Frontiers of Astronomy, Astrophysics and Cosmology, 2015, Vol. 1, No. 2, 74-89
Available online at http://pubs.sciepub.com/faac/1/2/1

DOI:10.12691/faac-1-2-1

Gravity Based Integral Charge Quark and Higgs Super Symmetry

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Received March 26, 2015; Revised May 31, 2015; Accepted July 01, 2015

Abstract From gravity point of view, so far no model succeeded in understanding the link between strongly interacting massive fermions and strongly interacting massive bosons/mesons. One should not forget the fact that, strongly interacting massive fermions are only playing a major role in the formation of observable luminous and non-luminous massive celestial objects. By interconnecting the strong coupling constant and gravitational constant via the Schwarzschild interaction, in this paper, the authors reviewed the basics of strong nuclear interaction and also reviewed the previously published “integral charge Quark and Higgs super symmetry” results and proposed a very simple mechanism for understanding the observed unstable baryons. For the unstable hadronic particles and unstable electro weak particles- ‘classification scheme', ‘mass spectrum' and ‘charge spectrum' are the three vital factors and these three things can be understood with ‘integral charge super symmetry’. Here the authors would like to stress the fact that, the observed Mesonic mass spectrum, Baryonic mass spectrum and Higgs mass spectrum can be reproduced with ‘integral charge Quark and Higgs super symmetry’. Important point to be noted is that without considering the currently believed ‘color' charge concept, observed unstable baryons ‘mass' and ‘charge' spectrum can be understood. By any chance if any light quark boson having integral charge couples with any integral charge baryon, then a neutral baryon can be generated. This idea is very much similar to the ‘photon absorption’ by electron. In this context, the authors produced many clear cut evidences.

Keywords: *schwarzschild interaction, avogadro number, electroweak interaction, strong interaction and super symmetry*

Cite This Article: U. V. S. Seshavatharam, and S. Lakshminarayana, “Gravity Based Integral Charge Quark and Higgs Super Symmetry.” *Frontiers of Astronomy, Astrophysics and Cosmology*, vol. 1, no. 2 (2015): 74-89. doi: 10.12691/faac-1-2-1.

1. Introduction

Quantum chromo dynamics is successful in understanding sub nuclear physics, General theory of relativity is successful in understanding cosmology and celestial mechanics and Quantum mechanics is successful in understanding particle physics, thermodynamics and astrophysics. But so far no model is successful in understanding Super symmetry and final unification. Here it may be noted that, strongly interacting massive fermions are only playing a major role in the formation of observable massive stars and compact objects like neutron stars and black holes etc. If one is willing to consider any celestial object as a big elementary particle generator, then it is inevitable to study ‘Strong interaction’, ‘gravity’ and ‘Super symmetry’ in a unified manner. In this context - by considering the strength of Schwarzschild interaction as ‘unity’ and by considering Avogadro number as a suitable scaling factor, the authors made an attempt to fit and understand the basics of final unification and super symmetry.

2. Integral Charge Quark and Higgs Physics

Calculations based on fractional charge quarks and lattice gauge formalism have successfully reproduced the masses of many hadrons, including the proton. Here the key point to be noted is that, fractional charge quarks are well founded theoretically and ‘not yet all evidenced experimentally'. This negative result of modern collider experiments strongly cast doubt on the ‘natural existence' of “fractional charge bare quark fermions”. In the previously published papers [1,2,3,4] the authors proposed that there exist integral charge quark fermions, integral charge quark bosons, integral charge (massive) effective quark fermi-gluons and integral charge (massive) quark boso-gluons. Clearly speaking, for baryons, currently believed role of quark fermions is taken up by the ‘effective quark fermi-gluons’ and for mesons, currently believed role of quark fermions is taken up by massive ‘quark boso-gluons'. Note that in this paper, “integral charge (massive) effective quark fermi-gluons” have been eliminated and a simplified mechanism is proposed for understanding the observed baryonic mass and charge spectrum. Important point to be noted is that without considering the currently believed ‘color' charge concept, observed unstable baryons ‘mass' and ‘charge' spectrum can be understood. By any chance if any light quark boson having integral charge couples with any charged baryon, then a neutral baryon can be generated. This idea is very much similar to ‘photon absorption’ by electron. When a weakly interacting electron is able to absorb a boson, in strong interaction it is certainly possible. Moreover, if any unstable baryon couples with two or three unstable light quark bosons then the unstable baryon mass increases and charge also changes. In most of the cases baryon charge changes from $\pm$ e to neutral and neutral to $\pm$ e. In rare cases unstable baryon with $\pm$ 2e can also be generated. Note that, if any two oppositely charged quark boso-gluons couple together then a neutral quark boson or meson can be generated.

3. False Failure of Super Symmetry

Super symmetry differs notably from currently known symmetries in that its corresponding conserved charge (via Noether’s theorem) is a fermion called a super charge and carrying spin-1/2, as opposed to a scalar (spin-0) or vector (spin-1). A super symmetry may also be interpreted as new fermionic (anticommuting) dimensions of spacetime, super partners of the usual bosonic spacetime coordinates, and in this formulation the theory is said to live in super space. Currently there is only indirect evidence for the existence of super symmetry, primarily in the form of evidence for gauge coupling unification. A central motivation for super symmetry close to the TeV energy scale is the resolution of the hierarchy problem of the Standard Model [5,6,7]. Without the extra super symmetric particles, the Higgs boson mass is subject to quantum corrections which are so large as to naturally drive it close to the Planck mass barring its fine tuning to an extraordinarily tiny value. In the super symmetric theory, on the other hand, these quantum corrections are cancelled by those from the corresponding super partners above the super symmetry breaking scale, which becomes the new characteristic natural scale for the Higgs mass.

Other attractive features of TeV-scale super symmetry are the fact that it often provides a candidate dark matter particle at a mass scale consistent with thermal relic abundance calculations, provides a natural mechanism for electroweak symmetry breaking and allows for the precise high-energy unification of the weak, the strong and electromagnetic interactions. Therefore, scenarios where super symmetric partners appear with masses not much greater than 1 TeV are considered as the most well-motivated by theorists. These scenarios would imply that experimental traces of the super partners should begin to emerge in high-energy collisions at the LHC relatively soon. The Large Hadron Collider at CERN is currently producing the world’s highest energy collisions and offers the best chance at discovering super particles for the foreseeable future.

In a conventional and currently believed modern approach, as of February 2015, no meaningful signs of the super partners have been observed in LHC. The (false) failure of the Large Hadron Collider to find evidence for super symmetry has led some physicists to suggest that the theory should be abandoned or modified. The authors are also thinking in the same direction. Clearly speaking, if one is willing to modify the current concepts of SUSY, certainly one can recognize and appreciate the great success of LHC. If one is willing to consider the ‘charged electro weak W boson’ as the SUSY partner of Top quark or if one is willing to consider the neutral electroweak Z boson as the SUSY partner of pair of Higgs fermions or if one is willing to consider ‘neutral pion’ as a SUSY candidate of pair of strange quark fermions or if one is willing to consider the charged pion as the SUSY partner of Proton and Muon or if one is willing to consider the observed light mesons as the ‘excited SUSY levels of proton’, it is certainly possible to say that, LHC has succeeded in confirming the basics of SUSY. The authors would like to stress the fact that, “confirmation of SYSY” depends on how we perceive, how we analyze and how we interpret the data produced by LHC and problem is not with LHC. In this very critical condition, with reference to the published paper [1] entitled “Super symmetry in strong and weak interactions” , the authors extended the scope of electroweak interaction and SUSY to atomic level and successfully developed a simple relation for understanding the total energy of electron [4] in Hydrogen atom.

4. To Fit the Strong Interaction Physical Parameters

From gravity point of view, so far no model succeeded in understanding the link between strongly interacting massive fermions and strongly interacting massive bosons/mesons. One should not forget the fact that, strongly interacting massive fermions are only playing a major role in the formation of observable luminous and non-luminous massive celestial objects. In this section the authors made an attempt to explore the meaning of “strength of atomic interactions” with reference to Black holes [8,9] and quantitatively developed heuristic relations in between the gravitational constant, strong coupling constant and weak coupling constants.

1) If it is true that c and G are fundamental physical constants, then $\left(c^4/G\right)$ can be considered as a fundamental compound constant related to a characteristic limiting force.
2) Black holes are the ultimate state of matter’s geometric structure.
3) Magnitude of the operating force at the black hole surface is the order of $\left(c^4/G\right)$.
4) Gravitational interaction taking place at black holes can be called as ‘Schwarzschild interaction’.
5) Strength of ‘Schwarzschild interaction’ can be assumed to be unity.
6) Strength of any other interaction can be defined as the ratio of operating force magnitude and the classical or astrophysical force magnitude $\left(c^4/G\right)$.

