# What is Fundamental ? NOTHING is Fundamental !!!

Frank Dodd (Tony) Smith, Jr. - 2017

**Fundamental = Starting Point of a Process Describing Realistic Physics**
including **Lagrangian** and **Algebraic Quantum Field Theory (AQFT)**.
**The Starting Point of Our Universe was a Fundamental Spinor Void**
**Void = NOTHING so NOTHING is Fundamental**

This paper explores the Process,
which allows calculation of Standard Model Particle Masses and Force  Strengths.

Page 2 is a Graphic Overview.

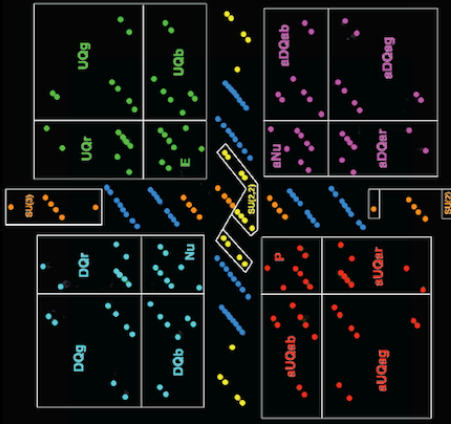Pages 3-13 **What is Fundamental? NOTHING is Fundamental !!!**

Pages 14-64 are my 2018-2019 Calendar with Physics Graphics.

Pages 65-68 are about Leonardo DaVinci's Salvator Mundi and E8.

Void -> Cl(Void) -> Cl(0) -> Cl(1) -> Cl(2) -> Cl(4) -> Cl(16)

10^19 E8 Lattice 240-vertex Polytope Cells in Universe at End of Inflation

Dark Energy Accelerated Expansion

Development of Galaxies, Planets, etc.

Afterglow Light Pattern 380,000 yrs.

Dark Ages

Inflation

Quantum Fluctuations

1st Stars about 400 million yrs.

Big Bang Expansion
13.7 billion years

NJL Quantum Condensate

3 Kaluza-Klein Fermion Generations

RGB Truth Quark

RGB Truth AntiQuark

NJL Higgs as Condensate of T T̄

HIGGS

CP2

M4

Lagrangian

CP2 Internal Symmetry Space

E8 / D4xD4
8D SpaceTime

M4 Physical SpaceTime

UQg    UQb

UQr    E

aDQab    aDQeg

aNu    aDQar

SU(3)

SU(2)

DQr    Nu

DQg    DQb

P    eUQar

eUQab    eUQeg

SU(2)

Cl(0,16) x Cl(0,8) = Cl(0,24)

M(2,Cl(0,24)) = Cl(1,25)

Completion of Union of
All Tensor Products of Cl(1,25) = AQFT

Penrose-Hameroff Quantum Condensate

OCCIPITAL LOBE

PARIETAL LOBE

VISION

Visual cortex receives and processes signals from the retinas of the eyes

TOUCH

TASTE

LANGUAGE RECEPTION

MOVEMENT

SPEECH

TEMPORAL LOBE

FRONTAL LOBE

PLANNING

LANGUAGE EXPRESSION

10^19 Tubulin Dimers in a Human Brain

Kaluza-Klein Spacetime
M4 x CP2

| | |
|---|---|
| | 1 |
| | 16 |
| | 120 |
| | 560 |
| | 1820 |
| | 4368 |
| | 8008 |
| | 11440 |
| | 12870 |
| | 11440 |
| | 8008 |
| | 4368 |
| | 1820 |
| | 560 |
| | 120 |
| | 16 |
| | 1 |

Cl(8) that contains
28 = D4 for CP2
Std Model

Cl(8) that contains
28 = D4 for M4
Gravity

1
8
28
56
70
56
28
8
1

x

1
8
28
56
70
56
28
8
1

=

1
16
120
560
1820
...

Cl(8) x Cl(8) = Cl(16)

Spinors:
(8s+8c) x (8s+8c) =
(8s·8s) + (8s·8c)
+ (8c·8s + 8c·8c)

Quantum Resonant Connection

Microtubules 40 microns long have 65,536 Tubulin Dimers

Non-perturbativity

Stability

Meta-stability

Instability

Fermilab Tquark

Fermilab high Tquark

Fermilab low Tquark

TSFermilab Tquark

LHC Higgs 3

LHC Higgs 2

LHC Higgs

Higgs pole mass $M_h$ in GeV

Top pole mass $M_t$ in GeV
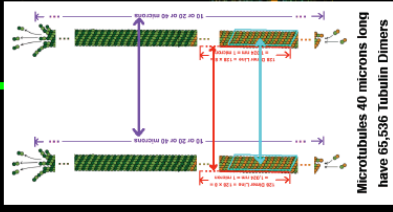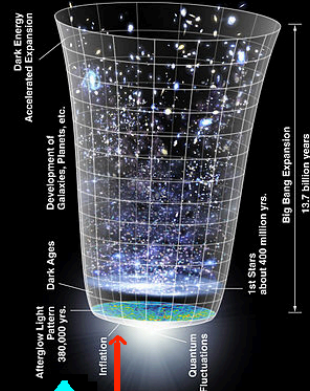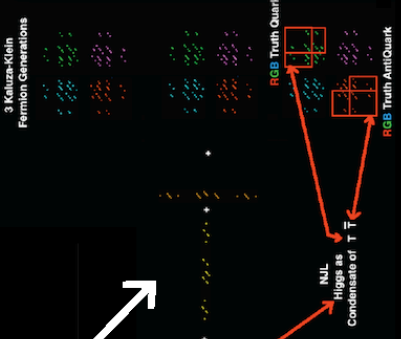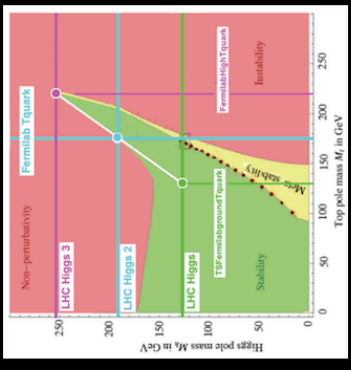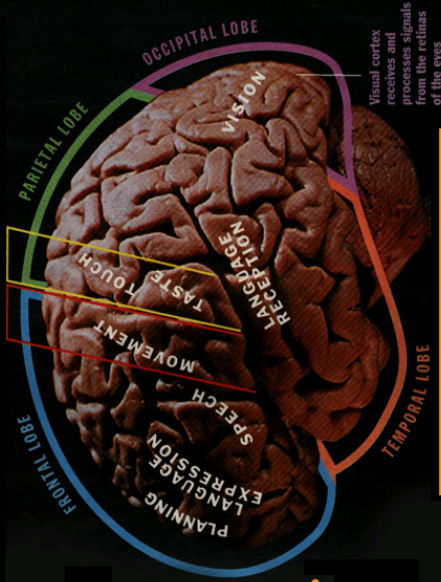
# What is Fundamental ? NOTHING

Frank Dodd (Tony) Smith, Jr. - 2017

**Fundamental = Starting Point of a Process Describing Realistic Physics**
including Lagrangian and Algebraic Quantum Field Theory (AQFT).
This paper explores the Process through detailed worked examples.
(for further details and calculations see Smith references)
**The Starting Point of Our Universe was a Fundamental Spinor Void**
**Void = NOTHING so NOTHING is Fundamental**

**Fundamental Spinor Void** based on **0-dim Real Clifford Algebra Cl(Void)**
from which emerged by Finkelstein's process of Iterating Clifford Algebra Formation
(Finkelstein, Int. J. Theor. Phys. 2017 56 : 2-39)

Cl(0) = 2^0 = 1-dim
Cl(1) = 2^1 = 2-dim
Cl(2) = 2^2 = 4-dim with 2^1 = 1+1 half-spinor fermions/antifermions

and

Cl(4) = 2^4 = 16-dim with 2^2 = 2+2 half-spinor fermions/antifermions

and

Cl(16) = 2^16 = 65,536-dim with 2^8 = 128 + 128  half-spinor fermions/antifermions
**128-dim Cl(16) Half-Spinors = 2 copies of Geoffrey Dixon's 64-dim RxCxHxO**
where R = Real, C = Complex, H = Quaternion, O = Octonion Division Algebras
(Dixon, Division Algebras (O, H, C, and R) and Windmill Tilting)
**248-dim E8 = 128-dim Cl(16) Half-Spinors + 120-dim Cl(16) BiVectors**
By **8-Periodicity of Real Clifford Algebras**
**Cl(8) x ...( N times tensor product )... x Cl(8) = Cl(8N)**
**Cl(16) can be factored into the tensor product Cl(8) x Cl(8)**
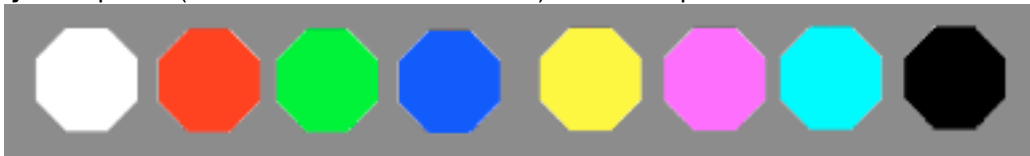Each of the Cl(8) = 2^8 = 256-dim with 2^4 = 8+8 Cl(8) half-spinor fermions/antifermions

and

**By Triality** half-spinors (8 fermions and 8 antifermions) are isomorphic to each other and to 8 vectors

**By 8-Periodicity Cl(8) and Cl(16) have basic structure underlying all Real Clifford Algebras**.

**The Iterated Clifford Algebra Creation Sequence begins with
a Compact Quantum Fluctuation in a Parent Universe (Real Form E8(-248))
that Unfolds into an Octonionic Inflation of Our Universe (Real Form E8(8))**
(Smith, viXra 1709.0265)
The Creation Sequence can also be seen in terms of Spinor/Clifford Algebra Doubling

Cl(0,0) -> Cl(0,2) -> Cl(0,4) -> Cl(0,6) -> Cl(0,8) ->

that goes to Cl(0,8) which has Vector - Half-Spinor Triality
and by 8-Periodicity is the Basic Building Block of Real Clifford Algebras.
The Creation Sequence continues by Tensor Product

-> Cl(0,8)xCl(0,8) = Cl(0,16) -> Cl(0,16)xCl(0,8) = Cl(0,24) ->

**Cl(0,16) contains the Maximal Exceptional E8 Lie Algebra**
Cl(0,24) contains the Vector Space of the 24-dim Leech Lattice Λ24 that is composed of
3 copies of E8 Lattices ( 2 being Integral Domains and 1 not Algebraically closed )
The Creation Sequence continues by constructing the Conformal Structure
of 2x2 matrices with entries in Cl(0,24) = M(2,Cl(0,24))
(Porteous, Clifford Algebras and the Classical Groups and
Lounesto and Porteous, Lectures on Clifford (Geometric) Algebras and Applications)

-> M(2,Cl(0,24)) = Cl(1,25) ->

Since all the matrix entries are Cl(0,24) = tensor product of 3 copies of Cl(0,8)
8-Periodicity allows formation of the tensor products of copies of Cl(1,25)

**-> Completion of Union of All Tensor Products of Cl(1,25) = hyperfinite AQFT**

The hyperfinite AQFT has Real / Octonionic structure inherited from Cl(0,8)
and
it also has Quaternionic structure due to

Cl(1,25) = Cl(1,9)xCl(0,8)xCl(0,8) and Cl(1,9) = Cl(1,5) x Cl(0,4) = Cl(2,4) x Cl(0,4)
where
the vector space of Cl(2,4) is 6-dim Conformal Spacetime
which contains 4-dim Minkowski Spacetime M4 of Cl(1,3)
and
the vector space of Cl(0,4) corresponds to CP2 = SU(3) / SU(2)xU(1)
so that **before breaking Octonionic symmetry non-unitarity of Octonion Quantum
Processes allows particle creation during the Inflation Era**
(Adler, Quaternionic Quantum Mechanics and Quantum Fields, pages 50-52, 561)
and **after breaking non-unitary Octonionic 8-dim Spacetime
to unitary Quaternionic Spacetime, thus ending the Inflation Era,
the Spacetime of the hyperfinite AQFT is (4+4)-dim M4 x CP2 Kaluza-Klein
(Real Form E8(-24))**

**The E8 contained in Cl(0,16)** is not a conventional Gauge Group
but
**is a Recipe for a Realistic Physics Lagrangian**:

**Fermion Terms:**
E8 / D8 = 128-dim = 8-dim Spacetime Components of 8 Fermion Particles
+
8-dim Spacetime Components of 8 Fermion AntiParticles

**Spacetime Base Manifold Terms:**
D8 / D4 x D4 = 64-dim = 8-dim Spacetime Position x 8-dim Spacetime Momentum

**Gauge Boson and Ghost Terms:**
The two 28-dim D4 correspond to the M4 and CP2 of M4 x CP2 Kaluza-Klein

D4_M4 = 16-dim U(2,2) containing SU(2,2) = Spin(2,4) Conformal Gravity
         and 12 Standard Model Ghosts

D4_CP2 = 8-dim SU(3) Color Force plus 4 Translation Gravity Ghosts
          and 12 Conformal Gravity Ghosts
Electroweak SU(2) x U(1) come from Little Group of CP2 = SU(3) / SU(2) x U(1)
                    (Batakis, Class. Quantum Grav.3 (1986) L99-L105)

This E8 Structure can be seen in terms of its 240 Root Vectors
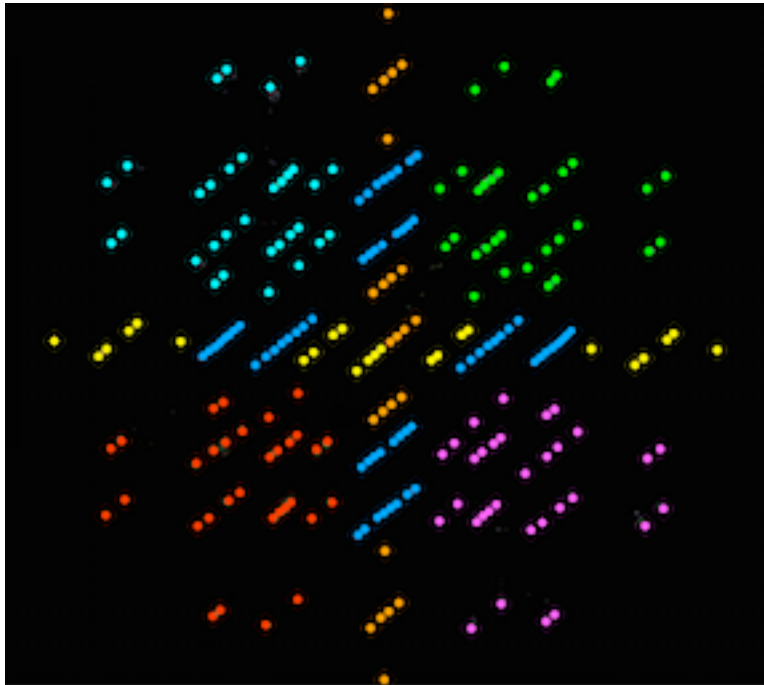


each of which has a realistic Physics Interpretation:
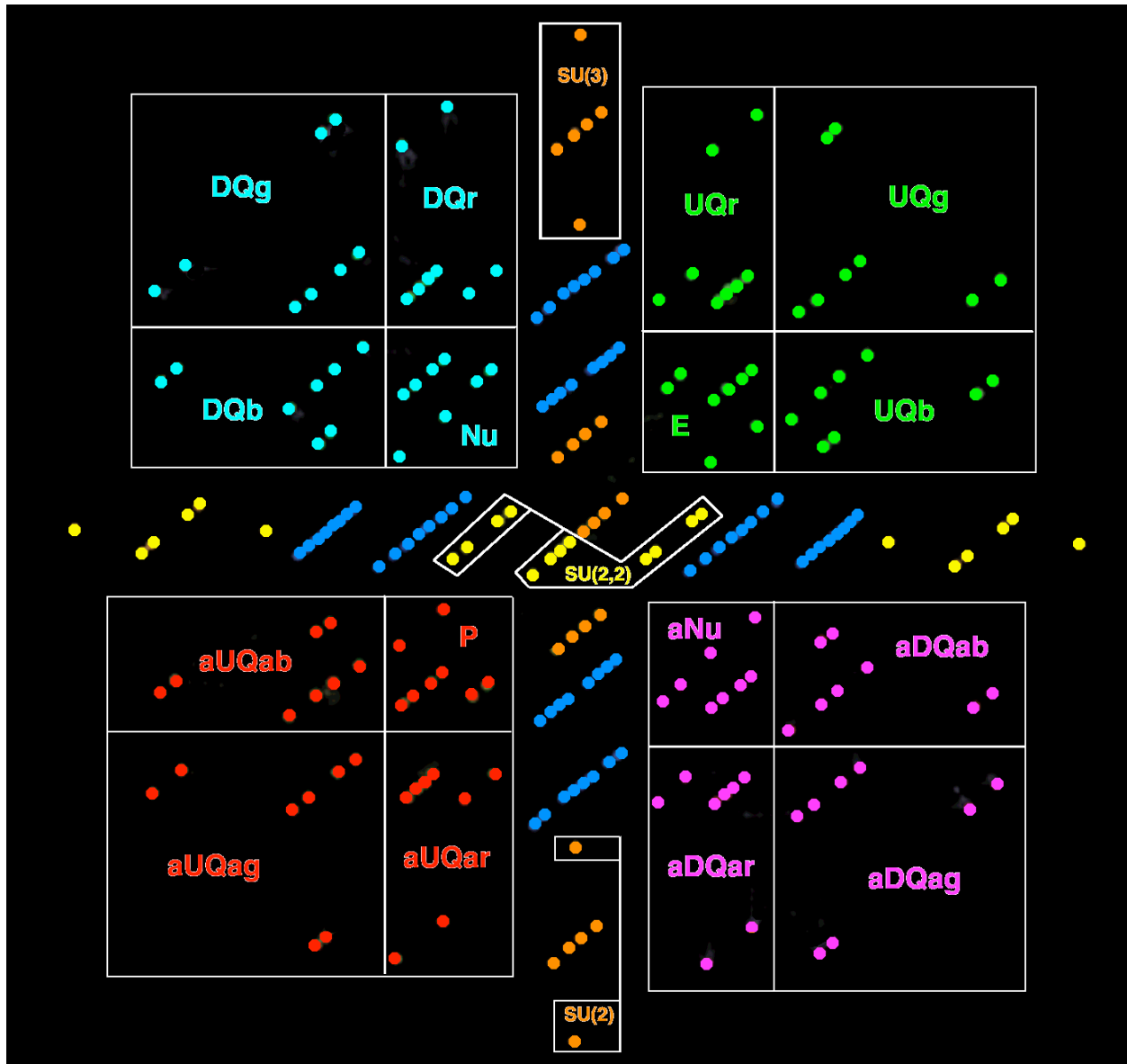
E = electron, UQr = red up quark, UQg = green up quark, UQb = blue up quark
Nu = neutrino, DQr = red down quark, DQg = green down quark, DQb = blue down quark
P = positron, aUQar = anti-red up antiquark,
aUQag = anti-green up antiquark, aUQab = anti-blue up antiquark
aNu = antineutrino, aDQar = anti-red down antiquark,
aDQag = anti-green down antiquark, aDQab = anti-blue down antiquark

Each Lepton and Quark has 8 components with respect to 4+4 dim Kaluza-Klein
6 orange SU(3) and 2 orange SU(2) represent Standard Model root vectors
24-6-2 = 16 orange represent U(2,2) Conformal Gravity Ghosts
12 yellow SU(2,2) represent Conformal Gravity SU(2,2) root vectors
24-12 = 12 yellow represent Standard Model Ghosts
32+32 = 64 blue represent 4+4 dim Kaluza-Klein M4 x CP2 Spacetime Base Manifold
32 for M4 position x 8 momentum and 32 for CP2 position x 8 momentum

# Higgs and Second and Third Generation Fermions emerge from breaking Octonionic Symmetry of the Inflation Era to Quaternionic Symmetry of Present Era.
### (Mayer, Acta Physica Austriaca, Suppl. XXIII (1981))
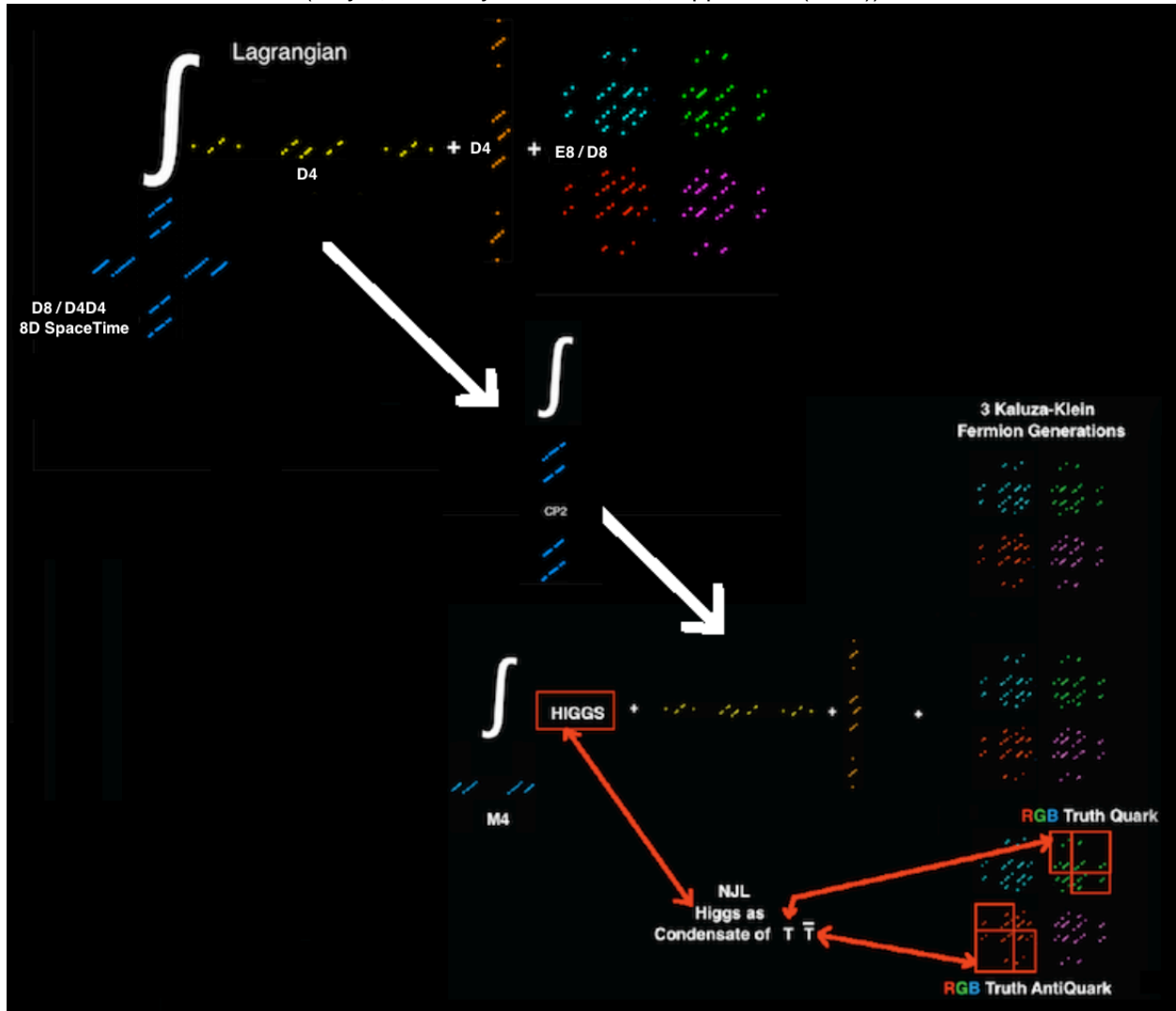


The Higgs is a Condensate of Tquark and Tantiquark resulting in
3 mass states for the Higgs and the Tquark
(Smith, viXra 1701.0496)

