Integral charge 3 quark bound system with binding energy 939 MeV

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Abstract. In the previous paper [1] it is suggested that there exists integral charge effective quark fermi-gluons and quark boso-gluons. Effective quark fermi-gluons generates charged ground state baryons and quark boso-gluons generates ground state neutral mesons. In this paper it is suggested that with a binding energy of 939 MeV any 3 (effective) quark fermi-gluons couples together to form a charged ground state baryon. Square root of any 2 quark fermi-gluons or cubic root of any 3 quark fermi-gluons can be called as 'hybrid' quark fermi-gluons. Hybrid quark fermi-gluons of up and down are 746 MeV, 779 MeV and 813 MeV. Out of 6 quark fermi-gluons, for a three quark bound system (with binding energy 939 MeV) different combinations of quark fermi-gluons and hybrid quark fermi-gluons can be possible and hence different ground state baryons can be generated with different quark flavors. If n=1, 2, 3,.. excited energy levels follows $[n\,(n+1)]^{\frac{1}{12}}$ or $\left[\frac{n(n+1)}{2}\right]^{\frac{1}{12}}$ $\times$ sum of 3 quark fermi-gluons rest energy. Another interesting thing is that light quark bosons like up boson mass =1.94 MeV and down boson mass=4.2 MeV couples with these ground or excited states to form doublets and triplets. 3 up quark fermi-gluons having rest energy 3×685 MeV and binding energy 939 MeV generates a ground state charged baryon of rest energy $(3 \times 685) - 939 \cong 1116\ MeV$. Up boson mass =1.94 MeV couples with this charged state and generates a neutral baryon at 1118 MeV. Two up and one down quark fermi-gluons having binding enegy 939 MeV generates charged $(2 \times 685 + 885) - 939 \cong 1316 MeV$. One up and two down quark fermi-gluons having binding enegy 939 MeV generates charged $(685 + 2 \times 885) - 939 \cong 1516 MeV$. Thus 1177 MeV and 1377 MeV ground state charged baryons can be generated. This idea can be applied to other heavy quark fermi-gluons.

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1. Introduction

Till now no negative comments received for the previous paper [1]. Keeping this in view this second paper is prepared. Estimated or phenomenological [2, 3] masses of up and down quarks are 1.3 to 3.3 MeV and 4.1 to 5.8 MeV respectively. In any way their sum is not matching with the nucleons rest energy. There should be some reason for this mismatch. By assigning the 'colour' property standard model assumes that Ω *baryon constitutes 3 strange quarks having charge* $-\frac{1}{3}e$*. In standard model there exists 8 gluons having 'colour' charge with no rest mass and in between the quarks strong interaction is mediated by these gluons. Now a days field experts are thinking about penta quarks! If gluons has no rest mass and up, down and strange quarks mass sum is small (compared to the baryons rest mass) how to fit or predict the baryons rest mass?*

To over come this difficulty in this paper [1] it is assumed that there exists integral charge quark fermions, integral charge quark bosons, integral charge (massive) quark fermi-gluons and integral charge (massive) quark boso-gluons. If effective up quark mass is 2.45 MeV its corresponding effective up fermi-gluon mass is 685 MeV. If effective down quark mass is 5.28 MeV its corresponding effective down fermi-gluon mass is 885 MeV. If effective strange quark mass is 85.1 MeV its corresponding effective strange fermi-gluon mass is 2234 MeV. If it is assumed that these quark fermi-gluons constitutes integral chage then any 2 quark fermi-gluons having net charge 'zero' and couples with one $\pm e$ *quark fermi-gluon and generates a* $\pm e$ *charged baryon. This can be understood as having integral charge, any 2 quark fermi-gluons couples together to form a neutral boson and neutral boson couples with another quark fermi-gluon and thus Pauli exclusion principle is maintained. This is the basic idea of this paper. In this way observed baryons mass can be fitted. In the previous paper authors proposed a method [1] for nucleons mass generation.*

2. Integral charge quark efective fermions, quark bosons, massive quark efective fermi-gluons and massive quark boso-gluons

It is assumed [1] that, up quark can have a corresponding up boson, down quark can have a corresponding down boson and so on. Mass of quark boson is assumed as,

$$Q_b \cong \frac{mass\ of\ quark\ fermion}{\Psi} \cong \frac{Q_f}{\Psi}. \tag{1}$$

