Exploration

Arithmetic Relations Connected with Planck Scale

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Abstract

We show that Schwarzschild radius of Planck mass plays a vital role in electroweak and strong interactions. With reference to the observed large proportionality ratios, it seems appropriate to consider two large gravitational constants assumed to be associated with nuclear and electromagnetic interactions. Qualitatively, this idea is similar to "Strong gravity" concept proposed by Abdus Salam and C.Sivaram [Mod. Phys. Lett., A8(4), 321- 326. (1993)]. Among the wide range of applications (*i.e.*, Planck scale, elementary particles, atomic nuclei, planets and neutron stars), we generated a set of arithmetic relations and developed arithmetic methods for estimating the Newtonian gravitational constant from the known microscopic physical constants. As the current unification paradigm is failing in developing a 'practical unification procedure', the point that we wish to emphasize here is that, by considering 'only two' assumptions, we presented a number of applications connecting micro-macro physical systems and finally developed arithmetic relations for understanding the role of the Newtonian gravitational constant in microscopic physics. We appeal the mainstream physicists to see the possibility of considering the proposed relations for further investigation with respect to strong, electroweak and gravitational interactions collectively.

Keywords: Schwarzschild radius, Planck mass, Newtonian gravitational constant, large microscopic gravitational constants; theory of everything.

1. Introduction

A Grand Unified Theory (GUT) is a model in particle physics in which at high energy, the three gauge interactions of the Standard Model which define the electromagnetic, weak, and strong interactions, are merged into one single force. Unifying gravity with the other three interactions would provide a theory of everything (TOE) [1-4]. In general, GUT is often seen as an intermediate step towards a TOE. The most desirable cases of any unified description [4] are:

1) To simplify the complicated issues of known physics.
2) To predict new effects, arising from a combination of the fields inherent in the unified description.

So far it has never been achieved. In this short communication, by considering the Schwarzschild radius of Planck mass and proton-electron mass ratio, we proposed very simple relations among the Newtonian gravitational constant, Fermi's weak coupling constant, Strong

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coupling constant and nuclear charge radius. With further research and analysis, workable TOE concepts can be established.

2. Conceptual thought connected with final unification

Conceptual thought: Schwarzschild radius of Planck mass plays a vital role in electroweak and strong interactions.

Let, $G_N \cong 6.67408\times 10^{-11}$ m^{3}kg^{-1}sec^{-2}.

$$\text{Planck mass} = M_{pl} \cong \sqrt{\frac{\hbar c}{G_N}} \cong 2.176471826\times 10^{-8}\,\text{kg}$$

$R_{spl} \cong$ Schwarzschild radius of Planck mass

$$\cong \frac{2G_N M_{pl}}{c^2} \cong 2\sqrt{\frac{G_N \hbar}{c^3}} \cong 3.2324592\times 10^{-35}\ \text{m}$$

3. Strange result connected with Planck scale Schwarzschild radius

Let, $\left(\frac{m_p}{m_e}\right)$ be the proton-electron mass ratio.

G_F be the Fermi's weak coupling constant.

It is noticed that

$$\left(\frac{m_p}{m_e}\right) \cong \left(\frac{G_F}{\hbar c R_{spl}^2}\right)^{\frac{1}{10}} \cong \left(\frac{G_F c^2}{4G_N \hbar^2}\right)^{\frac{1}{10}} \quad (1)$$

Based on this relation,

$$G_F \cong \left(\frac{m_p}{m_e}\right)^{10}\left(\frac{4G_N \hbar^2}{c^2}\right) \cong 1.438965\times 10^{-62}\ \text{J.m}^3 \quad (2)$$

$$G_N \cong \left(\frac{m_e}{m_p}\right)^{10}\left(\frac{G_F c^2}{4\hbar^2}\right) \quad (3)$$

$$\frac{G_F}{G_N} \cong \left\{\left(\frac{m_p}{m_e}\right)^{10}\right\}\left(\frac{4\hbar^2}{c^2}\right) \quad (4)$$

If, recommended $G_F \cong 1.435850984\times 10^{-62}$ J.m^3, obtained $G_N \cong 6.65963739\times 10^{-11}$ m^{3}kg^{-1}sec^{-2}

4. Strange result connected with Fermi's weak coupling constant

Let, $R_0 \approx 1.24$ fm be the nuclear charge radius.