7) If one is willing to represent the magnitude of the operating force as a fraction of $\left(c^4/G\right)$ i.e X times of $\left(c^4/G\right)$, where $X \ll 1$, then

$$\frac{X \text{ times of } \left(c^4/G\right)}{\left(c^4/G\right)} \cong X \to \text{Effective } G \Rightarrow \frac{G}{X} \qquad (1)$$

If X is very small, $\left(1/X\right)$ becomes very large. In this way, X can be called as the strength of interaction. Clearly speaking, strength of any interaction is $\left(1/X\right)$ times less than the 'Schwarzschild interaction' and effective G becomes $\left(G/X\right)$.

8) Avogadro number is an absolute number [10-16] q and it is having no units like 'per mole'. Atomic interaction strength is N_A^2 times less than the Schwarzschild interaction and hence atomic gravitational constant can be expressed as:

$$\left.\begin{aligned} &G_A \cong N_A^2 G \text{ and } G_A m_A^2 \cong G m_M^2 \\ &\to m_M \cong \sqrt{\frac{G_A}{G}} \cdot m_A \cong N_A m_A \end{aligned}\right\} \qquad (2)$$

Here, m_A is the unified atomic mass unit, $m_M \cong 0.001$ kg is the molar mass unit expressed as 'one gram' and hence it is possible to think that, m_M constitutes N_A number of atoms which in turn constitutes N_A number of protons.

9) Since 2009, the authors are working on this concept and proposed many coincidences. This proposal is well received by reviewers of many online physics journals. Finally by considering the Schwarzschild interaction, the authors succeeded in exploring the beauty of its back ground physics and many foreground applications. For further details readers are requested to see the published papers and references therein [14,15,16].

10) $\left(\frac{\hbar c}{G_A m_e^2}\right) \cong 1.57413044 \times 10^{-3}$ can be considered as the unified elementary interaction strength. It is having many applications in nuclear physics and atomic physics. one can see different forms of

$$\left(\frac{\hbar c}{G_A m_e^2}\right) \text{viz,} \left(\frac{\hbar c}{G_A m_e^2}\right)^{\frac{1}{3}},$$

$$\left(\frac{\hbar c}{G_A m_e^2}\right)^{\frac{1}{2}}, \left(\frac{\hbar c}{G_A m_e^2}\right), \left(\frac{\hbar c}{G_A m_e^2}\right)^{\frac{3}{2}},$$

$$\left(\frac{\hbar c}{G_A m_e^2}\right)^{2}, \left(\frac{\hbar c}{G_A m_e^2}\right)^{3} \text{ etc.}$$

11) Strong coupling constant can be expressed as:

$$\alpha_s \cong \left(\frac{\hbar c}{G_A m_e^2}\right)^{\frac{1}{3}} \cong 0.116326922 \qquad (3)$$

This can be compared with the experimental value $0.1161_{-0.0048}^{+0.0041}$. This is the most precise result obtained at a hadron - hadron collider [17]. This is one of the many foreground applications of the proposed atomic gravitational constant.

12) Down and Up quark mass ratio can be expressed as:

$$\left.\begin{aligned} &\frac{m_d c^2}{m_u c^2} \cong \ln\left(\frac{1}{\alpha_s}\right) \cong \frac{1}{3}\ln\left(\frac{\hbar c}{G_A m_e^2}\right) \\ &\quad \cong 2.151350754 \cong \Upsilon......(\text{say}) \\ &\frac{m_u c^2}{m_d c^2} \cong \left[\ln\left(\frac{1}{\alpha_s}\right)\right]^{-1} \cong \frac{1}{\Upsilon} \cong 0.46482429 \end{aligned}\right\} \qquad (4)$$

This proposed ratio of up and down quark mass ratio can be compared with the current estimates [17] of 0.46(5).

13) Ratio of Up quark and electron rest mass can be expressed as [1]:

$$\frac{m_u c^2}{m_e c^2} \cong \left(\frac{1}{\alpha_s}\right) \cong \left(\frac{\hbar c}{G_A m_e^2}\right)^{\frac{1}{3}} \cong \exp\left(\Upsilon\right) \qquad (5)$$

$$\to m_u c^2 \cong 4.393 \cong 4.4 \text{ MeV and}$$

$$\Rightarrow m_d c^2 \cong 9.45 \text{ MeV}$$

14) Proton's rest mass can be expressed as:

$$m_p c^2 \cong \left(\frac{1}{\alpha} + \frac{1}{\alpha_s}\right)\sqrt{m_d m_u}\, c^2 \cong 938.32 \text{ MeV} \qquad (6)$$

15) Nucleon mass difference can be expressed as:

$$\frac{\sqrt{m_d m_u}\, c^2}{m_n c^2 - m_p c^2} \cong \ln\left(\frac{1}{\alpha} + \frac{1}{\alpha_s}\right) \cong 1.2935 \text{ MeV} \qquad (7)$$

16) Proton's characteristic radius can be expressed as:

$$R_0 \cong \left(\frac{\alpha_s}{N_A^{1/3}}\right)\left(\frac{G_A m_p}{c^2}\right) \cong 0.6205 \text{ fm} \qquad (8)$$

17) Proton's rms radius can be expressed as [19]:

$$R_{rms} \cong \left(\frac{\alpha_s}{N_A^{1/3}}\right)\left(\frac{\sqrt{2} G_A m_p}{c^2}\right) \cong \sqrt{2} R_0 \cong 0.8775 \text{ fm} \qquad (9)$$

18) Nuclear charge radius can be expressed as [20]:

$$R_c \cong \left(\frac{\alpha_s}{N_A^{1/3}}\right)\left(\frac{2 G_A m_p}{c^2}\right) \cong 2R_0 \cong 1.241 \text{ fm} \qquad (10)$$

19) Proton number based nuclear stable mass number can be expressed as [15,16]:

$$\left.\begin{array}{l} A_s \cong 2Z + \left(\dfrac{\hbar c}{G_A m_e^2}\right)(2Z)^2 \\ \rightarrow A_s \cong 2Z + \left\{\alpha_s^3 (2Z)^2\right\} \cong 2Z + \left(4Z^2\alpha_s^3\right) \end{array}\right\} \quad (11)$$

20) Nuclear binding energy at the stable mass number can be expressed as [15,16,21,22,23,24]:

$$(B)_{A_s} \cong kZ\left\{\left(m_d/2m_u\right)\left[2m_u c^2 + m_d c^2\right]\right\}$$
$$\cong k \times Z \times 19.6 \text{ MeV}$$

where,

$$\left.\begin{array}{l} \underline{\text{Case-1}}: Z \cong 2 \text{ to } 30, \ \text{k} \cong \left(\dfrac{Z}{30}\right)^{\frac{1}{6}} \\ \underline{\text{Case-2}}: Z >= 30, \ \text{k} \cong 1 \end{array}\right\} \quad (12)$$

21) Approximately nuclear binding energy above and below the stable mass number can be expressed as:

$$\left.\begin{array}{l} (\text{A>A}_s), \ (B)_A \cong \left(\dfrac{A}{A_s}\right)^{\frac{2}{3}} (B)_{A_s} \\ (\text{A<A}_s), \ (B)_A \cong \left(\dfrac{A}{A_s}\right)^{\frac{4}{3}} (B)_{A_s} \end{array}\right\} \quad (13)$$

It needs further study and theoretical back up.

22) At the stable mass number, proton's kinetic energy can be expressed as [23,24]:

$$(KE)_{protons} \cong k \times Z \times 19.6 \text{ MeV} \quad (14)$$

Clearly speaking, protons kinetic energy is equal to the nuclear binding energy [23,24].

