
K
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J
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I
E
k

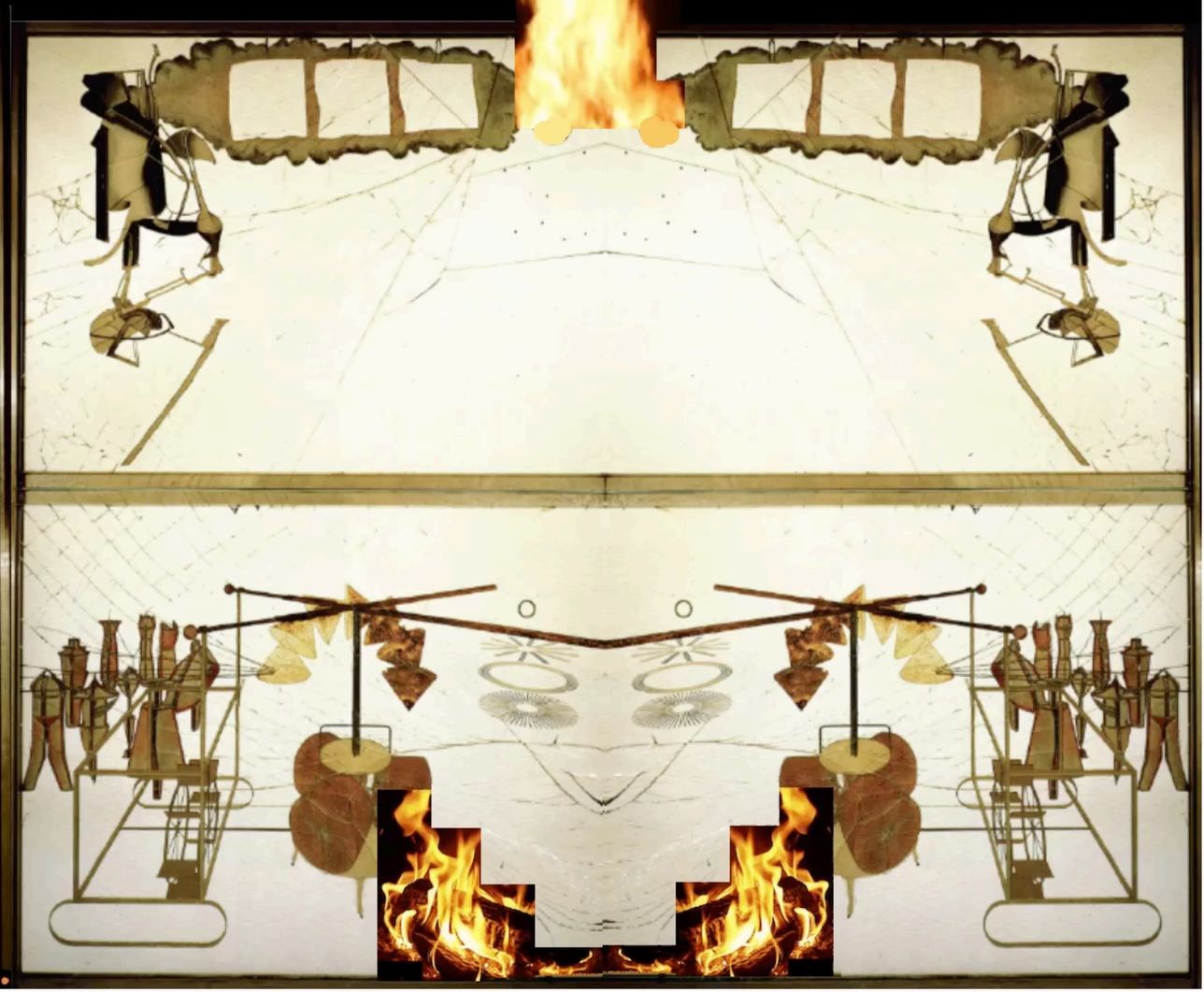
The ROOF

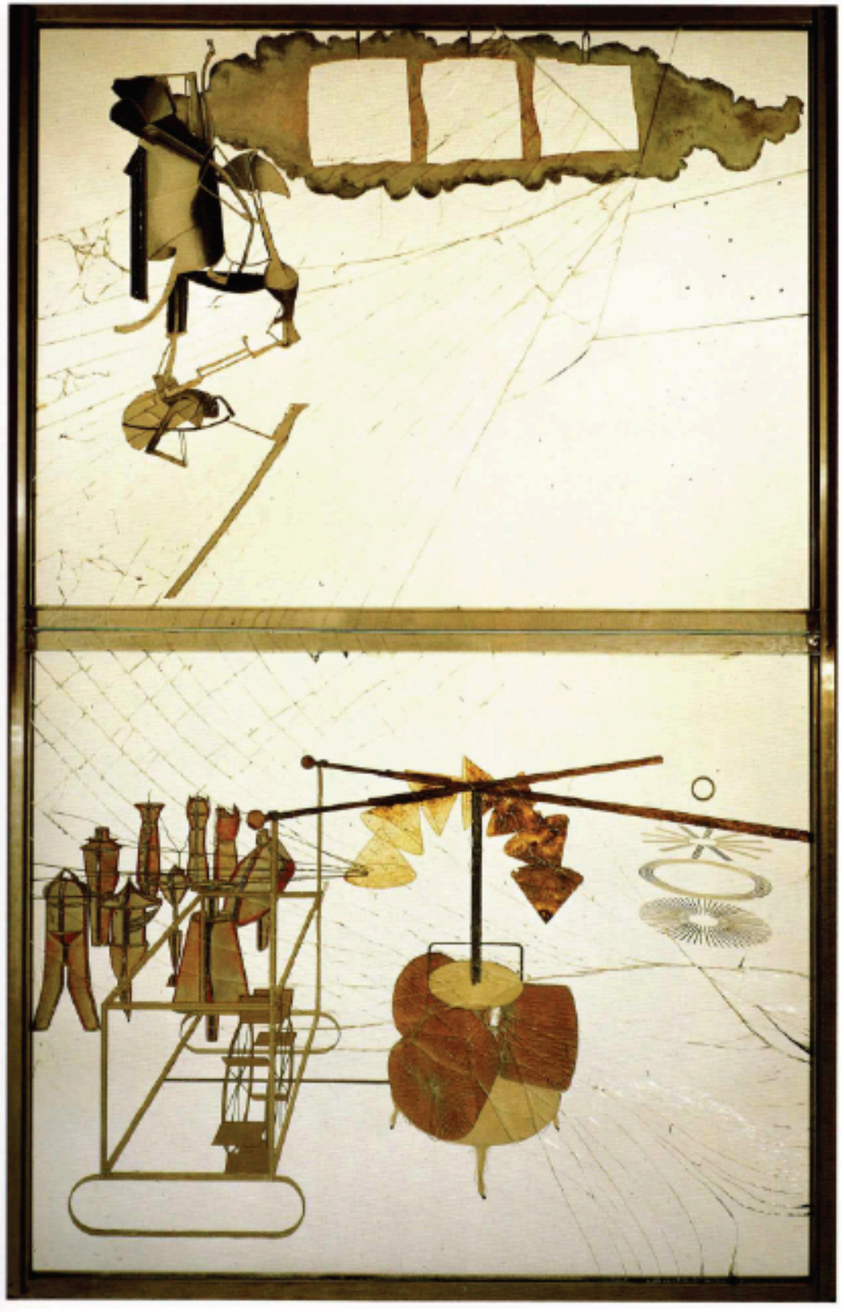
is on FIRE

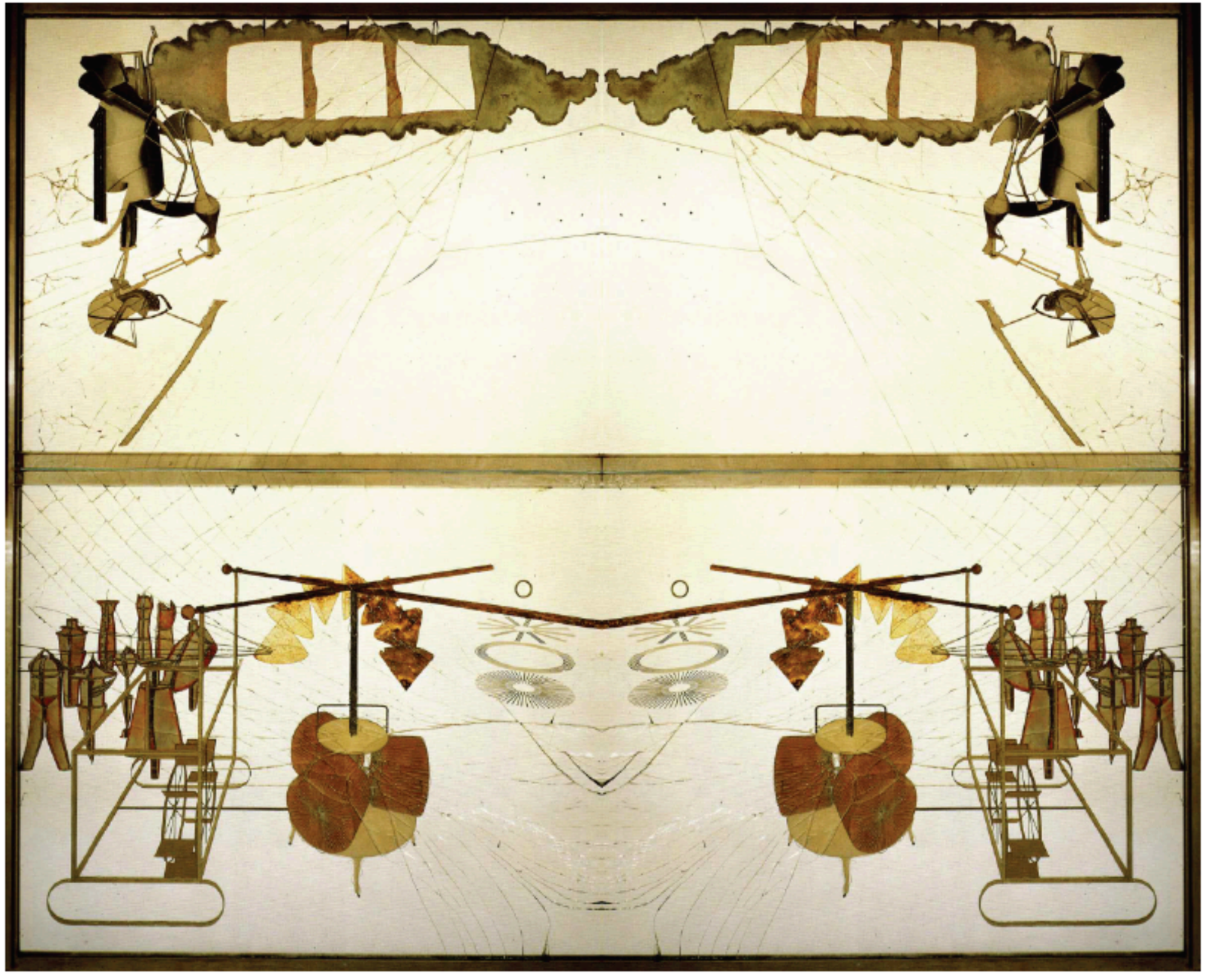
Science, Art, and Music

Let the

HOLY GHOST BURN







H4 + H4 = E8

(-24) 32 32 32 H4

H4 32 32 32 (-24)

F4

B4

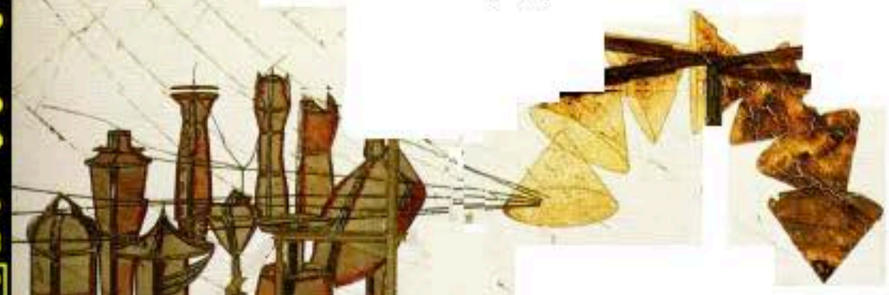
D4

F4

B4

D4

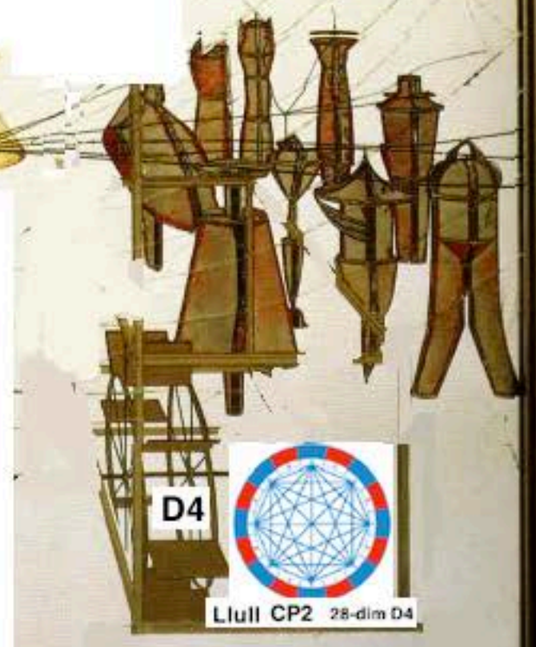
9 + 7 = 16 = U(2,2)



M4 x CP2

3 + 9 = 12 = SU(2) x U(3)

CP2



CP2 x M4

H4 + H4 = E8

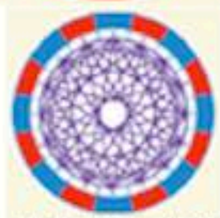
(-24) 32 32 32 H4 H4 32 32 32 (-24)

F4 B4 D4 D4 B4 F4

Cl(16) Vectors

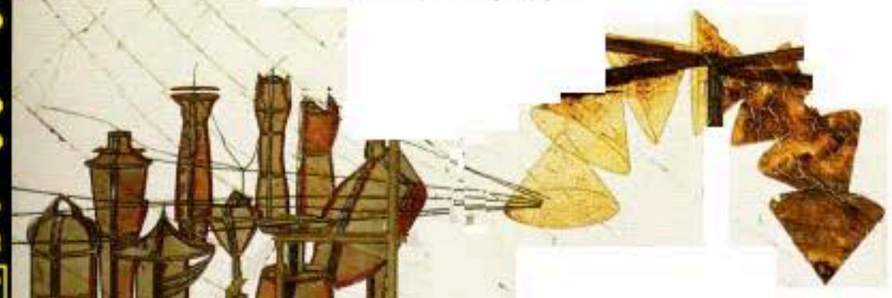
LIE BALL
INTERIOR SPIRIT WORLD

PHYSICAL WORLD
SHILOV BOUNDARY
LIE SPHERE



Llull 64-dim A7+R

9 + 7 = 16 = U(2,2)



Llull M4 28-dim D4

D4

M4 x CP2

3 + 9 = 12 = SU(2) x U(3)

CP2

Llull CP2 28-dim D4

D4

CP2 x M4

H4 + H4 = E8

(-24) 32 32 32 H4 H4 32 32 32 (-24)

F4 B4 D4 D4 B4 F4

Cl(16) Vectors

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PHYSICAL WORLD
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Llull 64-dim A7+R

9 + 7 = 16 = U(2,2)

M4 x CP2

1 8 8 8 1 1 1

3 + 9 = 12 = SU(2) x U(3)

CP2

1 8 8 8 1 1 1

CP2 x M4

560 Cl(16) TriVectors = 10 copies of 56-dim Fr3(O)

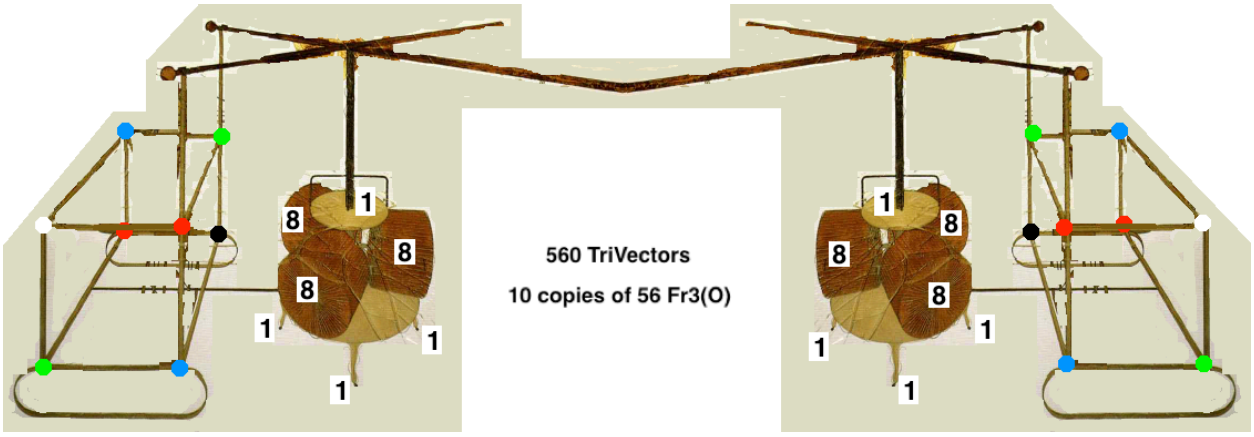
Only one copy of Fr3(O) is explicitly shown by Duchamp because the 10 copies are one for each of 26-16 = 10 dimensions of 26D String=World-Line Theory with all 10 being in a State of Superposition

8 of the 10 dimensions are represented by 8 algebraically independent E8 Lattices (7 Integral Domains) so that each of the 8 types of Fermions has its own E8 Lattice

26D String=World-Line Theory comes from Fr3(O) =

= 56-dim Freudenthal Algeba Fr3(O) = Complexification of 27-dim J3(O) with 26-dim traceless part J3(O)o

The Large Glass + Mirror connects World-Line Strings with the volumes of M4 and CP2 parts of Spacetime and 56 of the 560 TriVectors of Cl(16) = Fr3(O) = 1+8+8+8+1+1+1 + 1+8+8+8+1+1+1



Strings = World-Lines in M4 and CP2 interact by entire fine-grained histories in Andrew Gray's quant-ph/9712037v2 Quantum Theory with interference factors among different possible histories at each time. Each Gray History is a World-Line String.

The Gray Fine-Grained History Quantum Theory is equivalent to the Nambu-Goto action of 26D String Theory.

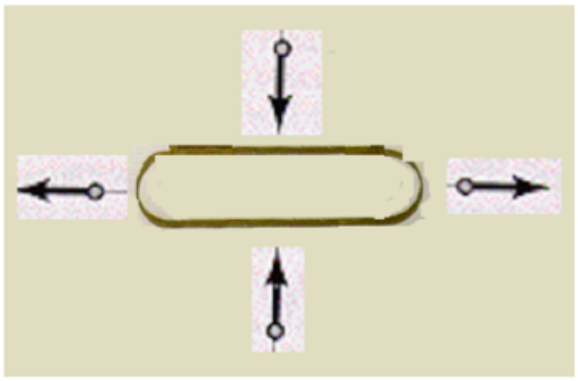
Nambu-Goto symmetric 24x24 traceless spin-2 particle is Quantum Bohmion carrier of Bohm Quantum Potential

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

Tachyons localized at orbifolds of fermions produce virtual clouds of particles / antiparticles that dress fermions as Schwinger Sources.

www.outline-of-knowledge.info/OKD/5/Physics/Matter/Atom/Orbital/Spin/spin%20of%20particle.html said "... Spin-2 particles are tensors, with two symmetry axes ...".

Richard Feynman in his Lectures on Gravitation said "... The polarization of a graviton is a tensor quantity. ... we draw arrows indicating the direction to be associated with surfaces normal to the axes. In the plane perpendicular to the direction of propagation we have the two stresses ... These are the only two possible quadrupole stresses;
the stresses representable by all arrows pointing towards the origin (or away from the origin) are something like a fluid pressure, which has zero spin.
The “stresses” (actually rotations) representable by all arrows pointing in a clockwise (or counter-clockwise) direction correspond to spin 1. ...
The stresses represented by ...



... have ... spin ... two ... a complete 360 degree rotation corresponds to two complete cycles of phase ...".

The 4 such "runners" of the TriVector part of the Large Glass + Mirror (in red boxes) correspond to a Spin-2 Bohm Quantum Potential Bohmion

One of the two M4 "runners" carries 2 of the 4 M4 components of the Bohmion.
The other M4 "runner" carries the other 2 of the 4 M4 components of the Bohmion.

One of the two CP2 "runners" carries 2 of the 4 CP2 components of the Bohmion.
The other CP2 "runner" carries the other 2 of the 4 CP2 components of the Bohmion.

H4 + H4 = E8

(-24) 32 32 32 H4 H4 32 32 32 (-24)

F4 B4 D4 D4 B4 F4

Cl(16) Vectors

LIE BALL
INTERIOR SPIRIT WORLD

PHYSICAL WORLD
SHILOV BOUNDARY
LIE SPHERE

Llull 64-dim A7+R

9 + 7 = 16 = U(2,2)

M4 x CP2

D4

1 8 8 8 1 1 1

2 Complex

E6 72 rv Fr3(O

D3 12 rv A3

Bin Icos 60 120 E8 60

3 + 9 = 12 = SU(2) x U(3)

CP2

1 8 8 8 1 1 1

D4

CP2 x M4

H4 + H4 = E8

(-24) 32 32 32 H4

H4 32 32 32 (-24)

F4

B4

D4

Cl(16) Vectors

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Llull 64-dim A7+R

9 + 7 = 16 = U(2,2)

3 + 9 = 12 = SU(2) x U(3)

2 Complex

E6 72 rv Fr3(O) CP2

D3 12 rv A3

Bin-Icosa 120 McKay(E8)

60 60

1 8 8 8 1 1 1

1 8 8 8 1 1 1

D4

Llull M4 28-dim D4

M4 x CP2

D4

Llull CP2 28-dim D4

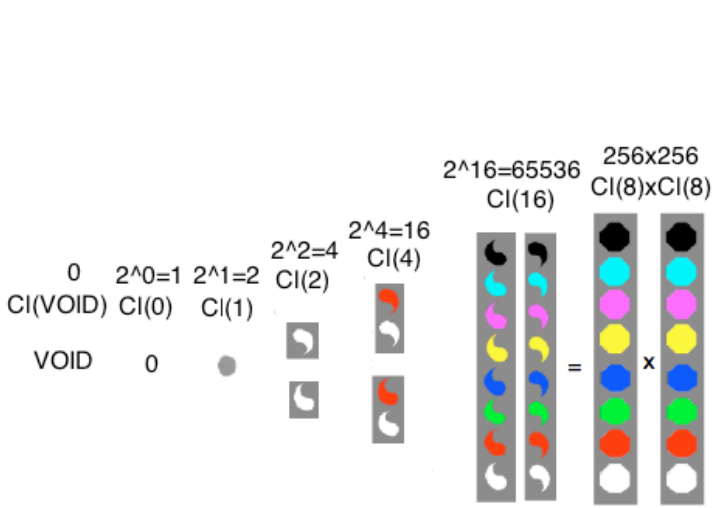
CP2 x M4

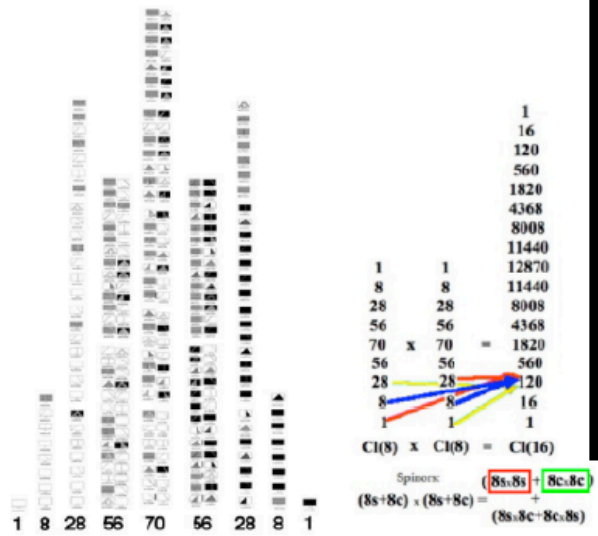
Dimension of Clifford Algebra						
0	2^0=1	2^1=2	2^2=4	2^4=16	2^16=65536	256x256

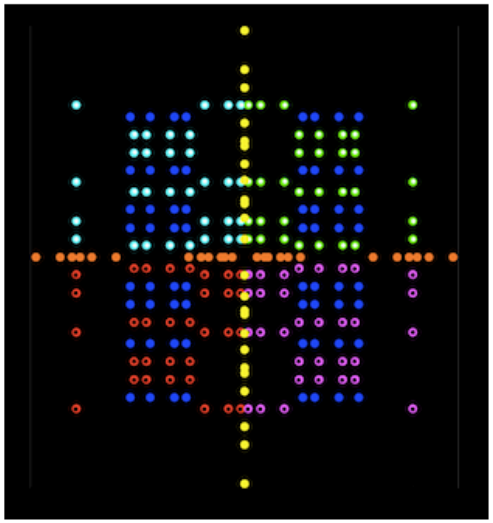
VOID -> Cl(VOID) -> Cl(0,0) -> Cl(0,1)-> Cl(0,2) -> Cl(0,4) -> Cl(0,16) = Cl(0,8)xCl(0,8) --> Cl(0,16)xCl(0,8) = Cl(0,24) -> M(2,Cl(0,24)) = Cl(1,25) ->

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

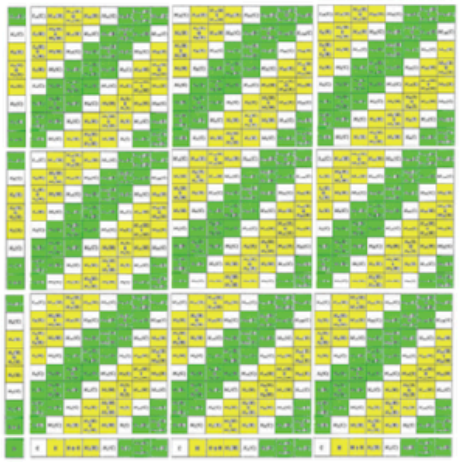
Cl(1,25) = Cl(1,9)xCl(0,8)xCl(0,8) and Cl(1,9) = Cl(1,5) x Cl(0,4) = Cl(2,4) x Cl(0,4)







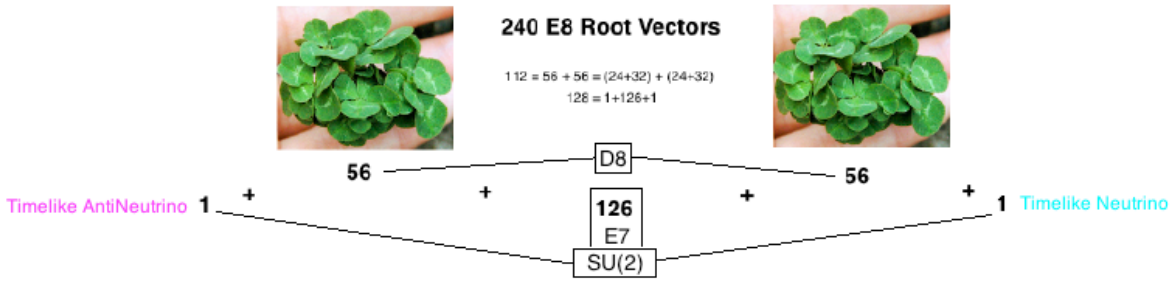
Cl(16) contains 120 + 64 + 64 = 248 = E8
with 112 + 128 = 240 root vectors



The completion of the union of all tensor products of Cl(16) = Cl(8)xCl(8) produces a generalized Hyperfinite II1 von Neumann factor that gives the Cl(16)-E8 model a natural Algebraic Quantum Field Theory

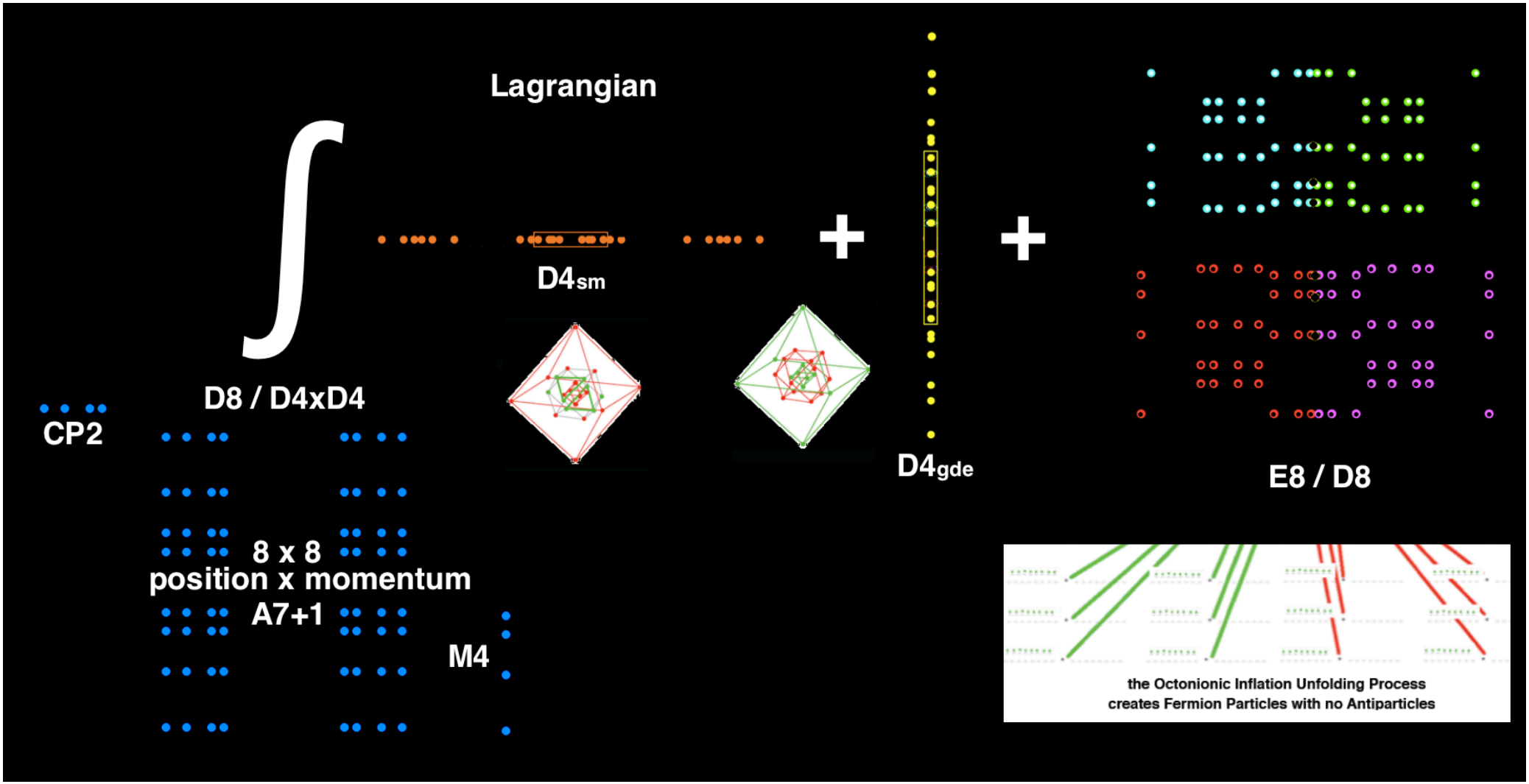
The Cl(16)-E8 AQFT inherits structure from the Cl(16)-E8 Local Lagrangian

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



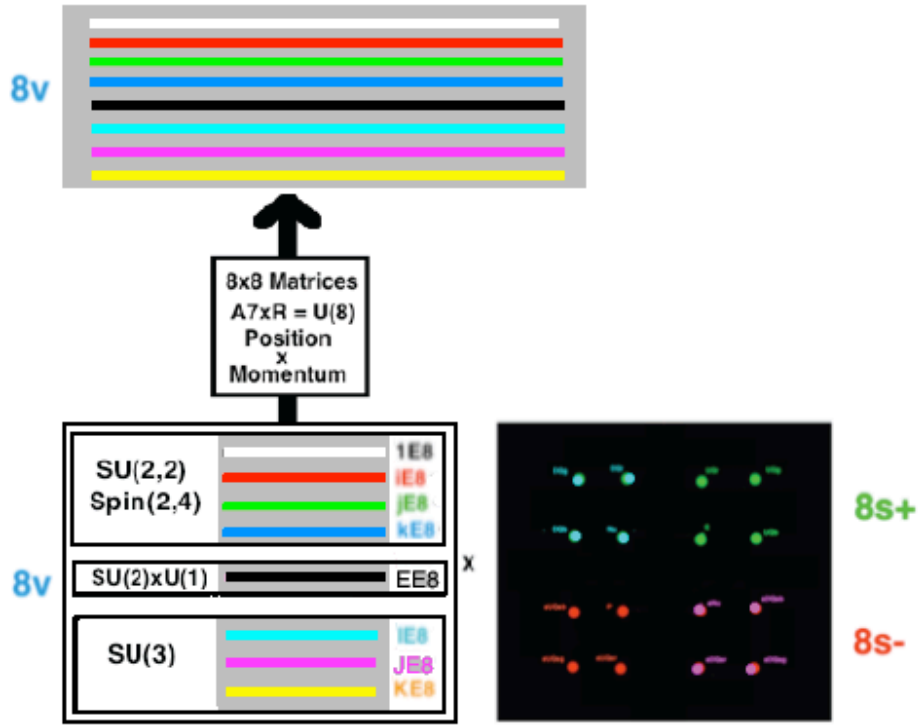
January 2018

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
D4sm
D4gde
E8 / D8
D8 / D4xD4
CP2
8 x 8
position x momentum
A7+1
M4
the Octonionic Inflation Unfolding Process
creates Fermion Particles with no Antiparticles

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			



Indra's Net of Schwinger Sources - Bohm Quantum Blockchain

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

$\int$ Standard Model Gauge Gravity + Fermion Particle-AntiParticle

8-dim SpaceTime

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

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

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

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

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

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

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

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

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

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

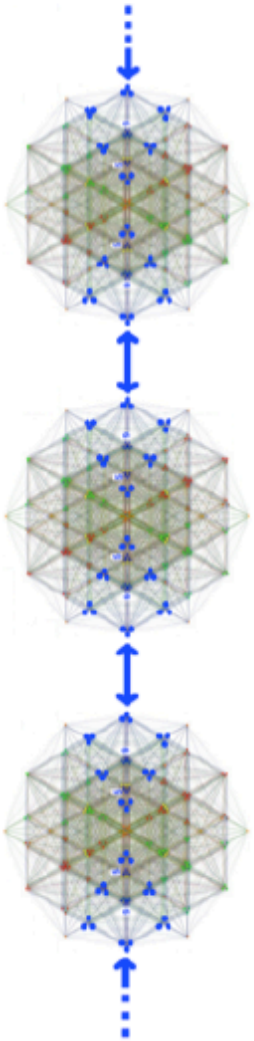
(Since a Leech lattice is based on copies of an E8 lattice and since there are 7 distinct E8 integral domain lattices there are 7 (or 8 if you include a non-integral domain E8 lattice)mdistinct Leech lattices. The physical Leech lattice is a superposition of them, effectively adding a factor of 8 to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

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

March 2018

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

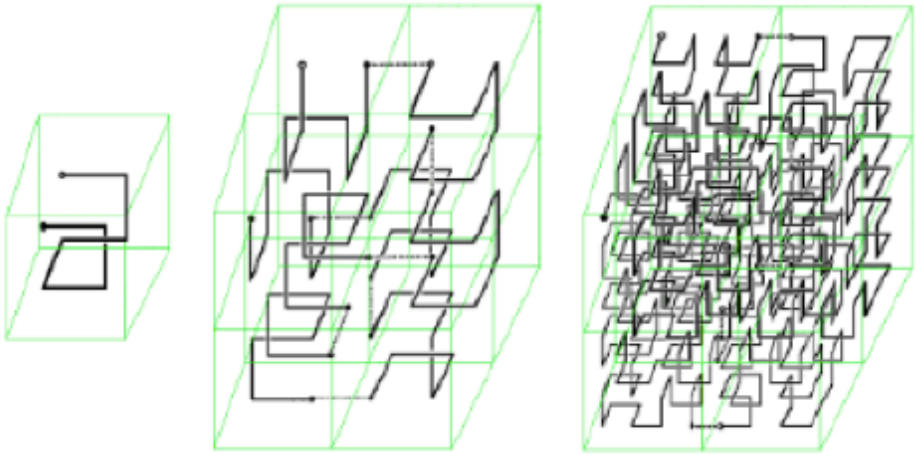
Big Bang E8(-248) : Spin(16) I Octonion Inflation E8(8) : SO(8,8) I Quaternion Conformal Evolution E8(-24) : SO*(16)

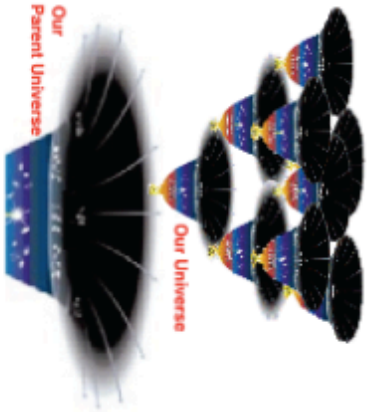


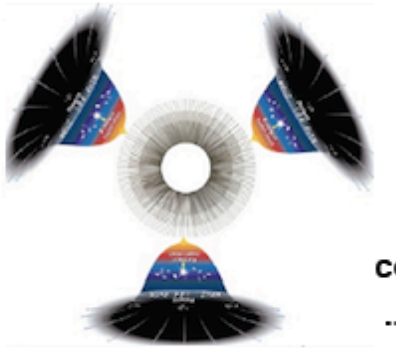
At the end of Non-Unitary Octonionic Inflation Our Universe
had about (1/2) 16^64 = (1/2) (2^4)^64 = 2^255 = 6 x 10^76 Fermion Particles
the size of our Universe was then about 10^(-24) cm
which is about the size of a Fermion Schwinger Source Kerr-Newman Cloud

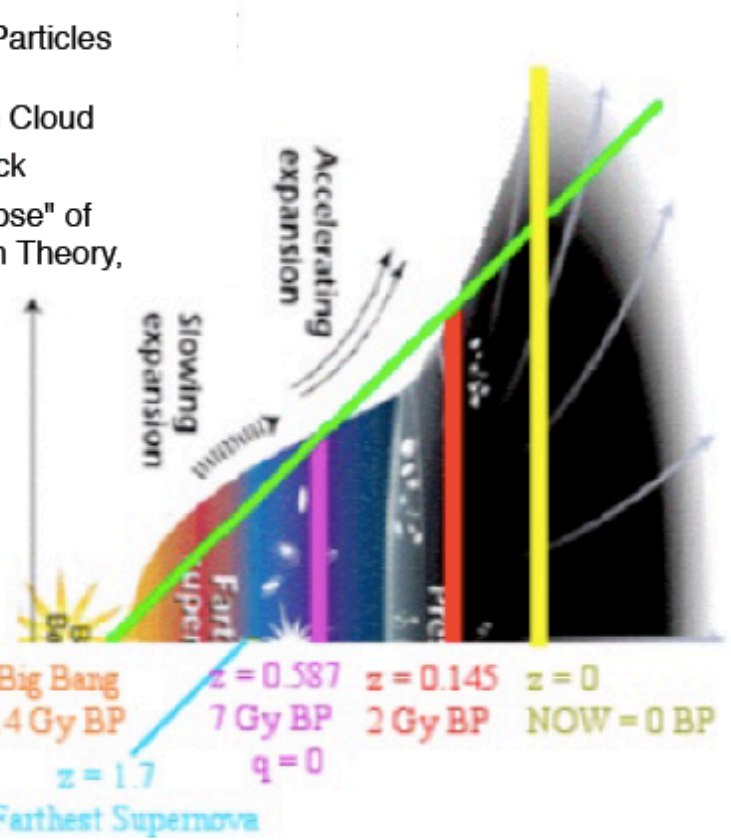
The End of Inflation time was at about 10^(-34) sec = 2^64 Tplanck

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









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

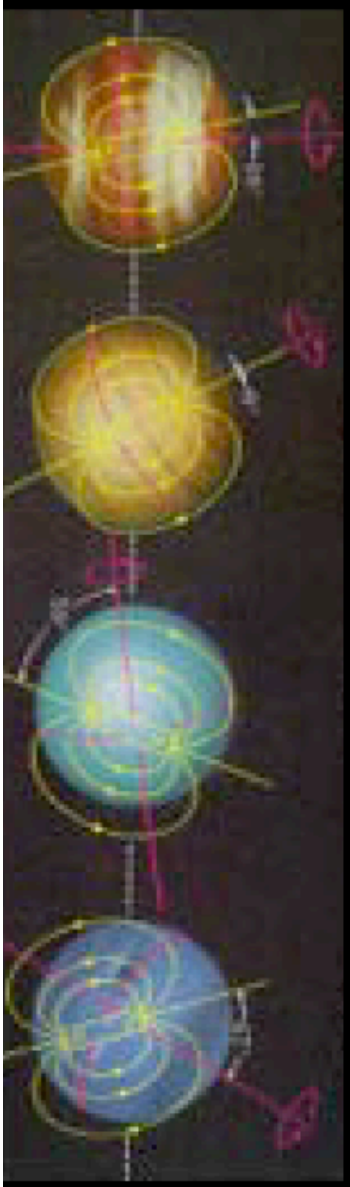
Paola Zizzi in gr-qc/0007006:

"... **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



0.72 AU
VENUS

MERCURY
0.39 AU

Octahedron
1 : sqrt(3)
1 : 1.7321

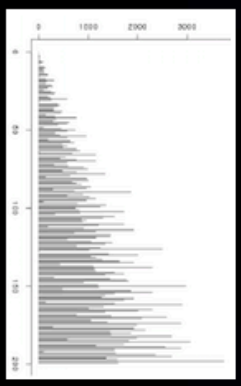
1 AU
MOON

EARTH

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

Dodecahedron

MARS
1.52 AU



Tetrahedron
1 : 3

SelfDual

5.20 AU
JUPITER

Cuboctahedron
1 : 2
(square face inscribed radius)

Cube
1 : sqrt(3)
1 : 1.7321

SATURN
9.54 AU

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

NEPTUNE
30.06 AU

URANUS
19.19 AU

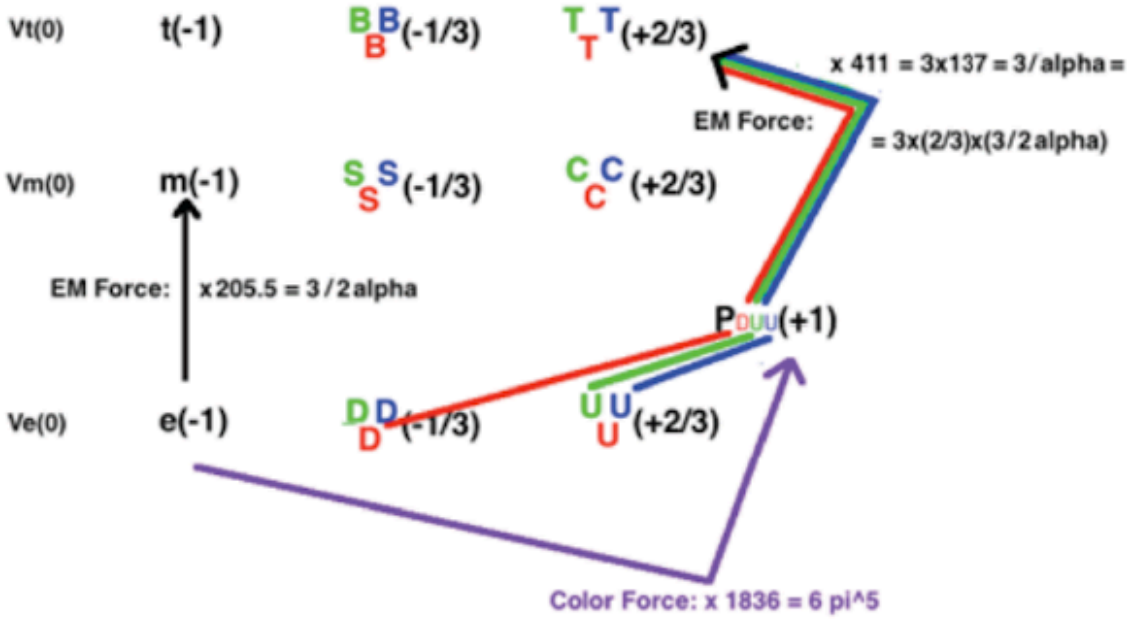
Pioneer
Anomaly
20 AU

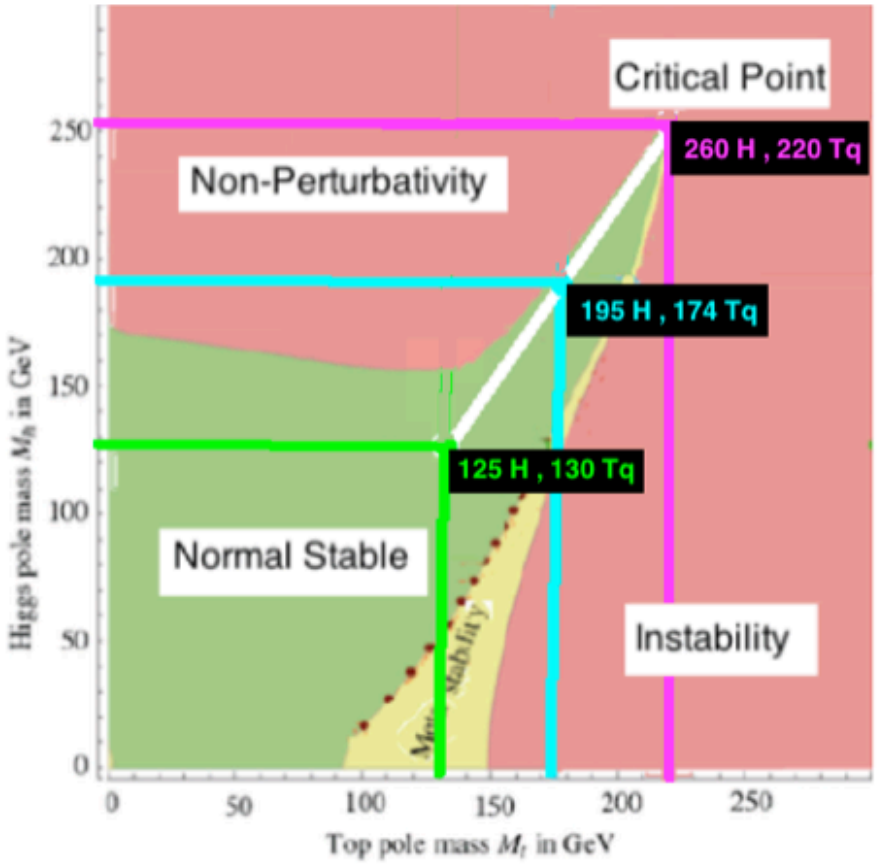
Rhombic Dodecahedron
1 : sqrt(2)
1 : 1.4142

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

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

Mforce represents the effective mass;

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

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

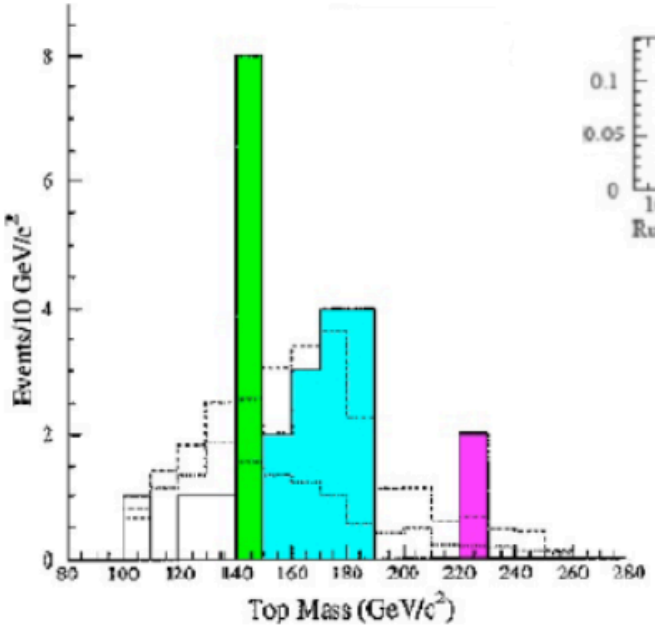
the dimensionality of the Internal Symmetry Space of the target vertex

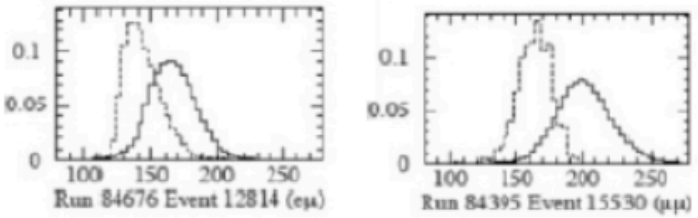
with the dimensionality of the link from the origin to the target vertex

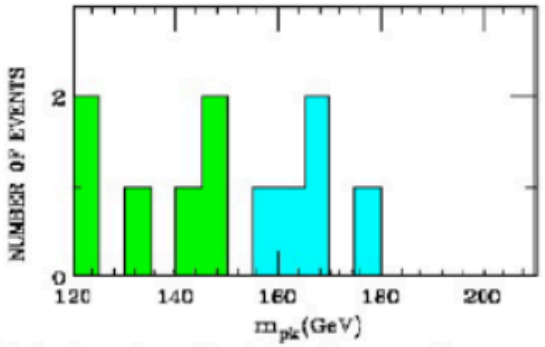
Force	M	Vol(M)	Group	SymSpace	D	Vol(D)	Q	Vol(Q)
gravity	S^4	8pi^2/3	Spin(5)	Spin(7) / Spin(5)xU(1)	IV5	pi^5/2^4 5!	RP^1xS^4	8pi^3/3
color	CP^2	8pi^2/3	SU(3)	SU(4) / SU(3)xU(1)	B^6(ball)	pi^3/6	S^5	4pi^3
Weak	S^2xS^2	2x4pi	SU(2)	Spin(5) / SU(2)xU(1)	IV3	pi^3/24	RP^1xS^2	4pi^2
e-mag	T^4	4x2pi	U(1)	-	-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

June 2018

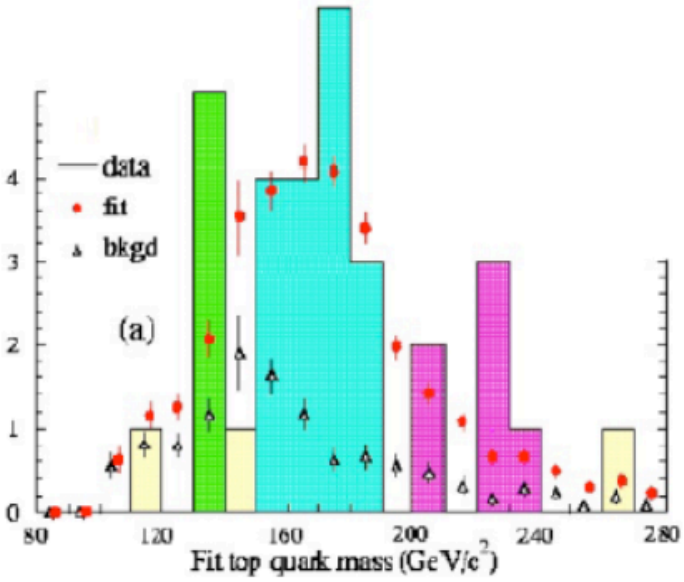
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4	5	6	7	8	9
10	11	12	13	14 Flag Day	15	16
17 Father's Day	18	19	20	21 Summer Begins	22	23
24	25	26	27	28	29	30

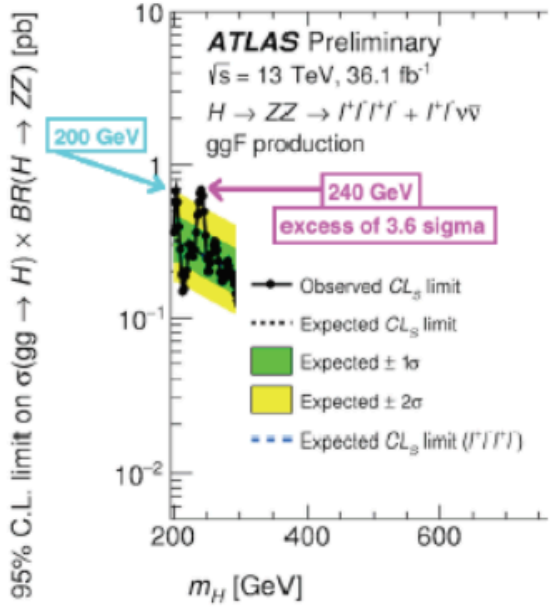


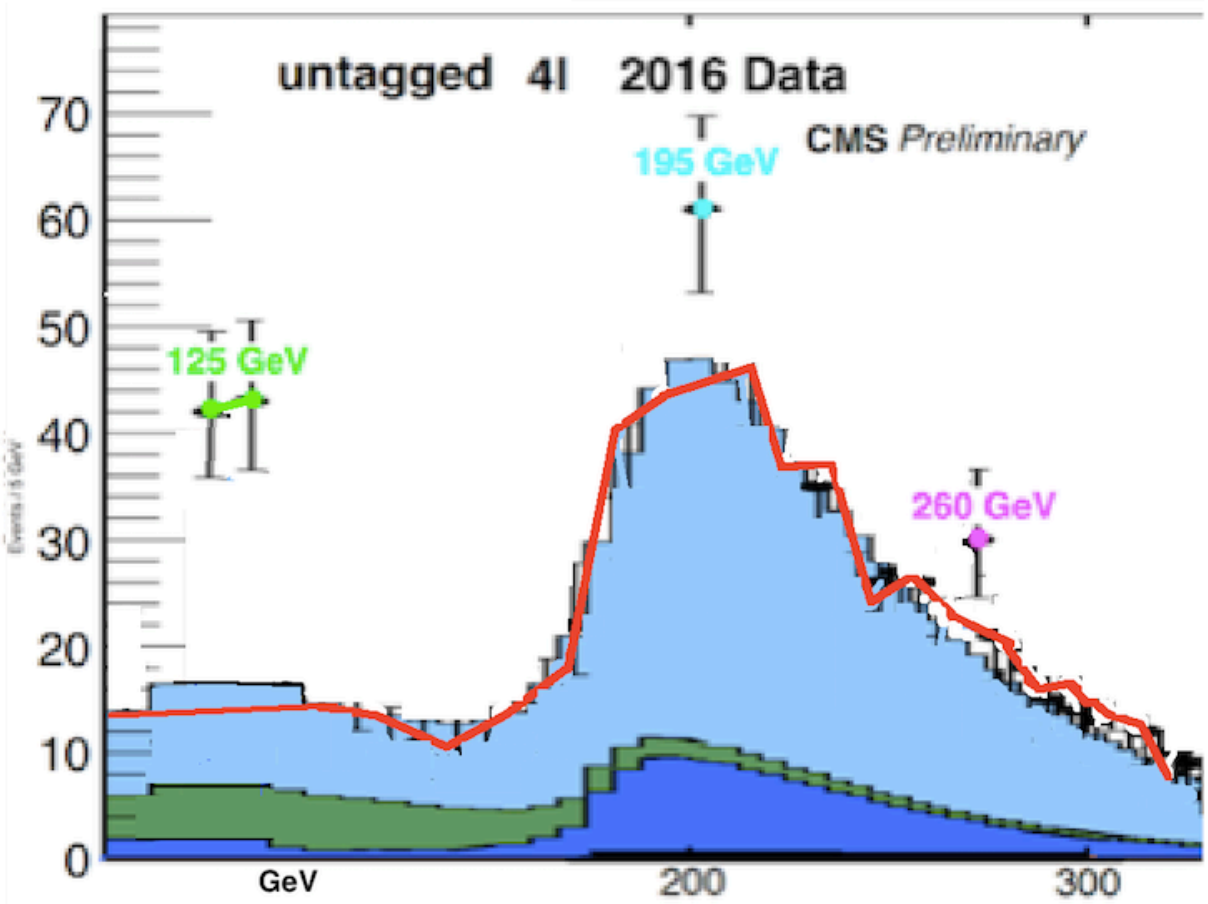




The distribution of m_{pk} values determined from 11 CDF dilepton events



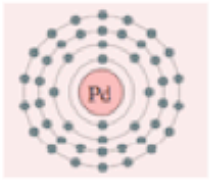


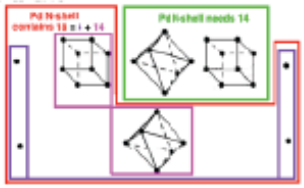


July 2018

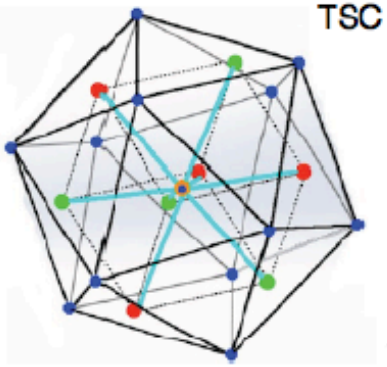
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 Canada Day	2	3	4 Independence Day	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

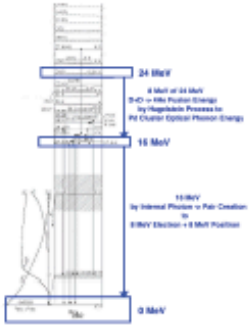
Schwinger Pd-D Zeolite Quantum Fusion Process:

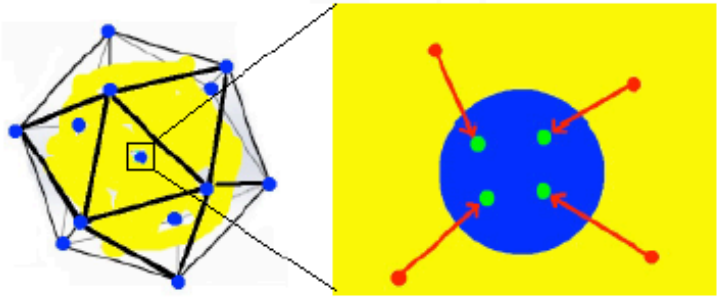


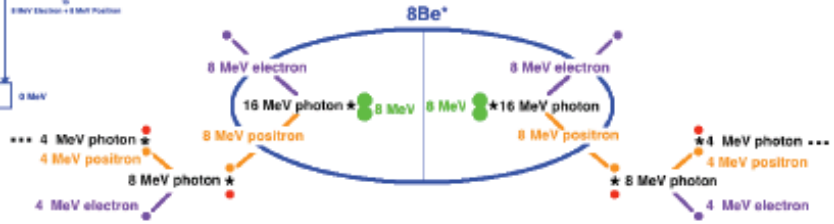


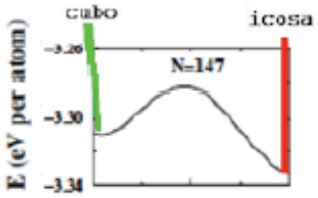
Akito Takahashi TSC Pd-D Fusion



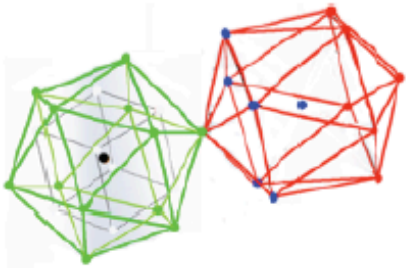


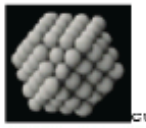


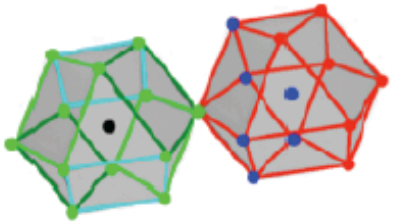


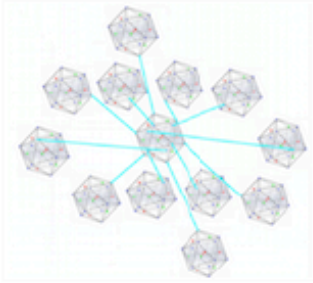


Sandia-UNM 147-atom Pd Clusters

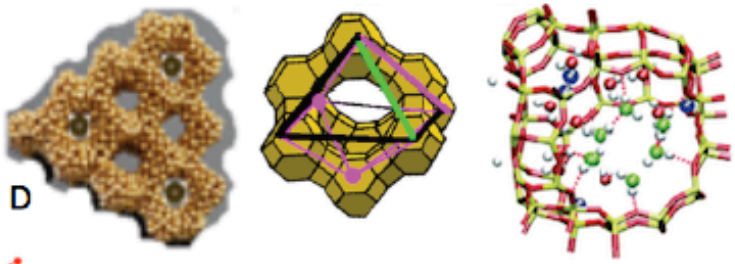


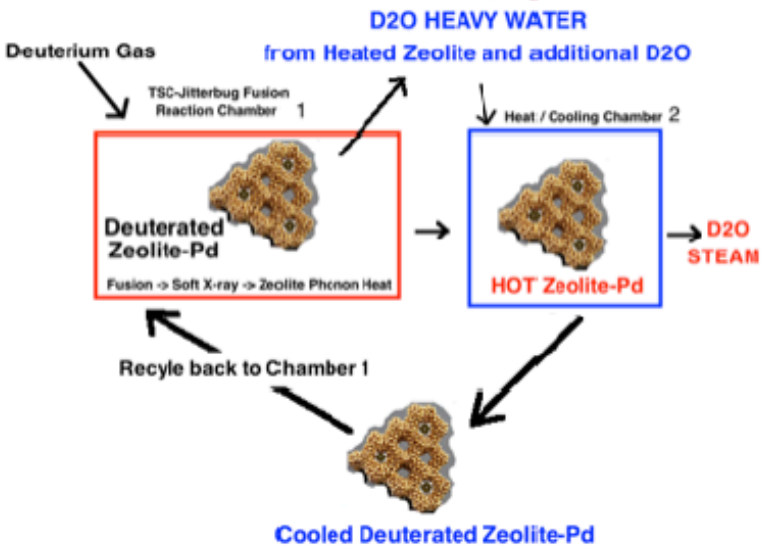




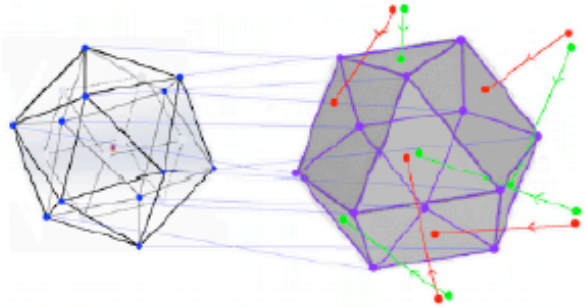


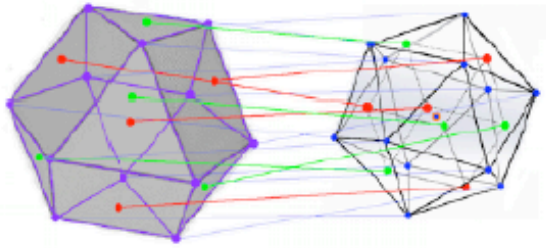
Peter Hagelstein Nuclear Energy to Pd Structure to Zeolite





Klee Irwin Jitterbug Eject He and Reload D





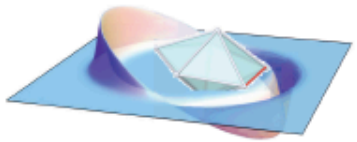
August 2018

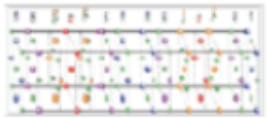
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

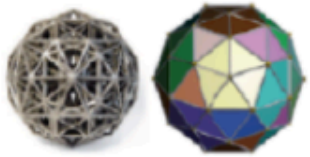
Each ORC State, analagous to a Possible Conscious Thought, is represented by a Chain of Local E8-Cl(16) Deutsch-type Multiverse Snapshots
Each of the Local E8-Cl(16) Multiverse Snapshots is described by an E8 State. Since E8 has 240 Root Vectors and
the 240 Root Vectors correspond to the 240-Polytope (see "Geometric Frustration" by Sadoc and Mosseri (Cambridge 2006) where they say

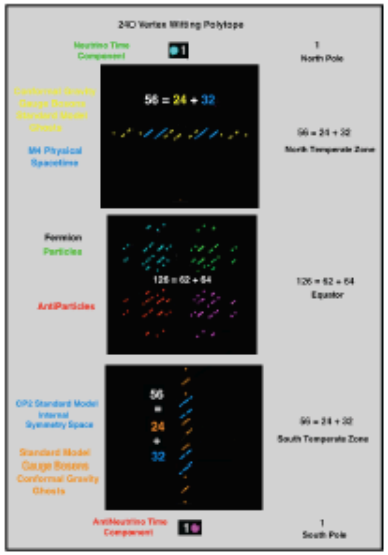
"The polytope 240 ...[is]... not a regular polytope ... but ... an ordered structure on a hypersphere ... S3 ... which is chiral ...
generated by adding two replicas of the {3,3,5}, displaced along a screw axis of S3 ...".)

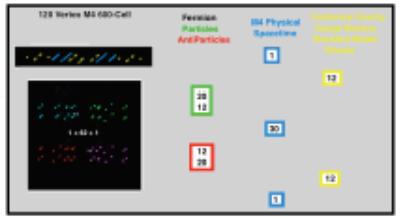
each Local E8-Cl(16) Multiverse Snapshot is represented by a pair of {3,3,5} 600-cells.

