relation. Assuming the proton number Z, in general, for all atoms, lower stability can be fitted directly with the following relation [37].

$$A_s \cong 2Z\left[1 + 2Z\left(\frac{a_c}{a_s}\right)^2\right] \cong 2Z + Z^2 * 0.0063 \tag{73}$$

If $Z = 21$, $A_s \cong 44.78$; if $Z = 29$, $A_s \cong 63.29$; if $Z = 47$, $A_s \cong 107.91$; if $Z = 53$, $A_s \cong 123.68$; if $Z = 60$, $A_s \cong 142.66$; if $Z = 79$, $A_s \cong 197.29$; if $Z = 83$, $A_s \cong 209.37$; if $Z = 92$, $A_s \cong 237.29$;

Stable super heavy elements can be predicted with this relation. In between Z = 30 to Z = 60 obtained A_s is lower compared to the actual A_s. It is noticed that, upper stability in light and medium atoms upto Z ≈ 56 can be fitted with the following relation.

$$A_s \cong 2Z\left[1+2Z\left(\left(\frac{a_c}{a_s}\right)^2+\left(\frac{a_c}{a_a+a_p}\right)^2\right)\right] \cong 2Z+Z^2*0.0082 \tag{74}$$

From this relation for $Z = 56$, obtained upper A_s ≅ 137.7. Note that, for $Z = 56$, actual stable A_s ≅137 ≅ 1_ where α is the fine structure ratio. This seems to be a nice and interesting coincidence. In between 0.0063 and 0.0082, for light and medium atoms upto Z ≈ 56 or A_s ≈ 137, mean stability can be fitted with the following relation.

$$A_s \cong 2Z+Z^2*0.0072 \tag{75}$$

Surprisingly it is noticed that, in this relation, $0.0072 \approx \alpha \cong 0.0073$. Thus upto Z ≅ 56 or A_s ≈ 137; mean stability can be expressed as

$$A_s \approx 2Z+\left(Z^2\alpha\right) \tag{76}$$

e) Nuclear binding energy with 2 terms and only one energy constant

Nuclear binding energy can be fitted with 2 terms or 4 factors with $a_c \cong 0.7681$ MeV as the single energy constant [41,42]. First term can be expressed as

$$T_1 \cong (f)\,(A+1)\ln\left[(A+1)\,X_S\right]a_c \tag{77}$$

where $f \cong 1+\frac{2Z}{A_s} \leq 2.0$ and $X_S \cong 8.91424$ is the strong coupling constant. Second term can be expressed as

$$T_2 \cong \left[\frac{A^2+\left(f.Z^2\right)}{X_S^2}\right]a_c \tag{78}$$

Close to the stable mass number A_s,

$$B.E = T_1 - T_2 \tag{79}$$

Please see the following data.

$Z = 2$ & $A = 4$, $B.E \cong 28.93$ MeV; $Z = 10$ & $A = 20$, $B.E \cong 160.44$ MeV;
$Z = 26$ & $A = 56$, $B.E \cong 482.06$ MeV; $Z = 50$ & $A = 118$, $B.E \cong 1007.35$ MeV;
$Z = 79$ & $A = 197$, $B.E \cong 1563.72$ MeV; $Z = 82$ & $A = 208$, $B.E \cong 1634.76$ MeV;
$Z = 92$ & $A = 238$, $B.E \cong 1805.15$ MeV;

Above 2 terms can be put into 4 factors as

$$B.E \cong \left[2-\frac{A}{2Z}\right](f)\,(A+1)\ln\left[(A+1)\,X_S\right]a_c \tag{80}$$

With this relation,

Z = 2 & A = 4, B.E ≅ 29.07 MeV; Z = 10 & A = 20; B.E ≅ 160.98 MeV;
Z = 26 & A = 56, B.E ≅ 484.56 MeV; Z = 50 & A = 118; B.E ≅ 973.32 MeV;
Z = 79 & A = 197, B.E ≅ 1542.1 MeV; Z = 82 & A = 208; B.E ≅ 1587.52 MeV;
Z = 92 & A = 238, B.E ≅ 1764.8 MeV;

These relations can be can be considered for further research and analysis positively.

VIII. Conclusions

Searching, collecting, sorting and compiling the cosmic code is an essential part of unification. In this attempt the above proposed observations and concepts can be given a chance. Further research and analysis in this new direction and the experimental data may reveal the facts.

IX. Acknowledgements

The first author is indebted to professor K. V. Krishna Murthy, Chairman, Institute of Scientific Research on Vedas (I-SERVE), Hyderabad, India and Shri K. V. R. S. Murthy, former scientist IICT (CSIR) Govt. of India, Director, Research and Development, I-SERVE, for their valuable guidance and great support in developing this subject.

References Références Referencias

1. Sciama, D. W. Modern Cosmology. Cambridge University Press. (1971) OCLC 6931707.
2. Hawking. S.W and George Francis Rayner Ellis. The Large Scale Structure of Space-Time. Cambridge University Press. (1973).
3. Raine, D. J. Mach's Principle in general relativity. Royal Astronomical Society 171: 507. 1975.
4. Bondi, et al. The LenseThirring Effect and Mach's Principle. Physics Letters A. Vol-228, Issue 3, 7 April 1997, Pages 121-126.
5. R. G. Vishwakarma. A Machian Model of Dark Energy. Class.Quant.Grav. 19 (2002) 4747-4752.
6. J. V. Narlikar. An Introduction to Cosmology. 3rd edition, Cambridge University Press.(2002).
7. Abdus Salam. Strong Interactions, Gravitation and Cosmology. Publ. in: NATO Advanced Study Institute, Erice, June16-July 6, 1972.
8. P. Caldirola, M. Pavsic and Recami E. Explaining the Large Numbers by a Hierarchy of Universes: A Unified Theory of Strong and Gravitational Interactions. IL Nuovo Cimento Vol. 48 B, No. 2, 11 Dec 1978.
9. Abdus Salam. Strong Interactions, Gravitation and Cosmology. Publ. in: NATO Advanced Study Institute, Erice, June16-July 6, 1972.
10. Salam A, Sivaram C. Strong Gravity Approach to QCD and Confinement. Mod. Phys. Lett., 1993, v. A8(4), 321-326.
11. Recami E. Elementary Particles as Micro-Universes, and Strong Black-holes: A Bi-Scale Approach to Gravitational and Strong Interactions. Preprint NSF-ITP-02-94.
12. Halpern, Paul (2004). The Great Beyond: Higher Dimensions, Parallel Universes, and the Extraordinary Search for a Theory of Everything. Hoboken, New Jersey: John Wiley Sons, Inc.. p. 326. ISBN 0-471-46595-X.
13. Smolin, Lee (2006). The Trouble with Physics: The Rise of String Theory, the Fall of a Science, and What Comes Next. New York: Houghton Mifflin Co.. p. 392. ISBN 0-618-55105-0.
14. Woit, Peter (2006). Not Even Wrong - The Failure of String Theory And the Search for Unity in Physical Law. London: Jonathan Cape &: New York: Basic Books. p. 290. ISBN 978-0-465-09275-8.
15. E. Cremmer, B. Julia and J. Scherk. Supergravity theory in eleven dimensions, Physics Letters B76 (1978) pp 409-412.
16. Wess, Julius; Bagger, Jonathan (1992). Super symmetry and Supergravity. Princeton University Press. pp. 260. ISBN 0691025304.
17. David Gross, Einstein and the search for Unification. Current science, Vol. 89, No. 12, 25 Dec 2005.
18. Hawking S.W. A Brief History of Time. Book. Bantam Dell Publishing Group. 1988.
19. P. J. Mohr and B.N. Taylor. CODATA recommended values of the fundamental physical constants:2006. Rev. Mod. Phys. 80 (2008) 633, Apr - Jun 2008.
20. J. Huchara. Estimates of the Hubble Constant, 2009. Harvard-Smithsonian Center for Astrophysics. http://hubble.plot.dat
21. W. L. Freedman et al. Final Results from the Hubble Space Telescope Key Project to Measure the Hubble Constant. The Astrophysical Journal 553 (1): 47-72.
22. N. Jarosik et al. Seven-Year Wilson Microwave Anisotropy Probe (WMAP) Observations: Sky Maps, Systematic Errors, and Basic Results (PDF). nasa.gov. Retrieved 2010-12-02.
23. P. A. M. Dirac. The cosmological constants. Nature, 139, 323, 1937.
24. P. A. M. Dirac. A new basis for cosmology. Proc. Roy. Soc. A 165, 199, 1938.
25. U. V. S. Seshavatharam. Physics of rotating and expanding black hole universe. Progress in Physics, Vol-2, April, 2010. p.7-14.
26. U. V. S. Seshavatharam and S. Lakshminarayana. Super Symmetry in Strong and Weak interactions. Int. J. Mod. Phys. E, Vol.19, No.2, (2010), p.263-280.
27. U. V. S. Seshavatharam and S. Lakshminarayana. SUSY and strong nuclear gravity in (120-160) GeV mass range. Hadronic journal, Vol-34, No 3, 2011 June, p.277-300.
28. U. V. S. Seshavatharam and S. Lakshminarayana. Nucleus in Strong nuclear gravity. Proceedings of the DAE Symp. on Nucl. Phys. 56 (2011) p.302.
29. U. V. S. Seshavatharam and S. Lakshminarayana. Integral charge SUSY in Strong nuclear gravity. Proceedings of the DAE Symp. on Nucl. Phys. 56 (2011) p.842.
30. Geiger H and Marsden E. On a di_use reaction of the particles. Proc. Roy. Soc., Ser. A 82: 495-500, 1909.
31. U.V.S. Seshavatharam and S. Lakshminarayana. Quantum Mechanics, Cosmic Acceleration and CMB Radiation. Global Journal of Science Frontier Research Vol. 12 Issue 4, p.17, 2012.
32. U.V.S. Seshavatharam and S. Lakshminarayana. Accelerating universe and the expanding atom. To be appeared in the Hadronic journal.
33. U.V.S. Seshavatharam and S. Lakshminarayana. Hubble Volume, Cosmic Variable Proton Mass and the CMB Radiation Energy Density. To be appaered in the Global Journal of Science Frontier Research.
34. Michael O. Distler et al. The RMS Charge Radius of the Proton and Zemach Moments. Phys. Lett. B696:343-347, 2011.
35. Particle Data Group (W.-M. Yao et al.), J. Phys. G 33 (2006) 1, http://pdg.bbb.gov.
36. S. Atashbar Tehrani and A. N. Khorramian. Determination of the strong coupling constant using

available experimental data. CPC(HEP & NP), 2010, 34(9): 1485-1487. Vol. 34, No. 9, Sep., 2010.
37. P. Roy Chowdhury et al. Modified Bethe-Weizsacker mass formula with isotonic shift and new driplines. Mod. Phys. Lett. A20 (2005) p.1605-1618.
38. W. D. Myers et al. Table of Nuclear Masses according to the 1994 Thomas-Fermi Model.(from nsdssd.lbl.gov).
39. U. V. S. Seshavatharam and S. Lakshminarayana. Role of the fine structure ratio in fitting the SEMF energy constants and super heavy magic numbers. Hadronic journal. Vol. 35, No. 1, p.113, 2012.
40. G. Audi and A.H. Wapstra. The 1993 atomic mass evolution.(I) Atomic mass table. Nuclear physics, A 565, 1993, p1-65.
41. Strong nuclear gravitational constant and the origin of nuclear planck scale. Progress in Physics, Vol-3, July, 2010. p.31-38.
42. U. V. S. Seshavatharam and S. Lakshminarayana. Strong nuclear gravity- a brief report. Hadronic journal. Vol. 34, No. 4, p.431, 2011.

Global Journal of Science Frontier Research
Physics and Space Sciences
Volume 12 Issue 5 Version 1.0 Year 2012
Type : Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

Design, Analysis and Performance Study of a Hybrid PV-Diesel - Wind System for a Village Gopal Nagar in Comilla

By M.M Hoque, I.K.A Bhuiyan, Rajib Ahmed, A.A .Farooque & S.K Aditya

University of Dhaka, Bangladesh

Abstract - In this report, a hybrid power system has been designed considering photovoltaic, wind turbine generator and diesel generator. HOMER software has been used for analyzing the performance of the system. Different performance analysis like feasibility, sensitivity, cost, and sustainability has been done. Environmental and economic analysis is used to discuss the sustainability of a hybrid power system. Primary ac loads for 24 hours, solar resource and wind resource inputs for a year are used. Analysis reveals that the hybrid system with photovoltaic, diesel generator, wind turbine give better performance in terms of cost and sensitivity.

Keywords : *Hybrid Power System, Renewable energy, Sustainability, HOMER, Photovoltaic.*

GJSFR-A Classification : *FOR Code: 850599*

Strictly as per the compliance and regulations of :

Design, Analysis and Performance Study of a Hybrid PV-Diesel- Wind System for a Village Gopal Nagar in Comilla

M.M Hoque [α], I.K.A Bhuiyan [σ], Rajib Ahmed [ρ], A.A .Farooque [ω] & S.K Aditya [¥]

Abstract - **In this report, a hybrid power system has been designed considering photovoltaic, wind turbine generator and diesel generator. HOMER software has been used for analyzing the performance of the system. Different performance analysis like feasibility, sensitivity, cost, and sustainability has been done. Environmental and economic analysis is used to discuss the sustainability of a hybrid power system. Primary ac loads for 24 hours, solar resource and wind resource inputs for a year are used. Analysis reveals that the hybrid system with photovoltaic, diesel generator, wind turbine give better performance in terms of cost and sensitivity.**

Keywords : Hybrid Power System, Renewable energy, Sustainability, HOMER, Photovoltaic.