23) At the stable mass number, neutrons' kinetic energy can be expressed as follows [23,24].

$$(KE)_{neutrons} \cong k \times N \times 19.6 \text{ MeV} \quad (15)$$

24) At the stable mass number, nucleons' kinetic energy can be expressed as:

$$(KE)_{neucleons} \cong k \times A \times 19.6 \text{ MeV} \quad (16)$$

This can be compared with the Fermi gas model of nucleons total kinetic energy [23,24,25] expression,

$$(E_{kin})_{(P,N)} \cong \frac{3}{10}\frac{\hbar^2}{m_n R_0^2}\left(\frac{9\pi}{4}\right)^{\frac{2}{3}}\left(\frac{N^{5/3}+Z^{5/3}}{A^{2/3}}\right)$$

where $R_0 \approx 1.2$ fm. ....(16A)

25) The characteristic atomic force can be represented by $\left(c^4/G_A\right)$ and the famous Fermi's weak coupling constant can be expressed as [18]:

$$G_F \cong \sqrt{\frac{G_A m_e^2}{\hbar c}}\left(\frac{e^2}{4\pi\varepsilon_0}\right)\left\{\frac{4\pi}{3}\left(\sqrt{\left(\frac{e^2}{4\pi\varepsilon_0}\right)\left(\frac{c^4}{G_A}\right)^{-1}}\right)^3\right\}$$
$$\cong \left(\frac{1}{\alpha_s}\right)^{3/2}\left(\frac{e^2}{4\pi\varepsilon_0}\right)\left\{\frac{4\pi}{3}\left(\sqrt{\left(\frac{e^2}{4\pi\varepsilon_0}\right)\left(\frac{c^4}{G_A}\right)^{-1}}\right)^3\right\} \quad (17)$$
$$\cong 1.40 \times 10^{-62} \text{ J.m}^4$$

where

$$\sqrt{\left(\frac{e^2}{4\pi\varepsilon_0}\right)\left(\frac{c^4}{G_A}\right)^{-1}} \cong \sqrt{\frac{e^2 G_A}{4\pi\varepsilon_0 c^4}} \cong 8.314359 \times 10^{-13} \text{ m}$$

can be considered as the characteristic length associated with weak interaction range and $\frac{4\pi}{3}\left(\sqrt{\left(\frac{e^2}{4\pi\varepsilon_0}\right)\left(\frac{c^4}{G_A}\right)^{-1}}\right)^3$ can be considered as the characteristic volume associated with weak interaction.

26) Ground state potential energy of electron in hydrogen atom can be expressed as [16]:

$$\left(E_{pot}\right)_{ground} \cong -\frac{1}{2}\left(\frac{\hbar c}{G_A m_e^2}\right)^2 \sqrt{m_p m_e c^2}$$
$$\cong -\sqrt{\frac{m_p}{m_e}}\left\{\left(\frac{\hbar}{m_e c}\right)^2\left(\frac{2G_A m_e}{c^2}\right)^{-1}\right\}\left(\frac{c^4}{G_A}\right) \quad (18)$$

5. Basic Concepts of Modified and Revised Integral Charge Quark and Higgs Super Symmetry

1. If m_f and m_b are the rest masses of fermion and boson,

$$m_b c^2 \cong \frac{m_f c^2}{\Psi} \cong \frac{m_f c^2}{2.26}. \quad (19)$$

This idea can be applied to protons, quarks, Higgs particles and charged leptons. Based on the observed mesonic mass spectrum, magnitude of the proposed fermion-boson mass rario can be fixed in many ways. Its value seems to lie in bewteen $\Psi \cong 2.254$ and $\Psi \cong 2.265$ and for practical purpose in this paper the authors consider a value of $\Psi \cong 2.26$. In a semi empirical approach it can be fitted in the following way and it needs theoretical back up.

$$\Psi \cong \sqrt{\Upsilon^2 + \frac{1}{\Upsilon}} \cong \sqrt{\frac{m_d^2}{m_u^2} + \frac{m_u}{m_d}} \quad (20)$$
$$\cong 2.2568$$

where $\Upsilon \cong m_d/m_u$.

2. There exist nature friendly 'integral charge quark fermions' and 'integral charge quark bosons'. If m_f and m_b are the rest masses of quark fermion and quark boson respectively, $m_b \cong \frac{m_f}{\Psi} \cong 2.26.$

27) There exists integral charge Higgs fermion [1-3] and mass ratio of Higgs fermion and electron can be expressed as:

$$\frac{M_{Hf}c^2}{m_e c^2} \cong \frac{1}{2}\left(\frac{G_A m_e^2}{\hbar c}\right)^2 \rightarrow M_{Hf}c^2 \cong 103112.06\text{ MeV} \qquad (21)$$

3. There exists integral charge Higgs boson of rest energy close to

$$M_{Hb}c^2 \cong \frac{1}{2}\left(\frac{G_A m_e^2}{\hbar c}\right)^2\left(\frac{m_e c^2}{\Psi}\right) \cong \frac{1}{2}\left(\frac{G_A m_e^2}{\hbar c}\right)^2\left(\frac{m_e c^2}{2.26}\right) \cong \frac{103112}{2.26} \cong 45625\text{ MeV}. \qquad (22)$$

Coincidence-1: With this integral charge Higgs boson, neutral Z boson rest energy can be obtained in the following form.

$$m_Z c^2 \cong \left(M_{Hb}c^2\right)^{\pm} + \left(M_{Hb}c^2\right)^{\mp} \cong 2M_{Hb}c^2 \cong 91250\text{ MeV} \qquad (23)$$

It can be compared with the observed mass of the neutral electroweak Z boson of rest energy 91187 MeV [18].

Coincidence-2: The obtained top quark boson rest energy is 80438 MeV and is very close to the observed W boson of rest energy 80385 MeV [18]. 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 noticed that Higg's charged boson and top quark boson couple together to form a new 'neutral' boson of rest energy 126.0 GeV.

$$\left(M_{Hb}c^2\right)^{\pm} + \left(m_W c^2\right)^{\mp} \cong 126.0\ \text{GeV}. \qquad (24)$$

Table 1. Fitting of quark fermion and quark boson smasses

Quark	$Q_f c^2 \cong$ Quark fermion rest energy in MeV	$Q_b c^2 \cong$ Quark boson rest energy in MeV	$Q_G c^2 \cong$ Quark gluon rest energy in MeV
Up	4.4	1.95	370
Down	9.45	4.18	478
Strange	152.3	67.39	1207
Charm	1310.6	579.9	2474
Bottom	5281.3	2336.9	3938
Top	181791	80438.5	12810

Coincidence-3: Neutral pion seems to be the combination of strange qurark boson pair and can be expressed as:

$$\left(m_\pi c^2\right)^0 \cong 2\left(\frac{S_f c^2}{\Psi}\right) \cong \left[\left(S_b c^2\right)^{\pm} + \left(S_b c^2\right)^{\mp}\right] \cong 134.78\text{ MeV} \qquad (25)$$

Here $\left(S_f, S_b\right)$ represent strange quark fermion and strange quark boson rest masses respectively.

Coincidence-4: Charged pion can be considered as the geometric mean of 'super symmetric boson of proton' and 'super symmetric boson of muon' and can be expressed as follows.

$$\left(m_\pi c^2\right)^{\pm} \cong \frac{\sqrt{m_p m_\mu}\,c^2}{\Psi} \cong 139.32\text{MeV} \qquad (26)$$

4. There exist integral charge massive quark gluons. Here, gluon means massive bosons having integral charge. These gluons play a vital role in understanding and generating the observed mesons rest mass.
5. The quark gluon rest energy is equal to

$$Q_G c^2 \cong \frac{1}{2\Upsilon}\left[M_{Hb}^2 \times Q_b\right]^{\frac{1}{3}} c^2 \qquad (27)$$

6. 'Integral charge light quark bosons' in one or two numbers couple with the ground or excited unstable baryons and generate doublets and triplets. This is similar to 'absorption of photons' by electron.

6. Proposed Integral Charge Quark Fermions, Bosons and Gluons

In the previous published paper [1], the authors suggested that up, strange and bottom quarks are in geometric series. Similarly down, charm and top quarks are in another geometric series. Please see Table 1 for the proposed quark 'fermion' masses, 'boson' masses and 'gluon' masses.

Note that, baryon and meson charge-mass spectrum can be generated from these mass units. Quark fermions, quark bosons, quark gluons and their connecting relations can be expressed in the following way. Note that all these relations got publihsed in the reference [1] and here in this paper the key operating numbers are reviewed in a unfied approach and needs firther research at fundamenatl level. It can be suggested that, ratio of electron rest mass and up quark fermion mass is close to the magnitude of strong coupling constant.