As to the unconventional mass states other than 125 GeV Higgs and 174 GeV Tquark:
**ATLAS**, for the Full 2016 36.1 fb-1 of 2016 data in the Higgs -> ZZ* -> 4l channel,
on 5 July 2017 released ATLAS-CONF-2017-058 saying:
"... A search for heavy resonances ...[ in the Higgs -> ZZ* -> 4l channel ]...
uses proton–proton collision data at a centre-of-mass energy of 13 TeV
corresponding to an integrated luminosity of 36.1 fb-1 collected with the ATLAS
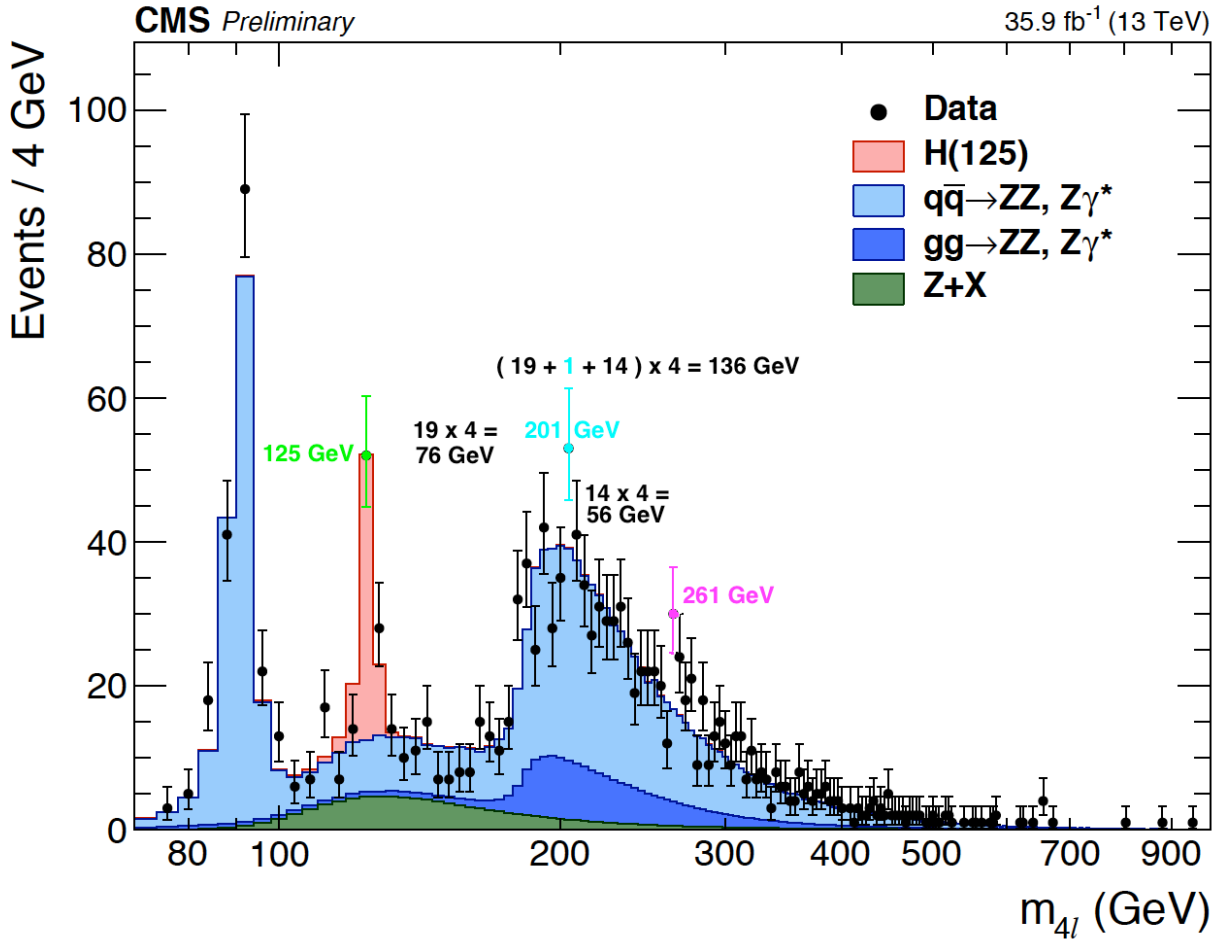detector during 2015 and 2016 at the Large Hadron Collider ...
**excess ...[is]... observed in the data for m4l around 240 ... GeV ...
with a local significance of 3.6 sigma ...".
It will be interesting to see whether the 2017 ATLAS data of over 45 fb-1
will confirm or refute the excess at 240 GeV as a Higgs mass state.**

Here is a chart showing the 3 Mass States for Higgs and Tquark ( viXra 1701.0496 ):
green dot in the Stable region (green) has 125 GeV Higgs and 130 GeV Tquark
cyan dot on the Non-perturbativity Boundary has 190 GeV Higgs and 174 GeV Tquark
magenta dot at the Critical Point has 250 GeV Higgs and 220 GeV Tquark
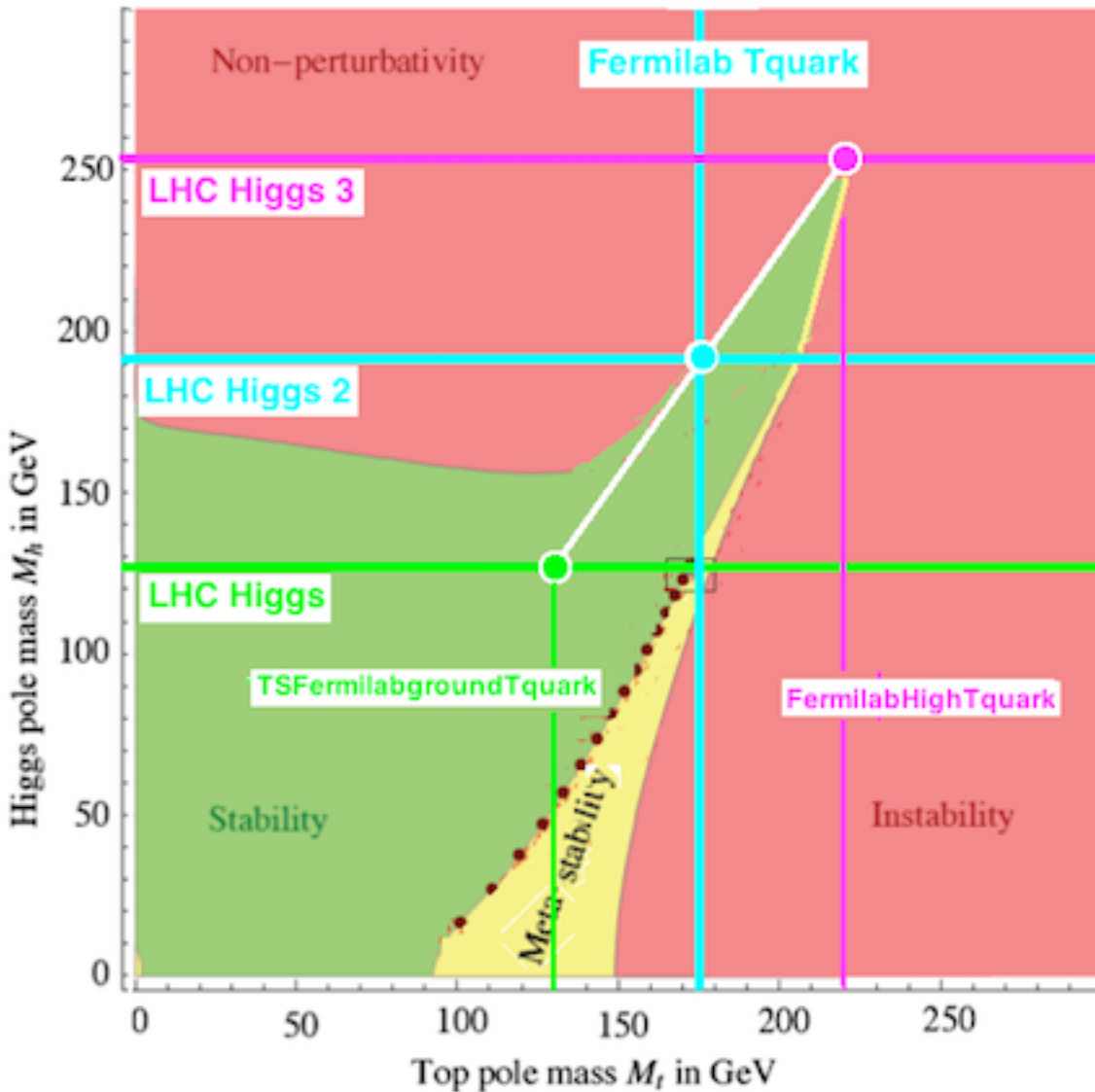


**CMS**, for their Full 35.9 fb-1 of 2016 data in the Higgs -> ZZ* -> 4l channel,
in CMS-PAS-HIG-16-041 has bins of 4 GeV width and shows all 3 Higgs mass states:
low-mass Higgs state (green) with mass 125 GeV
middle-mass Higgs state (cyan) with mass 201 GeV (close to 190 GeV)
high-mass Higgs state (magenta) with mass 261 GeV (close to 240 and 250 GeV)

**CMS** *Preliminary*                                    35.9 fb⁻¹ (13 TeV)

Events / 4 GeV

- Data
- H(125)
- $q\bar{q} \to ZZ, Z\gamma^*$
- $gg \to ZZ, Z\gamma^*$
- Z+X

( 19 + 1 + 14 ) x 4 = 136 GeV

125 GeV

19 x 4 = 76 GeV

201 GeV

14 x 4 = 56 GeV

261 GeV

$m_{4l}$ (GeV)

**Semileptonic histograms of CDF and D0 show all 3 Truth Quark Mass States**



semileptonic histogram

CDF (FERMILAB-PUB-94/097-E)



- data
- fit
- bkgd

(a)

semileptonic histogram

D0 (hep-ex/9703008)
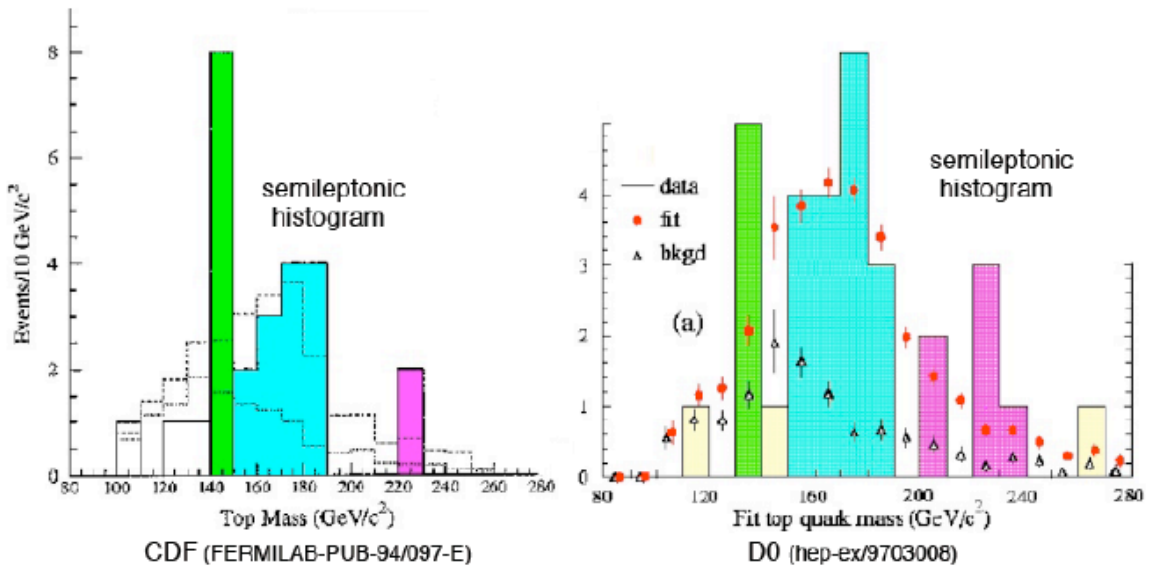
low-mass Tquark state (green) with mass 130 GeV
middle-mass Tquark state (cyan) with mass 174 GeV
high-mass Tquark state (magenta) with mass 220 GeV

**The Completion of Union of All Tensor Products of Cl(1,25) = hyperfinite AQFT**
(Smith, viXra 1701.0495)
**containing the Realistic Physics of the Lagrangian.**
**It also contains, due to its Cl(1,25) components,**
**the structure of 26-dim String Theory**
**in which Strings are seen as Particle World-Lines,**
**the massless spin 2 state is the carrier of the Bohm Quantum Potential,** and
**the SO(24) little group is related to the Monster automorphism group**
**that is the symmetry of each cell of Planck-scale local lattice structure.**
(Green, Schwartz, and Witten, "Superstring Theory" vol. 1)
10-dim String Spacetime is Kaluza-Klein 6-dim Conformal x 4-dim CP2 giving M4 x CP2
8-dim K-K Classical Lagrangian Spacetime as an NJL condensate of Dixon's
64-dim Particle spinor T = RxCxHxO and the 64-dim AntiParticle spinor Tbar
**Each cell of E8 Classical Lagrangian Spacetime corresponds to 65,536-dim Cl(16)**
**which contains 248-dim E8 = 120-dim D8 bivectors +128-dim D8 half-spinors**
**Human Brain Microtubules 40 microns long have 65,536 Tubulin Dimers**
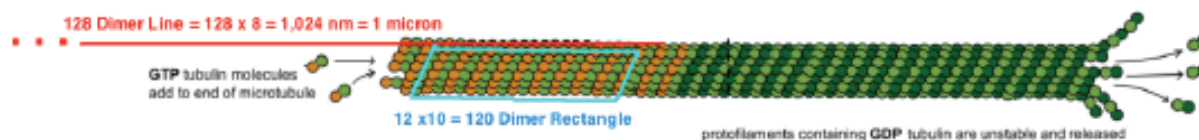


( image adapted from 12biophys.blogspot.com Lecture 11 )
**and so can have Bohm Quantum Resonance with Cl(16) Spacetime cells**
so that **the State of Consciousness of a Human is in exact resonant**
**correspondence with a subset of the cells of E8 Classical Lagrangian Spacetime**
Therefore **E8 Classical Lagrangian Spacetime NJL Condensate** is effectively the
**Spirit World** in which the **Human States of Consciousness = Souls exist.**


**What happens to a Fundamental Fermion Particle whose World-Line string**
**intersects a Single Cell ?**
The Fundamental Fermion Particle does not remain a single Planck-scale entity.
Tachyons create clouds of particles/antiparticles.
(Schroer, hep-th/9908021)
**The Fundamental Fermion Cloud looks like a Kerr-Newman Black Hole.**
(Arcos and Pereira, hep-th/0210103)
**What is the size of the Fundamental Fermion Kerr-Newman Cloud ?**
The Cloud is one Planck-scale Fundamental Fermion Valence Particle plus
an effectively neutral cloud of particle/antiparticle pairs. The symmetry of the cloud
is governed by the 24-dimensional Leech lattice by which the Single Cell was formed.
According to the ATLAS at brauer.maths.qmul.ac.uk/Atlas/v3/spor/M/
the maximal subgroup of the Monster M involving Co1 is 2^(1+24).Co1 of order
139511839126336328171520000 = 1.4 x 10^26   As 2.Co1 is the Automorphism group
of the Leech Lattice modulo to which the Single Cell was formed,
and as the 26-dim String Theory Leech Lattice is a superposition of 8 Leech Lattices,
8 x 2^(1+24).Co1 describes the structure of the Cloud. Therefore,
the volume of the Cloud should be on the order of 10^27 x Planck scale containing
10^27 particle/antiparticle pairs with size 10^(27/3) x 1.6 x 10^(-33) cm = 10^(-24) cm.

**Fundamental Fermion Clouds are Schwinger Sources.**

Sources require Linear Operators
"... represented by a definite integral [of a]... kernel ... function ...".
(Fock, "Fundamental of Quantum Mechanics" (1931))

Kernel Functions for Complex Classical Domains were described by Hua.
(Hua, "Harmonic Analysis of Functions of Several Complex Variables in the Classical Domains" (1958))

Schwinger in 1951 "... introduced a description in terms of Green's functions, what Feynman had called propagators ... The Green's functions are vacuum expectation values of time-ordered Heisenberg operators, and the field theory can be defined non-perturbatively in terms of these functions ...[which]... gave deep structural insights into QFTs; in particular ... the structure of the Green's functions when their variables are analytically continued to complex values ...".
(Schweber, PNAS 102, 7783-7788)

The Classical Domains (complete simply connected Riemannian symmetric spaces) representing 4-dim Spacetime with Quaternionic Structure are:
S1 x S1 x S1 x S1 = 4 copies of U(1)
S2 x S2 = 2 copies of SU(2)
CP2 = SU(3) / SU(2)xU(1)
S4 = Spin(5) / Spin(4) = Euclidean version of Spin(2,3) / Spin(1,3)
(Wolf, J. Math. Mech 14 (1965) 1033-1047)

Wyler showed how to use Green's Functions = Kernel Functions of Classical Domain structures characterizing Sources = Leptons, Quarks, and Gauge Bosons,
to calculate Particle Masses and Force Strengths
(Wyler, 1971 - C. R. Acad. Sc. Paris, t. 271, 186-188)

"... We introduce a quantitative description of the particle source in terms of a source function ... we do not have to claim that we can make the source arbitrarily small ... the experimeter... must detect the particles ...[by]... collision that annihilates the particle ... the source ... can be ... an abstraction of an annilhilation collision, with the source acting negatively, as a sink ... The basic things are ... the source functions ... describing the intermediate propagation of the particle ..."
(Schwinger, 1969 - see physics/0610054)

**Schwinger Sources can be described by continuous manifold structures of Bounded Complex Domains and their Shilov Boundaries**
and
**Wyler's techniques allow calculation of Particle Masses and Force Strengths**
(Smith, viXra 1602.0319)


**Results of such calculations are shown in the Technical Endnotes:**

# Technical Endnotes:

## Results of Calculations:

Quark masses are constituent masses. Most of the calculations are tree-level.
Fermions are Schwinger Sources with geometry of Complex Bounded Domains
and Kerr-Newman Black Hole structure size about 10^(-24) cm.
Since ratios are calculated, values for one particle mass and one force strength are assumed.

| Particle/Force | Tree-Level | Higher-Order |
|---|---|---|
| e-neutrino | 0 | 0 for nu_1 |
| mu-neutrino | 0 | 9 x 10^(-3) eV for nu_2 |
| tau-neutrino | 0 | 5.4 x 10^(-2) eV for nu_3 |
| electron | 0.5110 MeV | |
| down quark | 312.8 MeV | charged pion = 139 MeV |
| up quark | 312.8 MeV | proton = 938.25 MeV |
| | | neutron - proton = 1.1 MeV |
| muon | 104.8 MeV | 106.2 MeV |
| strange quark | 625 MeV | |
| charm quark | 2090 MeV | |
| tauon | 1.88 GeV | |
| beauty quark | 5.63 GeV | |
| truth quark (low state) | 130 GeV | (middle state) 174 GeV |
| | | (high state) 218 GeV |
| W+ | 80.326 GeV | |
| W- | 80.326 GeV | |
| W0 | 98.379 GeV | Z0 = 91.862 GeV |

Mplanck 1.217x10^19 GeV

| | | |
|---|---|---|
| Higgs VEV (assumed) | 252.5 GeV | |
| Higgs (low state) | 126 GeV | (middle state) 182 GeV |
| | | (high state) 239 GeV |

| | | |
|---|---|---|
| Gravity Gg (assumed) | 1 | |
| (Gg)(Mproton^2 / Mplanck^2) | | 5 x 10^(-39) |
| EM fine structure | 1/137.03608 | |
| Weak Gw | 0.2535 | |
| Gw(Mproton^2 / (Mw+^2 + Mw-^2 + Mz0^2)) | | 1.05 x 10^(-5) |
| Color Force at 0.245 GeV | 0.6286 | 0.106 at 91 GeV |

Kobayashi-Maskawa parameters for W+ and W- processes are:

| | d | s | b |
|---|---|---|---|
| u | 0.975 | 0.222 | 0.00249 -0.00388i |
| c | -0.222 -0.000161i | 0.974 -0.0000365i | 0.0423 |
| t | 0.00698 -0.00378i | -0.0418 -0.00086i | 0.999 |

The phase angle d13 is taken to be 1 radian.

**Dark Energy : Dark Matter : Ordinary Matter = 0.75 : 0.21 : 0.04**

# References:

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Smith, viXra 1709.0265

Wolf, J. Math. Mech 14 (1965) 1033-1047

Wyler, 1971 - C. R. Acad. Sc. Paris, t. 271, 186-188
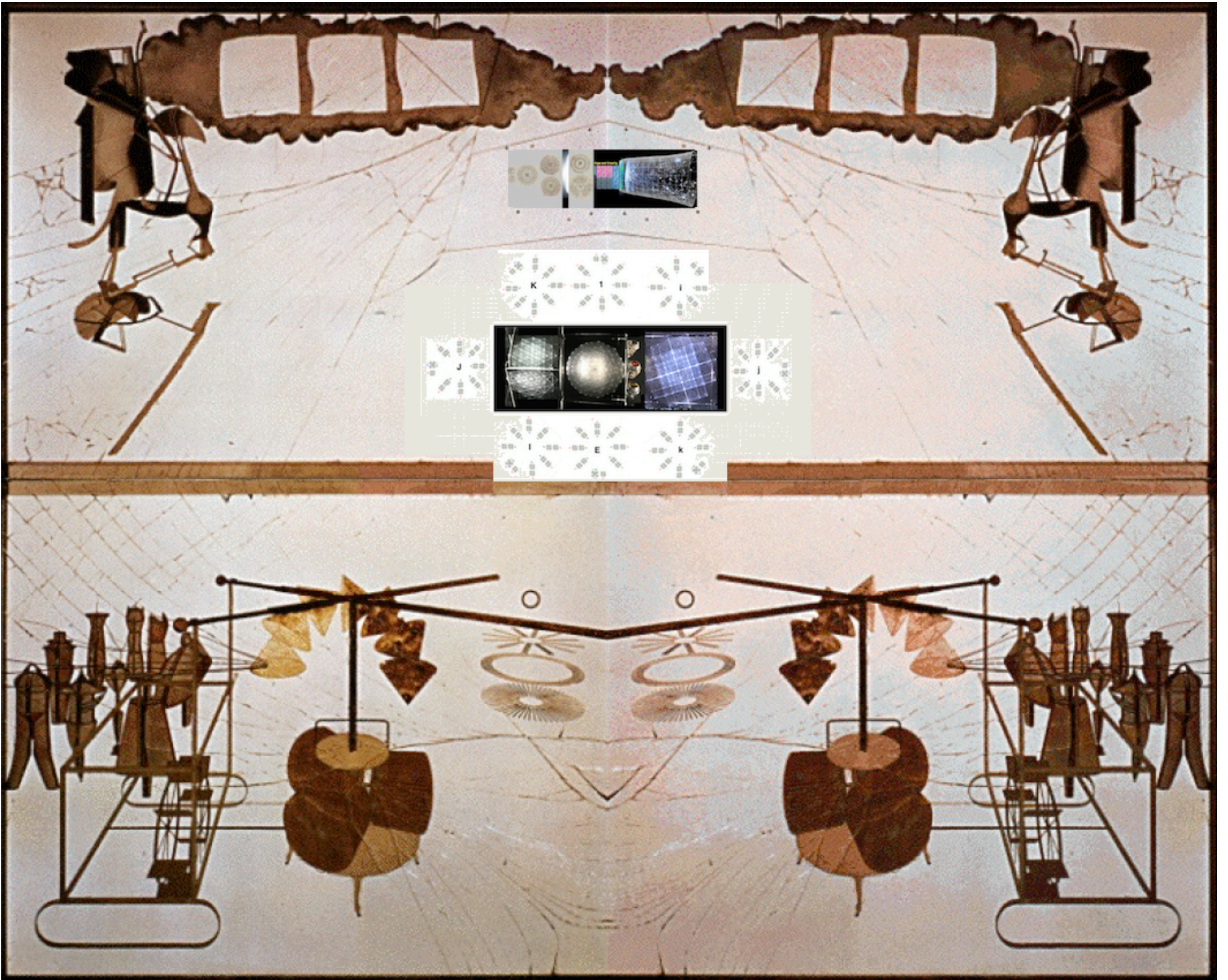
## Dimension of Clifford Algebra