I. Introduction

Energy is the basic requirement of modern life-style. As a developing country, Bangladesh has been encountering difficulties in supplying energy to maintain its large population & economic growth. The current demand for energy exceeds the available resources. Now, it is the time to think alternative energy source. Therefore, Renewable Energy can be alternative to the fossil fuel. Renewable Energy is clean, green, free, pollution less, endless energy source [1].

From current Energy scenario of Bangladesh, total power generation 4500MW, demand 6000 MW and shortage 1500 MW. The resources of total power generation are Gas (81.43%), Furnace Oil (5.43%), Coal (4.77%), Hydro (4.39%), Diesel (4.08%) [2,10].

Majority of rural households in Bangladesh are deprived of steady electricity supply from national grid. Based on national energy policy at least 15% of the energy mix should be based on renewable energy with in 2025. For this the development an isolated systems is needed in the remote areas with the utilization of local energy resources such as Micro, Hydro, Wind, PV etc through stand alone Hybrid system.

Bangladesh is situated between 20°34' and 26°38' north latitudes and 88°01' and 92°41' east longitudes with nearly 162 million people living on 144,000 km^2 land area. Gopal Nagar is a village which is geographically situated in Comilla Zilla, Chittagong Division, Bangladesh, Asia and its geographical co-ordinate is 23°40'0" North, 91°0'0" East, is a suitable place for designing stand-alone hybrid power system because this is not possible to establish grid connected system in this rural area. For ensuring steady and continuous electricity generations, a hybrid power system (HPS) including more than one renewable energy elements is introduced. In this paper, environmental and economic analyses are used to discuss the sustainability of a hybrid power system. An investigation is made on small-scale operations of 100kWh per day HPS as a stand- alone power generation system consisting of solar (photovoltaic) and wind energy [3-8].

II. Hybrid Power System

Hybrid power system combine two or more modes of electricity generation together, usually using renewable technologies such as Solar Photovoltaic (PV) & Wind turbines. Hybrid systems provide a high level of energy security through the mix of generation methods and often will incorporate a storage system (battery & fuel cell) or small fossil fueled generator to ensure maximum supply reliability & security. Wind turbines & Solar panels are the most well known of the renewable energy devices used in hybrid power systems. Village hybrid power system can range in size from small household systems (100Wh/day) to ones supplying a whole area (10MWh/day).Village scale hybrid power system can be distinguished into two Micro grids and Mini grids . The components of Micro-Grid (100 kWh/day) power system are wind, PV, Batteries and conventional generator which provide DC power .Mini-Grid power systems (700 kWh/day) uses the same components ,just more of them and larger to provide AC power .The various combinations of hybrid system are PV-Wind, PV-Fuel cell, PV-Wind –Fuel cell, PV-Wind-Battery etc. Hybrid system provide certain advantages over a single resource like lower energy cost ,high reliability, low maintenance, flexibility, longer equipment life and utility grade potential [4-8].

Author α σ ρ ω ¥ : Dept. of Applied Physics, Electronics & Communication Engineering, University of Dhaka, Dhaka-1000, Bangladesh. E-mails : mohammad.hoque64@gmail.com, mithu_apece.du@yahoo.com, rajib.ahmed.apece@gmail.com, dipu6174@gmail.com, aditya@univdhaka.edu

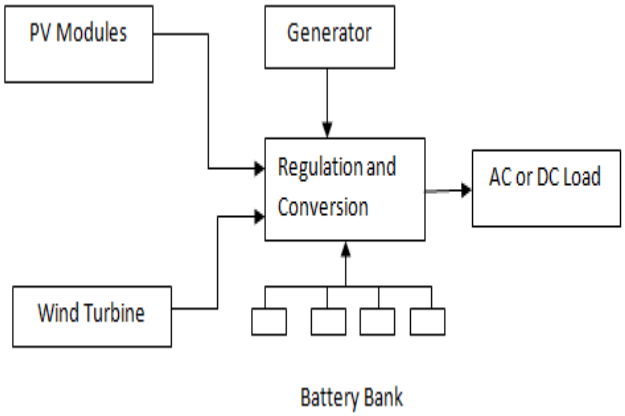


Figure 2.1 : General block diagram of a Hybrid Power System

III. Simulation Setup

We used HOMER (Hybrid Optimization for Electric Renewables) software for modeling Hybrid PV-Diesel-Wind System for a Village Gopal Nagar in Comilla. This program allows for flexible renewable energy hybrid system design using a library of components that can be inserted into the system, including a diverse set of electricity generators, energy storage, and load options. HOMER models off-grid and grid-connected power systems, comprising wind, solar, hydro, biomass and conventional power sources. Renewable as well as conventional power generating technologies can be modeled through HOMER. This model can analyze standalone PV-wind-fuel cell system. The DC power produced from PV arrays and the fuel cell is converted into AC power and then fed to the AC Bus. The AC power generated from the wind turbines is directly fed to the AC Bus. Excess power goes to the Battery bank and is utilized by the fuel cell in case of lack of generated power from Wind or PV sources. The system architecture simulated in HOMER is shown in figure [3.1] [9]

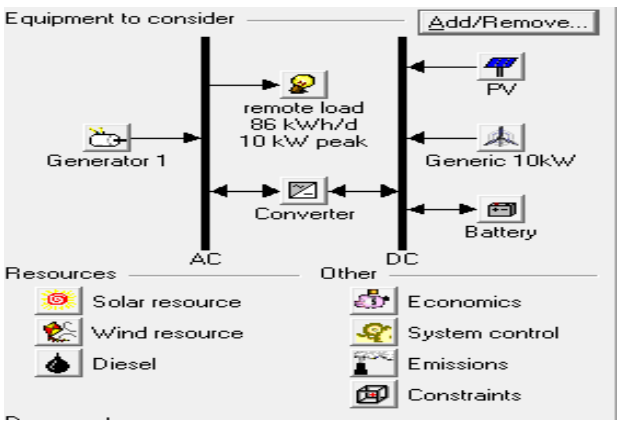


Figure 3.1 : Hybrid System Architecture

The equipments that we used in our simulator are wind turbine (1kW), PV array (1kW),diesel generator (15kW), battery (72 ah) and converter (12kW) .The simulation parameters are used as project lifetime (15 years), Wind resource(Comilla Bangladesh) and Solar resource (Comilla Bangladesh), daily noise to the load (15%), hourly noise to the load (20%), WTG life time (15years), Solar PV life time (20 years), Battery floating life time (4 years) ,Converter life time (15 years) Diesel generator life time (15,000 hours), Diesel price at site (42 taka/liter) and Reduced Carbon/GHG emission.

Figure 3.2 shows the primary ac load inputs for the month of January in 2011 with annual average load of 85.0 kWh/d, annual peak load 8.18 kW and load factor 0.433.

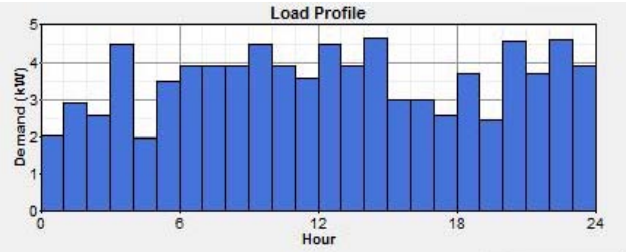


Figure 3.2 : Primary ac load inputs for the month of January in 2011 (Gopal Nagar, Comilla)

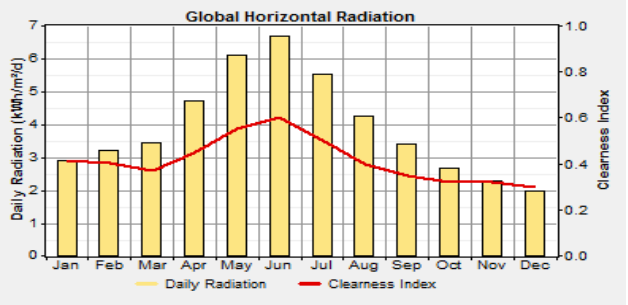


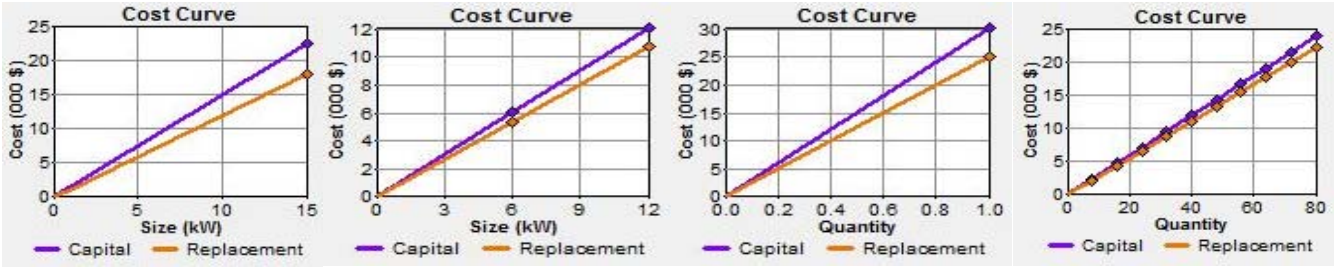
Figure 3.3 : Solar Insolation Data for a Year

Solar insolation data is presented in figure 3.3. Clearness index is low in Sep-Dec at Gopal Nagar due to frequent cloudy and foggy data. Average annual solar insolation is only 3.5 kW/m^2 /day.

The cost curve which the indication of capital cost and replacement cost is shown in figure 3.4 for Generator (A1), Converter (A2), Wind Turbine (A3) and Battery inputs (A4).

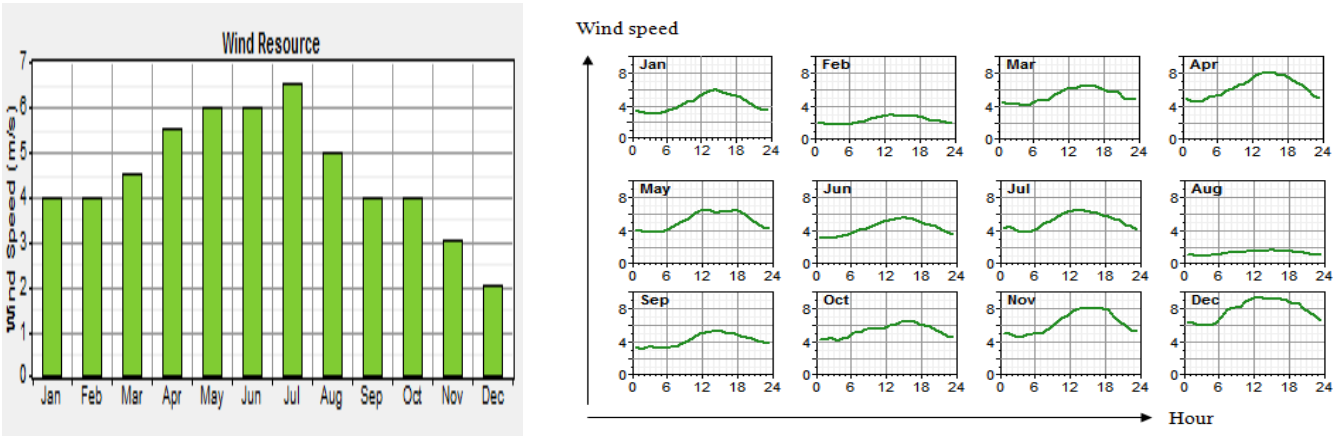
One year wind speed data is presented in figure 3.5(B1). It shows wind speed is low in Cartwright. Annual average wind speed is only 5.02m/s. Wind speed histogram follow the bell shape distribution fit is shown in figure 3.4. Moreover, wind speed profile for each month of year 2011 is shown in figure 3.5(B2).Wind resource is much lower than our initial expectation.

The "optimal system" determined by HOMER depends on the input assumptions. Key assumptions for the price of different components of Hybrid system are summarized in the table1 bellow:



(A1) (A2) (A3) (A4)

Figure 3.4 : Cost Curve for Generator (A1), Converter (A2), Wind Turbine (A3) and Battery inputs (A4)



(A1) (A2)

Figure 3.3 : Wind Resource Inputs (A1) and Wind Speed Profile in 2011 (Gopal Nagar, Comilla)

Table 1 : Cost of Different Equipments for the Hybrid System

Parameter	Capital Cost(taka)	Replacement(taka)	O & M(taka)
Generator	25000 BDT/kW	20000 BDT/kW	0.7 BDT/hr
PV module	300,000 BDT/kW	250,000 BDT/kW	500 BDT/year
Wind Turbine	130,000 BDT/kW	100,000 BDT/kW	500 BDT/year
Converter	27,000 BDT/kW	22,000 BDT/kW	50 BDT/year
Battery	7,000 BDT/kWh	6,000 BDT/kWh	50 BDT/year
Diesel	42/lit		
Others	20,000 BDT/kW		

IV. Result Analysis

We have analyzed the Hybrid Power System with HOMER software. Homer optimization results indicate that the hybrid system capable of producing lowest cost electricity should consists of one Generic 10 kW wind turbine, one PV array,15 diesel generator, 32 Batteries and 6 bidirectional converter to link ac and dc bus. Figure 4.1 shows the simulation result of HOMER.