The proposed USB geometric ratio is

$$g_U \cong \left[(\Upsilon)\frac{\Upsilon+1}{\Upsilon-1}\right]^2 \cong 34.6737 \qquad (28)$$

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

$$g_D \cong \left[(2\Upsilon)\frac{\Upsilon+1}{\Upsilon-1}\right]^2 \cong 138.695\ \text{and} \qquad (29)$$

$$\frac{g_D}{g_U} \cong \frac{\text{DCT geometric ratio}}{\text{USB geometric ratio}} \cong 4. \tag{30}$$

Quark boson mass can be defined by the following relation.

$$\text{Quark boson mass} = Q_b \cong \frac{\text{Quark fermion mass}}{\Psi} \cong \frac{Q_f}{\Psi} \tag{31}$$

Quark gluon mass can be defined by the following relation.

$$Q_G c^2 \cong \frac{1}{2\Upsilon}\left[M_{Hb}^2 \times Q_b\right]^{\frac{1}{3}} c^2 \tag{32}$$

Predicted short lived strongly interacting neutral quark boson rest energies are: 3.9 MeV, 8.4 MeV, 1160 MeV, 4674 MeV and 160878 MeV.

7. To Fit and Predict the Baryonic Mass Spectrum

The authhors proposed a complicated mechanism in the previously proposed paper. By eliminating the previously proposed concept of "quark fermi gluons", in this paper the authgors proposed a very simple and straight forward mechanism for understanding, fitting and predicting the the observed baryonic mass and charge spectrum. Basic concepts can be expressed as follows.

1) Nucleus can be considered as a sea of protons, integral charge quark bosons and integral charge quark gluons.
2) Under high energy collision, like absorption of photons by electron, proton combines with any one quark boson and generates a neutral ground state baryon. This type of baryon can be called as Mono boson baryon.
3) Under high energy collision, proton combines with quark boson pair and generates a charged ground state baryon. This type of baryon can be called as Bi boson baryon.
4) Primary excited levels follow

$$\left[n(n+1)\right]^{\frac{1}{4}} \text{ or } \left[\frac{n(n+1)}{2}\right]^{\frac{1}{4}}.$$

Presently understood Regge trajectory of some of the Baryons and Mesons can be fitted in this way. If one is willing to express the rest mass of any quark fermion or boson with $\sqrt{\frac{\hbar c}{G_A}}$, then with reference to the basic concept of vector atom model, excited levels of any quark fermion or quark boson can be

$$x.\sqrt{\frac{\sqrt{n(n+1)}\hbar c^5}{G_A}} \cong x.\left[n(n+1)\right]^{\frac{1}{4}}.\sqrt{\frac{\hbar c^5}{G_A}}.$$

where x is a factor.

5) Like absorption of photons by electron, excited levels again couple with up or down quark bosons and generate neutral or charged observable baryons and thus doublets and triplets can be understood.
6) Secondary energy levels follow $\left[n(n+1)\right]^{\frac{1}{12}}$ or $\left[\frac{n(n+1)}{2}\right]^{\frac{1}{12}}$. Based on primary energy levels and by any reason quark boson or fermion under goes a cubic root, then energy levels seems to follow $\left[n(n+1)\right]^{\frac{1}{12}}$ or $\left[\frac{n(n+1)}{2}\right]^{\frac{1}{12}}$.

8. Ground and Excited Mono Boson Neutral Baryons

Step-1: Proton combines with one quark boson and generates a neutral ground state baryon.

$$\left(B_f c^2\right)^0 \cong m_p c^2 + Q_b c^2 \tag{33}$$

Step-2: Primary energy levels of neutral ground state baryon can be understood as follows.

$$\left.\begin{array}{l} \left[B_f c^2\right]_I^0 \cong I^{\frac{1}{4}}\left(m_p c^2 + Q_b c^2\right) \\ \text{where } I = n(n+1) \text{ and } n = 1,2,3.., \\ \left[B_f c^2\right]_{I/2}^0 \cong \left(\frac{I}{2}\right)^{\frac{1}{4}}\left(m_p c^2 + Q_b c^2\right) \end{array}\right\} \tag{34}$$

Step-3: Secondary energy levels of neutral excited state baryon can be understood as follows.

$$\left.\begin{array}{l} \left[B_f c^2\right]_{(I,J)}^0 \cong \left[J\right]^{\frac{1}{12}}\left[\left[I\right]^{\frac{1}{4}}\left(m_p c^2 + Q_b c^2\right)\right] \\ \text{where } J = m(m+1) \text{ and m=1,2,3.., } \\ \left[B_f c^2\right]_{(I/2,J/2)}^0 \cong \left[\frac{J}{2}\right]^{\frac{1}{12}}\left[\left[\frac{I}{2}\right]^{\frac{1}{4}}\left(m_p c^2 + Q_b c^2\right)\right] \end{array}\right\} \tag{35}$$

See the following Table 2 to Table 9.

1. Observed Lamda baryon can be classified and fitted with first primary energy level of Proton+Up boson in Table 2.
2. Primary energy levels of (Proton+Up boson) and (Proton+Down boson) can be compared with the currently believed nucleon excited levels.
3. Observed Sigma and Xi baryons can be classified and fitted with secondary energy levels of 1118.1 MeV and 1120.8 MeV respectively.
4. Some times, excited levels couple with up or down bososns and generate integral charge baryons.
5. Observed neutral bottom baryons can be supposed to be the secondary energy levels of Proton and one Bottom boson . See Table 7, Table 8,Table 9.

6. Obseved and believed top quark seems to be the top quark baryon at I=20 with energy level 172084.6 MeV. Predicted other top quark baryon masses can be seen in Table 2, column-9

Table 2. Ground and Primary energy levels of Mono boson neutral baryons

n	I=n(n+1)	I^(1/4)	Proton + Up boson	Proton + Down boson	Proton + Strange boson	Proton + Charm boson	Proton + Bottom boson	Proton + Top boson
1	2	1.189207	1118.1	1120.8	1195.9	1805.4	3894.9	96770.3
2	6	1.565085	1471.5	1475.0	1573.9	2376.1	5125.9	127356.8
3	12	1.86121	1750.0	1754.1	1871.7	2825.6	6095.8	151453.7
4	20	2.114743	1988.3	1993.0	2126.7	3210.5	6926.1	172084.6
5	30	2.340347	2200.4	2205.7	2353.6	3553.0	7665.0	190442.9
6	42	2.54573	2393.6	2399.2	2560.1	3864.9	8337.7	207155.6
7	56	2.735565	2572.0	2578.1	2751.1	4153.1	8959.4	222603.2
8	72	2.912951	2738.8	2745.3	2929.4	4422.4	9540.4	237037.8
9	90	3.08007	2895.9	2902.8	3097.5	4676.1	10087.8	250636.9
10	110	3.238532	3044.9	3052.2	3256.9	4916.6	10606.7	263531.6
n	**I/2**	**(I/2)^(1/4)**	**Proton + Up boson**	**Proton + Down boson**	**Proton + Strange boson**	**Proton + Charm boson**	**Proton + Bottom boson**	**Proton + Top boson**
1	1	1	940.2	942.5	1005.7	1518.2	3275.2	81373.8
2	3	1.316074	1237.4	1240.3	1323.5	1998.0	4310.4	107093.9
3	6	1.565085	1471.5	1475.0	1573.9	2376.1	5125.9	127356.8
4	10	1.778279	1672.0	1675.9	1788.3	2699.7	5824.2	144705.3
5	15	1.96799	1850.3	1854.7	1979.1	2987.7	6445.5	160142.7
6	21	2.140695	2012.7	2017.5	2152.8	3249.9	7011.1	174196.4
7	28	2.300327	2162.8	2167.9	2313.4	3492.3	7534.0	187186.3
8	36	2.44949	2303.1	2308.5	2463.4	3718.7	8022.5	199324.2
9	45	2.59002	2435.2	2441.0	2604.7	3932.1	8482.8	210759.7
10	55	2.72327	2560.5	2566.6	2738.7	4134.4	8919.2	221602.7

Table 3. Neutral and secondary energy levels of (Proton+Up boson) = 1118.1 MeV

m	J=m(m+1)	J^(1/12)	Energy level	J/2=m(m+1)/2	(J/2)^(1/12)	Energy level
1	2	1.059463	1184.6	1	1	1118.1
2	6	1.161037	1298.2	3	1.095873	1225.3
3	12	1.230076	1375.3	6	1.161037	1298.2
4	20	1.283569	1435.2	10	1.211528	1354.6
5	30	1.32768	1484.5	15	1.253163	1401.2
6	42	1.365434	1526.7	21	1.288798	1441.0
7	56	1.398564	1563.7	28	1.320069	1476.0
8	72	1.428163	1596.8	36	1.348006	1507.2
9	90	1.454968	1626.8	45	1.373307	1535.5
10	110	1.479504	1654.2	55	1.396466	1561.4