0        2^0=1      2^1=2      2^2=4    2^4=16    2^16=65536    256x256

VOID -> Cl(VOID) -> Cl(0,0) -> Cl(0,1)-> Cl(0,2) -> Cl(0,4) -> Cl(0,16) = Cl(0,8)xCl(0,8)  --> Cl(0,16)xCl(0,8) = Cl(0,24) -> M(2,Cl(0,24)) = Cl(1,25) ->

-> Completion of Union of All Tensor Products of Cl(1,25) = hyperfinite AQFT

Cl(1,25) = Cl(1,9)xCl(0,8)xCl(0,8) and Cl(1,9) = Cl(1,5) x Cl(0,4) = Cl(2,4) x Cl(0,4)



2^16=65536
Cl(16)

256x256
Cl(8)xCl(8)

2^4=16
Cl(4)

2^2=4
Cl(2)

2^1=2
Cl(1)

2^0=1
Cl(0)

0
Cl(VOID)

VOID     0

1 8 28 56 70 56 28 8 1

Spinors:    ( 8s×8s ) + ( 8c×8c )
(8s+8c) × (8s+8c) =
(8s×8c+8c×8s)

Cl(8)   x   Cl(8)   =   Cl(16)

```
 1           1           1
 8           8          16
28          28         120
56          56         560
70    x     70     =  1820
56          56        4368
28          28        8008
 8           8       11440
 1           1       12870
                     11440
                      8008
                      4368
                      1820
                       560
                       120
                        16
                         1
```

Cl(16) contains 120 + 64 + 64 = 248 = E8
with 112 + 128 = 240 root vectors
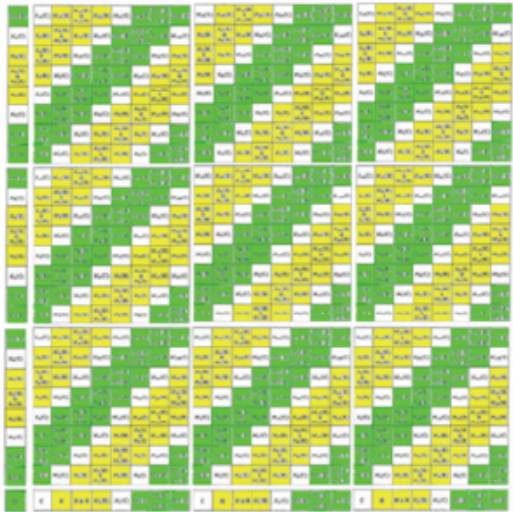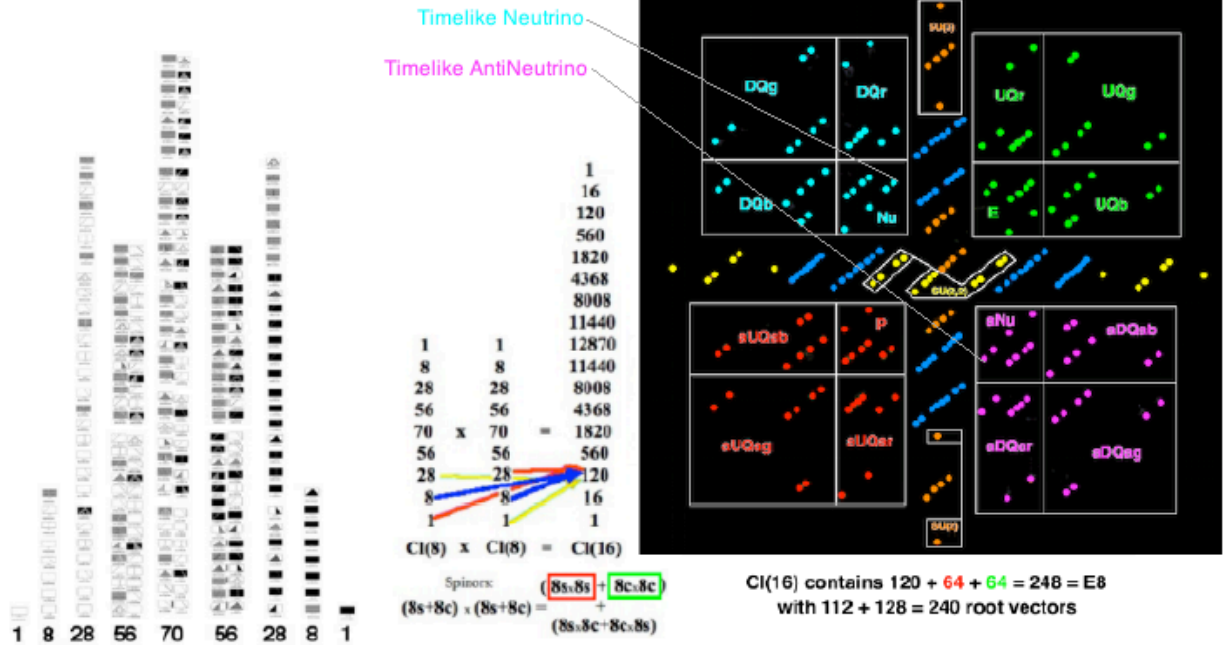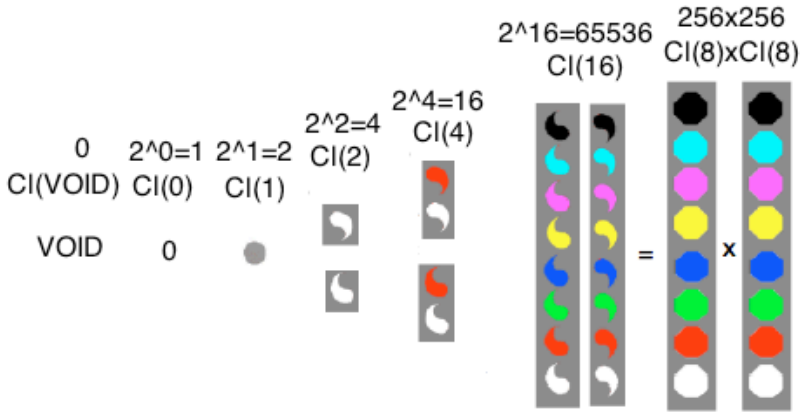
The completion of the union of all tensor products of Cl(16) = Cl(8)xCl(8) produces a generalized Hyperfinite II1 von Neumann factor
that gives the Cl(16)-E8 model a natural Algebraic Quantum Field Theory

The Cl(16)-E8 AQFT inherits structure from the Cl(16)-E8 Local Lagrangian

The Creation-Annihilation Operator structure of Cl(16)-E8 AQFT is given by the Maximal Contraction of E8 = semidirect product A7 x h92
where h92 = 92+1+92 = 185-dim Heisenberg algebra and A7 = 63-dim SL(8)

## 240 E8 Root Vectors

112 = 56 + 56 = (24+32) + (24+32)
128 = 1+126+1

56 ——— D8 ——— 56

Timelike AntiNeutrino 1 +          +          + 1 Timelike Neutrino

126
E7

SU(2)
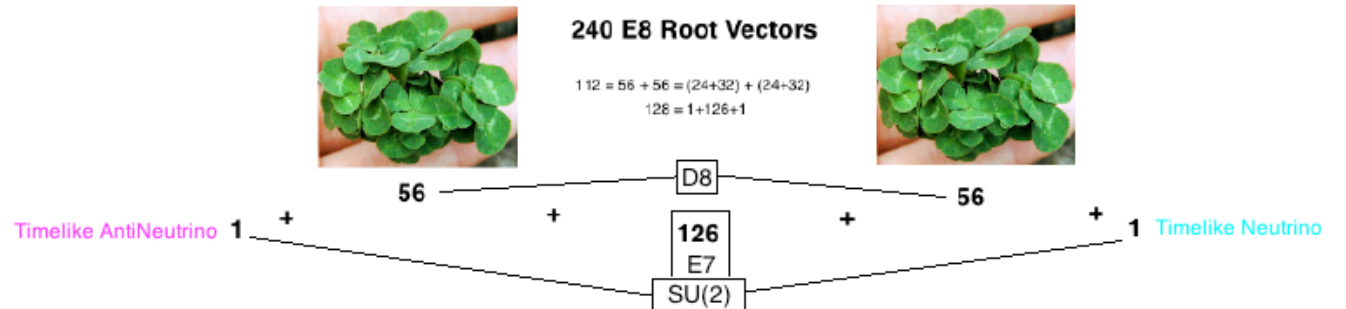
# January 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | 1<br><br>New Year's Day | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15<br><br>Martin Luther King, Jr. Day | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | | | |

$\int$ Lagrangian

D4

$+$ D4 $+$ E8 / D8

Spin(2,4)

Spin(2,3)

D8 / D4xD4
8D SpaceTime

M4 Physical SpaceTime    CP2 Internal Symmetry Space

SU(3)

SU(4)

SU(2)
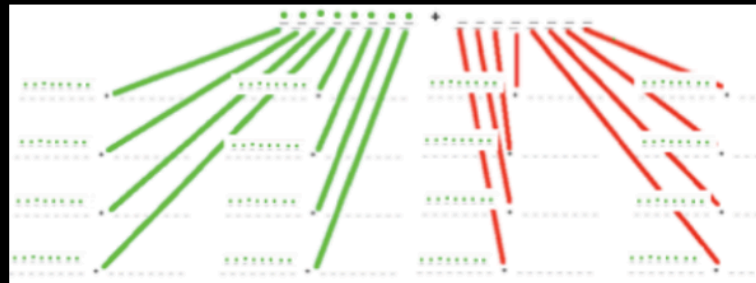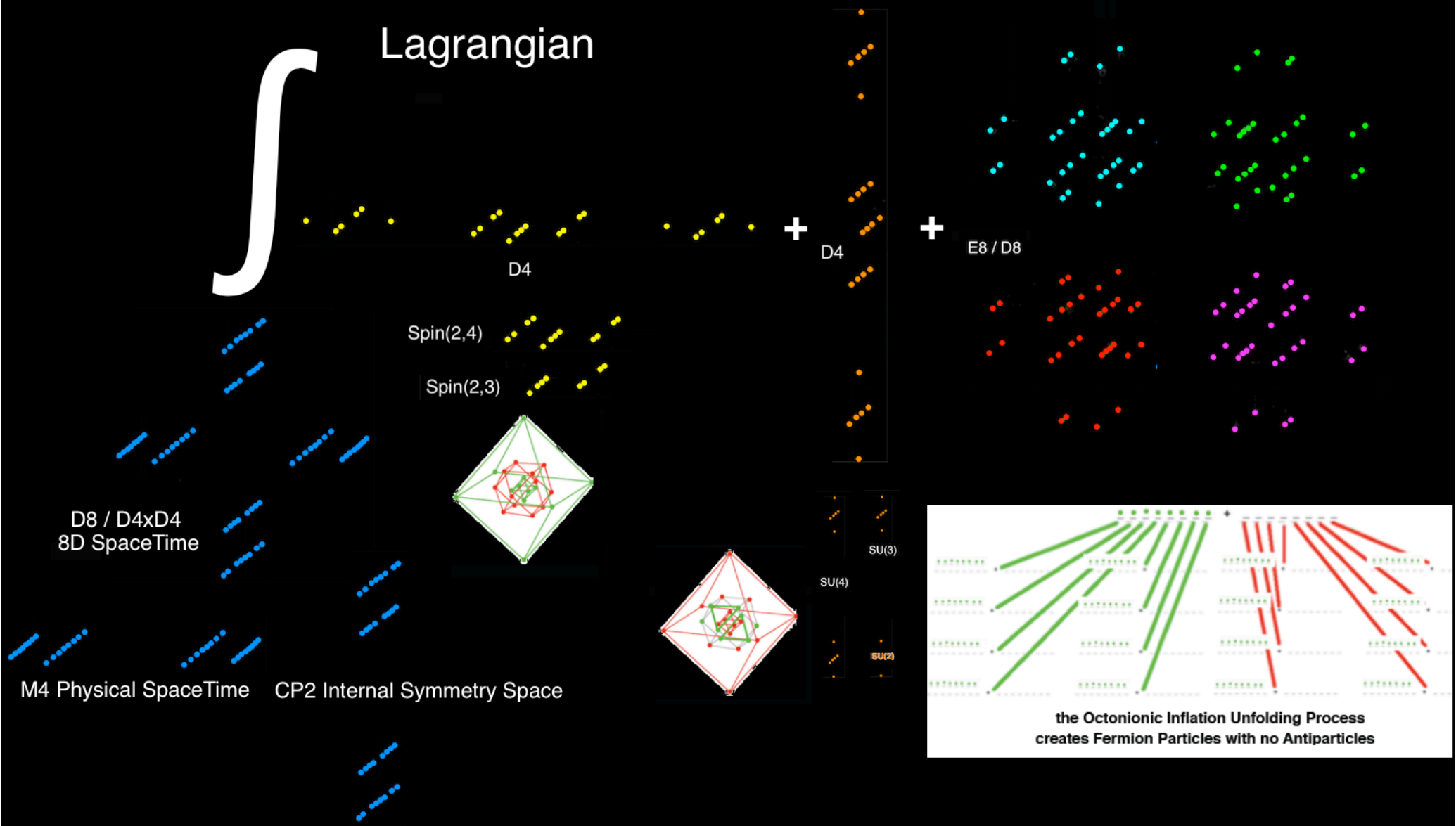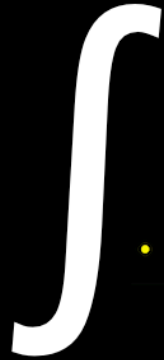
the Octonionic Inflation Unfolding Process
creates Fermion Particles with no Antiparticles

# February 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | 1 | 2<br><br>Groundhog Day | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12<br><br>Lincoln's Birthday | 13 | 14<br><br>St. Valentine's Day<br>Ash Wednesday | 15 | 16<br><br>Chinese New Year | 17 |
| 18 | 19<br><br>President's Day | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28<br><br>Purim | | | |

8v

8x8 Matrices
A7xR = U(8)
Position
x
Momentum

SU(2,2)
Spin(2,4)

1E8
iE8
jE8
kE8

8v

SU(2)xU(1)

EE8

SU(3)

IE8
JE8
KE8

x

8s+

8s-
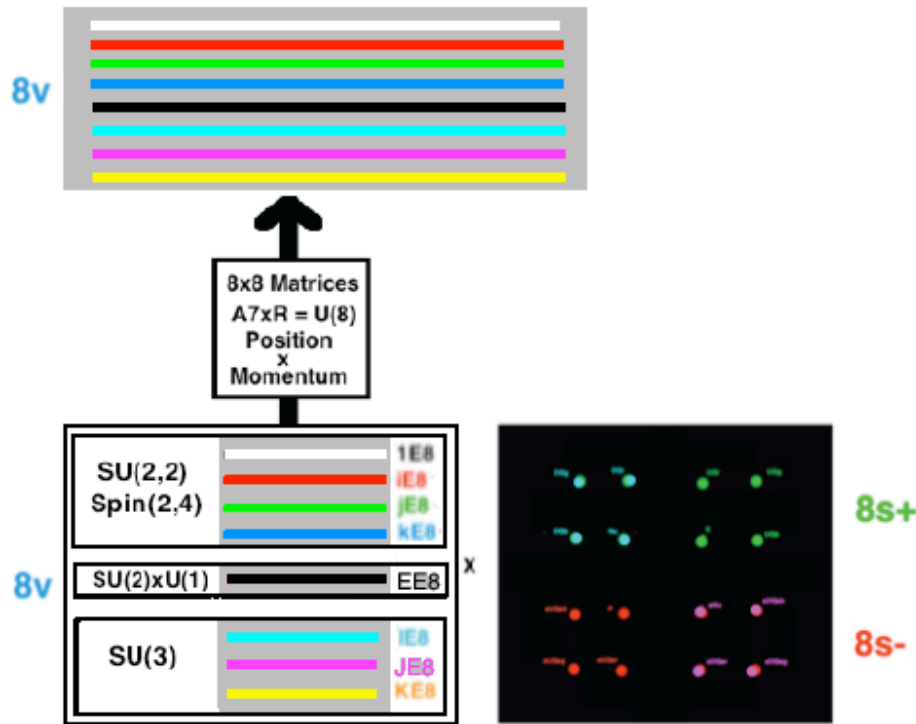
Indra's Net of Schwinger Sources - Bohm Quantum Blockchain

The Cl(16)-E8 AQFT inherits structure from the Cl(16)-E8 Local Lagrangian

$$\int \text{Standard Model Gauge Gravity} \;+\; \text{Fermion Particle-AntiParticle}$$

8-dim SpaceTime

the Cl(16)-E8 model at the Planck Scale has spacetime condensing out of Clifford
structures forming a Leech lattice underlying 26-dim String Theory of World-Lines
with 8 + 8 + 8 = 24-dim of fermion particles and antiparticles and of spacetime.

Slices of 8v SpaceTime are represented as D8 branes. Each D8 brane has
Planck-Scale Lattice Structure superpositions of 8 types of E8 Lattice
denoted by 1E8, iE8, jE8, kE8, EE8, IE8, JE8, KE8

Stack D8 branes to get SpaceTime with Strings = World-Lines

Let Oct16 = discrete mutiplicative group { +/-1, +/-i, +/-j, +/-k, +/-E, +/-I, +/-J, +/-K}.
Orbifold by Oct16 the 8s+ to get 8 Fermion Particle Types
Orbifold by Oct16 the 8s- to get 8 Fermion AntiParticle Types

Gauge Bosons from 1E8 and EE8 parts of a D8 give U(2) Electroweak Force
Gauge Bosons from IE8, JE8, and KE8 parts of a D8 give SU(3) Color Force
Gauge Bosons from 1E8, iE8, jE8, and kE8 parts of a D8 give U(2,2) Conformal Gravity

The 8x8 matrices for collective coordinates linking one D8 to the next D8
give Position x Momentum

The automorphism group of a single 26-dim String Theory cell modulo the Leech lattice
is the Monster Group of order about 8 x 10^53.

When a fermion particle/antiparticle appearsTachyons create a cloud of particles/antiparticles.
The cloud is one Planck-scale Fundamental Fermion Valence Particle plus an effectively
neutral cloud of particle/antiparticle pairs forming a Kerr-Newman black hole.
That cloud constitutes the Schwinger Source.

The Schwinger Sources are finite regions in a Complex Domain spacetime
corresponding to Green's functions of particle creation / annihilation.

Its structure comes from the 24-dim Leech lattice part of the Monster Group which is
2^(1+24) times the double cover of Co1, for a total order of about 10^26.

(Since a Leech lattice is based on copies of an E8 lattice and since there are 7 distinct E8 integral domain
lattices there are 7 (or 8 if you include a non-integral domain E8 lattice)mdistinct Leech lattices.
The physical Leech lattice is a superposition of them, effectively adding a factor of 8 to the order.)

The volume of the Kerr-Newman Cloud is on the order of 10^27 x Planck scale,
= roughly 10^(-24) cm.

# March 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------|---------|-----------|----------|--------|----------|
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 Daylight Savings Begins | 12 | 13 | 14 | 15 | 16 | 17 St. Patrick's Day |
| 18 | 19 | 20 Spring Begins | 21 | 22 | 23 | 24 |
| 25 Palm Sunday | 26 | 27 | 28 | 29 | 30 Passover | 31 |

# Big Bang E8(-248) : Spin(16) | Octonion Inflation E8(8) : SO(8,8) | Quaternion Conformal Evolution E8(-24) : SO*(16)

At the end of Non-Unitary Octonionic Inflation Our Universe
had about (1/2) 16^64 = (1/2) (2^4)^64 = 2^255 = 6 x 10^76 Fermion Particles
the size of our Universe was then about 10^(-24) cm
which is about the size of a Fermion Schwinger Source Kerr-Newman Cloud

The End of Inflation time was at about 10^(-34) sec = 2^64 Tplanck

The Zizzi Inflation phase of our universe ends with decoherence "collapse" of
the 2^64 Superposition Inflated Universe into Many Worlds of Quantum Theory,

Accelerating expansion

Slowing expansion

Big Bang
14 Gy BP

z = 0.587
7 Gy BP
q = 0

z = 0.145
2 Gy BP

z = 0
NOW = 0 BP

z = 1.7
Farthest Supernova

Our Parent Universe
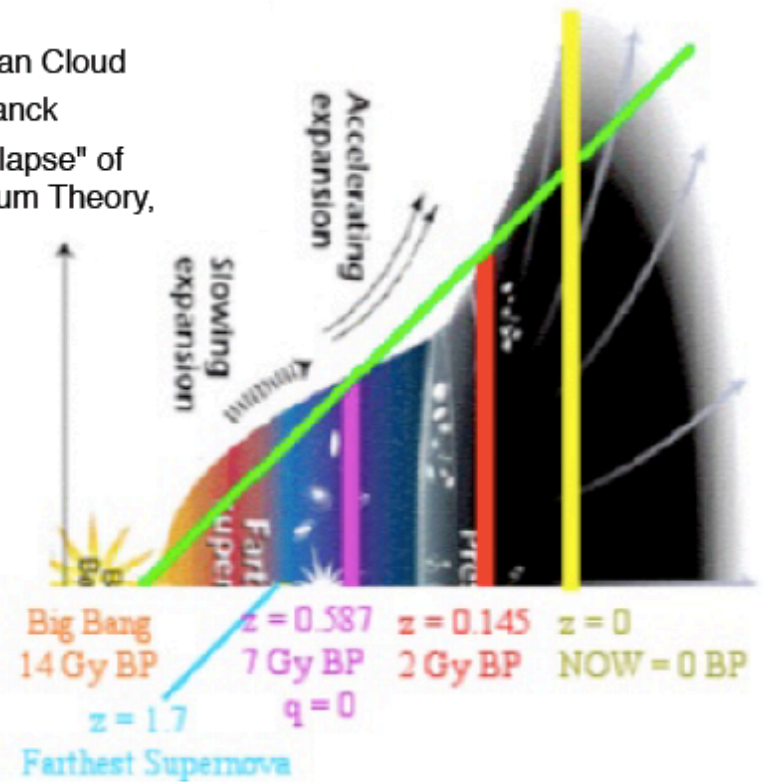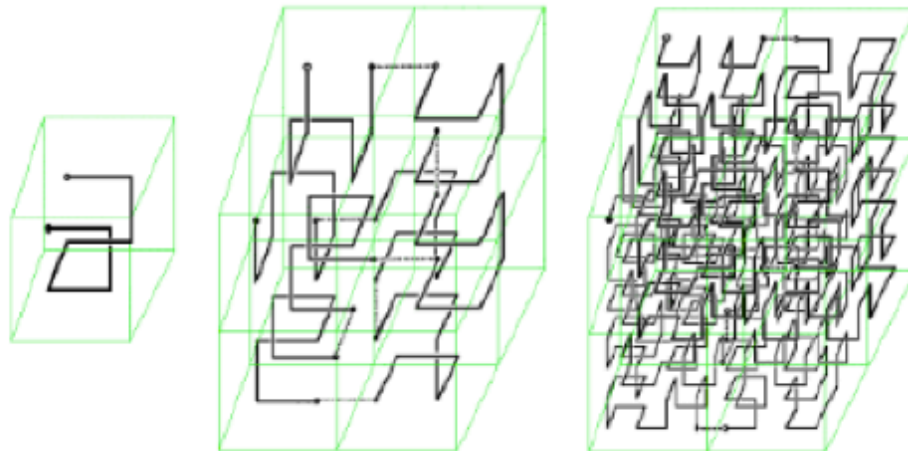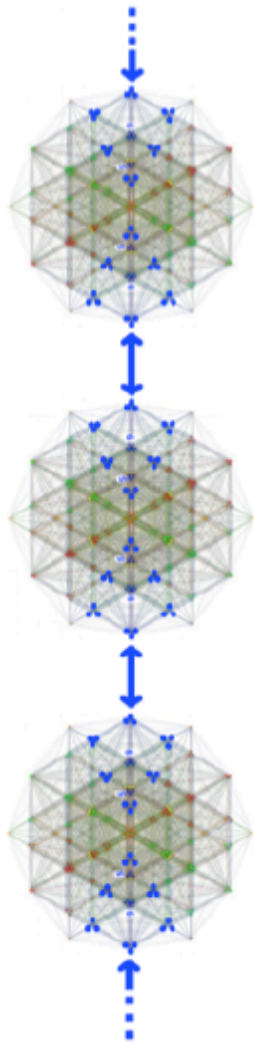
Our Universe

The ratio Dark Energy : Dark Matter : Ordinary Matter
for our Universe at the present time is calculated to be:
0.75 : 0.21 : 0.04
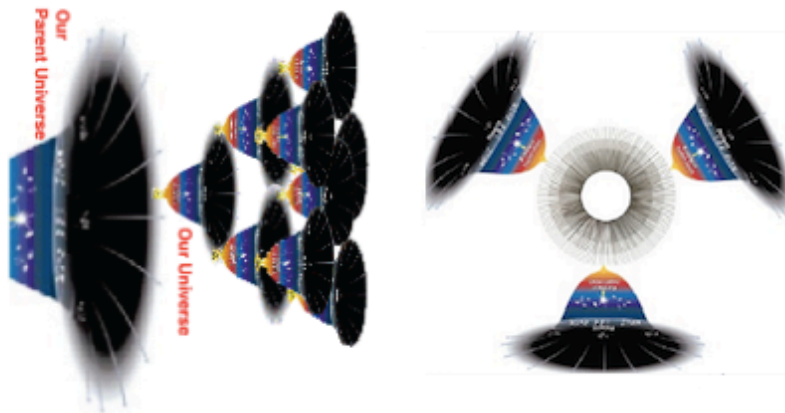
Paola Zizzi in gr-qc/0007006:

"... **The self-reduction of the superposed quantum state ...
corresponds to a superposed state of ... [ 10^19 = 2^64 qubits ]
... also the number of superposed tubulins-qubits in our brain
... leading to a conscious event. ...**".