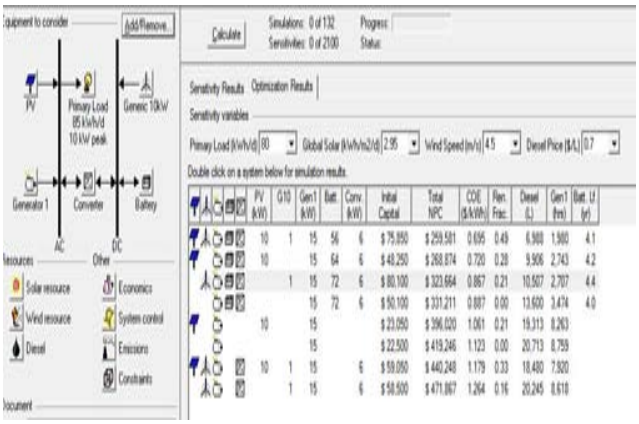


Figure 4.1 : Simulation Result from HOMER

Form the simulation we see the different values of cost of energy (COE) for different combination of PV, Wind, Generator, Converter and Battery. Finally, we can infer that the lowest cost of energy (COE) is found from the first combination (PV–Wind–Generator–Converter-Battery). Initial cost of such a system would be about 35 lac and it will produce electricity (39396 kWh/yr) at a cost of 58 taka per kWh. Therefore the total amount of annual income is 2284968 taka (39396 *58) and payback period is about 15 year. Such a system would result in a renewable energy fraction of 30% using about only 10840L/yr diesel and hence saving a huge amount of it. Excess electricity is only about 3% in this case as shown in Figure 4.2. Moreover the contribution of PV, Wind, and Diesel on our proposed Hybrid system is shown in Table1.

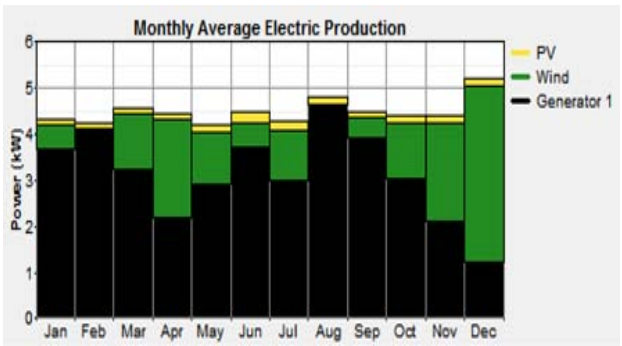


Figure 4.2 : Electricity Production (Yearly)

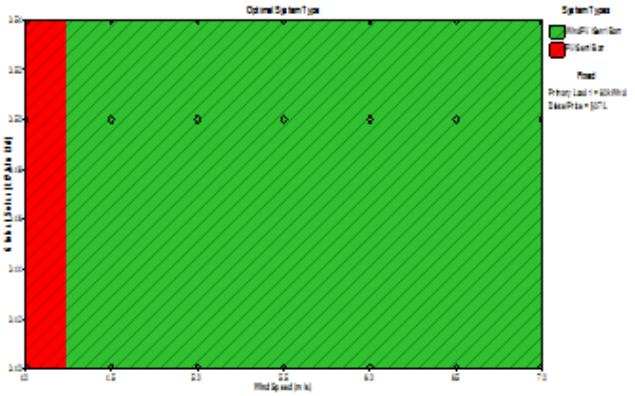


Figure 4.3 : HOMER Optimization

From HOMER Optimization (Figure 4.3) we see that the green part is much wider than red part for primary load 80kWh/day with diesel price $.7/L. The green part means the contribution of PV,Wind,Generator and Battery on sensitivity for the hybrid system. On the other hand, red part for PV, Generator and Battery. Therefore we can infer that the system is more sensible.

V. Further Development

- We have just simulated the Hybrid power system but practical implementation is needed and problems are encountered during implementation should be overcome.
- Practically we don't get sufficient energy from photovoltaic, therefore further investigation should be made for more efficient Hybrid system.
- Detailed economic analysis of the hardware will be carried out with respect to the capital cost and the availability of the wind & solar resources.
- It is also suggested that energy conservation measures should be taken in Gopal Nogor and the possibility of electricity generation using local wood should also be studied.

VI. Conclusion

The result obtained through HOMER simulation is considered as promising. The excess load is only 5% and there is no capacity shortage and unmet load is also fractional which is assumed to be zero. Moreover, the payback period of the system is about 15 years. This are excellent findings. The environmental friendly nature of the hybrid system can also be depicted from the annual emission of the system. However, as the consideration of the equipments was done optimistically for the desired house load , further detailed economic analysis is required for practical implementation .

References Références Referencias

1. Duffe J.A, Beckman W. A., *" Solar Engineering of Thermal Processes"*, New York: John Willey and Sons, 1980.

2. Muhtasham Hussain, Md. Shafiuzzaman Khan Khadem, Himangshu Ranjan Ghosh, "Final Report of Solar and Wind Energy Resource Assessment (SWERA) - Bangladesh Project", Renewable Energy Research Center, University of Dhaka, Bangladesh, February 2007.
3. www.maplandia.com/bangladesh/chittagong-div/comilla-zl/gopalnagar-23-36-0-n-91-5-0-e/
4. Saheb-Koussa, D., M. Haddadi, and M. Belhamel, Economic and technical study of a hybrid system (wind-photovoltaic-diesel) for rural electrification in Algeria. Applied Energy, 2009. 86(7-8): 1024-1030.
5. Shaahid, S.M. and I. El-Amin, Techno-economic evaluation of off-grid hybrid photovoltaic-diesel-battery power systems for rural electrification in Saudi Arabia-A way forward for sustainable development. Renewable and Sustainable Energy Reviews, 2009. 13(3): p. 625-633.
6. Shaahid, S.M., et al., Potential of autonomous/off-grid hybrid wind-diesel power system for electrification of a remote settlement in Saudi Arabia. Wind Engineering, 2004. 28(5): p. 621-628.
7. Elhadidy, M.A. and S.M. Shaahid, Feasibility of hybrid (wind+solar) power systems for Dhahran, Saudi Arabia. Renewable Energy, 1999. 16(1 -4 pt 2): p. 970-976.
8. Shaahid, S.M. and M.A. Elhadidy, Wind and solar energy at Dhahran, Saudi Arabia. Renewable Energy, 1994. 4(4): p. 441-445.
9. HOMER - Getting Started Guide for HOMER Version 2.2 2011, National Renewable Energy Laboratory, Operated for the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy.
10. http://www.usaid.gov/bd/programs/energy_response.html#more

This page is intentionally left blank

Global Journal of Science Frontier Research
Physics and Space Sciences
Volume 12 Issue 5 Version 1.0 Year 2012
Type : Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

Refraction as a Function of Molecular Gravitation: Fresh Insights into the Nature of Space, Mass and Energy and a New Possibility in the Creation of Metamaterials

By H M Mwangasha

Abstract - The paper begins by stating and illustrating what it claims as a new discovery, namely, that the refractive index of a substance is a function of the gravitational field set up by its molecules. An interpretation of the discovery leads to revolutionary insights on the nature of refraction and the relationship linking space, mass and energy. A nanotechnology based on this discovery is suggested.

GJSFR-A Classification : FOR Code: 020201

Strictly as per the compliance and regulations of :

Refraction as a Function of Molecular Gravitation: Fresh Insights into the Nature of Space, Mass and Energy and a New Possibility in the Creation of Metamaterials

H M Mwangasha

Abstract - The paper begins by stating and illustrating what it claims as a new discovery, namely, that the refractive index of a substance is a function of the gravitational field set up by its molecules. An interpretation of the discovery leads to revolutionary insights on the nature of refraction and the relationship linking space, mass and energy. A nanotechnology based on this discovery is suggested.

I. Introduction

To many respected scientists today the force of gravity remains basically the force with significance only in the world of macroscopic phenomena. This paper challenges the perception by demonstrating significant microscopic effects of gravity at the atomic and molecular level. But the greatest challenge of this work to our cherished scientific worldview concerns (a) the nature and explanation of refraction, (b) the relationship between mass and space and (c) the relationship between energy and volume.

Despite centuries of serious scientific investigation what we have today as scientific explanation of refraction in material mediums is no more than a hodgepodge of learned but conflicting opinions. However, a shaky consensus is building along the line of thought which seeks to explain refraction in terms of interactions between incoming energy and the energy systems of the particles constituting the medium. Some have viewed this interaction as atomic absorption of a particular wavelength followed by the emission of a shorter wavelength with the same frequency; others see it as the interaction between incoming photons and the phonons in the medium producing a number of waves whose overall wavelength is shorter than, while its frequency remains the same as, that of the incident wave; a few others see it differently.

The bending of light in the vicinity of a massive body, on the other hand, is explained as resulting from a completely different phenomenon, namely, the curvature of space-time.

All these explanations become entirely untenable in view of the relationship, presented in this paper, between refraction and gravitation. According to this study, the effect of the gravitational field on length is the explanation for both refraction in material media and the bending of light by massive bodies.

In a radical departure from the current view of mass as *that which causes space-time curvature* this paper is a firm statement that there can be no space without mass. Space (which turns out to be no more than the cosmic gravitational field) is getting more and more depleted as more and more of the cosmic mass gets converted into energy; and this depletion of space, according to this paper, must manifest itself as the expansion of the universe - an expansion which takes place not as our universe conquers more and more of a supposed extra-cosmos space but as every piece of matter in it expands through **length dilation** in a weakening cosmic gravitational field. In a weakened cosmic gravitational field the distance between the earth and some distant galaxy increases (as we expect from the length dilation prediction of General Relativity) and this increase of distance between the earth and distant galaxies is what observers on earth see as receding galaxies.

Further, this work asserts that volume is the property of energy and that without energy the mass of the whole universe would occupy zero volume (such would be an ideal or perfect cosmic black hole);.atoms have volumes depending on the quantity of energy each has. The validity of this assertion is brought out by demonstrating (a) how volume changes in atomic bonding can be used to calculate bond energies of the atoms and (b) how the density of a substance can be calculated from its molecular weight and the sum of the Van de Waal volumes of the atoms constituting the molecule.

II. Refraction and Molecular Gravitation

It all began with my own observation that the refractive index of a medium, n, is directly proportional to the gravitational field set up by its molecules, i.e., $n = kGm/r^2$,where k has the value of 1.30×10^{16}, G is the gravitational constant, m and r are the mass and the radius of the medium's molecule. Thus for water, whose molecular radius is 139 pm.(1) at 25 C, $n = 1.3 \times 10^{16} \times 6.67 \times 10^{-11} \times 18 \times 1.66 \times 10^{-27} / (139 \times 10^{-12})^2 = 1.34$ **(cf. 1.33),** using wavelength 581 nm. Similarly, for

carbon disulfide, with a molecular radius of 258 pm (computed from carbon-sulfur bond length of 155 pm [2] and covalent radii for carbon and sulfur as 77 pm and 102 pm respectively) [3] and atomic weights for C and S being 12 and 32, $n = 1.3 \times 10^{16} \times 6.67 \times 10^{-11} \times 76 \times 1.66 \times 10^{-27} / (258 \times 10^{-12})^2 = 1.64$ (cf. 1.63)[4]

Diamond is made up units each of which consists of five atoms (four covalently bonded to a central one) all packed in a geometry which yields a sphere of radius 191 pm. This gives $n = 1.3 \times 10^{16} \times 6.67 \times 10^{-11} \times 60 \times 1.66 \times 10^{-27} / (191 \times 10^{-12})^2 = 2.37$ (cf. 2.41)[4]. (Deviations from the expected values, in brackets, are insignificant given the approximations in atomic radius tables)

More examples could be given.

III. Interpretation

My interpretation of this observation led to the following conclusions:

a) *Refraction through material mediums (e.g. water or glass) and the bending of star light by a massive body are caused by the same phenomenon, namely, gravitational length contraction*

Refraction in a medium of refractive index n occurs because in the gravitational field of the medium the wavelength of the radiation being observed contracts from l_0 in vacuum to l_0 / n in the medium, the frequency does not change because the observer and the clock are in n = 1. Thus for this observer the velocity becomes $fxl_0/n=c/n$. But if observer and clock were in the medium (were it possible for the observer to be in the intermolecular spaces of a glass slab, for instance) the frequency would increase to nf_0 due to gravitational time dilation; and the velocity of the radiation (for the observer in the medium) would be $nf_0 \times l_0/n = f_0 \times l_o = c$. In other words, the velocity of an electromagnetic wave is the same for all observers as long as the observer is in the refracting medium.

b) *There is a relationship between the volume of an atom or a molecule and the energy in that atom or molecule*

The observation that $n = kGm/r^2$ suggests that the circumference of the molecule, rather than any point inside it, is the crucial region for refraction; and the observation that, in general, n decreases with rising temperature suggests (in the light of $n = kGm/r^2$) that molecules (as we shall in deed show below) actually expand on absorbing energy. These two observations lead us to postulate that the volume of an atom or molecule is equal to the energy in it; in deed, I have been able to establish that the volume of a hydrogen atom represents electromagnetic energy at the rate of 5.15×10^{-26} J/pm^3.Thus when two hydrogen atoms are brought together to form a covalent bond their radii shrink from 120pm. to 37pm i.e. a total volume decrease of $2x4pi/3(120^3 - 37^3)$ representing energy release equal to $2 \times 4pi/3\ (120^3 - 37^3) \times 5.15 \times 10^{-26} \times 6.02 \times 10^{23} = 437$ kJ/mol. Notice that this energy is, in fact, the H-H bond energy[5]; notice, also, that this postulate is validated as it explains the Hydrogen Morse Curve very satisfactorily. In deed, the postulate affords us the possibility of constructing many formulations for important scientific quantitative analysis, e g.

(1) The covalent bond energy, BDE, between two atoms of the same element Y is given by $BDE = 2.6 \times 10^{-4}(Y^3 - (N/Z)^3y^3)$ kJ/mol. where Y, y, N and Z are , respectively, the vdw radius, covalent radius, nucleon and atomic number of the element. Thus, the vdw and covalent radii of carbon being 171 pm and 77 pm while its N and Z are 12 and 6, the C-C bond energy comes to 350 kJ/mol (cf. 348 kJ/mol.) [5]. Similarly, for oxygen with N, Z and vdw radius as 16, 8 and 152 pm, and taking its covalent radius as 71.7 pm (rather than the more familiar 73 pm [6] for reasons to be given later), the O-O bond energy works out to 146 kJ/mol. (cf. 148`kJ/mol.) [7]. Deviations from the expected values (bracketed) are insignificant for our illustrative purposes here. With minor modifications, this formula can be used to determine the bond energy between any two elements known to Chemistry.