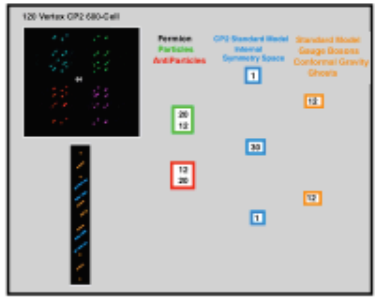


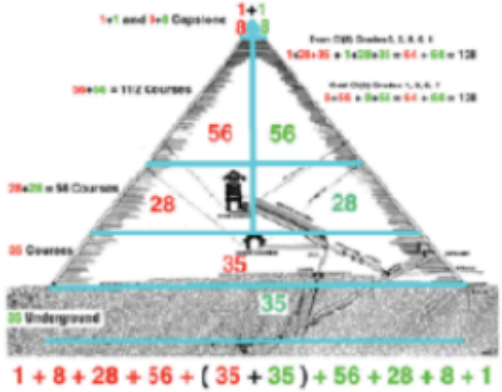












Green, Schwartz, and Witten say in their book "Superstring Theory" vol. 1 (Cambridge 1986)
"... For the ... closed ... bosonic string ... The first excited level ... consists of ...
the ground state ... tachyon ... and ... a scalar ... 'dilaton' ... and ...
SO(24) ... little group of a ...[26-dim]...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

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

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

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

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

First consider Superposition of States involving one tubulin
with one electron of mass m and two different position states separated by a .
The Superposition Separation Energy Difference is the gravitational energy

E_electron = G m^2 / a

For any single given tubulin a = 1 nanometer = 10^(-7) cm so that for a single Electron

T = h / E_electron = (Compton / Schwarzschild) (a / c) = 10^26 sec = 10^19 years

Now consider the case of N Tubulin Electrons in Coherent Superposition
Jack Sarfatti defines coherence length L by L^3 = N a^3 so that
the Superposition Energy E_N of N superposed Conformation Electrons is

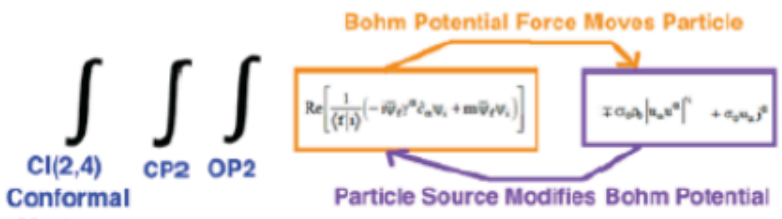
E_N = G M^2 / L = N^(5/3) E_electron

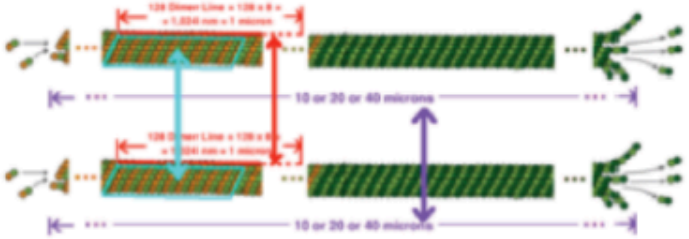
The decoherence time for the system of N Tubulin Electrons is

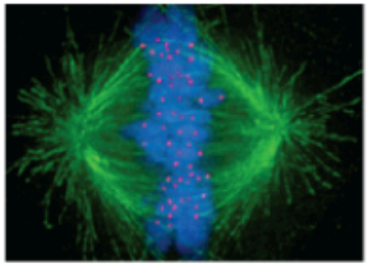
T_N = h / E_N = h / N^(5/3) E_electron = N^(-5/3) 10^26 sec

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

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

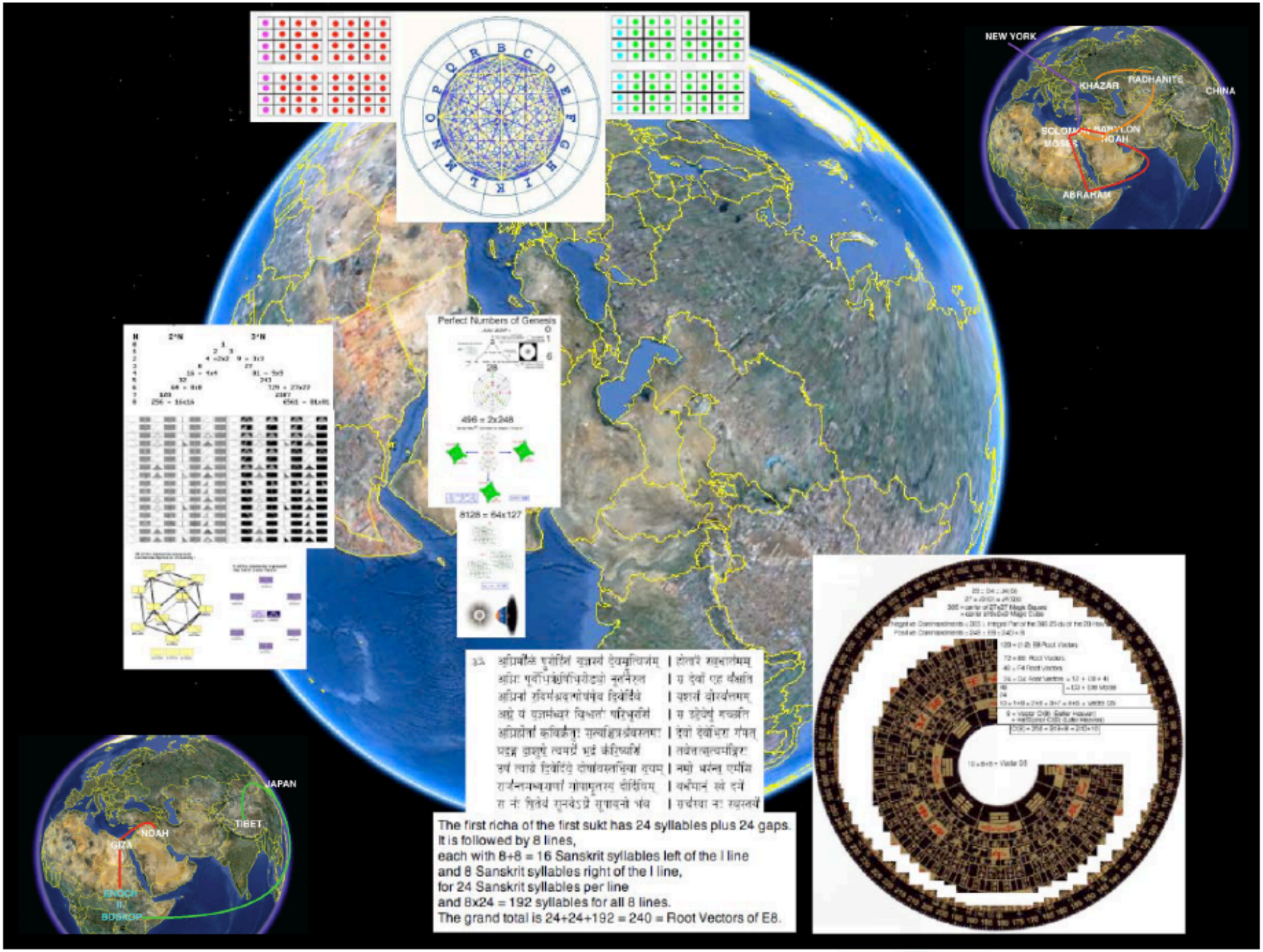


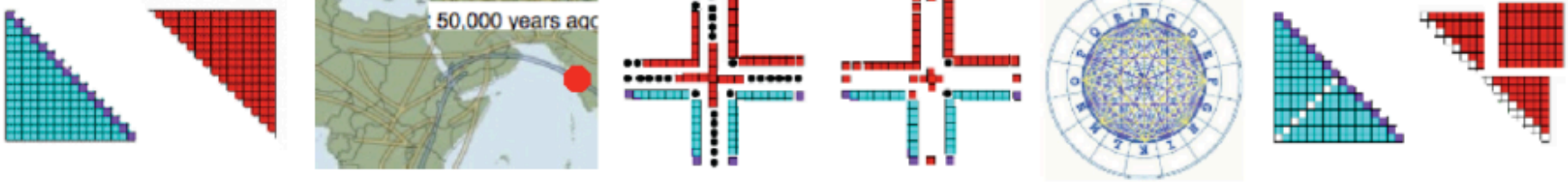




September 2018

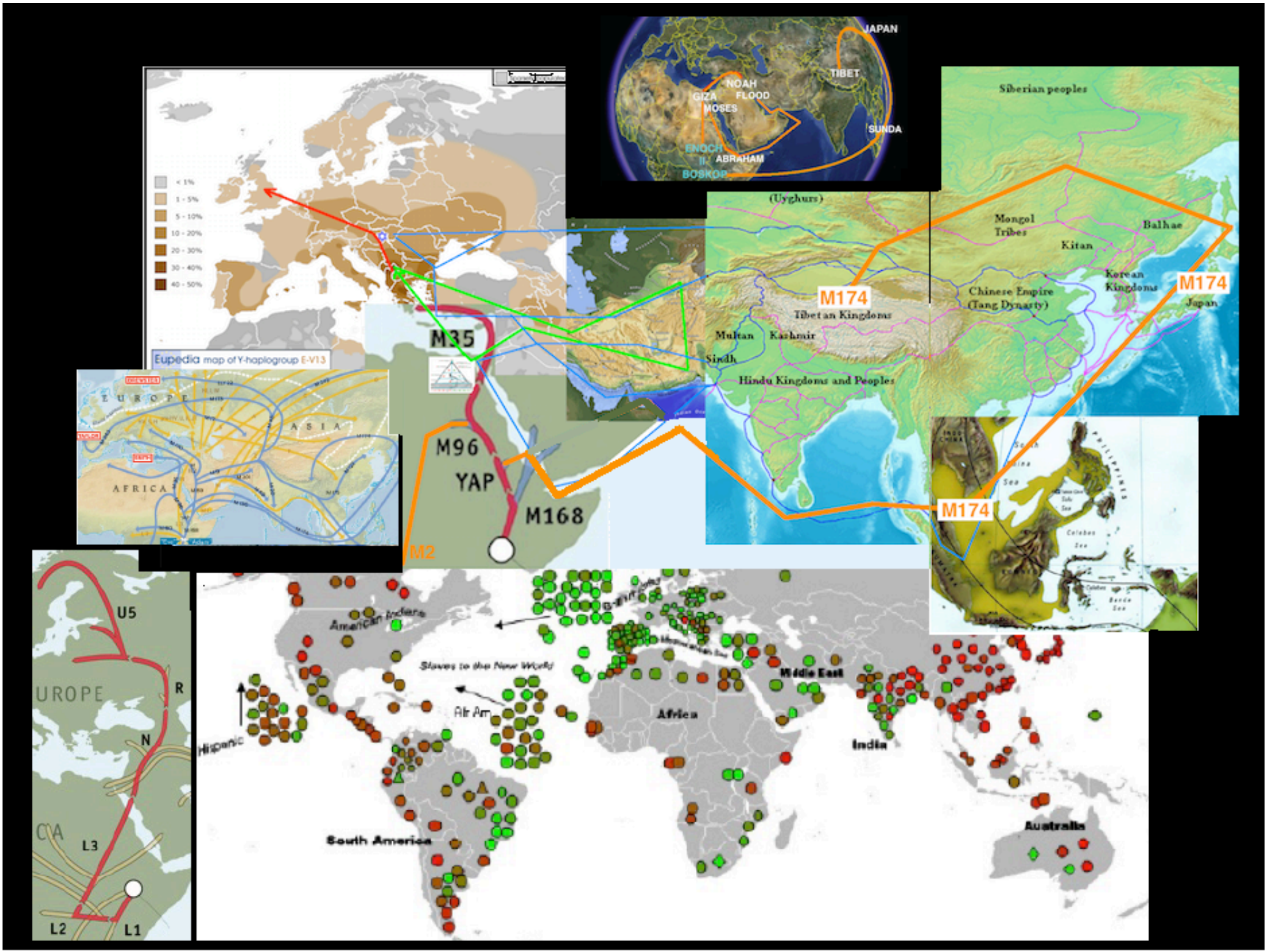
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3 Labor Day	4	5	6	7	8
9 Grandparents Day Rosh Hashanah	10	11	12	13	14	15
16	17	18 Yom Kippur	19	20	21	22 Autumn Begins
23 30	24	25	26	27	28	29


NEW YORK
KHAZAR
RADHANITE
CHINA
SCOTLAND
BABYLON
MOSES
NOAH
ABRAHAM
Perfect Numbers of Genesis
28
496 = 2x248
8128 = 64x127
JAPAN
TIBET
NOAH
GIZA
ENOCH
BOSKOP
The first richa of the first sukt has 24 syllables plus 24 gaps.
It is followed by 8 lines,
each with 8+8 = 16 Sanskrit syllables left of the I line
and 8 Sanskrit syllables right of the I line,
for 24 Sanskrit syllables per line
and 8x24 = 192 syllables for all 8 lines.
The grand total is 24+24+192 = 240 = Root Vectors of E8.


50,000 years ago

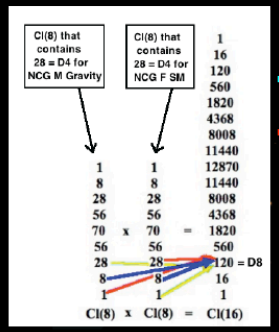
October 2018

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			

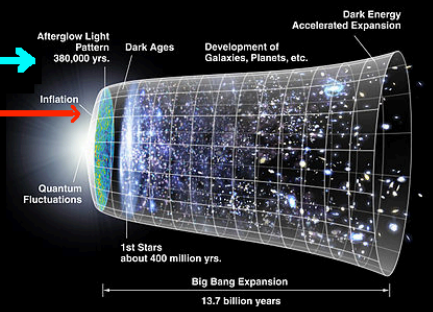

JAPAN
TIBET
NOAH
FLOOD
GIZA
MOSES
SUNDA
ENOCH
ABRAHAM
BOSKOP
Eupedia map of Y-haplogroup E-V13
EUROPE
ASIA
AFRICA
M35
M96
YAP
M168
M2
(Uyghurs)
Mongol Tribes
Balhae
Kitan
Korean Kingdoms
Chinese Empire (Tang Dynasty)
M174
Japan
Tibetan Kingdoms
Multan
Kashmir
Sindh
Hindu Kingdoms and Peoples
Siberian peoples
M174
M174
U5
R
N
L3
L2
L1
American Indians
Slaves to the New World
Hispanic
Africa
Middle East
India
Australia
South America

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	

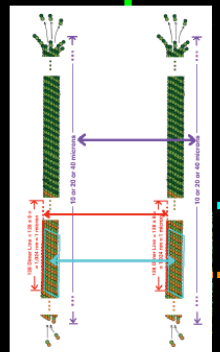


NJL Quantum Condensate



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

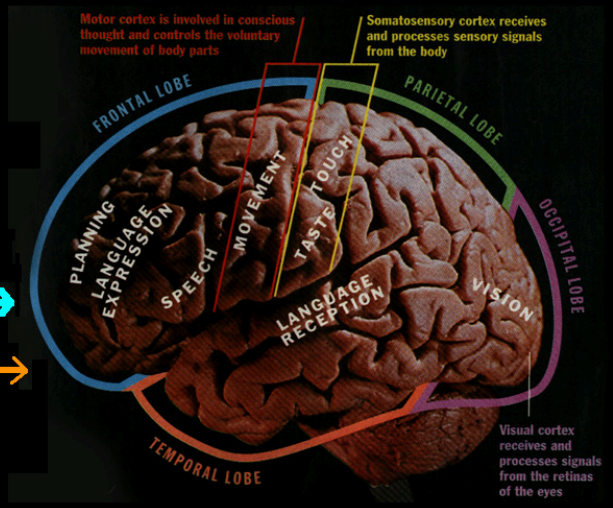
Quantum Resonant Connection



Microtubules 40 microns long have 65,536 Tubulin Dimers

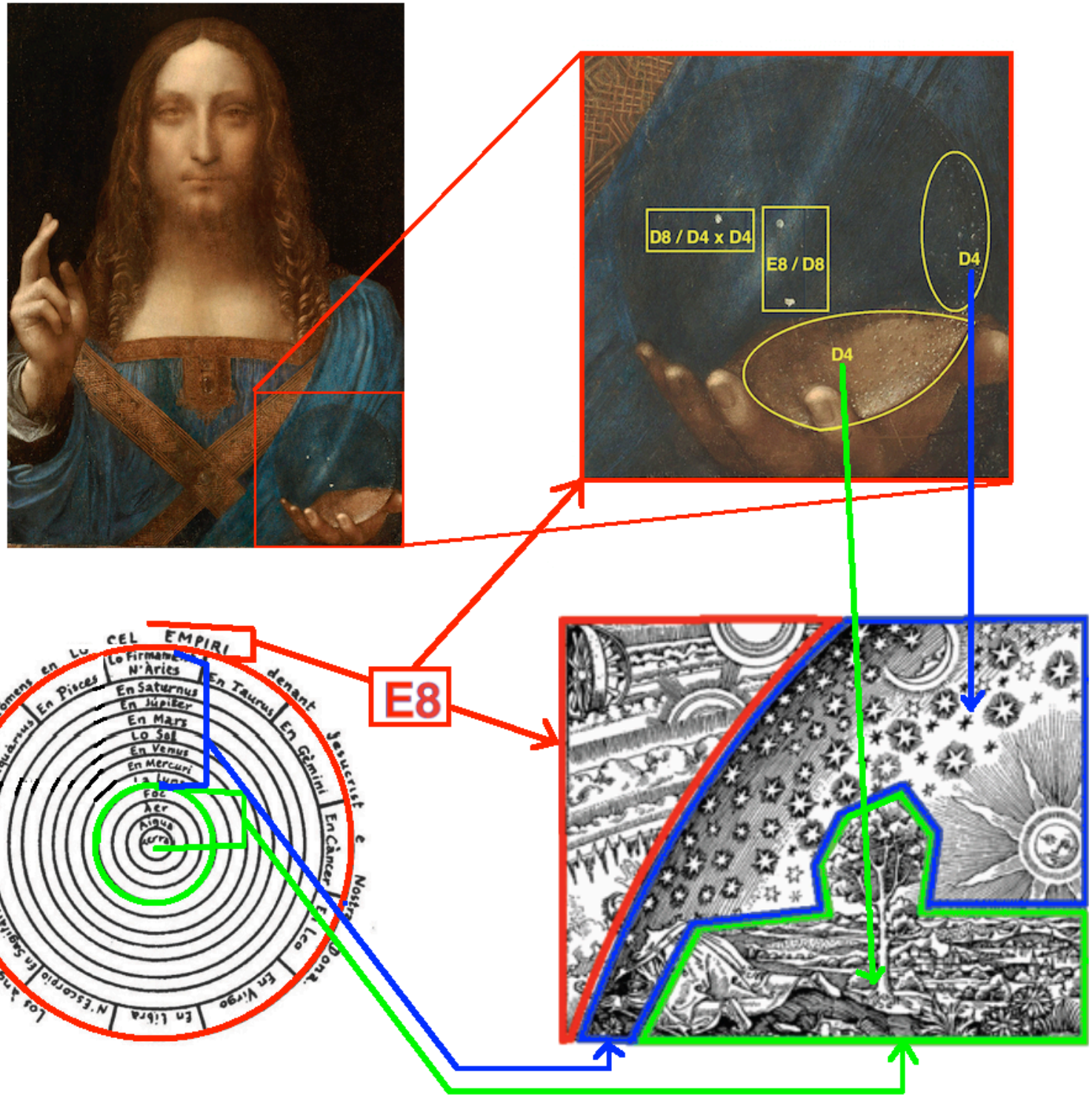
Penrose-Hameroff Quantum Condensate

10^19 Tubulin Dimers in a Human Brain



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 30	24 New Year's Eve 31	25 Christmas Day	26 Kwanzaa	27	28	29


D8 / D4 x D4
E8 / D8
D4
D4
E8
EMPIRI
Lo Firmament
N'Àries
En Taurus
En Gèmini
En Càncer
Leo
En Virgo
En Libra
N.Escorpio
En Sagitarius
En Capricornus
l'Aquàrius
En Pisces
En Saturnus
En Júpiter
En Mart
Lo Sol
En Venus
En Mercuri
Foc
Aer
Aigua
Terra

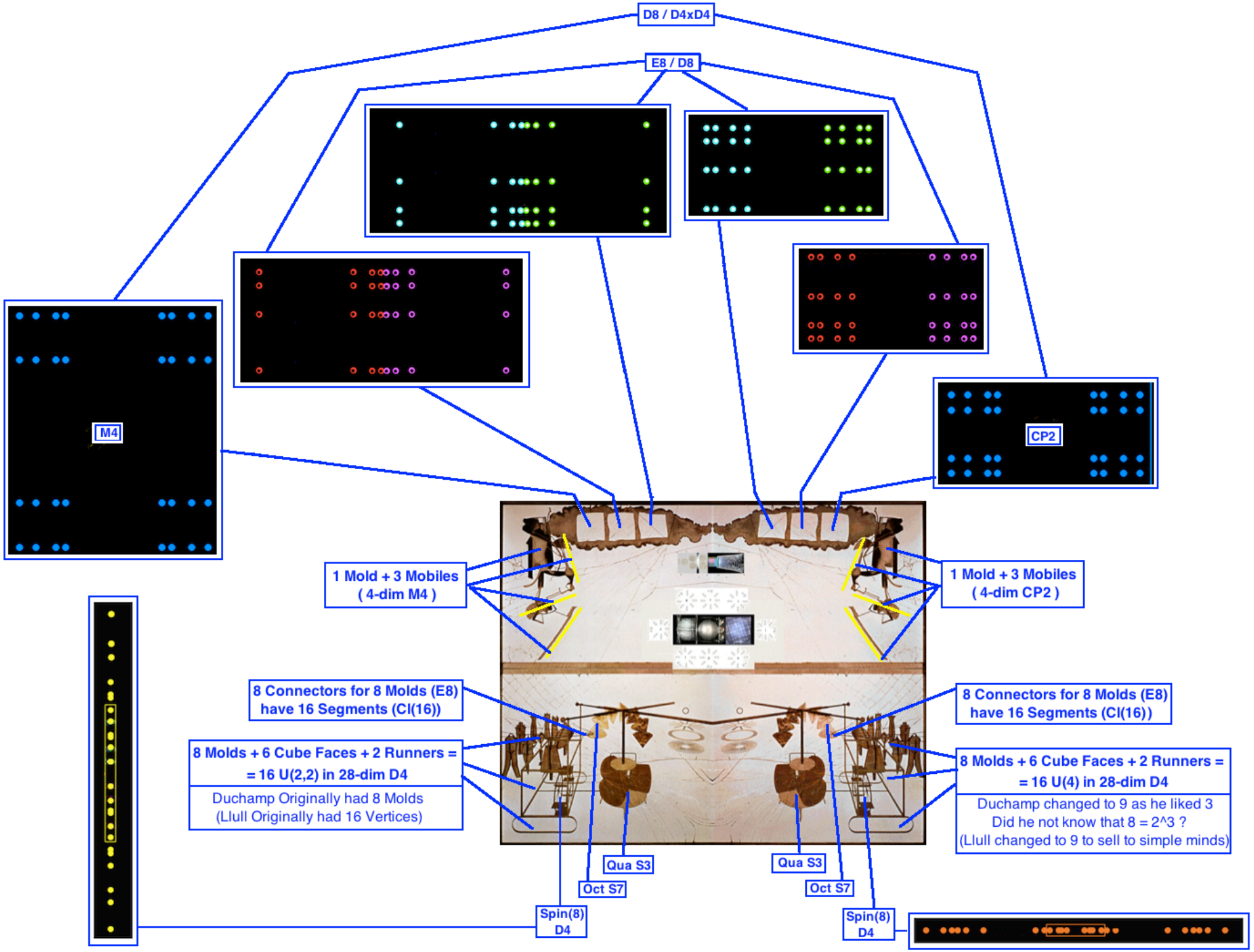
timeanddate.com

January 2019 (United States)

February 2019

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

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


D8 / D4xD4
E8 / D8
M4
CP2
1 Mold + 3 Mobiles
(4-dim M4)
1 Mold + 3 Mobiles
(4-dim CP2)
8 Connectors for 8 Molds (E8)
have 16 Segments (Cl(16))
8 Molds + 6 Cube Faces + 2 Runners =
= 16 U(2,2) in 28-dim D4
Duchamp Originally had 8 Molds
(Llull Originally had 16 Vertices)
8 Connectors for 8 Molds (E8)
have 16 Segments (Cl(16))
8 Molds + 6 Cube Faces + 2 Runners =
= 16 U(4) in 28-dim D4
Duchamp changed to 9 as he liked 3
Did he not know that 8 = 2^3 ?
(Llull changed to 9 to sell to simple minds)
Qua S3
Oct S7
Qua S3
Oct S7
Spin(8)
D4
Spin(8)
D4

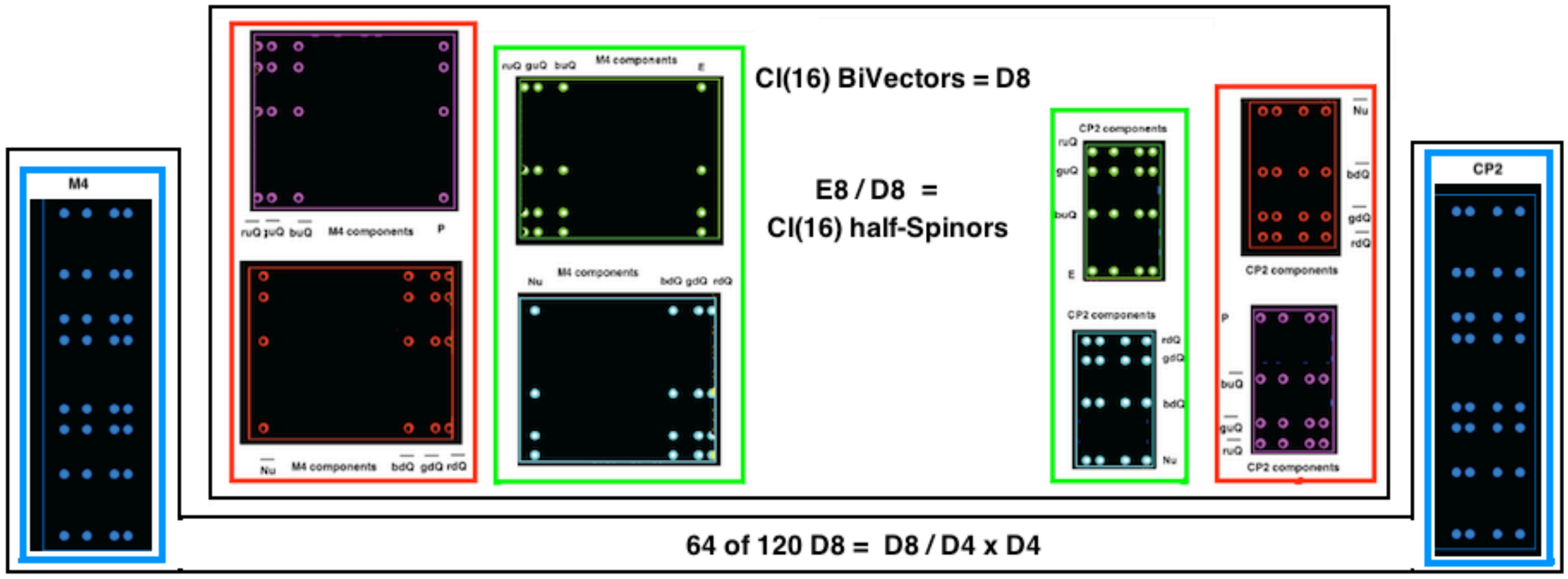
timeanddate.com

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



D4 in Cl(8)

B4 in Cl(8)

F4 in Cl(8)

Cl(16) Vectors

LIE BALL
INTERIOR SPIRIT WORLD

PHYSICAL WORLD
SHILOV BOUNDARY
LIE SPHERE

D4 in Cl(8)

B4 in Cl(8)

F4 in Cl(8)

9 + 7 = 16 = U(2,2)

3 + 9 = 12 = SU(2) x U(3)

2 Complex

E6 72rv

D3 12rv

H4

120rv

D4

1 8 8 8 1 1 1

Cl(16) TriVectors =
10 copies of
56 Fr3(O)

1 8 8 8 1 1 1

D4

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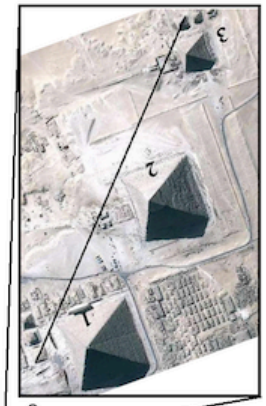
March 2019 (United States)

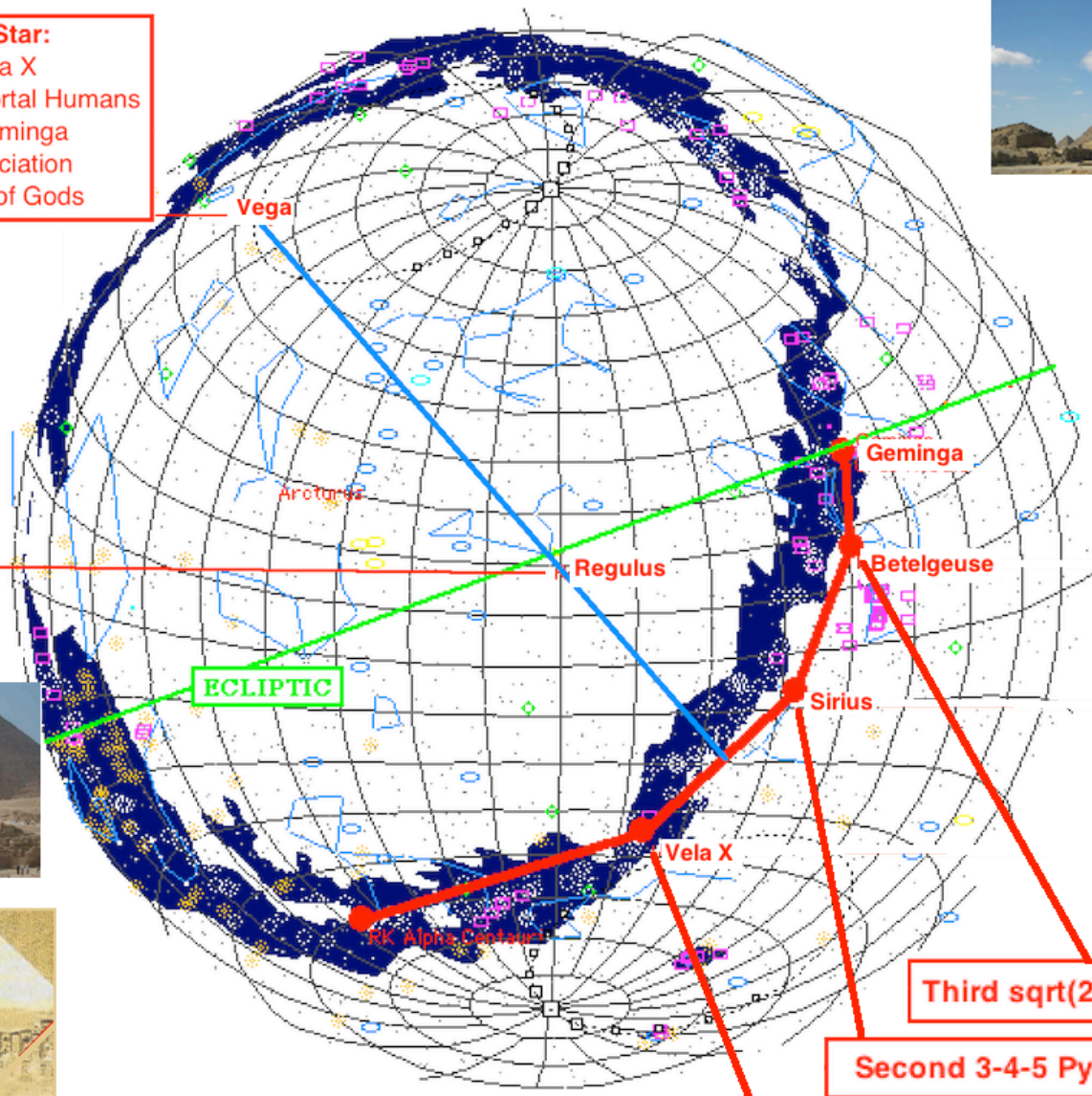
April 2019

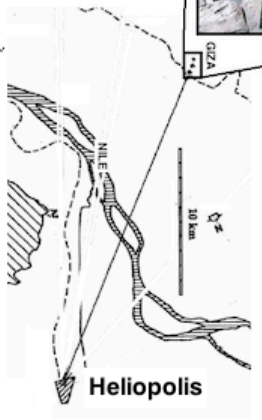
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

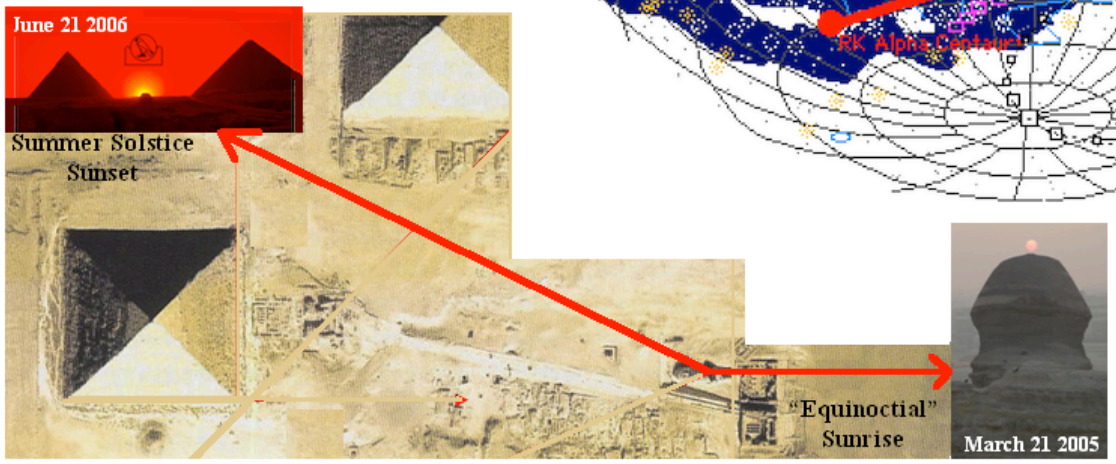
Sun	Mon	Tue	Wed	Thu	Fri	Sat
24	25	26 3rd Quarter	27	28	1	2
3	4	5	6 New Moon	7	8	9
10	11	12	13	14 1st Quarter	15	16
17	18	19	20 March equinox Full Moon	21 Purim	22	23
24	25	26	27	28 3rd Quarter	29	30
31	1	2	3 Isra and Mi'raj	4	5 New Moon	6

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









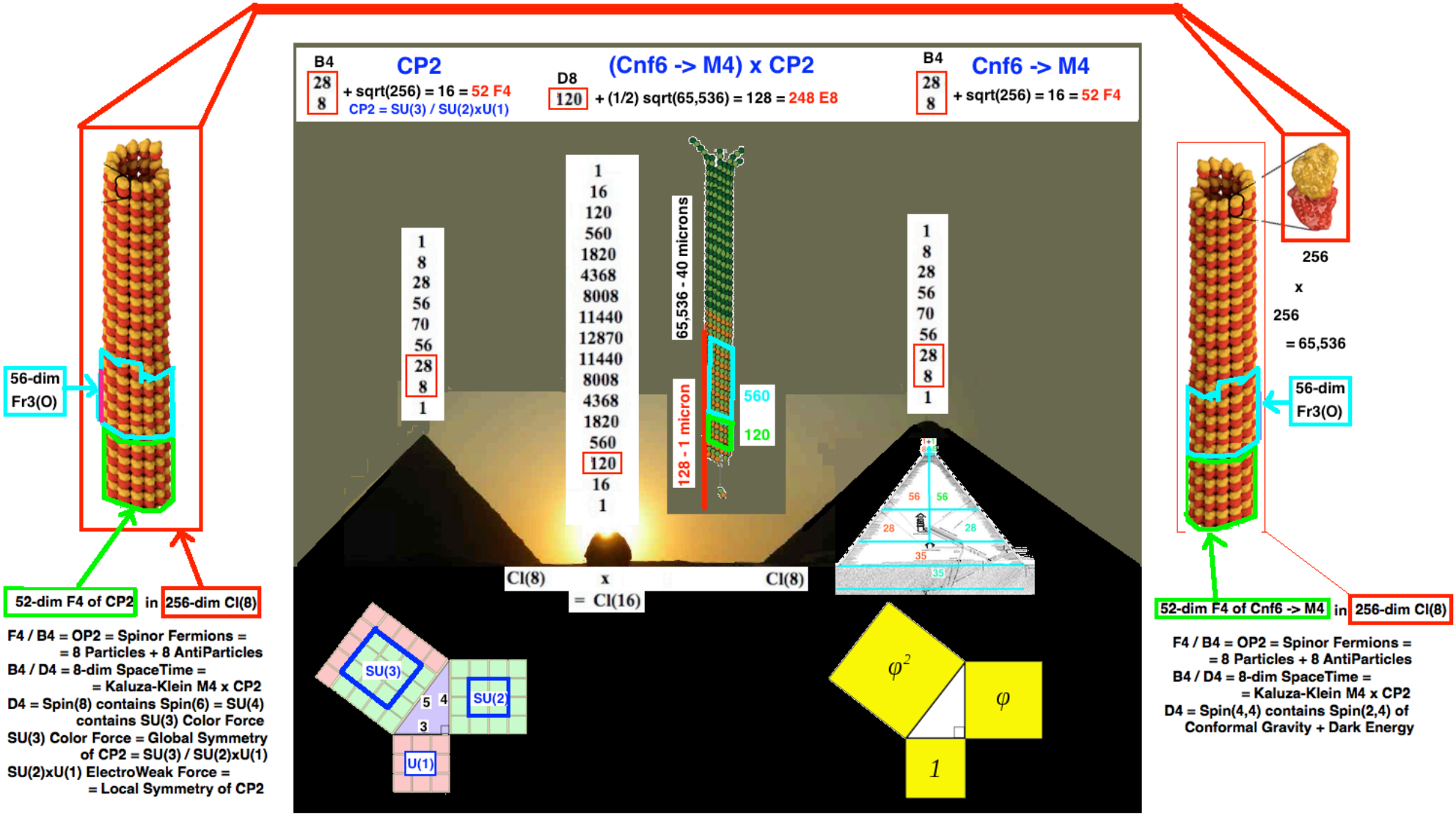
timeanddate.com

April 2019 (United States)

May 2019

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

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



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

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
D8 = Cl(16) BiVectors = 120
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)
10xFr3(O) = Cl(16) TriVectors = 560

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

timeanddate.com

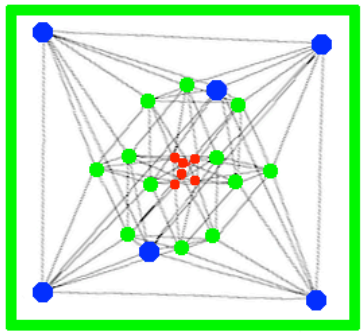
May 2019 (United States)

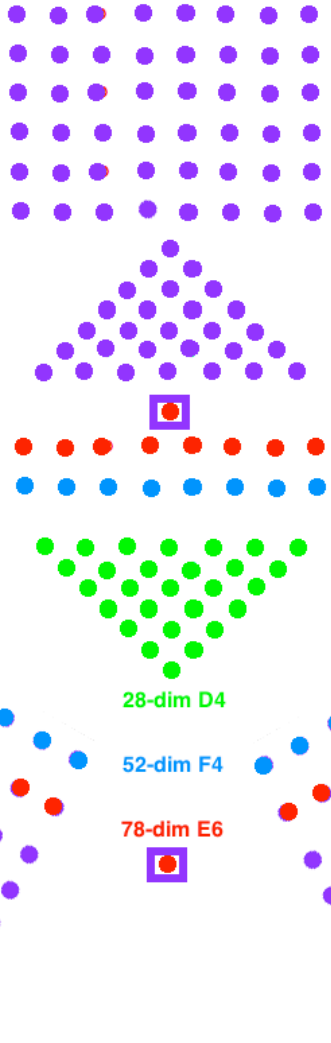
June 2019

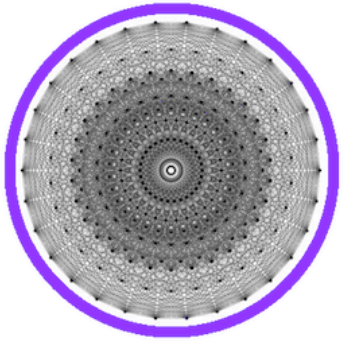
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

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







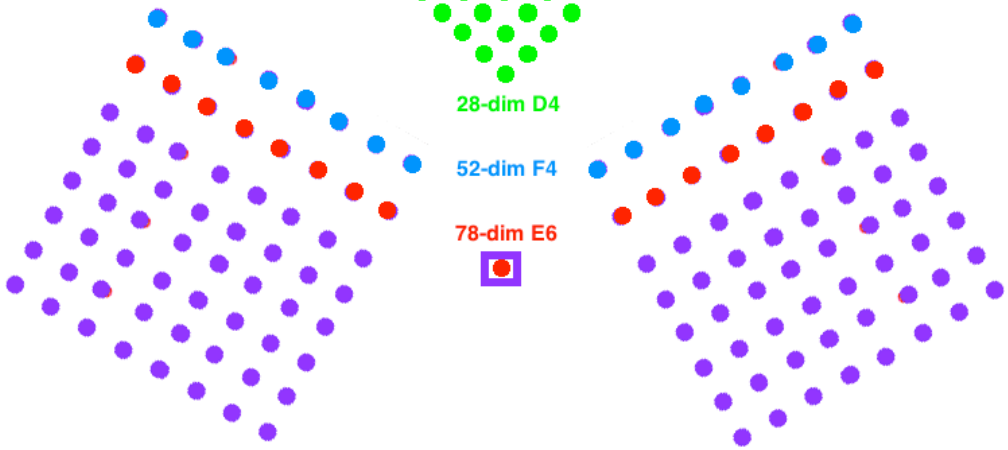
78-dim E6 = 52-dim F4 + 26-dim J(3,O)o

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

28-dim D4

52-dim F4

78-dim E6



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

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

timeanddate.com

June 2019 (United States)

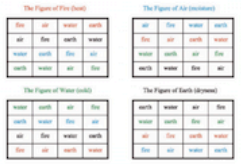
July 2019

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

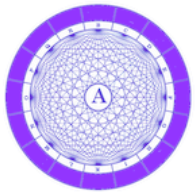
Sun	Mon	Tue	Wed	Thu	Fri	Sat
26 3rd Quarter	27 Memorial Day	28	29	30	31 Lailat al-Qadr	1
2	3 New Moon	4	5 Eid al-Fitr	6	7	8
9 Shavuot	10 1st Quarter	11	12	13	14	15
16	17 Full Moon	18	19	20	21 June Solstice	22
23	24	25 3rd Quarter	26	27	28	29
30	1	2 New Moon	3	4 Independence Day	5	6

Ramon Llull Wheels:

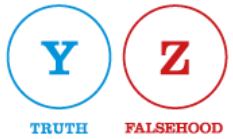
Tensor Product RxCxHxO = T = 64-dim =



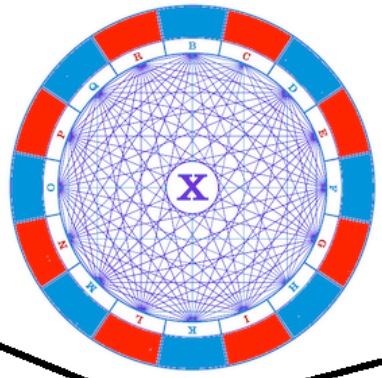
T + T = 128-dim = E8 / D8

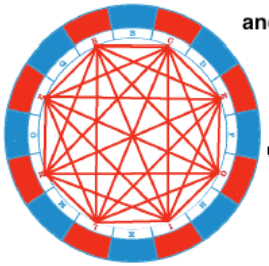


120-dim D8
and E8 / D8 = (OxO)P2



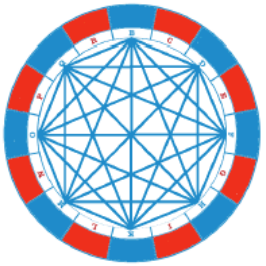
Binary Real Clifford Algebras
of tensor product Cl(8) x Cl(8) = Cl(16)



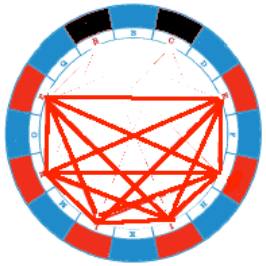


28-dim D4

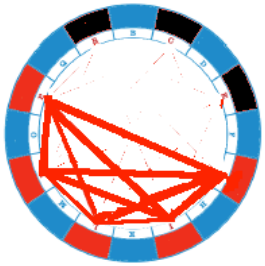
120-dim D8



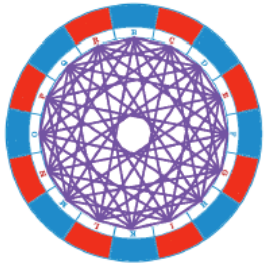
28-dim D4



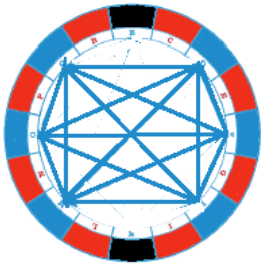
15-dim Spin(2,4)



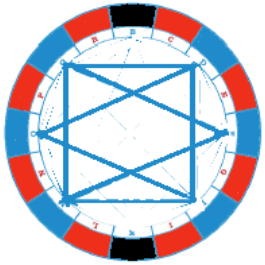
10-dim Spin(2,3)



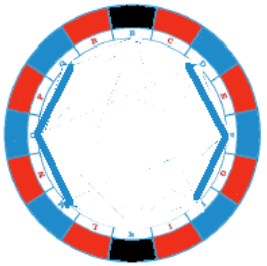
64-dim A7+R



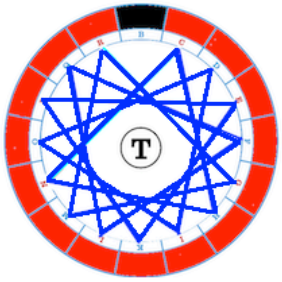
15-dim SU(4)

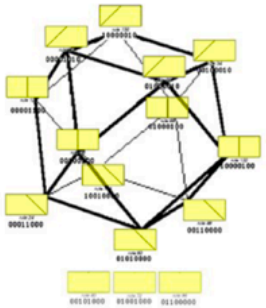


8-dim SU(3)



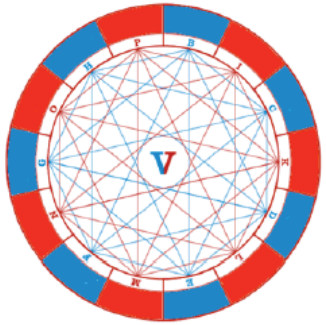
4-dim SU(2)xU(1)



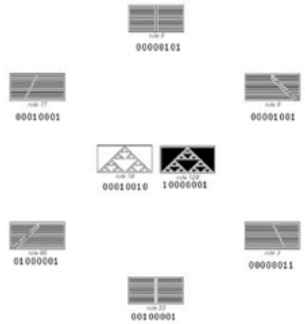


3 = Cartan Subalgebra D3 = A3

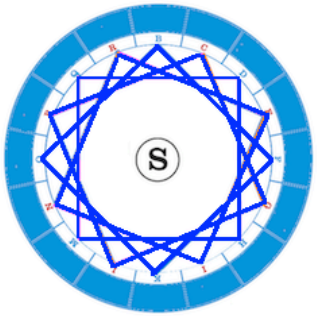
4 x 3 = Cuboctahedron Vertices D3 = A3
D3 = A3 acts Conformally on M4 of M4 x CP2 Kaluza-Klein



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



4 + 4 = Cube Vertices = A2 =
= SU(3) of CP2 = SU(3) / SU(2)xU(1)



4 = CP2 of M4 x CP2 Kaluza-Klein
4 = SU(2)xU(1) of CP2 = SU(3) / SU(2)xU(1)

timeanddate.com

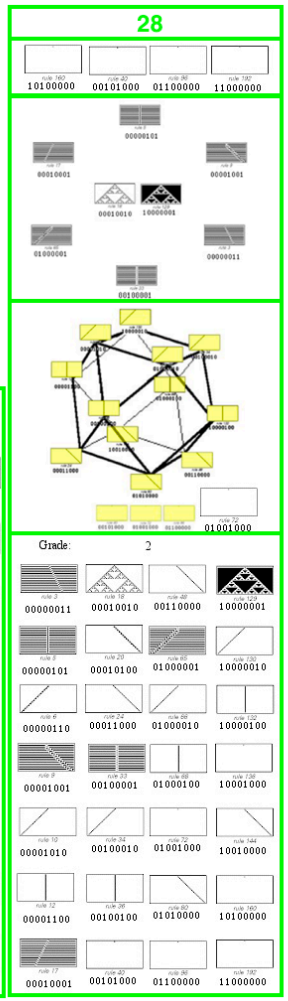
July 2019 (United States)

August 2019

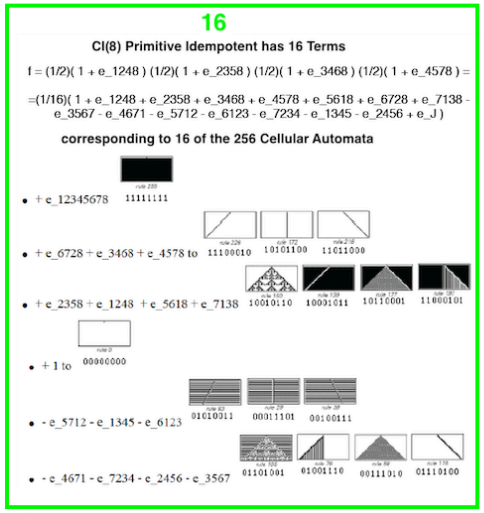
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

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

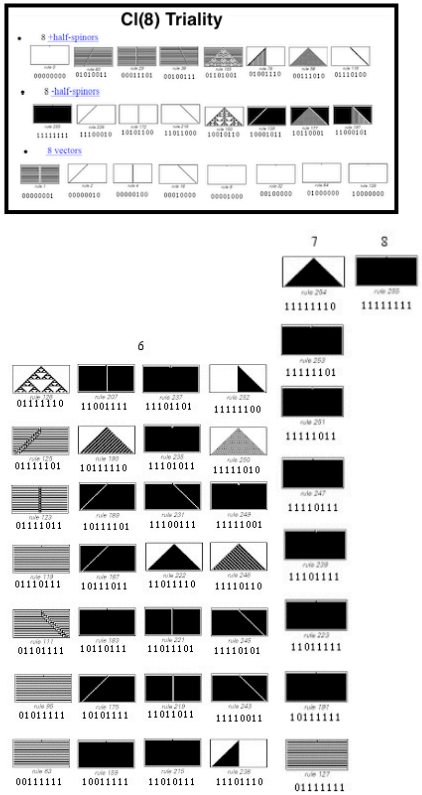
256-dim Cl(8) as Cellular Automata



8+28+16 = 52 F4

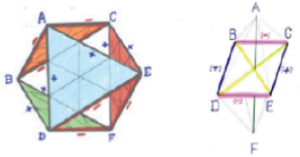


Tensor Product Cl(8) x Cl(8) = Cl(16)
(F4 in Cl(8)) x (F4 in Cl(8)) =
= 8x8 + 28x1 + 1x28 + 16x16 =
= 120 Cl(16) BiVectors + (128 + 128) Cl(16) Spinors
120 Cl(16) BiVectors + 128 Cl(16) Half-Spinors = E8

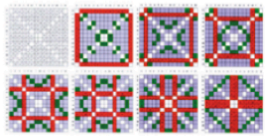


Guillermo Moreno (arXiv math/0512517) has shown that **V(7,2) = Spin(7) / Spin(5)** can be identified with the **Zero Divisors of Sedenions** which have 7+28 = 35 Associative Triples and for which Zero Divisors are given by the fibration V(7,2) -> G2 -> S3 [3-sphere] and which have 4-2=2 ZD Irreducible Components and 10-dim Lie Sphere Spin(7) / Spin(5)xU(1) whose 10D correspond to **Cl(1,9) = Cl(2,8) Conformal over Cl(1,7)** that **V(15,2) = Spin(15) / 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 Spin(15) / Spin(13)xU(1) whose 26D correspond to **26D String Theory and to 26-dim traceless J(3,O)o** that **V(127,2) = Spin(127) / Spin(125)** is related to, but not identified with, the **Zero Divisors of Voudon 256-ons** corresponding to 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 Spin(127) / Spin(125)xU(1)

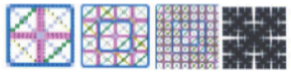
Robert de Marrais said "... 256 ... 2^8 ions Voudons ... Moreno ... determines that the automorphism group of the ZD's of all 2^n-ions ... obey a simple pattern: for n ≥ 4 this group has the form G2 x (n-3) x S3 (... order-6 permutation group on 3 elements) ... This says the automorphism group of the Sedenions' ZD's has order 14 x 1 x 6 = 84 ... based on 7 octahedral lattices ("Box-Kites") ...



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



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



timeanddate.com

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.

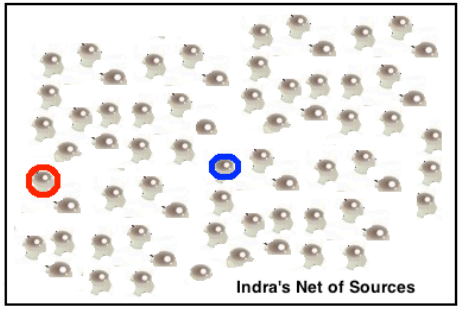
The initial Valence Particle is Planck scale. The number of Virtual Particles is determined by the Planck scale geometry of spacetime. The E8 model at the Planck Scale has spacetime condensing out of Clifford structures forming a Lorentz Leech lattice underlying 26-dim String Theory of World-Lines with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

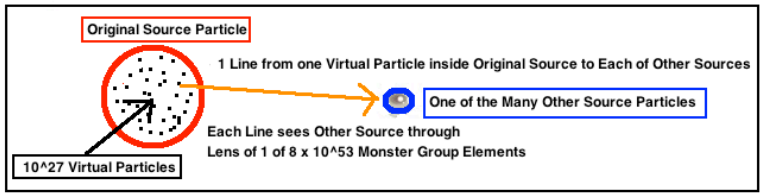
Each Schwinger Source particle-antiparticle pair should see (with Bohm Quantum Potential and Sarfatti Back-Reaction) the rest of our Universe in the perspective of 8 x 10^53 Monster Symmetry so a Schwinger Source acting as a Jewel of Indra's Net of Schwinger Source Bohm Quantum Blockchain Physics can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

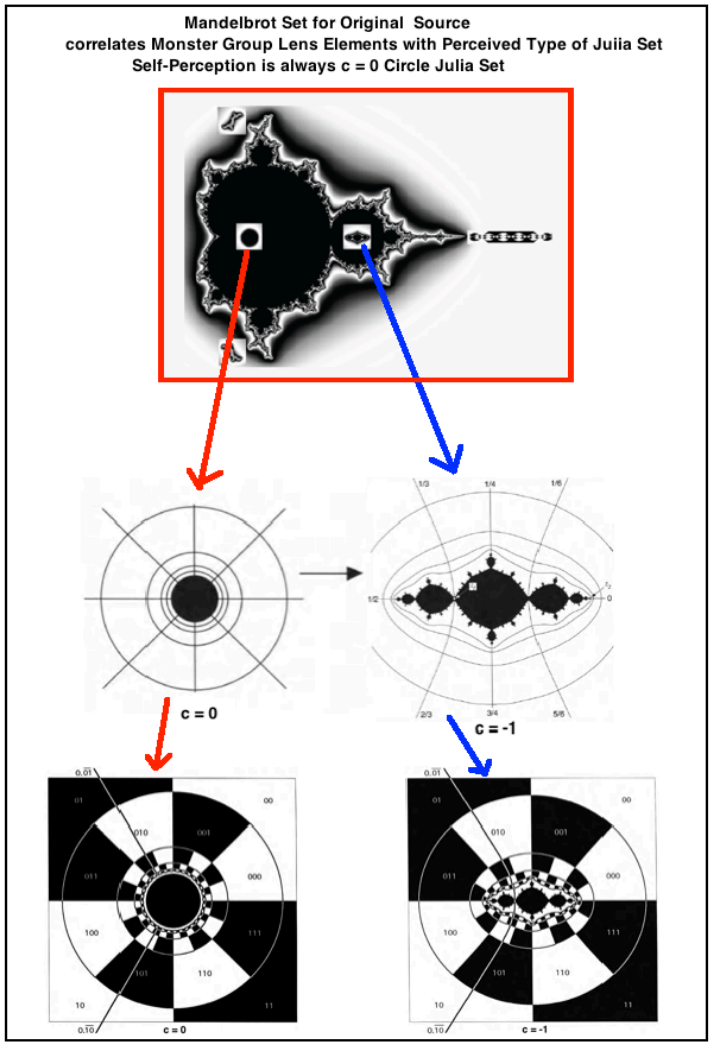
To fit inside the initial Schwinger Source the Information Elements of all the Other Schwinger Sources of Our Universe (10^77 or so) should be distributed as a Fractal Julia Set. There are 2^n stage-n cells in a Binary Decomposition of Julia Sets, so a stage-256 Julia level set based on Binary Decomposition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

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

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







timeanddate.com

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

S0 S1 S3 S7
U U U U
T = R x C x H x O
Z2 U(1) SU(2) Spin(8)

Division Algebras, Lattices, Physics, Windmill Tilting
Geoffrey Dixon

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

$$\Delta_0 = \tfrac{1}{4}(1+i\vec{x})(1+ie_7) = (\tfrac{1}{2}(1+i\vec{x}))(\tfrac{1}{2}(1+ie_7))$$
$$\Delta_1 = \tfrac{1}{4}(1-i\vec{x})(1+ie_7) = (\tfrac{1}{2}(1-i\vec{x}))(\tfrac{1}{2}(1+ie_7))$$
$$\Delta_2 = \tfrac{1}{4}(1+i\vec{y})(1-ie_7) = (\tfrac{1}{2}(1+i\vec{y}))(\tfrac{1}{2}(1-ie_7))$$
$$\Delta_3 = \tfrac{1}{4}(1-i\vec{y})(1-ie_7) = (\tfrac{1}{2}(1-i\vec{y}))(\tfrac{1}{2}(1-ie_7))$$

In the Pauli algebra case, we got Dirac spinors by doubling $\mathbf{P}$ to $\mathbf{P}^2$ we double up and use $\mathbf{T}^2$ as our spinor space. Let 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

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

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

Geoffrey Dixon wrote a 1995 paper in which he represented the Leech lattice over $\mathbf{O}^3$.
the final result breaks up the inner shell of Λ_{24},
which is of order $K_{24} = 196560$,
into three subsets with orders $3\times240 = 720$,
$3 \times 240 \times 16 = 11520$, and $3 \times 240 \times 16 \times 16 = 184320$,
the sum of all three orders being 196560.

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

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

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

Particle/Force	Tree-Level	Higher-Order
e-neutrino	0	0 for nu_1
mu-neutrino	0	9 x 10^(-3) eV for nu_2
tau-neutrino	0	5.4 x 10^(-2) eV for nu_3
electron	0.5110 MeV	
down quark	312.8 MeV	charged pion = 139 MeV
up quark	312.8 MeV	proton = 938.25 MeV
		neutron - proton = 1.1 MeV
muon	104.8 MeV	106.2 MeV
strange quark	625 MeV	
charm quark	2090 MeV	
tauon	1.88 GeV	
beauty quark	5.63 GeV	
truth quark (low state)	130 GeV	(middle state) 174 GeV
		(high state) 218 GeV
W+	80.326 GeV	
W-	80.326 GeV	
W0	98.379 GeV	Z0 = 91.862 GeV
Mplanck 1.217x10^19 GeV		
Higgs VEV (assumed)	252.5 GeV	
Higgs (low state)	126 GeV	(middle state) 182 GeV
		(high state) 239 GeV
Gravity Gg (assumed)	1	
(Gg)(Mproton^2 / Mplanck^2)		5 x 10^(-39)
EM fine structure	1/137.03608	
Weak Gw	0.2535	
Gw(Mproton^2 / (Mw+^2 + Mw-^2 + Mz0^2))		1.05 x 10^(-5)
Color Force at 0.245 GeV	0.6286	0.106 at 91 GeV

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

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

The phase angle d13 is taken to be 1 radian.

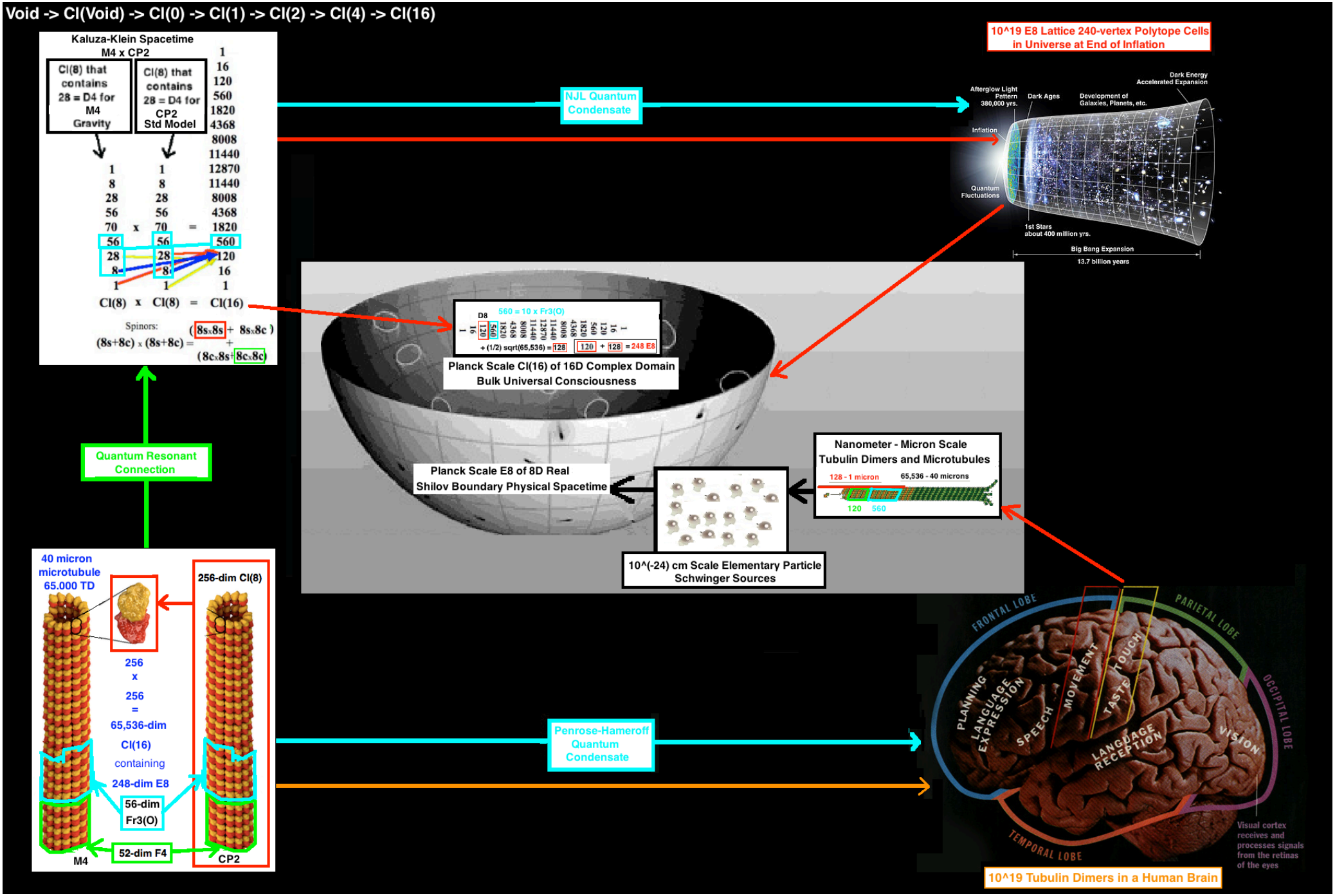
timeanddate.com

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 -> Cl(Void) -> Cl(0) -> Cl(1) -> Cl(2) -> Cl(4) -> Cl(16)
Kaluza-Klein Spacetime
M4 x CP2
Cl(8) that contains 28 = D4 for M4 Gravity
Cl(8) that contains 28 = D4 for CP2 Std Model
1 16 120 560 1820 4368 8008 11440 12870 11440 8008 4368 1820 560 120 16 1
1 8 28 56 70 56 28 8 1
1 8 28 56 70 56 28 8 1
Cl(8) x Cl(8) = Cl(16)
Spinors:
(8s+8c) x (8s+8c) = (8sx8s + 8sx8c) + (8cx8s + 8cx8c)
Quantum Resonant Connection
10^19 E8 Lattice 240-vertex Polytope Cells in Universe at End of Inflation
NJL Quantum Condensate
Afterglow Light Pattern 380,000 yrs.
Dark Ages
Development of Galaxies, Planets, etc.
Dark Energy Accelerated Expansion
Inflation
Quantum Fluctuations
1st Stars about 400 million yrs.
Big Bang Expansion
13.7 billion years
560 = 10 x Fr3(O)
D8
1 16 120 560 1820 4368 8008 11440 12870 11440 8008 4368 1820 560 120 16 1
+ (1/2) sqrt(65,536) = 128
120 + 128 = 248 E8
Planck Scale Cl(16) of 16D Complex Domain Bulk Universal Consciousness
Planck Scale E8 of 8D Real Shilov Boundary Physical Spacetime
10^(-24) cm Scale Elementary Particle Schwinger Sources
Nanometer - Micron Scale Tubulin Dimers and Microtubules
128 - 1 micron
65,536 - 40 microns
120 560
40 micron microtubule 65,000 TD
256-dim Cl(8)
256 x 256 = 65,536-dim Cl(16) containing 248-dim E8
56-dim Fr3(O)
52-dim F4
M4
CP2
Penrose-Hameroff Quantum Condensate
FRONTAL LOBE
PARIETAL LOBE
OCCIPITAL LOBE
TEMPORAL LOBE
PLANNING
LANGUAGE EXPRESSION
SPEECH
MOVEMENT
TOUCH
TASTE
LANGUAGE RECEPTION
VISION
Visual cortex receives and processes signals from the retinas of the eyes
10^19 Tubulin Dimers in a Human Brain

timeanddate.com

November 2019 (United States)

December 2019

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

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

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

Kaluza-Klein Spacetime
M4 x CP2

Cl(8) that contains 28 = D4 for M4 Gravity		Cl(8) that contains 28 = D4 for CP2 Std Model
1		1
8		8
28		28
56		56
70	x	70 = 1820
56		56 = 560
28		28 = 120
8		8 = 16
1		1 = 1

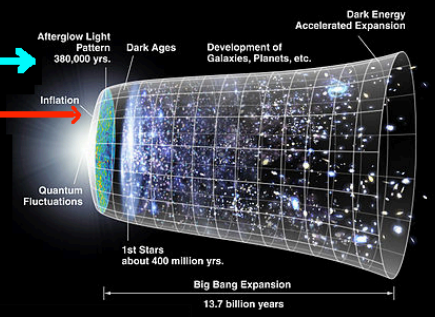
Cl(8) x Cl(8) = Cl(16)

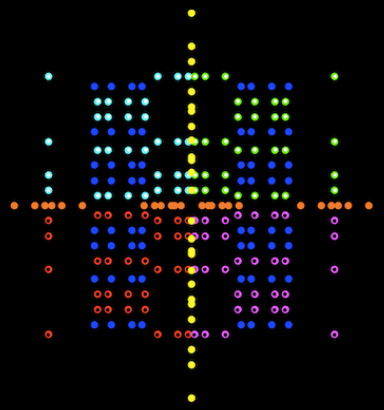
Spinors: $(8_s \times 8_s + 8_s \times 8_c)$
$(8s+8c) \times (8s+8c) =$ +
$(8_c \times 8_s + 8_c \times 8_c)$

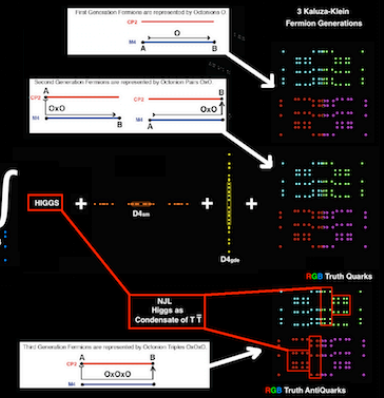
Quantum Resonant Connection

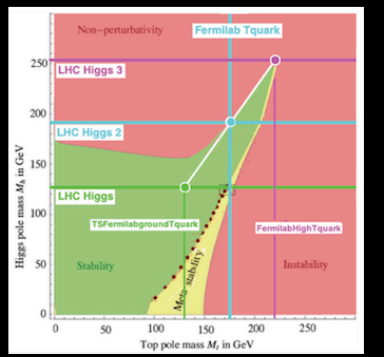
NJL Quantum Condensate

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





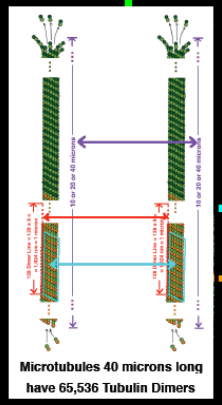




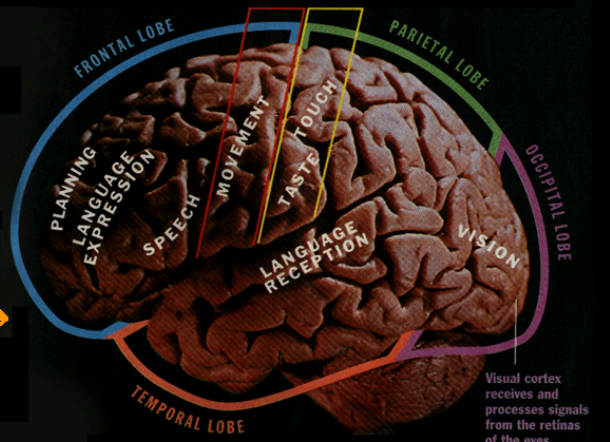
Cl(0,16) x Cl(0,8) = Cl(0,24)

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

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



Penrose-Hameroff Quantum Condensate



10^19 Tubulin Dimers in a Human Brain

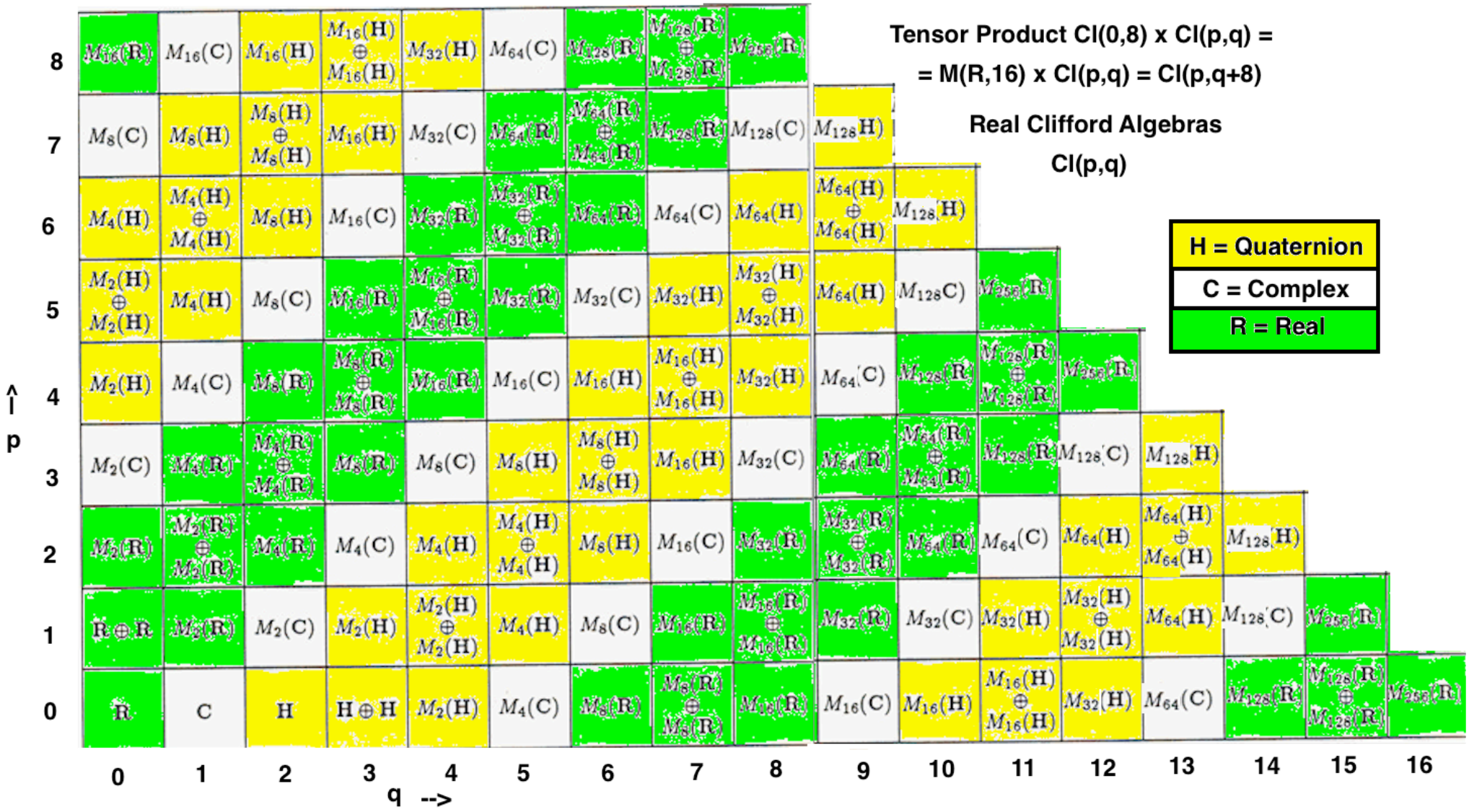
timeanddate.com

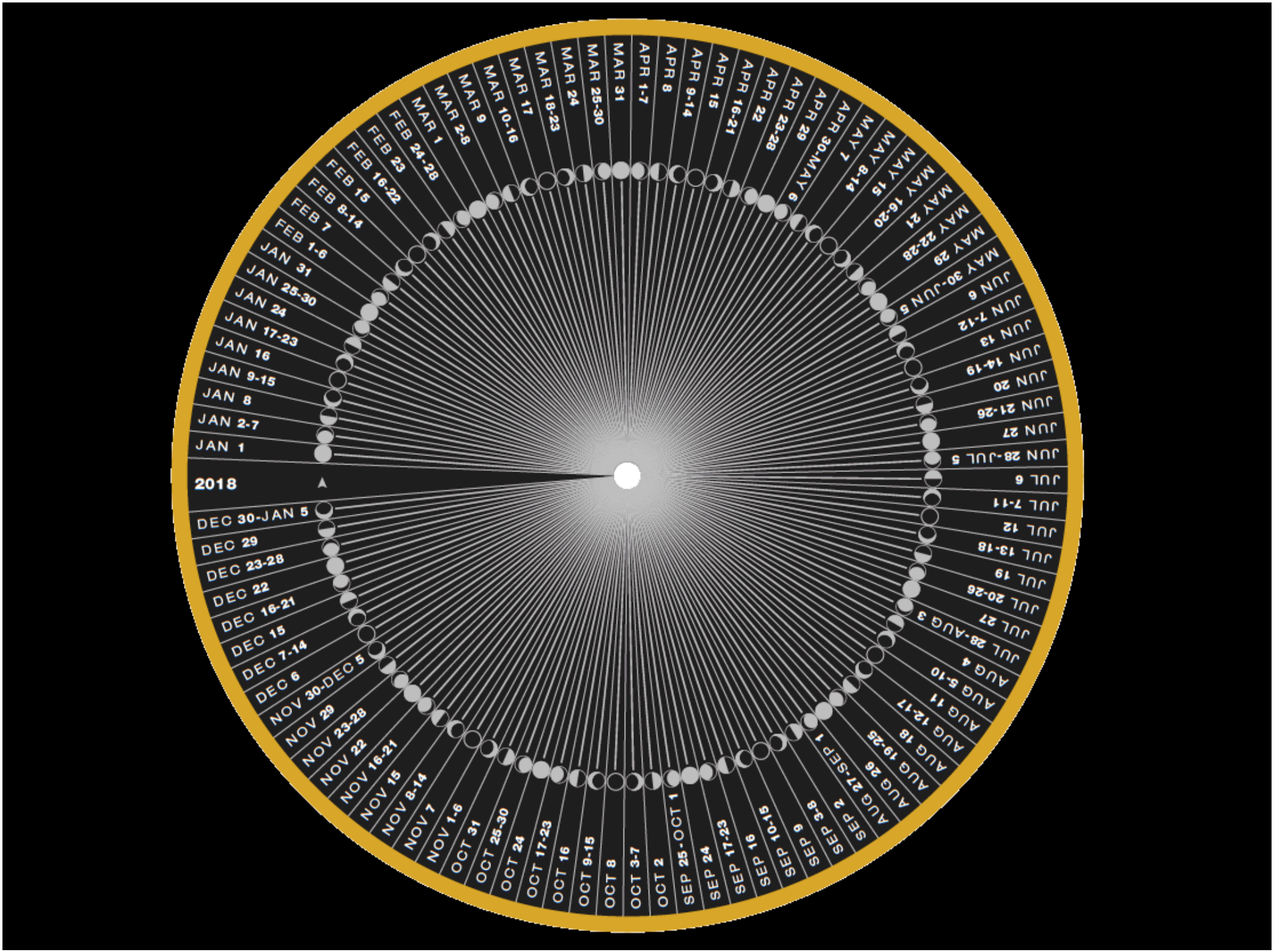
December 2019 (United States)

January 2020

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

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


Tensor Product Cl(0,8) x Cl(p,q) =
= M(R,16) x Cl(p,q) = Cl(p,q+8)
Real Clifford Algebras
Cl(p,q)
H = Quaternion
C = Complex
R = Real
p
q -->


2018
JAN 1
JAN 2-7
JAN 8
JAN 9-15
JAN 16
JAN 17-23
JAN 24
JAN 25-30
JAN 31
FEB 1-6
FEB 7
FEB 8-14
FEB 15
FEB 16-22
FEB 23
FEB 24-28
MAR 1
MAR 2-8
MAR 9
MAR 10-16
MAR 17
MAR 18-23
MAR 24
MAR 25-30
MAR 31
APR 1-7
APR 8
APR 9-14
APR 15
APR 16-21
APR 22
APR 23-28
APR 29
APR 30-MAY 6
MAY 7
MAY 8-14
MAY 15
MAY 16-20
MAY 21
MAY 22-28
MAY 29
MAY 30-JUN 5
JUN 6
JUN 7-12
JUN 13
JUN 14-19
JUN 20
JUN 21-26
JUN 27
JUN 28-JUL 5
JUL 6
JUL 7-11
JUL 12
JUL 13-18
JUL 19
JUL 20-26
JUL 27
JUL 28-AUG 3
AUG 4
AUG 5-10
AUG 11
AUG 12-17
AUG 18
AUG 19-25
AUG 26
AUG 27-SEP 1
SEP 2
SEP 3-8
SEP 9
SEP 10-15
SEP 16
SEP 17-23
SEP 24
SEP 25-OCT 1
OCT 2
OCT 3-7
OCT 8
OCT 9-15
OCT 16
OCT 17-23
OCT 24
OCT 25-30
OCT 31
NOV 1-6
NOV 7
NOV 8-14
NOV 15
NOV 16-21
NOV 22
NOV 23-28
NOV 29
NOV 30-DEC 5
DEC 6
DEC 7-14
DEC 15
DEC 16-21
DEC 22
DEC 23-28
DEC 29
DEC 30-JAN 5

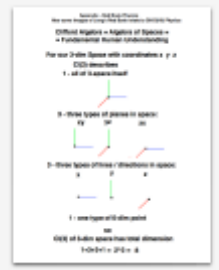
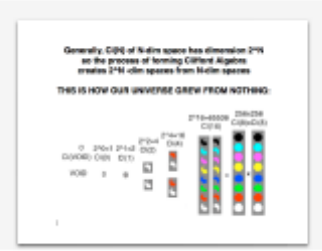
RED BOOK PHYSICS

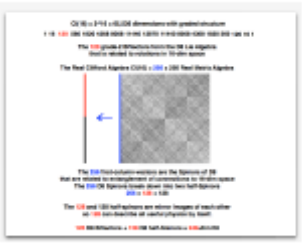
How Jung's Red Book Archetypes connect with E8 - Cl(16) Physics

Frank Dodd (Tony) Smith, Jr. - 2018

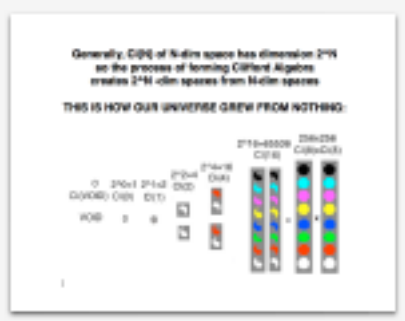
The first five pages after the cover summarize the rest of this paper.