# April 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------|---------|-----------|----------|--------|----------|
| 1 <br><br> April Fool's Day <br> Easter Sunday | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 <br><br> Earth Day | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | | | | | |

MOON

EARTH
1 AU

MERCURY
0.39 AU

Octahedron
1 : sqrt(3)
1 : 1.7321

0.72 AU
VENUS

Icosahedron
1 : sqrt(15-6sqrt(5))
1 : 1.2584
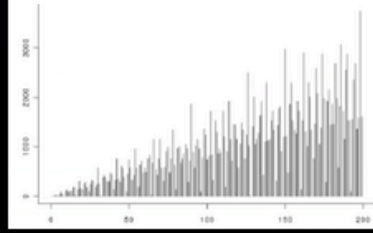
Dodecahedron

MARS
1.52 AU

Tetrahedron
1 : 3

SelfDual

5.20 AU
JUPITER

Cube
1 : sqrt(3)
1 : 1.7321

SATURN
9.54 AU

Cuboctahedron
D3 Root Vectors
Conformal SU(2,2) =
= Spin(2,4)

Cuboctahedron and Rhombic Dodecahedron
are 3-dim central figures of the 4-dim 24-cell

URANUS
19.19 AU

Pioneer
Anomaly
20 AU

Cuboctahedron
1 : 2
(square face inscribed radius)

NEPTUNE
30.06 AU

Rhombic Dodecahedron
1 : sqrt(2)
1 : 1.4142

CONFORMAL
KEPLER

# May 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | 1<br><br>May Day | 2 | 3 | 4 | 5<br><br>Cinco de Mayo |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13<br><br>Mother's Day | 14 | 15 | 16 | 17 | 18 | 19<br><br>Shavuot Begins Sundown |
| 20 | 21<br><br>Victoria Day | 22 | 23 | 24 | 25 | 26 |
| 27 | 28<br><br>Memorial Day | 29 | 30 | 31 | | |
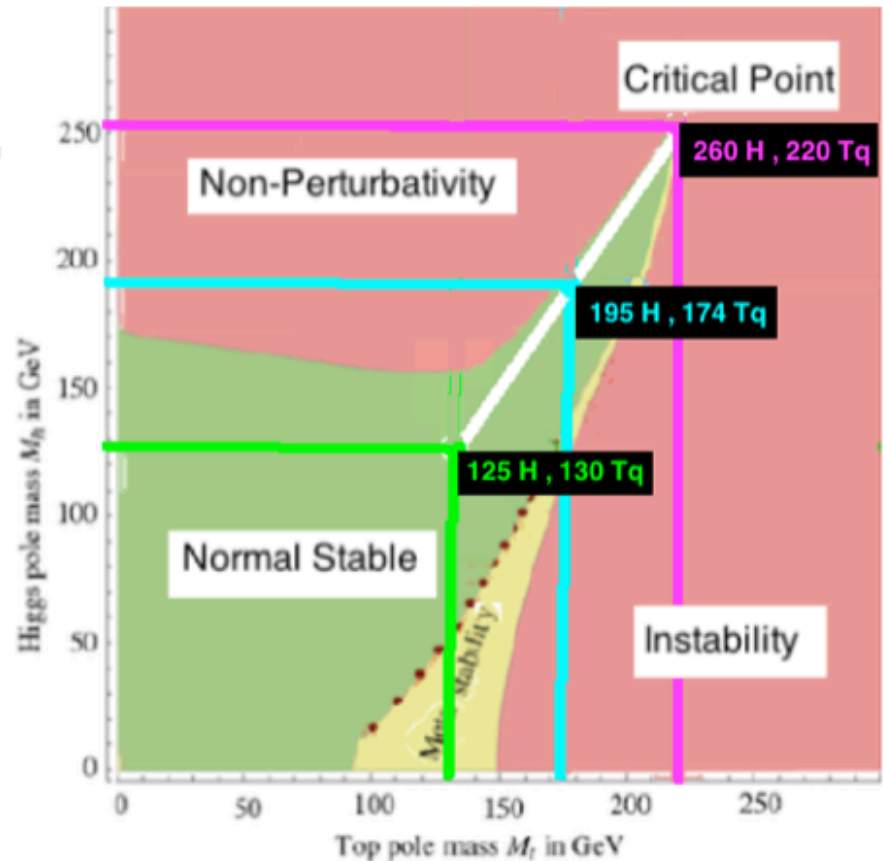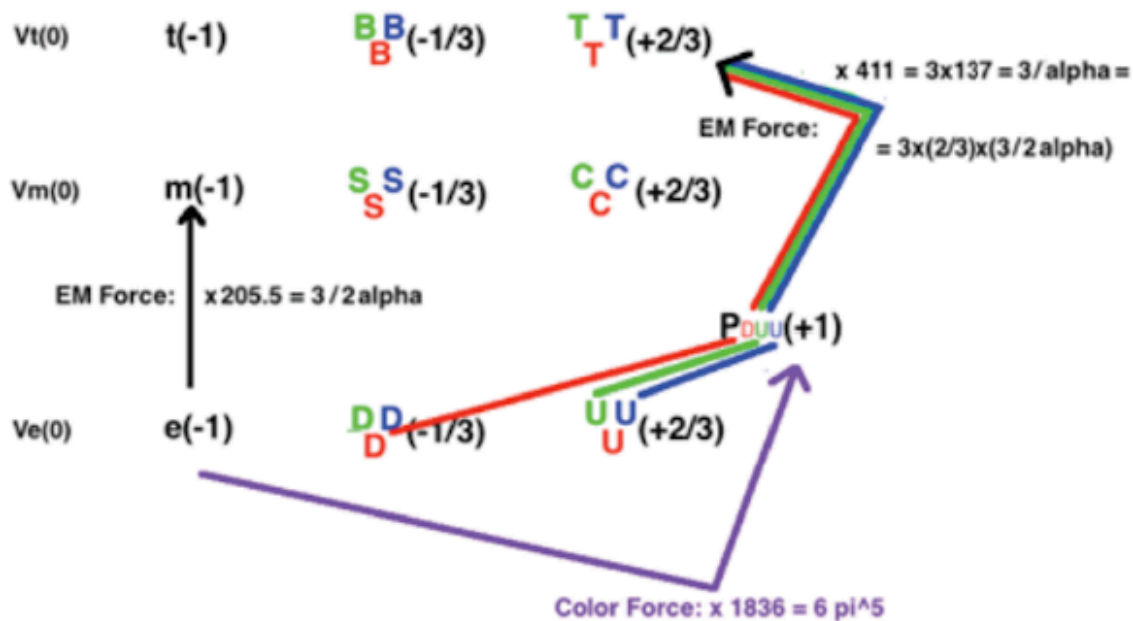
Vt(0)   t(-1)        $^B_B$B(-1/3)      $^T_T$T(+2/3)           x 411 = 3x137 = 3/alpha =

                                         EM Force:              = 3x(2/3)x(3/2 alpha)

Vm(0)   m(-1)        $^S_S$S(-1/3)      $^C_C$C(+2/3)

EM Force:  x 205.5 = 3/2 alpha          P$_{DUU}$(+1)

Ve(0)   e(-1)        $^D_D$D(-1/3)      $^U_U$U(+2/3)

                    Color Force: x 1836 = 6 pi^5

**The Schwinger Sources are finite regions in a Complex Domain spacetime**
**corresponding to Green's functions of particle creation / annihilation.**

The force strength of a given force is

(1 / Mforce^2 ) ( \Vol(MISforce)) ( \Vol(Qforce) / \Vol(Dforce)^( 1 / mforce ))

Mforce represents the effective mass;

mforce is 4 for Gravity and Color force, 2 for Weak force 1 for Electromagnetism

\Vol(Dforce)^( 1 / mforce ) is to reconcile

the dimensionality of the Internal Symmetry Space of the target vertex

with the dimensionality of the link from the origin to the target vertex

| Force | M | Vol(M) | Group | SymSpace | D | Vol(D) | Q | Vol(Q) |
|-------|---|--------|-------|----------|---|--------|---|--------|
| gravity | S^4 | 8pi^2/3 | Spin(5) | Spin(7) / Spin(5)xU(1) | IV5 | pi^5/2^4 5! | RP^1xS^4 | 8pi^3/3 |
| color | CP^2 | 8pi^2/3 | SU(3) | SU(4) / SU(3)xU(1) | B^6(ball) | pi^3/6 | S^5 | 4pi^3 |
| Weak | S^2xS^2 | 2x4pi | SU(2) | Spin(5) / SU(2)xU(1) | IV3 | pi^3/24 | RP^1xS^2 | 4pi^2 |
| e-mag | T^4 | 4x2pi | U(1) | - | - | - | - | - |

# June 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------|---------|-----------|----------|--------|----------|
|  |  |  |  |  | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14<br><br>Flag Day | 15 | 16 |
| 17<br><br>Father's Day | 18 | 19 | 20 | 21<br><br>Summer Begins | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |

Events/10 GeV/c²

Top Mass (GeV/c²)

Run 84676 Event 12814 (eμ)

Run 84395 Event 15530 (μμ)

NUMBER OF EVENTS

m_plt (GeV)
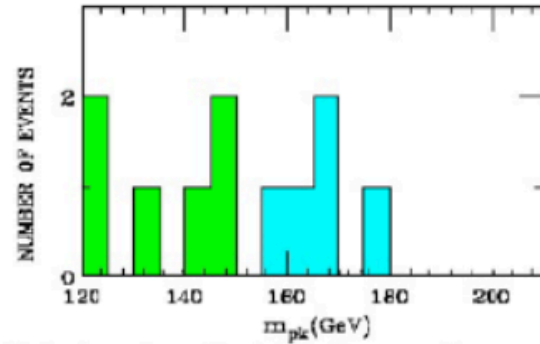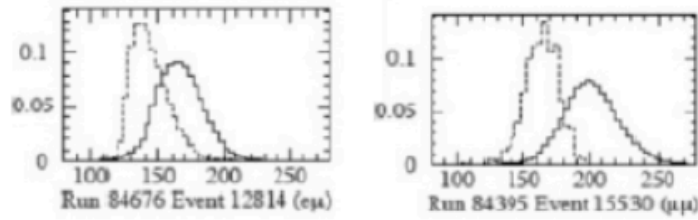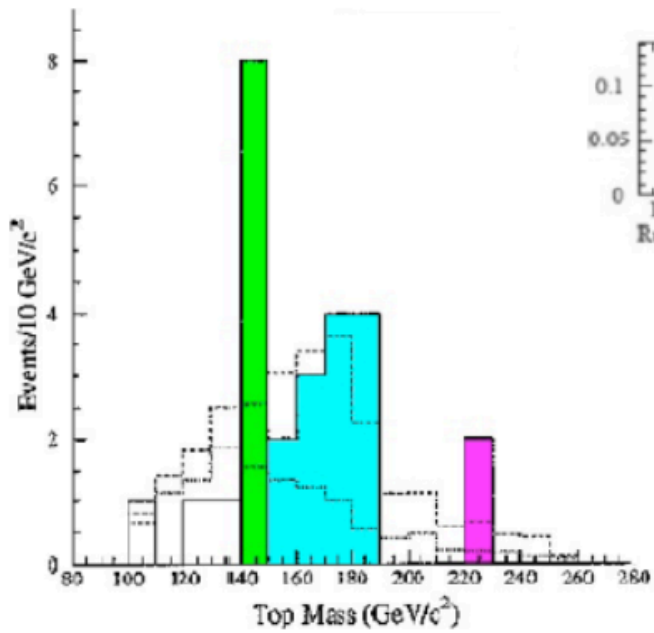
The distribution of m_plt values determined from 11 CDF dilepton events

data
fit
bkgd

(a)

Fit top quark mass (GeV/c²)

95% C.L. limit on σ(gg → H) × BR(H → ZZ) [pb]

**ATLAS** Preliminary
√s = 13 TeV, 36.1 fb⁻¹
$H \rightarrow ZZ \rightarrow l^+l^-l^+l^- + l^+l^-\nu\bar{\nu}$
ggF production

200 GeV

240 GeV
excess of 3.6 sigma

— Observed CL_s limit
······ Expected CL_s limit
Expected ± 1σ
Expected ± 2σ
---- Expected CL_s limit (l⁺l⁻l⁺l⁻)

$m_H$ [GeV]

untagged  4l  2016 Data

CMS *Preliminary*

195 GeV

125 GeV

260 GeV

Events / 5 GeV

GeV
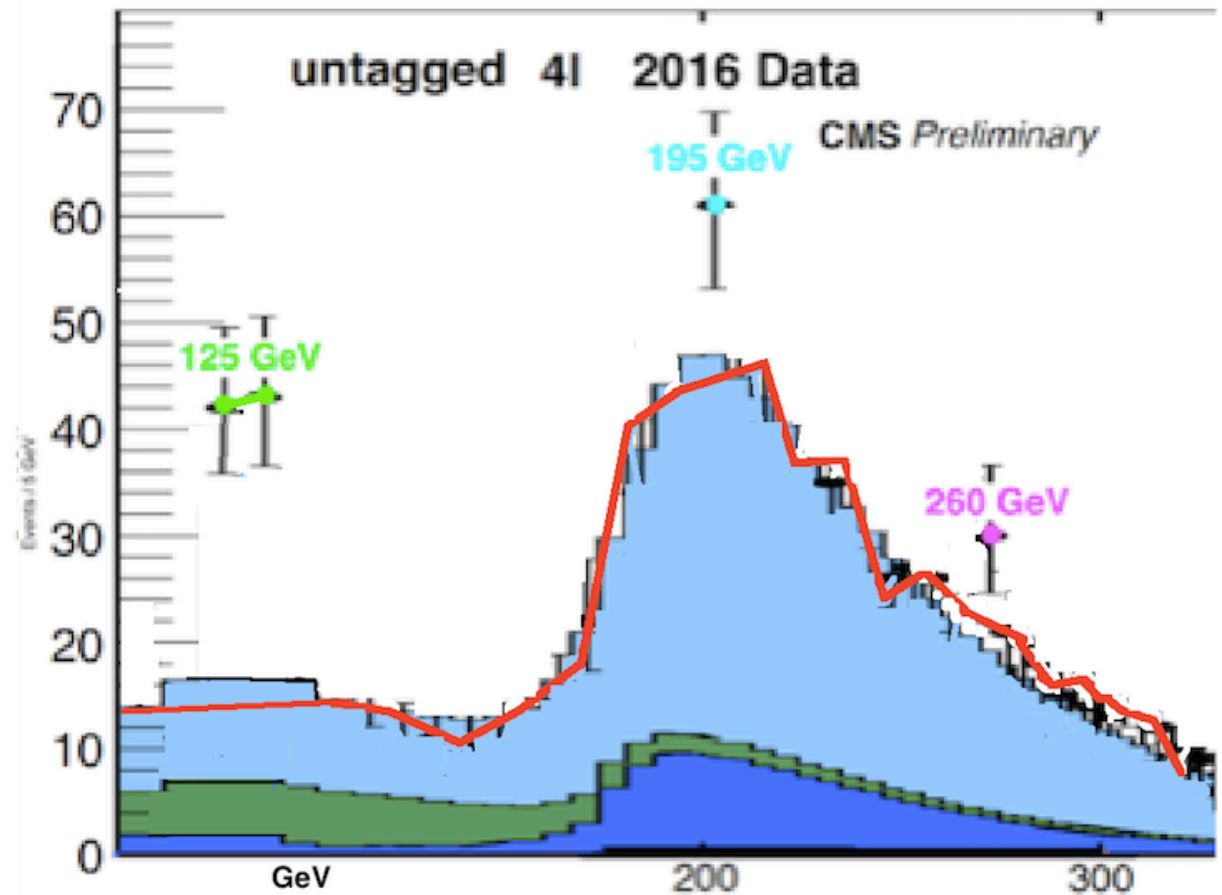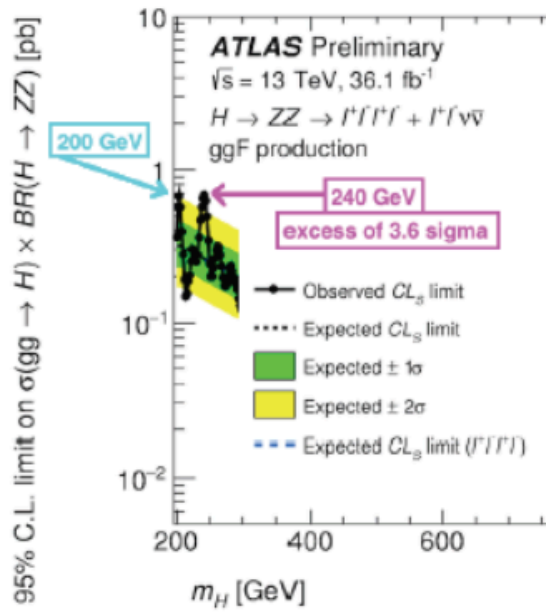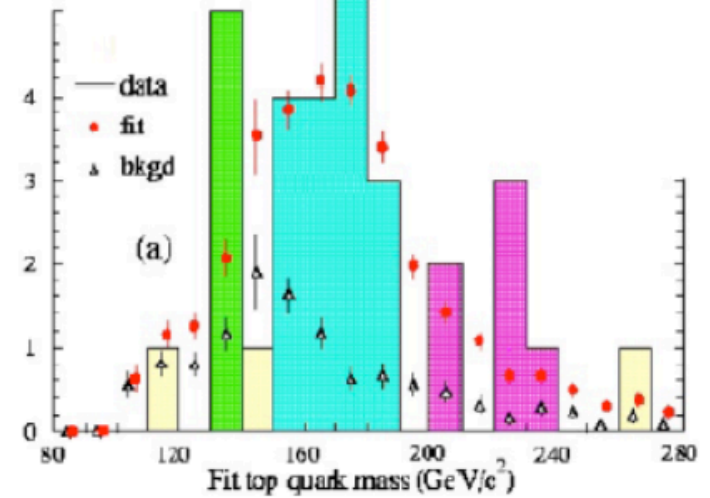
# July 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| 1 <br><br> Canada Day | 2 | 3 | 4 <br><br> Independence Day | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

# Schwinger Pd-D Zeolite
# Quantum Fusion Process:



## Akito Takahashi
## TSC Pd-D Fusion



8Be*

8 MeV electron                    8 MeV electron
16 MeV photon ★ 8 MeV | 8 MeV ★ 16 MeV photon
★★★ 4 MeV photon ★                    ★ 4 MeV photon ★★★
4 MeV positron                    4 MeV positron
8 MeV positron          8 MeV positron
8 MeV photon ★                    ★ 8 MeV photon
4 MeV electron                    4 MeV electron

cubo                icosa

E (eV per atom)

N=147

-3.20
-3.30
-3.34
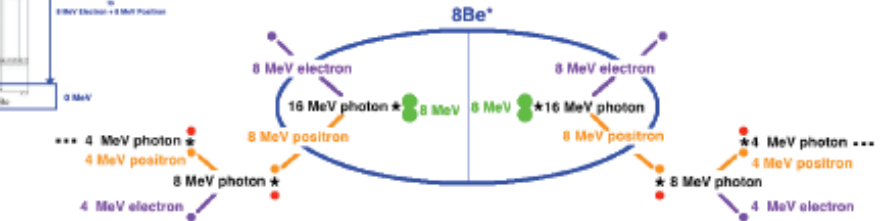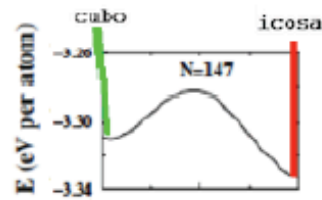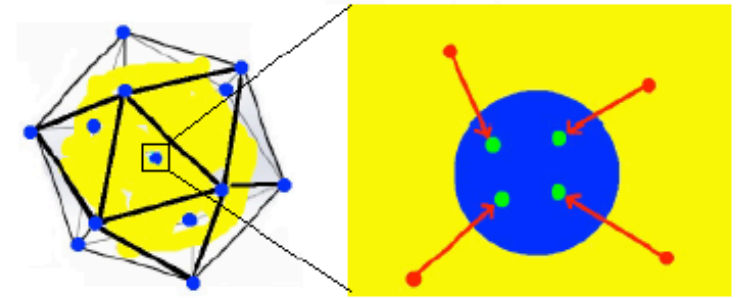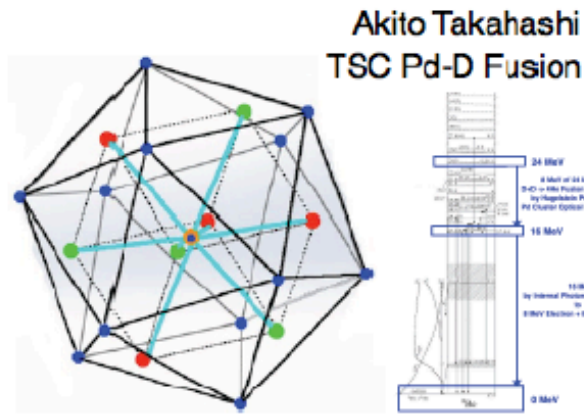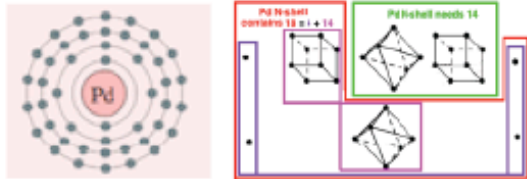
## Sandia-UNM 147-atom Pd Clusters



icosa

cubo

## Klee Irwin Jitterbug Eject He and Reload D



## Peter Hagelstein Nuclear Energy to Pd Structure to Zeolite



**D2O HEAVY WATER**
**from Heated Zeolite and additional D2O**

Deuterium Gas

TSC-Jitterbug Fusion
Reaction Chamber   1

Heat / Cooling Chamber 2

**Deuterated
Zeolite-Pd**

Fusion -> Soft X-ray -> Zeolite Phonon Heat

**HOT Zeolite-Pd**

→ **D2O
STEAM**

Recyle back to Chamber 1

**Cooled Deuterated Zeolite-Pd**
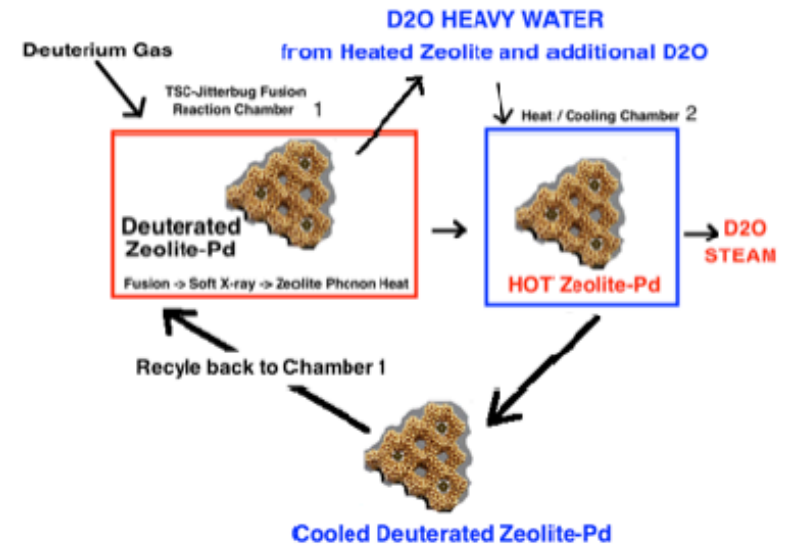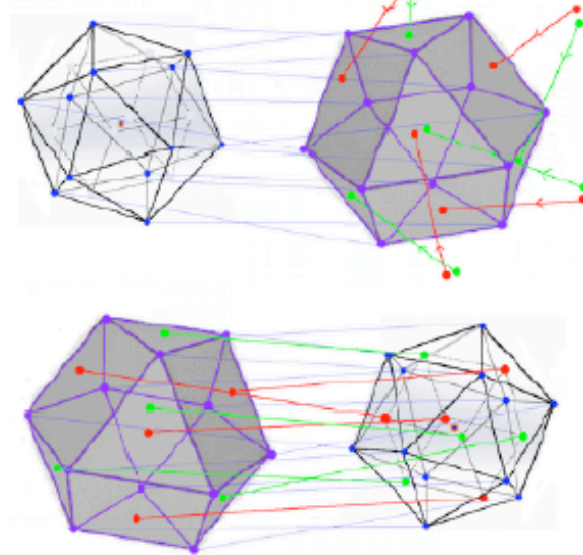
# August 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------|---------|-----------|----------|--------|----------|
|  |  |  | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 |  |