(2) What science has hitherto defined as the *density of a substance* now turns out to be (for covalently bonded molecular substances) the ***ratio of molecular mass to the sum of Van de Waal radii of the atoms constituting the molecule.*** Thus for water (H2O with vdw radius for H and O as 120 pm and 152 pm respectively) we have, at 25C, $density = 18 \times 1.66 \times 10^{-27} / ((4pi/3\ (2 \times 120^3 + 152^3) \times 10^{-36}) = 1021$ kg /m^3 (cf. 1000 kg /m^3) Similarly, for ethanol (C_2H_5OH), $density = 46 \times 1.66 \times 10^{-27} / ((4pi/3\ (2 \times 170^3 + 6 \times 120^3 + 152^3) \times 10^{-36})) = 767$ kg /m^3 (cf. 789 kg /m^3. The slight but significant deviations from expected values are mainly due to intermolecular hydrogen bonding (in the case of water) and molecular polarity in the case of ethanol. Again, with minor modifications, this formula can be extended to determine the density of any substance.

c) *The gravitational field of the universe is not in space but it is itself space*

The fact that length contracts in a stronger, while expanding in a weaker, gravitational field can tell us a lot about the relationship between the gravitational field and what science calls space. To see this, we must answer the question: Why does length change in different gravitational fields? The question is most satisfactorily answered if we postulate that the gravitational field is space which means that an object entering a region of weaker gravitational field has to expand in search of space; conversely, an object entering a stronger gravitational field has to shrink since it now encloses (what we describe below as) ***higher density*** space. Let us explain: Consider a cube of side y

placed in a region of n =1. If the gravitational field is increased to double n, each side of this cube will contract to y/2 shrinking the volume to $y^3/8$ which means we can now fit 8 cubes in the place of one just by doubling the n. Thus a volume of y^3 in a region of n = 1 is equivalent to a volume of $y^3/8$ in a region of n = 2. In other words, a region of higher gravitational field is *more spacious* than a region of lower gravitational field. Suppose, to give a further illustration, an atom is placed alone in a universe as big as our own. If the gravitational field in this universe is then decreased slowly towards zero, the atom will continue to expand until it fills the whole universe; at that point (when the field is only slightly above zero) space in that universe has become so little that a single atom will occupy the whole of it. Notice the implied distinction between *space* and *volume:* the amount of space enclosed by a particular volume depends on the density, n, of that space.

We are now in a position to explain many hitherto unsatisfactorily explained scientific observations, e.g.

(1) *Why a moving stick shrinks in length.* Increasing the velocity of the stick from 0 to v, relative to the observer, increases the mass of each molecule in the stick from m_0 to $m_0/(1-v^2/c^2)^{1/2}$ (as we know from General Relativity). But this increase in mass will cause an increase in n from n_0 to $n_0/(1-v^2/c^2)^{1/2}$ .Now we know, from the foregoing, that when n increases by a certain factor, length will contract by the reciprocal of that factor (e.g. when n is doubled, length is halved); so the radius of each molecule in the stick above, and therefore the length of the whole stick as we shall show below, will contract by the reciprocal of $(1-v^2/c^2)^{-1/2}$. Thus the new length of the stick l' is given by $l' = l_0 (1-v^2/c^2)^{1/2}$. In other words, the relativistic equation for length contraction, and in deed for time dilation, is now seen to be a corollary of the corresponding equation for mass increase.

(2) *Why the universe expands.* Cosmic mass is continually being lost through stellar mass-energy conversions; this means that cosmic n is continually falling due to this decrease in mass as well as due to the fact that the energy released occupies more and more of cosmic space. The decrease in cosmic n means an expansion of the distance between an observer on Earth and a star out there, hence the observed Dopplar red shifts. This immediately leads to a cosmogony: the primeval 'atom' was an enormous perfect black hole and the Big Bang was a sudden conversion of a chunk of this black hole mass into energy.

d) The fabric of the universe is made up of the gravitational and the electromagnetic fields moving at c relative to each other

From everything we have said so far, it is clear that the formula $n = kGm/r^2$ can be generalized into $n = kE$, where E is the gravitational field. Thus as E approaches infinity, i.e. as we approach the black hole situation, n approaches infinity. Notice that where the velocity of light is infinitely low (as in a perfect black hole), time also moves infinitely slowly just as it moves infinitely fast where the velocity of light is infinitely high. This tells us that time is no more than a consequence of the fact of the relative motion between the gravitational and the electromagnetic fields.

Since energy occupies space (space as gravitational field), we expect that once a particular region of the gravitational field is occupied by energy that region should be at zero gravity. This is what we see inside the atom or molecule: the region from the nucleus to the circumference of the molecule, which is occupied by molecular energy, has zero gravitational field. Notice that it is across this zero gravitational field where we expect gravitons to be flying past at c. This means that we must distinguish between a **field** (gravitational or electromagnetic) and the field's **quanta of propagation:** the field is, *more or less*, at rest relative to the observer [8] but gravitons or photons are propagating at c relative to the observer.

Granted, then, that an atom (between the nucleus and the circumference) is a quantity of electromagnetic energy occupying (and so reducing to zero) a particular region of the atomic gravitational field let us turn to investigate what happens when (i) an incoming photon strikes an atom (ii) when an atom enters a lower gravitational field *and it is not allowed to expand*.

(i) When an incoming photon hits an atom, two events are possible:

(1) If the photon is of a non-absorbable wavelength it will pass through the molecule at infinite velocity suffering refraction only in the intermolecular gravitational field – infinite velocity because in that region E is zero and so n = 0 and the velocity = infinity , i.e., on reaching a point on the atom's circumference, the photon ***instantaneously*** finds itself on the opposite side of the circumference; and this is what we should expect because, for the photon, there is no space (E = 0) inside the atom as this space has been occupied by the atom's energy .

(2)If the photon is absorbable, it gets absorbed and because there is no space inside the atom or molecule this absorbed photon must find space beyond the already occupied region causing the molecule to expand. If these absorbable photons come in such a rapid succession as to make the molecule a net absorber the molecule will expand as the temperature rises. This leads us to underline, as we demonstrate, the fact that (contrary to current scientific scholarly consensus) ***thermal expansion of a substance is actually due to the thermal expansion of its constituent molecules***.

Let us show this.

The average kinetic energy of a gaseous molecule is **fkT/2** (where f = degrees of freedom, T = absolute temperature and k is the Boltzmann constant. This energy (according to the energy / volume rate of 5.15 x 10-26, see above) represents **molecular volume = f kT/2 x $5.15x10^{-26}$ pm^3.** If this molecule now absorbs a quantity of energy equal to the molecular specific heat capacity, its temperature will rise to (T+1) and its volume will increase to **f k/2(T+1) x $5.15x10^{-26}$ pm^3.** Therefore the coefficient of thermal cubic expansion **B** is given by **$B=5.15x10^{-26}xfk/2(T+1-T) / fkT/2 x 5.15x10^{-26} = 1/T$** which is the expected value for any gas.

But we must now answer two very important questions: (i) we know that kinetic energy of a molecule is not the only energy the molecule has and this means that the molecule's *kinetic* volume (i.e. volume representing its kinetic energy) is only a fraction of the molecule's total volume. If this is so then how can the thermal coefficient of the molecule's kinetic volume be equal to the thermal coefficient of the molecule's total volume? (ii) And how can the thermal coefficient of each molecule be equal to the thermal coefficient of the bulk sample constituted by the molecules?

To answer both questions we must bear in mind the central thesis of this work, namely, the refractive index is directly proportional to Gm/r^2 where r is the molecular radius. So, if the molecule expands, r increases and n drops. If the n of each molecule in the sample drops by the same amount, the n in the whole intermolecular space will drop by this same amount. Therefore the whole sample constituted by these molecules will find itself in a region of decreased n with the result that its volume increases. It can be shown quantitatively that the thermal expansion coefficient of kinetic volume is in deed equal to that of both the volume of the whole molecule and the volume of the whole bulk sample.

(ii) When an atom enters a lower gravitational field it should (as we saw above) expand; but if this atom is *not allowed to expand* (as in our next illustration) it will be forced to shed away some of its energy in response to space decrease with the result that its volume shrinks.

Let us illustrate this. When two H-atoms are brought so close together that they touch each other let us realize that *at the point of touch* each of these atoms enters a zero gravitational field region and so it should begin to expand phenomenally but the bonding between these atoms (which starts as soon as they touch each other) prevents them from expanding; the result is that each atom gives up so much energy that its radius shrinks from 120 to 37 pm.

*e) The idea of **space-time curvature** must be replaced by that of **space density***

Mass does not curve space; rather mass (as the source of gravitational field) engenders or creates space; and in this space length and time will expand or contract depending on (a) the density, n, of this space (which varies inversely proportionally with distance from the centre of mass) and (b) the space density of the region of the observer. This explains why the idea of space-time curvature *actually works* as a model of scientific explanation and analysis.

Once we recognize that space is the cosmic gravitational field and that time is simply a consequence of the fact of the relative motion between this field and the electromagnetic one then we see immediately that the quantity *space density,* with n as its measure, is best suited to explain every physical phenomenon related to the effects of gravitation. I believe we should be able to show, in the light of everything said so far, that every motion in our universe is ultimately one and the same motion, namely, the relative motion between these two cosmic fields: the gravitational and the electromagnetic.

IV. Application

This link between the refractive index and molecular gravitation is certainly going to find extensive application in the whole enterprise of science and technology. I am already trying to figure out how it might be employed in the creation of Metamaterials.

V. Notes

(1) http:/www. chem 1.com/acad/sci/aboutwater.html

(2) http:/commons.wikipedia.org/wiki/FileCarbon_disulphide

(3) http:/www.wikipedia.org/wiki/Atomic radii of elements

(4) http://www.science.uwaterloo … bondl.html

(5) See (4) above.

(6) See (3) above

(7) See (4) above

(8) Observer and field at relative velocity << c

Global Journal of Science Frontier Research
Physics and Space Sciences
Volume 12 Issue 5 Version 1.0 Year 2012
Type : Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

Hubble Volume, Cosmic Variable Proton Mass and the CMB Radiation Energy Density

By U. V. S. Seshavatharam & Prof. S. Lakshminarayana

Andhra University, India

Abstract - It is noticed that, in the accelerating universe, proton mass, proton size and the strong coupling constant are cosmic variable constants. Independent of the cosmic red shift and CMBR observations, cosmic acceleration can be verified by measuring the `rate of decrease' in the proton mass. Cosmic initial conditions can be addressed with the Planck mass $M_P \cong \sqrt{\hbar c/G}$ and the coulomb mass $M_C \cong \sqrt{e^2/4\pi\epsilon_0 G}$. Based on the Mach's principle and the characteristic Hubble mass of the present universe, $M_0 \cong \frac{c^3}{2GH_0}$, it is noticed that, in the Hubble volume, critical density, observed matter density and the thermal energy density are in geometric series and the geometric ratio is 1 + ln (M_0 / M_C). In this connection, it can be suggested that - in understanding the basics of grand unification and cosmology, cosmic Hubble volume can be given a chance.

Keywords : *Hubble mass, Planck mass, Coulomb mass, variable proton mass, variable proton size, variable strong coupling constant, CMB radiation, cosmic critical density, cosmic matter density, CMB thermal energy density and Cosmic age.*

GJSFR-A Classification : *FOR Code: 020201*

Strictly as per the compliance and regulations of :

Hubble Volume, Cosmic Variable Proton Mass and the CMB Radiation Energy Density

U. V. S. Seshavatharam [α] & Prof. S. Lakshminarayana [σ]

Abstract - It is noticed that, in the accelerating universe, proton mass, proton size and the strong coupling constant are cosmic variable constants. Independent of the cosmic red shift and CMBR observations, cosmic acceleration can be verified by measuring the `rate of decrease' in the proton mass. Cosmic initial conditions can be addressed with the Planck mass $M_P \cong \sqrt{\hbar c/G}$ and the coulomb mass $M_C \cong \sqrt{e^2/4\pi\epsilon_0 G}$. Based on the Mach's principle and the characteristic Hubble mass of the present universe, $M_0 \cong \frac{c^3}{2GH_0}$, it is noticed that, in the Hubble volume, critical density, observed matter density and the thermal energy density are in geometric series and the geometric ratio is 1 + ln (M_o / MC) : In this connection, it can be suggested that - in understanding the basics of grand unification and cosmology, cosmic Hubble volume can be given a chance.

Keywords : *Hubble mass, Planck mass, Coulomb mass, variable proton mass, variable proton size, variable strong coupling constant, CMB radiation, cosmic critical density, cosmic matter density, CMB thermal energy density and Cosmic age.*

I. Introduction

This is an extension of our work published in JGSFR [1]. The central idea is - in the accelerating universe, proton mass and size are variable physical quantities. Even though this idea is not in-line with the present physics concepts, it makes an attempt to unify the fundamental interactions. In study of our theoretical cosmology we generally consider galaxy as a point. Only the space between any two galaxies is increasing with time. It is generally accepted that, the expansion of the universe is on the average {i.e., when all matter is smeared uniformly, bound objects (as in Kinetic Energy << Potential Energy) do not participate in the expansion of the universe (negligible). Even gravitationally bound system like our solar system, or galaxies and even cluster of galaxies do not expand with the universe. Electromagnetism (EM) is forty orders of magnitude stronger, hence atoms which are EM bound systems are not affected by the expansion of the universe. There are cosmological scenarios called Big Rip where the the expansion of the universe is so rapid in the finite future (in fact, approaches infinite in finite time) that it would eventually tear apart atoms. However, current observations do not indicate that possibility. Considering the unification program [2], in this paper an attempt is made to understand the origin of the proton mass, proton size, the strong coupling constant and the CMB radiation.