It is noticed that, $$\left(\frac{m_p}{m_e}\right) \cong \sqrt{\frac{\hbar c R_0^2}{G_F}} \tag{5}$$

From relations (1) and (5),

$$R_0 \cong \left(\frac{m_p}{m_e}\right)^6 \sqrt{\frac{4\hbar G_N}{c^3}} \cong \left(\frac{m_p}{m_e}\right)^6 R_{spl} \tag{6}$$

$$\frac{R_0}{R_{spl}} \cong \left(\frac{m_p}{m_e}\right)^6 \text{ (Or) } \frac{\pi R_0^2}{\pi R_{spl}^2} \cong \left(\frac{m_p}{m_e}\right)^{12} \tag{7}$$

If, $G_N \cong 6.67408\times10^{-11}$ m^{3}kg^{-1}sec^{-2}, obtained $R_0 \cong 1.238755\,\text{fm}$

5. Strange result connected with Strong coupling constant

Let, $\alpha_s \cong 0.1153$ be the strong coupling constant.
It is noticed that,

$$\left(\frac{m_p}{m_e}\right)^{12} \cong \left(\frac{1}{\alpha_s}\right)\left(\frac{\hbar c}{G_N m_p^2}\right) \tag{8}$$

From relations (6) and (7)

$$\alpha_s \cong \left(\frac{m_e}{m_p}\right)^{12}\left(\frac{\hbar c}{G_N m_p^2}\right) \cong \left(\frac{R_{spl}}{R_0}\right)^2\left(\frac{\hbar c}{G_N m_p^2}\right) \cong \left(\frac{2\hbar}{m_p R_0 c}\right)^2 \tag{9}$$

From above relations, we would like to say that, magnitude of α_s seems to be around 0.1153. The same conclusion can also be extracted from Particle data group's (PDG) review on Quantum chromodynamics [5]. See the following table-1.

Table-1: Magnitude of α_s close to 0.1153

1	$\alpha_s\left(M_Z^2\right) = 0.1161^{+0.0041}_{-0.0048}$		7	$\alpha_s\left(M_Z^2\right) = 0.1158 \pm 0.0035.$
2	$\alpha_s\left(M_Z^2\right) = 0.1151^{+0.0093}_{-0.0087}.$		8	$\alpha_s\left(M_Z^2\right) = 0.1154 \pm 0.0020.$
3	$\alpha_s\left(M_Z^2\right) = 0.1148 \pm 0.0014(exp.) \pm 0.0018(PDF)^{+0.0050}_{-0.0000}$		9	$\alpha_s\left(M_Z^2\right) = 0.1131^{+0.0028}_{-0.0022}$
4	$\alpha_s\left(M_Z^2\right) = 0.1134 \pm 0.0011,$		10	$\alpha_s\left(M_Z^2\right) \cong 0.1156^{+0.0021}_{-0.0022}$
5	$\alpha_s\left(M_Z^2\right) = 0.1142 \pm 0.0023,$		11	$\alpha_s\left(M_Z^2\right) \cong 0.1156^{+0.0041}_{-0.0034}$
6	$\alpha_s\left(M_Z^2\right) = 0.1151^{+0.0033}_{-0.0032}$		12	$\alpha_s\left(M_Z^2\right) \cong 0.1151^{+0.0093}_{-0.0087}$