CLIFFORD ALGEBRAS to E8



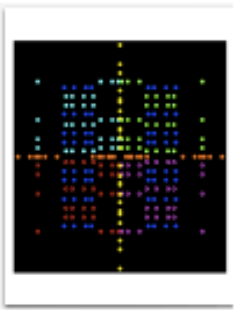
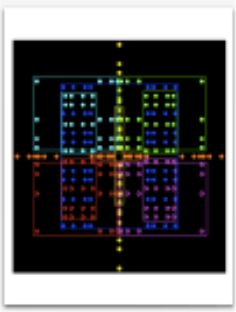
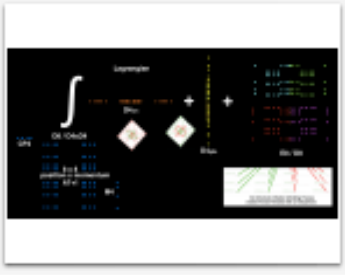
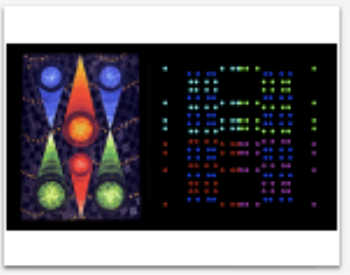

CLIFFORD EVOLUTION of OUR UNIVERSE



CREATION - OCTONIONIC NON-UNITARY INFLATION
28+64+28 = 120 D8 = 4X32 =128 D8 HALF-SPINOR

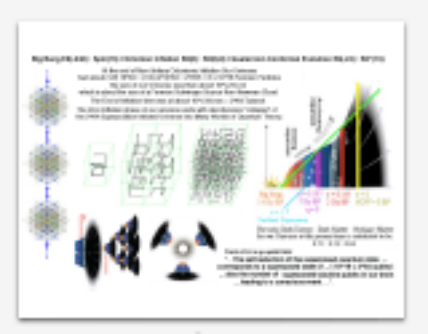



E8 - PARTICLES and FORCES - 8D LAGRANGIAN - TRIALITY

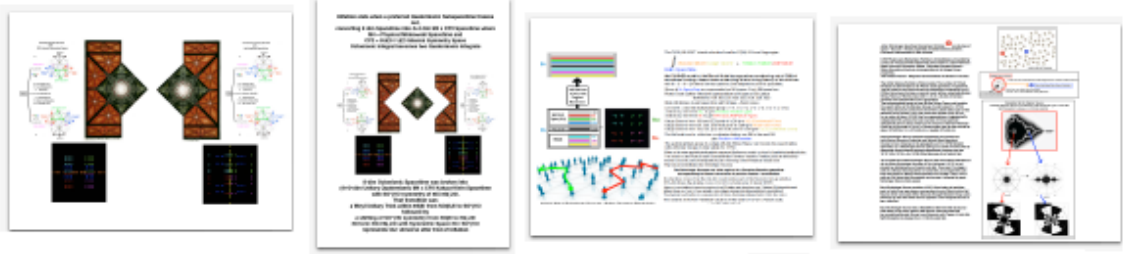





E8 HEISENBERG CREATION-ANNIHILATION - 28+64+(63+1)+64=28

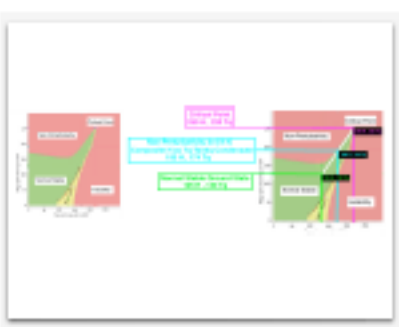
AFTER INFLATION - QUATERNIONIC UNITARY EXPANSION
now - DE : DM : OM = 0.75 : 0.21 : 0.04

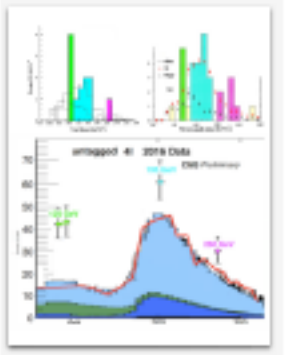


E8 = H4 STANDARD MODEL CP2 + H4 GRAVITY+DARK ENERGY M4
STRINGS = WORLD LINES 26D STRING THEORY - SPIN-2 BOHMIONS
QUANTUM BLOCKCHAINS OF SCHWINGER SOURCES

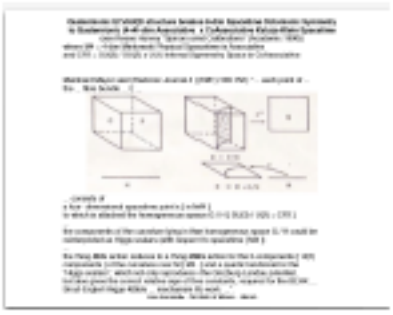


HIGGS = NAMBU-JONA-LASINIO TRUTH QUARK COMPOSITE
FERMILAB TRUTH QUARK MASSES 130 GeV - 174 GeV - 220 GeV
CMS HIGGS MASSES 125 GeV - 195 GeV - 260 GeV

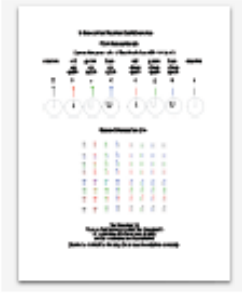




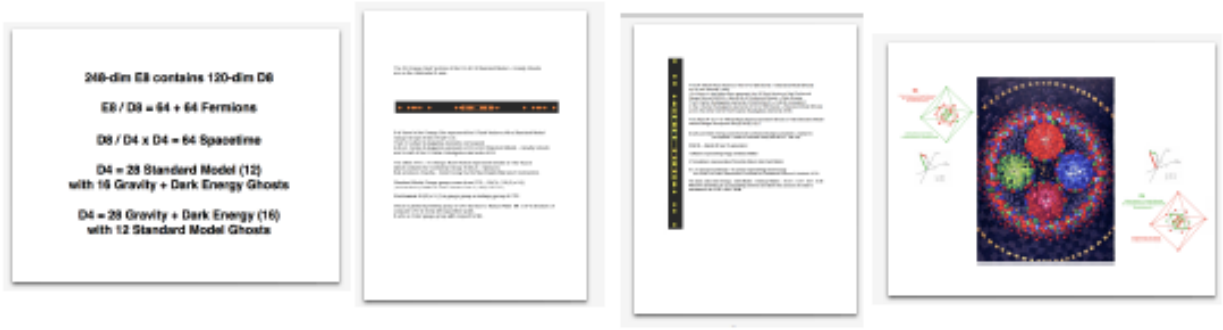
M4xCP2 KALUZA-KLEIN - MAYER HIGGS - 3 FERMION GENERATIONS



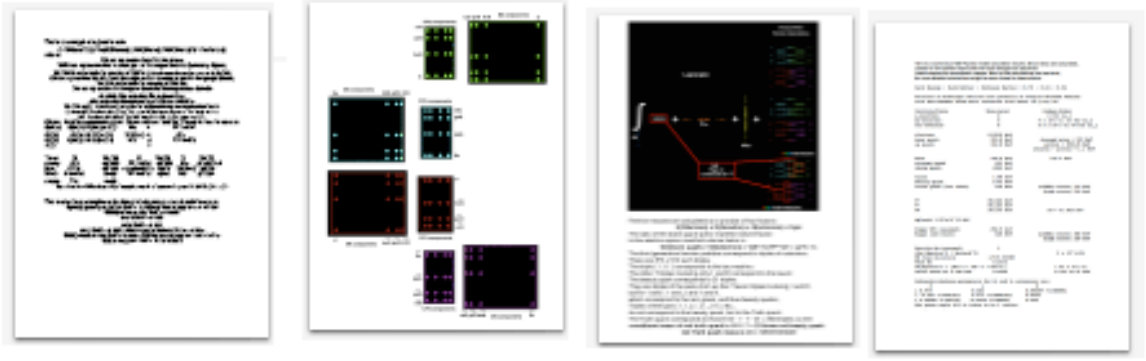
FERMION OCTONIONIC BRAIDS - FERMION MASSES



D4 STANDARD MODEL and GRAVITY+DE GHOSTS
D4 GRAVITY+DE and STANDARD MODEL GHOSTS



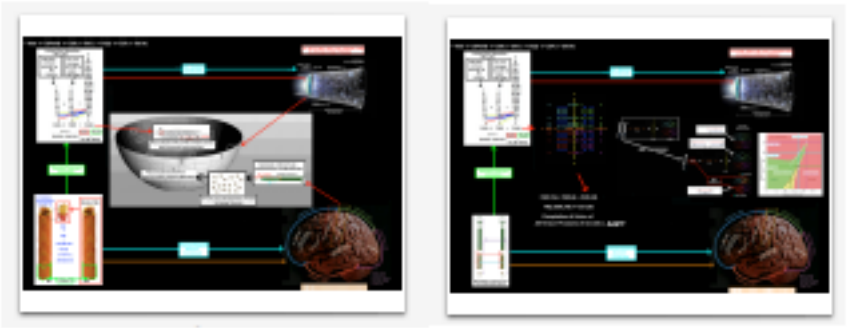
FORCE STRENGTHS - 4D LAGRANGIAN - CALCULATION RESULTS



E8 - H4 - F4 - D4 - D3=A3 - H3 - H2=PENROSE STAR

CELLULAR AUTOMATA - CL(8) - CL(16) - MICROTUBULE - PYRAMIDS

SHILOV BOUNDARY HUMAN MIND
COMPLEX DOMAIN UNIVERSAL CONSCIOUSNESS



William KIngdon Clifford (1845 - 1879)
described Geometry in terms of his invention: Real Clifford Algebras,
which he called "**mind-stuff**", saying:

"... That element of which ... even the simplest feeling is a complex,
I shall call **Mind-stuff**.
A moving molecule of **inorganic matter** does not possess mind or consciousness ; but it **possesses a small piece of mind-stuff**. ...
When molecules are ... combined together ... the elements of mind-stuff which go along with them ... combine ... to form the ... beginnings of Sentience.
When the molecules are so combined as to form the brain and nervous system ... the corresponding elements of mind-stuff are so combined as to form some kind of consciousness ... changes in the complex which take place at the same time get so linked together that the repetition of one implies the repetition of the other.
When matter takes the complex form of a living human brain,
the corresponding mind-stuff takes the form of a human consciousness ...".

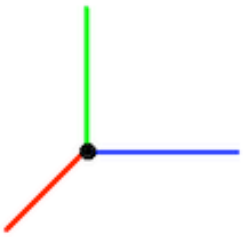
(Wikipedia - (1878, "On the Nature of Things-in-Themselves", Mind, Vol. 3, No. 9, pp. 57–67))

Clifford Algebra = Algebra of Spaces =
= Fundamental Human Understanding

For our 3-dim Space with coordinates x y z

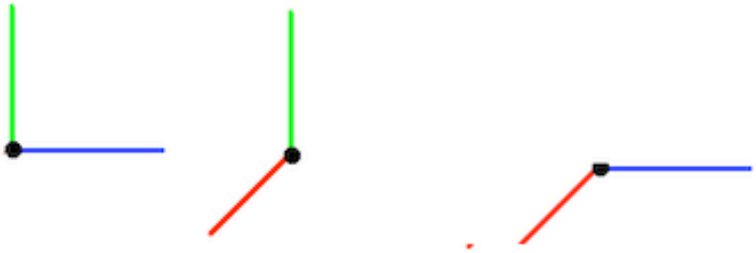
Cl(3) describes

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

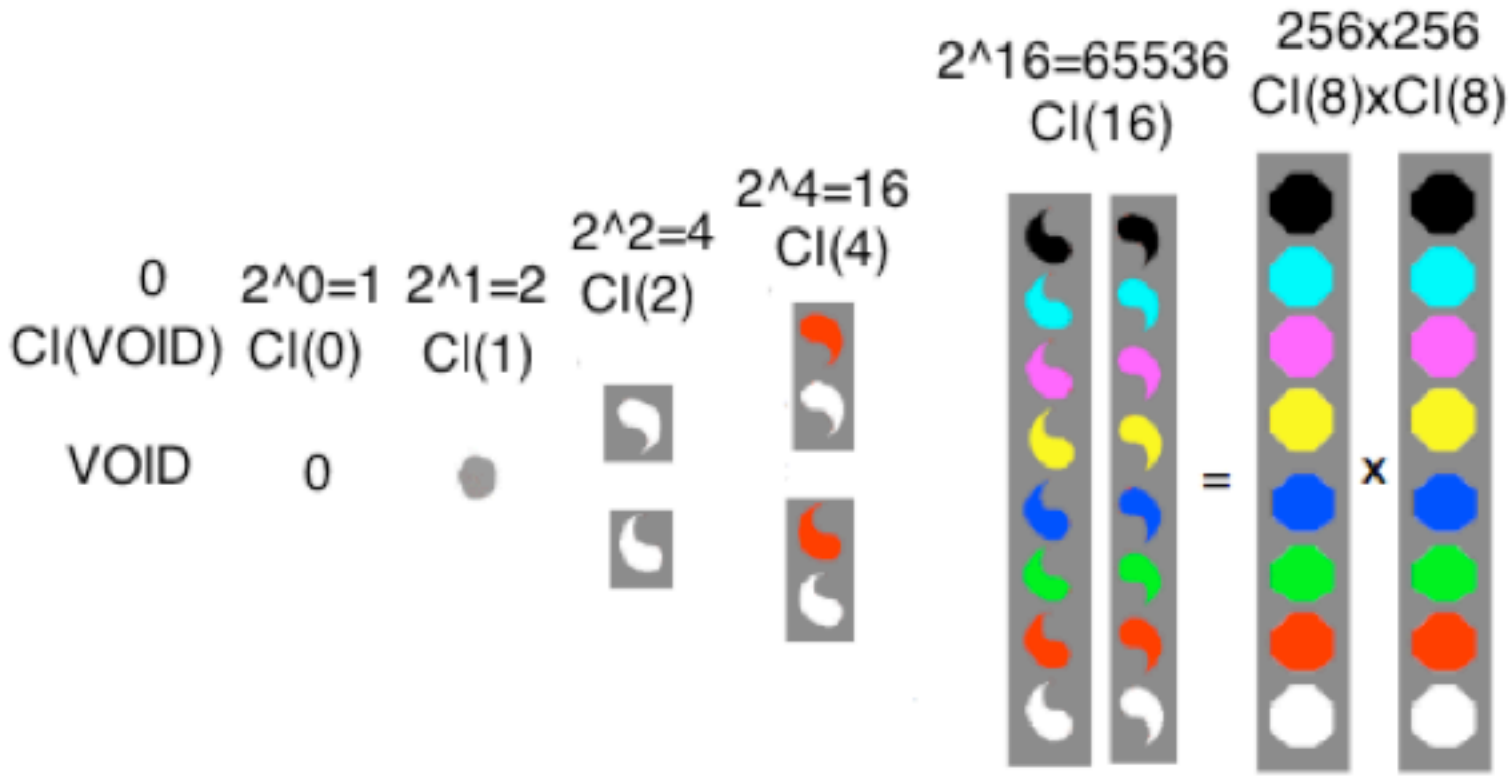
so

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:

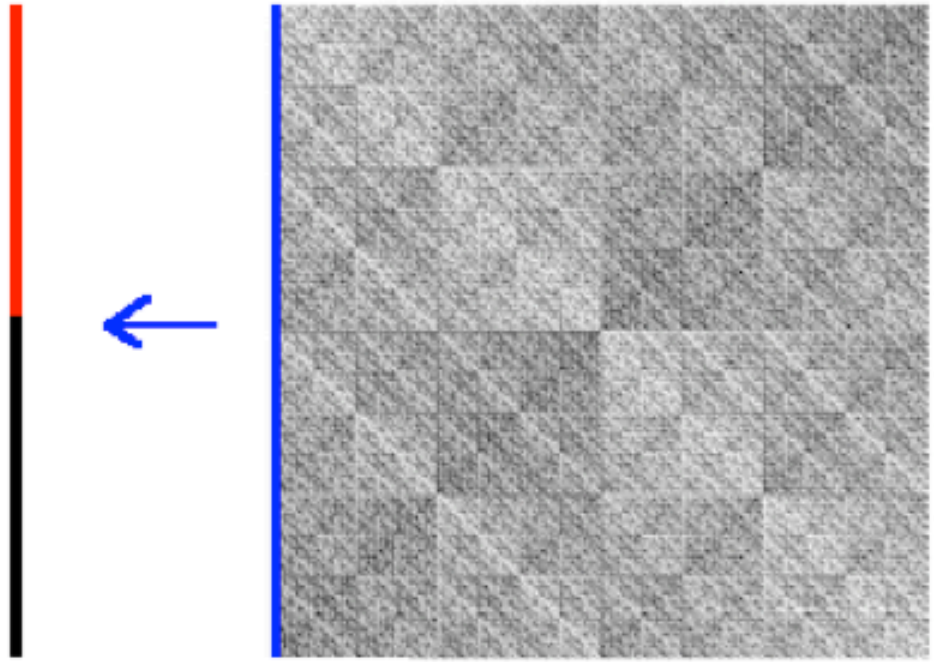


Cl(16) = 2^16 = 65,536 dimensions with graded structure

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 x 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

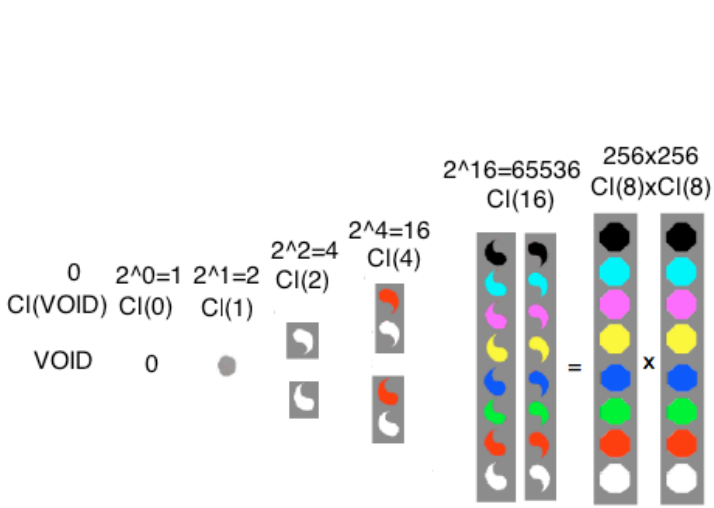
D4 = 28 Gravity + Dark Energy (16)
with 12 Standard Model Ghosts

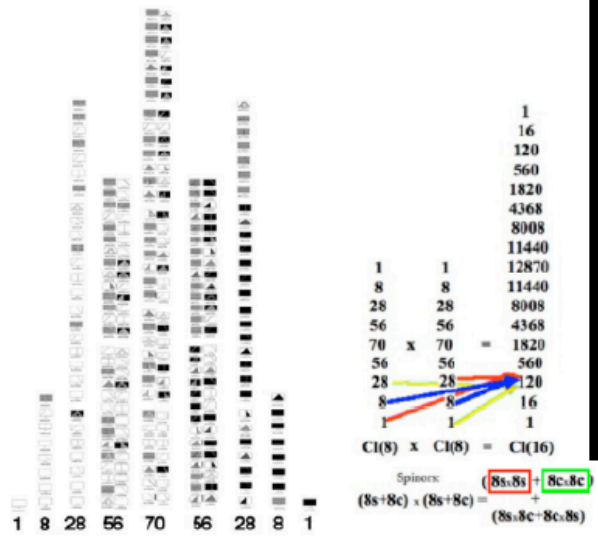
Dimension of Clifford Algebra						
0	2^0=1	2^1=2	2^2=4	2^4=16	2^16=65536	256x256

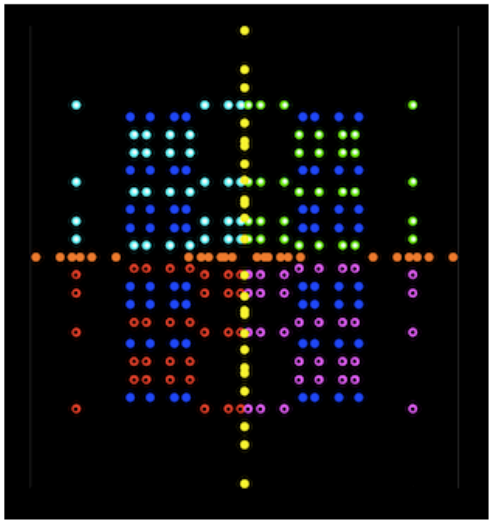
VOID -> Cl(VOID) -> Cl(0,0) -> Cl(0,1)-> Cl(0,2) -> Cl(0,4) -> Cl(0,16) = Cl(0,8)xCl(0,8) --> Cl(0,16)xCl(0,8) = Cl(0,24) -> M(2,Cl(0,24)) = Cl(1,25) ->

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

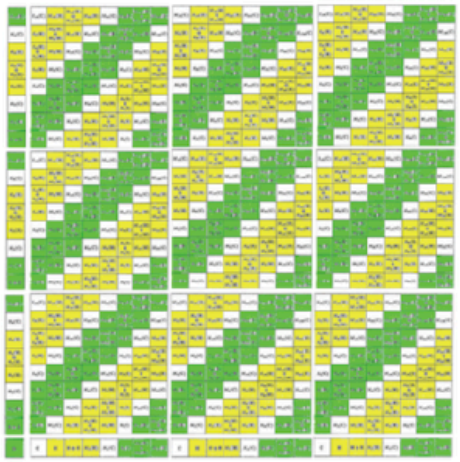
Cl(1,25) = Cl(1,9)xCl(0,8)xCl(0,8) and Cl(1,9) = Cl(1,5) x Cl(0,4) = Cl(2,4) x Cl(0,4)







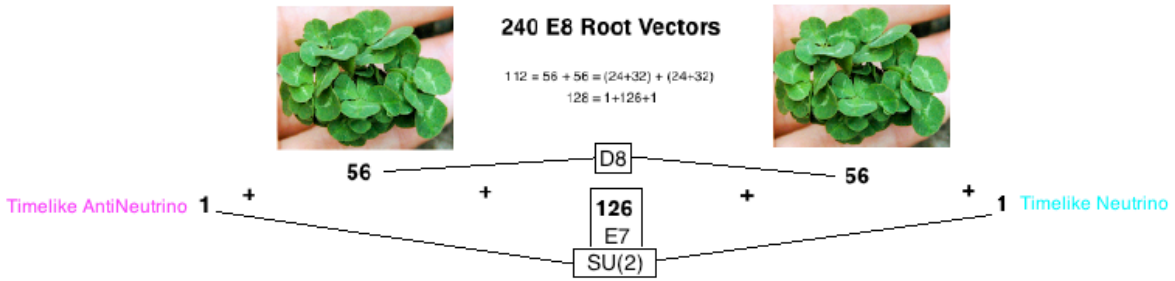
Cl(16) contains 120 + 64 + 64 = 248 = E8
with 112 + 128 = 240 root vectors



The completion of the union of all tensor products of Cl(16) = Cl(8)xCl(8) produces a generalized Hyperfinite II1 von Neumann factor that gives the Cl(16)-E8 model a natural Algebraic Quantum Field Theory

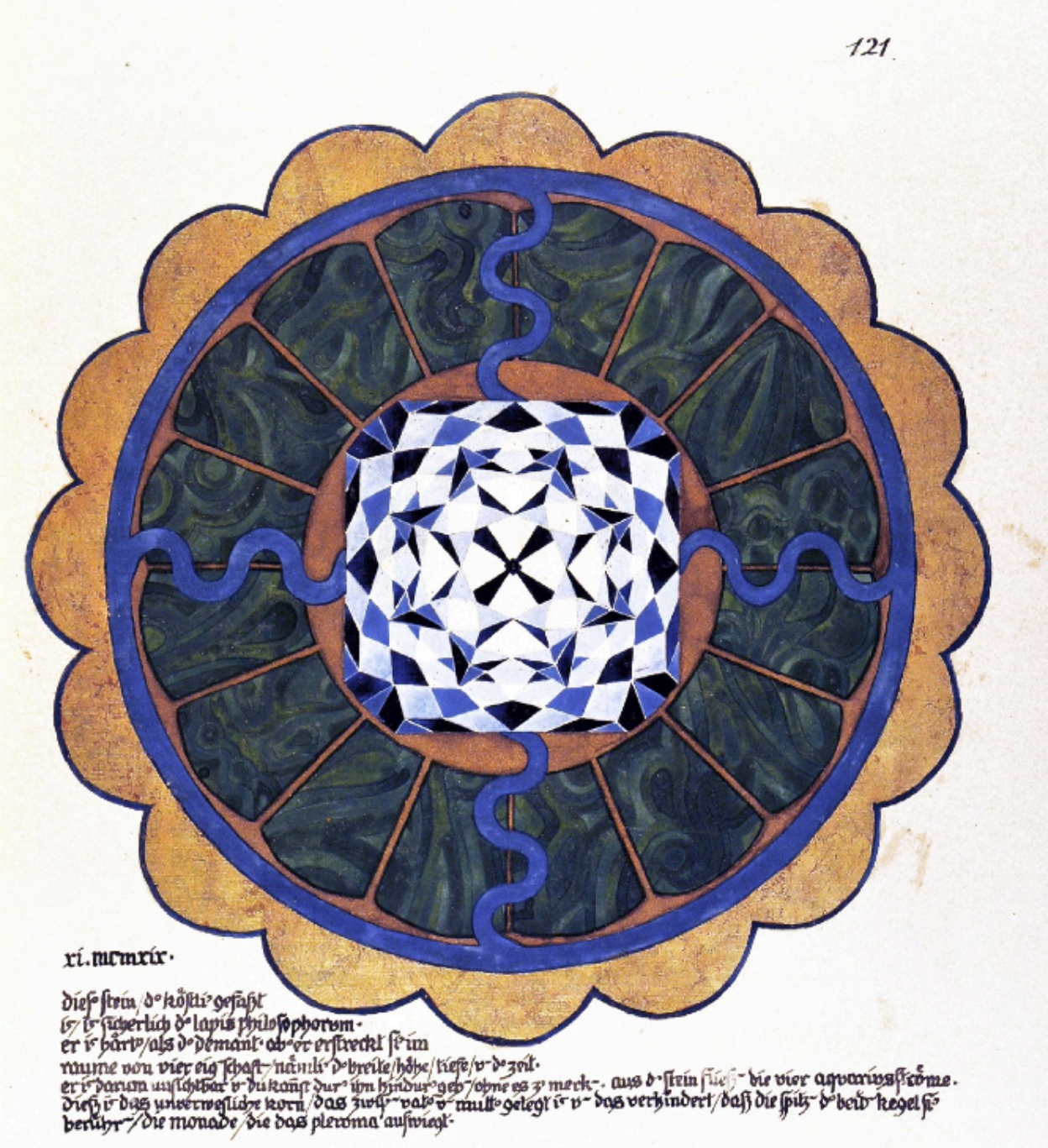
The Cl(16)-E8 AQFT inherits structure from the Cl(16)-E8 Local Lagrangian

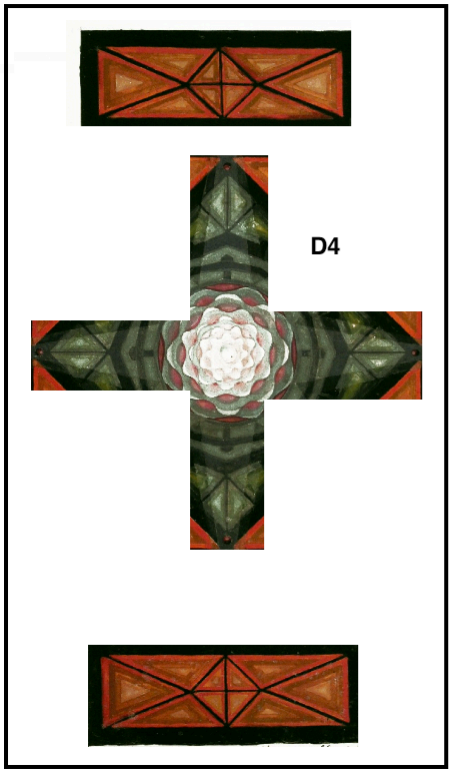
The Creation-Annihilation Operator structure of Cl(16)-E8 AQFT is given by the Maximal Contraction of E8 = semidirect product A7 x h92 where h92 = 92+1+92 = 185-dim Heisenberg algebra and A7 = 63-dim SL(8)

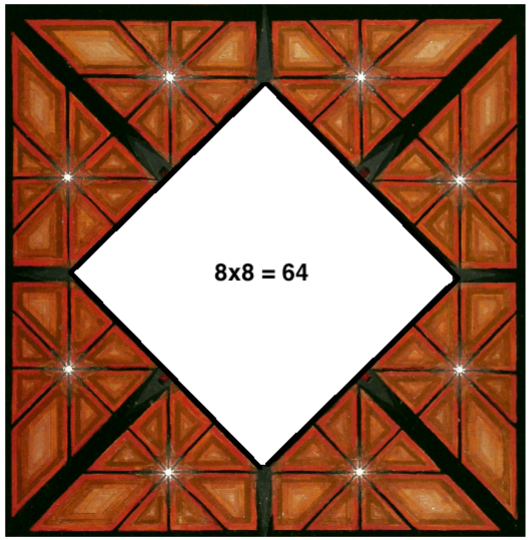


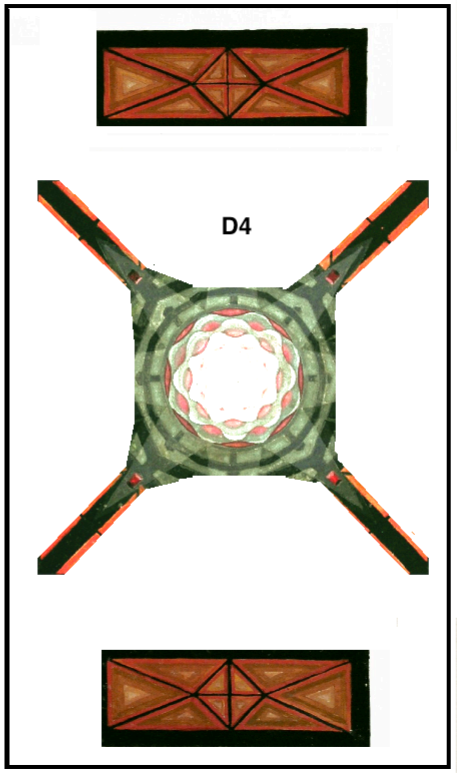
When Our Planck Scale Universe emerged from its Parent Universe by Quantum Fluctuation it was described by SO(16) symmetry of Compact E8(-248).
E8 Compact Form E8(-248) with Symmetric Space E8 / Spin(16) represents Our Planck Scale Universe when it emerged from its Parent Universe by Quantum Fluctuation.

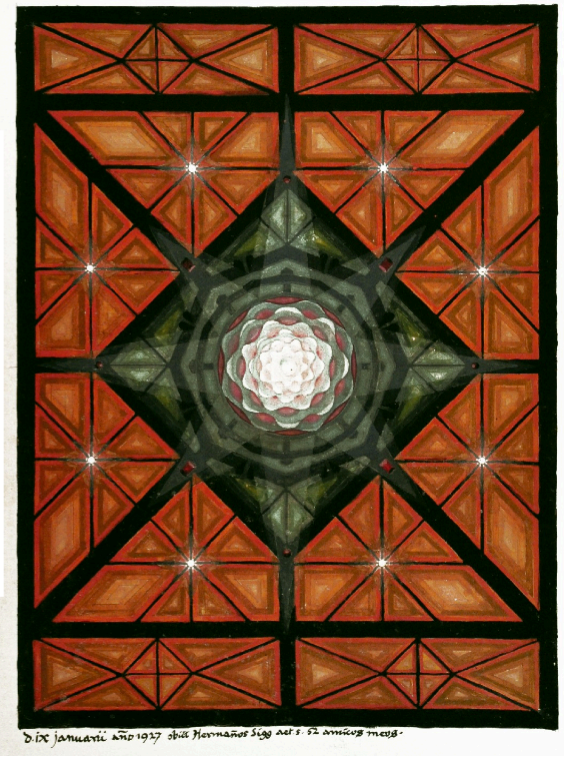
E8 Split Form EVIII E8(8) with Symmetric Space E8 / SO(8,8)
represents
Our Universe during Octonionic Inflation
with Non-Unitary Quantum Processes.

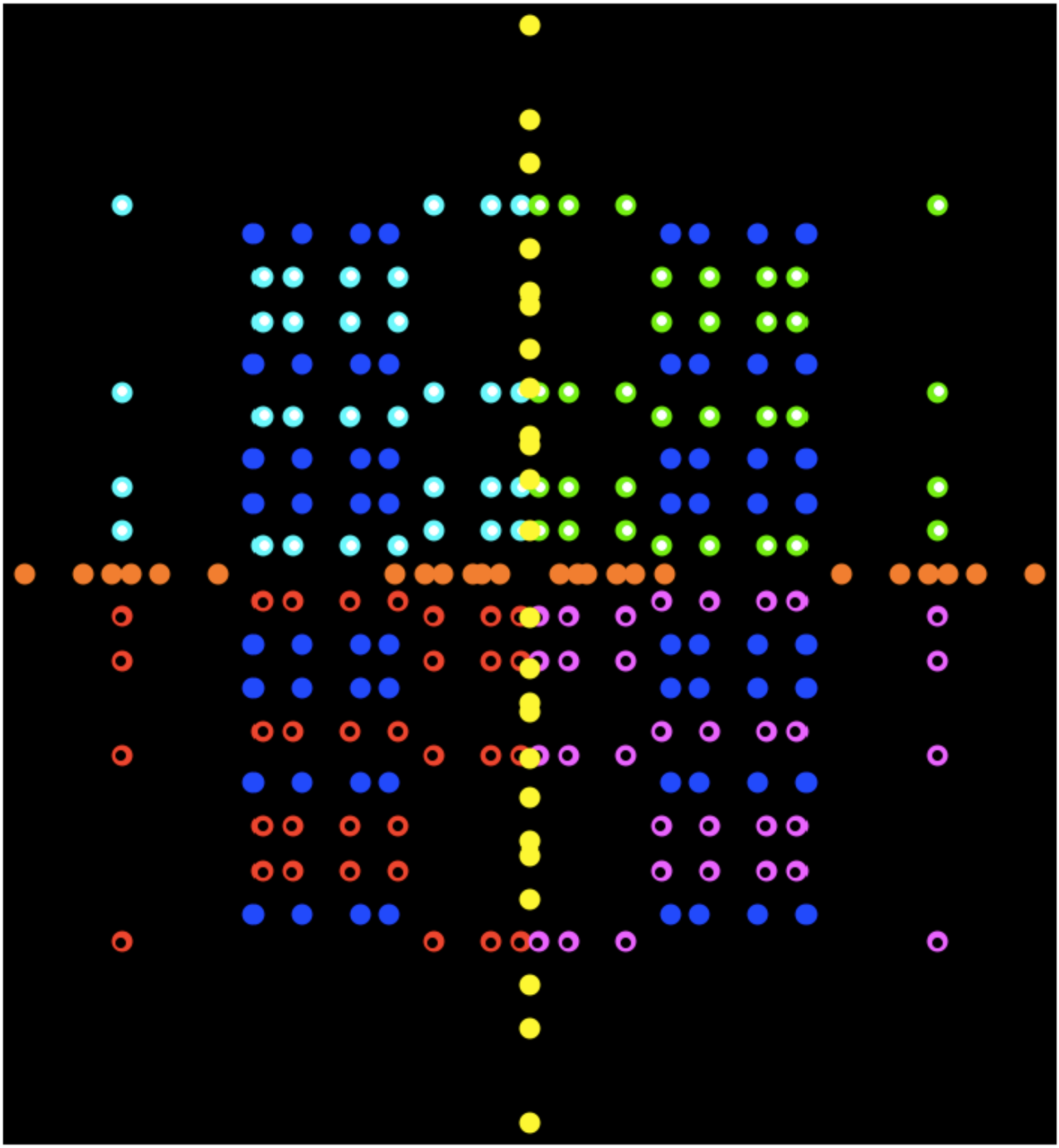


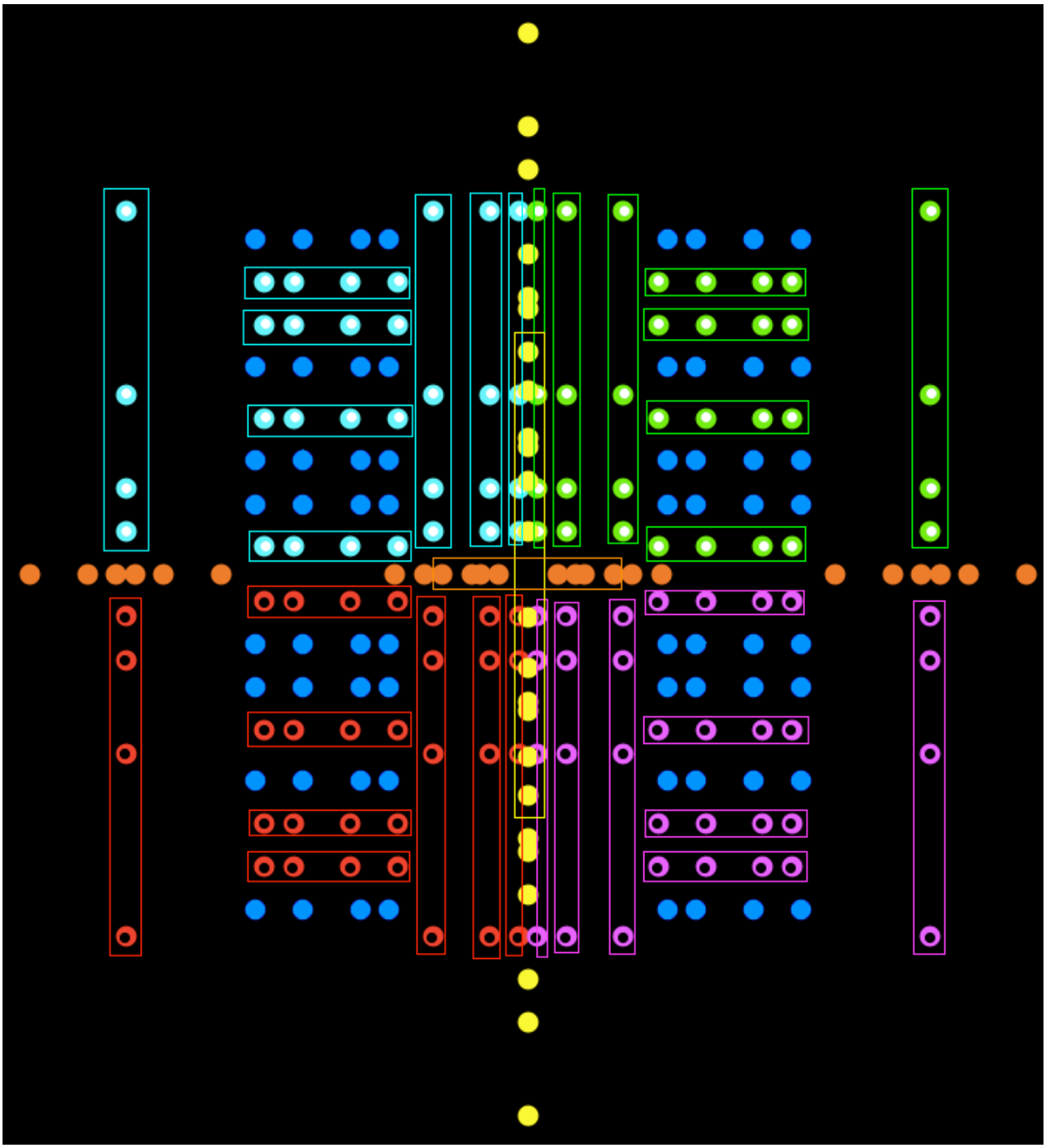

D4

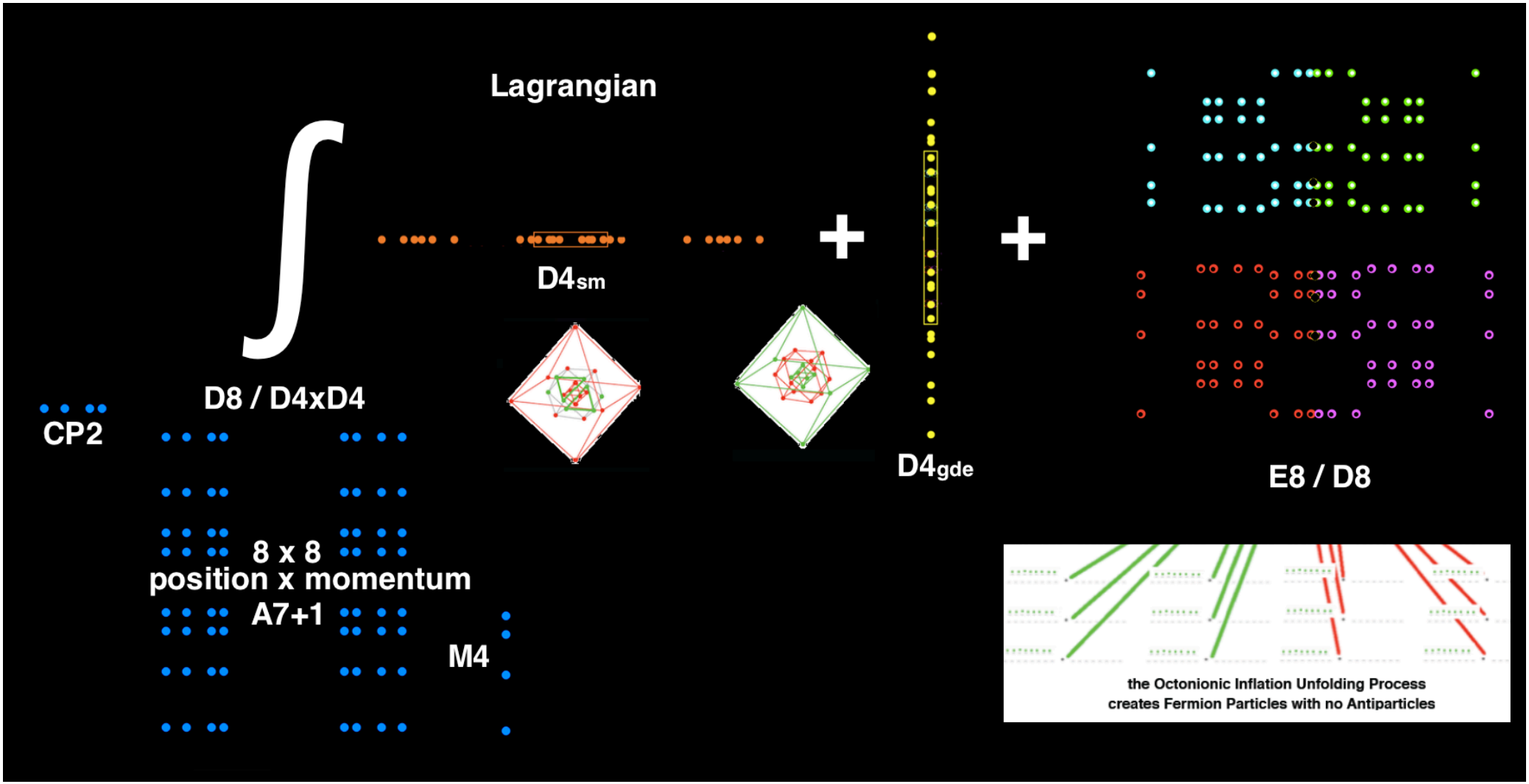

8x8 = 64

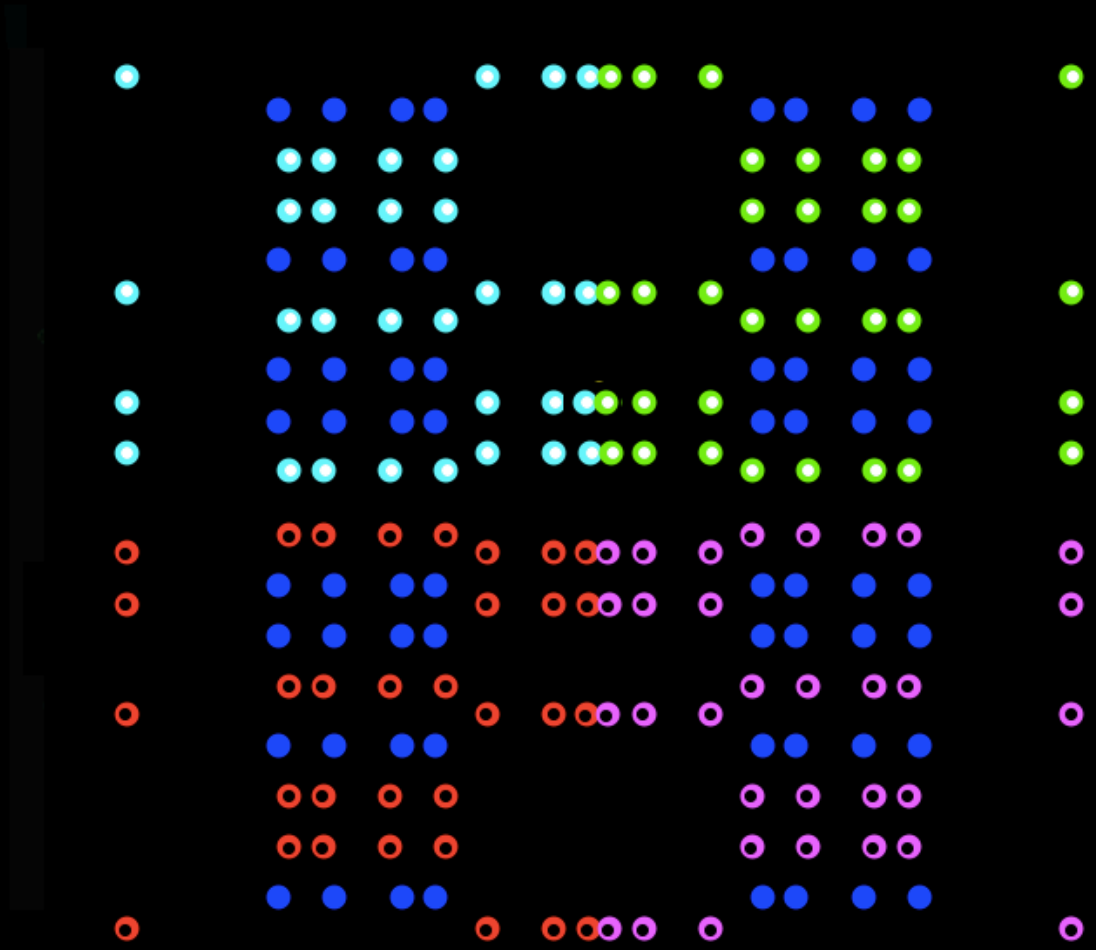

D4

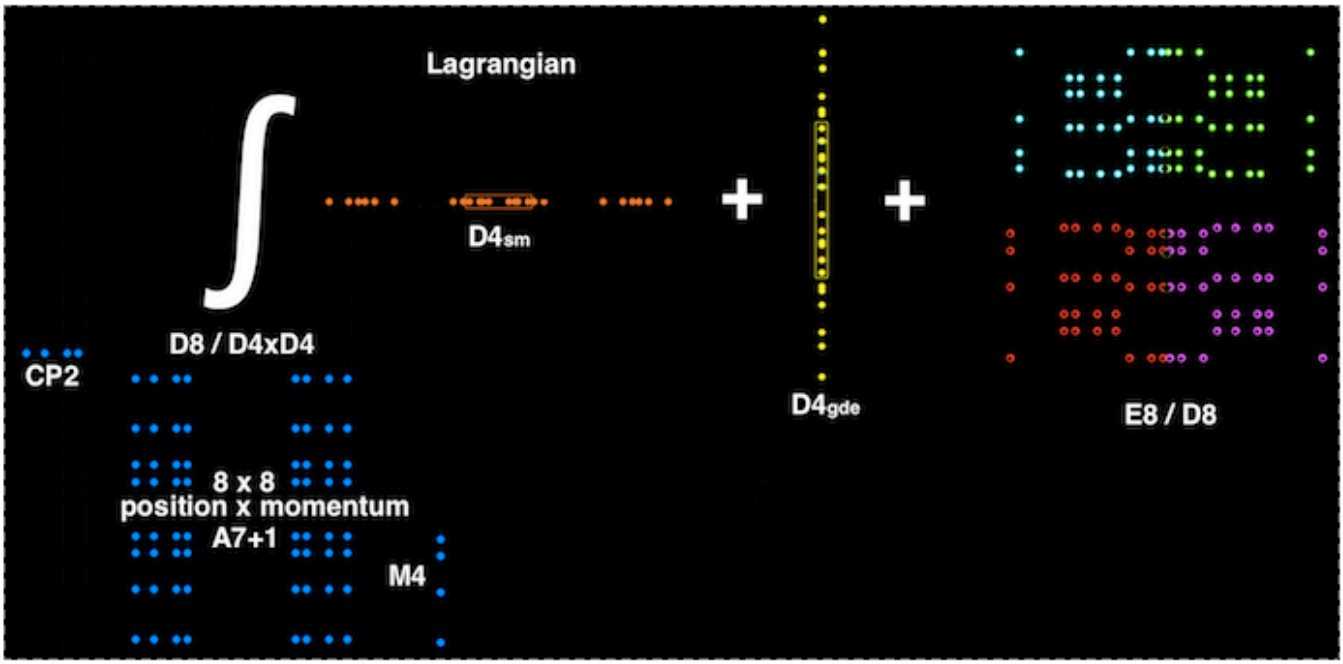

D. IX januarii año 1927 obiit Hermanos Sigg aet. s. 52 annus mens.






Lagrangian
D4sm
D4gde
E8 / D8
D8 / D4xD4
CP2
8 x 8
position x momentum
A7+1
M4
the Octonionic Inflation Unfolding Process
creates Fermion Particles with no Antiparticles

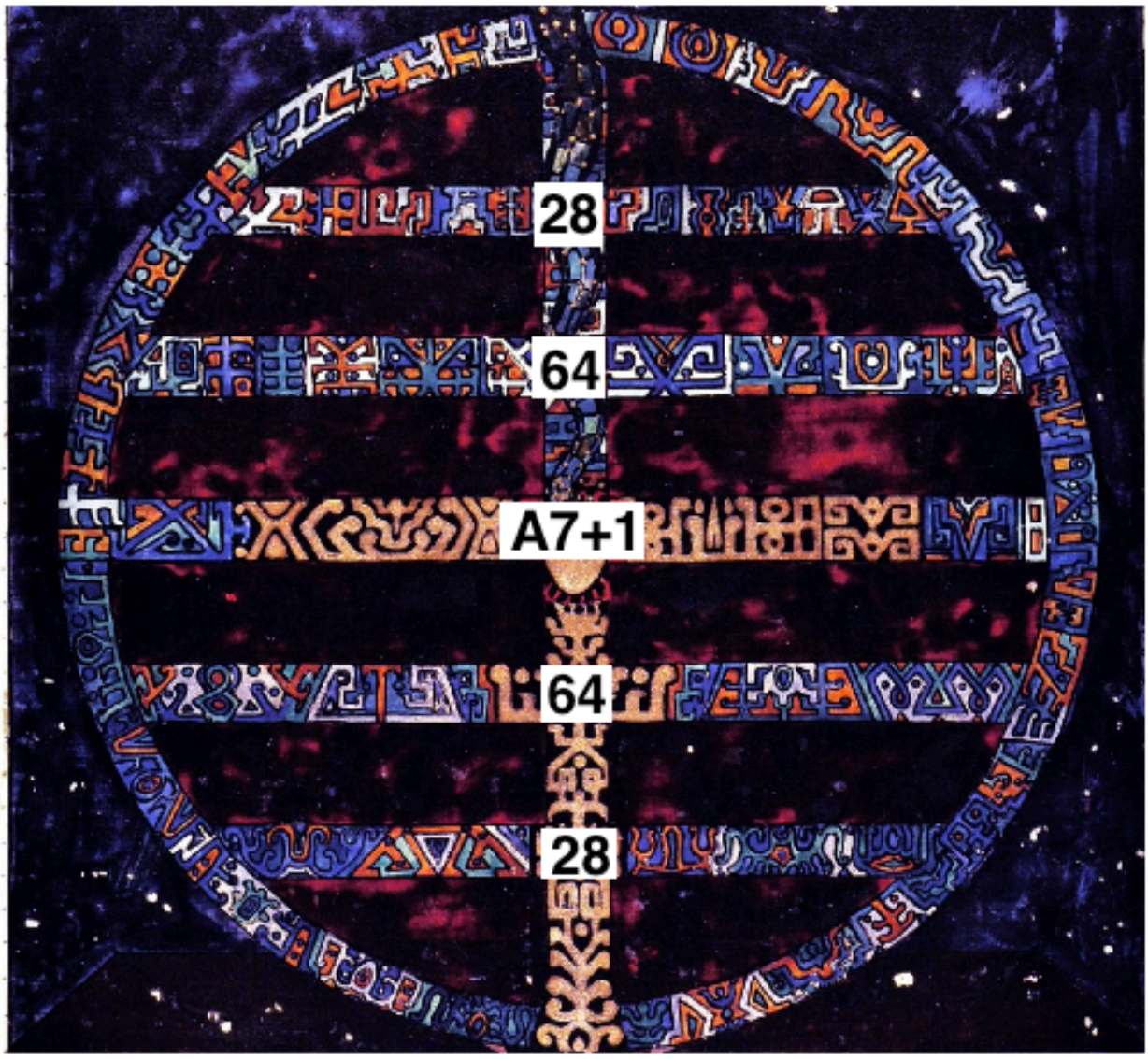




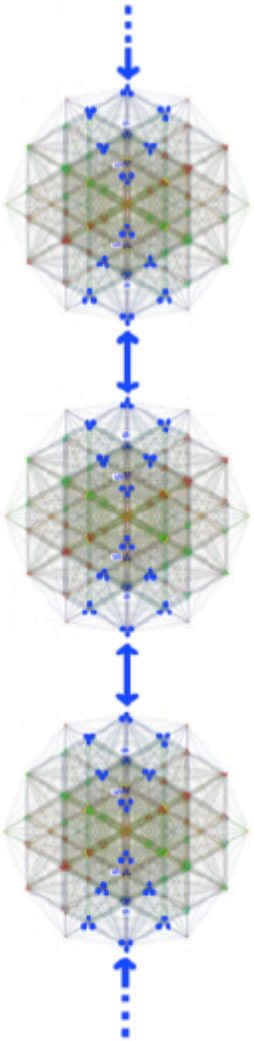
Creation-Annihilation Operators for 8 components of 8+8 Fermions
are
odd-grade-+/-1 part
of
E8 Maximal Contraction generalized Heisenberg Algebra

h92 x A7 = 28 + 64 + ((SL(8,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")


28
64
A7+1
64
28

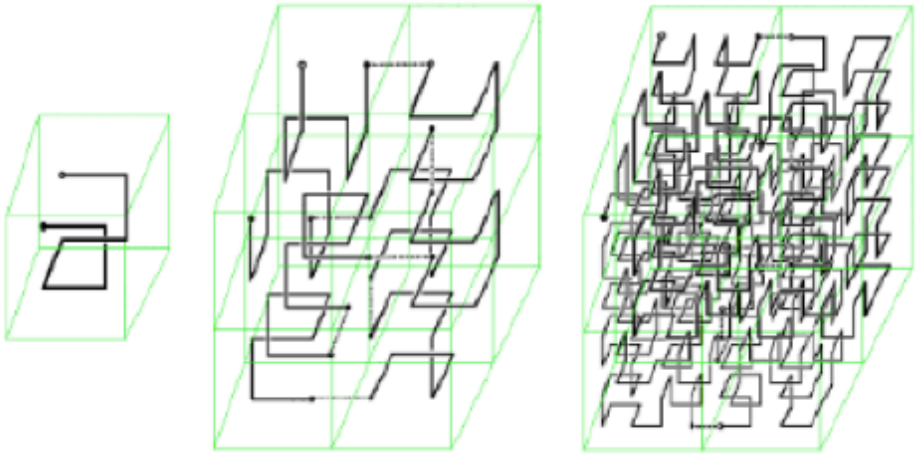
Big Bang E8(-248) : Spin(16) I Octonion Inflation E8(8) : SO(8,8) I Quaternion Conformal Evolution E8(-24) : SO*(16)

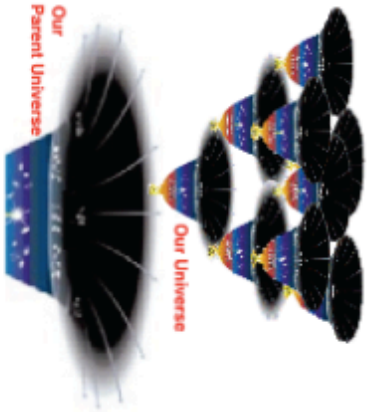


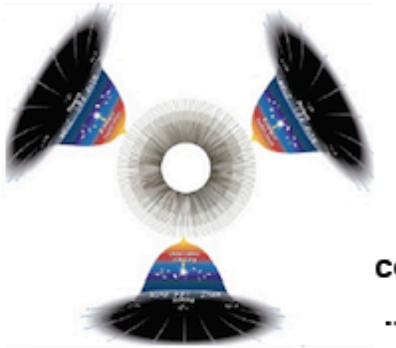
At the end of Non-Unitary Octonionic Inflation Our Universe
had about (1/2) 16^64 = (1/2) (2^4)^64 = 2^255 = 6 x 10^76 Fermion Particles
the size of our Universe was then about 10^(-24) cm
which is about the size of a Fermion Schwinger Source Kerr-Newman Cloud

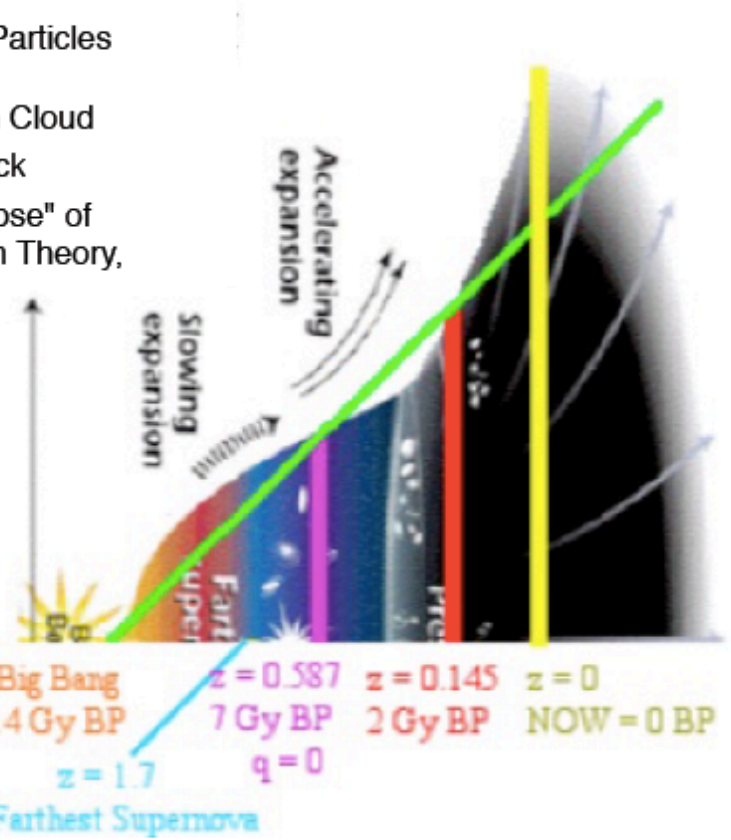
The End of Inflation time was at about 10^(-34) sec = 2^64 Tplanck

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







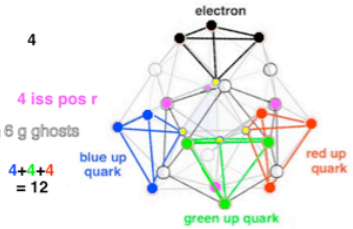


The ratio Dark Energy : Dark Matter : Ordinary Matter for our Universe at the present time is calculated to be:
0.75 : 0.21 : 0.04

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

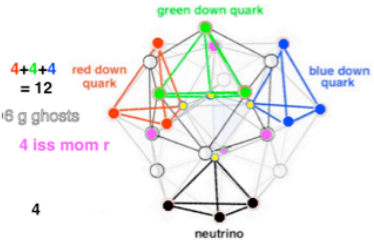


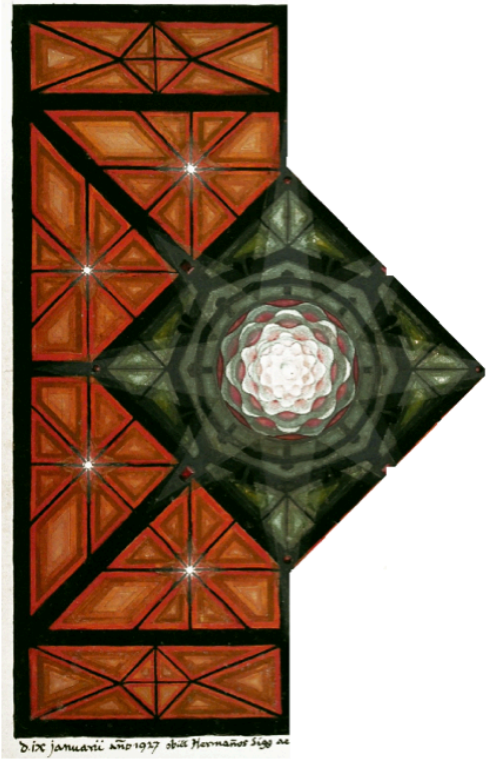
D4sm

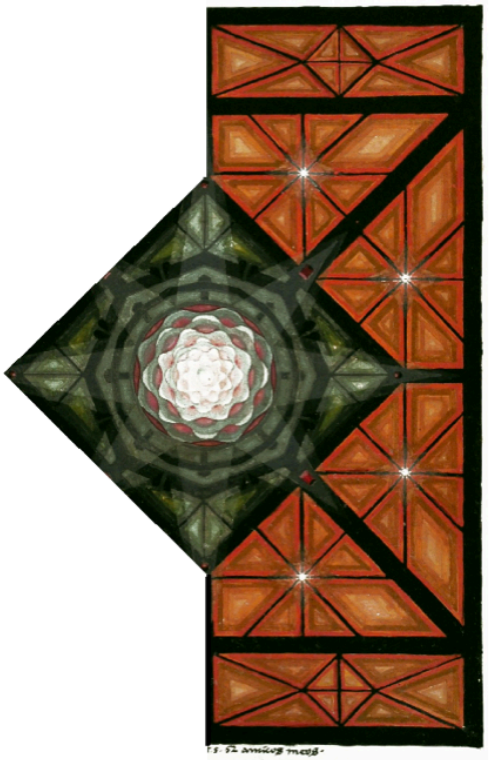
12 iss pos uvw
12 up antiquarks
4 positron

12 sm A0 A1 A2

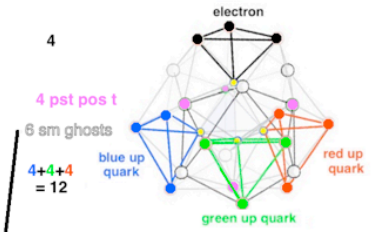
4 antineutrino
12 down antiquarks
12 iss pos uvw







Conformal Gravity 600-Cell
with
M4 Physical SpaceTime

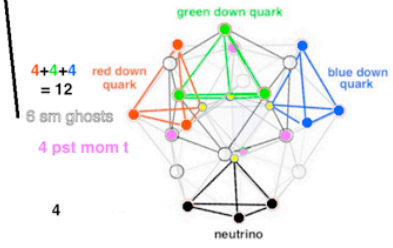


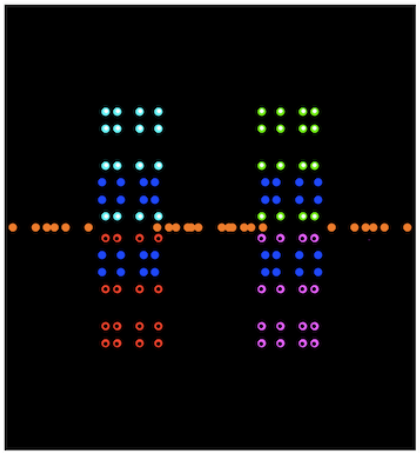
D4g

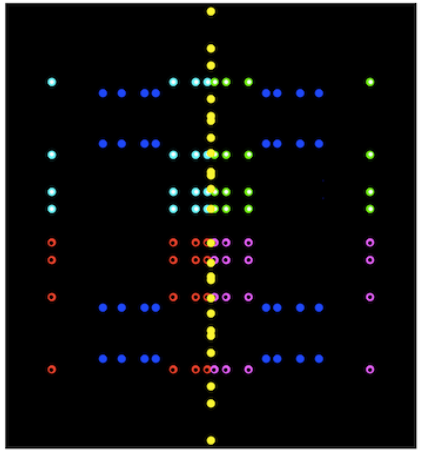
12 pst pos xyz
12 up antiquarks
4 positron

12 cnf grav A3=D3

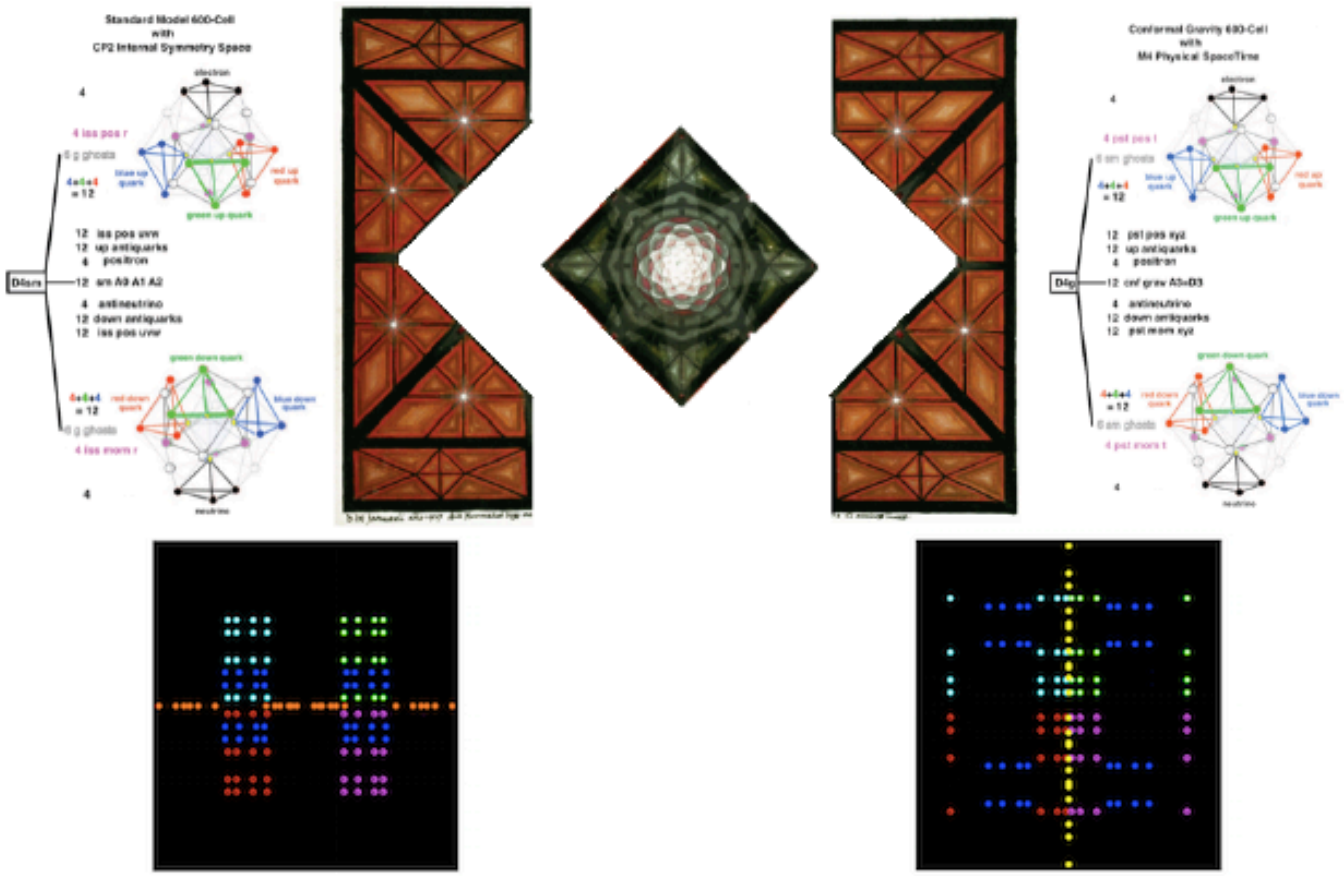
4 antineutrino
12 down antiquarks
12 pst mom xyz



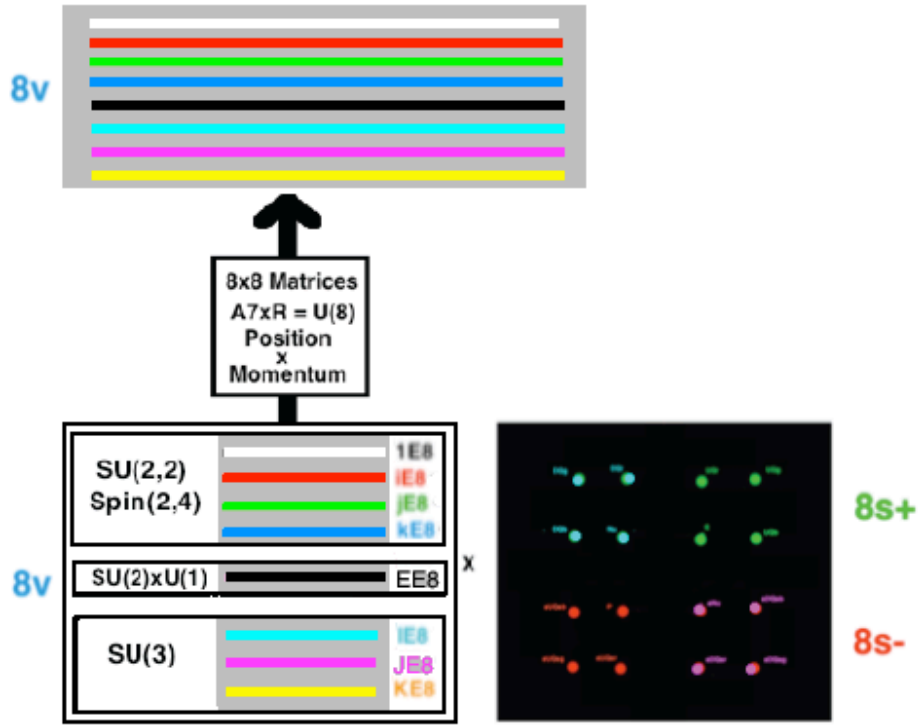




Inflation ends when a preferred Quaternionic Subspacetime freezes out,
converting 8 dim Spacetime into 4+4 dim M4 x CP2 Spacetime where
M4 = Physical Minkowski Spacetime and
CP2 = SU(3) / U(2) Internal Symmetry Space
Octonionic Integral becomes two Quaternionic Integrals



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



Indra's Net of Schwinger Sources - Bohm Quantum Blockchain

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

$\int$ Standard Model Gauge Gravity + Fermion Particle-AntiParticle

8-dim SpaceTime

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

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

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

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

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

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

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

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

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

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

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

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

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.