Based on the big bang concepts- in the expanding universe, rate of decrease in CMBR temperature is a measure of the cosmic rate of expansion. Modern standard cosmology is based on two contradictory statements. They are - present CMBR temperature is isotropic and the present universe is accelerating. In particle physics also, till today laboratory evidence for the existence of dark matter and dark energy is very poor. Recent observations and thoughts supports the existence of the cosmic axis of evil. Independent of the cosmic red shift and CMBR observations, cosmic acceleration can be verified by measuring the `rate of decrease' in the proton mass.

Large dimensionless constants and compound physical constants reflects an intrinsic property of nature [2]. Whether to consider them or discard them depends on the physical interpretations, logics, experiments, observations and our choice of scientific interest. In most of the critical cases, `time' only will decide the issue. The mystery can be resolved only with further research, analysis, discussions and encouragement. If M_e and M_p are the rest masses of electron and proton respectively, it is noticed that,

$$\frac{\hbar c}{Gm_p\sqrt{M_0 m_e}} \cong 0.99753 \qquad (1)$$

where $M_0 \cong \frac{c^3}{2GH_0}$ and the best value [4,5] of H_0 is $70.4^{+1.3}_{-1.4}$ Km / sec / Mpc. Surprisingly this ratio is close to unity! How to interpret this ratio? This relation can be obtained semi empirically from the characteristic nuclear charge radius and the characteristic Hubble size! But it needs the knowledge of coupling 'gravity', `Avogadro number' and the `non-gravitational' atomic forces which is right now not in the main stream research. Interested readers may please refer [1,6]. Please note that, in the above relation along with the variable Hubble constant, there exists one variable atomic physical constant. Based on the above coincidence, magnitude of the present Hubble's constant [7] can be expressed as

Author α : Honorary faculty, I-SERVE, Alakapuri, Hyderabad-35, AP, India. E-mail : seshavatharam.uvs@gmail.com
Author σ: Dept. of Nuclear Physics, Andhra University, Visakhapatnam-03, AP, India. E-mail : lnsrirama@yahoo.com

$$H_0 \cong \frac{Gm_p^2 m_e c}{2\hbar^2} \cong 70.75 \text{ Km/sec/Mpc} \qquad (2)$$

In the physics history, it was suggested that, gravitational constant and the speed of light were cosmic variables. In our earlier paper it was assumed that, reduced Planck's constant was a cosmic variable[6]. In no way these ideas were fitting into the existing concepts of physics. Another alternative idea is - to assume that, proton mass is a cosmic variable. If so one must explain the origin of proton size and the strong coupling constant. In this paper an attempt is made to fit these strong interaction properties.

a) Hubble volume - a compromise between closed and at universe

In modern cosmology, the shape of the universe is flat. In between the closed space and flat space, there is one compromise. That is `Hubble volume'. Note that Hubble volume is only a theoretical and spherical expanding volume and is virtual. From Hubble volume one can estimate the Hubble mass. By coupling the Hubble mass with the Mach's principle, one can understand the origin of cosmic physical parameters.

b) Mach's principle - Hubble volume - Hubble mass

In theoretical physics, particularly in discussions of gravitation theories, Mach's principle [8-12] is the name given by Einstein to an interesting hypothesis often credited to the physicist and philosopher Ernst Mach. The idea is that the local motion of a rotating reference frame is determined by the large scale distribution of matter. There are a number of rival formulations of the principle. A very general statement of Mach's principle is 'local physical laws are determined by the large-scale structure of the universe'. This concept was a guiding factor in Einstein's development of the general theory of relativity. Einstein realized that the overall distribution of matter would determine the metric tensor, which tells the observer which frame is rotationally stationary. Note that till today quantitatively Mach's principle was not implemented successfully in cosmic and nuclear physics. With reference to the Hubble radius $R_0 \cong \frac{c}{H_0}$, Hubble mass can be expressed as $M_0 \cong \frac{c^3}{2GH_0}$. Considering the Mach's principle and the Hubble mass, in this paper an attempt is made to understand the origin of the cosmic and strong interaction physical parameters.

c) Hubble's law

Hubble's law is the name for the astronomical observation in physical cosmology that the space-time volume of the observable universe is expanding [7]. It is considered the first observational basis for the expanding space paradigm and today serves as one of the pieces of evidence most often cited in support of the Big Bang model.

The law is often expressed by the equation

$$v = H_0 D \qquad (3)$$

with H_0 the constant of proportionality (the Hubble constant), D is the galaxy distance and v the recession velocity of the galaxy. The SI unit of H0 is sec^{-1} but it is most frequently quoted in Km/sec/Mpc. The Hubble Key Project used the Hubble space telescope to establish the most precise optical determination [3-5]. The most precise CMB radiation determinations by WMAP for the seven year release in 2010 found 71.0 $\pm$ 2.5 Km/s/Mpc. The most accurate value is $70.4\ ^{+1.3}_{-1.4}$ Km/s/Mpc [5].

d) Hubble mass - The characteristic mass of the present universe

The characteristic radius of the present universe is

$$R_0 \cong \frac{c}{H_0} \cong 1.307646 \times 10^{26} \text{ m} \qquad (4)$$

where $H_0 \cong 70.75$ Km/sec/Mpc. Let the cosmic closure density is,

$$\rho_0 \cong \frac{3H_0^2}{8\pi G} \cong 9.40 \times 10^{-27} \text{ Kg/m}^3 \qquad (5)$$

The present volume of the universe in a Euclidean sphere of radius $\left(\frac{c}{H_0}\right)$ is equal to

$$v_0 \cong \frac{4\pi}{3}\left(\frac{c}{H_0}\right)^3 \cong 9.36611 \times 10^{78} \text{ m}^3 \qquad (6)$$

Thus the characteristic mass of the present universe in a Euclidean sphere of radius $\left(\frac{c}{H_0}\right)$ is equal to

$$M_0 \cong \rho_0 \cdot v_0 \cong \frac{c^3}{2GH_0} \cong 8.80434 \times 10^{52} \text{ Kg} \qquad (7)$$

This may be called as the Hubble mass of the present universe. Here one may ask the question: what is the physical meaning of characteristic radius or characteristic volume or characteristic density or characteristic mass? Particle horizon, event horizon etc are connected with the Hubble radius $\left(\frac{c}{H_0}\right)$ and are well known. Its corresponding Hubble volume is $\frac{4\pi}{3}\left(\frac{c}{H_0}\right)^3$. The critical density $\frac{3H_0^2}{8\pi G}$ plays a key role in cosmic expansion. When all these physical expressions play a critical or crucial role in the cosmic structure, the mass unit $\frac{c^3}{2GH_0}$ will also play some crucial or interesting role in the observable universe. In this paper, an attempt is made to understand the applications of the Hubble mass in the existing physical laws of atom and the universe.

II. The Coulomb Mass in the Planck Scale

In the Planck scale, similar to the Planck mass, with reference to the elementary charge, a new mass unit can be constructed in the following way.

$$M_C \cong \sqrt{\frac{e^2}{4\pi\varepsilon_0 G}} \cong 1.859211 \times 10^{-9}\ \text{Kg} \qquad (8)$$

$$M_C c^2 \cong \sqrt{\frac{e^2 c^4}{4\pi\varepsilon_0 G}} \cong 1.042941 \times 10^{18}\ \text{GeV} \qquad (9)$$

Here 'e' is the elementary charge and (c^4/G) is the classical limit of force. How to interpret this mass unit? Is it a primordial massive charged particle? If 2 such oppositely charged particles annihilates, a large amount of energy can be released. Considering so many such pairs annihilation hot big bang or inflation can be understood. This may be the root cause of cosmic energy reservoir. Such pairs may be the chief constituents of black holes. In certain time interval with a well defined quantum rules they annihilate and release a large amount of energy in the form of γ photons. In the expanding universe, with its pair annihilation, origin of the CMBR can be understood.

It is widely accepted that charged leptons, quarks, and baryons all these comes under matter or mass carriers and photons and mesons comes under force carriers. If so what about this new mass unit? Is it a fermion? or is it a boson? or else is it represents a large potential well in the primordial matter or mass generation program? Is it the mother of magnetic monopoles? Is it the mother of all charged particles? By any suitable proportionality ratio or with a suitable scale factor if one is able to bring down its mass to the observed particles mass scale, very easily a grand unified model can be developed. Clearly speaking e; c and G play a vital role in fundamental physics. With these 3 constants space-time curvature concepts at a charged particle surface can be studied. Characteristic 'Coulomb radius' can be expressed as

$$R_C \cong \frac{2GM_C}{c^2} \cong 2.716354 \times 10^{-36}\ \text{m} \qquad (10)$$

a) To understand the Proton rest mass

Giving a primary and fundamental significance [13] to the existence of m_e, $\hbar$, G & c and considering the Machian concept of the distance cosmic back ground in the form of 'cosmic Hubble mass', mp can be considered as the characteristic cosmic variable physical quantity.

$$(m_p)_0 \cong \frac{\hbar c}{G\sqrt{M_0 m_e}} \cong \sqrt{\frac{m_e}{M_0}} \cdot \frac{M_p^2}{m_e} \qquad (11)$$

where $M_P \cong \sqrt{\hbar c/G}$ and $(m_p)_0$ is the present mass of the nucleon. Present proton-electron mass ratio is

$$\frac{(m_p)_0}{m_e} \cong \sqrt{\frac{m_e}{M_0}} \cdot \left(\frac{M_P}{m_e}\right)^2 \qquad (12)$$

At the Planck scale, i.e. when $M_0 \cong M_C \cong \sqrt{\frac{e^2}{4\pi\epsilon_0 G}}$, mass of proton is

$$(m_p)_P \cong \frac{\hbar c}{G\sqrt{M_C m_e}} \cong \frac{M_P^2}{\sqrt{M_C m_e}} \cong 11510.2075\ \text{Kg} \qquad (13)$$

This may be an imaginary mass of proton at the Planck scale. Grand unified models assumes the existence of heavy massive particles and magnetic monoploes in the early universe. Based on this point, the proposed idea can be given a chance. This mass unit plays an interesting role in particle physics. Authors are working in this new direction.

If this idea is true, this new planck scale nucleon rest mass must play a critical role in understanding the characteristics of the present proton- like present proton size and the present strong coupling constant. In this connection, an attempt is made in the following subsections.

At any time t; it can be suggested that,

$$\left[\frac{(m_p)_P}{(m_p)_t}\right] \cong \sqrt{\frac{M_t}{M_C}} \qquad (14)$$

where M_t is the cosmic Hubble mass at time t and $(m_p)_t$ is the mass of proton at time t:

b) The present size of the proton

Let the Planck scale proton radius is

$$(R_p)_P \cong \frac{2G\,(m_p)_P}{c^2} \cong 1.70953 \times 10^{-23}\ \text{m} \qquad (15)$$

It is noticed that, at present proton radius is close to

$$(R_p)_0 \cong \left[\frac{(m_p)_P}{(m_p)_0}\right]^{1/4} \cdot \frac{2G\,(m_p)_P}{c^2} \cong 8.755843 \times 10^{-16}\ \text{m} \qquad (16)$$

where $(m_p)_P$ is the assumed proton mass at the Planck scale and $(m_o)_P$ is the present proton mass. This obtained value can be compared with the experimental rms charge radius of the present proton, $8.768(69)\times10^{-16}$m [13]. Volume ratio is $\left[\frac{(m_p)_P}{(m_p)_0}\right]^{3/4} \cong 1.343583 \times 10^{23}$ and is close to the Avogadro number

c) The present strong coupling constant

The strong coupling constant α_s is a fundamental parameter of the Standard Model. It plays a more central role in the QCD analysis of parton densities in the moment space. It is noticed that,

$$\frac{1}{\alpha_s} \cong \sqrt{1+\ln\left[\frac{(m_p)_P}{(m_p)_0}\right]} \cong 8.4856582 \qquad (17)$$

And $\alpha_s \cong 0.1178459$. This can be compared with experimental value [13].

