Chapter 3A: ELEMENTARY or FUNDAMENTAL PARTICLES – the Quantum Mechanical Version

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3.1 INTRODUCTION

In this work, an elementary particle refers to an element, without any other intrinsically constituting member(s) apart from itself; hence there exists no element(s), to which it can be reduced. This forms the 'final, primary, fundamental or ultimate' basic building block(s) for any physically existing object. It is hence ***indivisible*** and expected to be ***indestructible*** otherwise physical existence might cease to exist at one point or another in time. http://en.wikipedia.org/wiki/Elementary_particle: Accessed on May 21st 2015.

From about the last lap of the 19th Century, Scientists began observing that phenomena taking place at sub-atomic levels tended to defy Classical Mechanical laws prevalent at the time. It is under such circumstances that Quantum Mechanics and its subsidiaries, the General and Special Relativistic Mechanics sprouted to bridge the gap. A lot of exploration began and efforts were put into the study of the fundamental particles that constitute the nucleons and the laws that govern their interactive behaviors.

The above search has led to what is known as the '***Standard Model'***, which comprises of fundamental particles that have been identified so far, and room is available for others under prediction. Other Scientists however, have remained 'unsatisfied' with the 'finality' in the search, which the 'Standard Model' appears to promote; and have progressed to suggest other unification Models, capable of capturing other sectors, which the Standard model does not address, such as *gravitation*. Still others have shown greater interests in coming up with an all embracing Model, which would leave no physical phenomenon unexplained. This universal model is currently referred to as the '***Theory of Everything'***.
http://en.wikipedia.org/wiki/Theory_of_everything: Accessed on June 12th 2015.

One of the major objectives of this work is to confirm that, ***Classical Mechanical laws*** are ***effectively*** and ***accurately functional*** even at the sub-atomic levels of matter, a functionality which has been solely reserved for Quantum mechanics hitherto!

The ability for Classical Mechanical laws to ***control*** and ***predict*** objective phenomena at matter's elementary level, lies fundamentally in the ***existence*** and ***characteristic operations*** of the ***ultimate elementary*** particles of matter earmarked in this work, namely, the ***unlike magnetic monopoles.*** These are shown to control and predict all phenomenal behavior both at the macro (Chapter 2A & 2B) and micro-levels (Chapter 1) of matter.

The ***unlike Magnetic Monopoles*** are presented in this study as providing the much needed equation. These are ***the ultimate constitutive elements of all matter*** as we know it, while simultaneously ***controlling*** all its (matter) interactions through their ***magnetic force*** and its ***subsidiaries*** (like: centrifugal, centripetal, gravitation forces etc…). Experimental evidence is provided in this work to this effect (cf. Chapter 3B).

Among the strongest evidences provided in this work, which confirm the grip or the functionality of Classical Mechanical laws on the sub-atomic platform is the ***derivation*** of ***Planck's constant*** (***h***) and its reduced form (***ħ***) using both ***Hooke's*** and ***Newton's Second Laws***. Derivation is also done on the ***universal gravitation constant (G),*** just as on the ***speed of light in free space*** (***C***); and all these are exercises accomplished using Classic Mechanical laws and theories.

Since Quantum Mechanics and its subsidiaries *rely greatly* onto these ***Classic Mechanical Constants*** in the formulation of their laws and theories, especially in the sub-atomic domain, it can be favorably concluded that Classical Mechanics forms the backbone of Quantum Mechanics. This alludes to the expectation that Classical Mechanics has all it requires to predict phenomena at all levels including the sub-atomic zone; and this is illustrated in this work.

In order to establish a balanced position between the current proposal and the prevalent Quantum Mechanical elementary particle scheme, a brief exploration of the latter is done prior and this is addressed in this part of the Chapter; its Classic Mechanical - based counterpart is addressed in Chapter 3B.

The Standard Model is ***Quantum Mechanical modeling scheme***, in which the identified fundamental particles are classified and their mutual interactions defined. This model is carved out of a ***system of laws and theories*** propounded within Quantum Mechanics' domain. It becomes necessary then to peruse through some key laws and theories which provide the framework and rationale to the Standard Model of fundamental particles.

3.2 *FOUNDATIONS OF THE STANDARD MODEL*

3.2.1 *Introduction*

As expressed above, the Standard Model is quite a complex entity. Effort is done in this work to explore some of the main building blocks of the Model beginning with the concept of ***the universal natural constants*** followed by the ***Planck's natural unit system***. It must be mentioned at the outset, that several other pertinent aspects are interwoven within the main Sections to highlight some intricate items that are judged influencing the logical positions in the build-up of the Model.

The proposed approach is necessary, since Quantum Mechanics is itself a ***serial layered-system***, with one stage leading to another and ***a fault in one part***, may easily lead to the ***falsification of numerous parts of the entire system***. This in part explains its '***ring-fenced*** or ***impenetrable character'*** and hence its formidable logical forms, which require extra probe even within the main sections.

As a means of preparing a stronger position in favor of the ***unlike magnetic monopoles*** as the fundamental particles of matter, ***counter positions*** are developed along, prompting reasons why it is held in this work, that the Classical Mechanical proposal in Chapter 3B,

is actually a better system of elementary particle of matter than what Quantum Mechanics is proposing under its Standard Model scheme.

3.2.2 *Universal Natural Constants and Planck's Natural Units*

3.2.2.1 *Introduction*

There are several prevalent **natural unit systems** in vogue, each propounded to serve a specific purpose. Each natural unit system 'claims' to determine the values of their units based only on some **universal natural physical constants** (quantifiable ***by measurement only***) that are simultaneously universal in nature and constant/invariable in time. In this work, the ***Planck's natural units***, as adopted by the **Quantum Mechanics' holders** are fronted to exemplify the rest of the natural unit systems. The details of the natural unit systems in vogue to-date may be found at:
https://en.wikipedia.org/wiki/Natural_units#Systems_of_natural_units: Accessed on August 27th 2015.

In addition, natural units are "natural" because the origin of their definition (= universal natural physical constants) comes only from properties of ***nature*** or ***universe*** and **not** from ***any human construct***. They are 'given' (datum) and hence cannot be derived or formulated from other scientific laws. These constants are said to be **natural** in so far as they are not based on properties of any prototype, object or particle but are ***solely derived*** from the **properties** of ***free space*** (***the universe***) as expressed by the **universal natural physical constants.** The natural units cannot therefore be derived from other laws of nature than the ones in which they explicitly occur. In some circles, they are referred to as "***God's units***"
https://en.wikipedia.org/wiki/Nature; https://en.wikipedia.org/wiki/Natural_units:
Accessed on August 26th 2015

Further, typical of all natural unit systems, is their dependence on what is conceived as ***universal natural constants*** as already stated above: these are perceived to proceed from the ***universe-world*** and only detectable by measurement in the ***Earth-world***. Such constants are held to represent natural or universal laws. The said constants are hence

conceived as ***eternal*** and ***fundamental*** to the extent that they cannot be derived from any other constants; instead they are the ones from which all other constants can be built.

3.2.2.2 ***Universal Natural Physical Constants***

Quantum Mechanics identifies more than **four universal or natural physical constants** upon which natural units are based. The four constants are sufficient for the interests pursued in part of the study. These with their current SI estimated values are:

1. **Planck's Constant, $h \approx 6.626\ 069\ 57 \times 10^{-34}$ J.s**
2. **Reduced Planck's Constant $\hbar$ $(= h/2\pi) \approx 1.054\ 571\ 726 \times 10^{-34}$ J.s**
3. **Speed of Light in Vacuum, $C \approx 299{,}792{,}458$ ms^{-1}**
4. **Newtonian Gravitation Constant, $G \approx 6.673\ 84 \times 10^{-11}$ $m^3kg^{-1}s^{-2}$**

The rest can be viewed at:
https://en.wikipedia.org/wiki/Physical_constant#Table_of_universal_constants: Accessed on August 26th 2015.

3.2.2.3 ***Inferable Characteristics of the Universal Natural Constants***

From the characterization associated with the universal natural physical constants above, the following hold:

1. They are not derived constants, but elementary natural invariable universal values. Each of these must be expressed in ***one respective categorical unit***, which should reflect each's ***respective uniqueness*** or ***singularity***. They are '***eternal', invariable*** and ***fundamental***; expressing the presumed ***innate properties of the universe***.

2. The natural invariable universal constants are themselves ***neither irreducible*** nor ***factorable*** into any other elementary constants. They instead form the ***basic elements*** from which all other units are derivable. Each natural constant *cannot be expressed* in terms of other natural or other constants, say in form of equations or formulae. However, the reduced Planck's constant (***$\hbar = h/2$***) appears to flout this rule (indeed all others do the same as discussed shortly!).

3. They have the ***same value*** in any place and at any time ***in the universe***.

4. They are defined and recognized by a Standard Regulatory Authority (currently SI).

5. The elementary natural invariable universal constants are ***solely measurable*** and hence are **not predictable** by any known theory. The universal natural constants are ***laws of nature***, which unfold the activities or processes of the universe; without themselves being the causalities of these processes.

http://unendliches.net/english/index.htm?naturkonstanten.htm: Accessed on August 25th 2015.

Note, however, that given the ***all embracing, general characteristic of natural laws***, covering not only all cases that have so far been observed but all cases that ever will (or could) be observed, these **laws of nature** ***cannot therefore be "proven***"; except they can be **refuted,** upon identifying ***a necessary falsifier*** by observation or experimentation. Besides, *a* ***non-falsifiable*** law of nature is not, strictly speaking, a law of nature or scientific at all, but something belonging to the *field of faith*!

http://unendliches.net/english/index.htm?naturkonstanten.htm: Accessed on August 25th 2015.

3.2.2.4 ***Assessment of the Universal Natural Physical Constants' Characteristics***

The immediate impression paraded by Quantum Mechanics in describing the universal natural physical constants as ***laws of nature***, is that these constants are '***sacrosanct'*** and hence '***untouchable'***, given to the world as it were from some supernatural source, say God! This is one of the ***'hidden objective' truth*** that Quantum Mechanics cannot release for ***subjective relativistic treatment*** or ***analysis***!

Very often, the determination of the universal natural constants are practically presented as '***extremely difficult'*** to come-by values; and are often stumbled upon almost ***miraculously*** and ***only during experimental work***. The most dramatic of these is the Cavendish's 'accidental' and 'indirect' determination of the Newtonian Gravitation constant, the details of which are found at:

https://en.wikipedia.org/wiki/Gravitational_constant#History_of_measurement: Accessed on August 26th 2015.

Having ***ring-fenced*** the universal natural physical constants from the known scientific methods of assessment, the Quantum Mechanics' beholders, secured their hands out of the grip of known procedures applied by Classic Mechanics; to the extent of promulgating several theories and laws, which caught so many scientists unprepared while others got mesmerized with the 'new' findings and joined the Quantum Mechanical scientific school of thought.

The Quantum Mechanical School gained a lot of scientific following particularly, as it appeared to offer 'scientific' solutions to areas that Classic Mechanics could not explain then; especially in the sub-atomic domain. This saw ***Einstein*** in 1905, promulgating almost single-handedly the *Special Relativistic* and in 1916, the *General Quantum Mechanical* branches of Physics, which are still prevalent to-date.
http://unendliches.net/english/index.htm?naturkonstanten.htm: Accessed on August 26th 2015.

As a way forward, it becomes necessary that, we explore more of the Planck's natural units system and its influence on some theories that depend on this system and are deemed pertinent to the ulterior probe, just as exploring a few Einstein's laws and theories that apply as the foundation of the Standard Model, which framework prescribes the fundamental elements of matter and how they interact with each other.

The above strategy is accomplished in two stages. Primarily, we begin by concentrating on probing the characterization associated with the universal natural physical constants; so as to establish in fact whether these values are actually sacrosanct (***tailored once-for-all by nature/universe***), fundamental and hence not derivable from other known constants or otherwise! The second effort includes investigation of the ***general rationale*** behind the formulation of Planck's natural units.

3.2.2.5 ***The Planck's Constant h (J-s) is a Derivable Classic Mechanical Parameter***

In Chapter1, Section 1.6.3, it was analytically proved beyond any valid scientific doubt that actually Planck's constant is ***derivable*** and ***quantifiable*** from **Classic Mechanical Law** of **Hooke** and **Newton's second law of motion**. The constant was derived using the Hydrogen's single electron mechanics, which are only possible under the dynamism of ***unlike magnetic monopoles.*** This success ***breaks the order of property*** associated with the constant's being ***non-derivational*** using other laws, other than those of the universe!

There is therefore **nothing 'sacrosanct'** or ***fundamental*** with this constant; it is **as ordinary as** any other Classic Mechanical constant. It is part of the laws of Classical Mechanics and hence ***cannot*** apply itself as **an elementary/fundamental value** upon which other constants can be based; it is itself ***a derivative*** and hence ***a compound*** or ***synthesis*** of ***other parameters*** and it subscribes or applies itself to the Classic Mechanical procedures.

Being a ***construct*** of human beings, the constant draws its efficacy ***in this earth world*** and it explains ***terrestrial mechanics*** and ***not of the abstract universe world*** as Quantum Mechanics tries to lure us to believe. The constant therefore ***does not subscribe to the laws of nature*** as defined by Quantum Mechanics!

In order to verify the above, reference is made of Equations (1.85 & 1.86 in Chapter 1) and repeated here for emphasis. We have that:

For a single oscillator (say hydrogen electron in ground state), the ***parametric form*** of Planck's constant ***h*** is rendered as:

$$h = \frac{\pi m_{red} r v}{3} \qquad (3.1)$$

Where: r, v and m_{red} are the distance of the oscillator from the hydrogen atom's nucleus, the orbital velocity and reduced electron mass respectively.

Equation (3.1) displays the ***aggregate or parametric form of factors*** that constitute Planck's constant. Besides, the (***J-s***) units of the constant are sufficient to pronounce loud and clear that the constant in question is indeed ***a composite.*** Clearly, there is no fundamental constant, of which Planck's constant is expected to be, that can be expressed in terms of other derivable units, other than that pertaining to itself. It follows therefore that the Planck's constant is a value, which can be determined ***analytically*** (hence it is ***predictable*** from other **Classic Mechanical laws**) and ***not solely through experimental measurements*** as Quantum Mechanics hold.

In the event that there are ***n*** oscillators (electrons) in a single orbit situated *r* from the nucleus, circulating the nucleus at orbital speed *v*, the total reduced mass becomes *"m = nm_{red}"* and the general Planck's constant becomes:

$$nh = \frac{\pi m r v}{3} \qquad (3.2)$$

Where, n = 1, 2, 3,…….

Besides Quantum Mechanics would find it very difficult indeed to hold on the position that Planck's constant is a constant at all, since among their theories, they hold that mass is invariant at high speeds approaching that of light! The claim that mass increases with velocity is one other area which is rejected in this work; the grounds upon which the said rejection is effected are offered in coming Sections of this work.

In sum, since this is the very first time that Planck's constant has been derived using Classic Mechanical Laws, and proved to be a ***'synthetic' or parametric*** factor, it necessarily follows, that the same ***must be deleted*** from Quantum Mechanics' list of the universal natural physical constants.

The deletion from the universal natural constants' Quantum Mechanical list, follows its ***'sacrosanct' properties having been falsified*** in this work. It is ***drawing nothing*** from the universe down to the Earth; it is only ***a locally*** generated constant! At this rate Quantum Mechanics remains with **only three** purported 'universal natural physical

constants', namely: ***ħ, C and G***. Any claim by Quantum Mechanics therefore to ***derive a unit*** system based on Planck's constant runs into ***serious difficulty!***

3.2.2.6 ***The Reduced Planck's constant, ħ and the Dark Energy/Matter***

Since ***ħ = h/2π***, all the analysis done on ***h*** directly maps onto it. It should also ***be deleted*** from the list of Quantum Mechanics' universal natural physical constants. The Quantum Mechanics' ***inaccurate definition and evaluation*** of this particular constant is the ultimate cause of the source of speculation for the existence of ***"Dark Energy/Matter***" in the universe. Analysis was done in Chapter 1, and it was shown that actually, the 5/6 (≈ ***84%) of energy,*** which has been attributed to the fictitious source, is accountable for ***within*** the oscillating system and ***not supplied*** by the "Dark Energy/Matter"!

It was shown in Chapter 1 Section 1.6.4, that ***ħ*** is a composite/synthetic figure and hence not a basic constant; its parametric form was also developed. This is repeated below for emphasis and quick reference.