Here $\Psi \cong \ln\left(6+\sqrt{13}\right) \cong 2.262341189$ *is a new number [1] can be called as the super symmetric fermion-boson mass ratio. Can we call these bosons as up boson, down boson etc? The twist is that, the left over mass in quark fermion behaves as the effective qaurk fermion having mass as*

$$Q_{fe} \cong \left(1-\frac{1}{\Psi}\right) Q_f \cong 0.55798 \times Q_f. \tag{2}$$

Not only that, these quark effective fermions and quark bosons transform into corresponding massive charged quark effective fermi-gluons and quark boso-gluons. For

Quark	Q_{fe} MeV	Q_{fg} MeV	Q_b MeV	Q_{bg} MeV
Up	$U_{fe} \cong 2.45 \cong 0.558 \times 4.4$	$U_{fg} \cong 685$	$U_b \cong 1.94$	$U_{bg} \cong 368$
Down	$D_{fe} \cong 5.28 \cong 0.558 \times 9.47$	$D_{fg} \cong 885$	$D_b \cong 4.187$	$D_{bg} \cong 475$
Strange	$S_{fe} \cong 85.09 \cong 0.558 \times 152.5$	$S_{fg} \cong 2234$	$S_b \cong 67.4$	$S_{bg} \cong 1200$
Charm	$C_{fe} \cong 732.9 \cong 0.558 \times 1313.5$	$C_{fg} \cong 4580$	$C_b \cong 580.6$	$C_{bg} \cong 2459$
Bottom	$B_{fe} \cong 2950.0 \cong 0.558 \times 5286.9$	$B_{fg} \cong 7286$	$B_b \cong 2337$	$B_{bg} \cong 3912$
Top	$T_{fe} \cong 101620 \cong 0.558 \times 182121$	$T_{fg} \cong 23706$	$T_b \cong 80505$	$T_{bg} \cong 12728$

Table 1. Effective quark, effective quark fermi-gluon, quark boson and quark boso-gluon masses.

the 'effective quark fermion' its corresponding 'effective fermi-gluon mass' is given by

$$Q_{fg} \cong \left(11450^2 \times Q_{fe}\right)^{\frac{1}{3}}. \tag{3}$$

For the 'quark boson' its corresponding 'quark boso-gluon mass' is given by

$$Q_{bg} \cong \left[\left(\frac{11450}{\Psi}\right)^2 \times Q_b\right]^{\frac{1}{3}} \cong \left[5061^2 \times Q_b\right]^{\frac{1}{3}}. \tag{4}$$

Here 11450 MeV is the assumed [1, 5, 6] strongly interacting sub quark fermion and 5061 MeV is its corresponding sub quark boson. Here the interesting idea is that, these are having integral charges but not fractional charges. For baryons, role of quark fermions is taken up by the new efective quark fermi-gluons. For mesons, role of quark fermions is taken up by the quark boso-gluons.

3. Different combinations of quark fermi-gluons

In this paper it is suggested that with a binding energy of 939 MeV any 3 (effective) quark fermi-gluons couples together to form a charged ground state baryon. Note that this is a simple algebraic sum. This idea is very similar to the nuclear binding energy. Why the binding energy is 939 MeV is an interesting question to be answered. Authors are working in this direction. For the time being by selecting different combinations and comparing them with the observable baryons proposed ideas can be analyzed. By considering $3U_{fg} - 939 \cong (1116)^{\pm e}$ *MeV is obtained. This rest energy is close to the* $\wedge^0$ *particle. But charge is different.*

In the previous paper it is also suggested that there exists quark bosons having integral charge. Rest energy of quark bosons are $U_b \cong 1.94$ *MeV,* $D_b \cong 4.19$ *MeV,* $S_b \cong 67.4$ *MeV,* $C_b \cong 580.6$ *MeV,* $B_b \cong 2337.0$ *MeV and* $T_b \cong 80505.0$ *MeV. Interesting thing is that light quark bosons like up boson mass =1.94 MeV and down boson mass=4.2 MeV couples with these ground or excited states to form doublets and triplets. If 1116 MeV having charge* $\pm e$ *couples with up boson having charge* $\mp e$ *then neutral states can be obtained. This idea can be applied to any ground or excited state of the obtained charged*