III. To Understand the CMBR Temperature

Pair particles creation and annihilation in 'free space'- is an interesting idea. In the expanding universe, by considering the proposed charged M_C and its pair annihilation as a characteristic cosmic phenomena, origin of the isotropic CMB radiation can be addressed. Where the free space is occupied by a large massive body, there the pair annihilation of M_C can not be seen and this may be a reason for the observed anisotropy of CMB. At any time t, it can be suggested that

$$k_B T_t \cong \sqrt{\frac{M_C}{M_t}} \cdot 2M_C c^2 \qquad (18)$$

where M_t is the cosmic mass at time t and T_t is the cosmic temperature at time t, Please note that, at present

$$T_0 \cong \sqrt{\frac{M_C}{M_0}} \cdot \frac{2M_C c^2}{k_B} \cong 3.5175\ {}^0\text{Kelvin} \qquad (19)$$

Qualitatively and quantitatively this can be compared with the present CMBR temperature 2.725^0 Kelvin. It seems to be a direct consequence of the Mach's principle. It means - at any time, the cosmic mass or cosmic size play a critical role in the pair annihilation energy of M_C, Initial temperature of the universe can be expressed as

$$T_C \cong \frac{2M_C c^2}{k_B} \cong 2.42 \times 10^{31}\ {}^0\text{Kelvin} \qquad (20)$$

With reference to the present observed CMBR temperature, considering the 3 dimensional average thermal energy $\frac{3}{2}k_B T_t$, above relation can be expressed

$$\frac{3}{2}k_B T_t \cong \sqrt{\frac{M_C}{M_t}} \cdot 2M_C c^2 \qquad (21)$$

Thus,

$$T_0 \cong \left(\frac{2}{3}\right)\sqrt{\frac{M_C}{M_0}} \cdot \frac{2M_C c^2}{k_B} \cong 2.345\ {}^0\text{Kelvin} \qquad (22)$$

In this way, origin of the CMB radiation can be studied. But it has to be discussed in depth. Please see the following section. Now, initial temperature of the universe can be expressed as

$$T_C \cong \left(\frac{2}{3}\right)\frac{2M_C c^2}{k_B} \cong 1.61 \times 10^{31}\ {}^0\text{Kelvin} \qquad (23)$$

IV. Cosmic Critical Density, Matter Density and Thermal Energy Density

It is noticed that, there exists a very simple relation in between the cosmic critical density, matter density and the thermal energy density. It can be expressed in the following way. At any time t;

$$\left(\frac{\rho_c}{\rho_m}\right)_t \cong \left(\frac{\rho_m}{\rho_T}\right)_t \cong 1+\ln\left(\frac{M_t}{M_C}\right) \qquad (24)$$

where $\rho_c \cong M_t\left[\frac{4\pi}{3}\left(\frac{c}{H_t}\right)^3\right]^{-1} \cong \frac{3H_t^2}{8\pi G}$, ρ_m is the matter density and P_T is the thermal energy density expressed in gram/cm^3 or Kg/m^3. Considering the Planck-Coulomb scale, at the beginning if

$$\left(\frac{\rho_c}{\rho_m}\right)_C \cong \left(\frac{\rho_m}{\rho_T}\right)_C \cong 1 \qquad (25)$$

$$(\rho_c)_C \cong (\rho_m)_C \cong (\rho_T)_C \qquad (26)$$

Thus at any time t,

$$\rho_m \cong \sqrt{\rho_c \cdot \rho_T} \qquad (27)$$

$$\rho_m \cong \left[1+\ln\left(\frac{M_t}{M_C}\right)\right]^{-1}\rho_c \qquad (28)$$

$$\rho_T \cong \left[1+\ln\left(\frac{M_t}{M_C}\right)\right]^{-2}\rho_c \cong \left[1+\ln\left(\frac{M_t}{M_C}\right)\right]^{-1}\rho_m \qquad (29)$$

In this way, observed matter density and the thermal energy density can be studied in a unified manner. The observed CMB anisotropy can be related with the inter galactic matter density uctuations.

a) Present matter density of the universe

At present if $H_0 \cong 70.75$ Km/sec/Mpc,

$$(\rho_m)_0 \cong \left[1+\ln\left(\frac{M_0}{M_C}\right)\right]^{-1}(\rho_c)_0 \qquad (30)$$

$\cong 6.573 \times 10^{-32}$ gram/cm^3 where $(\rho_c)_0 \cong 9.4 \times 10^{-30}$ gram/cm^3 and $\left[1+\ln\left(\frac{M_0}{M_C}\right)\right] \cong 143.013$. Based on the average mass-to-light ratio for any galaxy [14]

$$(\rho_m)_0 \cong 1.5 \times 10^{-32}\eta h_0 \ \text{gram/cm}^3 \qquad (31)$$

where for any galaxy, $\langle\frac{M_G}{L_G}\rangle \cong \eta\left(\frac{M_\odot}{L_\odot}\right)$ and the number $h_0 \cong \frac{H_0}{100\ \text{Km/sec/Mpc}} \cong \frac{70.75}{100} \cong 0.7075$

Note that elliptical galaxies probably comprise about 60% of the galaxies in the universe and spiral galaxies thought to make up about 20% percent of the galaxies in the universe. Almost 80% of the galaxies are in the form of elliptical and spiral galaxies. For spiral galaxies, $\eta h_0^{-1} \cong 9 \pm 1$ and for elliptical galaxies, $\eta h_0^{-1} \cong 10 \pm 2$. For our galaxy inner part, $\eta h_0^{-1} \cong 6 \pm 2$. Thus the average ηh_0^{-1} is very close to 8 to 9 and its corresponding matter density is close to (6.0 to 6.76) $\times 10^{-32}$ gram/cm^3 and can be compared with the above proposed magnitude of 6.573 $\times$ 10^{-32} gram/cm^3.

b) Present thermal energy density of the universe

At present if $H_0 \cong 70.75 \text{ Km/sec/Mpc}$,

$$(\rho_T)_0 \cong \left[1 + \ln\left(\frac{M_0}{M_C}\right)\right]^{-2} (\rho_c)_0 \cong 4.6 \times 10^{-34} \text{ gram/cm}^3 \tag{32}$$

and thus

$$(\rho_T c^2)_0 \cong \left[1 + \ln\left(\frac{M_0}{M_C}\right)\right]^{-2} (\rho_c c^2)_0 \cong 4.131 \times 10^{-14} \text{ J/m}^3 \tag{33}$$

At present if

$$(\rho_T c^2)_0 \cong a T_0^4 \tag{34}$$

where $a \cong 7.56576 \times 10^{-16} \text{ J/m}^3\text{K}^4$ is the radiation energy density constant, then the obtained temperature is, $T_0 \cong 2.718$ ^{0}Kelvin. This is accurately fitting with the observed CMBR temperature, $T_0 \cong 2.725$ ^{0}Kelvin. Thus in this way, the present value of the Hubble's constant and the present CMBR temperature can be corelated with the following trial-error relation.

$$\left[1 + \ln\left(\frac{c^3}{2GH_0M_C}\right)\right]^{-1} H_0 \cong \sqrt{\frac{8\pi G a T_0^4}{3c^2}} \tag{35}$$

V. Present Cosmic Age

Cosmic age can be assumed as

$$t \cong \left(\frac{\rho_c c^2}{\rho_T c^2}\right)_t \left(\frac{1}{H_t}\right) \cong \left[1 + \ln\left(\frac{c^3}{2GH_tM_C}\right)\right]^2 \left(\frac{1}{H_t}\right) \tag{36}$$

Here note that, cosmic age is directly proportional to the ratio of critical energy density and the thermal energy density. In this way, this proposed method differs from the current or standard model of cosmology by the ratio $\left(\frac{\rho_c c^2}{\rho_T c^2}\right)_0$. Thus at any time t,

$$t \cdot H_t \cong \left(\frac{\rho_c c^2}{\rho_T c^2}\right)_t \cong \left[1 + \ln\left(\frac{c^3}{2GH_tM_C}\right)\right]^2 \tag{37}$$

At present if $H_0 \cong 70.75 \text{ Km/sec/Mpc}$, present cosmic age can be expressed as

$$t_0 \cong \left[1 + \ln\left(\frac{c^3}{2GH_0M_C}\right)\right]^2 \left(\frac{1}{H_0}\right) \tag{38}$$

i.e The present cosmic age is 8.92 $\times$ 10^{21} sec $\cong$ 282.7 trillion years. With this large time - smooth cosmic expansion, cosmic isotropy, super novae dimming and magnetic monopole vanishing etc can be understood. In Indian vedic cosmology, total age of the universe is 311 trillion years [15]. This is a striking and surprising coincidence. It can be suggested that, modern cosmology and Indian vedic cosmology can be studied in a unified manner.

a) Time concept in Indian vedic cosmology

According to the Indian vedic science, the life span of Lord Brahma, the creator of the universe, is 100 'Brahma-Years'. One day or one night in the life of Brahma is called a Kalpa or 4.32 billion years. Every Kalpa creates 14 Manus one after the other, who in turn manifest and regulate this world. Thus, there are fourteen generations of Manu in each Kalpa. Each Manus life (Manvantara) consists of 71 Chaturyugas (quartets of Yugas or eras). Each Chaturyuga is composed of four eras or Yugas: Satya, Treta, Dwapara and Kali. The span of the Satya Yuga is 1,728,000 human years, Treta Yuga is 1,296,000 human years long, the Dwapara Yuga 864,000 human years and the Kali Yuga 432,000 human years. When Manu perishes at the end of his life, Brahma creates the next Manu and the cycle continues until all fourteen Manus and the Universe perish by the end of Bramha's day. When 'night' falls, Brahma goes to sleep for a period of 4.32 billion years, which is a period of time equal one day (of Brahma) and the lives of fourteen Manus. The next 'morning', Brahma creates fourteen additional Manus in sequence just as he has done on the previous 'day'. The cycle goes on for 100 'divine years' at the end of which Brahma perishes and is regenerated. Bramha's entire life equals 311 trillion, 40 billion years. Once Bramha dies there is an equal period of unmanifestation for 311 trillion, 40 billion years, until the next Bramha is created.

VI. Conclusions

The proposed relations are interesting and may be useful in understanding the basics of grand unification and cosmology. Further research, analysis, observations and experiments in this new direction may reveal the facts.

VII. Acknowledgements

The first author is indebted to professor K. V. Krishna Murthy, Chairman, Institute of Scientific Research on Vedas (I-SERVE), Hyderabad, India and Shri K. V. R. S. Murthy, former scientist IICT (CSIR) Govt. of India, Director, Research and Development, I-SERVE,

for their valuable guidance and great support in developing this subject.

References Références Referencias

1. U.V.S. Seshavatharam and S. Lakshminarayana. Quantum Mechanics, Cosmic Acceleration and CMB Radiation. Global Journal of Science Frontier Research Volume XII Issue IV Version I (A)
2. Recami E. Elementary Particles as Micro-Universes, and \Strong Black-holes": A Bi-Scale Approach to Gravitational and Strong Interactions. Preprint NSF-ITP-02-94.
3. P. A. M. Dirac. The cosmological constants. Nature, 139, 323, 1937.
4. J. Huchara. Estimates of the Hubble Constant, 2009. Harvard-Smithsonian Center for Astrophysics. http://hubble.plot.dat
5. W. L. Freedman et al. Final Results from the Hubble Space Telescope Key Project to Measure the Hubble Constant. The Astrophysical Journal 553 (1): 47-72.
6. U.V.S. Seshavatharam and S. Lakshminarayana. Accelerating universe and the expanding atom. To be appeared in the Hadronic journal.
7. Hubble, E.P. The 200-inch telescope and some problems it may solve, PASP, 59,153-167, 1947.
8. Sciama, D. W. Modern Cosmology. Cambridge University Press. (1971) OCLC 6931707.
9. Hawking. S.W and George Francis Rayner Ellis. The Large Scale Structure of Space-Time. Cambridge University Press. (1973)
10. Raine, D. J. Mach's Principle in general relativity. Royal Astronomical Society 171: 507. 1975.
11. Bondi, et al. The Lense-Thirring Effect and Mach's Principle. Physics Letters A. Vol-228, Issue 3, 7 April 1997, Pages 121-126.
12. R. G. Vishwakarma. A Machian Model of Dark Energy. Class. Quant. Grav. 19 (2002) 4747-4752.
13. P.J. Mohr, B.N. Taylor, and D.B. Newell. CODATA Recommended Values of the Fundamental Physical Constants:2006. Rev. Mod. Phys. 80 (2008) 633.
14. J. V. Narlikar. An Introduction to Cosmology. 3rd edition, Cambridge University Press.(2002)
15. Ebenezer Burgess. Translation of the Surya-Siddhanta. A text-book of Hindu Astronomy. Journal of the American Oriental Society, Vol. 6, 1860, pp.141- 498.

Global Journals Inc. (US) Guidelines Handbook 2012

www.GlobalJournals.org

FELLOW OF ASSOCIATION OF RESEARCH SOCIETY IN SCIENCE (FARSS)

- 'FARSS' title will be awarded to the person after approval of Editor-in-Chief and Editorial Board. The title 'FARSS" can be added to name in the following manner. eg. Dr. John E. Hall, Ph.D., FARSS or William Walldroff Ph. D., M.S., FARSS
- Being FARSS is a respectful honor. It authenticates your research activities. After becoming FARSS, you can use 'FARSS' title as you use your degree in suffix of your name. This will definitely will enhance and add up your name. You can use it on your Career Counseling Materials/CV/Resume/Visiting Card/Name Plate etc.
- 60% Discount will be provided to FARSS members for publishing research papers in Global Journals Inc., if our Editorial Board and Peer Reviewers accept the paper. For the life time, if you are author/co-author of any paper bill sent to you will automatically be discounted one by 60%
- FARSS will be given a renowned, secure, free professional email address with 100 GB of space eg.johnhall@globaljournals.org. You will be facilitated with Webmail, SpamAssassin, Email Forwarders, Auto-Responders, Email Delivery Route tracing, etc.
- FARSS member is eligible to become paid peer reviewer at Global Journals Inc. to earn up to 15% of realized author charges taken from author of respective paper. After reviewing 5 or more papers you can request to transfer the amount to your bank account or to your PayPal account.
- Eg. If we had taken 420 USD from author, we can send 63 USD to your account.
- FARSS member can apply for free approval, grading and certification of some of their Educational and Institutional Degrees from Global Journals Inc. (US) and Open Association of Research,Society U.S.A.
- After you are FARSS. You can send us scanned copy of all of your documents. We will verify, grade and certify them within a month. It will be based on your academic records, quality of research papers published by you, and 50 more criteria. This is beneficial for your job interviews as recruiting organization need not just rely on you for authenticity and your unknown qualities, you would have authentic ranks of all of your documents. Our scale is unique worldwide.
- FARSS member can proceed to get benefits of free research podcasting in Global Research Radio with their research documents, slides and online movies.
- After your publication anywhere in the world, you can upload you research paper with your recorded voice or you can use our professional RJs to record your paper their voice. We can also stream your conference videos and display your slides online.
- FARSS will be eligible for free application of Standardization of their Researches by Open Scientific Standards. Standardization is next step and level after publishing in a journal. A team of research and professional will work with you to take your research to its next level, which is worldwide open standardization.

