

**PHYSICAL CONCEPTUAL MODEL FOR THE QUANTUM INTERACTION
BETWEEN THE FUNDAMENTAL FORCES OF NATURE**

AYMAN KASSEM , AERONAUTICAL ENGINEER

CAIRO , EGYPT

Contact address : PHYSICALMODEL2017@GMAIL.COM

PREFACE

This is a model characterised by its simplicity , it explains the events running from the big bang to the present day and scales from the planck scale to the size of the universe , all these in terms of one sub particle and a set of four fundamental forces along with their subsequent interactions

This is a bottom up approach instead of the usual top down one the interaction at the planck scale level holds a determinant role in the play of forces at a cosmological level

we note here that the interface between this model and the standard model in nuclear physics remains vacant for future research

**the other major advantage of his model is that it offers explanation
– a very reasonable one – to major problems in the domain of
astrophysics and nuclear physics**

**This model carries challenging ideas to long held concepts and
views and Need to be validated , and the only way to validate this
model is through a robust computer simulation**

*TO ALL HUMANITY ,
FOR THEY SHOULD MAKE USE THIS
KNOWLEDGE
FOR THE PURPOSE OF THE
COMMON GOOD OF ALL*

CONTENTS

1. JUSTIFICATION OF THE MODEL	4
2. DEFINITION OF THE MODEL	6
3. DEFINITION OF THE FORCES	10
4. INFLATIONARY MODEL	13
5. BIG BANG SENARIO	20
6. GRAVITATION	19
7. GALAXY ROTATION	21
8. TIME CONSTRAINING	28
9. THERMAL ENERGY	41
10.PROTON STRUCTURE	43
11.BIG BANG AND ENERGY CONSTRAINING	68
12.ELECTROMAGNETISM	81
13. CMB ORIGIN	102
14. TIME HORIZON, SHAPE OF THE UNIVERSE	104
15. FINAL WORD ON THE BIG BANG , INFLATION	115
16.CONCLUSIONS	119
17.REFERENCES	134

1.1 JUSTIFICATION OF THE USE OF CONSTANT INFLATION SPEED OF THE UNIVERSE

Age of the universe (calculated) = { C*P } /H

Where P is the astronomical parsec = 3.28 light years

H is hubble's constant (67-75 average value = 71 km per mega parsec)

The calculated value is 13.773 billion years , which is in close agreement with Observational finding

1.3 JUSTIFICATION FOR THE DEVELOPMENT OF THIS PHYSICAL MODEL

1- The universe is uniform and homogeneous in all directions

(apart from normal matter) (ref 1)

2- Very large number of quantum particles behave –

statistically speaking – like classical model , and this

allows to draw this physical model which is conforms to

the observation

2-DEFINITION OF THE MODEL

2.1 Energy quanta (EQ)

The smallest possible constituent of the universe in the planck scale domain

Energy quanta (EQ) are identical in their energy content

Energy quanta (EQ) are

1-spinning around themselves in a unified direction

(We define Energy quanta (EQ) spin as (-SE))

2- spinning around quantons

(we define quanton spin as (-SQ) and it is in the same rotation direction as energy quanta (EQ) spin (-SE) (we later will show the significance of this negative sign)

Energy quanta (EQ) are subject to

1- attraction force between each other (FAE)

2-repulsive force due to their similar spin (FRE)

moving between neighbouring quantons

2.2 QUANTONS

1- Quantons are an accumulation of energy quanta (EQ) and arranged in lattice form

2-The quanton lattice constitutes the space fabric

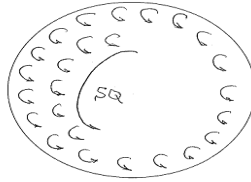
3-Quantons are spherical in shape due to the principle of minimum energy but may vary in their energy content (number of energy quanta (EQ)) and in size Between initial size (V_0) and critical size (V_f)

4-The energy quanta (EQ) are spinning around quantons as well as them selves

5- if energy quanta (EQ) were free to move in space this would lead to dimensional energy asymmetry , and hence , the quantons are needed to provide energy symmetry in all spatial directions for energy quanta (EQ)

6-Quantons are held in a quasi equilibrium state under the effect of two sets of forces Internal forces and external forces

Due to the balance of these forces the quantons inflate from their initial volume (V_0) to a critical volume (V_f) , after this the quanton splits up into two identical quantons sharing up the original energy quanta (EQ)



REPRESENTATIVE FIGURE FOR ENERGY QUANTA SPINNING INSIDE A QUANTON

2.3 INTRINSIC PROPERTIES OF ENERGY QUANTA (EQ)

Spin (SE) , attraction force (FAE) and repulsion force (FRE) are the intrinsic properties of energy quanta (EQ)

2.4 ROLE OF SPIN

1- energy quanta spin (-SE) is actual spin and different from atomic spin

2- The energy quanta (EQ) are spinning around themselves (-SE)

The role of spin (SE) is to create a force (FRE) to oppose the Attraction force (FAE) of energy quanta (EQ) , and acts to aid In the expansion of space fabric

**3- the energy quanta (EQ) spin around the quanton (-SQ)
and its direction is governed by minimum energy principle
(spin (-SQ) direction will be in a way such that the resultant
forces due to its effect would not oppose the expansion
/contraction of space fabric)**

**So, in inflationary scenario , the spin direction of quanton (-SQ)
is the same as the spin direction of energy quanta (-SE)**

While it is opposite spin (+SQ) in a contraction direction

2.5 QUANTON GENERATION

**Quantons are generated due to the splitting action of the quantons
under the pressure of inflationary force (FI) after reaching a
critical volume (VF)**

2.4 ANTI QUANTONS

**Anti quantons are similar to quantons but their energy quanta (EQ)
have an inverse spin around the quanton (+ SQ)**

**Due to the difference in spin between the quanton and the
anti quanton the nature of force between them is an attraction**

force (quanton / anti quanton attraction force(FAQ)

2.5 QUANTON / ANTI QUANTON ANNIHILATION

**As a result of the attraction force between the quanton /
Anti quanton the two bodies would annihilate each other ,
(due to spin difference) , the resultant is energy quanta (EQ)
That are absorbed by neighbouring quantons**

2.6 ANTI QUANTON GNERATION

**anti quntons are generated individually during contraction of
space fabric (due to spin reversal of quanton)
anti quantons have positive quanton spin (+SQ)**

3 -DEFINITION OF FORCES

3.1 QUANTON INFLATIONARY FORCE (FI) (INTERNAL)

This force is due to

**1- the repulsive force between different energy
quanta (EQ) inside a quanton (FRE) , induced by similar spin (-SE)
in all of them This force tries to expand the quanton in size**

**2- centrifugal force due to the spin of energy quanta (EQ)
around quantons (SQ)**

3.2 QUANTON BINDING FORCE (FB) (INTERNAL)

It is the resultant of energy quanta (EQ) attraction force ((FAE)

**This force is responsible for holding the quanton together against
the expansion force of quanton inflationary force (FI)**

3.3 QUANTON RETAINING FORCE (FT) (EXTERNAL)

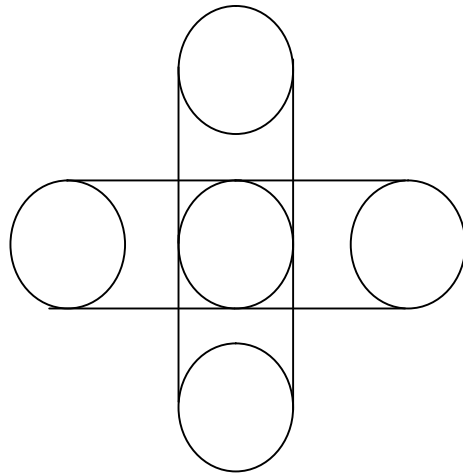
This force is the result of

- 1- the sharing of energy quanta (EQ) between different quantons**
- 2- the attraction force between different energy quanta (EQ)**

of neighbouring quantons

Quanton retaining force (FT) is a force of attraction in all cases

**And this force maintains the quantons attached to each other and
binds The quanton lattice (space fabric)**



Representation of quanton retaining force (FT)

3.4 QUANTON REPULSION FORCE (FR) (EXTERNAL)

**This force is due to repulsive force between energy quanta(EQ)
spin (-SE)**

**This force maintains the quantons away from each other and
prevents them from merging together and it is opposed by the
retaining force (FT)**

3.5 QUANTON / ANTI QUANTO ATTRACTION FORCE (FAQ)

**Difference in spin between quanton and antiquanton would lead
to the appearance of a force of attraction (FAQ)**

3.6 QUANTON / QUANTON REPULSION FORCE (FRQ)

Due to the repulsion between quantons with same spin direction (-SQ) but with different spin values a repulsion force form between them

4. INFLATIONARY MODEL

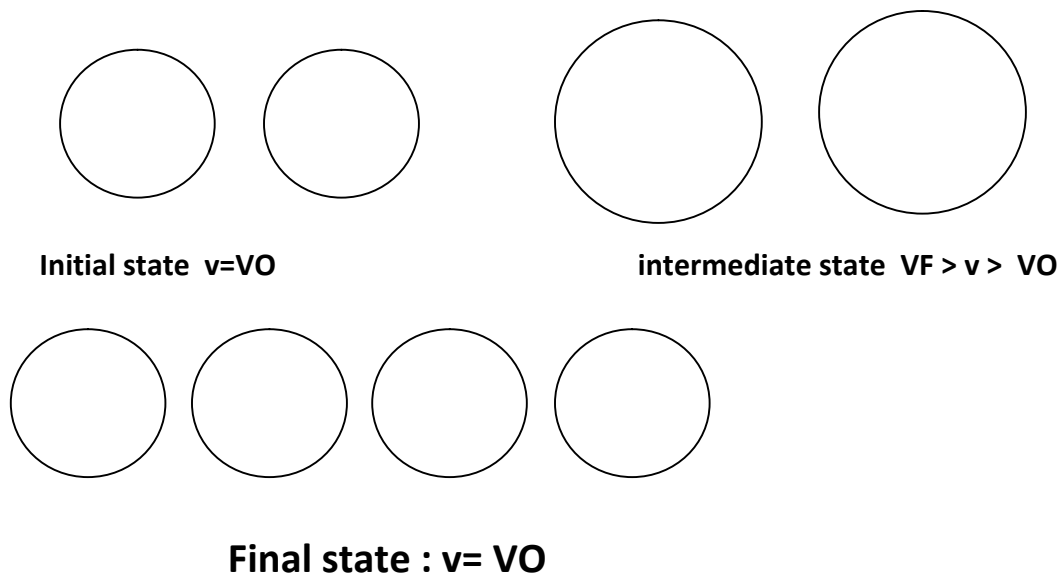
1- In this model the universe is thought of as a sphere that is travelling through True vacuum at the speed of light (C) the inflationary speed might have been less than (C) , during the Primordial phase due to the disruptive effect of radiation

2- Most of the big bang energy was in the form of inflationary momentum energy , and smaller part was in the form of radiation / thermal energy and due to this fact , the inflationary momentum helped to overcome the disruptive and chaotic effect of radiation energy through rapid expansion and subsequent cooling and contributed to the uniformity of space fabric

4.1 INTERNAL BALANCE OF FORCES

Quantons are internally under the quasi balance between a stronger inflationary force (FI) than the binding force (FB) as a result the quanton expands under the effect of this inflationary force (FI) , the size of the quanton expands from its original volume (Vo) and as the quanton expands , the centrifugal force is weakened as well as the repulsive force (FRE) between energy quanta (EQ) and consequently the inflationary force (FI) , quanton expands until it reaches a critical volume (Vc) Then the quanton splits into two identical quntons sharing the energy quanta (EQ) equally between them and size of the qanton is back to the initial volume (Vo) for each quanton , and this splitting is due to the minimum energy requirements (due to temporary increase in the effect of attraction force (FAE))

The splitting action restores the quasi equilibrium temporarily and allows for a repeat Of the qunton inflationary scenario



Variation of quanton size before , during and after inflation

4.2 EXTERNAL BALANCE OF FORCES

The quantons under the balance of the quanton repulsive force (FR) and the quanton retaining force (FT) ,and tries to distance every quanton from the nearby ones

the repulsive force (FR) is much higher and it is augmented the internally by the effect of inflationary force (FI)

As the overall number of quantons increases so, is the space they occupy also The expansion of this quanton lattice is the synonym of expanding space fabric

Originally , the universe started with very high inflationary energy corresponds to high quanton inflationary force (FI) and high repulsive force (FR)) (due to the very high number of energy quanta (EQ) per quanton)

4.2 RESULTS OF UNIVERSE'S INFLATIONARY MODEL

As space fabric expands ,and the number of quanton splitting increase , this would lead to

1- Reduction in the number of energy quanta (EQ) per quanton

,and this reducing the inflationary force (FI) and repulsive force (FR) which drive the universe's inflation

2- A less significant decrease in the quanton retaining force (FT)

that binds Quanton lattice (space fabric) together

all the intermediate forces (FR) , (FT) , (FI) , (FB) will experience a reduction in magnitude as they are all dependent on the number of energy quanta (EQ) per quanton , but the ratio of energy

quanta (EQ) which are shared between the different quantons is set to rise due to a significant drop in the repulsive force (FR) that

Tries to contain every quanton apart from the neighbouring ones

2-Principle of minimum energy , that drives the energy quanta (EQ) of different quantons (now heavily depleted)to merge in a single quanton

4.3 ANALOGIES BETWEEN THE PHYSICAL MODEL AND COSMOLOGICAL FORCES

- 1- The effect of quanton inflationary force (FI) force and repulsive force (FR) can be viewed as inflationary momentum or THE DARK ENERGY That drives the universe 's expansion
- 2- as the universe expands inflationary momentum grows weaker as more energy is being diverted to holding the expanding quanton lattice (space fabric) together (increasing share of retaining force (FT))

5. BIG BANG SENARIO

5.1 INFLATION OUTSIDE SPACETIME

As , it moved out of a pseudo-singularity , under the inflationary momentum and thermal energy pressure , the energy content had to

1- Be Quantized in the form of energy quanta (EQ)