6. Our approach of simplification

In the early seventies Abdus Salam and his co-workers proposed the concept of strong gravity [6-8]. In this context, in physics literature one can see valuable paperson 'strong gravity' proposed by C. J. Isham, Abdus Salam, Sivaram, J. Strathdee, K. P. Sinha, Y. Ne'eman and Dj. Sijacki. In Strong gravity, the successive self-interaction of a nonlinear spin-2 field was used to describe a non-abelian field of strong interactions. This idea was formulated in a two-tensor theory of strong and gravitational interactions, where the strong tensor fields are governed by Einstein-type field equations with a strong gravitational constant $G_f \approx 10^{38}$ times the Newtonian gravitational constant, G_N. Within the framework of this proposal, tensor fields were identified to play a fundamental role in the strong-interaction physics of quantum chromodynamics (QCD). Modifying these concepts, O. F. Akinto and Farida Tahir recently posted their work in arXiv preprint [8]. They elaborately discussed on modified strong gravity concepts pertaining to QCD and general relativity. In 2013. Roberto Onofrio [9] proposed that, at atto-meter scale, Newtonian gravitational constant seems to reach a magnitude of $8.205\times10^{22}\text{m}^3\text{kg}^{-1}\text{sec}^{-2}$. In this context, above proposed typical relations can be simplified with the following two workable assumptions and two workable relations. For their background, readers are encouraged to refer our published papers and conference proceedings [10-19].

Assumption 1: Magnitude of the gravitational constant associated with the electromagnetic interaction is, $G_e \cong 2.374335306\times10^{37}\ \text{m}^3\text{kg}^{-1}\text{sec}^{-2}$.

Assumption 2: Magnitude of the gravitational constant associated with the strong interaction is, $G_s \cong 3.327641113\times10^{28}\ \text{m}^3\text{kg}^{-1}\text{sec}^{-2}$.

Relation 1: To ft the magnitude of G_e

$$\frac{m_p}{m_e} \cong 2\pi\sqrt{\frac{4\pi\varepsilon_0 G_e m_e^2}{e^2}} \cong 2\pi\left(m_e \bigg/ \sqrt{\frac{e^2}{4\pi\varepsilon_0 G_e}}\right) \tag{10}$$

Using $\sqrt{\frac{e^2}{4\pi\varepsilon_0 G_e}} \cong 0.00175\ \text{MeV}/c^2$, muon and tau rest masses can be fitted [14, 18, 19]. See application-18.

Relation 2: To ft the magnitude of G_s Or G_N

$$\frac{m_p}{m_e} \cong \left(\frac{G_s}{G_N^{2/3} G_e^{1/3}}\right)^{\frac{1}{7}} \tag{11}$$

7. Applications of G_s and G_e in micro-macro physics

Application 1

Strong coupling constant,

$$\alpha_s \cong \left(\frac{m_e}{m_p}\right)\left(\frac{G_e m_e^2}{G_s m_p^2}\right) \cong \left(\frac{G_e^8 G_N^2}{G_s^{10}}\right)^{\frac{1}{7}} \tag{12}$$

See application 19 also. Based on applications (1) and (19), it is possible to show that,

$$G_s\left(m_p + m_n\right)^2 \approx \sqrt{\frac{4\pi\varepsilon_0 \hbar^3 c^3}{e^2}} \Rightarrow \frac{G_s\left(m_p + m_n\right)^2}{\hbar c} \approx \sqrt{\frac{4\pi\varepsilon_0 \hbar c}{e^2}} \approx \sqrt{\frac{1}{\alpha}}$$

Application 2

$$\begin{aligned} &\text{Reduced Planck's constant, } \hbar \cong \frac{m_e}{c}\sqrt{(G_e m_e)(G_s m_p)} \\ &\text{and } \left(\frac{\hbar}{m_e}\right) \cong \frac{1}{c}\sqrt{(G_e m_e)(G_s m_p)} \\ &\left.\begin{aligned} &\to \hbar c \cong \left(G_N^3 G_e^{12} G_s^6\right)^{\frac{1}{21}} m_p^2 \cong \left(\frac{G_s^{12} G_e^{10}}{G_N}\right)^{\frac{1}{21}} m_e^2 \\ &\Rightarrow \sqrt{\frac{\hbar c}{G_N}} \cong \left(\frac{G_e^2 G_s}{G_N^3}\right)^{\frac{1}{7}} m_p \cong \left(\frac{G_s^6 G_e^5}{G_N^{11}}\right)^{\frac{1}{21}} m_e \end{aligned}\right\} \end{aligned} \tag{13}$$

