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The Unified Theory in the Big-bang Universe

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Abstract: *The novel Unified Theory of Everything is established with the institution of the Quantum Quark Dynamics for the strong interaction from the successful explication of the long-quested origin of the fine structure constant ratio "137."The theory demonstrates that Nature is astute and simple, enabling to predict with simple arithmetic all the masses of the elementary particles in one-to-one agreement with the observed values. The united theory also explicated the multi-quark physics that leads to the multi-spaces that culminate in the {real, imaginary} dual-time Universe with the singularity black hole core and the "Bang!" of the"big-bang".*

Keywords: *Unified Theory of Everything, Quantum Quark Dynamics, Big-Bang.*

1. INTRODUCTION

The Unified Theory of Everything—that has long been regarded to be beyond human fathomability—has been successfully established with the introduction of the Quantum Quark Dynamics (QQD) of strong interaction, whereupon all interactions arise from the electronic Charges in varied guises [1, 2].

The predicted quarks and leptons (and associated particles), for example, in one-to-one agreement with observation are exhibited in the Particle Femto scope in Fig.1 (see §2). The QQD in the unified theory goes on to explain the quark interaction mechanism in all the multi-quark states, starting from the simple nucleons: how the 3 (compressible) quarks in P{uud} and N{udd}—that together weigh only O(10 MeV)in free states—are compressed by the universal QQD force, increasing to their total mass of 940 MeV in simple arithmetic [2].

In terms of the prevalent physics, in stark contrast, the heavy nucleonmasses come from the interactions of gluons and (free) quarks and quark-antiquark pairs in zillions that zip around near the speed of light, banging each other and appearing and disappearing inside the nucleons [3]. This banal shenanigan goes on for all other multi-quark states. Einstein, who warned that "If you cannot explain it simply, you don't understand it well enough," would flatly reject it as a nonsense. The Higgs physics and the QCD in fact create quandaries, their explanations for the multi quark state formations more inconsonant and muddled that even the super-computers cannot extricate the botch.

This paper goes on to explain for the first time the various inordinate mysteries in physics that have been attributed to the creator's secret recipes ever beyond human comprehension:

1) The origin of the fine structure constant ratio of $\alpha_{strong}/\alpha_{em} = 137$ [1]. Because of the inordinately disparate nature of the strong interaction, the great Richard Feynmanin fact lamented: "Nobody knows. It ("137") is one of the greatest damn mysteries of physics: a magic number that comes to us with no understanding by man. You might say the Hand of God wrote that number, and we don't know how He pushed His pencil." [4]

When Wolfgang Pauli passed on, it was said, he asked none other than the Heavenly God, "Why is alpha equals to one over 137?" Werner Heisenberg also proclaimed that all the quandaries of quantum mechanics would be shriveled when "137" was explained [1,2].

The origin of this signal number "137" has been explicated through the novel Quantum Quark Dynamics (QQD)[see §3], where its field fortifies in multiplication of inversely squared fractional quark charges. And the great Heisenberg was right! The QQD unifies the physics, and explicate the formidable problems all-around, including the mechanism of "Asymptotic Freedom" without requiring the multifarious QCD [1].

The idea of multi-space has long been advocated by (putting aside its underlying mechanisms) the string theory, where the matter arises from the fundamental composition of tiny, vibrating strings rather than point-like particles [5]. In the Unified Theory—interactions are characterized by separate Planck's Constant, stipulating its respective Quantum Uncertainty Principle. The Planck's Constant for the strong interaction proves to be very small, enabling the quarks to interact in multispaces.

The highly compressive QQD force that generates the singularity-like compression at the black hole core assimilates the dual time {t, τ} (see §12), causing the possible collapse of the symmetric quark multispace. The rise and fall of the laboratory observation of the H (750 GeV) state[6]shall then be proven to be really the sway of the floating by **(**unobservable) darkmatter black hole(see §13).This is further confirmed to be physical reality in the observation of the CMB cold spot (see §14) and the clarification of the fifth force conjecture (see §15).

2) The singularity-like black hole core and "Bang!" in the big-bang. These problems are far too exorbitant in terms of the EM and gravity, and the mysteries have been considered to be the work of the creator God Himself, ever unsolvable by human minds. In terms of the QQD, the quark pairs in large (yet limited) number in their multi-spaces may collapse into a tiny compacted space to generate the energy that may exponentially rise not only to create the singularity-like black hole cores[7], but also the incredible "Bang!"for the big-bang (see §13).

Black hole singularity by gravity has in fact been rejected to be nonphysical by the authorities in the field, including Einstein himself, and John Wheeler thought the solution of the problem would lead to new physics. Now, the novel physics proves to be the QQD in this paper.

3) Dark matter and energy: The invisible dark matter and energy manifest as more than a half content of the Universe, and thus its explanation would require a structural impetus that could affect the half of the Universe, not an incidentally dispersed facts as generally so perceived.

This in fact coincides with the demeanor of the time that, unlike the dual directed space **{+(x, y, z), -** (x, y, z), manifests only in the positive directed time "t", seemingly without the opposite directed time**.** Is this genuine reality, or due to human inaptitude?

This bone of contention could be solved (see §12) in the mathematically controlled Universe by the dual time $\{t, \tau = it\}$, whereupon the imaginary τ–time constituent becomes invisible to generate the other dark half of the Universe, bulging in an accelerated speed (§12) as observed. This solves the origin of the dark matter and energy, the so-called biggest mysteries in the Universe.

The scientific advancements are made by the daring introduction of novel unaccustomed ideas. All the seemingly exotic ideas in this paper are clinched to be true after excruciatingly painstaking open-minded analysis of the observed data. Understanding the novel revolutionary ideas in this paper would take equally open-minded strenuous considerations.

2. ORIGIN OF MASS AND PARTICLE FEMTO SCOPE

The potent significance of the energy relation in terms of single electron charge "e" and its radius r_e [8],

$$E = e^2/r_e \approx 0.511 \text{ MeV}, \tag{1}$$

precisely generating the electron mass m_e is confirmed in introductory EM text books [2].

And the electronic charge "e" in varied guises has now been determined to be the source of all forces in the Unified Theory of Everything [1,2].The Fractal Cosmology[9] postulates, on the other hand, that the "r_e" denotes the characteristic elementary particle hole radius for the electron, commensurate with the cosmological black hole radius [1].

It is entirely conceivable that the Eq. (1) represents the basic physics that explains the origin of the electron mass, and its profound physics can consistently be expanded to establish the heavier particle masses as well with appropriate substructures. It shall be shown that the nucleon space can accommodate multi-spaces (see §6), demonstrating that –without even mentioning about the possible role of the infinitesimal Planck's Length of 10^{-33} cm << r_e–the nucleon and electron space seems to be never too small for the Nature to accommodate further intrications. In fact, by compressing r_e of Eq.(1) by a factor ℓ(which can be malleably large), the following contrivance may become operative:

1) The inbred particle hole of radius r_e can accommodate ℓ^3 electronic substructures, the particle mass increasing in ℓ^4.
2) The repulsive force of the compressed electronic substructure of charge $q_1$erequires to meet the stability condition [2]:

$$[q_1 /(r_e/\ell)]^2 < 137 \quad . \qquad (2)$$

The physics here is clearly legitimate, and its authenticity has been ascertained by the generation of the "Particle Femtoscope" of Fig. 1, which (akin to the Galileo's telescope that established the heliocentric solar system), accurately predicts the masses of all three generations of quarks and leptons as well as the associated particles [9]—the {W,Z}bosons —in terms of the systematic parameter "ℓ" in one-to one correspondence with observations [10]. The compressibility of the particle substructures also proves to be true, performing a vital role in the formation of all compound particle states (see §5, §6 and §7).

The neutrinos, although well-nigh massless, would assimilate their own portentous space with the emblematic span. Thus they may entangle with the{e, μ,τ} leptons in the weak interaction quantum uncertainties, ebbing like the empty hotel rooms accommodating the transient excursionists in neutrino oscillations.

The {W,Z} bosons are created with great number {39,426, 44,156} of compressible substructures that provide their very heavy masses, and the W-boson is forced to both spin = {1, 0} states by the stability requirement of Eq.(2) [1]. Thus {W,Z} bosons have never been massless, and are unrelated in basic structure with the exclusively spin = 1 (without the spin = 0 counterpart that is required to explain the pion decay) zero-mass photon.

The "Goddamn Particle" whimsically titillated the world as the "God Particle", but the Particle Femtoscope here divulges that the 125 GeV state—with a constricted substructure off the predilection of ℓ = 3(2L)—must be a knotty state that actually could act like the Higgs bosons. The Higgs physics ignores the truth of Eqs. (1) and (2), and fancies Margaret Thatcher making her way through the party workers, or passing through the molasses-like medium, all the massless point particles acquiring their masses. To say the least, this is an insult to physics.

