

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 14-105 are my 2018-2019 Calendar with Red Book appendix.

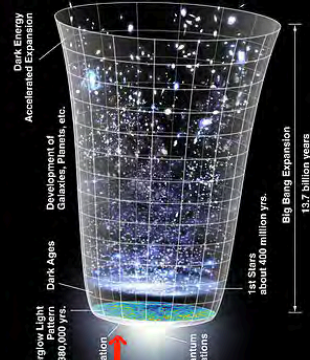
Pages 106-109 are about Leonardo DaVinci's Salvator Mundi and E8.

Void \rightarrow C(Void) \rightarrow C(0) \rightarrow C(1) \rightarrow C(2) \rightarrow C(4) \rightarrow C(16)

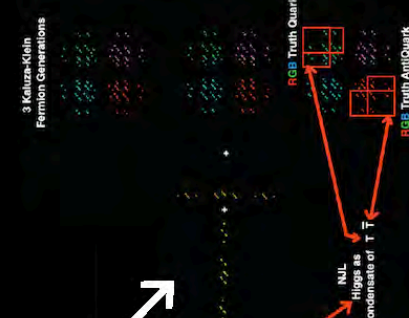
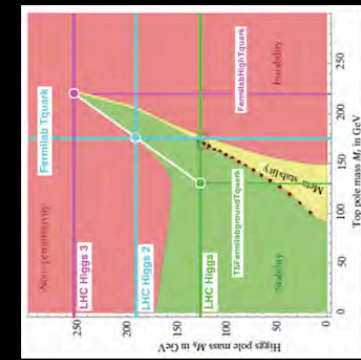
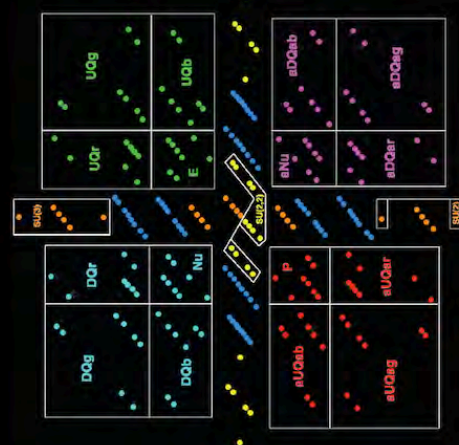
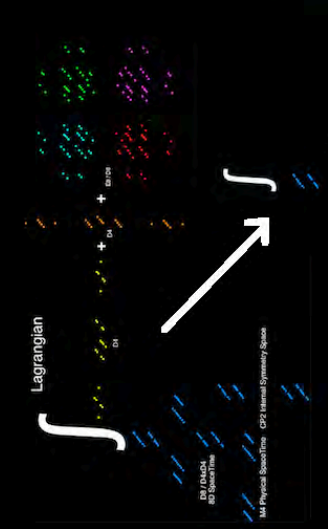
| Kaluza-Klein Spacetime M4 x CP2 | |
|------------------------------------|--|
| C(8) that contains D4 for Gravity | 1 8 28 56 70 x 70 = 4900 28 8 1 |
| C(8) that contains D4 for CP2 | 16 120 560 1820 4368 8008 11440 12870 11440 8008 4368 1820 560 120 16 1 |

$C(8) \times C(8) = C(16)$
 Spinors: $(8s, 8s) + (8s, 8c)$
 $(8s+8c) \times (8s+8c) = (8c, 8s) + (8c, 8c)$

10¹⁹ E8 Lattice 240-vertex Polytope Cells in Universe at End of Inflation



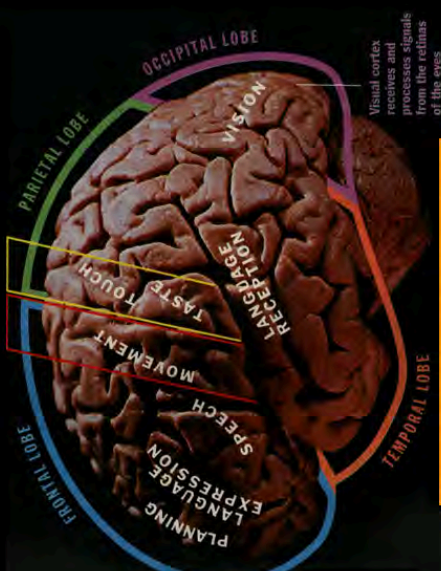
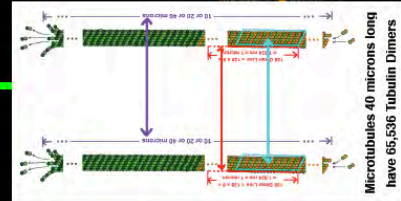
NuL Quantum Condensate



$C(0, 16) \times C(0, 8) = C(0, 24)$
 $M(2, C(0, 24)) = C(1, 25)$

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

Quantum Resonant Connection



10¹⁹ Tubulin Dimers in a Human Brain

Penrose-Hameroff Quantum Condensate

What is Fundamental ? NOTHING

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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)

$$\text{Cl}(0) = 2^0 = 1\text{-dim}$$

$$\text{Cl}(1) = 2^1 = 2\text{-dim}$$

$$\text{Cl}(2) = 2^2 = 4\text{-dim with } 2^1 = 1+1 \text{ half-spinor fermions/antifermions}$$



and

$$\text{Cl}(4) = 2^4 = 16\text{-dim with } 2^2 = 2+2 \text{ half-spinor fermions/antifermions}$$



and

$$\text{Cl}(16) = 2^{16} = 65,536\text{-dim with } 2^8 = 128 + 128 \text{ half-spinor fermions/antifermions}$$

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)

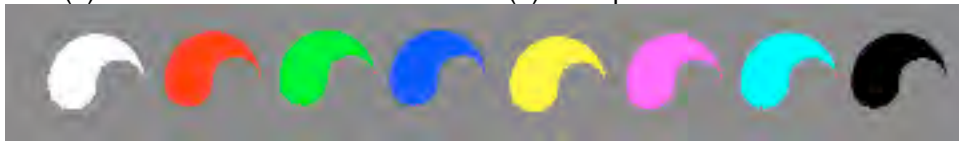
248-dim E8 = 128-dim Cl(16) Half-Spinors + 120-dim Cl(16) BiVectors

By 8-Periodicity of Real Clifford Algebras

$$\text{Cl}(8) \times \dots (\text{N times tensor product}) \dots \times \text{Cl}(8) = \text{Cl}(8N)$$

Cl(16) can be factored into the tensor product $\text{Cl}(8) \times \text{Cl}(8)$

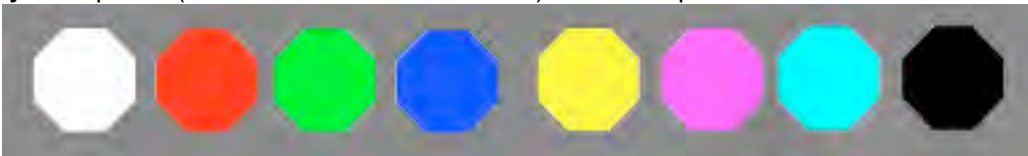
Each of the $\text{Cl}(8) = 2^8 = 256\text{-dim with } 2^4 = 8+8 \text{ Cl}(8) \text{ half-spinor fermions/antifermions}$



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

$$\text{Cl}(0,0) \rightarrow \text{Cl}(0,2) \rightarrow \text{Cl}(0,4) \rightarrow \text{Cl}(0,6) \rightarrow \text{Cl}(0,8) \rightarrow$$

that goes to $\text{Cl}(0,8)$ 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

$$\rightarrow \text{Cl}(0,8) \times \text{Cl}(0,8) = \text{Cl}(0,16) \rightarrow \text{Cl}(0,16) \times \text{Cl}(0,8) = \text{Cl}(0,24) \rightarrow$$

$\text{Cl}(0,16)$ contains the Maximal Exceptional E8 Lie Algebra

$\text{Cl}(0,24)$ contains the Vector Space of the 24-dim Leech Lattice Λ_{24} 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 $\text{Cl}(0,24) = M(2, \text{Cl}(0,24))$

(Porteous, Clifford Algebras and the Classical Groups and Lounesto and Porteous, Lectures on Clifford (Geometric) Algebras and Applications)

$$\rightarrow M(2, \text{Cl}(0,24)) = \text{Cl}(1,25) \rightarrow$$

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

\rightarrow Completion of Union of All Tensor Products of $\text{Cl}(1,25) =$ hyperfinite AQFT

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

$\text{Cl}(1,25) = \text{Cl}(1,9) \times \text{Cl}(0,8) \times \text{Cl}(0,8)$ and $\text{Cl}(1,9) = \text{Cl}(1,5) \times \text{Cl}(0,4) = \text{Cl}(2,4) \times \text{Cl}(0,4)$ where

the vector space of $\text{Cl}(2,4)$ is 6-dim Conformal Spacetime which contains 4-dim Minkowski Spacetime M_4 of $\text{Cl}(1,3)$ and

the vector space of $\text{Cl}(0,4)$ corresponds to $\text{CP}^2 = \text{SU}(3) / \text{SU}(2) \times \text{U}(1)$

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 $M_4 \times \text{CP}^2$ 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:

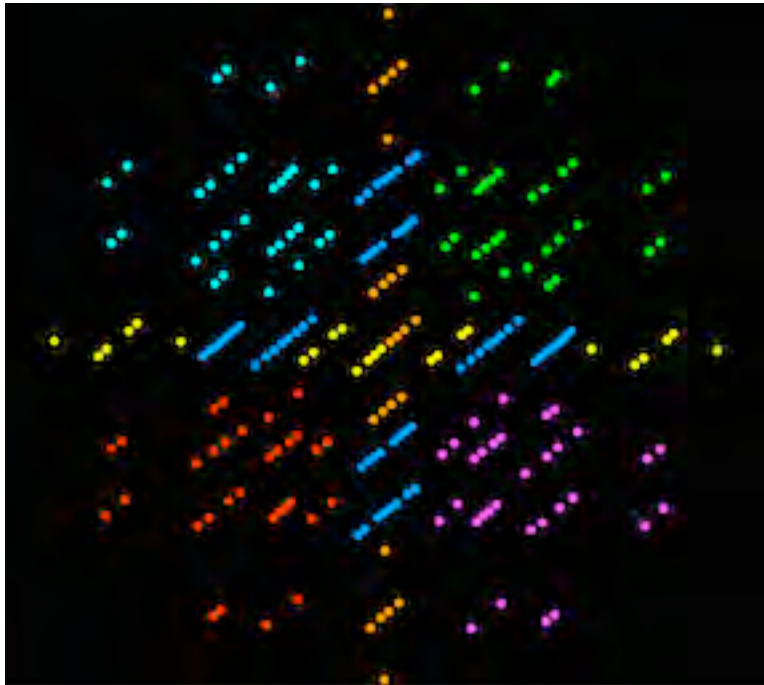
The two 28-dim D4 correspond to the M4 and CP2 of M4 x CP2 Kaluza-Klein

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

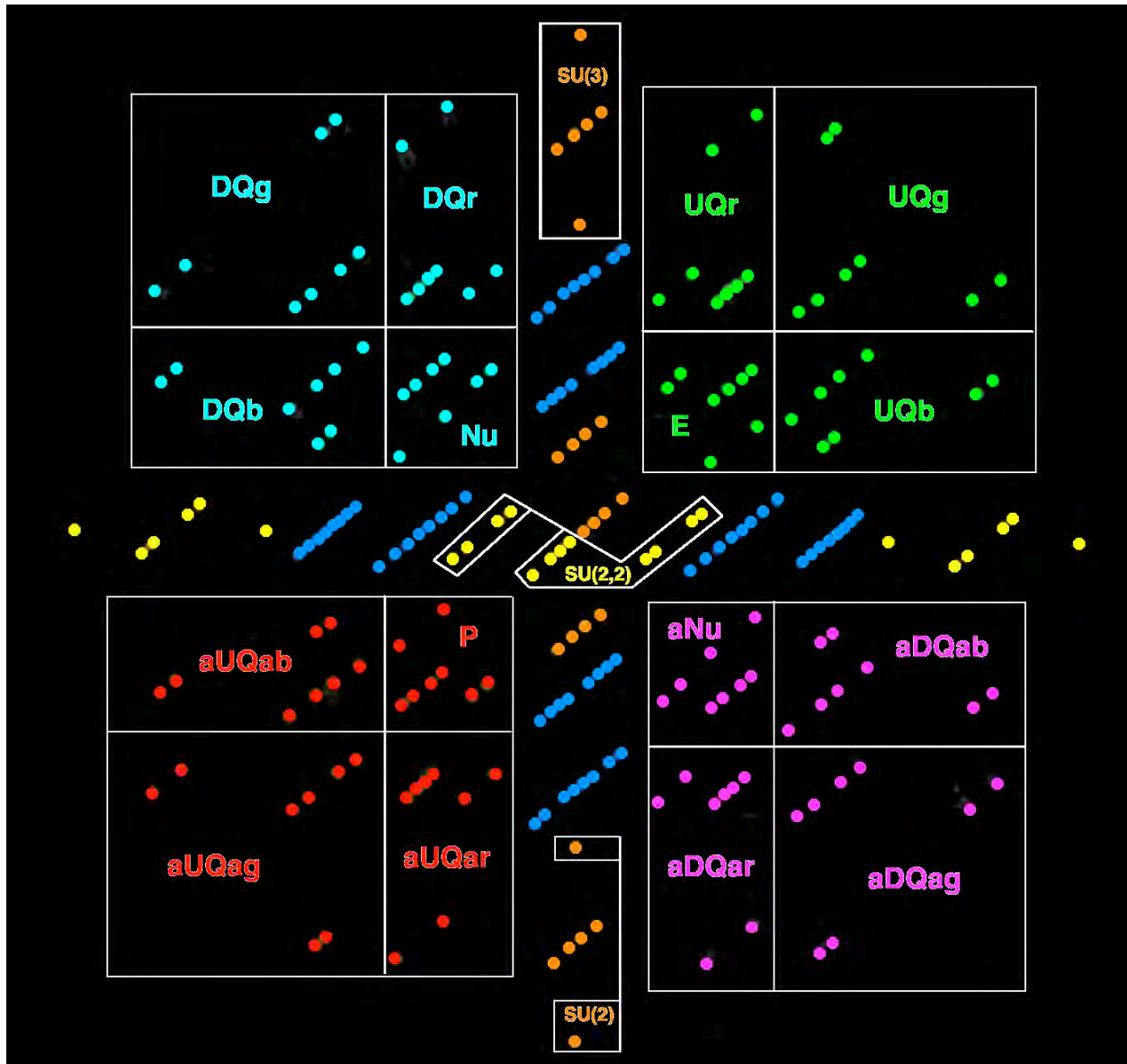
D4_CP2 = 8-dim SU(3) Color Force plus 4 Translation Gravity Ghosts
and 12 Conformal Gravity Ghosts

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



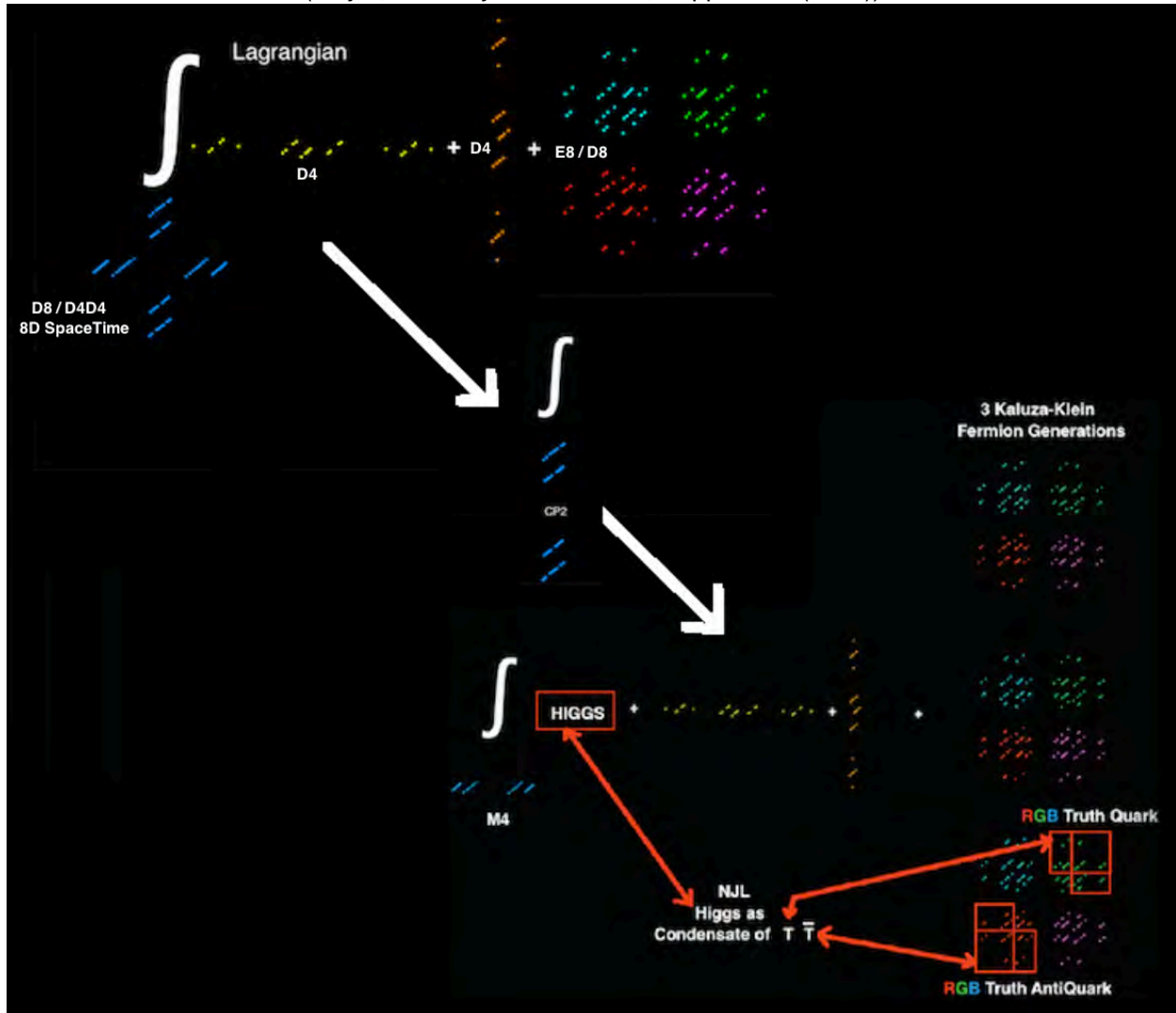
each of which has a realistic Physics Interpretation:



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 Tantiqark resulting in
 3 mass states for the Higgs and the Tquark
 (Smith, viXra 1701.0496)

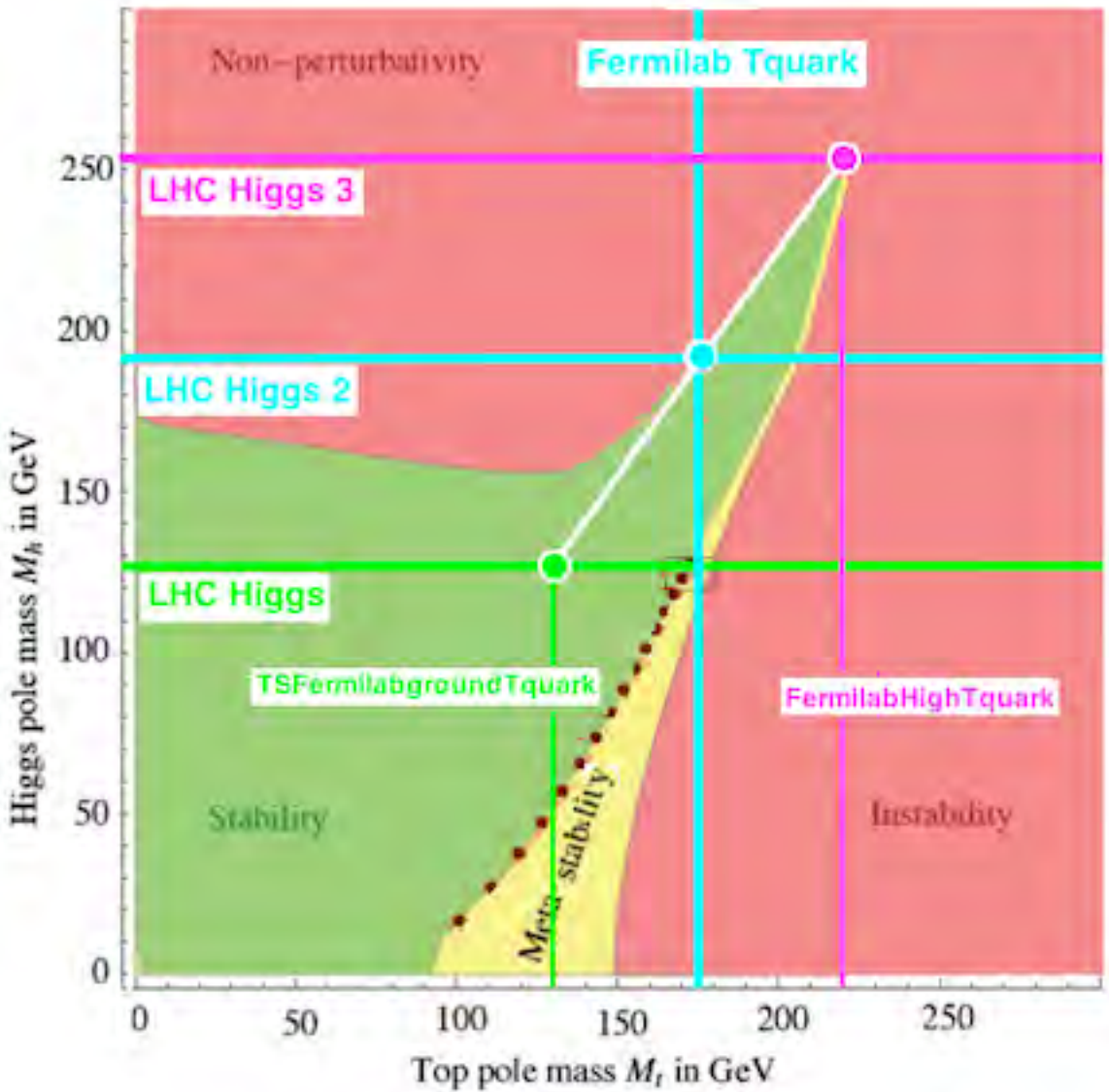
As to the unconventional mass states other than 125 GeV Higgs and 174 GeV Tquark:
ATLAS, for the Full 2016 36.1 fb-1 of 2016 data in the Higgs -> ZZ* -> 4l channel,
 on 5 July 2017 released ATLAS-CONF-2017-058 saying:

“... 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 ...

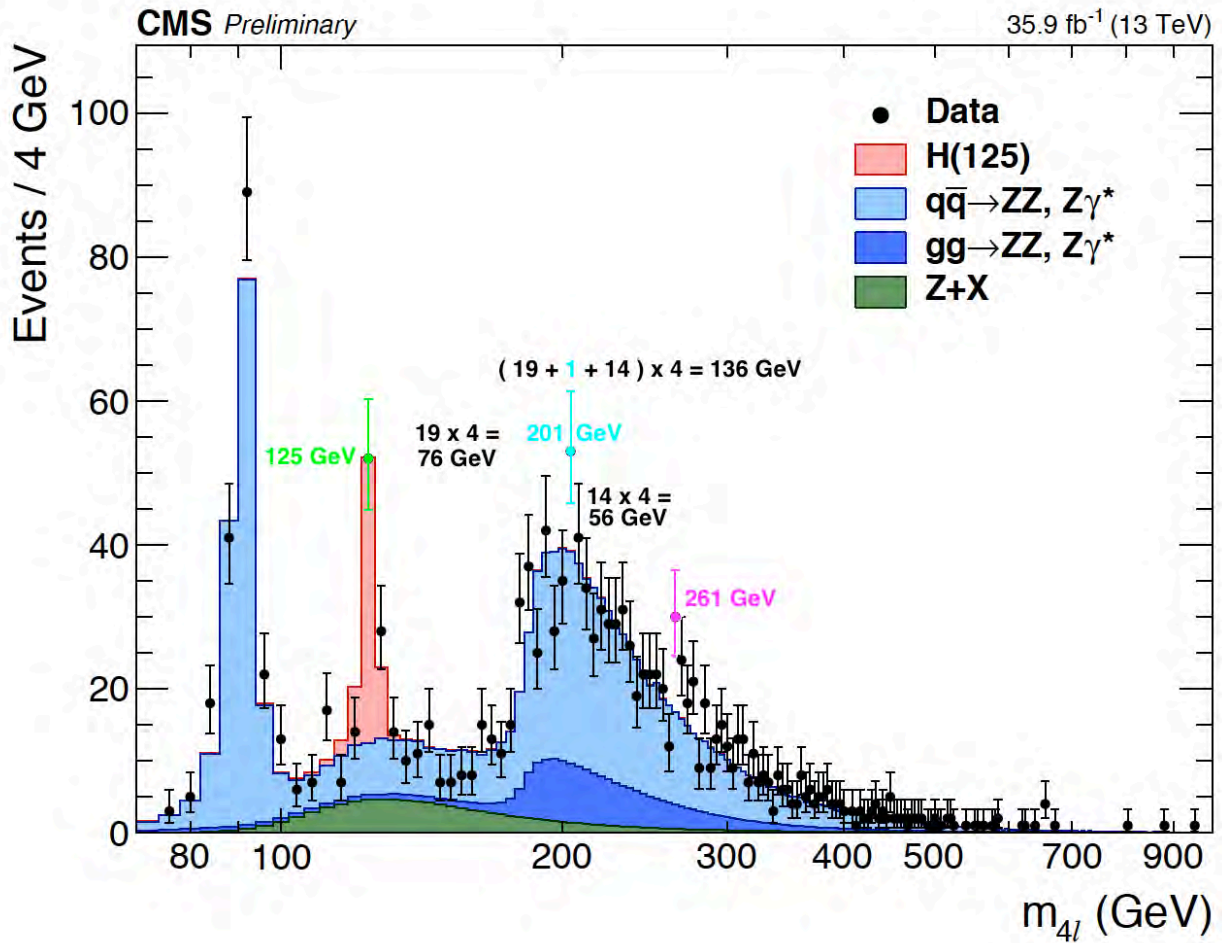
**excess ...[is]... observed in the data for m4l around 240 ... GeV ...
 with a local significance of 3.6 sigma ...”.**

**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.**

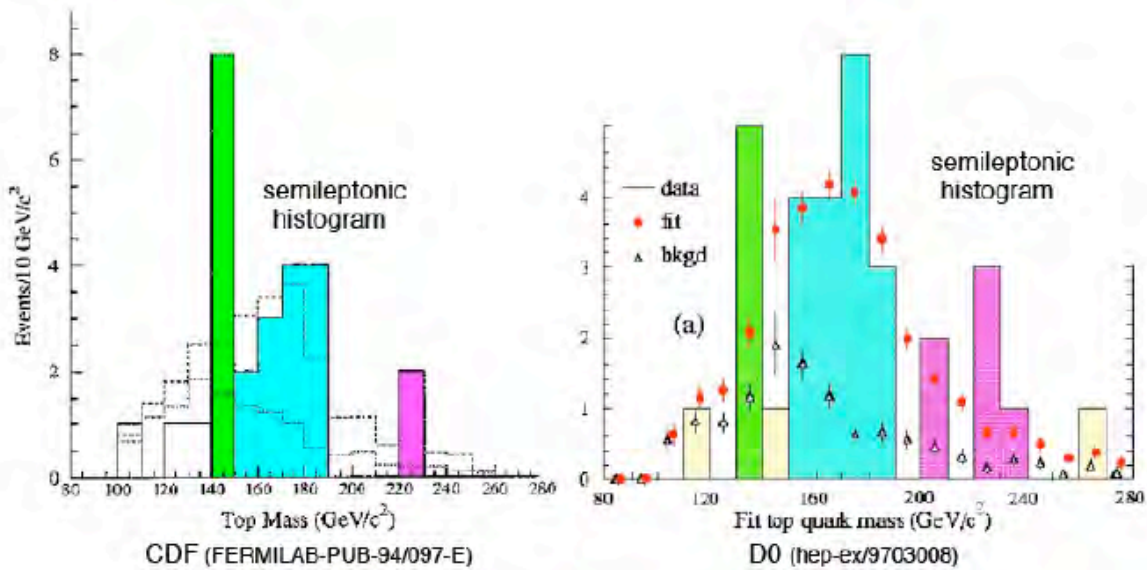
Here is a chart showing the 3 Mass States for Higgs and Tquark (viXra 1701.0496):
green dot in the Stable region (green) has 125 GeV Higgs and 130 GeV Tquark
cyan dot on the Non-perturbativity Boundary has 190 GeV Higgs and 174 GeV Tquark
magenta dot at the Critical Point has 250 GeV Higgs and 220 GeV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



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



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 CP^2 giving $M^4 \times CP^2$

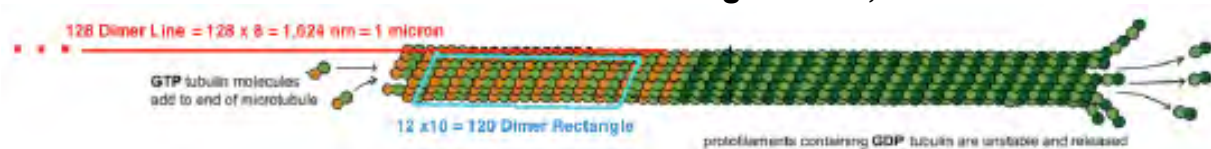
8-dim K-K Classical Lagrangian Spacetime as an NJL condensate of Dixon's

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 Co_1 is $2^{(1+24)}.Co_1$ of order

$139511839126336328171520000 = 1.4 \times 10^{26}$ As $2.Co_1$ 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,

$8 \times 2^{(1+24)}.Co_1$ 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 $10^{(27/3)} \times 1.6 \times 10^{(-33)} \text{ cm} = 10^{(-24)} \text{ cm}$.