From Equation (3.1), and taking $\boldsymbol{m = nm_{red}}$, where ***n*** is the number of oscillating electrons in an orbit situated ***r*** distance from Hydrogen atom's nucleus and orbiting at velocity **v**, the following mathematical procedure obtains.

$$2nh = \frac{2\pi nm_{red}\, rv}{3} \Leftrightarrow \frac{2\pi mrv}{3} \tag{3.3}$$

It follows,

$$\frac{6nh}{2\pi} = 6n\hbar \Leftrightarrow mrv \tag{3.4}$$

The ***Quantum Mechanical*** (defective) ***formula*** for the same constant is built in Equations (1.97 – 1.99); let it suffice to state the final results as in Equation (3.5).

$$n\hbar = mrv \tag{3.5}$$

It is not difficult therefore to confirm that the reduced Planck's constant is clearly known by Quantum Mechanics as a parametric figure and hence is not basic or fundamental!

The inaccuracy in evaluating the constant is deducible from Equations (3.4 & 3.5); this implies that Quantum Mechanics evaluates the reduced Planck's constant at 1/6 (≈ ***16 %***) of its Classical Mechanical value! Thus Quantum Mechanics is left with no alternative other than speculating or hypothesizing an existence in the universe of some "un-seen" and hence "Dark Energy/Matter" as an explanation for the missing 5/6 (≈ ***84%***) measurable energy, but whose source it cannot identify physically!

From then on, a search has been on to spot this fictitious source of such enormous amount of energy. Myriads of theories in its favor have been propounded and several scientists have obtained academic honors for work in the probe for the 'Dark Energy/Matter'; while others are claiming specialization in the same field! Several ***sophisticated*** or ***specialized probe antennas*** and ***telescopes*** are over the world and in space; all targeted to spot the elusive 'Dark Energy/Matter' location!

In this work, all the above mentioned list of efforts and others, remain to produce no positive results, for the ***solution*** to the un-seen yet measurable energy is supplied by ***Classic Mechanical's prediction*** of the reduced Planck's constant. It cannot be more emphasized than reiterating the proven fact that ***Classical Mechanics is far more accurate*** in predicting ***sub-atomic phenomena*** than ***Quantum Mechanics;*** and that both Planck's constant and its reduced version are ***Classic Mechanical derivatives*** and double as ***parametric values*** and hence they are ***not base values*** as claimed by Quantum Mechanics.

The "chasing of the wind" game should stop, for the '***elusive***' source of the '***extra energy'***, which is about 84% of the total measurable energy has at ***last been found;*** it has been identified to be ***located within*** the oscillatory system itself and not in some "***Dark spot***" somewhere in the universe as Quantum Mechanics had earlier predicted! Now, let resources be channeled to some other real scientific issues; otherwise the 'game of searching' for the source of "Dark Energy/Matter" is over!

In sum, **h** just as **ħ** are direct products of ***Classical Mechanics' laws*** and hence are ***not base*** or ***universal natural constants*** 'sealed' in the universe! At this rate, Quantum Mechanics is remaining with two constants, namely, ***G*** and ***C***, the Newtonian Gravitation constant and the velocity of light in the vacuum respectively. Next we probe G to certify whether it is a fundamental constant constructed in the universe.

3.2.2.7 ***The Newtonian Gravitation Constant G, its Derivation and Black Hole***

Quantum Mechanics upholds that G is a base and hence fundamental constant determined in the 'universe world'. However, the ***units*** ($m^3kg^{-1}s^{-2}$) associated with the Gravitation constant strongly project that ***the constant is composite*** other than being ***basic*** or ***fundamental***, for it is expressible in terms of other parameters, contrary to the definition of a fundamental constant according to Quantum Mechanics!

Further, in this study however, it shown that actually, G is parametric (synthetic) and can be derived using ***Kepler – Newton's Classic Mechanical laws*** as demonstrated below.

Assuming least perturbation in the atmosphere, Kepler's planetary laws of motion, describing the motion of planets around the Sun can be summarized as:

1. The orbit of a planet is an Ellipse with the Sun at one of the two foci.
2. A line segment joining a planet and the Sun sweeps out equal areas during equal intervals of time.
3. The square of the orbital period (T) of a planet is proportional to the cube of the semi-major axis (a) of its orbit.

These same laws apply with respect to artificial satellites orbiting the Earth; and certainly in any other system, which bear similar system characteristics, like in the Hydrogen atom where an electron orbits the nucleus. Following is the sequence of steps to illustrate that indeed the Universal Gravitation Constant G, can be derived or compounded from Kepler's laws of planetary motion, in conjunction with Newton's Gravitation and second laws of motion.

Kepler's First Orbital Law

Normal orbits (Kaplerian orbits) are a function of the central position of the earth's gravitation field – the largest force (F) acting on the satellite. Normal motion of satellite is therefore determinable from Newton's gravitation law coupled with Newton's second law of motion.

$$F = \frac{GMm}{r^2} = ma \Leftrightarrow -m\ddot{\vec{r}} \qquad (3.6)$$

Where, M and m are masses of the Sun and Earth (equivalently, between the Earth and orbiting Satellite) respectively, G *is the Universal gravitation constant. F* is the gravitational force between Sun and Earth and *r* is the perpendicular distance between Sun and Earth. The negative sign depicts an attractive force and ***a*** is the Earth's acceleration towards Sun.

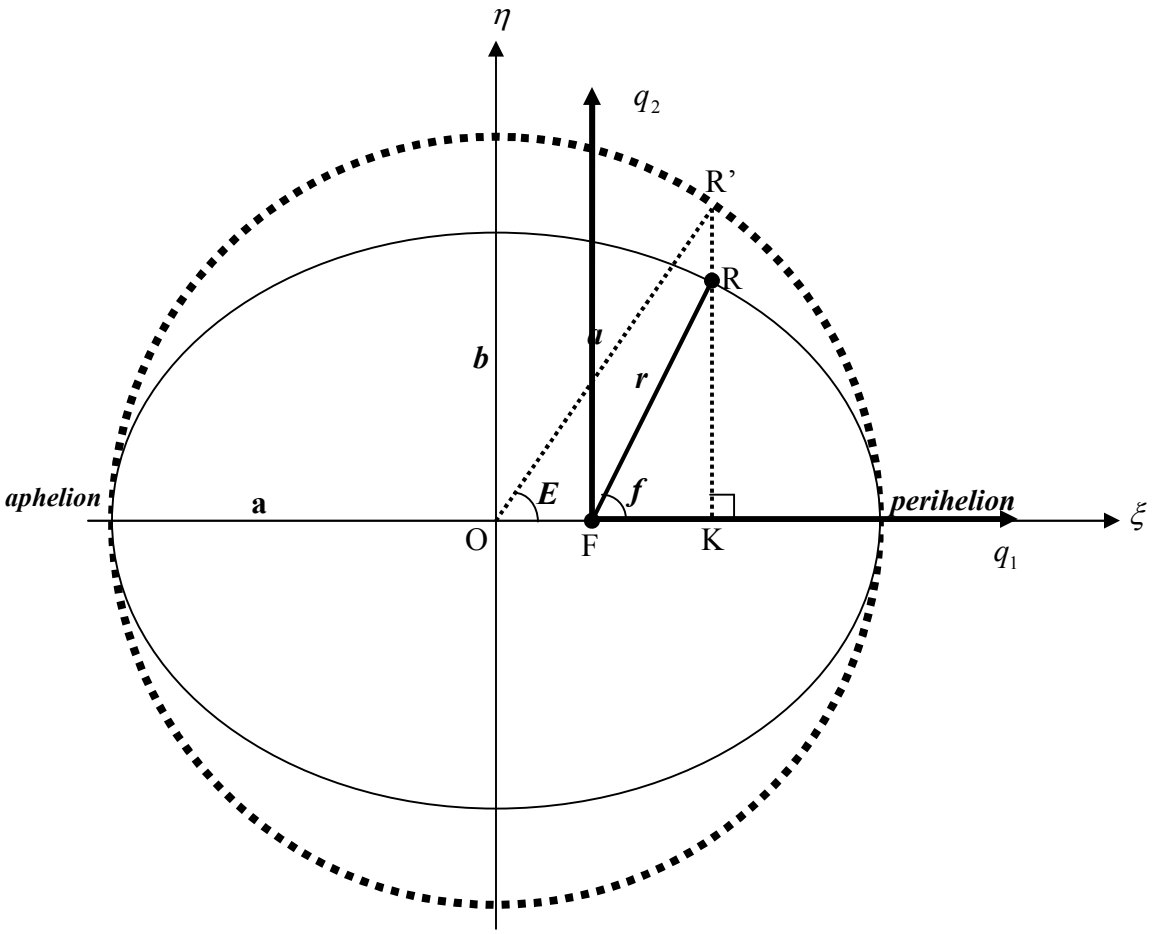

Figure 3.1: **Two – Coordinate Orbital Systems of the Earth orbiting the Sun**

In Figure 3.1, the two analytical possible methods of defining the Earth's orbit about the Sun: from the focus and centre of the elliptical path are projected. A circular path is included to depict the anomaly associated with the elliptic option instead of a circular path.

The 2-dimensional coordinate system associated with the centre of the ellipse is organized with coordinates: (**ξ, η, 0**) following the Cartesian format (x, y, z). The other 2-dimensional system referenced to one of the foci, assumes coordinates as: (**q_1, q_2, 0**). It follows that, Figure (3.1) provides Earth/Satellite position in the (q) orbital plane coordinate system (referenced to one of the foci of the ellipse); and the principal axes of the ellipse form the (ξ, η) coordinate system.

From Equation (3.6), we have:

$a = \ddot{r} = \frac{GM}{r^2}$. In the vector form the same Equation can be rendered as:

$$\ddot{\vec{r}} = -GM\frac{\vec{r}}{r^3} \Leftrightarrow -\mu\frac{\vec{r}}{r^3} \qquad (3.7)$$

Where,

$\mu = GM$ is the earth's gravitational constant and $\vec{r}$ is unit vector.

Observe: the ***co-linearity*** between $\ddot{\vec{r}}$ (acceleration) and $\vec{r}$ (unit vector) in Equation (3.7) is typical of central gravity fields (e.g. a particle released from rest traces a straight line to Earth).

From Figure 3.1: ***q_1 = r cos f*** and ***q_2 = r sin f***

Transposing the ***q*** co-ordinate system (to ease computation), we have:

$\vec{q} = [q_1\ q_2\ 0]^T$, which turn as:

$$\vec{q} = r\begin{bmatrix}\cos f\\ \sin f\\ 0\end{bmatrix} \qquad (3.8)$$

Where f is the true anomaly which varies with respect to time just as r does; E is the eccentric anomaly. Both anomalies are determined counter-clockwise.

Thus, Equation (3.7) can then be rendered in ***a transposed 3-dim unit*** vector format as:

$$\ddot{\vec{r}} \;=\; -\mu\frac{\vec{r}}{r^3} \;\Leftrightarrow\; -\frac{\mu}{r^2}\begin{bmatrix}\cos f\\ \sin f\\ 0\end{bmatrix} \tag{3.9}$$

Further,

$$\dot{\vec{q}} \;=\; \dot{r}\begin{bmatrix}\cos f\\ \sin f\\ 0\end{bmatrix} \;+\; r\,\dot{f}\begin{bmatrix}-\sin f\\ \cos f\\ 0\end{bmatrix} \tag{3.10}$$

Giving:

$$\ddot{\vec{q}} \;=\; \ddot{r}\begin{bmatrix}\cos f\\ \sin f\\ 0\end{bmatrix} \;+\; 2\dot{r}\dot{f}\begin{bmatrix}-\sin f\\ \cos f\\ 0\end{bmatrix} \;+\; r\ddot{f}\begin{bmatrix}-\sin f\\ \cos f\\ 0\end{bmatrix} \;-\; r(\dot{f})^2\begin{bmatrix}\cos f\\ \sin f\\ 0\end{bmatrix} \tag{3.11}$$

Equation (3.11) is in **same form** as Equation (3.9); moreover, the two Equations depict the same acceleration of the orbiting Earth. The Orbital locations *closest* to and *farthest* from the focal point are the ***Perihelion*** and ***Aphelion*** respectively. Thus by equating factors with the **same bracketed coefficients** (alternatively at perihelion/aphelion where $f = 0$) the following obtains:

$$\ddot{\vec{r}} \;\Leftrightarrow\; -\frac{\mu}{r^2}\begin{bmatrix}\cos f\\ \sin f\\ 0\end{bmatrix} \;=\; \ddot{r}\begin{bmatrix}\cos f\\ \sin f\\ 0\end{bmatrix} \;-\; r(\dot{f})^2\begin{bmatrix}\cos f\\ \sin f\\ 0\end{bmatrix} \tag{3.12}$$

And

$$2\dot{r}\dot{f}\begin{bmatrix}-\sin f\\ \cos f\\ 0\end{bmatrix} \;+\; r\ddot{f}\begin{bmatrix}-\sin f\\ \cos f\\ 0\end{bmatrix} \;=\; 0 \tag{3.13}$$

From Equations (3.12) & (3.13) we can deduce that:

$$\ddot{r} - r(\dot{f})^2 = -\frac{\mu}{r^2} \tag{3.14}$$

$$r\ddot{f} + 2\dot{r}\dot{f} = 0 \tag{3.15}$$

Multiplying Equation (3.15) by *r* and integrating we have,

$$\int \left(r^2 \ddot{f} + 2r\dot{r}\dot{f}\right)dt = H \tag{3.16}$$

Where *H* is a constant; this ***constant parameter*** turns out to be the "*known constant*", which is the **angular momentum per unit mass of the orbiting Earth**.

Equation (3.16) can be re-written as:

$$\int \frac{d}{dt}\left(r^2 \dot{f}\right)dt = H \tag{3.17}$$

Thus:

$$r^2 \dot{f} = H \tag{3.18}$$

Clearly Equation (3.18) denotes H, the ***Earth's angular momentum per its unit mass*** (***Earth's specific angular momentum***); and since *H* is a constant, ***the angular momentum of an orbiting Earth is conserved***.

To solve Equation (3.14), we make the following substitution:

Let $u = \frac{1}{r}$ and chain integrate with respect to f; while utilizing Equation (3.18).

$$\frac{du}{df} = \frac{du}{dr}\frac{dr}{dt}\frac{dt}{df} \Leftrightarrow -\frac{1}{r^2}\dot{r}\frac{r^2}{H} = -\frac{\dot{r}}{H} \tag{3.19}$$

Integrating further,

$$\frac{d^2u}{df^2} = \frac{d}{dt}\left(-\frac{\dot{r}}{H}\right)\frac{dt}{df} \Leftrightarrow -\frac{r^2\ddot{r}}{H^2} = -\frac{\ddot{r}}{u^2H^2} \tag{3.20}$$

From which:

$$\ddot{r} = -H^2 u^2 \frac{d^2 u}{df^2} \tag{3.21}$$

By inserting the result in Equation (3.14); while substituting for r and $\dot{f}$ being obtained from Equation (3.18), we have:

$$H^2 u^2 \frac{d^2 u}{df^2} + \frac{1}{u} H^2 u^4 = \mu u^2 \Leftrightarrow \frac{d^2 u}{df^2} + u = \frac{\mu}{H^2} \tag{3.22}$$

Solving Equation (3.22) results in:

$$u = \frac{1}{r} = B\cos f + \frac{\mu}{H^2} \tag{3.23}$$

Where, B is a constant.

Evidently, Equation (3.23) is the **equation of the ellipse** as r sweeps out *an elliptical locus*, about one of the foci.

Next, the equation of the ellipse in ***its principal form*** (i.e. referenced to the centre of the ellipse) is expressed in Equation (3.24).

$$\frac{\xi^2}{a^2} + \frac{\eta^2}{b^2} = 1 \tag{3.24}$$

Where, using Figure 3.1, we have:

$$\xi = ae + r\cos f \tag{3.25}$$

$$\eta = r\sin f \tag{3.26}$$

From the Ellipse relations, it is known:

$$b^2 = a^2\left(1 - e^2\right) \tag{3.27}$$

Where, a and b are the major and minor radii respectively and e is the ellipse's eccentricity.