Each QRC State, analogous to a Possible Conscious Thought, is represented by a Chain of Local E8-Cl(16) Deutsch-type Multiverse Snapshots

Each of the Local E8-Cl(16) Multiverse Snapshots is described by an E8 State. Since E8 has 240 Root Vectors and

the 240 Root Vectors correspond to the 240-Polytope (see "Geometric Frustration" by Sadoc and Mosseri (Cambridge 2006) where they say

"The polytope 240 ...[is]... not a regular polytope ... but ... an ordered structure on a hypersphere ... S3 ... which is chiral ...

generated by adding two replicas of the {3,3,5}, displaced along a screw axis of S3 ...")

each Local E8-Cl(16) Multiverse Snapshot is represented by a pair of {3,3,5} 600-cells.
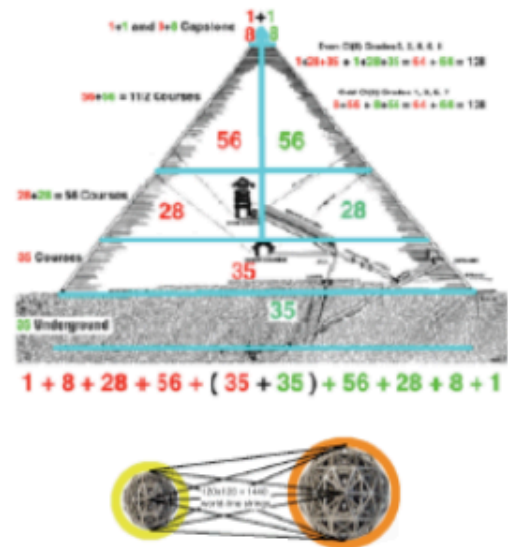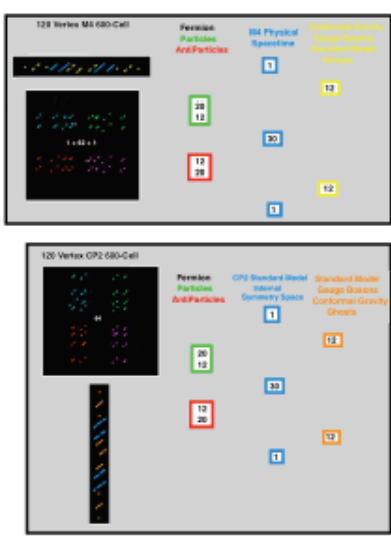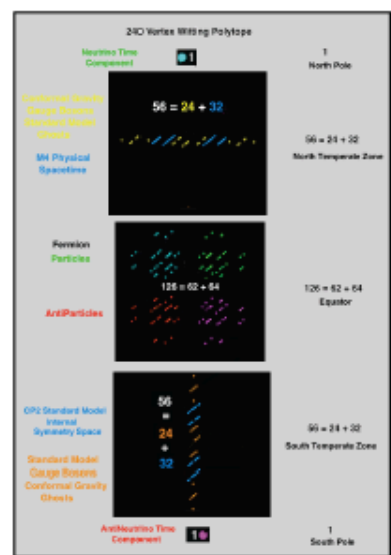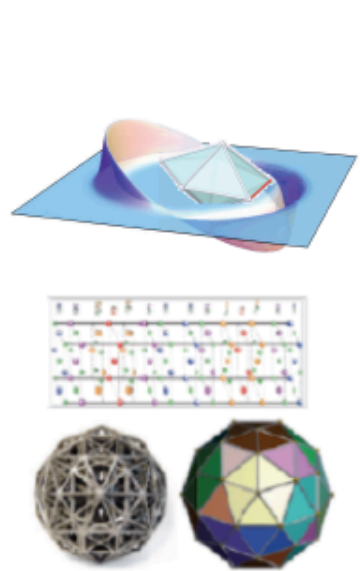


Green, Schwartz, and Witten say in their book "Superstring Theory" vol. 1 (Cambridge 1986)
"... For the ... closed ... bosonic string .... The first excited level ... consists of ... the ground state ... tachyon ... and ... a scalar ... 'dilaton' ... and ... SO(24) ... little group of a ...[26-dim]... massless particle ... and ... a ... massless ... spin two state ...".

Closed string tachyons localized at orbifolds of fermions produce virtual clouds of particles / antiparticles that dress fermions.

Dilatons are Goldstone bosons of spontaneously broken scale invariance that (analogous to Higgs) go from mediating a long-range scalar gravity-type force to the nonlocality of the Bohm-Sarfatti Quantum Potential.

The SO(24) little group is related to the Monster automorphism group that is the symmetry of each cell of Planck scale local lattice structure.

The massless spin two state is the carrier of the Bohm-Sarfatti Quantum Potential. Peter R. Holland says in his book "The Quantum Theory of Motion" (Cambridge 1993)
"... the total force ... from the quantum potential ... does not ... fall off with distance ... because ... the quantum potential ... depends on the form of ...[the quantum state]... rather than ... its ... magnitude ...".

First consider Superposition of States involving one tubulin
with one electron of mass m and two different position states separated by a .
The Superposition Separation Energy Difference is the gravitational energy
$$E_{electron} = G \, m^2 / a$$
For any single given tubulin a = 1 nanometer = $10^{-7}$ cm so that for a single Electron
$$T = h / E_{electron} = (Compton / Schwarzschild)(a/c) = 10^{26} \, sec = 10^{19} \, years$$
Now consider the case of N Tubulin Electrons in Coherent Superposition
Jack Sarfatti defines coherence length L by $L^3 = N \, a^3$ so that
the Superposition Energy $E_N$ of N superposed Conformation Electrons is
$$E_N = G \, M^2 / L = N^{5/3} \, E_{electron}$$
The decoherence time for the system of N Tubulin Electrons is
$$T_N = h / E_N = h / N^{5/3} E_{electron} = N^{-5/3} \, 10^{26} \, sec$$

| Number of Involved Tubulin Dimers | Time $T_N$ | |
|---|---|---|
| $10^{(11+9)} = 10^{20}$ | $10^{(-33 + 26)} = 10^{-7}$ sec | $10^{11}$ neurons x $10^9$ TD / neuron |
| $10^{16}$ | $10^{(-27 + 26)} = 10^{-1}$ sec - 10 Hz - Human Alpha EEG is 8 to 13 Hz - | |

Fundamental Schumann Resonance is 7.8 Hz -
Time of Hamiltonian Circuit of $10^{16}$ TD separated from nearest neighbors
by 10 nm is $10^{16}$ x 10 nm / c = ($10^{16}$ x $10^{-6}$) cm / c = $10^{10}$ cm / c = 0.3 sec -

**Bohm Potential Force Moves Particle**

$$Re\left[\frac{1}{\langle f | i \rangle}\left(-i\bar{\Psi}_f z^a \partial_a \Psi_i + m\bar{\Psi}_f \Psi_i\right)\right] \qquad \mp \alpha_i g_i b_i \left|u_a u^a\right|^n + \alpha_i a_{i,e} \beta^a$$

**Particle Source Modifies Bohm Potential**

**Cl(2,4) Conformal Vectors** $\quad$ **CP2** $\quad$ **OP2**

$1 + 8 + 28 + 56 + ( 35 + 35 ) + 56 + 28 + 8 + 1$
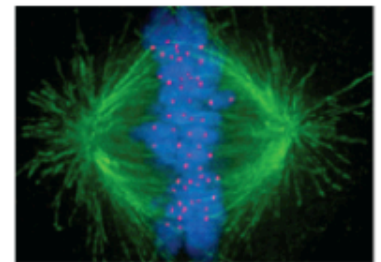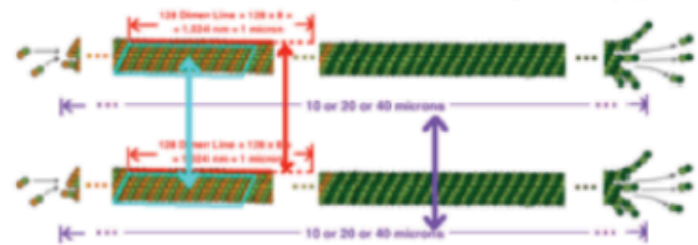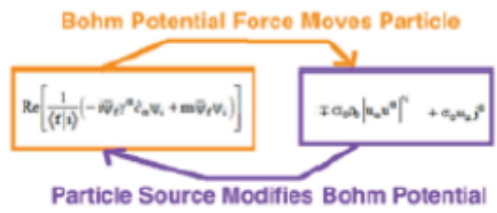
# September 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------|---------|-----------|----------|--------|----------|
| | | | | | | 1 |
| 2 | 3<br><br>Labor Day | 4 | 5 | 6 | 7 | 8 |
| 9<br><br>Grandparents Day<br>Rosh Hashanah | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18<br><br>Yom Kippur | 19 | 20 | 21 | 22<br><br>Autumn Begins |
| 23  30 | 24 | 25 | 26 | 27 | 28 | 29 |
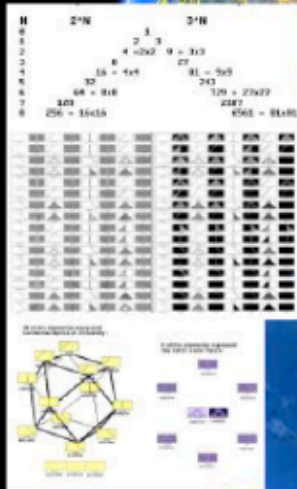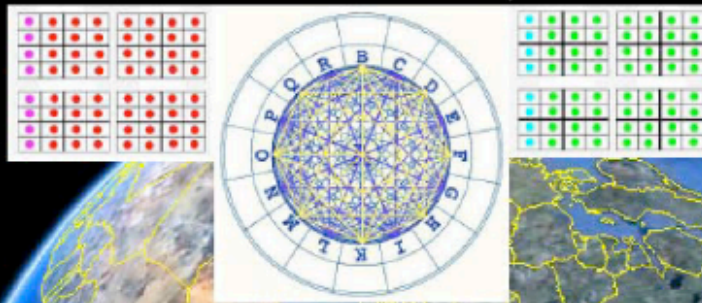
The first richa of the first sukt has 24 syllables plus 24 gaps.
It is followed by 8 lines,
each with 8+8 = 16 Sanskrit syllables left of the I line
and 8 Sanskrit syllables right of the I line,
for 24 Sanskrit syllables per line
and 8x24 = 192 syllables for all 8 lines.
The grand total is 24+24+192 = 240 = Root Vectors of E8.
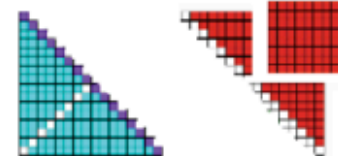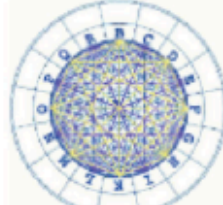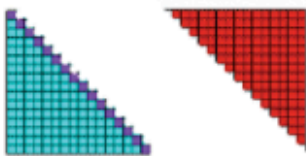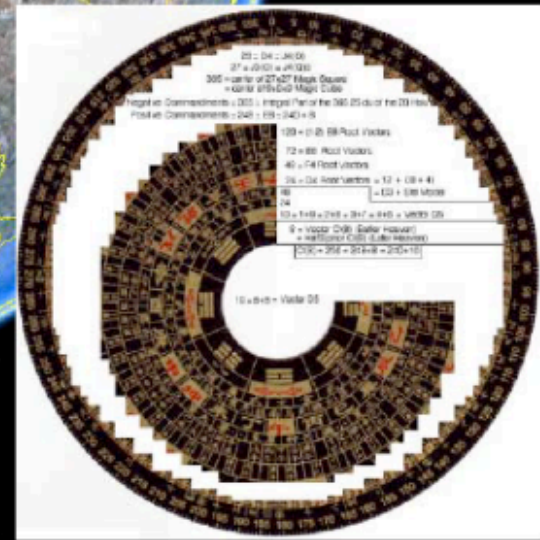
# October 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 <br><br> Columbus Day | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 <br><br> Halloween | | | |
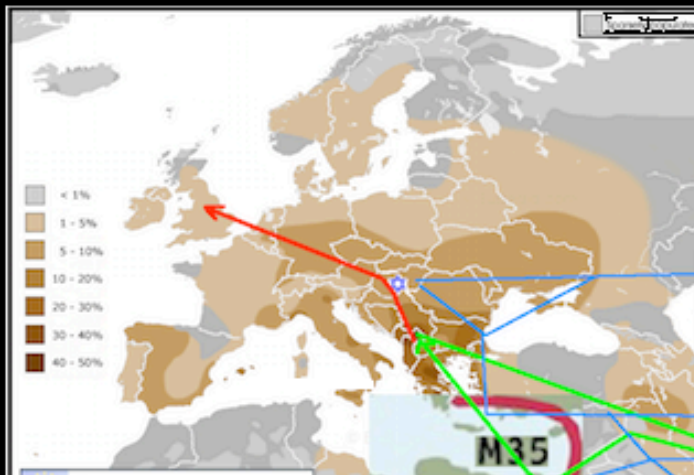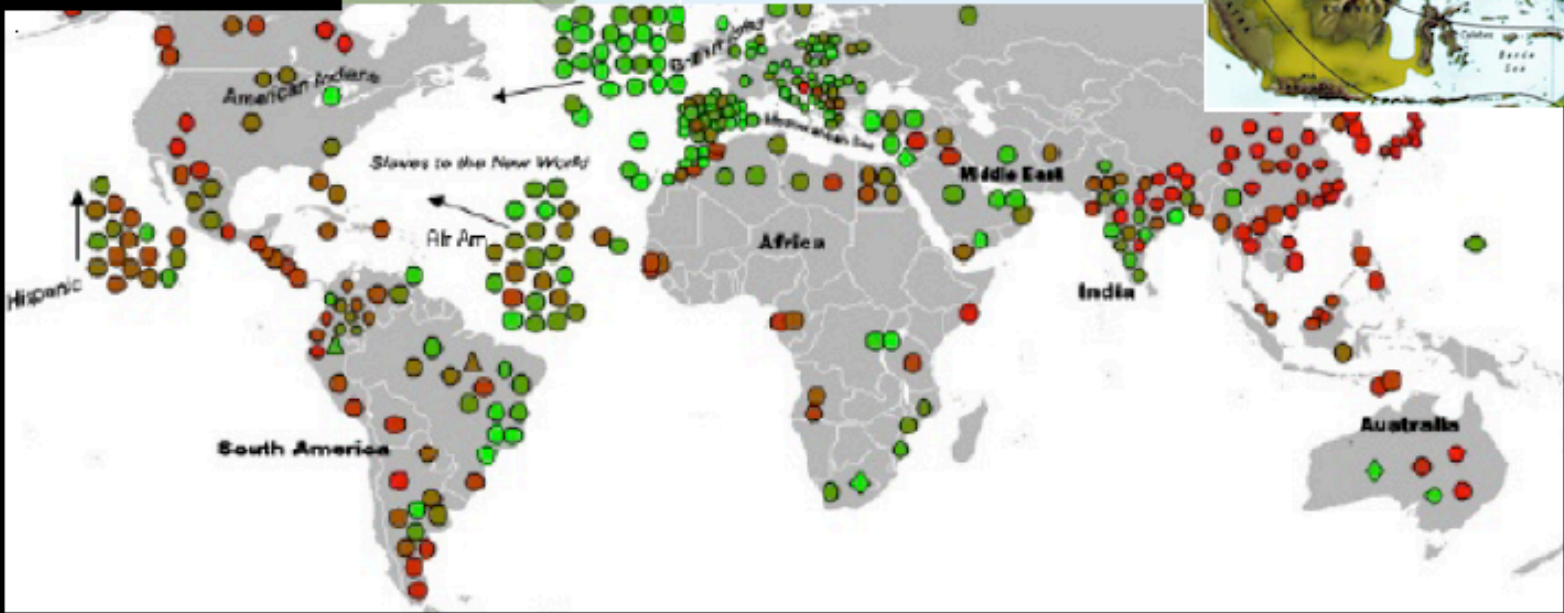
# November 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------|---------|-----------|----------|--------|----------|
|        |        |         |           | 1        | 2      | 3        |
| 4 <br><br> Daylight Savings Ends | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 <br><br> Veterans Day | 12 <br><br> Veterans Day (Observed) | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 <br><br> Thanksgiving | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | |

| Cl(8) that contains 28 = D4 for NCG M Gravity | Cl(8) that contains 28 = D4 for NCG F SM | |
|---|---|---|
| | | 1 |
| | | 16 |
| | | 120 |
| | | 560 |
| | | 1820 |
| | | 4368 |
| | | 8008 |
| | | 11440 |
| 1 | 1 | 12870 |
| 8 | 8 | 11440 |
| 28 | 28 | 8008 |
| 56 | 56 | 4368 |
| 70 x | 70 = | 1820 |
| 56 | 56 | 560 |
| 28 | 28 | 120 = D8 |
| 8 | 8 | 16 |
| 1 | 1 | 1 |
| Cl(8) x | Cl(8) = | Cl(16) |

**NJL Quantum Condensate**

**10^19 E8 Lattice 240-vertex Polytope Cells in Universe at End of Inflation**

Afterglow Light Pattern 380,000 yrs.
Dark Ages
Development of Galaxies, Planets, etc.
Dark Energy Accelerated Expansion
Inflation
Quantum Fluctuations
1st Stars about 400 million yrs.
Big Bang Expansion
13.7 billion years

**Quantum Resonant Connection**

**10^19 Tubulin Dimers in a Human Brain**

Motor cortex is involved in conscious thought and controls the voluntary movement of body parts
Somatosensory cortex receives and processes sensory signals from the body

FRONTAL LOBE
PARIETAL LOBE
OCCIPITAL LOBE
TEMPORAL LOBE
PLANNING
LANGUAGE EXPRESSION
SPEECH
MOVEMENT
TASTE
TOUCH
LANGUAGE RECEPTION
VISION

Visual cortex receives and processes signals from the retinas of the eyes

**Penrose-Hameroff Quantum Condensate**

Microtubules 40 microns long have 65,536 Tubulin Dimers

IN MEMORY OF

# December 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | | | 1 |
| 2 <br><br> Hanukkah | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 <br><br> Winter Begins | 22 |
| 23   30 | 24   New Year's Eve   31 | 25 <br> Christmas Day | 26 <br> Kwanzaa | 27 | 28 | 29 |

D8 / D4 x D4

E8 / D8

D4

D4

E8

LO CEL EMPIRI
Lo Firmament
N'Àries
En Pisces    En Taurus    denant
En Aquàrius    En Gèmini    Jesucrist e
En Capricornus    En Càncer    Nostra
En Saturnus    En Leo    Dona
En Júpiter
En Mars
Lo Sol
En Venus
En Mercuri
La Luna
Foc
Àer
Aigua
Terra
En Virgo
En Libra
N'Escorpió    En Sagitari
Los àngels
les ànimes de sancts hòmens en
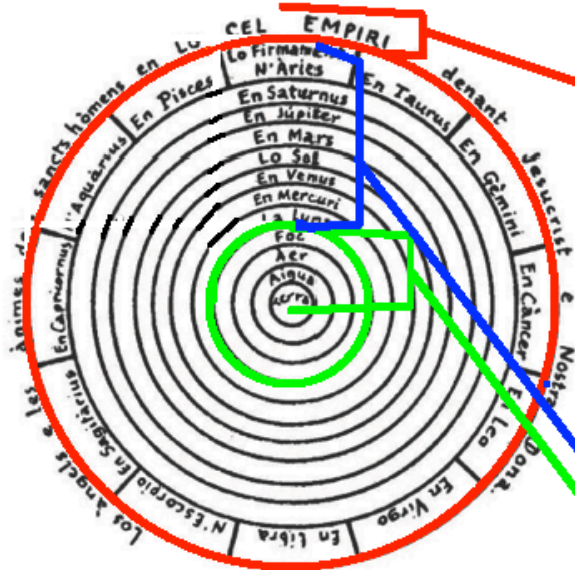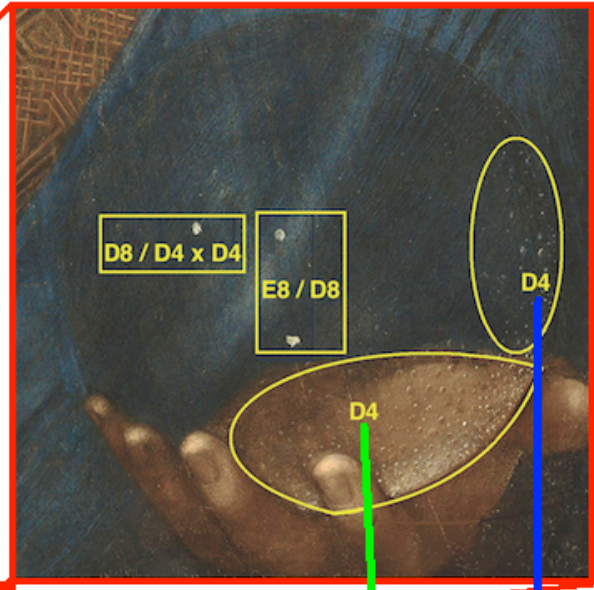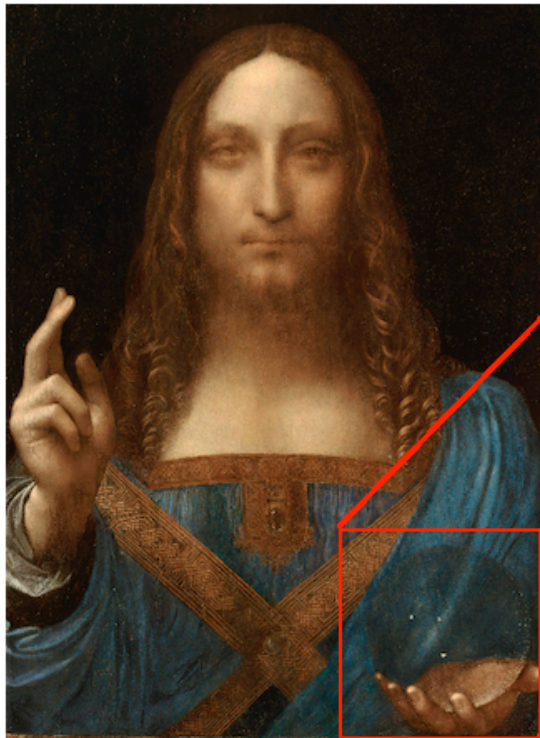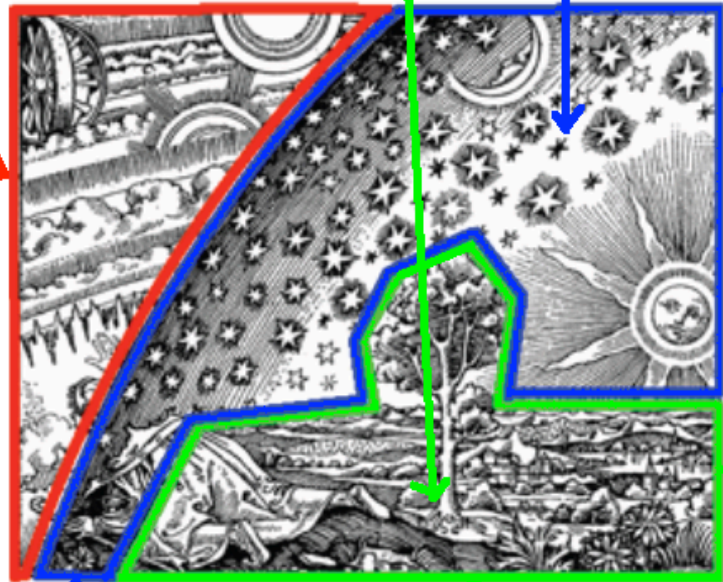
# January 2019 (United States)