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:

$S^1 \times S^1 \times S^1 \times S^1 = 4$ copies of $U(1)$

$S^2 \times S^2 = 2$ copies of $SU(2)$

$CP^2 = SU(3) / SU(2) \times U(1)$

$S^4 = Spin(5) / Spin(4) =$ 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 experimenter... must detect the particles ...[by]... collision that annihilates the particle ... the source ... can be ... an abstraction of an annihilation 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 | $9 \times 10^{(-3)}$ eV for nu_2 |
| tau-neutrino | 0 | $5.4 \times 10^{(-2)}$ 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 1.217×10^{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) | | $5 \times 10^{(-39)}$ |
| EM fine structure | 1/137.03608 | |
| Weak Gw | 0.2535 | |
| Gw(Mproton ² / (Mw+ ² + Mw- ² + Mz0 ²)) | | $1.05 \times 10^{(-5)}$ |
| 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:

Adler, Quaternionic Quantum Mechanics and Quantum Fields (1995), pages 50-52, 561

Arcos and Pereira, hep-th/0210103

Batakis, Class. Quantum Grav.3 (1986) L99-L105

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Fock, Fundamental of Quantum Mechanics

Green, Schwartz, and Witten, Superstring Theory vol. 1

Hua, Harmonic Analysis of Functions of Several Complex Variables
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Lounesto and Porteous, Lectures on Clifford (Geometric) Algebras and Applications

Mayer, Acta Physica Austriaca, Suppl. XXIII (1981)

Porteous, Clifford Algebras and the Classical Groups

Schroer, hep-th/9908021

Schweber, PNAS 102, 7783-7788

Schwinger, 1969 - see physics/0610054

Smith, viXra 1602.0319

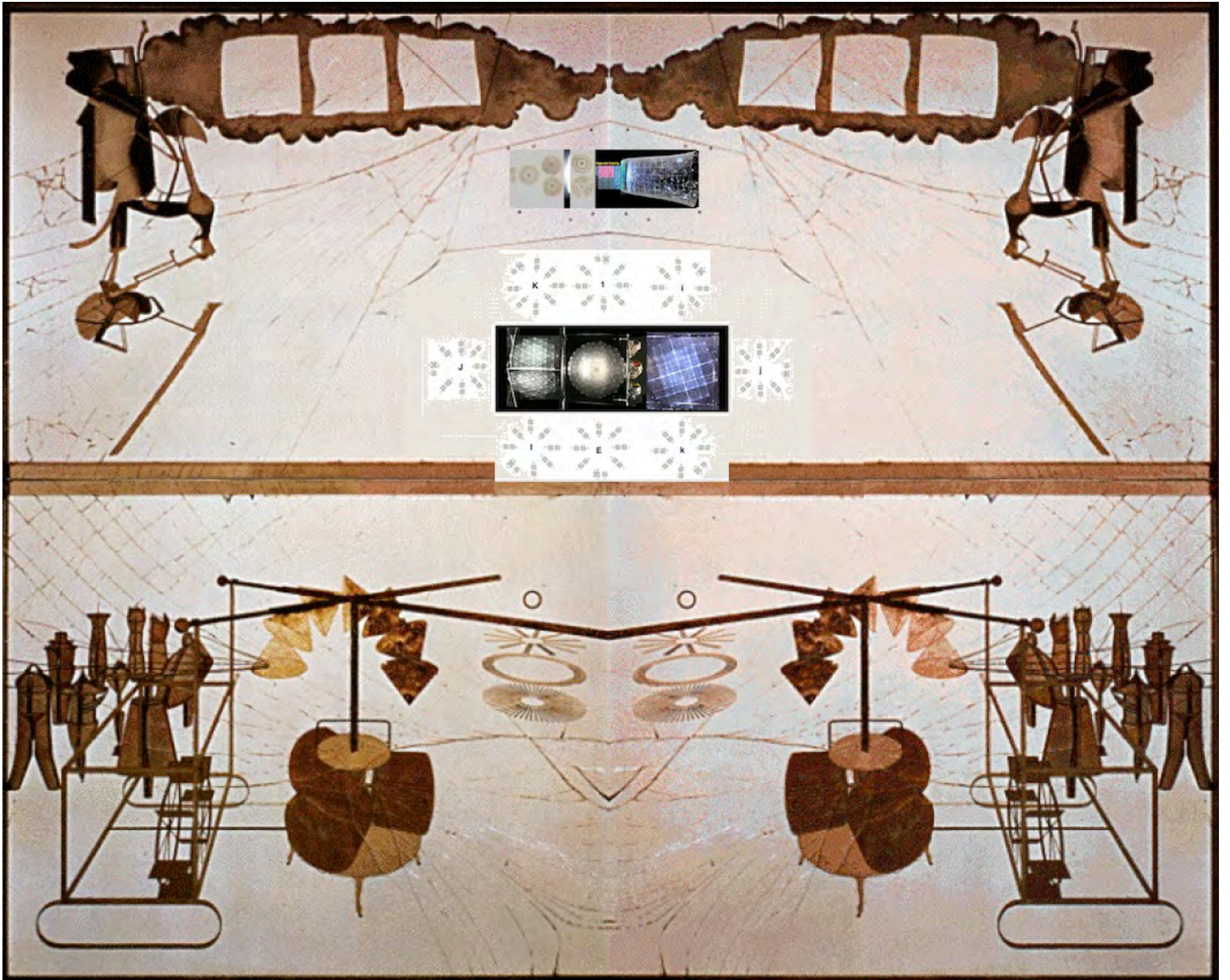
Smith, viXra 1701.0495

Smith, viXra 1701.0496

Smith, viXra 1709.0265

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

Wyler, 1971 - C. R. Acad. Sc. Paris, t. 271, 186-188

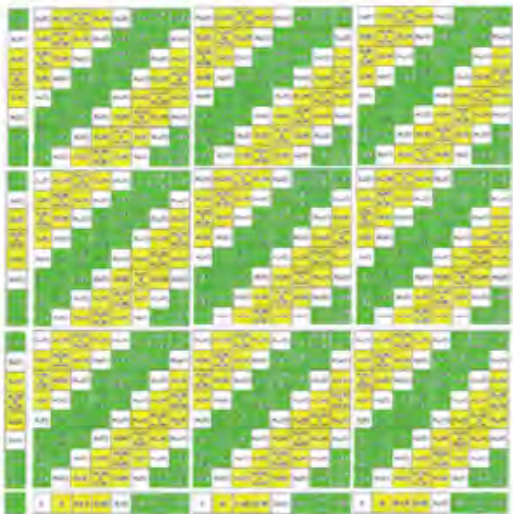
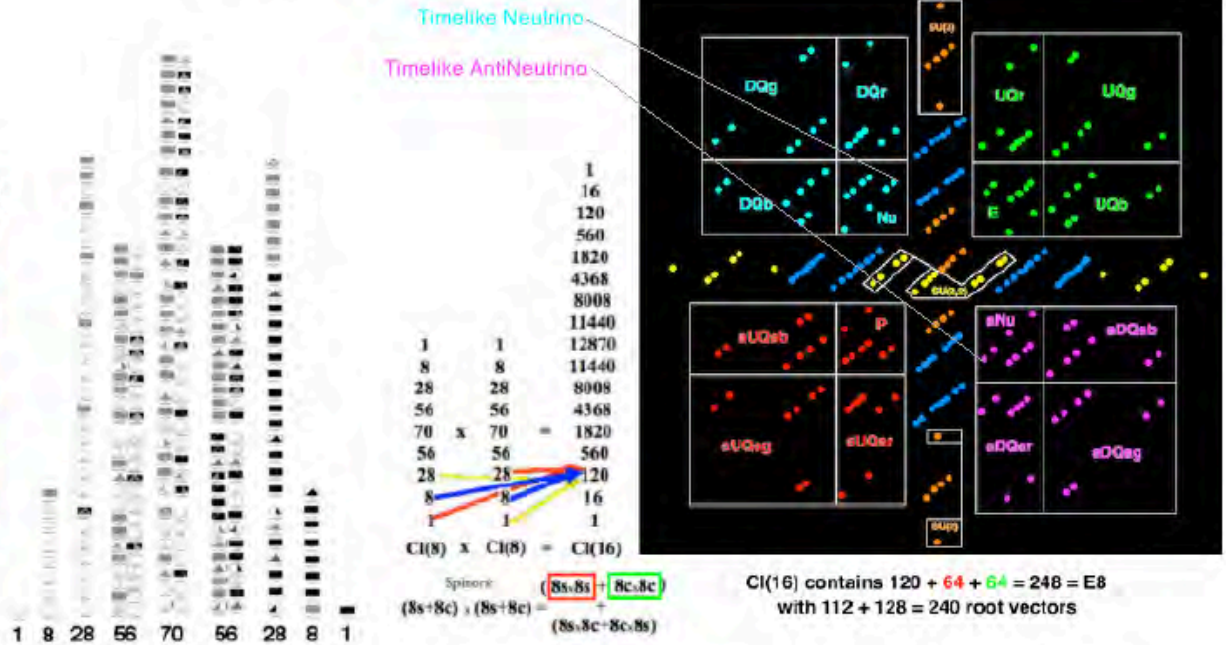
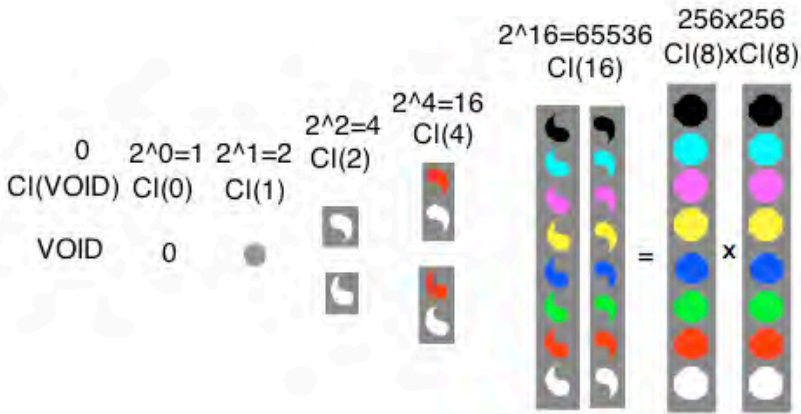


| Dimension of Clifford Algebra | | | | | | |
|-------------------------------|---------|---------|---------|----------|----------------|---------|
| 0 | $2^0=1$ | $2^1=2$ | $2^2=4$ | $2^4=16$ | $2^{16}=65536$ | 256x256 |

VOID \rightarrow CI(VOID) \rightarrow CI(0,0) \rightarrow CI(0,1) \rightarrow CI(0,2) \rightarrow CI(0,4) \rightarrow CI(0,16) = CI(0,8)xCI(0,8) \rightarrow CI(0,16)xCI(0,8) = CI(0,24) \rightarrow M(2,CI(0,24)) = CI(1,25) \rightarrow

\rightarrow Completion of Union of All Tensor Products of CI(1,25) = hyperfinite AQFT

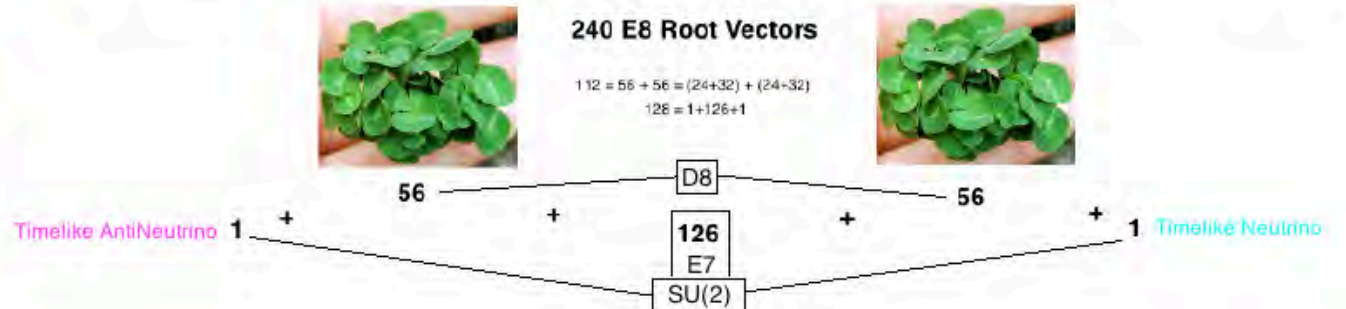
CI(1,25) = CI(1,9)xCI(0,8)xCI(0,8) and CI(1,9) = CI(1,5) x CI(0,4) = CI(2,4) x CI(0,4)



The completion of the union of all tensor products of CI(16) = CI(8)xCI(8) produces a generalized Hyperfinite III von Neumann factor that gives the CI(16)-E8 model a natural Algebraic Quantum Field Theory

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

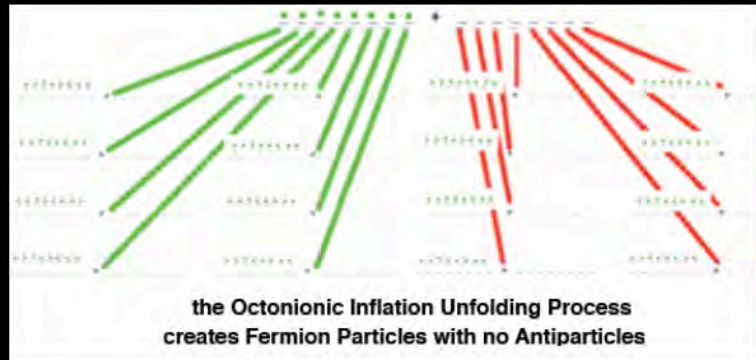
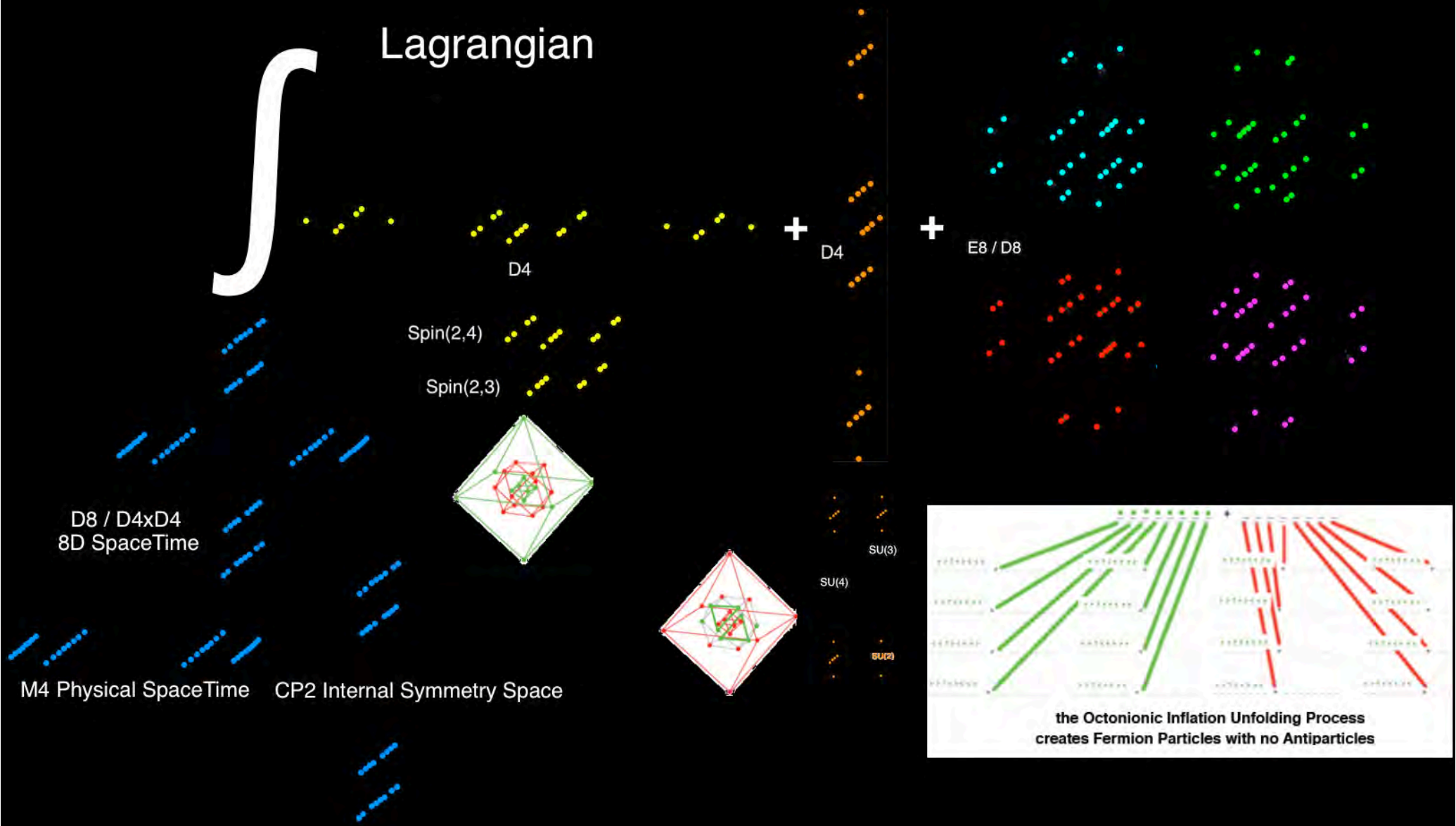
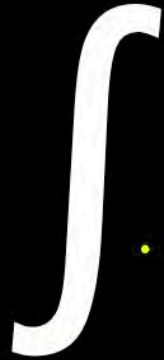
The Creation-Annihilation Operator structure of CI(16)-E8 AQFT is given by the Maximal Contraction of E8 = semidirect product A7 x h92 where h92 = 92+1+92 = 185-dim Heisenberg algebra and A7 = 63-dim SL(8)



January 2018

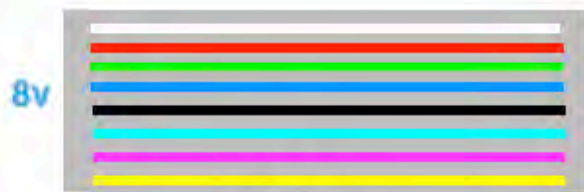
| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|-----------------------------------|---------|-----------|----------|--------|----------|
| | 1 New Year's Day | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 Martin Luther King, Jr. Day | 16 | 17 | 18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

Lagrangian



February 2018

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



8x8 Matrices
 $A7 \times R = U(8)$
 Position
 x
 Momentum



8s+

8s-



Indra's Net of Schwinger Sources - Bohm Quantum Blockchain

The Cl(16)-E8 AQFT inherits structure from the C(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 multiplicative 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 8×10^{26} .

When a fermion particle/antiparticle appears Tachyons 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 $2^{24} \times 24!$ 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) distinct 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 $10^{27} \times \text{Planck scale}$,
 = roughly $10^{(-24)}$ cm.

March 2018

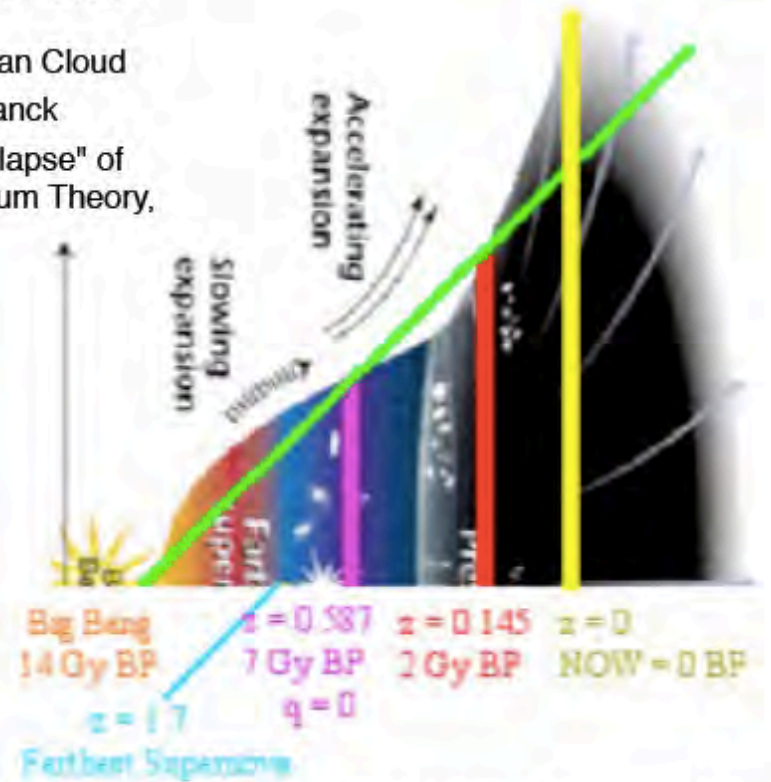
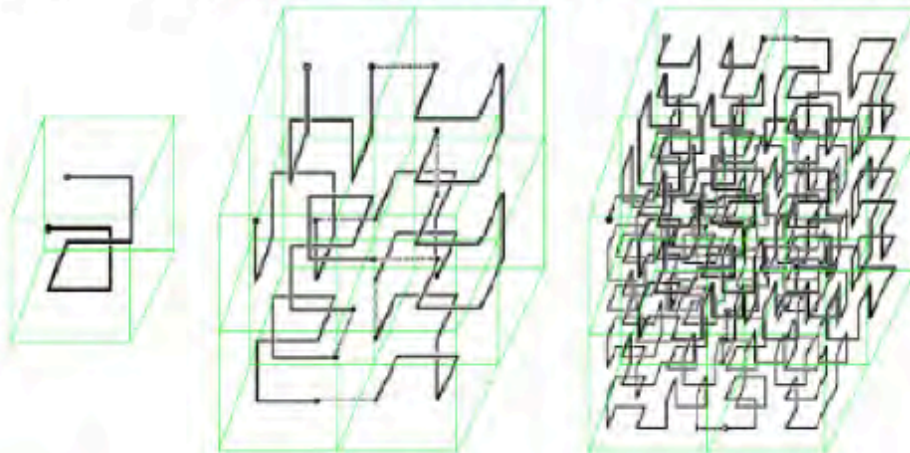
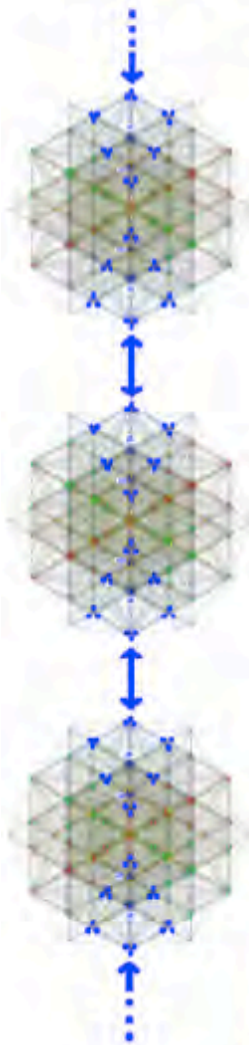
| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|-------------------------------|--------|---------------------|-----------|----------|----------------|-------------------------|
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 Daylight Savings Begins | 12 | 13 | 14 | 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)

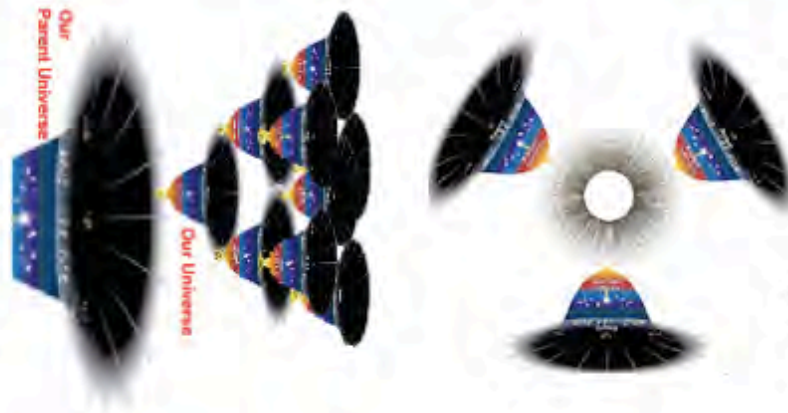
At the end of Non-Unitary Octonionic Inflation Our Universe had about $(1/2) 16^{64} = (1/2) (2^4)^{64} = 2^{255} = 6 \times 10^{76}$ Fermion Particles
 the size of our Universe was then about $10^{(-24)}$ cm
 which is about the size of a Fermion Schwinger Source Kerr-Newman Cloud

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,



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 April Fool's Day Easter Sunday | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 Earth Day | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | | | | | |

CONFORMAL KEPLER

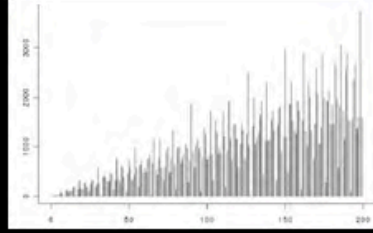
MERCURY
 0.39 AU
 Octahedron
 1 : $\sqrt{3}$
 1 : 1.7321

VENUS
 0.72 AU
 Icosahedron
 1 : $\sqrt{(15-6\sqrt{5})}$
 1 : 1.2584

EARTH
 1 AU
 Dodecahedron
 1 : 1.2584

MOON
 1 AU

MARS
 1.52 AU



Tetrahedron
 1 : 3
 SelfDual

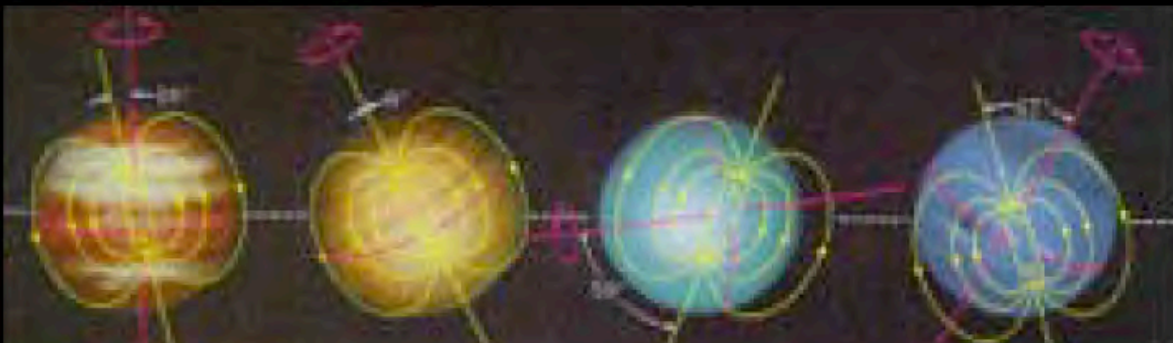
JUPITER
 5.20 AU
 Cube
 1 : $\sqrt{3}$
 1 : 1.7321

SATURN
 9.54 AU

Cuboctahedron
 1 : 2
 (square face inscribed radius)

NEPTUNE
 30.06 AU
 Rhombic Dodecahedron
 1 : $\sqrt{2}$
 1 : 1.4142

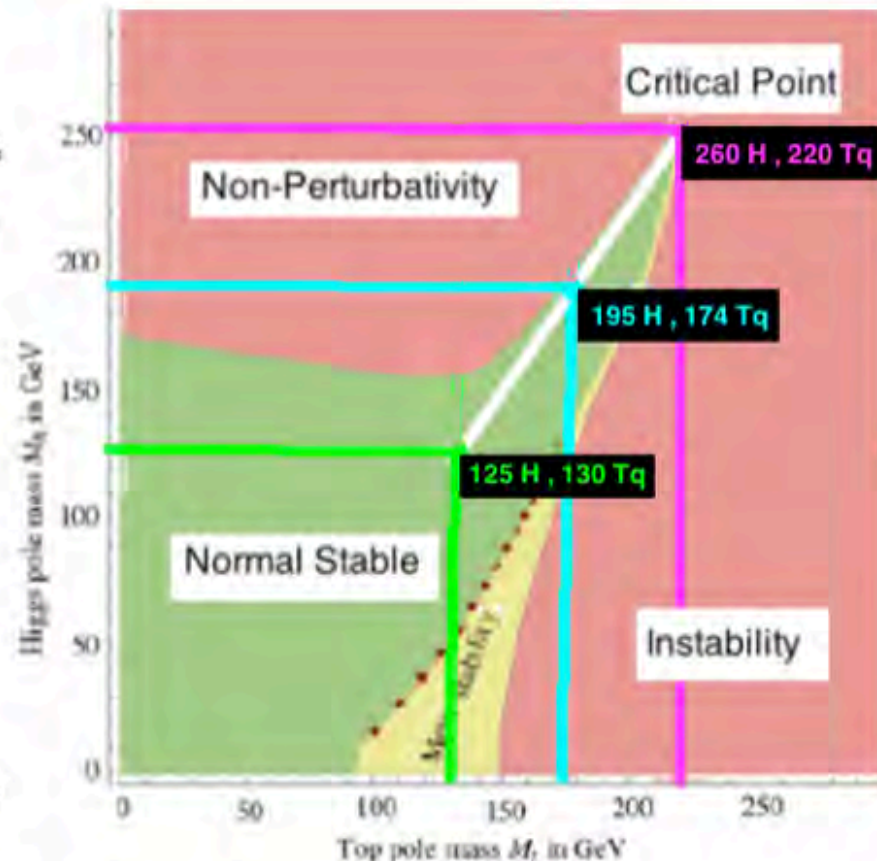
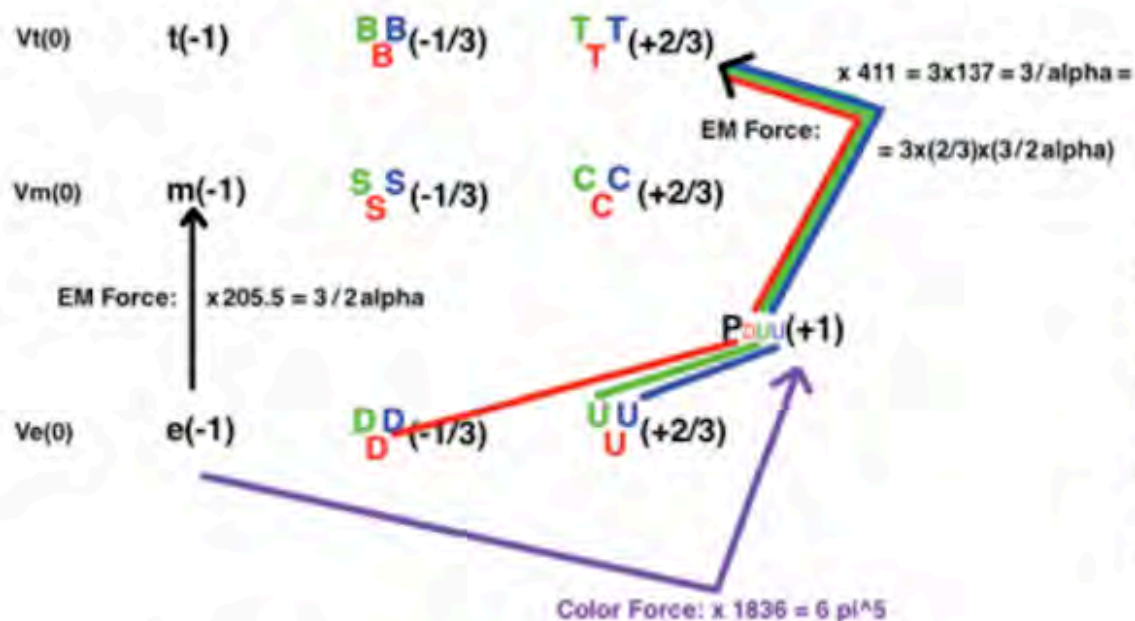
URANUS
 19.19 AU
 Pioneer Anomaly
 20 AU
 Cuboctahedron
 D3 Root Vectors
 Conformal SU(2,2) = Spin(2,4)



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

May 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------------------|--------------------|--------------|-----------|----------|--------|---------------------------------|
| | | 1 May Day | 2 | 3 | 4 | 5 Cinco de Mayo |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 Mother's Day | 14 | 15 | 16 | 17 | 18 | 19 Shavuot Begins Sundown |
| 20 | 21 Victoria Day | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 Memorial Day | 29 | 30 | 31 | | |



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

$$\left(\frac{1}{M_{\text{force}}^2} \right) \left(\text{Vol}(\text{MIS}_{\text{force}}) \right) \left(\frac{\text{Vol}(\text{Q}_{\text{force}})}{\text{Vol}(\text{D}_{\text{force}})^{1/m_{\text{force}}}} \right)$$

M_{force} represents the effective mass;

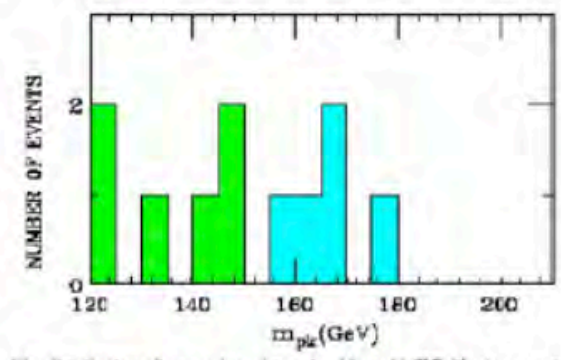
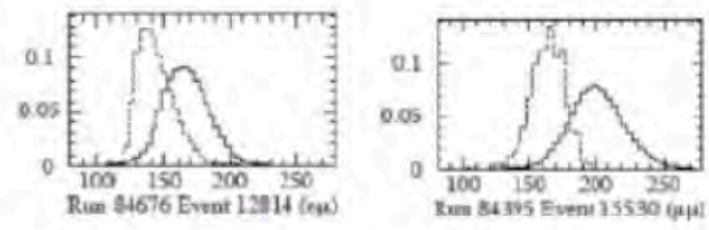
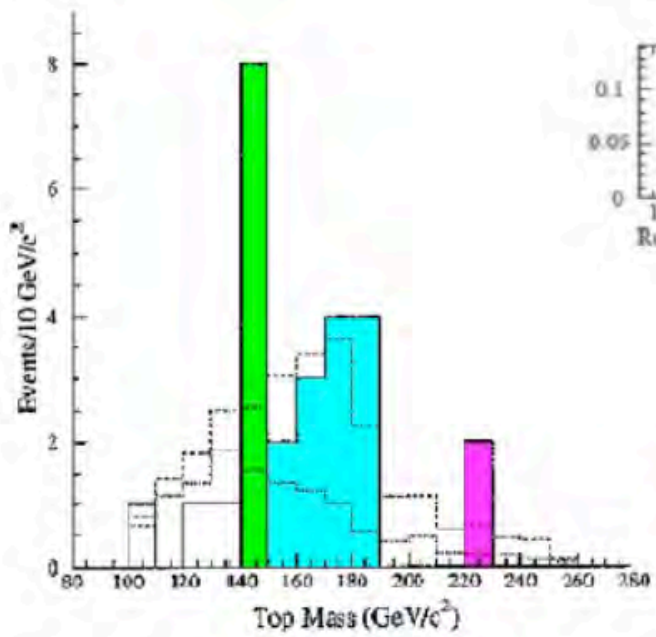
m_{force} is 4 for Gravity and Color force, 2 for Weak force 1 for Electromagnetism

$\text{Vol}(\text{D}_{\text{force}})^{1/m_{\text{force}}}$ 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

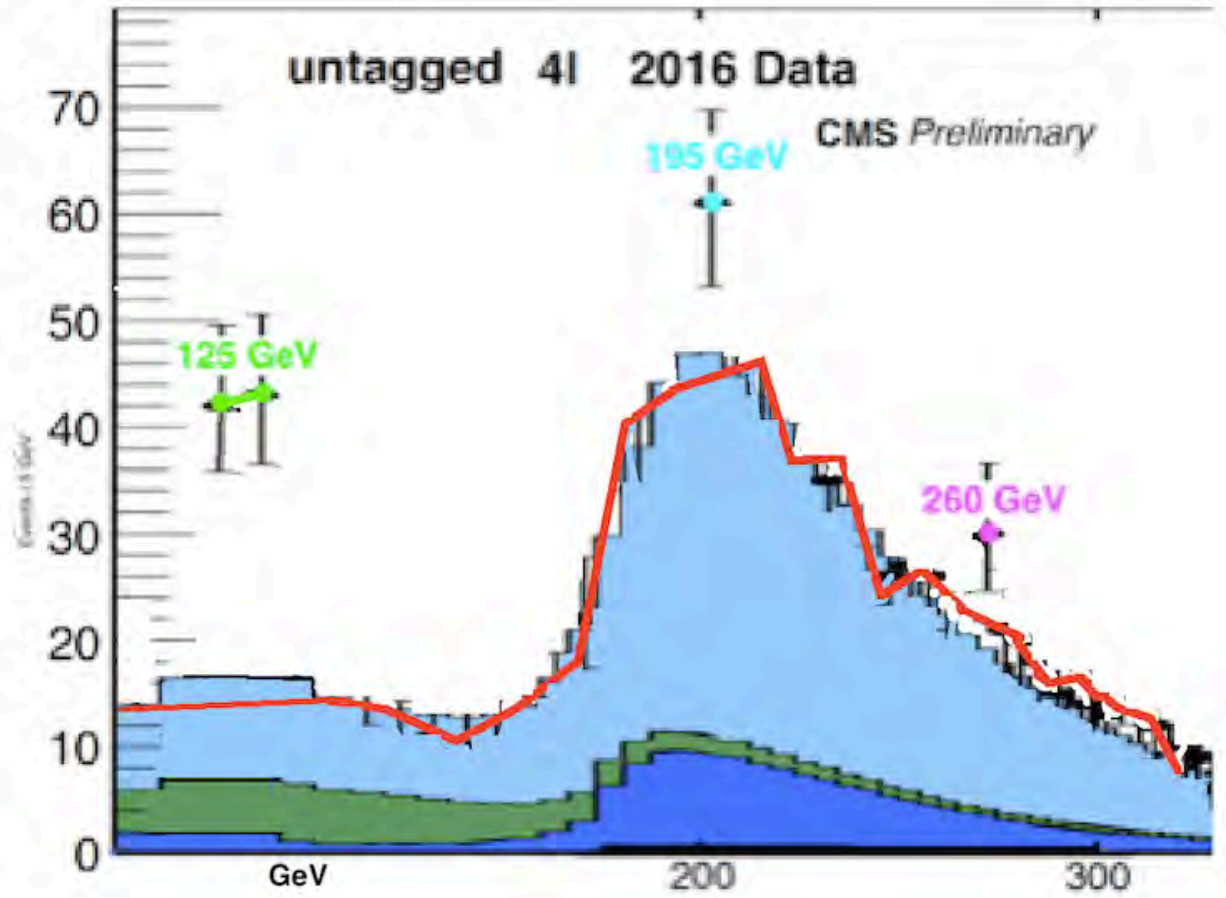
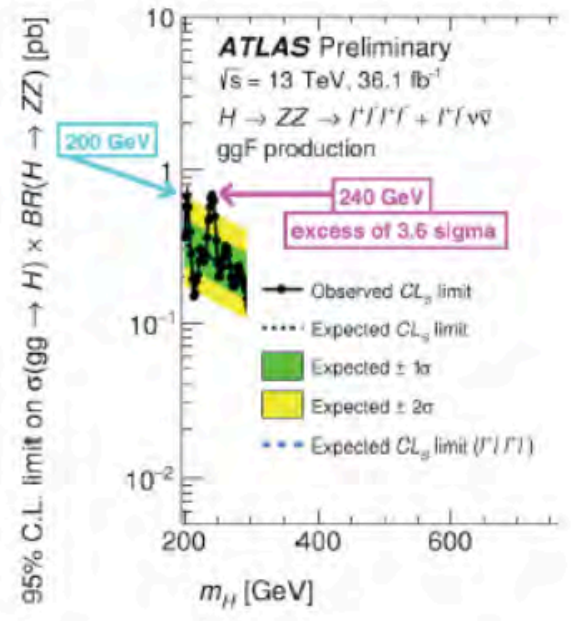
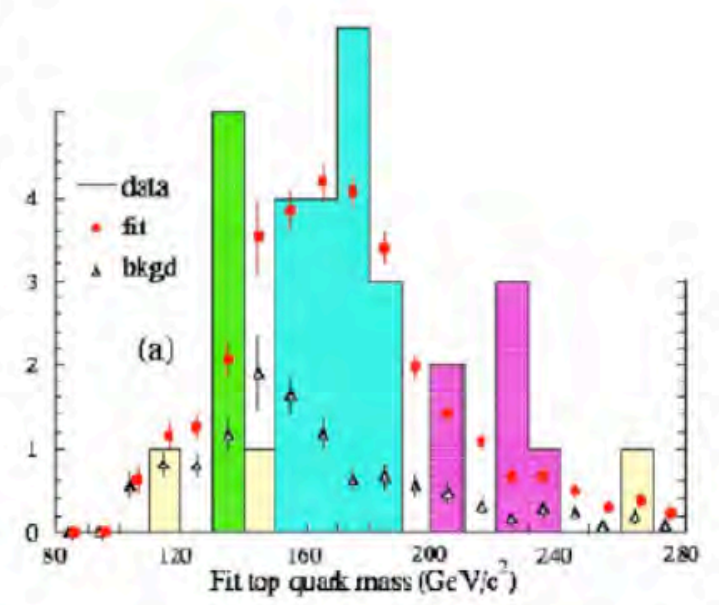
| Force | M | Vol(M) | Group | SymSpace | D | Vol(D) | Q | Vol(Q) |
|---------|------------------|-----------------|---------|------------------------|--------------------|----------------|-------------------|------------|
| gravity | S^4 | $8\pi^2/3$ | Spin(5) | Spin(7) / Spin(5)xU(1) | IV5 | $\pi^5/2^4 5!$ | $RP^1 \times S^4$ | $8\pi^3/3$ |
| color | CP^2 | $8\pi^2/3$ | SU(3) | SU(4) / SU(3)xU(1) | $B^6(\text{ball})$ | $\pi^3/6$ | S^5 | $4\pi^3$ |
| Weak | $S^2 \times S^2$ | $2 \times 4\pi$ | SU(2) | Spin(5) / SU(2)xU(1) | IV3 | $\pi^3/24$ | $RP^1 \times S^2$ | $4\pi^2$ |
| e-mag | T^4 | $4 \times 2\pi$ | 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 Flag Day | 15 | 16 |
| 17 Father's Day | 18 | 19 | 20 | 21 Summer Begins | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |