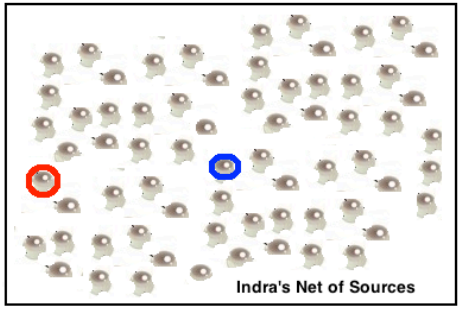
The initial Valence Particle is Planck scale. The number of Virtual Particles is determined by the Planck scale geometry of spacetime. The E8 model at the Planck Scale has spacetime condensing out of Clifford structures forming a Lorentz Leech lattice underlying 26-dim String Theory of World-Lines with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

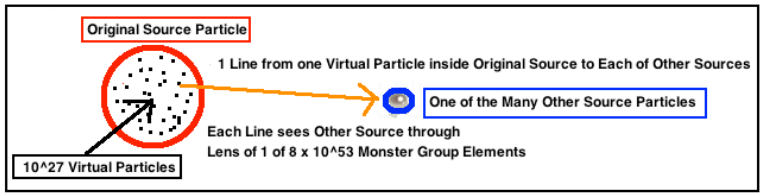
Each Schwinger Source particle-antiparticle pair should see (with Bohm Quantum Potential and Sarfatti Back-Reaction) the rest of our Universe in the perspective of 8 x 10^53 Monster Symmetry so a Schwinger Source acting as a Jewel of Indra's Net of Schwinger Source Bohm Quantum Blockchain Physics can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

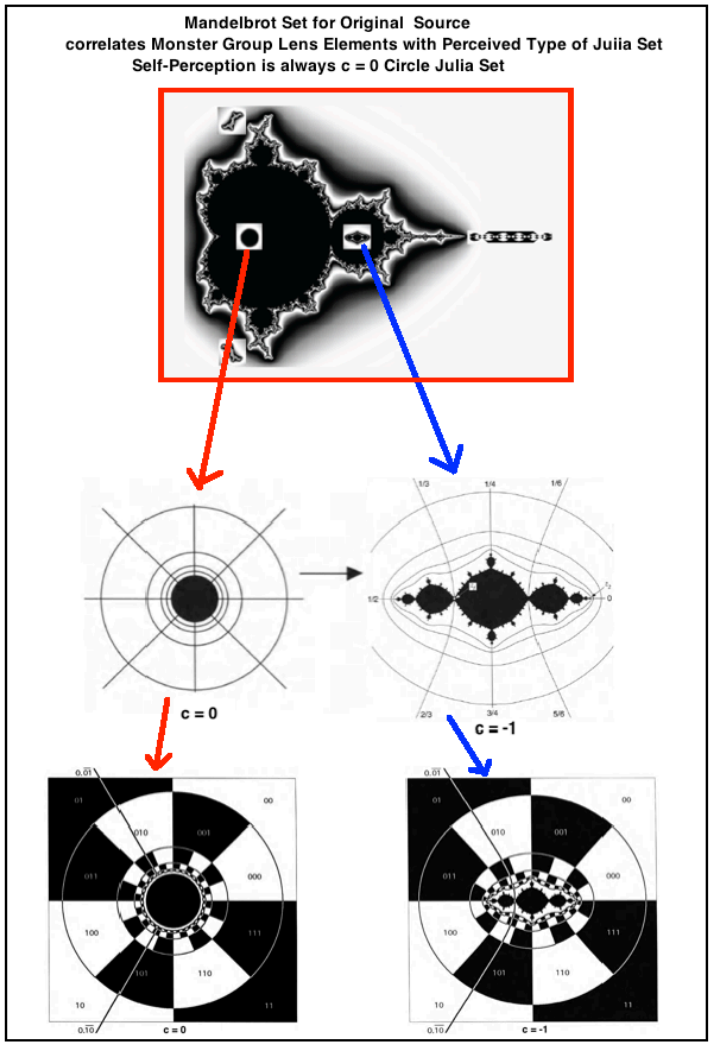
To fit inside the initial Schwinger Source the Information Elements of all the Other Schwinger Sources of Our Universe (10^77 or so) should be distributed as a Fractal Julia Set. There are 2^n stage-n cells in a Binary Decomposition of Julia Sets, so a stage-256 Julia level set based on Binary Decomposition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

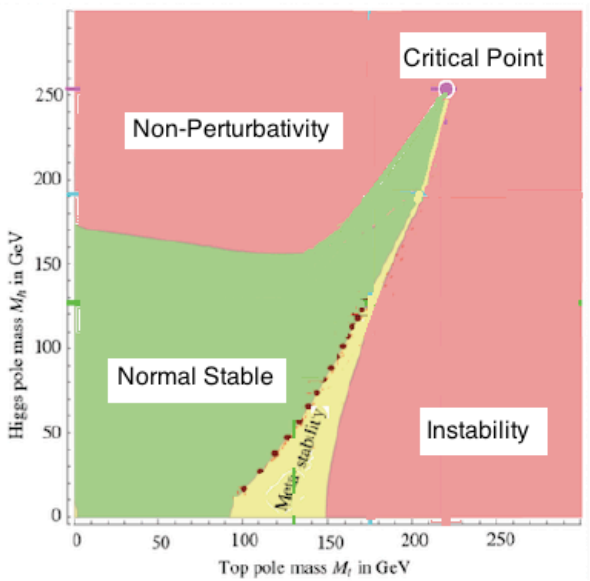
Each Schwinger Source contains 10^27 Virtual pairs of particles each of which can see along a connecting Line an Other Indra's Net Source which Line sees Other Sources through Monster Group Lens elements so that the Other Source appears to the Original Source to be a Julia Set.

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





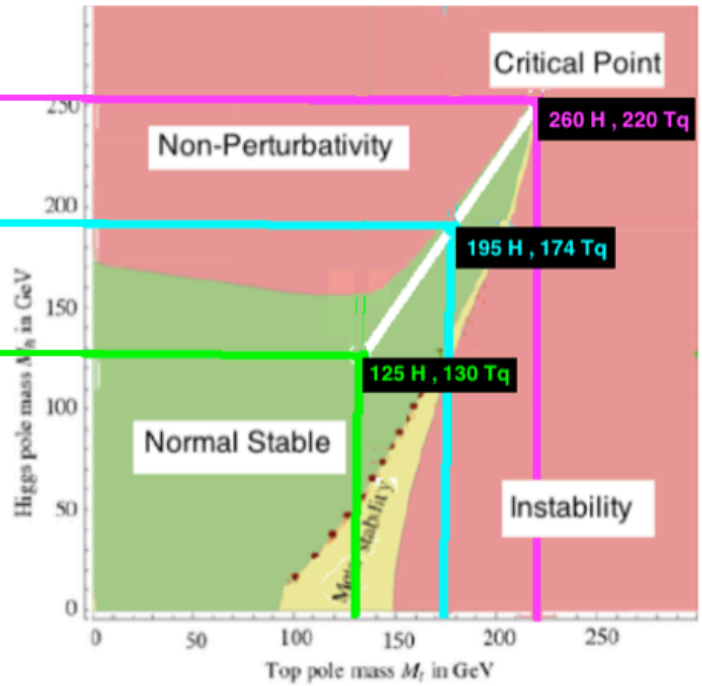


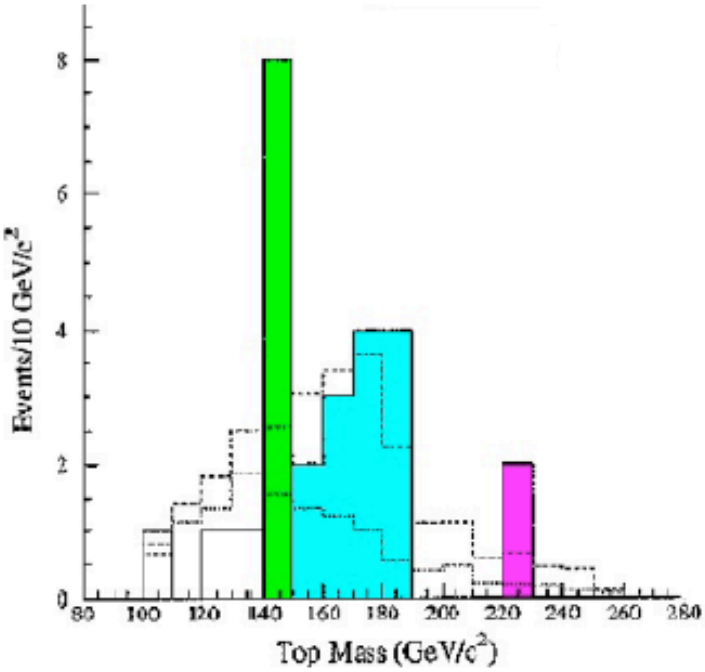


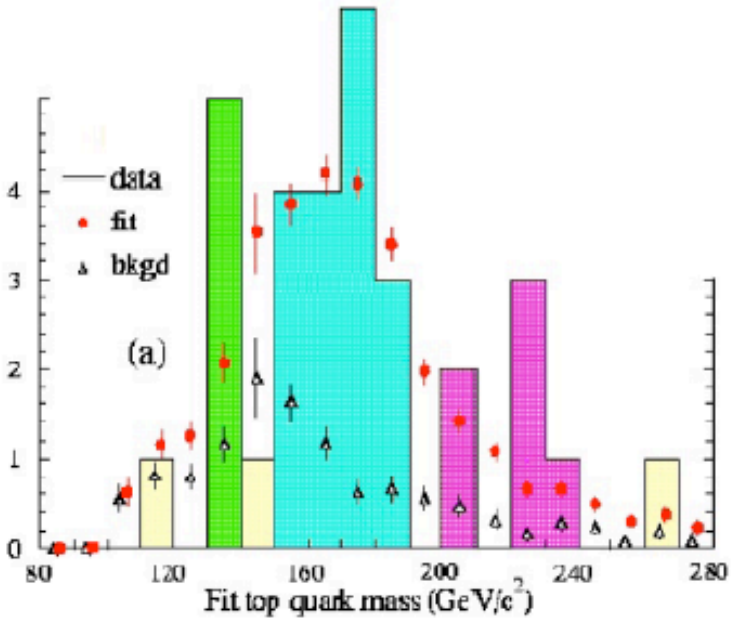
Critical Point
250 H , 220 Tq

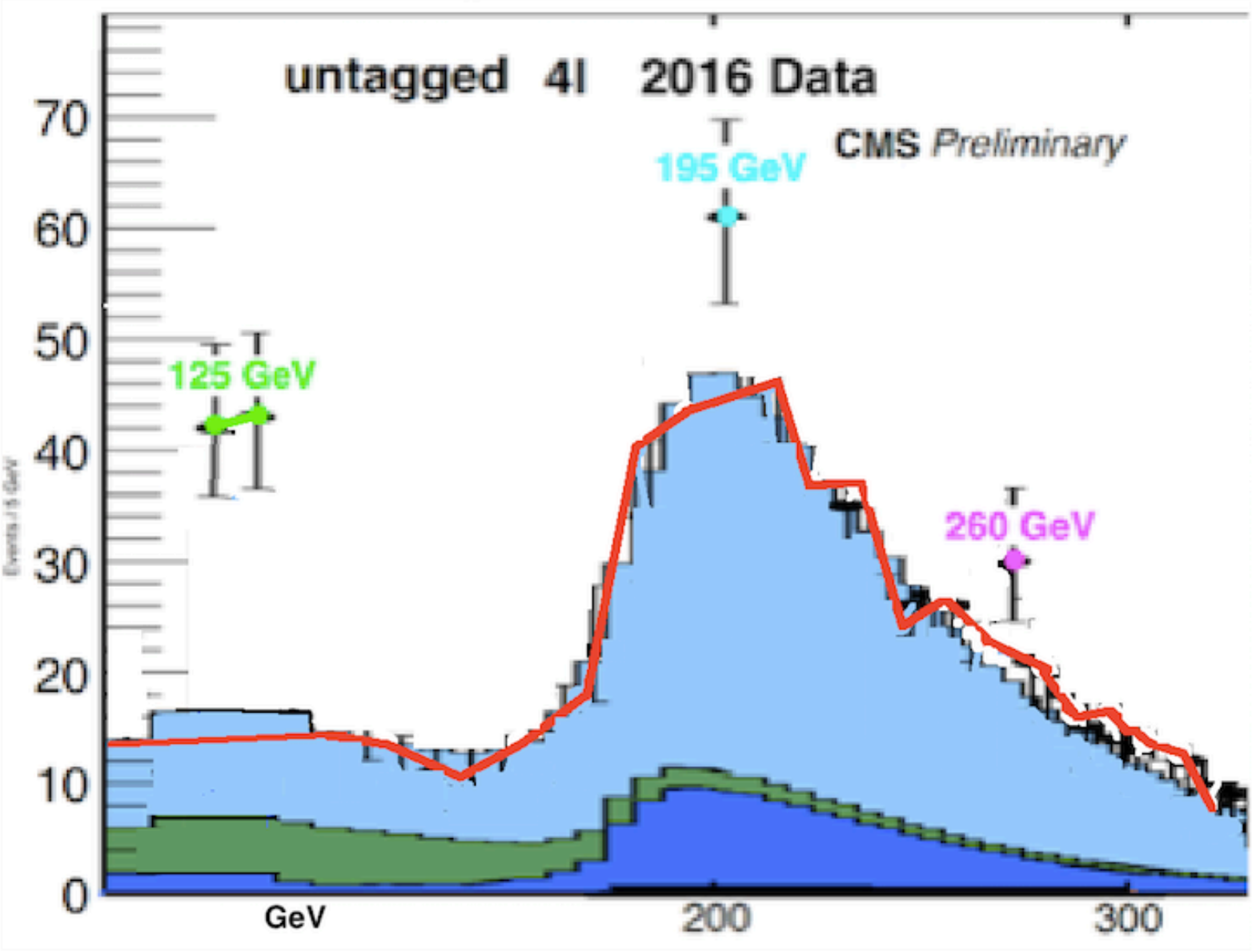
Non-Perturbativity 4+4 K-K
Composite H as Tq-Tantiq Condensate
195 H , 174 Tq

Normal Stable Ground State
125 H , 130 Tq

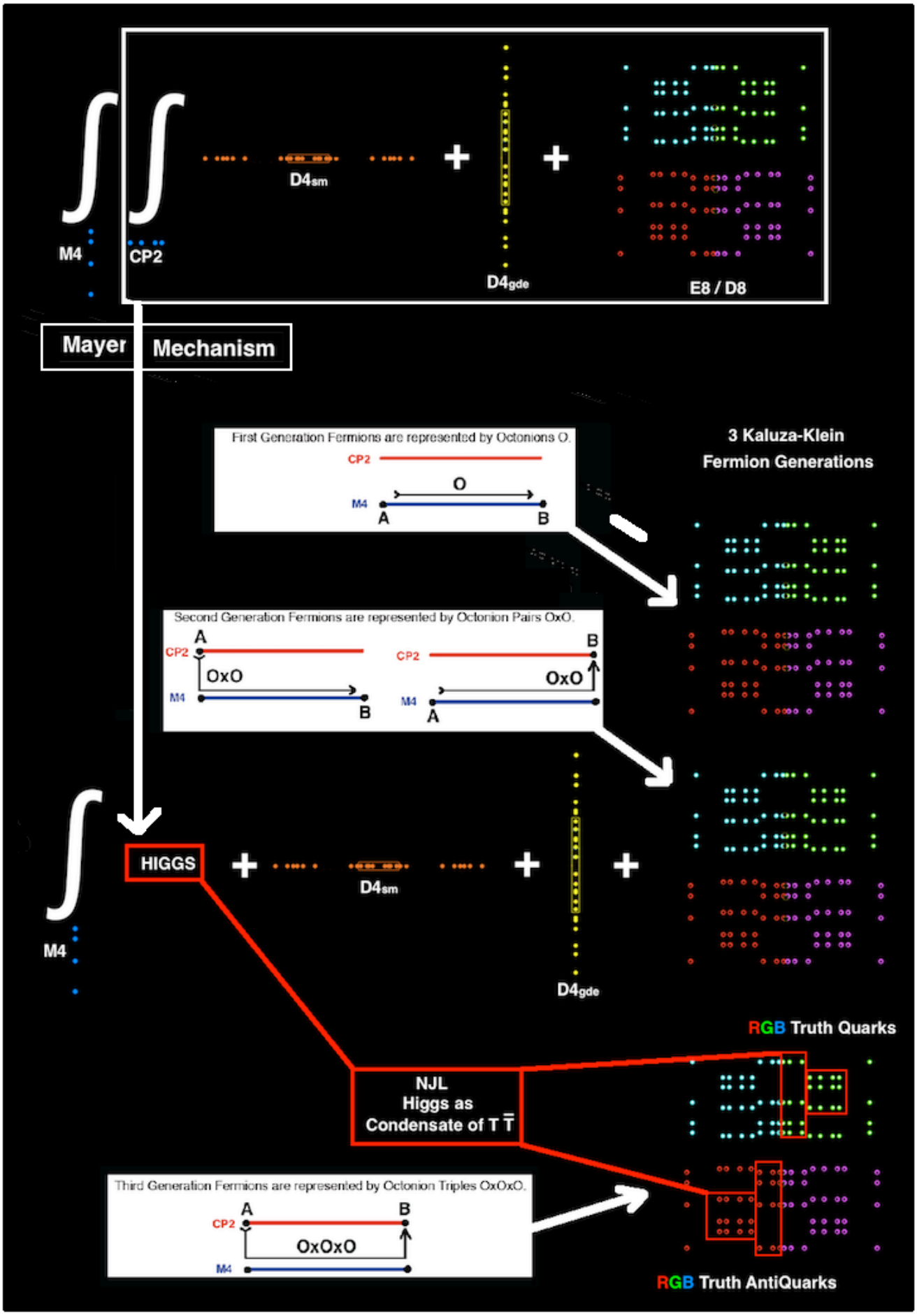



Events/10 GeV/c²
Top Mass (GeV/c²)


data
fit
bkgd
(a)
Fit top quark mass (GeV/c²)


untagged 4l 2016 Data
CMS Preliminary
195 GeV
125 GeV
260 GeV
GeV

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

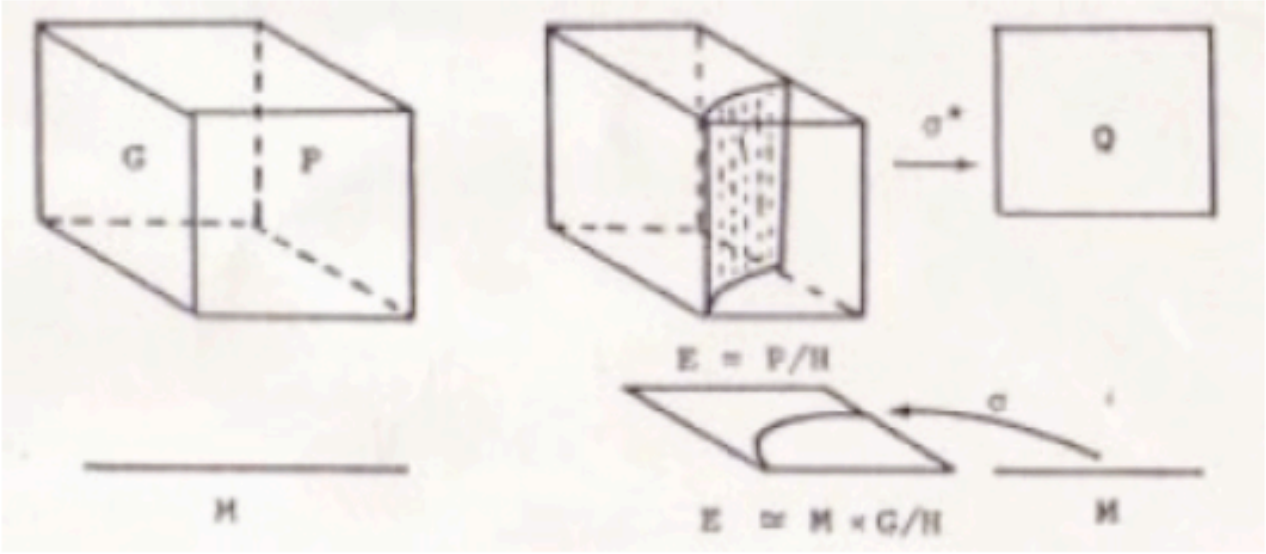


Quaternionic E7xSU(2) structure breaks 8-dim Spacetime Octonionic Symmetry to Quaternionic (4+4)-dim Associative x CoAssociative Kaluza-Klein Spacetime

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

where M4 = 4-dim Minkowski Physical Spacetime is Associative
and CP2 = SU(3) / SU(2) x U(1) Internal Symmetry Space is CoAssociative

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



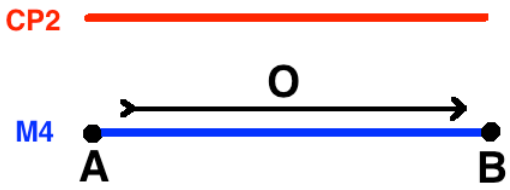
... consists of
a four- dimensional spacetime point x [in M4]
to which is attached the homogeneous space G / H [SU(3) / U(2) = CP2]
...
the components of the curvature lying in the homogeneous space G / H could be reinterpreted as Higgs scalars (with respect to spacetime [M4])
...
the Yang-Mills action 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)

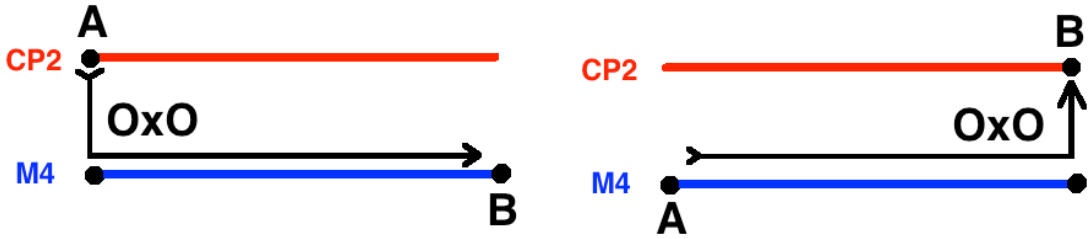
3 Generations of Fermions

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

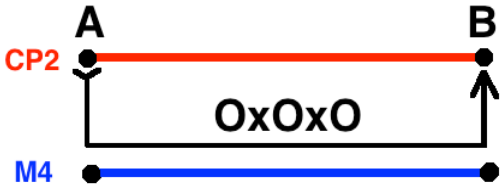
1 - A and B are both in M4: First Generation Fermion
whose path can be represented by the single O basis element
so that First Generation Fermions are represented by Octonions O.



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.

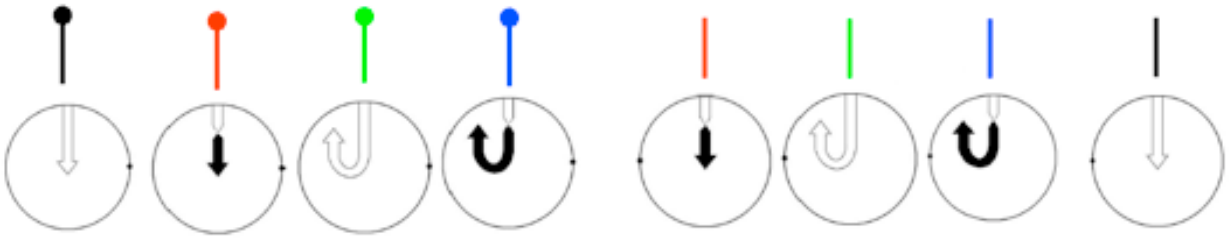


3 Generation Fermion Combinatorics

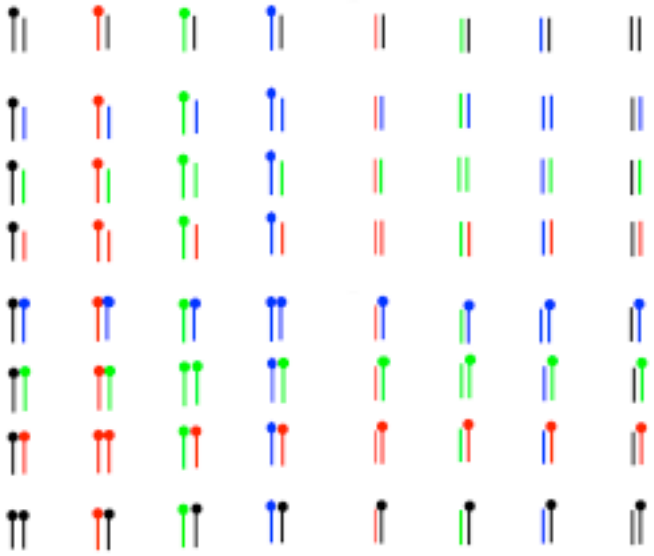
First Generation (8)

(geometric representation of Octonions is from arXiv 1010.2979)

electron	red up quark	green up quark	blue up quark	red down quark	green down quark	blue down quark	neutrino
E	I	J	K	i	j	k	1



Second Generation (64)

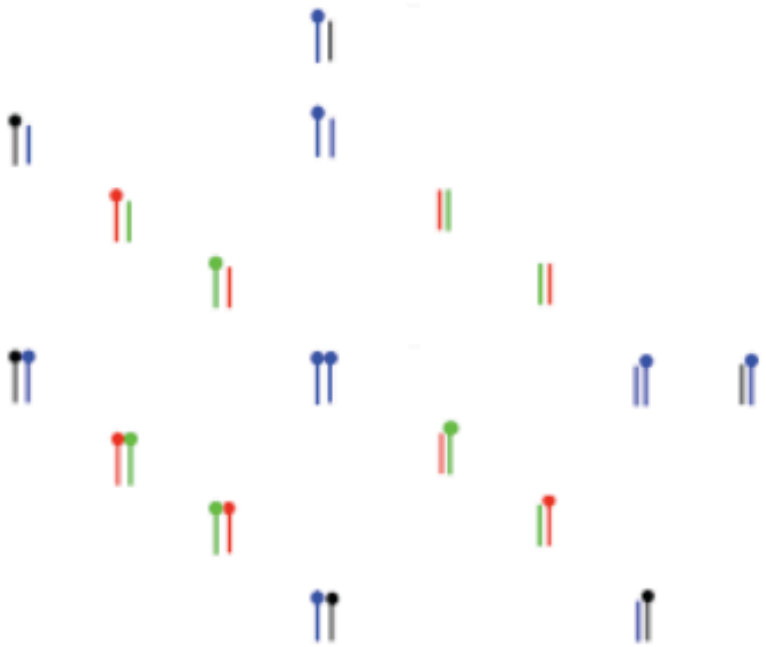


Mu Neutrino (1)
Rule: a Pair belongs to the Mu Neutrino if:
All elements are Colorless (black)
and all elements are Associative
(that is, is 1 which is the only Colorless Associative element) .

Muon (3)
Rule: a Pair belongs to the Muon if:
All elements are Colorless (black)
and at least one element is NonAssociative
(that is, is E which is the only Colorless NonAssociative element).

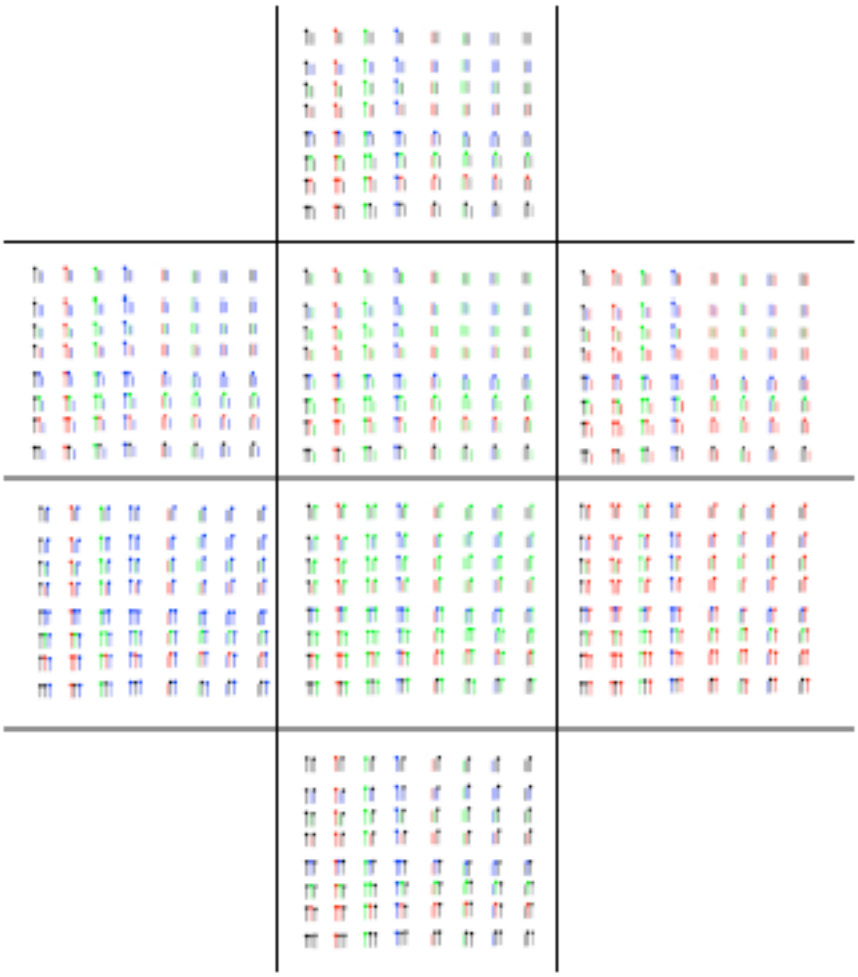
Blue Strange Quark **(3)**
Rule: a Pair belongs to the Blue Strange Quark if:
There is at least one Blue element and the other element is Blue or Colorless (black)
and all elements are Associative (that is, is either 1 or i or j or k).

Blue Charm Quark **(17)**
Rules: a Pair belongs to the Blue Charm Quark if:
1 - There is at least one Blue element and the other element is Blue or Colorless (black)
and at least one element is NonAssociative (that is, is either E or I or J or K)
2 - There is one Red element and one Green element (Red x Green = Blue).



(Red and Green Strange and Charm Quarks follow similar rules)

Third Generation (512)

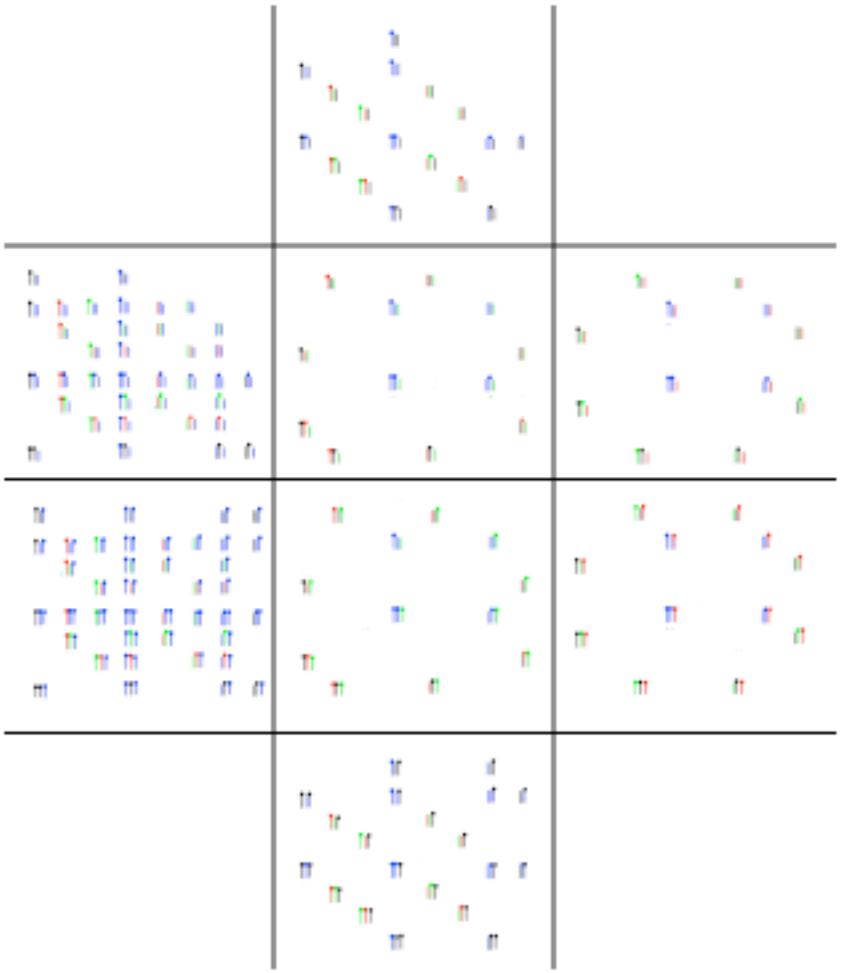


Tau Neutrino (1)
Rule: a Triple belongs to the Tau Neutrino if:
All elements are Colorless (black)
and all elements are Associative
(that is, is 1 which is the only Colorless Associative element)

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)

Blue Beauty Quark (7)
Rule: a Triple belongs to the Blue Beauty Quark if:
There is at least one Blue element and all other elements are Blue or Colorless (black) and all elements are Associative (that is, is either 1 or i or j or k).

Blue Truth Quark (161)
Rules: a Triple belongs to the Blue Truth Quark if:
1 - There is at least one Blue element and all other elements are Blue or Colorless (black)
and at least one element is NonAssociative (that is, is either E or I or J or K)
2 - There is one Red element and one Green element and the other element is Colorless (Red x Green = Blue)
3 - The Triple has one element each that is Red, Green, or Blue,
in which case the color of the Third element (for Third Generation) is determinative and must be Blue.



(Red and Green Beauty and Truth Quarks follow similar rules)

Fermion masses are calculated as a product of four factors:

V(Qfermion) x N(Graviton) x N(octonion) x Sym

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

V(Qdown quark) / V(Qelectron) = V(S^7x 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 mb = 5.63111 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 mt = 129.5155 GeV**

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

The 24 Orange Root Vectors of the D4 of E8 Standard Model + Gravity Ghosts
are on the Horizontal X-axis.

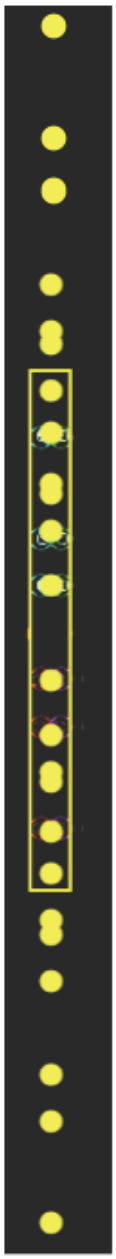
8 of them in the Orange Box represent the 8 Root Vectors of the Standard Model Gauge Groups SU(3) SU(2) U(1).
Their 4 Cartan Subalgebra elements correspond
to the 4 Cartan Subalgebra elements of D4 of E8 Standard Model + Gravity Ghosts
and to half of the 8 Cartan Subalgebra elements of E8.

The other 24-8 = 16 Orange Root Vectors represent Ghosts of 16D U(2,2)
which contains the Conformal Group SU(2,2) = Spin(2,4)
that produces Gravity + Dark Energy by the MacDowell-Mansouri mechanism.

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

Electroweak SU(2) x U(1) is gauge group as isotropy group of CP2.

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



The 24 Yellow Root Vectors of the D4 of E8 Gravity + Standard Model Ghosts are on the Vertical Y-axis.
12 of them in theYellow Box represent the 12 Root Vectors of the Conformal Gauge Group SU(2,2) = Spin(2,4) of Conformal Gravity + Dark Energy.
The 4 Cartan Subalgebra elements of SU(2,2)xU(1) = U(2,2) correspond to the 4 Cartan Subalgebra elements of D4 of E8 Gravity + Standard Model Ghosts and to the other half of the 8 Cartan Subalgebra elements of E8.

The other 24-12 = 12 Yellow Root Vectors represent Ghosts of 12D Standard Model whose Gauge Groups are SU(3) SU(2) U(1).

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

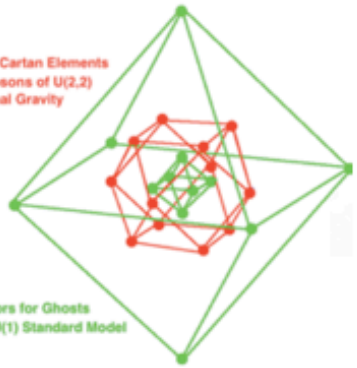
4 Translations representing Primordial Black Hole Dark Matter

10 = 4 Special Conformal + 6 Lorentz representing Dark Energy
(see Irving Ezra Segal, "Mathematical Cosmology and Extragalactic Astronomy" (Academic 1976))

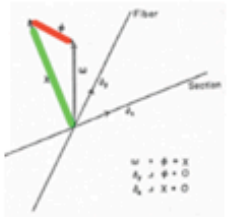
The basic ratio Dark Energy : Dark Matter : Ordinary Matter = 10:4:1 = 0.67 : 0.27 : 0.06
When the dynamics of our expanding universe are taken into account, the ratio is calculated to be **0.75 : 0.21 : 0.04**

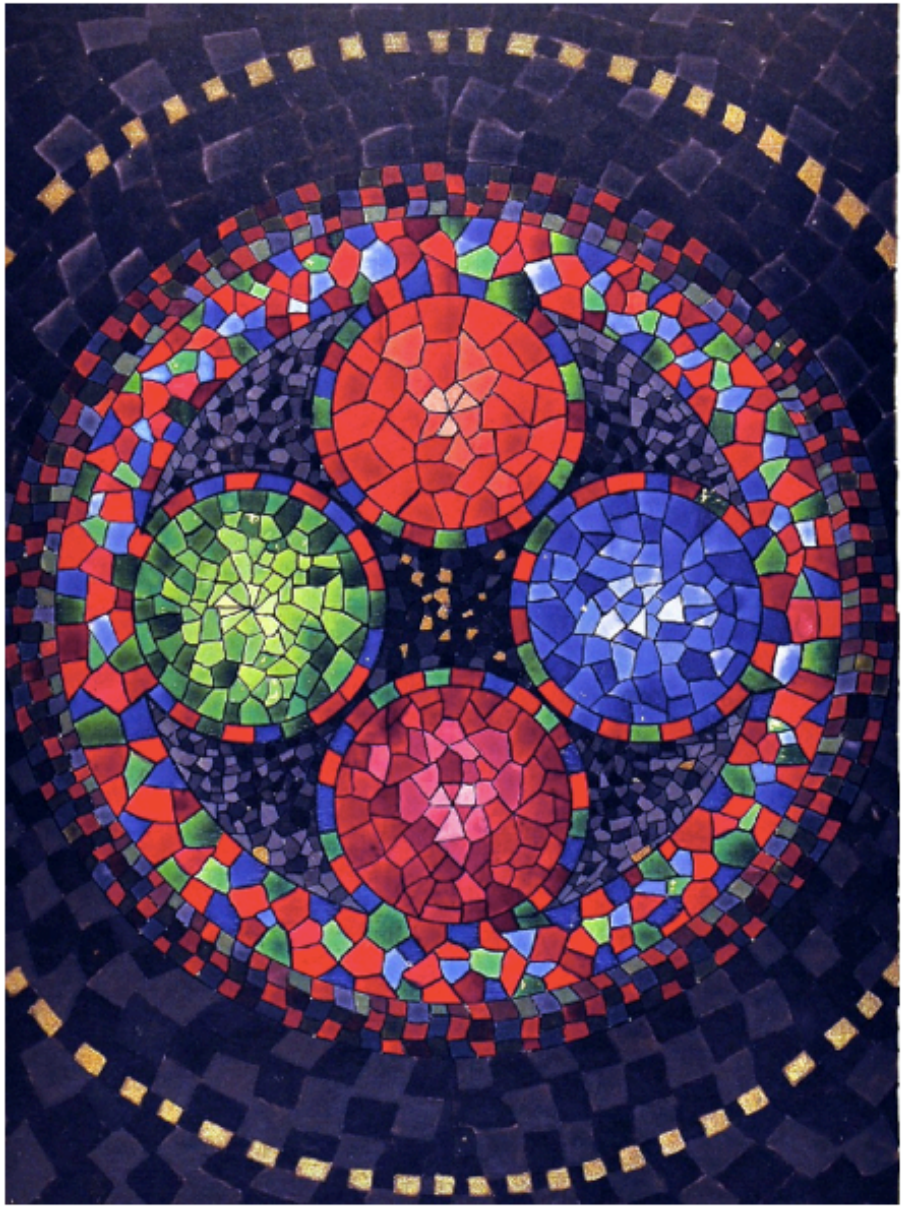
D4

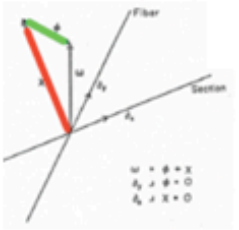
12 Root Vectors + 4 Cartan Elements
for 16 Gauge Bosons of U(2,2)
for Conformal Gravity



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

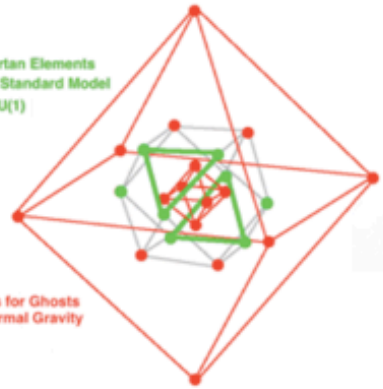






D4

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^1xS^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^1xS^2
U(1)	-	-	1	-

Force	M	Vol(M)	Q	Vol(Q)	D	Vol(D)
gravity	S^4	8pi^2/3	RP^1xS^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^2xS^2	2x4pi	RP^1xS^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 10^19 GeV = 1 ; GGmproton^2 approx 5 x 10^-39

SU(3) color at 245 MeV = 0.6286

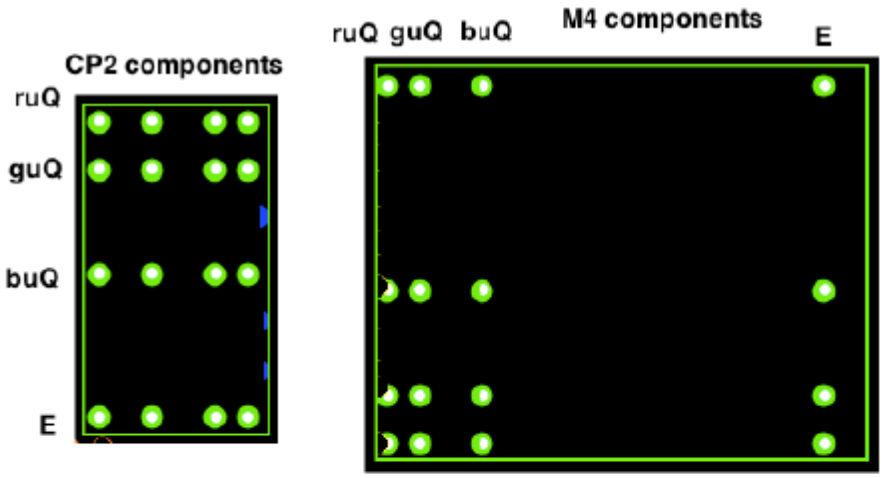
at 5.3 GeV = 0.166

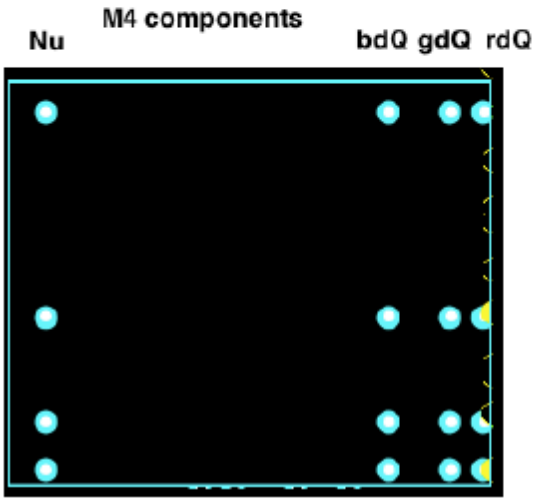
at 34 GeV = 0.121

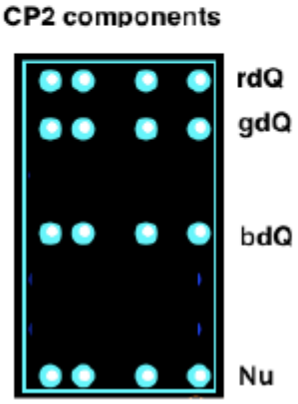
at 91 GeV = 0.106 ; with nonperturbative effects = 0.125

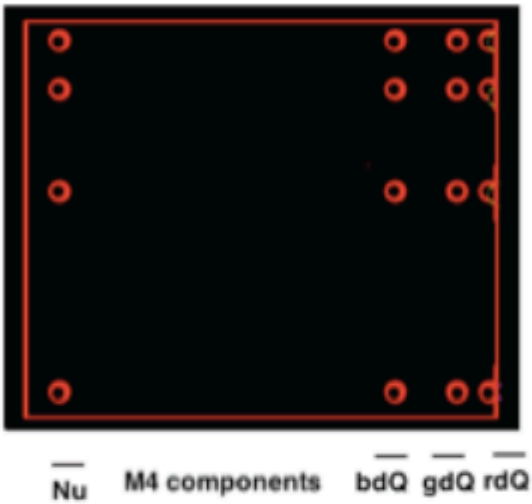
SU(2) weak at 100 GeV = 0.2535 ; GWmproton^2 approx 1.05 x 10^-5

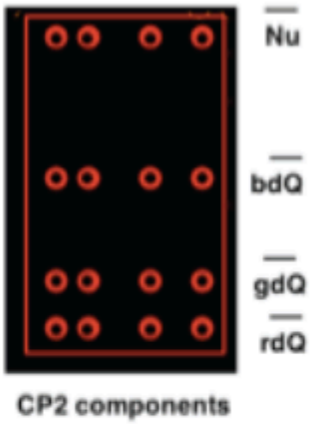
U(1) e-mag at 4 KeV = 1/137.03608

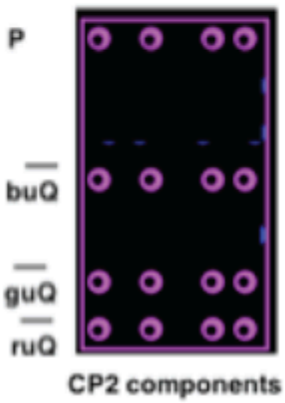

CP2 components
ruQ
guQ
buQ
E
ruQ guQ buQ
M4 components
E

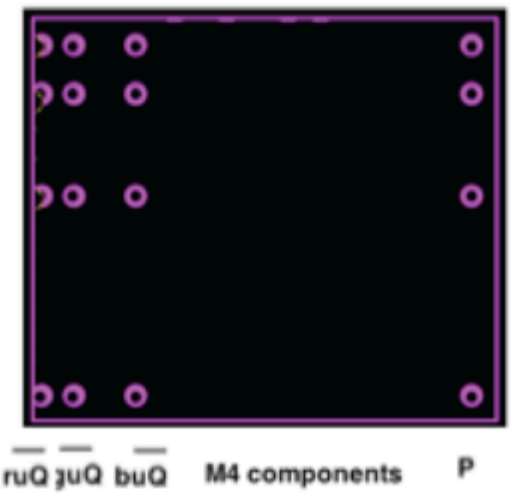

Nu
M4 components
bdQ gdQ rdQ

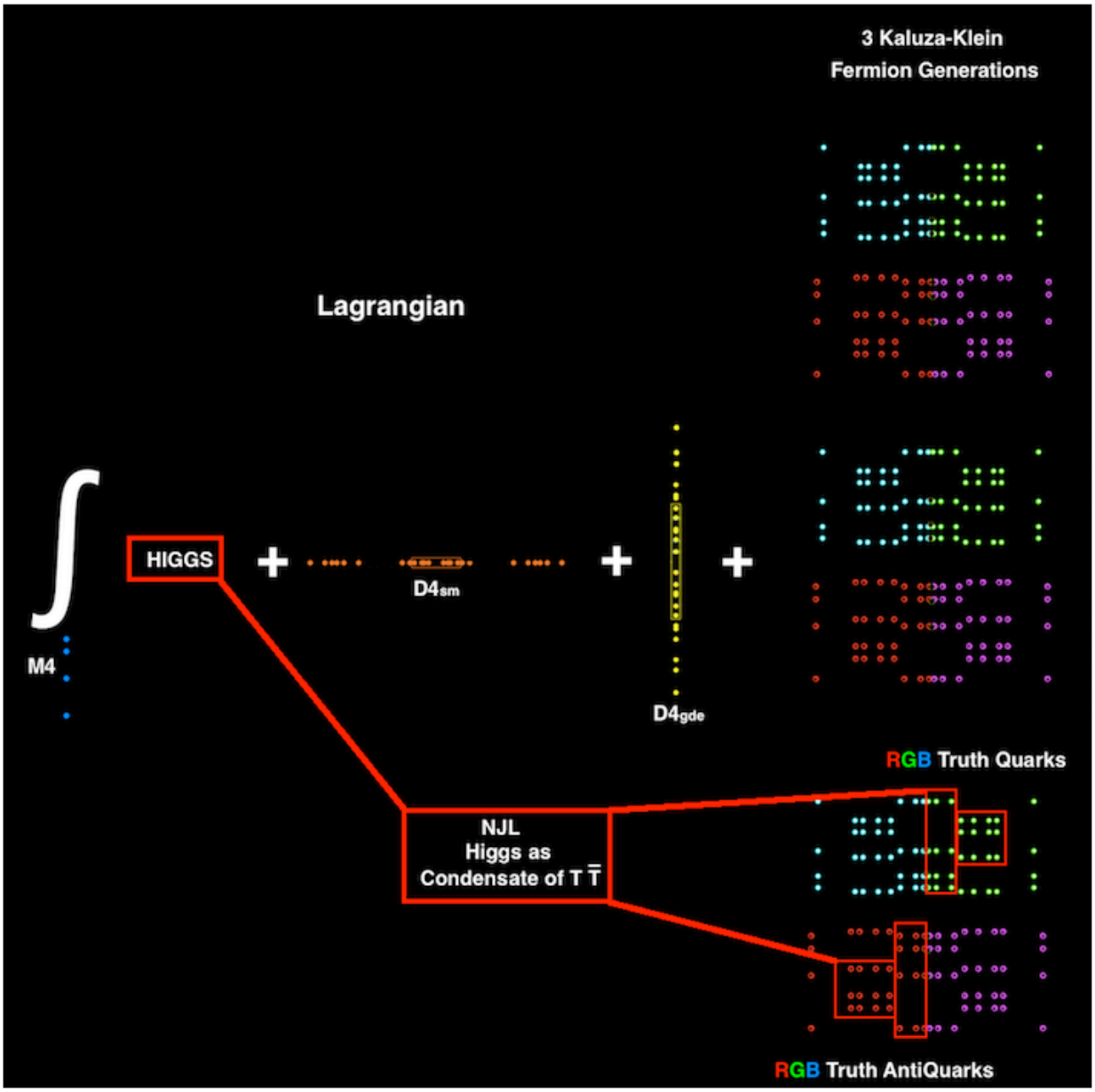

CP2 components
rdQ
gdQ
bdQ
Nu


Nu
M4 components
bdQ gdQ rdQ


Nu
bdQ
gdQ
rdQ
CP2 components


P
buQ
guQ
ruQ
CP2 components


ruQ guQ buQ
M4 components
P



Fermion masses are calculated as a product of four factors:

V(Qfermion) x N(Graviton) x N(octonion) x Sym

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

V(Qdown quark) / V(Qelectron) = V(S^7x 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

red Truth quark mass is mt = 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.

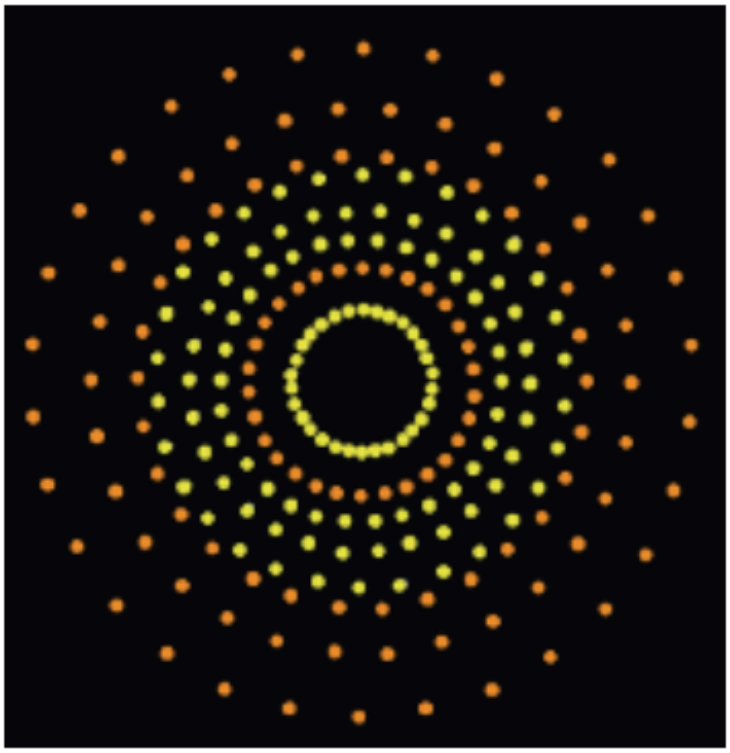
Particle/Force	Tree-Level	Higher-Order
e-neutrino	0	0 for nu_1
mu-neutrino	0	9 x 10^(-3) eV for nu_2
tau-neutrino	0	5.4 x 10^(-2) eV for nu_3
electron	0.5110 MeV	
down quark	312.8 MeV	charged pion = 139 MeV
up quark	312.8 MeV	proton = 938.25 MeV
		neutron - proton = 1.1 MeV
muon	104.8 MeV	106.2 MeV
strange quark	625 MeV	
charm quark	2090 MeV	
tauon	1.88 GeV	
beauty quark	5.63 GeV	
truth quark (low state)	130 GeV	(middle state) 174 GeV
		(high state) 218 GeV
W+	80.326 GeV	
W-	80.326 GeV	
W0	98.379 GeV	Z0 = 91.862 GeV
Mplanck 1.217x10^19 GeV		
Higgs VEV (assumed)	252.5 GeV	
Higgs (low state)	126 GeV	(middle state) 182 GeV
		(high state) 239 GeV
Gravity Gg (assumed)	1	
(Gg)(Mproton^2 / Mplanck^2)		5 x 10^(-39)
EM fine structure	1/137.03608	
Weak Gw	0.2535	
Gw(Mproton^2 / (Mw+^2 + Mw-^2 + Mz0^2))		1.05 x 10^(-5)
Color Force at 0.245 GeV	0.6286	0.106 at 91 GeV

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

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

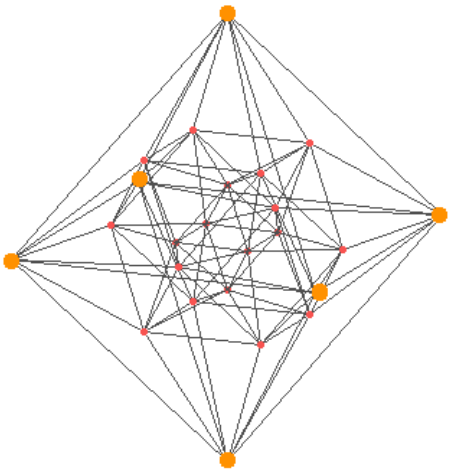
The phase angle d13 is taken to be 1 radian.

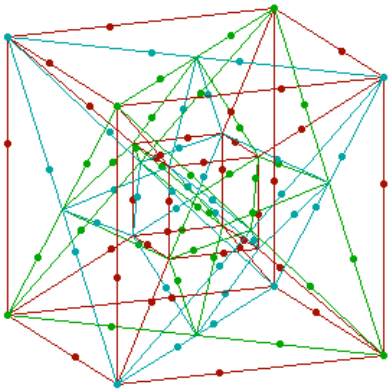
E8 = H4 + H4 = 120 + 120 = 240-vertex Witting polytope tiling of 8-dim space



E8 = 120 BiVectors + 128 half-Spinors of Cl(16) Clifford Algebra
with graded structure
1 16 120 560 1820 4368 8008 11440 12870 11440 8008 4368 1820 560 120 16 1
By 8-Periodicity of Real Clifford Algebras: Cl(16) = tensor product Cl(8) x Cl(8)
so with that product E8 = F4 x F4

H4 = 24 (vertices) + 96 (edges) = 120-vertex 600-cell tiling of 4-dim space
with Coxeter Group determined by E8



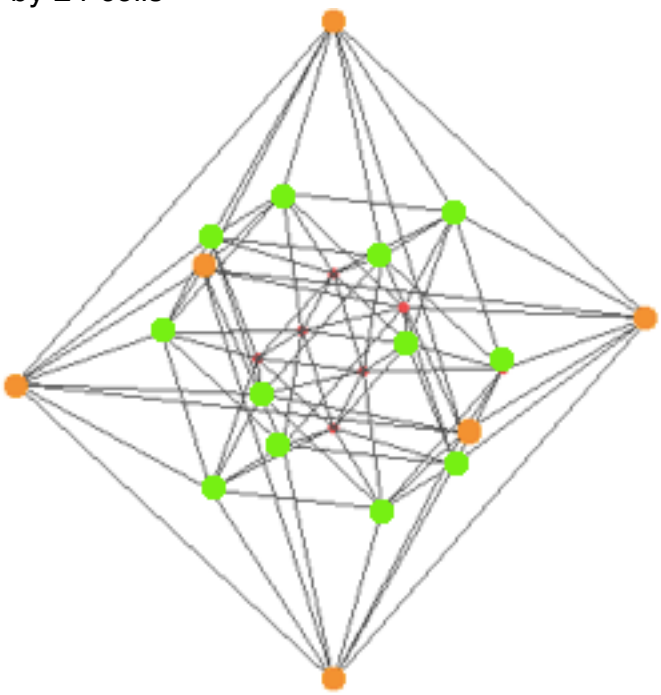


F4 = 24 cell + dual 24-cell tiling of 4-dim space

F4 = 8 Vectors + 28 BiVectors + 16 Spinors of Cl(8) Clifford Algebra
with graded structure 1 8 28 56 70 56 28 8 1
tile 4-dim space by 24-cells and their dual 24-cells

D4 24-cell tiling of 4-dim space

D4 = 28 BiVectors of Cl(8) Clifford Algebra with 24 root vectors
with graded structure 1 8 28 56 70 56 28 8 1
tile 4-dim space by 24-cells



A3 = D3 = cuboctahedral tiling of 3-dim space

A3=D3 = 15 BiVectors of Cl(6) Clifford Algebra with 12 root vectors and
with graded structure 1 6 15 20 15 6 1
tile 3-dim space by cuboctahedra
which can be seen as a central part of a 24-cell (green vertices above)

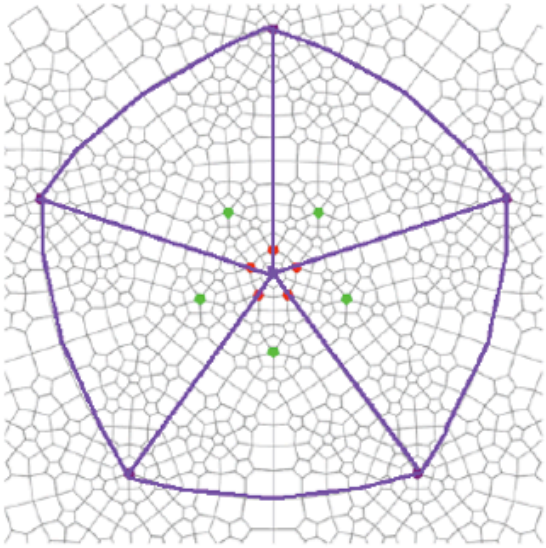
H3 = 12-Vertex Icosahedron as Jitterbug Transform of 12-Vertex Cuboctahedron

with Coxeter Group determined by D6

H2 Penrose STAR tilings of 2-dim space

H2 = I^5_2 = Penrose STAR tiling of 2-dim space
with Coxeter group determined by A4 which contains A2
and field extension Q(sqrt(5))

The central part of the tiling has 5 pentagonal sectors

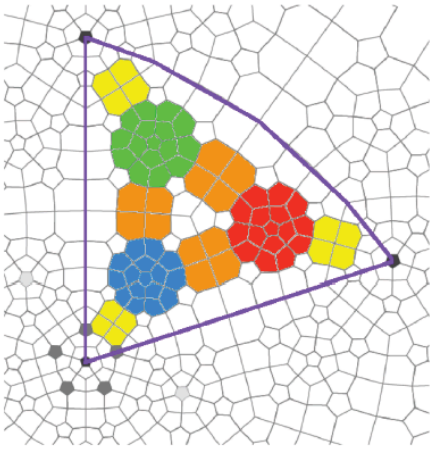


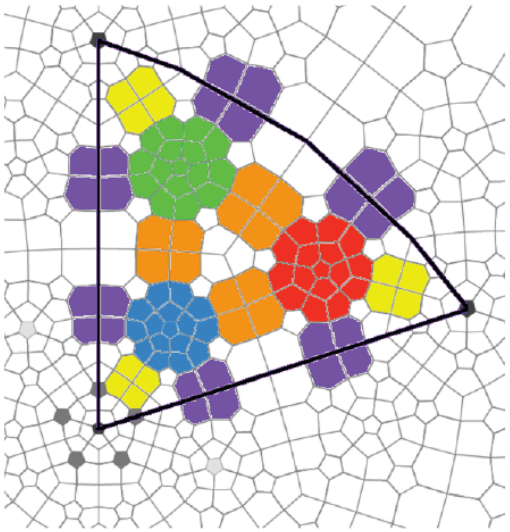
Each of the 5 pentagonal sectors of the tiling contains a 2-dim projected version of the 8-dim E8 Root Vector structure of E8 Physics corresponding to the Complex E6 subalgebra of Octonionic E8. The outer boundary of each sector is not a straight line but is curved with Conformal Symmetry and pentagonal sectors further out are conformally curved rather than straight-line pentagons.

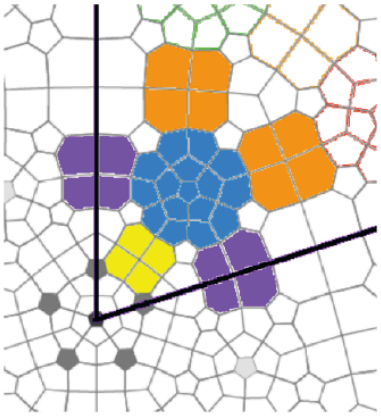
Each pentagonal sector represents the Complex part of Octonionic E8 Physics whose 240 E8 Root Vectors project to the 72 Root Vectors of E6 subalgebra of E8 which 72 E6 Root Vectors have the following physical interpretation

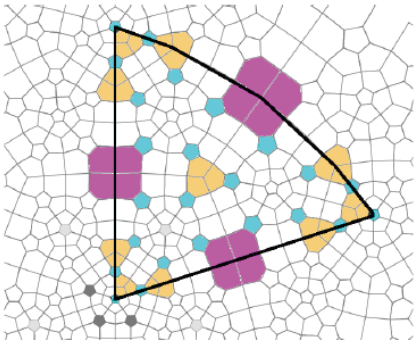
16 = 2x8 of which represent Complex Fermion Particles
16 = 2x8 of which represent Complex Fermion AntiParticles
16 = 2x(4+4) of which represent Complex (4+4)-dim Kaluza-Klein SpaceTime
12 of which represent the Standard Model
12 of which represent Gravity + Dark Energy

as shown in the following image of one of the pentagonal sectors:

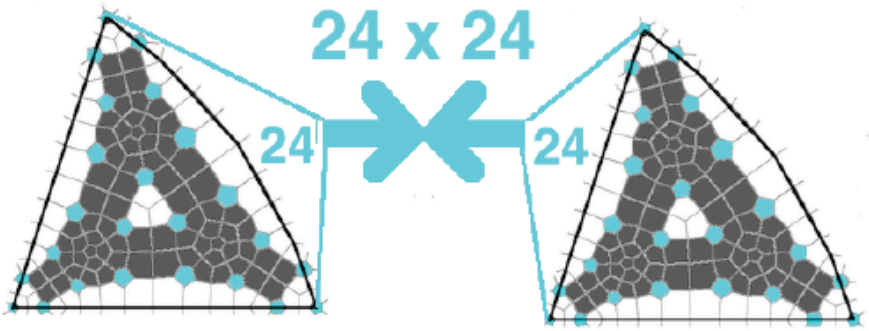






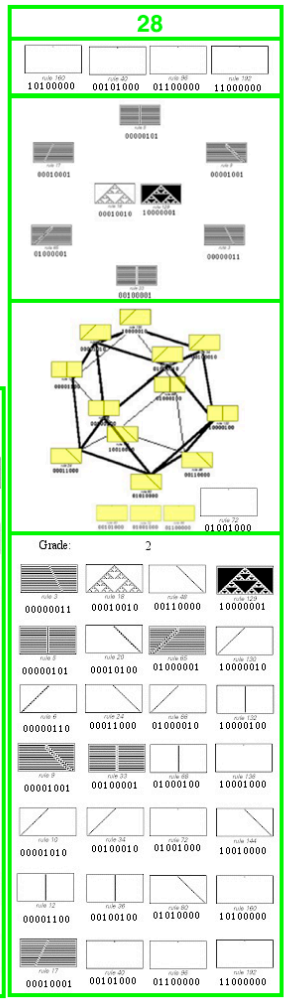


The Bohm Quantum Potential interacts between two Pentagonal Sectors by
24 Bohm Carrier Tiles of one Pentagonal Sector carrying E8 Configuration Information
and comparing it with
24 Bohm Carrier Tiles of the Other Sector carrying E8 Configuration Information.
If the resulting 24 x 24 Matrix shows that the two E8 Configurations are similar,
then a Bohm Quantum Potential Resonant Connection is established.