Application 3

Bohr radius of hydrogen atom,

$$a_0 \cong \left(\frac{4\pi\varepsilon_0 G_e m_e^2}{e^2}\right)\left(\frac{G_s m_p}{c^2}\right) \cong \left(\frac{4\pi\varepsilon_0 G_s m_p m_e}{e^2}\right)\left(\frac{G_e m_e}{c^2}\right) \tag{14}$$

Application 4

$$\begin{aligned} &\text{A) Characteristic atomic radius, } R_{atom} \cong \frac{2\sqrt{G_s G_e}\, m_p}{c^2} \cong 33 \text{ pm} \\ &\text{B) Characteristic atomic radii, } R_A \approx A^{\frac{1}{3}}\left(\frac{2\sqrt{G_s G_e}\, m_p}{c^2}\right) \approx A^{\frac{1}{3}} 33 \text{ pm} \end{aligned} \tag{15}$$

where A is the atomic mass number

Application 5

Fermi's Weak coupling constant,

$$G_F \cong \left\{\left(G_N^{1/3} G_e^{2/3}\right) m_p^2\right\}\left(\frac{2G_s m_p}{c^2}\right)^2 \cong \hbar c\left(\frac{2G_s m_e}{c^2}\right)^2 \tag{16}$$

Application 6

Neutron weak decay and Avogadro number,

$$\begin{aligned} &\left(m_n - m_p\right)c^2 \times t_n \cong \sqrt{\frac{G_e}{G_N}}\left(\frac{G_s m_p^2}{c}\right) \\ &\to t_n \cong \sqrt{\frac{G_e}{G_N}}\left(\frac{G_s m_p^2}{\left(m_n - m_p\right)c^3}\right) \cong 893.875 \text{ sec} \end{aligned} \tag{17}$$

where, $\sqrt{\frac{G_e}{G_N}} \cong 5.964517556 \times 10^{23} \cong N_A$ is very close to Avogadro number [14,18,19].

Application 7

$$\text{Nuclear charge radius, } R_0 \cong \frac{2G_s m_p}{c^2} \cong 1.23858 \text{ fm} \tag{18}$$

Application8

$$\text{Root mean square radius of proton, } R_p \cong \frac{\sqrt{2}G_s m_p}{c^2} \cong 0.875806 \text{ fm} \tag{19}$$

Application 9

Stable mass number [10,17],

$$A_s \cong 2Z + \left\{ \left(\frac{G_s m_p m_e}{\hbar c} \right) (2Z) \right\}^2 \cong 2Z + 0.00642 (Z)^2 \tag{20}$$

Application 10

For $Z \geq 30$, close to stable atomic nuclides, nuclear binding energy [10],

$$(BE)_{As} \cong -(Z) \sqrt{\left(\frac{3}{5} \frac{e^2}{4\pi\varepsilon_0 R_p} \right) \left(\frac{3}{5} \frac{G_s m_p^2}{R_p} \right)} \cong -Z \times 19.8 \text{ MeV} \tag{21}$$

Application 11

Weak coupling angle and up-down quark mass ratio,

$$\begin{aligned} &\text{A)} \sin\theta_W \cong \sqrt{\frac{4\pi\varepsilon_0 G_s m_p m_e}{e^2}} \cong \left(\frac{m_u}{m_d} \right) \cong 0.4687924 \\ &\text{B)} \sin^2\theta_W \cong \frac{4\pi\varepsilon_0 G_s m_p m_e}{e^2} \cong \left(\frac{m_u}{m_d} \right)^2 \cong 0.2197663 \end{aligned} \tag{22}$$

where m_u, m_d represent up and down quark masses respectively.