Substituting the above into the principal ellipse equation (3.24) and re-arranging, we have:

$$\left(1 - e^2\right)(ae + r\cos f)^2 + r^2 \sin^2 f = a^2\left(1 - e^2\right) \tag{3.28}$$

By method of completing the square we have:

$$r^2 + 2r\frac{(1 - e^2)a\,e\cos f}{(1 - e^2\cos^2 f)} = \frac{a^2(1 - e^2)^2}{1 - e^2\cos^2 f} \qquad (3.29)$$

Which, reduces to:

$$\left[r + ae\frac{(1 - e^2)\cos f}{1 - e^2\cos^2 f}\right]^2 = \left[\frac{a^2(1 - e^2)^2}{1 - e^2\cos^2 f} + \frac{(1 - e^2)^2 a^2 e^2\cos^2 f}{(1 - e^2\cos^2 f)^2}\right]$$

.....(3.30)

From which,

$$r = \frac{a(1 - e^2)}{1 + e\cos f} \qquad (3.31)$$

Thus:

$$\frac{1}{r} = \frac{1}{a(1 - e^2)} + \frac{e\cos f}{a(1 - e^2)} \qquad (3.32)$$

From Equation (3.23) through Equation (3.32), ***the motion of a satellite under conditions of a normal/classic orbit, is shown to be an Ellipse (Kepler's First Orbital Law).***

Now, comparing Equation (3.23) and Equation (3.32) we have,

$$\text{Constant } B = \frac{e}{a(1 - e^2)} \text{ and } H = \sqrt{\mu a(1 - e^2)} \qquad (3.33)$$

Thus ***the average angular momentum K*** for the Earth of mass ***m***, orbiting the Sun of mass ***M*** is given as:

$$K = \frac{H}{m}m \Leftrightarrow m\sqrt{\mu a(1 - e^2)} \Rightarrow m\sqrt{aGM(1 - e^2)} \qquad (3.34)$$

From Equation (3.7), the Universal Gravitation constant G is determined as:

$$G = \frac{(mvr)^2}{Mm^2 a(1 - e^2)} \Leftrightarrow \frac{(vr)^2}{Ma(1 - e^2)} \qquad (3.35)$$

Where,

- ***v*** is the Earth's orbital velocity about the Sun

- ***r*** is the perpendicular distance between Sun and Earth
- ***m*** is the Earth's average mass ≈ ***5.9726 x 10 ^{24} kg***
- ***M*** is the Sun's average mass ≈ ***1.9885 x 10 ^{30} kg***
- ***e*** is the Earth's orbital eccentricity as determined in this work (cf. Equation (2.100) ≈ ***0.0107275***
- ***a*** is Earth's semi-major radius as determined in this work (cf. Equation (2.108)) ≈ ***1.49320337815 x 10 ^{11} m***

Taking calculations at the ***Perihelion***, we have:

- ***v*** ≈ ***2.9812 x 10^{4} ms^{-1}*** (cf. Chapter 2B, Equation (2.113))
- ***r*** = ***a***

From Equation (3.35), G is estimated as:

$$G = \frac{(vr)^2}{Ma(1 - e^2)} \Leftrightarrow \frac{v^2 a}{M(1-e^2)} = \frac{2.9812^2 \; x\, 10^8 \; x\, 1.49320337815 \, x\, 10^{11}}{1.9885 \, x\, 10^{30} \; x\, (1 - 0.0107275^2)}$$

$$\approx 6.6756122 \quad x \quad 10^{-11} \quad m^3 \, kg^{-1} \, s^{-2}$$

.....(3.36)

Referencing the estimation of G about the ***Aphelion***, we have:

- ***v*** ≈ ***2.9809 x 10^{4} ms^{-1}*** (cf. Chapter 2B, Equation (2.115))

$$G = \frac{v^2 a}{M(1-e^2)} \Leftrightarrow \frac{2.9809^2 \; x\, 10^8 \; x\, 1.49320337815 \, x\, 10^{11}}{1.9885 \, x\, 10^{30} \; x\, (1 - 0.0107275^2)} \qquad (3.37)$$

$$\approx 6.6732618 \quad x \quad 10^{-11} \quad m^3 \, kg^{-1} \, s^{-2}$$

Taking the average of the Gravitation constant estimated at the Perihelion and Aphelion, we have:

$$G \approx \frac{(6.6756122 + 6.6732618) \quad x \quad 10^{-11}}{2} = 6.674437 \quad x \quad 10^{-11} \, m^3 \, kg^{-1} \, s^{-2}$$

.....(3.38)

The current value of ***G ≈ 6.67408 x 10^{-11} m^{3}kg^{-1}s^{-2}*** (3.39)

http://physics.nist.gov/cgi-bin/cuu/Value?bg|search_for=universal_in!: Accessed on August 24th 2015.

The closeness of the determined average value of the Gravitation constant and the **Cavendish's referenced** value (***6.754 x 10^{-11} m^3 kg^{-1} s^{-2}***) cum current value of the same, proves beyond reasonable doubt that indeed the Gravitation constant may be '**extremely elusive** and **very difficult to measure'** as Quantum Mechanics has been holding; but it has been established in this work that the Gravitation constant **can easily** be ***derived*** and ***quantified*** from ***other elementary parameters*** as defined within the ***Classical Mechanics' framework.***

Clearly, the Gravitation constant **does not** qualify to be categorized as **a natural** nor an **elementary parameter** in accordance to Quantum Mechanics' categorization. This already introduces another dilemma to the presumed 'natural units' of Quantum mechanics.
https://en.wikipedia.org/wiki/Gravitational_constant#History_of_measurement: Accessed on August 24th 2015.

Observe: The highly correlated results between current value and the derived Gravitation constant results, puts more weight on the ***derived eccentricity of Earth of about 0.0107275*** instead of the **current value of about 0.0167**!

From the foregone conclusion, Kepler's third law of planetary offers another platform where the Universal Gravitation Constant can be estimated. The same law is expressed as in Equation (3.40).

$$G = \frac{4\pi^2 a^3}{T^2 (M + m)} \qquad (3.40)$$

Where, T is the Periodic Time (≈ 365.25 x 23.9344699 x 3600 s) and the rest of the constants are identified as before.

$$G = \frac{4\pi^2 a^3}{T^2 (M + m)} \Leftrightarrow \frac{4 x \pi^2 x 1.49320337815^3 x 10^{33}}{(365.25 x 23.9344699 x 3600)^2 x (1.9885059726 x 10^{30})}$$
$$\approx 6.6735459 \quad x \quad 10^{-11}\ m^3\ kg^{-1}\ s^{-2}$$

.....(3.41)

https://en.wikipedia.org/wiki/Orbital_period#Small_body_orbiting_a_central_body: Accessed on August 24th 2015.

The above result provides further evidence that the Gravitation constant is actually a ***compound or composite*** element, ***easily derivable*** from several platforms guaranteed by Classical Mechanical laws, as well as measurable from experimental sources.

Now, we put Equation (3.35) to the **dimensional proof**, using the just derived expression for the ***Universal Gravitation constant*** (Equation (3.35)) and one reducible using ***Kepler's third law*** of planetary motion respectively (Equation (3.40)). This comparison is presented below.

$$\left[\frac{(mvr)^2}{m^3 a(1-e^2)}\right] \Leftrightarrow \frac{[M^2][L^2T^{-2}][L^2]}{[M^3][L]} = L^3M^{-1}T^{-2}$$
$$\left[\frac{4\pi^2 f^2 a^3}{(M+m)}\right] \Leftrightarrow \frac{[L^3][T^{-2}]}{[M]} = L^3M^{-1}T^{-2} \quad (3.42)$$

While the ***dimensional balance*** between various ways of deriving a parameter may not be unique to the parameter under review, it is ***nonetheless essential*** to inferences made thereafter. Clearly the universal gravitation constant ***G*** is a derivable parameter, just as the Planck's constant (***h***) and its reduced version (***ħ***); this runs contrary to the prevalent opinion, where these three factors are presented as **elementary constants**, whose values are ***solely determinable through experimental measurements*** under the Quantum Mechanics' dispensation***!***
(https://en.wikipedia.org/wiki/Orbit: Accessed on August 19th 2015)
(https://en.wikipedia.org/wiki/Kepler's_laws_of_planetary_motion: Accessed on August 19th 2015).

The "Black Hole"

The so-called "Black hole" is another design of Quantum Mechanics, which it uses to construct some explanation about the source of the just calibrated G constant. Extinction

of some stars is attributed to be the cause of the so-call Black hole. It is a ***generic*** prediction of general relativity! It cannot be detected, but believed to exist somewhere in the universe. There are equally as many 'Specialists' in this area; who are not only busy trying to locate the earth associated 'Black Hole' (and others), and propounding theories after theories, as they are for the "Dark Energy/Matter" search!
https://en.wikipedia.org/wiki/Black_hole: Accessed on August 30th 2015
http://astronomy.nmsu.edu/geas/lectures/lecture26/slide01.html: Accessed on September 3rd 2015.

The final result for both of these groups is the same, since these two entities do not exist anywhere; instead, the causality of both the '***extra measurable energy'*** and the ***gravitation*** of the Earth towards the Sun, just as the Earth's movements, have been determined in this work and are predictable from ***Classic Mechanical*** laws; the search games must stop!

Having determined ***G*** as parametric and hence a synthetic constant, determinable using Classic Mechanical laws, (just ***h*** and ***ħ)*** the constant flouts the characteristic of being fundamental or basic. Consequently, G does ***not qualify*** as a ***universal natural constant*** as defined under Quantum Mechanics. In the following paragraphs, probe is done on the fourth candidate for the universal natural constants cherished by Quantum Mechanics namely, ***C*** the velocity of light in the vacuum!

3.2.2.8. ***Determination of the Speed of Light in Vacuum (free-air)***, ***C***

Thrust is finally directed to the 4th constant, presumed to be among the universal natural constants by Quantum Mechanics. One salient disadvantage the constant features is its dimensional units, m/s^{1}. These expose the constant as a ***parametric*** or ***synthetic*** value, determinable from other laws. At this rate the constant fails the test of being a fundamental constant by Quantum Mechanics' standards or definition. The presented order of probe in respect of C reflects much of the arguments raised in Chapter 1 Section 1.6.4.4. Several aspects of the same are repeated here for emphasis.

Determination of the Velocity Range of Visible Light from Hydrogen Atom Mechanics

The range of the ***velocity of visible light*** with respect to the visible frequencies, whose range is estimated at: 4.3 – 7.9 x 10^{14} Hz was determined using the mechanics of an electron orbiting a Hydrogen Atom nucleus in Chapter 1, Section 1.6.4.4; and was shown to lie between: ***2.1737816 – 3.07419144 x 10 ^{5} m/s*** (cf. Equations (1.108 & 1.111)).

Now, relying on the scientific fact that ***the frequency of a wave determines its color,*** and that the visible frequency range is determined with respect to red through to violet colors, whose associated frequencies are estimated at: ***4.3 – 7.9 x 10^{14}*** Hz respectively, the range of the corresponding velocities of such particles radiating at the said visible frequencies can be estimated from ***dimensional analysis techniques*** as well.

https://en.wikipedia.org/wiki/Frequency#Light: Accessed on September 4th 2015.

Determination of the Velocity Range of Visible Light from Dimensional Analysis

The dimensions of Energy E (Joule) are founds as:

$$[Joule] \;=\; M\,L^2\,T^{-2} \tag{3.43}$$

Clearly by ***scaling the dimensions*** of a joule to ***a unit mass***, we get:

$$\frac{[Energy]}{[Mass]} \;=\; \frac{[E]}{[Mass]} \;=\; \left(\frac{M\,L^2\,T^{-2}}{M}\right) \;\Leftrightarrow\; \left(L\,T^{-1}\right)^2 \tag{3.44}$$

The Energy E per unit mass m is defined as the ***specific energy*** (J/kg) of a system. From Equation (3.44), it is obvious that the specific energy is ***dimensionally equal*** to the square of the velocity component associated with the system.

Now,

$$E \;=\; h\,f \;\Leftrightarrow\; \frac{\pi\,m\,r\,v}{3}\,f \;\Rightarrow\; \frac{\pi\,m\,r\,v}{3}\,\frac{v}{\lambda} \;=\; \frac{\pi\,m\,r\,v^2}{3\;x\;2\,\pi\,r} \;\Leftrightarrow\; \frac{m\,v^2}{6} \tag{3.45}$$

Equation (3.45) can be rendered as:

$$\frac{6\,E}{m} \;=\; v^2 \tag{3.46}$$

Where, all parameters are defined as before.

However, the system we are employing ***to quantify*** the obtained dimensional equality between ***the specific mass*** of the system and its associated ***square velocity*** instead returns ***6 times the required Energy*** as indicated in Equation (3.46). In this event, it becomes necessary ***to scale down*** the Energy E (***in Equation (3.45))*** to ***the sixth's*** order, so as to obtain the desirable dimensional equality between the specific mass and associated velocity.

Thus:

$$v_{red} = \left(\frac{h\, f_{red}}{6\, x\, m_{electron}} \right)^{\frac{1}{2}} \Leftrightarrow \left(\frac{6.55433766\, x\, 4.3\, x\, 10^{-20}}{6\, x\, 9.10938291\, x\, 10^{-31}} \right)^{\frac{1}{2}} \approx 2.27079814\, x\, 10^{5}\ m\, s^{-1} \quad (3.47)$$

$$v_{violet} = \left(\frac{h\, f_{violet}}{6\, x\, m_{electron}} \right)^{\frac{1}{2}} \Leftrightarrow \left(\frac{6.55433766\, x\, 7.9\, x\, 10^{-20}}{6\, x\, 9.10938291\, x\, 10^{-31}} \right)^{\frac{1}{2}} \approx 3.07792368\, x\, 10^{5}\ m\, s^{-1} \quad (3.48)$$

Thus the ***average speed of visible light, c*** is estimated as:

$$c = \frac{\left(2.27079814 + 3.07792368\right) x\, 10^{5}}{2} \approx 2.67436091\, x\, 10^{5}\ m\, s^{-1} \quad (3.49)$$

We recall in Chapter 1 Section 1.6.4.4, ***the average velocity of light, c*** was determined as: ***2.6239865 x 10^5 m/s*** (cf. Equation (1.112)). This value compares favorably with the value computed using dimensional analysis techniques, in Equation (3.49).

Now, given the accuracy of the frequencies involved in these ***two analytic derivations***, it becomes clear that the current value associated with the velocity of light of 299,792,458 m/s is ***on the other high side***! In this work, the average speed value from the two derivations, which is ***2.65 x 10^5 m/s*** is assumed as the most representative value for the velocity of light in free space. In this order, the current value of ***299,792,458 m/s*** qualifies as ***superluminal speed!*** Besides, light is ***not monochromatic***, we can only determine its average value, even in free space.

The problem of Quantum Mechanical Characterization of C

In this work the *Special Relativists'* hypotheses that ***all electromagnetic waves travel at c*** and that ***c is the maximum possible speed for all matter*** are ***not tenable***; these proposals are rejected '*on merit'*.

Reference is made of, Einstein – Planck's Energy Radiation law, restated in Equation (3.50) cf. Equation (1.87), which depicts ***energy (E) being radiated by a frequency (f) travelling at a speed (v)***; this same-orbital speed cannot be anything different from the *speed of the* ***n*** *oscillating particles/electrons*, which radiate the energy. This is true since the particle-wave Equation (3.51) defines the ***same speed*** for both ***the particle*** and the ***frequency!*** That is, ***both the particle and its associated frequency operate at the same velocity***!

$$E = nhf \tag{3.50}$$

The particle-wave Equation of orbiting electrons is rendered as:

$$Velocity\left(v\ m\,s^{-1}\right) = Frequency\left(f\ s^{-1}\right)\ x\ \ Wavelength\left(\lambda\ m\right) \tag{3.51}$$

Thus from Equations (3.50 & 3.51), it follows that:

$$E = nhf \Leftrightarrow nh\left(\frac{v}{\lambda}\right) \tag{3.52}$$

This implies:

$$E \propto v \tag{3.53}$$

Clearly, this velocity ***v***, which keeps on decreasing in upper energy shells, cannot denote a constant *c (as apparently upheld by Quantum Mechanics!);* even as the excited electron keeps on radiating in those slow velocity-prone shells!

Besides, in this current work, the maximum (ground state) velocity $\boldsymbol{V_0}$ is approximated as: $\boldsymbol{4.9187062989 \times 10^6\ m/s}$, which is slightly more than ***60 times less*** than the current value of: ***c = 299,792,458 m/s***! This value associated with ***c***, presents a difficulty situation where ***a wave travels faster*** than ***the speed of the oscillating particle that***

radiates it; which ***contradicts*** the Special Relativists' own principle, which ***prohibits superluminal speeds*** for matter. This is illustrated below, with reference done on a single orbiting electron about Hydrogen nucleus.