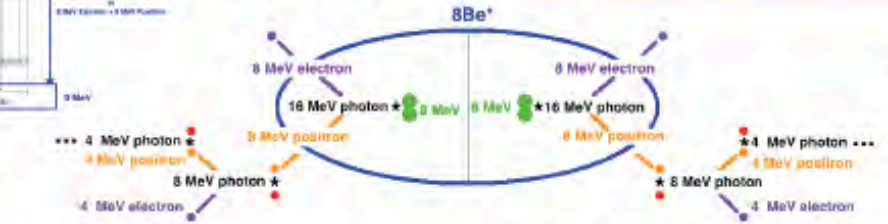
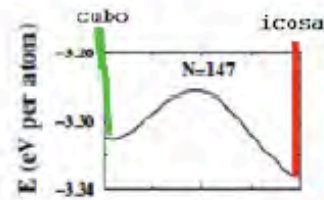
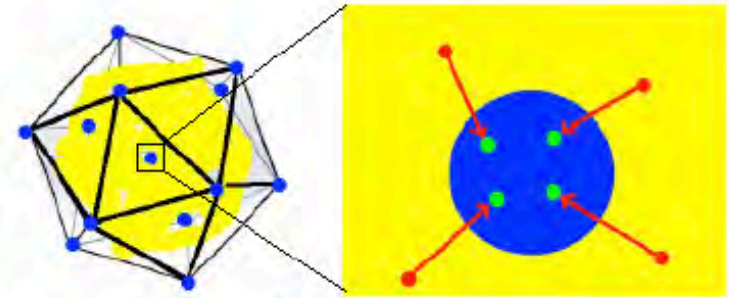
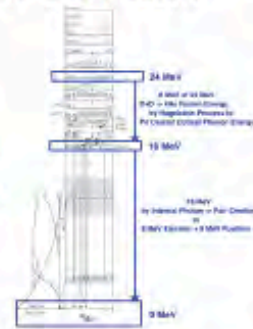
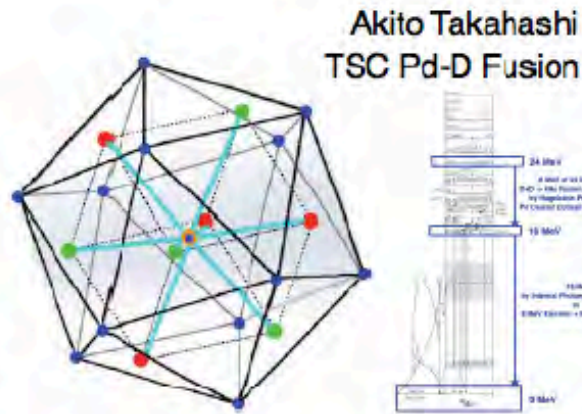
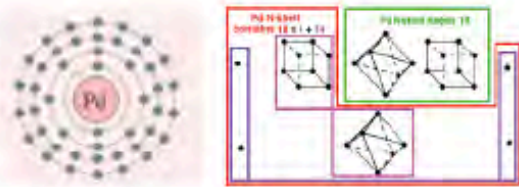
The distribution of $m_{\mu\mu}$ values determined from 11 CP dilepton events



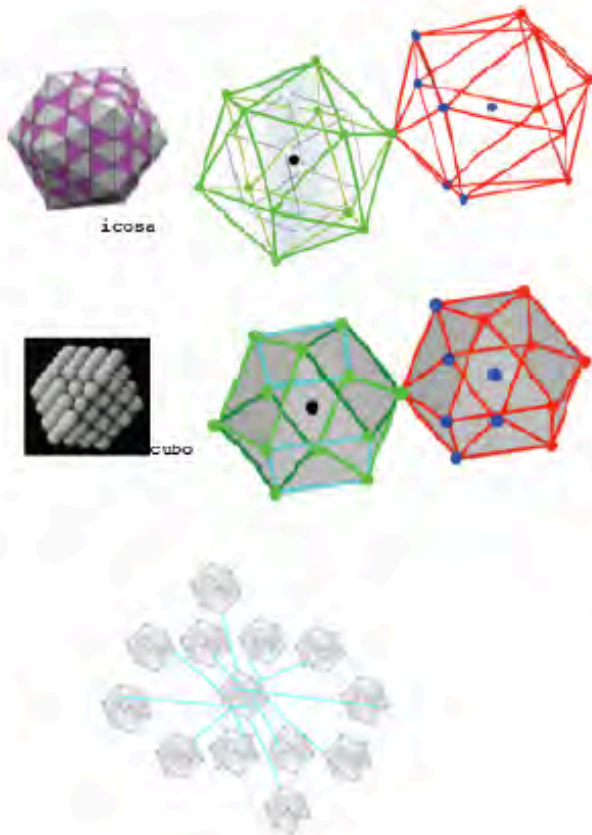
July 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|-----------------|--------|---------|-----------------------|----------|--------|----------|
| 1 Canada Day | 2 | 3 | 4 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:



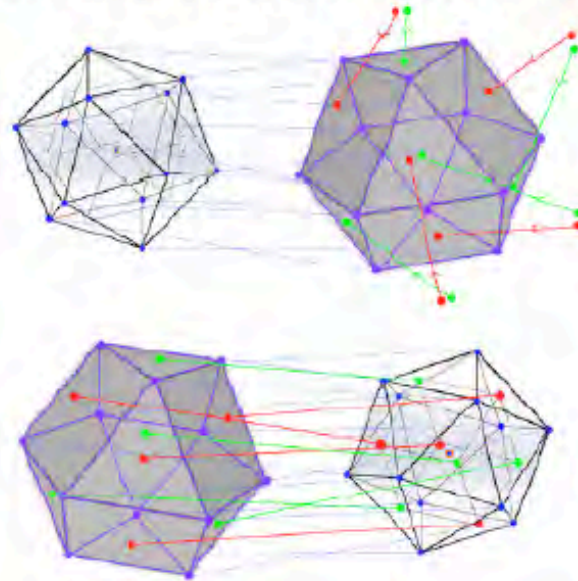
Sandia-UNM 147-atom Pd Clusters



Peter Hagelstein Nuclear Energy to Pd Structure to Zeolite



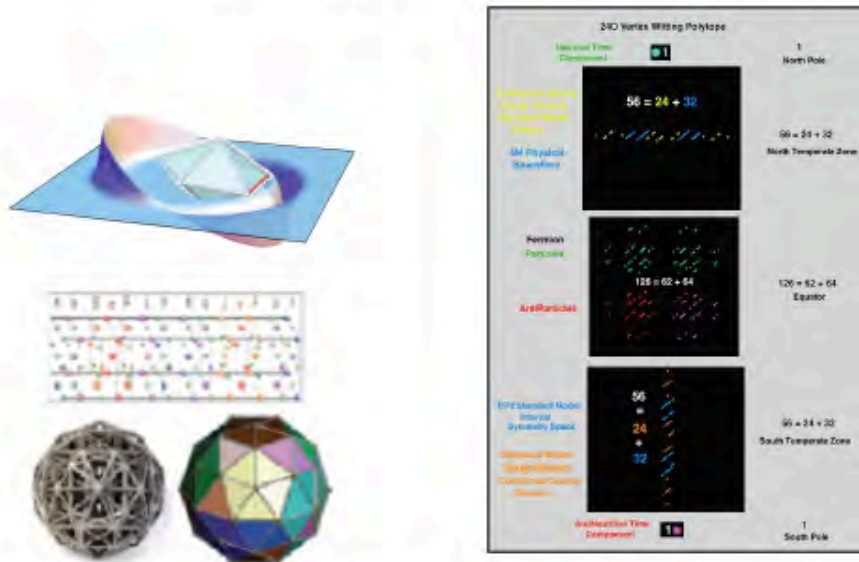
Klee Irwin Jitterbug Eject He and Reload D



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 EB-CK(16) Deutch-type Multiverse Snapshots
 Each of the Local EB-CK(16) Multiverse Snapshots is described by an EB State. Since EB 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 EB-CK(10) Multiverse Snapshot is represented by a pair of (3,3,5) 000-cells.

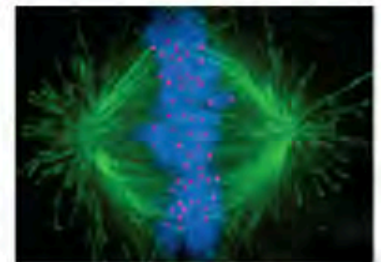
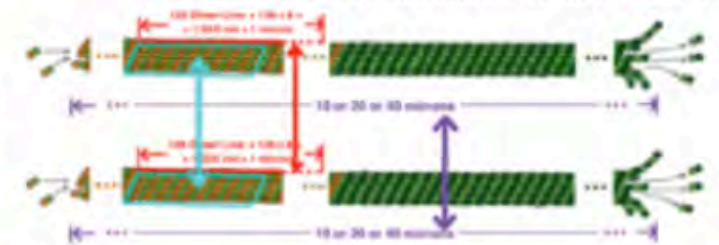
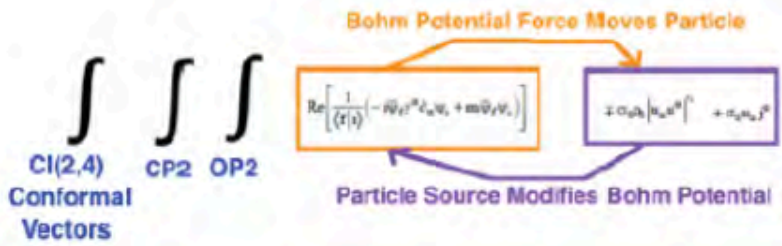


Green, Schwartz, and Witten say in their book "Superstring Theory" vol. 1 (Cambridge 1986) "For the ... closed ... bosonic string ... The first excited level ... consists of ... the ground state ... tachyon ... and ... a scalar ... 'dilaton' ... and ... SO(24) ... little group of a ... [26-dim] ... massless 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 $E_{\text{electron}} = G m^2 / a$
 For any single given tubulin $a = 1 \text{ nanometer} = 10^{-9} \text{ cm}$ so that for a single Electron $T = h / E_{\text{electron}} = (Compton / Schwarzschild) (a / c) = 10^{-26} \text{ sec} = 10^{-19} \text{ years}$
 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 $E_N = G M^2 / L = N^{5/3} E_{\text{electron}}$
 The decoherence time for the system of N Tubulin Electrons is $T_N = h / E_N = h / N^{5/3} E_{\text{electron}} = N^{-5/3} 10^{-26} \text{ sec}$

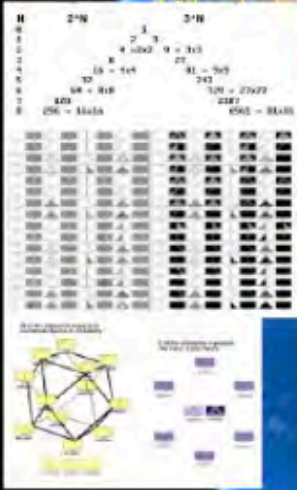
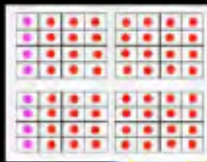
| Number of Involved Tubulin Dimers | Time T_N |
|-----------------------------------|---|
| $10^{11}(11+9) = 10^{20}$ | $10^{11}(33 + 26) = 10^{11} \text{ sec} = 10^{11} \text{ neurons} \times 10^9 \text{ TD} / \text{neuron}$ |
| 10^{16} | $10^{16}(27 + 26) = 10^{16} \text{ sec} = 10 \text{ Hz} = \text{Human Alpha EEG is 8 to 13 Hz} = \text{Fundamental Schumann Resonance is 7.8 Hz}$ |

Time of Hamiltonian Circuit of 10^{16} TD separated from nearest neighbors by 10 nm is $10^{16} \times 10 \text{ nm} / c = (10^{16} \times 10^{-8}) \text{ cm} / c = 10^{10} \text{ cm} / c = 0.3 \text{ sec}$



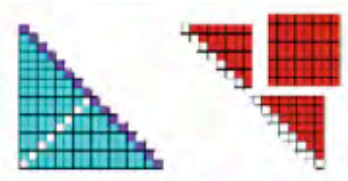
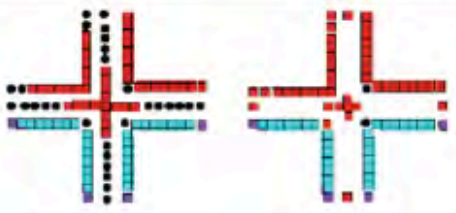
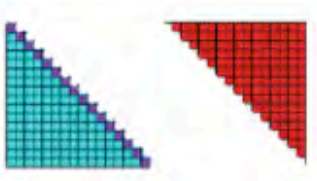
September 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--|----------------|------------------|-----------|----------|--------|---------------------|
| | | | | | | 1 |
| 2 | 3 Labor Day | 4 | 5 | 6 | 7 | 8 |
| 9 Grandparents Day Rosh Hashanah | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 Yom Kippur | 19 | 20 | 21 | 22 Autumn Begins |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| | 30 | | | | | |



3.3 श्रीमद्वेदिक पुराणेति सुप्रस्यं देवकीयजम् । देवदरे खुदालाभम्
 अश्रः पूर्वोपश्रुतिविरोद्धो नूननेरुत् । स एवो एह वैश्रुति
 अश्रितो शर्वमश्रुताभिर्भव दिव्यैरेव । पशरतं चोरवलाभम्
 अश्रु यं पञ्चमश्वर विभक्तं शरिचूर्णेन । स श्रुदन्तुं सज्जनो
 अश्रितोर्वा कविर्जन्तुः गुण्यैश्च श्रुतसत्ता । इयो एवो भूय गण्यम्
 पदम् अश्रुते ल्यमये श्रुते केशिचरिते । तदेवताश्वरमीडिर
 एवं एवाश्रुते दिव्यैरेव दोषावश्रुतिवा सुप्रस्यं । नशो परन्तु वर्ण्येव
 शर्वनवश्वर्याणां गोपसुतस्य वेदिशियम् । कर्षिपानं खे दवे
 स नीः श्रुतेवं सुनवेऽप्रे सुपावनो भव । शर्चसा नाः खुदन्तं

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 l line
 and 8 Sanskrit syllables right of the l 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 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 Halloween | | | |



Eupedia map of Y-haplogroup E-V13

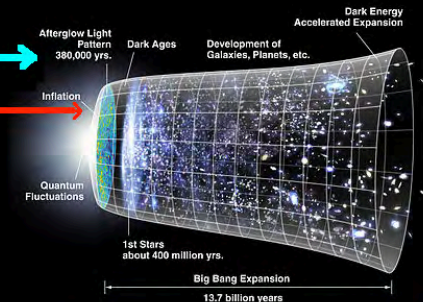


November 2018

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|-------------------------------|----------------------------------|---------|-----------|--------------------|--------|----------|
| | | | | 1 | 2 | 3 |
| 4 Daylight Savings Ends | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 Veterans Day | 12 Veterans Day (Observed) | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 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 = D8 |
| 56 | 56 | 560 |
| 28 | 28 | 120 = D8 |
| 8 | 8 | 16 |
| 1 | 1 | 1 |
| $Cl(8) \times Cl(8) = Cl(16)$ | | |

NJL Quantum Condensate

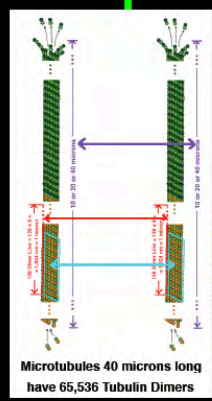


$10^{19} E8$ Lattice 240-vertex Polytope Cells in Universe at End of Inflation

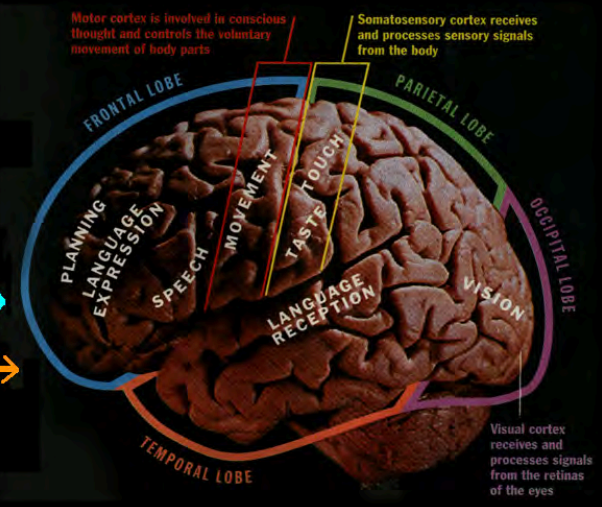


Quantum Resonant Connection

10^{19} Tubulin Dimers in a Human Brain

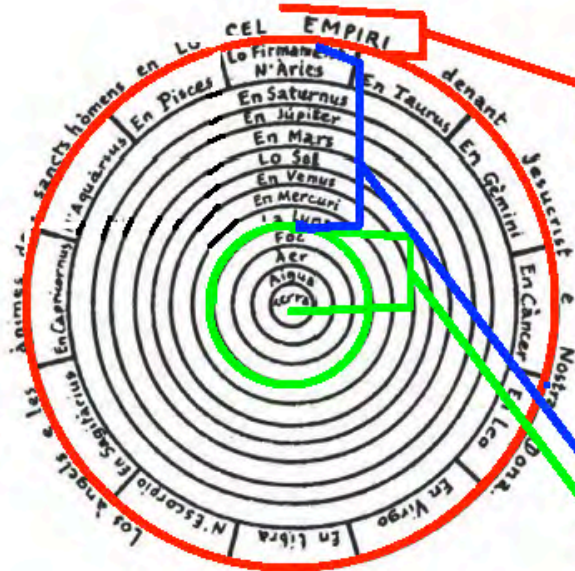
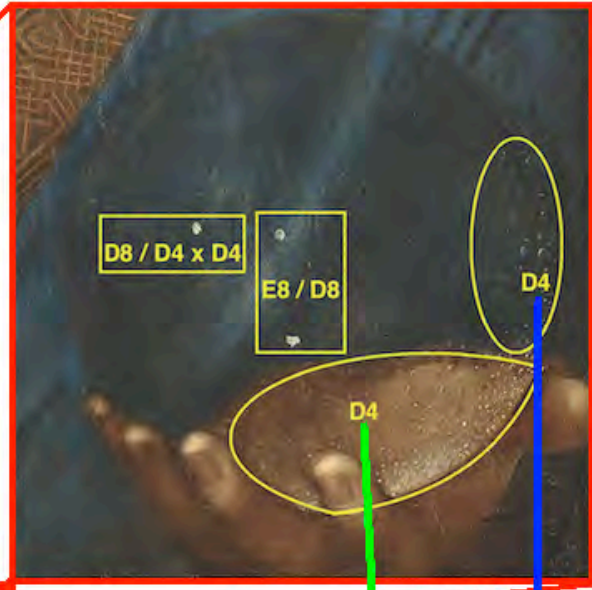
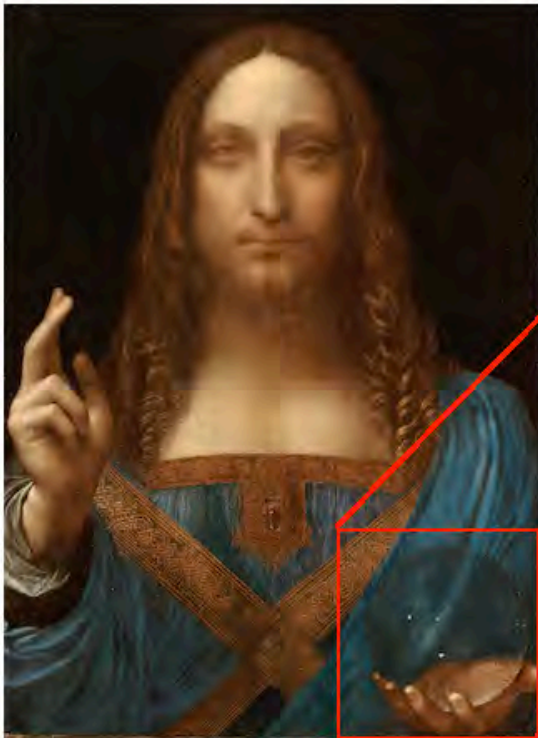


Penrose-Hameroff Quantum Condensate

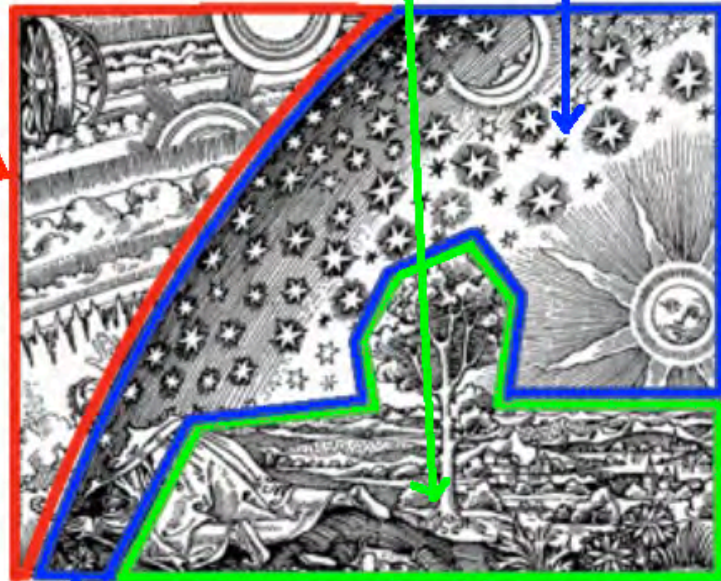


December 2018

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



E8

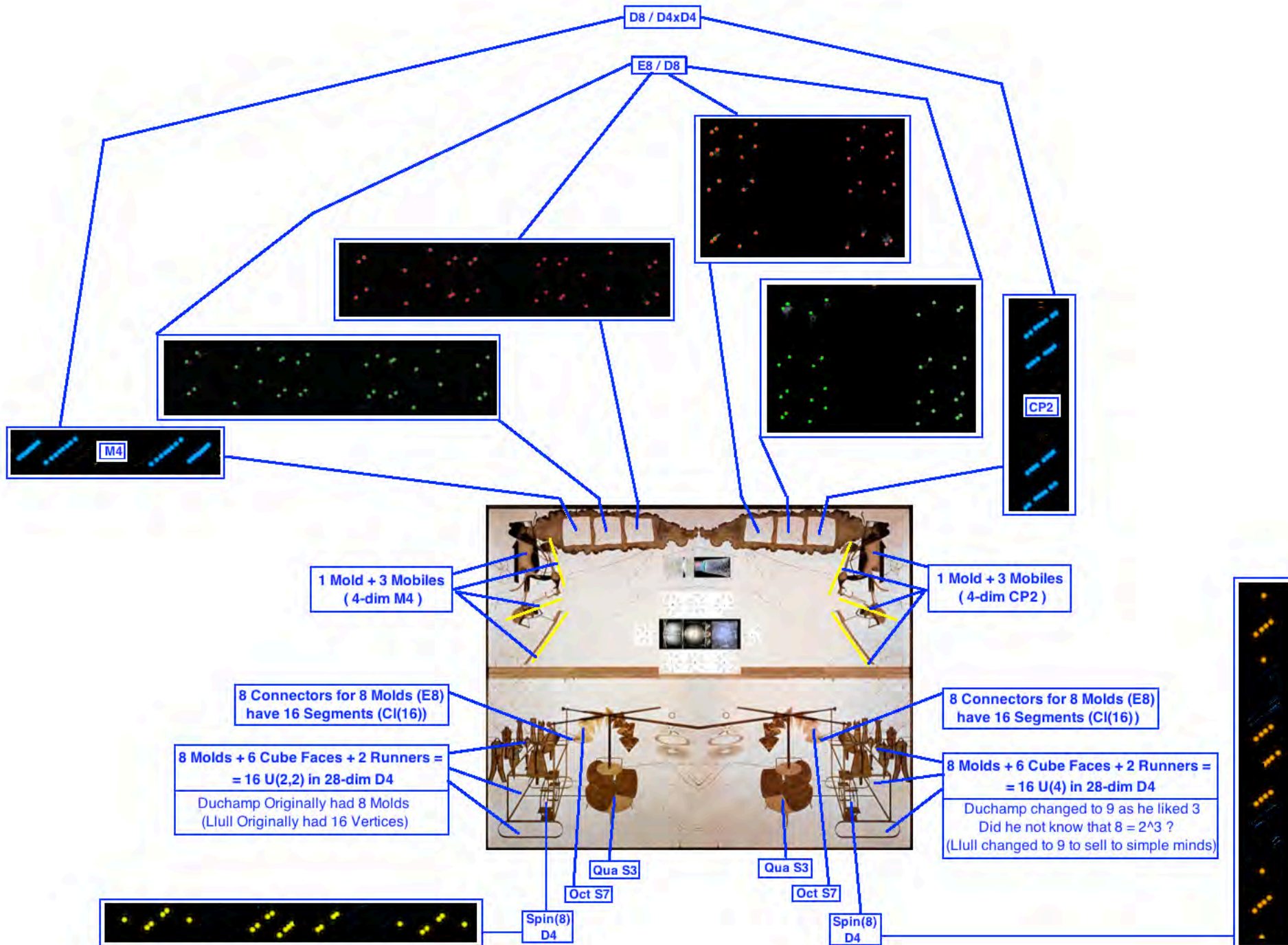


January 2019 (United States)

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



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

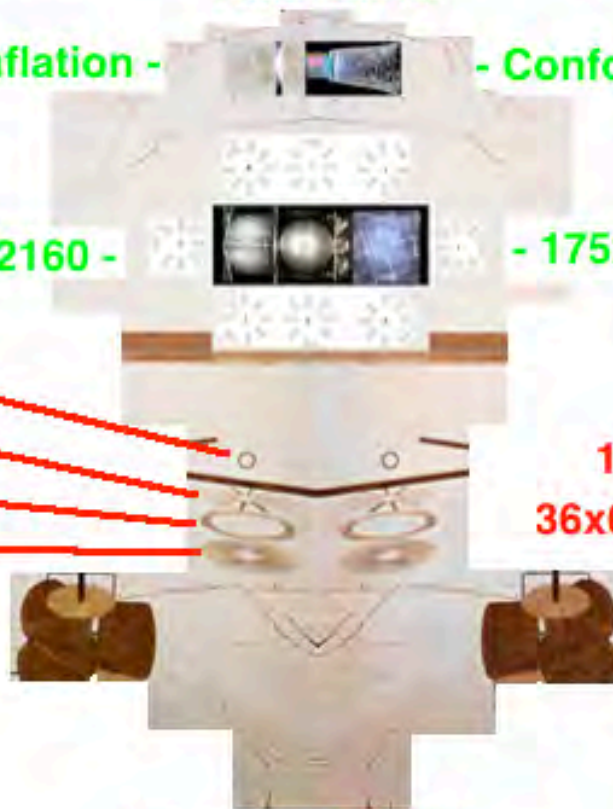
Big Bang - Inflation - Conformal Evolution

E8 240 - 2160 - 17520 = 240 + 8x2160

Alien Eyes
1
36
6
60

1+6 = 7 of S7
36x60 = 2160 = E8 Layer 2






Alien LGL+LGL Body



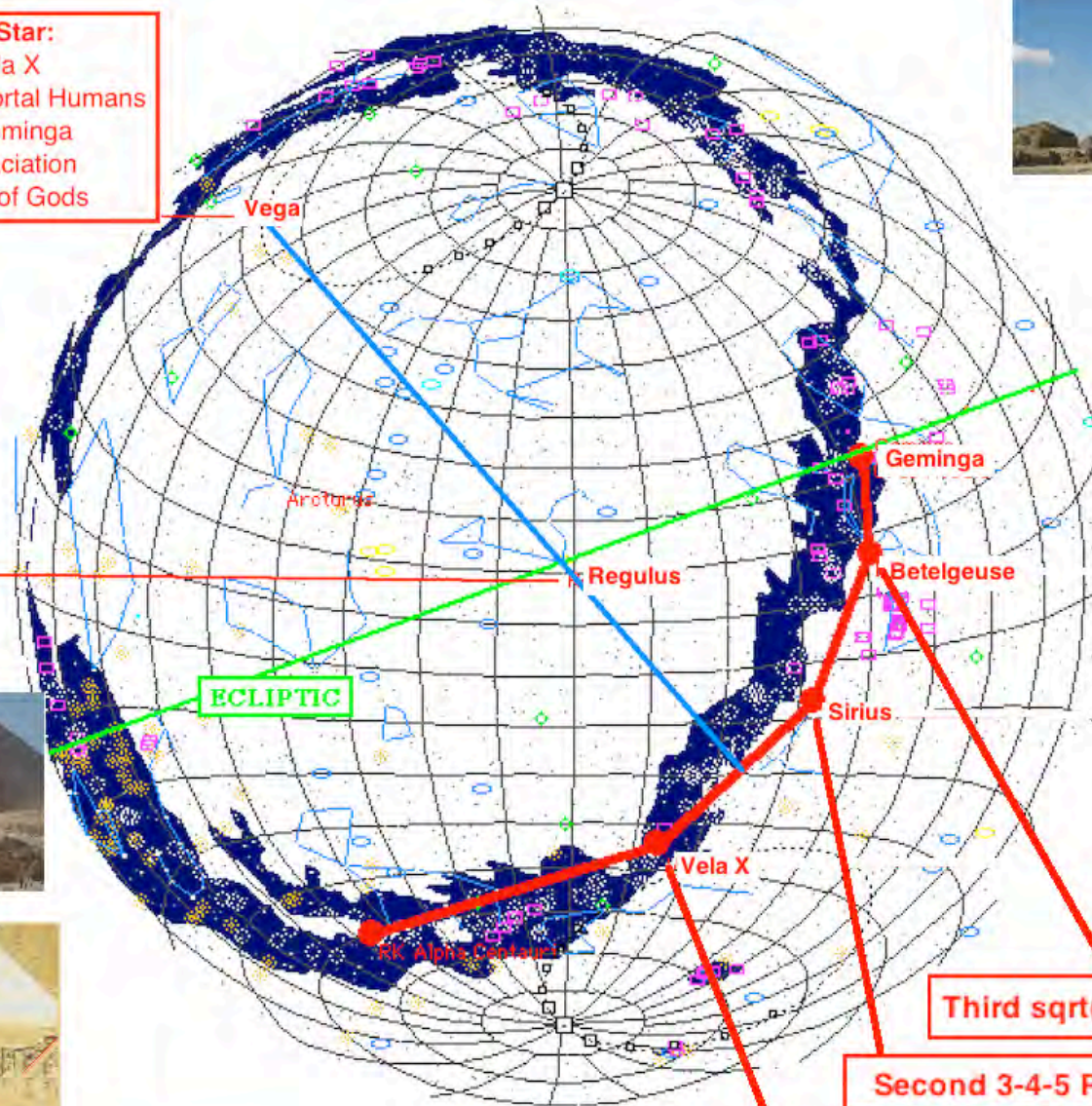
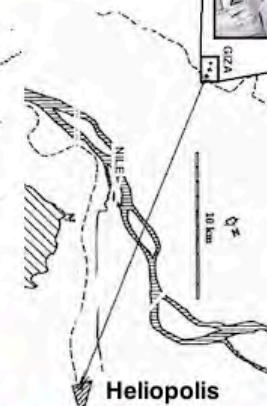
March 2019 (United States)

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 <small>March equinox</small>  Full Moon | 21 <small>Purim</small> | 22 | 23 |
| 24 | 25 | 26 | 27 | 28  3rd Quarter | 29 | 30 |
| 31 | 1 | 2 | 3 <small>Isra and Mi'raj</small> | 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