2- Introduce a spin (SE) whose interaction between similar spins

of neighbouring energy quanta (EQ) would generate a

repulsive force (FRE) to oppose the attraction force (FAE)

between different energy quanta (EQ)

initially as a singularity would explode in unopposed expansion of energy quanta(EQ) this thermal energy prevents the energy quanta from combining into quantons

b - after the initial expansion and relative cooling , energy quanta (EQ) began to recombine and form quantons , but the still elevated temperatures prevent them from forming inter- quanton binding links (qanton retaining force (FT))

5.2 INFLATION WITHIN SPACETIME

after further cooling the quanton retaining force (FT) appears , and binds quanton lattice (space fabric) together

6. QUANTUM GRAVITATION

6.1 MATTER- QUANTON INTERACTION

(refer to section : analogies to proton structure)

Gravitational force is a complex interaction

it is the resultant of the effect of two forces

1- Qunton retaining force (FT) (which is attraction in nature

dominates at the planck scale)

2- Qunton repulsive force (FR) (which is repulsive in nature and

has a significant effect at the cosmological level)

Gravitational force lines apply via quanton lattice (space fabric)

The quanton retaining force (FT) mediates the attraction part of gravitational force effect between Two bodies

We can express the attraction part of gravitation force between two bodies as How much of quanton retaining force (FT) lines that

exist between two bodies (field intensity)

6.2 EFFECT OF SCALE ON GRAVITATION

IN RELATIVISTIC TERMS , ULTRA MASS BODIES

DISTORT GRAVITATION , AS WELL AS SPACETIME ,

SINCE , WHILE DISTORTING SPACETIME , THE

GRAVITATION WHICH IS MEDIATED THROUGH

QUANTON LATTICE (SPACE FABRIC) WILL ALSO BE

DISTORTED

Explanation:

Quanton lattice (space fabric) behaves as a mesh of load

Carrying cells , this net of cells bends under the gravitational load of

High mass bodies (relativistic space fabric distortion)

And while this mesh is distorted (bent), the weight transmission

through it is also altered (distortion of gravitational field)

And subsequently , the attraction part of gravitation is distributed

over a larger area of space mesh

so there is the compensatory mechanism for the distortion

Caused by repulsive force (FR) and has its roots in inflationary

momentum of the universe and the relatively weaker retaining force (FT)

EFFECT OF QUANTON REPULSION FORCE (FR)

It has a significant effect on gravitation in case of ultra high mass bodies

- 1- It distorts (stretches space fabric) due to the repulsion between matter and quanton lattice (space fabric)
- 2- it dilutes the effects of gravitational force exerted by large bodies

7. ABNORMAL ROTATIONAL SPEED OF SPIRAL GALAXIES

_Patterns of rotational speed of galaxies indicate greater velocity of rotation than what would have been the case under laws of celestial mechanics

we can make the following observations

- 1- a wide range of estimation of the galactic mass

(with estimates of total mass from $4.8 \cdot 10^{11}$ to 20 or even $30 \cdot 10^{11}$ solar masses) with stellar luminous mass of about $6 \cdot 10^{10}$ solar masses (ref 2,3,4)

the wide ranging estimates of the dark matter based mainly on simulation and comparison of rotational speeds (ref 5, 6) without direct observational evidence , due to the problem of detecting dark matter , which remains elusive till now scientists know that it exists from its effect on the behaviour of galaxies and stars

2-instead , we can offer an alternative explanation which is

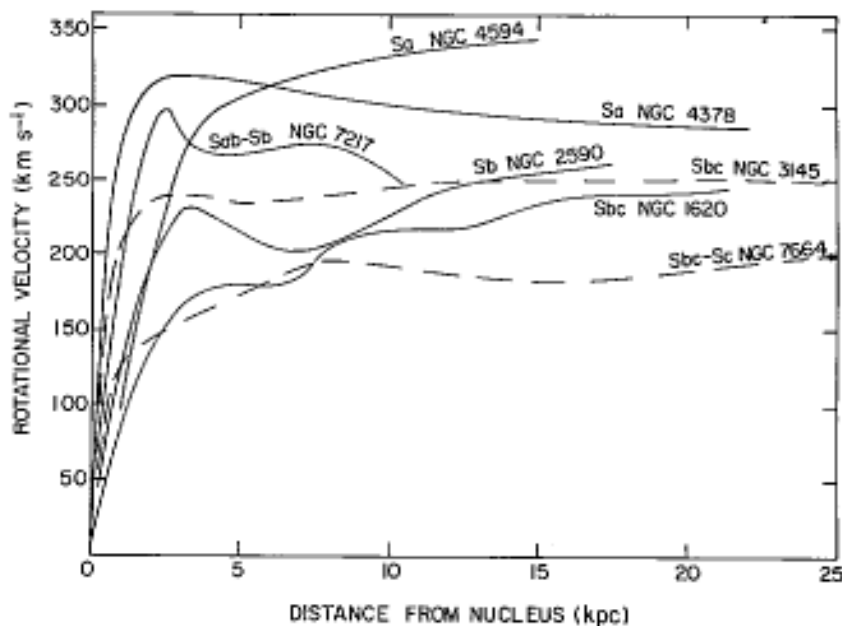
the presence of large undetected cold and Non luminous ordinary matter in the form of a halo (ref 5,6) which leads to under estimation of their contribution to the rotational speed of galaxies

3- the effect of the repulsive force (FR) is to dilute the gravitational attraction effect of the galactic mass and spreads it over a wider area hence , the net effect would be an almost constant rotational speed

the quanton repulsive force (FR) exerts a diluting effect on the

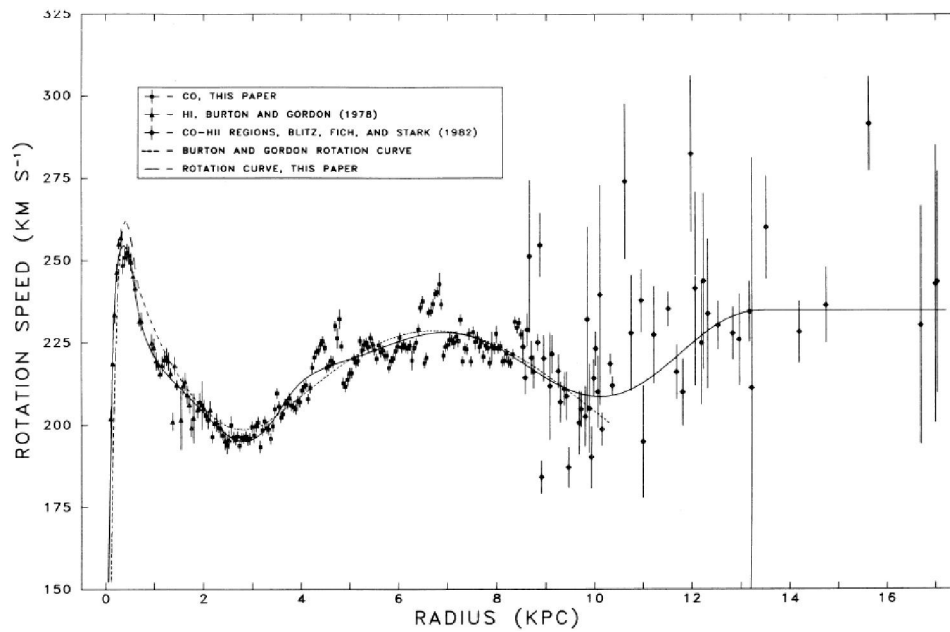
quanton retaining force (FT) This effect becomes most significant as we move to a higher cosmological scale

4- so , we suggest that the flat rotation curve of the galaxies is the result of an addition of stellar hot matter and cold halo (undetected normal matter) then a subtraction due to repulsive force (FR) effect at closer areas to the galactic bulge and then compensatory addition of the subtracted part at areas distant from the galactic bulge not a sole addition process



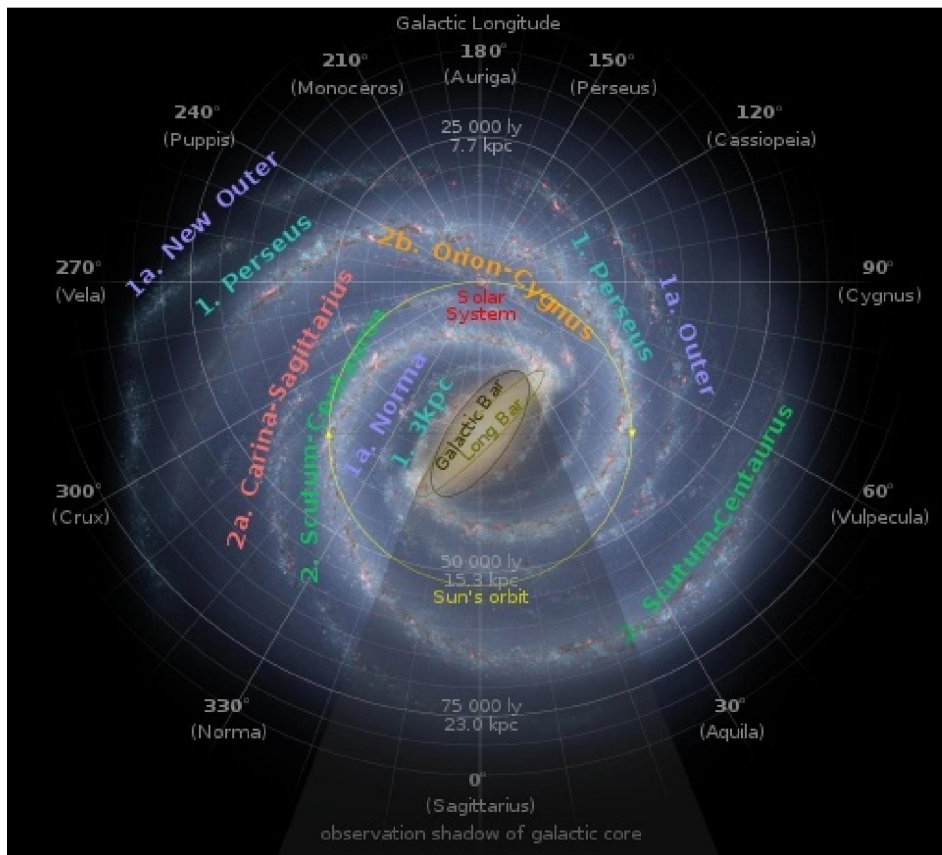
Rotational speed of some spiral galaxies

Source : <https://web.njit.edu/~gary/202/Lecture25.html>



Rotational speed of the milky way away from the bulge

Source <https://web.njit.edu/~gary/202/Lecture25.html>

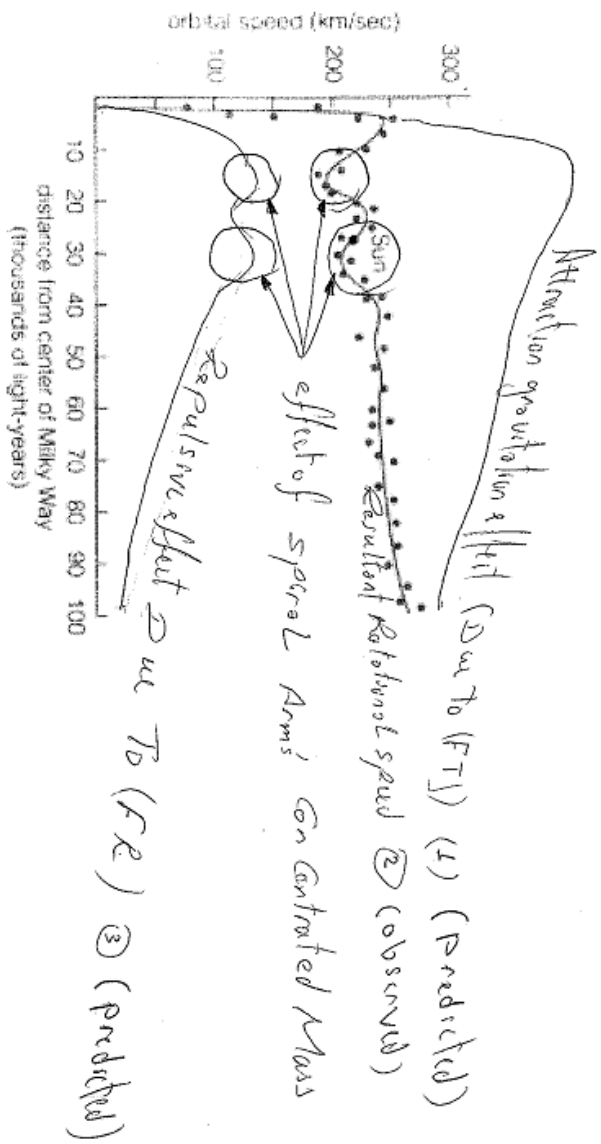


Spiral structure of the milky way Source

https://en.wikipedia.org/wiki/Milky_Way

5-We observed rotational speed of spiral galaxies with localized Curve bottoming which coincides with the spiral arms (concentrated mass) , the localized rotational speed bottoming occurs at 3 and 11 k.parsecs which coincides with perseus and scutum –centaurus arms of the milky way , this localized bottoming of rotational speed very clearly indicates the presence of a repulsive force (FR) that increases in its influence in the locality of high mass objects

dark matter hypothesis cannot provide an answer to this observation (localized rotational speed bottoming)



The observed Rotational speed is the Resultant of Underestimated Baryonic Stellar Mass Effect - Repulsive effect

7.2 EXPLANATION FOR WEAKNESS OF GRAVITY

gravitational action is mediated through quanton retaining force (FT) (planck scale force carrier)

in case if the retaining force (FT) were similar to the order of magnitude to electromagnetic force , or the strong nuclear force this would have led to the contraction of the universe (collapse of quanton lattice)

(i.e force carriers of other fundamental forces are more

massive compared to gravitation force carrier)