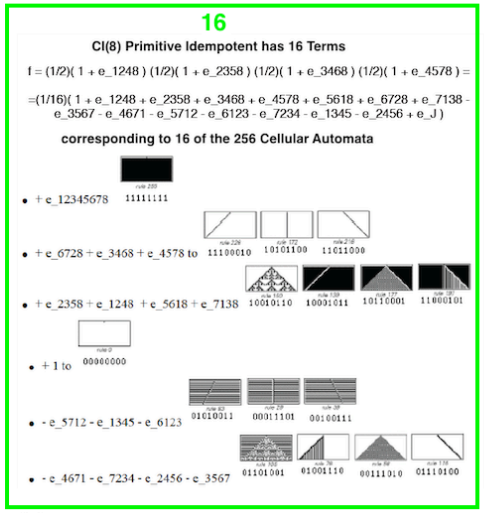


The Bohm Quantum Potential 24x24 Matrix is traceless because Configuration
Resonance is sensitive to similarity rather than dilation scale
and is symmetric because Configuration Resonance is symmetric between Sectors.

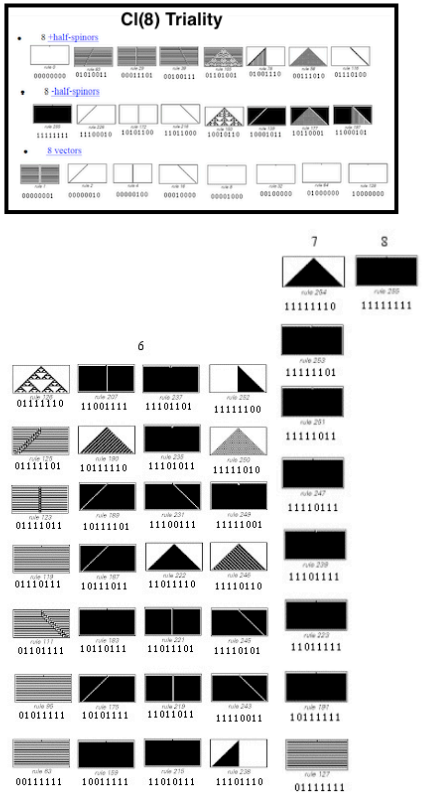
256-dim Cl(8) as Cellular Automata



8+28+16 = 52 F4

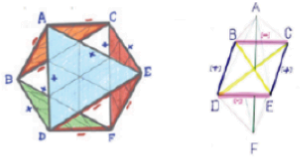


Tensor Product Cl(8) x Cl(8) = Cl(16)
(F4 in Cl(8)) x (F4 in Cl(8)) =
= 8x8 + 28x1 + 1x28 + 16x16 =
= 120 Cl(16) BiVectors + (128 + 128) Cl(16) Spinors
120 Cl(16) BiVectors + 128 Cl(16) Half-Spinors = E8

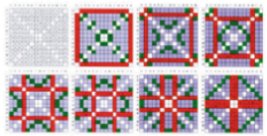


Guillermo Moreno (arXiv math/0512517) has shown that **V(7,2) = Spin(7) / Spin(5)** can be identified with the **Zero Divisors of Sedenions** which have 7+28 = 35 Associative Triples and for which Zero Divisors are given by the fibration V(7,2) -> G2 -> S3 [3-sphere] and which have 4-2=2 ZD Irreducible Components and 10-dim Lie Sphere Spin(7) / Spin(5)xU(1) whose 10D correspond to **Cl(1,9) = Cl(2,8) Conformal over Cl(1,7)** that **V(15,2) = Spin(15) / 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 Spin(15) / Spin(13)xU(1) whose 26D correspond to **26D String Theory and to 26-dim traceless J(3,O)o** that **V(127,2) = Spin(127) / Spin(125)** is related to, but not identified with, the **Zero Divisors of Voudon 256-ons** corresponding to 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 Spin(127) / Spin(125)xU(1)

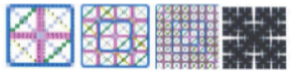
Robert de Marrais said "... 256 ... 2^8 ions Voudons ... Moreno ... determines that the automorphism group of the ZD's of all 2^n-ions ... obey a simple pattern: for n ≥ 4 this group has the form G2 x (n-3) x S3 (... order-6 permutation group on 3 elements) ... This says the automorphism group of the Sedenions' ZD's has order 14 x 1 x 6 = 84 ... based on 7 octahedral lattices ("Box-Kites") ...

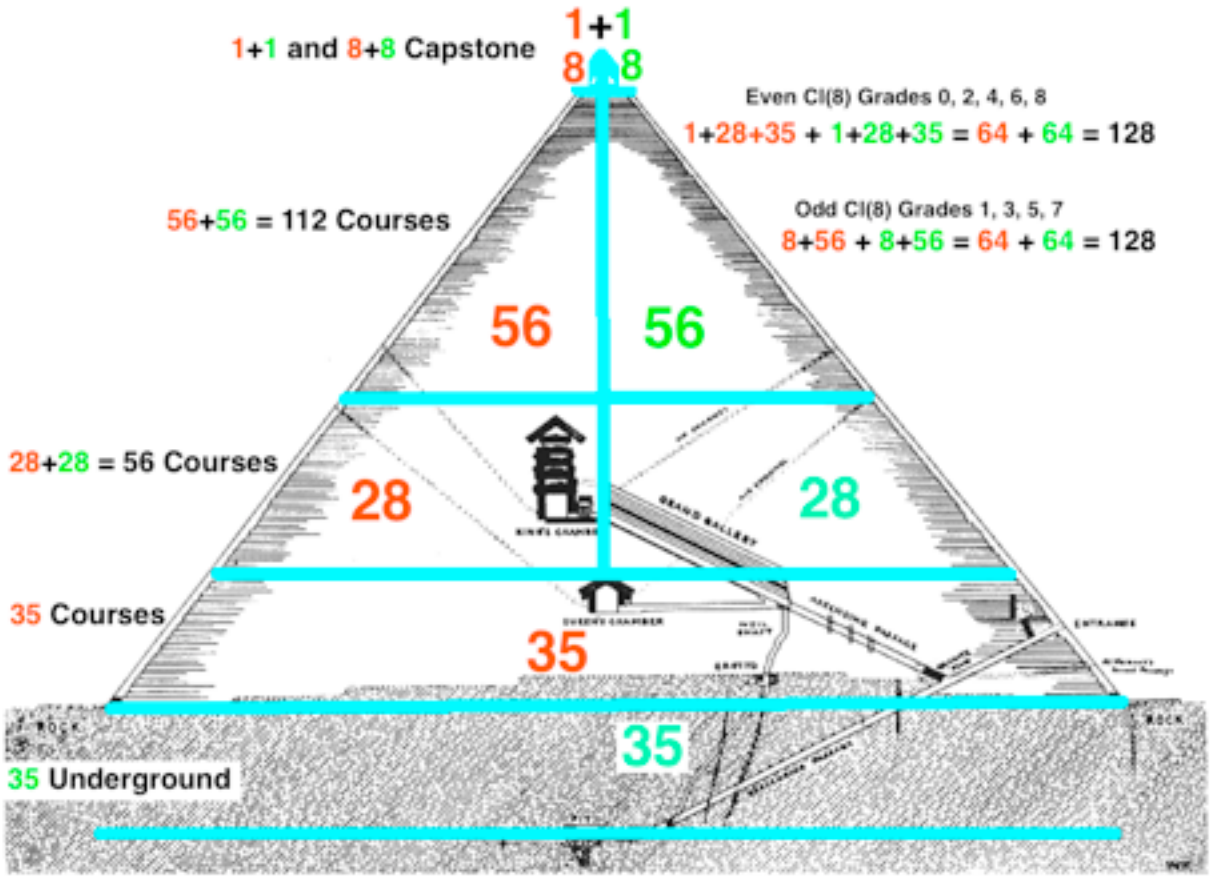


... Harmonics of Box-Kites, called here "Kite-Chain Middens," ... extend indefinitely into higher forms of 2^n -ions. All non-Midden-collected ZD diagonals in the ... 32-ons ... belong... to a set of 15 "emanation tables," ... they house 168 ... PSL(2,7) ... cells ... 8 ... 32-ons ,,, ET's ... from S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

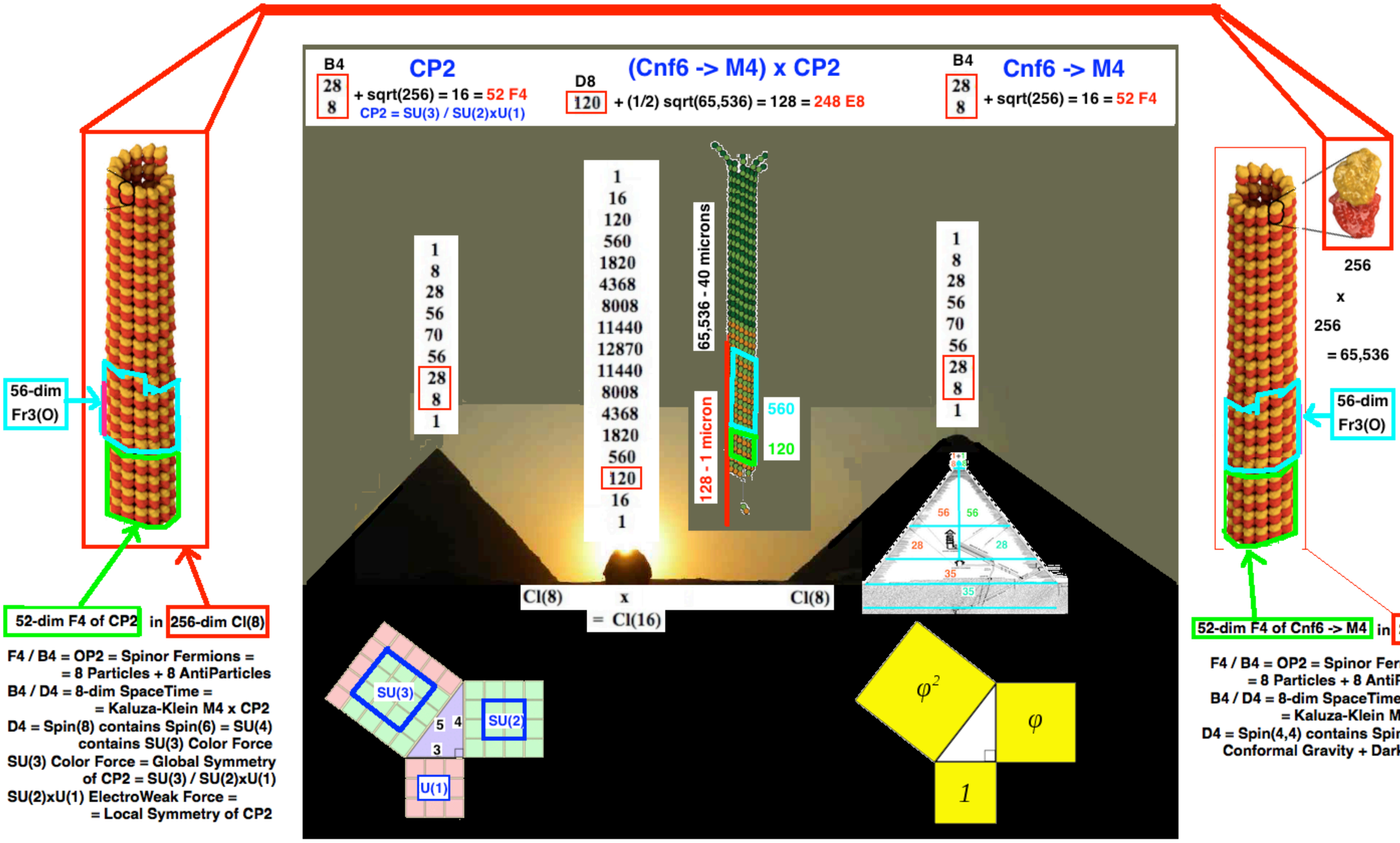


[here are] ... Emanation Tables ... ET's for S = 15, N = 5,6,7 ... and fractal limit ...





1 + 8 + 28 + 56 + (35 + 35) + 56 + 28 + 8 + 1



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

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

D8 = Cl(16) BiVectors = 120
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)
10xFr3(O) = Cl(16) TriVectors = 560

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

Kaluza-Klein Spacetime
M4 x CP2

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

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

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

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

Spinors:
(8s+8c) x (8s+8c) = (8sx8s + 8sx8c + 8cx8s + 8cx8c)

Quantum Resonant Connection

40 micron microtubule 65.000 TD

256-dim Cl(8)

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

56-dim Fr3(O)

52-dim F4

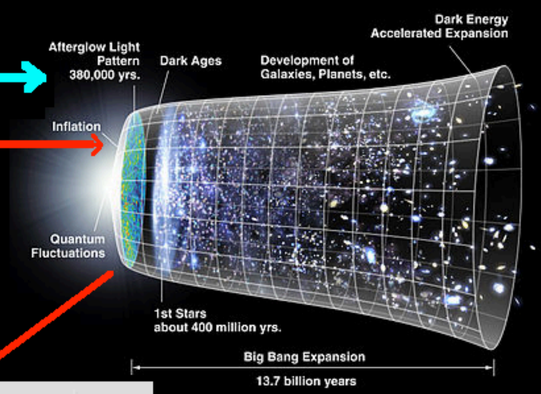
M4

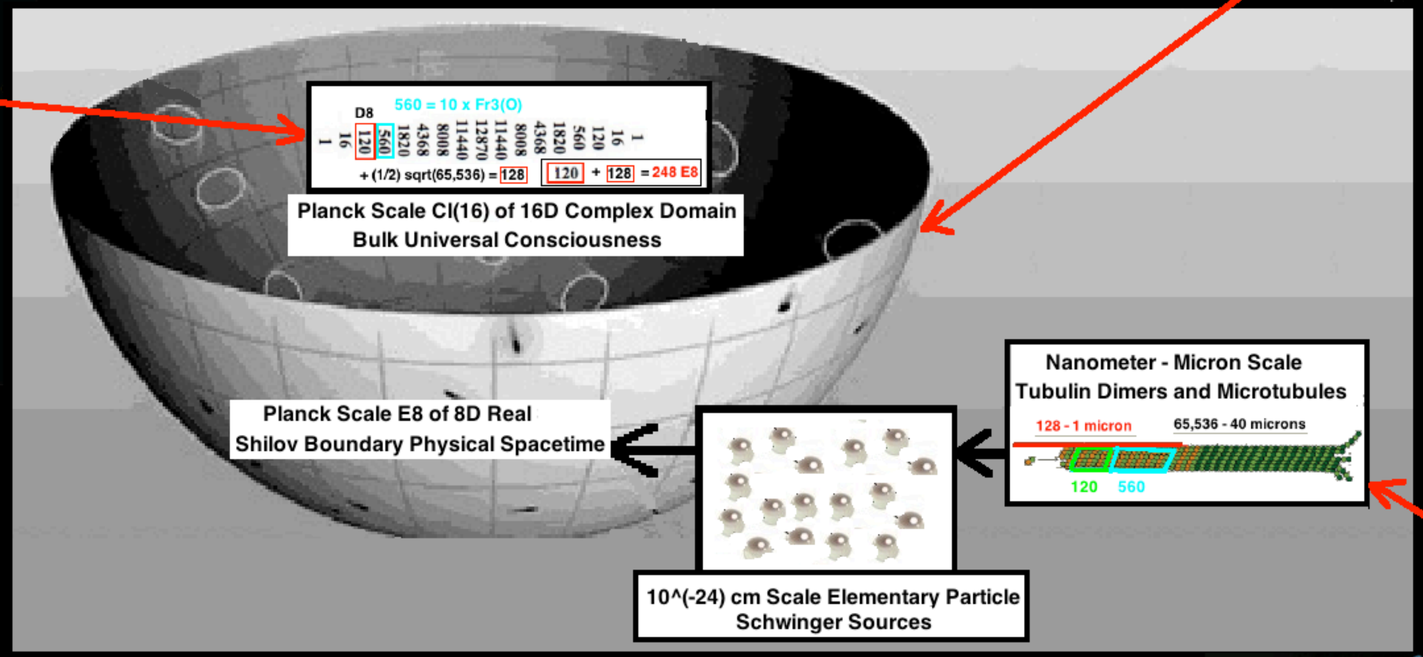
CP2

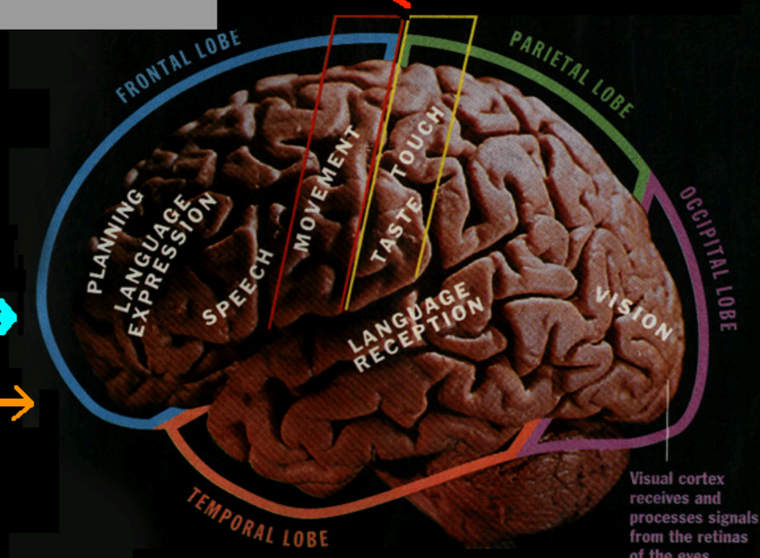
Penrose-Hameroff Quantum Condensate

NJL Quantum Condensate

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







10^19 Tubulin Dimers in a Human Brain

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

Kaluza-Klein Spacetime
M4 x CP2

Cl(8) that contains 28 = D4 for M4 Gravity		Cl(8) that contains 28 = D4 for CP2 Std Model
1		1
8		8
28		28
56		56
70	x	70 = 1820
56		56 = 560
28		28 = 120
8		8 = 16
1		1 = 1

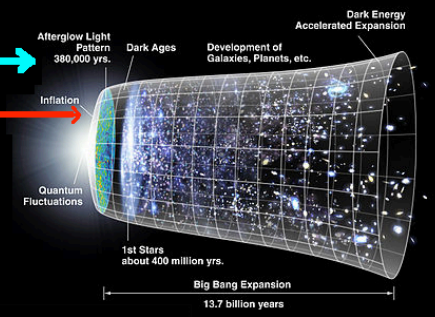
Cl(8) x Cl(8) = Cl(16)

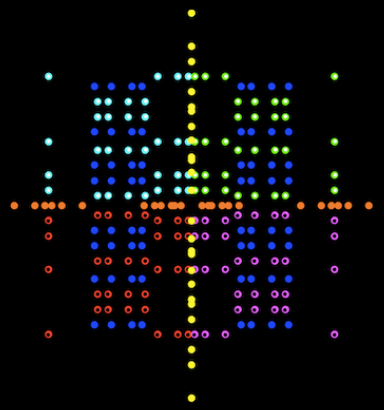
Spinors: $(8_s \times 8_s + 8_s \times 8_c)$
$(8s+8c) \times (8s+8c) =$ +
$(8_c \times 8_s + 8_c \times 8_c)$

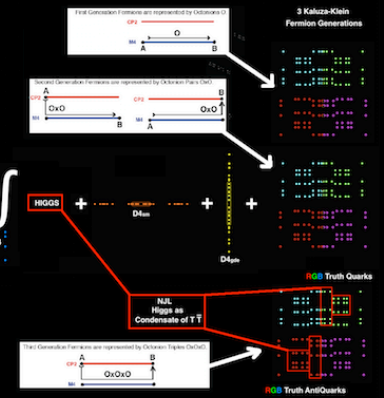
Quantum Resonant Connection

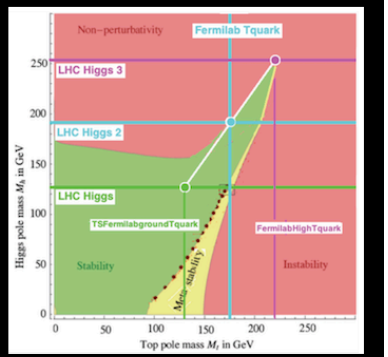
NJL Quantum Condensate

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





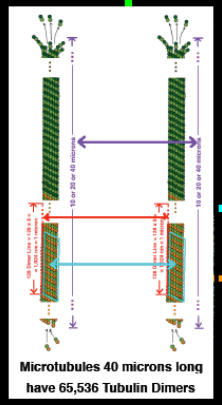




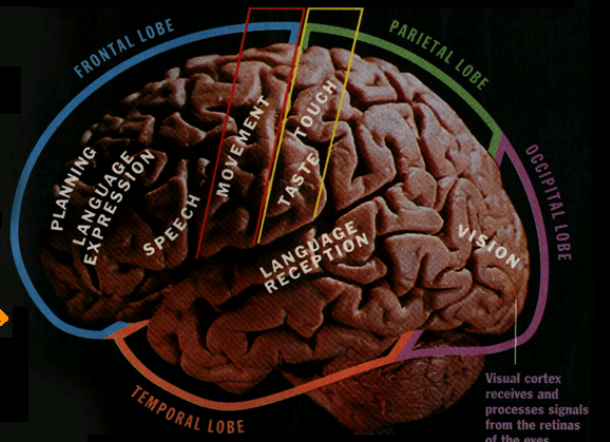
Cl(0,16) x Cl(0,8) = Cl(0,24)

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

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



Penrose-Hameroff Quantum Condensate



10^19 Tubulin Dimers in a Human Brain

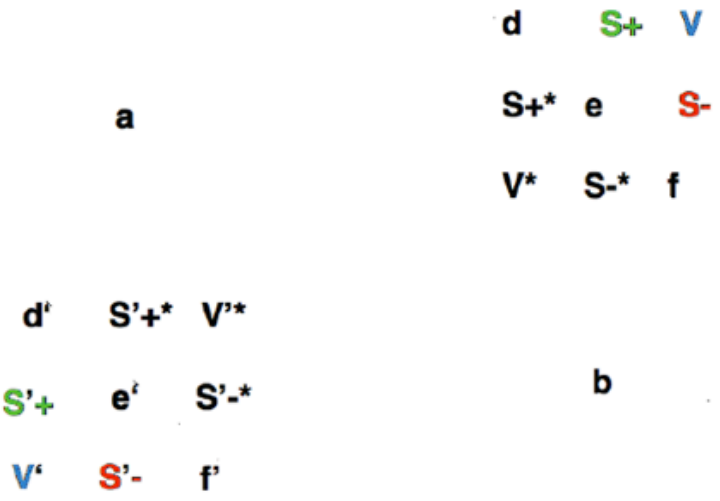
E8 Physics World-Lines = Strings as String Theory

Fundamental Interactions are not among Point Particles
but are among Strings = World-Line Histories of Particles.

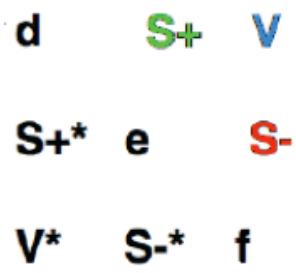
David Finkelstein said
(“Space-Time Code. III” Phys. Rev. D (1972) 2922-2931)
“... According to relativity,
the world is a collection of processes (events}
with an unexpectedly unified causal or chronological structure.
Then an object is secondary ...[to]...
a long causal sequence of processes, world line. ..
[if] we assemble these ... into chromosomelike code sequences ...
and braid and cross-link these strands
to make more complex objects and their interactions
...[then]... The idea of the quantum jump comes into its own ...”.

Do the 56-dim grade-3 TriVectors of Cl(8) represent 26D String Theory of E8 Physics ?

56-dim Freudenthal Algebra Fr3(O) = Zorn vector-matrices



where a, b, d, e, and f are real numbers;
S+, V, S-, S'+, V', and S'- are Octonions;
and * denotes conjugation.



is 27-dim J3(O) = 3x3 Hermitian Octonion Matrices
whose traceless part is 26-dim J3(O)o
that describes 26D String Theory
with

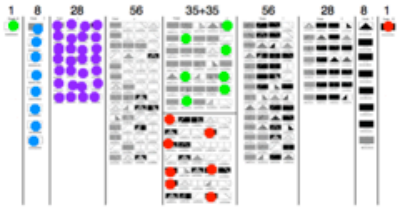
V = 8-dim Spacetime
the 8-real-dim space RP1 x S7 that is the Shilov Boundary
of the 16-real-dim IV(8,2) Bounded Domain (tube type)
of the BDI Symmetric Space Spin(10) / Spin(8) x U(1)

S+ = 8 +half-Spinor Fermion Particles
the real part RP1 x S7 of the Complex Shilov Boundary S
of the 32-real-dim V non-tube type.bounded Domain (CxO)P2
of the EIII Symmetric Space E6 / Spin(10) x U(1).

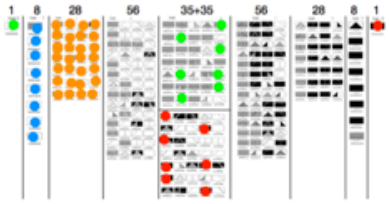
S- = 8 - half-Spinor Fermion AntiParticles
RP1 x S7 in the Complex part of the Shilov Boundary S of the 32-real-dim V non-tube type bounded Domain (CxO)P2 of the EIII Symmetric Space E6 / Spin(10) x U(1)

Fr3(O) has two copies of J3(O)
and therefore is its Complexification
and
therefore also is a Complexification of J3(O)o
and of 26D String Theory
so
Fr3(O) is the structural basis
for E8 World-Lines = Strings Theory

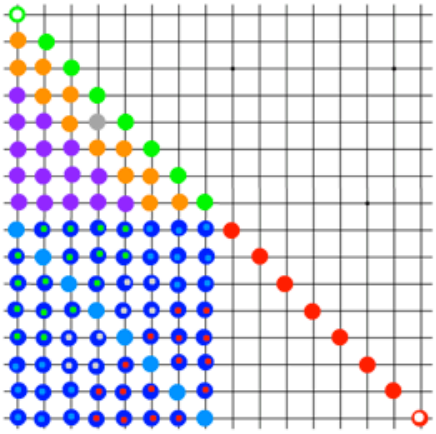
First Cl(8) D4 F4 acting on M4
Graded Representation



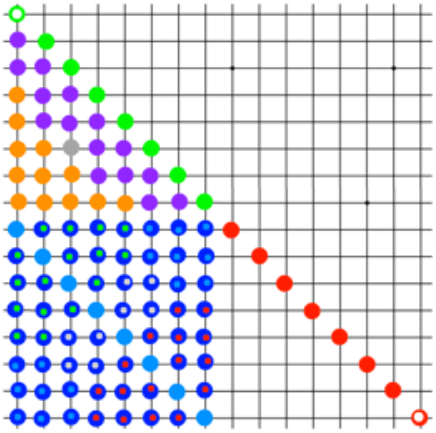
Second Cl(8) D4 F4 acting on CP2
Graded Representation



16x16 Matrix Representation



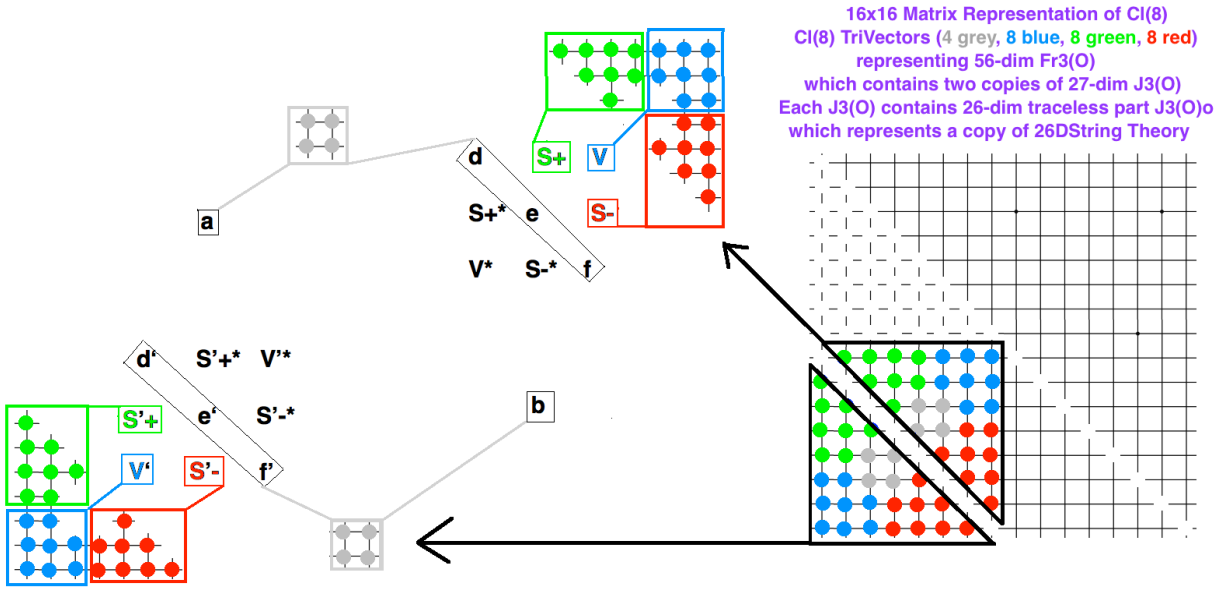
16x16 Matrix Representation



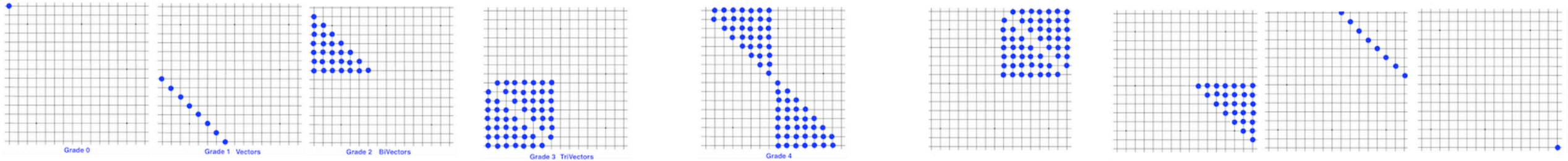
15 Purple = Spin(2,4) = SU(2,2) Gauge Bosons
1 Grey = U(1) of U(2,2) Propagator Phase
12 Orange = Standard Model Ghosts

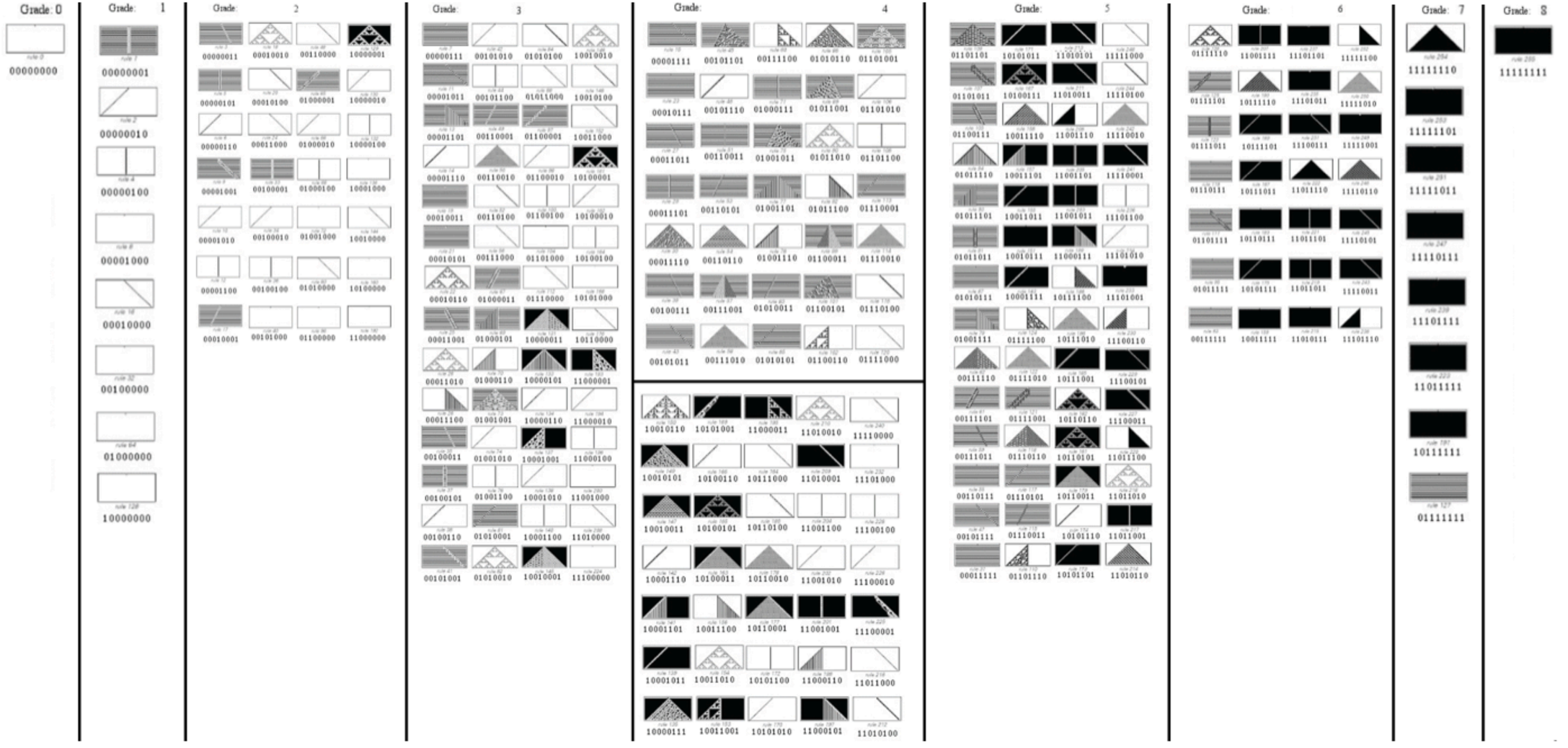
12 Orange = SU(3) x SU(2) x U(1) Gauge Bosons
1 Grey = U(1) of U(3) Propagator Phase
15 Purple = Gravity + Dark Energy Ghosts

Cl(8) TriVectors correspond to Fr3(O)

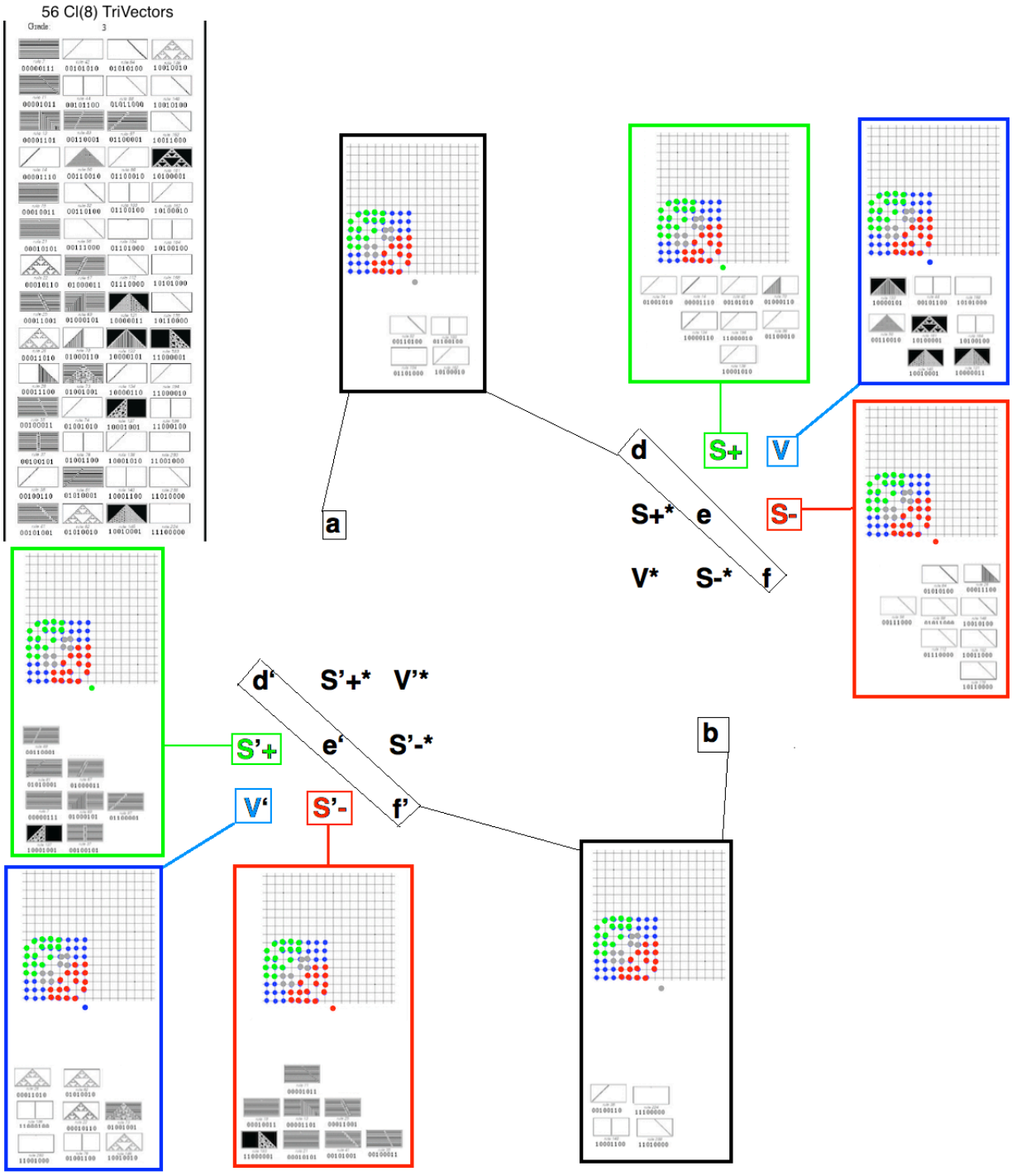


16x16 Matrix Representation of Cl(8)



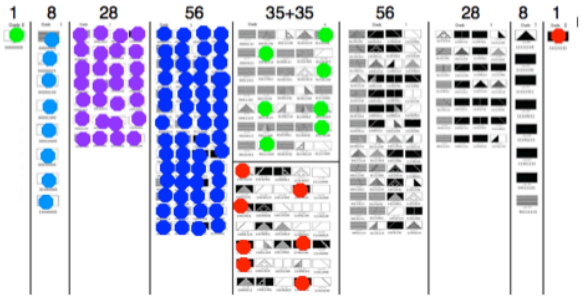


Here is the correspondence in terms of graded Cl(8):



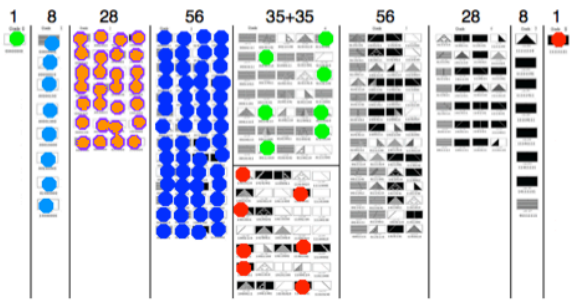
Due to 8-Periodicity of Real Clifford Algebras
tensor product Cl(8) x Cl(8) = Cl(16)

First Cl(8) D4 F4 acting on M4
Graded Representation

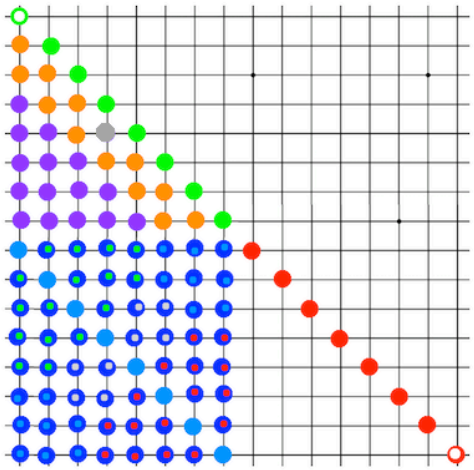


x

Second Cl(8) D4 F4 acting on CP2
Graded Representation

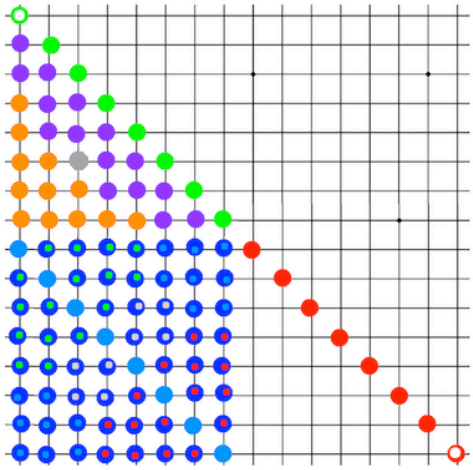


16x16 Matrix Representation



x

16x16 Matrix Representation



=

256x256 = 65,536-dim Cl(16) containing 248-dim E8
1 16 120 560 ...

BiVector D8 of E8 = 120 = 28 + 8x8 + 28 = 28 + 64 + 28

TriVector Cl(16) String Theory = 560 = 56 + 8x28 + 28x8 + 56 = 10 x 56

Cl(16) Spinors = 8 x 8 + 8 x 8 + 8 x 8 + 8 x 8

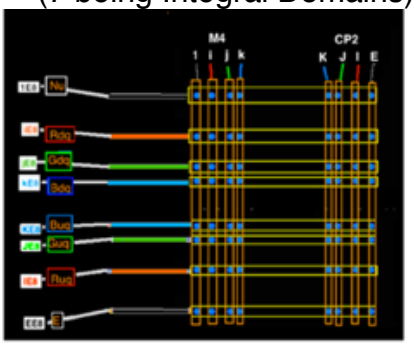
E8 half-Spinors = 8 x 8 + 8 x 8 = 64 + 64

The 560 TriVectors of Cl(16) are 10 copies of 56 = Fr3(O)

Fr3(O) is Complexification of J3(O)

d	S+	V
S+*	e	S-
V*	S-*	f

V is a Superposition of 8 E8 8-dim Spacetime Lattices
(7 being Integral Domains)



corresponding to the 8 fundamental Fermion Types.

Each Fermion Type propagates within its own E8 Lattice
within the Superposition
which accounts for 8 of the 10 copies of Fr3(O)

The other 2 copies of Fr3(O)
correspond to the 2 diagonal elements d and f
which describe the 10-dim R(1,9) space
that is Conformal over 8-dim R(0,8) space
which has Clifford Algebra Cl(0,8) = Cl(1,7) of RP1 x S7

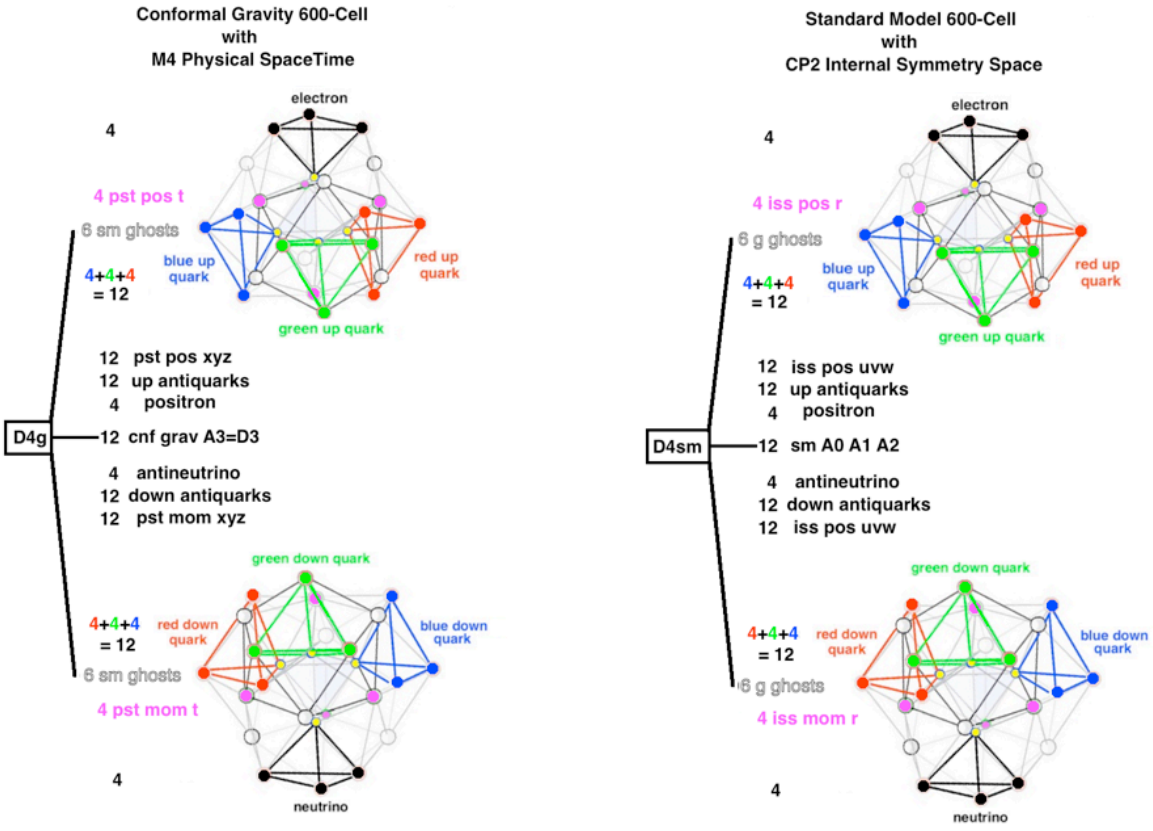
How to Visualize a Schwinger Source in 7 Steps:
(Explanation of this Visualization is given in viXra 1807.0372)

First, look at the 240-vertex E8 Root Vector representation of the Valence Fermion of the Schwinger Source Cloud. It is two 600-cells, each with 120 vertices:
H4 M4 representing Conformal Gravity and the M4 part of M4 x CP2 Kaluza-Klein
where M4 = 4D Minkowski Physical Spacetime
and
H4 CP2 representing the Standard Model and the CP2 part of M4 x CP2
where CP2 = SU(3) / SU(2) x U(1) Internal Symmetry Space

The H4 M4 600-cell is larger than the H4 CP2 600-cell by the Golden Ratio

E8 240 Root Vectors =

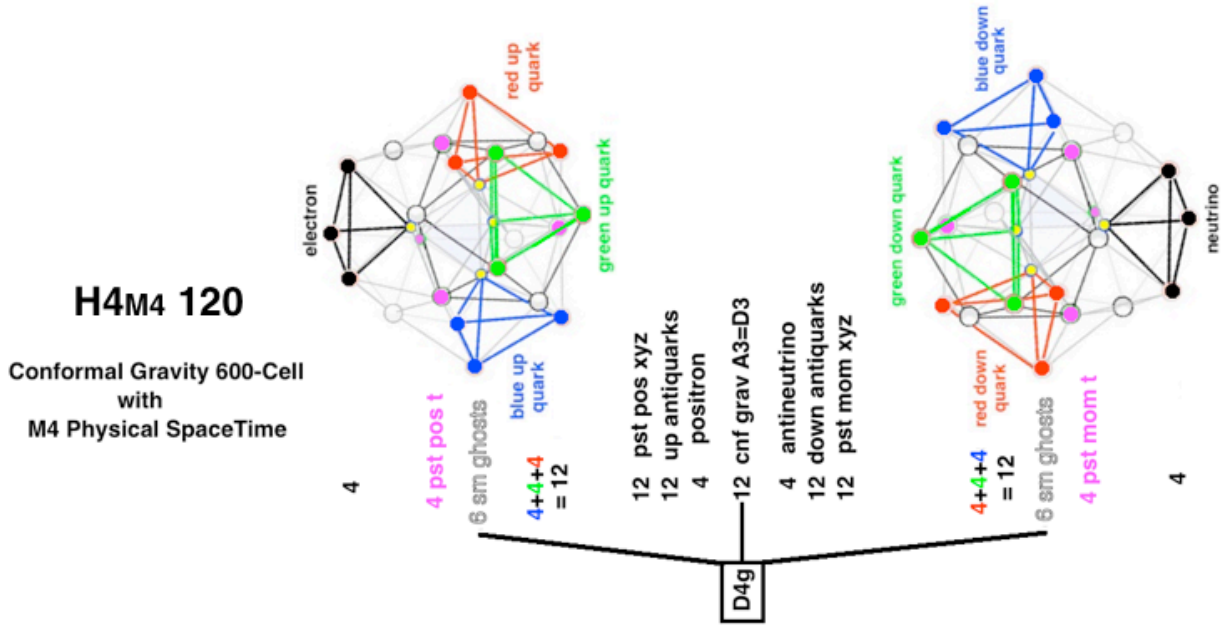
= H4M4 120 **+** **H4CP2 120**



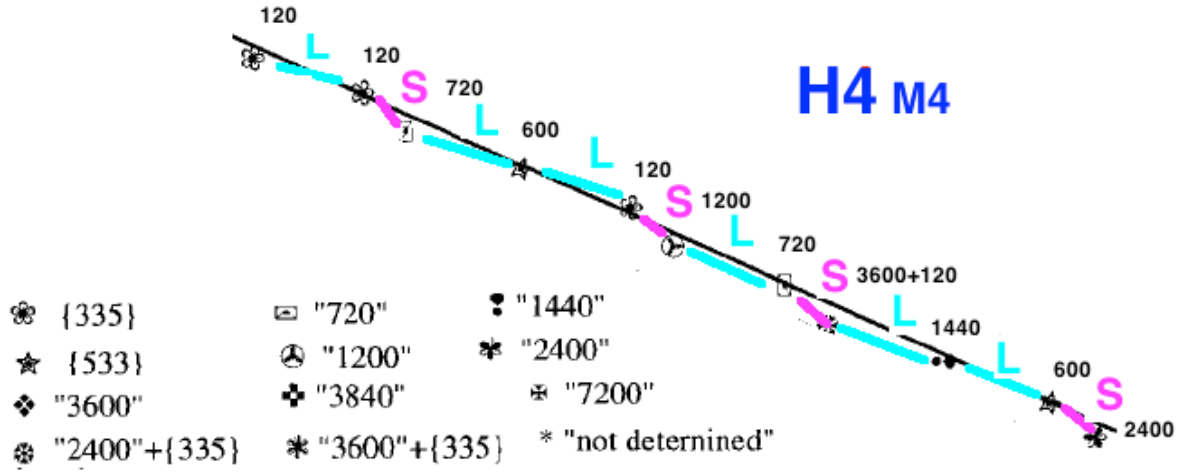
Each First-Generation Fermion is represented by a 4-vertex Tetrahedron
in the H4 M4 600-cell and in the H4 CP2 600-cell.

The Valence Fermion is represented as
the corresponding two Tetrahedra being activated.

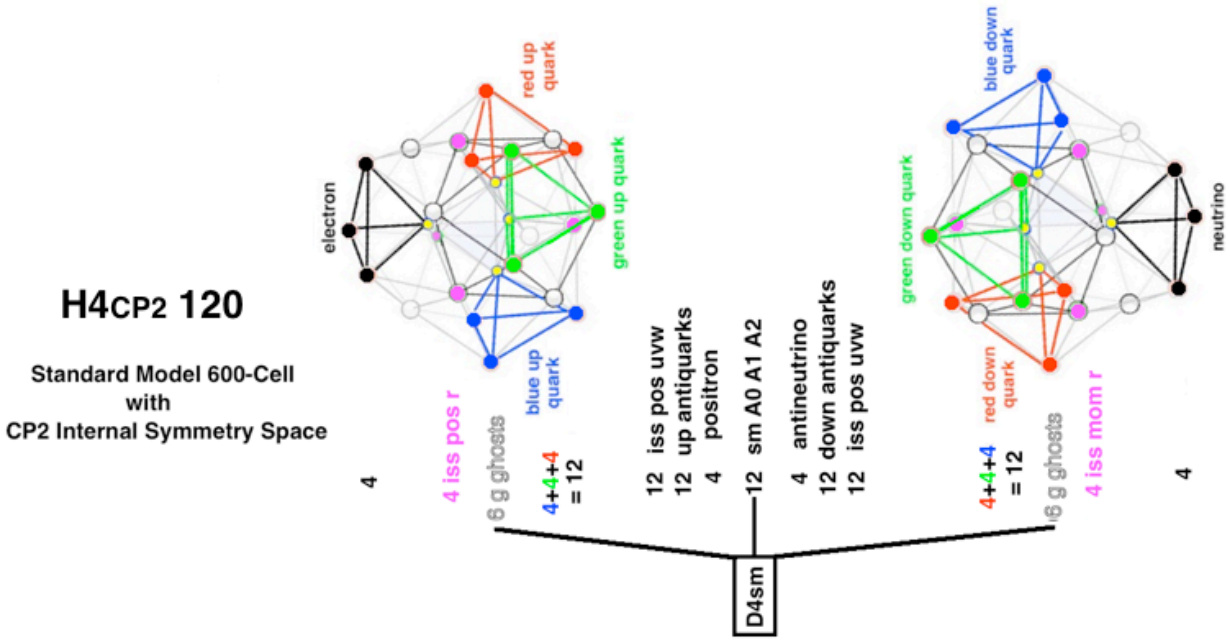
Second, look only at the H4 M4 600-cell to see how the Valence Fermion looks in M4 Minkowski Physical Spacetime:



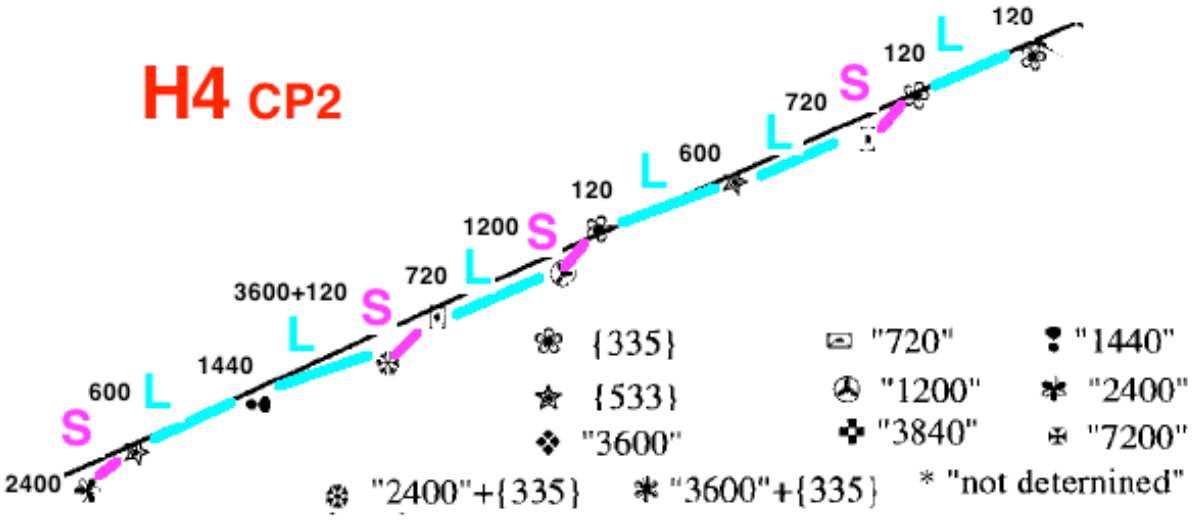
Third,
look at the Fibonacci Shell Structure of the M4 part of the Schwinger Source Cloud



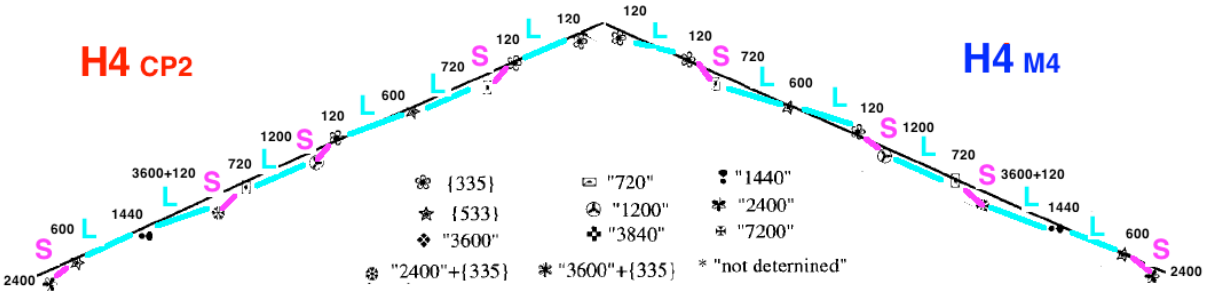
Fourth, look only at the H4 CP2 600-cell to see how the Valence Fermion looks in CP2 Internal Symmetry Space:



Fifth,
look at the Fibonacci Shell Structure of the CP2 part of the Schwinger Source Cloud

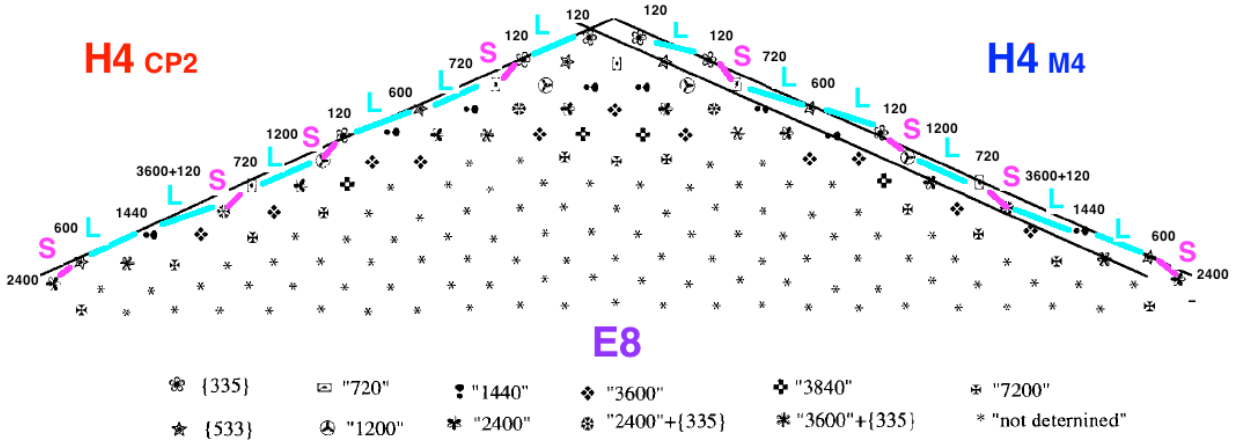


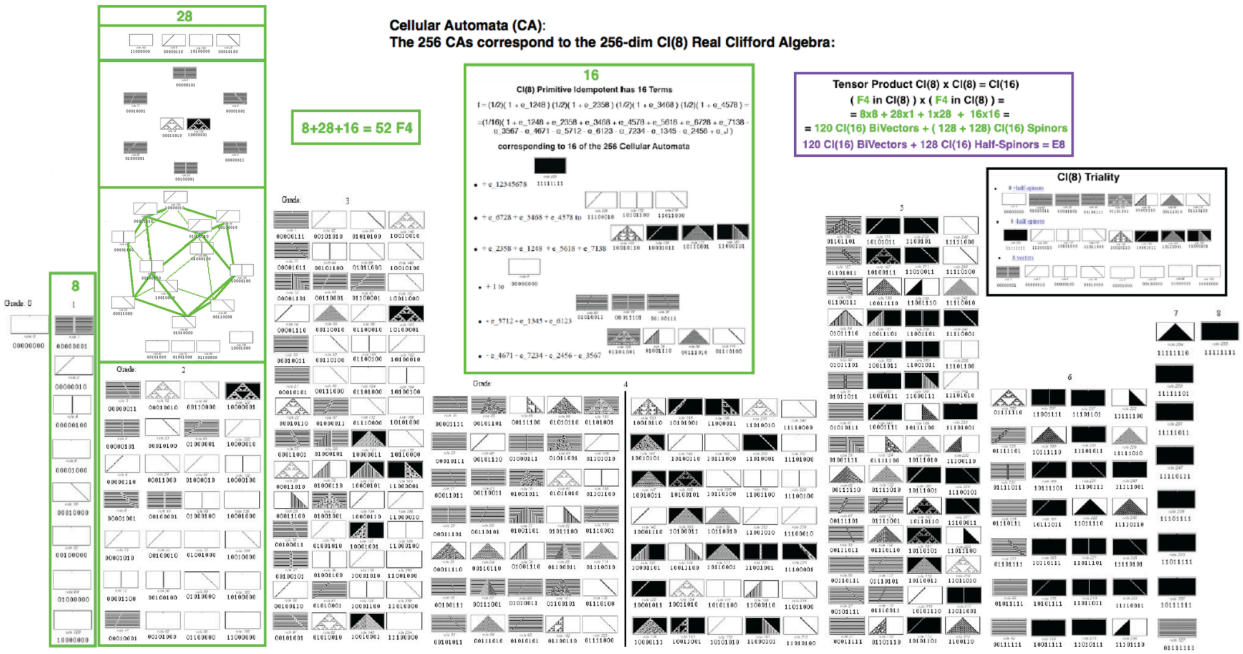
Sixth,
look at the combined Shell Structures of H4 M4 and H4 CP2:

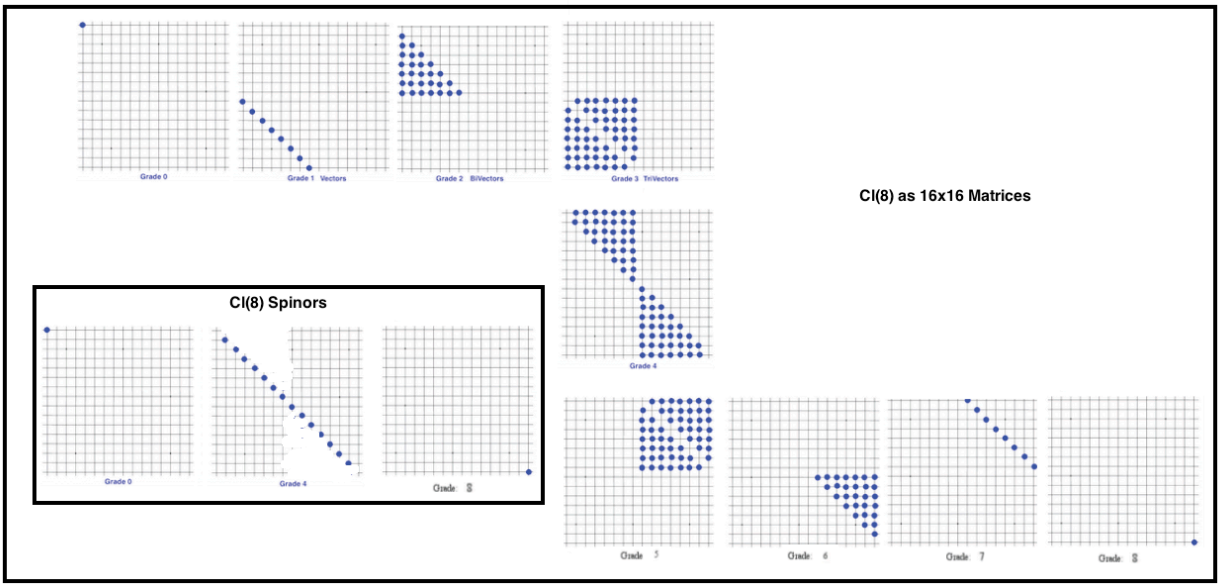


At this stage, you see the M4 and CP2 parts of the Schwinger Source Cloud
but
you have not yet seen the full E8 Schwinger Source Cloud.
For that, you need to go to the 7th Step:

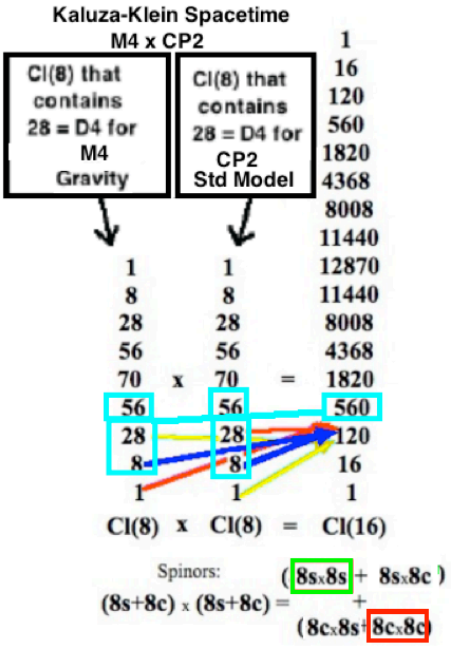
Seventh,
combine the H4 M4 and H4 CP2 parts to form the full E8 Schwinger Source:

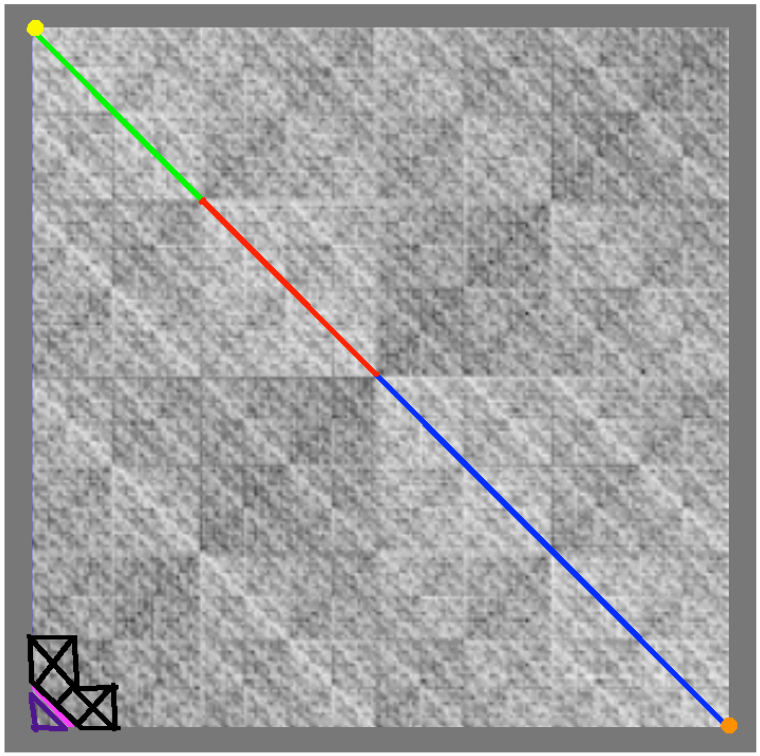



28
8
8+28+16 = 52 F4
16
Cl(8) Primitive Idempotent has 16 Terms
corresponding to 16 of the 256 Cellular Automata
Cellular Automata (CA):
The 256 CAs correspond to the 256-dim Cl(8) Real Clifford Algebra:
Tensor Product Cl(8) x Cl(8) = Cl(16)
(F4 in Cl(8)) x (F4 in Cl(8)) =
= 8x8 + 28x1 + 1x28 + 16x16 =
= 120 Cl(16) BiVectors + (128 + 128) Cl(16) Spinors
120 Cl(16) BiVectors + 128 Cl(16) Half-Spinors = E8
Cl(8) Triality


Grade 0
Grade 1 Vectors
Grade 2 BiVectors
Grade 3 TriVectors
Cl(8) as 16x16 Matrices
Cl(8) Spinors
Grade 0
Grade 4
Grade: 8
Grade 4
Grade: 5
Grade: 6
Grade: 7
Grade: 8

Cl(16) = tensor product Cl(8) x Cl(8) = 256x256 Real Matrix Algebra M256(R)





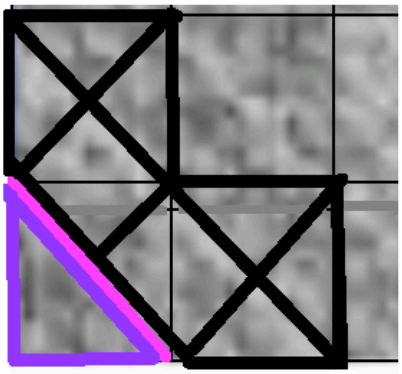
Cl(16) Vectors (magenta) = diagonal 16 of bottom left 16x16 = grade 1
Cl(16) BiVectors = 120 D8 adjoint
Cl(16 TriVectors = 560 = 10 copies of 56-dim Fr3(O)

Cl(16) Spinors = diagonal 256 of M256(R) =
= 1 grade 0 (yellow) and 1 grade 16 (orange)
and 254 grade 8 (green and red and blue)
Cl(16) half-Spinors of E8 = 128 half-diagonal
8 components of yellow (neutrino) and green (down quarks, electron, up quarks)
8 components of red (antiparticles)
Cl(16) half-spinors not in E8 = 128 half-diagonal (blue and orange) =
= mirror fermions

Cl(16) middle grade 8

1	+	1	=	2
8x8	+	8x8	=	128
28x28	+	28x28	=	1568
56x56	+	56x56	=	6272
70x70			=	4900
total of Cl(16) grade-8			=	12870

Cl(16) Vectors BiVectors TriVectors



Results of E8 Physics Calculations:

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.