Sphinx

ECLIPTIC

Third $\sqrt{2} \times 10/9$ Pyramid

Second 3-4-5 Pyramid

Great Golden CI(8) Pyramid



June 21 2006
 Summer Solstice
 Sunset



"Equinoctial"
 Sunrise



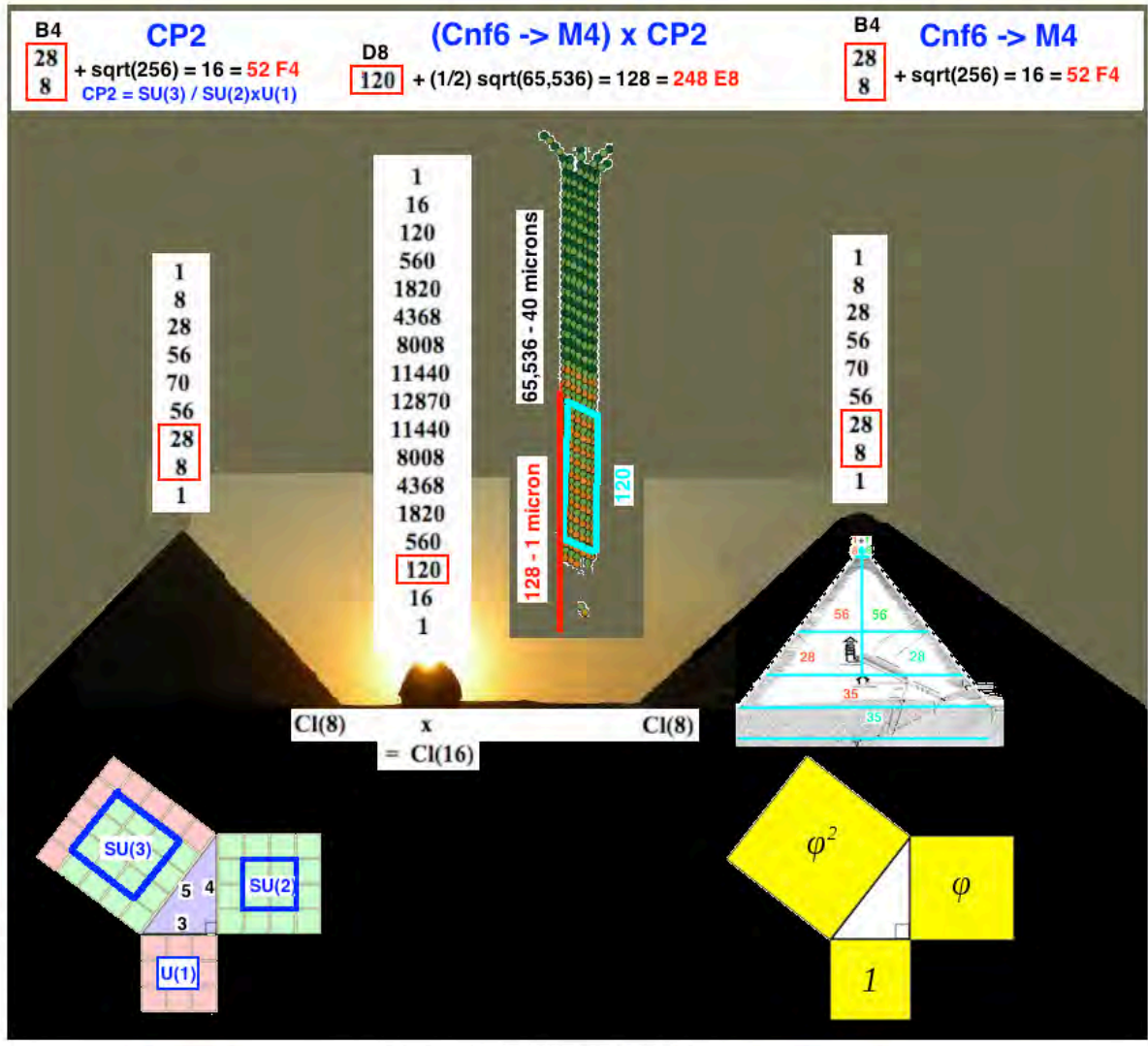
March 21 2005

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

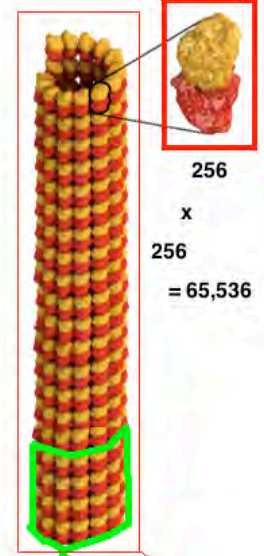


52-dim F4 of CP2 in 256-dim Cl(8)

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



Cross section



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

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)

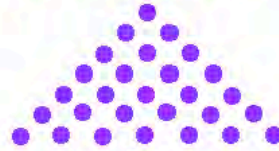
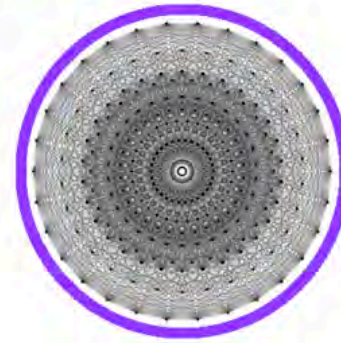
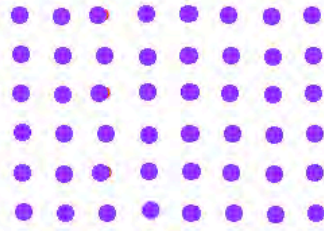
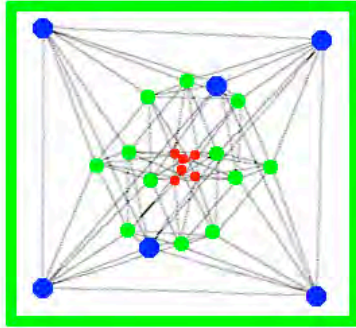
May 2019 (United States)

June 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 | 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

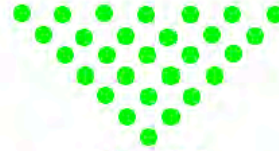


78-dim E6 = 52-dim F4 + 26-dim J(3,O)0



2 Complex Structure Elements 

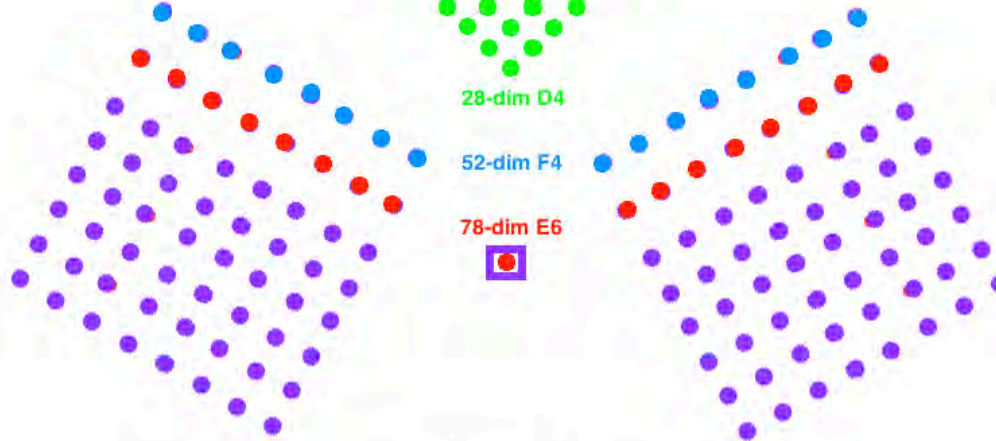
of 78-dim E6 are absorbed into 48+48+48+28 = 144 of 248-dim E8



28-dim D4

52-dim F4

78-dim E6



$E6 / (D5 \times U(1)) = 32\text{-Real-dim Symmetric Space of Type EIII} = (C \times O)P2$
 16-Complex-dim NonCompact Dual = Type V Bounded Domain in subspace of $J(3, C \times O)$
 Shilov Boundary = Not Tube Type = 8-Complex-dim =
 = bundle with fiber $S^1 \times S^7$ and base space S^9 with fibration $S^1 \rightarrow S^9 \rightarrow CP^4$
 each fiber $S^1 \times S^7$ = Shilov Boundary for $D5 / (D4 \times U(1)) = \text{Lie Sphere } RP^1 \times S^7$

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

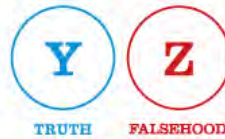
| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|------------------|------------------|------------------|---------------|--------------------|-------------------|-----|
| 26 🌑 3rd Quarter | 27 Memorial Day | 28 | 29 | 30 | 31 Lailat al-Qadr | 1 |
| 2 | 3 🌑 New Moon | 4 | 5 Eid al-Fitr | 6 | 7 | 8 |
| 9 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:

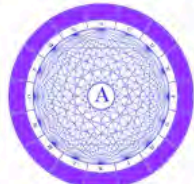
Tensor Product $RxCxHxO = T = 64\text{-dim} =$

| | | | |
|---------------------|---|-------------------------|---|
| The Figure of Truth | | The Figure of Falsehood | |
| W | U | W | U |
| V | T | V | T |
| S | R | S | R |
| Q | P | Q | P |
| O | N | O | N |
| M | L | M | L |
| K | J | K | J |
| I | H | I | H |
| G | F | G | F |
| E | D | E | D |
| C | B | C | B |
| A | | A | |

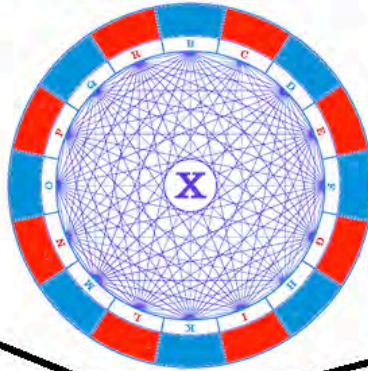
$T + T = 128\text{-dim} = E8 / D8$



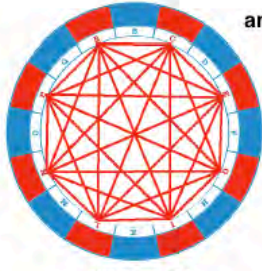
Binary Real Clifford Algebras of tensor product $Cl(8) \times Cl(8) = Cl(16)$



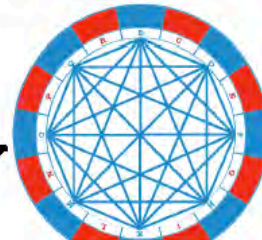
120-dim D8 and $E8 / D8 = (OxO)P2$



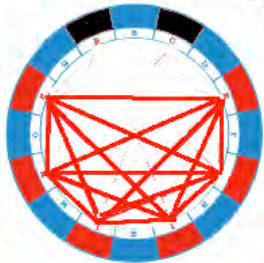
120-dim D8



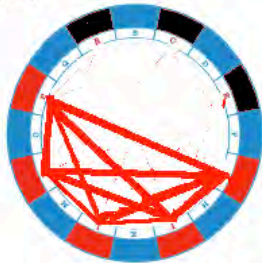
28-dim D4



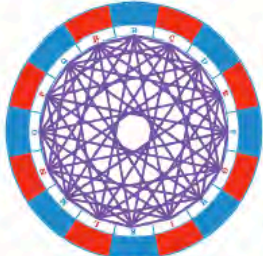
28-dim D4



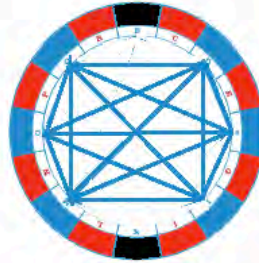
15-dim Spin(2,4)



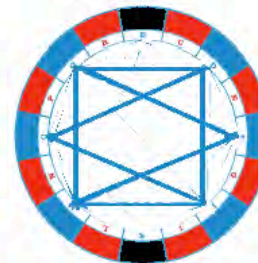
10-dim Spin(2,3)



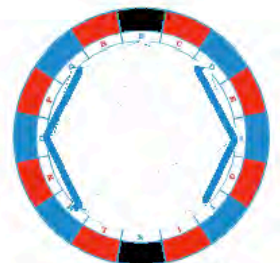
64-dim A7+R



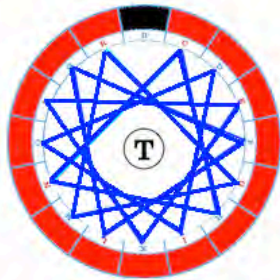
15-dim SU(4)



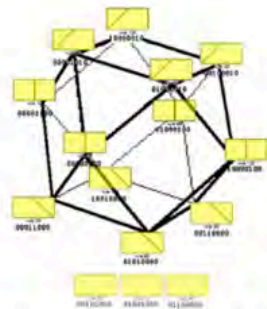
8-dim SU(3)



4-dim SU(2)xU(1)

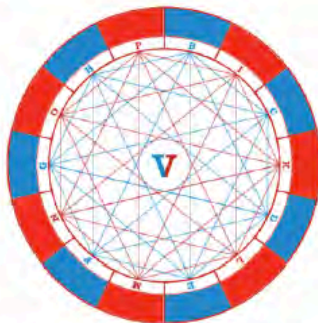


3 = Cartan Subalgebra D3 = A3

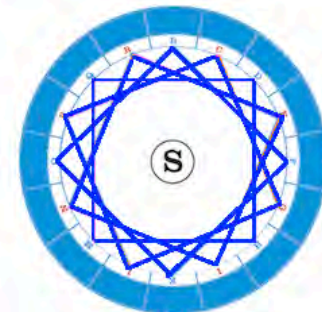


4 x 3 = Cuboctahedron Vertices D3 = A3

D3 = A3 acts Conformally on M4 of M4 x CP2 Kaluza-Klein



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)

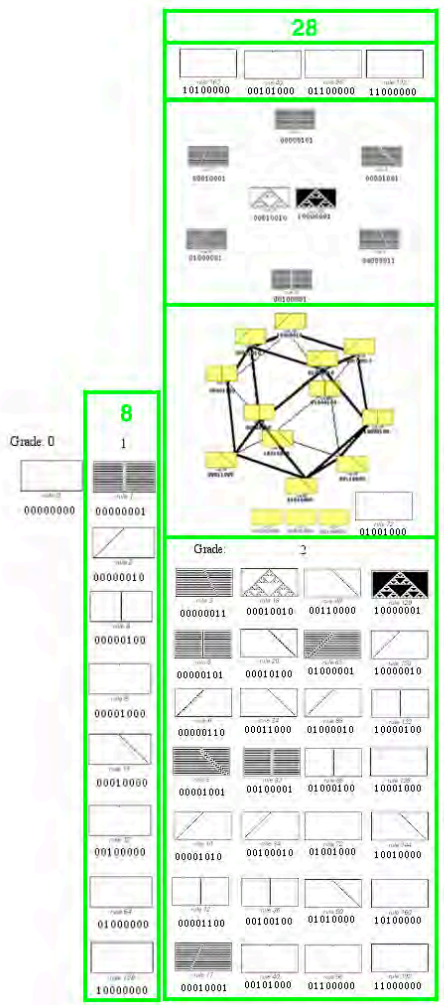
42 Assessors = 21-dim Spin(7) + 21-dim Spin(7)
Zero Divisors of Sedenions

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 |



$8+28+16 = 52 \text{ F4}$

256-dim Cl(8) as Cellular Automata

16
 Cl(8) Primitive Idempotent has 16 Terms
 $I = (1/2)(1 + e_{1248}) (1/2)(1 + e_{2358}) (1/2)(1 + e_{3468}) (1/2)(1 + e_{4578}) =$
 $=(1/16)(1 + e_{1248} + e_{2358} + e_{3468} + e_{4578} + e_{5618} + e_{6728} + e_{7138} + e_{3567} - e_{4671} - e_{5712} - e_{6123} - e_{7234} - e_{1345} - e_{2456} + e_{J})$
 corresponding to 16 of the 256 Cellular Automata

• $+ e_{12345678}$ 11111111

• $+ e_{6728} - e_{3468} + e_{4578}$ to 1110010 10101100 11011000

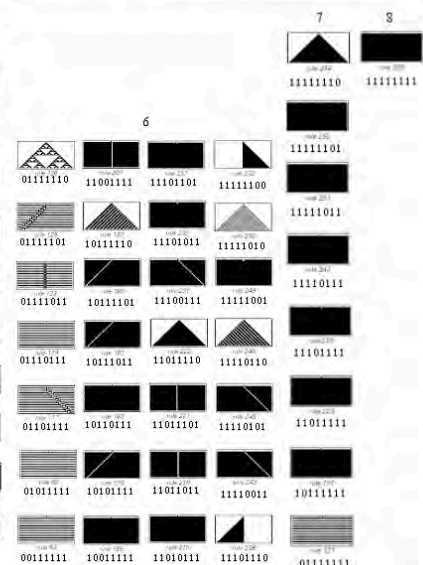
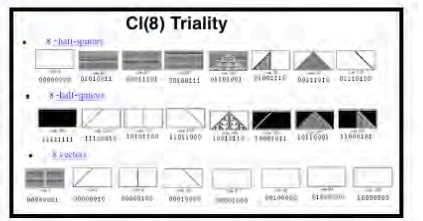
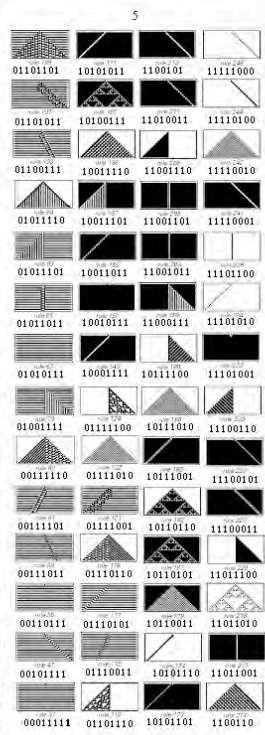
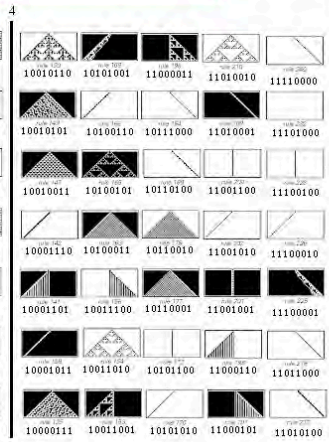
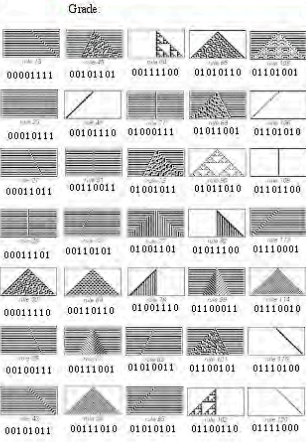
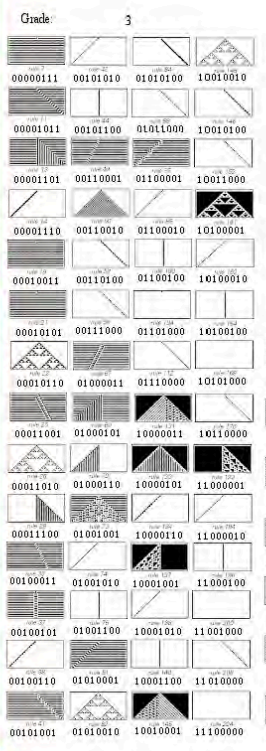
• $+ e_{2358} - e_{1248} + e_{5618} - e_{7138}$ 1001010 1001011 1011000 11000101

• $+ 1$ to 00000000

• $- e_{5712} - e_{1345} - e_{6123}$ 01010011 00011100 00100111

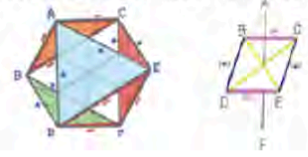
• $- e_{4671} - e_{7234} - e_{2456} - e_{3567}$ 01101101 01001110 00111101 01110100

Tensor Product Cl(8) x Cl(8) = Cl(16)
 $(F4 \text{ in Cl(8)}) \times (F4 \text{ in Cl(8)}) =$
 $= 8 \times 8 + 28 \times 1 + 1 \times 28 + 16 \times 16 =$
 $= 120 \text{ Cl(16) BiVectors} + (128 + 128) \text{ Cl(16) Spinors}$
 $120 \text{ Cl(16) BiVectors} + 128 \text{ Cl(16) Half-Spinors} = E8$



Guillermo Moreno (arXiv math/0512517) has shown that $V(7,2) = \text{Spin}(7) / \text{Spin}(5)$ can be identified with the Zero Divisors of Sedenions which have $7+28 = 35$ Associative Triples and for which Zero Divisors are given by the fibration $V(7,2) \rightarrow G_2 \rightarrow S^3$ [3-sphere] and which have 4-2=2 ZD Irreducible Components and 10-dim Lie Sphere $\text{Spin}(7) / \text{Spin}(5) \times U(1)$ whose 10D corresponds to $\text{Cl}(1,9) = \text{Cl}(2,8)$ Conformal over $\text{Cl}(1,7)$ that $V(15,2) = \text{Spin}(15) / \text{Spin}(13)$ is related to, but not identified with, the Zero Divisors of 32-ons which have $35 + 120 = 155$ Associative Triples and which have 8-2=6 ZD Irreducible Components and 26-dim Lie Sphere $\text{Spin}(15) / \text{Spin}(13) \times U(1)$ whose 26D correspond to 26D String Theory and to 26-dim traceless $J(3,0)_0$ that $V(127,2) = \text{Spin}(127) / \text{Spin}(125)$ is related to, but not identified with, the Zero Divisors of Voudon 256-ons corresponding to $\text{Cl}(8)$ which have $1+6+28+120+496+2016+8128=10795$ Associative Triples and which have 64-2=62 ZD Irreducible Components and 250-dim Lie Sphere $\text{Spin}(127) / \text{Spin}(125) \times U(1)$

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 $G_2 \times (n-3) \times S_3$ (... order-6 permutation group on 3 elements) ... This says the automorphism group of the Sedenions' ZD's has order $14 \times 1 \times 6 = 84$... 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.

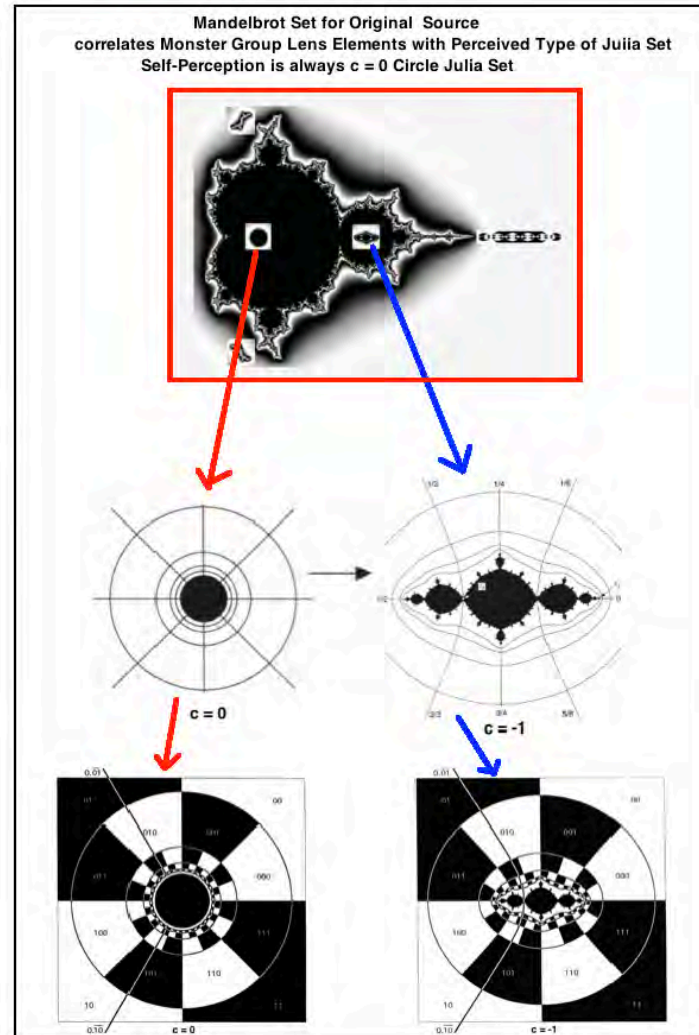
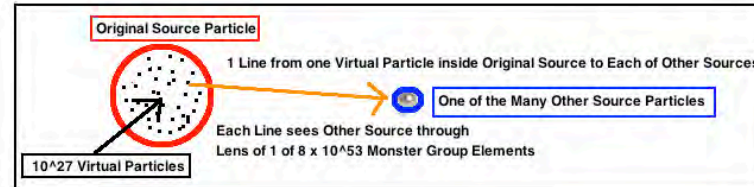
The automorphism group of one 26-dim String Theory cell modulo the Leech lattice is the Monster Group of order about 8×10^{53} . The Cloud structure comes from the 24-dim Leech lattice part of the Monster Group which is 2^{24} times the double cover of Co_1 , for an order of about 10^{26} . Due to superpositions 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 $10^{(27/3)} \times 1.6 \times 10^{(-33)} \text{ cm} = \text{roughly } 10^{(-24)} \text{ cm}$.

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 8×10^{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 $2^{256} = \text{about } 10^{77}$ 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.



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 |

$$\begin{array}{cccc}
\mathbf{S0} & \mathbf{S1} & \mathbf{S3} & \mathbf{S7} \\
\mathbf{U} & \mathbf{U} & \mathbf{U} & \mathbf{U} \\
\mathbf{T} = \mathbf{R} \times \mathbf{C} \times \mathbf{H} \times \mathbf{O} \\
\mathbf{Z2} & \mathbf{U(1)} & \mathbf{SU(2)} & \mathbf{Spin(8)}
\end{array}$$

Division Algebras, Lattices, Physics, Windmill Tilting
Geoffrey Dixon

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

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

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

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

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

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 Ψ 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

$$= 8 \times 8 + 8 \times 8 = 64 + 64 = \mathbf{T} + \mathbf{T} = 128 = \mathbf{T}^2 =$$

$$= \mathbf{E8} / \mathbf{D8} = (\mathbf{O} \times \mathbf{O}) \mathbf{P}^2 = \text{HalfSpinors of } \mathbf{Cl}(16)$$

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 Λ_{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 | $9 \times 10^{(-3)}$ eV for nu_2 |
| tau-neutrino | 0 | $5.4 \times 10^{(-2)}$ 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 | 1.217×10^{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) | | $5 \times 10^{(-39)}$ |
| EM fine structure | 1/137.03608 | |
| Weak Gw | 0.2535 | |
| Gw(Mproton ² / (Mw+ ² + Mw- ² + Mz0 ²)) | | $1.05 \times 10^{(-5)}$ |
| 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) First Day of Sukkot | 15 | 16 | 17 | 18 | 19 |
| 20 Last Day of Sukkot | 21 Shmini Atzeret 🌑 3rd Quarter | 22 Simchat Torah | 23 | 24 | 25 | 26 |
| 27 🌑 New Moon | 28 | 29 | 30 | 31 | 1 | 2 |

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

Kaluza-Klein Spacetime
M4 x CP2

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

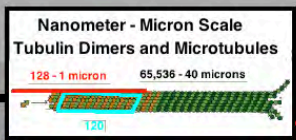
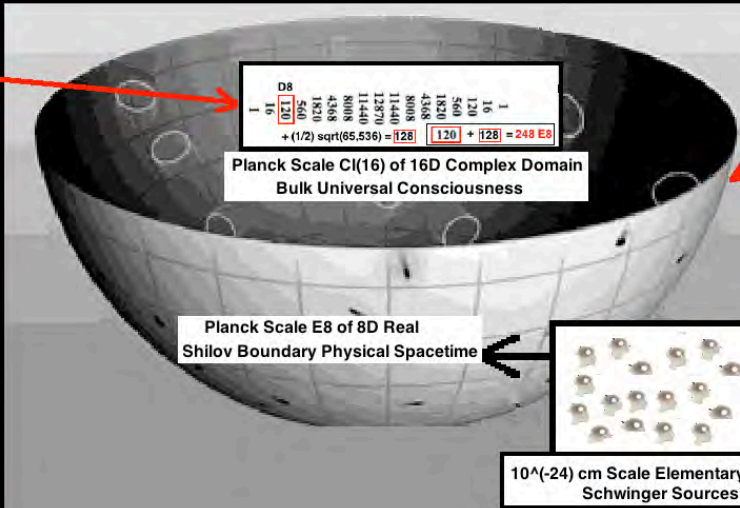
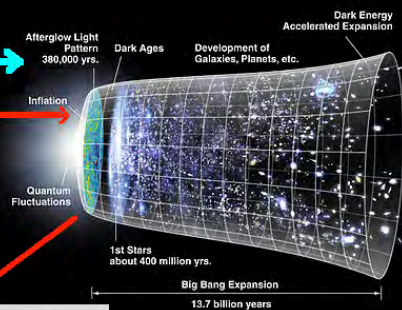
CI(8) that contains 28 = D4 for M4 Gravity

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

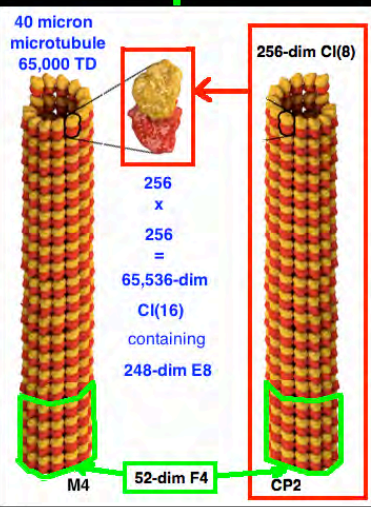
Spinors: $(8s+8c) \times (8s+8c) = (8c \cdot 8s + 8c \cdot 8c)$

NJL Quantum Condensate

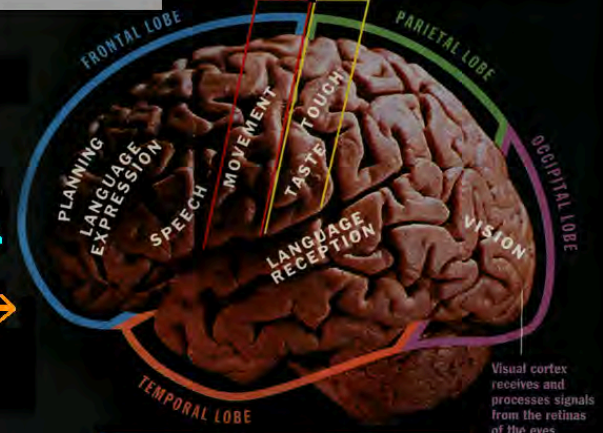
10¹⁹ E8 Lattice 240-vertex Polytope Cells in Universe at End of Inflation



Quantum Resonant Connection



Penrose-Hameroff Quantum Condensate



10¹⁹ 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 -> CI(Void) -> CI(0) -> CI(1) -> CI(2) -> CI(4) -> CI(16)

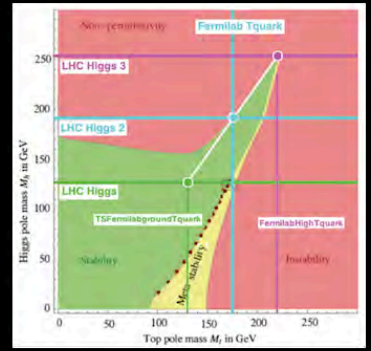
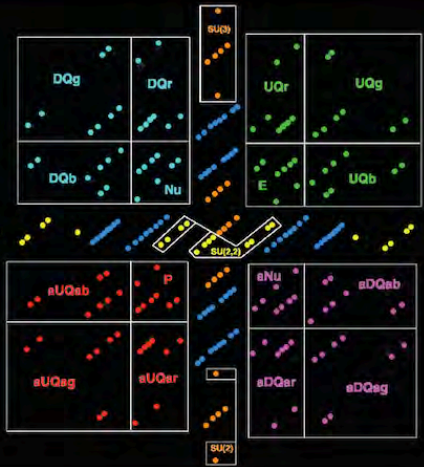
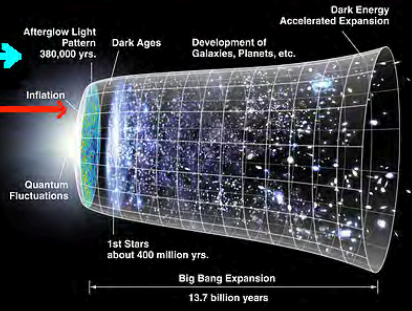
Kaluza-Klein Spacetime
M4 x CP2

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

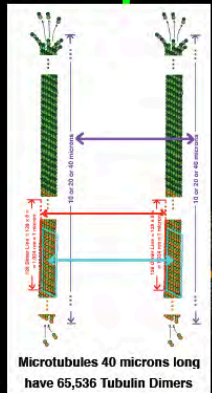
Spinors: $(8s+8c) \times (8s+8c) = (8c \cdot 8s + 8s \cdot 8c)$

NJL Quantum Condensate

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



Quantum Resonant Connection

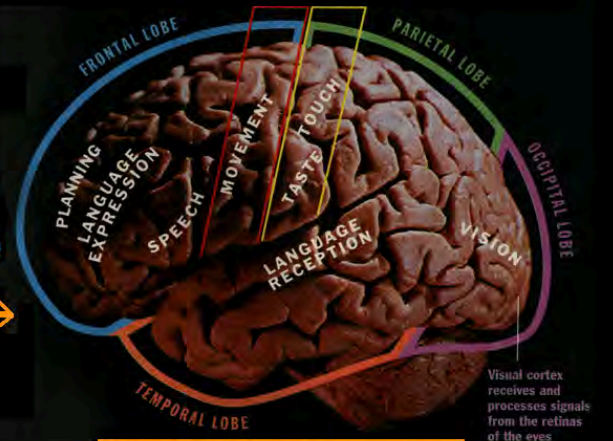


$CI(0,16) \times CI(0,8) = CI(0,24)$

$M(2, CI(0,24)) = CI(1,25)$

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

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 $Cl(0,8) \times Cl(p,q) = M(R,16) \times Cl(p,q) = Cl(p,q+8)$