February 2019

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   |   |   |   |   | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 |   |   |

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| 30 | 31 | 1 New Year's Day | 2 | 3 | 4 | 5 ● New Moon |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 ◑ 1st Quarter | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 Martin Luther King Jr. Day<br>Tu Bishvat/Tu B'Shevat<br>○ Full Moon | 22 | 23 | 24 | 25 | 26 |
| 27 ◐ 3rd Quarter | 28 | 29 | 30 | 31 | 1 | 2 |

D8 / D4xD4

E8 / D8

M4

CP2

1 Mold + 3 Mobiles
( 4-dim M4 )

1 Mold + 3 Mobiles
( 4-dim CP2 )

8 Connectors for 8 Molds (E8)
have 16 Segments (Cl(16))

8 Connectors for 8 Molds (E8)
have 16 Segments (Cl(16))

8 Molds + 6 Cube Faces + 2 Runners =
= 16 U(2,2) in 28-dim D4

Duchamp Originally had 8 Molds
(Llull Originally had 16 Vertices)

8 Molds + 6 Cube Faces + 2 Runners =
= 16 U(4) in 28-dim D4

Duchamp changed to 9 as he liked 3
Did he not know that 8 = 2^3 ?
(Llull changed to 9 to sell to simple minds)

Qua S3

Oct S7

Qua S3

Oct S7

Spin(8)
D4

Spin(8)
D4

# February 2019 (United States)

March 2019

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   |   |   |   |   | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 |   |   |   |   |   |   |

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-----|-----|-----|-----|-----|-----|-----|
| 27 ◑ 3rd Quarter | 28 | 29 | 30 | 31 | 1 | 2 |
| 3 | 4 ● New Moon | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 ◐ 1st Quarter | 13 | 14 | 15 | 16 |
| 17 | 18 Presidents' Day | 19 ○ Full Moon | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 ◑ 3rd Quarter | 27 | 28 | 1 | 2 |

**Alien Mind**

**Big Bang - Inflation -** — **- Conformal Evolution**

**E8 240 - 2160 -** — **- 17520 = 240 + 8x2160**

1

**Alien** 36

**Eyes** 6

60

**1+6 = 7 of S7**

**36x60 = 2160 = E8 Layer 2**

**Alien LGL+LGL Body**

# March 2019 (United States)

timeanddate.com

April 2019

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 |   |   |   |   |

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| 24 | 25 | 26 ◑ 3rd Quarter | 27 | 28 | 1 | 2 |
| 3 | 4 | 5 | 6 ● New Moon | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 ◐ 1st Quarter | 15 | 16 |
| 17 | 18 | 19 | 20 March equinox ○ Full Moon | 21 Purim | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 ◑ 3rd Quarter | 29 | 30 |
| 31 | 1 | 2 | 3 Isra and Mi'raj | 4 | 5 ● New Moon | 6 |

Vega = North Star:
**11600 BP** - Vela X
Manetho Rule of Mortal Humans
**37000 BP** - Geminga
Wisconsin Glaciation
Manetho Rule of Gods

Vega

Geminga

Sphinx

Betelgeuse

Regulus

Sirius

ECLIPTIC

Vela X

RK Alpha Centauri

Heliopolis
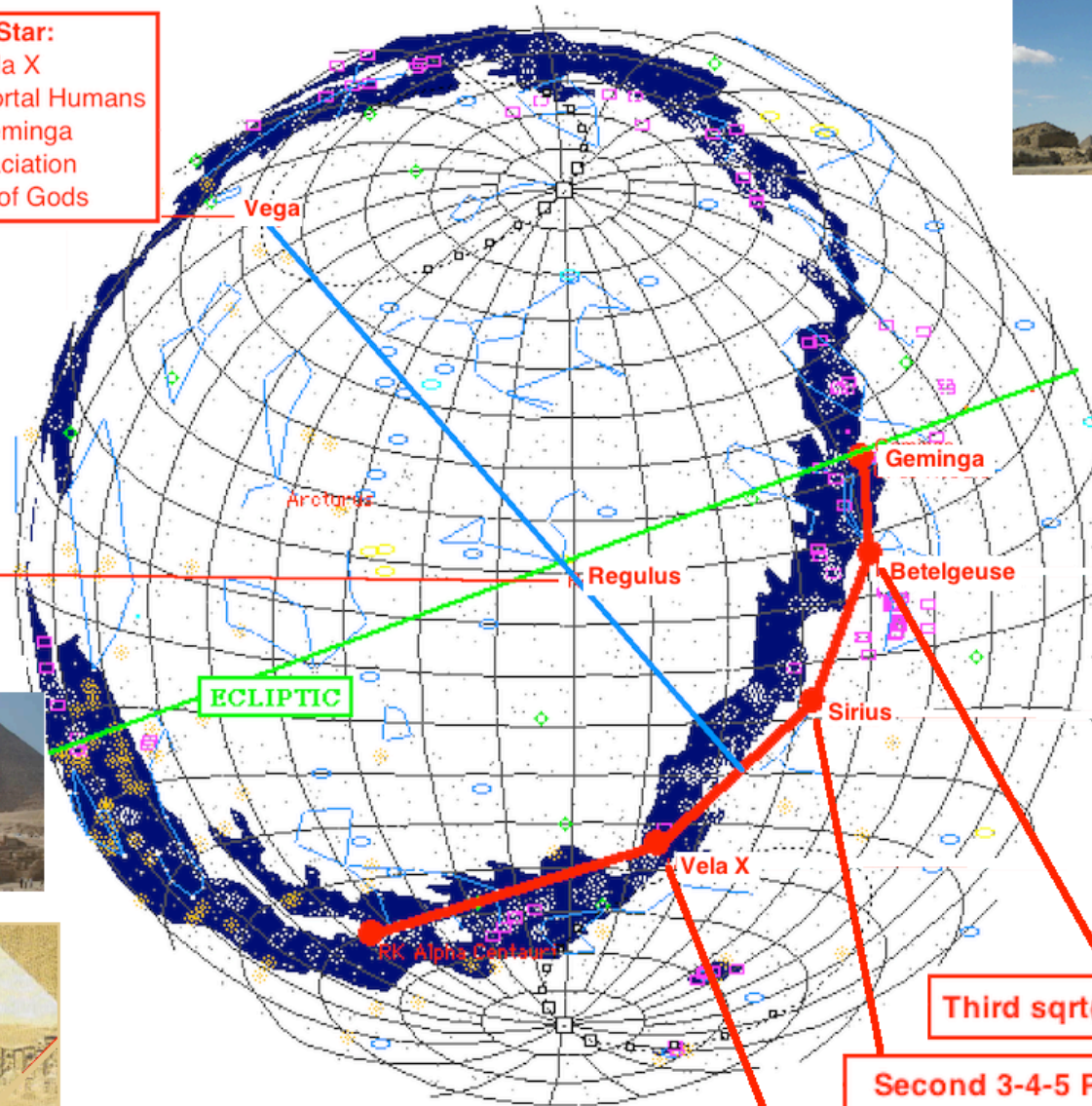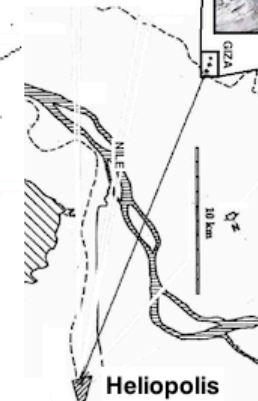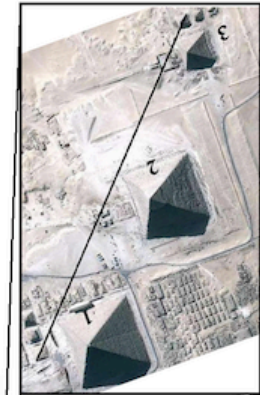
Third sqrt(2) x 10/9 Pyramid

Second 3-4-5 Pyramid

Great Golden Cl(8) Pyramid

June 21 2006

Summer Solstice
Sunset

"Equinoctial"
Sunrise

March 21 2005
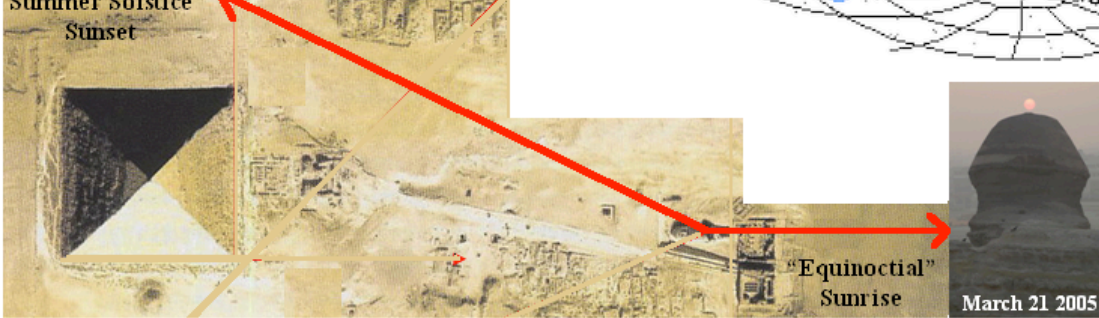
# April 2019 (United States)

**May 2019**

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   |   |   | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 |   |

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| 31 | 1 | 2 | 3 Isra and Mi'raj | 4 | 5 ● New Moon | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 ◑ 1st Quarter | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 Good Friday (Many regions) ○ Full Moon | 20 Passover (first day) |
| 21 Easter Sunday | 22 Easter Monday | 23 | 24 | 25 | 26 ◐ 3rd Quarter | 27 Last Day of Passover |
| 28 | 29 | 30 | 1 Yom HaShoah | 2 | 3 | 4 ● New Moon |

B4
28
8
+ sqrt(256) = 16 = **52 F4**

**CP2**
CP2 = SU(3) / SU(2)xU(1)

D8
120
+ (1/2) sqrt(65,536) = 128 = **248 E8**

**(Cnf6 -> M4) x CP2**

B4
28
8
+ sqrt(256) = 16 = **52 F4**

**Cnf6 -> M4**

1
8
28
56
70
56
28
8
1

1
16
120
560
1820
4368
8008
11440
12870
11440
8008
4368
1820
560
120
16
1

65,536 - 40 microns

128 - 1 micron

120

1
8
28
56
70
56
28
8
1

256

x

256

= 65,536

Cl(8)    x    Cl(8)

= Cl(16)

56  56
28    28
35
35
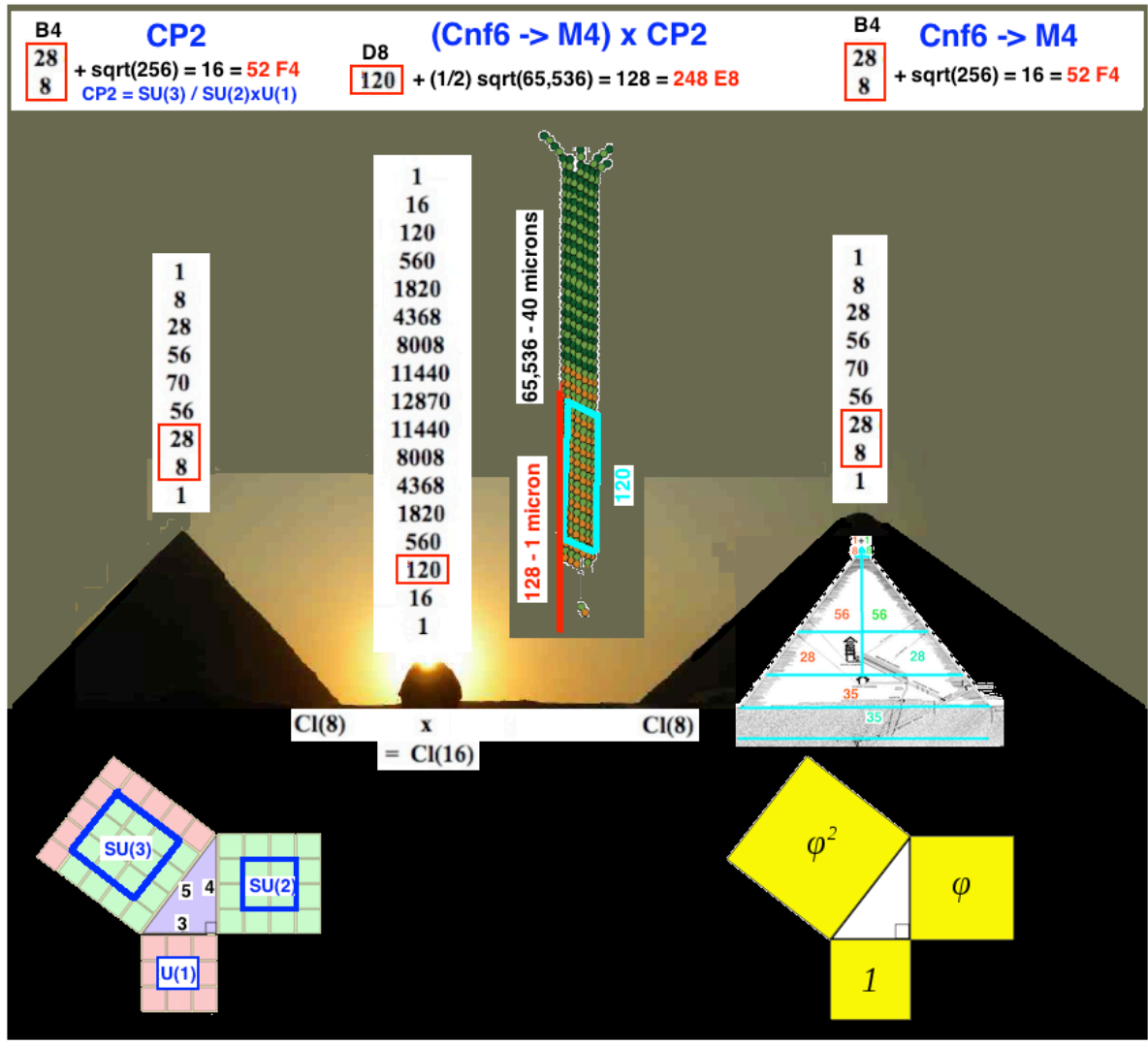
**52-dim F4 of CP2** in **256-dim Cl(8)**

F4 / B4 = OP2 = Spinor Fermions =
= 8 Particles + 8 AntiParticles
B4 / D4 = 8-dim SpaceTime =
= Kaluza-Klein M4 x CP2
D4 = Spin(8) contains Spin(6) = SU(4)
contains SU(3) Color Force
SU(3) Color Force = Global Symmetry
of CP2 = SU(3) / SU(2)xU(1)
SU(2)xU(1) ElectroWeak Force =
= Local Symmetry of CP2

SU(3)

SU(2)

5   4

3

U(1)

$\varphi^2$

$\varphi$

1

**52-dim F4 of Cnf6 -> M4** in **256-dim Cl(8)**

F4 / B4 = OP2 = Spinor Fermions =
= 8 Particles + 8 AntiParticles
B4 / D4 = 8-dim SpaceTime =
= Kaluza-Klein M4 x CP2
D4 = Spin(4,4) contains Spin(2,4) of
Conformal Gravity + Dark Energy

Cross section

Cross section

**E8 Kaluza-Klein (Cnf6 -> M4) x CP2**

In ( Cl(8) of CP2 ) x ( Cl(8) of Cnf6 -> M4 ) = Cl(16)
containing E8
at each of the 256 points of Cl(8) of Cnf6 -> M4
there are all 256 points of Cl(8) of CP2

E8 / D8 = 128-dim Fermion Spinor Space = 8 components of 8+8 Fermions
D8 / D4 x D4 = A7+1 = 64 = 8-dim position x 8-dim momentum
D4 containing D3 = Spin(2,4) = A3 = SU(2,2) for Conformal Gravity + Dark Energy
D4 containing D3 = SU(4) containing Color Force SU(3)

timeanddate.com

# May 2019 (United States)

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| 28 | 29 | 30 | 1 Yom HaShoah | 2 | 3 | 4 ● New Moon |
| 5 | 6 Ramadan starts | 7 | 8 | 9 Yom Ha'atzmaut | 10 | 11 ◑ 1st Quarter |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 ○ Full Moon |
| 19 | 20 | 21 | 22 | 23 Lag BaOmer | 24 | 25 |
| 26 ◐ 3rd Quarter | 27 Memorial Day | 28 | 29 | 30 | 31 Lailat al-Qadr | 1 |

# 24-Cell D4 to Pyramid F4 to E6 Tarot to 240-Polytope E8 Giza
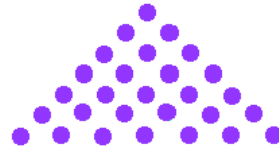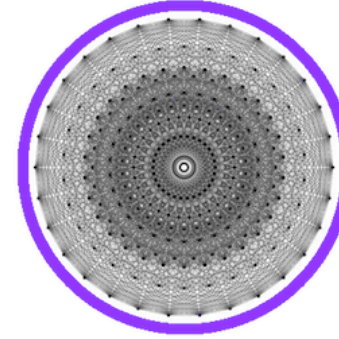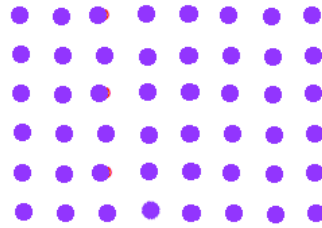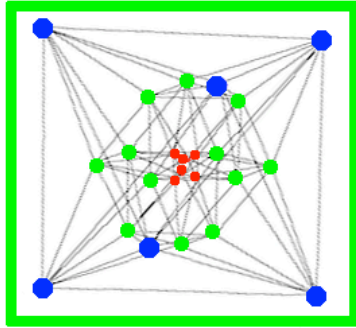


**78-dim E6 = 52-dim F4 + 26-dim J(3,O)o**

**2 Complex Structure Elements** of 78-dim E6 are absorbed into **48+48+48+28 = 144 of 248-dim E8**
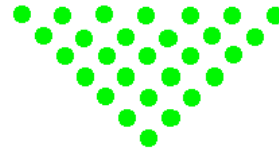
**28-dim D4**

**52-dim F4**

**78-dim E6**
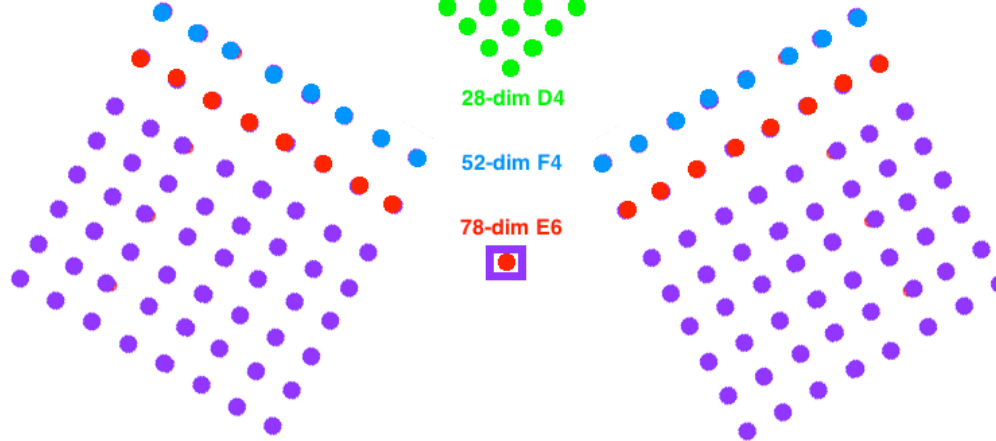
E6 / ( D5xU(1) ) = 32-Real-dim Symmetric Space of Type EIII = (CxO)P2
16-Complex-dim NonCompact Dual = Type V Bounded Domain in subspace of J(3,CxO)
Shilov Boundary = Not Tube Type = 8-Complex-dim =
= bundle with fiber S1xS7 and base space S9 with fibration S1 -> S9 -> CP4
each fiber S1xS7 = Shilov Boundary for D5 / ( D4xU(1) ) = Lie Sphere RP1xS7

| Force | Hermitian symmetric space | | M | Vol(M) | D | Vol(D) | | Qforce | Vol(Q) |
|---|---|---|---|---|---|---|---|---|---|
| gravity | Spin(5) | Spin(7) / Spin(5)xU(1) | S^4 | 8pi^2/3 | IV5 | pi^5/2^4 5! | 4 | RP^1xS^4 | 8pi^3/3 |
| color | SU(3) | SU(4) / SU(3)xU(1) | CP^2 | 8pi^2/3 | B^6(ball) | pi^3/6 | 4 | S^5 | 4pi^3 |
| Weak | SU(2) | Spin(5) / SU(2)xU(1) | S^2xS^2 | 2x4pi | IV3 | pi^3/24 | 2 | RP^1xS^2 | 4pi^2 |
| e-mag | U(1) | - | T^4 | 4x2pi | - | - | 1 | - | - |

# June 2019 (United States)

July 2019

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 |   |   |   |

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| 26 3rd Quarter | 27 Memorial Day | 28 | 29 | 30 | 31 Lailat al-Qadr | 1 |
| 2 | 3 New Moon | 4 | 5 Eid al-Fitr | 6 | 7 | 8 |
| 9 Shavuot | 10 1st Quarter | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 Full Moon | 18 | 19 | 20 | 21 June Solstice | 22 |
| 23 | 24 | 25 3rd Quarter | 26 | 27 | 28 | 29 |
| 30 | 1 | 2 New Moon | 3 | 4 Independence Day | 5 | 6 |

# Ramon Llull Wheels:

Tensor Product RxCxHxO = T = 64-dim =

T + T = 128-dim = E8 / D8



The Figure of Fire (hot)  The Figure of Air (moisture)
The Figure of Water (cold)  The Figure of Earth (dryness)

**Y** TRUTH     **Z** FALSEHOOD

120-dim D8
and E8 / D8 = (OxO)P2

Binary Real Clifford Algebras
of tensor product Cl(8) x Cl(8) = Cl(16)

**X**
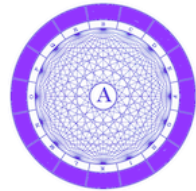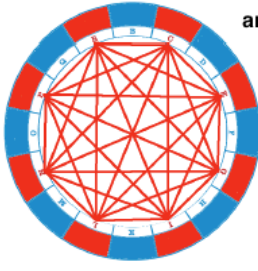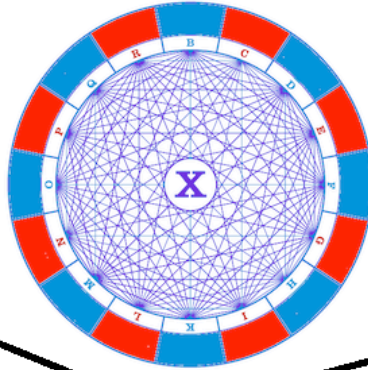
28-dim D4