2-retaining force (FT) acts to combine quantons ,ie it acts to

against the expansion of space fabric and for this reason we

would expect it to be a smaller force and be resisted by much

stronger force (FR) in this inflationary scenario

7-3 RELATIVISTIC IMPLICATIONS

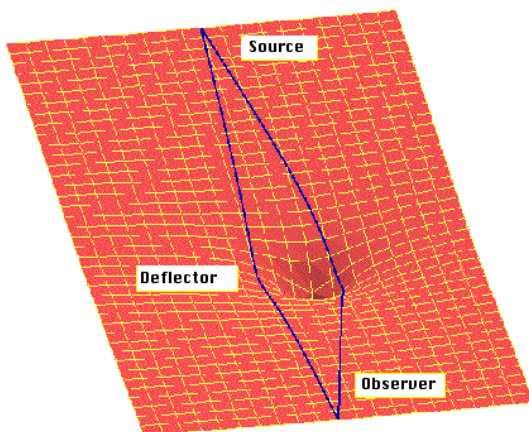
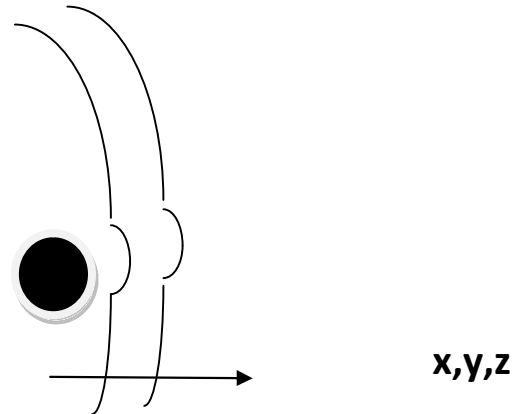
MATTER DISTORSION OF SPACE FABRIC

It can be explained as a result of quanton repulsive force (FR) which

manifests itself more markedly at in case of ultra high mass objects
such as cosmological bodies

This repulsive force causes a extra stretching in the already curved
space fabric (quanton lattice)

Objects of ultra high mass induce a localized
stretching of an already curved
space fabric texture



Gravitational lensing is an example of repulsive force (FR) distortion
of spacetime

source : <http://w.astro.berkeley.edu/~jcohn/lens.html>)

8-TIME CONSTRAINING- ELABORATION ON THE RELATIONSHIP BETWEEN ENERGY AND THE SPEED (C)

Let n be the number of energy quanta (EQ) in a unit volume

And F_c : be the force carrier coefficient which expresses how much energy a single energy quanta contains (energy content per (EQ)

Then (D) is the energy density = $n * F_c$

For a volume = $d * x * y * z * c * t$

For for a unit length (1 meter) $x = y = z = 1$,

And $t = (1/C)$ seconds = 1 meter

So , unit volume = $v = 1$

And total energy in a unit volume = energy density * unit volume
= (D)

Alternatively , For a unit time and based on the homogeneity and uniformity of spacetime this can be expressed as

$$x = y = z = C * t = C$$

So , the total volume for a 4-Dimensional shape in a unit time

(Length of its sides equals to(C) = C^4

And the total energy content inside that volume

$$E = D * C^4$$

This can be put in the form of

$$E = (C^2 * D) * C^2$$

Which reminds us of the mass energy equivalence equation

$$E = M * C^2$$

$$\text{So, } M = D * C^2$$

The term D can be expressed as the following

$$M = C^2 * \sqrt{c_{mx}^2 + c_{my}^2 + c_{mz}^2}$$

and in a realistic world $c_{mt} = \text{zero}$

Where c_{mx} , c_{my} , c_{mz} , c_{mt} are constraining coefficients

Based on the above mentioned results we reach the following conclusions

1- $E = D * C^4$ does not only represent the volumetric density

Equation but it represents the degrees of freedom available

for the energy system

So the power of (4) represents unconstrained energy in all

x, y, z , and t axes

2-The factors c_{mx} , c_{my} , c_{mz} are constraining factors in two

Rotational dimensions (refer to proton structure section)

namely , we have the rotational constraining in (y, z) , (x, z) ,

(x,y) axis corresponding components in (x,y,z) axes so, we

come to the following conclusion

3-Mass is the square root summation of three energy

components which are partially constrained in rotation

dimensions + constraining energy

the term C^2 indicates rotational constraining in two rotational dimensions (x,y) , (y,z), (z,x) as we noted previously

(this assumption of two degree rotation

constraining will be corrected in the proton structure

section , but we keep it for now for the sake of clarity)

HOW JUSTIFIED ARE WE IN THE DEDUCING A RELASHIONSIP

VALID FOR MASS BASED ON ASSUMPTION OF UNIFORM AND

HOMOGENOUS SPACETIME ,

IN FACT THIS RELATIONSHIP $E = D * C^4$ IS A PROPERTY OF
SPACETIME JUST AS THE CONSTANT (C) IS
AND NOT SUBJECT TO PREVAILING CONDITIONS
AND IT EXPRESSES ENERGY DEGREES OF FREEDOM IN SPACETIME
(UNCONSTRAINED ENERGY IN ALL FOUR DIMENSIONS)

8-2 IMPLICATIONS OF THE ENERGY CONSTRAINING EQUATION

1- Partial energy constraining in rotational dimensions in space

Plus free rotational energy gives matter its physical shape

(refer to proton structure section)

2-For spacetime , it is time dimension energy constrained ,

and Space dimensions energy free , so , we are able to go back

and forth in space but not in time

and this explains why time has no physical form

8-3 RELATIVISTIC INTERPRETATIONS OF ENERGY

CONSTRAINT

8-3-1 PHYSICAL MEANING OF MASS ENERGY EQUIVALENCE

$$**E = M * C^2**$$

Expresses the release of the partially constrained and
constraining energy components (in the form of mass) in
rotational dimensions in (x, y, z) dimensions multiplied by
the free energy corresponding to rotation around direction
of (x, y, z) and free time dimension energy to give free

Thermal energy in the form $E = D * C^4$

8.4 TIME DIMENSION ENERGY CONSTRAINING

1-For the case of energy quanta (EQ) which are energy free in
space and time dimension energy constrained , the time
constraining takes the form of Energy quanta spin (-SE)
and this constraint will make the energy time dimension
invariant

**Note that energy quanta (EQ) are able to move between
quantons and quantons move in space as it expands , so
energy quanta are space dimension energy free**

8.5 ORIGIN OF DUAL NATURE OF WAVES

**Any force carrier which is energy constrained in
one direction will suffer the inertial effects of that mass
experiences in the energy constrained direction**

**1- photons experience the inertial effects of mass in the plane
perpendicular to the propagation direction of the
electromagnetic waves**

**2- energy quanta (EQ) experience the centrifugal force as they
spin around a quanton (-SE)**

8.6 RELATIVISTIC TIME- DIMENSION ENEGY CONSTRAINING

**1- constraining energy in space dimensions gives it inertial
properties of mass along constrained dimensions while**

2- constraining energy in time dimension gives it wave like behaviour

3-Wave like behaviour of the particle increases as it reaches relativistic speeds (gradual process)

4-time dimension energy constraining is possible but it is gradual as the particle increases its speed , and it will be fully constrained in energy in time dimension as speed equals (C) (it it has left the time dimension to become time invariant , it does not experience the passage of time)

5- as a particle is at rest , it has a 3- dimensional form , and as it speeds up , it gradually leaves the Time- dimension until speed =(C) (becomes time- dimension energy constrained)

in return , the travelling particle will suffer the relativistic effects along the axis of travel (relativistic length shortening) and this is specifically due to time-dimension energy constraining

6-as expected , massless particles , have no physical shapes

do not feel the effect of time and have the full character of

wave behaviour and time dimension energy constrained

7- We conclude that events in one dimension , influence the

Events of other dimensions , in other words , constraining

of time dimension energy comes on the expense of other

Dimensions' energy and its physical shape

7-We have ordinary matter constrained partially in two

Dimensions (rotation) (out of 3)

for simplicity will be in the reduced constrained energy

form $(2/3,2/3,2/3,0)$, for (x,y,z,t)

where $2/3$ energy dimension constraint means is that

out 3 rotational degrees of freedom , 2 of which are

constrained and remains only one degree of freedom the

point can rotate around it (around reference

axis x,y,z only) (again , this form will be revised ,

refer to proton structure section)

For photons , they are constrained in time and the plane

perpendicular to its axis of travel or (0,1,1,1)

8- For energy quanta (EQ) they are constrained only in the

time dimension ie the constrained energy form is (0,0,0,1)

(energy quanta are time – invariant)(constant with respect

to time while they are free to travel in space as parts of

quanta)

9-as energy quanta (EQ) are constrained only in time , they

do not have a physical shape or inertial properties , but

their presence can be felt due to their wave like behaviour

10-remembering mass – energy equivalence

relationship which is $E=M*C^2$

we come to the conclusion that thermal energy is the only

form of energy which is unconstrained in any dimension

and takes the constraining form of (0,0,0,0)

8.7 IMPLICATIONS OF TIME DIMENSION ENERGY CONSTRAINING

- 1- Thermal energy is the only form of energy which has the

4 degrees of freedom available
- 2- Imposition of a force carrier on the energy comes with

one or more constraints (in space or time)
- 3- The space fabric is indeed 3 dimensional due to time

dimension energy constraining , while ordinary matter is

3 dimensional (partially energy constrained in space

dimension but it has free energy in all four dimensions

so it does experience the passage of time
- 4-The maximum degrees of freedom for any type of

energy is three , except thermal energy , and that is the

reason behind the entropy (unrecoverable energy in the

time dimension)

this is due to the fact that any process that involves conversion of any form of energy into thermal energy will lead to losses due to energy conversion into the time dimension (which is energy constrained – does not exist- in real 3 - dimensional world)

5-The number of energy constrains + number of energy degrees of freedom should always equal four (for x,y,z,t)

6-During energy conversion , as energy is constrained in one dimension , it is released from constrained dimension

7- No energy can take the constrained energy form (1,1,1,1 apart from big bang pseudo singularity event since this would mean that a particle that exists does not have a physical presence in space or in time

8- For ordinary matter no direct time dimension energy

constraining is possible (ordinary matter can exist in 3 dimensional space not 4 dimensional one)

8.8 PHYSICAL MEANING OF THE CONSTANT (C)

The general relation $E= D*C^4$

Does not just Express a relationship between energy and

The constant (C) , but in effect , it is an energy

relationship that links all the different dimensions

Without such a constant relationship , energy would

have behaved differently in each one of the space and

time dimensions , in addition it reflects uniformity and

symmetry of energy with respect to inflationary

scenario

8.9 GENERALIZED ENERGY MATRIX IN SPACETIME

we can write the generalized energy matrix of the space time in the form

$$E = \begin{array}{c|ccc} \text{space} & \text{Ext} & \text{Eyt} & \text{Ezt} \\ \hline \text{Time} & \text{Etx} & \text{Ety} & \text{Etz} \end{array}$$

From the previous relationship the energy in (x,y, z) dimesions do not have mixed components of the form Exy ,Eyz , Ezx

Or even in the form Exx , Eyy , Ezz

The only relationship between energy in different dimensions is time

and even in the time dimension energy , the thee components Etx , Ety , Etz are linked together again by time

So , we can now understand the role time plays in the transmission of energy under inflationary conditions , in ensuring dimensional energy symmetry in all axis

for the case of space fabric the energy matrix is in the form

$$E = \begin{array}{c|ccc} \text{F} & \text{F} & \text{F} \\ \hline \text{C} & \text{C} & \text{C} \end{array}$$

Where f = free energy (in space)

C = constrained energy (in time dimension)

And as percentages it can be expressed as

E = space	25%	25%	25%
Time	8.3 %	8.3 %	8.3%

But why there is no mixed energy components of the form E_{xy} ,
simply in a quantized space fabric , there is no way to link the
different dimensions by mixed energy components , and the only
way is as we said through time

9-1-THERMAL ENERGY IN VIEW OF THE PHYSICAL MODEL

As expected , thermal energy which has the constraining form
(0,0,0,0) (free in all the four dimensions) does not have a force
Carrier , instead it hijacks the force carrier of other forces

So , we do not feel thermal energy , but we feel its effect on other
forces

Thermal energy role varies according to the inflation / retraction
Of the space fabric

During an inflation , the role of the thermal energy is disruptive
, it tries to destroy the energy constraint for any dimension

For space fabric, the effect is to disrupt the links between
quatoms (ie formation of space fabric wrinkles which will be
discussed in the electromagnetic section)

For behaviour during contraction , the thermal energy effect is to
gravitate the energy of other forces towards a singularity , this is
not possible in an inflationary scenario

9.2 -THERMAL ENERGY EFFECT AND THE ROLE OF SPACE FABRIC AND MATTER

**THERMAL ENERGY IS THE SOURCE OF THE BINDING ENERGY AS
WELL AS THE METHOD TO DESTROY THIS BINDING ENERGY**

As temperature increases we observe the following effects

1- Break down of chemical bonds

2- Electron detachment from atoms (plasma formation)

3- Protons detach from neutrons

**4- Break down of protons and neutrons and the formation of
quark gluon plasma**

**this physical model , it predicts that a further temperature rise
would lead to**

5- The disintegration of quanton lattice

**6- Breakdown of quantons into their constituent energy
quanta (EQ)**

**we can go further to say , that the formation quantons , the
expansion of quanton lattice (space fabric) and the formation of
matter played a role in rapid cooling of the universe by absorbing
some the time dimension non constrained thermal energy and**

harnessing it into the formation of quantons (stored in the form of quanton spin(-SQ) and matter (in the form of binding energy and to over come repulsive force (FR))

so, initial energy content became partially constrained in three dimensional components (ordinary matter)