(Quark & Quark-like States)

Particle	q(e)	ℓ=3x(2L)	Spin	Mass (MeV)
t	+2/3	3x(2x7)	½	173,142
X(125)	*	3x 13	0	125,050
Z	0	3x(2x6)	1	91,073
W	±1	3x(2x6)	(1,0)	80,583
b	-1/3	3x(2x3)	½	4,200
c	+2/3	3x(2x2)	½	1,177
s	-1/3	3x(2x1)	½	73.6
d	-1/3	3 x 1	½	4.6
u	+2/3	3 x 1	½	2.4

(Lepton & Lepton-like States)

Particle	q(e)	ℓ=(3or4)L	spin	Mass (MeV)
Z	0	3x7	1	91,400
W	± 1	3x7	(1,0)	80,496
τ	-1	4x2	½	1,758
μ	-1	4x1	½	107
e	-1	1	½	0.511

Fig1. *Particle Femtoscope*

In fact, the μ lepton that has its mass of "107 MeV" has for long been a bewilderment in physics. Richard Feynman inscribed on the corner of his Caltech blackboard, "Why does the muon have so much mass?" Isidor Rabi also quipped "Who ordered that muon?" [2] These great physicists in the history were demanding a credible explanation, and this unified theory gives them the decisive answer in terms of its definitive substructures.

This author challenges the Higgs physics to likewise explain the muon(see page 137 of [11]).While looking through the Particle Femtoscope, the author felt he knew how Galileo felt when —only to be prosecuted—his telescope revealed clearly that the planets were actually rotating around the Sun.

The W boson is not the straightly weak interaction particle as being claimed by the prevailing physics. In fact, the W boson is determined to interact strongly in the (expectedly) high energy collision [12]. It is mostly generated as the strongly interacting quark-like particles, transforming in a measured steps to become the weakly interacting lepton-like W boson through the situation dependent transformation. This explains not only the two different lifetimes for the neutron decays in the be amand bottle setup [13], but also why the free neutrons decay, while stabilizing the Deuteron.

Moreover, the spin = 1 quark-like W boson (not the massless gluon) may—herding with the residual quarks—also manifest the bewildering proton spin puzzle. The interaction of the electrons and muons with different substructures (not as the point particles in the Standard Theory) would give the different proton sizes [1].

3. Quantum Quark Dynamics (QQD)

It has been shown [1] that the interactions forces are represented in the Coulomb-like framework. To generate the furtive "137", the strong interaction force of the fractional quark charges of $\{q_1,q_2\}$ (via quantum unitary entanglement transpose to $\{q_{1*},q_{2*}\}$in$q_1q_{1*=1}$and q_2q_{2*} = 1) could be represented by $F_{st}(q_{1,}q_2)=k_{st(}r_{n)}[(e/q_{1)}{}^2{}_{(}e_/q_{2)}{}^2]$ in the direct (strong) QQD interaction inside

the finite radius of $<r_n>$. (3)

While the EM interaction emerges linearly in the electronic charge "e" to be both attractive and repulsive, the strong forces (by multiplication) is generated in quadratic to be always attractive [1,2]. The ratio between the strong QQD force and EM force in terms of their equations of state $\{w_{em}= 1/3$ and $w_{QQD} =(1/q_1)^2 (1/q_2)^2 (1/q_3)^2\}$ gives,

$$\alpha_{QQD}(uud) = F_{QQD/\ Fem} =(3w_{QQD}/(3w_{em}) = 3\ [1/([2/3]^{2}]^{2} (1/[1/3]^{2})\approx 137. \quad (4)$$

for the proton.

For the neutron, through the quantum entanglement of the strong interaction (see §2), the quark-like W- boson (with its integerEM charge qw = -e) in {udd} → (uud + W -},

$$\alpha_{QQD}(udd) = \alpha_{QQD}(uud) \approx 137, \quad (5)$$

unraveling the long quested puzzle of "137".This quark-like W bosons interacting strongly has been seen in this paper to be in force in multitudes of interaction configurations[12].The multiplicative QQD forces ultimately increases exponentially and become inordinately large as the number of interacting quarks increase to provide the extraordinary great energy creation mechanism for the singulary-like black hole core as well as the long desperately pursued "Bang" generation for the big-bang.(see§13).

In the virtue of the strong interaction, a residual quark "qr," can always generate the comrade (virtual) quark-anti quark pair {qv, qv,a}to form the three-quark configuration of {qr,, qv, qv,a} for the separate generation of space for the QQD force≈ 137. This autonomous universal QQD base field is designated as the "Qucleon" (see§ 6 and § 7).

4. General Uncertainty Principles

The Planck Constant, ħ, is correlated to the EM fine structure constant, α_{em}, in [1]

$$\hbar_{em}\ (/sec)\ =(\hbar\ ) = e^2 / (\alpha_{em}\ c)\approx 6.58 \times 10^{-25}\ GeV, \quad (6)$$

but there is yet no inimitable pretext. Since the all interactions in the unified theory arise from the electronic charges in varied guises, ultimately propagating by the speed of "c", Eq.(6) for one thing reveals it's property for the dispersing photon (EM) quantum energy in $E_{em} = \hbar_{em}$ w with the dispersion property of the EM energy with $\hbar_{em}$.

There are 4 interactions x = {strong, weak, EM, gravity} with distinct fine structure interaction strengths $\alpha_x = \{1, 1/137, 10^{-6}, 2 \times 10^{-61}\}$. (The α_g surmise varies widely as $\{2 \times 10^{-45}, 5.9 \times 10^{-39}, 3 \times 10^{-42}\}$ as well [13]). In the light of $E_{em} = \hbar_{em} w$, the $\hbar_x$ can be generalized to be the universal dispersion constants as [14],

$\hbar_{gr}(/\text{sec}) = e^2 / \alpha_{gr}\, c \approx 8 \times 10^{31}$ for gravity, (7)

$\hbar_{st}(/\text{sec}) = e^2 / \alpha_{st}\, c \approx 4.8 \times 10^{-27}$ GeV for strong interaction, (8)

$\hbar_{w}(/\text{sec}) = e^2 / \alpha_{weak}\, c \approx 4.8 \times 10^{-21}$ GeV for weak interaction. (9)

This establishes the distinctively increasing series of universal dispersion constants,

$\hbar_{st} << \hbar_{em} << (\hbar_w) << \hbar_{gr}$. (10)

The Eqs. (7, 8, 9) now provide the quantum uncertainty principles for all interactions:

$(\Delta p)_x (\Delta x)_x = \hbar_x$, and $(\Delta E)_x (\Delta t)_x = \hbar_x$. (11)

The Planck constants $\hbar_x$ in Eq (10) as the universal dispersion parameter thus exhibits important bearings in the developing interaction framework of the Universe [1]:

1) The gravity with extremely large dispersive power $\hbar_g$ enables its gravity field inside the Sun to propagate out to the entire Universe, while the EM field with smaller dispersive power $\hbar_{em}$ only from its thin layer of surface. Anything in turmoil produce waves, but the extremely large dispersive power would engender the extremely weak gravity field, making the gravitons hard to be detected. More than that, the gravity leaks out of the black hole to influence the surroundings, while the EM field is entirely confined inside to make it dark.
2) The strong QQD interaction with its germinally small $\hbar_s$ may make the quarks to interact with its tight uncertainty principle. That enables to critically compress the quarks, forming the high energy intense multi-quark states (see §7), providing the singularity-like core to the black hole (see § 12), and ultimately the "Bang!" of the big-bang Universe (see § 16)
3) The quark-like W boson with tiny $\hbar_s$ transforms to the lepton-like W boson with larger $\hbar_w$, enabling to decay with varied decay aberrations (see §2).

5. TRI-QUARKNUCLEON STATES

This paper can solve the nucleon mass riddle in simple arithmetic because the quarks are made of the compressible electronic substructures (see §2). They could be compressed by the universal QQD base force≈ 137 in the nucleon to the heavy mass

$M_q \approx C_q\, m_q$, (12)

where $C_q < 137$. This physics shall also prove to be absolutely correct for all bound quarks in the multi-quark—baryons and mesons—states.