First	Second	Third	Sum, MeV	Sum-939, MeV
U_{fg}	U_{fg}	U_{fg}	2055	1116
U_{fg}	U_{fg}	D_{fg}	2255	1316
U_{fg}	D_{fg}	D_{fg}	2455	1516
D_{fg}	D_{fg}	D_{fg}	2655	1716
U_{fg}	U_{fg}	$\left(U_{fg}^2 D_{fg}\right)^{\frac{1}{3}}$	2116	1177
U_{fg}	D_{fg}	$\left(U_{fg}^2 D_{fg}\right)^{\frac{1}{3}}$	2316	1377
D_{fg}	D_{fg}	$\left(U_{fg}^2 D_{fg}\right)^{\frac{1}{3}}$	2516	1577
U_{fg}	U_{fg}	$\left(D_{fg}^2 U_{fg}\right)^{\frac{1}{3}}$	2183	1244
U_{fg}	D_{fg}	$\left(D_{fg}^2 U_{fg}\right)^{\frac{1}{3}}$	2383	1444
D_{fg}	D_{fg}	$\left(D_{fg}^2 U_{fg}\right)^{\frac{1}{3}}$	2583	1644
U_{fg}	U_{fg}	$(U_{fg} D_{fg})^{\frac{1}{2}}$	2149	1210
U_{fg}	D_{fg}	$(U_{fg} D_{fg})^{\frac{1}{2}}$	2349	1410
D_{fg}	D_{fg}	$(U_{fg} D_{fg})^{\frac{1}{2}}$	2549	1610

Table 2. Fitting of Up and Down baryons mass spectrum.

baryon. Sum of up and down boson masses is $1.94 + 4.19 \cong 6.13$ *MeV. Considering doublets and triplets it is noticed that,* $(x \times 1.94) + (y \times 4.19)$ *MeV where x, and y are integers* $= 1, 2, 3, .. \leq 3$ *couples with the charged baryons and generates doublets and triplets.*

4. Hybrid quark fermi-gluons and Hybrid ground state baryons

Another interesting twist is that square root of any 2 quark fermi-gluons or cubic root of any 3 quark fermi-gluons can be called as 'hybrid' quark fermi-gluons. Hybrid quark fermi-gluons of up and down are $\left(U_{fg}^2 D_{fg}\right)^{\frac{1}{3}} \cong 746$ *MeV,* $(U_{fg} D_{fg})^{\frac{1}{2}} \cong 779$ *MeV,* $\left(D_{fg}^2 U_{fg}\right)^{\frac{1}{3}} \cong 813$ *MeV. These hybrid quark fermi-gluons having 2 or 3 different quark flavors couples with one or two plain quark flavors. Such combinations can be called as hybrid quark fermi-gluon combinations. It is also noticed that most of the observed baryons are of this type only. This idea can be applied to heavy quarks. Out of 6 quark fermi-gluons, for a three quark bound system (with binding energy 939 MeV) different combinations of quark fermi-gluons and hybrid quark fermi-gluons can be possible and hence different ground state baryons can be generated with different quark flavors. In this way a number of 3 quark fermi-gluons combinations can be predicted easily. But the problem is how to classify the observed baryons in this new classification scheme? Authors are working in this new direction.*

In this paper some ground state charged baryons are predicted and fitted. In table-2, *row-6 and column-5 baryon is* $(1177)^{\pm e}$. *It is obtained as* $2U_{fg}+\left(U_{fg}^2D_{fg}\right)^{\frac{1}{3}}\cong 2116\ MeV$ *and* $2116-939\cong 1177\ MeV$. $(1177\ MeV)^{\pm e}+2\,(1.94+4.19\ MeV)^0\cong(1189\ MeV)^{\pm e}$. $(1189\ MeV)^{\pm e}+(4.19\ MeV)^{\mp e}\cong(1193\ MeV)^0$. $(1193\ MeV)^0+(4.19\ MeV)^{\pm e}\cong(1197\ MeV)^{\pm e}$. *These baryons can be compared with* Σ *baryons. Ground state Charmed baryons and Bottom baryons can be observed in tables 5, 6 and 7.*

5. Excited levels of ground states

In the previous paper it is suggested that quark fermi-gluons follows super fine rotational levels as

$$[n\,(n+1)]^{\frac{1}{12}}\quad\text{and}\quad\left[\frac{n\,(n+1)}{2}\right]^{\frac{1}{12}}. \tag{5}$$