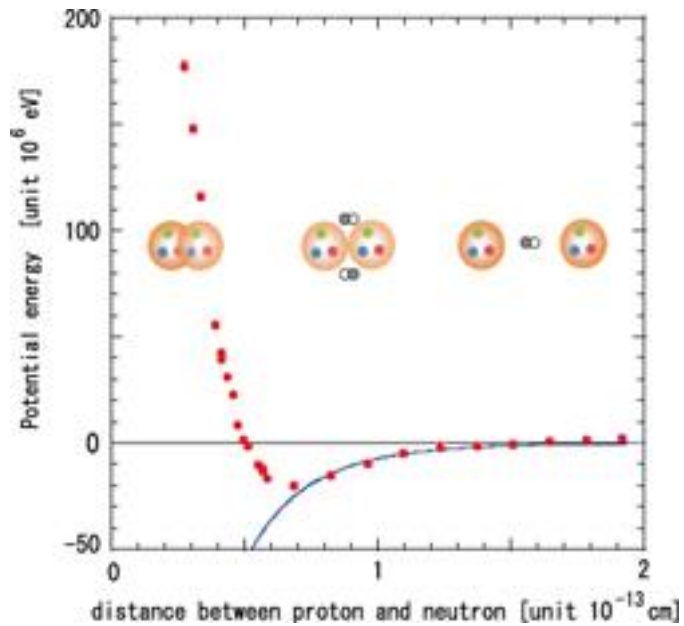
or , constrained in time (quanton lattice or space fabric) and thus ensuring the uniformity and homogeneity of the universe

10-1 PROPOSED ANALOGY BETWEEN THE BEHAVIOUR OF COLOUR CONFINEMENT FORCE AND INTER –QUANTON FORCE

the following _discussion services to draw analogy between the behaviour of the components under this model and that of the nuclear matter

The colour confinement force is the origin of the strong nuclear force

The colour confinement force exhibits similarity to the behaviour of inter quanton force



Source : <https://www.s.u-tokyo.ac.jp/en/press/2007/10.html>

The characteristic curve of the colour confinement force is represented by three segments

1- Strong repulsion force that resists any attempt to merge quarks together

2- Segment of increased attraction as quarks move away from each other

3- Constant attraction force up to critical distance

4- Then breaking of the gluon bond

5- As the gluon string is shortened the old bond is restored in

addition to the formation of a new quark anti quark pair

for the case of inter-quanton forces we have

1- In case quantons move towards each other a very strong

repulsive force (FR) (in case of an inflationary scenario)

that resists any attempt to merge the quanton by the

retaining force (FT) (contracting space fabric) and this

force would increase exponentially as quantons move

towards each other

As quantons move away from each other ,

the retaining force (FT) opposes the separation

initially the retaining force (FT) has two components

a-due to the sharing of energy quanta (EQ) between different

quantons

b-the attraction force between energy quanta (EQ) of neighbouring

quantons and the term (a) gives retaining force initial high value

3-a- as quantons move away from each other the first component

Diminishes and leaves the second component of the retaining force (FT) only , so the attraction force experiences a drop

3.b – as the distance between quantons increases , the size also increases due to the inflationary momentum , until reaching a critical volume then quanton splits , so as maintain the constant distance and the constant attraction force (FT)

but that where the similarities end between the force profile in the quark –gluon case and inter quanton force profile why, then , there is a divergence from , the inter-quanton force behaviour ?

the chain of quantons splitting can be endless so as to maintain a constant distance between quantons (due to inflationary momentum) , and this chain is supported by transverse quanton connections contained in the quanton lattice that can support an almost endless cycles of quanton splitting and extensions of the quanton chain

based on the abovementioned analogy of behaviours and divergence , we can offer the following explanation of the composition of quark gluon bond

1-Quarks are formed of array of quantons

2- gluons are formed from super dense quanton lattice

3- The gluon string is supported by the quanton lattice up to a certain length

4-As the gluon string length increases , the repulsive force(FR)

Exerted by the super dense gluon string distorts the quanton

lattice and weakens the supporting role it plays in the

support of the extended gluon string

5-Finally the gluon string breaks (due to weak retaining force

(FT), under the weight of its energy content and as a result

its length is reduced , and the quanton lattice distorted

connections are restored (due to reduction in the effect of

repulsive force (FR)

a quark/ anti quark pair is generated and a new quark takes

up its position at the break site

10-2 ANALOGIES TO THE PROTON STRUCTURE

of course the composition of baryonic matter is much more difficult to tackle in a conceptual model due to its complexity but at least , We can draw analogies between the physical model with the standard model in nuclear physics

the basis of the analysis is the transformation from space dimension free energy and time dimension energy constrained in the constrained energy form $(0,0,0,1)$ to the form of the ordinary matter , (time dimension energy free and thee partially constrained energy components in two rotational dimensions

each in the equivalent constrained form $(2/3,2/3,2/3,0)$)

Based on this analysis we can propose the following analogy

1- Three quarks representing partially constrained energy

(rotational constraining in two dimensions (y,z) , (x,z) , (x,y))

corresponding to (x,y,z) directions (they serve as anchor points to which the gluon are attached)

2- The three colour states (red , green and blue) are orientations

In space and as we expect from them they would change in colour as they change in orientation

3- gluons represent the constraining (binding) energy

That binds all constrained energies together

They act as spacers , skeletal members of space truss

Connecting the joints or the anchor points (quarks) and in

doing so , they give matter the outlines (skeleton)of its physical

shape (gluons exist on the peripheries of the proton)

4- A transformation mechanism that releases the time

Dimension energy constraint From the basic space fabric

components (we proposed that quark gluon are made of

super dense quanton string formations)

the analogy based evidence indicates that the component of

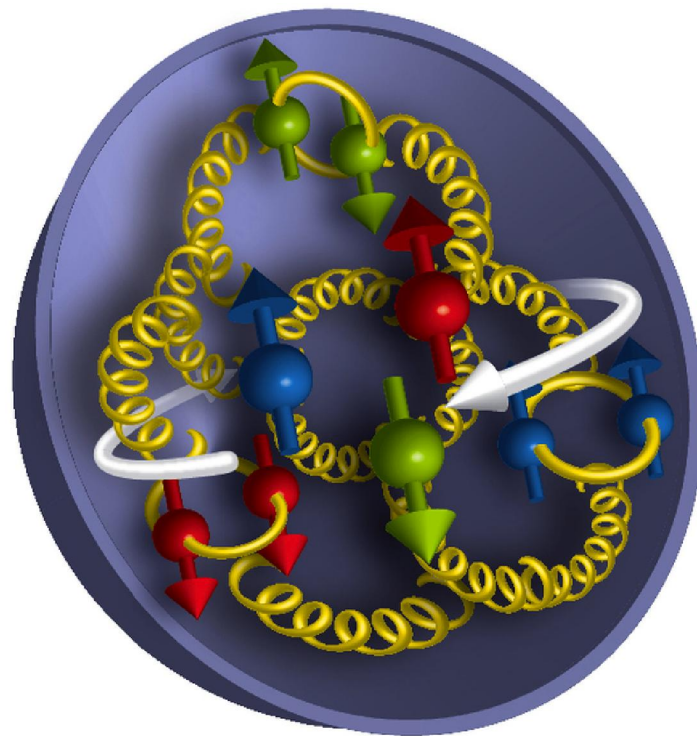
time dimension energy constraining is energy quanta spin (-SE)

(again different from atomic spin) and the orbital rotation of

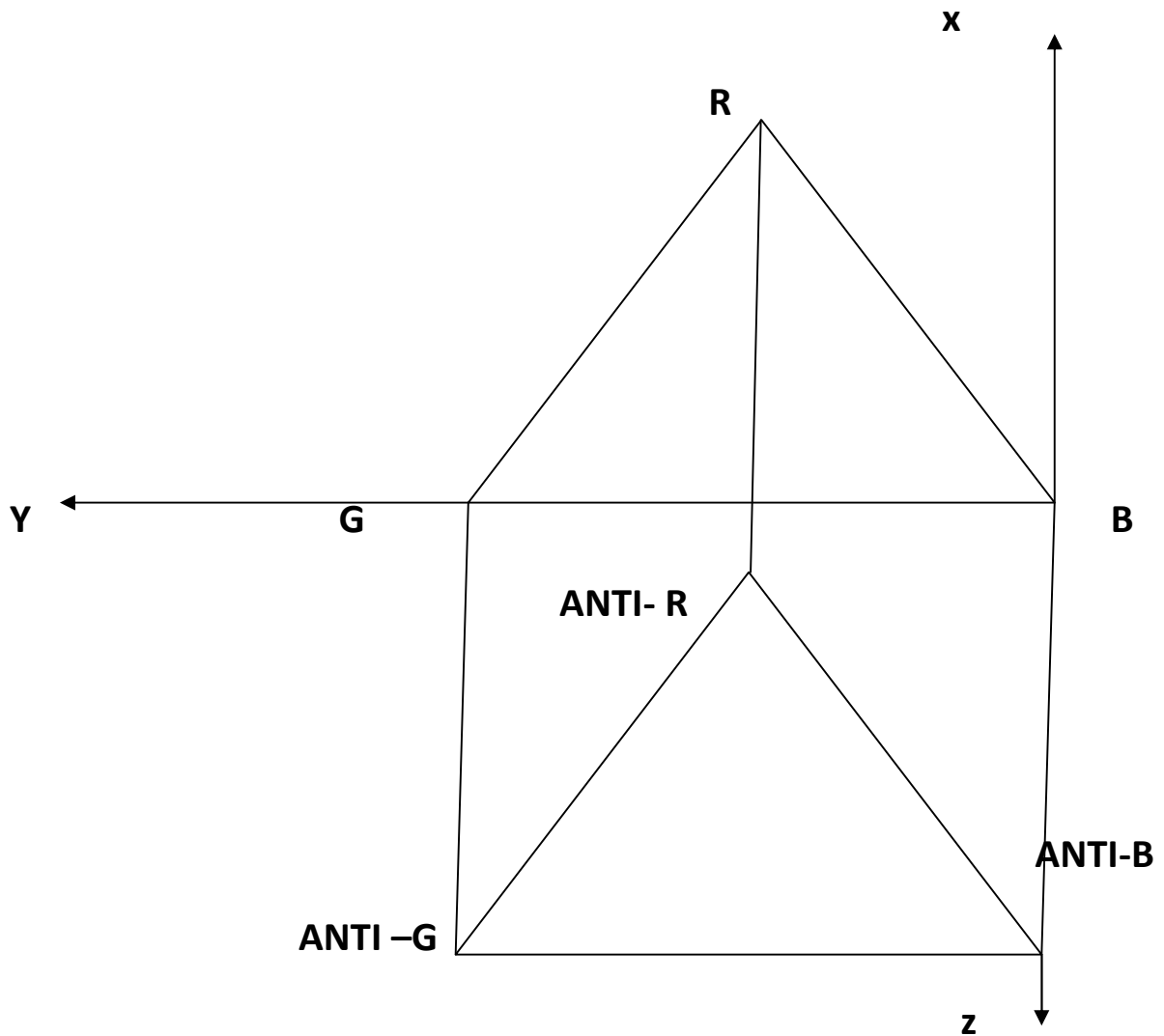
the quark gluon structure represents

1- the time dimension energy release mechanism

2- the method the matter acquires its planar form



The internal structure of a proton, with quarks, gluons, and quark spin shown. Image credit: Brookhaven National Laboratory



In minimum energy terms

1- 3 quark pairs represent the minimum number of points

required for 3- dimensional shape to be formed

2- The 8 gluons represent the skeleton that attach to the anchor points (quarks) and give matter its physical shape in space

, the system follows minimum energy requirements , by

**defining shape with the minimum number of spatial members
(8 members only)**

also to note that

**A-a pyramid could not give a 3 d shape since the rotation of the
pyramid tip will not give a planar shape**

**B-only 8 independent gluons strings are needed to define the
spatial structure (no need for the ninth)**

3-based on the previous results we can understand why

quarks and gluon cannot be isolated from each other and

the reason behind the strength of colour confinement force

which is needed to preserve the matter spatial integrity

10-3 HOW 3 D SHAPE IS ACQUIRED

1- defining anchor points (quarks) that are allowed to

free rotational movement only

2- defining spatial connecting members (gluons)

3- free time dimension rotational energy that is required to

**A-release the time dimension energy constraint (caused
by energy quanta spin (-SE))**

B- give the spatial structure is planar shape

Also to note that

**the gluons are strings and that they could not take a planar form
(by having multiple strings that take a planar form) because this
would be very expensive in energy terms (against minimum
energy principle)**

**4-the orbital rotation supplement the partial degrees of
of freedom ($1/3$ for each axis) so as to give the quark
gluon skeletal structure its 3 Dimensional form**

10-4 HOW ORBITAL ROTATION ROLE IS PERFORMED

There are two possible scenarios

Rotation of 120 degrees around single axis

**and then a change in colour charge , the 120 degree
rotation in the same rotation direction then a second
change in colour charge and final 120 degree rotation in
the same direction and final colour charge change or
Rotation of 240 degrees around each axis (x,y,z)**

(this is due to the fact that 360 degrees are needed to release the time dimension constraint and 360 degrees are needed to give the skeletal quark gluon Their 3 D shape

10-5 EXPLANATION OF THE QUARK GLUON BEHAVIOUR IN VIEW OF ENERGY CONSTAINING

As the quark gluon structure is acted upon by external stressor that tries to elongate the spacing between the quarks , the gluons align and form a string that attaches of them , the structure loses its 3 D shape

this behaviour can be explained as the quarks are pulled apart , the orbital rotation of the quark gluon is disturbed , and hence the spatial integrity of the quark gluon structure is compromised the quark gluon structure is transformed from the constraint form ($2/3, 2/3, 2/3, 0$) to the form ($1,0,0,1$)

This action (disturbing the orbital rotation)

1- causes the structure to go from 3 dimensional to one dimensional form , as gluons are skeletal structure that use

the orbital rotation to give them the 3 dimensional form
 2-reappearance of the time dimension constraint that was
 released by the orbital rotations
 3-also to note that the quark gluon structure cannot go to the
 constrained form (1,1,0,0) due to minimum energy requirements
 as we have discussed before

10-6 ENERGY MATRIX OF THE QUARK GLUON STRUCTURE

The total energy of 3 quark gluon system can be written as

Eq TOTAL = E CONSTRAINED + E FREE (excluding T-dimension)

$$\text{Or } \begin{vmatrix} 0 & C & C \\ C & 0 & C \\ C & C & 0 \end{vmatrix} + \begin{vmatrix} F & 0 & 0 \\ 0 & F & 0 \\ 0 & 0 & F \end{vmatrix} = \begin{vmatrix} F & C & C \\ C & F & C \\ C & C & F \end{vmatrix}$$