It can be easily shown [1] that the u quark in the nucleon is compressed by

$C_u \approx 130.13$ to $M_u \approx C_u m_u \approx 312.3$ MeV, (13)

whiile the d quark, already packed heavier than u quark by a factor of $m_d / m_n \approx 1.9$ with the same ℓ, is compressed by a factor of

$C_d \approx (m_u/m_d)\, C_u \approx 68.17$ to $M_d \approx C_d m_d \approx 313.6$ MeV . (14)

That establishes the confined 3 quark nucleon masses to their observed values [1,2],

$\{M_p, M_n\} = \{938.2 \text{ MeV}, 939.5 \text{ MeV}\}$ (15)

The universal QQD force in the nucleon is in the main spent for the quark compressions to heavy masses of $M_{u,d}$, whereupon the {u, d}quarks masses increase by

$\Delta_u \approx M_u - m_u \approx m_u (C_u - 1) \approx 309.9$ MeV, and

$\Delta_d \approx M_d - m_d \approx m_d (C_d - 1) \approx 309.0$ MeV , (16)

Giving $\Delta_u \approx \Delta_d$, (17)

After utilizing the most part of the QQD force in the compression of the quark to the point-like Heavy $\{M_{u,d}\}$ states, each quark would behave like a classical particle in a shallow binding well of the remaining QQD force< **O(10),** behaving like free particles. When the bound quark is pushed outward, the QQD force itself [of O (137)] would act like the powerful rubber band to keep the quarks entrapped inside the nucleon. The "Asymptotic Freedom" is thus written in the QQD quark interaction in the multi-quark states, including the nucleons {also see [1] and §6).

The Eqs. (13, 14) for the {u, d} quarks point to a relationship of

$O(m_x C_x) \approx O(m_y C_y)$. (18)

The relation may extend into the heavier mass (m_y) quarks of larger number of compressed Substructures to which the C_x of the light weight {u,d} quarks of very compressible sparse Substructures can increase along C_y--> 1.0.The existence of the heaviest t-quark with mass m_t ≈173,142 MeV thus posits that—in a limit of compression of the light weight {u,d} quarks in the collapse of the multi-spaces to a single space by the culminating direct QQD force (see §XIV)—the maximum compression parameter may increase toward the possible value of

$C_{max} \rightarrow O(173{,}142/2.4) \approx O(72{,}143)$ with $C_t \rightarrow 1$ (19)

6. DI-QUARK MESON STATES

The twin quark pair states with the $\{q, q_a\}$ charges (where the subscript "a" represents the anti quark), generate the direct QQD force of $QQD(q,q_a) \approx 3((1/q^2)(1/q_a^2))$ according to Eq.(3). The actual primary quark compression parameters $C_q \approx C_{qa}$ can be determined, because m (q)= m(q_a), by

$M(q,q_a) \approx C(q,q_a) m(q,q_a)$ (20)

from the observed data. The compressional mass increments are determined by$\Delta_q \approx M_q - m_q \approx (C_q - 1) m_q$,that is, by $C_q \approx 1 + \Delta_q / m_q$ for the quarks {s,c,b} as well as for the corresponding anti-quarks $\{s_a, c_a, b_a\}$.

The results are as follows [15]:

$\phi(s,s_a\}$ of mass 1020 MeV $\rightarrow \Delta_s \approx 436$ MeV of $C_s \approx 6.93$, and $QQD(ss_a) \approx 243$,

$J/\psi(c,c_a)$ of mass 3096 MeV$\rightarrow \Delta_c \approx 371$ MeV of $C_c \approx 1.31$,and $QQD(cc_a) \approx 15.2$, (21)

$Y(bb_a)$ of mass 9460MeV $\rightarrow \Delta_b \approx 530$ MeV of$C_b \approx 1.13$, and $QQD(bb_a) \approx 243$

The crucial question here is whether the compression parameters $C_q$and $\mathbf{C_{qa}}$ here are determined by the direct $QQD(q,q_a)$force. The respective direct QQD forces here are divergent by a factor as large as "16".In the light of the near constant values of Δ_q in Eq. (21), it is clear here that the same universal QQD base field ≈ 137 instead determines the $\{\Delta_q , C_q\}$, not the varying direct $QQD(q,q_a)$.

This means that all the actual quark compression parameters $\{C_s, C_c, C_b\}$in Eq.(21)—like the $\{C_u, C_d,\}$ of Eq. (13 and 14)—are determined interms of the same universal QQD base field force ≈ 137. This contradict the anticipated consequences in terms of the familiar EM and gravity physics. How could it be? Because of the innately different nature of strong QQD interaction from EM and gravity, new understanding here is required.

In the primordial Universe, the abundant {u,d} quarks may in the main team up in the all abundant stable {(uud) & (udd)} as well as $\{(u_a u_a d_a)$ & $(u_a d_a d_a)\}$ states in the universal QQD base fields. In the ongoing Universe, each of the bound quark q and q_a would spontaneously produce a comrade (virtual) quark-anti quark pair $\{q_v, q_{va}\}$ in the prevailing action of the strong interaction to form the tri-quark system of $\{q, q_v, q_{va}\}$and $\{q_a, q_v, q_{va}\}$. The charged quark-like W boson can adjust, if necessary, their fractionally charges to {+,-} {2e/3, 2e/3, e/3} to establish the universal QQD base field ≈ 137 in their respective space (see §3).

For the twin-quark stateϕ(s,s$_a$} of mass 1020 MeV, for example, the s-quark and s$_a$-quark each separately produce—spontaneously in the strength of QQD—the comrade (virtual){u,u$_a$} quark pair as shown in Fig. 2 to:

$$s \rightarrow s + \{u,u_a\} \quad \& s_a \rightarrow s_a + \{u,u_a\}. \tag{22}$$

with fractional quark charges, respectively, of

$$\{-e/3, 2e/3, -2e/3\} \text{ and } \{e/3, 2e/3, -2e/3\}. \tag{23}$$

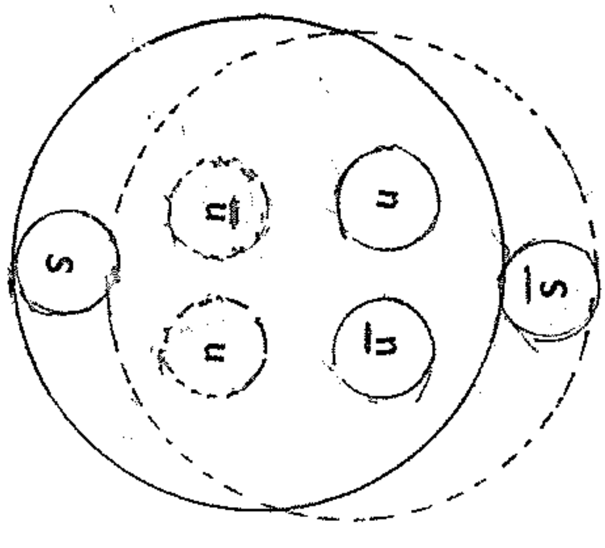


Fig2. *Dual Qucleons in the ϕ(ss$_a$) State (only for a figurative demonstration)*

The both triple {s,u,u$_a$ } and {s$_a$,u,u$_a$} quark sets (separately) would produce a universal QQD base field of 137 to establish their respective Qucleon in two separate space, i.e. the Qucleon (s, u, u$_a$) and Qucleon (s$_a$,u,u$_a$), which are maintained in the strength of strong QQD interaction.

In the prevalent physics, both Qucleons would reside in a (same) single space. Then the interactions would overlap, the multiplicative QQD force trending upward to $\rightarrow(137)^2$, to cause huge increases in the compression parameters C_s and C_u, generating a corresponding immense mass increment of Δ_{av}(ss$_a$).

That didn't happen here. Not at this low energy point, yet. But, as the interaction energy increase, the pinch compression (see § 7) intensifies to cause the collapsing of the multi-space to exponentially drive up the direct QQD energies, for example, to the levels of H(750 GeV) state (see §13). This collapsing of the multi-space, however, would require a strong singularity-like compressive force in the black hole core (see §13). The exponentially increasing direct QQD force with increasing number of quark production and participation may generate the "Bang!" in the big-bang of the Universe [see §16]. The inconsistency above resolves when the dual-Qucleon spaces [see Fig. 2 and Eq.(22)] do not overlap in the low energy interactions, maintaining their own separate multi-Qucleon spaces to bind them.

In fact, all the effective compression parameters for the (spontaneous) mass increases observed for the quarks in the low energy interactions are the same universal {C_u, C_d,} of Eqs. (13,14) and {C_s, C_c, C_b} of Eq. (21), and the approximately same Δ_{av} being determined entirely in terms of the single universal QQD base field force of 137, the quarks of strongly interaction (with diminutive $\hbar_s$) acting like classical particles with insignificant uncertainties.