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

(**for calculation details see viXra 1804.0121**)

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

Particle/Force	Tree-Level	Higher-Order
e-neutrino	0	0 for nu_1
mu-neutrino	0	9 x 10^(-3) eV for nu_2
tau-neutrino	0	5.4 x 10^(-2) eV for nu_3
electron	0.5110 MeV	
down quark	312.8 MeV	charged pion = 139 MeV
up quark	312.8 MeV	proton = 938.25 MeV
		neutron - proton = 1.1 MeV
muon	104.8 MeV	106.2 MeV
strange quark	625 MeV	
charm quark	2090 MeV	
tauon	1.88 GeV	
beauty quark	5.63 GeV	
truth quark (low state)	130 GeV	(middle state) 174 GeV
		(high state) 218 GeV
W+	80.326 GeV	
W-	80.326 GeV	
W0	98.379 GeV	Z0 = 91.862 GeV
Mplanck	1.217x10^19 GeV	
Higgs VEV (assumed)	252.5 GeV	
Higgs (low state)	126 GeV	(middle state) 182 GeV
		(high state) 239 GeV
Gravity Gg (assumed)	1	
(Gg)(Mproton^2 / Mplanck^2)		5 x 10^(-39)
EM fine structure	1/137.03608	
Weak Gw	0.2535	
Gw(Mproton^2 / (Mw+^2 + Mw-^2 + Mz0^2))		1.05 x 10^(-5)
Color Force at 0.245 GeV	0.6286	0.106 at 91 GeV

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

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

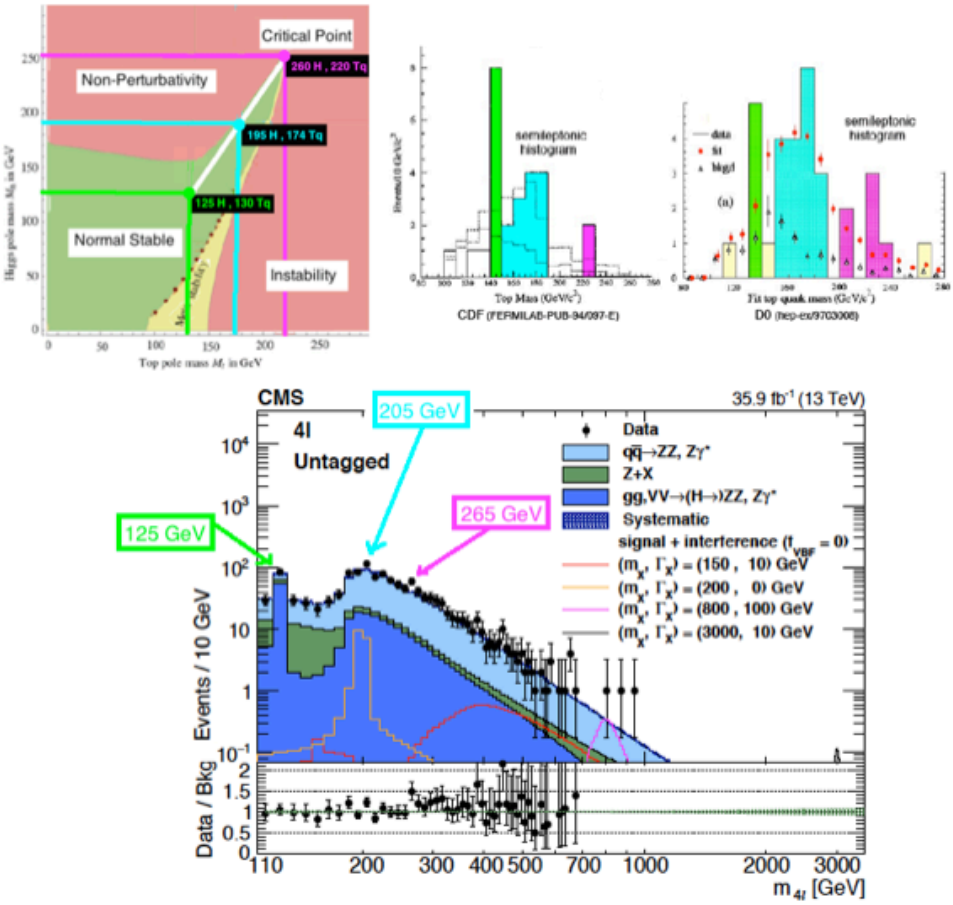
The phase angle d13 is taken to be 1 radian.

E8 Physics: Higgs and Truth Quark = 3-Mass-State Nambu-Jona-Lasinio System:

Higgs at 125 GeV and Truth Quark at 130 GeV

Higgs at 200 GeV and Truth Quark at 174 GeV

Higgs at 250 GeV and Truth Quark at 220 GeV



Upper Left = Higgs-Truth Quark mass state phase diagram

Upper Center = CDF semileptonic histogram of 3 Truth Quark Mass States
FERMILAB-PUB-94/097E

Upper Right = D0 semileptonic histogram of 3 Truth Quark Mass States
hep-ex/9703008

Lower = CMS H -> ZZ* -> 4l histogram of 3 Higgs Mass States
arXiv 1804.01939

(**for detailed comparison with experiments see viXra 1804.0121**)

Overview of Cl(16) Physics with Pd-D Fusion

Frank Dodd (Tony) Smith, Jr. - 2018

Abstract

This is a pdf file of 40 slides about the Basic Ideas of Cl(16) Physics with Pd-D Fusion
It is only an Overview of Basic Ideas. Details are in http://vixra.org/pdf/1807.0166v2.pdf
and http://vixra.org/pdf/1603.0098v2.pdf and my viXra pages and my web sites
including http://valdostamuseum.com/hamsmith/

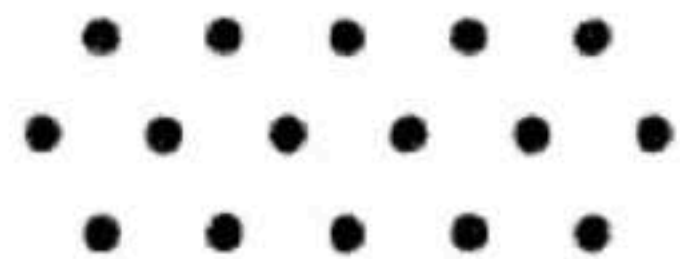
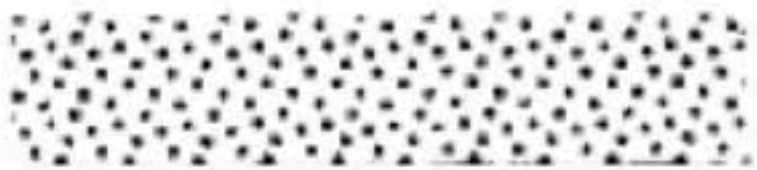
The Slideshow in mov format is on the web at

http://valdostamuseum.com/hamsmith/Cl16PdD.mov

The mov slides have no audio narration
because I think that audio would distract from video presentation of the slides.

Table of Contents

All Universes begin as Quantum Fluctuations of the Empty Set = Void
by Quantum Fluctuation of Compact E8(-248) Real Form of E8
which is the First Grothendieck Universe and they all evolve according to
David Finkelstein's Iteration of Real Clifford Algebras:

$n = 0$	$\varnothing$	**= Void**
$n = 1$	$\{\varnothing\}$	**= Cl(0)**
$n = 2$	$\varnothing$ $\{\varnothing\}$	**= Cl(1)**
$n = 4$	$\varnothing$ $\{\{\varnothing\}\}$ $\{\varnothing\&\{\varnothing\}\}$ $\{\varnothing\}$	**= Cl(2)**
$n = 16$		**= Cl(4)**
$n = 65,536$		**= Cl(2^4=16) = Cl(16)**

Kaluza-Klein Spacetime
M4 x CP2

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

Cl(8) is M16(R)
=
16 x 16 Matrix Algebra
of Real Numbers.

Cl(8) x Cl(8) = Cl(16)
8-Periodicity tensor product

Cl(16) is M256(R) = 256 x 256 Matrix Algebra of Real Numbers
with
Vectors = 16-dim IV(8) Complex Domain Lie Ball
of Symmetric Space Spin(10) / Spin(8)xU(1)
with Lie Sphere Shilov Boundary RP1 x S7

BiVectors with an antisymmetric Bracket Product form a Lie Algebra.
120-dim Cl(16) BiVectors + 128-dim Cl16) half-Spinors = 248-dim E8

TriVectors with a symmetric Jordan Product form a Jordan Algebra.
560-dim Cl(16) TriVectors = 10 copies of 56-dim Fr3(O)
Fr3(O) = Complexification of 27-dim J3(O)

560 = 56 + 8 x 28 + 28 x 8 + 56
120 = 28 + 8 x 8 + 28

Cl(8) Spinors x Cl(8) Spinors = Cl(16) Spinors
8-Periodicity tensor product

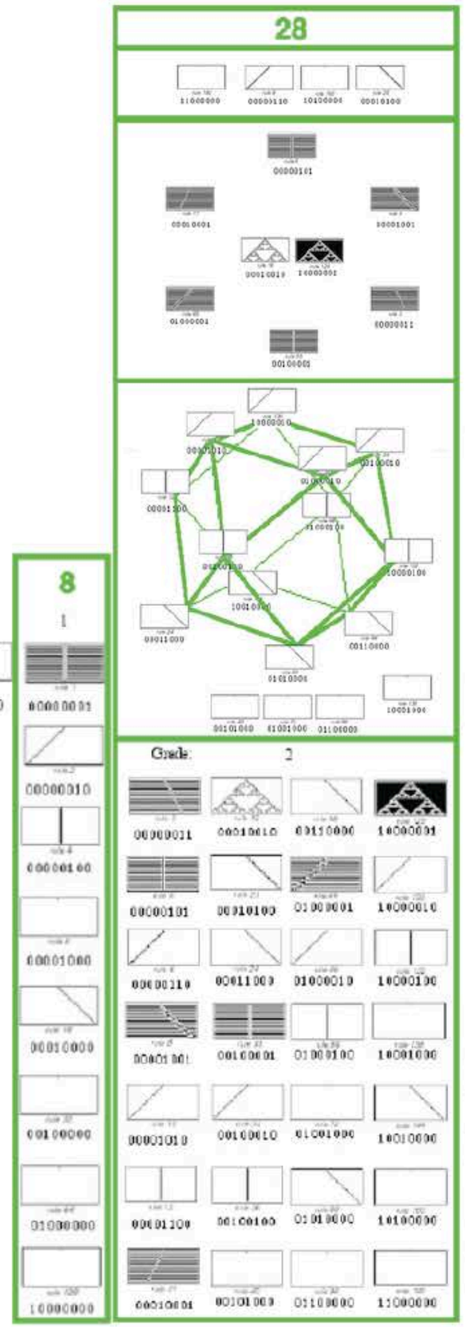
Cl(8) Spinors = 8 S+ + 8 S-

8 S+ + 8 S- x 8 S+ + 8 S- =

= 8x8 S++ + 8x8 S+- + 8x8 S-+ + 8x8 S--

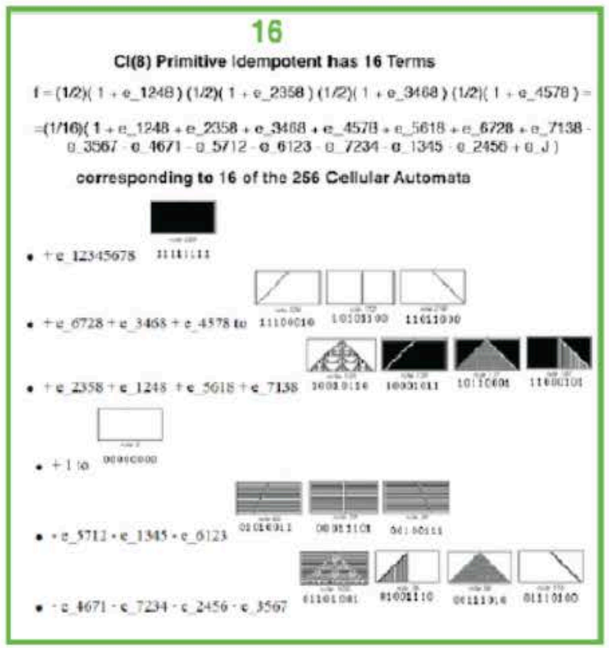
Cl(16) helicity consistent half-Spinors = 64 S++ + 64 S-- = 128

Cl(8) structure is in African IFA divination through its 16x16 = 2^8 = 256 Odu and is also represented by the 256 Elementary Cellular Automata
the binary nature of which has its historical origin in Africa.
Ron Eglash (in his book "African Fractals" (Rutgers 1999) and on his web site) says:
"... **a historical path for base-2 calculation ... begins with African divination** ...".

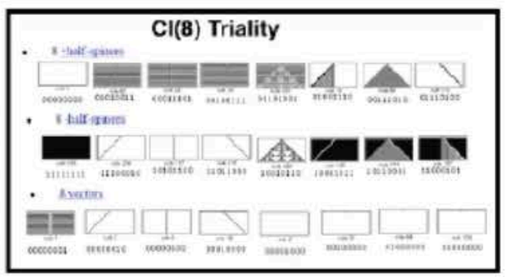


Cellular Automata (CA):
The 256 CAs correspond to the 256-dim Cl(8) Real Clifford Algebra:

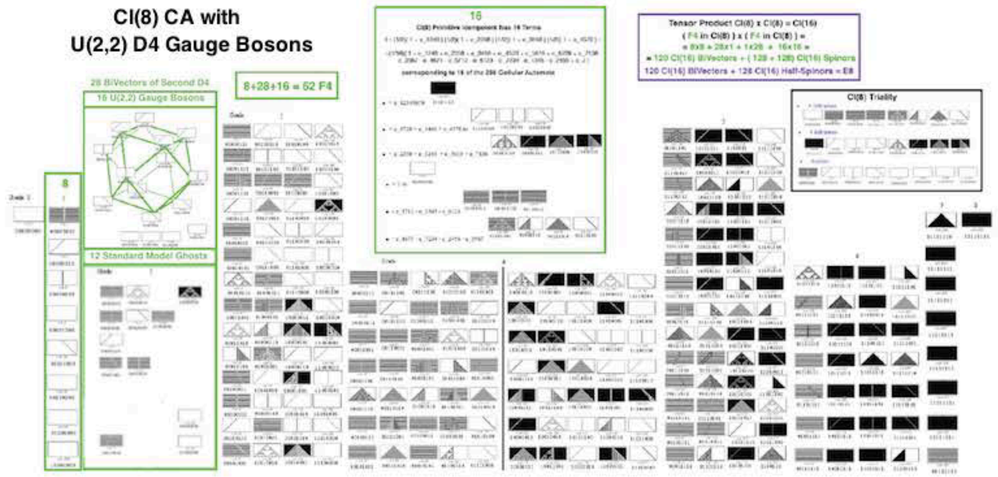
8+28+16 = 52 F4



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



There are two D4 = Cl(8) BiVectors in the D8 = Cl(16) BiVectors that live in E8



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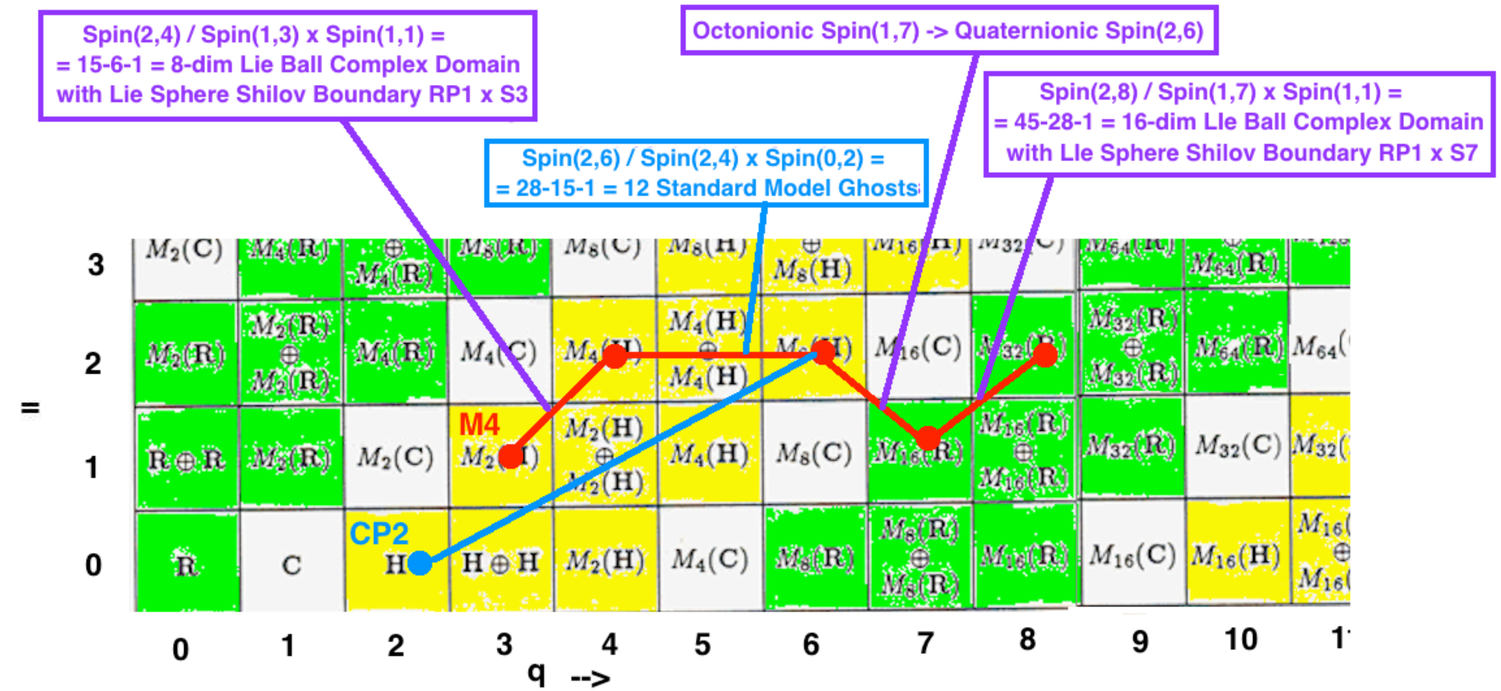

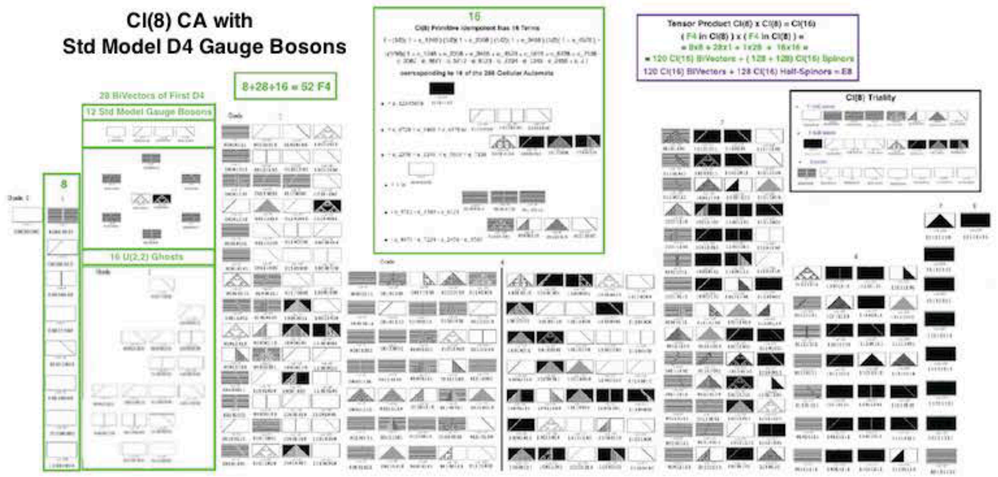

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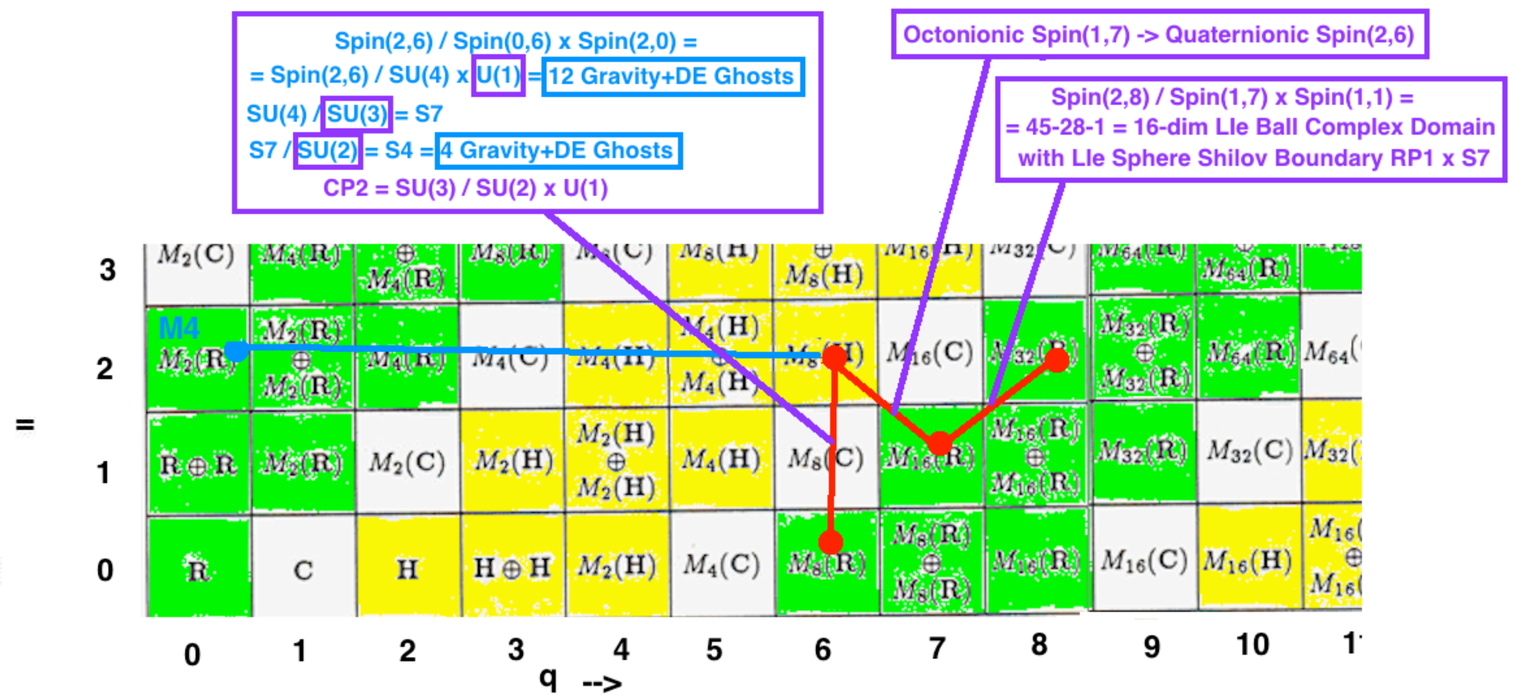

Kaluza-Klein Spacetime
M4 x CP2

Cl(8) that contains 28 = D4 for M4 Gravity		Cl(8) that contains 28 = D4 for CP2 Std Model		
1		1		1
8		8		16
28		28		120
56		56		560
70	x	70	=	1820
56		56		560
28		28		120
8		8		16
1		1		1
Cl(8)	x	Cl(8)	=	Cl(16)

256 Spinors

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

$(8s \times 8s + 8c \times 8c)$ 128 half-Spinors + 120 D8 = 248 E8 with 240 Root Vectors

560 = 10 copies of 56 Fr3(O)

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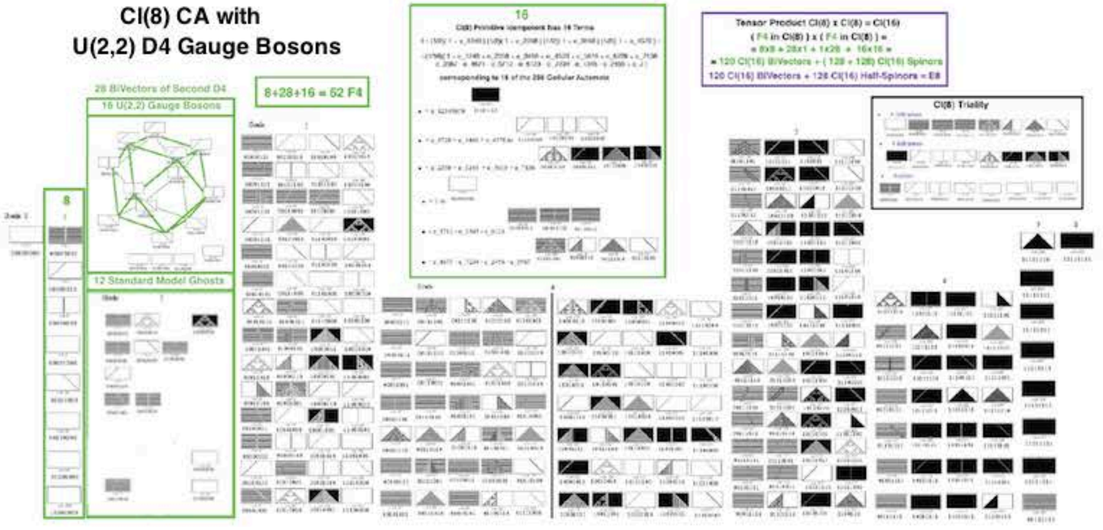
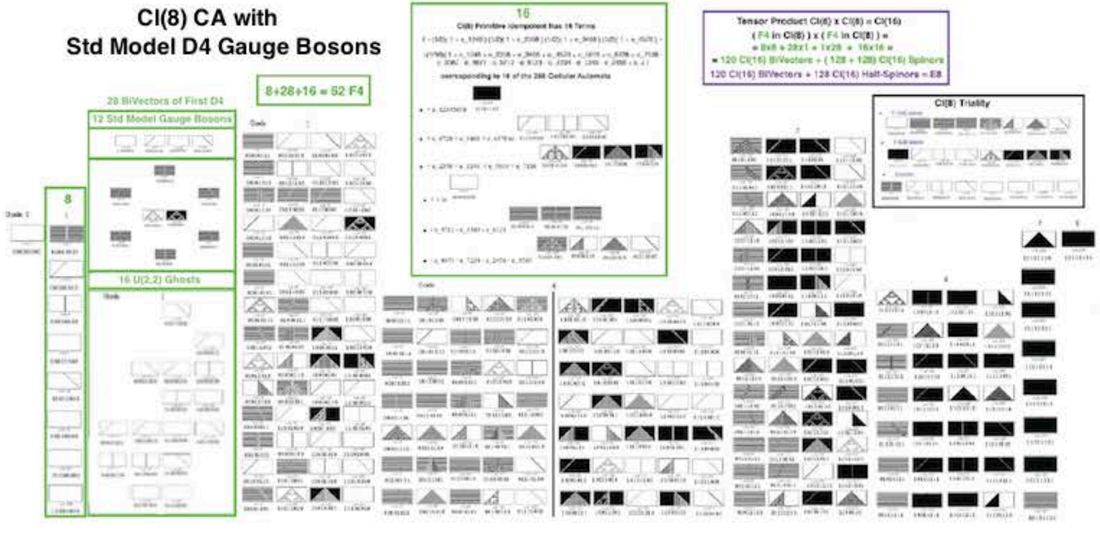
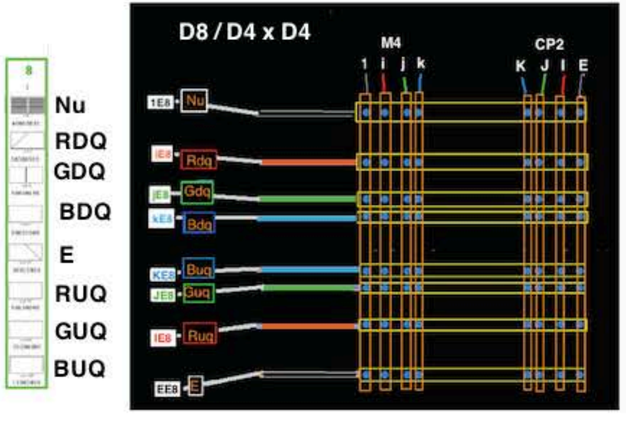
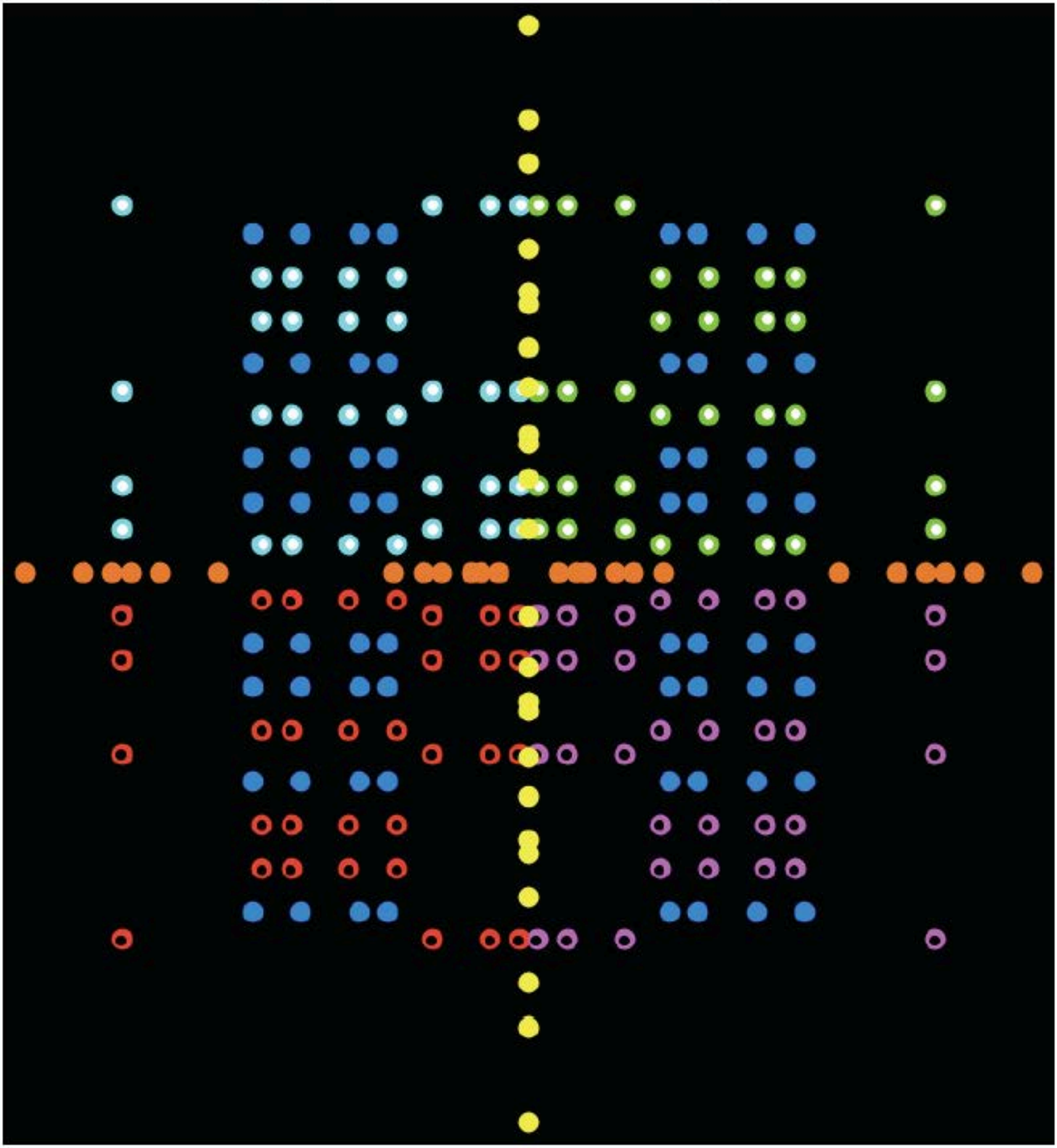


X





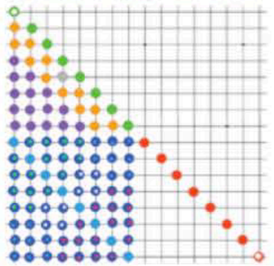


240 E8 Root Vectors = 112 D8 Root Vectors + 128 D8 half-spinors
128 D8 half-spinors = 128 elements of E8 / D8
Green and Cyan dots with white centers (32+32=64 dots) = Fermion Particles
Red and Magenta dots with black centers (32+32=64 dots) = Fermion AntiParticles

112 D8 Root Vectors = 64 D8 / D4xD4 (blue) + 24 D4 (yellow) + 24 D4 (orange)

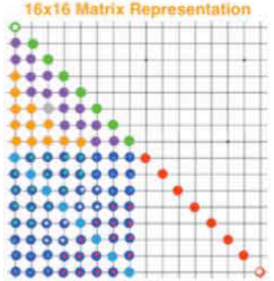
In terms of 16x16 Matrices of Cl(8) and 256x256 Matrices of Cl(16)
(Matrices of Real Numbers. Cl(8) TriVectors = 2-color dots with dark blue outer part.)

Cl(8)
16x16 Matrix Representation



x

Cl(8)
16x16 Matrix Representation



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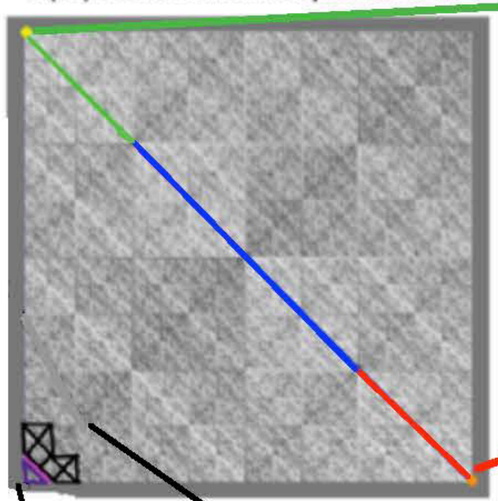
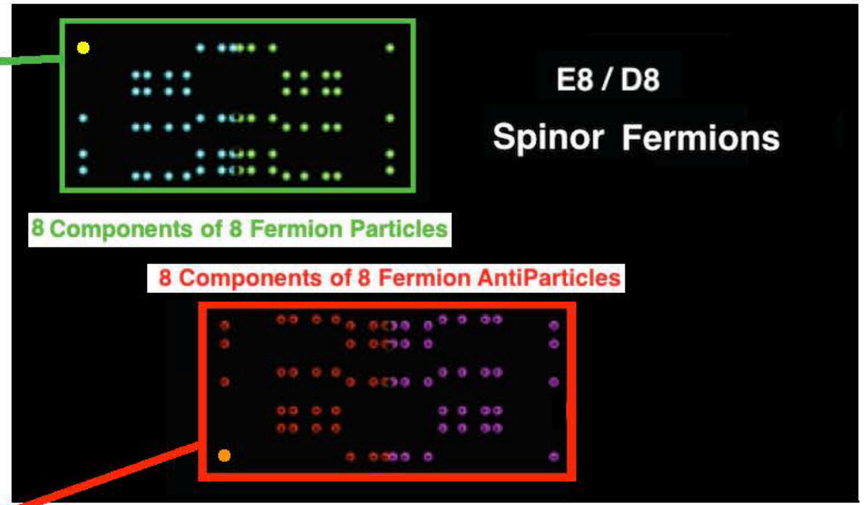
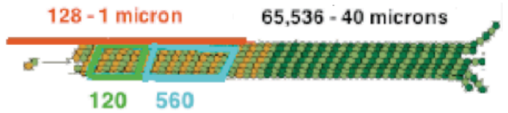
15 Purple = Spin(2,4) = SU(2,2) Gauge Bosons
1 Grey = U(1) of U(2,2) Propagator Phase
12 Orange = Standard Model Ghosts

12 Orange = SU(3) x SU(2) x U(1) Gauge Bosons
1 Grey = U(1) of U(3) Propagator Phase
15 Purple = Gravity + Dark Energy Ghosts

Cl(16) 256x256 Matrix Representation



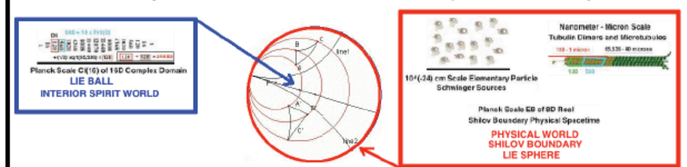




Human Brain Microtubules 40 microns = 65,536 Tubulin Dimers

Physical Body contains Information
Cl(16) = 65,536
- 16 Vector Complex Domain
- 128 half-Spinor part of E8
- 120 BiVector part of E8
- 560 TriVector Fr3(O)
= 64,712 Ethereal Information

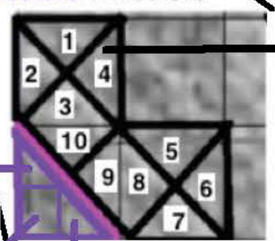
each Human Microtubule with 65,536 Tubulin Dimers
can have a Bohm Quantum Resonant Connection with
a Spirit World Unit Lattice Cell with 65,536-element Cl(16) Structure



The Earthly World is the 8-real-dim Lie Sphere Shilov Boundary RP1 x S7

The Spirit World is the interior of that Shilov Boundary
which is the Type IV(8) Bounded Complex Domain
corresponding to the Lie Ball Symmetric Space D5 / D4 x U(1)

Cl(16) Vectors
BiVectors TriVectors

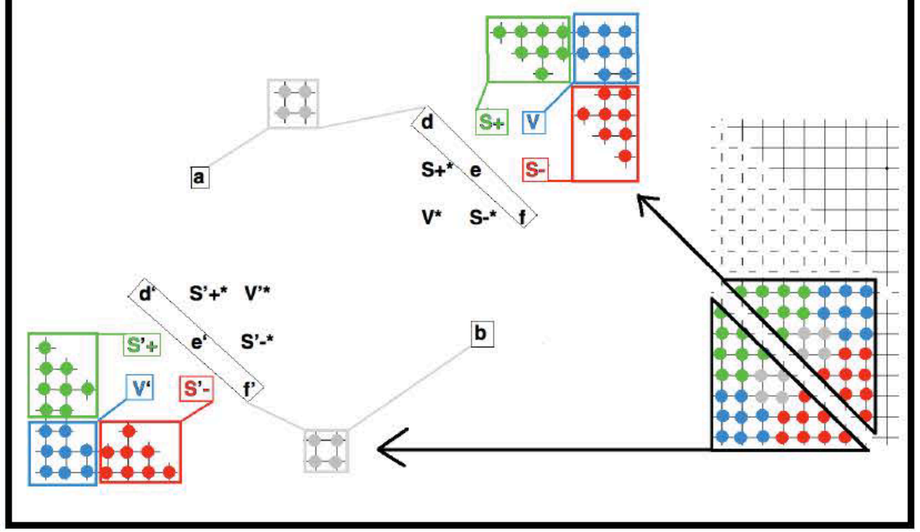


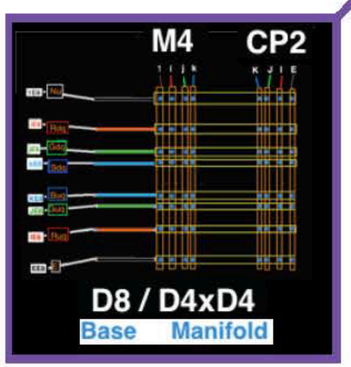
Second D4

Standard Model Gauge Bosons
Gravity + Dark Energy Ghosts
propagator phase Ghost

Fr3(O) is Zorn-type matrices
a,b,d,d',e,e',f,f' are Real Numbers
S+,S'+,V, V',S-,S'- are Octonions
* = Conjugate

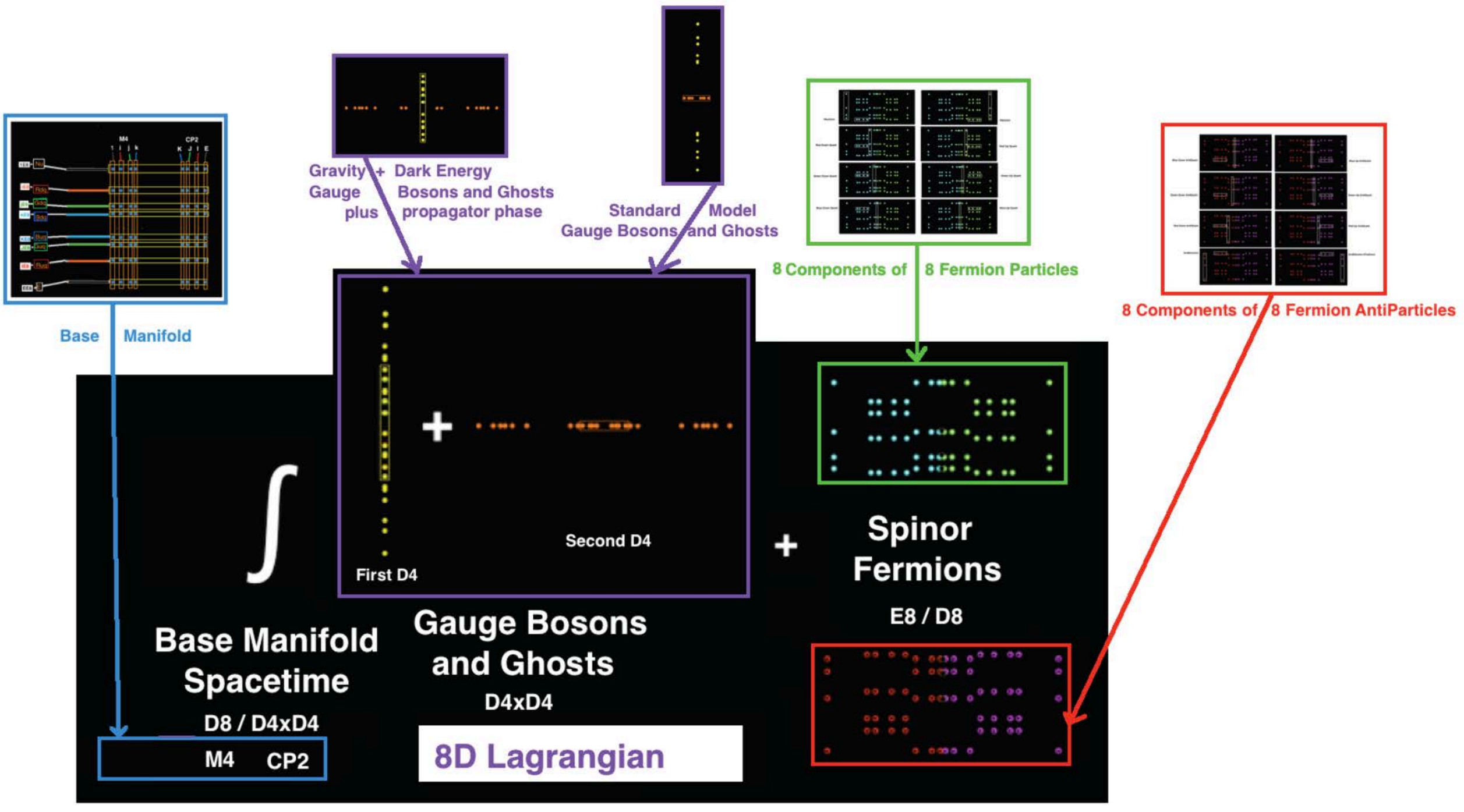
16x16 Matrix Representation of Cl(8)
Cl(8) TriVectors (4 grey, 8 blue, 8 green, 8 red)
representing 56-dim Fr3(O)
which contains two copies of 27-dim J3(O)
Each J3(O) contains 26-dim traceless part J3(O)o
which represents a copy of 26DString Theory





First D4

Gravity + Dark Energy Gauge Bosons
propagator phase
Standard Model Ghosts


M4
CP2
Base
Manifold
Gravity + Dark Energy
Gauge
plus
Bosons and Ghosts
propagator phase
Standard
Model
Gauge Bosons and Ghosts
8 Components of
8 Fermion Particles
8 Components of
8 Fermion AntiParticles
First D4
Second D4
Spinor
Fermions
E8 / D8
Base Manifold
Spacetime
D8 / D4xD4
M4
CP2
Gauge Bosons
and Ghosts
D4xD4
8D Lagrangian

The 8D-4D E8 Lagrangian System has these characterictics:

Lagrangian has 8-dim Lorentz structure satisfying Coleman-Mandula because its Fermionic fundamental spinor representations are built with respect to spinor representations for 8-dim Spin(1,7) spacetime - see Steven Weinberg, "The Quantum Theory of Fields" Volume III

Lagrangian is UltraViolet finite because each Fermionic Term Fermion has in 8-dim Spacetime units of mass^(7/2) and each Bosonic Gauge Boson + Ghost Term has units of mass^(1), so, since (8+8)x(7/2) = 56 = 28 + 28 the Fermionic Terms cancel the Bosonic Terms - see Steven Weinberg "1986 Dirac Lectures Elementary Particles and the Laws of Physics"

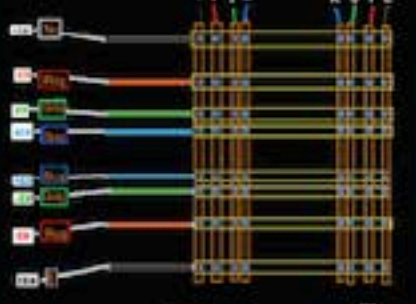
Lagrangian is Chiral because E8 contains Cl(16) half-spinors (64+64) for a Fermion Generation but does not contain Cl(16) Mirror Fermion AntiGeneration half-spinors. Fermion +half-spinor Particles with high enough velocity are seen as left-handed. Fermion -half-spinor AntiParticles with high enough velocity are seen as right-handed.

Lagrangian obeys Spin-Statistics because the CP2 part of M4xCP2 Kaluza-Klein has index structure Euler number 2+1 = 3 and Atiyah-Singer index -1/8 which is not the net number of generations because CP2 has no spin structure but you can use a generalized spin structure (Hawking and Pope (Phys. Lett. 73B (1978) 42-44)) to get (for integral m) the generalized CP2 index n_R - n_L = (1/2) m (m+1) Prior to Dimensional Reduction: m = 1, n_R - n_L = (1/2)x1x2 = 1 for 1 generation After Reduction to 4+4 Kaluza-Klein: m = 2, n_R - n_L = (1/2)x2x3 = 1 for 3 generations Hawking and Pope say: "Generalized Spin Structures in Quantum Gravity ...what happens in CP2 … one could replace the electromagnetic field by a Yang-Mills field whose group G had a double covering G~. The fermion field would have to occur in representations which changed sign under the non-trivial element of the kernel of the projection … G~ -> G while the bosons would have to occur in representations which did not change sign …". For E8 physical gauge bosons are in the 28+28=56-dim D4xD4 subalgebra. D4 = SO(8) is the Hawking-Pope G with double covering G~ = Spin(8). The 8 fermion particles / antiparticles are D4 half-spinors represented within E8 by anti-commutators and so do change sign while the 28 gauge bosons are D4 adjoint represented within E8 by commutators and so do not change sign.

E8 Lagrangian inherits from F4 the property whereby its Spinor Part need not be written as Commutators but can also be written in terms of Fermionic AntiCommutators - see Pierre Ramond hep-th/0112261 -also, F4 lives in Cl(8) as Vectors + BiVectors + Spinors and by 8-Periodicity Cl(16) = tensor product Cl(8) x Cl(8) and E8 lives in Cl(16) as BiVectors + half-Spinors.

Lagrangian

$\int$



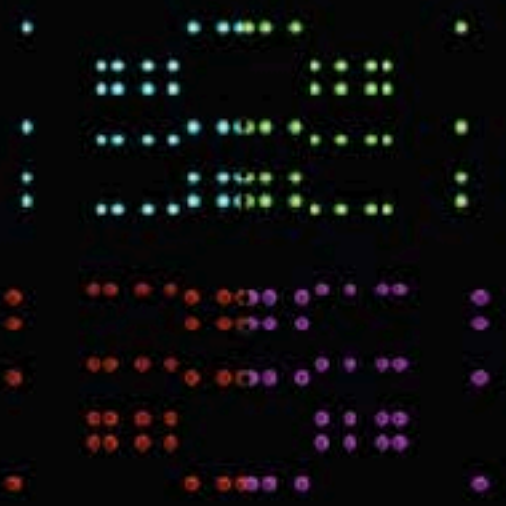
A7+1
D8 / D4xD4

First D4

+

+

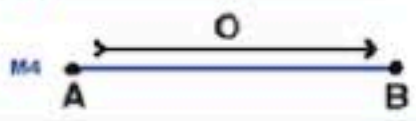
Second D4



E8 / D8

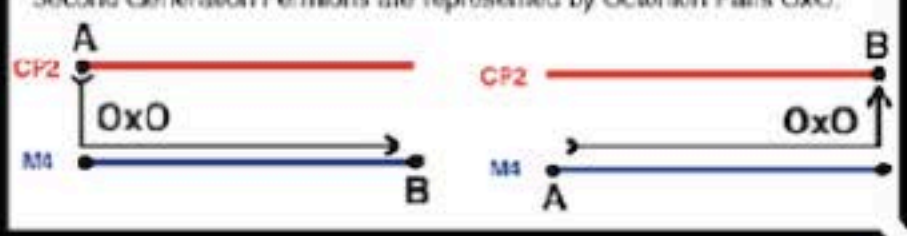
Mayer Mechanism

First Generation Fermions are represented by Octonions O



3 Kaluza-Klein
Fermion Generations

Second Generation Fermions are represented by Octonion Pairs OxO



$\int$

HIGGS

+

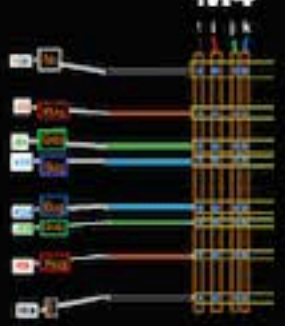
$D4_{sm}$

+

$D4_{gde}$

+

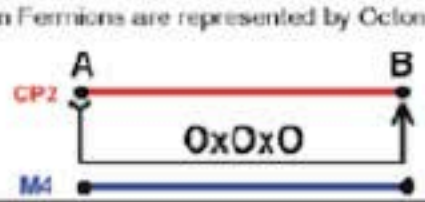
M4



RGB Truth Quarks

NJL
Higgs as
Condensate of $T\bar{T}$

Third Generation Fermions are represented by Octonion Triples OxOxO



RGB Truth AntiQuarks

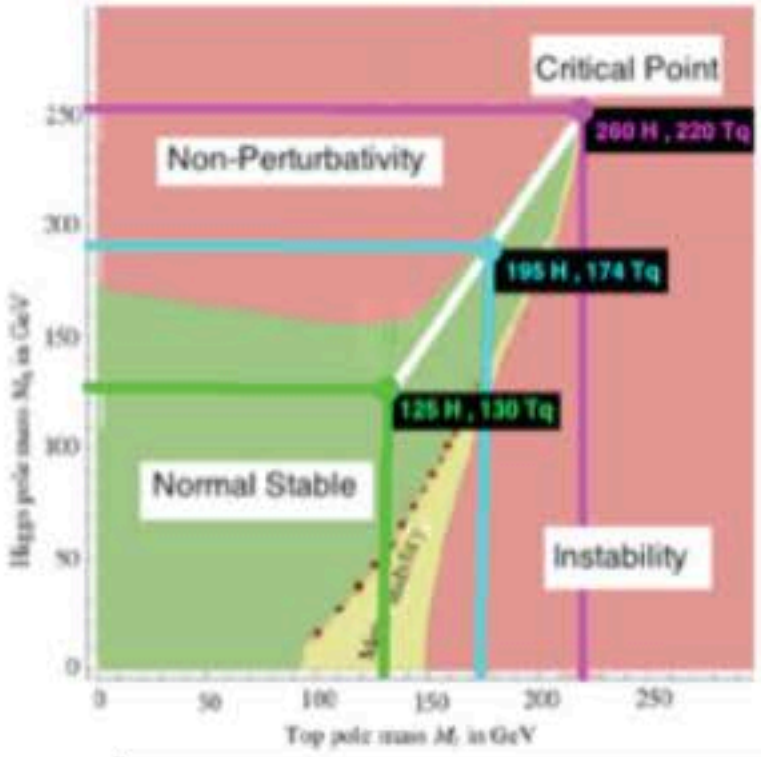
The Real Form of E8 at Initial Big Bang is Compact E8(-248) with SO(16) Symmetry.

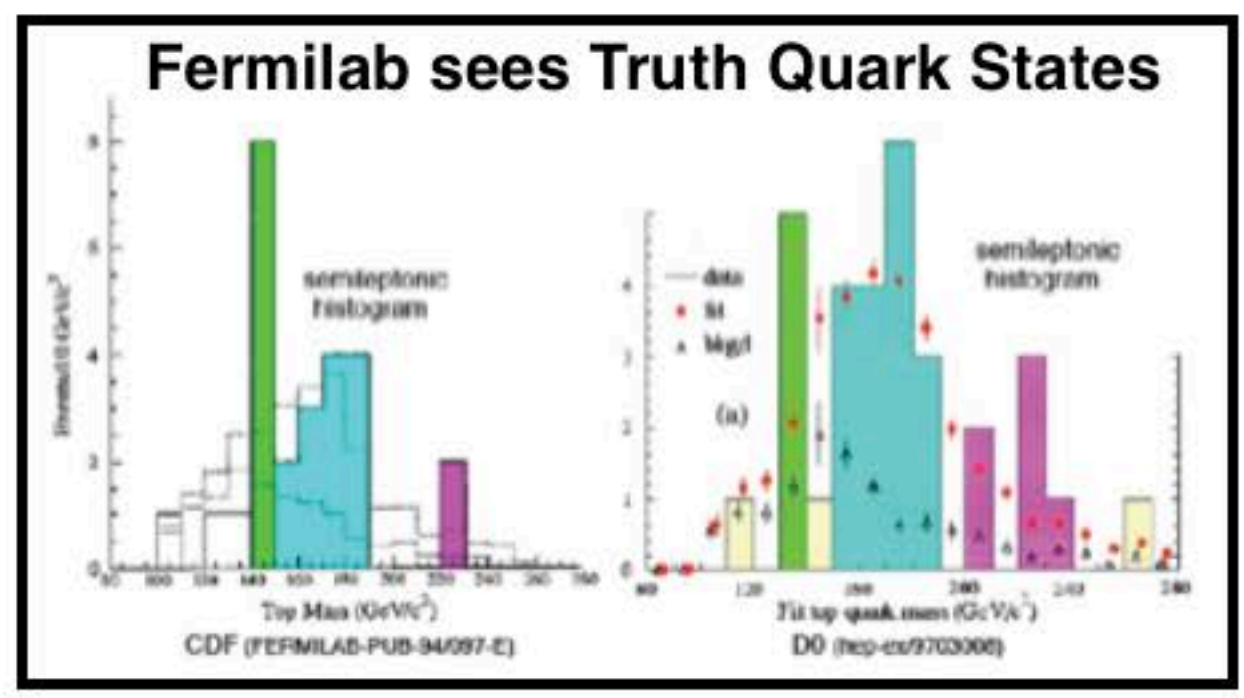
The Real Form of E8 during Inflation is E8(8) with SO(8,8) Symmetry.
In the 8D Lagrangian the Base Manifold Spacetime is 8-dim Octonion
with respect to which Quantum Processes are Non-Unitary
so that during Inflation Particles are created.

After Inflation the Symmetry of Spacetime is broken from Octonion to Quaternion,
the Real Form of E8 becomes E8(-24) with SO*(16) = Sk(8,H) Symmetry,
and the Base Manifold Spacetime becomes M4 x CP2 Kaluza-Klein
(where M4 = Minkowski and CP2 = SU(3) / SU(2)xU(1) = Internal Symmetry Space)

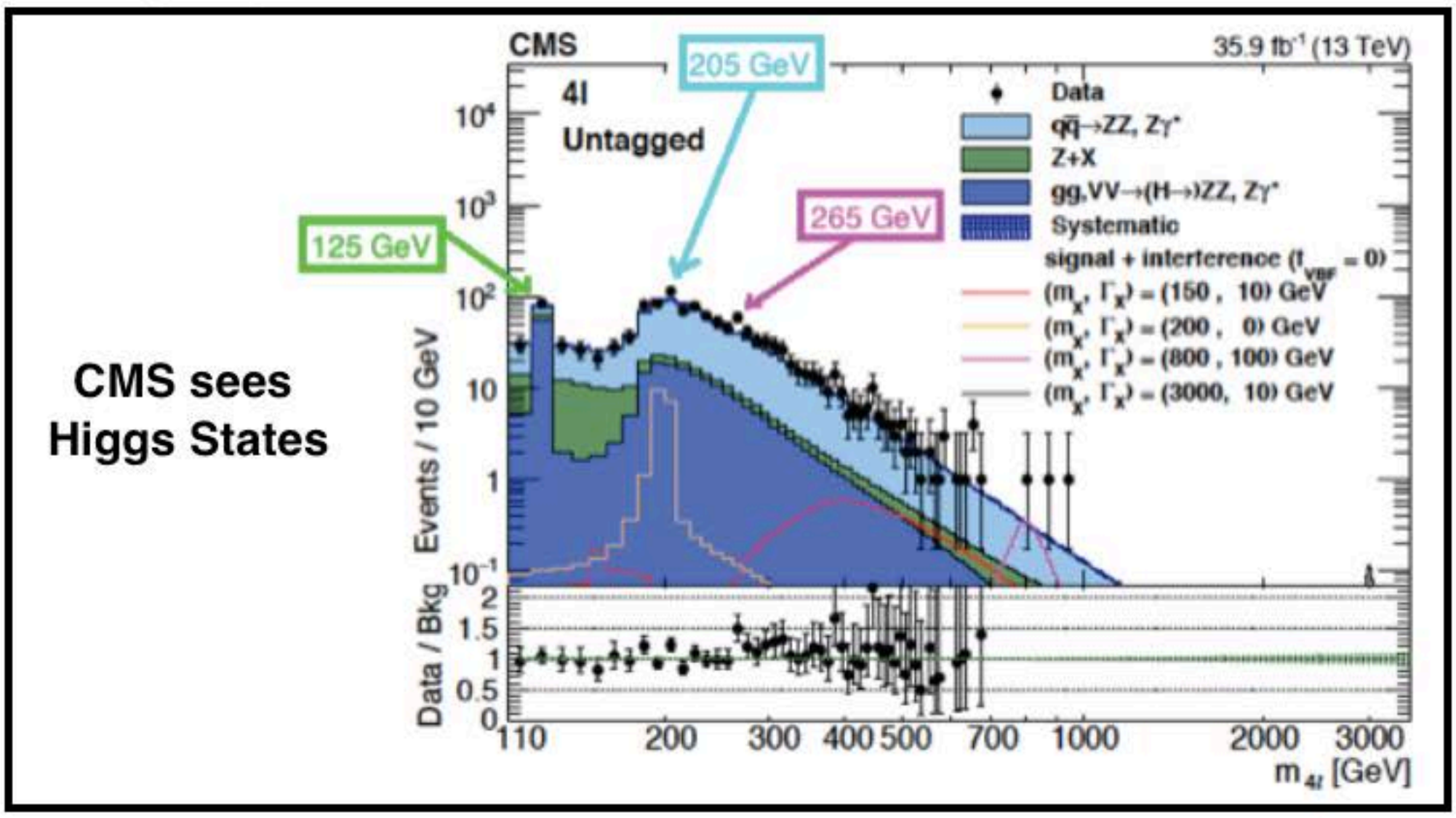
Breaking Spacetime and World-Lines of Particles into M4 x CP2 Kaluza-Klein
produces Higgs (Mayer and Trautman in Acta Physica Austriaca, Suppl. XXIII (1981))
and Fermion Generations 2 and 3 which produces a Nambu - Jona-Lasinio System of
Higgs and Truth Quarks (Yamawaki et al in hep-ph/9603293 and hep-ph/0311165)
that has Higgs as Truth Quark-AntiQuark condensate and 3 mass states:

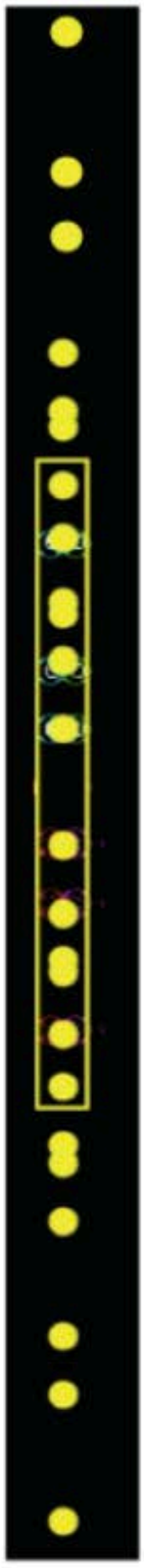
Higgs at 125 GeV and Truth Quark at 130 GeV
Higgs at 200 GeV and Truth Quark at 174 GeV
Higgs at 250 GeV and Truth Quark at 220 GeV





CMS sees Higgs States





The 24 Yellow Root Vectors of the D4 of E8 Gravity + Standard Model Ghosts are on the Vertical Y-axis.
12 of them in theYellow Box represent the 12 Root Vectors of the Conformal Gauge Group SU(2,2) = Spin(2,4) of Conformal Gravity + Dark Energy.
The 4 Cartan Subalgebra elements of SU(2,2)xU(1) = U(2,2) correspond to the 4 Cartan Subalgebra elements of D4 of E8 Gravity + Standard Model Ghosts and to the other half of the 8 Cartan Subalgebra elements of E8.

The other 24-12 = 12 Yellow Root Vectors represent Ghosts of 12D Standard Model whose Gauge Groups are SU(3) SU(2) U(1).

Gravity and Dark Energy come from its Conformal Subgroup SU(2,2) = Spin(2,4)

- see Mohapatra "Unification and Supersymmetry section 14.6
R. Aldrovandi and J. G. Peireira in gr-qc/9809061

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**

Ghosts correspond to Gauge Bosons:

Steven Weinberg in The Quantum Theory of Fields Volume II Section 15.7 said:
"... there is a beautiful geometric interpretation of the ghosts and the BRST symmetry ...
The gauge fields A_a^u may be written as one-forms A_a = A_a_u dx_u, where dx_μ are a set of anticommuting c-numbers. ... This can be combined with the ghost to compose a one-form **A**_a = A_a + w_a in an extended space.
Also, the ordinary exterior derivative d = dx^u d/dx^u may be combined with the BRST operator s to form an exterior derivative D = d + s in this space,
which is nilpotent because s^2 = d^2 = sd + ds = 0 ...".

The 24 Orange Root Vectors of the D4 of E8 Standard Model + Gravity Ghosts
are on the Horizontal X-axis.

8 of them in the Orange Box represent the 8 Root Vectors of the Standard Model Gauge Groups SU(3) SU(2) U(1).
Their 4 Cartan Subalgebra elements correspond
to the 4 Cartan Subalgebra elements of D4 of E8 Standard Model + Gravity Ghosts
and to half of the 8 Cartan Subalgebra elements of E8.

The other 24-8 = 16 Orange Root Vectors represent Ghosts of 16D U(2,2)
which contains the Conformal Group SU(2,2) = Spin(2,4)
that produces Gravity + Dark Energy by the MacDowell-Mansouri mechanism.

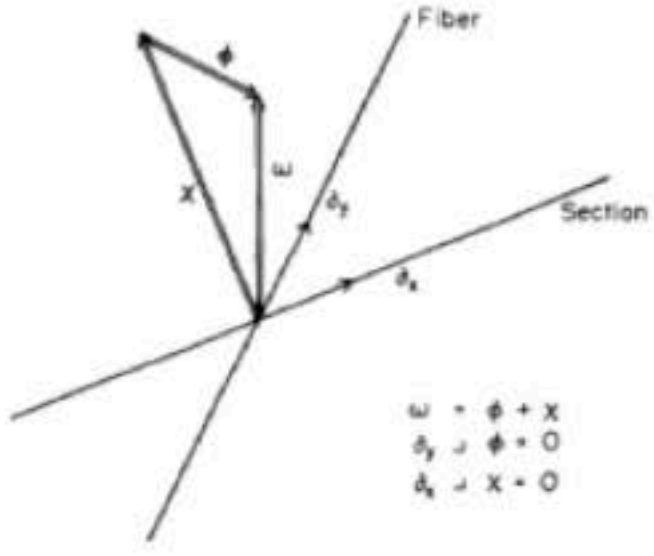
Standard Model Gauge groups come from CP2 = SU(3) / SU(2) x U(1)
(as described by Batakis in Class. Quantum Grav. 3 (1986) L99-L105)

Electroweak SU(2) x U(1) is gauge group as isotropy group of CP2.

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

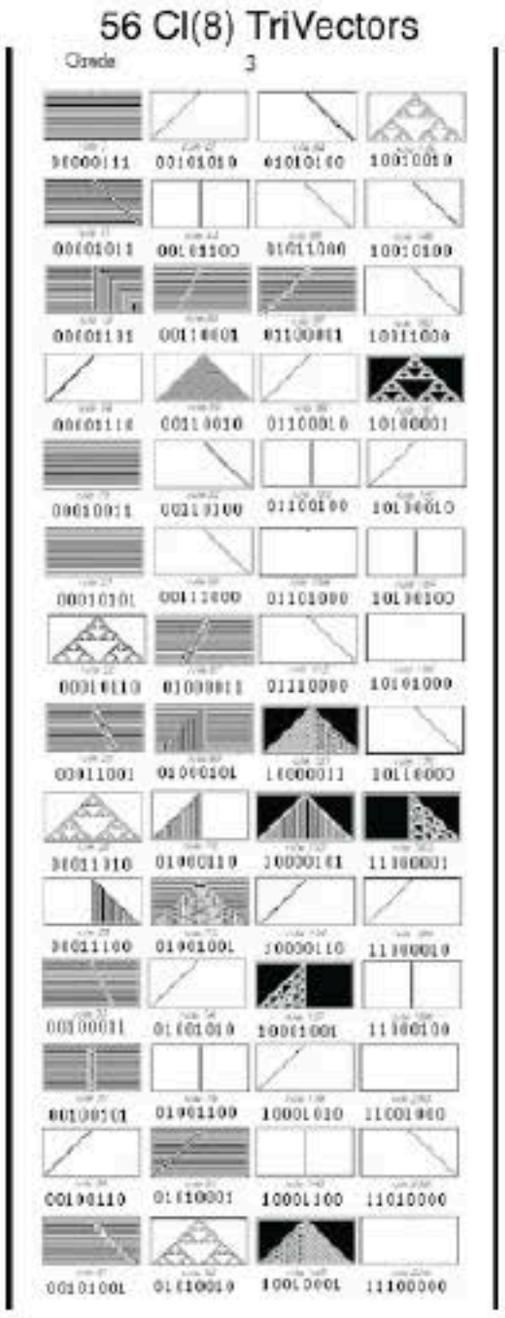
Ghosts correspond to Gauge Bosons:

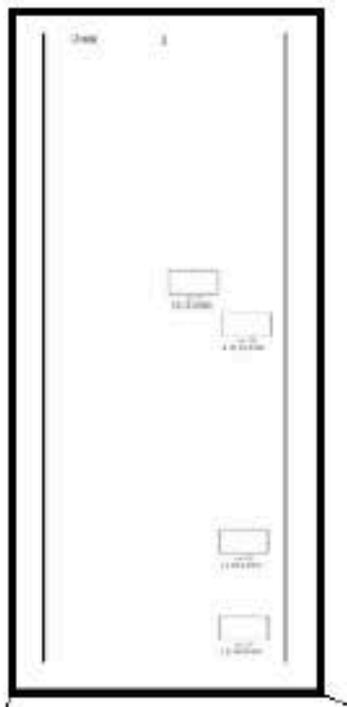
Jean Thierry-Mieg in J. Math. Phys. 21 (1980) 2834-2838 said:
"... The ghost and the gauge field:
The single lines represent a local coordinate system
of a principal fiber bundle of base space-time.
The double lines are 1 forms.
The connection of the principle bundle w is assumed to be vertical.
Its contravariant components PHI and X are recognized, respectively,
as the Yang-Mills gauge field and the Faddeev-Popov ghost form ...

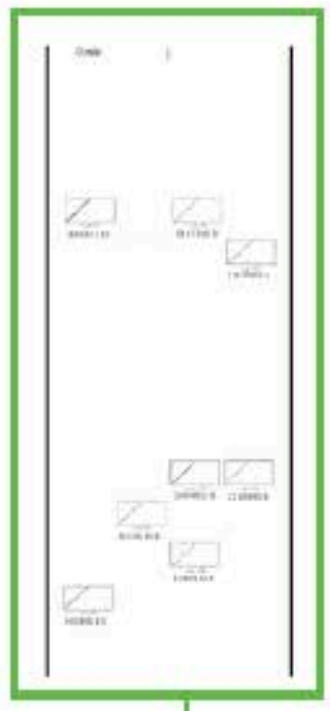


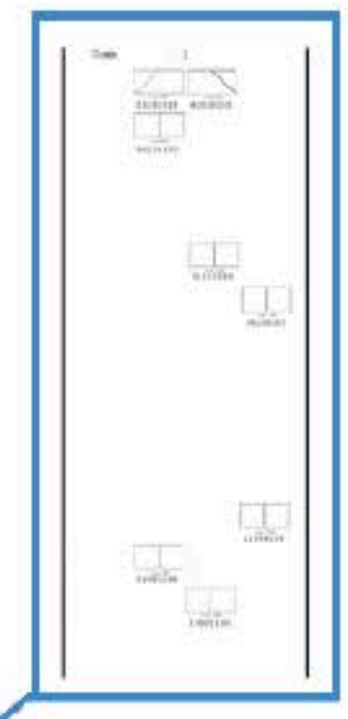
..."

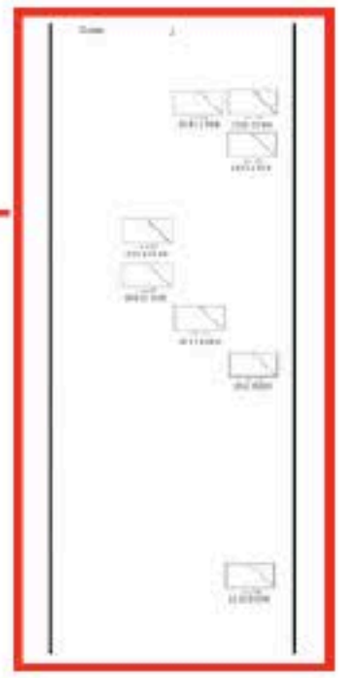
56 Cl(8) TriVectors correspond to Fr3(O) of 26D World-Line=String Theory











a

d

S+* e

V* S-* f

S+

V

S-

d'

S'+* V'*

e' S'-*

f'

S'+

V'

S'-

b

To see how Fr3(O) gives String Theory look at one of the J3(O)o in Fr3(O)

One of the two 26D traceless J3(O)o parts of Fr3(O)

d	**S+**	**V**
S+*	**-d-f**	**S-**
V*	**S-***	**f**

S+ = 8 First-Generation Fermion Particles
S- = 8 First-Generation Fermion AntiParticles

S+ and **S-** are Orbifolded in the 26D String Theory Space
leaving 26 - 16 = 10 dimensions of 8-dim **V** and 1-dim d and 1-dim f.

d and f act to make 10-dim **V**+d+f a Conformal Space over 8-dim **V**
with Octonionic symmetries Spin(1,9) = SL2(O) and Spin(0,8) = Spin(1,7)
due to the Clifford Algebra isomorphism Cl(0,8) = Cl(1,7) = M16(R)

Green, Schwartz, and Witten, in "Superstring Theory" vol. 1, describe 26D String Theory saying ".... 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** ...".

Tachyons localized at orbifolds of fermions produce virtual clouds of particles / antiparticles that dress fermions by filling their Schwinger Source regions.

Dilatons are Goldstone bosons of spontaneously broken scale invariance that (analagous 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 2 state = Bohmion = Carrier of the Bohm Force of the Bohm Quantum Potential.