As predicted in Chapter 1, Equations (1.81 & 1.92) repeated below twined as Equation (3.54) respectively for quick reference, we observe that the two Equations address the same reality. Thus:

$$E \Leftrightarrow mc^2 = hf \tag{3.54}$$

$$\text{Where, } h = \frac{\pi m r v}{3} \quad and \quad f = \frac{v}{\lambda} \Leftrightarrow \frac{v}{2\pi r} \tag{3.55}$$

Consequently:

$$mc^2 = \frac{\pi m r v^2}{3 \;\; x \;\; 2\pi r} \Leftrightarrow c = \frac{v}{\sqrt{6}} \tag{3.56}$$

Clearly, from Equation (3.56), ***v > c***; this implies that the orbiting electron moves at ***a superluminal speed***, which contradicts the *Special Relativistic position*! Further, its value is ***not unique*** as it depends on the value of ***v***, which is a variable in itself. This is a sufficient condition for disqualifying C as a fundamental constant.

Logically, since the: ***E = hf*** has been thoroughly derived using Classic Mechanical procedures, it follows that the ***$E = mC^2$*** must ***be rejected***; it is false! The same position is proved and held in Section 3.2.6 (also cf. Chapter 1, Section 1.6.4.4)

Einstein who propounded Equation: ***$E = mC^2$*** must have been guided by ***dimensional analysis*** of his formulation which ties with the ***E = hf*** formula as can be deduced from Equation (3.56)!

The determined value for speed of light is ***three standard figures*** (10^3) below the current Quantum mechanical value of about 2.997 924 58 x 10^8 m/s; which is determined under ***modulated environments***. For example, in 1978, Peter Woods and Colleagues, used a ***Laser method*** and determined the velocity of light as ***299, 792.4588 km/s*** (exact!).

However, a **laser** ("**light amplification by stimulated emission of radiation**") is defined as a device that emits **light** through a process of optical **amplification** based on the **stimulated** emission of **electromagnetic radiation**.
https://en.wikipedia.org/wiki/Laser: Accessed on September 1st 2015.
http://micro.magnet.fsu.edu/primer/lightandcolor/speedoflight.html: Accessed on August 23rd 2015.

Such methods used to determine the velocity of light cannot only ***disfigure, modify*** or ***transform the specimen*** (natural light), but also carry out measurements in ***exotic environments***; thereby rendering the final results suspect! This holds since the available experimental details surrounding the determination of the said value, *do not guarantee* the preservation of the ***natural state*** and ***natural dynamism of the specimen*** under investigation.

In the final analysis, Quantum Mechanics has ***no universal natural constants*** as it claims; and this is provable from its own definition of a universal natural constant. The four major constants assessed, namely: ***h, ħ, G*** and ***C*** are determinable from Classical Mechanical laws; the slated constants cannot therefore be basic or universal from which all others can be deduced. They are far from representing the laws of the universe or nature as defined by Quantum Mechanics; they instead, reflect the mechanics of the ***real world*** as we know it. As may be deduced already, ***natural laws*** are only available in ***the real world*** and not in some 'imaginary' location like the universe world defined under Quantum Mechanics.

3.2.3 *Subjective and Objective Interpretation of 'Laws of Nature'*

Despite the fact that Quantum Mechanics has been shown ***in want of any fundamental constants*** despite its claims, it remains ***nonetheless worthwhile*** to probe its methods in as far as the interpretation of its set of 'laws of nature' entails. This is critical for the positive appreciation of Quantum Mechanics' theories of the elementary particles and how they interact among themselves.

In the background, it known that an ***interrelated*** and ***consistent*** system of laws of nature is called a ***scientific theory*** (e.g. Classic Mechanical theory). In this case a theory is a profound, measurable and logical thinking (*contemplation* or *knowledge abstract*) about ***how nature works***, and ***not how nature is perceived to function***!

In this order, a theory provides ***an explanatory framework for some observation*** and from the assumptions of the explanation follows a number of possible hypotheses that can be **tested** in order to provide support for, review or challenge, the theory. Clearly a theory is ***not a hypothesis*** (proposed or prospective explanation); at most it is a set of scientifically proven hypotheses.
https://en.wikipedia.org/wiki/Theory; https://en.wikipedia.org/wiki/Hypothesis: Accessed on August 25th 2015.

From a theory, an extraction of a specific state of affairs inherent within the framework of the theory under study is called a **model;** like the '***standard model'***, which is founded strongly on ***Special Relativistic Mechanics*** - a subsidiary of the Quantum Mechanical Theory.

The aim of ***scientific modeling*** is to construct a formal system that will **not produce** theoretical consequences that are **contrary** to what is found **in reality**. Predictions or other statements drawn from such formal systems must ***mirror or map the real world*** only insofar as these ***scientific models are true***. A model is predicated to make as much accurate predictions as possible, when its assumptions are valid, and might well not make accurate predictions when its assumptions do not hold. Scientific modeling is therefore an effort to depict ***realities*** which are often physically inaccessible, say the Geomagnet, but present measurable effects in our competence to detect or measure.
http://www.britannica.com/science/scientific-modeling: Accessed on September 1st 2015.
https://en.wikipedia.org/wiki/Scientific_modelling: Accessed on September 1st 2015.

The more effective a construed model is, the greater the 'amount' of the ***entire reality*** of the object under study is extracted. That model will be that ***much closer to reality*** it is explicating, if it depicts as much of ***the majority characteristics inherent*** in the inaccessible object as possible. Scientific modeling therefore is an effort to extract as much ***objectivity (reality)*** of an object as the qualified modeler is capable of determining, the circumstances prevailing, just as the level of knowledge one is operating from. Hence even the best models are least likely to reveal ***all there is about the subject being explored*** (sometimes misrepresentation notwithstanding), but will present the **'most approximate best'** of ***all reality*** that ***there is.***
https://en.wikipedia.org/wiki/Scientific_modelling: Accessed on August 25th 2015.

3.2.4 *Types of Scientific Modeling*

There are two salient schools of thought on the subject associated with the scientific world. These are the **subjective** model designers**,** which school is closely associated with ***Quantum Mechanics*** and **objective scientific** model designers, who are favorably classified under ***Classical Mechanics***.

3.2.4.1 *The Subjective Model Designers*

This school holds that the use of models in science goes to show that laws of nature can describe ***only images*** of reality **as perceived by an observer rather than reality itself**. A model therefore becomes a **mental picture** of the designer as he/she contemplates the object to appear and function! It is a subjective interpretation of reality from the dire experience or knowledge level of the model designer. The physicist ***conscientiously decides*** to represent a personal picture of how he/she thinks reality is!

The holders of the above position continue to insist and affirm that "even if the model predicted by a theory corresponds in every respect to our observations of nature, this does not necessarily mean that the theory behind the model corresponds to reality!"

Comment: The subjective designer, may also be handicapped by the unavailability of the most appropriate or effective tools to elucidate the ***reality of the theory*** under modeling. In the end the theory under representation must also be built along similar anomalies.

Subsequently, the theory will be addressing simply ***subjective*** and ***distorted opinions*** over a reality.

Sometimes it may be the ineptitude or incompetence of the designer to translate even the most obvious characteristics into meaningful expressions of reality; and this may translate into giving an impression that both the model and the theory, on which the former purportedly is referenced, draw from the ***same fountain*** – the ***appearances of reality!***

At this rate, ***'all reality'*** in this school of thought (Quantum Mechanics) becomes ***relative***, hence the name '(***special) relativistic mechanics'.*** There is ***nothing certain*** or ***definite about reality***, all is ***changing, probabilistic*** or ***statistical***. The ***equilibrium state*** becomes an ideal untenable, since all matter and hence the universe is in ***constant dynamism***, expanding and contracting! In all, ***the observer constructs his own universe into being***.

It is such dilemma that the holders of this position situate themselves in, which leads them **under desperation,** to assume that there *is* ***no way of distinguishing*** between ***truth*** and ***falsity***. For this reason this school of physicists regards the ***traditional question*** of whether a theory is ***true in itself*** as *meaningless*, or **at least unanswerable** and *unimportant*!
Cf. "Law of nature": http://unendliches.net/english/index.htm?naturkonstanten.htm: Accessed on September 14th 2015

3.2.4.2. ***Quantum Mechanical "Rules" on Scientific Modeling***
Quantum Mechanics nonetheless provides ***"Rules"*** to guide the subjective scientific modelers in their effort to represent obscure realities so as to attain a recognizable level of ***acceptability***! In this way the would-be purely subjective modeling methods are oriented in some direction to attain some characteristics held by Quantum mechanics as ***basic minima*** in representing reality "***as it is***" despite divergent levels of appreciations.

In this order, Quantum Mechanics "prevails" that "a scientific theory **does not have to be "true"**" as long as it satisfies the following four conditions or guidelines:

1. **Internal consistency**: the theory should not contain any contradictory or self-contradictory statements.
2. **External consistency**: the theory should not contradict other established scientific theories; it must lend itself to being fully integrated into the whole of science.
3. **Falsifiability**: the theory must have consequences whose negation can in principle be confirmed by ***observation***; that upon ***observation*** or ***experimental evidence*** the affected theory is revised or even rejected altogether.
4. ***Explanatory power***: the theory must be able to either fully explain states of affairs hitherto ***unaccounted-for*** or serve as an instrument to derive them from more basic states of affairs.

Cf. "Law of nature" http://unendliches.net/english/index.htm?naturkonstanten.htm: Accessed on August 25th 2015.

3.2.4.3 ***Evaluation of Subjective Relativistic Modeling***

Clearly, the beholders of the above approach are in other words expressing a controversial principle that, '***truth like other concepts is also relative'***! However, they simultaneously turn around to define a new set of grounds that are meant to ascertain '***universality,*** that is, ***objectivity***' of new Quantum mechanical theories in-the-making, guided by the 4 Rules; and this ***contradicts strongly*** the Quantum mechanical adherence to ***subjective relativity*** and ***probability***.

In brief the above four conditions appear to the holders of the subjective relativity school to **substitute** the **formal scientific method** which thrives on ***the objectivity*** or ***reality principle.*** The scientific method comprises of **techniques** or **well-tailored** procedures for investigating phenomena. Such procedures include ***systematic empirical*** or ***experimental measurable evidence*** subject to specific principles of ***objective reasoning***, leading to the formulation, testing, modification and even rejection of hypotheses.
https://en.wikipedia.org/wiki/Scientific_method: Accessed on August 25th 2015.

Further, it is difficult to evaluate any subsequent procedures or theories which ***flout*** or ***modify*** the scientific method as ***truly valid*** right from their conception. This may explain in part the various 'patched or bridge/intervening laws or explanations' identified with Quantum Mechanics as if '***all is done to salvage the unsustainable'*** (this is so spread in the Standard Model), unlike its counterpart, the Classic Mechanics. This defeats the time-long tested position that '*the fewer laws a theory requires and the simpler these laws are, the better is the theory as a whole'*.

Again, scientific modeling according to the subjective designers reduces it to '**imaginative fine-art's** procedures, where the artist is tasked to apply his/her imaginative faculties to represent a specific idea or situation. For instance, if a group of rowdy students in a particular school feel like ridiculing a disciplinarian Head-teacher, they are likely to paint a sphinx of the latter. Such paint is likely to bear a well designed portrait of his/her head so perfectly made to the extent that any acquaintance of the Head-teacher will be able to associate the face of the person it is intended to depict and ridicule.

The final drawing or model, while depicting the ***opinion of its designer***, illustrating how he/she conceived and struggled to express the theme set before him/her, may not be construed to actually represent the ***true realities*** about the Head-teacher. The final portrait simply represents **an opinion** about the subject; it reflects one's appreciation, understanding or bias of a subject, without necessarily revealing any substantial level of truth about the subject. Such is the general worth of subjective modelers; they ***diverge from objective realities to create subjective opinions***.

3.2.4.4 ***Relativity of Simultaneity Principle: an example of subjective modeling***

Events separated by space cannot occur simultaneously to observers located in different frames of reference in motion. An event viewed as occurring at time t_1 on the earth appears to have taken place later at time t_2 by an observer in a plane. Clearly the occurrence of an event depends on the viewer. The occurrence and detection are ***matched*** or ***twinned events*** (so contiguous like Siamese twins) and since this ***matching cannot occur at the same time*** for all observers in frames under different motion schemes, then the ***'absolute simultaneity'*** principle is impossible; it is **all relative**. Each viewer will

declare the cause and effect (detection) blend at different moments, hence the ***relativity of simultaneity principle.***
https://en.wikipedia.org/wiki/Relativity_of_simultaneity: Accessed on September 10th 2015.

Comment: In the first place, the issue remains as to whether the occurrence of an event is dictated by the action of its detection; or rather, the event only occurs at the moment of its detection! The illusory of the principle resides in placing ***the effect long before the cause*** ('what is not detected has not occurred or is yet to occur'. This is the case where the effect engineers its own cause!).

If it all depended on detection for an event to occur, then one would die and continue to walk around since it will not have come to his consciousness that he/she is in fact dead! Indeed very few of such events would be allowed to take place for example, virtually all human beings would dictate that death, disease, poverty, loneliness (etc…) do not come their way by simply closing off their consciousness to their possible occurrence. All these aspirations do not happen in the real earth world save in the universe world. In other words, ***relative subjectivism*** is not sustainable, just as its attendant products, the ***subjective modeling*** schemes.

Further, the relativity of simultaneity principle allows '***multiple, kaleidoscopic occurrence of a phenomenon'*** at different times! For example, since satellite transmission is not instantaneous, (it takes time for a signal to travel between locations), a goal scored during a soccer campaign in London will be recognized as occurring at different times world-over! Since, detection is 'a proof of occurrence', one million observers for example, will be detecting the same goal at different times, then put together, the same goal will hatch into million goals at the end of the day!

Clearly, the kaleidoscopic phenomenon product of the relativity of simultaneity principle, places ***history*** and the ***present*** ('the now') at par and this is ***simultaneously allowable in the universe world*** and ***unacceptable in the real (earth) world***.

3.2.4.5 ***The Objective Model Designers***

This school of physicists concedes that while a good or excellent model may not articulate all the reality form of the object under study, it nonetheless captures as much of the ***true reality*** the object holds, which exceeds the mere imagination of the respective designer. The objectivity tools the designer employs to depict an inaccessible reality are drawn directly from the measurable or detectible manifestations of the reality under study, some distortions notwithstanding as discussed already.

According to this school, effective theories and laws of nature are not mere instruments used to describe or predict our observations of nature but that they are, true (may be not ultimate) descriptions of reality as ***it is in itself***. Human beings **do not invent** but **simply formulate or articulate laws of nature** in as much they are capable of doing so.

Clearly an observer cannot accurately claim to be the **causality** or **generator** of the laws of nature! Human beings discover consistence of behavior and thereby capture/model those phenomena into Equations and theories. Natural laws are therefore not formulated in another possible world and thereafter transmitted to the Earth for bequeathal or possession, but ***constructed intelligently*** in effort to make the reality imposing itself to us through consistency, to some intelligible human beings' formulation. These fundamental things happen ***without us*** we simply do not determine their occurrence; otherwise, if it were in our capacity, many people would postpone their respective death dates indefinitely!

However, we can disrupt or interfere with some natural laws by carrying out activities which can vary their natural flow, say the harsh climate changes we are experiencing to-day as a result of inimical human activities to the environment. Similarly, we can cause changes to the would-be natural biological reproductive rhythms through bio-chemical means; but we ***can never erase the natural laws*** and proclaim for example, that there is no longer death among human beings in the world! In the second part of Chapter 3, it is proved beyond any doubt that matter, as we know it, ***cannot be annihilated*** under any cost not even in the nuclear reactors; it is always ***conserved,*** as natural law demands; despite Quantum Mechanics holding otherwise. It follows therefore that ***the true natural***

laws are ***earth-bound*** and they do not exist anywhere else, not even in the universe as Quantum Mechanics speculates.

Clearly the ***degree of truth*** of ***an objective theory*** consists in its ***level of correspondence*** to ultimate reality. The above school typifies the Classic Mechanical philosophy; phenomena are explored to ascertain the objectivity or reality of the same and not as they appear from the investigator's point of reference.

3.2.5 ***The Quantum Mechanics' Principle of the "Two Worlds"- Universe and Earth***

There is an ***un-written principle*** typical of all "Natural Units" proposers, that there exists 'two worlds', namely the ***universe*** and ***earth***; each having a unique ***measurement unit-system***. In this work, attention is put on Quantum Mechanics' adopted units, namely the ***Planck's natural units***.