It is also seen here that, the Δ_q is nearly steady in $C_q \approx 1 + \Delta_q / m_q$, and $C_q \rightarrow 1.0$ with the increasing m_q because the heavier quarks have denser substructures that would be harder to be compressed.

7. Partially Overlapping Qucleon Multi-Spaces

The general understanding of the multi-quark states is still nebulous in terms of the prevailing physic. However, there are now more than enough observed data available to fully confirm the novel physics developed in this paper ([15] and [16]). In fact, the dual Qucleon spaces in the twin-quark meson states are decisive, indicating definitive, yet unanticipated regularities. The novel "Truths" in physics are discovered through such observations that challenge ongoing (incorrect) physics.

If the weightier anchor quarks are heavy like {c, b}, the spontaneous di-quark states are aprioriformed, as for the twin quark states, in terms of the universal compression parameters{C_u, C_d, C_s, C_c, C_b} for the universal QQD base force≈ 137 of the Qucleons.

However, in addition, the separate Qucleon spaces for the low mass partner quarks {u, d, and docilely for s as well}are observed to partially overlap to{u*,d*,s*}and slightly increase their effective universal QQD forces to enhance their compression parameters by a factor k, i.e., C^*_q (u*,d*,s*) = k C_q (u,d,s)as follows:

C (1864 MeV; cu_a) of $\Delta_{av}(cu_a)$ ≈ 342 MeV, with QQD(cu_a) ≈ 15.2,

toC(2007 MeV; cu^*_a) with k ≈ 1.45

C (1869 MeV; cd_a) of$\Delta_{av}(cd_a)$ ≈ 343.7 MeV, with QQD(cd_a) ≈ 60.75,

to C(2010 MeV;cd^*_a) with k≈1.45 (24)

B (5042 MeV;bu_a) of $\Delta_{av}(bu_a)$ ≈ 419.8 MeV, with QQD(bu_a) ≈ 60.75,

to B(5,279 MeV; bu^*_a}with k ≈1.8

B (5,239 MeV; bs_a) of $\Delta_{av}(bs_a)$ ≈ 482.7 Me, with QQD (bs_a) ≈ 243,

to B (5,370 MeV; bs^*_a} with k ≈1.22

The spontaneous mass increases of the di-quark {q1,$q2_a$} state here are determined by M(q1) = m(q1)C_{q1}, and M($q2_a$) = m($q2_a$)C_{q2a} with the effective mass increase of the each quark,Δ(q1) = m(q1)[C_{q1} - 1) and Δ($q2_a$) = m($q2_a$)(C_{q2a} -1) to be averaged by $\Delta_{av}(q1,q2_a) \approx [\Delta(q1) + \Delta(q2_a)]/2$.

When the anchor quarks are not heavy (including s-quark), on the other hand, it is observed that no spontaneous bound states are produced; the bound states are produced only with the pinch Compression of the light weight {u,d} quark partners to {u*,d*} [17],

S(891 MeV; su^*_a) state and S(895; sd^*_a) both with k_1≈ 1.23. (25)

An interesting question arises here as to what happens when the di-quark states—as in the {uu_a, ud_a, dd_a } states—do not contain any heavy anchor quarks? Then not only there is no spontaneous states, but also both light weight quarks are pinch compressed to {$u^*u^*_a$,$u^*d^*_a$, $d^*d^*_a$ }! The ρ and ω mesons belong to this group, and the both {u,d} component quarks are pinch compressed with parameter ofk_1≈ 1.23 [the same value for the{u_a*and d_a*}, respectively, in the S(891, su_a*) and S(895, sd^*_a) states in Eq. (25)].

The mass of the ρ(+,–) of {$u^*d_a^*$,$u_a^*d^*$}, and {ρ(o),ω(o)} of ($u^*u_a^*$,$d^*d_a^*$) are thus determined [15] to be:

$$2m_u C_u k_1 \approx 2m_d C_d k_1 \approx 770 \text{ MeV}. \quad (26)$$

Remarkably, these states are in fact so observed, proving the assertion.

It is again seen yn Eq. (24) that, while the respective direct QQD forces for the di-quark States vary by factors as large as "16", the essentially same mass increments {$\Delta_{av}(cu_a)\Delta_{av}(cd_a)$ $\Delta_{av}(bu_a)$ $\Delta_{av}(bu_a)$} are observed, confirming that all the quark bound states are compressed by the same universal QQD base force of Qucleons, not by the widely varying direct QQD forces.

When the bound quarks are forcefully pushed apart, they would not stand idle; they would generate additional comrade (virtual) quark-anti quark pairs in droves to strengthen their binding [1]. This provides over and above explanation how the quarks can institute the rubber-band like force of the asymptotic freedom without the need of circuitous QCD (also see §5 and [1]) With the very small universal dispersion constant $\hbar_s$ (see §4),the simple shell model like delineations of the multi-quark states result in terms of the compression parameters.

The resulting simple and efficient description of the particle states in turn confirms that the QQD in this paper in fact is the correct physics. (In contrast, the explication of the multi-quarks states by the prevalent theory, as its inadequacy revealed in the description of the tri-quark nucleon states (see §5), require extremely complicated QCD analysis that only lead to incongruous and incorrect pretentiousness.)

8. NUCLEON BINDING MECHANISM

The nucleon binding mechanism is still unsolved. Although the Yukawa potential is highly useful in analyzing the nucleon binding, it is not compatible with the presumed gluon physics, and the question of "gluon or meson?" still is a desperately unsolved puzzle. The QQD here explicates that the answer is "both!" When two nucleons (proton and neutron, for example, in Fig. 3) approach each other, the interference between them would loom. One of the u-quark in the neutron at an appropriate proximity, for example, may generate the {u, d_a} comrade pair at the fringe of the proton. Thus the universal QQD (= gluon force) extends from one nucleon to the other, and here the detached {u, d_a} quark pair in the proton may interact with residual {u} in the neutron via the modulated {u, u, d_a} Qucleon force.

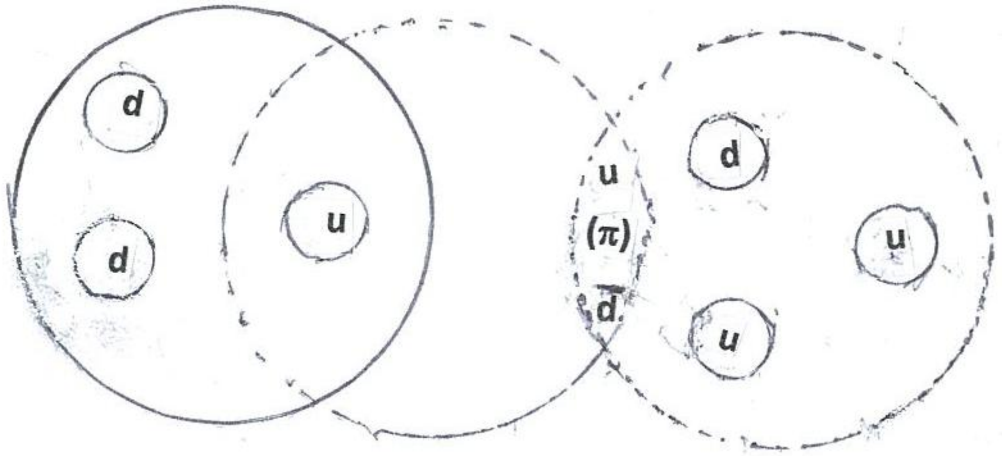


Fig3. *Nuclear binding mechanism both by gluon and π-meson (only for the figurative demonstration)*

The circumscription for the low mass u-d_a quark pair for the π(+,–) meson generation here is unusual, and the interaction seems to arise not in the usual Qucleon interaction. Still, the both for sure could generate their own direct QQD forces—QQD (u) ≈ $3[1/(2/3)]^2$ and QQD(d_a) ≈ $3[1/(1/3)]^2$—to be trapped to generate its π-meson mass [9] by

$m[\pi(+)] \approx m_u\, QQD(u) + m_d\, QQD(d_a) \approx 140$ MeV ,

$m[\pi(-)] \approx m_u\, QQD(u_a) + m_d\, QQD(d) \approx 140$ MEv (27)

and they are so observed.

On the ther hand, with

$m[\pi(0),_u] \approx m_u\, QQD(u) + m_{ua}\, QQD(u_a) \approx 2m_u\, 3[1/(2/3)^2] \approx 32.4$MeV,

and $m[\pi(0),_d] \approx m_d QQD(d) + m_{da}\, QQD(d_a) \approx 2\, m_d\, 3[1/(1/3)^2] \approx 248$MeV,

the mass symmetry for the π(0)is broken to be restored by the quantum superposition of $[\pi(0)] \longrightarrow [uu_a + dd_a]/2^{1/2}$and thus $m[\pi(0)] \approx 140$ MeV.