Application 12

$$\begin{aligned} &\text{A) Magnetic dipole moment of proton,} \\ &\mu_{proton} \cong \left(\frac{m_u}{m_d} \right) \left(\frac{e G_s m_p}{c} \right) \cong 1.394455 \times 10^{-26} \text{ J/Tesla} \\ &\text{B) Magnetic dipole moment of neutron,} \\ &\mu_{neutron} \cong \left(\frac{m_u}{m_d} \right)^{\frac{3}{2}} \left(\frac{e G_s m_n}{c} \right) \cong 9.54761 \times 10^{-27} \text{ J/Tesla} \end{aligned} \tag{23}$$

Application 13

Planet earth's magnetic dipole moment,

$$\mu_{earth} \cong \left(\frac{\mu_{proton}}{\mu_{electron}} \right) * \left(\frac{e G_s M_{earth}}{2c} \right) \cong 8.15 \times 10^{22} \text{ J.Tesla}^{-1}. \tag{24}$$

Note: Based on this relation, solar planets, exo-planets (hot Jupiters) and neutron stars mass dependent magnetic dipole moments can be estimated [20].

Application 14

Newtonian gravitational constant,

$$G_N \cong \frac{G_F^3 c^{12}}{64 G_e^2 G_s^6 m_p^{12}} \cong \left(\frac{m_e}{m_p}\right)^{\frac{21}{2}} \left(\frac{G_s^{3/2}}{G_e^{1/2}}\right)$$
$$\cong \left(\frac{1}{4\pi^2 \alpha_s^{3/2}}\right)\left(\frac{m_e}{m_p}\right)^{11}\left(\frac{e^2}{4\pi\varepsilon_0 m_p^2}\right) \tag{25}$$
$$\cong \frac{2.611621345\times10^{-12}}{\alpha_s^{3/2}} \frac{\text{m}^3}{\text{kg.sec}^2}$$

Application 15

Nuclear Planck mass,

$$m_{npl} \cong \sqrt{\frac{\hbar c}{G_s}} \cong \left(\frac{G_N^3 G_e^{12}}{G_s^{15}}\right)^{\frac{1}{42}} m_p$$
$$\cong \left(\frac{G_e^{10}}{G_N G_s^9}\right)^{\frac{1}{42}} m_e \cong 546.78 \text{ MeV}/c^2 \tag{26}$$

Nuclear Planck size,

$$\sqrt{\frac{G_s \hbar}{c^3}} \cong \frac{G_s m_{npl}}{c^2} \cong 0.361 \text{ fm} \tag{27}$$

Application 16

A) If (M_{NS}, m_n) represent the masses of neutron star [21] and neutron, then,

$$\frac{G_N M_{NS} m_n}{\hbar c} \approx \sqrt{\frac{G_s}{G_N}} \to M_{NS} \approx 3.175 M \tag{28}$$

B) If R_{NS} represents the neutron star radius [22], then,

$$\frac{R_{NS}}{\left(\sqrt{G_s \hbar / c^3}\right)} \approx \sqrt{\frac{G_s}{G_N}} \to R_{NS} \approx 8.06 \text{ km} \tag{29}$$

Application 17

Three generations of baryonic mass spectrum can be understood with [23],

$$\left(m_{baryon} c^2\right) \cong n^{\frac{1}{4}} \left[\left(\tfrac{1}{\alpha_s}\right)^y 546.8 \text{ MeV}\right] \tag{30}$$

where, $y \cong \left(\frac{1}{4}, \frac{1}{2} \text{ and } 1\right)$ and n=1,2,3,.. Corresponding three generations of mesonic mass spectrum can be understood with,

$$\left(m_{meson} c^2\right) \cong \left\{ n^{\frac{1}{4}} \left[\left(\tfrac{1}{\alpha_s}\right)^y 546.8 \text{ MeV}\right]\right\} + \{546.8 \text{ MeV}\} \tag{31}$$