Secondly, ***matter-related characteristics*** exist naturally plentiful in the universe world and hence there is ever a ***gradient-mode*** between the universe and the earth worlds, with the latter being 'ever-thirsty', in a waiting position "to capture" the required elements existent only in the universe-world. This is a one-way mode, with the universe world ***anticipating nothing*** from the earth world; yet the earth sphere situates itself as a 'shell' in wait of being filled "***from above***"!

Thirdly, there exists an "***inter-face" system***, which translates the unitary system of the universe into that of the earth world! In the Standard Model, this interface is supplied by the ***Bosons elementary particles,*** which are deemed to stand between the earth and universe worlds with the ***inherent*** (or ***extended***) capacity to ***sieve*** and ***transmit*** characteristics, like ***mass*** and ***color*** to the earth bound, shell-like elementary particles, the ***Fermions***.

3.2.5.1 ***The Universe World***

The ***'universe' world***, is a ***non-dimensional*** sphere, where all units of measure are the "same" thing; they are ***homogenous*** in all ways, the North and South magnetic polarities

for example, are indistinguishable individual entities. It is 'legitimate' in the universe world to ask for example, "***how many meters are in a second or how many kilograms are in a meter"*** and so on. Thus ***kg = m = s*** etc…It is also in order, to inquire: "***how many elephants are there in a mango***"! In the ordinary sense this may sound ***ridiculous*** and held with ***contempt***, but it makes "a lot of sense" in the Quantum Mechanics circles, for there are no internal set rules broken and all consistences are preserved! Moreover, such theories 'need not be true'; all that is required is that the in-coming 'theory' does not falsify other 'theories that preceded it, as discussed in Section 3.2.4.2.
http://www.superstringtheory.com/unitsa.html: Accessed on September 2nd 2015.

This is a ***super world*** where part of its defining laws is extended to the earth through the ***universal natural constants***, that is: ***h, ħ, G***, ***C*** and others. These constants are equal and assume a ***value of 1*** in the universal world!

The universe world is equivalently definable as consisting all the earth world requires to ***explain*** and ***activate*** its own mechanical laws; it is the soul, life/motor of the earth world. This explains the genesis or roots of the ***Boson particles***, which act as interfaces between the resourceful universe and the empty/shell ***Fermion particles*** constituting the earth world's matter aspects.

The universe world is constituted of ***probabilistic material, concepts*** and ***ideas.*** Clearly in this universe world, there are ***no fundamental contrarieties***; it is ***world of equal probabilities*** and hence *everything is possible* and is therefore ***probabilistically equal***. The only requirement is ***one's choice.*** In this order:

- God and the Devil are likely probable entities; God and devil worship become a matter of equal-choice!
- Man and woman are the 'same' among themselves and both stand at the same level of appreciation as any other animal! It follows therefore that it is a matter of choice to choose between: hetero-, homo-, lesbian-, pedophile-, bestiality-, and any other form of sexuality or 'union'!

- Life and death are the ***indistinguishable***, just as riches and poverty, love and hatred, beauty and ugliness, a saint and sinner, mass and mass-less, clean and dirty, success and failure, etc….
- Energy of an object is the same as its mass. This premise is exploited by Einstein, who employed ***dimensional analysis*** (pertaining to $E = hf$) to propound $E = mC^2$ formula. It is not difficult to observe that, the cited formula applies perfectly in the universe world, since there $C = 1$. Further, it is not also strange to state that ***Energy*** is equal to ***frequency***, then by transitivity ***mass*** is also equal to ***frequency*** since $h = 1$ in the universe world!
- $1 = 2$ etc… This statement is also definable in the universe world, since mathematically, it is defined that: 0! = 1! = 1. It follows then:

$$\begin{aligned} &Since: \ 1 = 1 + 0 \Rightarrow 1 = (1 + 0) \\ &\therefore \ 1! = (1 + 0)! \Leftrightarrow 1! + 0! \Rightarrow 1 + 1 \qquad (3.57) \\ &In \ \ this \ \ way: \ 1 = 2 \ \ (\text{'}proved\text{'}!) \end{aligned}$$

The above and all other classes in the above categories receive special cushion from the 4 Quantum Mechanical rules for scientific modeling cited above. In addition and without being contradictory, all the contents of the universal world, despite being indistinguishable, they nonetheless ***preserve their individuality*** (they're indistinguishable individuals)! This observation is instrumental in apportioning unique properties to the Boson particles, which enable them to ***extract*** and ***communicate*** different attributes from the universe world to the Earth (Fermion) world.

3.2.5.2 ***The Earth (Fermion) World***

In this world, matter is ***distinguishable*** and is ***not homogeneous***. Here ***dimensional aspects*** are critically guarded. The matter of the earth world is not only constituted by material or tangible things, but also waves, force, color, spin, ideas, concepts and so on. Typical of the earth world is that it owes its existence and operations to the universe world; the earth world is comparable to a void or shell, which the universe world populates and activates via the intermediary particles, the Bosons. As stated already, the Fermions assume some form of empty molds in wait for filling "from above"!

The method of the transfer or communication between the universe and earth worlds requires a changeover mechanism; such linkage is better understood within the area of ***Planck's natural unit system***; and to this we turn.

3.2.6 ***Generation of Planck's natural Unit System***

While in the universe world the ***dimensional aspects*** of measurable elements are ***indistinguishable***, each of these elements retains the memory of its unique dimension. In this Section, and in the interest of shortening exploration of this field, while at the same time capturing the gist of the rationale behind the determination of Planck units, it becomes necessary and suffices only to explore the generation of a few members of the set. The items of choice include ***Planck's: Length (L), Mass (M)*** and ***Time (T).***

That is, for the sake of illustration, of how the indistinguishable elements of the universe world are ***'incarnated'*** in the earth world to become unique and distinguished measurable entities, we consider here only three such measurable elements, namely: length, mass and time. These assume the respective nomenclature of: ***Planck's length*** (l_p); ***Planck's mass*** (m_p) and ***Planck's time*** (t_p)

Planck's natural units '***drop***' into the earth world with ***a unit value each***, thereby keeping their universe identity, but obtain the earth (***SI metric***) equivalent values via dimensional acquisition. These natural units ***adjust*** the universe units to assume appropriate ***dimensional orders***, so as to become applicable or functional in the earth world, just as the astronaut's suit acclimatizes an Astronaut with the atmosphere during space walks. This '***adjustment***' function is assumed by the **Bosons Particles** in the Standard Model.

The natural units therefore function as interfaces, which ***convert*** the universe order into the earth order. In this way, the elements of the universe world do not have direct access into the earth world, except via the established interfaces. It becomes therefore ***unacceptable to apply the non-dimensionality*** in the universe world to the earth order. It is therefore illegitimate to insist on the "mass – energy equivalence law", which is definable in the universe world, and apply it directly in the earth world. As discussed

below, a ***one – to – one equivalence*** allotment between the universe and earth worlds is ***not legitimate*** in the real earth world order.

The Planck's natural units supply the ***basic unit system*** from which all others are ***derived***, say Planck's area, volume and so on. The three basic Planck's unit elements of interest employ three universal natural constants, namely: ***ħ, G*** and ***C*** for the sustenance of the dimensional balance as illustrated below.

1. ***Planck's Length*** $(l_p) = \left(\frac{\hbar G}{C^3}\right)^{\frac{1}{2}} \Leftrightarrow 1\ Planck\ unit\ of\ length$ (3.58)

$$\left[l_p\right] = \left(\frac{M L^2 T^{-1} L^3 M^{-1} T^{-2}}{L^3 T^{-3}}\right)^{\frac{1}{2}} = L \quad (Dimension) \tag{3.59}$$

$$l_p = \left(\frac{1.054571726\ x\ 6.67384\ x\ 10^{-45}}{2.99792458^3\ x\ 10^{24}}\right)^{\frac{1}{2}} \approx 1.616199\ x\ 10^{-35}\ m \tag{3.60}$$

In the earth or metric unit system, 1 Planck unit of length is about: 1.616199 x 10^{-35} m

2. ***Planck's Mass*** $(m_p) = \left(\frac{\hbar C}{G}\right)^{\frac{1}{2}} \Leftrightarrow 1\ Planck\ unit\ of\ mass$ (3.61)

$$\left[m_p\right] = \left(\frac{M L^2 T^{-1} L T^{-1}}{L^3 M^{-1} T^{-2}}\right)^{\frac{1}{2}} = M \quad (Dimension) \tag{3.62}$$

$$m_p = \left(\frac{1.054571726\ x\ 2.99792458\ x\ 10^{-26}}{6.67384\ x\ 10^{-11}}\right)^{\frac{1}{2}} \approx 2.17651\ x\ 10^{-8}\ kg \tag{3.63}$$

In the earth or metric unit system, 1 Planck unit for mass is about: 2.17651 x 10^{-8} kg

3. ***Planck's Time*** $(t_p) = \left(\frac{\hbar G}{C^5}\right) \Leftrightarrow \frac{l_p}{C} = \frac{\hbar}{m_p C^2} \Leftrightarrow 1\ Planck\ unit\ of\ time$ (3.64)

$$\left[t_p\right] = \frac{L}{L T^{-1}} = T \quad (Dimension) \tag{3.65}$$

$$t_p = \frac{1.616199 \quad x \quad 10^{-35}}{2.99792458 \quad x \quad 10^{8}} \approx 5.39106 \quad x \quad 10^{-44}\ s \qquad (3.66)$$

In the earth or metric unit system, 1 Planck unit for time is about: 5.39106 x 10^{-44} s

Observe, the choice of leaving out ***ħ*** in the definition of Planck' natural units of length, mass and time is not easy to establish, since it would also procure the ***same dimensional*** status as ***ħ*** is capable of providing; while providing ***different equivalent values*** of Planck units in the metric system, than those procured with ***ħ***! This observation also puts a challenge to the SI managers to provide grounds for the choice of ***ħ*** (and not ***h***) in determining the equivalent values of Planck's units in the SI domain; as well as probing the value of the velocity of light floated by Quantum Mechanics.

Further, the physical significances of Planck's units remain difficult to articulate! Their use is mostly ***confined to theoretical physics*** because most of them are too large or too small for empirical or practical use and there are ***large uncertainties*** in their values. Such ***imprecision***, is typical Quantum Mechanics as '***convenience, internal consistence*** or ***simplicity'*** influences much of its ***choice*** and ***justification*** of parameter values! https://en.wikipedia.org/wiki/Planck_units#Derived_units: Accessed on September 2nd 2015.

The above observation articulates a persistent dilemma, as to why great efforts are put in to realize such a system of '***impotent***' Planck's natural units of no practical scientific worth! May be it serves to provide the uniqueness of ***Quantum Mechanics*** from the environment provided by ***Classic or metric Mechanics***! However, there is another greater price to pay, when it comes to ***derived Planck's units*** obtained from Planck's natural or base units. To illustrate the point we investigate the derived ***Planck's Energy*** case.

$$Planck's\ Energy\ (E_P) = m_p C^2 \Rightarrow \frac{\hbar}{t_p} = \left(\frac{\hbar C^5}{G}\right)^{\frac{1}{2}} = 1\ Planck's\ Energy\ unit \qquad (3.67)$$

$$[E_p] = M L^2 T^{-2} \quad (Dimension\ of\ Joule) \qquad (3.68)$$

Investing the dimensions of the radiation energy formula, namely: ***E* = *hf***, one finds:

$$[hf] \;=\; M L^2 T^{-2} \quad (Dimension\ \ of\ \ Joule) \qquad (3.69)$$

$$E_p \;=\; m_p C^2 \;\Leftrightarrow\; 2.17651\,x\,10^{-8}\,x\,299792458^2 \approx 1.956149634\,x\,10^9\ J \quad (3.70)$$

Equation (3.70) returns ***a singular Energy constant*** E_p carved out of two constants in the Planck's unit system. On the other hand Equation (3.69) turns out a ***variable radiation Energy*** parameter, since ***h*** is a constant, but ***frequency*** is a ***variable.***

Clearly, while Equation (3.70) and ***E = hf*** return the ***same dimensions*** of Energy (Joule), they are nevertheless computing ***very different energies:*** Equation (3.70) determines an ***energy constant*** in ***Planck's units***, whereas Equation (***E = hf***) computes ***variable radiation energy in basic metric units.*** The confusion arises when the ***state of a constant E_p*** turns out as equivalent to ***a variable E***; and this occurs when the ***principles of the universe world*** are passed over directly into the ***earth world,*** and this is ***unacceptable*** as it ***contravenes intellectual honesty***.

For in ***Planck's unit system***: $E_p \;=\; m_p C^2 \;\Rightarrow$ returns a ***singular Energy constant,*** whose value is computed as ≈ ***1.956149634 x 10^9 J***. But translating the ***constant relation*** in Planck's unit system and render it into ***a variable format*** in the ***basic metric system***, that is: $E \;=\; mC^2 \;\Rightarrow$ ***variable radiation Energy***, implies a **one-to-one mapping** between the Planck's and Basic (metric) units as illustrated below:

$$E_P \;\leftrightarrow\; E \quad and \quad m_p \;\leftrightarrow\; m \qquad (3.71)$$

The relation (3.71) is ***only definable*** and hence ***'legitimate' in the universe*** world and the same is regarded as ***illogical in the earth or real*** world, for it exemplifies those awkward cases, where 1 = 2. In addition, it becomes difficult to appreciate how a formula, ***a product between two fixed constants***, which returns a ***definite constant***, undergoes some form of metamorphosis or transformation and turns out only to be categorized as a ***law***! It

would also be interesting to establish the ***significance*** of the ***energy constant E_p*** in the earth or real world.

In any case, if we let the Relation (3.71) to hold, the following would apply:

$$E_p = m_p c^2 \Leftrightarrow E = m_e v^2 \Rightarrow c = v\left(\frac{m_e}{m_p}\right)^{\frac{1}{2}} \qquad (3.72)$$

Where, m_p is the Planck's mass, m_e denotes the electron mass with the rest of constants defined as before. But since, $m_e \angle m_p$, it follows inevitably, that $\boldsymbol{c} < \boldsymbol{v}$, which again turns out to contradict the maxima velocity condition set out by the Quantum Mechanics.

In this work therefore, the ***'famous' Einstein Energy – mass equivalence law*** is **rejected *on merit.*** Otherwise, if situation is maintained, the 'adverse' consequences discussed in Chapter 1 Section 1.6.4.4 and Section 3.2.2.8 on the status of the velocity of light ***persists***; that is, the velocity of light is ***three standard figures*** (***10^3***) down its current associated value; a position destined to break the spine of Quantum Mechanics.

3.3 *QUANTUM MECHANICS' ELEMENTARY PARTICLE STANDARD MODEL*

3.3.1 *Introduction*

The Quantum Mechanical elementary particle system can be defined as ***a subjective scientific modeling of the basis upon which matter is construed as made of and interact***. The system depends heavily on the principle of the ***two worlds***; with the ***universe –*** as the resourceful world, consisting of all elements and forces, with which the earth world is ***loaded*** and ***activated*** respectively**.**

The two articulated worlds are ***interfaced*** via a particle system, which has the capacity to ***extract causal elements*** from the universe world and transmit them into respective ***void shells*** or ***molds*** located in the earth world. These transmitters are known the ***Boson particles***.

It is also equally probable that these Bosons, may not be extracting their cargo they 'hurl' into the earth world from the universe world, but they may be innately endowed as such. Further, it is also not clear what happens to a Boson which has accomplished its mission, whether it gets trapped in the mold or it returns to the Boson zone ready for the next errand! However, it becomes safer, if it is assumed that these Bosons become ***'permanently' fused*** with their earth bound-shell hosts; since for example, on sustained pounding of nucleons in Large Hadron Colliders (LHC), the Higgs Boson particle, which is held as 'broadcasting' mass into the earth's respective molds, was reported extracted on July 4th 2012.

http://home.web.cern.ch/topics/large-hadron-collider: Accessed on September 8th 2015.

http://home.web.cern.ch/topics/higgs-boson: Accessed on September 8th 2015.

The foregone information is summarized in Figure 3.2, which depicts the structure and category composition of the Quantum Mechanics' Elementary Particle Standard Model.