The attractive universal QQD (=gluon) force here may reach out from one nucleon to the other nucleon to deliver the pion and institute the attractive interlacing Yukawa force.

The heavier s-quark for the K (su) meson, on the other hand, may safeguard its proximate Qucleon interaction with $C_s \approx 6.93 \to 6.5$ [see Eq. (21)], to get its mass[9],

$m_k \approx m_u\, QQD(u) + m_s C_s \approx 495$ MeV.

9. PENT A-QUARK STATES

The two light weight $\{u,u_a\}$ quarks pair can be produced along the three-quark proton state, firmly established by the residual {uud} and {udd} quarks, and the $\{uu_a\}$ pairs simply goes on to be bound by the QQD compression to generate the mass of the spontaneous state by (see Fig. 4A)

$$M_{2A}\approx M_n + 2\, m_u C_u \approx (940 + 2 \times 2.4 \times 130)\text{MeV} \approx 1564 \text{ MeV}, \quad (28)$$

Where $Cu_a \approx Cu$ of Eq.(7), close to the excited nucleon masses in Table 1 that ranges around 1535 MeV [18].

This is a big surprise; out of the long proclivity, it would rather be (incorrectly) surmised that the $\{u\text{-}u_a\}$ quark pair here would crop up as a π-meson of mass ≈140 MeV to generate a state of mass,

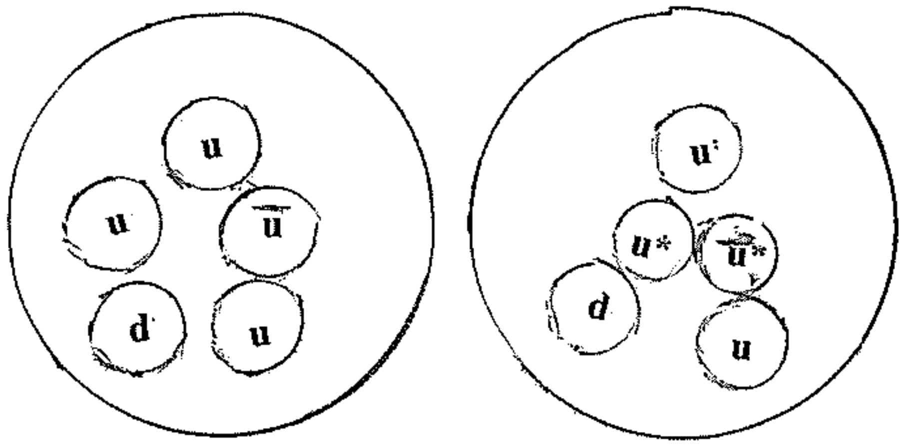
$$M_p + M_\pi \approx 940 \text{ MeV} + 140 \text{ MeV} \approx 1{,}080 \text{ MeV}, \quad (29)$$

but the anticipated state has nowhere been observed [2].

The $\{u,u_a\}$ quark pair in Fig. 4A that are centrally bound to produce the M(1564 MeV) state [9] would also be pinch compressed with parameter $k_m \approx 1.23$ [the same value observed in Eq. (25)] as shown in Fig. 4B to generate the mass of the state,

$$M_{2B}\approx M_n + 2m_u\, C_u\, k_m \approx 940 \text{ MeV} + 770 \text{ MeV} \approx 1710 \text{ MeV}, \quad (30)$$

the observed value for the excited baryon states shown in Table 1. This reveals that the $\{\rho, \omega\}$ mesons of mass 770 MeV themselves [see Eq. (26)] are tangibly embedded inside the nucleon mass of O(1710 MeV) states [9, 18].



(A) (B)

Fig4. *The distinct Penta-quark Baryon States (not to scale)*

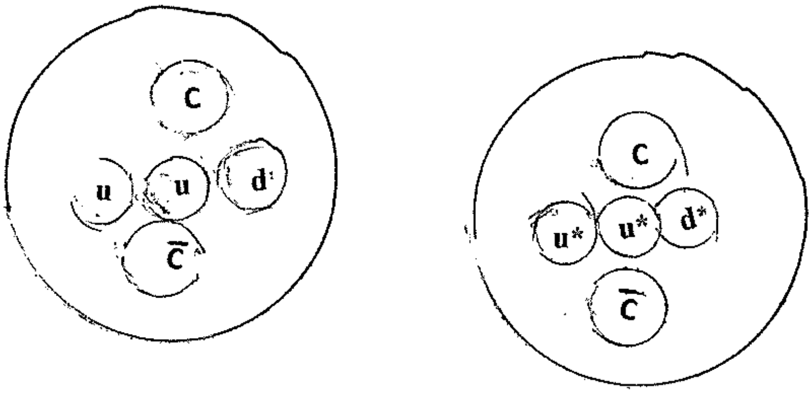
The heavier penta-quark states of the spontaneous $\{c,c_a; u,u,d\}$ state (see Fig. 5A)is now expected. In terms of the universal QQD, the $\{c,c_a\}$ and {u,u,d}components here may behave like the J/ψ and nucleon. In fact, the modified compression parameter of the J/ψ state with $C_c\approx1.46$ [close to $C_c\approx1.31$ of Eq.(25)], along with the nucleon mass of 940 MeV, produces the $P_c(4380)$ state [19].

Table1. *The excited nucleons as spontaneous and pinched multi-quark states*

L_n	S_n	$\mathbf{S_{u\text{-}ua}}$	$L_{u\text{-}ua}$	$J_{u\text{-}ua}$	L_t	$(J_t)^P$	$L_{2I,2J}$	Mn*(MeV)
0	(1/2)	**0**	0	0	0	$(1/2)^-$	S11	1535
1			1	1	1	$(1/2)^+$	P11	1440
					2	$(3/2)^-$	D13	1520
		1	0	1	1	$(1/2)^+$	P11	1710*
						$(3/2)^+$	P13	1720*

The heavy $\{c,c_a\}$ anchor quarks would promote the pinch compression of the 3quark set of low mass {u,u,d} components in Fig. 5A of P_c (4380) state to {u*.u*,d*} with $k_2\approx1.08$ [slightly smaller than

$k_1 \approx 1.23$ for the 2 quark set {u*,d*} in {ρ, ω} states]as shown in Fig.(5B)and produces the observed P_c (4,450; cc_a;u*u*d*} state [19].



(A) (B)

Fig5. *Penta-quark states P(4380) andP*$_c$(4450) (not to scale)*

10. TETRA QUARK STATES

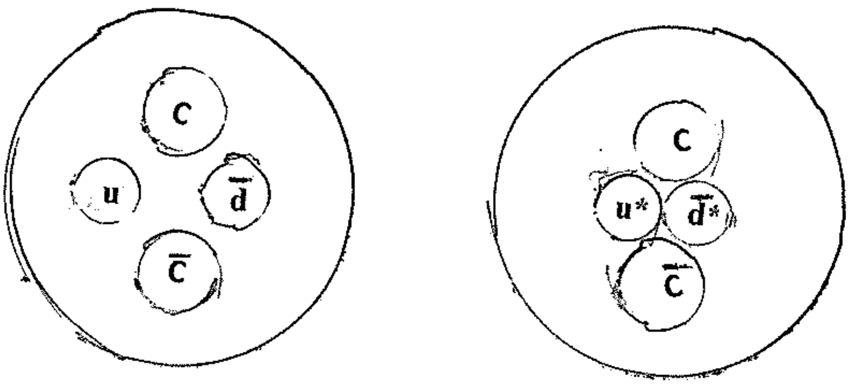
The confirmation of the di-quarks states in this paper underwrite the tetra-quark states in terms of the universal QQD compressions. The eminent among them is the {$cc_a ud_a$} state (see Fig. 6A).

The heavy {c, c_a} quarks would generate the universal QQD base field (see §V), and $C_{\underline{c}} \approx 1.39$close to the twin-quark compression parameter of $C_{\underline{c}} \approx 1.31$would generate the observed spontaneous T (3,872) state [20]. Prompted to be pulled together by the heavy anchor {c,c_a} quark pair, the {u, d_a} quark pair components (see Fig. 6B) can be pinch compressed tighter with a larger parameter $k_3 \approx 1.89$ to produce

$$\{C^*_u, C^*_d\}_{4,430} \approx k_3 \{C_u, C_d\}_{\{p,n\}} \tag{31}$$

in agreement with the observed mass for the T*(4,430) [21].These agreements are phenomenal when the experts in the field are yet uncertain of what their observations are, generating quantum feud among them.[22].