Table 4. Neutral and secondary energy levels of (Proton+Up boson) = 1120.8 MeV

m	J=m(m+1)	J^(1/12)	Energy level	J/2=m(m+1)/2	(J/2)^(1/12)	Energy level
1	2	1.059463	1187.4	1	1	1120.8
2	6	1.161037	1301.3	3	1.095873	1228.3
3	12	1.230076	1378.7	6	1.161037	1301.3
4	20	1.283569	1438.6	10	1.211528	1357.9
5	30	1.32768	1488.1	15	1.253163	1404.5
6	42	1.365434	1530.4	21	1.288798	1444.5
7	56	1.398564	1567.5	28	1.320069	1479.5
8	72	1.428163	1600.7	36	1.348006	1510.8
9	90	1.454968	1630.7	45	1.373307	1539.2
10	110	1.479504	1658.2	55	1.396466	1565.2

Table 5. Neutral and secondary energy levels of (Proton+Up boson) = 1195.9 MeV

m	J=m(m+1)	J^(1/12)	Energy level	J/2=m(m+1)/2	(J/2)^(1/12)	Energy level
1	2	1.059463	1267.054	1	1	1195.94
2	6	1.161037	1388.53	3	1.095873	1310.598
3	12	1.230076	1471.097	6	1.161037	1388.53
4	20	1.283569	1535.071	10	1.211528	1448.914
5	30	1.32768	1587.826	15	1.253163	1498.708
6	42	1.365434	1632.977	21	1.288798	1541.325
7	56	1.398564	1672.599	28	1.320069	1578.723
8	72	1.428163	1707.997	36	1.348006	1612.134
9	90	1.454968	1740.055	45	1.373307	1642.393
10	110	1.479504	1769.398	55	1.396466	1670.089

Table 6. Neutral and secondary energy levels of (Proton+ Charm boson) = 1805.4 MeV

m	J=m(m+1)	J^(1/12)	Energy level	J/2=m(m+1)/2	(J/2)^(1/12)	Energy level
1	2	1.059463	1912.8	1	1	1805.4
2	6	1.161037	2096.1	3	1.095873	1978.5
3	12	1.230076	2220.8	6	1.161037	2096.1
4	20	1.283569	2317.4	10	1.211528	2187.3
5	30	1.32768	2397.0	15	1.253163	2262.5
6	42	1.365434	2465.2	21	1.288798	2326.8
7	56	1.398564	2525.0	28	1.320069	2383.3
8	72	1.428163	2578.4	36	1.348006	2433.7
9	90	1.454968	2626.8	45	1.373307	2479.4
10	110	1.479504	2671.1	55	1.396466	2521.2

Table 7. Neutral and secondary energy levels of (Proton+ Bottom boson) = 3894.9 MeV

m	J=m(m+1)	J^(1/12)	Energy level	J/2=m(m+1)/2	(J/2)^(1/12)	Energy level
1	2	1.059463	4126.5	1	1	3894.9
2	6	1.161037	4522.1	3	1.095873	4268.3
3	12	1.230076	4791.0	6	1.161037	4522.1
4	20	1.283569	4999.4	10	1.211528	4718.8
5	30	1.32768	5171.2	15	1.253163	4880.9
6	42	1.365434	5318.2	21	1.288798	5019.7
7	56	1.398564	5447.3	28	1.320069	5141.5
8	72	1.428163	5562.6	36	1.348006	5250.3
9	90	1.454968	5667.0	45	1.373307	5348.9
10	110	1.479504	5762.5	55	1.396466	5439.1

Table 8. Neutral and secondary energy levels of (Proton+ Bottom boson) = 4310.4 MeV

m	J=m(m+1)	J^(1/12)	Energy level	J/2=m(m+1)/2	(J/2)^(1/12)	Energy level
1	2	1.059463	4566.7	1	1	4310.4
2	6	1.161037	5004.5	3	1.095873	4723.6
3	12	1.230076	5302.1	6	1.161037	5004.5
4	20	1.283569	5532.7	10	1.211528	5222.2
5	30	1.32768	5722.8	15	1.253163	5401.6
6	42	1.365434	5885.6	21	1.288798	5555.2
7	56	1.398564	6028.4	28	1.320069	5690.0
8	72	1.428163	6156.0	36	1.348006	5810.4
9	90	1.454968	6271.5	45	1.373307	5919.5
10	110	1.479504	6377.3	55	1.396466	6019.3

Table 9. Neutral and secondary energy levels of (Proton+ Bottom boson) = 5125.9 MeV

m	J=m(m+1)	J^(1/12)	Energy level	J/2=m(m+1)/2	(J/2)^(1/12)	Energy level
1	2	1.059463	5430.7	1	1	5125.9
2	6	1.161037	5951.4	3	1.095873	5617.3
3	12	1.230076	6305.2	6	1.161037	5951.4
4	20	1.283569	6579.4	10	1.211528	6210.2
5	30	1.32768	6805.6	15	1.253163	6423.6
6	42	1.365434	6999.1	21	1.288798	6606.3
7	56	1.398564	7168.9	28	1.320069	6766.5
8	72	1.428163	7320.6	36	1.348006	6909.7
9	90	1.454968	7458.0	45	1.373307	7039.4
10	110	1.479504	7583.8	55	1.396466	7158.1

9. Ground and Excited Bi Boson Charged Baryons

Step-1: Proton couples with quark boson pair and generates a charged ground state baryon.

$$\left(B_f c^2\right)^{\pm} \cong m_p c^2 + \left(2Q_b c^2\right) \qquad (36)$$

Step-2: Primary energy levels of charged ground state baryon can be understood as follows.

$$\left.\begin{aligned} \left[B_f c^2\right]_I^{\pm} &\cong I^{\frac{1}{4}}\left(m_p c^2 + \left(2Q_b c^2\right)\right) \\ \left[B_f c^2\right]_{I/2}^{\pm} &\cong \left(\frac{I}{2}\right)^{\frac{1}{4}}\left(m_p c^2 + \left(2Q_b c^2\right)\right) \end{aligned}\right\} \qquad (37)$$

Step-3: Secondary energy levels of charged ground state baryon can be understood as follows.

$$\left.\begin{aligned} &\left[B_f c^2\right]_{(I,J)}^{\pm} \cong \left[J\right]^{\frac{1}{12}}\left[\left[I\right]^{\frac{1}{4}}\left(m_p c^2 + \left(2Q_b c^2\right)\right)\right] \\ &\text{where } J = m\left(m+1\right) \text{ and m=1,2,3..,} \\ &\left[B_f c^2\right]_{(I/2,J/2)}^{0} \cong \left[\frac{J}{2}\right]^{\frac{1}{12}}\left[\left[\frac{I}{2}\right]^{\frac{1}{4}}\left(m_p c^2 + \left(2Q_b c^2\right)\right)\right] \end{aligned}\right\} (38)$$

See the following Table 10.

Table 10. Ground and Primary energy levels of Bi boson charged baryons

n	I=n(n+1)	I^(1/4)	Proton + 2Up bosons	Proton + 2Down bosons	Proton + 2Strange bosons	Proton + 2Charm bosons	Proton + 2Bottom bosons	Proton + 2Top bosons
1	2	1.189207	1120.4	1125.7	1276.1	2495.0	6673.9	192424.7
2	6	1.565085	1474.6	1481.6	1679.4	3283.7	8783.4	253245.2
3	12	1.86121	1753.6	1761.9	1997.2	3905.0	10445.2	301161.0
4	20	2.114743	1992.5	2001.9	2269.2	4436.9	11868.1	342184.9
5	30	2.340347	2205.0	2215.4	2511.3	4910.2	13134.2	378689.9
6	42	2.54573	2398.5	2409.9	2731.7	5341.1	14286.8	411922.7
7	56	2.735565	2577.4	2589.6	2935.4	5739.4	15352.2	442639.7
8	72	2.912951	2744.5	2757.5	3125.7	6111.6	16347.7	471342.4
9	90	3.08007	2902.0	2915.7	3305.1	6462.2	17285.6	498383.9
10	110	3.238532	3051.3	3065.7	3475.1	6794.7	18174.9	524024.5
n	**I/2**	**(I/2)^(1/4)**	**Proton + 2Up bosons**	**Proton + 2Down bosons**	**Proton + 2Strange bosons**	**Proton + 2Charm bosons**	**Proton + 2Bottom bosons**	**Proton + 2Top bosons**
1	1	1	942.2	946.6	1073.1	2098.1	5612.1	161809.3
2	3	1.316074	1240.0	1245.8	1412.2	2761.2	7385.9	212953.0
3	6	1.565085	1474.6	1481.6	1679.4	3283.7	8783.4	253245.2
4	10	1.778279	1675.4	1683.4	1908.2	3731.0	9979.8	287742.1
5	15	1.96799	1854.2	1863.0	2111.8	4129.0	11044.5	318439.0
6	21	2.140695	2016.9	2026.5	2297.1	4491.3	12013.7	346384.3
7	28	2.300327	2167.3	2177.6	2468.4	4826.3	12909.6	372214.2
8	36	2.44949	2307.8	2318.8	2628.4	5139.2	13746.7	396350.2
9	45	2.59002	2440.2	2451.8	2779.2	5434.0	14535.4	419089.3
10	55	2.72327	2565.8	2577.9	2922.2	5713.6	15283.2	440650.3