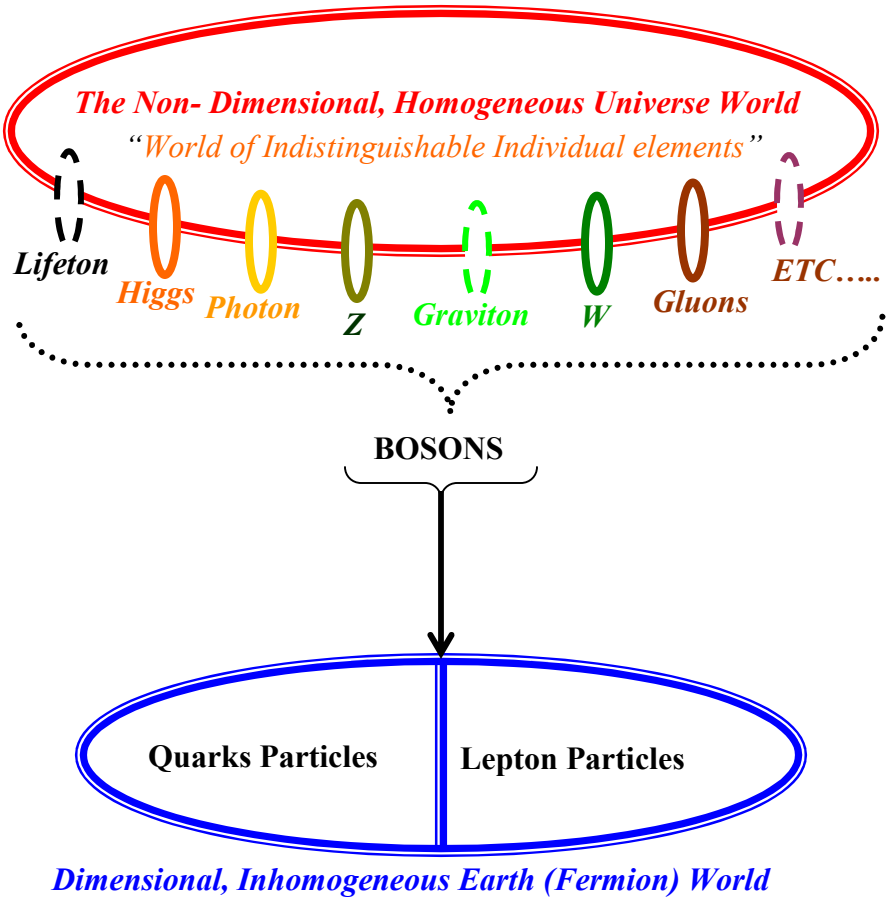

Figure 3.2: **Pictorial Representation of the Quantum Mechanical Elementary Particle Structure and Category Composition**

3.3.2 *Quantum Mechanical Elementary Particle Structure and Category Composition*

3.3.2.1 *Matter – Force Classification of Elementary Particles*

Traditionally, Quantum Mechanics groups 'known' **elementary subatomic particles** fall under two categories, the **Fermions** and **Bosons**. This main particle-categorization and the associated sub-divisions are presented in Figure 3.3.

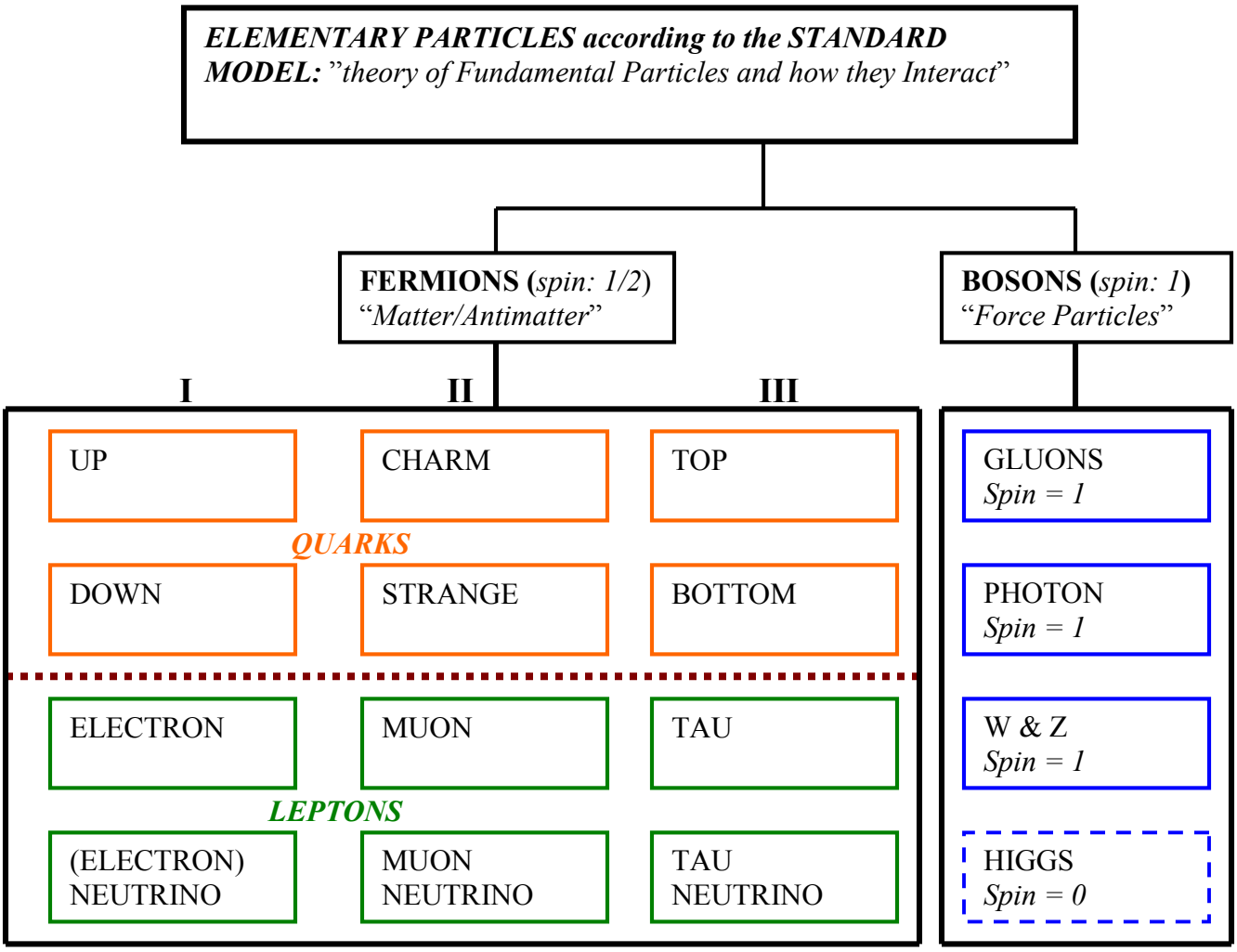

Figure 3.3: **The 17 Traditional Fundamental Particles**

Quantum Mechanical fundamental particles are either the *building blocks of matter*, called ***fermions*** (these obey Pauli's Exclusion Principle: 'no two fermions can occupy the same place simultaneously'), or the *carriers of forces*, called ***bosons***. There are twelve

named fermions and five named bosons in the standard model, making up the 17 primary particles; these are expressed in Figure 3.3. It should be noted that there are other 'derived' elementary particles bringing the entire lot of fundamental particles to 61 (currently) as discussed in Section 3.3.2.4.

Further, Quantum theory estimates that all matter is constructed from the articulated elementary particles, for instance, ***protons*** and ***neutrons*** are respectively held to be constituted by the '***up and down' Quark*** elementary particles. A ***neutron*** is made up of '*one up and two down quarks'*, while a ***proton*** is constituted by '*two up and one down quark';* and the 'free' ***electron*** is regarded as ***an indivisible element*** and hence **an elementary particle.**

http://en.wikipedia.org/wiki/Elementary_particle: Accessed on May 15th 2015.

http://en.wikipedia.org/wiki/Fundamental_interaction: Accessed on May 15th 2015.

http://physics.info/standard/: Accessed on May 15th 2015

Leptons and ***Quarks*** are ***Fermions***, but so are things made from them like: *protons, neutrons, atoms, molecules* and others. ***Bosons***, in contrast, defy Pauli's principle, since these can 'mix' easily in the same location. Gluons, photons, and the W, Z and Higgs are all bosons and these do not 'crash' into each other in their electromagnetic radiation patterns! However, the occurrence of ***interference patterns***, which are results of electromagnetic radiations' 'crashing' into each other seem to ***contradict*** the above view!

3.3.2.2 ***Quarks and Leptons***

Fermions are divided into two groups of six: those that *must bind together* are called ***quarks*** and those that can *exist independently* are called ***leptons (***'thin'***)***. Quarks are known to bind into Pentalets, Quartets, Triplets and Doublets as articulated in Section 3.3.2.3. The *pentalets* and *quartets* are called ***hyperons***; *triplets* are called ***baryons*** ('heavy'); the *doublets* are called ***mesons (***'medium'); they all follow the **confinement** existence laws.

As discussed later, Classic Mechanical elementary particles, the ***unlike magnetic monopoles*** can exist ***in isolation*** as testified to in *Ampere's experiment* of the magnetic force fields about steady current carrying conductors (cf. Chapter 1, Section 1.2.2).
https://en.wikipedia.org/wiki/Quark: Accessed on June 12th 2015.

3.3.2.3 **Quarks *and Leptons***

Fermions are divided into two groups of six: those that *must bind together* are called ***quarks*** and those that can *exist independently* are called ***leptons (***'thin'***)***.

Quarks are currently known to bind into ***pentalets***, ***quartets***, ***triplets*** and ***doublets***. The pentalets and quartets constitute the ***hyperons*** (Gk: "over-sized particles"); while the triplets construct the ***baryons*** (Gk: "heavy") category. The doublets are called ***mesons*** (Gk: "medium"). In this order:

1. **Mesons -** these belong to the ***Bosons*** classification and are intermediate mass particles comprised of a ***quark - anti-quark*** pair. The ***neutral pion*** is an example of a meson. It is projected to have a life-span of about ***8.4 x 10^{-17}s*** and it decays into an electron, positron, and gamma ray.

   https://en.wikipedia.org/wiki/Pion: Accessed on September 8th 2015.

2. ***Baryons*** – these are ***Fermions*** with ***three quark*** particles in their combination structures. For example, the ***proton*** is a stable baryon and is considered to be composed of *two up quarks* and *one down quark*. The ***neutron*** is also a baryon, composed of *one up* and *two down quarks*. A bound neutron, say in the nucleus of an atom is stable, while a free neutron is unstable with ***lifetime*** of about **881.5±1.5 s (about 14 minutes, 42 seconds).**

   https://en.wikipedia.org/wiki/Neutron#Free_neutron_decay: Accessed on August 18th 2015.

   Currently, a new particle called ***Pentaquark*** (also known as *Theta-plus*) with a composition of *two up quarks*, *two down quarks* and *an anti-strange quark* is reported to have been identified. The combination of quark charges +2/3(u), -1/3

(d) and 1/3 (anti-strange) gives a net charge of +1. The ***lifetime*** of the particle is about ***10^{-20} seconds***.

http://hyperphysics.phy-astr.gsu.edu/hbase/particles/pquark.html#c1: Accessed on August 18th 2015.

3. ***Flavor*** – this is a difficult concept to specify, however, it refers to the 6 states associated with quarks, namely: ***up, down, strange, charm***, ***top*** and ***bottom***.

http://physics.info/standard/: Accessed on August 18th 2015.

Collectively the ***hyperons,*** **baryons**, **mesons** and **quarks** (the fundamental particles) are known as ***hadrons*** (Gk: "massive"). This name alludes to the ability of the point-like quarks to bind together and form particles that are "heavy", that is: having size, volume, bulk, or thickness. *Baryons* found in the nucleus (the ***proton*** and ***neutron***) are called ***nucleons***.

Quarks follow the ***confinement existence*** laws; they do not exist in isolation, unlike their counterparts the Leptons and the Classic Mechanical elementary particles, the ***unlike magnetic monopoles,*** which can exist *in isolation* as testified to in *Ampere's experiment* of the magnetic force fields about steady current carrying conductors (cf. Chapter 1, Section 1.2.2).

https://en.wikipedia.org/wiki/Quark: Accessed on June 12th 2015.

https://en.wikipedia.org/wiki/Hadron: Accessed on August 18th 2015.

http://hyperphysics.phy-astr.gsu.edu/hbase/particles/hadron.html#c1: Accessed on August 18th 2015.

4. ***The Neutrinos ('the tiny neutral particles'):*** These belong to the family of ***Leptons***; they come in *three flavors* and are named after their partner Leptons: the electron, muon, and tau. Neutrinos have very little mass (compared to other leptons: cfr. Table 3.1) and interact *so weakly with the rest of the particles* and in such situation, they are said to be *exceptionally difficult to detect!*

3.3.2.4 ***The Particle/Matter and Anti-Particle/Matter Classification***

All Quantum Mechanical Fermion particles bear a ***mirror symmetry characteristic***, which is passed on the '***matter domain'*** constructed by the respective particles. On the other hand, the Boson particle class does not have the Antiparticle characteristic.

- The ***fundamental Fermions*** constitute the *'matter & antimatter particles'*. The Fermions include: the ***Quarks*** *and their anti-quarks;* ***Leptons*** *and their anti-leptons* particles.
- The ***fundamental Bosons*** are comprised of ***four*** 'known' ***force-gauge particles*** and these are: ***photons, gluons***, ***W&Z*** and the ***Higgs*** *boson* as well as the *projected* ***gauge*** gravitation particle, the ***graviton***. In this work, room is created for possible other Boson particles, say one mediating 'life', the "***lifeton***" and etc. These are known to ***mediate force interactions*** among fermions, thereby supplying communications in physical systems that appear not to be reducible to more basic interactions. The ***Higgs Boson*** is a newly determined particle (2012) which mediates ***mass*** to the fermions. Thus ***mass*** is held as ***a force element*** in ***Quantum Mechanics***. This contributes strongly to the ***Einstein's Quantum Mechanical mass – force equivalence theory*** as discussed earlier.

https://en.wikipedia.org/wiki/Higgs_boson#Discovery_of_candidate_boson_at_CERN: Accessed on August 16th 2015.

https://en.wikipedia.org/wiki/Mass%E2%80%93energy_equivalence: Accessed on August 16th 2015.

In this order, we have particles and anti-particles and correspondingly matter and anti-matter. These two contrariety classifications are populated as briefly specified below:

- **Fermion Particles** are predominantly 12 (6 Quarks and 6 Leptons). However, ***Quarks*** come in ***6 flavors*** and ***three primary colors***; together making up ***18 unique*** *Quarks* in all. Thus we have for example: Red Up Quark, Green Up Quark, Blue Up Quark, etc…. ***Leptons*** are colorless, but come in ***6 flavors*** (3 of which are Neutrinos). Total Fermion particle: **18 + 6 = 24.**

- **Fermion Antiparticles**: Fermions are **matter particles** and for every ***particle of matter*** there is a corresponding ***antiparticle of antimatter***. So we can have for example: Ant-red anti-Up Quark; anti-electron (positron) and so on. This matter-antimatter symmetry means we have to double the number of fermions from 24 (= 18 + 6) to *48*. Thus Particle – Anti-particle Fermions are: ***2 x 24 = 48***

- **Boson Particles**: Gluons appear in ***8*** color combinations. In addition, there are two kinds of W boson, one kind of Z boson, and one kind of photon, making a total of ***4*** electroweak bosons. There is only ***1*** kind of Higgs boson. **Bosons being non-matter particles,** they have ***no antiparticle counterparts***.

Hence the total of: ***48 + 8 + 4 + 1 = 61 'unique' elementary particles*** defined with the Quantum Mechanic's Standard Model.
https://en.wikipedia.org/wiki/Standard_Model#Total_particle_count: Accessed on August 18th 2015.

3.3.2.5 ***Fermions' three Generational*** **I, II and III Categorization (**cf. Figure 3.3**)**
Fermions ('*matter* and *antimatter' particles*) belong to one of three known generations: the ***stable*** (I), the ***fragile*** (II) and the ***very volatile*** (III) tiers.

Generation I particles *can* combine to form ***hadrons*** with effectively infinite life spans (stable atoms made of electrons, protons, and neutrons for example). ***Everyday matter***, falls under this category. It follows that in this study, most references with respect to Quantum Mechanical particles are done with respect to this stable particle section.

The ***fragile Generation II particles*** always form ***unstable hadrons***. The longest lived hadron containing a generation II quark is the ***lambda particle*** (made of an up, down, and strange quark). It has a mean lifetime of about ***5 x 10^{-25} s***, which period is less than ***a billionth of a second***, which is long-lived for an unstable hadron.
https://en.wikipedia.org/wiki/Lambda_baryon: accessed on August 18th 2015.