- FARSS is eligible to earn from their researches: While publishing his paper with Global Journals Inc. (US), FARSS can decide whether he/she would like to publish his/her research in closed manner. When readers will buy that individual research paper for reading, 80% of its earning by Global Journals Inc. (US) will be transferred to FARSS member's bank account after certain threshold balance. There is no time limit for collection. FARSS member can decide its price and we can help in decision.

MEMBER OF ASSOCIATION OF RESEARCH SOCIETY IN SCIENCE (MARSS)

- 'MARSS' title will be awarded to the person after approval of Editor-in-Chief and Editorial Board. The title 'MARSS" can be added to name in the following manner. eg. Dr. John E. Hall, Ph.D., MARSS or William Walldroff Ph. D., M.S., MARSS
- Being MARSS is a respectful honor. It authenticates your research activities. After becoming MARSS, you can use 'MARSS' title as you use your degree in suffix of your name. This will definitely will enhance and add up your name. You can use it on your Career Counseling Materials/CV/Resume/Visiting Card/Name Plate etc.
- 40% Discount will be provided to MARSS members for publishing research papers in Global Journals Inc., if our Editorial Board and Peer Reviewers accept the paper. For the life time, if you are author/co-author of any paper bill sent to you will automatically be discounted one by 60%
- MARSS will be given a renowned, secure, free professional email address with 30 GB of space eg.johnhall@globaljournals.org. You will be facilitated with Webmail, SpamAssassin, Email Forwarders, Auto-Responders, Email Delivery Route tracing, etc.
- MARSS member is eligible to become paid peer reviewer at Global Journals Inc. to earn up to 10% of realized author charges taken from author of respective paper. After reviewing 5 or more papers you can request to transfer the amount to your bank account or to your PayPal account.
- MARSS member can apply for free approval, grading and certification of some of their Educational and Institutional Degrees from Global Journals Inc. (US) and Open Association of Research,Society U.S.A.
- MARSS is eligible to earn from their researches: While publishing his paper with Global Journals Inc. (US), MARSS can decide whether he/she would like to publish his/her research in closed manner. When readers will buy that individual research paper for reading, 40% of its earning by Global Journals Inc. (US) will be transferred to MARSS member's bank account after certain threshold balance. There is no time limit for collection. MARSS member can decide its price and we can help in decision.

AUXILIARY MEMBERSHIPS

ANNUAL MEMBER

- Annual Member will be authorized to receive e-Journal GJSFR for one year (subscription for one year).
- The member will be allotted free 1 GB Web-space along with subDomain to contribute and participate in our activities.
- A professional email address will be allotted free 500 MB email space.

PAPER PUBLICATION

- The members can publish paper once. The paper will be sent to two-peer reviewer. The paper will be published after the acceptance of peer reviewers and Editorial Board.

Process of submission of Research Paper

The Area or field of specialization may or may not be of any category as mentioned in 'Scope of Journal' menu of the GlobalJournals.org website. There are 37 Research Journal categorized with Six parental Journals GJCST, GJMR, GJRE, GJMBR, GJSFR, GJHSS. For Authors should prefer the mentioned categories. There are three widely used systems UDC, DDC and LCC. The details are available as 'Knowledge Abstract' at Home page. The major advantage of this coding is that, the research work will be exposed to and shared with all over the world as we are being abstracted and indexed worldwide.

The paper should be in proper format. The format can be downloaded from first page of 'Author Guideline' Menu. The Author is expected to follow the general rules as mentioned in this menu. The paper should be written in MS-Word Format (*.DOC,*.DOCX).

The Author can submit the paper either online or offline. The authors should prefer online submission.Online Submission: There are three ways to submit your paper:

(A) (I) First, register yourself using top right corner of Home page then Login. If you are already registered, then login using your username and password.

(II) Choose corresponding Journal.

(III) Click 'Submit Manuscript'. Fill required information and Upload the paper.

(B) If you are using Internet Explorer, then Direct Submission through Homepage is also available.

(C) If these two are not conveninet , and then email the paper directly to dean@globaljournals.org.

Offline Submission: Author can send the typed form of paper by Post. However, online submission should be preferred.

Preferred Author Guidelines

MANUSCRIPT STYLE INSTRUCTION (Must be strictly followed)

Page Size: 8.27" X 11'"

- Left Margin: 0.65
- Right Margin: 0.65
- Top Margin: 0.75
- Bottom Margin: 0.75
- Font type of all text should be Swis 721 Lt BT.
- Paper Title should be of Font Size 24 with one Column section.
- Author Name in Font Size of 11 with one column as of Title.
- Abstract Font size of 9 Bold, "Abstract" word in Italic Bold.
- Main Text: Font size 10 with justified two columns section
- Two Column with Equal Column with of 3.38 and Gaping of .2
- First Character must be three lines Drop capped.
- Paragraph before Spacing of 1 pt and After of 0 pt.
- Line Spacing of 1 pt
- Large Images must be in One Column
- Numbering of First Main Headings (Heading 1) must be in Roman Letters, Capital Letter, and Font Size of 10.
- Numbering of Second Main Headings (Heading 2) must be in Alphabets, Italic, and Font Size of 10.

You can use your own standard format also.
Author Guidelines:

1. General,

2. Ethical Guidelines,

3. Submission of Manuscripts,

4. Manuscript's Category,

5. Structure and Format of Manuscript,

6. After Acceptance.

1. GENERAL

Before submitting your research paper, one is advised to go through the details as mentioned in following heads. It will be beneficial, while peer reviewer justify your paper for publication.

Scope

The Global Journals Inc. (US) welcome the submission of original paper, review paper, survey article relevant to the all the streams of Philosophy and knowledge. The Global Journals Inc. (US) is parental platform for Global Journal of Computer Science and Technology, Researches in Engineering, Medical Research, Science Frontier Research, Human Social Science, Management, and Business organization. The choice of specific field can be done otherwise as following in Abstracting and Indexing Page on this Website. As the all Global

Journals Inc. (US) are being abstracted and indexed (in process) by most of the reputed organizations. Topics of only narrow interest will not be accepted unless they have wider potential or consequences.

2. ETHICAL GUIDELINES

Authors should follow the ethical guidelines as mentioned below for publication of research paper and research activities.

Papers are accepted on strict understanding that the material in whole or in part has not been, nor is being, considered for publication elsewhere. If the paper once accepted by Global Journals Inc. (US) and Editorial Board, will become the copyright of the Global Journals Inc. (US).

Authorship: The authors and coauthors should have active contribution to conception design, analysis and interpretation of findings. They should critically review the contents and drafting of the paper. All should approve the final version of the paper before submission

The Global Journals Inc. (US) follows the definition of authorship set up by the Global Academy of Research and Development. According to the Global Academy of R&D authorship, criteria must be based on:

1) Substantial contributions to conception and acquisition of data, analysis and interpretation of the findings.

2) Drafting the paper and revising it critically regarding important academic content.

3) Final approval of the version of the paper to be published.

All authors should have been credited according to their appropriate contribution in research activity and preparing paper. Contributors who do not match the criteria as authors may be mentioned under Acknowledgement.

Acknowledgements: Contributors to the research other than authors credited should be mentioned under acknowledgement. The specifications of the source of funding for the research if appropriate can be included. Suppliers of resources may be mentioned along with address.

Appeal of Decision: The Editorial Board's decision on publication of the paper is final and cannot be appealed elsewhere.

Permissions: It is the author's responsibility to have prior permission if all or parts of earlier published illustrations are used in this paper.

Please mention proper reference and appropriate acknowledgements wherever expected.

If all or parts of previously published illustrations are used, permission must be taken from the copyright holder concerned. It is the author's responsibility to take these in writing.

Approval for reproduction/modification of any information (including figures and tables) published elsewhere must be obtained by the authors/copyright holders before submission of the manuscript. Contributors (Authors) are responsible for any copyright fee involved.

3. SUBMISSION OF MANUSCRIPTS

Manuscripts should be uploaded via this online submission page. The online submission is most efficient method for submission of papers, as it enables rapid distribution of manuscripts and consequently speeds up the review procedure. It also enables authors to know the status of their own manuscripts by emailing us. Complete instructions for submitting a paper is available below.

Manuscript submission is a systematic procedure and little preparation is required beyond having all parts of your manuscript in a given format and a computer with an Internet connection and a Web browser. Full help and instructions are provided on-screen. As an author, you will be prompted for login and manuscript details as Field of Paper and then to upload your manuscript file(s) according to the instructions.

To avoid postal delays, all transaction is preferred by e-mail. A finished manuscript submission is confirmed by e-mail immediately and your paper enters the editorial process with no postal delays. When a conclusion is made about the publication of your paper by our Editorial Board, revisions can be submitted online with the same procedure, with an occasion to view and respond to all comments.

Complete support for both authors and co-author is provided.

4. MANUSCRIPT'S CATEGORY

Based on potential and nature, the manuscript can be categorized under the following heads:

Original research paper: Such papers are reports of high-level significant original research work.

Review papers: These are concise, significant but helpful and decisive topics for young researchers.

Research articles: These are handled with small investigation and applications

Research letters: The letters are small and concise comments on previously published matters.

5.STRUCTURE AND FORMAT OF MANUSCRIPT

The recommended size of original research paper is less than seven thousand words, review papers fewer than seven thousands words also.Preparation of research paper or how to write research paper, are major hurdle, while writing manuscript. The research articles and research letters should be fewer than three thousand words, the structure original research paper; sometime review paper should be as follows:

Papers: These are reports of significant research (typically less than 7000 words equivalent, including tables, figures, references), and comprise:

(a)Title should be relevant and commensurate with the theme of the paper.

(b) A brief Summary, "Abstract" (less than 150 words) containing the major results and conclusions.

(c) Up to ten keywords, that precisely identifies the paper's subject, purpose, and focus.

(d) An Introduction, giving necessary background excluding subheadings; objectives must be clearly declared.

(e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition; sources of information must be given and numerical methods must be specified by reference, unless non-standard.

(f) Results should be presented concisely, by well-designed tables and/or figures; the same data may not be used in both; suitable statistical data should be given. All data must be obtained with attention to numerical detail in the planning stage. As reproduced design has been recognized to be important to experiments for a considerable time, the Editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned un-refereed;

(g) Discussion should cover the implications and consequences, not just recapitulating the results; conclusions should be summarizing.

(h) Brief Acknowledgements.

(i) References in the proper form.

Authors should very cautiously consider the preparation of papers to ensure that they communicate efficiently. Papers are much more likely to be accepted, if they are cautiously designed and laid out, contain few or no errors, are summarizing, and be conventional to the approach and instructions. They will in addition, be published with much less delays than those that require much technical and editorial correction.

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

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

Format

Language: The language of publication is UK English. Authors, for whom English is a second language, must have their manuscript efficiently edited by an English-speaking person before submission to make sure that, the English is of high excellence. It is preferable, that manuscripts should be professionally edited.

Standard Usage, Abbreviations, and Units: Spelling and hyphenation should be conventional to The Concise Oxford English Dictionary. Statistics and measurements should at all times be given in figures, e.g. 16 min, except for when the number begins a sentence. When the number does not refer to a unit of measurement it should be spelt in full unless, it is 160 or greater.

Abbreviations supposed to be used carefully. The abbreviated name or expression is supposed to be cited in full at first usage, followed by the conventional abbreviation in parentheses.

Metric SI units are supposed to generally be used excluding where they conflict with current practice or are confusing. For illustration, 1.4 l rather than 1.4 × 10-3 m3, or 4 mm somewhat than 4 × 10-3 m. Chemical formula and solutions must identify the form used, e.g. anhydrous or hydrated, and the concentration must be in clearly defined units. Common species names should be followed by underlines at the first mention. For following use the generic name should be constricted to a single letter, if it is clear.

Structure

All manuscripts submitted to Global Journals Inc. (US), ought to include:

Title: The title page must carry an instructive title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) wherever the work was carried out. The full postal address in addition with the e-mail address of related author must be given. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining and indexing.

Abstract, used in Original Papers and Reviews:

Optimizing Abstract for Search Engines

Many researchers searching for information online will use search engines such as Google, Yahoo or similar. By optimizing your paper for search engines, you will amplify the chance of someone finding it. This in turn will make it more likely to be viewed and/or cited in a further work. Global Journals Inc. (US) have compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Key Words

A major linchpin in research work for the writing research paper is the keyword search, which one will employ to find both library and Internet resources.

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

Search engines for most searches, use Boolean searching, which is somewhat different from Internet searches. The Boolean search uses "operators," words (and, or, not, and near) that enable you to expand or narrow your affords. Tips for research paper while preparing research paper are very helpful guideline of research paper.

Choice of key words is first tool of tips to write research paper. Research paper writing is an art.A few tips for deciding as strategically as possible about keyword search:

- One should start brainstorming lists of possible keywords before even begin searching. Think about the most important concepts related to research work. Ask, "What words would a source have to include to be truly valuable in research paper?" Then consider synonyms for the important words.
- It may take the discovery of only one relevant paper to let steer in the right keyword direction because in most databases, the keywords under which a research paper is abstracted are listed with the paper.
- One should avoid outdated words.

Keywords are the key that opens a door to research work sources. Keyword searching is an art in which researcher's skills are bound to improve with experience and time.

Numerical Methods: Numerical methods used should be clear and, where appropriate, supported by references.

Acknowledgements: Please make these as concise as possible.

References

References follow the Harvard scheme of referencing. References in the text should cite the authors' names followed by the time of their publication, unless there are three or more authors when simply the first author's name is quoted followed by et al. unpublished work has to only be cited where necessary, and only in the text. Copies of references in press in other journals have to be supplied with submitted typescripts. It is necessary that all citations and references be carefully checked before submission, as mistakes or omissions will cause delays.