Application 18

$$\text{Let,} \quad \gamma \cong \left(\frac{4\pi\varepsilon_0 G_e m_e^2}{e^2} \right) \cong 292.23277 \tag{32}$$

Muon and tau rest masses,

$$\left.\begin{array}{l} \left(m_{lepton}c^2\right)_n \cong \left\{ \gamma^3 + \left[\left(n^2\gamma\right)^n \left(\frac{G_e}{G_N}\right)^{\frac{1}{4}} \right] \right\}^{\frac{1}{3}} \sqrt{\frac{e^2c^4}{4\pi\varepsilon_0 G_e}} \\ \cong \left\{ \gamma^3 + \left[\left(n^2\gamma\right)^n \left(\frac{G_e}{G_N}\right)^{\frac{1}{4}} \right] \right\}^{\frac{1}{3}} 1.7486\times10^{-3}\ \text{MeV} \\ \text{where,} \ \ n = 1, 2. \end{array}\right\} \tag{33}$$

$\left(m_\mu c^2\right)_{n=1} \cong 106.45$ MeV . $\left(m_\tau c^2\right)_{n=2} \cong 1780.1$ MeV .
$\left(m_{new} c^2\right)_{n=3} \cong 42192$ MeV. This is for future experimental verification.

Application 19

$$\alpha_s \cong \left(\frac{2G_s m_{npl}}{c^2 R_0} \right)^4 \cong \left(\frac{4G_s\hbar}{c^3 R_o^2} \right)^2 \cong \left(\frac{\hbar c}{G_s m_p^2} \right)^2 \tag{34}$$

Application 20

Based on relation (34),

$$\left.\begin{array}{l} \text{Fine structure ratio, } \alpha \approx \frac{\alpha_s}{16} \approx \left(\frac{G_s\hbar}{c^3 R_o^2} \right)^2 \approx 0.007206 \\ \rightarrow \hbar \approx \left\{ \left(\frac{e^2}{4\pi\varepsilon_0 c} \right) \left(\frac{G_s\left(m_p + m_n\right)^2}{c} \right)^2 \right\}^{\frac{1}{3}} \\ \Rightarrow G_s \approx \sqrt{\frac{4\pi\varepsilon_0\hbar^3c^3}{16e^2m_p^4}} \approx \sqrt{\frac{4\pi\varepsilon_0\hbar^3c^3}{e^2\left(m_p + m_n\right)^4}} \\ \text{and } \ G_s\left(m_p + m_n\right)^2 \approx \sqrt{\frac{4\pi\varepsilon_0\hbar^3c^3}{e^2}} \end{array}\right\} \tag{35}$$

8. ‘System of units’ independent Avogadro number and Molar mass unit

If, atoms as a whole believed to exhibit electromagnetic interaction, then molar mass constant and Avogadro number, both can be understood with the following simple relation [15].

$$G_e\left(m_{atom}\right)^2 \cong G_N\left(M_{mole}\right)^2 \tag{36}$$

where m_{atom} is the unified atomic mass unit and M_{mole} is the molar mass unit or gram mole.

Thus it is very clear to say that, directly and indirectly 'gravity' plays a key role in understanding the molar mass unit.

$$\frac{M_{mole}}{m_{atom}} \cong \sqrt{\frac{G_e}{G_N}} \rightarrow M_{mole} \cong \sqrt{\frac{G_e}{G_N}} \times m_{atom} \tag{37}$$

$$\text{where } \sqrt{\frac{G_e}{G_N}} \cong 5.96 \times 10^{23} \cong \text{Avogadro number, } N_A$$

$$\text{and } \left(0.00099 > M_{mole} < \ 0.001\right) \text{ kg}$$

Based on these relations, "independent of system of units" and "independent of ad-hoc selection of exactly one gram", it may be possible to explore the correct physical meaning of the famous 'Molar mass unit' and 'Avogadro number' in a unified approach. It may be noted that, Avogadro number and 'gram mole' are having many applications in solid state physics, gas dynamics/thermodynamics and basic chemistry/electrochemistry. By considering the following relation, it is possible to couple the Avogadro number with the observed four fundamental interactions.