Note that $\left[\frac{n(n+1)}{2}\right]^{\frac{1}{12}}$ *are the root mean square [5, 6] levels of* n *and* $\sqrt{n}$ *where n=1, 2, 3,.. The surprising observation is that in particle physics excited massive states are*

First	Second	Third	Sum, MeV	Sum-939, MeV
U_{fg}	U_{fg}	$\left(U_{fg}^2S_{fg}\right)^{\frac{1}{3}}$	2386	1447
U_{fg}	D_{fg}	$\left(U_{fg}^2S_{fg}\right)^{\frac{1}{3}}$	2586	1647
D_{fg}	D_{fg}	$\left(U_{fg}^2S_{fg}\right)^{\frac{1}{3}}$	2786	1847
U_{fg}	U_{fg}	$\left(D_{fg}^2Sfg\right)^{\frac{1}{3}}$	2575	1636
U_{fg}	D_{fg}	$\left(D_{fg}^2S_{fg}\right)^{\frac{1}{3}}$	2775	1836
D_{fg}	D_{fg}	$\left(D_{fg}^2S_{fg}\right)^{\frac{1}{3}}$	2975	2036
U_{fg}	U_{fg}	$(U_{fg}D_{fg}S_{fg})^{\frac{1}{3}}$	2476	1537
U_{fg}	D_{fg}	$(U_{fg}D_{fg}S_{fg})^{\frac{1}{3}}$	2676	1737
D_{fg}	D_{fg}	$(U_{fg}D_{fg}S_{fg})^{\frac{1}{3}}$	2876	1937
U_{fg}	U_{fg}	$(S_{fg}U_{fg})^{\frac{1}{2}}$	2607	1668
U_{fg}	D_{fg}	$(S_{fg}U_{fg})^{\frac{1}{2}}$	2807	1868
D_{fg}	D_{fg}	$(S_{fg}U_{fg})^{\frac{1}{2}}$	3007	2068
U_{fg}	U_{fg}	$\left(S_{fg}^2U_{fg}\right)^{\frac{1}{3}}$	2876	1937
U_{fg}	D_{fg}	$\left(S_{fg}^2U_{fg}\right)^{\frac{1}{3}}$	3076	2137
D_{fg}	D_{fg}	$\left(S_{fg}^2U_{fg}\right)^{\frac{1}{3}}$	3276	2337
U_{fg}	U_{fg}	$\left(S_{fg}^2D_{fg}\right)^{\frac{1}{3}}$	3011	2072
U_{fg}	D_{fg}	$\left(S_{fg}^2D_{fg}\right)^{\frac{1}{3}}$	3211	2272
D_{fg}	D_{fg}	$\left(S_{fg}^2D_{fg}\right)^{\frac{1}{3}}$	3411	2472

Table 3. Fitting of Strange, Up and Down baryons mass spectrum.

First	Second	Third	Sum, MeV	Sum-939, MeV
U_{fg}	U_{fg}	$\left(U_{fg}^2 C_{fg}\right)^{\frac{1}{3}}$	2660	1721
U_{fg}	D_{fg}	$\left(U_{fg}^2 C_{fg}\right)^{\frac{1}{3}}$	2860	1921
D_{fg}	D_{fg}	$\left(U_{fg}^2 C_{fg}\right)^{\frac{1}{3}}$	3060	2121
U_{fg}	U_{fg}	$\left(D_{fg}^2 Cfg\right)^{\frac{1}{3}}$	2901	1962
U_{fg}	D_{fg}	$\left(D_{fg}^2 C_{fg}\right)^{\frac{1}{3}}$	3101	2162
D_{fg}	D_{fg}	$\left(D_{fg}^2 C_{fg}\right)^{\frac{1}{3}}$	3301	2362
U_{fg}	U_{fg}	$(U_{fg} D_{fg} C_{fg})^{\frac{1}{3}}$	2776	1837
U_{fg}	D_{fg}	$(U_{fg} D_{fg} C_{fg})^{\frac{1}{3}}$	2976	2037
D_{fg}	D_{fg}	$(U_{fg} D_{fg} C_{fg})^{\frac{1}{3}}$	3176	2237
U_{fg}	U_{fg}	$(C_{fg} U_{fg})^{\frac{1}{2}}$	3141	2202
U_{fg}	D_{fg}	$(C_{fg} U_{fg})^{\frac{1}{2}}$	3341	2402
D_{fg}	D_{fg}	$(C_{fg} U_{fg})^{\frac{1}{2}}$	3541	2602
U_{fg}	U_{fg}	$(C_{fg} D_{fg})^{\frac{1}{2}}$	3383	2444
U_{fg}	D_{fg}	$(C_{fg} D_{fg})^{\frac{1}{2}}$	3583	2644
D_{fg}	D_{fg}	$(C_{fg} D_{fg})^{\frac{1}{2}}$	3783	2844