120-dim D8
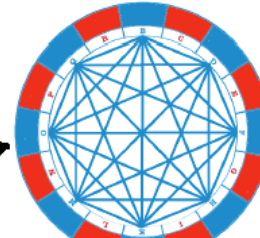
28-dim D4
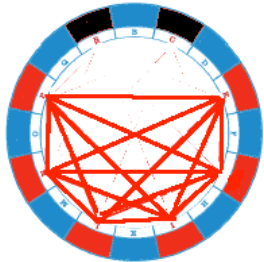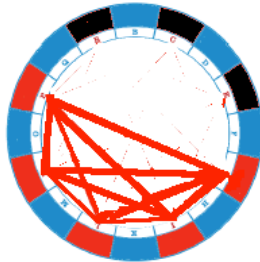
15-dim Spin(2,4)     10-dim Spin(2,3)
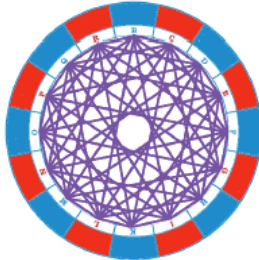
64-dim A7+R
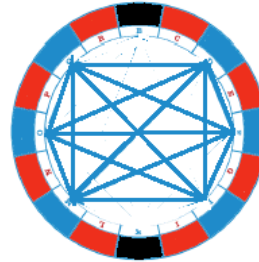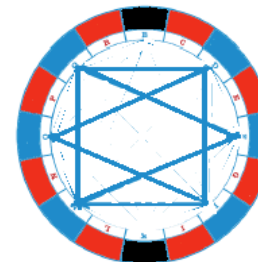
15-dim SU(4)     8-dim SU(3)     4-dim SU(2)xU(1)

**T**
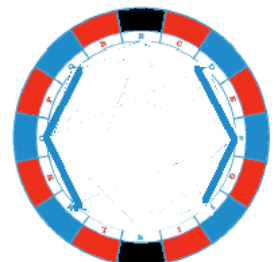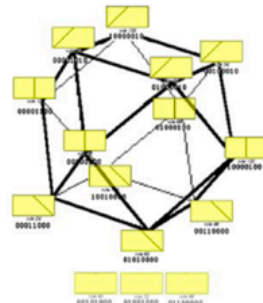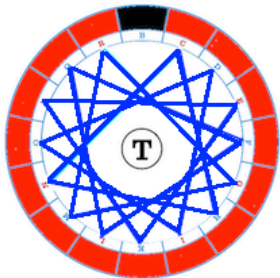
3 = Cartan Subalgebra D3 = A3

**V**

**S**

4 x 3 = Cuboctahedron Vertices D3 = A3
D3 = A3 acts Conformally on M4 of M4 x CP2 Kaluza-Klein
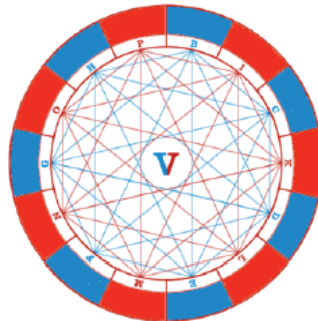
42 Assessors = 21-dim Spin(7) + 21-dim Spin(7)
Zero Divisors of Sedenions
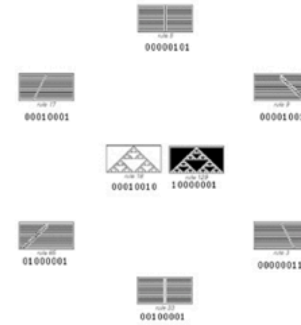
4 + 4 = Cube Vertices = A2 =
= SU(3) of CP2 = SU(3) / SU(2)xU(1)
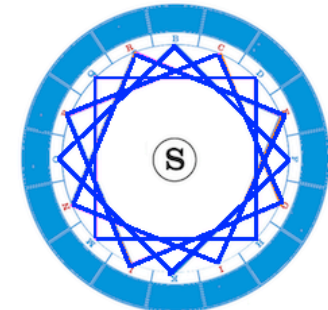
4 = CP2 of M4 x CP2 Kaluza-Klein
4 = SU(2)xU(1) of CP2 = SU(3) / SU(2)xU(1)

# July 2019 (United States)

August 2019

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| 30 | 1 | 2 ● New Moon | 3 | 4 Independence Day | 5 | 6 |
| 7 | 8 | 9 ◑ 1st Quarter | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 ○ Full Moon | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 ◑ 3rd Quarter | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 ● New Moon | 1 | 2 | 3 |
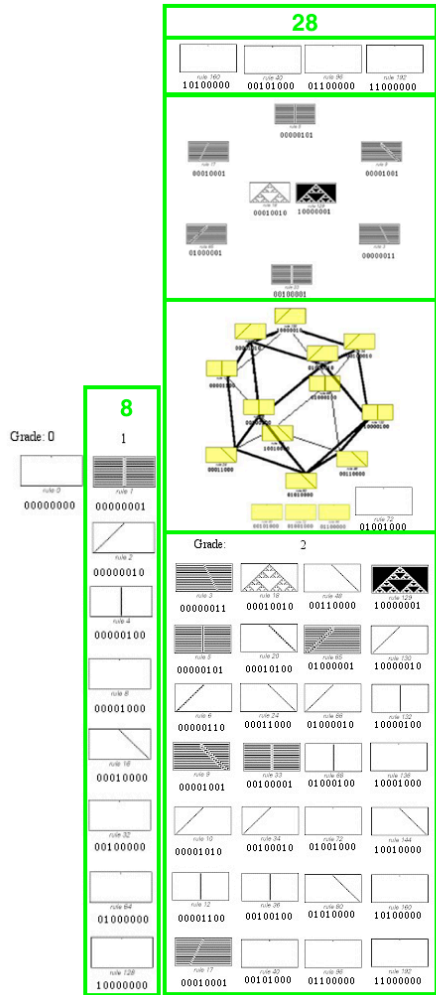
## 256-dim Cl(8) as Cellular Automata

**28**



**8+28+16 = 52 F4**

### 16

**Cl(8) Primitive Idempotent has 16 Terms**

$f = (1/2)( 1 + e_{1248} )(1/2)( 1 + e_{2358} )(1/2)( 1 + e_{3468} )(1/2)( 1 + e_{4578} ) =$

$=(1/16)( 1 + e_{1248} + e_{2358} + e_{3468} + e_{4578} + e_{5618} + e_{6728} + e_{7138} - e_{3567} - e_{4671} - e_{5712} - e_{6123} - e_{7234} - e_{1345} - e_{2456} + e_J )$

**corresponding to 16 of the 256 Cellular Automata**

- $e_{12345678}$
- $e_{6728} + e_{3468} + e_{4578}$ to
- $e_{2358} + e_{1248} + e_{5618} + e_{7138}$
- $+ 1$ to
- $- e_{5712} - e_{1345} - e_{6123}$
- $- e_{4671} - e_{7234} - e_{2456} - e_{3567}$

**Tensor Product Cl(8) x Cl(8) = Cl(16)**

( **F4** in Cl(8) ) x ( **F4** in Cl(8) ) =
= 8x8 + 28x1 + 1x28 + 16x16 =
= **120 Cl(16) BiVectors + ( 128 + 128) Cl(16) Spinors**
**120 Cl(16) BiVectors + 128 Cl(16) Half-Spinors = E8**

### Cl(8) Triality

8 +half-spinors

8 -half-spinors

8 vectors

**Grade: 0**

**1**

**8**

Grade: 2

Grade: 3

Grade: 4

5

6

7   8

Robert de Marrais said      "... 256 ... 2^8 ions Voudons ...      Moreno ... determines that the automorphism group of the ZD's of all 2^n-ions ... obey a simple pattern: for n ≥ 4 this group has the form G2 x (n-3) x S3 (... order-6 permutation group on 3 elements) ... This says the automorphism group of the Sedenions' ZD's has order 14 x 1 x 6 = 84  ... based on 7 octahedral lattices ("Box-Kites") ...
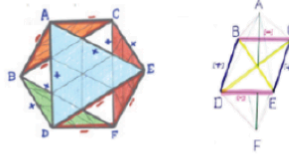
... Harmonics of Box-Kites, called here "Kite-Chain Middens," ... extend indefinitely into higher forms of 2^n -ions. All non-Midden-collected ZD diagonals in the ... 32-ons ... belong... to a set of 15 "emanation tables," ... they house 168 ... PSL(2,7) ... cells ... 8 ... 32-ons ,,, ET's ... from S = 8 to 15 ...
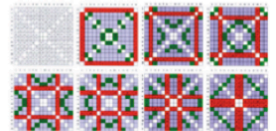
[here are] ... Emanation Tables ... ET's for S = 15, N = 5,6,7 ... and fractal limit ...

# August 2019 (United States)

September 2019

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | | | | | |

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| 28 | 29 | 30 | 31 ● New Moon | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 ◗ 1st Quarter | 8 | 9 | 10 |
| 11 Tisha B'Av | 12 Eid al-Adha | 13 | 14 | 15 ○ Full Moon | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 ◑ 3rd Quarter | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 ● New Moon | 31 |

Julian Schwinger describes Elementary Particles  as volumes of space - Sources - whose properties are determined by Green's Functions characteristic of the volumes.

In E8 Physics any Elementary Particle is immediately surrounded by a cloud of virtual particle-antiparticle pairs similar to a Kerr-Newman Black Hole with Symmetric Space - Bounded Complex Domain - Shilov Boundary structure corresponding to its Gauge Group properties.
The Poisson Kernel - Bergman Kernel defines the Green's Function.

The initial Valence Particle is Planck scale. The number of Virtual Particles is determined by the Planck scale geometry of spacetime. The E8 model at the Planck Scale has spacetime condensing out of Clifford structures forming a Lorentz Leech lattice underlying 26-dim String Theory of World-Lines with 8 + 8 + 8 = 24-dim of fermion particles and antiparticles and of spacetime.
The automorphism group of one 26-dim String Theory cell modulo the Leech lattice is the Monster Group of order about $8 \times 10^{53}$.
The Cloud structure comes from the 24-dim Leech lattice part of the Monster Group which is $2^{(1+24)}$ times the double cover of Co1, for an order of about $10^{26}$. Due to superpostions of algebraically independent E8 Lattices the total number of Virtual particle/ antiparticle pairs is about $10^{27}$ so the volume of the Kerr-Newman Cloud is on the order of $10^{27}$ x Planck scale, and its size should be about $10^{(27/3)} \times 1.6 \times 10^{(-33)}$ cm = roughly $10^{(-24)}$ cm.

Each Schwinger Source particle-antiparticle pair should see (with Bohm Quantum Potential and Sarfatti Back-Reaction) the rest of our Universe in the perspective of $8 \times 10^{53}$ Monster Symmetry so a Schwinger Source acting as a Jewel of Indra's Net of Schwinger Source Bohm Quantum Blockchain Physics can see $10^{27} \times 8 \times 10^{53} = 8 \times 10^{80}$ Other Sources of an Indra's Net.

To fit inside the initial Schwinger Source the Information Elements of all the Other Schwinger Sources of Our Universe ( $10^{77}$ or so ) should be distributed as a Fractal Julia Set. There are $2^n$ stage-n cells in a Binary Decomposition of Julia Sets, so a stage-256 Julia level set based on Binary Decomposition has $2^{256}$ = about $10^{77}$ cells so Full Indra Net information can be seen / reflected by each Schwinger Source Indra Jewel.

Each Schwinger Source contains $10^{27}$ Virtual pairs of particles each of which can see along a connecting Line an Other Indra's Net Source which Line sees Other Sources through Monster Group Lens elements so that the Other Source appears to the Original Source to be a Julia Set.

Each Schwinger Source has a Mandelbrot Set that tells its Source what each of the many Indra's Net Source Julia set looks like by correlating Monster Group Lens Elements with Types of Julia Set. Self-Perception is always the c = 0 Circle Julia Set.



Indra's Net of Sources



Original Source Particle

1 Line from one Virtual Particle inside Original Source to Each of Other Sources

One of the Many Other Source Particles

Each Line sees Other Source through Lens of 1 of $8 \times 10^{53}$ Monster Group Elements

$10^{27}$ Virtual Particles

Mandelbrot Set for Original Source
correlates Monster Group Lens Elements with Perceived Type of Julia Set
Self-Perception is always c = 0 Circle Julia Set



c = 0

c = -1

c = 0

c = -1

# September 2019 (United States)

October 2019

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|  |  | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 |  |  |

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| 1 Muharram | 2 Labor Day | 3 | 4 | 5 ◑ 1st Quarter | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 ○ Full Moon |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 ◐ 3rd Quarter |
| 22 | 23 September equinox | 24 | 25 | 26 | 27 | 28 ● New Moon |
| 29 | 30 Rosh Hashana | 1 | 2 | 3 | 4 | 5 ◑ 1st Quarter |

SO   S1    S3    S7
U    U     U     U
T = R x C x H x O
Z2  U(1)  SU(2)  Spin(8)

Division Algebras, Lattices, Physics, Windmill Tilting
Geoffrey Dixon

As to $\mathbf{T}$, resolve its identity into four orthogonal *idempotents*

$\Delta_0 = \frac{1}{4}(1 + i\vec{x})(1 + ie_7) = (\frac{1}{2}(1 + i\vec{x}))(\frac{1}{2}(1 + ie_7))$

$\Delta_1 = \frac{1}{4}(1 - i\vec{x})(1 + ie_7) = (\frac{1}{2}(1 - i\vec{x}))(\frac{1}{2}(1 + ie_7))$

$\Delta_2 = \frac{1}{4}(1 + i\vec{y})(1 - ie_7) = (\frac{1}{2}(1 + i\vec{y}))(\frac{1}{2}(1 - ie_7))$

$\Delta_3 = \frac{1}{4}(1 - i\vec{y})(1 - ie_7) = (\frac{1}{2}(1 - i\vec{y}))(\frac{1}{2}(1 - ie_7))$

In the Pauli algebra case, we got Dirac spinors by doubling $\mathbf{P}$ to $\mathbf{P}^2$
we double up and use $\mathbf{T}^2$ as our spinor space. Let $\Psi$ be a $\mathbf{T}^2$ spinor
the following identifications fall out of the mathematics

$\rho_+\Psi :$   matter
$\rho_-\Psi :$   antimatter

---

8 Fermion First-Generation Particles
each with 8 Spacetime Components

$\rho_+\Psi\Delta_0 :$   matter - neutrino - $SU(3)$ singlet
$\rho_+\Psi\Delta_1 :$   matter - electron - $SU(3)$ singlet
$\rho_+\Psi\Delta_2 :$   matter - up quark - $SU(3)$ triplet
$\rho_+\Psi\Delta_3 :$   matter - down quark - $SU(3)$ triplet

+

8 Fermion First-Generation AntiParticles
each with 8 Spacetime Components

$\rho_-\Psi\Delta_3 :$   antimatter - antineutrino - $SU(3)$ antisinglet
$\rho_-\Psi\Delta_2 :$   antimatter - positron - $SU(3)$ antisinglet
$\rho_-\Psi\Delta_1 :$   antimatter - anti-up antiquark - $SU(3)$ antitriplet
$\rho_-\Psi\Delta_0 :$   antimatter - anti-down antiquark - $SU(3)$ antitriplet

= 8x8 + 8x8 = 64 + 64 = T + T = 128 = T2 =

= E8 / D8 = (OxO)P2 = HalfSpinors of Cl(16)

---

Geoffrey Dixon wrote a 1995 paper in which he represented
the Leech lattice over $\mathbf{O}^3$.
the final result breaks up the inner shell of $\Lambda_{24}$,
which is of order $K_{24} = 196560$,
into three subsets with orders $3 \times 240 = 720$,
$3 \times 240 \times 16 = 11520$, and $3 \times 240 \times 16 \times 16 = 184320$,
the sum of all three orders being 196560.

---

Here is a summary of E8 Physics model calculation results. Since ratios are calculated,
values for one particle mass and one force strength are assumed.
Quark masses are constituent masses. Most of the calculations are tree-level,
so more detailed calculations might be even closer to observations.

Dark Energy : Dark Matter : Ordinary Matter = 0.75 : 0.21 : 0.04

Fermions as Schwinger Sources have geometry of Complex Bounded Domains
with Kerr-Newman Black Hole structure size about 10^(-24) cm.

| Particle/Force | Tree-Level | Higher-Order |
|---|---|---|
| e-neutrino | 0 | 0 for nu_1 |
| mu-neutrino | 0 | 9 x 10^(-3) eV for nu_2 |
| tau-neutrino | 0 | 5.4 x 10^(-2) eV for nu_3 |
| electron | 0.5110 MeV | |
| down quark | 312.8 MeV | charged pion = 139 MeV |
| up quark | 312.8 MeV | proton = 938.25 MeV |
| | | neutron - proton = 1.1 MeV |
| muon | 104.8 MeV | 106.2 MeV |
| strange quark | 625 MeV | |
| charm quark | 2090 MeV | |
| tauon | 1.88 GeV | |
| beauty quark | 5.63 GeV | |
| truth quark (low state) | 130 GeV | (middle state) 174 GeV |
| | | (high state) 218 GeV |
| W+ | 80.326 GeV | |
| W- | 80.326 GeV | |
| WO | 98.379 GeV | ZO = 91.862 GeV |

Mplanck 1.217x10^19 GeV

| | | |
|---|---|---|
| Higgs VEV (assumed) | 252.5 GeV | |
| Higgs (low state) | 126 GeV | (middle state) 182 GeV |
| | | (high state) 239 GeV |
| Gravity Gg (assumed) | 1 | |
| (Gg)(Mproton^2 / Mplanck^2) | | 5 x 10^(-39) |
| EM fine structure | 1/137.03608 | |
| Weak Gw | 0.2535 | |
| Gw(Mproton^2 / (Mw+^2 + Mw-^2 + Mz0^2)) | | 1.05 x 10^(-5) |
| Color Force at 0.245 GeV | 0.6286 | 0.106 at 91 GeV |

Kobayashi-Maskawa parameters for W+ and W- processes are:

| | d | s | b |
|---|---|---|---|
| u | 0.975 | 0.222 | 0.00249 -0.00388i |
| c | -0.222 -0.000161i | 0.974 -0.0000365i | 0.0423 |
| t | 0.00698 -0.00378i | -0.0418 -0.00086i | 0.999 |

The phase angle d13 is taken to be 1 radian.

# October 2019 (United States)

November 2019

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|  |  |  |  |  | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| 29 | 30 Rosh Hashana | 1 | 2 | 3 | 4 | 5 ◑ 1st Quarter |
| 6 | 7 | 8 | 9 Yom Kippur | 10 | 11 | 12 |
| 13 ○ Full Moon | 14 Columbus Day (Most regions)<br>First Day of Sukkot | 15 | 16 | 17 | 18 | 19 |
| 20 Last Day of Sukkot | 21 Shmini Atzeret<br>◐ 3rd Quarter | 22 Simchat Torah | 23 | 24 | 25 | 26 |
| 27 ● New Moon | 28 | 29 | 30 | 31 | 1 | 2 |

**Void -> Cl(Void) -> Cl(0) -> Cl(1) -> Cl(2) -> Cl(4) -> Cl(16)**

Kaluza-Klein Spacetime
M4 x CP2

| Cl(8) that contains 28 = D4 for M4 Gravity | Cl(8) that contains 28 = D4 for CP2 Std Model |
|---|---|

| | | |
|---|---|---|
| | | 1 |
| | | 16 |
| | | 120 |
| | | 560 |
| | | 1820 |
| | | 4368 |
| | | 8008 |
| | | 11440 |
| | | 12870 |
| 1 | 1 | 11440 |
| 8 | 8 | 8008 |
| 28 | 28 | 4368 |
| 56 | 56 | 1820 |
| 70 x | 70 = | 560 |
| 56 | 56 | 120 |
| 28 | 28 | 16 |
| 8 | 8 | 1 |
| 1 | 1 | |

Cl(8) x Cl(8) = Cl(16)

Spinors: ( 8s x 8s + 8s x 8c )
(8s+8c) x (8s+8c) = +
(8c x 8s + 8c x 8c)

**Quantum Resonant Connection**

40 micron microtubule
65,000 TD

256-dim Cl(8)

256
x
256
=
65,536-dim
Cl(16)
containing
248-dim E8

M4    52-dim F4    CP2

**NJL Quantum Condensate**

**10^19 E8 Lattice 240-vertex Polytope Cells in Universe at End of Inflation**

Afterglow Light Pattern 380,000 yrs.   Dark Ages   Development of Galaxies, Planets, etc.   Dark Energy Accelerated Expansion

Inflation

Quantum Fluctuations

1st Stars about 400 million yrs.