Similarly, the spontaneous binding of {$cc_a ss_a$} composition as shown in Fig. 7A with $C_{\underline{c}} \approx 1.32$ and $C_{\underline{s}} \approx 6.94$ (both close to those for the twin-quark states, all interacting in the Universal QQD base field) generates mass for the T_4 (4,140), which is the acute average observed values at 4020 MeV and 4260 MeV [23]. The lighter {ss_a} components here may be pinch compressed to {s*s*$_a$} with the pinch compression parameter $k_s \approx 1.51$ (a bit smaller than $k_3 \approx 1.89$, because the s-quark is heavier than {u,d} quarks), and generates the observed T*(4,660) state [21].



(A) (B)

Fig6. *Tetra-quark States (not to scale)*

The recent observation of {sb_a ud_a} state as X(5568) has aroused a great interest since it is the first hadronic state with four different valance quarks [24]. It has been noted (see §5), on the other hand, that with the heavy mass of the b-quark, $C_b \rightarrow 1$, and the single {b_a} quark binding is expected a bit weaker than the {b, b_a} twin-pair binding in the Ymeson state, slightly modifying $C_b \approx 1.11 \rightarrow 1.06$ here. Based on the same universal compression parameters for the nucleonic {C_u, C_d} (see §4) and {$C_s \approx 6.93$, $C_b \approx 1.06$}for the twin-quark states (see §6), the state generates observed spontaneous 5568 MeV state.

11. HEAVIER MULTI-QUARK STATES

Along with the increasing pinch compression parameter of k, the pattern of the higher multi-quark states with heavier masses gets more complex, generating the confound states in profusion. Thus, their observational data are yet tentative. Still, the masses of the tetra-quark state of heavy anchor quarks-- C_4 ($cc_a ss_a$; 4140 MeV) of Fig. 7A (see §10 and [23]), possibilities occur with an addition of {u,d_a } pair to the state:

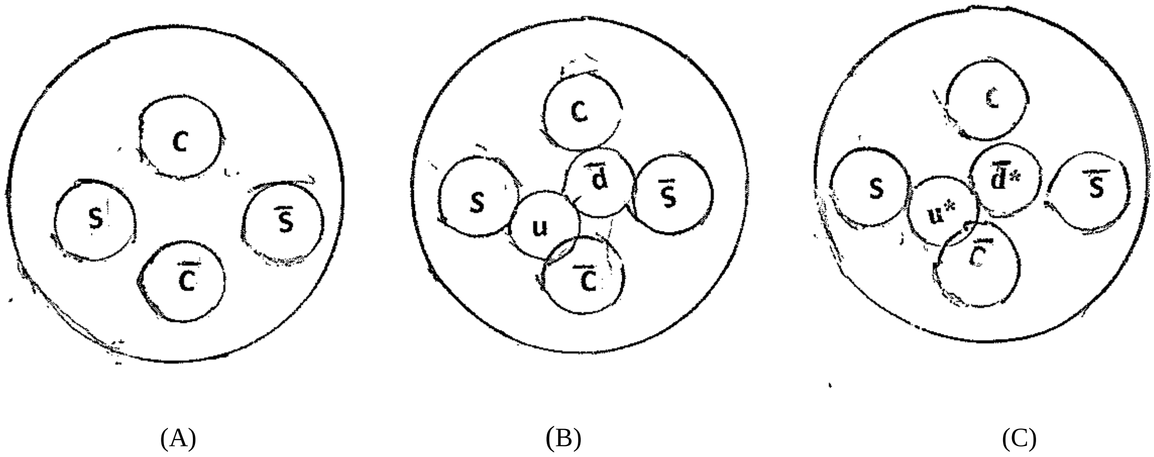


Fig7. *The C_4($cc_a ss_a$; 4140 MeV)state(A), the spontaneous {$cc_a ss_a$; u,u_a;; 4,764 MeV}state (B), and the pinch compressed {$cc_a ss_a$; u^*,d^*_a; 6,275 MeV} state.(C)*

1) The {$cc_a ss_a$;ud_a }state (see Fig.7B) with spontaneous universal QQD compression parameters of {$C_u \approx 130$, $C_d \approx 68$) generate the observed 4,764 MeV state [25].
2) With the *appreciably stronger pinch compression parameter of $k_{2*} \approx 3.42$*, the mass level for the state {$cc_a ss_a$; u^*,d^*_a} (see Fig 7C) compares with the observed 6,275 MeV state [26].

The accurate predictions of all multi-quark state masses in this paper out-and-out prove that the basic mass generation mechanisms of Eqs. (1) ~ (2) are correct, and the Particle Femto scope of Fg. 1 is as reliable eye-opener as Galileo's telescope.

12. DARK MATTER AND ENERGY

The Universe is observed in symmetry, but the time "t" is observed non-symmetric, being observed uni-directed, while the space is dual directed in {+(x,y,z), -(x,y,z)}. Einstein showed that space and time are essentially the same thing—a single entity called "space-time." Moreover, the Universe is strictly administered by mathematics. The oblivion of the opposite time then may mean that the "time" direction is mathematically hoisted to square root of dual {+,-}tracks, managing the Universe in dual time (t, $\tau = it$}, whereupon the imaginary τ –time Universe has been cached from human capability of observation.

This dual-directed time {t, τ} is not an idle speculation. It underwrites the {(observational)Hermitean--(non-observational) anti Hermitean} basic Quantum Physics [27]. Mathematics of dual-time { t, τ} pursuit is fully consistent with the {H, aH} physics to veil the τ–zone Universe as the non observable dark matter and energy in disparate to the t-zone Universe [6].

The permanent and ubiquitous dual time {t, τ } may arise with the "Bang!" of big-bang singularity, and in temporarily and locally in the black hole singularity cores (see §13, §14,§15).

The quarks in the initial big-bang expansion would diffuse in

$$N(u) = N_1(u) + \Delta_u \text{ with } N(u_a) = N_1(u) \text{ and}$$

$$N(d) = N_2(d) + \Delta_d \text{ with } N(d_a) = N_2(d). \quad (32)$$

It can now be shown that [28, 29],

{(+) ←→(+) , (-)←→(-), (+)→← (-) } in the Hermitean t-zone Universe,

{(+)→←(+) , (-)→←(-), (+)←→ (-)}in the anti-Hermitean τ–zone Universe. (33)

Thus the directions of the linear EM interaction are disparate between the two {t, τ} Universes, testifying that EM interactions in the two Universes do not interfere each other, becoming mutually invisible as envisioned.

Eqs. (32) and (33)spur to:

Separate Congregations of (+) and (-) charges [charged black holes]

Annihilation of particles N(u)with N(u_a) & N(d) with N(d_a) [matter asymmetry]

τ=it-------------------------------------- S* --→t

(AH Universe) (Big-Bang!) (H Universe)

Fig8. *Establishment of matter asymmetry in the Hermitean t-zone Universe and the separate charge congregations in the anti-Hermitean τ-zone Universe*

The equal number of particle-antiparticle in the t-zone attract and annihilate each other to reinforce the stupendous expansion of the Universe, causing the collective light from the first objects in the Universe as observed [30]. This leaves the Δ_u and Δ_d unscathed, leading to the still unexplained comprehensive mass asymmetry in the expanding observable and neutral Hermitian t-zone Universe [28].

The τ-zone physics (although not observable from the t-zone Universe) is real and observable to the τ–zone Universe itself, and the both charges are attractive to themselves in the **τ–**zone Universe**,** charges congregating separately (see Eq. (33) and Fig. 9).

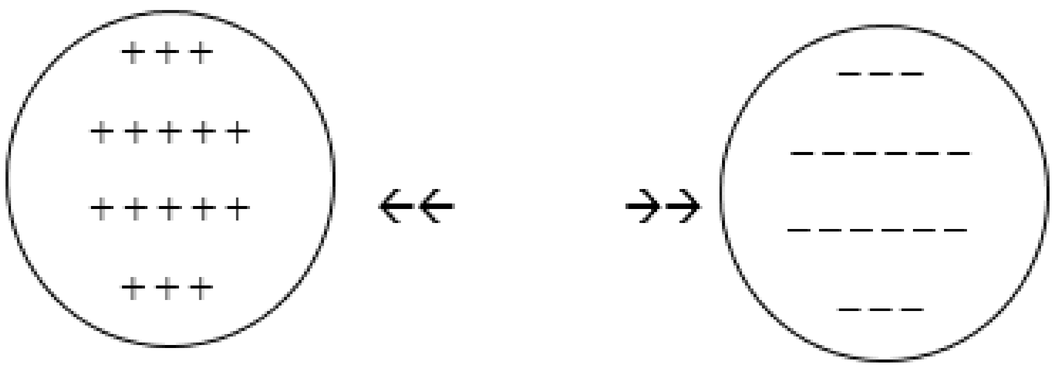


Fig9. *Charges congregations that eventuate the black holes in the τ-zone Universe*

As more and more charges are congregated with time, eventually charged**τ–**zone black holes with their QQD singularity cores are generated [31]. Due to the extremely small α_{gr}/α_{em}--> O (3 x 10 $^{-59}$), the charged black holes can be generated in the microscopic scale and may be come inconspicuous, sporadically floating by. In fact, tiny dark matter black holes can be very hard to be detected [32, 33], possibly generating dark matter galaxies bereft starlight as speculated [34].