1) Observed Omega and Charmed baryons can be classified and fitted with Primary energy levels of Proton and 2 Strange bosons. See Table 10 column-6. Clearly speaking, Omega baryons can be observed at I=2 and I=20 with rest energies 1680 MeV and 2269 MeV respectively and most of the believed Charmed baryons can be observed atI=6, I=7, I/2=21,I/2=28,I/2=36,I/2=45, I/2=55, and other baryons like 2455 MeV, 2575 MeV, can be classified with Primary energy levels of (Proton and 2 Up bosons) or (Proton and 2 Strange bosons) and can be seen in columns 3 and 4.
2) Observed neutral bottom baryons can be supposed to be the secondary energy levels of Proton and two charm baryons. See the following Table 13 columns at I=72 and 90 with enrgy levels 5739 MeV and 6111 MeV.

10. Ground and Excited Charged and Neutral Light Mesons

In the previously published paper [1], the authors proposed a simple procedure for fitting and predicting the light neutral and charged mesons.

Step-1: Super symmetric boson of Proton is the mother of observed light mesons and can be called as the "Sproton".

$$\left(M_{sp}c^2\right)^{\pm} \cong \frac{m_p c^2}{\Psi} \cong 415.165\ \text{MeV} \tag{39}$$

Step-2: Primary energy levels of Sproton can be understood as follows.

$$\left.\begin{aligned}
&\left[M_{sp}c^2\right]_I^{\pm} \cong I^{\frac{1}{4}}\left(\frac{m_p c^2}{\Psi}\right) \cong I^{\frac{1}{4}}415.165\ \text{MeV}\\
&\text{where } I = n(n+1) \text{ and } n = 1,2,3..,\\
&\left[M_{sp}c^2\right]_{I/2}^{\pm} \cong \left(\frac{I}{2}\right)^{\frac{1}{4}}\left(\frac{m_p c^2}{\Psi}\right) \cong \left(\frac{I}{2}\right)^{\frac{1}{4}}415.165\ \text{MeV}
\end{aligned}\right\} \tag{40}$$

See the following Table 11. These charged states join with up or down bosons and generate neutral light mesons. **Step-3:** Ground and excited levels of Sproton couple with up or down bosons and generate neutral light mesons.

See Table 12 for neutral light mesons generated by considering Down boson of rest energy 4.18 MeV. One can see all the observed light mesons and this is a straight forward evidence for the proposed integral charge quark super symmetry and straight forward confirmation for the existence of susy partener of strongly interacting Proton.

Table 11. Charged and primary energy levels of Sproton =415.165 MeV

n	I=n(n+1)	I^(1/4)	Energy level	I/2=n(n+1)/2	(I/2)^(1/4)	Energy level
1	2	1.189207	493.7	1	1	415.2
2	6	1.565085	649.8	3	1.316074	546.4
3	12	1.86121	772.7	6	1.565085	649.8
4	20	2.114743	878.0	10	1.778279	738.3
5	30	2.340347	971.6	15	1.96799	817.0
6	42	2.54573	1056.9	21	2.140695	888.7
7	56	2.735565	1135.7	28	2.300327	955.0
8	72	2.912951	1209.4	36	2.44949	1016.9
9	90	3.08007	1278.7	45	2.59002	1075.3
10	110	3.238532	1344.5	55	2.72327	1130.6

Table 12. Neutral and primary energy levels of Sproton =415.165 MeV joined with Down boson

n	I=n(n+1)	I^(1/4)	Energy level+ Down boson	I/2=n(n+1)/2	(I/2)^(1/4)	Energy level+ Down boson
1	2	1.189207	497.9	1	1	419.3
2	6	1.565085	653.9	3	1.316074	550.6
3	12	1.86121	776.9	6	1.565085	653.9
4	20	2.114743	882.1	10	1.778279	742.5
5	30	2.340347	975.8	15	1.96799	821.2
6	42	2.54573	1061.1	21	2.140695	892.9
7	56	2.735565	1139.9	28	2.300327	959.2
8	72	2.912951	1213.5	36	2.44949	1021.1
9	90	3.08007	1282.9	45	2.59002	1079.5
10	110	3.238532	1348.7	55	2.72327	1134.8

11. Ground and Excited Neutral Heavy Quark Gluons

In the previously published paper, the authors proposed the following same procedure in understanding, fitting and predicting the heavy neutral and charged quark mesons.

Step-1: Oppositely charged quark gluons generate neutral and ground state heavy gluons.

$$\left(M_G c^2\right)^0 \cong \left(Q_{G1}c^2 + Q_{G2}c^2\right) \qquad (41)$$

where, $\left(Q_{G1}, Q_{G2}\right)$ represent any two integral charge quark gluons.

Step-2: Primary energy levels of neutral quark gluons can be understood as follows.

$$\left.\begin{aligned} &\left[M_G c^2\right]_I^0 \cong I^{\frac{1}{12}}\left(Q_{G1}c^2 + Q_{G2}c^2\right) \\ &\text{where } I = n\left(n+1\right) \text{and } n = 1, 2, 3.., \\ &\left[M_G c^2\right]_{I/2}^0 \cong \left(\frac{I}{2}\right)^{\frac{1}{12}}\left(Q_{G1}c^2 + Q_{G2}c^2\right) \end{aligned}\right\} \qquad (42)$$

See the following Table 13 to Table 25.

Table 13. Neutral and primary energy levels of Up-UP gluons

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	784.0	1	1	740.0
2	6	1.161037	859.2	3	1.095873	810.9
3	12	1.230076	910.3	6	1.161037	859.2
4	20	1.283569	949.8	10	1.211528	896.5
5	30	1.32768	982.5	15	1.253163	927.3
6	42	1.365434	1010.4	21	1.288798	953.7
7	56	1.398564	1034.9	28	1.320069	976.9
8	72	1.428163	1056.8	36	1.348006	997.5
9	90	1.454968	1076.7	45	1.373307	1016.2
10	110	1.479504	1094.8	55	1.396466	1033.4

Table 14. Neutral and primary energy levels of Down-Dopwn gluons

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	1012.8	1	1	956.0
2	6	1.161037	1110.0	3	1.095873	1047.7
3	12	1.230076	1176.0	6	1.161037	1110.0
4	20	1.283569	1227.1	10	1.211528	1158.2
5	30	1.32768	1269.3	15	1.253163	1198.0
6	42	1.365434	1305.4	21	1.288798	1232.1
7	56	1.398564	1337.0	28	1.320069	1262.0
8	72	1.428163	1365.3	36	1.348006	1288.7
9	90	1.454968	1390.9	45	1.373307	1312.9
10	110	1.479504	1414.4	55	1.396466	1335.0

Table 15. Neutral and primary energy levels of Up and Down gluons

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	898.4	1	1	848.0
2	6	1.161037	984.6	3	1.095873	929.3
3	12	1.230076	1043.1	6	1.161037	984.6
4	20	1.283569	1088.5	10	1.211528	1027.4
5	30	1.32768	1125.9	15	1.253163	1062.7
6	42	1.365434	1157.9	21	1.288798	1092.9
7	56	1.398564	1186.0	28	1.320069	1119.4
8	72	1.428163	1211.1	36	1.348006	1143.1
9	90	1.454968	1233.8	45	1.373307	1164.6
10	110	1.479504	1254.6	55	1.396466	1184.2

Table 16. Neutral and primary energy levels of Strange and Up gluons

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	1670.8	1	1	1577.0
2	6	1.161037	1831.0	3	1.095873	1728.2
3	12	1.230076	1939.8	6	1.161037	1831.0
4	20	1.283569	2024.2	10	1.211528	1910.6
5	30	1.32768	2093.8	15	1.253163	1976.2
6	42	1.365434	2153.3	21	1.288798	2032.4
7	56	1.398564	2205.5	28	1.320069	2081.7
8	72	1.428163	2252.2	36	1.348006	2125.8
9	90	1.454968	2294.5	45	1.373307	2165.7
10	110	1.479504	2333.2	55	1.396466	2202.2