Table 4. Fitting of Charm, Up and Down baryons mass spectrum.

First	Second	Third	Sum, MeV	Sum-939, MeV
U_{fg}	U_{fg}	$\left(S_{fg}^2 B_{fg}\right)^{\frac{1}{3}}$	4683	3744
U_{fg}	D_{fg}	$\left(S_{fg}^2 B_{fg}\right)^{\frac{1}{3}}$	4883	3944
D_{fg}	D_{fg}	$\left(S_{fg}^2 B_{fg}\right)^{\frac{1}{3}}$	5083	4144
U_{fg}	U_{fg}	$(B_{fg} S_{fg})^{\frac{1}{2}}$	5404	4465
U_{fg}	D_{fg}	$(B_{fg} S_{fg})^{\frac{1}{2}}$	5604	4665
D_{fg}	D_{fg}	$(B_{fg} S_{fg})^{\frac{1}{2}}$	5804	4865
U_{fg}	U_{fg}	$\left(B_{fg}^2 S_{fg}\right)^{\frac{1}{3}}$	6283	5344
U_{fg}	D_{fg}	$\left(B_{fg}^2 S_{fg}\right)^{\frac{1}{3}}$	6483	5544
D_{fg}	D_{fg}	$\left(B_{fg}^2 S_{fg}\right)^{\frac{1}{3}}$	6683	5744

Table 5. Fitting of Up, Down, Strange and Bottom baryons mass spectrum.

following two types of discrete levels. They are

$$[n(n+1)]^{\frac{1}{12}}\, Sum \;\text{ and }\; \left[\frac{n(n+1)}{2}\right]^{\frac{1}{12}} Sum. \tag{6}$$

First	Second	Third	Sum, MeV	Sum-939, MeV
S_{fg}	U_{fg}	$\left(S_{fg}^2 C_{fg}\right)^{\frac{1}{3}}$	5757	4818
S_{fg}	D_{fg}	$\left(S_{fg}^2 C_{fg}\right)^{\frac{1}{3}}$	5957	5018
S_{fg}	S_{fg}	$\left(S_{fg}^2 C_{fg}\right)^{\frac{1}{3}}$	7305	6366
S_{fg}	U_{fg}	$(C_{fg} S_{fg})^{\frac{1}{2}}$	6118	5179
S_{fg}	D_{fg}	$(C_{fg} S_{fg})^{\frac{1}{2}}$	6318	5379
S_{fg}	S_{fg}	$(C_{fg} S_{fg})^{\frac{1}{2}}$	7667	6728
S_{fg}	U_{fg}	$\left(C_{fg}^2 S_{fg}\right)^{\frac{1}{3}}$	6524	5585
S_{fg}	D_{fg}	$\left(C_{fg}^2 S_{fg}\right)^{\frac{1}{3}}$	6724	5785
S_{fg}	S_{fg}	$\left(C_{fg}^2 S_{fg}\right)^{\frac{1}{3}}$	8073	7134

Table 6. Fitting of Strange and Charm baryons mass spectrum.