Recent analysis of the prevailing dark matter and energy has proved that prevailing theory is delusive [29]; “the biggest mystery in the Universe.”On the other hand, it has been shown that the collapsing t-zone stars--electrically neutral body--are the powerful source of radiation energy through their interaction of the charged components, the radiation flux growing during the collapse by a factor of millions [35].

It is obvious then that the collapses of the τ–zone charge congregations (either fully positive, or negative) into the dark matter black holes would produce the inordinate τ–zone (dark) energy, in time culminating into the 73 % content of the Universe! The gravity act in common in both (t-τ) zone Universe, expanding the Universe in acceleration.

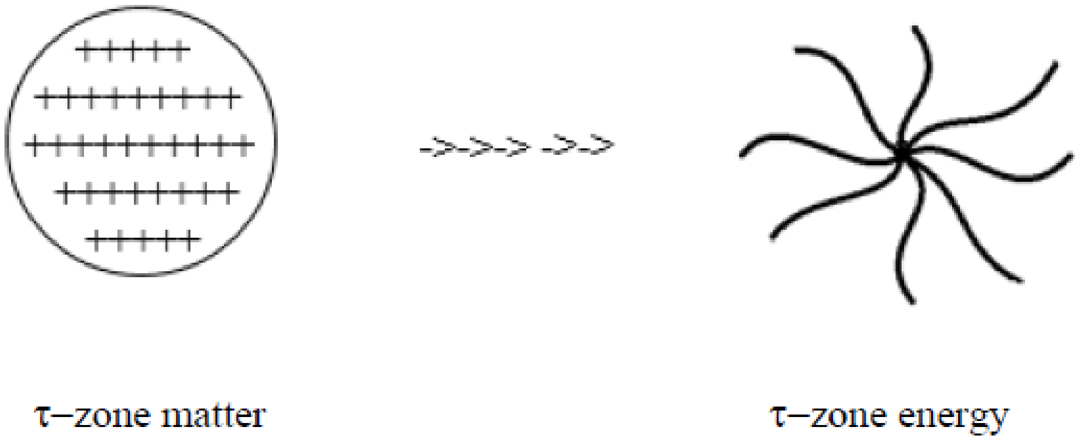


Fig10. *The collapse of the τ–zone EM “+” charge congregations(not in scale) could generate the critical portion of τ–zone radiation energy.*

13. The H (750 GeV) State

If theT_4 ($ccs_as_{a;}$ 4,140) state [33] of Fig.7 that girdle the 4 low mass {u,ud_ad_a} quark throng that suffer an extra strong compression to causes their Qucleon spaces to collapse, its direct

QQD equation of state would be ,

$$\kappa_4 = \omega_{QQD}(u^\wedge u^\wedge d^\wedge{}_a d^\wedge{}_a) \approx 410. \tag{34}$$

The ultimate compression parameter of the collapsed {$u^\wedge$, $u^\wedge d^\wedge{}_a d^\wedge{}_a$ } gives

$$C^\wedge{}_{u,d} \approx 130\ \kappa_4 \approx O(130 \text{ x } 410) \approx O(53{,}300), \tag{35}$$

which reaches up toward the perfunctorily surmised value of O (72,143) in Eq.(13).There are number of possible ways the quarks may respond to the strong QQD compression force to generate the H(750 GeV) state. A simple proceeding is through the consorted compression collapse to a single 3D space, where the {$u^\wedge,d^\wedge$} quarks with the same substructure number [2] of $\ell = 3 \text{ x } 1$ (see Fig. 1) may converge with the pinch compression of $k^*{}^\wedge{}_d \approx 1.91$ to the ultimate $C^\wedge{}_d \rightarrow k^*{}^\wedge{}_d\, C^\wedge{}_{d.} \approx 130$. By adding the mass contribution from the M_4(cc_ass_a:4,140MeV) components, the mass of the collapsed state for C_{uda}($cc\ s_as_{a\,;}\ u^\wedge u^\wedge d^\wedge{}_a d^\wedge{}_a$) —as well as the $C^*{}_{ua\,d}${$cc\ s_as_{a\,;}\ u^\wedge{}_a\ u^\wedge{}_a\ d^\wedge\ d^\wedge$} states—would be,

$$2(m^\wedge{}_u C^\wedge{}_u + m^\wedge{}_d C^\wedge{}_d)\ k_4 + 4{,}140 \approx O(750 \text{ GeV}) \tag{36}$$

correctly verging on the observed mass value for the H(750 GeV) state. Where could this extra strong compression for the {uu,d_ad_a}—as well as for the {u_au_add} —constituents come from? The dual {t, **τ**} times arise with the black hole singularity core formations, both (the permanent and ubiquitous kind) in the “Bang!” of the big-bang and (the momentary and local kind) at black hole singularity-like cores. The dual {t, **τ**} field in the black hole core here is passingly capable of interacting in terms of the same t-zone dynamics of the incidental quark constituents.

In fact, since the charge q(u) = +2e/3 and q(d_a) = +e/3, both positive, the strong **τ**–zone (positive charge) EM compressive force arising in the temporary (t-**τ**) dual time at the dark black hole core could act upon the t-zone {$uud_a d_a$}quark pairs of charge "+2e" to compress and cause it to QQD collapse to the {u^ u^d^$_a$ d^$_a$ } state.

The compressed EM (together) neutral quarks in the H(750 GeV) state may decay into the diphotons. This requires the girdling quark state to charge "- 2 e", that is {c_a,c_a; s,s}. This t-zone {c_a,c_a; s,s}quark pairs would stay out of the dual {t, **τ**} black hole core, $*S^{(+)}(t, \tau)$, moving onunaffected (see Fig. 11). As the floating **τ**–zone black hole moves away, the charge neutral {c_a,c_a,s,s;u^,u^,d^$_a$,d^$_a$} state QQD collapses as the neutral H(750 GeV) state.

Silmilarly, the {c,c,s_a,s_a;u^$_a$,u^$_a$;d^,d^} state, prompted by the negatively charged **τ**–zone black hole(t, , **τ**} core $*S^{(-)}(t, \tau)$, may as well forge the H(750 GeV) state. The higher number of similar quark pair productions and their subsequent collapses would help establish the QQD generated singularity-like core in the black holes. Through the very high energy **τ**-zone singularity-like compression for the H(750 GeV) state via the surging dual {t, **τ** } EM force, the t-zone multiple quark-anti quark pairs likely erupt into a pair of t-zone photon jets that could look like pair of photons [36].

The observation of the H(750 GeV) state [37]—the expectedly weak statistical revelation—by the highly capable ATLAS and AMS teams may not be a simple observational aberration, and the subsequent oblivion of the state [38] actually can be the indication for the fortuitous detection of the floating by dark matter black holes that act like a strewn cloud. The current speculation in fact is that such tiny (dark matter) black holes might intermittently hit the Earth [39].

This conspicuous role of the dark matter black holes for the formation of the H (750 GeV) state, is truly astounding. But the same contrivances have been observed to be acting to generate the CMB cold spot (see §14) and the conjecture for the fifth force-like phenomena (see §15).