Real Clifford Algebras $Cl(p,q)$

H = Quaternion

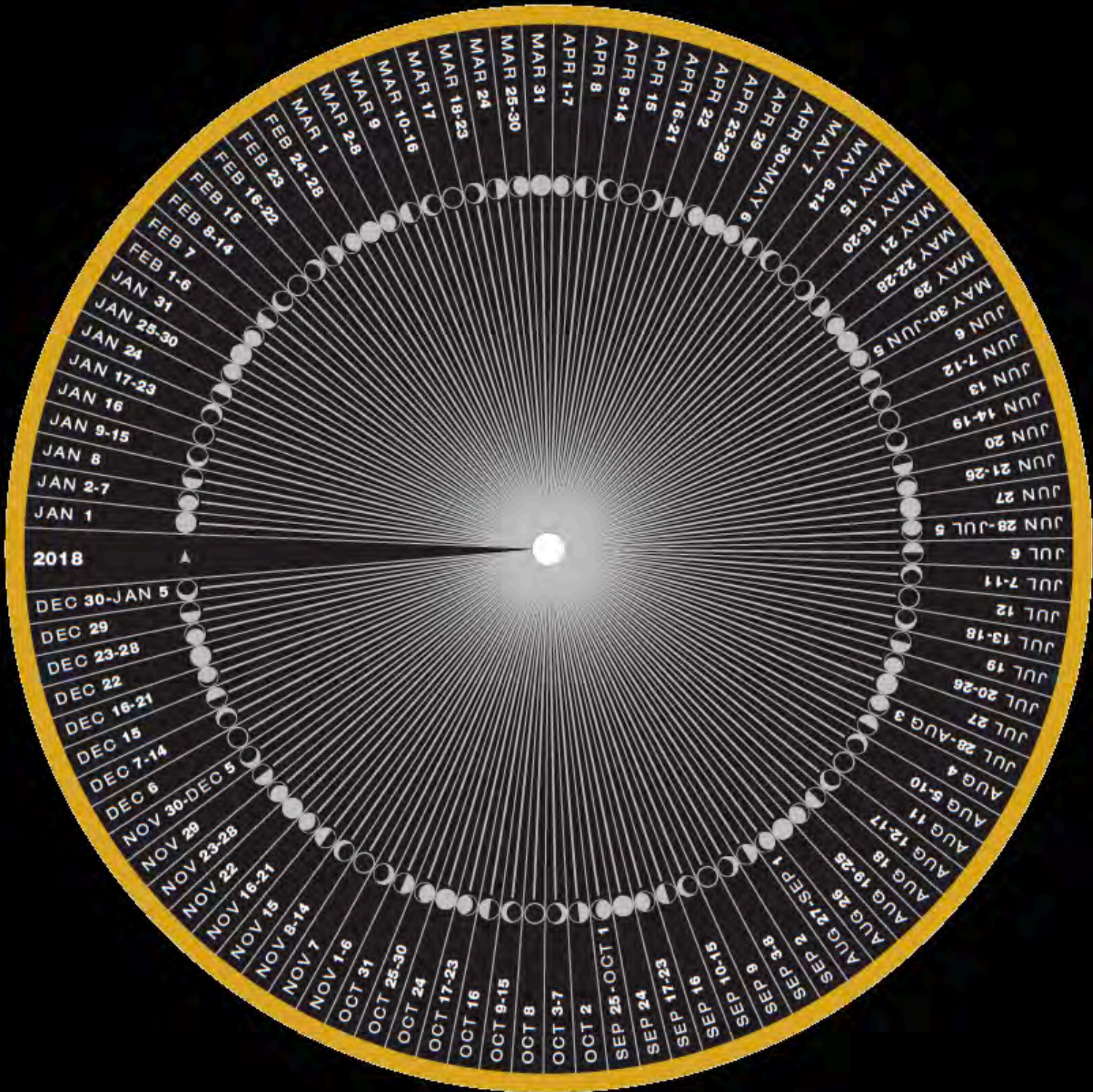
C = Complex

R = Real

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

q -->

p ↑

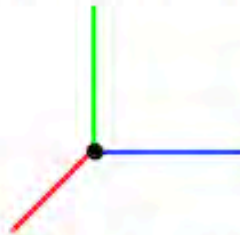


**Clifford Algebra = Algebra of Spaces =
= Fundamental Human Understanding**

For our 3-dim Space with coordinates x y z

Cl(3) describes

1 - all of 3-space itself



3 - three types of planes in space:

xy

yz

zx



3 - three types of lines / directions in space:

x

y

z



1 - one type of 0-dim point

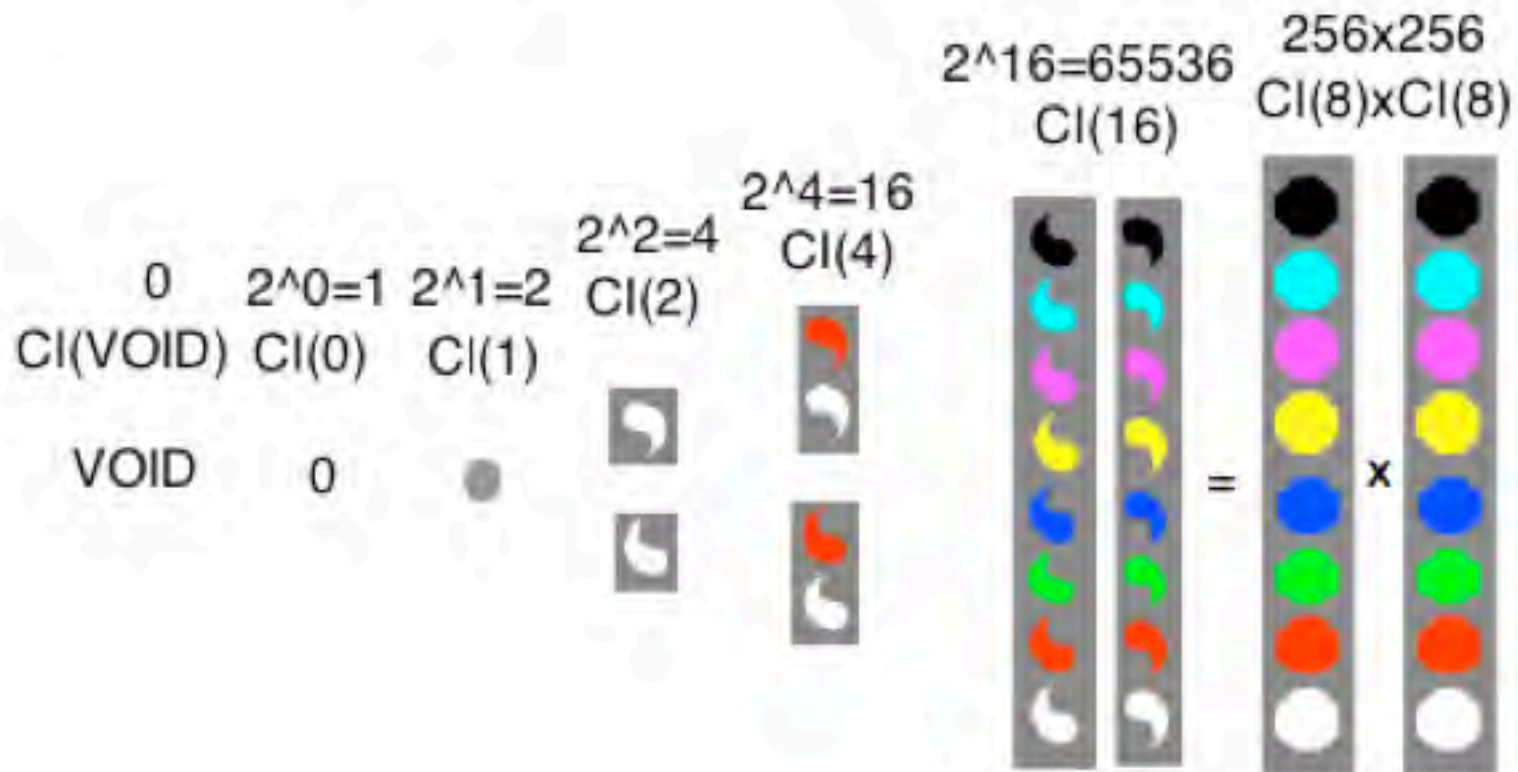
so

Cl(3) of 3-dim space has total dimension

$$1+3+3+1 = 2^3 = 8$$

Generally, $Cl(N)$ of N -dim space has dimension 2^N
 so the process of forming Clifford Algebra
 creates 2^N -dim spaces from N -dim spaces

THIS IS HOW OUR UNIVERSE GREW FROM NOTHING:

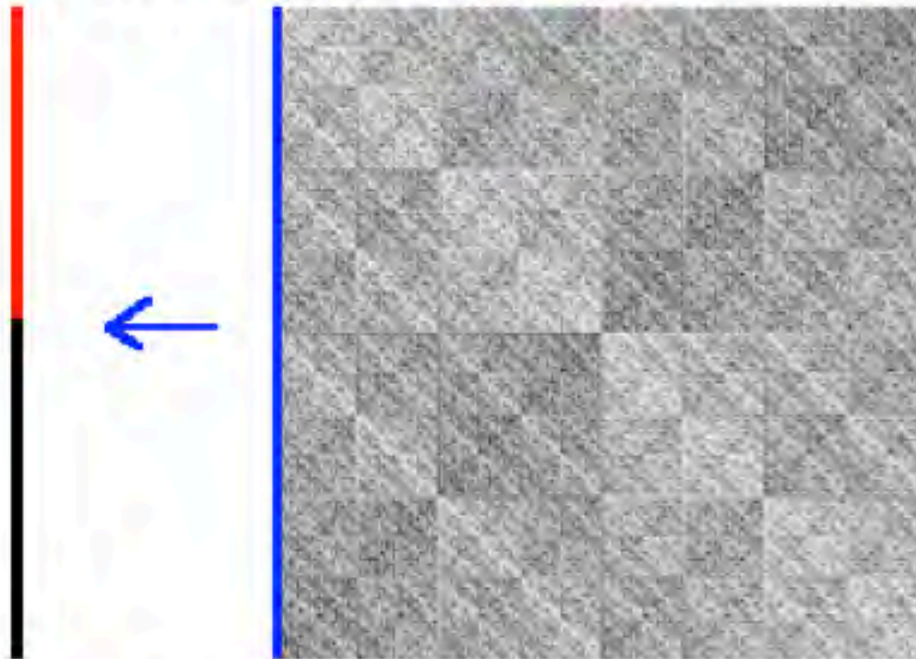


$Cl(16) = 2^{16} = 65,536$ dimensions with graded structure

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

The **120** grade-2 BiVectors form the D8 Lie Algebra that is related to rotations in 16-dim space

The Real Clifford Algebra $Cl(16) = 256 \times 256$ Real Matrix Algebra



The **256** first-column-vectors are the Spinors of D8 that are related to entanglement of connections to 16-dim space

The **256** D8 Spinors break down into two half-Spinors

$$256 = 128 + 128$$

The **128** and 128 half-spinors are mirror images of each other so **128** can describe all useful physics by itself.

120 D8 BiVectors + **128** D8 half-Spinors = **248**-dim E8

248-dim E8 lives in Cl(16) |
containing 120-dim D8 biVectors of Cl(16)

E8 / D8 = 64 + 64 Fermions = 128-dim D8 half-Spinors of Cl(16)

D8 / D4 x D4 = 64 Spacetime

D4 = 28 Standard Model (12)
with 16 Gravity + Dark Energy Ghosts

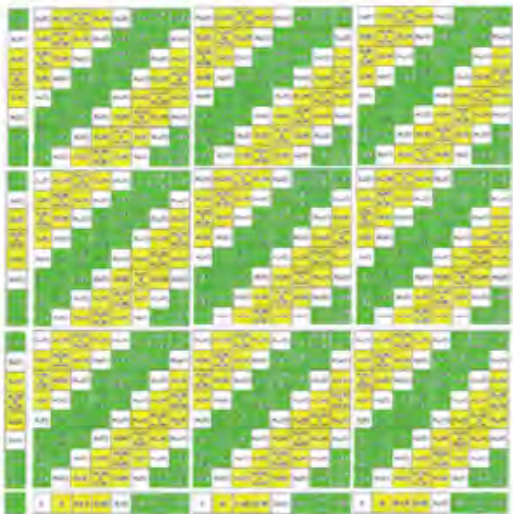
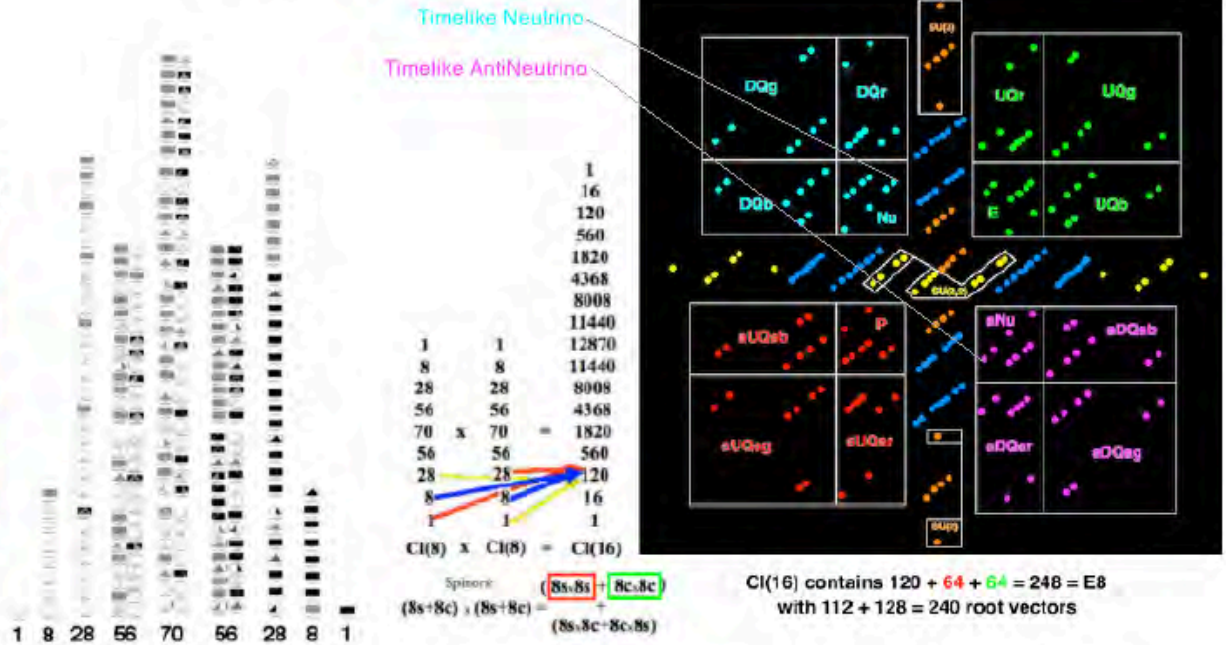
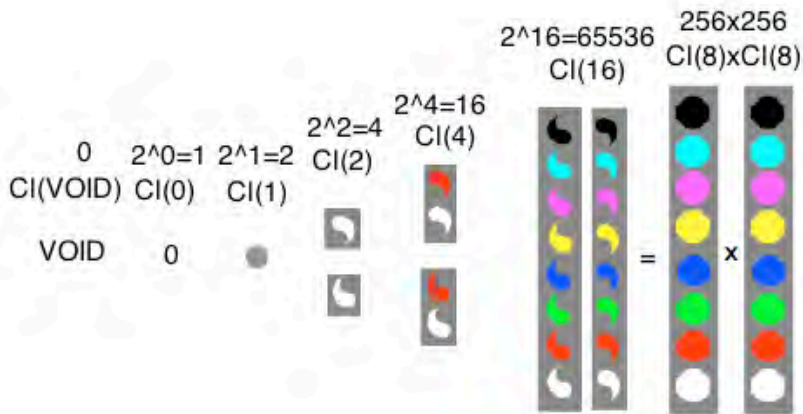
D4 = 28 Gravity + Dark Energy (16)
with 12 Standard Model Ghosts

| Dimension of Clifford Algebra | | | | | | |
|-------------------------------|---------|---------|---------|----------|----------------|---------|
| 0 | $2^0=1$ | $2^1=2$ | $2^2=4$ | $2^4=16$ | $2^{16}=65536$ | 256x256 |

VOID \rightarrow CI(VOID) \rightarrow CI(0,0) \rightarrow CI(0,1) \rightarrow CI(0,2) \rightarrow CI(0,4) \rightarrow CI(0,16) = CI(0,8)xCI(0,8) \rightarrow CI(0,16)xCI(0,8) = CI(0,24) \rightarrow M(2,CI(0,24)) = CI(1,25) \rightarrow

\rightarrow Completion of Union of All Tensor Products of CI(1,25) = hyperfinite AQFT

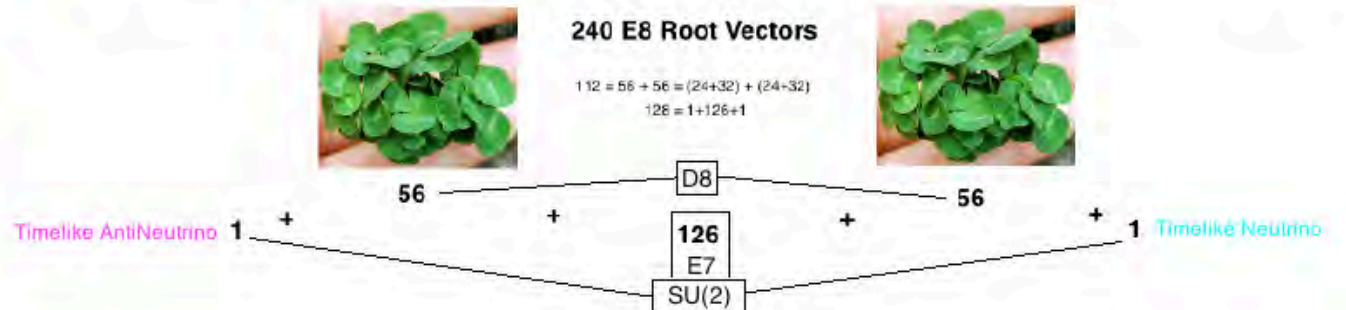
CI(1,25) = CI(1,9)xCI(0,8)xCI(0,8) and CI(1,9) = CI(1,5) x CI(0,4) = CI(2,4) x CI(0,4)



The completion of the union of all tensor products of CI(16) = CI(8)xCI(8) produces a generalized Hyperfinite III von Neumann factor that gives the CI(16)-E8 model a natural Algebraic Quantum Field Theory

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

The Creation-Annihilation Operator structure of CI(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)



When Our Planck Scale Universe emerged from its Parent Universe
by Quantum Fluctuation it was described by
SO(16) symmetry of Compact E8(-248).
E8 Compact Form E8(-248) with Symmetric Space E8 / Spin(16)
represents Our Planck Scale Universe
when it emerged from its Parent Universe by Quantum Fluctuation.



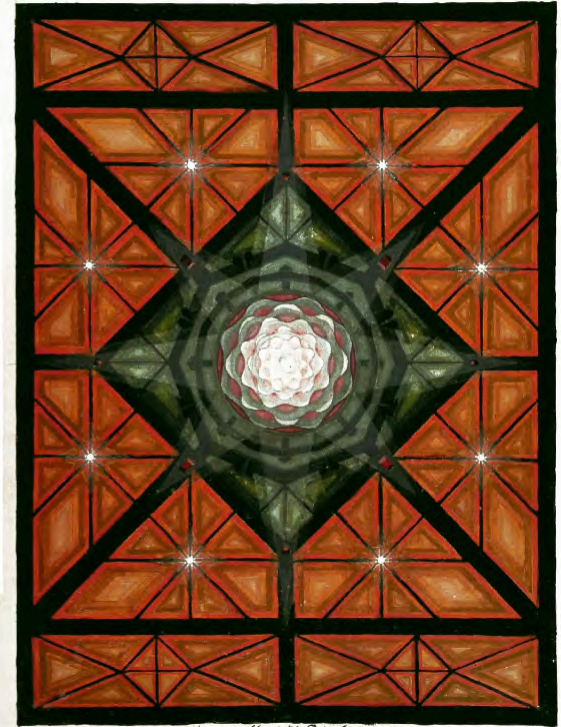
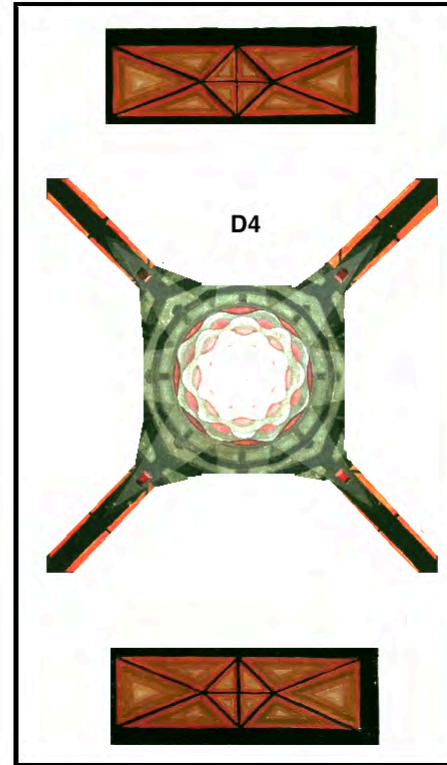
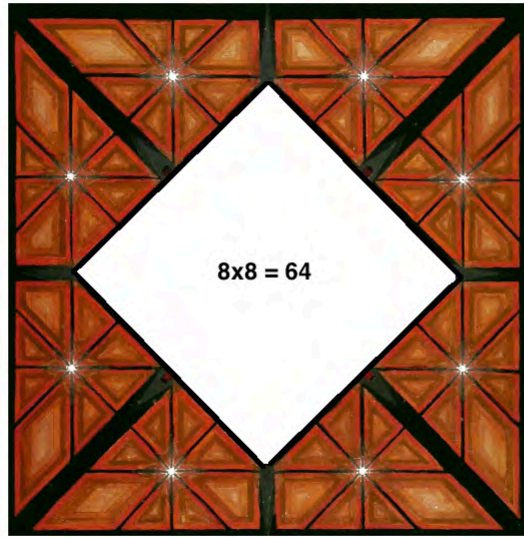
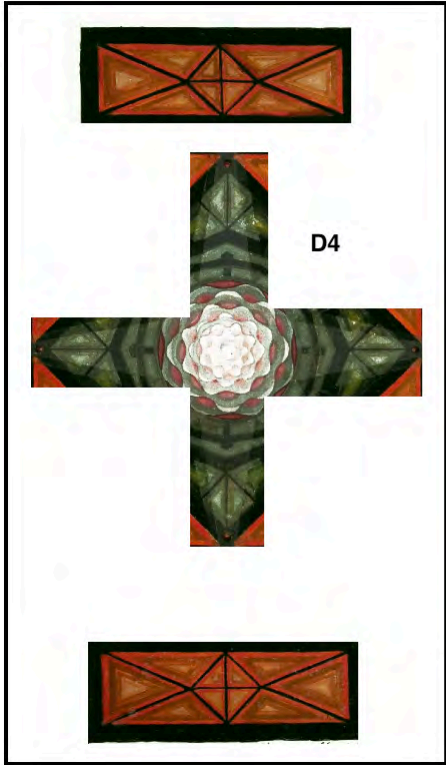
E8 Split Form EVIII E8(8) with Symmetric Space E8 / SO(8,8)
 represents
 Our Universe during Octonionic Inflation
 with Non-Unitary Quantum Processes.

121



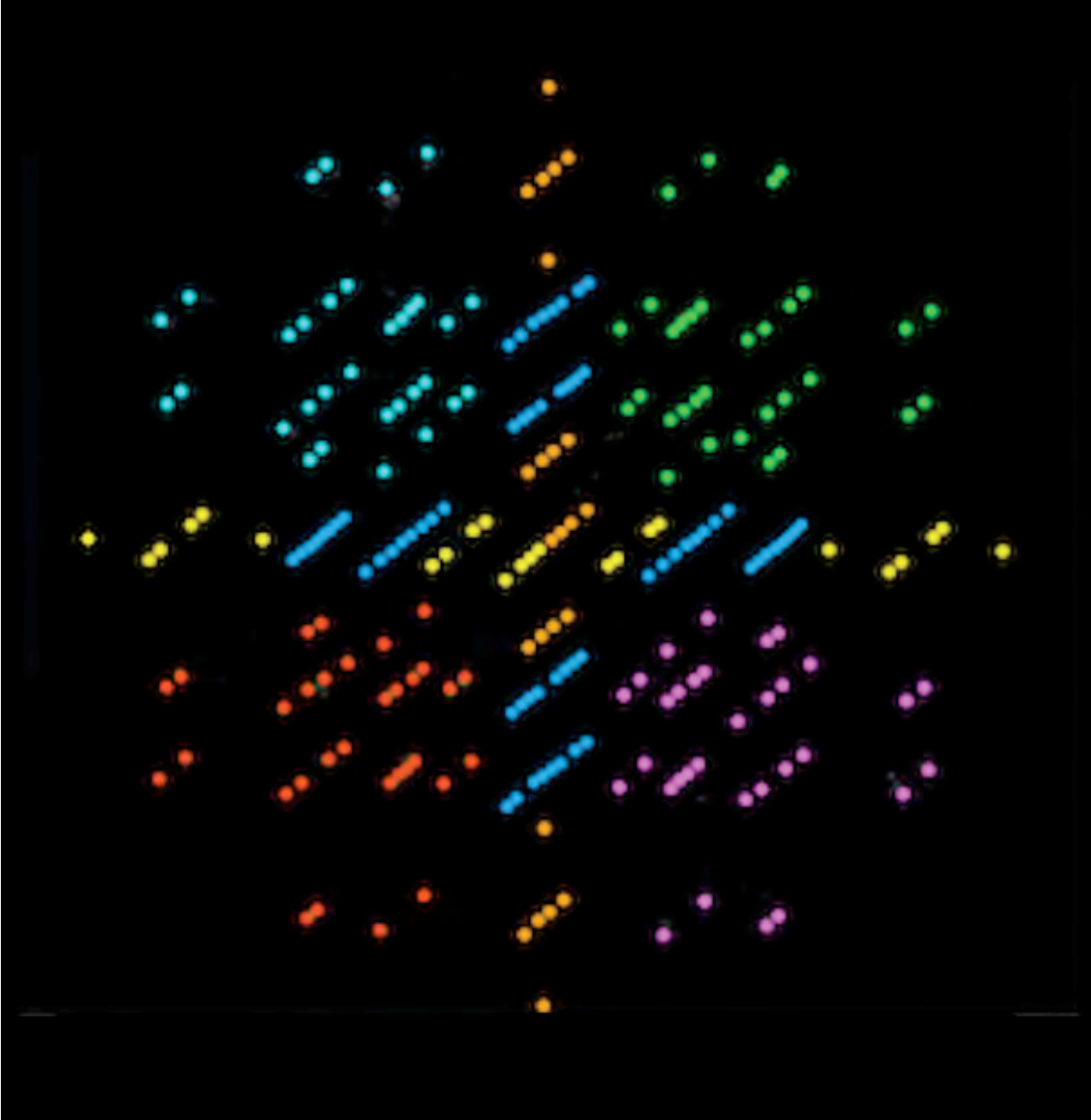
xi. mcmxix.

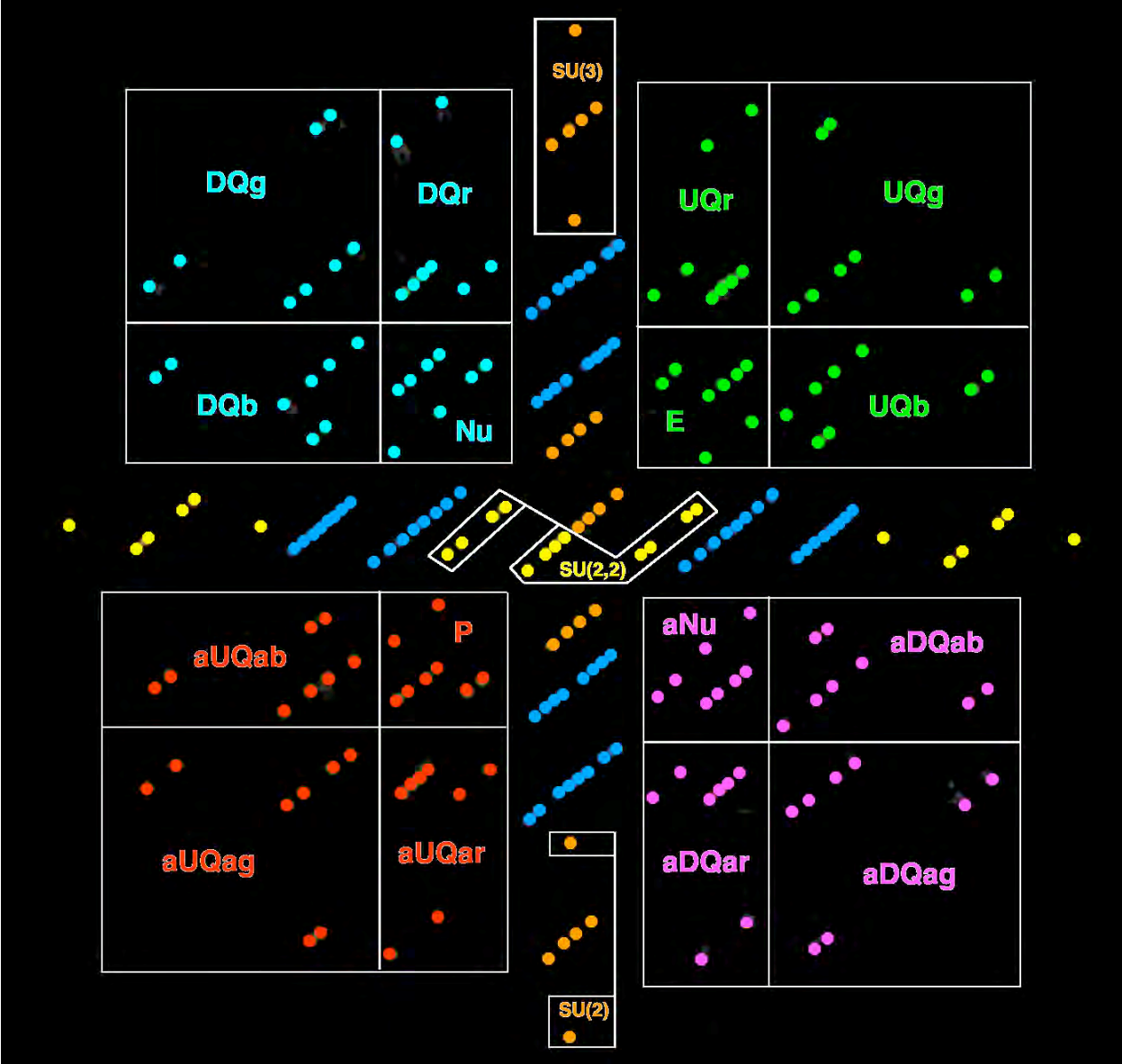
dieß stein, d' köstli' gefäßt
 is' is' sicherlich d' lapis philosophorum.
 er is' harts' als d' demant' ob' er erstreckt se' im
 raume von vier eig' schaft' naml' d' breite/höhe/tiefe/v' d' zeit.
 er is' darvon unlosbar v' du kanst' dur' im hindur' geh' ohne es z' meck'.
 dieß is' das unermessliche kern' das zw' val' v' mult' gelegt is' v' das verhindert, das die spitz' d' beid' kegel se'
 berührt / die monade / die das pleroma aufwiegt.



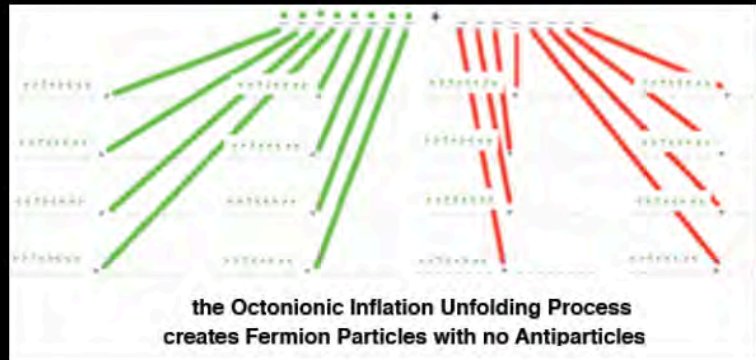
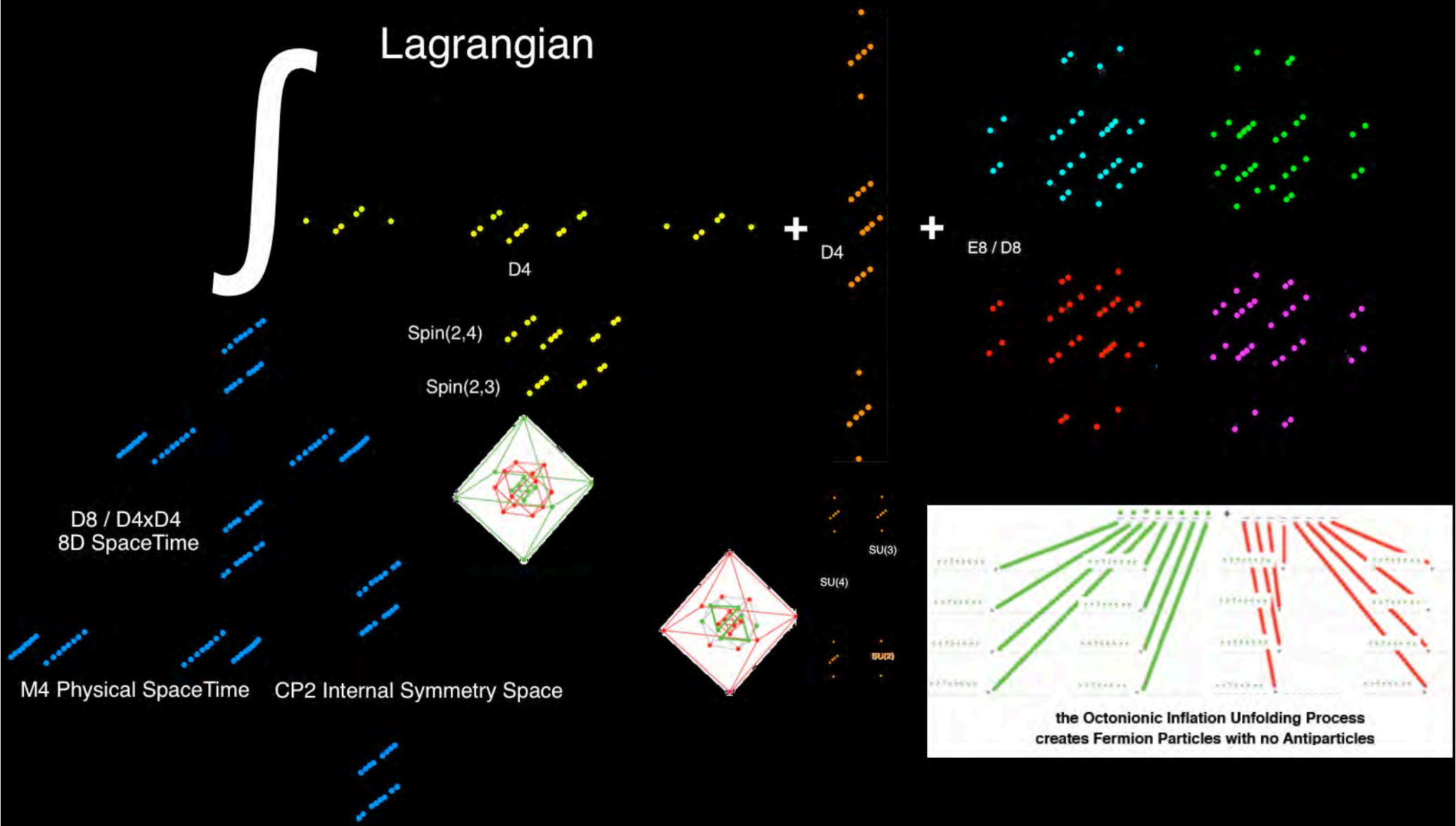
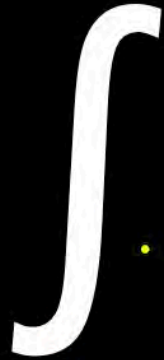
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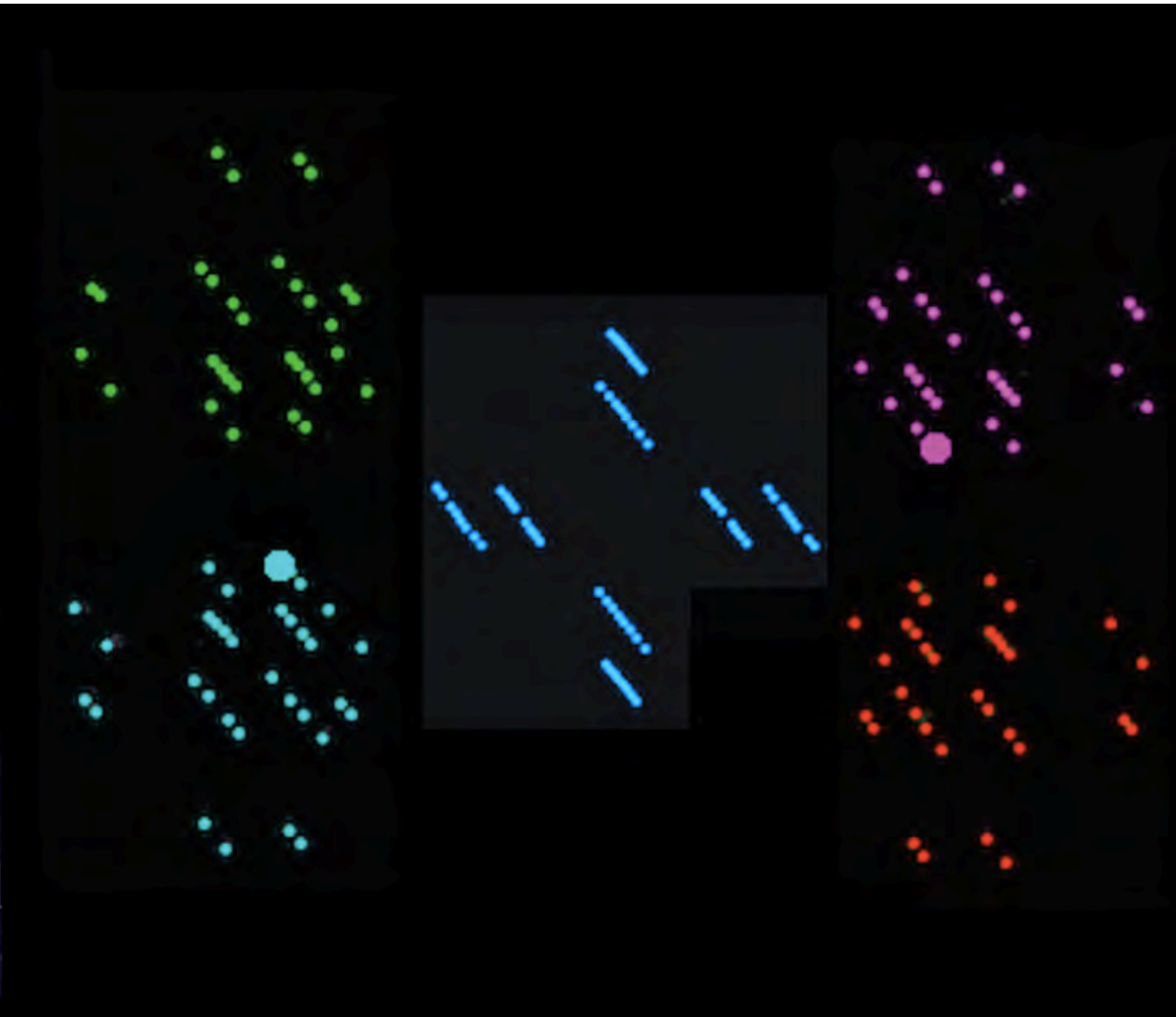