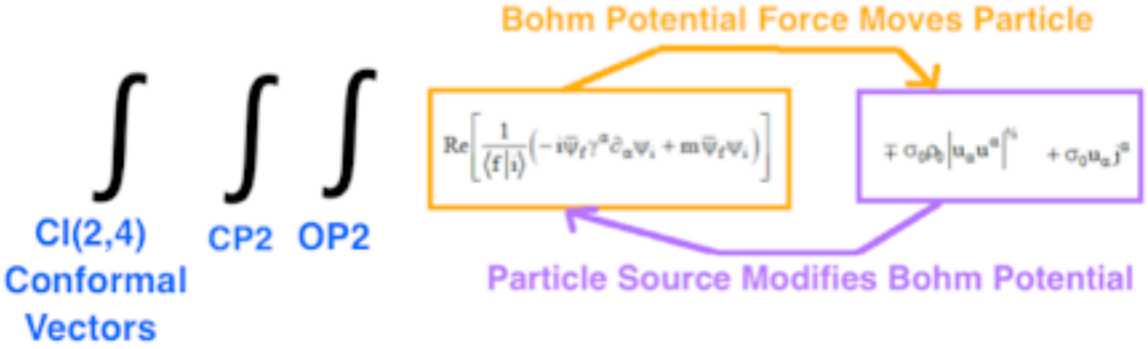
Similarity of the spin 2 Bohmion to the spin 2 Graviton accounts for the Bohmion's ability to support Penrose Consciousness with Superposition Separation Energy Difference G m^2 / a
where, for a Human Brain, m = mass of electron and a = 1 nanometer in Tubulin Dimer

Andrew Gray (quant-ph/9712037v2) said:
"... A new formulation of **quantum mechanics ... assign[s] ... probabilities ... to entire fine-grained histories ... [It] is fully relativistic and applicable to multi-particle systems** ...[and]...
makes the same experimental predictions as quantum field theory ...
consider space and time cut up into small volume elements
... and then take the limit as ... volume ... ---> 0 ...
get the final amplitude ... by considering all possible distributions at a time t earlier ...
for each such distribution the amplitude for it to occur [is] multiplied by the amplitude to get ... the final distribution ... **the interference factor ... is a measure of how much interference between the different possible histories that contain the distribution of interest there is at each time** ... This result is the ...
Feynman amplitude squared times the product of all the interference factors ...".

Consider the Gray Fine-Grained History to be a World-Line String.

The Gray Fine-Grained History Quantum Theory
is equivalent to
the Nambu-Goto action of 26D String Theory.
Nambu-Goto 24x24 traceless spin-2 particle
is
Quantum Bohmion carrier of Bohm Quantum Potential

Roderick I. Sutherland (arXiv 1509.02442v3) has given a Lagrangian
for the Gray Fine-Grained Nambu-Goto Quantum Bohm Potential
that has been extended by Jack Sarfatti to include nonlinear Back-Reaction



that enables Penrose-Hameroff Quantum Consciousness and Free Will,
justifying Clifford's characterization of Real Clifford Algebras as
"... mind-stuff tak[ing] the form of ... human consciousness ...".

Tachyons localized at orbifolds of fermions produce virtual clouds of particles / antiparticles that dress fermions and so produce Schwinger Sources.

When a fermion particle/antiparticle appears in E8 spacetime it does not remain a single Planck-scale entity because **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**.
Its **structure comes from the 24-dim Leech lattice part of the Monster Group which is**

2^(1+24) times the double cover of Co1, for a total order of about 10^26.

Since a Leech lattice is based on copies of an E8 lattice
and since there are 7 distinct E8 integral domain lattices
there are 7 (or 8 if you include a non-integral domain E8 lattice) 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, so the Kerr-Newman Cloud **Source should contain about 10^27 particle/antiparticle pairs and its size should be about** 10^(27/3) x 1.6 x 10^(-33) cm = roughly **10^(-24) cm**.

Quantum Kernel Functions and Schwinger Source Green's Functions

Fock "Fundamental of Quantum Mechanics" (1931) showed that it requires Linear Operators "... represented by a definite integral [of a]... kernel ... function ...".

Hua "Harmonic Analysis of Functions of Several Complex Variables in the Classical Domains" (1958) showed Kernel Functions for Complex Classical Domains.

Schwinger (1951 - see Schweber, PNAS 102, 7783-7788) "... 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 ...".

Wolf (J. Math. Mech 14 (1965) 1033-1047) showed that the Classical Domains (complete simply connected Riemannian symmetric spaces) representing 4-dim Spacetime with Quaternionic Structure are:

S1 x S1 x S1 x S1 = 4 copies of U(1)
S2 x S2 = 2 copies of SU(2)
CP2 = SU(3) / SU(2)xU(1)
S4 = Spin(5) / Spin(4) = Euclidean version of Spin(2,3) / Spin(1,3)

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

Cl(16) Physics constructs the **Lagrangian** integral such that the **mass m emerges as the integral over the Schwinger Source spacetime region** of its Kerr-Newman cloud of virtual particle/antiparticle pairs plus the Valence Fermion so that the volume of the Schwinger Source fermion defines its mass, which, being dressed with the particle/antiparticle pair cloud, gives **quark mass as constituent mass**.

Armand Wyler used Harmonic Geometry to calculate:

Fermion masses as a product of four factors:

V(Qfermion) x N(Graviton) x N(octonion) x Sym

V(Qfermion) is the volume of the part of the half-spinor fermion particle manifold S^7 x RP^1 related to the fermion particle by photon, weak boson, or gluon interactions.
N(Graviton) is the number of types of Spin(0,5) graviton related to the fermion.
N(octonion) is an octonion number factor relating up-type quark masses to down-type quark masses in each generation.
Sym is an internal symmetry factor, relating 2nd and 3rd generation massive leptons to first generation fermions. It is not used in first-generation calculations.

Force Strengths are made up of two parts:

the relevant spacetime manifold of gauge group global action
the U(1) photon sees 4-dim spacetime as T^4 = S1 x S1 X S1 x S1
the SU(2) weak boson sees 4-dim spacetime as S2 x S2
the SU(3) weak boson sees 4-dim spacetime as CP2
the Spin(5) of gravity sees 4-dim spacetime as S4
and
the volume of the Shilov boundary corresponding to the symmetric space with local symmetry of the gauge boson. The nontrivial Shilov boundaries are:
for SU(2) Shilov = RP^1xS^2
for SU(3) Shilov = S^5
for Spin(5) Shilov = RP^1xS^4

Schwinger Sources as described above are continuous manifold structures of Bounded Complex Domains and their Shilov Boundaries but the E8-Cl(16) 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 a single 26-dim String Theory cell modulo the Leech lattice is the Monster Group of order about 8 x 10^53.

Cl(1,25) Algebraic Quantum Field Theory (AQFT)

26D String Theory has a Real Clifford Algebra Cl(1,25) constructed from

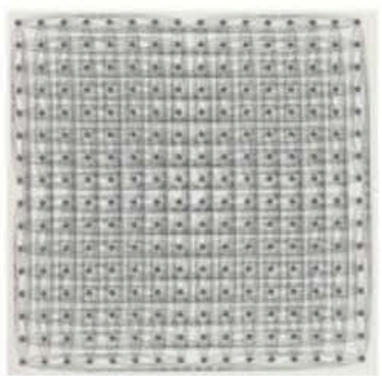
Cl(16) = Cl(8)xCl(8) -> Cl(8)xCl(8)xCl(8) = Cl(24)
to get to the Leech Lattice 24-dim Vector Space

Conformal Structure of 2x2 matrices with entries in Cl(24)
(Porteous, Clifford Algebras and the Classical Groups and
Lounesto and Porteous, Lectures on Clifford (Geometric) Algebras and Applications)
gives M(2,Cl(24)) = Cl(1,25) with Lorentz Leech Lattice Vector Space.

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

Cl(1,25) x ...(N times tensor product)... x Cl(1,25)

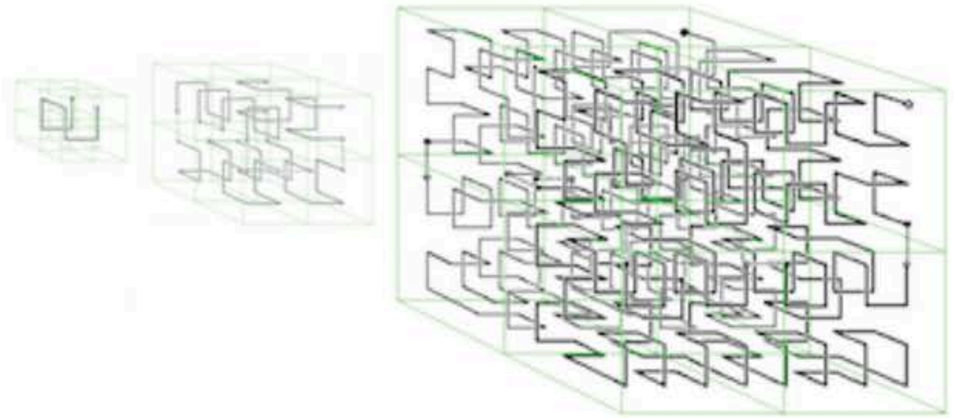
For N = 2^8 = 256 the copies of Cl(1,25) are on the 256 vertices
of the 8-dim HyperCube



For N = 2^16 = 65,536 the copies of Cl(1,25) fill in the 8-dim HyperCube
William Gilbert's web page says: "... The n-bit reflected binary Gray code will describe a path on the edges of an n-dimensional cube that can be used as the initial stage of a Hilbert curve that will fill an n-dim... cube. ...".

As N grows, the copies of Cl(1,25) continue to fill the 8-dim HyperCube of E8 SpaceTime using higher Hilbert curve stages from the 8-bit reflected binary Gray code subdividing the initial 8-dim HyperCube into more and more sub-HyperCubes.

If edges of sub-HyperCubes, equal to the distance between adjacent copies of Cl(1,25), remain constantly at the Planck Length, then the full 8-dim HyperCube of our Universe expands as N grows to 2^16 and beyond similarly to the way shown by this 3-HyperCube example for N = 2^3, 4^3, 8^3 from Wiliam Gilbert's web page:



Completion of Union of All Tensor Products of Cl(1,25) =
= hyperfinite AQFT = Algebraic Quantum Field Theory =
= the Third Grothendieck Universe

The AQFT contains a copy of E8 within Cl(16) within each copy of Cl(1,25)
The E8 is a Recipe for a Realistic Physics Lagrangian
so the AQFT has a natural realistic Lagrangian structure.

The Vector Space of Cl(1,25) is the Spacetime of a 26D String Theory
in which Strings are World-Lines of Particles
and
the Massless Symmetric Spin 2 State is the Carrier
of the Bohm Quantum Potential with Sarfatti Back-Reaction

The **Cl(1,25) AQFT** being the completion of the union of all tensor products of Cl(1,25)
it **is the Real Clifford Algebra (8-Periodicity) analog**
of the completion of the union of all tensor products of the Complex Clifford Algebra
(2-Periodicity) Cl(2;C) of 2x2 Complex Matrices = M2(C) of Spinor Fock Space that
is the **Hyperfinite II1 von Neumann factor algebra**.

Results of E8 Physics Calculations:

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.

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

(for calculation details see viXra 1804.0121)

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

Particle/Force	Tree-Level	Higher-Order
e-neutrino	0	0 for nu_1
mu-neutrino	0	9 x 10^(-3) eV for nu_2
tau-neutrino	0	5.4 x 10^(-2) eV for nu_3
electron	0.5110 MeV	
down quark	312.8 MeV	charged pion = 139 MeV
up quark	312.8 MeV	proton = 938.25 MeV
		neutron - proton = 1.1 MeV
muon	104.8 MeV	106.2 MeV
strange quark	625 MeV	
charm quark	2090 MeV	
tauon	1.88 GeV	
beauty quark	5.63 GeV	
truth quark (low state)	130 GeV	(middle state) 174 GeV
		(high state) 218 GeV
W+	80.326 GeV	
W-	80.326 GeV	
W0	98.379 GeV	Z0 = 91.862 GeV
Mplanck	1.217x10^19 GeV	
Higgs VEV (assumed)	252.5 GeV	
Higgs (low state)	126 GeV	(middle state) 182 GeV
		(high state) 239 GeV
Gravity Gg (assumed)	1	
(Gg)(Mproton^2 / Mplanck^2)		5 x 10^(-39)
EM fine structure	1/137.03608	
Weak Gw	0.2535	
Gw(Mproton^2 / (Mw+^2 + Mw-^2 + Mz0^2))		1.05 x 10^(-5)
Color Force at 0.245 GeV	0.6286	0.106 at 91 GeV

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

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

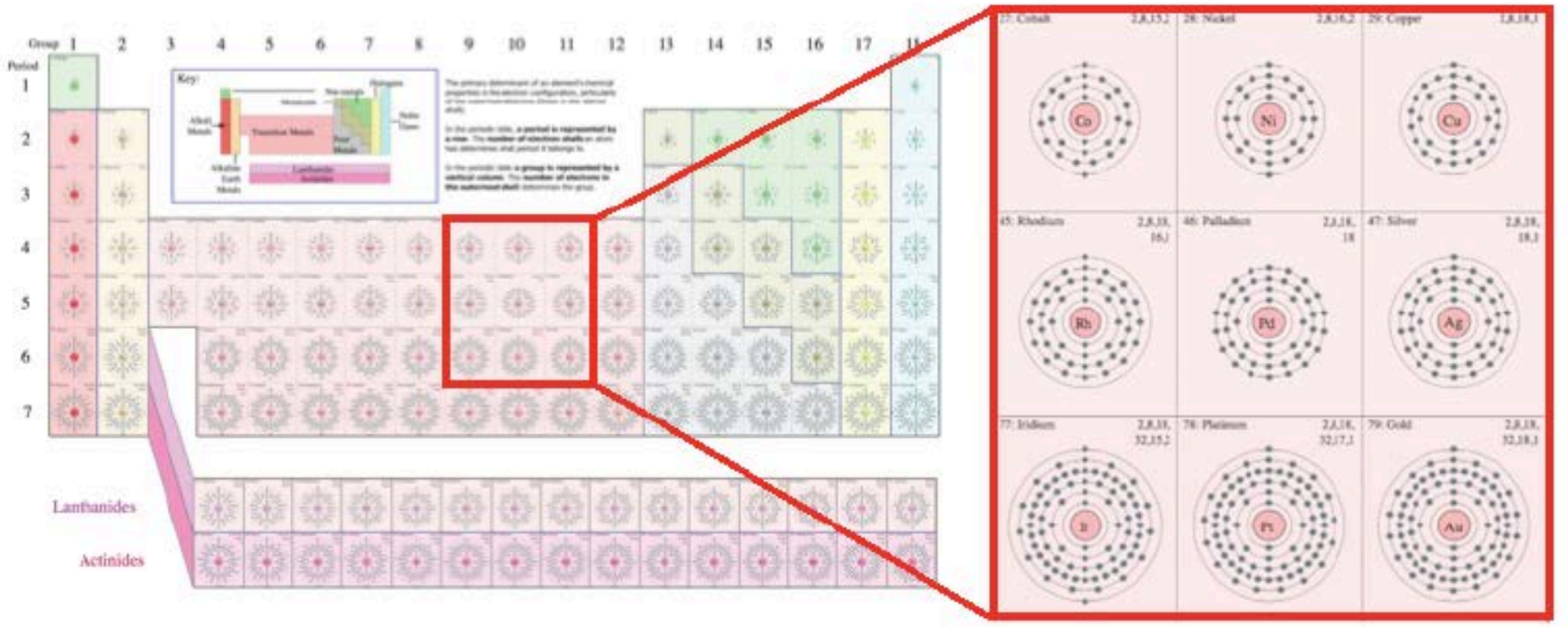
The phase angle d13 is taken to be 1 radian.

The problem of the determination of the quark masses is not trivial. We can define as a "current" quark mass the mass entering in the Lagrangian (or Hamiltonian) representation of a hadron; this comes out to be of the order of some MeV/c^2 for u, d quarks, and $\sim$0.2 GeV/c^2 for s quarks. However, the strong field surrounds the quarks in such a way that they acquire a "constituent" (effective) mass including the equivalent of the color field; this comes out to be of the order of some 300 MeV/c^2 for u, d quarks, and $\sim$0.5 GeV/c^2 for s quarks. Current quark masses are almost the same as constituent quark mass for heavy quarks. Alessandro De Angelis · Mário Pimenta

Introduction to Particle and Astroparticle Physics Second Edition

Constituent Mass Quarks (Schwinger Sources)
combine to form Nuclei for Atoms such as
Deuterium and Palladium.

Wikipedia says (I added red material specifically about Pd): "...



... Each s subshell holds at most 2 electrons Each p subshell holds at most 6 electrons Each d subshell holds at most 10 electrons Each f subshell holds at most 14 electrons Each g subshell holds at most 18 electrons ...

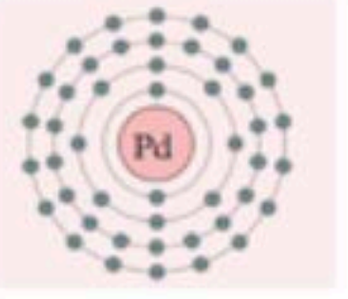
Shell name	Subshell name	Subshell max electrons	Shell max electrons
K	1s	2	2
L	2s	2	2 + 6 = 8
	2p	6	
M	3s	2	2 + 6 + 10 = 18
	3p	6	
	3d	10	
N	4s	2	2 + 6 + + 10 + 14 = 32
	4p	6	
	4d	10	
	4f	14	

Palladium

2

2+6 = 8

2+6+10 = 18



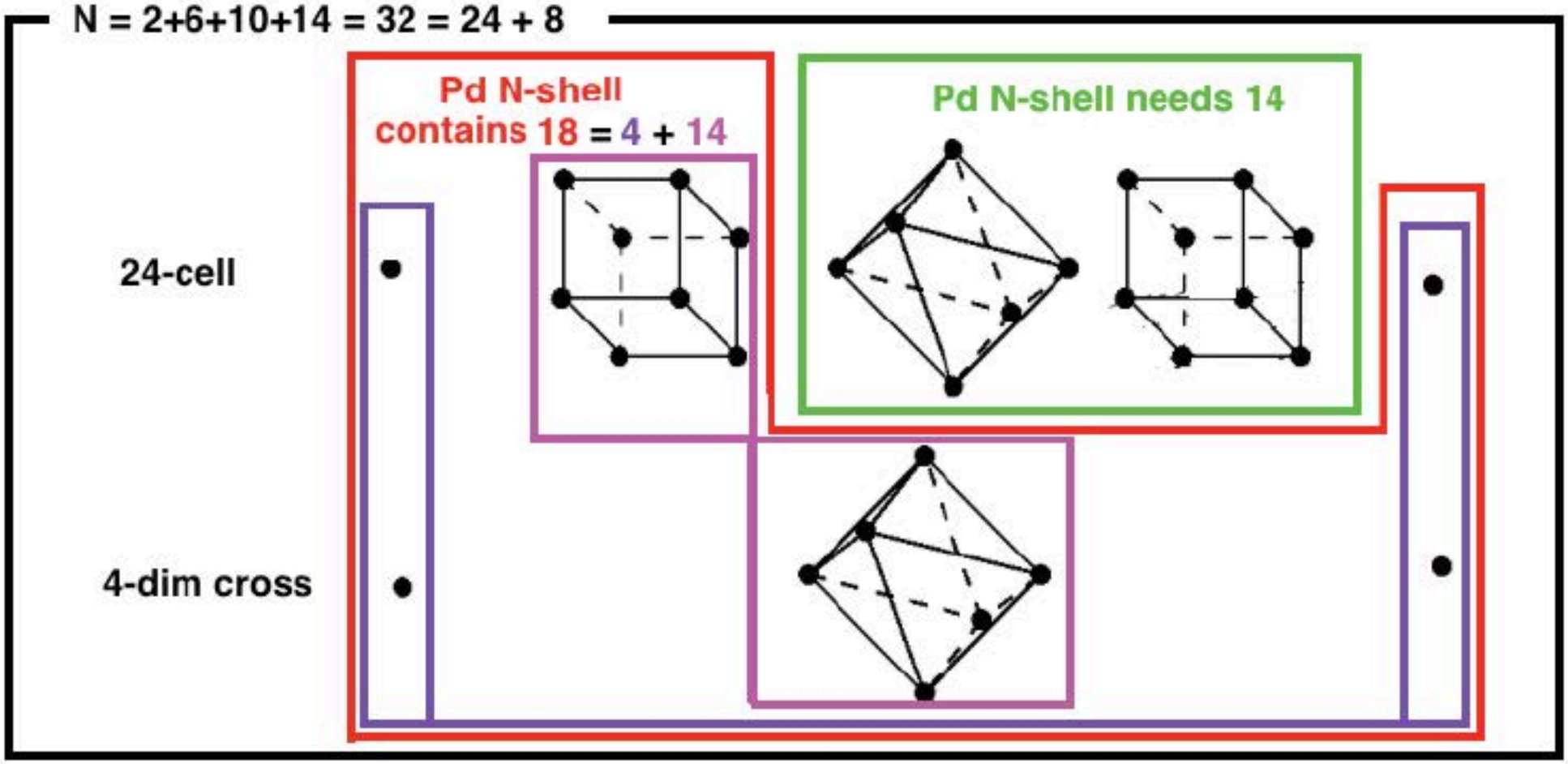
2+6+10 = 18

... ...

palladium (atomic number 46) has no electrons in the fifth shell, unlike other atoms ...[in its periodic table neighborhood]...".

A full N-shell has s + p + d + f = 2 + 6 + 10 + 14 = 32 electrons.

Palladium N-shell has 2 + 6 + 10 = 18 electrons and "holes" to receive 14 electrons:

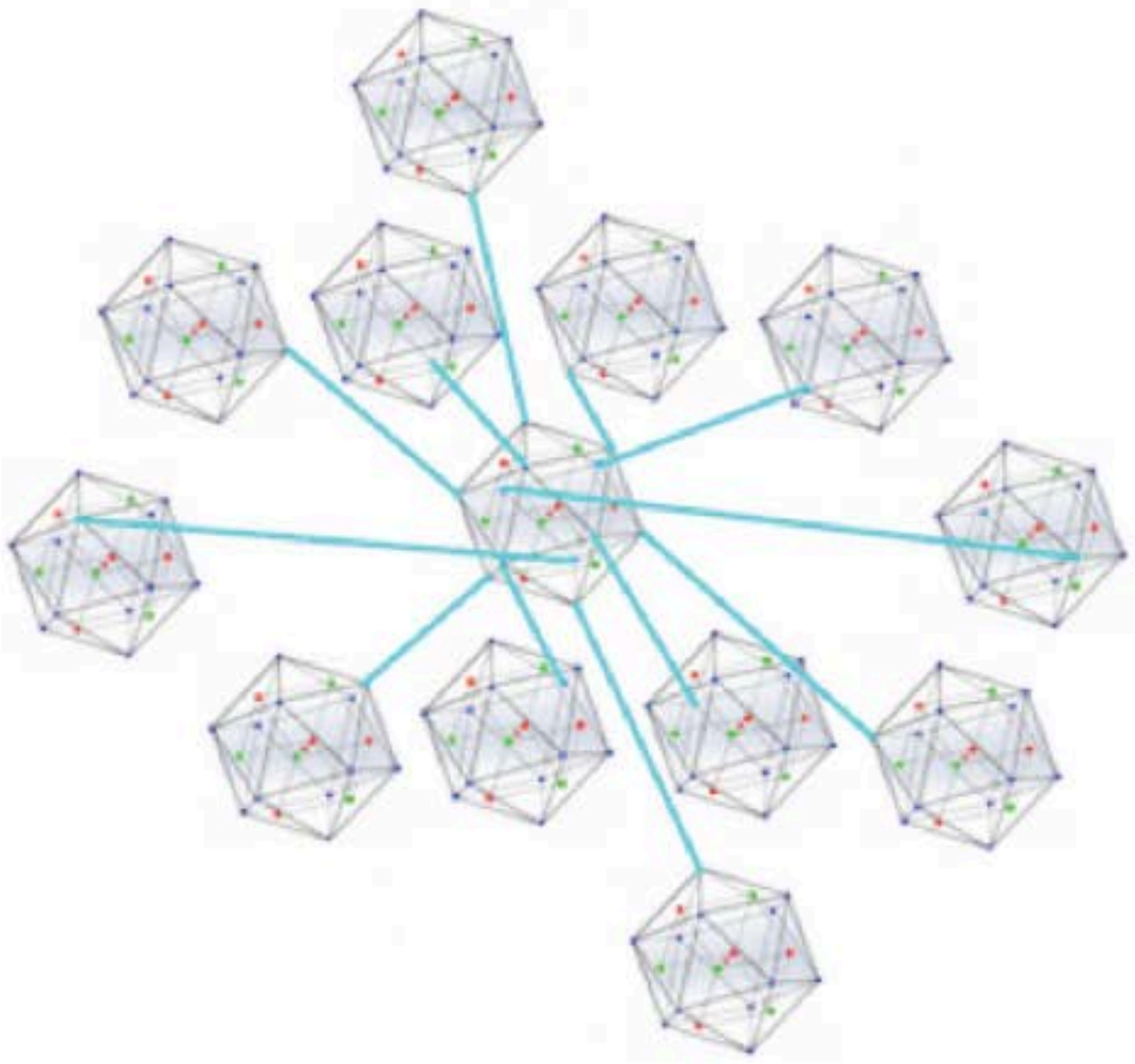


Each Palladium atom has 18-14 = 4 N-shell electrons that can interact
with 4 electrons of 4 Deuterium atoms absorbed into a Pd cluster,
helping them to participate in a Schwinger coherent quantum state for TSC Fusion.

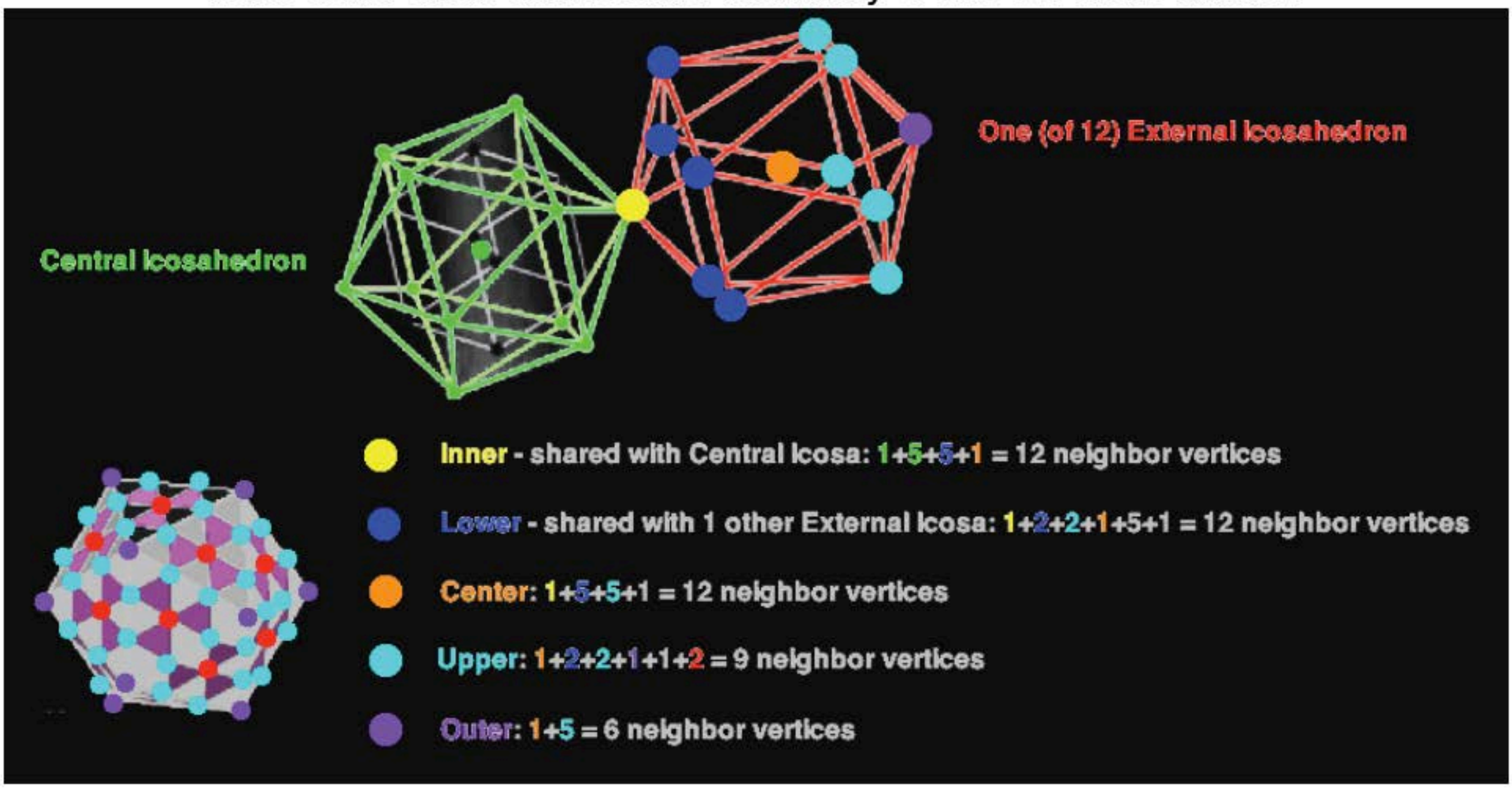
Further, each Palladium atom has 14 N-shell electrons
12 to fill needs of other Pd atoms
and 2 for a Dirac Fermion Band for Klein Paradox Tunnelling.

What is the structure of the icosahedral 147-atom Pd cluster ?

The icosahedral 147-atom ground state has 12 exterior icosahedra
and a central icosahedron with 12 interior vertices
which are the innermost vertices of 12 exterior TSC Fusion site icosahedra:

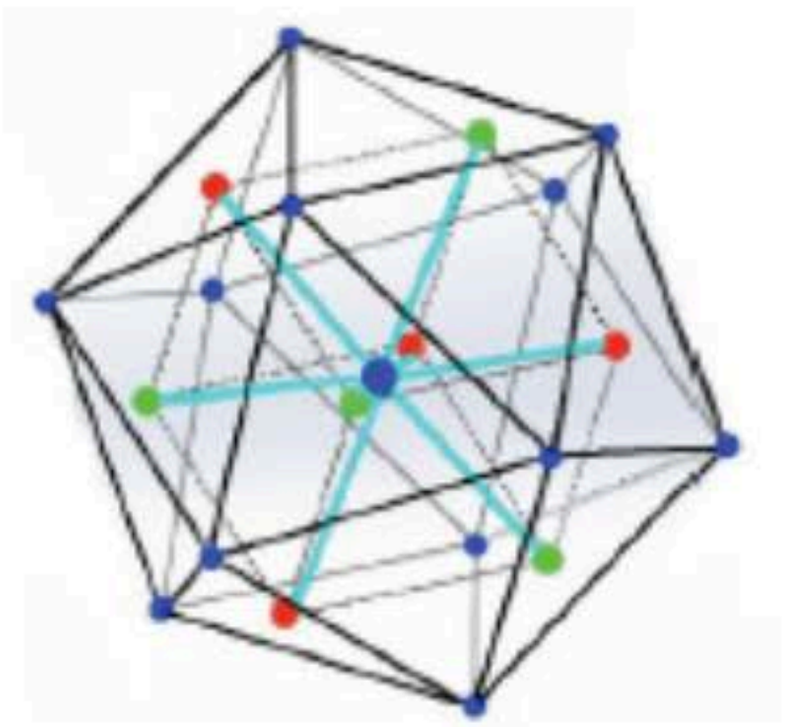


The 12 exterior icosahedra each
have outer faces on the outer boundary of the 147-atom cluster.



In TSC Icosahedra of a Pd cluster
4 D (D+D+D+D) form a Schwinger Coherent Quantum State

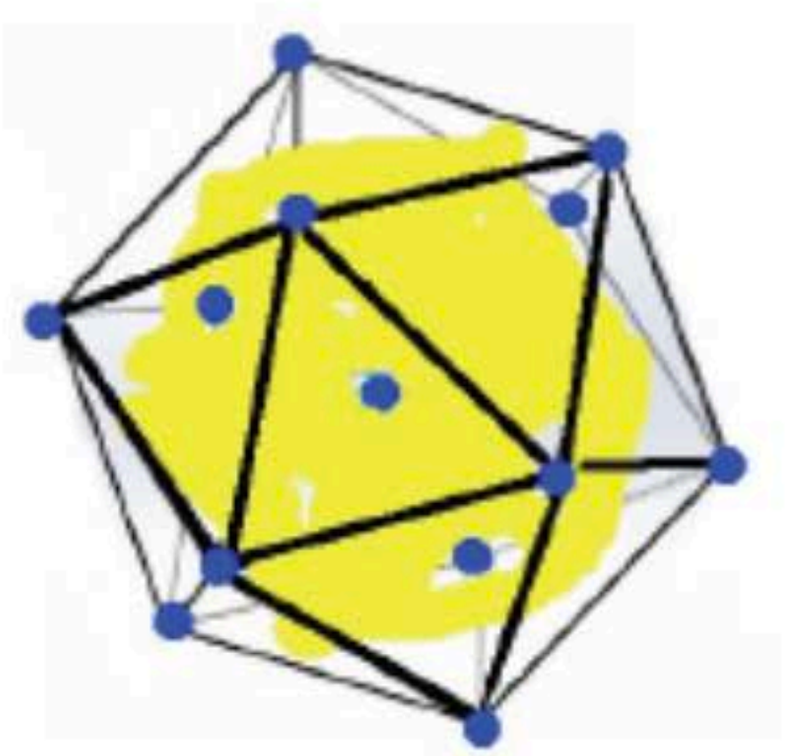
From a classical approximation point of view there are 12+1 = 13 Pd nuclei (blue) within which there is a 2-tetrahedral configuration of 4 D nuclei (red) and 4 D electrons green)



In the Schwinger coherent quantum state (yellow) the 4 D nucei and 4 D electrons are smeared out all over the interior of the icosahedral TSC cell

and

the 4 D electrons screen out the positive charge of the 4 D nuclei
making the Schwinger coherent quantum cloud effectively neutral with no Coulomb repulsion or attraction.

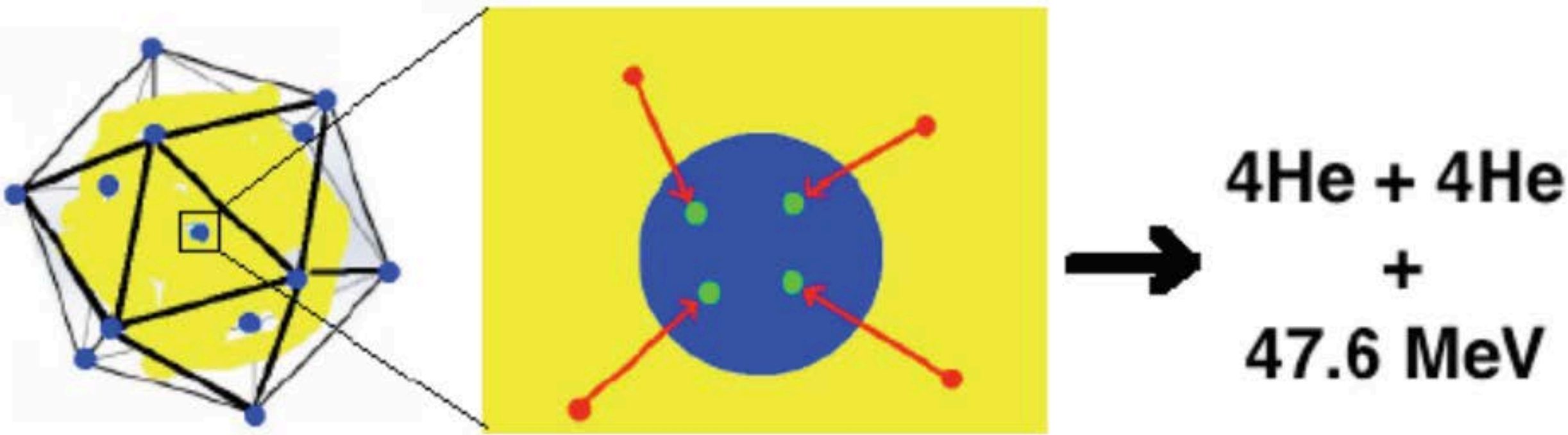


The process of forming the Schwinger State which collapses to the central Pd atom
where Deuterium nuclei undergo Cold Fusion is called by Akito Takahashi Tetrahedral Symmetric Condensation (TSC).

The D Schwinger State nuclei go to the central Pd atom and by Klein Paradox Tunnelling 4 D nuclei undergo TSC Cold Fusion producing 4He + 4He + 47.6 MeV

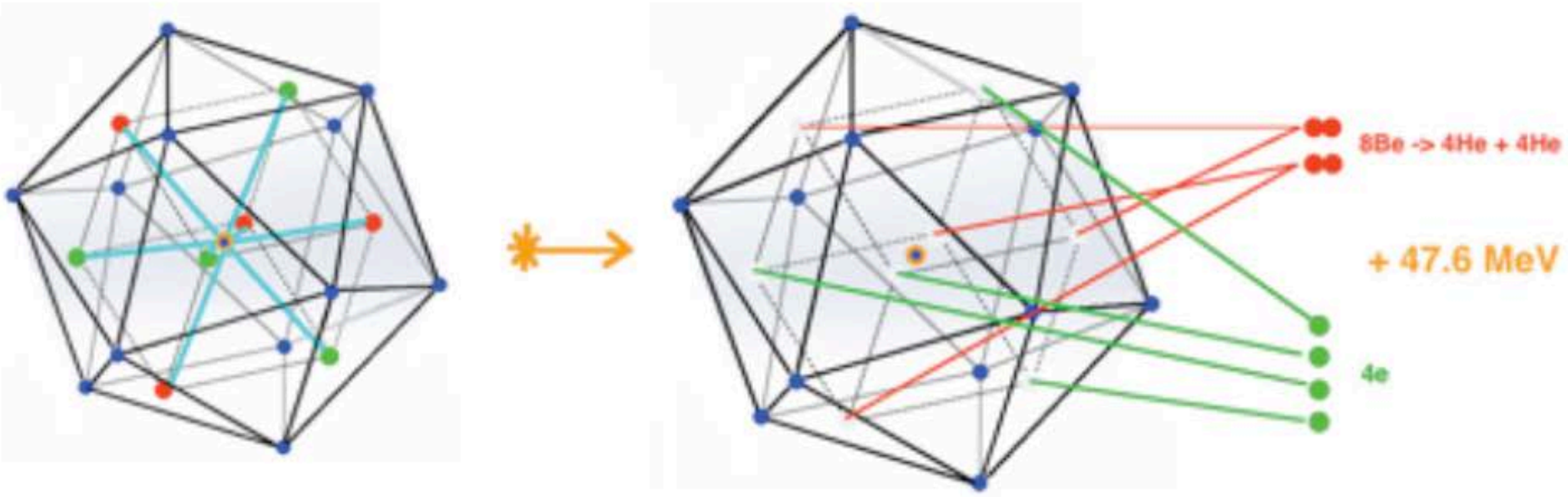
Now look at the central Pd atom in the TSC cell.
Its outer electron shell of 18 electrons has 4 free electrons
(14 of them being bound to the outer 12 Pd atoms plus 2 forming a Dirac Fermion Band)

which 4 free electrons pull the 4 D nuclei out of the Schwinger quantum cloud
into the Central Pd Atom

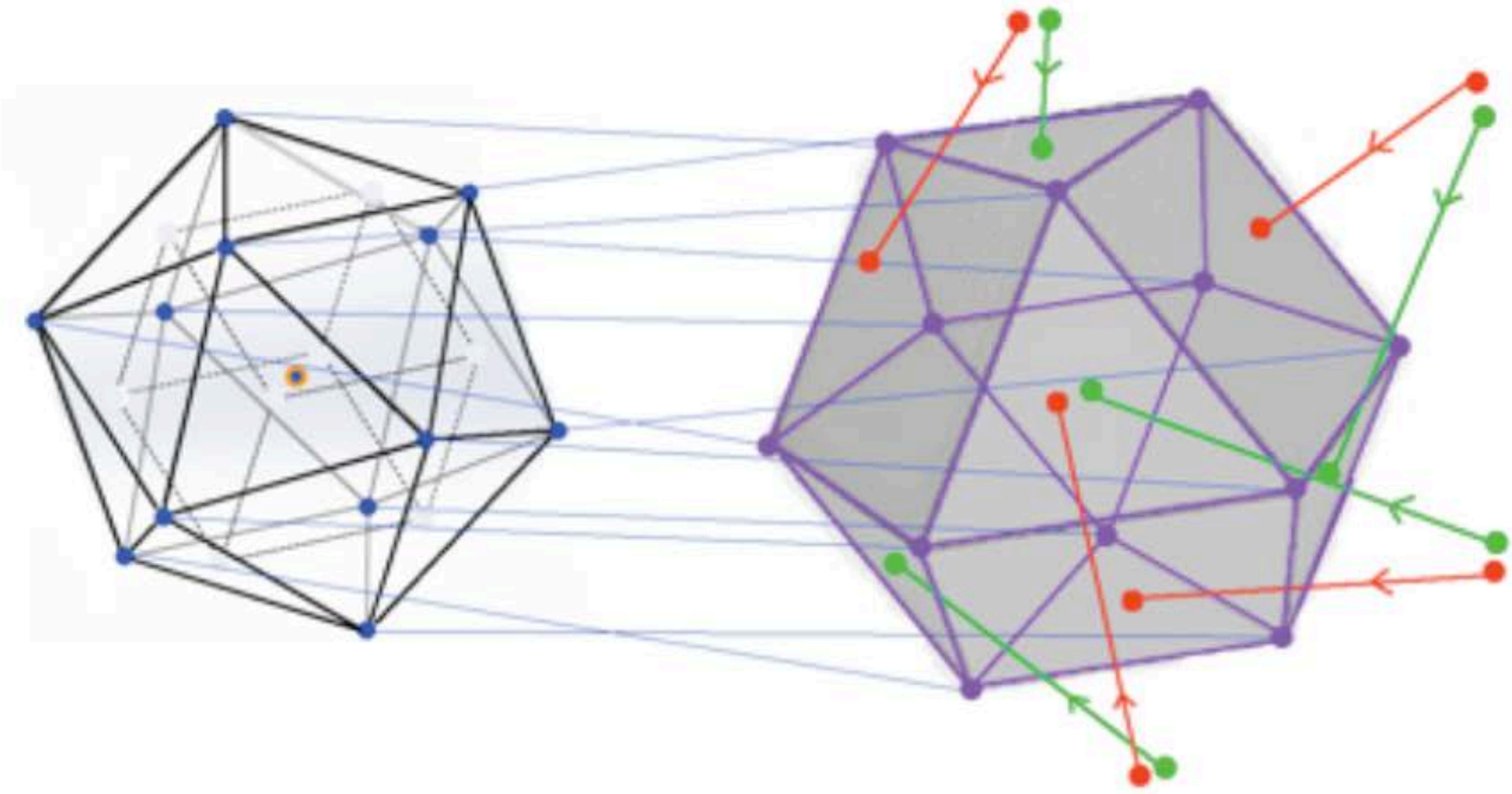


When the 4 D nuclei get into the small volume of the Central Pd Atom
they “see” each other as repulsive like electrical charges
resulting in a very high Coulomb barrier between them
but
that is when the Dirac Fermion Band takes effect
and gets them to rapidly penetrate the barrier by Klein Paradox Tunnelling

Some of the TSC Fusion Energy goes to a Jitterbug transformation

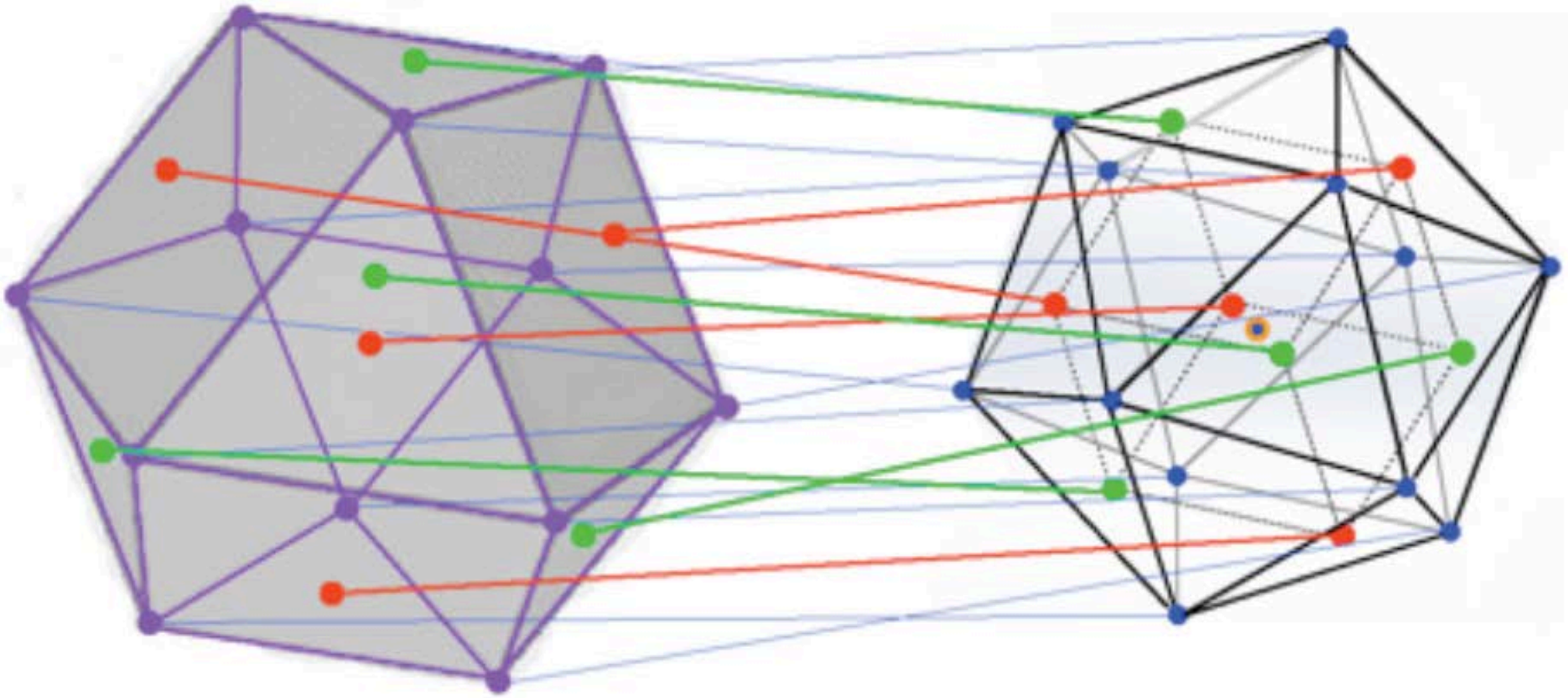


of the icosahedral Palladium, depleted of Deuterium fusion fuel,
to a cuboctahedral configuration

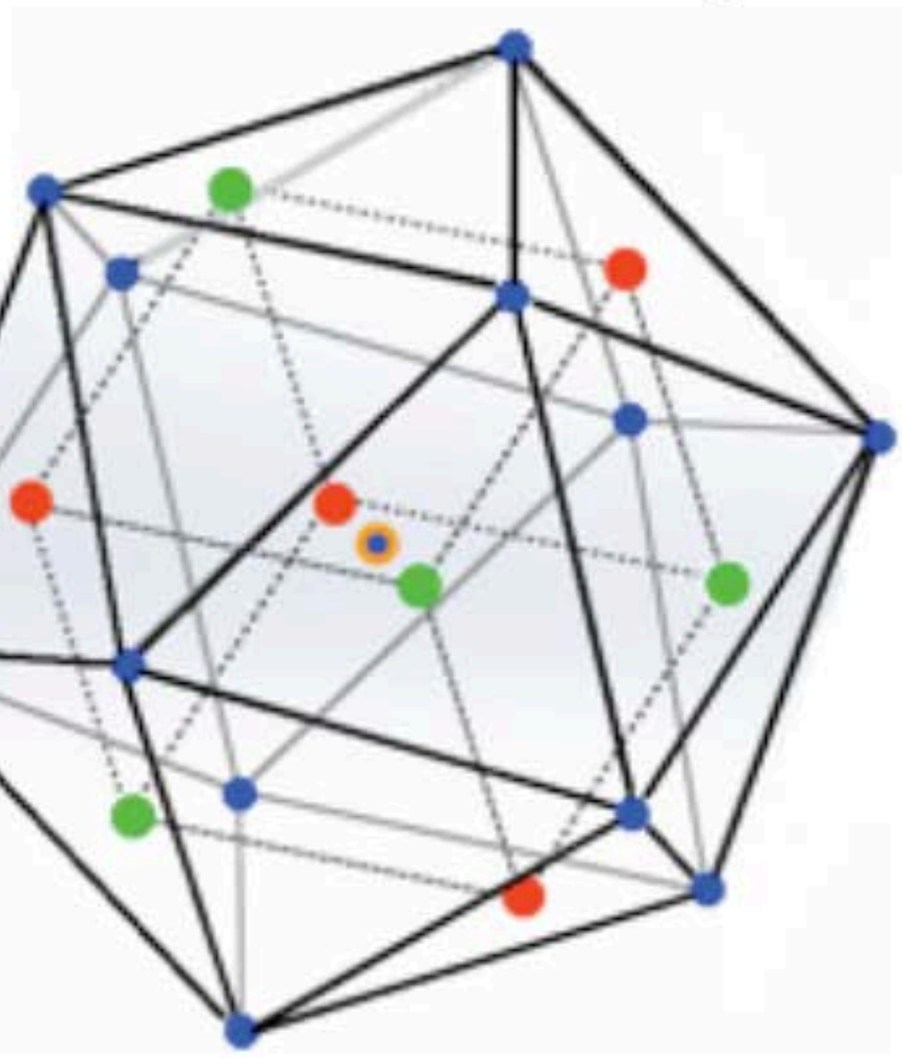


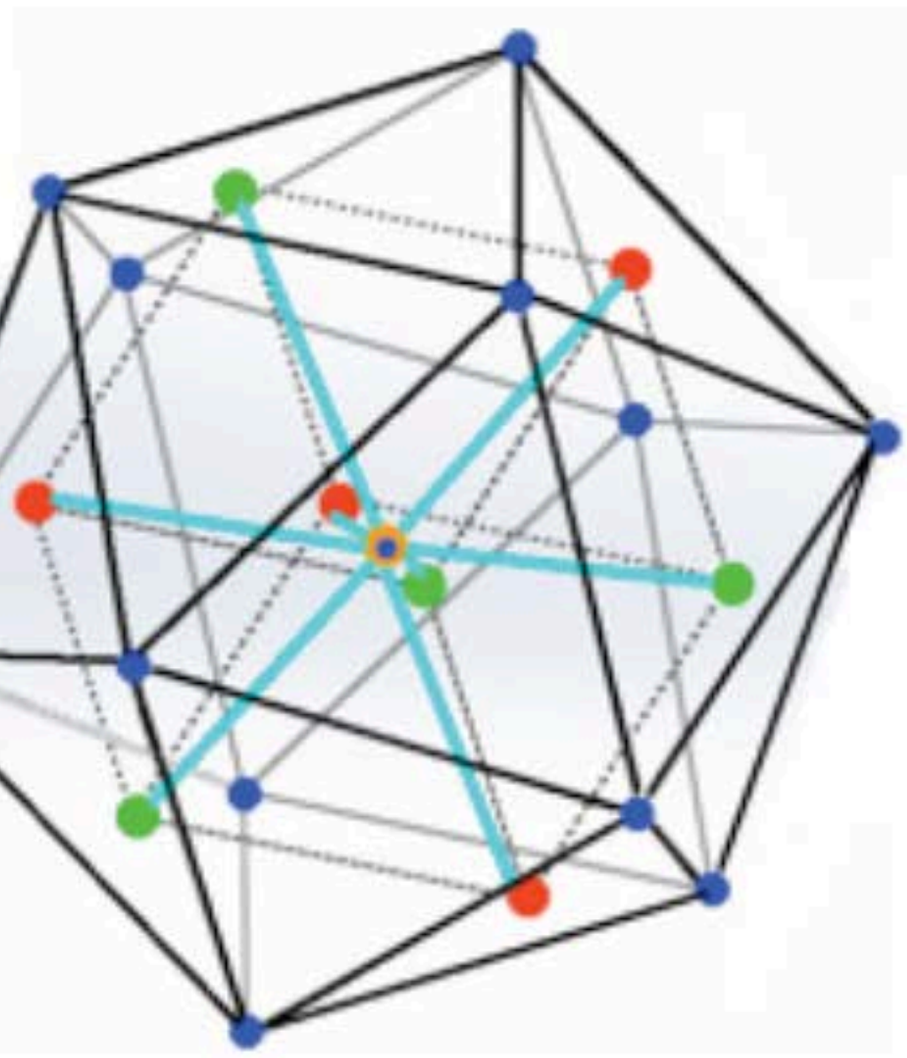
which has 6 large square openings through which
the 4He TSC Fusion Product Ash can leave the Pd cluster
and ambient Deuterium Fuel can enter to reload the Palladium cluster.

Then, since the icosahedral configuration is the Palladium cluster ground state, another Jitterbug transformation



takes the Palladium cluster to an icosahedral configuration with the replenished Deuterium nuclei and electrons ready for another round of TSC fusion





Deuterium Gas

TSC-Jitterbug Fusion
Reaction Chamber 1

Zeolite-Pd

Fusion -> Zeolite Phonon Heat

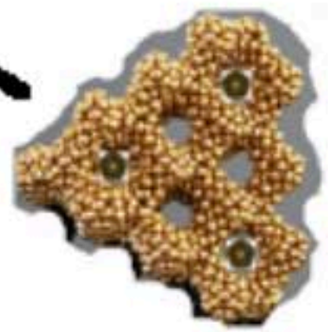
D2O HEAVY WATER

Heat / Cooling Chamber 2

HOT Zeolite-Pd

D2O STEAM

Recyle back to Chamber 1

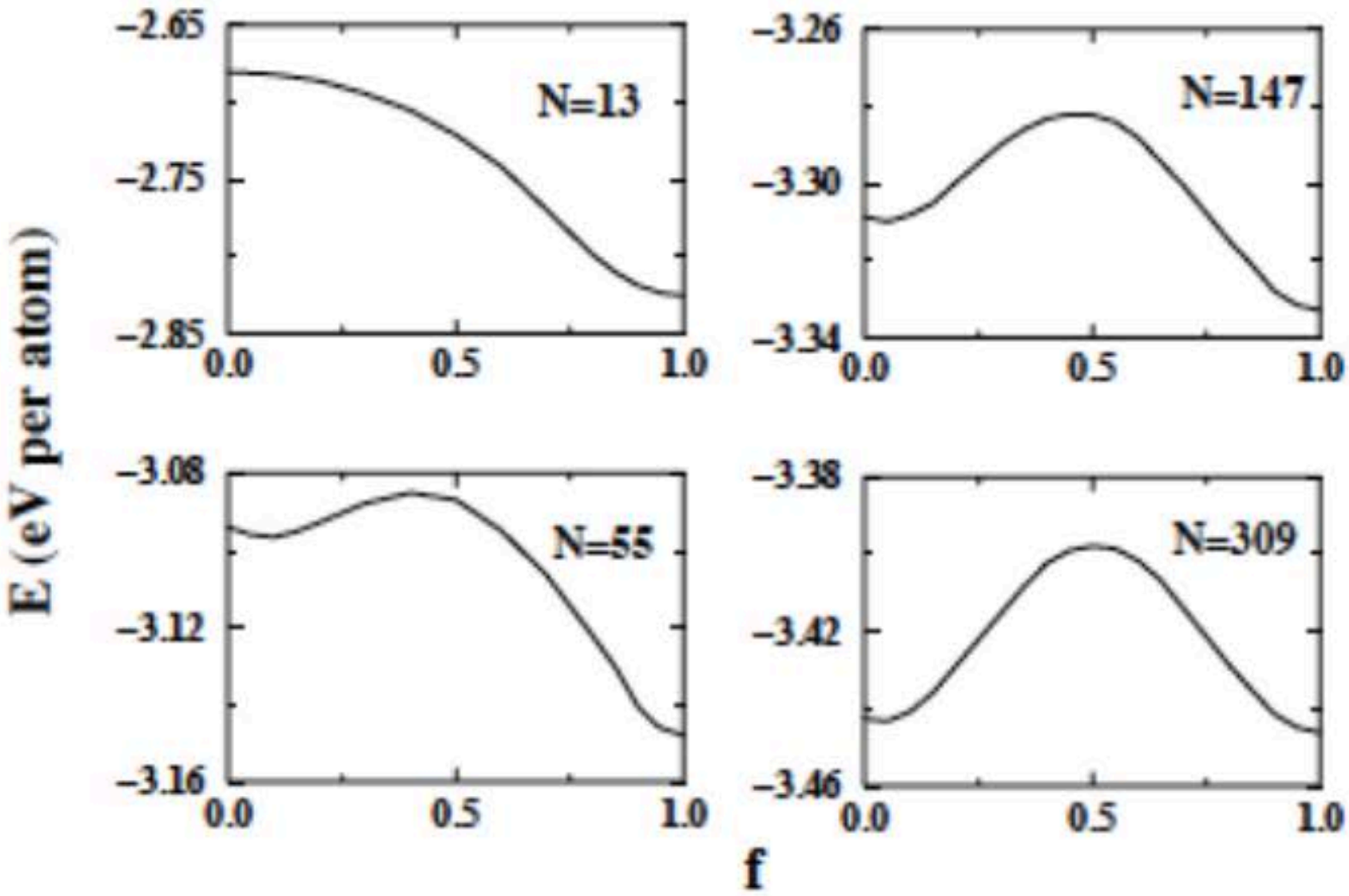


Cooled Dried Zeolite-Pd

As more layers are added, the deformations of tetrahedra and octahedra accumulate and eventually destabilize the structures necessary for Jitterbug and TSC Fusion.
The next Mackay cluster beyond 147 atoms has 147+162 = 309 atoms.

Barretau, Desjonqueres, and Spanjaard in Eur. Phys. J. D. 11 (2000) 395-402 say:
"... the icosahedron is the preferred structure at small sizes, and
the critical size at which the relative stability becomes favorable
to cuboctahedrons is N = 561 for PdN clusters ...[for which]...
For N = 13 the cuboctahedron is ... unstable.

For N = 55, 147, and 309 atoms the cuboctahedron is metastable and slightly distorted.
Its transformation to a perfect icosahedral structure needs an activation energy
of 12 meV for N = 55, 28 meV for N = 147 and 45 meV for N = 309.
The activation energies involved in the inverse transformation
are 61 meV for N = 55, 51 meV for N = 147 and 48 meV for N = 309.
...[compare 47.6 MeV for each TSC Fusion event]...

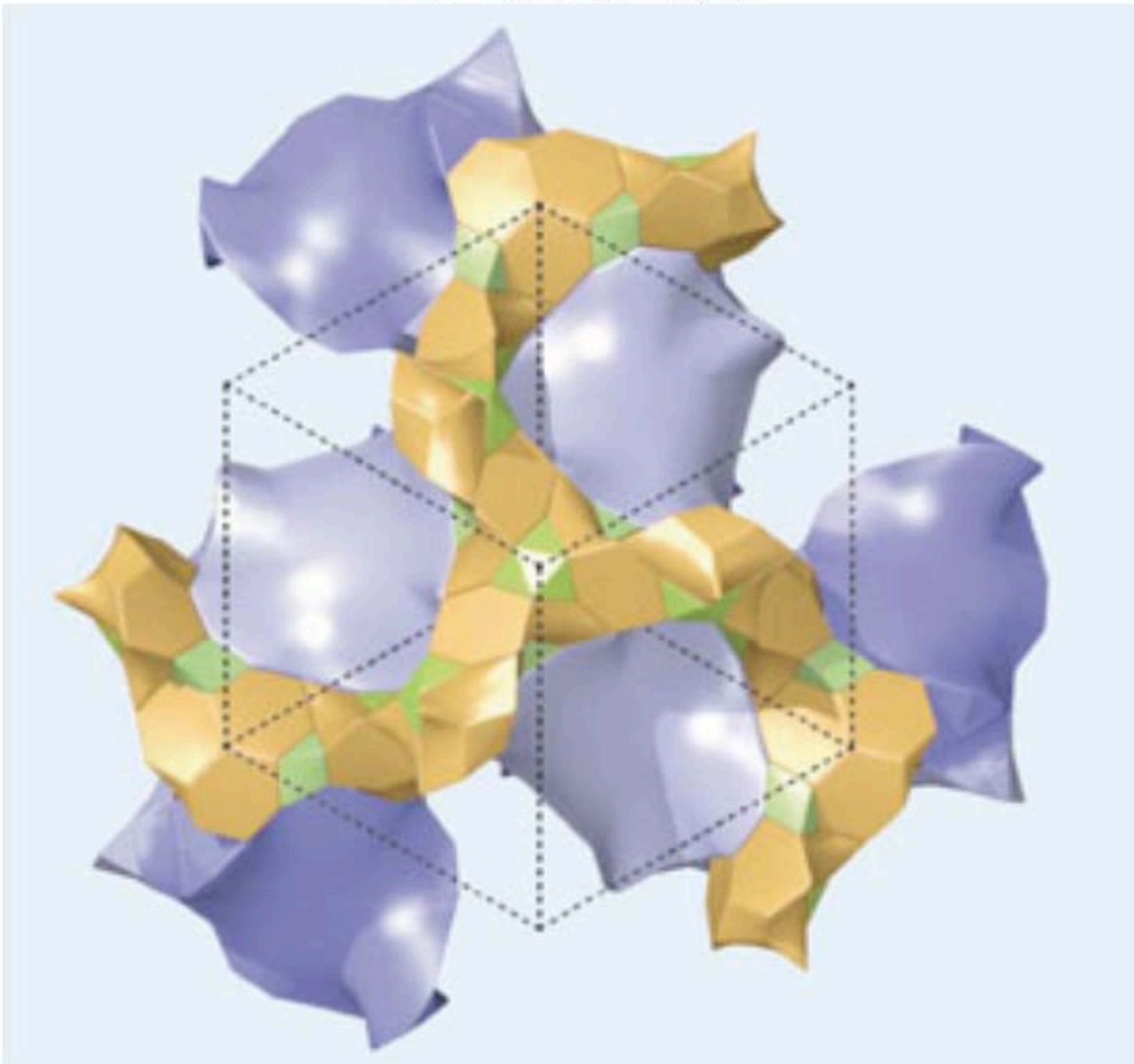


... The evolution of the potential energy profile of homogeneously relaxed ... PdN clusters during the Mackay [Jitterbug] transformation for increasing values of N.
f is a fraction of the displacements ... f = 0 and 1 correspond to the ... cuboctahedron and icosahedron, respectively ...".

N = 309 is disfavored for TSC-Jitterbug Fusion with respect to N = 147 for two reasons:
energy levels are too close for rapid Jitterbug cubocta to icosa transition
N = 309 Pd Cluster is too large (2 nm) to fit
through 1.5 nm expanded Sodium Zeolite Y pore
so
147 atoms is optimal for Pd cluster Cold Fusion

I would like to see experiments
with Zeolite directly using Sandia 1.5 nm Palladium NanoClusters.

If there is difficulty with getting the Sandia Clusters to fit into the Sodium Zeolite Y
then
I would like to see experiments
with Zeolite ITQ-37



which has pore size about 2 nanometers.
(Royal Society of Chemistry, 29 April 2009 and Sun et al, Nature 2009)

Julian Schwinger in 1990 lecture at Universite de Bourgogne said:
"... **in the very low energy cold fusion, one deals essentially with a single state, described by a single wave function, all parts of which are coherent** ...".

Akito Takahashi proposed a process Tetrahedral Symmetric Condensation (TSC)
that for **4 Deuterons (D) in an icosahedral cluster of Palladium (Pd) atoms produces a Schwinger coherent quantum state**
that **effectively distributes the electron population among deuterons**
so that the Coulomb barrier is eliminated and the four Deuterium (D) nuclei can simultaneously interact and fuse, forming two 4He nuclei plus 47.6 MeV energy.
Peter Hagelstein used phonon models for Relativistic Coupling Between Lattice Vibrations and Nuclear Excitation, enabled by break-down of Foldy-Wouthuysen transformation due to 8-15 THz Lattice Vibration Modes, to show direct transfer of the 47.6 MeV energy of Cold Fusion to the Pd lattice as excited optical phonon modes.
The only Cold Fusion experiments producing heat consistently and reproducibly are the detections of heat using Pd Clusters and Deuterium gas by Arata and Zhang (replicated by McKubre at SRI) and by Iraj Parchamazad.
Arata and Zhang (and SRI) used Palladium black with initial cluster sizes distributed around 5 nm so that a substantial number of Pd clusters had diameter 1.5 nm. However, clumping increased the cluster size to around 40 nm at which size Takahashi et al said, based on their similar work, the "heat-power level drop[ped]... drastically".
(see Current Science 108 (25 Feb 2015) LENR Special Section Preface)
Iraj Parchamazad and Melvin Miles avoided the clumping problem by growing the Pd clusters within Zeolite cavities. Using Sodium Zeolite Y whose cavity size is around 1.2 nm (but capable of expansion by about a factor of 2), they produced Pd clusters of 1.5 nm size size which were dispersed within the Zeolite cavities thus preventing clumping. Upon exposure of his Pd clusters in Zeolite to Deuterium gas, he produced heat in 10 out of 10 experiments with
Cold Fusion Energy on the scale of kiloWatts per milligram of Palladium.
(see coldfusionnow.org/iraj-parchamazad-lenr-with-zeolites/)

For Everybody on Earth to be Happy, the Abundant Cheap Energy must provide a high Standard of Living (current USA standard) for a lot of people (10 billion), and:

last for a long time (more than decades) - rules out Oil, Gas, Methane, and Coal;

have no serious radioactive waste - rules out Uranium, Thorium, and Tritium (Lithium);

have realistically scalable capital cost - rules out Solar which would require Satellite collectors with area 1% of pi x 6,000^2 = 1,000,000 km^2 = (1,000 km)^2 or cloud-free collectors on Earth surface with the same area. Less than 100% efficiency would require correspondingly larger area of collectors.

That leaves one possible source of Abundant Cheap Energy for 10 billion people:

	Reserves (Terawatt-years)	Duration years)
Deuterium	1.9 x 10^9 (1/1000 of ocean supply)	2,000,000

Energy is only necessary, but not sufficient,
for 10 billion humans to be happy in a harmonious society.

Humanity also needs (image from Doonesbury)

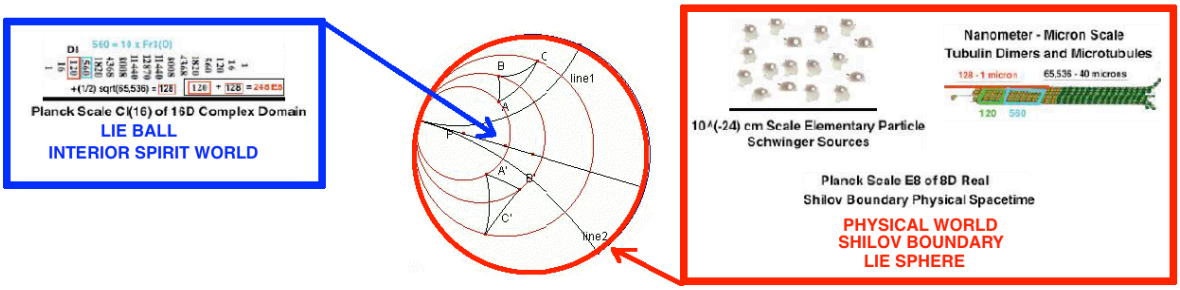
Nuclear Annihilation could occur if USA or Russia or China decided that a First Strike were in their best interest because the Other seemed to be preparing for Nuclear War and that Nuclear War could be survivable due to First Strike Suppression of Retaliation and historical facts such as Hiroshima has rebuilt, Nagasaki had no Firestorm, and the Kuwaiti Firestorm did not cause a Nuclear Winter. It could be avoided if **USA and Russia and China agreed to share Power over Earth just as Spain and Portugal did in 1494 in the Treaty of Tordesillas**.

"... Rudolf Steiner (1861-1925) ... was the founder of Anthroposophy, a philosophy and spiritual movement whose aim ... is to develop supersensible capacaties that enable access to what Steiner described as a spiritual dimension underlying all of life ...
"Geisteswissenschaft" ... is the re-awakening of a spiritual awareness ..."
(Jennie Louise Cain - 2016 U. MIchigan Ph.D. thesis)

Rudolf Steiner, in Cosmic Memory, said "... The Fourfold Man ... consists of ... the **physical** body, the **ether** ... body, the **astral** body and the **" I "** ...".