Where C represents constrained energy

And F: free energy for (red , green , blue) axis

Horizontal rows represent (Red, Green ,Blue) axis

Vertical columns represent rotation around (R,G,B) axis

And for 3 pair quarks (3 dimensional shape) , the total energy

Equivalence matrix become

$$E_{qT} \text{PAIR} = \begin{array}{c|ccc|ccc|c} & \mathbf{F} & \mathbf{C} & \mathbf{C} & & \mathbf{C} & \mathbf{0} & \mathbf{0} & \mathbf{0} \\ & \mathbf{C} & \mathbf{F} & \mathbf{C} & & \mathbf{0} & \mathbf{C} & \mathbf{0} & \mathbf{0} \\ & \mathbf{C} & \mathbf{C} & \mathbf{C} & & \mathbf{0} & \mathbf{0} & \mathbf{C} & \mathbf{0} \\ \hline & \mathbf{0} & \mathbf{0} & \mathbf{0} & & \mathbf{F} & \mathbf{C} & \mathbf{C} & \mathbf{0} \\ & \mathbf{0} & \mathbf{0} & \mathbf{0} & & \mathbf{C} & \mathbf{F} & \mathbf{C} & \mathbf{0} \\ & \mathbf{0} & \mathbf{0} & \mathbf{0} & & \mathbf{C} & \mathbf{C} & \mathbf{F} & \mathbf{0} \\ \hline \text{Time} & \mathbf{0} & \mathbf{0} & \mathbf{0} & & \mathbf{0} & \mathbf{0} & \mathbf{0} & \mathbf{F} \end{array}$$

Where the matrix

$$\begin{array}{|ccc|} \hline \mathbf{C} & \mathbf{0} & \mathbf{0} \\ \hline \mathbf{0} & \mathbf{C} & \mathbf{0} \\ \hline \mathbf{0} & \mathbf{0} & \mathbf{C} \\ \hline \end{array}$$

represents the constraints between (red/ anti red , green / anti green , blue / anti blue)

also to note

1- this matrix expresses the total energy (free + constrained in

the quark gluon 3 pair system originally written as

$$E = D * C^4$$

2- each element in this matrix represents (1/3) degree of energy

freedom or constraint (except time where it represents full

degree of freedom) (or constraint)

3- first 3 rows represent (R,G,B) system , the rows (4 to 6)

represent rotation around (anti Red, anti Green , anti Blue)

4-the first 3 columns represent rotation around (R,G,B)

and columns (4 , to 6) represent axis (anti R , anti Green ,

anti Blue)

4- each gluon can constrain two degrees of freedom (

excluding the rotation around gluon own axial direction)

5- for 3 pair quark gluon system we have (3 *2 pairs) =

6 anchor points

total rotational degrees of freedom = $6 * 3$ degrees per point

= 18 degree of freedom

number of gluon constrained degrees of freedom = $8 * 2 = 16$

constrained degrees of freedom

number of rotationally free degrees of freedom = $18-16 = 2$

free rotational degrees of freedom

from the previous finding we arrive at the following

conclusion

there are two simultaneous orbital rotations of the quark gluon pair

also to note that only two dimensional rotations can achieve energy dimensional symmetry needed for the stability of the quark gluon pair

so , as the time dimension energy constrains are freed , then ,

the free time dimension energy is channelled into orbital

rotations around two axes simultaneously, and consecutively

ie we have

1- free rotation around (x,y) for x and y while z is fully

constrained

2- free rotation around (y ,z) for y ,z while x is fully

constrained

3- free rotation around (z,x) for z,x while y is fully

constrained

And this free time dimension energy is allowed to supplement the partially free rotational degree of energy freedom (2/3) around each axis of rotation hence , the equivalent constrained energy form (2/3 , 2/3 , 2/3, 0) becomes the form (1/3 , 1/3 , 1 ,1/3)

But this constrained energy form has two problems

1- there are 4 degrees of rotational freedom for spatial dimensions (2 degrees of rotation for two axes)

while the available rotational degrees of freedom are two (18-16)

2- the time dimension energy is (1/3) constrained while ordinary matter is time dimension energy free and should be constrained only in spatial dimensions

those two problems had been solved by the quark gluon

structure by introducing the concept of energy over
constraining,

ie while the two axes perform their orbital rotation ,

the third axis performs also orbital rotation but this time

in multiples of rotation in the same direction as quanta

spin and energy quanta spin (opposite to the direction of

orbital rotation of the other two axes

so , the quark gluon system uses the available time

dimension constrained energy ($1/3$) to over constrain the

third dimension by forcing it to rotate in opposite direction

to orbital spin , this over constraining allows the system to

in effect to borrow energy from the future

and as the third axis is over constrained extra two degrees

of freedom are introduced (since the rotation around the

third axis releases additional two degrees of freedom

and the constrained energy form becomes

($1/3$, $1/3$, $4/3$, 0) or ($1/3$, $4/3$, $1/3$, 0) or

($4/3$, $1/3$, $1/3$, 0) and the

corresponding energy degrees of freedom becomes

($2/3$, $2/3$, $-1/3$, 1) , while the three states of rotation will

take the form

1- @ (x, y) for x and y axes and @ (-z) for (z axis)

then

2-@ (y ,z) for y and z axes and @ (-x) for x axis

then

3-@ (z, x) for x , z axes and @ (-y) for y axis

And a full cycle (360 deg)will require 3 full rotations

Which is equivalent to 1080 deg as

(a full rotation will give only 120 degree around each axis)

	X	Y	Z
	@x @y @ z	@x @y @ z	@x @y @z
First state	120 120 0	120 120 0	0 0 -120
Second state	-120 0 0	0 120 120	0 120 120
Third state	120 0 120	0 -120 0	120 0 120
One rev total	120 120 120	120 120 120	120 120 120

table representing the three states of quark gluon rotation

From the above we can reach the following conclusions

1- the quark gluon structure three dimensional orbital

rotation releases time dimension energy constraints in two

spatial dimensions and over constraining the third to

supplement their degrees of freedom by additional two

degrees of freedom due to overconstraining

2- two dimensional simultaneous orbital rotation serves to

transit from one dimension to the other which ensures the dimensional energy symmetry as we have mentioned previously

3- the 8 gluons satisfy the minimum energy principle but most importantly allow two rotational degrees of freedom which the energy constrained form $(2/3, 2/3, 2/3, 0)$ could not have provided

4- the three states of the energy constrained form listed previously achieve a complete cycle in 1080 degrees of rotation (one for time dimension energy release and the second for performing the three dimensional shape and the third is due to over constraining to provide the additional degrees of freedom needed for energy symmetry

5- the quark gluon structure change colour charge as it rotates

this serves , most probably , to release , or constrain the quarks so as to facilitate the orbital rotation as specified previously

6- we have mentioned the stable energy constrained

form $(\frac{1}{3}, \frac{1}{3}, \frac{4}{3}, 0)$ which has tree states , but did

this energy constrained form evolve from $(0,0,0,1)$

through the equivalent energy constrained form

$(\frac{2}{3}, \frac{2}{3}, \frac{2}{3}, 0)$, most probably no

the evidence suggests that the quark gluon string energy

constrained form $(1,0,0,1)$ was the intermediary between

the space fabric energy constrained form $(0,0,0,1)$ (quark

gluon string formations) and the final stable form

$(\frac{1}{3}, \frac{1}{3}, \frac{4}{3}, 0)$

we can see that this stable energy constrained form can

evolve more easily from the quark string formation

1-by releasing the time dimension constrained energy in two dimensions and over constraining the third and adding the released and over constrained time dimension energy in the form of orbital rotations to two dimensions at a time

2-successively and adding a colour charge mechanism that ensures the release / over constraining of quarks according to the direction of rotation

10-7 EXPLANATION OF GRAVITATIONAL TIME DILATION

_As the gravitational attraction increases , the 3- dimensional body suffers a diminution in size

The gravitation tries to pack molecules more tightly together

The shape of the 3 dimensional body is affected , and so is orbital rotation of protons and neutrons which is responsible for

1- giving the quark gluon structure its 3 dimensional shape

2- releasing the time dimension energy constraint

so , as the shape is affected (diminution) , and the time

dimension energy release mechanism is also affected

this means that the 3 dimensional body becomes more and

more time dimension energy constrained (i. e it feels less and

less the passage of time)

in extreme case as gravitation = infinity

the 3 dimensional body becomes a singularity

density = infinity and it becomes fully time dimension energy

constrained (it not affected by time)

10-8 EXPLANATION OF RELATIVISTIC LENGTH CONTRACTION AND TIM DILATION IN TERMS OF CONSTRAINED ENERGY

**_As a 3 dimensional body travels along the x- axis for example , it
becomes gradually time dimension energy constrained along this
direction**

This means that the orbital rotation of protons and neutrons' quark

gluon structure gradually diminishes

And as a result , the body suffers a gradual length shortening along the axis of travel as well as time dilation

10-9 EXPLANATION OF RELATIVISTIC MASS IN TERMS OF CONSTRAINING ENERGY

We have defined mass as

**Mass = rotation constrained energy around one rotational axis in two spatial dimensions and over constrained in the third axis +
constraining energy**

**As the a 3 dimensional body reaches relativistic speeds we can observe the following change : a substantial increase in
constraining energy (gluon binding energy)**

**this increase corresponds to the repulsive part of the strong
nuclear interaction curve , and this increase is exponential
and indicates that gluons try to oppose the attempt to
contract its length as it travels with increasing relativistic
speeds**

ultimately as speed = C the binding (constraining) energy

approaches infinity (and relativistic mass as well approaches

infinity)

11-IMPLICATIONS OF TIME DIMENSION CONSTRAINING ON THE

BIG BANG MODEL

PHASE ONE

1-the big bang was a necessity as the universe has no

feedback system to maintain a steady state

(initial singularity)

2-Just before the big bang (pseudo-singularity event) energy

constraining form was (1,1,1,1) (fully constrained energy)

3-inflationary momentum imposed a constraint on both space

and time , so energy could not expand in space without being

constrained in time , and could not expand in time without being constrained in space

4-The energy of the universe was divided equally between the four dimensions (this does not of course mean that every dimension had his own separate 25 % share of energy)

5- energy in space(x,y,z) was constrained in time and became Quanton lattice (space fabric) (75 % of the total energy of the universe) and took the constrained form (0,0,0,1) (keeping in mind that there cannot be 100% transfer of energy to space fabric form due to the fact that energy cannot expand in space without expanding in time at the same time

PHASE TWO

6- energy in time dimension was constrained in space and took the constrained form (1,1,1,0) (25% of total energy

7-This energy interacted with space fabric in the following manner

75 % of the energy free in the time and constrained in space interacted with 25 % of the time constrained energy and free space as we noted previously

But why 75% of 25 % : it is basically a thermal release

process , and due to the fact the space fabric is time

dimension energy constrained , so there must be a loss of at

least 25% of free energy in the time dimension which cannot

interact with it (entropy principle)

why 25 % of the 75 % :

basically it is a balance , the energy free in time dimension

had to interact with an equal amount of energy constrained energy in time dimension

8-The 25% of space fabric (75%) was transformed from the constrained form (0,0,0,1) energy constrained only in time dimension to the form (1,0,0,1) this is a quark gluon sting structures (refer to proton structure section)

while the 75 % of the time dimension free energy part (25%) was transformed from the constrained form (1,1,1,0) to the form (1,1,0,0) or (1,0,1,0) etc under the effect of inflationary momentum

9-The form (1,0,0,1) indicates quark gluon strings that were Formed due to the effect of thermal energy that helped to overcome the repulsive force (FR) and coalesced quanton lattice strings (space fabric) into forming super structure of quark gluon strings

9- after this phase the balance of energies was 56% space

fabric , 6.25 % thermal energy , and 18 % quark gluon string structures of the form (1,0,0,1) ,and 18 % in the energy unstable form (1,1,0,0)

PHASE THREE

11-The form (1,1,0,0) is highly unstable and it was further reduced to the form (1,0,0,0) by inflationary momentum this interaction took the form of 50 %(two dimensions only) of the energy in the constrained energy form (1,1,0,0) (9%) interacted with an equal amount of space fabric of the constrained energy form (0,0,0,1) to become of the constrained energy form (1,0,0,0) while the equal amount of space fabric (9%) was transformed into quark gluon strings of the constrained energy form (1,0,0,1)

12- also 25 % of the initial 18.75 % (4.68%) was transformed

Into thermal energy , ie free energy in space and in time of the constrained energy form (0,0,0,0)

14- the remaining 25% of the original (18%) energy in the energy constrained form (1,1,0,0) became quark gluon strings of the constrained energy form (1,0,0,1)

13- the energy balance at the end of phase three became space fabric (47 %) , quark gluon strings (32 %) , thermal energy (11%) , and the energy of the form (1,0,0,0) represented 9 %

PHASE FOUR

14- the constrained energy form (1,0,0,0) is also unstable but it could not be constrained to the form (0,0,0,0) fully and could not interact with space fabric to form quark gluon strings of the constrained energy form (1,0,0,1) since

temperatures would have cooled substantially by then for space fabric to be transformed into quark gluon strings

15-Instead 75 % of energy in the constrained form (1,0,0,0)

(about 7.75%) was transformed into the constrained form

(0,0,0,1) ie it became time dimension energy constrained

(space fabric) and in return 25% of those 9 % (2.25%)

became free thermal energy of the constrained form (0,0,0,0)

16- after the end of phase four the balance of energies

became as follows Space fabric (54.75 %) , quark gluon

strings (32%) , thermal energy (13.25%)

PHASE FIVE

17 –as the temperature by then would have cooled further to

allow quark gluon strings to form hyper structures (baryonic

matter) and this became on the expense of thermal energy

18- this model did not take into account the binding energy

required for the formation of quanton lattice (ie quanton spin (-SQ)) as well as the formation of quark gluon hyper structures ,So we expect the space fabric share and baryonic matter share to be a little bit higher and the thermal energy in return some percentages lower