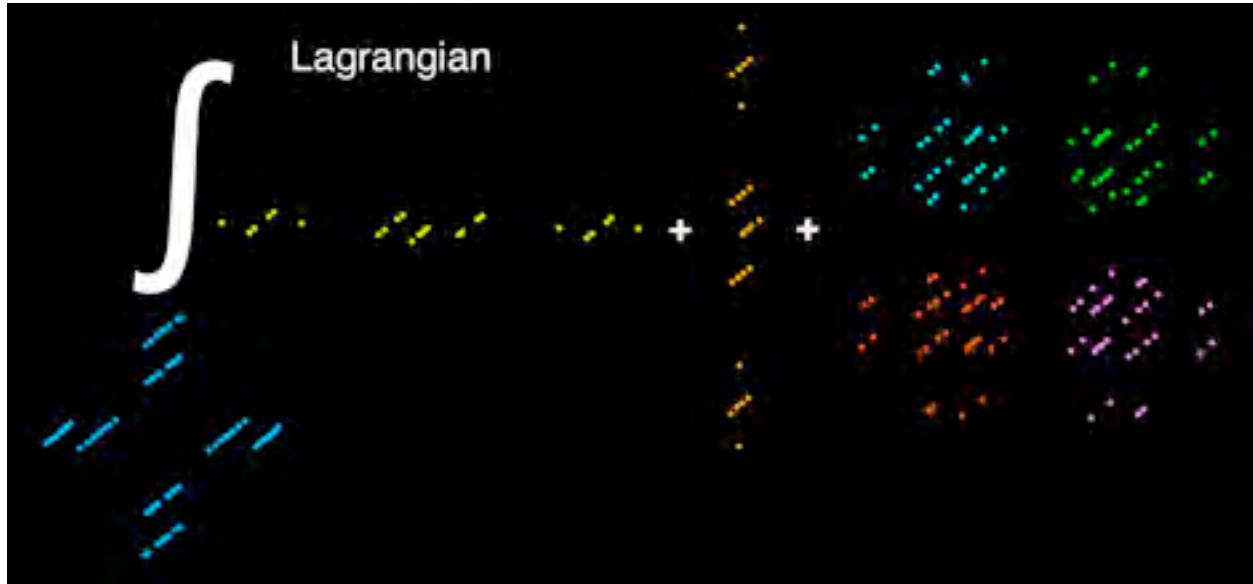




Lagrangian



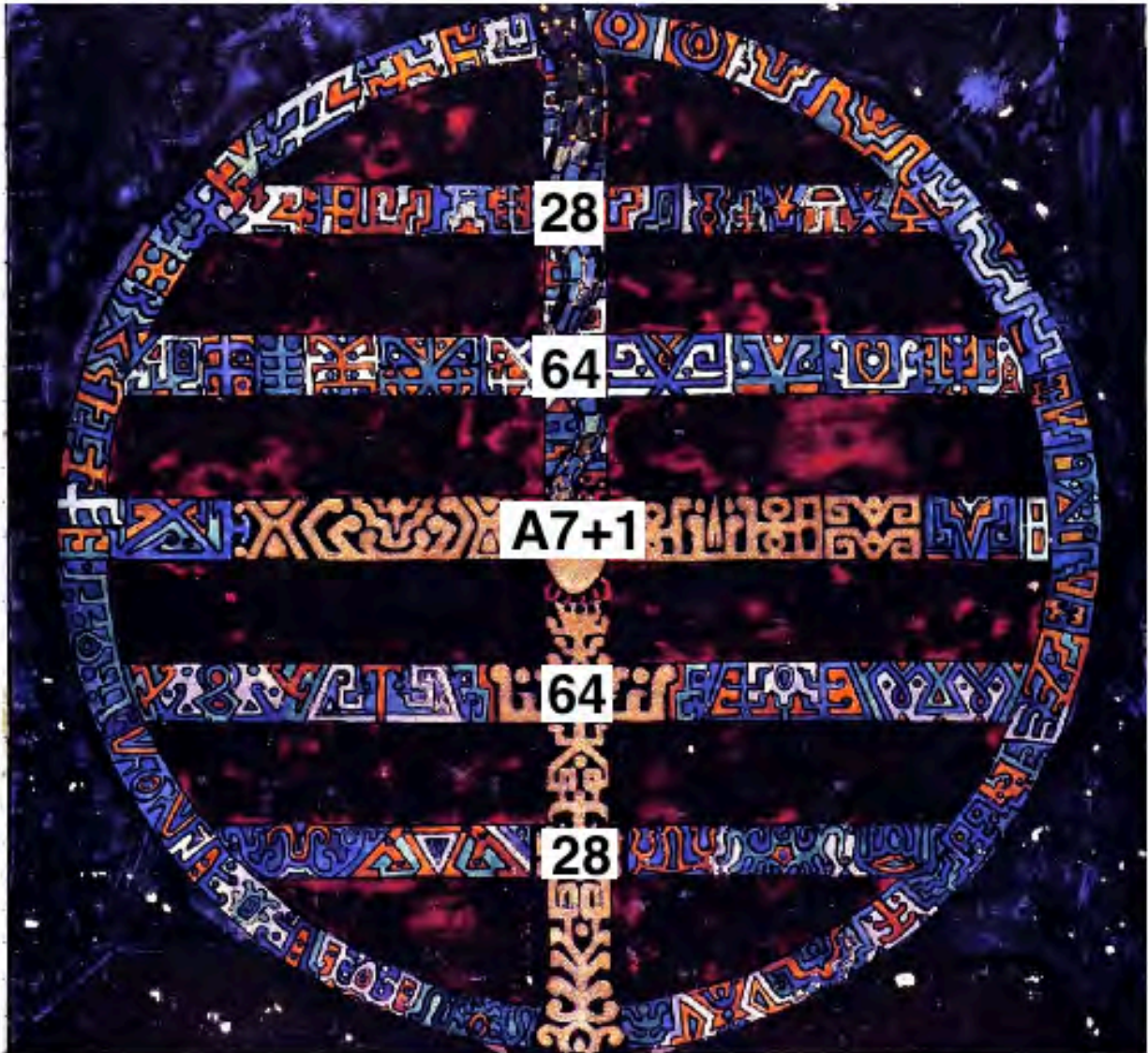




**Creation-Annihilation Operators for 8 components of 8+8 Fermions
are
odd-grade-+/-1 part
of
E8 Maximal Contraction generalized Heisenberg Algebra**

$$\mathfrak{h}_{92} \times \mathfrak{A}_7 = 28 + 64 + ((\mathfrak{SL}(8, \mathbb{R}) + 1) + 64 + 28)$$

(see Rutwig Campoamor-Stursberg in Acta Physica Polonica B 41 (2010) 53-77 "Contractions of Exceptional Lie Algebras and SemiDirect Products")

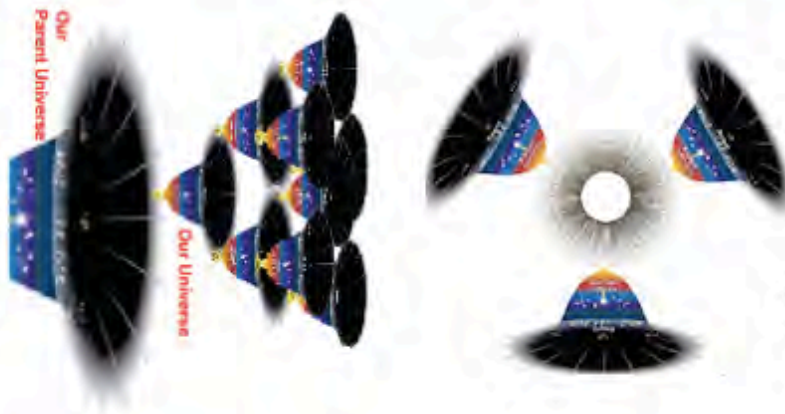
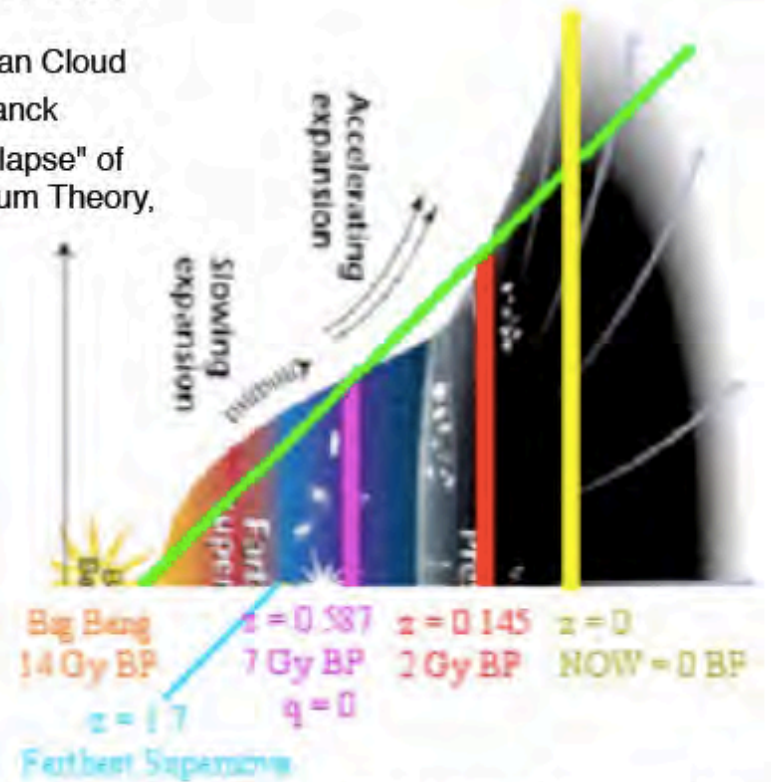
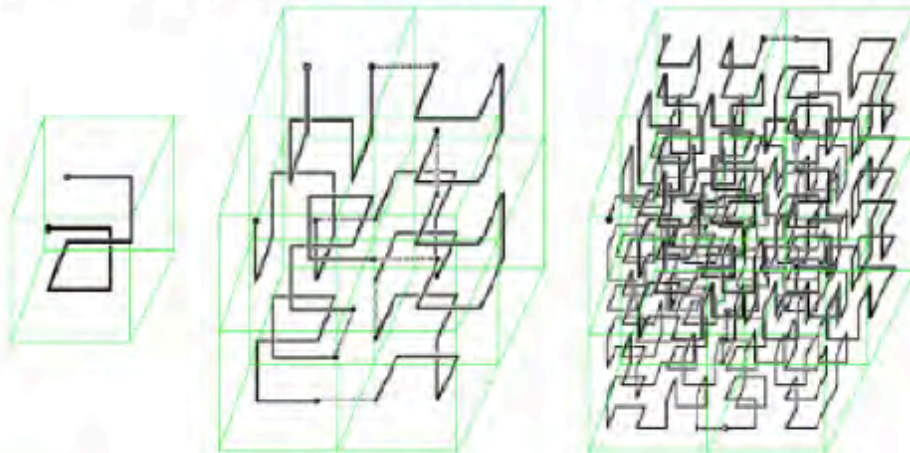
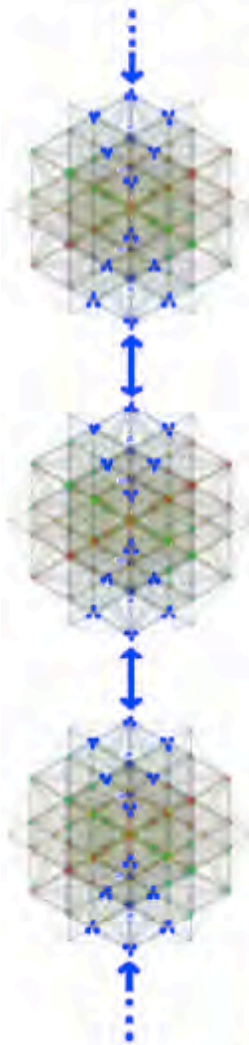


Big Bang E8(-248) : Spin(16) | Octonion Inflation E8(8) : SO(8,8) | Quaternion Conformal Evolution E8(-24) : SO*(16)

At the end of Non-Unitary Octonionic Inflation Our Universe had about $(1/2) 16^{64} = (1/2) (2^4)^{64} = 2^{255} = 6 \times 10^{76}$ 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,

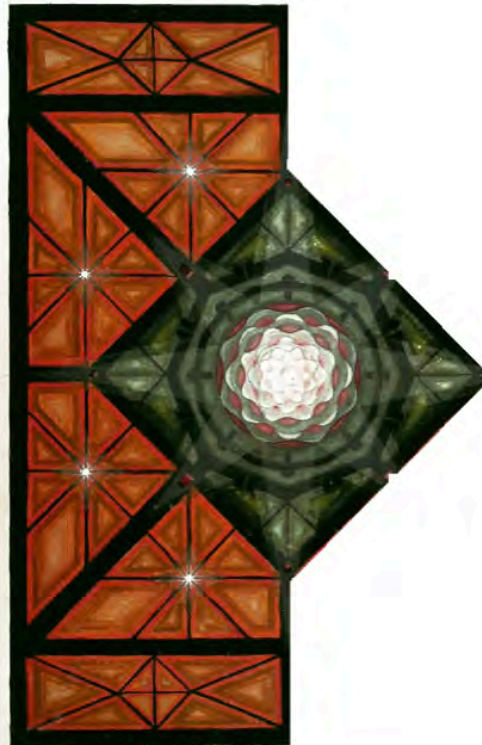
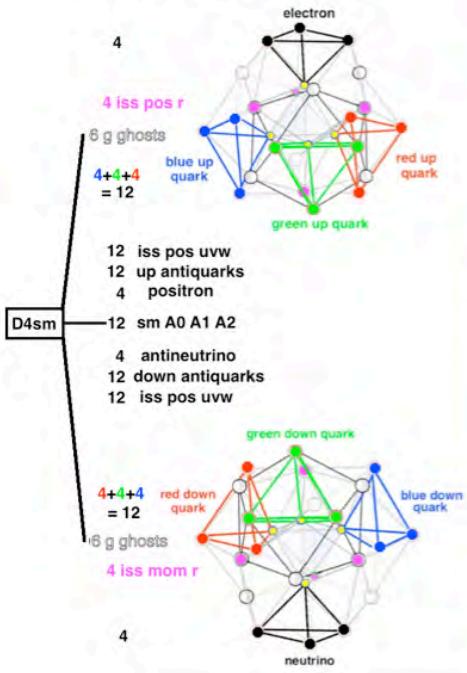


The ratio Dark Energy : Dark Matter : Ordinary Matter for our Universe at the present time is calculated to be:
 0.75 : 0.21 : 0.04

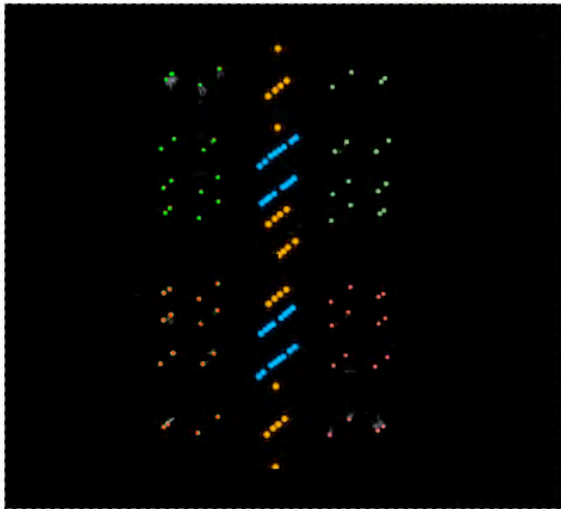
Paola Zizzi in gr-qc/0007006:

"... 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. ..."

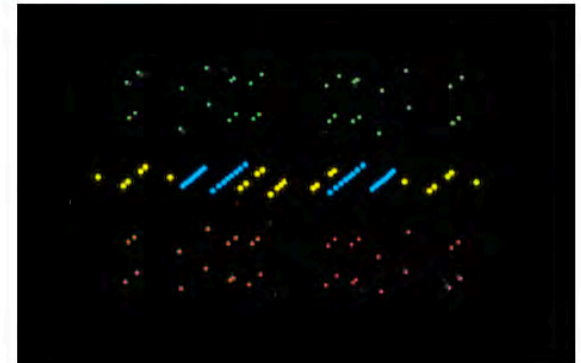
Standard Model 600-Cell
with
CP2 Internal Symmetry Space



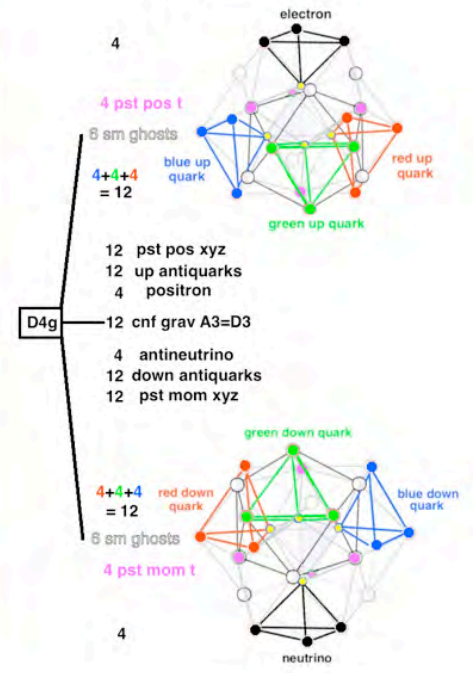
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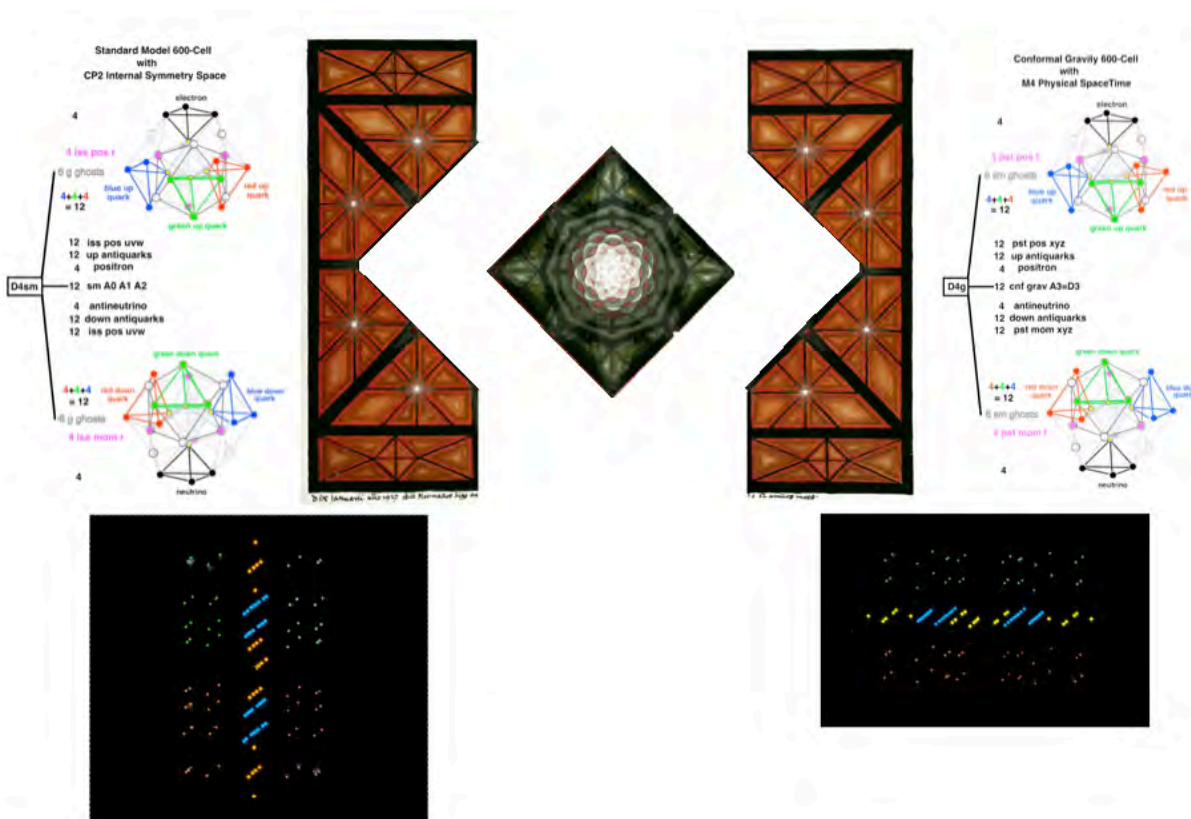
F 22 August 2003



Conformal Gravity 600-Cell
with
M4 Physical SpaceTime



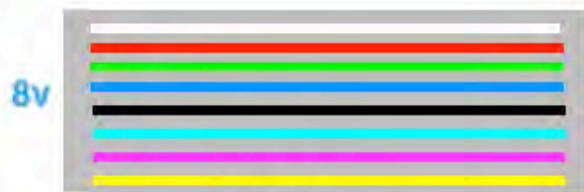
Inflation ends when a preferred Quaternionic Subspacetime freezes out,
converting 8 dim Spacetime into 4+4 dim M4 x CP2 Spacetime where
M4 = Physical Minkowski Spacetime and
CP2 = SU(3) / U(2) Internal Symmetry Space
Octonionic Integral becomes two Quaternionic Integrals



8-dim Octonionic Spacetime was broken into
(4+4)-dim Unitary Quaternionic M4 x CP2 Kaluza-Klein Spacetime
with $SO^*(16)$ symmetry of EIX E8(-24).

That transition was
a Weyl Unitary Trick within E8(8) from $SO(8,8)$ to $SO^*(16)$
followed by

a shifting of $SO^*(16)$ symmetry from E8(8) to E8(-24)
E8 form EIX E8(-24) with Symmetric Space E8 / $SO^*(16)$
represents Our Universe after End of Inflation



8x8 Matrices
 $A7 \times R = U(8)$
 Position
 x
 Momentum



8s+

8s-



Indra's Net of Schwinger Sources - Bohm Quantum Blockchain

The Cl(16)-E8 AQFT inherits structure from the C(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 multiplicative 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 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 8×10^{26} .


When a fermion particle/antiparticle appears Tachyons 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^{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) distinct 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.

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.

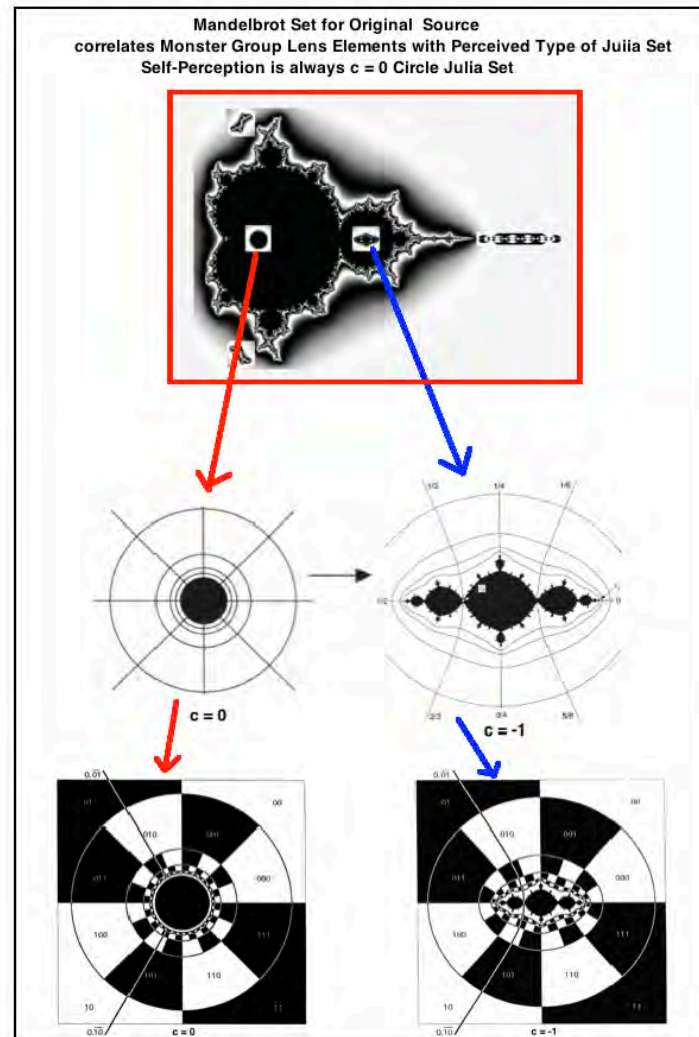
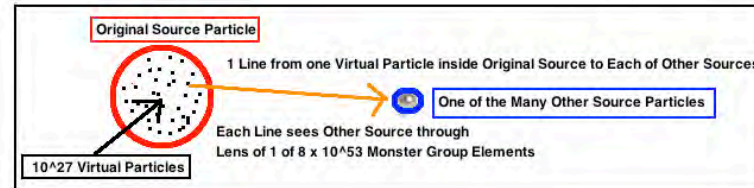
The initial Valence Particle is Planck scale. The number of Virtual Particles is determined by the Planck scale geometry of spacetime. The E8 model at the Planck Scale has spacetime condensing out of Clifford structures forming a Lorentz Leech lattice underlying 26-dim String Theory of World-Lines with $8 + 8 + 8 = 24$ -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 8×10^{53} . The Cloud structure comes from the 24-dim Leech lattice part of the Monster Group which is 2^{24} times the double cover of Co_1 , for an order of about 10^{26} . Due to superpositions 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 $10^{(27/3)} \times 1.6 \times 10^{(-33)} \text{ cm} = \text{roughly } 10^{(-24)} \text{ cm}$.

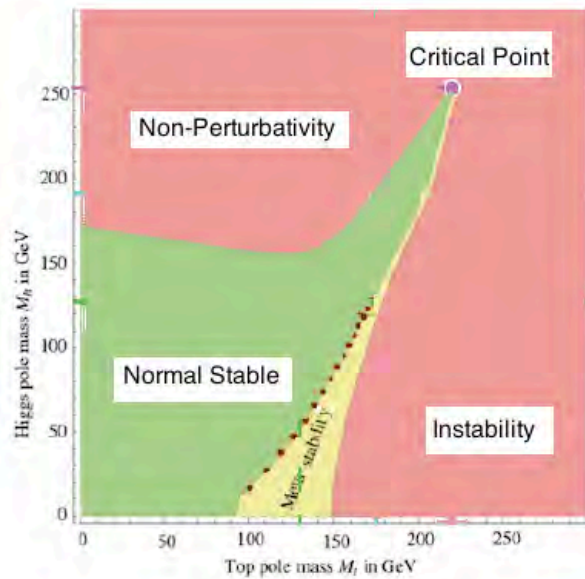
Each Schwinger Source particle-antiparticle pair should see (with Bohm Quantum Potential and Sarfatti Back-Reaction) the rest of our Universe in the perspective of 8×10^{53} Monster Symmetry so a Schwinger Source acting as a Jewel of Indra's Net of Schwinger Source Bohm Quantum Blockchain Physics can 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 $2^{256} = \text{about } 10^{77}$ 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.

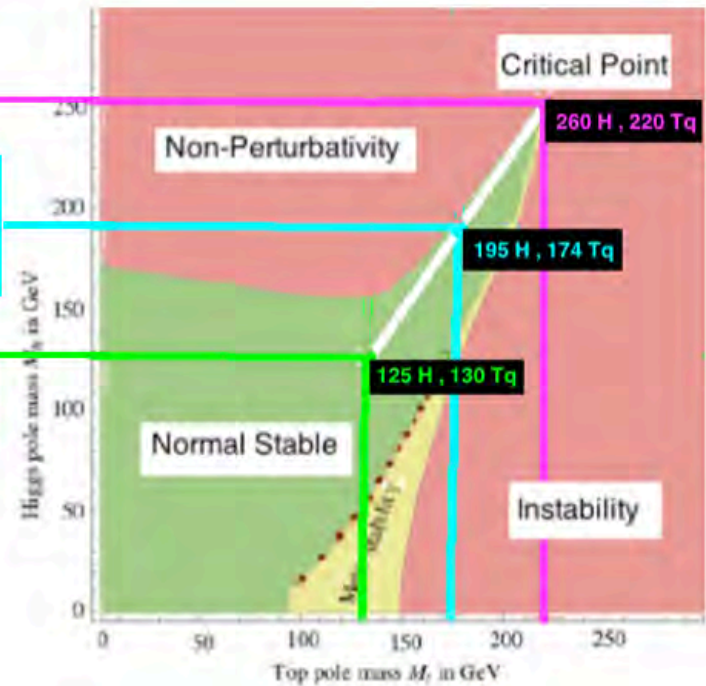


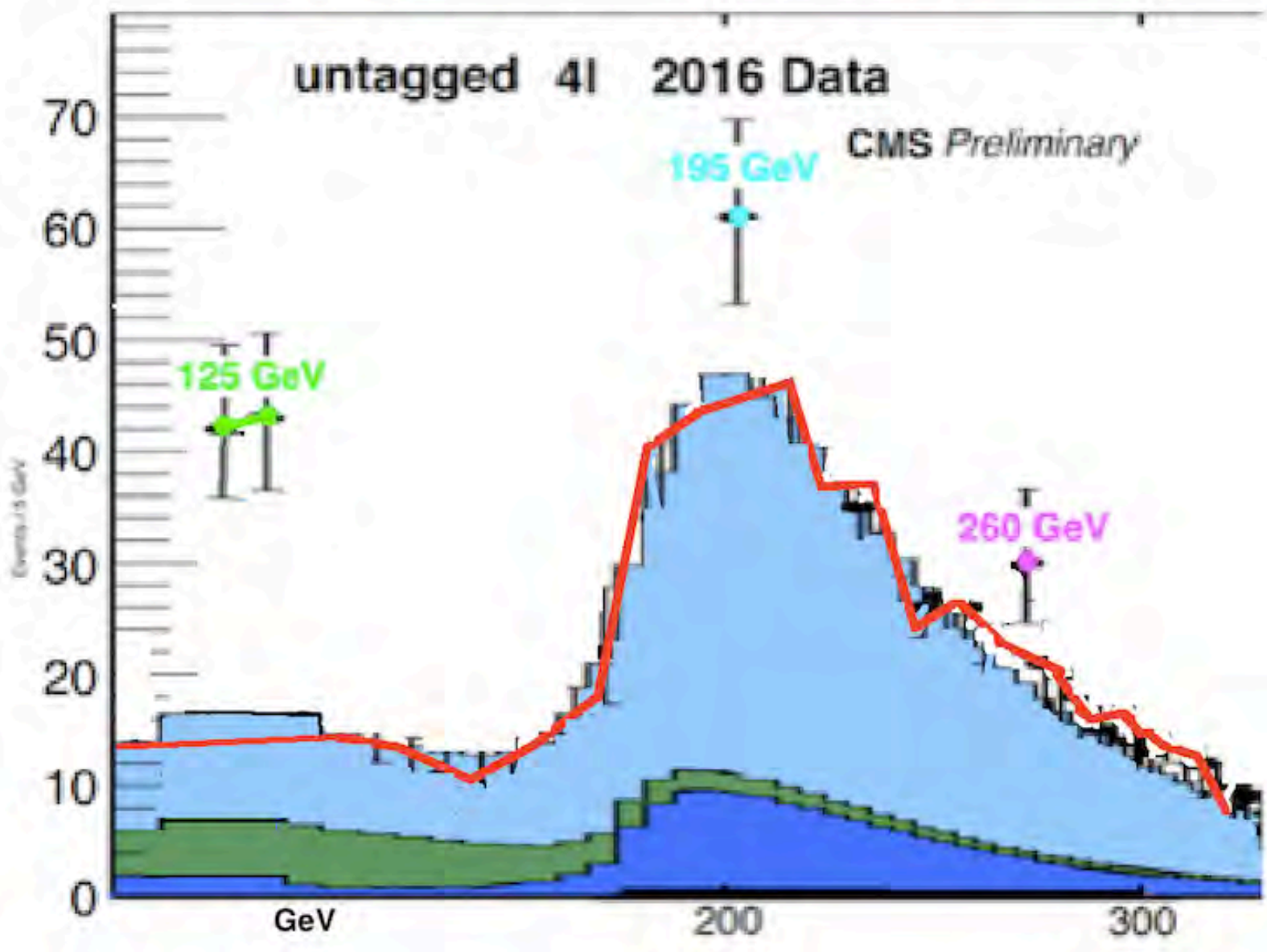
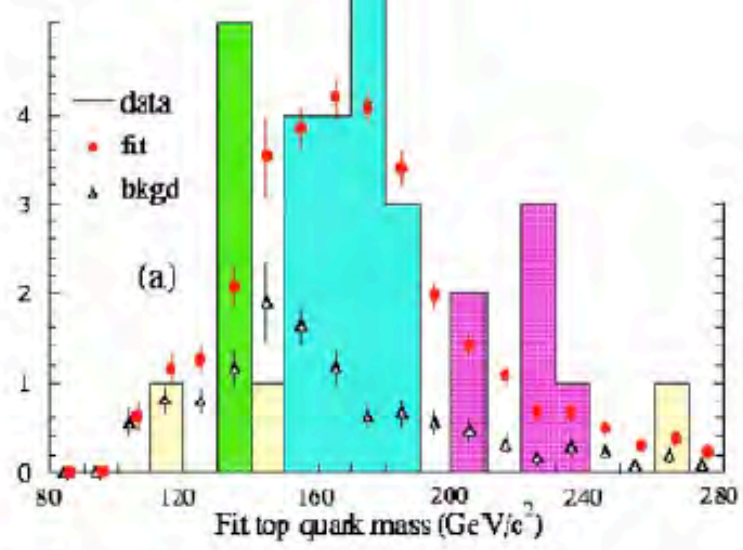
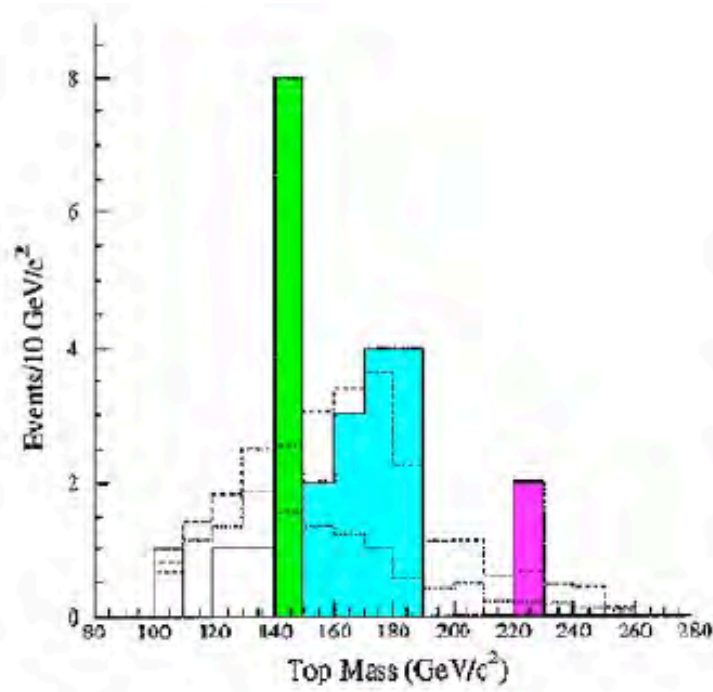