First	Second	Third	Sum, MeV	Sum-939, MeV
S_{fg}	U_{fg}	$\left(S_{fg}^2 B_{fg}\right)^{\frac{1}{3}}$	6232	5293
S_{fg}	D_{fg}	$\left(S_{fg}^2 B_{fg}\right)^{\frac{1}{3}}$	6432	5493
S_{fg}	S_{fg}	$\left(S_{fg}^2 B_{fg}\right)^{\frac{1}{3}}$	7781	6842
S_{fg}	U_{fg}	$(B_{fg} S_{fg})^{\frac{1}{2}}$	6953	6014
S_{fg}	D_{fg}	$(B_{fg} S_{fg})^{\frac{1}{2}}$	7153	6214
S_{fg}	S_{fg}	$(B_{fg} S_{fg})^{\frac{1}{2}}$	8502	7563
S_{fg}	U_{fg}	$\left(B_{fg}^2 S_{fg}\right)^{\frac{1}{3}}$	7832	6893
S_{fg}	D_{fg}	$\left(B_{fg}^2 S_{fg}\right)^{\frac{1}{3}}$	8032	7093
S_{fg}	S_{fg}	$\left(B_{fg}^2 S_{fg}\right)^{\frac{1}{3}}$	9381	8442

Table 7. Fitting of Strange and Bottom baryons mass spectrum.

where $I = n\,(n+1)$ *and n=1, 2, 3,.. Observable rest energy of the excited baryon is*

$$[I]^{\frac{1}{12}}\, Sum - 939\ MeV. \tag{7}$$

$$\left[\frac{I}{2}\right]^{\frac{1}{12}} Sum - 939\ MeV. \tag{8}$$

Presently understood "Regge trajectory" of some of the baryons can be fitted in this way. These levels can be called as 'super fine rotational levels'.

6. Up and down baryons charge-mass spectrum

See the following tables 8 and 9. Notice the bold face excited baryon masses. Sum of up and down boson masses is $1.94 + 4.19 \cong 6.13$ *MeV. Up and*

level	$3U_{fg} \cong 2055$	$2U_{fg} + D_{fg} \cong 2255$	$U_{fg} + 2D_{fg} \cong 2455$	$3D_{fg} \cong 2655$
$2^{\frac{1}{12}}$	**1238**	**1450**	**1662**	1874
$3^{\frac{1}{12}}$	**1313**	**1532**	1751	1971
$6^{\frac{1}{12}}$	**1447**	**1679**	1911	2144
$10^{\frac{1}{12}}$	1550	1793	2035	2278
$12^{\frac{1}{12}}$	1589	1835	2081	2327
$15^{\frac{1}{12}}$	1636	1887	2138	2388
$20^{\frac{1}{12}}$	1699	1955	2212	2469
$21^{\frac{1}{12}}$	1709	1967	2225	2183

Table 8. $\wedge, \Sigma, \Xi$ *and* Ω baryons charge-mass spectrum.

level	$2U_{fg} + \left(U_{fg}^2 D_{fg}\right)^{\frac{1}{3}} \cong 2116$	$U_{fg} + D_{fg} + \left(U_{fg}^2 D_{fg}\right)^{\frac{1}{3}} \cong 2316$
$2^{\frac{1}{12}}$	**1303**	**1515**
$3^{\frac{1}{12}}$	**1380**	1599
$6^{\frac{1}{12}}$	1518	1750
$10^{\frac{1}{12}}$	1625	1867
$12^{\frac{1}{12}}$	1664	1910
$15^{\frac{1}{12}}$	1713	1963
$20^{\frac{1}{12}}$	1777	2034
$21^{\frac{1}{12}}$	1788	2046

Table 9. $\wedge, \Sigma, \Xi$ *and* Ω hybrid baryons charge-mass spectrum.

down quark bosons $(x \times 1.94) + (y \times 4.19)$ MeV *where* x, *and* y *are integers* $=1, 2, 3, . \leq 3$ *couples with ground state and excited* $(\pm e)$ *charged baryons and generates doublets and triplets. For example in table-8 consider row-3 and column-3. Charged baryon mass is* $(1532\, MeV)^{\pm e}$. *This charged state couples with up boson as* $(1532\, MeV)^{\pm e} + (1.94\, MeV)^{\mp e} \cong (1534\, MeV)^0$ *or couples with down boson as* $(1532\, MeV)^{\pm e} + (4.19\, MeV)^{\mp e} \cong (1536\, MeV)^0$ *or* $(1532\, MeV)^{\pm e} + (1.94 + 4.19\, MeV)^0 \cong (1538\, MeV)^{\pm e}$. *This idea can be applied to any charged baryon.*

Conclusions

Till now no negative comments received for the previous paper [1]. Keeping this in view this second paper is prepared. In this paper with the proposed ideas so many ground state baryons and their excited levels are proposed for verification. These ideas are applied to heavy quarks also. Authors request the science community for further analysis.

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Request

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