Big Bang Expansion
13.7 billion years

D8
1
16
120
560
4368
8008
11440
12870
11440
8008
4368
1820
120
16
1
+ (1/2) sqrt(65,536) = 128    120 + 128 = 248 E8

**Planck Scale Cl(16) of 16D Complex Domain
Bulk Universal Consciousness**

**Nanometer - Micron Scale
Tubulin Dimers and Microtubules**
128 - 1 micron    65,536 - 40 microns
T20

**Planck Scale E8 of 8D Real
Shilov Boundary Physical Spacetime**

**10^(-24) cm Scale Elementary Particle
Schwinger Sources**

**Penrose-Hameroff Quantum Condensate**

FRONTAL LOBE   PARIETAL LOBE   OCCIPITAL LOBE   TEMPORAL LOBE
PLANNING   LANGUAGE EXPRESSION   SPEECH   MOVEMENT   TOUCH   TASTE   LANGUAGE RECEPTION   VISION
Visual cortex receives and processes signals from the retinas of the eyes

**10^19 Tubulin Dimers in a Human Brain**

# November 2019 (United States)

December 2019

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| 27 New Moon | 28 | 29 | 30 | 31 | 1 | 2 |
| 3 | 4 1st Quarter | 5 | 6 | 7 | 8 | 9 |
| 10 The Prophet's Birthday | 11 Veterans Day | 12 Full Moon | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 3rd Quarter | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 New Moon | 27 | 28 Thanksgiving Day | 29 | 30 |

Void -> Cl(Void) -> Cl(0) -> Cl(1) -> Cl(2) -> Cl(4) -> Cl(16)



Kaluza-Klein Spacetime
M4 x CP2

| Cl(8) that contains 28 = D4 for M4 Gravity | Cl(8) that contains 28 = D4 for CP2 Std Model | |
|---|---|---|
| | | 1 |
| | | 16 |
| | | 120 |
| | | 560 |
| | | 1820 |
| | | 4368 |
| | | 8008 |
| | | 11440 |
| 1 | 1 | 12870 |
| 8 | 8 | 11440 |
| 28 | 28 | 8008 |
| 56 | 56 | 4368 |
| 70 x | 70 = | 1820 |
| 56 | 56 | 560 |
| 28 | 28 | 120 |
| 8 | 8 | 16 |
| 1 | 1 | 1 |

Cl(8) x Cl(8) = Cl(16)

Spinors:
(8s+8c) x (8s+8c)

$(8s \times 8s) + (8s \times 8c)$
$+$
$(8c \times 8s + 8c \times 8c)$

**10^19 E8 Lattice 240-vertex Polytope Cells in Universe at End of Inflation**

NJL Quantum Condensate
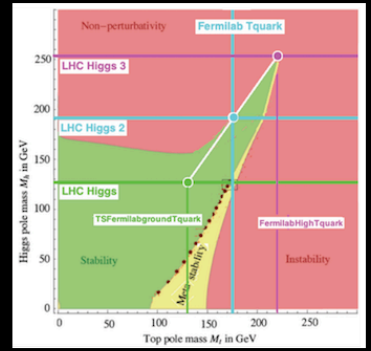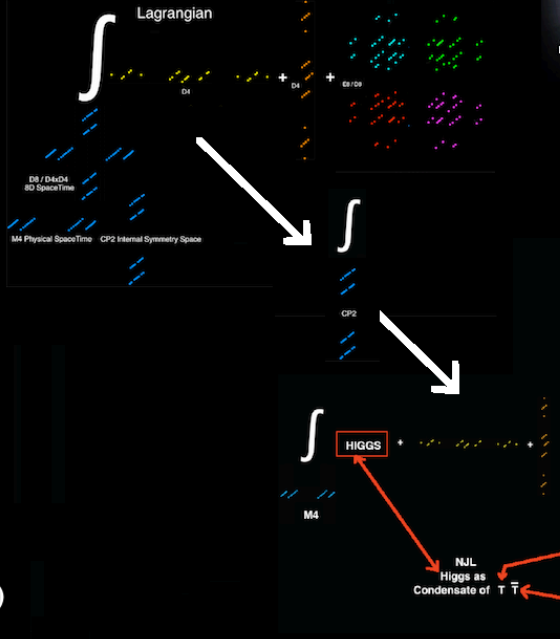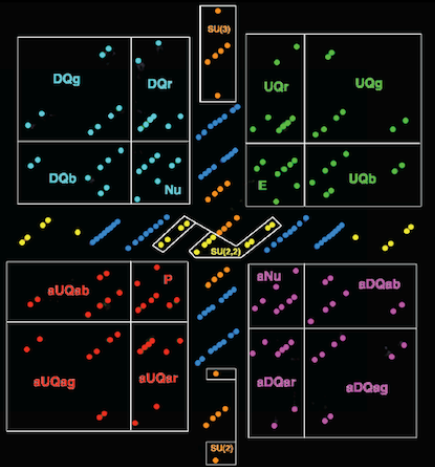
Quantum Resonant Connection

Cl(0,16) x Cl(0,8) = Cl(0,24)

M(2,Cl(0,24)) = Cl(1,25)

Completion of Union of
All Tensor Products of Cl(1,25) = **AQFT**

Lagrangian

3 Kaluza-Klein Fermion Generations

HIGGS

NJL Higgs as Condensate of T T̄

RGB Truth Quark
RGB Truth AntiQuark

Microtubules 40 microns long have 65,536 Tubulin Dimers

Penrose-Hameroff Quantum Condensate
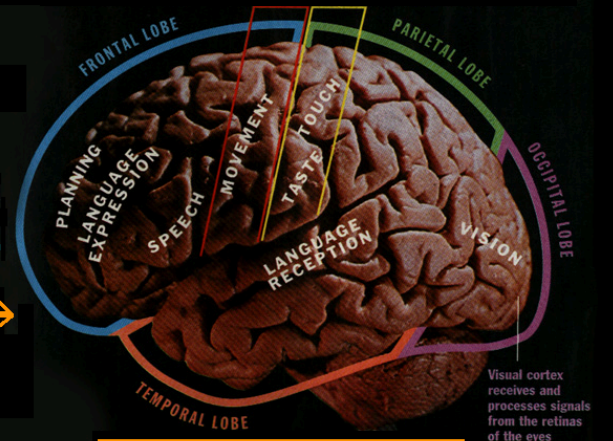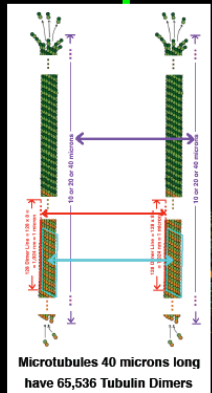
**10^19 Tubulin Dimers in a Human Brain**

# December 2019 (United States)

January 2020

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|   |   |   | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 |   |

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 ◑ 1st Quarter | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 ○ Full Moon | 13 | 14 |
| 15 | 16 | 17 | 18 ◑ 3rd Quarter | 19 | 20 | 21 December Solstice |
| 22 | 23 Chanukah/Hanukkah (first day) | 24 Christmas Eve | 25 Christmas Day | 26 ● New Moon | 27 | 28 |
| 29 | 30 Last Day of Chanukah | 31 | 1 New Year's Day | 2 ◑ 1st Quarter | 3 | 4 |

Tensor Product Cl(0,8) x Cl(p,q) =
= M(R,16) x Cl(p,q) = Cl(p,q+8)

**Real Clifford Algebras Cl(p,q)**

Legend:
- H = Quaternion (yellow)
- C = Complex (white)
- R = Real (green)

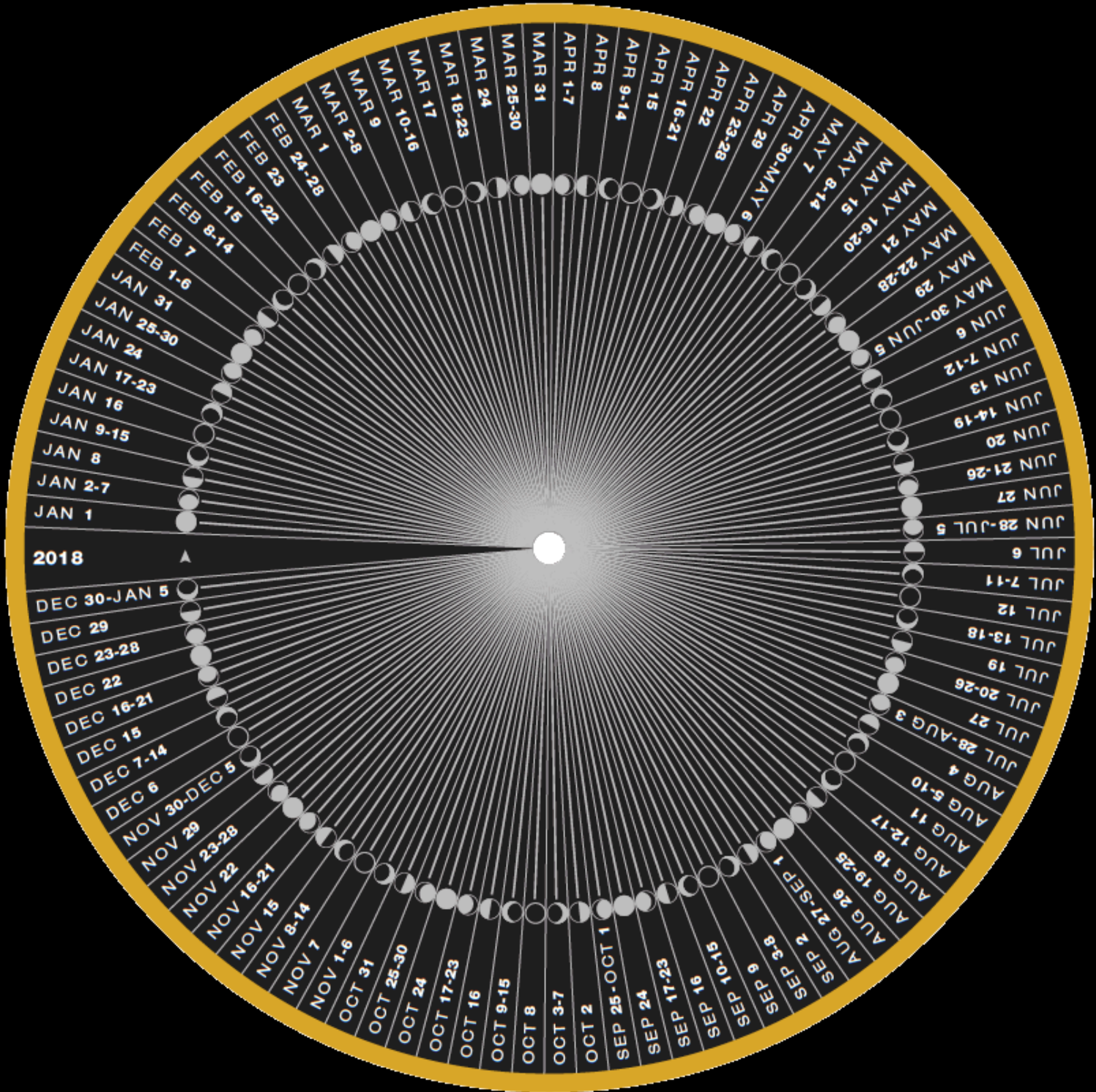| $p$ \ $q$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **8** | $M_{16}(R)$ | $M_{16}(C)$ | $M_{16}(H)$ | $M_{16}(H)\oplus M_{16}(H)$ | $M_{32}(H)$ | $M_{64}(C)$ | $M_{128}(R)$ | $M_{128}(R)\oplus M_{128}(R)$ | $M_{256}(R)$ | | | | | | | | |
| **7** | $M_8(C)$ | $M_8(H)$ | $M_8(H)\oplus M_8(H)$ | $M_{16}(H)$ | $M_{32}(C)$ | $M_{64}(R)$ | $M_{64}(R)\oplus M_{64}(R)$ | $M_{128}(R)$ | $M_{128}(C)$ | $M_{128}(H)$ | | | | | | | |
| **6** | $M_4(H)$ | $M_4(H)\oplus M_4(H)$ | $M_8(H)$ | $M_{16}(C)$ | $M_{32}(R)$ | $M_{32}(R)\oplus M_{32}(R)$ | $M_{64}(R)$ | $M_{64}(C)$ | $M_{64}(H)$ | $M_{64}(H)\oplus M_{64}(H)$ | $M_{128}(H)$ | | | | | | |
| **5** | $M_2(H)\oplus M_2(H)$ | $M_4(H)$ | $M_8(C)$ | $M_{16}(R)$ | $M_{16}(R)\oplus M_{16}(R)$ | $M_{32}(R)$ | $M_{32}(C)$ | $M_{32}(H)$ | $M_{32}(H)\oplus M_{32}(H)$ | $M_{64}(H)$ | $M_{128}(C)$ | $M_{256}(R)$ | | | | | |
| **4** | $M_2(H)$ | $M_4(C)$ | $M_8(R)$ | $M_8(R)\oplus M_8(R)$ | $M_{16}(R)$ | $M_{16}(C)$ | $M_{16}(H)$ | $M_{16}(H)\oplus M_{16}(H)$ | $M_{32}(H)$ | $M_{64}(C)$ | $M_{128}(R)$ | $M_{128}(R)\oplus M_{128}(R)$ | $M_{256}(R)$ | | | | |
| **3** | $M_2(C)$ | $M_4(R)$ | $M_4(R)\oplus M_4(R)$ | $M_8(R)$ | $M_8(C)$ | $M_8(H)$ | $M_8(H)\oplus M_8(H)$ | $M_{16}(H)$ | $M_{32}(C)$ | $M_{64}(R)$ | $M_{64}(R)\oplus M_{64}(R)$ | $M_{128}(R)$ | $M_{128}(C)$ | $M_{128}(H)$ | | | |
| **2** | $M_2(R)$ | $M_2(R)\oplus M_2(R)$ | $M_4(R)$ | $M_4(C)$ | $M_4(H)$ | $M_4(H)\oplus M_4(H)$ | $M_8(H)$ | $M_{16}(C)$ | $M_{32}(R)$ | $M_{32}(R)\oplus M_{32}(R)$ | $M_{64}(R)$ | $M_{64}(C)$ | $M_{64}(H)$ | $M_{64}(H)\oplus M_{64}(H)$ | $M_{128}(H)$ | | |
| **1** | $R\oplus R$ | $M_2(R)$ | $M_2(C)$ | $M_2(H)$ | $M_2(H)\oplus M_2(H)$ | $M_4(H)$ | $M_8(C)$ | $M_{16}(R)$ | $M_{16}(R)\oplus M_{16}(R)$ | $M_{32}(R)$ | $M_{32}(C)$ | $M_{32}(H)$ | $M_{32}(H)\oplus M_{32}(H)$ | $M_{64}(H)$ | $M_{128}(C)$ | $M_{256}(R)$ | |
| **0** | $R$ | $C$ | $H$ | $H\oplus H$ | $M_2(H)$ | $M_4(C)$ | $M_8(R)$ | $M_8(R)\oplus M_8(R)$ | $M_{16}(R)$ | $M_{16}(C)$ | $M_{16}(H)$ | $M_{16}(H)\oplus M_{16}(H)$ | $M_{32}(H)$ | $M_{64}(C)$ | $M_{128}(R)$ | $M_{128}(R)\oplus M_{128}(R)$ | $M_{256}(R)$ |

$q \longrightarrow$

# Leonardo da Vinci E8

Frank Dodd (Tony) Smith, Jr. - 2017

Wikipedia: "... Christ as Salvator Mundi (Saviour of The World) ... is a painting ... from c. 1500 ... by Leonardo da Vinci ... The painting shows Christ, in Renaissance dress, giving a benediction with his raised right hand and crossed fingers while holding a crystal sphere in his left hand ...



... It was ... possibly painted for Louis XII of France and his consort, Anne of Brittany ... shortly after the conquests of Milan and Genoa around 1500 [and] subsequently owned by Charles I of England and recorded in his art collection in 1649 ... Leonardo painted the orb as if it were a hollow glass bubble that does not refract or distort the light passing through it ...[instead of]... paint[ing] the distortion that would occur when looking through a solid clear orb ...".

Since Leonardo's orb is a hollow sphere instead of a solid ball Leonardo's markings are all on the surface of the 2-dim sphere boundary of the ball in 3-dim space.

E8-Cl(16) Physics (viXra 1602.0319) is based on the 240 Root Vectors of E8 which are points on the 7-dim sphere boundary of the ball in 8-dim space.

$$248\text{-dim E8} = 120\text{-dim D8} + 128\text{-dim D8} + \text{half-spinor} =$$
$$= \text{D4xD4} + \text{8x8} + 128\text{-dim D8} + \text{half-spinor D8+s}$$

The structure of E8 was depicted by Flammarion (wood engraving on page 163 of his 1888 book "L'Atmosphere Meteorologie Populaire") on a Celestial Sphere beyond our Earthly Plane and its Star-Sun-Moon-Planets Sphere (viXra 1304.0071):
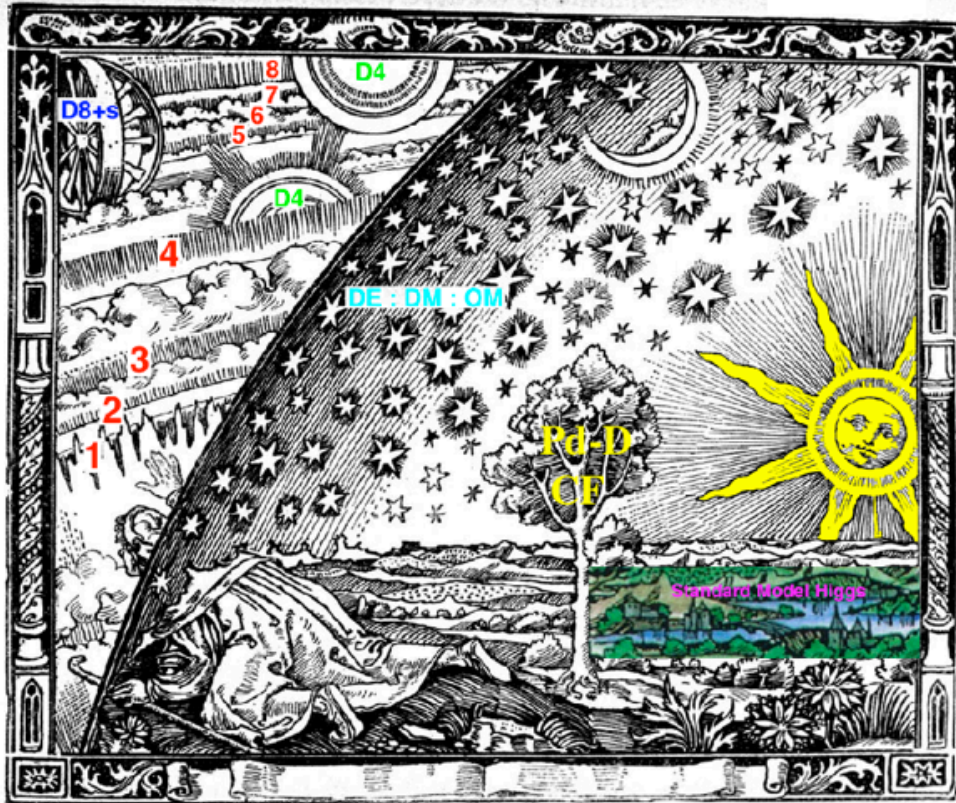
Flammarion's 1888 engraving was much later than Leonardo's 1500 painting
so it did not directly influence Leonardo, but its basic components were well known
from at least the time of Ramon Llull (1232-1315)
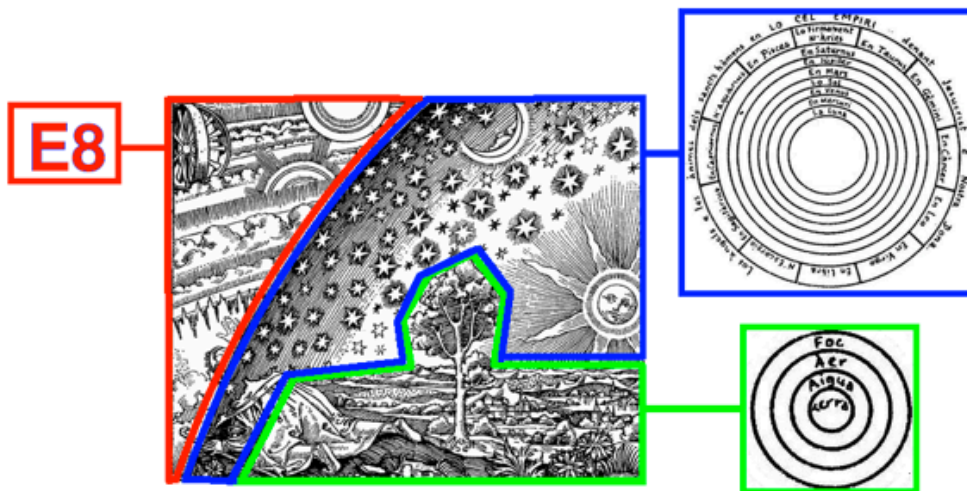


who, according to R. Pring-Mill, Studies on Ramon Llull , Barcelona, PAM-Curial, 1991,
p. 62, produced a "Scheme of the simplified aristotelian cosmos"
as a circle centered by 4 layers Earth, Water, Air, and Fire
and then by 7 layers Moon, Mercury, Venus, Sun, Mars, Jupiter, and Saturn
and an 8th layer for the fixed Stars described by the Zodiac

and <span style="color:red">the 13th layer of Angels, Saints, and the Heavenly Empire of Jesus and G-d which I interpret as E8 Physics by which G-d governs Our Universe.</span>
that is beyond the outer 4+7+1 = 12 layers of Earth, Sun, Moon, Planets, Stars:



The Flammarion Celestial Sphere representation of E8
corresponds to Leonardo's Sphere with markings also representing E8.

Flammarion's Celestial Sphere has <span style="color:green">two copies of D4 each with 24 Root Vectors</span>
and <span style="color:blue">128 Root Vectors from +half-spinors D8+s of D8</span>
and
<span style="color:red">8 levels of 8 Spacetime dimensions for position x momentum = 8x8 = 64 Root Vectors</span>
thus giving <span style="color:green">24 + 24</span> + <span style="color:blue">128</span> + <span style="color:red">64</span> = 240 Root Vectors of E8.

Flammarion's Earthly Plane and Stars-Sun-Moon-Panets Sphere corresponding to

  Gravity , Dark Energy ratio DE:DM:OM , Higgs , Solar Fusion , and Pd-D Cold Fusion

is not shown explicitly by Leonardo, but is represented by Leonardo as

  Earthly Plane = Brown Hand and Stars-Sun-Moon-Panets Sphere = Blue Garment.

Leonardo's Celestial Sphere represents E8 in this way:
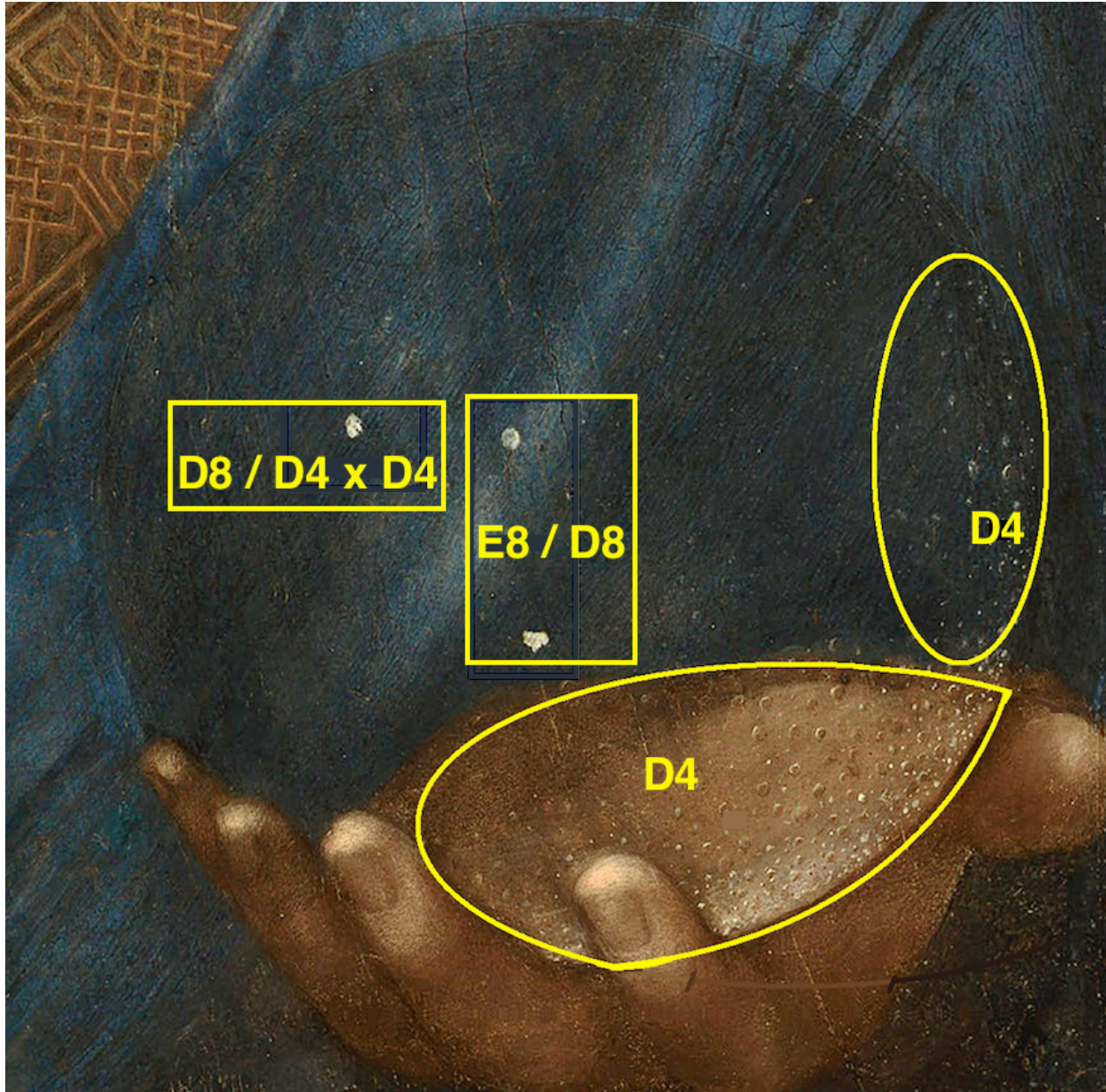
Two markings correspond to 64+64 = 128-dim E8 / D8

(8x8 Fermion and 8x8 AntiFermion components)

The third marking corresponds to 64-dim D8 / D4 x D4

(8-dim Spacetime 8x8 Position x Momentum)

One of the D4 groups of markings corresponds to

the Standard Model and Gravity-Dark Energy Ghosts.

The other D4 group of markings corresponds to

Gravity-Dark Energy and Standard Model Ghosts.

24 of each D4 group of markings are D4 Root Vectors,

the others are composite structures such as

Gauge-Boson-bound (mesons, baryons, atoms) and Gravity-bound (black holes, planets, stars, galaxies).

E8-Cl(16) Physics Calculations of Particle Masses and Force Strengths

from Green's Functions = Kernel Functions of Schwinger Sources

make use of Shilov Boundaries of Complex Domains whose structure

is inherited from the geometry of E8.