References to information on the World Wide Web can be given, but only if the information is available without charge to readers on an official site. Wikipedia and Similar websites are not allowed where anyone can change the information. Authors will be asked to make available electronic copies of the cited information for inclusion on the Global Journals Inc. (US) homepage at the judgment of the Editorial Board.

The Editorial Board and Global Journals Inc. (US) recommend that, citation of online-published papers and other material should be done via a DOI (digital object identifier). If an author cites anything, which does not have a DOI, they run the risk of the cited material not being noticeable.

The Editorial Board and Global Journals Inc. (US) recommend the use of a tool such as Reference Manager for reference management and formatting.

Tables, Figures and Figure Legends

Tables: Tables should be few in number, cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g. Table 4, a self-explanatory caption and be on a separate sheet. Vertical lines should not be used.

Figures: Figures are supposed to be submitted as separate files. Always take in a citation in the text for each figure using Arabic numbers, e.g. Fig. 4. Artwork must be submitted online in electronic form by e-mailing them.

Preparation of Electronic Figures for Publication

Even though low quality images are sufficient for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit (or e-mail) EPS (line art) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings) in relation to the imitation size. Please give the data for figures in black and white or submit a Color Work Agreement Form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

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

Color Charges: It is the rule of the Global Journals Inc. (US) for authors to pay the full cost for the reproduction of their color artwork. Hence, please note that, if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a color work agreement form before your paper can be published.

Figure Legends: Self-explanatory legends of all figures should be incorporated separately under the heading 'Legends to Figures'. In the full-text online edition of the journal, figure legends may possibly be truncated in abbreviated links to the full screen version. Therefore, the first 100 characters of any legend should notify the reader, about the key aspects of the figure.

6. AFTER ACCEPTANCE

Upon approval of a paper for publication, the manuscript will be forwarded to the dean, who is responsible for the publication of the Global Journals Inc. (US).

6.1 Proof Corrections

The corresponding author will receive an e-mail alert containing a link to a website or will be attached. A working e-mail address must therefore be provided for the related author.

Acrobat Reader will be required in order to read this file. This software can be downloaded

(Free of charge) from the following website:

www.adobe.com/products/acrobat/readstep2.html. This will facilitate the file to be opened, read on screen, and printed out in order for any corrections to be added. Further instructions will be sent with the proof.

Proofs must be returned to the dean at dean@globaljournals.org within three days of receipt.

As changes to proofs are costly, we inquire that you only correct typesetting errors. All illustrations are retained by the publisher. Please note that the authors are responsible for all statements made in their work, including changes made by the copy editor.

6.2 Early View of Global Journals Inc. (US) (Publication Prior to Print)

The Global Journals Inc. (US) are enclosed by our publishing's Early View service. Early View articles are complete full-text articles sent in advance of their publication. Early View articles are absolute and final. They have been completely reviewed, revised and edited for publication, and the authors' final corrections have been incorporated. Because they are in final form, no changes can be made after sending them. The nature of Early View articles means that they do not yet have volume, issue or page numbers, so Early View articles cannot be cited in the conventional way.

6.3 Author Services

Online production tracking is available for your article through Author Services. Author Services enables authors to track their article - once it has been accepted - through the production process to publication online and in print. Authors can check the status of their articles online and choose to receive automated e-mails at key stages of production. The authors will receive an e-mail with a unique link that enables them to register and have their article automatically added to the system. Please ensure that a complete e-mail address is provided when submitting the manuscript.

6.4 Author Material Archive Policy

Please note that if not specifically requested, publisher will dispose off hardcopy & electronic information submitted, after the two months of publication. If you require the return of any information submitted, please inform the Editorial Board or dean as soon as possible.

6.5 Offprint and Extra Copies

A PDF offprint of the online-published article will be provided free of charge to the related author, and may be distributed according to the Publisher's terms and conditions. Additional paper offprint may be ordered by emailing us at: editor@globaljournals.org .

the search? Will I be able to find all information in this field area? If the answer of these types of questions will be "Yes" then you can choose that topic. In most of the cases, you may have to conduct the surveys and have to visit several places because this field is related to Computer Science and Information Technology. Also, you may have to do a lot of work to find all rise and falls regarding the various data of that subject. Sometimes, detailed information plays a vital role, instead of short information.

2. Evaluators are human: First thing to remember that evaluators are also human being. They are not only meant for rejecting a paper. They are here to evaluate your paper. So, present your Best.

3. Think Like Evaluators: If you are in a confusion or getting demotivated that your paper will be accepted by evaluators or not, then think and try to evaluate your paper like an Evaluator. Try to understand that what an evaluator wants in your research paper and automatically you will have your answer.

4. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

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

6. Use of computer is recommended: As you are doing research in the field of Computer Science, then this point is quite obvious.

7. Use right software: Always use good quality software packages. If you are not capable to judge good software then you can lose quality of your paper unknowingly. There are various software programs available to help you, which you can get through Internet.

8. Use the Internet for help: An excellent start for your paper can be by using the Google. It is an excellent search engine, where you can have your doubts resolved. You may also read some answers for the frequent question how to write my research paper or find model research paper. From the internet library you can download books. If you have all required books make important reading selecting and analyzing the specified information. Then put together research paper sketch out.

9. Use and get big pictures: Always use encyclopedias, Wikipedia to get pictures so that you can go into the depth.

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

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

12. Make all efforts: Make all efforts to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in introduction, that what is the need of a particular research paper. Polish your work by good skill of writing and always give an evaluator, what he wants.

13. Have backups: When you are going to do any important thing like making research paper, you should always have backup copies of it either in your computer or in paper. This will help you to not to lose any of your important.

14. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several and unnecessary diagrams will degrade the quality of your paper by creating "hotchpotch." So always, try to make and include those diagrams, which are made by your own to improve readability and understandability of your paper.

15. Use of direct quotes: When you do research relevant to literature, history or current affairs then use of quotes become essential but if study is relevant to science then use of quotes is not preferable.

16. Use proper verb tense: Use proper verb tenses in your paper. Use past tense, to present those events that happened. Use present tense to indicate events that are going on. Use future tense to indicate future happening events. Use of improper and wrong tenses will confuse the evaluator. Avoid the sentences that are incomplete.

17. Never use online paper: If you are getting any paper on Internet, then never use it as your research paper because it might be possible that evaluator has already seen it or maybe it is outdated version.

18. **Pick a good study spot:** To do your research studies always try to pick a spot, which is quiet. Every spot is not for studies. Spot that suits you choose it and proceed further.

19. Know what you know: Always try to know, what you know by making objectives. Else, you will be confused and cannot achieve your target.

20. Use good quality grammar: Always use a good quality grammar and use words that will throw positive impact on evaluator. Use of good quality grammar does not mean to use tough words, that for each word the evaluator has to go through dictionary. Do not start sentence with a conjunction. Do not fragment sentences. Eliminate one-word sentences. Ignore passive voice. Do not ever use a big word when a diminutive one would suffice. Verbs have to be in agreement with their subjects. Prepositions are not expressions to finish sentences with. It is incorrect to ever divide an infinitive. Avoid clichés like the disease. Also, always shun irritating alliteration. Use language that is simple and straight forward. put together a neat summary.

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

22. Never start in last minute: Always start at right time and give enough time to research work. Leaving everything to the last minute will degrade your paper and spoil your work.

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

24. Never copy others' work: Never copy others' work and give it your name because if evaluator has seen it anywhere you will be in trouble.

25. Take proper rest and food: No matter how many hours you spend for your research activity, if you are not taking care of your health then all your efforts will be in vain. For a quality research, study is must, and this can be done by taking proper rest and food.

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

27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. **Think technically:** Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

31. Adding unnecessary information: Do not add unnecessary information, like, I have used MS Excel to draw graph. Do not add irrelevant and inappropriate material. These all will create superfluous. Foreign terminology and phrases are not apropos. One should NEVER take a broad view. Analogy in script is like feathers on a snake. Not at all use a large word when a very small one would be

sufficient. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Amplification is a billion times of inferior quality than sarcasm.

32. Never oversimplify everything: To add material in your research paper, never go for oversimplification. This will definitely irritate the evaluator. Be more or less specific. Also too, by no means, ever use rhythmic redundancies. Contractions aren't essential and shouldn't be there used. Comparisons are as terrible as clichés. Give up ampersands and abbreviations, and so on. Remove commas, that are, not necessary. Parenthetical words however should be together with this in commas. Understatement is all the time the complete best way to put onward earth-shaking thoughts. Give a detailed literary review.

33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

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

Informal Guidelines of Research Paper Writing

Key points to remember:

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

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

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

General style:

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

To make a paper clear

· Adhere to recommended page limits

Mistakes to evade

- Insertion a title at the foot of a page with the subsequent text on the next page

- Separating a table/chart or figure - impound each figure/table to a single page
- Submitting a manuscript with pages out of sequence

In every sections of your document

· Use standard writing style including articles ("a", "the," etc.)

· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

· Shun familiar wording, don't address the reviewer directly, and don't use slang, slang language, or superlatives

· Shun use of extra pictures - include only those figures essential to presenting results

Title Page:

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

Abstract:

The summary should be two hundred words or less. It should briefly and clearly explain the key findings reported in the manuscript--must have precise statistics. It should not have abnormal acronyms or abbreviations. It should be logical in itself. Shun citing references at this point.

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

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to

shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

- Single section, and succinct
- As a outline of job done, it is always written in past tense
- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
- What you account in an conceptual must be regular with what you reported in the manuscript
- Exact spelling, clearness of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else

Introduction:

The **Introduction** should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable to comprehend and calculate the purpose of your study without having to submit to other works. The basis for the study should be offered. Give most important references but shun difficult to make a comprehensive appraisal of the topic. In the introduction, describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will have no attention in your result. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here. Following approach can create a valuable beginning:

- Explain the value (significance) of the study
- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

- Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done.
- Sort out your thoughts; manufacture one key point with every section. If you make the four points listed above, you will need a least of four paragraphs.
- Present surroundings information only as desirable in order hold up a situation. The reviewer does not desire to read the whole thing you know about a topic.
- Shape the theory/purpose specifically - do not take a broad view.
- As always, give awareness to spelling, simplicity and correctness of sentences and phrases.

Procedures (Methods and Materials):

This part is supposed to be the easiest to carve if you have good skills. A sound written Procedures segment allows a capable scientist to replacement your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt for the least amount of information that would permit another capable scientist to spare your outcome but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section. When a technique is used that has been well described in another object, mention the specific item describing a way but draw the basic

principle while stating the situation. The purpose is to text all particular resources and broad procedures, so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step by step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

- Explain materials individually only if the study is so complex that it saves liberty this way.
- Embrace particular materials, and any tools or provisions that are not frequently found in laboratories.
- Do not take in frequently found.
- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

Methods:

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

Approach:

- It is embarrassed or not possible to use vigorous voice when documenting methods with no using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result when script up the methods most authors use third person passive voice.
- Use standard style in this and in every other part of the paper - avoid familiar lists, and use full sentences.

What to keep away from

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

Results:

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

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

Content

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

What to stay away from

- Do not discuss or infer your outcome, report surroundings information, or try to explain anything.
- Not at all, take in raw data or intermediate calculations in a research manuscript.

- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

- As forever, use past tense when you submit to your results, and put the whole thing in a reasonable order.
- Put figures and tables, appropriately numbered, in order at the end of the report
- If you desire, you may place your figures and tables properly within the text of your results part.

Figures and tables

- If you put figures and tables at the end of the details, make certain that they are visibly distinguished from any attach appendix materials, such as raw facts
- Despite of position, each figure must be numbered one after the other and complete with subtitle
- In spite of position, each table must be titled, numbered one after the other and complete with heading
- All figure and table must be adequately complete that it could situate on its own, divide from text

Discussion:

The Discussion is expected the trickiest segment to write and describe. A lot of papers submitted for journal are discarded based on problems with the Discussion. There is no head of state for how long a argument should be. Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implication of the study. The purpose here is to offer an understanding of your results and hold up for all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of result should be visibly described. Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved with prospect, and let it drop at that.

- Make a decision if each premise is supported, discarded, or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."
- Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work
- You may propose future guidelines, such as how the experiment might be personalized to accomplish a new idea.
- Give details all of your remarks as much as possible, focus on mechanisms.
- Make a decision if the tentative design sufficiently addressed the theory, and whether or not it was correctly restricted.
- Try to present substitute explanations if sensible alternatives be present.
- One research will not counter an overall question, so maintain the large picture in mind, where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

- When you refer to information, differentiate data generated by your own studies from available information
- Submit to work done by specific persons (including you) in past tense.
- Submit to generally acknowledged facts and main beliefs in present tense.

Administration Rules Listed Before Submitting Your Research Paper to Global Journals Inc. (US)

Please carefully note down following rules and regulation before submitting your Research Paper to Global Journals Inc. (US):

Segment Draft and Final Research Paper: You have to strictly follow the template of research paper. If it is not done your paper may get rejected.

- The **major constraint** is that you must independently make all content, tables, graphs, and facts that are offered in the paper. You must write each part of the paper wholly on your own. The Peer-reviewers need to identify your own perceptive of the concepts in your own terms. NEVER extract straight from any foundation, and never rephrase someone else's analysis.

- Do not give permission to anyone else to "PROOFREAD" your manuscript.

- Methods to avoid Plagiarism is applied by us on every paper, if found guilty, you will be blacklisted by all of our collaborated research groups, your institution will be informed for this and strict legal actions will be taken immediately.)
- To guard yourself and others from possible illegal use please do not permit anyone right to use to your paper and files.

Criterion for Grading a Research Paper (Compilation) by Global Journals Inc. (US)

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals Inc. (US).

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

INDEX

save our planet

Global Journal of Science Frontier Research

Visit us on the Web at www.GlobalJournals.org | www.JournalofScience.org
or email us at helpdesk@globaljournals.org

ISSN 9755896