Generation III particles are not too distinct in their behaviors; for example the bottom quark, isn't much stranger than a strange quark! However, common to all is that they are *tremendously short-lived*, that for example the top quark doesn't exist long enough to do anything. It ***disintegrates*** as first as it forms to the extent that its existence can only be worked backwards from the evidence of its decay products!
http://physics.info/standard/: Accessed on August 18th 2015.

Remarks: Given the above characteristics, it becomes *more difficult* to classify the generation II and III category elements as ***elementary particles***, since they ***too disintegrate*** into other constitutive forms different from themselves! It turns out that the said elements are in fact 'composite' particles which decay into their ***constitutive parts*** under proper conducive conditions.

The above fact demands that the Generation II and III particles become ***deleted*** from the category of elementary particles, since they prove to be composites, as they are found with the natural capacity to disintegrate into other particles, which turn out to be their constitutive elements!

In the next paragraph, we investigate the procedure in which matter and antimatter particles acquire mass, which is one of their characteristic.

3.3.2.6 ***Quantum Mechanical Fermion Particles are Higgs Mass - brokered***

All Quantum mechanical Fermion particles are ***mass-brokered*** by the ***Higgs force-particles***; hence the necessary association between mass and energy in the Quantum Mechanical domain of the Special Relativists. Particles in Generation I are less massive than those in Generation II, which are less massive than those in Generation III in turn.

Within the Generations, Quarks are more massive than Leptons and Neutrinos are less massive than the other Leptons. Bosons are divided when it comes to mass. Gluons and photons are mass-less; whereas the W, Z, and Higgs bosons are massive. ***Higgs bosons give mass to all particles with mass, including itself!***

http://physics.info/standard/summary.shtml: Accessed on May 21st 2015.

From the above observations, the following flows:

1. All fermions are *mass-less* in themselves until they are filled with the ***mass power*** brokered by the **Higgs particles**! Clearly, the fermions are ***'composite' particles***, between themselves and the ***mass-energy Higgs particles*** and hence can be reduced or decay to their constitutive parts! This condition ***contradicts*** the ***indivisibility characteristic*** associated with a would-be elementary particle.

2. The **Higgs particle's** function of **brokering/mediate mass energy** to the 'void' or shell Fermions implies directly that the Higgs particle is **an agent/channel** of some **other mass-source**, from which it draws the mass it *transports or delivers* to the ***mass-less fermions***! Though this ultimate mass-energy source is not articulated in the Standard Model, it is most appropriate to confirm the ***universe world*** as the most adequate location for such resource.

3. The Higgs particle is therefore **a vehicle that transports** the **mass** component to the '**mass-less'** Fermions from the ***universe world*****!** This position has been identified above, as the genesis of the concepts like: the ***'black holes, black mass/energy'***. Similar inferences can be adduced in reference to rest of the other force-designated Boson particles in their interactional behavior with the Fermion block of particles.

Comment: At this point it becomes necessary to determine how many 'mass-loaded' Higgs particles are contained in each of **Fermion composite particle**, since by implication, the Fermions are 'mass-less' by themselves**.**

- Higgs particle is estimated to be 2.25 x 10^{-25} kg, but is **simultaneously** held to have an ***average life-time*** of: 1.6 x 10^{-22} seconds! The immediate issue arises as to how the ***highly volatile element*** can account for the ***stable mass-components*** of stable Fermions, like electrons!

https://en.wikipedia.org/wiki/Higgs_boson#Decay: Accessed on August 16th 2015.

- From Table 3.1 no single Fermion is an '**integral (quantum) mass-multiple'** of the Higgs' particle mass. It is only the volatile "Quark Top type" that can be **"roughly"** estimated in the articulated category.

TABLE 3.1: MASSES and CHARGES OF ELEMENTARY PARTICLES

PARTICLE FAMILY	***PARTICLE***	**MASS (kg)**	**MASS (MeV/C^2)**
1. **FERMIONS**			
1.1 ***QUARKS***			
	UP (u)	4.1×10^{-30}	2.3
(+2/3 charge)	DOWN (d)	8.6×10^{-30}	4.8
	CHARM (c)	2.273×10^{-27}	1,275
	STRANGE (s)	1.7×10^{-28}	95
(-1/3 charge)	TOP (t)	3.093×10^{-25}	173,070
	BOTTOM (b)	7.88×10^{-27}	4,420
1.2 ***LEPTONS***			
	ELECTRON (e)	$9.10938291 \times 10^{-31}$	0.510998928
(-1 charge)	MUON (μ)	$1.883531475 \times 10^{-28}$	105.6583715
	TAU (T)	3.16747×10^{-27}	1776.82
1.2.1 ***NEUTRINOS***			
(0 charge)	Electron Neutrino (V_e)	$< 10^{-35}$	$< 10^{-5}$
	Muon Neutrino (V_μ)	$< 10^{-35}$	$< 10^{-5}$
	Tau Neutrino (V_T)	$< 10^{-35}$	$< 10^{-5}$
2. ***BOSONS***			
(0 charge)	GLUONS (g)	0	0
	PHOTON (Y)	0	0
(± 1 charge)	W	1.433×10^{-25}	80,385
(0 charge)	Z	1.62557×10^{-25}	91,187.6
(0 charge)	HIGGS (H)	2.25×10^{-25}	125,900
* ***Nucleons***			
	Protons (p)	$1.672621777 \times 10^{-27}$	938.272046
	Neutron (n)	$1.674927351 \times 10^{-27}$	939.565379

* Not elementary particles

- Thus practically **no Fermion** can be built on the **quantum mass premise of the Higgs particle** and clearly ***none of the Leptons' integral masses*** can be constructed

on the Higgs' integral/quantum particle mass' category! Besides, the mass of a Higgs particle is estimated as: ***2.25 x 10^{-25} kg***; now, it must be established how much of the Higgs particle fills the Quark particle shell for example, so as to obtain its prescribe mass. From Table 3.1, we have that: 'the up and down quarks' have respective average masses as: 4.1 and 8.6 x 10^{-30} kg. In quick arithmetic it follows that, the 'up and down quarks' are mass-wise approximately 1.82 x 10^{-5} and 3.82 x 10^{-5} respectively of the Higgs' mass particle!

The next arena of inquiry will be whether, the Higgs particle is ***partitionable*** or ***fragmentable*** so to be able to supply the mass component in 'doses'! Such difficulties allude to the necessity to **identify a consistent system of elementary particles** than Quantum Mechanics can provide! The unlike magnetic elementary particle system of Classic Mechanics, which is discussed in Chapter 3B, offers a better functional system under this quest.

https://en.wikipedia.org/wiki/Higgs_boson#Decay: Accessed on August 17th 2015.

- On the other hand, when the mass of the Higgs particle is compared to that of a single magnetic monopole, whose mass is projected to be an *1/8 of the electron mass*, one finds that the Higgs particle can be estimated to be comprised of **1.975984 x 10^{6}** magnetic monopoles! Such observations are used in this work to build an eventual conclusion alluding to the proposal that genuine Quantum Mechanical mass-particles, apply themselves in many ways as various combinations of magnetic monopoles.

- The issue remains therefore, as to ***how much*** of the ***'digital/analogue'*** Higgs' mass-particle **constructs** the various Fermion particles defined in the **Standard Model** of the Quantum Mechanical designated-Elementary particle system! Further, since the mass parameter transported to Fermions, for example, is tremendously ***decay-prone***, it must be assumed of any Fermion that it ***continuously*** and **uniformly** obtains its mass-component from some Higgs particle source, otherwise, there would be moments when a Fermion can be mass-less, or having variable masses!

- The Fermion particles are in ***entirety designated*** to be ***volatile elements*** in turn, since their mass-brokering particle is highly volatile! However, the contrary turns out to be the reality, say for the case of **an electron**, which is **a stable particle**. It follows therefore that the search for the scientific articulation of the ***actual existence*** and ***characteristics*** of the Higgs' particle; its ***significance*** and what ***it actually brokers, must be on***!

3.3.2.7 ***Quantum Mechanical Fermion Particles are Gluon Energy – brokered***

Quantum Mechanics tries to find solution to several of the above criticisms by ***appealing*** and ***stealthily*** introducing its ***non-dimensional*** universe world's ***embattled*** "***mass – energy***" equivalent law into the management of earth world physics!

Objects in Quantum Mechanics are associated with: ***kinetic (motion) energy*** and ***potential energy*** (the energy of ***arrangement***). Given the 'energy – mass' equivalence proposition, a moving particle is deemed 'more massive' than a stationary one because it has kinetic energy; in this way higher speeds are expected to **generate** and **fuse** more mass to a cruising object. This position forms one of the key tenets of Special Relativists.

Despite of the speed induced mass, the kinetic energy contribution to the entire object's mass sector is negligible. In Quantum Mechanics, the majority of the object "masses" is some form of potential energy, siphoned from the universe world and mediated into the earth world's particles by the ***Gluon Bosons***. It is logical therefore to associate a particle's **Kinetic energy** with the *Higgs Bosons particles* and the **potential energy** with the *Gluon Bosons.*

Since what is predicated of Fermions also applies to their product particles, it is in order, if we choose to exemplify the above position using a proton, which is a Fermion-type of particle known to spin about its axis but also, projected to be made of ***two up-quarks*** and a ***down quark***. From Table 3.1:

Mass of an up-quark is estimated at: **4.1×10^{-30} kg**

Mass of a down-quark is approximated as: **8.6 x 10^{-30} kg**
Mass of a proton is about: **1.672 621 777 x 10^{-27} kg**

Clearly, two up-quarks and one down-quark have an aggregate of ***16.8 x 10^{-30} kg***, which mass accounts for about ***1%*** of the total mass of the (spinning) proton particle! Quantum Mechanics projects that, the remaining ***99%*** mass component comes from the potential energy of the **mass-less *Gluon Bosons particles***, which they extract in turn from the universe world.

Again from the indefensible 'mass-energy equivalence law', the Gluon Bosons, double as supplying ***the strong force holding the proton together***. The interaction energy of these mass-less particles is what gives the proton most of its mass.

Quantum Mechanics clarifies further, how both the ***mass-filled Higgs*** and ***mass-less Gluon Bosons*** trade in the same mass commodity. These two particles draw their ***mass-cargoes*** from the same source in the universe world. However, the Higgs particles become ***fused*** with the mass cargo, whilst the Gluons simply ***supply 'room'*** for transportation of the mass cargo, without being immersed into the same.

The Gluons exemplify the '***conduit, agent*** and ***tunnel'*** attributes associated with the Bosons in respect of their interaction with the Earth world-bound particles; while the Higgs particles stand in for the '***embodiment'*** characteristic.

Further, there is also ***a difference between masses*** transacted by the Higgs particle and the Gluon Bosons, in the sense that the ***Higgs-mass*** ("***scalar mass***") ***does not translate itself into a force*** unlike the ***Gluon-mass ("vector mass")***, which operates both as ***a mass*** and ***energy or force***.
http://physics.info/standard/: Accessed on September 8th 2015.

Comment: The above explanation only adds more queries on the significance of the Higgs particle, for the ***16.8 x 10^{-30} kg*** due to the three quarks, cannot be even accounted

for by a single Higgs particle (whose mass ≈ ***2.25 x 10^{-25} kg***)! Quantum Mechanics remains with the burden of identifying the source of mass un-accounted for, either by the Higgs particles nor the Gluon Bosons and as may be identified in Table 3.1, all mass-designated particle carriers (Higgs, Gluons, W & Z Bosons) have individually masses ***greater than 16.8 x 10^{-30} kg***!

Secondly, as discussed shortly, there other Bosons in addition to the Higgs and Gluon particles that transmit mass to the Fermions; these are the W & Z Bosons. It becomes difficult therefore to articulate the individual ***contribution***s (and their types) from these several mass-carrier particles (Higgs, Gluons, W & Z Bosons) to the respective Fermions!

Thirdly, it cannot be over-emphasized that the 'mass – energy' equivalence law ***only binds elements in the non-dimensional universe world;*** it has ***no correspondence*** in the ***dimensional earth world***. This law clearly ***cannot be used*** to explain the physics in the earth world.

In Chapter 3B, the ***two unlike magnetic particles of Classic Mechanics***, replace the ***17*** or an extended ***61*** Quantum Mechanics' elementary particles and supply a single solution to all these interactive, mass-source difficulties associated with the Quantum Mechanics' Standard Model. This is achieved by defining ***self-contained*** elementary particles, whose mass parameter and interactive forces as inclusive of their ***intrinsic characteristics.*** In addition, the universe world, and the Fermion-Boson concepts are dealt away with, just as maintaining only one ultimate interactive source of force, namely ***magnetism***, which often operationalise itself through its subsidiaries say, the centripetal, centrifugal forces and others.

3.3.2.8 ***Spin-brokered Elementary Particle Classification***

In addition, all Quantum Mechanics' elementary particles (Fermions and Bosons) are categorized with respect to ***their 'Spin'*** types. The differentiation is done along *spin-statistics theorems* adopted by Quantum Mechanics. ***Fermions*** are said to have a '***half-***

integer spin' (odd-number of ½ integer spin) in their interactive patterns; thereby exhibiting *Fermi-Dirac Statistics characteristics.* These obey Pauli's exclusion principle. On the other hand, the Bosons carry ***an integer spin*** thereby satisfying *Bose-Einstein Statistics* (cf. Figure (3.3)).

https://en.wikipedia.org/wiki/Elementary_particle: Accessed on June 12th 2015.

http://www.britannica.com/science/Fermi-Dirac-statistics: Accessed on September 9th 2015; http://www.britannica.com/science/Bose-Einstein-statistics: Accessed on September 9th 2015; and http://www.britannica.com/science/Pauli-exclusion-principle: Accessed on September 9th 2015.

Observe:

1. In Quantum Mechanics, the concept of *spin* (whose causality is not known) is captured in (quantum) numbers signifying a state of a particle; and not in the *rotational* sense as held in Classical Mechanics. In this order Fermions have ***±½ spin*** (and their odd multiples) while the Bosons have a ***spin of ± 1*** (and their multiples); save the Higgs particle which is associated with ***0 spin***. Since much of the Quantum Mechanical spin physics, does not help to clear the criticisms raised above, it remains on the part of an avid researcher, to acclimatize oneself with the extents of this spin field.

https://en.wikipedia.org/wiki/Spin_%28physics%29#Fermions_and_bosons: Accessed on September 10th 2015.

2. In Classical Mechanics, however, the concept of spin is appreciated from its ***rotation-functional value.*** In this context, there are only two types of spin movements among the sub-atomic matter, namely the: ***clockwise*** and ***anti-clockwise spins.*** These sub-atomic characteristic movements, feature the ***unlike magnetic monopoles*** as they execute one of their *fundamental intrinsic functionality*, namely, ***circulation*** (by spinning). Special to these Classic Mechanical spins, is that they are ***transverse*** to each other as discussed in Chapter 3B.

3.3.2.9 ***Electric Charge- Brokered Elementary Particles' Categorization***

In Quantum Mechanics, charge is regarded as a *property of matter* that gives rise to electric and magnetic phenomena (known collectively as electromagnetism). Charge is quantized, it is held as existing in discrete amounts with restricted values — ***multiples and fractions*** of the ***elementary electric charge e*** ($\approx 1.6 \times 10^{-19}$ C). Particles that *exist independently* (the electron, muon, and tau) carry *multiples of the elementary charge*, while quarks carry *fractions of the elementary charge*. Quarks always bind together in groups whose *total charge is an integral multiple* of the elementary charge. In addition, since opposite charges attract, electrons tend to bind to protons to form atoms that are neutral overall.

Comment: The dilemma however, remains as to what ***exactly constitutes the elementary electric charge from which all other 'charge-portions' are referenced***! In Chapter 3B, magnetic charge is ultimately referenced to the unlike magnetic monopoles and is defined in terms of '***acceleration towards a stronger causality of the motion***'. Its value is estimated as: $\pm$ ***5.582 529 2014 x 10^{-12} m/s^2*** (cf. Chapter 1, Equation (1.25)). This magnetic charge value is derived and employed in this work, to determine the original ***Planck's constant h*** and the results are ***very satisfactory*** (cf. Chapter 1 Section 1.6).