Table 17. Neutral and primary energy levels of Strange and Down gluons

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	1785.2	1	1	1685.0
2	6	1.161037	1956.3	3	1.095873	1846.5
3	12	1.230076	2072.7	6	1.161037	1956.3
4	20	1.283569	2162.8	10	1.211528	2041.4
5	30	1.32768	2237.1	15	1.253163	2111.6
6	42	1.365434	2300.8	21	1.288798	2171.6
7	56	1.398564	2356.6	28	1.320069	2224.3
8	72	1.428163	2406.5	36	1.348006	2271.4
9	90	1.454968	2451.6	45	1.373307	2314.0
10	110	1.479504	2493.0	55	1.396466	2353.0

Table 18. Neutral and primary energy levels of Strange and Strange gluons

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	2557.5	1	1	2414.0
2	6	1.161037	2802.7	3	1.095873	2645.4
3	12	1.230076	2969.4	6	1.161037	2802.7
4	20	1.283569	3098.5	10	1.211528	2924.6
5	30	1.32768	3205.0	15	1.253163	3025.1
6	42	1.365434	3296.2	21	1.288798	3111.2
7	56	1.398564	3376.1	28	1.320069	3186.6
8	72	1.428163	3447.6	36	1.348006	3254.1
9	90	1.454968	3512.3	45	1.373307	3315.2
10	110	1.479504	3571.5	55	1.396466	3371.1

Table 19. Neutral and primary energy levels of Charm and Up gluons

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	3013.1	1	1	2844.0
2	6	1.161037	3302.0	3	1.095873	3116.7
3	12	1.230076	3498.3	6	1.161037	3302.0
4	20	1.283569	3650.5	10	1.211528	3445.6
5	30	1.32768	3775.9	15	1.253163	3564.0
6	42	1.365434	3883.3	21	1.288798	3665.3
7	56	1.398564	3977.5	28	1.320069	3754.3
8	72	1.428163	4061.7	36	1.348006	3833.7
9	90	1.454968	4137.9	45	1.373307	3905.7
10	110	1.479504	4207.7	55	1.396466	3971.5

Table 20. Neutral and primary energy levels of Charm and Down gluons

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	3127.5	1	1	2952.0
2	6	1.161037	3427.4	3	1.095873	3235.0
3	12	1.230076	3631.2	6	1.161037	3427.4
4	20	1.283569	3789.1	10	1.211528	3576.4
5	30	1.32768	3919.3	15	1.253163	3699.3
6	42	1.365434	4030.8	21	1.288798	3804.5
7	56	1.398564	4128.6	28	1.320069	3896.8
8	72	1.428163	4215.9	36	1.348006	3979.3
9	90	1.454968	4295.1	45	1.373307	4054.0
10	110	1.479504	4367.5	55	1.396466	4122.4

Table 21. Neutral and primary energy levels of Charm and Strange gluons

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	3899.9	1	1	3681.0
2	6	1.161037	4273.8	3	1.095873	4033.9
3	12	1.230076	4527.9	6	1.161037	4273.8
4	20	1.283569	4724.8	10	1.211528	4459.6
5	30	1.32768	4887.2	15	1.253163	4612.9
6	42	1.365434	5026.2	21	1.288798	4744.1
7	56	1.398564	5148.1	28	1.320069	4859.2
8	72	1.428163	5257.1	36	1.348006	4962.0
9	90	1.454968	5355.7	45	1.373307	5055.1
10	110	1.479504	5446.1	55	1.396466	5140.4

Table 22. Neutral and primary energy levels of Charm and Charm gluons

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	5242.2	1	1	4948.0
2	6	1.161037	5744.8	3	1.095873	5422.4
3	12	1.230076	6086.4	6	1.161037	5744.8
4	20	1.283569	6351.1	10	1.211528	5994.6
5	30	1.32768	6569.4	15	1.253163	6200.7
6	42	1.365434	6756.2	21	1.288798	6377.0
7	56	1.398564	6920.1	28	1.320069	6531.7
8	72	1.428163	7066.5	36	1.348006	6669.9
9	90	1.454968	7199.2	45	1.373307	6795.1
10	110	1.479504	7320.6	55	1.396466	6909.7

Table 23. Neutral and primary energy levels of Bottom and Strange gluons

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	6793.3	1	1	6412.0
2	6	1.161037	7444.6	3	1.095873	7026.7
3	12	1.230076	7887.2	6	1.161037	7444.6
4	20	1.283569	8230.2	10	1.211528	7768.3
5	30	1.32768	8513.1	15	1.253163	8035.3
6	42	1.365434	8755.2	21	1.288798	8263.8
7	56	1.398564	8967.6	28	1.320069	8464.3
8	72	1.428163	9157.4	36	1.348006	8643.4
9	90	1.454968	9329.3	45	1.373307	8805.6
10	110	1.479504	9486.6	55	1.396466	8954.1

Table 24. Neutral and primary energy levels of Bottom and Bottom gluons

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	8344.3	1	1	7876.0
2	6	1.161037	9144.3	3	1.095873	8631.1
3	12	1.230076	9688.1	6	1.161037	9144.3
4	20	1.283569	10109.4	10	1.211528	9542.0
5	30	1.32768	10456.8	15	1.253163	9869.9
6	42	1.365434	10754.2	21	1.288798	10150.6
7	56	1.398564	11015.1	28	1.320069	10396.9
8	72	1.428163	11248.2	36	1.348006	10616.9
9	90	1.454968	11459.3	45	1.373307	10816.2
10	110	1.479504	11652.6	55	1.396466	10998.6

Table 25. Neutral and primary energy levels of Top and Top gluons

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	27143.4	1	1	25620.0
2	6	1.161037	29745.8	3	1.095873	28076.3
3	12	1.230076	31514.5	6	1.161037	29745.8
4	20	1.283569	32885.0	10	1.211528	31039.3
5	30	1.32768	34015.2	15	1.253163	32106.0
6	42	1.365434	34982.4	21	1.288798	33019.0
7	56	1.398564	35831.2	28	1.320069	33820.2
8	72	1.428163	36589.5	36	1.348006	34535.9
9	90	1.454968	37276.3	45	1.373307	35184.1
10	110	1.479504	37904.9	55	1.396466	35777.4

In this way many neutral gluons can be predicted and observed mesons can be fitted. This fitting procedure is very simple and suggests a revision in the current 'Quark classification scheme' connected with mesons.

12. Charged Charm - Strange Excited Mesons

It is noticed that, average of charmed and strange gluon mass is (2474+1207)/2=1840.5 MeV and is very close to the first charged Charm-Strange meson. Primary energy levels of charged 1840.5 MeV gluons can be understood as follows.

$$\left.\begin{array}{l} \left[M_{SC}c^2\right]_I^{\pm} \cong I^{\frac{1}{12}} \times 1840.5 \text{ MeV} \\ \text{where } I = n(n+1) \text{ and } n = 1,2,3.., \\ \left[M_{SC}c^2\right]_{I/2}^{\pm} \cong \left(\frac{I}{2}\right)^{\frac{1}{12}} \times 1840.5 \text{ MeV} \end{array}\right\} \qquad (43)$$

See the following Table 26. With this 1840.5 MeV, the historical excited levels of charmed strange mesons 1968 MeV, 2112 MeV, 2317 MeV, 2460 MeV, 2532 MeV, 2572 MeV, 2632 MeV, 2700 MeV, 2860 MeVand 3044 MeV can be fitted. This data strongly support the current classification scheme of charmed strange mesons including 1968 MeV.