19- strings changed from the constrained

energy form (1,0,0,1) to the form (1/3, 1/3,4/3,0)

(i.e the proton 's quark gluon structure)

matter) as we have shown previously

of course those are approximate values and express an ideal

process and a complete thermal conversion operation which would never be true in actual life , but evidence is that it was a very highly efficient conversion process but not ideal

in addition some of the thermal energy was diverted as a binding energy to contain the energy quanta (EQ) into more complex structures (quantons)

20- Total energy in the universe became = energy free in space

constrained in time (space fabric) + energy free in time

constrained in space (ordinary matter) + (thermal energy)

11-2 INSIGHTES INTO THE FORMATION OF ORDINARY MATTER

The quark gluon strings of energy constrained form (1,0,0,1)

Is not directionally stable , energy wise

To achieve this energy stability , it must satisfy the minimum

energy principle in all space dimensions , and this directional

preferentiality of energy in one direction makes this quark

gluon string unstable , energy wise

To achieve energy stability it must achieve energy symmetry

around all space dimensions , which imply the formation of

higher structures to achieve energy constraint / freedom

symmetry

The formation of such higher structures require high thermal energy , as a binding energy which was available during the primordial universe The process of ordinary matter formation entailed a trading of constrains i.e

1-the time dimension free energy partially constrained space dimension free energy (space fabric) in the constraint form (1,0,0,1)

2-with the aid of thermal energy , the time dimension constrained energy was released and the space dimensions were constrained partially

step one : implies the formation of complex structures (quark gluon strings) from quanton lattice (space fabric) with the aid of free energy in time dimension

Step two :

The quark gluon strings of a constrained form (1,0,0,1)

Transformed into 3 dimensional structure and released the

time dimension constrains which allowed them to acquire

3-dimensional shape (refer to proton structure section)

And became in the energy constrained form (1/3,1/3,4/3,0)

from the previous analysis we can reach the following

conclusions

1- Thermal energy played the instrumental role into the

formation of ordinary matter during the early universe

just as it can have a role in the disintegration of complex

structures and compounds as illustrated before , the thermal

energy can have a role into the formation of more complex

structures with processes as nuclear fusion

2- The scenario of ordinary matter formation and its ratio (32%)

during the early universe is suggestive that there had been
NO role for matter / anti matter annihilation and matter /
anti matter asymmetry as the pathways towards the
formation of ordinary matter

instead , the proposed scenario for the formation of ordinary
matter is a two step process

1- The formation of more complex structures from quanton

lattice with the aid of thermal energy (quark gluon strings)

2- the binding of those structures together so as to give

matter its physical shape and simultaneously releasing the
time dimension constrains

11-3 ELECTRON STRUCTURE AND EVOLUTION

The electron constrained energy form (2,0,0,0)

Suggests that the electron evolved from the energy form (1,0,0,0)

that harnessed thermal energy to overcome the repulsive force

(FR) and transformed into the over constrained form (2,0,0,0)

And this happened specifically during phase four according to the big bang serario , and this in comparison with the formation of the quark – gluon string which the same model suggests to have taken place at phases two and three

electron energy degree of freedom form will be (-1 , 1,1,1)

11-4 NEUTRON ENERGY CONSTRAINED FORM

The energy constrained form of the neutron will be

(1/3 , 4 /3 , 4/3 , 0) while the energy degree of freedom

Will be (2/3 , -1/3 , -1/3 , 1)

, the neutron can be viewed as a complex particle resulting

from a combination of proton and electron

	X	Y	Z
	@x @y @ z	@x @y @ z	@x @y @z
First state	0 120 120	0 -120 0	0 0 -120
Second state	-120 0 0	120 0 120	0 0 -120
Third state	-120 0 0	0 -120 0	120 120 0
One rev total	-240 120 120	120 -240 120	120 120 -240

table representing the three states of quark gluon rotation for

neutron case

for a complete revolution there must be three rotations

one to release time dimension energy constraint

the second for over constraint

the third for the 3 D shape which is performed during over

constraining

11-5 NEUTRON UNSTABILITY- POSSIBLE CAUSE

For the proton the constrained energy form is

($1/3$, $1/3$, $4/3,0$) and the energy degrees of freedom form is
($2/3$, $2/3$, $-1/3$, 1)

So, for the available energy resources we have ($3/3$) degrees of freedom from free time dimension , and ($1/3$) degree of freedom from over constraining , total = $4/3$ energy resources for degrees of freedom

while there are ($2/3$) + ($2/3$) possible rotational degrees of freedom

so the balance of degrees of freedom = $3/3 + 1/3 - (2/3) - 2/3$
= zero (ie no energy redundancy)

If we look at the neutron constrained energy form which is
($1/3$, $4/3$, $4/3$, 0) and the energy degrees of freedom form
($2/3$, $-1/3$, $-1/3$, 1)

we can see that the available rotational energy resources are : Time ($3/3$) , over constraining ($1/3$) + ($1/3$)

total = $5/3$ available energy resources

total rotational energy resources Possible degree of freedom
= 2/3

Balance of energy degrees of freedom $3/3 + 1/3 + 1/3 - (2/3)$
= + 3/3

So for the neutron case there is redundancy of the energy
degrees of energy resources and this redundancy is at the
origin of neutron instability and eventual decay

for the electron case the constrained energy form (2,0,0,0) and the
energy degree of freedom form (-1, 1,1,1) we have (+2) rotational
dimensions energy resources and also two possible degrees of
freedom so , no redundancy for the case of electron and hence , it is
a stable particle

12- QUANTUM ELECTROMAGNETISM

QUANTON / ANTI QUANTON ANNIHILATION

1- As we have discussed previously that a force of attraction
develops between quanton and anti quanton due to
difference in their spin (+/-SQ) and as a result the two can

annihilate , and this is the attraction part of the
electromagnetic force

The result of this annihilation will not only be free energy quanta (EQ) absorbed by neighbouring quantons but a radiation energy (electromagnetic) as well ,

This is since it takes energy to force those energy quanta (EQ) into some sort of orderly structure (quanton or anti quanton)

And once this structure is being destroyed this energy is released in the form of radiation (electromagnetic energy)

we also note that quanton spin (-SQ) is in the same rotation direction as that of energy quanta (-SE)

12.1 ELECTROMAGNETIC WAVE PROPAGATION

As photons pass through quanton lattice , they are bound to interact with it

furthermore , this model suggests that any propagation of the electromagnetic waves must be through the interaction with quanton lattice (space fabric)

the mechanism of this transmission is through

particle / anti particle annihilation

we can offer here a highly simplified conceptual model of this

interaction , the interface between this model and

electron / positron pair remains vacant for future research

1- The nature of electromagnetic energy is a perturbation the

fabric of space

This perturbation takes the form of expansion / contraction pair

(a wrinkle)

2- This leads to the creation of quanton with higher negative

spin (-SQ) in the position of the expansion void and

anti quanton in the position of contraction side

(due to spin (SQ) reversal)

3- The spin of the anti quanton is (+SQ) while that on the

expansion side will be (-3SQ) (due to the preservation of

spin energy the quanton which the spin suffered a reversal

the spin energy was equivalent to $+SQ - (-SQ) = +2SQ$

so the new spin of the quantons on the expansion side will be

$$(-SQ) - (+2SQ) = (-3 SQ)$$

4- Attraction force (FAQ) develops between the quanton /

Anti quanton on the contraction side

And a repulsive force FRQ between quantons with negative

spins (-3SQ) and(-SQ) on the expansion side

5- Anti quantons are attracted to quantons on the contraction

side then , as the wrinkle moves forward as it is propelled by

the repulsive force (FRQ) on the expansion side as well

6- Quanton / antiquanton annihilation and generation of

electromagnetic wave due to the elimination of opposing

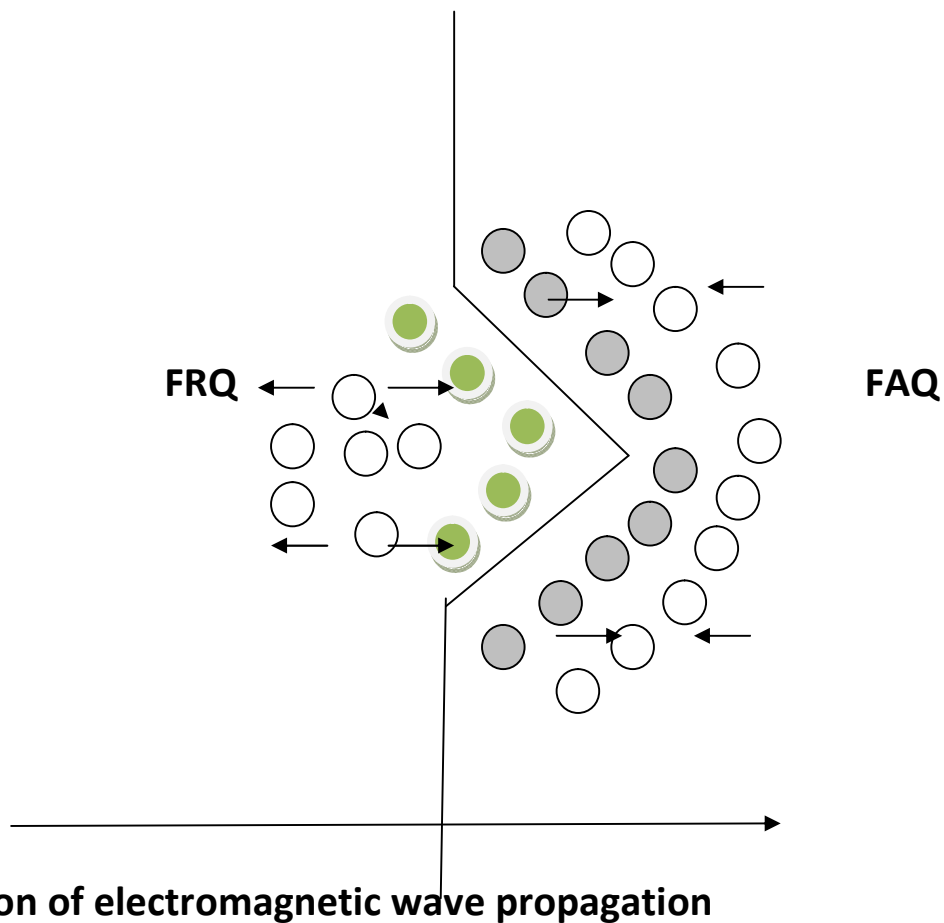
quanton and anti quanton spins (2 SQ)

7- The generated electromagnetic wave affects the

neighbouring dispersed energy quanta (EQ) in the direction of

propagation creating new quanta on the contraction

side and progression of the electromagnetic wave



The creation of a space fabric wrinkle by electromagnetic wave would lead to appearance of anti-quantons with spin (+SQ) (shaded spheres) on the contraction side of the wrinkle and quantons with (- 3 SQ) spin on the expansion side (green)

Anti-quantons would be attracted to quantons (white spheres) on the contraction side and be annihilated which would create a new cycle of the electromagnetic waves which propagate along the axis of the cone like wrinkle

1- The nature of the electromagnetic force repulsion and attraction curves which are almost identical (in opposition to the strong nuclear force curve and the complex attraction repulsion action of the gravitation force which lack this symmetry) suggests that the mechanism of transmission of electromagnetic force is fundamentally different from the other forces

2- based on the quanton / anti quanton annihilation mechanism , we suggest that the attraction part of the electromagnetic force curve is due to attraction force (FAQ) between quantons and anti quantons on the contraction side of the wrinkle

While the repulsion part of the curve is due to the force of

90
repulsion (FRQ) between quantons of varying spin values on

the expansion side of the wrinkle

3- Based on the results of the attraction force (FAQ) and the repulsive force (FRQ) we arrive at the conclusion that the ground potential of quanton lattice (space fabric) is equal to (-SQ) and this result is logical as there is actually no zero ground potential as there is no energy or matter in the universe that does not spin

And of course we measure the difference in potential not the absolute potential so , we are not aware of this negative potential

12-3 SIGNIFICANCE OF PLANCK CONSTANT (h)