Further, as discussed in Chapter 3B and 4, the 'famous' ***electric charge, e*** parameter and its associations, (say, the electric field ***E***, Electric charge ***e***, Electric waves, Electric permittivity ***ε*** and others) are ***not defined*** in this work, since ***no electric charge source*** can be associated with such parameters. Again, it is shown in Chapter 3B that, the once - thought to be the source of the electric charge, the ***electron*** is instead, ***a 'capsule' of 4 pairs of unlike magnetic monopoles***!

3.3.2.10 ***Classification of the Elementary Particles by Color Charges***

Quarks stick to other quarks because they possess a characteristic known as color charge. Quarks come in one of three primary colors: red, green, and blue. The colors of quarks in the standard model combine like the colors of light in human vision; for example: a baryon is a triplet of one red, one green, and one blue quark, so that together they appear

as a color neutral particle. Likewise, a meson (a doublet particle) of one colored quark and one anti-colored anti-quark actualizes a color neutral particle.

Further, quarks join up and always do so in a way that hides their color from the outside world. One color is never favored over another when quarks get together. Matter therefore is color neutral down to the very small scale. ***Gluon Bosons*** siphon individual and several combinations of colors from the universe world and mediate the respective color components to the Fermions and to themselves.

It also happens to corroborate that the **color charges** form the ***strong forces*** which keep the Fermions in the elementary and the combination forms together. That is, the three quarks combination and the atoms' nuclei are bound together by strong forces mediated by the ***Gluon Bosons.*** http://physics.info/standard/: Accessed on September 10th 2015.

Comment: The need for postulating an exterior strong force to keep the nucleus of an atom together arises from the assumption that protons are repulsive among themselves. The function of the Gluon Bosons therefore is to supply the much needed force to glue these particles together. In Chapter 3B, it is shown on the contrary that, protons deploy in ***attractive configurations*** within the nucleus and hence the force to keep the nucleus together arises from the ***interior arrangement*** of the protons themselves!

The Gluon mediated exterior force therefore becomes irrelevant. Instead, the repulsive forces among the sub-atomic particles arise from the vibration energy associated with ***neutron particles***. Hitherto, neutrons have been assigned the role of 'cushioning' the assumed repulsive action among protons; in this study, it turns out that the neutrons are instead the agents of nucleus decay processes!

The mechanism under which the repulsive vibration energy is implemented by the neutron particles is explained in Chapter 3B. In any case, let it suffice to mention here that, the neutron-brokered vibration energy is ***smaller*** compared to the binding energy brokered by the protons. However, this repulsive vibration energy aggregates and becomes ***more pronounced*** in heavier atoms (where neutron particles abound); and this

supplies a very strong clue as to why nucleus disintegration is easier in heavy atoms than in lighter ones.

Further, the second function of the Gluons of supplying color to the Fermion sub-atomic particles is also not upheld among the Classic Mechanical elementary particles, since the latter are '***self-contained'***; and this includes possession of the color characteristics, which are excited into detection at appropriate motion speeds. In a way, the unlike magnetic monopoles sort of constitute a ***'mini-world'*** of their own thereby eliminating the need to hypothesize dependence on other sources, like the universe world of Quantum Mechanics.

3.4 **THE SUB-ATOMIC INTERACTIVE FORCES**

3.4.1 ***Introduction***

Quantum Mechanics identifies three forces executing action among the Fermion sub-atomic particles. These nuclear forces are:

- The ***strong nuclear force***
- The ***electromagnetic force***
- The ***weak nuclear force***

Each force is engineered by a unique property born by the particle, which brokers the corresponding force. The ***Gluon Gauge/Force Boson*** bears the ***Color attribute***, which stimulates the ***strong nuclear force.*** The ***Charge characteristic***, which engineers ***electromagnetism*** (electric and magnetic forces)***,*** is carried by the ***Photon Gauge/Force Boson.*** The ***W & Z Gauge/Force Bosons*** bear the ***flavor characteristic***, which is responsible for the ***weak nuclear force***.

There is yet a fourth force recognized by Quantum Mechanics, the ***gravity force***, but whose agent particle (graviton) is not yet identified though the search is on.

3.4.2 ***The Strong Nuclear Force*** **(**operate within range of $\approx 10^{-15}$ m**)**

Colored Fermion particles (quarks) obtain their color features from the ***Gluon Bosons*** and are bound (glued) together by the appropriately named ***Gluons***. Gluons are colored, in a more complicated way than the quarks are. *Six of the eight gluons* have *two colors, one has four,* and *another has six*. Gluons glue quarks together, but they also stick to themselves. One consequence of this is that, they are more restricted to ***the nucleus cohesion*** than reaching beyond the nucleus; hence the strong force is an extremely ***short-range interactive force***. However, this is the strongest force, followed by the electromagnetic and trailed by the weaker nuclear force.

3.4.3 ***The Electromagnetic Force***

In Quantum Mechanics, charged particles interact by the exchange of ***photons,*** which is the ***carrier of the electromagnetic force***. Thus, whenever an electron repels another electron or an electron orbits a nucleus and radiates electromagnetic energy, a photon is responsible. Photons are thought to *be* ***mass-less, uncharged,*** and ***have an unlimited interactive range***. This explains why electromagnetic waves are said to travel at the same speed, the ***speed of light***, which doubles as the '***speed of the universe'***, where everthing originates or is imported from. A wave is therefore tuned and hence must replicate the speed of its causality, the photon, which is the speed of light!

Comment: The photon and the Gluon share something in common in that the two play the ***channel***, ***conduit*** or ***agent roles*** with respect to '***the cargoes'*** they carry from the universe world into the earth world of the elementary particles! The Photon is uncharged, yet it transports charge to other particles, and the Gluon is mass-less, yet it passes on 'vector mass' to quarks! The two are ***insulators*** or mere ***containers*** in connection to the 'cargoes' they transport. The immediate challenge remains to identify where Photon particle **deposits** the ***electric component*** which the Photon is attributed as 'downloading' (together with the magnetic component) to the earth bound elementary particles; for what is detectable is only the magnetic component!

Secondly, all research done in this study has returned fruitless results as to where the 'electric charge' is located in the earth world-bound elementary particles! This is the

basis why all products associated with the concept of '***Electric charge***" are not upheld in this work; however, many applications associated with the ***electric domain*** are inherited by ***a transverse magnetic component*** as discussed in Chapters 3B & 4.

Thirdly, it is discussed especially in Chapter 4, that one of the identifiable problems with the blanket speed associated with all electromagnetic waves is the creation of a frequency spectrum scheme, which returns an '***artificial***' or ***unrealistic scarcity*** of usable frequencies.

The "***one-speed for electromagnetic waves*** in free air " is a one type of Quantum Mechanical theories, whose implications have burdened the human community; in as much as it has created a frequency spectrum that squeezes usable frequencies in a ***tiny frequency bandwidth***, leaving the majority of the frequency range ***redundant***, especially the lower frequency domain! This problem is remedied in Chapter 4, by modeling a (Classic Mechanical-based) usable frequency-rich spectrum scheme to replace the prevalent frequency planning program designed by Quantum Mechanics.

In addition to availing myriads of usable frequencies, the proposed frequency scheme provides a special category of ***non-ionizing frequencies*** that can be used to ***subjugate*** and ***even kill*** HIV, Ebola and other viruses ***within*** a human body ***without endangering*** the desirable human cells! This therapy named as '***The tremor therapy'*** **cannot** be realized with the current Quantum Mechanics' generated frequency spectrum program.

On the other hand, this one-speed principle is **contradicted by sound waves in free air**, which are also electromagnetic by definition and convertible into the ***sine-cosine order*** (to feature like any other electromagnetic waves via ***Fourier transformation method***); these are known to travel in free air at ≈ ***330 - 340 m/s*** (other considerations like temperature and pressure notwithstanding), which range falls short of the velocity of light currently estimated at: ***299,792,458 m/s***!

In summary, the Quantum Mechanical ***failures sprout*** from importing the '***the non-dimensional laws associated with the universe world'*** directly into the earth world bound elementary particles, which are characterized by ***the dimension characteristics***. In this

work for example, I have managed to prove among other things that indeed though in the ***universe world***, the ***North and South magnetic poles*** may be characterized as being ***indistinguishable***, in the **earth world**, the two magnetic polarities are indeed **un-contaminating**; they are **distinct** from each other and can ***co-exist without mixing***; with the capacity also to exist as ***separate individual entities***.

The same applies to equating energy to mass in the dimensional prone - earth bound circumstances under the pretext that the same holds in the non-dimensional universe world! Again in this work, it is definitely shown that ***Classic Mechanical laws***, which explain both the ***micro*** (sub-atomic) and ***macro*** earth world-bound phenomena via the unlike magnetic monopoles, can derive those constants (***h, ħ, G, C*** among others) that Quantum Mechanics has been relying on **to appeal** and ***argue*** for the existence of the universe world!

It is high time therefore that the scientific community ***de-registers*** and ***de-couples*** the universe world as the ***determinant*** or ***reference*** for the earth world. If ever the universe world existed, it must be emphasized that it has ***nothing to deriver*** to the 'self-contained' earth world's scientific order. This brings us to ***quarantine*** the entire brokerage order managed currently by the ***Boson particles*** of Quantum Mechanics.

Subsequently, from the Classic Mechanical point of view, there is neither the universe world nor its intermediary agent, the Bosons; the two remain in the ***hypothetical*** world! The **universe world** is a product of relative subjective modeling, a strong tool employed by Quantum Mechanics. Its creation served the required purposes of the day, among which was to promote Quantum Mechanics as against Classical Mechanics. In this work, this internal 'bickering' has been smoothened; it follows therefore that the science community might as well do away with the universe world concept.

On the social platform, and along the above position, flows ***the impossibility*** of regarding Hetero-sexuality and Homo-sexuality, just as Bestiality, Incest, Pedophile and the like as ***equivalent things*** in the ***earth world***, simply because they are regarded so in ***the universe world!*** This 'scarecrow' characteristic which the concept of 'the universe world' bears is

widely employed by Quantum Mechanics to safeguard the internal cohesion of its laws and theories; and this achieved by '***intimidating***' other positions that would lead to the challenging, 'tearing' or 'bursting' of its theories and laws from within or without the system.

Further, the '***universe world'*** concept and its ***general methodology***, renders Quantum Mechanics open to being classified as some form of ***mythical religion of science***; for similar to all religions, there is little to question in the realm of faith. Likewise Quantum Mechanics improvises the concept as a means of sailing through its theories and laws un-challenged; they have to be ***believed in*** as a legacy! This is substantiated by its irrevocable ***procedural Rules*** for ***modeling scientific phenomena*** (cf. Section 3.2.4.2).

3.4.4 **The Weak Nuclear Force (**have very short range $\approx 10^{-18}$ m**)**

Flavored particles (quarks) interact weakly through the exchange of ***W*** *or* ***Z*** **Bosons** (also known as intermediate vector Bosons) — the carriers of the weak force. Nuclear decays are engineered by this force. This force is linked to the interactive forces between hypothesized '***Weakly Interactive Massive Particles (WIMPs)'*** which are earmarked for the 'dark matter' particles. These projected particles are assumed to ***interact very weakly*** with normal matter and as a result they are difficult to detect!

https://en.wikipedia.org/wiki/Cryogenic_Dark_Matter_Search: Accessed on September 12th 2015.

Comment: As already stated above the nucleus consists of both attractive and repulse forces provided by the protons and neutrons respectively. In normal circumstances, these forces are resultantly cohesive; however under other suitable conditions, a nucleus can decay into other constitutive parts as discussed in Chapter 3B. The existence of these weak interactive forces is hence ***not upheld*** in the Classic Mechanical modeling of a nucleus of an atom.

Besides, the link established between these weak nuclear forces and 'dark matter/energy's method of interacting with the sub-atomic particles, thereby supplying

the majority of the energy (≈ 84%), renders the entire project of weak nuclear forces ***suspect***, since 'dark matter/energy' is shown in this work as non-existent.

3.5 **CONCLUSION**

It is indeed a great challenge to ***remain focused*** when one sets out to explore the Quantum Mechanical's Standard Model, which articulates the elementary particles and their interactive modes. This is so because Quantum Mechanics' ***subjective methodology*** of ***scientific modeling*** and its ***logical framework differs widely*** with the normal or ***objective scientific designing*** and ***ordinary logical order***!

It becomes therefore very difficult to proceed from a statement to the next one, without posing barrages of remarks, criticisms, and the like! Several aspects are indeed ***contradictory***, the very "Rules" set are contravened even within the system itself. Consequently, it is a hard task to perform a ***coherent diagnosis*** or ***analysis*** of the Standard Model; it is too massive and complex.

Nonetheless, a studious researcher is destined to appreciate the Standard Model and other areas of Quantum Mechanics, if one endeavors to acclimatize oneself with methodology and the relative-subjective framework employed in Quantum Mechanical physics. Unfortunately, the logic pattern of the universe world remains repugnant with the thought patterns of the earth world order. This renders the Standard Model ***scantly comprehensible***.

Among the ***broad roots*** which contribute to the ***obscurity*** of the Model are the circumstances and frameworks of thought that prevailed (and still do so) during its construction or formation. Such factors surrounding the hewing of the Model are summarized as:

- Quantum Mechanics' propensity to appear distinct and often superior to Classical Mechanics, it set out to out-maneuver.

- The disguised stipulation of the ***non-dimensional*** universe and the ***dimensional*** earth worlds, with the former acting as the ***indispensable constructor*** and ***'benefactor'*** of the latter, with such dependence that the close down of the universe world, calls for an immediate annihilation of the earth world. Besides, its creation, it is ***the strict reserve*** or ***monopoly*** of Quantum Mechanics to ***define*** and ***interpret*** the functionality of this 'mighty' or ***godly*** universe world.
- The indiscriminate and shrewd methods employed to ***introduce*** the ***non-dimensional (indistinguishable)*** order (concepts, laws and theories) of the universe world by way of ***'indoctrination'*** into the ***dimensional (distinguishable)*** character (concepts, laws and theories) of the earth world.
- The Universal Constants and Planck's natural unit system, which Quantum Mechanics adopts. These are associated with indefatigable powers in their purported monopolistic capacity to expound the universe/natural laws. In this order, they are: ***sacrosanct***, ***indisputable***, ***only measurable*** and ***never-derivable***.
- The Relative and Subjective modeling of scientific phenomena by employing "Rules", which ***insulate*** derived laws, theories and hypotheses from both internal and external criticism. Typical derived laws are presented or ***promulgated*** in such a manner that they are not ***only indisputable***, but also apply ***irrevocably*** and ***universally***.

Quantum Mechanics is a ***well-enclosed system***, which does not allow penetration or dictation against its laws and theories; it is ***so subjectively guarded*** or ***ring-fenced*** to the extent that falsification of any of its tenets can only be ***effected internally*** and not from without!

In this order, it is least expected for Quantum Mechanics to ***dismantle*** and ***disown*** its claims over "Dark Matter/Energy", speed of light in free space, $\boldsymbol{E = mc^2}$ nor "Black Hole" theories even in the presence of scientific evidences provided in this work! The search for the same is bent to increase and more theories based on the two and similar concepts are expected to continue and abound; moreover lots of investment in terms of money, equipment and human resource has been implemented in these domains!

Quantum Mechanics is such ***an assertive*** system of Physics, which inherits from Classical Mechanics all elements, laws and theories, which it deems fitting in its domain, and defines the "inheritance" as '***special applications'*** or '***approximations***' of its laws and theories!

The analysis done, only serves the purpose of understanding the type of logic which Quantum Mechanics relies on in propounding its concepts, laws and theories and also to determine where its strength of its apparent success lays in the field of science. On constant probe of the subject it becomes increasingly clear that the fine scientific success associated with Quantum Mechanics, is finally ***brokered*** by the Classical Mechanics' laws and theories it inherits. In this work, it has been shown how Quantum mechanics ***thrives*** on Classic Mechanical derivable constants, namely: ***h, ħ*** and ***G*** by simply ***hooding*** them, thereby ***confiscating*** them as its own under the ('new') category of the un-derivable "***universal natural constants***"! Indeed Classical Mechanics has much on its side and all it needs is to revitalize itself.

This fact provides strength and guidelines to refurbish Classic Mechanics to provide ***smart and precise prediction*** in all aspects of science, a faculty it had lost due to its failure to identify its own system of ***elementary particles***. This is Classical Mechanics' own task and Quantum Mechanics cannot be of any assistance in this endeavor! In Chapter 3B, effort to build a systematic Classical Mechanics' elementary particle system is done under the auspices of ***the unlike magnetic monopoles.***