Table 26. Charged and primary energy levels of Sprotonic gluon

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	1949.9	1	1	1840.5
2	6	1.161037	2136.9	3	1.095873	2017.0
3	12	1.230076	2264.0	6	1.161037	2136.9
4	20	1.283569	2362.4	10	1.211528	2229.8
5	30	1.32768	2443.6	15	1.253163	2306.4
6	42	1.365434	2513.1	21	1.288798	2372.0
7	56	1.398564	2574.1	28	1.320069	2429.6
8	72	1.428163	2628.5	36	1.348006	2481.0
9	90	1.454968	2677.9	45	1.373307	2527.6
10	110	1.479504	2723.0	55	1.396466	2570.2

13. Ground and Excited Charged Gluons of Sproton

Charged “Sproton” transforms to gluonic form and generates the currently belived charmed strange mesons in the following way. Gluonic form of Sproton follows the same concept of quark gluon and its relation can be expressed as follows.

$$\left(M_X c^2\right)^{\pm} \cong \frac{1}{2\Upsilon}\left[M_{Hb}^2 \times M_{sb}\right]^{\frac{1}{3}} c^2 \cong 2213.78 \text{ MeV} \qquad (44)$$

Primary energy levels of charged heavy Sprotonic gluons can be understood as follows.

$$\left.\begin{aligned} &\left[M_X c^2\right]_I^{\pm} \cong I^{\frac{1}{12}} \times 2213.78 \text{ MeV} \\ &\text{where } I = n(n+1) \text{ and } n = 1, 2, 3.., \\ &\left[M_X c^2\right]_{I/2}^{\pm} \cong \left(\frac{I}{2}\right)^{\frac{1}{12}} \times 2213.78 \text{ MeV} \end{aligned}\right\} \qquad (45)$$

See the following Table 27. The historical excited levels of charmed strange mesons 2317 MeV, 2460 MeV, 2572 MeV, 2632 MeV, 2700 MeV, 2860 MeVand 3044 MeV can be seen approximately.

Table 27. Charged and primary energy levels of Sprotonic gluon

n	I=n(n+1)	I^(1/12)	Energy level	I/2=n(n+1)/2	(I/2)^(1/12)	Energy level
1	2	1.059463	2345.4	1	1	2213.8
2	6	1.161037	2570.3	3	1.095873	2426.0
3	12	1.230076	2723.1	6	1.161037	2570.3
4	20	1.283569	2841.5	10	1.211528	2682.1
5	30	1.32768	2939.2	15	1.253163	2774.2
6	42	1.365434	3022.8	21	1.288798	2853.1
7	56	1.398564	3096.1	28	1.320069	2922.3
8	72	1.428163	3161.6	36	1.348006	2984.2
9	90	1.454968	3221.0	45	1.373307	3040.2
10	110	1.479504	3275.3	55	1.396466	3091.5

14. Discussuion

For the present situation, it may not be possible to classify the hierarchy of the currently believed fundamental physical constants. But the authors are sure to say that, with the proposed relations it is certainly possible to correlate the physical constants of various branches of physics at fundamental level. In a semi empirical approach, the authors well connected the strong coupling constant and gravitational constant and clearly defined the quark mass generation formulae and relations. Even though all the relations are semi empirical, quark mass generation procedure has been interlinked with the strong coupling constant at fundamental level. Formulae for primary and secondary energy levels are very simple and are very easy to understand. By selecting suitable selection rules, number of baryonic and mesonic energy levels can be fine tuned and thus both, data fitting and data prediction can be made simple and straight forward. From the relations and data, one can easily understand the simpified scheme of “integral charge super symmetry” related to strong interaction and weak interaction. ‘Higgs fermion’ and ‘Higgs boson’ concepts can be recommended for in-depth discussion at fundamental level. With further research and analysis, both Standard model and SUSY can be studied in a unfied manner and the link between weakly interacting fermions and weakly interacting gravitons can be understood.

15. Conclusions

From all the above concepts, relations and data, it can be suggested that,

1. With reference to the well known Schwarzschild interaction, existence of $G_A \cong N_A^2 G$ can be confirmed with great confidence.
2. Fermion and boson mass ratio can be considered as 2.26 and can be recommended for implementation in current SUSY physics.
3. With reference to the well known observed elementary particle data starting from charged leptons to the (believed) top quark, integral charge Quark and Higgs super symmetry concepts can be recommended for further research and analysis.
4. $\left(\frac{\hbar c}{G_A m_e^2}\right)$ can be considered as a fundamental form of unified elementary interaction strength. By nature, if one is willing to consider strong coupling constant as the utmost fundamental physical constant, then quantitatively it is possible to show that, $m_e \cong \left(\frac{1}{\alpha_s}\right)^{3/2}\sqrt{\frac{\hbar c}{G_A}}.$
5. From particle physics point of view, both $\sqrt{\frac{\hbar c}{G_A}}$ and $\sqrt{\frac{e^2}{4\pi\varepsilon_0 G_A}}$ can be considered as characteristic weakly interacting ‘dark matter’ mass units.

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

[1] 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.

[2] 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.

[3] 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.

[4] U. V. S. Seshavatharam and S. Lakshminarayana. Calculating the energy of electron in H-atom using modified SUSY physics. Journal of Nuclear Physics, Material Sciences, Radiation and Applications Vol. 2, No. 2 November 2014pp. 1-13.

[5] Patrick Draper et al. Implications of a 125 GeV Higgs for the MSSM and Low-Scale SUSY Breaking. Phys. Rev. D 85, 095007 (2012).

[6] Weinberg, Steven, The Quantum Theory of Fields: Super symmetry, Cambridge University Press, Cambridge, Vol. 3 (1999).

[7] L. Gordon Kane and M. Shifman, eds. The Super symmetric World: The Beginnings of the Theory, World Scientific, Singapore (2000).

[8] Roger Penrose. Chandrasekhar, Black Holes, and Singularities. J. Astrophys. Astr. (1996) 17, 213-231.

[9] Subrahmanyan Chandrasekhar. On Stars, Their Evolution and Their Stability',Nobel Prize lecture, December 8, 1983.

[10] U. V. S. Seshavatharam and S. Lakshminarayana. Logic Behind the Squared Avogadro Number and SUSY. International Journal of Applied and Natural Sciences. Vol. 2, Issue 2, 23-40 (2013).

[11] U. V. S. Seshavatharam and S. Lakshminarayana. Nucleus in Strong nuclear gravity. Proceedings of the DAE Symp. On Nucl. Phys. 56: 302, 2011.

[12] U. V. S. Seshavatharam and S. Lakshminarayana. On the plausibility of final unification with Avogadro Number. Prespace time journal, Vol 5, issue 10, pp1028-1041. (2014).

[13] U. V. S. Seshavatharam and S. Lakshminarayana, Role of Avogadro number in grand unification. Hadronic Journal. Vol-33, No 5, (2010) October. p 513.

[14] U. V. S. Seshavatharam and S. Lakshminarayana. On fixing the magnitudes of gravitational constant and strong coupling constant. International Journal of Advanced Astronomy, 3 (1) 17-23, (2015).

[15] U. V. S. Seshavatharam, and S. Lakshminarayana, On the Role of Schwarzschild Interaction in Understanding Strong Interaction and Nuclear Binding Energy. Frontiers of Astronomy, Astrophysics and Cosmology, vol. 1, no. 1 (2015): 43-55.

[16] U. V. S. Seshavatharam, Lakshminarayana S. Final unification with Schwarzschild's Interaction.. Journal of Applied Physical Science International 3(1): 12-22, 2015.

[17] V.M. Abazov at al. Determination of the strong coupling constant from the inclusive jet cross section in $P\overline{P}$ ollisions at √s = 1.96 TeV. Phys.Rev.D80:111107, 2009.

[18] K.A. Olive et al. (Particle Data Group), Chin. Phys. C, 38, 090001 (2014)

[19] J. Mohr, B.N. Taylor, and D.B. Newell . CODATA Recommended Values of the Fundamental Physical Constants:2010" by in Rev. Mod. Phys. 84, 1527 (2012). http://pdg.lbl.gov/2014/reviews/rpp2014-rev-phys-constants.pdf

[20] Geiger H and Marsden E. On a diffuse reaction of the particles. Proc. Roy. Soc., Ser. A 82: 495-500, (1909).

[21] U. V. S. Seshavatharam and S. Lakshminarayana. On the Role of Up & Down Quarks in Understanding Nuclear Binding Energy. (Part I) and (Part II)). Prespacetime Journal, Volume 6, Issue 2, pp. 120-142. February 2015.

[22] U. V. S. Seshavatharam and S. Lakshminarayana. On the role of RMS radius of proton in understanding nuclear binding energy. Journal of Applied Physical Science International, Vol.: 2, Issue. 3 , p84-100, 2015.

[23] U. V. S. Seshavatharam and S. Lakshminarayana. Scale Independent Unified Quark Physics. Prespacetime Journal, Volume 6, Issue 3, pp. Vol 6, issue 3, P177-192. March 2015.

[24] U. V. S. Seshavatharam and S. Lakshminarayana. On the Ratio of Nuclear Binding Energy & Protons Kinetic Energy. Prespacetime Journal, Volume 6, Issue 3, pp. March 2015. (To be appeared).

[25] J.A. Maruhn et al., Simple Models of Many-Fermion Systems, Springer-Verlag Berlin Heidelberg 2010. Chapter 2, page: 45-70.