Critical Point
250 H , 220 Tq

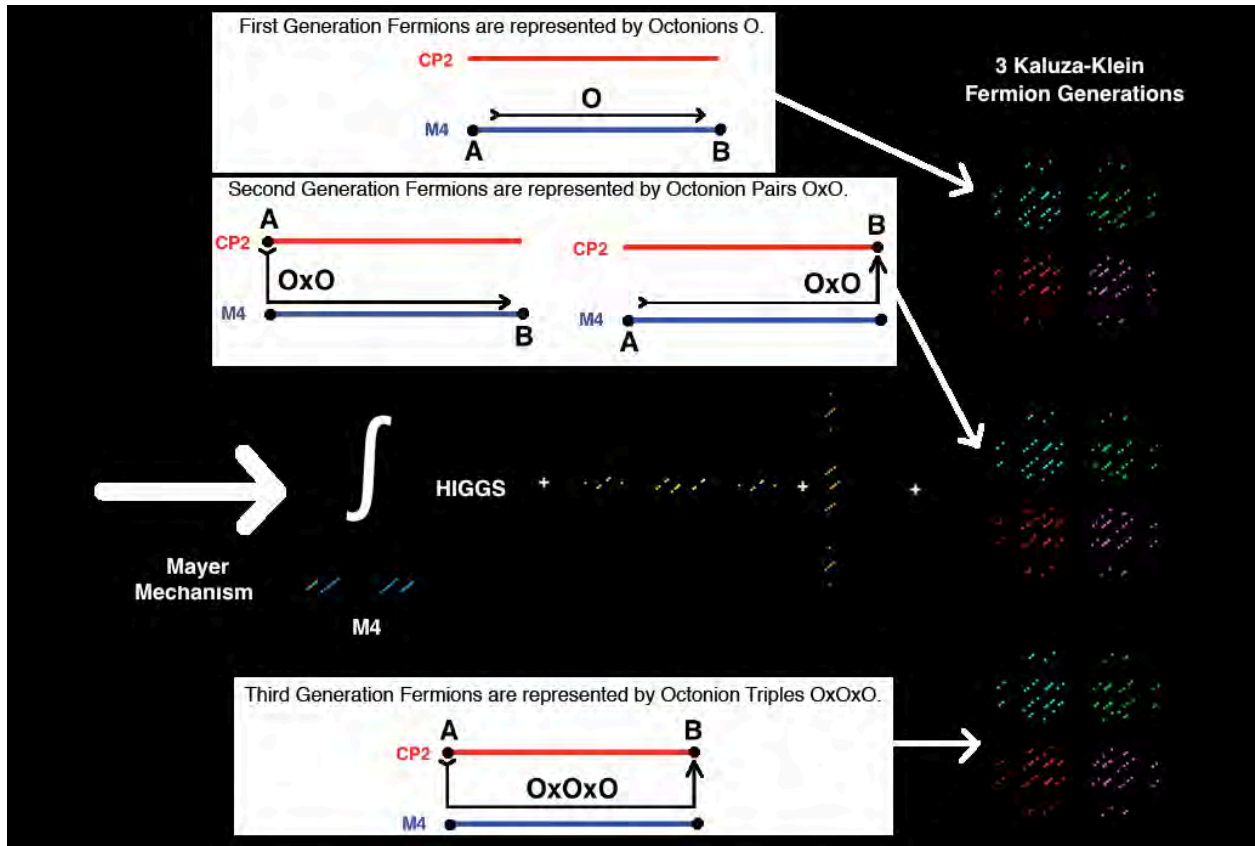
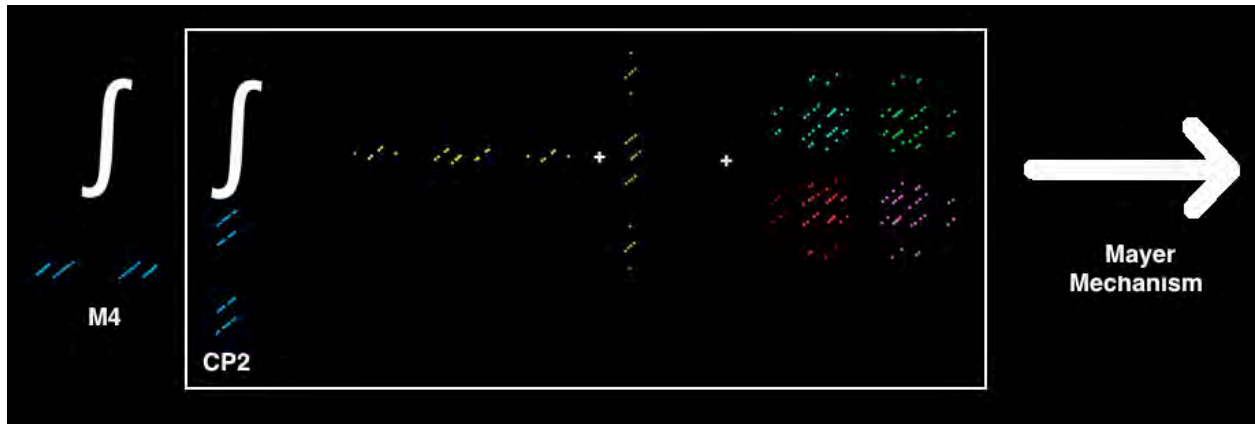
Non-Perturbativity 4+4 K-K
Composite H as Tq-Tantiq Condensate
195 H , 174 Tq

Normal Stable Ground State
125 H , 130 Tq





Splitting Octonionic Spacetime into Quaternionic $M4 \times CP2$ Kaluza-Klein over $CP2$ produces
Higgs by the Mayer Mechanism and
Second and Third Generation Fermions



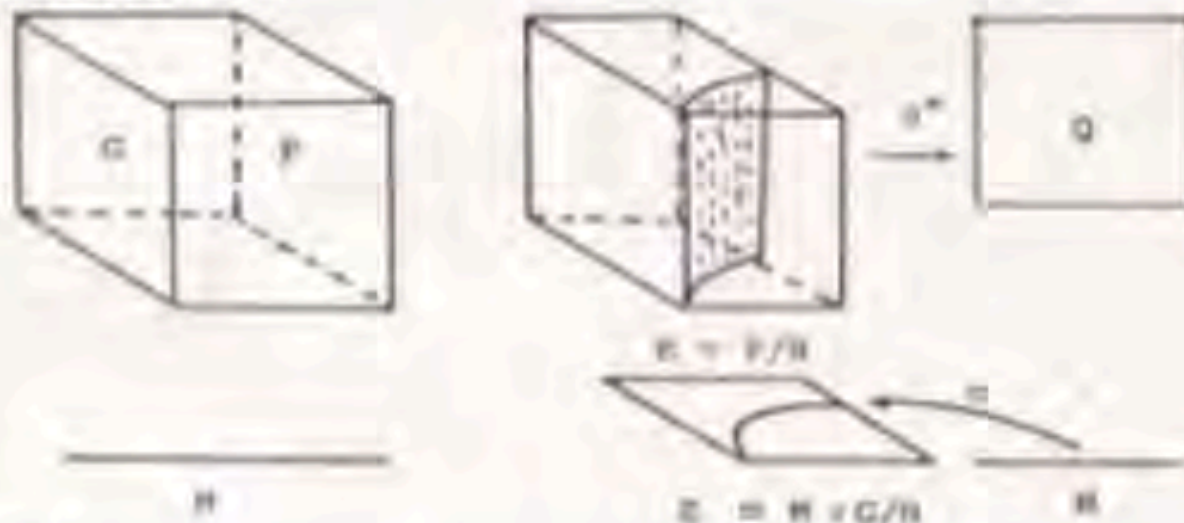
Quaternionic $E7 \times SU(2)$ structure breaks 8-dim Spacetime Octonionic Symmetry to Quaternionic (4+4)-dim Associative x CoAssociative Kaluza-Klein Spacetime

(see Reese Harvey "Spinors and Calibrations" (Academic 1990))

where $M4 = 4$ -dim Minkowski Physical Spacetime is Associative

and $CP2 = SU(3) / SU(2) \times U(1)$ Internal Symmetry Space is CoAssociative

Meinhard Mayer said (Hadronic Journal 4 (1981) 108-152): "... each point of ... the ... fibre bundle ... E ...



... consists of

a four- dimensional spacetime point x [in $M4$]

to which is attached the homogeneous space G / H [$SU(3) / U(2) = CP2$]

...

the components of the curvature lying in the homogeneous space G / H could be reinterpreted as Higgs scalars (with respect to spacetime [$M4$])

...

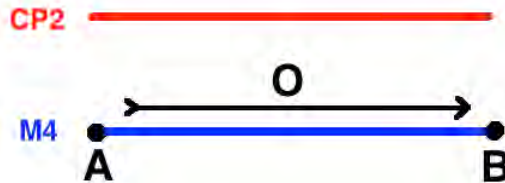
the Yang-Mills action reduces to a Yang-Mills action for the h -components [$U(2)$ components] of the curvature over M [$M4$] and a quartic functional for the "Higgs scalars", which not only reproduces the Ginzburg-Landau potential, but also gives the correct relative sign of the constants, required for the BEHK ... Brout-Englert-Higgs-Kibble ... mechanism to work. ..."

(see Appendix - Details of Mayer - Higgs)

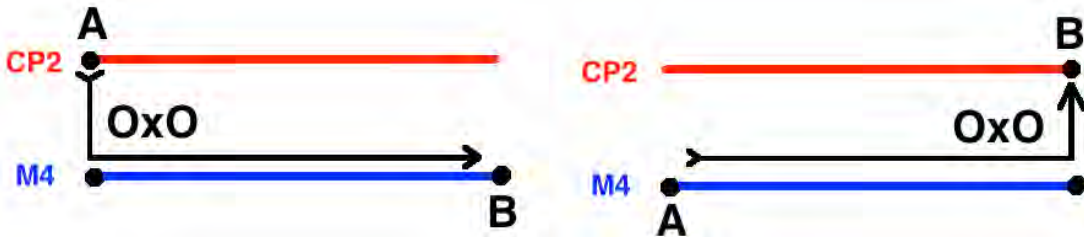
3 Generations of Fermions

In Kaluza-Klein $M4 \times CP2$ there are 3 possibilities for a fermion represented by an Octonion O basis element to go from point A to point B :

1 - A and B are both in $M4$: First Generation Fermion whose path can be represented by the single O basis element so that First Generation Fermions are represented by Octonions O .



2 - Either A or B , but not both, is in $CP2$: Second Generation Fermion whose path must be augmented by one projection from $CP2$ to $M4$, which projection can be represented by a second O basis element so that Second Generation Fermions are represented by Octonion Pairs OxO .



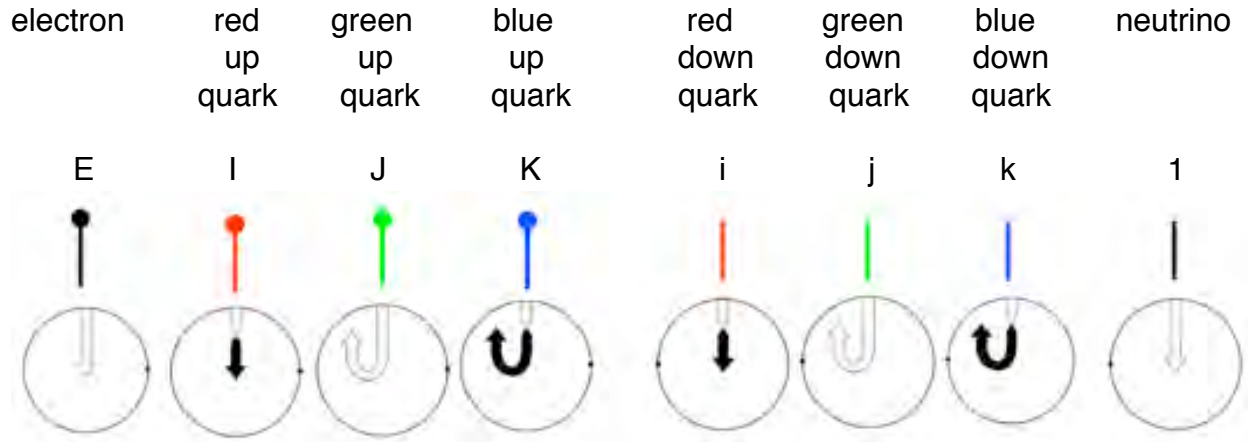
3 - Both A and B are in $CP2$: Third Generation Fermion whose path must be augmented by two projections from $CP2$ to $M4$, which projections can be represented by a second O and a third O , so that Third Generation Fermions are represented by Octonion Triples $OxOxO$.



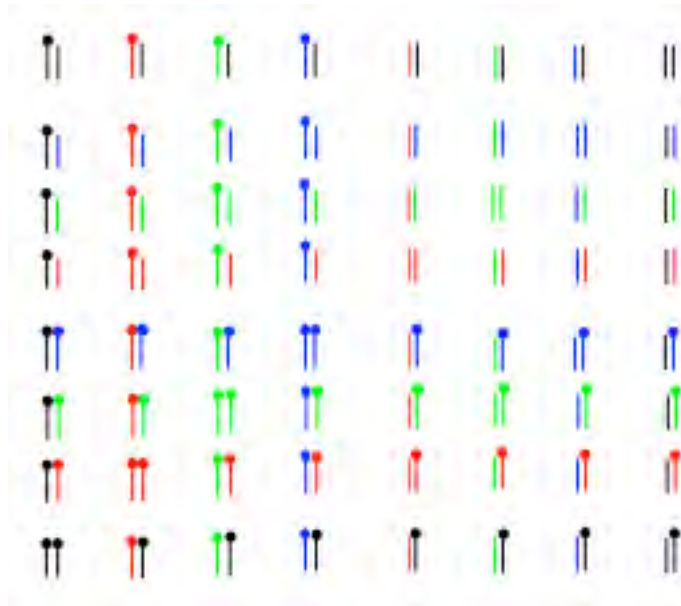
3 Generation Fermion Combinatorics

First Generation (8)

(geometric representation of Octonions is from arXiv 1010.2979)



Second Generation (64)



Mu Neutrino (1)

Rule: a Pair belongs to the Mu Neutrino if:

All elements are Colorless (black)

and all elements are Associative

(that is, is 1 which is the only Colorless Associative element) .

Fermion masses are calculated as a product of four factors:

$$V(\underline{Q}_{\text{fermion}}) \times N(\underline{G}_{\text{graviton}}) \times N(\underline{o}_{\text{octonion}}) \times \underline{S}_{\text{ym}}$$

The ratio of the down quark spinor manifold volume factor to the electron spinor manifold volume factor is

$$V(\underline{Q}_{\text{down quark}}) / V(\underline{Q}_{\text{electron}}) = V(S^7 \times RP^1) / 1 = \pi^5 / 3.$$

The third generation fermion particles correspond to triples of octonions.

There are $8^3 = 512$ such triples.

The triple $\{1, 1, 1\}$ corresponds to the tau-neutrino.

The other 7 triples involving only 1 and E correspond to the tauon:

$\{E, E, E\}$ $\{E, E, 1\}$ $\{E, 1, E\}$ $\{1, E, E\}$ $\{1, 1, E\}$ $\{1, E, 1\}$ $\{E, 1, 1\}$

The symmetry of the 7 tauon triples is the same

as the symmetry of the first generation tree-level-massive fermions, 3 down, quarks, the 3 up quarks, and the electron,

so by the Sym factor the tauon mass should be the same as

the sum of the masses of the first generation massive fermion particles.

Therefore the tauon mass is calculated at tree level as 1.877 GeV.

The beauty quark corresponds to 21 triples.

They are triples of the same form as the 7 tauon triples involving 1 and E, but for 1 and I, 1 and J, and 1 and K = red, green, and blue beauty quarks.

The seven red beauty quark triples correspond to the seven tauon triples, except that the beauty quark interacts with 6 Spin(0,5) gravitons while the tauon interacts with only two.

The red beauty quark constituent mass should be the tauon mass times the third generation graviton factor $6/2 = 3$,

so the **red beauty quark mass is $m_b = 5.63111 \text{ GeV}$** .

Triples of the type $\{1, I, J\}$, $\{I, J, K\}$, etc.,

do not correspond to the beauty quark, but to the truth quark.

The truth quark corresponds to those $512 - 1 - 7 - 21 = 483$ triples,

so the constituent mass of the red truth quark

is $161 / 7 = 23$ times the red beauty quark mass,

and the **red T-quark mass is $m_t = 129.5155 \text{ GeV}$**

Third Generation (512)

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | <table border="1"> <tbody> <tr><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td></tr> <tr><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td></tr> <tr><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td></tr> <tr><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td></tr> <tr><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td></tr> <tr><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td></tr> <tr><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td></tr> <tr><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td><td>TT</td></tr> </tbody> </table> | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | TT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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Tau Neutrino (1)

Rule: a Triple belongs to the Tau Neutrino if:
 All elements are Colorless (black)
 and all elements are Associative
 (that is, is 1 which is the only Colorless Associative element)

Tauon (7)

Rule: a Triple belongs to the Tauon if:
 All elements are Colorless (black)
 and at least one element is NonAssociative (that is, is E which is the only Colorless NonAssociative element)

248-dim E8 contains 120-dim D8

E8 / D8 = 64 + 64 Fermions

D8 / D4 x D4 = 64 Spacetime

**D4 = 28 Standard Model (12)
with 16 Gravity + Dark Energy Ghosts**

**D4 = 28 Gravity + Dark Energy (16)
with 12 Standard Model Ghosts**

D4 of Standard Model Gauge Bosons and Gravity Ghosts



The 24 orange are Root Vectors of the CP2-related D4 local isotropy group in the symmetric space $D8 / D4 \times D4$ that acts on the CP2 Internal Symmetry Space of Kaluza-Klein $M4 \times CP2$

8 orange are Root Vectors for Standard Model $SU(3) \times SU(2) \times U(1)$ which have $2+1+1 = 4$ Cartan SubAlgebra dimensions.


Standard Model Gauge groups come from $CP2 = SU(3) / SU(2) \times U(1)$
(as described by Batakis in Class. Quantum Grav. 3 (1986) L99-L105)

Electroweak $SU(2) \times U(1)$ is gauge group as isotropy group of CP2.

$SU(3)$ is global symmetry group of CP2 but due to Kaluza-Klein structure of compact CP2 at every $M4$ spacetime point, it acts as Color gauge group with respect to $M4$.

D4 of Conformal Gravity and Standard Model Ghosts



The 24 yellow  are Root Vectors of the M4-related D4 local isotropy group in the symmetric space $D_8 / D_4 \times D_4$ that acts on the M4 Internal Symmetry Space of Kaluza-Klein $M_4 \times CP^2$

12 yellow are Root Vectors for Conformal Gravity $U(2,2)$ which has 4 Cartan SubAlgebra dimensions.

Gravity and Dark Energy come from its Conformal Subgroup $SU(2,2) = Spin(2,4)$
(see Appendix - Details of Conformal Gravity and ratio DE : DM :OM)

$SU(2,2) = Spin(2,4)$ has 15 generators:

1 Dilation representing Higgs Ordinary Matter

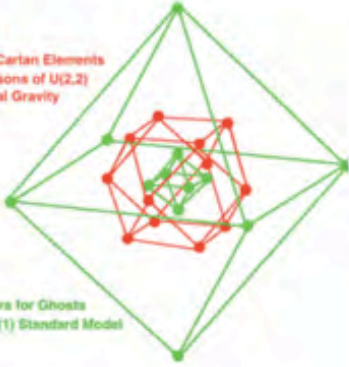
4 Translations representing Primordial Black Hole Dark Matter

10 = 4 Special Conformal + 6 Lorentz representing Dark Energy

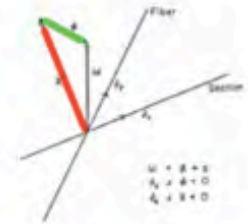
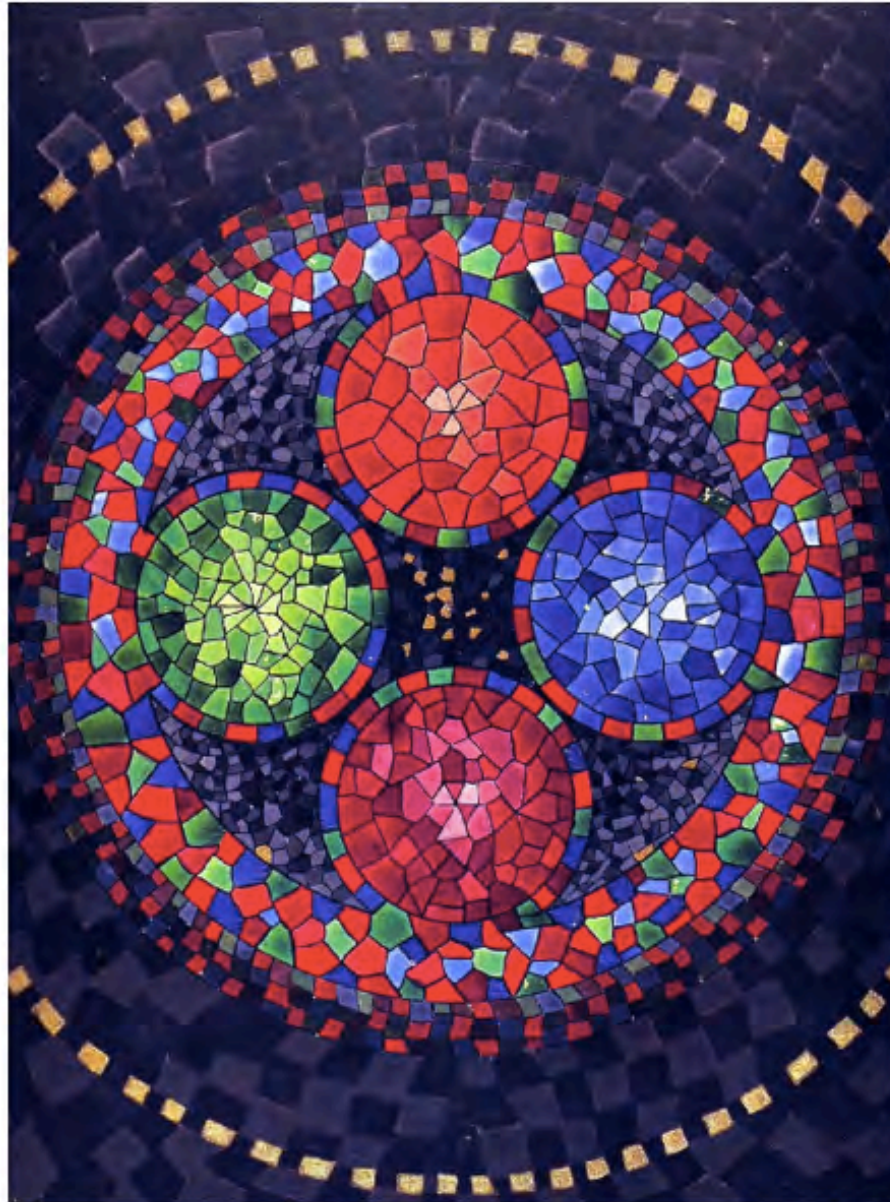
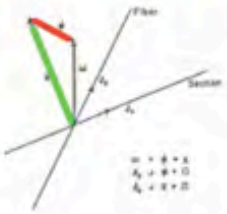
(see Irving Ezra Segal, "Mathematical Cosmology and Extragalactic Astronomy" (Academic 1976))

The basic ratio Dark Energy : Dark Matter : Ordinary Matter = 10:4:1 = 0.67 : 0.27 : 0.06
When the dynamics of our expanding universe are taken into account, the ratio is calculated to be **0.75 : 0.21 : 0.04**

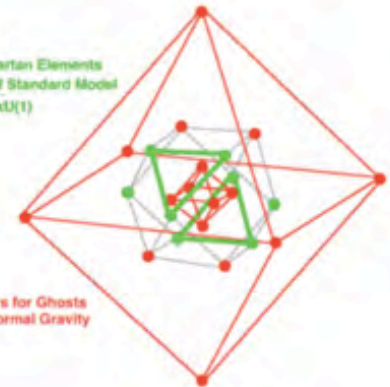
D4
 12 Root Vectors + 4 Cartan Elements
 for 16 Gauge Bosons of U(2,2)
 for Conformal Gravity



12 Root Vectors for Ghosts
 of SU(3)xSU(2)xU(1) Standard Model



D4
 8 Root Vectors + 4 Cartan Elements
 for 12 Gauge Bosons of Standard Model
 SU(3)xSU(2)xU(1)



16 Root Vectors for Ghosts
 of U(2,2) Conformal Gravity

The force strength of a given force is

$$(1 / Mforce^2) (Vol(MISforce)) (Vol(Qforce) / Vol(Dforce)^{ (1 / mforce) })$$

where:

Mforce represents the effective mass;

MISforce represents the relevant part of the target Internal Symmetry Space;

Vol(MISforce) stands for volume of MISforce and is sometimes also denoted by Vol(M);

Qforce represents the link from the origin to the relevant target for the gauge boson;

Vol(Qforce) stands for volume of Qforce;

Dforce represents the complex bounded homogeneous domain

of which Qforce is the Shilov boundary;

mforce is the dimensionality of Qforce, which is

Vol(Dforce)^{ (1 / mforce) } stands for a dimensional normalization factor

(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).

Qforce, Hermitian symmetric space, Dforce, mforce, and Vol(Dforce) for four forces are:

| | | | | |
|---------|------------------------|-----------------------|---|---------------------------------|
| Spin(5) | Spin(7) / Spin(5)xU(1) | IV5 | 4 | RP ¹ xS ⁴ |
| SU(3) | SU(4) / SU(3)xU(1) | B ⁶ (ball) | 4 | S ⁵ |
| SU(2) | Spin(5) / SU(2)xU(1) | IV3 | 2 | RP ¹ xS ² |
| U(1) | - | - | 1 | - |

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

squashed S5 = Shilov boundary of complex domain of symmetric space SU(4) / SU(3) x U(1)

The relative force strengths at the characteristic energy level of each force are:

Spin(5) gravity at 10¹⁹ GeV = 1 ; GGmproton² approx 5 x 10⁻³⁹

SU(3) color at 245 MeV = 0.6286

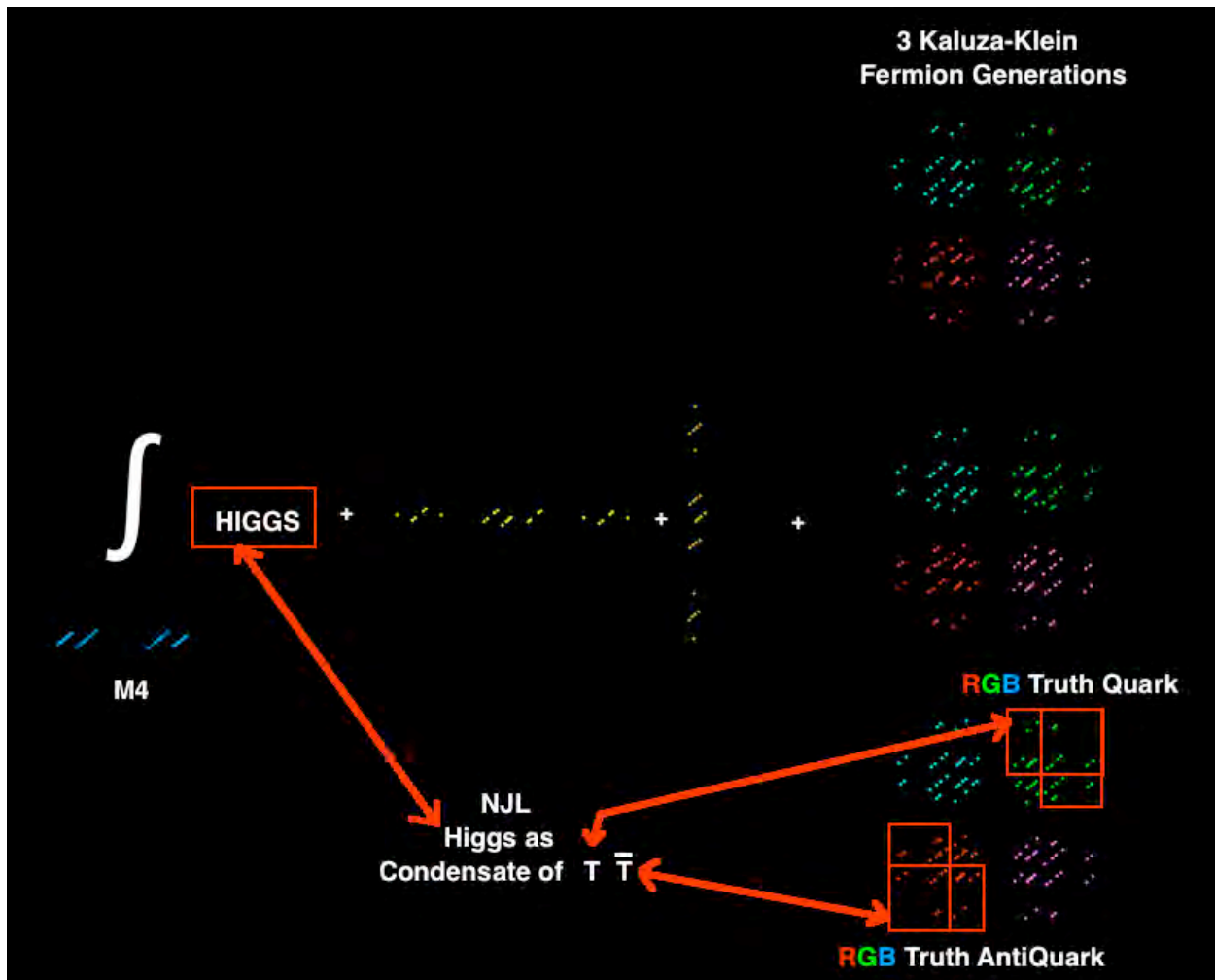
at 5.3 GeV = 0.166

at 34 GeV = 0.121

at 91 GeV = 0.106 ; with nonperturbative effects = 0.125

SU(2) weak at 100 GeV = 0.2535 ; GWmproton² approx 1.05 x 10⁻⁵

U(1) e-mag at 4 KeV = 1/137.03608



Fermion masses are calculated as a product of four factors:

$$V(\text{Qfermion}) \times N(\text{Graviton}) \times N(\text{octonion}) \times \text{Sym}$$

The ratio of the down quark spinor manifold volume factor to the electron spinor manifold volume factor is

$$V(\text{Qdown quark}) / V(\text{Qelectron}) = V(S^7 \times RP^1) / 1 = \pi^5 / 3.$$

The third generation fermion particles correspond to triples of octonions.

There are $8^3 = 512$ such triples.

The triple $\{1, 1, 1\}$ corresponds to the tau-neutrino.

The other 7 triples involving only 1 and E correspond to the tauon:

The beauty quark corresponds to 21 triples.

They are triples of the same form as the 7 tauon triples involving 1 and E, but for 1 and I, 1 and J, and 1 and K,

which correspond to the red, green, and blue beauty quarks,

Triples of the type $\{1, I, J\}$, $\{I, J, K\}$, etc.,

do not correspond to the beauty quark, but to the Truth quark.

The Truth quark corresponds to those $512 - 1 - 7 - 21 = 483$ triples, so the

constituent mass of red truth quark is $161 / 7 = 23$ times red beauty quark mass,

red Truth quark mass is $m_t = 129.5155$ GeV

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

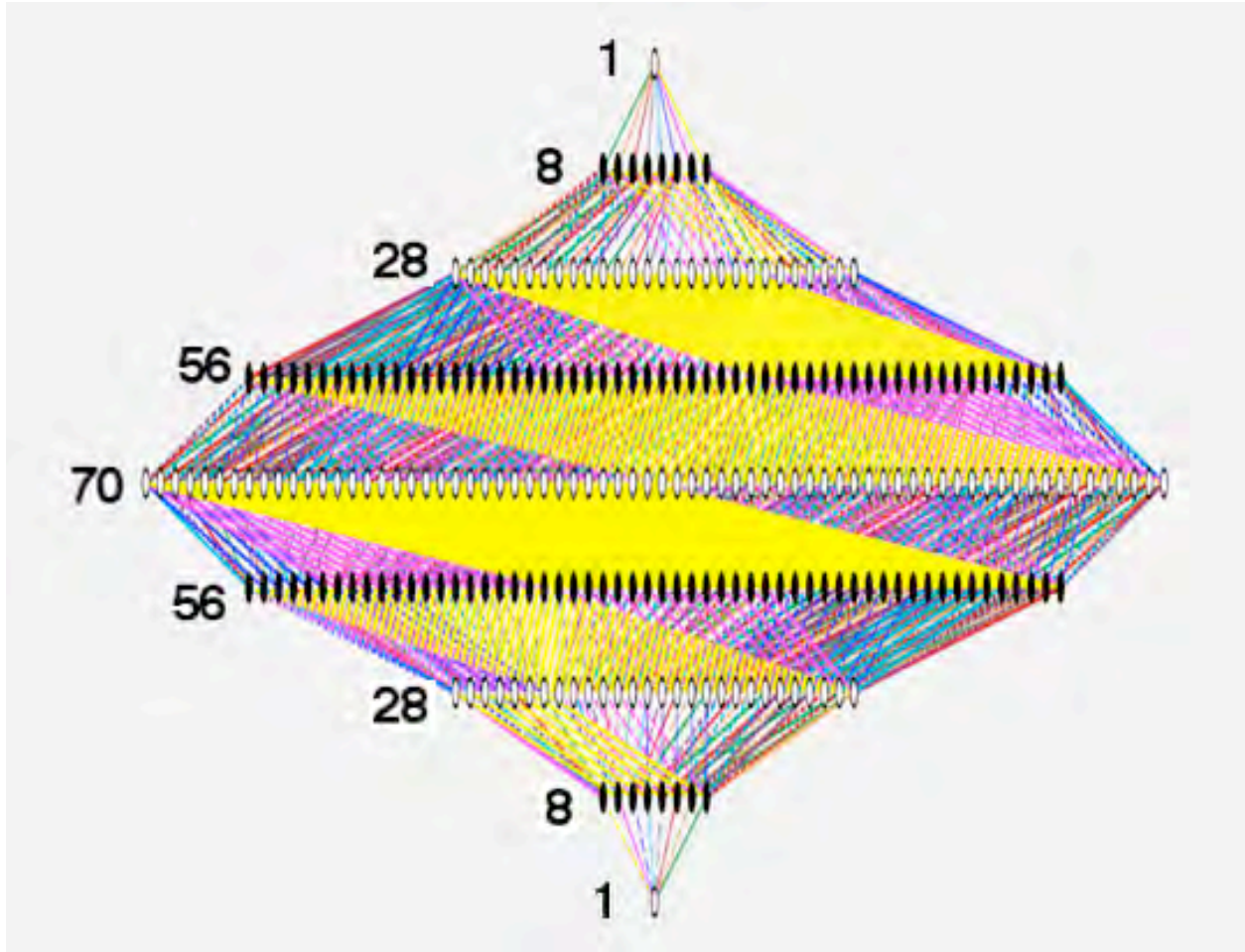
Fermions as Schwinger Sources have geometry of Complex Bounded Domains with Kerr-Newman Black Hole structure size about $10^{(-24)}$ cm.