$$\sqrt{\frac{M_{pl} * m_e}{m_p^2}} \cong \left(\frac{G_e}{G_N}\right)^{\frac{1}{6}} \cong N_A^{1/3} \tag{38}$$

9. Discussion

It is true that, unless stringent requirements are met, in general, speculative alternatives to currently accepted theories cannot be accepted or published. Scientific papers having content that lie outside the mainstream of current research must justify by including a clear, detailed discussion of the motivation for the new speculation, with reasons for introducing any new concepts. If the new formulation results are in contradiction with the accepted theory, then there must both be a discussion of which experiments could be done to verify that the conventional theory needs improvement, and also an analysis showing the consistency of the new theory with the existing experiments. In this context, we appeal that,

1) Subject of final unification is having a long unsuccessful history. Clearly speaking, so far, no model succeeded in implementing the Newtonian gravitational constant or Planck scale in nuclear and electroweak interactions.

2) Even though, the basic idea of String theory is very simple, very interesting and highly intuitive, there are no concrete new predictions on low energy scales and high energy scale predictions are beyond the reach of current technology.

3) It may be noted that, since 1992, J. E Brandenburg is working on 'GEM unification theory'[24] and proposed an interesting and unified relation, $\frac{e^2}{4\pi\varepsilon_0 G_N m_p m_e} \cong \left(\frac{1}{\alpha}\right)\left\{\exp\sqrt{\frac{m_p}{m_e}}\right\}^2$. Compared to J. E Brandenburg and other available models of current unification theories, in this paper, with reference to Planck scale, we presented a variety of multipurpose arithmetic relations pertaining to nuclear, electroweak and astrophysical applications.

4) Success of any unified model either depends on its physical/mathematical back ground or depends on its wide range of applications. It is clear from the above proposed applications (1 to 20) that the authors could satisfactorily fit the nuclear, electroweak and astrophysical data through unified semi-empirical relations. This sincere attempt is to be ascertained by the scientific community. Thus, we would like to appeal that, with respect to currently believed String theory and Quantum gravity models, proposed semi empirical relations and proposed assumptions, can be given some consideration in developing a 'workable model' of TOE.

5) Based on relations (10,11,13 and 16),

$$G_e \cong 2.374335306 \times 10^{37} \text{ m}^3\text{kg}^{-1}\text{sec}^{-2}\ .$$
$$G_s \cong 3.329560556 \times 10^{28} \text{ m}^3\text{kg}^{-1}\text{sec}^{-2}.$$
$$G_N \cong 6.679855427 \times 10^{-11} \text{ m}^3\text{kg}^{-1}\text{sec}^{-2}.$$
$$G_F \cong 1.440210093 \times 10^{-62} \text{ Jm}^3.$$

6) As the current unification paradigm is failing in developing a 'practical unification procedure', the point that we wish to emphasize here is that, by considering 'only two' assumptions, we presented a number of applications connecting micro-macro physical systems and finally developed arithmetic relations for understanding the role of the Newtonian gravitational constant in microscopic physics. We appeal the mainstream physicists to see the possibility of considering the proposed relations for further investigation with respect to strong, electroweak and gravitational interactions collectively.

7) Following this kind of computational approach, it is certainly possible to reproduce another set of arithmetic relations by using which, in near future, it may be possible to find a set of absolute relations having sound physical reasoning and strong mathematical back up.

10.Conclusion

Authors would like to appeal the science community that:

1) So far, the whole subject of nuclear physics and particle physics is being studied independent of 'gravity'.
2) Back ground of whole experimental apparatus of nuclear and particle physics is 'gravity' only.
3) As of today, 'string theory and its sister models' seem to be completely theoretical in nature and beyond the scope of observed four dimensions.
4) To have a 'theory of everything, it is inevitable to unite gravity and other three atomic interactions and is beyond the scope of current experimental physics.

In this very critical situation, in a broad view, our attempt can be given some consideration.

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