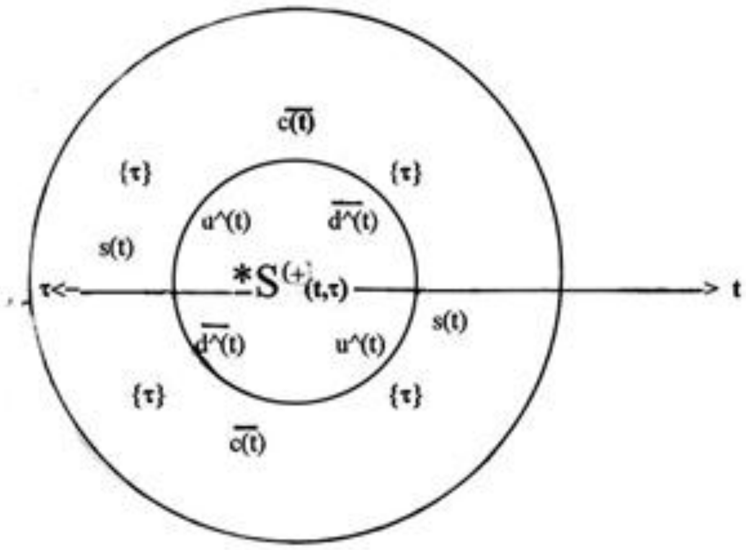


Fig11. *The black hole core, $*S^{(+)}(t, \tau)$, helps generate the H(750 GeV)state[not to scale]*

14. THE CMB COLD SPOT

The invisible (to the t-zone Universe) particles and antiparticles in the τ–zone Universe repulse each other and evades the annihilation [see Eq. (36)], preserving the EM charges. But—with the big-bang Universe interacting in the same way in gravity throughout—the τ -zone matter could initially occupy the Universe essentially like the t-zone matter, possibly ending at places with large space of its own as big as the CMB cold spot. The black holes can arise in both (t, τ} Universes: in colossal bulks in the gravity controlled t-zone Universe, while in the minute scale in the EM controlled τ–zone Universe. The diminutive τ–zone black holes [40,41] may fill the cold spot.

The t-zone CMB radiation of average energy $E_{0,t}$ = O(2.7 K) wonder into the cold spot, and move toward Earth. Without the dark black holes that fill the cold spot space, the (t-zone) CMB radiation dart through it and arrive Earth with the same temperature. With the τ-zone black holes filling the cold spot space, the traversing (t-zone) CMB radiation would hit theτ–zone black holes.

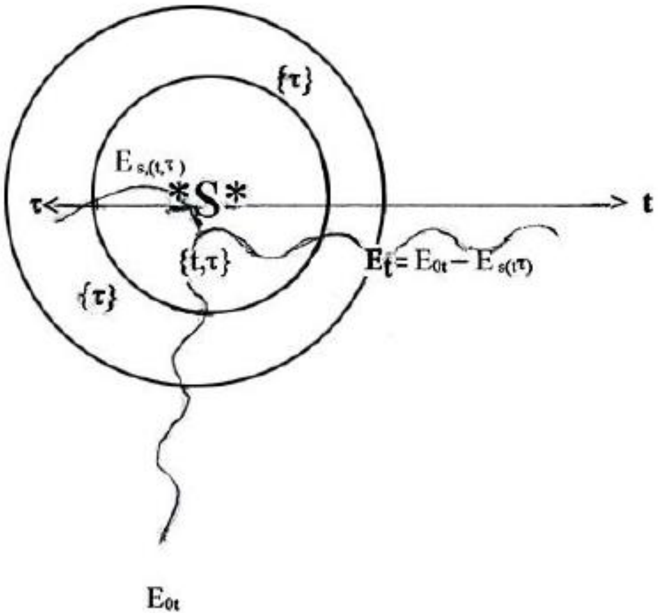


Fig12. *The (τ –zone) Black Hole interacting with the t-zone radiation (Not to scale)*

The (t-zone) CMB radiation in its passage may enters the {t, τ} dual time zone--generated by the singularity-like dark black hole core*S* (t, τ),and lose a small portion of its energy $E_{s,(t,\tau)}$=O(70 μK) through the t-t interaction, the remaining $E_t = E_{0,t} - E_{s,(t,\tau)}$ transmitted out into the free space (see Fig. 12). Thus the cold spot CMB temperature observed on Earth is reduced by $E_{s,(t,\Box)}$=O(70 μK). Some of the CMB radiation passing through the cold spot space might hit the dark black holes twice through their passage, and the energy lost would double to O(140 μK) as observed.

15. The Fifth Forth Conjecture

The ^{8}Be decay with an emission of the photon of energy 18.15 MeV that produces electron pair {e^+, e^- } which moves close together. But it is also observed to decay with photon energy of 17.6 MeV that produces the electron pair { e^+,e^-} with wide angle [42], which has been speculated to be caused by a novel fifth force particle X.

A drifting microscopic dark (τ -zone) matter black hole [39] may transport without Interaction with the t-zone photons. But the (t-zone) ^{8}Be particle decay photon of energy $E_{0,t}$ = 18.15 MeV may at time penetrate and interact with its { t, τ} dual times singularity-like core *S*(t τ,) of the passing τ -zone black hole and lose energy $E_{s,(t,\tau)}$= 0.55 MeV in t-t interaction. The photon energy here would be downgraded into $E_t = E_{0,t} - E_{s,(t,\tau)}$ = 17.6 MeV as demonstrated in Fig. 12 without requiring the speculated

fifth force.

A charged particle of mass M_x radiates energy E_x in proportion to $1/M_x^4$. Because $E_{electron}/E_{proton}$ = O(10^{13}), the proton may not produce high enough energy photons that participate with such a black hole (t, τ } core interaction, while the electron might. Also, the t-zone neutron of {u,d,d} as compared with the t-zone proton {u,u,d}, with the 4 times stronger QQD interaction force with the τ-zone black hole singularity-like core, might reveal some sign of t-t communication.

It is also interesting to note that the conjectured X-like boson might have been observed earlier at energies of 12 MeV and 13.45 MeV, but faded away without explanation [43], duplicating the H(750 GeV) event that are observed in different context then faded away.

16. The Bang of the Big-bang

One galaxy accommodates about 100 billions suns, while the universe contains 100 billion galaxies. This means there are O(10,000,000,000,000,000,000,000) suns, which is equivalent to [44],

$$M_U \approx O(6 \times 10^{82}\ \mathrm{MeV}/c^2) \tag{38}$$

in the Universe. After a great deal of expertly scrutiny of the observed data, it is surmised that some brisk quantum fluctuation gave birth to the Universe with an extraordinary bubble of energy, which grew into the Universe seen today [45].

But, how could a bubble of spontaneous energy generate the entire Universe? The big-bang theory itself said nothing about what the "Bang!" was, and how it had banged, or what happened before the "Bang!"? [46]. Prompted by the H(750 GeV)state that illuminates the singularity-like black hole core interaction in the light of the direct QQD interaction, this paper can light up the mystery in its novel limit.

If the desolate Universe in a flash of wit had generated n $\{u,d_a\}$ quark pairs in the infinitesimal space and time, they could interact in the tighter than the singularity-like black hole core, and generate the collapsed direct QQD interaction energy,

$$QQD\ (u,d_a)_{en} \approx O\ (\ n\ (m\hat{}_u+m\hat{}_d)/(q_u q_d)^{2n}\ ) \tag{39}$$

which generate the energy M_U of Eq. (39) with n≈ 61, that is by

$$\{61u,\ 61d_a\ )\ \text{quark pairs.} \tag{40}$$

The astute Universe could have instead achieve the job with the production of only the nd-quarks, that is (n/2) d, (n/2)d_a}—less EM charged, so the greatly stronger QQD energy generator than the u-quark—whereupon the QQD energy generated would be,

$$QQD(dd_a)_{en} \approx O\ (n\ m\hat{}_d\ /(q_d)^{2n}) \tag{41}$$

For the M_U ≈ O(6 x 10^{82} MeV/c^2), n ≈ O(32), that is only n/2 ≈ O(16) in d-d_a pairs. This is incredible; so small number of quark pairs collapsing in the infinitesimal Bang space could generate the direct QQD energy of O (M_U),creating the entire expanding Universe, fitting the impossible, yet so seemingly observed scenario of the "Bang!" of the big-bang!

These determinations are the results of simple initiative consideration, but perfectly fits the "Bang" spectacle of the big-bang. The crux of the physics thus must be correct, the permanent dual time $\{t, \tau\}$ commencing with the big-bang singularity eruption. The surprisingly small number of quarks required here for the "Bang!" in the big-bang gives a spacious room for the compliant determination for the detailed correct big-bang scheme, which requires much more elaborate and detailed considerations.

17. CONCLUSION

The Unified Theory of Everything, where all the interactions arise from the electronic charges in different guises, is established to determine the elementary and compound particle states. Also, with the introduction of the imaginary time, a fully symmetric space-time is established to elucidate the non-observable Universe of dark matter and energy as well as the "Bang!" of the big-bang that has been alleged to be the Creator's secret prescription.

The spirited and exquisite Universe in the astute designs shown in this paper is truly "Venerable". Galileo would declare that the cue here is clear: "Move on!" Much more work is needed. The author invites the world for its long overdue open-minded collaborations.

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