Electromagnetic energy is defined as

$$E = f \cdot h \quad (f = \text{FREQUENCY})$$

91

This can be seen as a train of (f) wrinkles that travel through

space fabric in a length = (C)

so , we can define planck constant as the resultant energy

released from quanton / anti- quanton annihilation

due to opposite spins (SQ)

so, this fixed energy content per wrinkle related quanton

anti quanton annihilation process , indicates that the

transmission of electromagnetic waves is

1- quantized and

2- time dimension energy invariant (constrained)

as we would expect from any force carrier that is travelling

at the speed (C)

and the process to transmit higher levels of energy through

space fabric entails increasing the frequency of transmission

ie increasing the number of electromagnetic pulses or space

92

fabric wrinkles that are travelling in a unit time (increased

frequency) or increasing the field intensity but no possible means of increasing the wrinkle size (and hence its capacity to transmit electromagnetic energy as it 's fixed)

a physical explanation of this limitation may be ascribed to the fact that the anti quantons are attracted to the neighbouring quantons on the contraction side as soon as they are formed and to notice also there is the repulsive part between the quantons of similar spin direction (-SQ) and different magnitudes on the expansion side , which propels the wrinkle still further to the contraction side so , soon after being attracted , quantons – and antiquantons annihilate , and the electromagnetic wave is generated energy which creates new anti quantons and the wrinkle

progresses the direction of electromagnetic wave

propagation , to note that

1- if electromagnetic waves could be transmitted in

true vacuum there would have not been any reason for such

a limitation (ie the existence of the constant (h)) , which in

effect indicate the opposition by space fabric to transmit

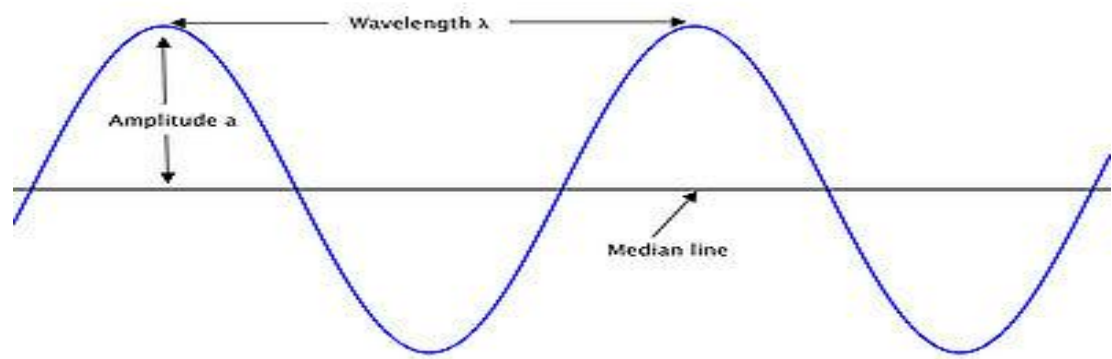
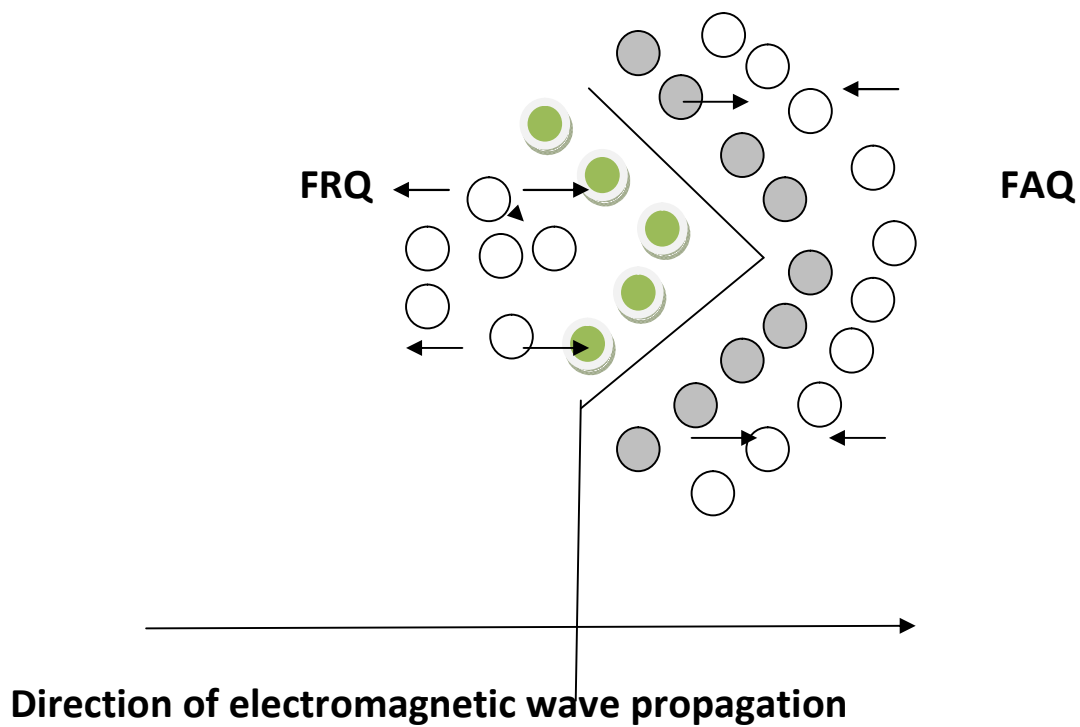
continuous flow of energy while space fabric itself is time

dimension energy constrained (ie quantized)

2- energy transmission through electromagnetic waves is

quantized while the electromagnetic field is continuous





Electromagnetic wave across the space fabric wrinkle

White circles : quantons , shaded circles : anti quantons

Green circles quantons with spin (-3SQ)

12-4 EXPLANATION OF CIRCULAR POLARIZATION

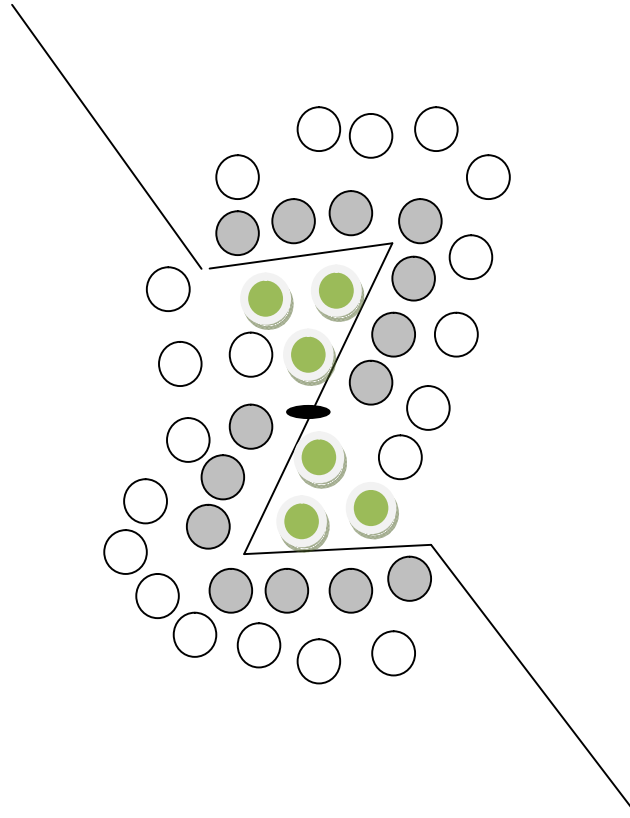
The circular polarization is a type of polarized light that can be generated by the same phenomena (space fabric wrinkle) but this time there will be double wrinkles

1- A circular polarized electromagnetic wave would generate a double wrinkle in space fabric , and as a result , a double pairs of quanton / anti quantons are generated (quantons on the expansion side of the wrinkle and anti quantons on the contraction side)

2- An attraction force (FAQ) will be generated between anti quanton and the quantons ahead of the wrinkle (contraction side) on each side while a repulsive force will be generated between the newly appeared quanton with higher negative spin (-SQ) and the neighbouring quanton on the expansion side of the wrinkle

3- The both anti quantons and quantons will annihilate as they are attracted to each other thus allowing for generation of a new electromagnetic wave and a new

wrinkle appears and the wave progresses in a screw like fashion



a double wrinkle would create two sets of quantons / anti quantons , anti quantons annihilate with neighbouring qauntons and new double wrinkle is formed this time , wrinkles progress in a screw like fashion ,note that the wave propagation direction would be normal to the plane of the wrinkle

12.5 MECHANISM OF ENERGY TRANSMISSION THROUGH ELECTROMAGNETIC WAVES

The transmission of energy via electromagnetic waves

involves two successive mechanisms

1- The annihilation of the quanton / anti quantons and the formation of a wrinkle

For this phase the energy transmission takes the form

$$E=h*f$$

2- The electromagnetic energy is diverted to change the spin of the quantons on the contraction side to be anti quantons and to increase the negative spin of quantons on the expansion side , thus a new electromagnetic field is formed due to the difference in spin between (quantons and anti quantons (attraction field) and between quantons of different spin magnitudes on the

expansion side (repulsive field)

3- As the electromagnetic wave travels between two successive wrinkles the transmission of the energy in the form of $U = \epsilon \cdot (E^2/2)$

E: field strength ϵ : permittivity of space

12.6 RELATIONSHIP BETWEEN ELECTRIC AND MAGNETIC FIELDS

During the propagation of electromagnetic fields we

Have the relationship $E = c \cdot B$

Given the electromagnetic wave ,this relationship suggests that

1- Electric field is the independent variable (it

Can propagate any plain of in 3 dimensional space)

2- Magnetic field is dependant field , so it

propagates perpendicular to the electric field and in

doing so its propagation is restricted to only one possible plain

3- Based on the results above we can consider that the magnetic field of electromagnetic wave to be constrained in one dimension and allowed to propagate in one possible plain (due to their dependence on the electric field)

4- And this is why the ratio between them is always equivalent to (C) which is one dimension degree of energy freedom less

12-7 RELATIONSHIP BETWEEN QUANTON SPIN AND ELECTROMAGNETIC FIELD

The electromagnetic field energy can be expressed in terms of quanton spin (SQ) assuming uniform electromagnetic field in space and time as

$$U = (S \cdot C)^4$$

Where S is the quanton spin factor which determines the energy stored in the form of spin due to wrinkle formation which is dependent on the number of quantons in a wrinkle and energy quanta per quanton and the specific energy required for energy quanta to enter into a spin formation

also energy can be expressed as

$$U = \epsilon \cdot (E^2/2)$$

We arrive at the result

$$E = C^2 \cdot (S^2 \cdot \sqrt{2/\epsilon})$$

12-8 ELECTROMAGNETIC ENERGY ACROSS THE WAVE

Electromagnetic Energy in the form $E = S^4 * C^4$

represents the radiation energy and agrees with our assertion that thermal (radiation) energy is the only type of energy without force carrier and it is free in time and free in space , to note that

1- The above mentioned equation is a field energy content

Equation for the transportation of the electromagnetic wave energy , while the delivery of the electromagnetic energy is in the form $E = h * f$

2- The four dimensional energy is in the form of

quanton spin inversion (from (-SQ) to (+SQ)) / increased quaton spin (from (-SQ) to (-3SQ))

3- The time dimension energy goes into the inversion of

the quanton spin from (-SQ) to (+SQ) (reversing the

quanton spin that is in the same rotation direction as that of the energy quanta (EQ))

4- Thermal energy is said to be free energy in space and free in time and not free in space and time

5- the general energy matrix of the thermal (radiation energy) take the form (as a percentage)

$$E_{total} = \begin{array}{c|ccc} \text{space} & F & F & F \\ \text{Time} & F & F & F \end{array} = \begin{array}{c|ccc} 25\% & 25\% & 25\% \\ 8.3\% & 8.3\% & 8.3\% \end{array}$$

And when energy is split across the electromagnetic wave induced wrinkle the energy is divided as follows

$$E_{total} = E_{contraction} + E_{expansion} + E_{expansion} +$$

E_{total}

and this equation has a unique solution

$$\text{if } E_{contraction} = -E_{expansion}$$

**this reminds us of the virtual particle creation /
annihilation mechanism , which is at the origin of
electromagnetic wave propagation**

we can express E contraction= space

-25%	-25%	-25%
time	-8.3%	-8.3% - 8.3%

E expansion = space

25%	25%	25%
Time	8.3%	8.3% 8.3%

of course E(expansion side) + E(contraction side) = zero

and the negative sign of the Energy matrix on the

contraction side indicates that energy needed to

reverse the qunaton spin direction (-SQ) (which is same

direction as energy quanta (EQ)) to a reverse direction

so , energy has three terms , one for field on expansion

side , one for the contraction side and the third for

maintaining the wrinkle between quantons / anti

qantons

12-9 QUANTUM FLUCTUATIONS – A POSSIBLE EXPLANATION

This model showed that the quanton / anti quanton annihilation can result in electromagnetic waves , and That the reverse is also possible , ie electromagnetic waves can result in the formation of a space fabric wrinkle and the subsequent virtual particle creation / annihilation we can go still further to propose that complex electromagnetic fields that are caused by orbital rotation of quark gluon structure may be at the origin of the virtual quarks (quark sea) that exists inside the proton or neutron

12-9 PREVALENCE OF ORDINARY MATTER AND SOURCE OF MATTER / ANTI MATTER ASYMMETRY

Evidence on the origin of the simple anti matter structure

(positron) Suggests its creation is linked to a contraction

Of space fabric (as we discussed in electromagnetism) , an

electromagnetic wave can lead to the creation of multiple

Quanton / anti quanton pairs which give rise to electron

positron pair)

so , the dominance of ordinary matter can be explained

that ordinary matter is a quanton based structure linked

to the inflationary conditions , and vice versa , namely the

anti matter is based on anti quanton which is generated

during space fabric contraction conditions

The source of asymmetry between matter and anti matter

can be ascribed to the difference in their interaction with

The intermediate forces of the space fabric at the planck scale dimensions

nature of intermediate forces which are different for the case of quanton based structure than anti quanton based structure the repulsive force (FRQ) between quantons would become an attraction force (FAQ)

12-10 ELECTRIC CHARGE

The energy degrees of freedom form of the proton takes the form ($2/3$, $2/3$, $-1/3$, 1) , while that of the neutron ($2/3$, $-1/3$, $-1/3$, 1) and the electron is (-1 , 1 , 1 , 1)

The first three terms remind us of the electric charge of the up quarks , down quarks and that of the electron

So , as the quanton spin difference can generate

electromagnetic field , orbital rotation can generate atomic

electric charge , and we conclude that

1- For every dimension there are possible 3 rotational degrees of freedom each free one corresponds to an atomic charge of $\pm 1/3$

2- Orbital rotational degrees of freedom (in opposite direction to quanton spin $(-SQ)$ give the positive atomic charge

3- Orbital rotation in multiples of quanton spin of over constrained dimension and in the same direction as quanton spin $(-SQ)$ would give negative atomic charge and that is the significance of this negative sign of quanton spin $(-SQ)$

4- A fully constrained dimension would be neutral in charge

5- electric charge is a property of energy partially / over
constrained in space

12-11 ANTI MATTER STRUCTURE

For the case of anti proton , it is composed of anti up
quarks and anti down quark

The anti proton has an atomic charge of (-1) , stable
particle , This does not mean that the energy

constrained form looks like $(2/3 , 5/3 , 5/3 , 0)$ and the
corresponding to energy degrees of freedom form

$(-1/3 , -2/3 , -2/3 , 1)$

This is because for anti matter The energy available
degrees of freedom are (-4) for space fabric contraction
case , and not (+4) as it is the case in inflationary
conditions

so , for the anti proton case the constrained energy

form is $(-1/3 , -1/3 , -4/3 , 0)$, and the corresponding energy degrees of freedom form is

$(-2/3 , -2/3 , +1/3 , -1)$

And this system is stable since the available rotational energy resources are - 4 which equal the number of Rotational degrees of freedom (no redundancy)

And for the anti neutron case the energy constrained form is $(-1/3 , -4/3 , -4/3 , 0)$