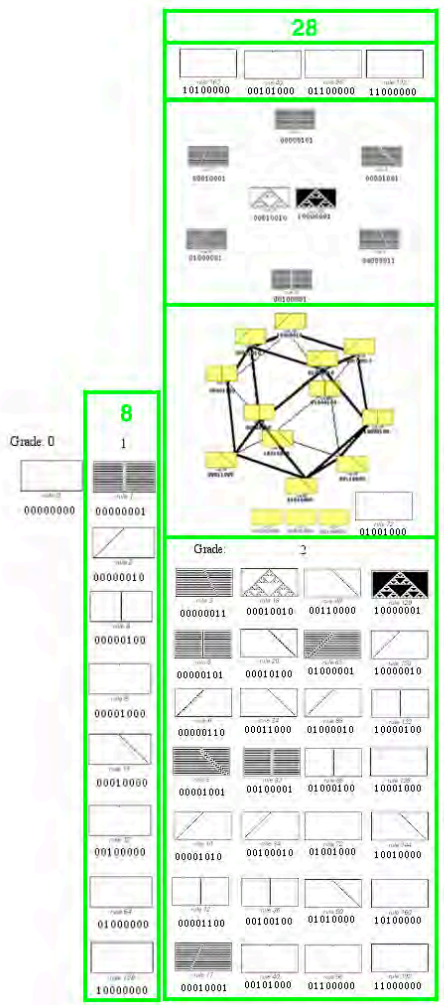
| Particle/Force | Tree-Level | Higher-Order |
|--|----------------------------|---|
| e-neutrino | 0 | 0 for nu_1 |
| mu-neutrino | 0 | $9 \times 10^{(-3)}$ eV for nu_2 |
| tau-neutrino | 0 | $5.4 \times 10^{(-2)}$ eV for nu_3 |
| electron | 0.5110 MeV | |
| down quark | 312.8 MeV | charged pion = 139 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 | 1.217×10^{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) | | $5 \times 10^{(-39)}$ |
| EM fine structure | 1/137.03608 | |
| Weak Gw | 0.2535 | |
| Gw(Mproton ² / (Mw+ ² + Mw- ² + Mz0 ²)) | | $1.05 \times 10^{(-5)}$ |
| 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.





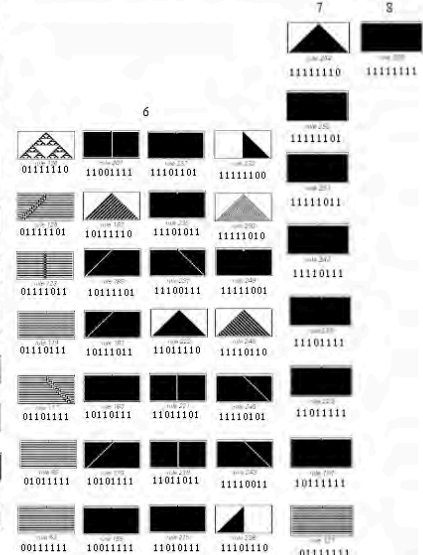
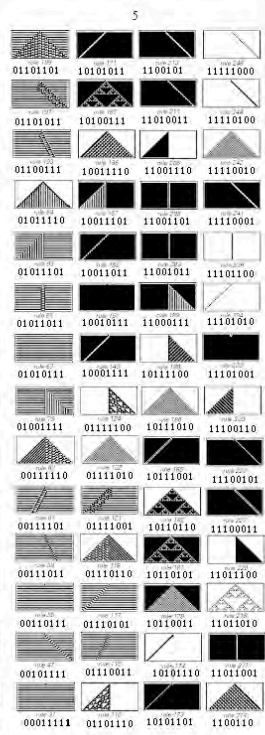
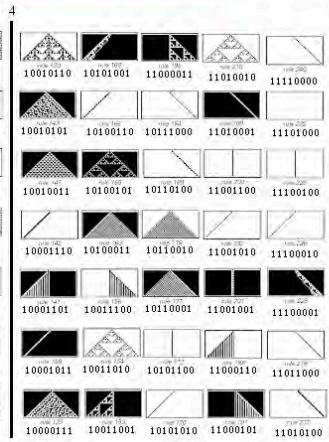
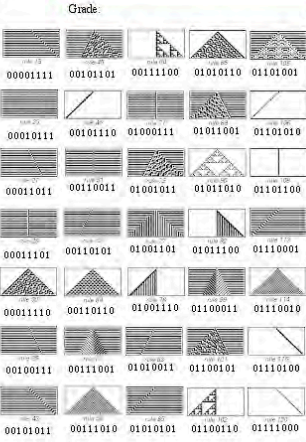
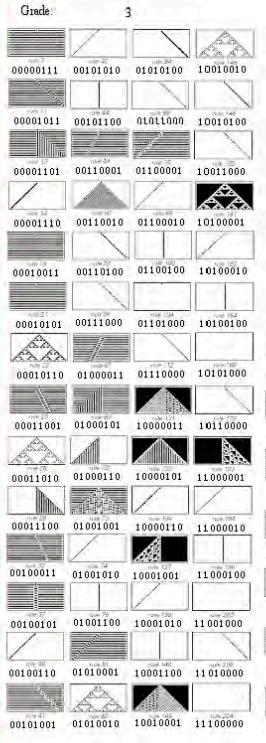
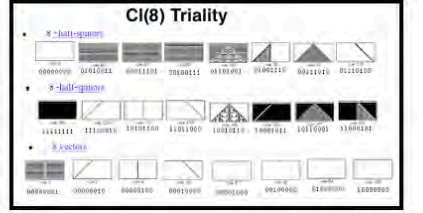
$8+28+16 = 52 \text{ F4}$

256-dim Cl(8) as Cellular Automata

16
 Cl(8) Primitive Idempotent has 16 Terms
 $I = (1/2)(1 + e_{1248}) (1/2)(1 + e_{2358}) (1/2)(1 + e_{3468}) (1/2)(1 + e_{4578}) =$
 $=(1/16)(1 + e_{1248} + e_{2358} + e_{3468} + e_{4578} + e_{5618} + e_{6728} + e_{7138} + e_{3567} - e_{4671} - e_{5712} - e_{6123} - e_{7234} - e_{1345} - e_{2456} + e_{J})$
 corresponding to 16 of the 256 Cellular Automata

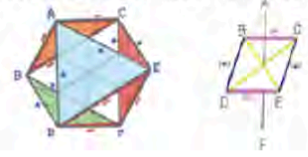
$\bullet + e_{12345678} \quad 11111111$
 $\bullet + e_{6728} - e_{3468} + e_{4578} \text{ to } 1110010 \quad 10101100 \quad 11011000$
 $\bullet + e_{2358} - e_{1248} + e_{5618} - e_{7138} \quad 1001010 \quad 10010111 \quad 10110001 \quad 11000101$
 $\bullet + 1 \text{ to } 00000000$
 $\bullet - e_{5712} - e_{1345} - e_{6123} \quad 01010011 \quad 00011100 \quad 00100111$
 $\bullet - e_{4671} - e_{7234} - e_{2456} - e_{3567} \quad 01101001 \quad 01001110 \quad 00111010 \quad 01110100$

Tensor Product Cl(8) x Cl(8) = Cl(16)
 $(F4 \text{ in Cl(8)}) \times (F4 \text{ in Cl(8)}) =$
 $= 8 \times 8 + 28 \times 1 + 1 \times 28 + 16 \times 16 =$
 $= 120 \text{ Cl(16) BiVectors} + (128 + 128) \text{ Cl(16) Spinors}$
 $120 \text{ Cl(16) BiVectors} + 128 \text{ Cl(16) Half-Spinors} = E8$



Guillermo Moreno (arXiv math/0512517) has shown that $V(7,2) = \text{Spin}(7) / \text{Spin}(5)$ can be identified with the Zero Divisors of Sedenions which have $7+28 = 35$ Associative Triples and for which Zero Divisors are given by the fibration $V(7,2) \rightarrow G_2 \rightarrow S^3$ [3-sphere] and which have 4-2=2 ZD Irreducible Components and 10-dim Lie Sphere $\text{Spin}(7) / \text{Spin}(5) \times U(1)$ whose 10D corresponds to $\text{Cl}(1,9) = \text{Cl}(2,8)$ Conformal over $\text{Cl}(1,7)$ that $V(15,2) = \text{Spin}(15) / \text{Spin}(13)$ is related to, but not identified with, the Zero Divisors of 32-ons which have $35 + 120 = 155$ Associative Triples and which have 8-2=6 ZD Irreducible Components and 26-dim Lie Sphere $\text{Spin}(15) / \text{Spin}(13) \times U(1)$ whose 26D correspond to 26D String Theory and to 26-dim traceless $J(3,0)$ that $V(127,2) = \text{Spin}(127) / \text{Spin}(125)$ is related to, but not identified with, the Zero Divisors of Voudon 256-ons corresponding to $\text{Cl}(8)$ which have $1+6+28+120+496+2016+8128=10795$ Associative Triples and which have 64-2=62 ZD Irreducible Components and 250-dim Lie Sphere $\text{Spin}(127) / \text{Spin}(125) \times U(1)$

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 $G_2 \times (n-3) \times S_3$ (... order-6 permutation group on 3 elements) ... This says the automorphism group of the Sedenions' ZD's has order $14 \times 1 \times 6 = 84$... based on 7 octahedral lattices ("Box-Kites") ...

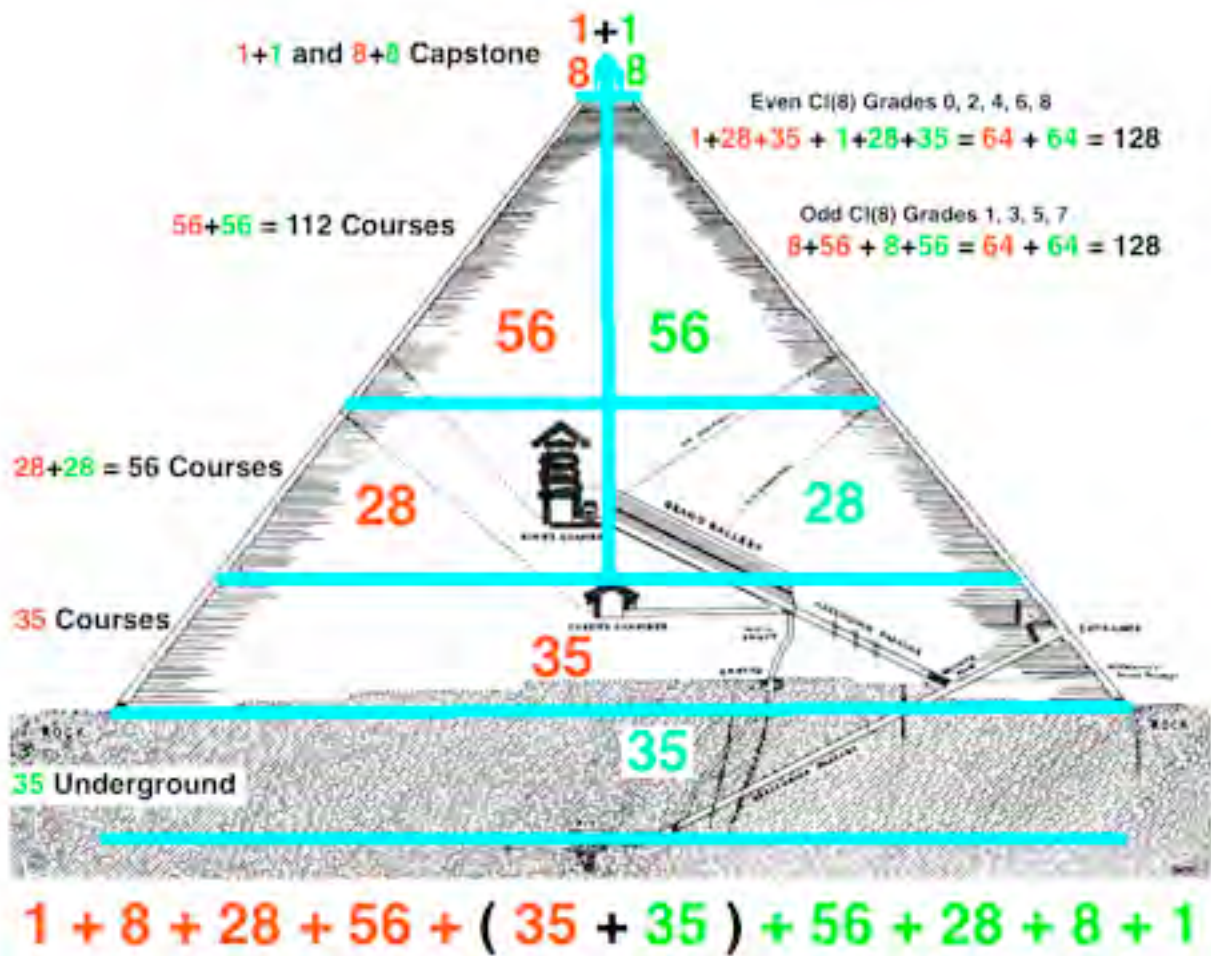


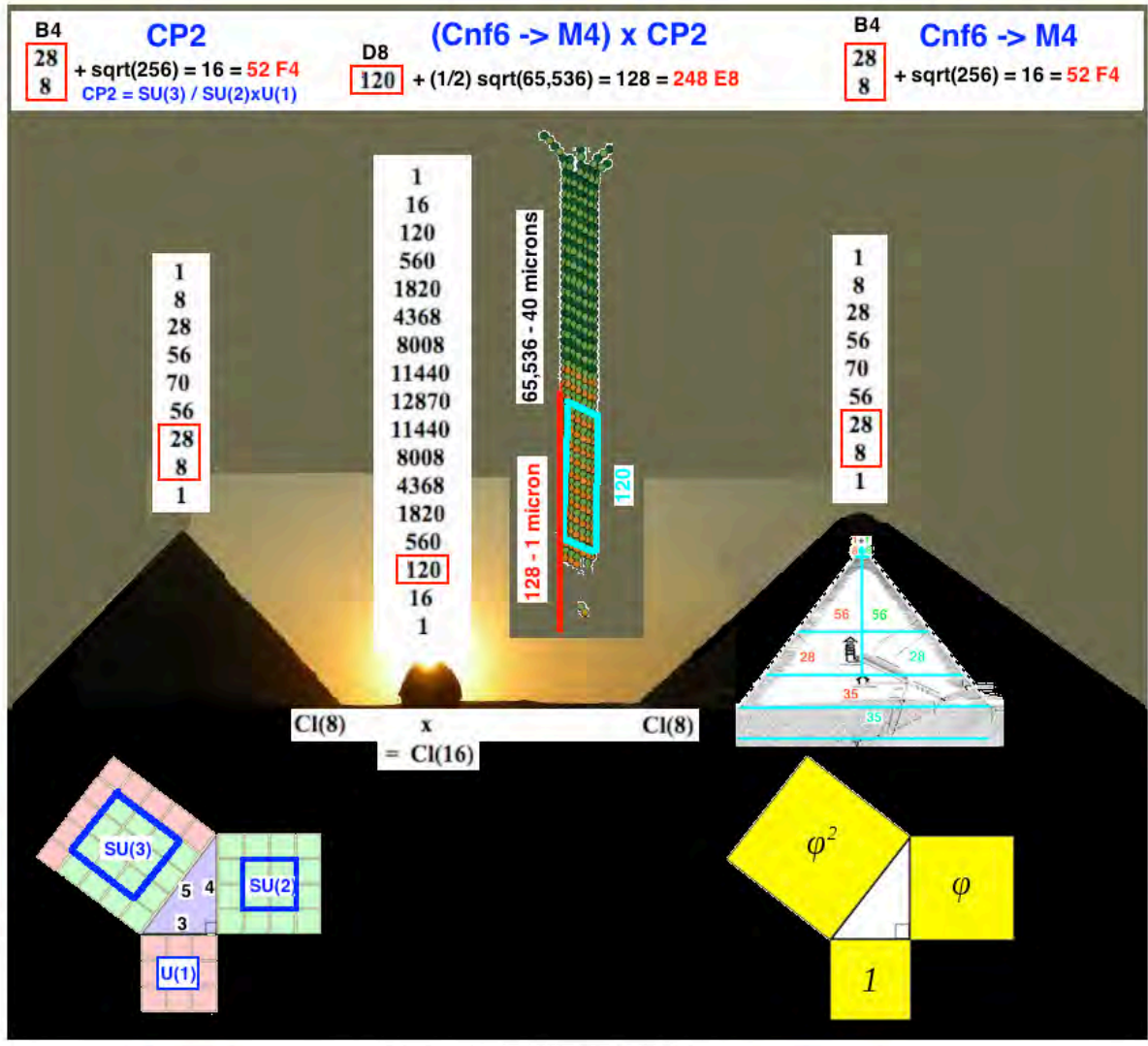
"... Harmonics of Box-Kites, called here "Kite-Chain Middens," ... extend indefinitely into higher forms of 2^n-ions. All non-Midden-collected ZD diagonals in the ... 32-ons ... belong ... to a set of 15 "emanation tables," ... they house 168 ... PSL(2,7) ... cells ... 8 ... 32-ons ... ET's ... from S = 8 to 15 ...



[here are] ... Emanation Tables ... ET's for S = 15, N = 5,6,7 ... and fractal limit ...

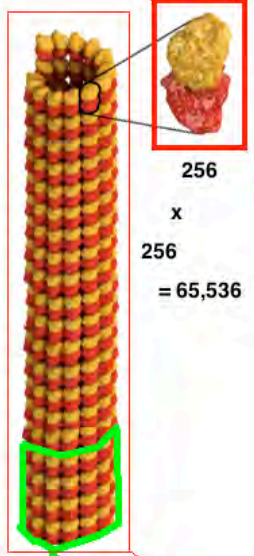






52-dim F4 of CP2 in 256-dim Cl(8)

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



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)

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

Kaluza-Klein Spacetime
M4 x CP2

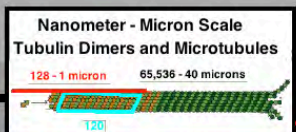
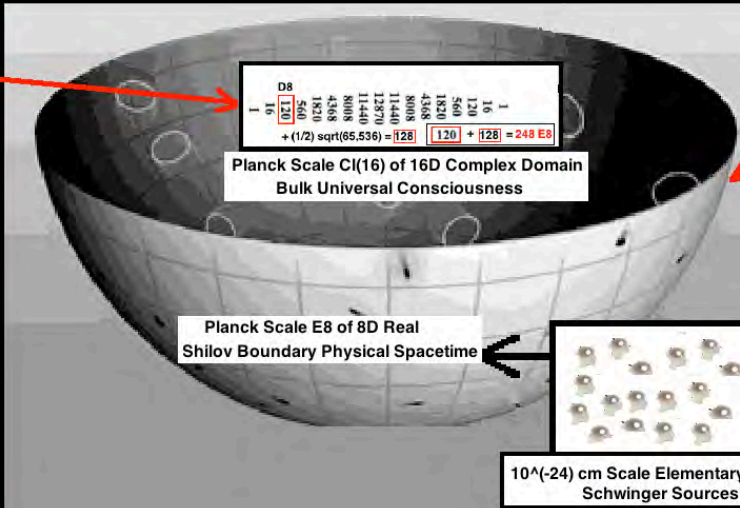
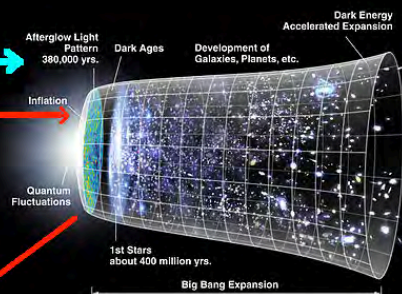
| | |
|-------|-------|
| 1 | 16 |
| 8 | 120 |
| 28 | 560 |
| 70 | 1820 |
| 160 | 4368 |
| 350 | 8008 |
| 700 | 11440 |
| 1287 | 12870 |
| 2520 | 11440 |
| 4368 | 8008 |
| 7000 | 4368 |
| 10000 | 2520 |
| 12870 | 1287 |
| 14420 | 700 |
| 14420 | 350 |
| 11440 | 160 |
| 8008 | 70 |
| 4368 | 28 |
| 1820 | 8 |
| 560 | 1 |
| 120 | 1 |

CI(8) x CI(8) = CI(16)

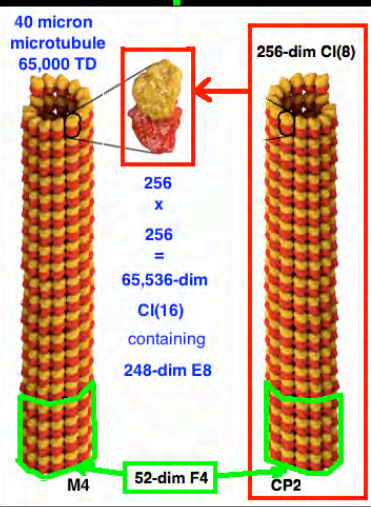
Spinors: $(8s, 8s) + (8s, 8c)$
 $(8s+8c) \times (8s+8c) = (8c, 8s+8c, 8c)$

NJL Quantum Condensate

10¹⁹ E8 Lattice 240-vertex Polytope Cells in Universe at End of Inflation



Quantum Resonant Connection



Penrose-Hameroff Quantum Condensate



10¹⁹ Tubulin Dimers in a Human Brain

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

Kaluza-Klein Spacetime
M4 x CP2

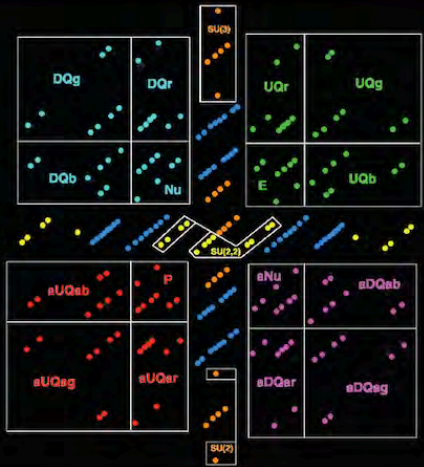
| | | |
|--|---|-------|
| CI(8) that contains 28 = D4 for M4 Gravity | CI(8) that contains 28 = D4 for CP2 Std Model | 16 |
| | | 120 |
| | | 560 |
| | | 1820 |
| | | 4368 |
| | | 8008 |
| | | 11440 |
| | | 12870 |
| | | 11440 |
| | | 8008 |
| | | 4368 |
| | | 560 |
| | | 120 |
| | | 16 |
| | | 1 |

CI(8) x CI(8) = CI(16)

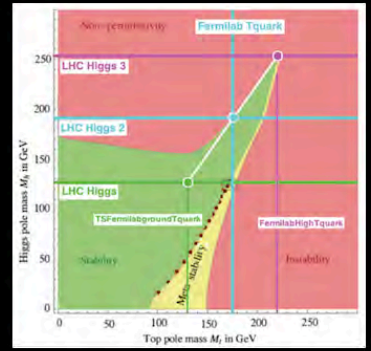
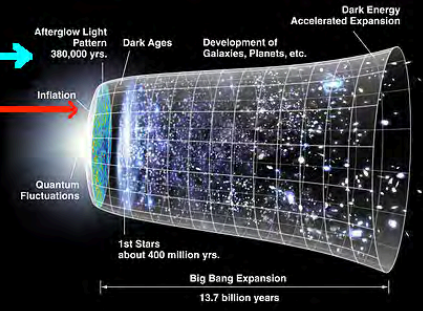
Spinors: $(8s+8c) \times (8s+8c) = (8s \cdot 8s + 8s \cdot 8c) + (8c \cdot 8s + 8c \cdot 8c)$

Quantum Resonant Connection

NJL Quantum Condensate

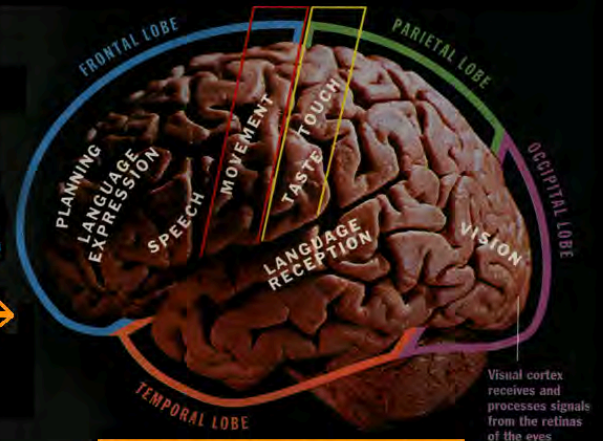
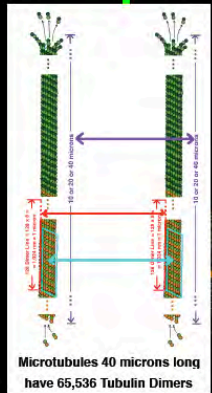


10^19 E8 Lattice 240-vertex Polytope Cells in Universe at End of Inflation



CI(0,16) x CI(0,8) = CI(0,24)
M(2,CI(0,24)) = CI(1,25)
Completion of Union of All Tensor Products of CI(1,25) = AQFT

Penrose-Hameroff Quantum Condensate



10^19 Tubulin Dimers in a Human Brain

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

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 ...



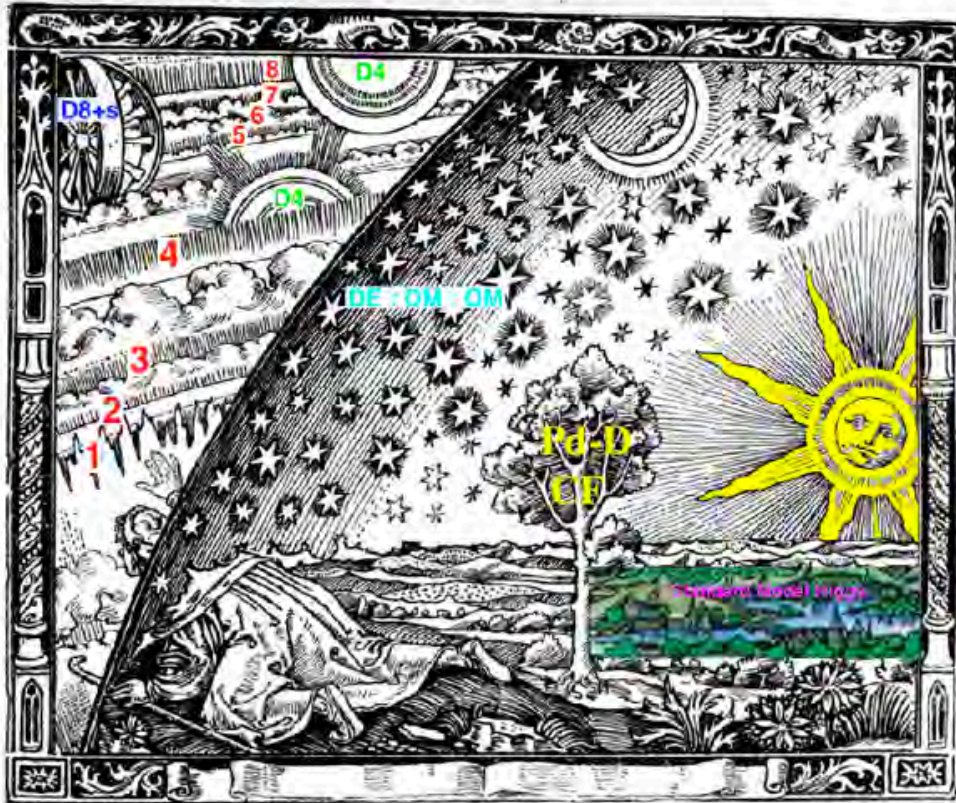
... It was ... possibly painted for Louis XII of France and his consort, Anne of Brittany ... shortly after the conquests of Milan and Genoa around 1500 [and] subsequently owned by Charles I of England and recorded in his art collection in 1649 ... Leonardo painted the orb as if it were a hollow glass 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.

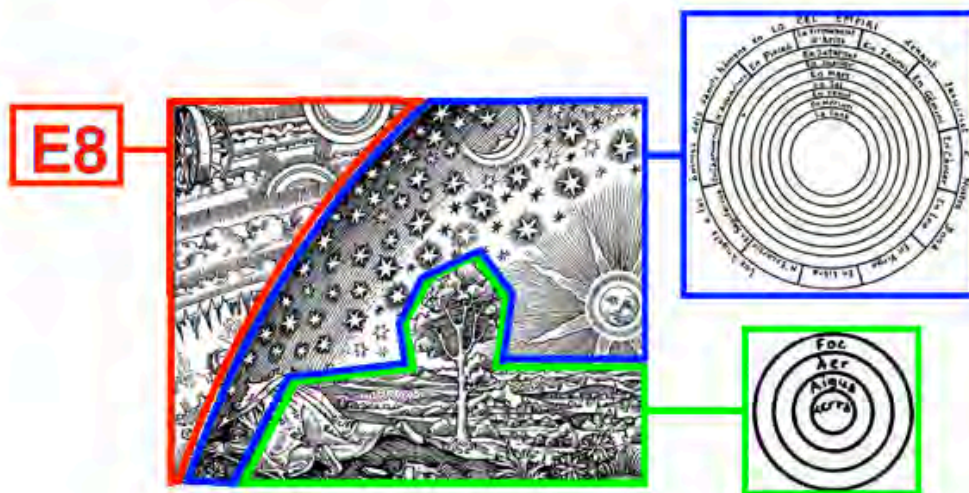
E8-CI(16) Physics (viXra 1602.0319) is based on the 240 Root Vectors of E8 which are points on the 7-dim sphere boundary of the ball in 8-dim space.

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

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-Curiel, 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 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. that is beyond the outer $4+7+1 = 12$ layers of Earth, Sun, Moon, Planets, Stars:



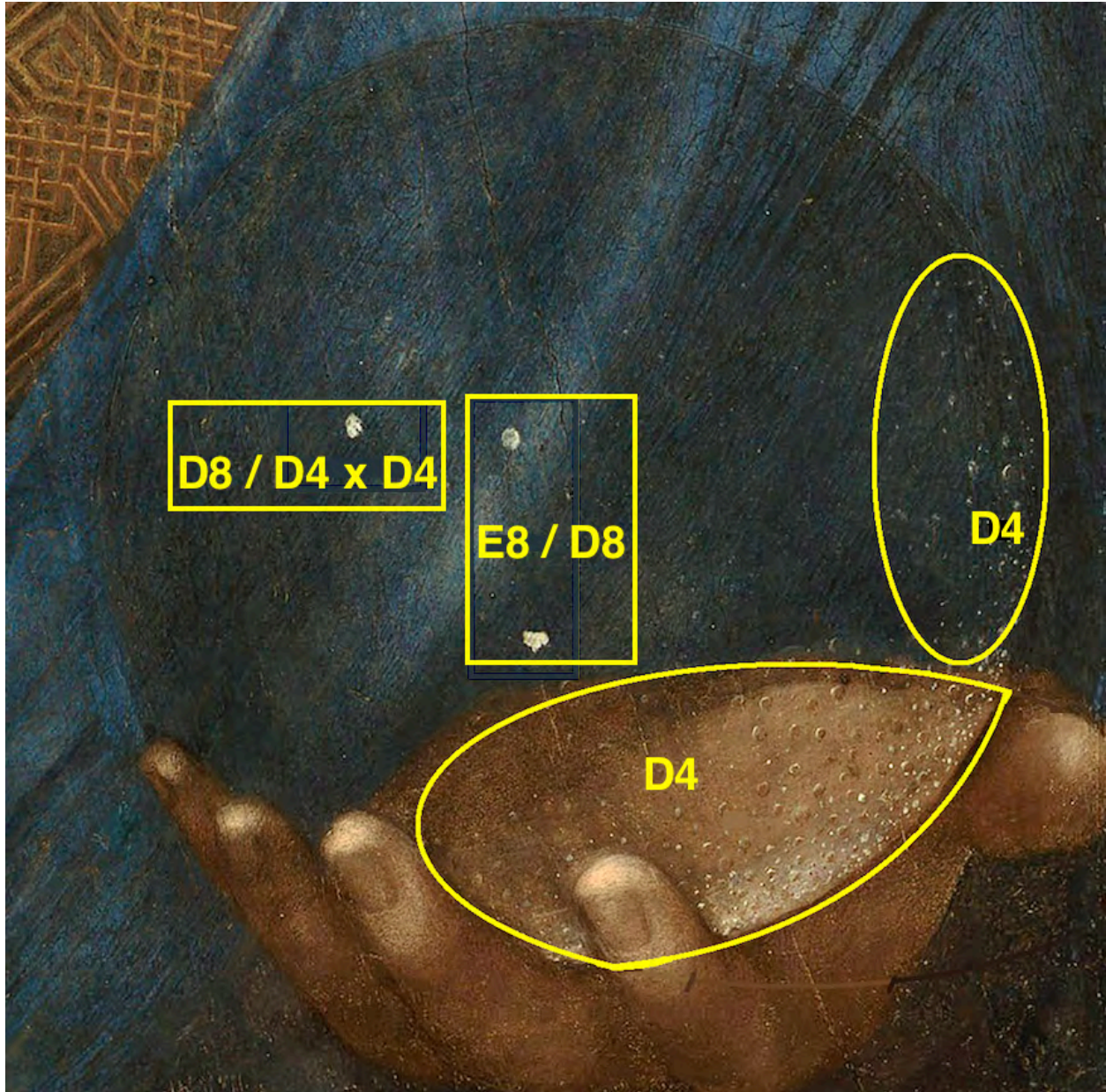
The Flammarion Celestial Sphere representation of E8 corresponds to Leonardo's Sphere with markings also representing E8.

Flammarion's Celestial Sphere has two copies of D4 each with 24 Root Vectors and 128 Root Vectors from +half-spinors D8+s of D8 and 8 levels of 8 Spacetime dimensions for position x momentum = $8 \times 8 = 64$ Root Vectors thus giving $24 + 24 + 128 + 64 = 240$ 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 $D8 / D4 \times D4$
 (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-CI(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 $E8$.**