And the corresponding energy degree of freedom is $(-2/3,+1/3 , +1/3 , -1)$

For the positron the constrained form is $(-2 , 0,0,0)$

While energy degree of freedom form is $(+1,-1,-1,-1)$

Available resources = time (1) + over constraining (1) =

2 = number of energy degrees of freedom

From the previous analysis , anti matter is clearly based on anti quanton structure and this is the reason behind the dominance of matter in this inflationary conditions

13-1 ORIGIN OF COSMIC MICROWAVE BACK GROUND RADIATION (CMB)

The cosmic microwave background radiation either belongs to sources in the distant past or to present events

If it reflects past events , then it should display whole multitude of different radiation patterns reflecting prevailing temperatures at those different epochs each with its own characteristic frequency pattern , instead the CMB displays remarkable homogeneity with variation of the order of (10^{-5})

This homogeneity of the CMB radiation pattern suggests that the origin of CMB belongs to present day sources

**More precisely , it is a reflection of the wave like behaviour
of the quanton lattice (space fabric)**

**let's remember that quanton lattice (Space fabric) is time
dimension energy constrained , and this constraining of**

**energy in the time dimension gives the space fabric the
wave like properties (polarization , interference , etc)**

and this wave like behaviour reflects the free thermal

**energy content of the present day universe (free energy in
space and free in time)**

**and the homogeneity of CMB confirms the homogeneity of
space fabric which this model is based upon**

13-2 HORIZON PROBLEM AND THE SHAPE OF THE UNIVERSE

1- this model suggest that temperatures had been

substantially reduced very early on the history of the

universe , so the condition of homogeneity and

uniformity of space fabric had been satisfied since then

2- another problem arises when an observer receives light

Emitted by far galaxies from two opposite directions

the distance of both , when added together belongs to

an age greater than the age of the universe

Based on our discussion we have determined that space

fabric is indeed three dimensional and expanding

homogenously in all three directions , so , the only shape

that satisfies this assumption is the spherical shape

Not only this but the spherical shape also gives an answer
to this horizon problem

as the space fabric is curved , so light , as it travels through

it is curved , and this is not due to any relativistic effect , it

is rather the norm

Remembering that the light is energy constrained in two dimensions (perpendicular to the direction of the photons travel)

So , photons experience the inertial effects that a mass experience in those two dimensions (namely centrifugal force)

In other words , light bends as it travels through a curved space fabric

So, a light emitted by two nearby galaxies can travel all the way around the universe to reach an observer from opposite directions

14 DARK MATTER – POSSIBLE ALTERNATIVES

The ratio of dark matter to normal matter which is almost 6 : 1 suggests that the dark matter is more efficient in managing the energy resources than ordinary matter

The other possible alternatives according to the constrained energy form are

- 1- $(1/3, 1/3, 1/3, 0)$, which is not possible since this requires $(6/3)$ rotational energy resources while time provides only $(3/3)$
- 2- $(2/3, 2/3, 2/3, 0)$, not possible , unstable due to non homogeneous orbital rotation (one axis at a time)
- 3- $(4/3, 4/3, 4/3, 0)$ not possible , unstable because of energy resources redundancy

15 - FINAL WORD ON BIG BANG AND INFLATION

- 1- during inflationary conditions the dimensional energy symmetry can be satisfied by linking the energy in all dimensions with a constant relationship (C)
the dimensions of this constant (C) are (L/T)
and the division sign is not haphazard , it says that

the relationship between space and time is diametric under
inflationary conditions

2- this means that energy cannot expand in space without being
constrained in time

And vice versa, energy cannot expand in time without being
constrained in space

and a particle can not be energy constrained and directly be
constrained in time at the same time

3- the price of uniform and symmetric expansion of energy in
space was for 25% of the total energy to be free in time

4- this is a direct consequence of the relationship

$$E = D * C^4 \text{ i.e. the dimensions of energy are } (L^4/T^4)$$

5- So the time must take its (share) of the total energy of the
universe (energy cannot expand in space without expanding
in time simultaneously)

6- this 25% of the total energy does not disappear or go into

hidden dimension , it is superimposed on the other 3 spatial

dimensions , as we discussed in the thermal energy section

7- we can understand now that space dimensions are energy

**degrees of freedom and time is a process , a direct
consequence of the directional energy dimensional
symmetry under inflationary conditions**

8- but things do not stop at that , the universe uses this thermal

**by products that are free in the time dimension from a
previous phase of the process to initiate and maintain the
next phase of process**

9- so , the big bang was , in effect a big bang , it was rather a

**highly efficient process of converting energy into space fabric
and ordinary matter**

X

Y

T

Z

16- CONCLUSIONS

- 1- The dark energy is a manifestation of planck scale forces and dark matter is cold diffuse undetected baryonic matter**
- 2- Origin of minimum energy principle : energy in its pure form (without a force carrier) would gravitate to a singularity (in the absence of inflationary momentum)**
- 3-energy quanta (EQ) are the fundamental particle in nature and quanta attraction (FAE) and repulsive forces (FRE) are the fundamental forces of nature and all the intermediate forces (FR , FT ,FB ,FA , FI) and the physical forces (gravitation , nuclear , and electromagnetism are subsequent forces**
- 4-force carrier (energy quanta (EQ) are literally imposed on the energy during the big bang due to inflationary**

momentum

- 3- quanton lattice constitute space fabric which is constituted of energy quanta (EQ)**
- 4- intermediate forces (FI) , (FR) ,(FB) , (FT) , (FRQ) and (FAQ) change with time due to the effects of universe's inflation**
- 5- gravitation and electromagnetic fields can be transmitted in true vacuum but not , physical forces (gravitation , nuclear , electromagnetism which are transmitted only in the presence of space fabric (not through true vacuum) and through their interaction with the quanton lattice (space fabric)**
- 6- Gravitation is the result of two forces , attraction (FT) which dominates at planck scale and repulsive (FR) Which dominates at cosmological scale**

7- In relativistic terms , Ultra high mass bodies

distort gravitation as well as spacetime

8- Calculations of stellar mass of galaxies are

underestimates due to large non luminous uncalculated

ordinary matter (cold halo of baryonic matter)

9- The rotation speed curves of galaxies is the result of

of an addition of stellar hot matter and cold halo

(normal matter) then a subtraction due to repulsive force

(FR) effect near the galactic bulge and second addition for

compensation far from the galactic bulge not a sole addition

process due to the effect of dark matter

10– the attraction force FAE between energy quanta gives rise

to part of gravitation and strong nuclear attraction

force while the repulsive force FRE gives rise to the repulsive

part of gravitation and the strong nuclear forces , meanwhile

quanton spin difference (SQ) gives rise to electromagnetic fields

- 11- The speed (C) which represents the speed of universe's inflation as well as that of energy quanta (EQ) Can be viewed as an intrinsic property of the energy
- 12- The relativity theory can be better understood in terms
An expanding universe at a speed of (C)
- 13- Relativistic mass distortion of spacetime is due to planck scale repulsive force (FR)
- 14- This model calls for re-assessment of the normal mass
Contribution (4%) to the total energy content of the
universe based on the aforementioned results
- 15- The formula

$$E=D*C^4$$

Represents the fundamental energy equation which

The power of (C) Represents the energy degrees of freedom

in space time as well as the energy density

16-the physical meaning of The constant (C) is that it is an energy relationship that links all the different dimensions , without such a constant relationship , energy would have behaved differently in each one of the space and time dimensions

17-Energy constraining describes how energy behaves in different dimensions under inflationary conditions

18- the energy relationship between space and time is diametric under inflationary conditions ie energy cannot expand in space without being constrained in time and energy cannot expand in time without being constrained in space

19-constraining energy in time gives it wave like properties while constraining energy in spatial dimensions gives it inertial properties along constrained dimensions

20 – proton mass can be defined as constrained energy in one rotational direction (out of three) in two spatial dimensions and over constrained energy in one rotation direction in the third dimension + constraining energy ,in other words : MASS = (CONSTRAINED AND CONSTRAINING ENERGY) and the actual constrained energy form for proton is (1/3,1/3,4/3, 0)

21- the physical meaning of the Energy mass equivalence

$$E=M*C^2$$

is the release of constrained energy in two dimensions in the form of mass to become free thermal energy

22- dual nature of waves is due to the fact that any force carrier whose energy is constrained in one direction is bound to suffer the inertial effects that mass suffers in the constrained energy direction

**23-this model confirms quanton lattice (space fabric)
Is three dimensional (time dimension energy
constrained) ,so we can go forth and back in space but
not in time , and that's the reason time has no physical
form**

**24-Thermal energy is the only form of energy which has the
4 degrees of freedom available , does not have a force
carrier , and acts to disrupt energy constraints of
other forces (disruptive effect)**

**25-The minimum energy degrees of freedom for any
other type of energy is one and the maximum is three ,
(except thermal energy) , and that is the reason behind
the entropy (unrecoverable energy in the time dimension
which is energy constrained –does not exist physically in
a 3 dimensional world)**

26 –consequently, maximum efficiency of any thermal

energy release process is 75%

27-During energy conversion , as energy is constrained in

dimension(s) , it is released from other constrained

dimension(s)

28-An analogy can be drawn based on the constrained

mass equivalence in which the gluons represent the

constraining energy and the quarks play the role of

the constrained energy

29 – we can view matter as energy constrained in space

dimension ,thermal energy as disruptive energy

and electromagnetic energy as perturbing energy

30- the big bang was a highly efficient process of converting

thermal energy into space fabric and ordinary matter

31- this model outlines a direct process of ordinary matter

formation with the aid of thermal energy based on space

fabric structures (quanton lattice) without matter / anti matter annihilation and suggests distribution of energy in the early universe (based on ideal process) was about 54 % in the form of space fabric energy , about 14 % thermal energy and the remaining 32 % of baryonic matter (quark gluon strings)

32- the formation of matter as well as the formation of space fabric played the major role behind transfer of initial thermal energy and the rapid cooling and that total energy of the universe (and vice versa ie thermal energy helped in the formation of space fabric and baryonic matter)

33- we can define the total energy of the universe to be equal to constrained energy in space and free in time (normal matter) + free energy in space and constrained in

time (space fabric) and (thermal energy)

34 – we can draw analogy between the behaviour of the

strong nuclear force and inter-quanton forces

which leads us to the suggestion of similarity in structure

as well

35- based on energy constraint analysis we conclude that

quarks represent the constrained energy and act as anchor

points to the gluons (constraining energy) which act as

spatial truss members and give the proton its physical

shape , and the colour charge of the quarks represent

spatial orientations in space

36- the orbital rotation of quark gluon structure releases

the time dimension energy constraint as well as it gives the

quark gluon skeleton its planar form

37- there are only 8 gluon due to minimum energy principle

**and also to allow only two rotational degrees of freedom
for orbital rotation simultaneously to obtain 3-D shape
and achieve directional energy symmetry**

**38- the quark gluon structure achieves extra degrees of
freedom and energy availability by using over constraining**

Of the third axis of rotation

**39- based on energy constraint analysis , the quark gluon
string formation was most probably the preceding step to
the formation of the baryonic matter**

40- gravitational time dilation as well as relativistic length

Shortening are due to interference in the orbital rotation

Of constituent quark gluon structures

41 – relativistic mass increase is due to the increase of

gluon energy as the matter suffers a relativistic length shortening

42- the instability and eventual decay of the neutron is due to redundancy of available rotational energy resources

In comparison to smaller number of rotational degrees of freedom , while stable atomic structures like the proton , there is no redundancy in the balance between energy resources and degrees of freedom

43- the nature of electromagnetic force propagation is fundamentally different from the gravitation and the strong nuclear force

44- the transmission of electromagnetic waves is

Through space fabric wrinkle formation and subsequent quanton / anti quanton annihilation

45- the significance of planck constant (h) is that it

Indicates the energy resulting from quanton anti quanton annihilation due to a related wrinkle , and it is a space fabric property that expresses the limitation imposed by quantized space fabric to the transmission of continuous flow of energy through electromagnetic waves

46- the ground potential of quanton lattice (space fabric) is equal to $(-SQ)$ (quanton spin) and any potential is measured with respect to this state

47- the transmission of electromagnetic energy is composed of two successive and repetitive steps , first quanton anti quanton annihilation wrinkle formation where

$U = h \cdot f$ and the transfer of electromagnetic energy between wrinkles via electromagnetic field formation

$$\text{where } U = \epsilon \cdot E^2 / (2)$$

48- the electric field of electromagnetic waves is the

independent field and the magnetic field is the dependent field and it is constrained in one dimension (ie it propagates normal to electric field) and hence field strength is reduced by a factor equals (C) Or one dimensional energy degree of freedom less than electric field

49- orbital free rotation gives the matter positive atomic charge while over constrained rotation gives it negative charge ,and fully constrained is neutral in atomic charge

50- evidence suggests that thermal energy in the form of radiation electromagnetic waves may be at the origin of simple virtual particle / anti particle creation elimination (quantum fluctuation) and more complex fields may be capable of generating complex virtual particles

51- the homogeneity of CMB suggests that it is a reflection

of the wave like behaviour of quanton lattice (space fabric) due to the prevailing free thermal energy of the present day universe

52- the source of matter / anti matter asymmetry can be explained as the result of difference in interaction with the space fabric forces

53- most of the physical phenomena in the macro scale world can be traced in origin to the planck scale world

54-this model confirms that space fabric displays a remarkable homogeneity and uniformity (apart from ordinary matter) both on microscopic as well as macroscopic level

55-Due to the uniformity of space fabric this model can provide the basis Of simulation for the interaction of basic forces in nature which agree with observational finding

17– REFERENCES

1-https://en.wikipedia.org/wiki/Cosmological_principle

2--<https://academic.oup.com/mnras/article/465/3/3724/2544345>

3-<https://academic.oup.com/mnras/article/406/1/264/1071477>

4-<http://iopscience.iop.org/article/10.1088/0004-637X/806/1/96/meta>

5-<https://www.nasa.gov/feature/goddard/2016/astronomers-discover-dizzying-spin-of-the-milky-way-galaxy-s-halo>

6-<http://chandra.harvard.edu/photo/2012/halo/>