In my view - see http://vixra.org/pdf/1810.0365v2 -

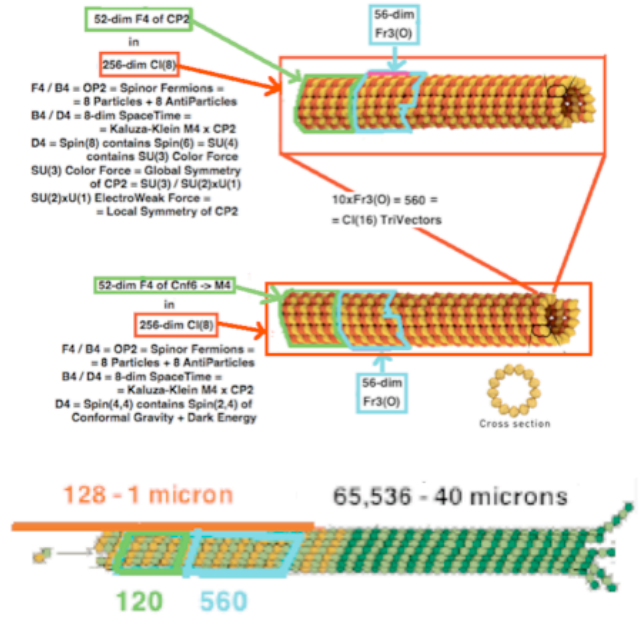
Spirit World = Complex Domain Lie Ball
Physical World = Shilov Boundary Lie Sphere



are related by Poisson Kernel and Bergman Kernel = Green's Function Propagator

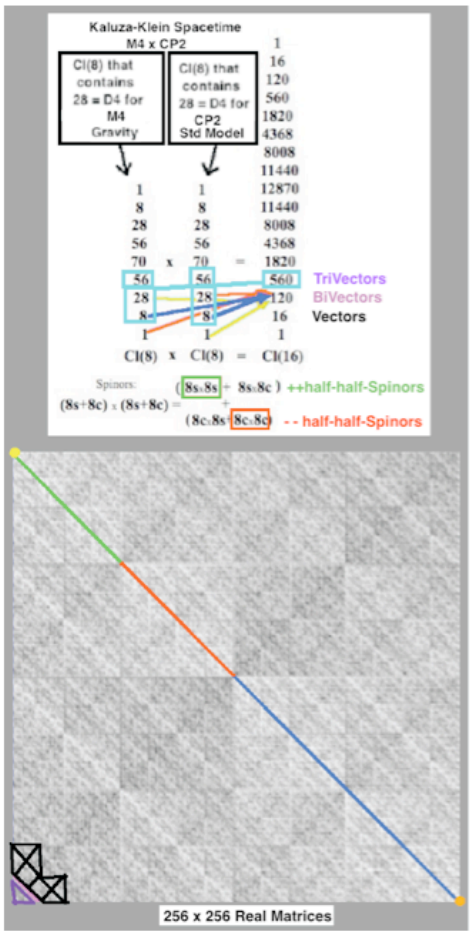
Physical Body is constructed of 40-micron Microtubules = 65,536 Tubulin Dimers
Ether Body is Quantum Consciousness Information = 64,712 elements per Microtubule

Astral Body is 26D World-Line Theory Lattice Cell with 65,536-dim Cl(16) Symmetry
“ I “ is Cl(16) Clifford Algebra Information = 64,712 elements per Lattice Cell



Human Brain Microtubules 40 microns = 65,536 Tubulin Dimers

Physical Body contains Information
Cl(16) = 65,536
- 16 Vector Complex Domain
- 128 half-Spinor part of E8
- 120 BiVector part of E8
- 560 TriVector Fr3(O)
= 64,712 Ethereal Information

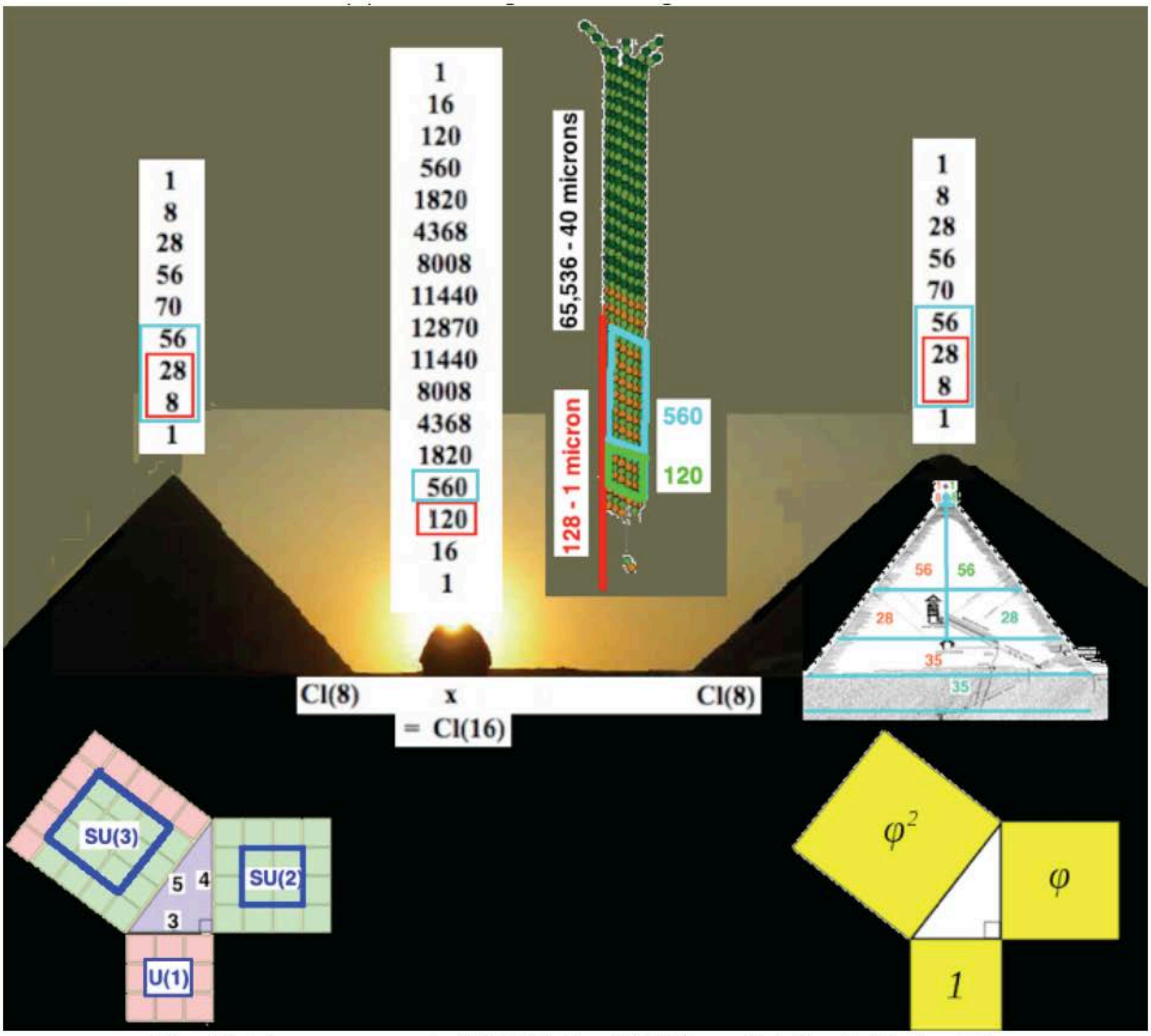


Astral Body contains Information
Cl(16) = 65,536 - 16 - 128 - 120 - 560 =
= 64,712 Spirit Information

“... Steiner ... regards ...the ancient Egyptians ... as oriented toward connection and interaction with the outer world, and ... the greater astronomical cosmos ... the age of the Egyptian pyramids [was] the time of development of the “Empfindungsseele” ... the ability to experience the outer world internally ...”.
(Jennie Louise Cain - 2016 U. MIchigan Ph.D. thesis)

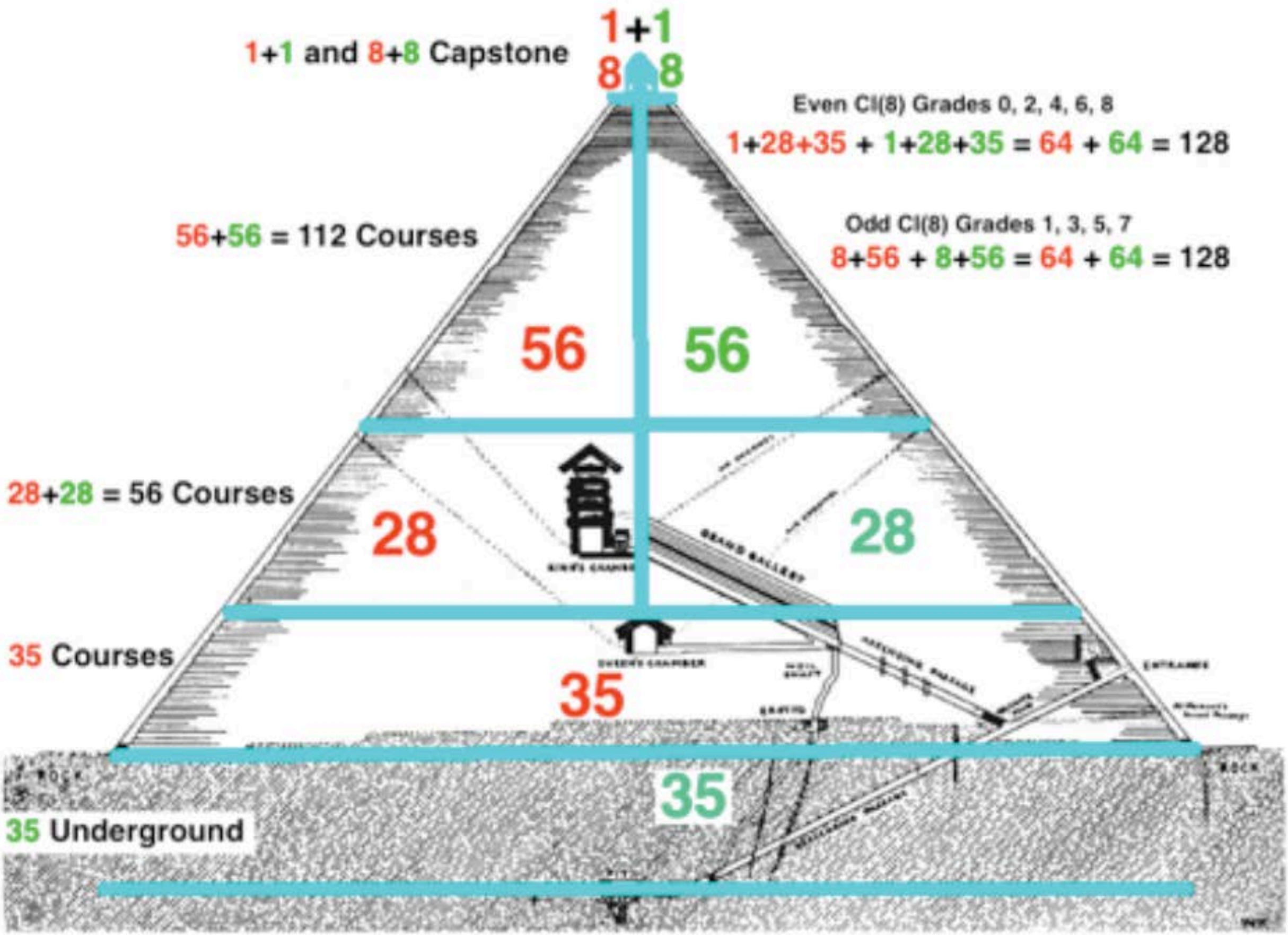
36,000 Years Ago - National Geographic Genographic YDNA -
M168 - YAP - M96 - **M35 Humans follow North Star Vega**
up the Nile to Giza and Mediterranean

This coincided with the beginning of Egyptian History according to Manetho
(working under Alexander's General and sucessor Ptolemy I):
36,525 years ago - Rule of Gods - North Star Vega - Geminga Shock - Glaciation
22,625 years ago - Rule of Demigods - last Glacial Maximum
17,413 years ago - Rule of Spirits of the Dead - end of last Glacial Maximum
11,600 years ago - Rule of Mortal Humans - North Star Vega - Vela X - end of Ice Age



The Sphinx represents 65,536-dim Cl(16) containing 248-dim E8
as tensor product of 256-dim Cl(8) containing 52-dim F4sm of CP2
and 256-dim Cl(8) containing 52-dim F4gde of M4 of M4 x CP2

Clifford Algebras were not known to European mathematicians until Clifford in the 19th century and not known to European physicists until Dirac in the 20th century but it seems to me that their structure was known to Africans in ancient times. The courses of the Great Pyramid of Giza correspond to the graded structure of 256-dim Cl(8):



$$1 + 8 + 28 + 56 + (35 + 35) + 56 + 28 + 8 + 1$$

(image adapted from David Davidson image - for larger size see tony5m17h.net/GreatPyrCl8.png)

William KIngdon Clifford (1845 - 1879), according to Wikipedia said in (1878, "On the Nature of Things-in-Themselves", Mind, Vol. 3, No. 9, pp. 57–67),

"... That element of which ... even the simplest feeling is a complex,

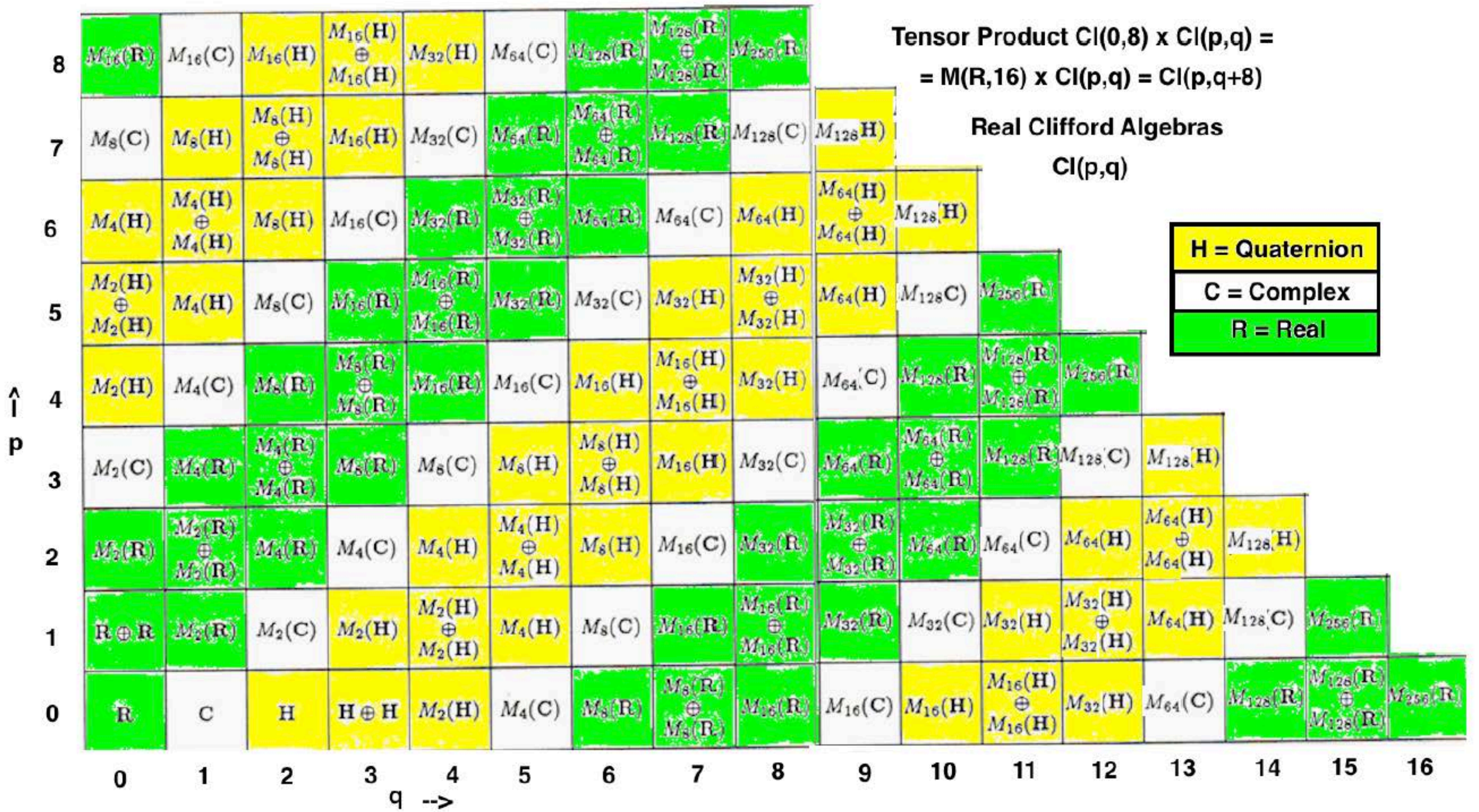
I shall call **Mind-stuff**.

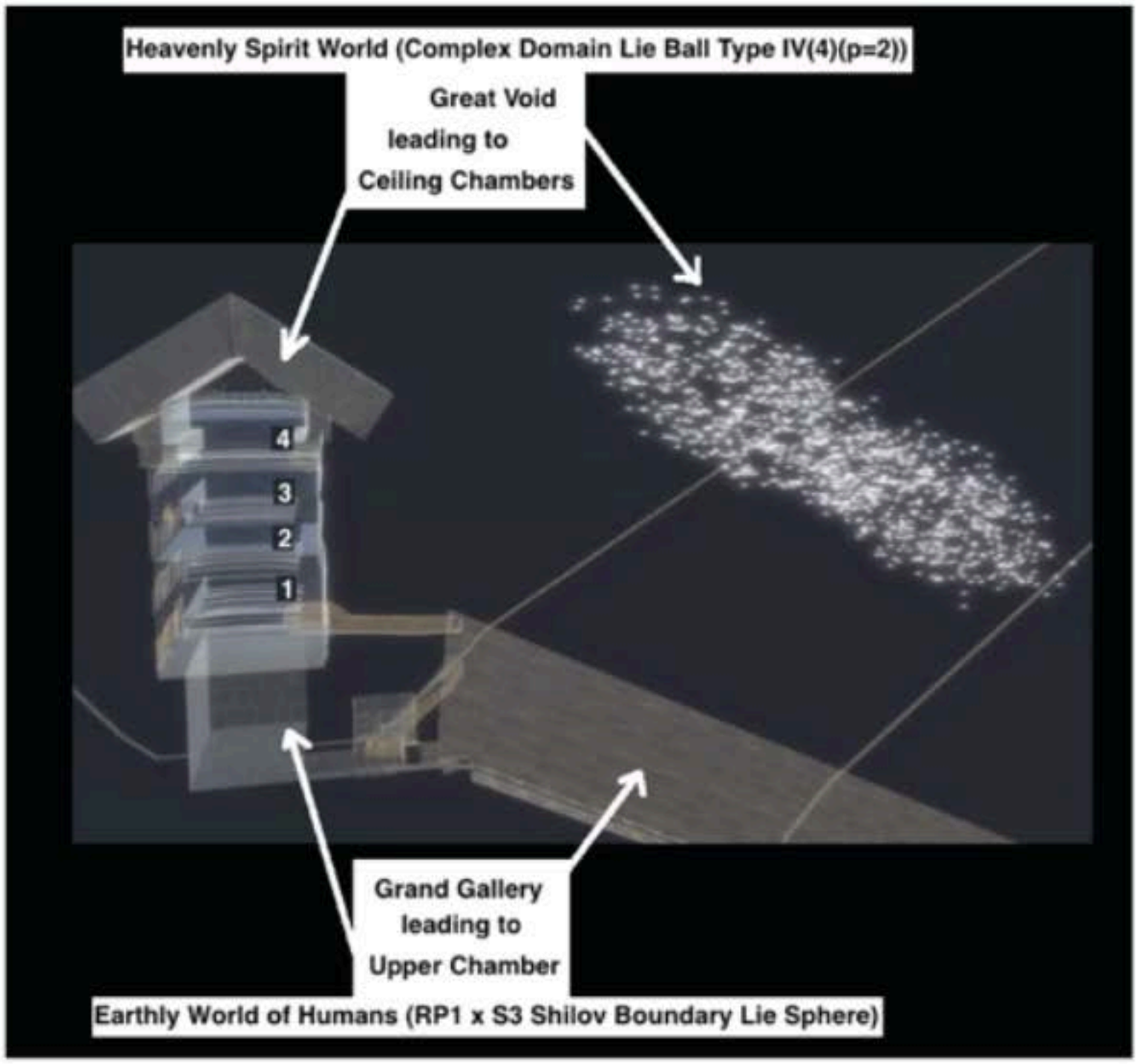
A moving molecule of inorganic matter does not possess mind or consciousness ; but it possesses a small piece of mind-stuff. ...

When molecules are ... combined together ... **the elements of mind-stuff** which go along with them ... **combine ... to form the ... beginnings of Sentience**.

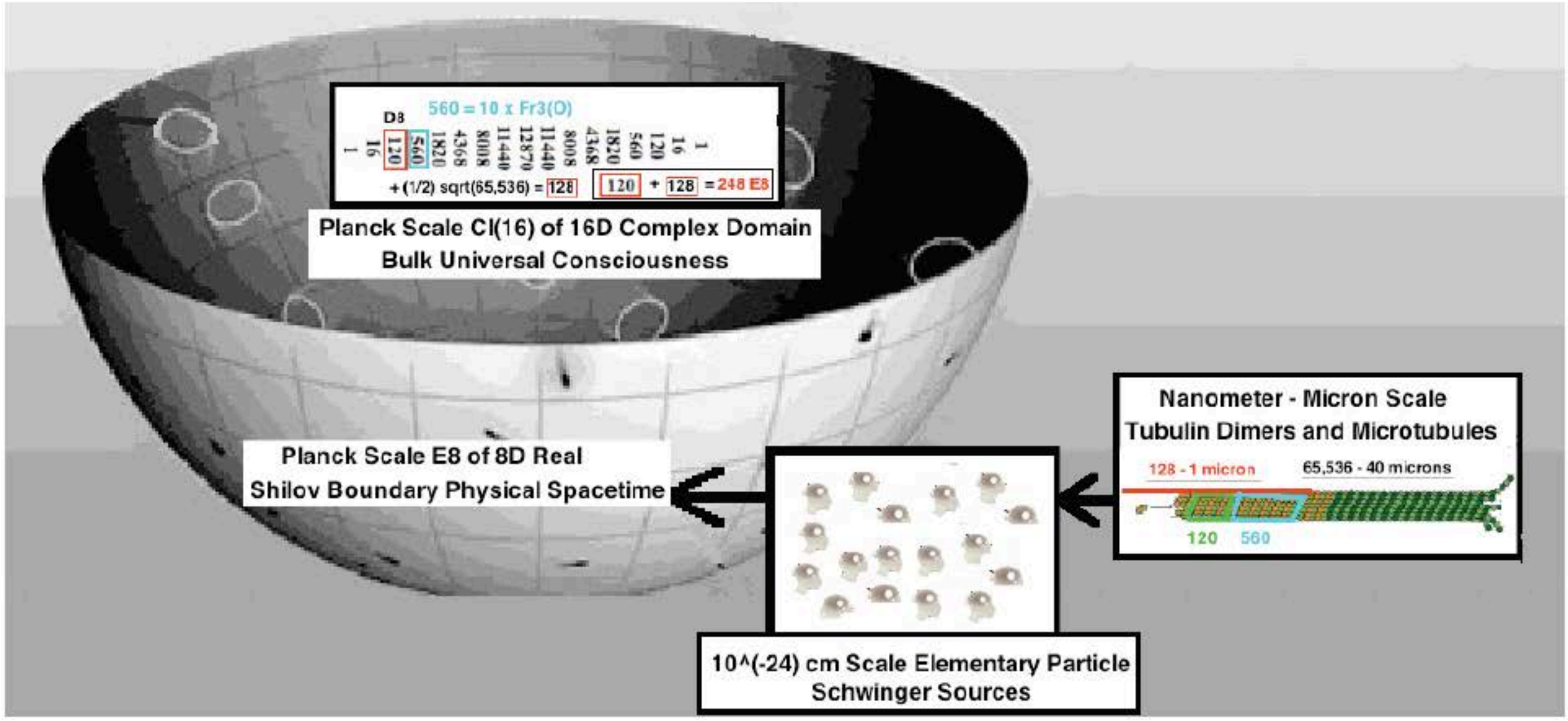
When the molecules are so combined as to form the brain and nervous system ... the corresponding elements of mind-stuff are so combined as to form some kind of consciousness ... changes in the complex which take place at the same time get so linked together that the repetition of one implies the repetition of the other.

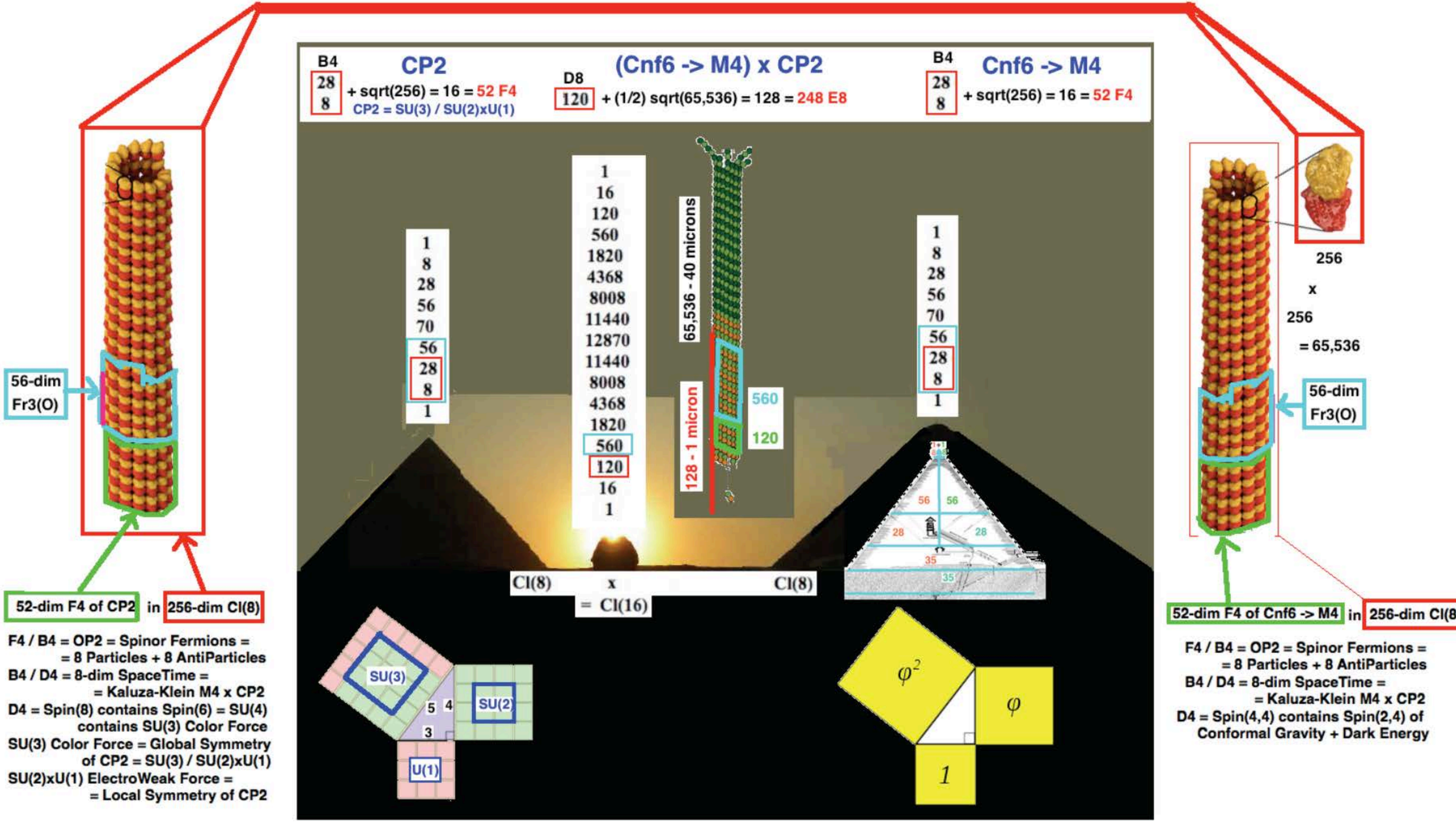
When matter takes the complex form of a living human brain, the corresponding mind-stuff takes the form of a human consciousness ...".





The Builders of the Great Pyramid represented the Real Shilov Boundary Physical world by the Grand Gallery and Upper Chamber that are easily accessible by Humans with Microtubule Quantum Consciousness and
they represented the Imaginary Complex World of Cl(16) Spacetime Cells mirroring the Human Microtubule World as Ceiling Chamber spaces and the Great Void that are more accessible to Souls of the Spirit World than to Physical Humans.





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

D8 = Cl(16) BiVectors = 120

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

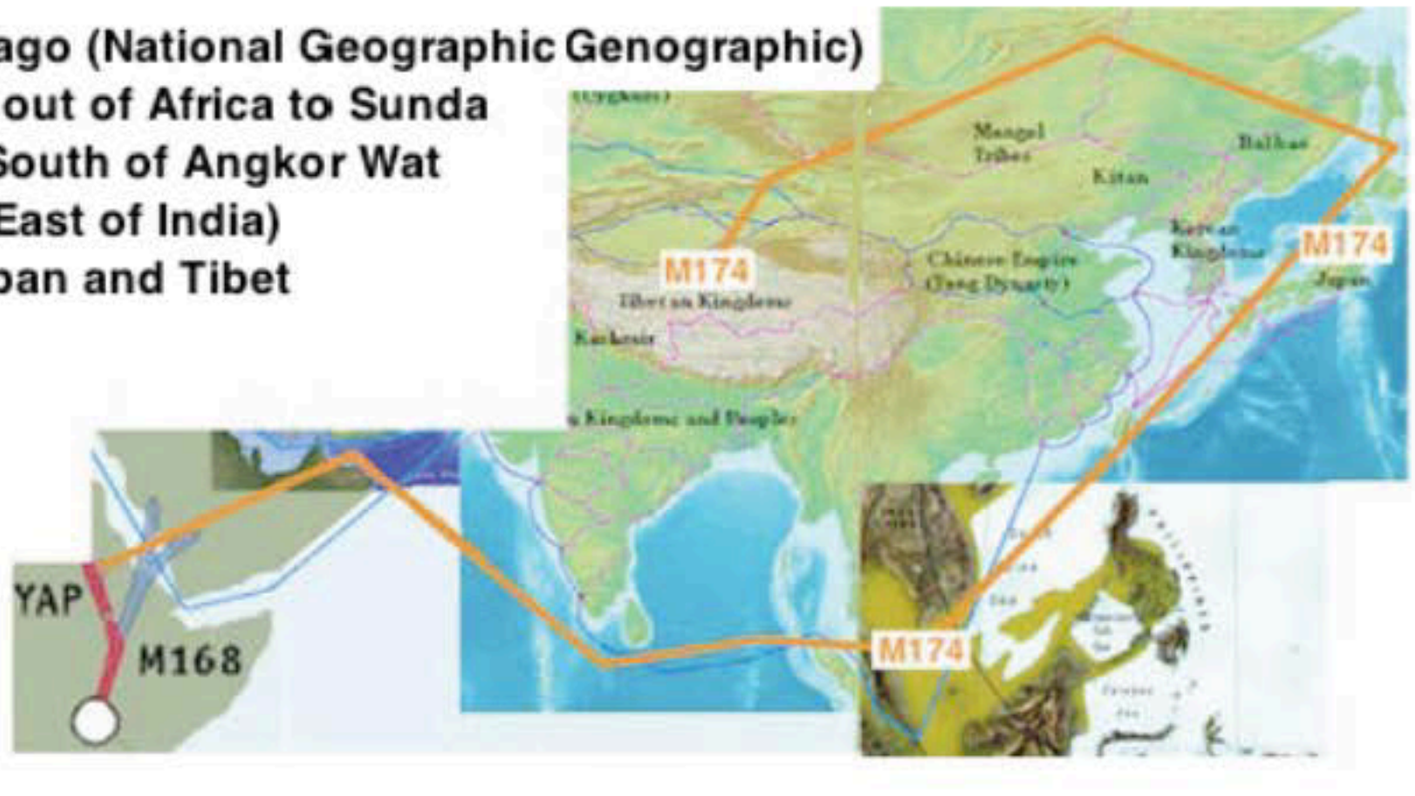
D4 containing D3 = SU(4) containing Color Force SU(3)

10xFr3(O) = Cl(16) TriVectors = 560

Cross section

Rig Veda / Angkor Wat

About 50,000 years ago (National Geographic Genographic)
YAP and M174 went out of Africa to Sunda
(then dry land South of Angkor Wat
and SouthEast of India)
and on to Japan and Tibet



Angkor Thom, Angkor Wat, Phnom Bakheng
<-->
Giza Great Pyramid Cl(8) (D4gde), Second Pyramid Cl(8) (D4sm), Sphinx Cl(16) (E8 + Fr3(O))

Angkor Thom: 8 yellow Outer Towers + 16 green Middle Towers = 24-dim OxOxO of Fr3(O) 26-D String=World-Line Theory
1 orange Inner Tower = Bohm Quantum Potential from Cl(16) TriVectors
4 red + 12 gray Inner Towers = Fundamental Lepton + Quark Particles / AntiParticles from Cl(16) half-Spinors

Angkor Wat: 4 yellow Inner Towers = 4-dim Minkowski Physical Spacetime of Kaluza-Klein M4 x CP2 from Cl(16) BiVectors
4 orange Middle Towers = 4-dim CP2 = SU(3) / SU(2) x U(1) of Kaluza-Klein M4 x CP2 from Cl(16) BiVectors

Phnom Bakheng: 64 cyan Towers = D8 / D4 x D4 = by Cl(16) Triality = ++half-Spinor Fermion Particles
= --half-Spinor Fermion AntiParticles
++half-Spinor Fermion Particles + --half-Spinor Fermion AntiParticles = 64+64 = 128 = E8 / D8

Rig Veda Mandala 1 encodes the 240 Root Vectors of E8 = 24 + 24 + 64 + 64 + 64

24 First Richa Syllables + 24 First Richa Gaps = D4sm + D4gde (purple box)

8x8 = 64 Last-8 Syllables of Last 8 lines = D8 / D4sm x D4gde (blue box)

8x8 = 64 (red box) plus 8x8 = 64 (green box) give 128 = E8 /D8 = Fermions
Middle-8 Syllables of Last 8 lines plus First-8 Syllables of Last 8 Lines

According to Wikipedia and emails from John Small:
"... **The Rig Veda is composed of ten books (called mandalas in Sanskrit) [that correspond to 10 Spacetime dimensions of 26D World-Line=String Theory]** ...

The first book [RV1] is a collection of hymns from seers of different families [encapsulating the whole Rig Veda] ...

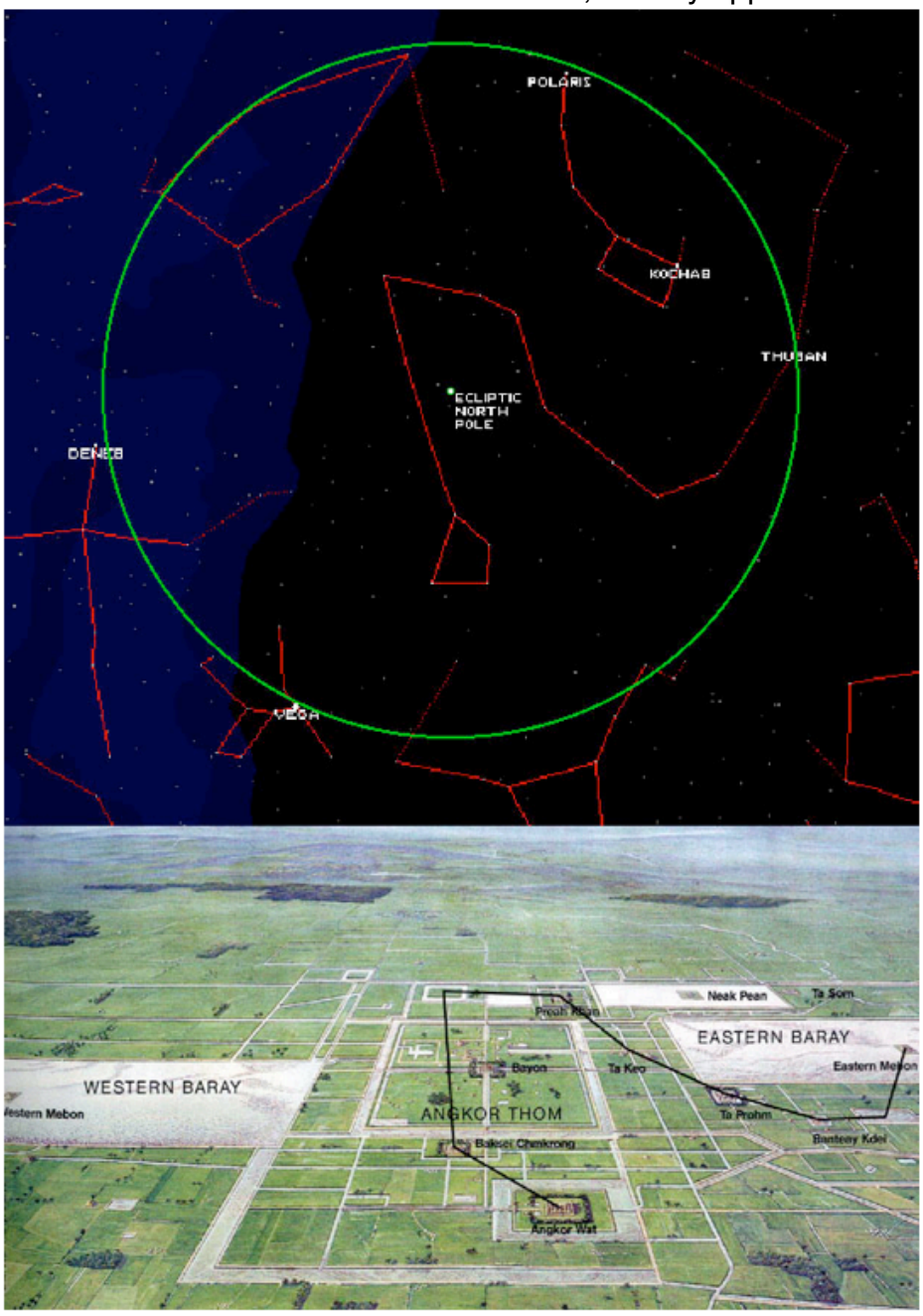
Seven of the books [RV2 through RV8] each relate primarily to one great seer [and represent the 7 imaginary Octonions] ...
The ninth book is [RV9] Soma hymns [and represent the Octonion Real Axis]
Terence McKenna postulates that the most likely candidate for soma is the mushroom Psilocybe cubensis, a hallucinogenic mushroom that grows in cow dung ... the 9th mandala of the Rig Veda makes ... references to the cow as the embodiment of soma ...

The tenth book [RV10] [complements the first and fills in the gaps]...".

RV2 through RV9 together represent
the Octonion Structure of Spin(0,8) = Spin(1,7)
and the RP1 x S7 LIe Sphere Shilov Boundary of Type IV(8) Complex Domain
of Lie Ball Symmetric Space Spin(2,8) / Spin(8) x U(1)

RV1 and RV10 together represent
the (1,1) Conformal Structure of Spin(1,9) = Spin(2,8) = SL(2,O)

Graham Hancock, in Heaven's Mirror, said "... Our current world age is Pisces because on the spring equinox ... Pisces rises just ahead of the sun ... because of precession ... (1 degree in 72 years) ... the sun spends around 2160 years
[2160 = second layer vertices of all E8 Lie Algebra Lattices]
in each constellation - a complete revolution taking 26,000 years!
The great Hindu temple-complex ... spread over 200 square miles confirms that they correspond to the stars in the constellation of Draco, as they appeared in 10,500 BC! ...



...".

The same star configuration of 10,500 BC = 12,500 years ago would have appeared in the previous precession period about 38,500 years ago, with Vega as North Star and Angkor Thom as the Ecliptic North Pole, about the time humans first arrived from Africa.

Geisteswissenschaft and Cl(16) Physics

Frank Dodd (Tony) Smith, Jr. - 2018

Abstract

Geisteswissenschaft is the term Rudolf Steiner used for study of the Spirit World and how it relates to the Physical World described by Cl(16) - E8 - Fr3(O) - Cl(1,25) Physics of viXra 1807.0166 and 1804.0121 (called herein Cl(16) Physics) and to Human History, including the Human HIstory shown by the National Geographic Genographic project.

Cl(16) Physics shows that orr Universe originated with Finkelstein Iteration
of Real Clifford Algebras from the Void (First Grothendieck Universe)
to Cl(16) (Second Grothendieck Universe)
whose BiVectors and two quarter-Spinors (++ and --) give Cl(16) Physics and
whose TriVectors give Fr3(O) String Theory
leading to a Cl(1,25) Algebraic Quantum Field Theory (AQFT)
that generalizes Hyperfinite II1 von Neumann factor Fock Space
from 2-Periodic Complex Clifford Algebra to 8-Periodic Real Clifford Algebra
to get the Third Grothendieck Universe.

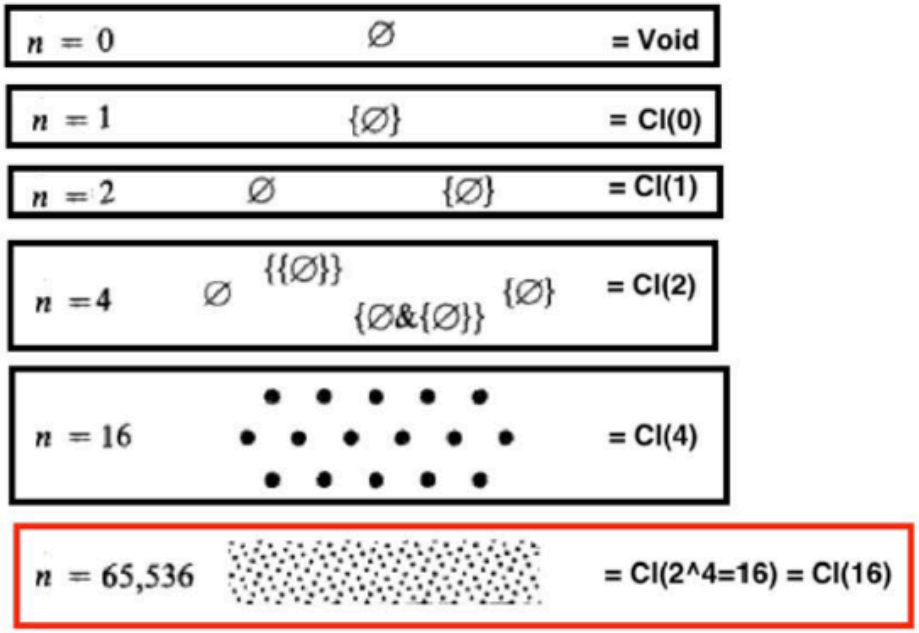
Rudolf Steiner used his Geisteswissenschaft to construct the First Goetheneanum in 1913 (it was burned down by arson in 1922) with structural designs corresponding to the structure of Cl(16) Physics. He viewed History as a succession of 7 cultures which I would call (also using the chronology of Manetho):

Polarea (during Octonionic Inflation) (Spirit World)
Hyperborea (Quaternionic, following Inflation) (Spirit World)
Lemuria (50,000 years ago) (Spirit and Physical Worlds) - Angkor and Rig Veda
Atlantis (40,000 years ago) (Sprit and Physical Worlds) - Pyramids and Sphinx
Era of Demigods - connection with Spirit World declines
Era of Spirits of the Dead - Spirit World is only a memory
Era of Mortal Humans - Technology dominates Spirit until 2012

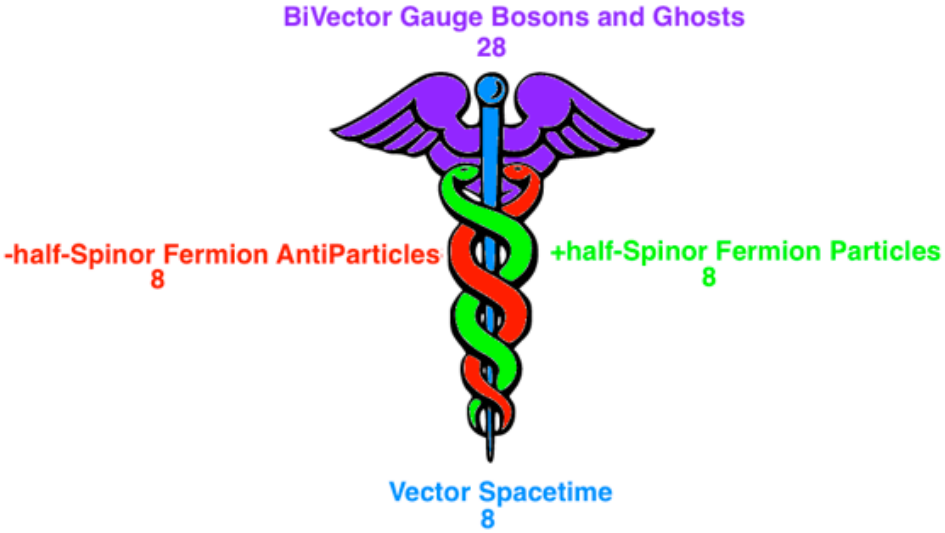
Table of Contents

Cl(16) at the Beginning of Our Universe

The **Real Clifford Algebra Cl(16)** is the culmination of David Finkelstein's process of Iteration of Clifford Algebras that began when Our Universe emerged from an Empty Set Void in its Parent Universe by Quantum Fluctuation



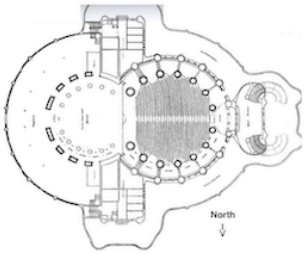
Cl(16) = Algebra of 256 x 256 Matrices of Real Numbers.
Cl(8) = Algebra of 16 x 16 Matrices of Real Numbers.
Cl(16) = tensor product Cl(8) x Cl(8) due to the 8-Periodicity of Real Clifford Algebras.
Cl(8) is 256-dimensional with Graded Structure 1+8+28+56+70+56+28+8+1
and with Spinor Structure 8+8 = 16 = sqrt(256)
52-dimensional **Exceptional Lie Algebra F4** lives in Cl(8) as
Grade-1 Vector 8 + Grade-2 BiVector 28 + +half-Spinor 8 + -half-Spinor 8

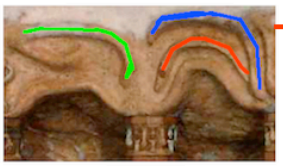


248-dimensional **Exceptional Lie Algebra E8** lives in Cl(16) = Cl(8) x Cl(8)

Rudolf Steiner's Geisteswissenschaft

First Goetheanum





Geisteswissenschaft

Initial Quantum Fluctuation VOID
from Parent Universe to Our Universe
Cl(VOID) -> Cl(0) -> Cl(1) -> Cl(2) -> Cl(4) -> Cl(16)
Cl(16) Vectors = D5 / D4xU(1) Lie Ball Interior Spirit World
with RP1xS7 Shilov Boundary Physical World
Cl(16) BiVectors + half-Spinors = E8
real form E8(-248) and E8 / Spin(16)

Polarea
Octonionic Non-Unitary Creation Inflation
Cl(16) TriVectors = 10 copies of Fr3(O) Aut(Fr3(O)) = E6
E6 / D5xU(1) has non-tube Complex Domain
Shilov Boundary = fibre RP1xS7 over S9
with RP1 -> S9 -> CP4 and CP4 unit sphere = S7
so S9 base space contains a second RP1xS7
D5 / D4xU(1) is tube-type Complex Domain
with Shilov Boundary a third RP1xS7
3 Shilov Boundary RP1xS7 are isomorphic by Triality
Fermion Particles + Fermion AntiParticles + Spacetime
real form E8(-248) and E8 / Spin(16)

Cl(16) with 2-track History
Physical Lie Sphere and Spirit Lie Ball Interior

Hyperborea - End of Octonionic Inflation
Quaternionic RP1xS3 x CP2
Separation of Lie Sphere Shilov Boundary
real form E8(-24) and E8 / Spin*(16)
from Lie Ball Interior of D5 / D4xU(1)

Quaternionic Unitary Expansion of Physical Lie Sphere
to Lemuria - Atlantis (Gods) -> Demigods ->
-> Spirits of the Dead -> Mortal Humans

Quaternionic Unitary Expansion of Spirit Lie Ball Interior
with Complex Barnes-Wall Lattice Structure

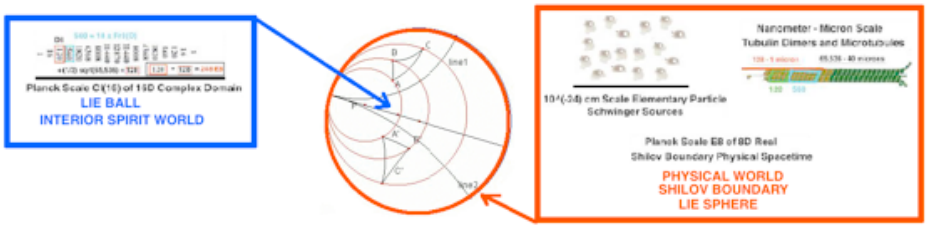
<-- Evolutionary Metamorphosis (7 columns) --<


Schwinger Source
CP2 = SU(3) / U(2)
H4 CP2
E8
H4 M4
M4 = RP1 x S3
H4 CP2
H4 M4
RP1
CP2
S3

Rudolf Steiner, in Cosmic Memory, said "... The Fourfold Man ... consists of ... the **physical body**, the ether ... body, the **astral body** and the " I " ...".
My view is of the **Shilov Boundary Lie Sphere Physical World**

Physical Body is constructed of 40-micron Microtubules = 65,536 Tubulin Dimers

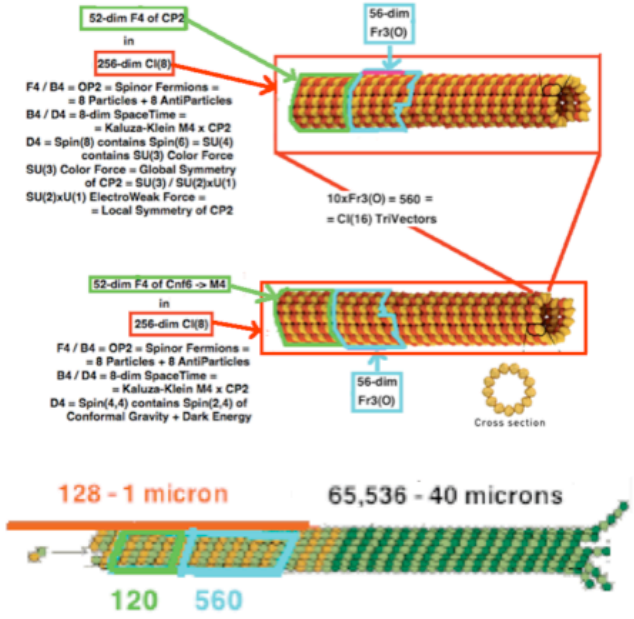
Ether Body is Information = 64,712 elements per Microtubule



and the **Complex Domain LIe Ball Spirit World**:

Astral Body is 26D World-Line Theory Lattice Cell with 65,536-dim Cl(16) Symmetry

" I " is Information = 64,712 elements per Lattice Cell



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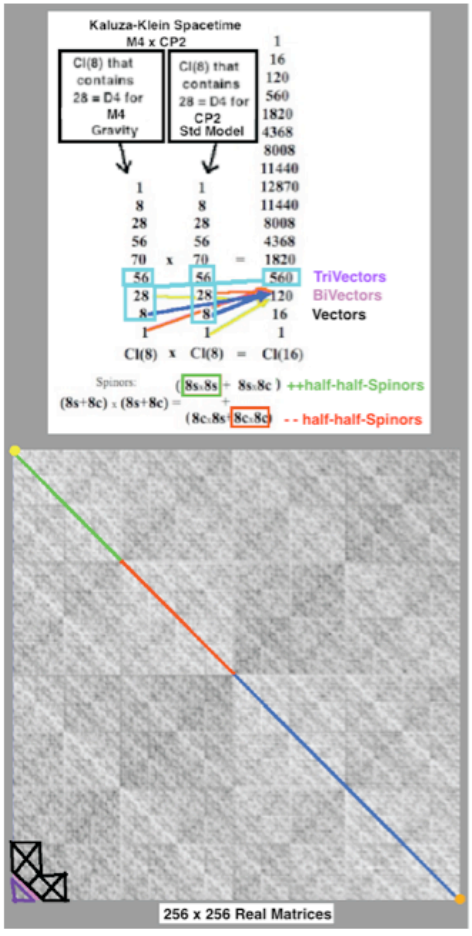
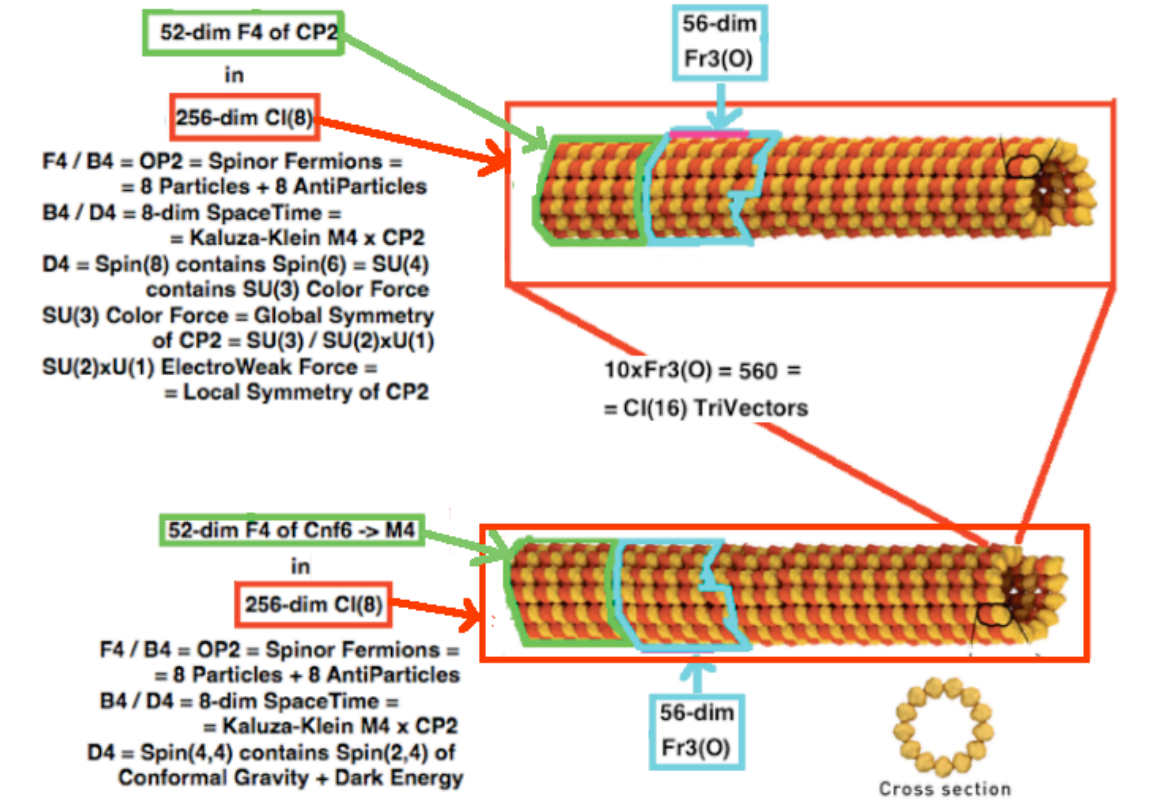
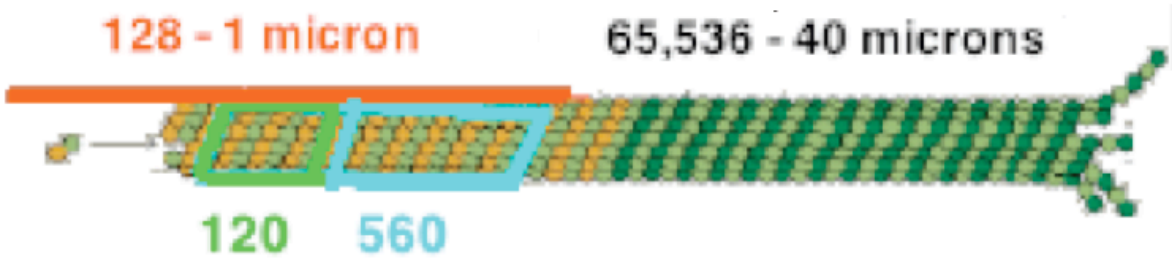


Astral Body contains Information

Cl(16) = 65,536 - 16 - 128 - 120 - 560 =
= 64,712 Spirit Information





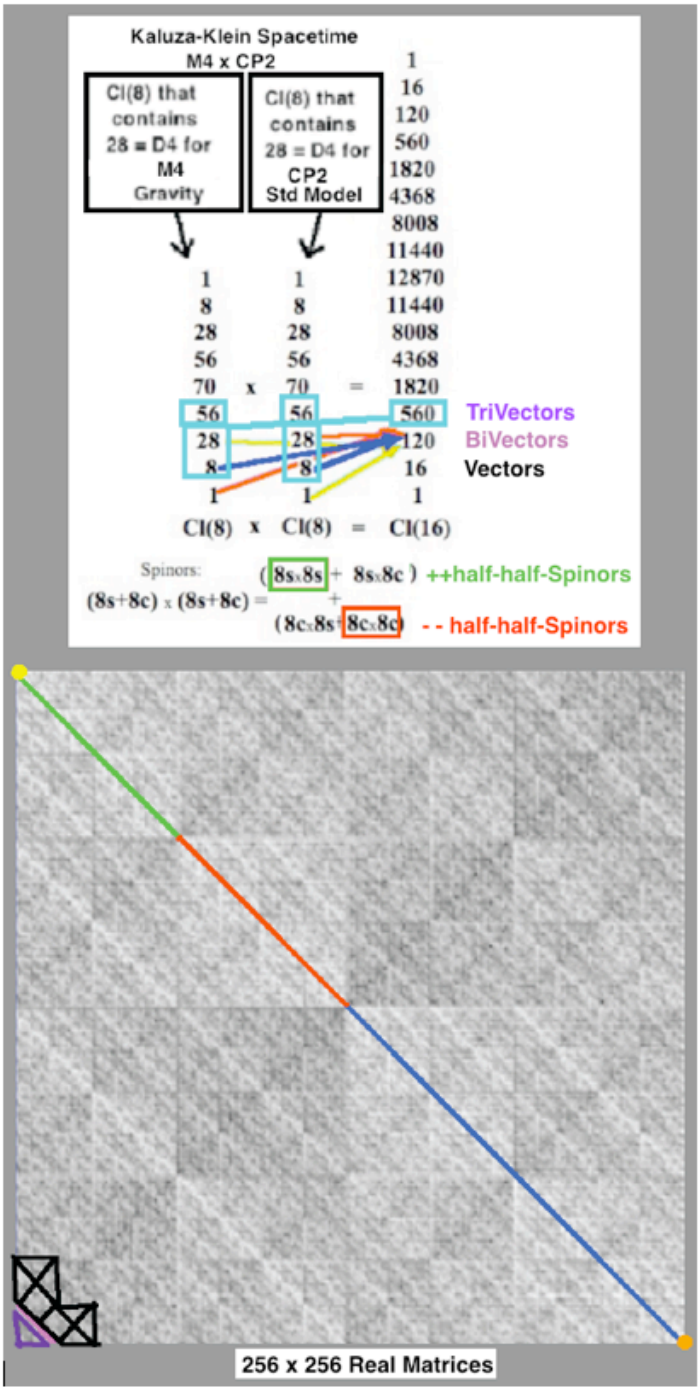
Human Brain Microtubules 40 microns = 65,536 Tubulin Dimers

Physical Body contains Information

Cl(16) = 65,536

- 16 Vector Complex Domain
- 128 half-Spinor part of E8
- 120 BiVector part of E8
- 560 TriVector Fr3(O)

= 64,712 Ethereal Information



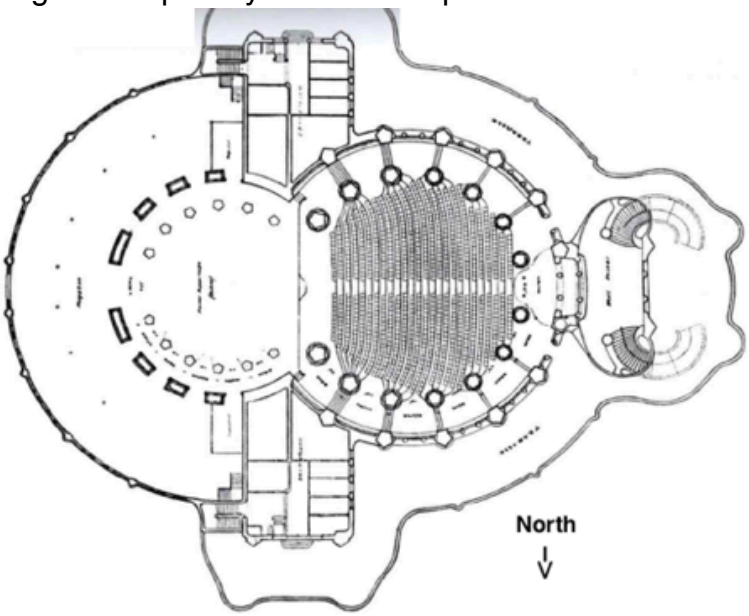
Astral Body contains Information

Cl(16) = 65,536 - 16 - 128 - 120 - 560 =

= 64,712 Spirit Information

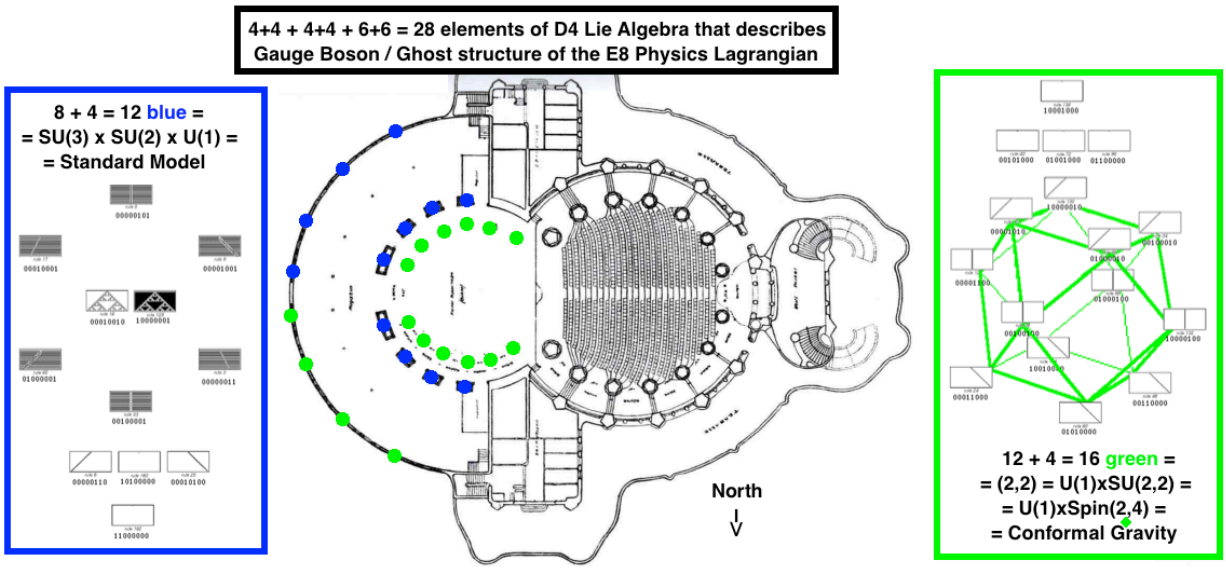
Jennie Louise Cain in her 2016 U. MIchigan Ph.D. thesis says:
"... **Rudolf Steiner** (1861-1925) ... was the f**ounder of Anthroposophy**, a philosophy and spiritual movement whose aim ... is to develop supersensible capacaties that enable access to what Steiner described as a spiritual dimension underlying all of life ...
Steiner argues that the loss of original clairvoyant capacities ... of ...
the ancient ... culture ... was necessary for the development of intellectualism ...
"Geisteswissenschaft" ... is the re-awakening of a spiritual awareness ...
Steiner ... regards ...the ancient Egyptians ... as oriented toward connection and interaction with the outer world, and ... the greater astronomical cosmos
...
the age of the Egyptian pyramids [was] the time of development of the "Empfindungsseele" ... the ability to experience the outer world internally ...
The pyramid itself is ... a large, sensing organ (an "Empfindungsorgan") that picks up the relationship of the earth culture as a whole to the cosmos ...
Steiner' s concept of the architecture of the future ... which he would seek to materialize in his Goetheanum ... is meant as a ... re-connection with the spiritual world ...
In 1913, Steiner began constructing the **Goetheanum** building in Dornach, Switzerland, ... as the headquarters of the Anthroposophical movement ...".

Here is its floor plan from Architecture, Painting, and Sculpture of the First Geotheanum, Nine Lectures by Rudolf Steiner 1915-1920 (hereinafter referred to as APSFG). He said "... Our building should portray ... how the spirits ... of the cosmos speak



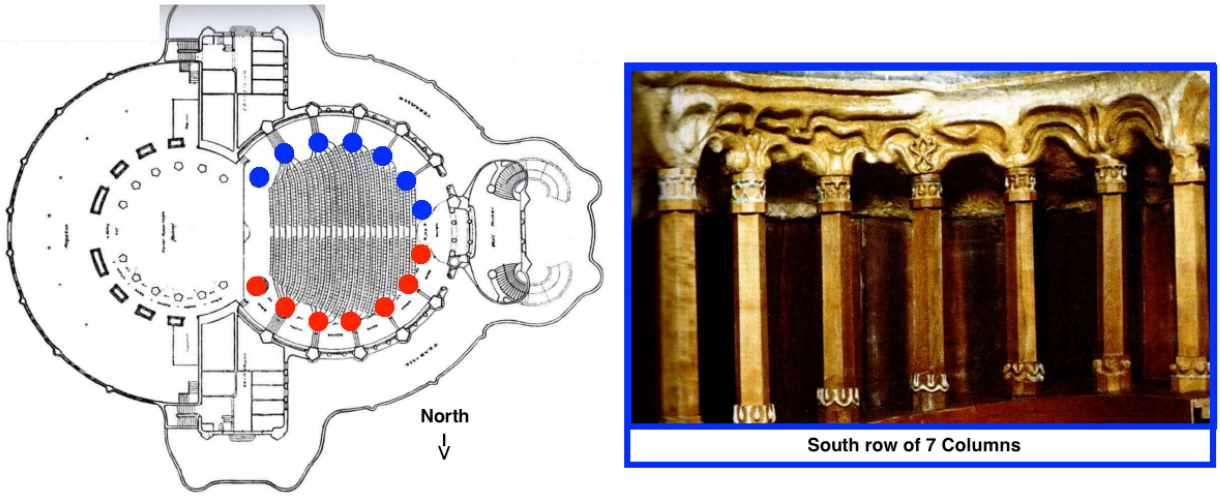
into the physical world. When we enter the bjuilding from the west and go east ...
the two times seven columns ... stand in relation to each other like the ... strings of a violin ... in the twenty-seven glass windows is lurking the mystery of the path into the spiritual world ...". The 27 windows correspond to 27-dim Jordan Algebra J3(O) with symmetry of Lie Algebra F4 of Clifford Algebra Cl(8) of Cl(8)xCl(8) = Cl(16) Physics.

Its Small Cupola (Eastern) was a stage for performances. It contained 28 elements corresponding to 28-dim D4 Lie Algebra



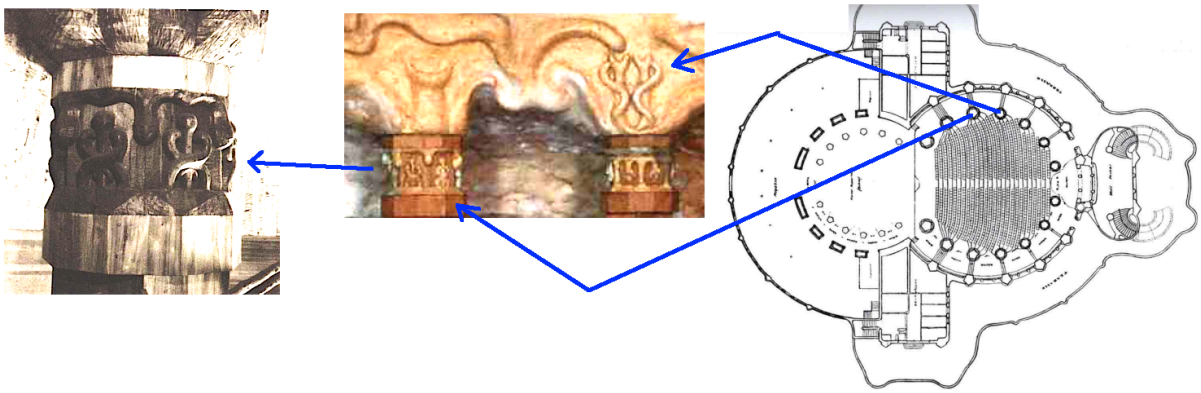
that describes how the Gauge Bosons / Ghosts of the Cl(16) Physics Lagrangian perform interactions on their stage of Spacetime.

Its Large Cupola (Western) was for the audience. It contained two sets of 7 columns.



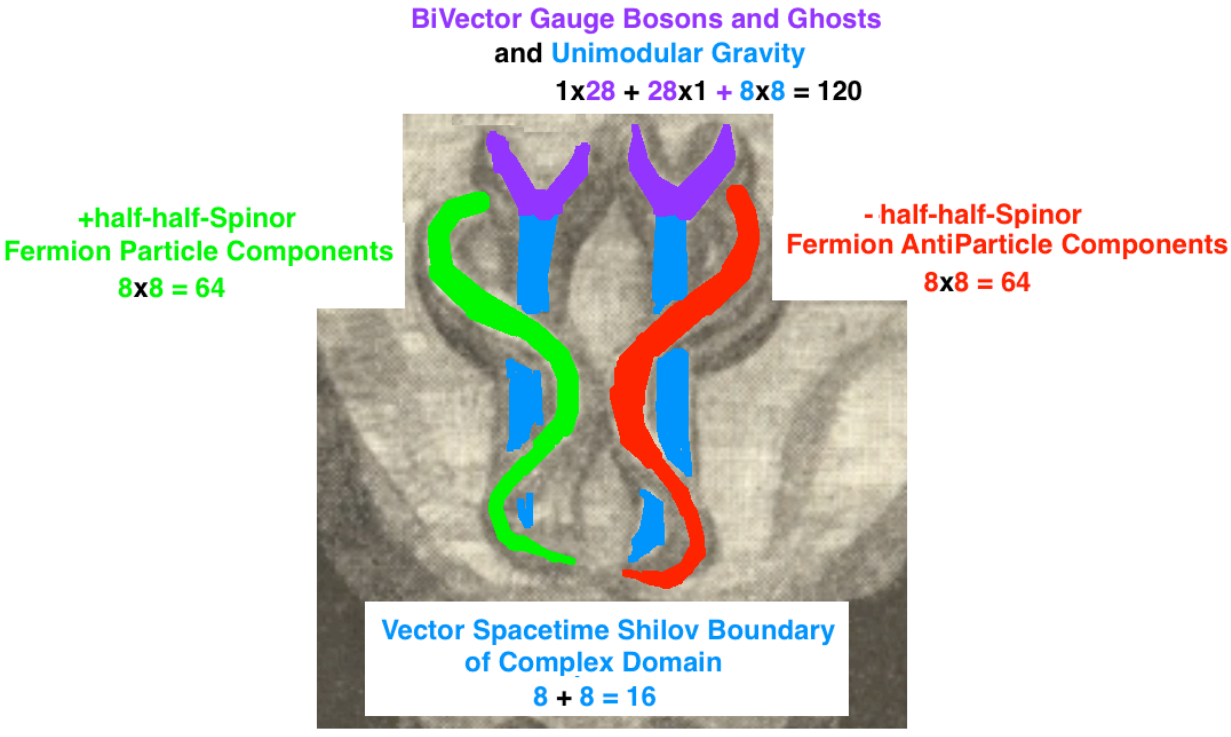
In APSFG Rudolf Steiner said “... When you come in ...[from the West, along]... the sole axis of symmetry ... you see a series of columns ... formed in such a way that only the symmetrical pairs have the same base and the same column. The capital formation progresses as you move from the entrance toward the stage ... you feel how the following capital always grows out of the previous with organic necessity. ...”.
The 2 rows of 7 columns correspond to the 2 tracks (Physical and Spiritual) of History.

As to columns 4 and 5 of the South row, Rudolf Steiner in APSFG said “Here we come



to something that causes the ... mystic ... to say: There he created a caduceus.
I didn't create a caduceus; I allowed the previous forms to grow.
The form originated on its own ...".

Although Rudolf Steiner claimed that his art avoided symbolism,
the form of the fifth column of the First Goetheanum represents F4 Lie Algebra
and the caduceus-like form of the fourth column has a similar physics interpretation:



E8 = 120 + 64 + 64 lives in Cl(16) = Cl(8) x Cl(8)

8+8 Vectors of Cl(16) and 120 BiVectors of Cl(16) and 64+64 half-Spinors of Cl(16)
with the 120 + 64+64 = 248 = E8 Lie Algebra
In terms of Cl(8) x Cl(8) = Cl(16) and the two F4s living in the two Cl(8)s

1x28 = D4 = 16 Gravity+Dark Energy Gauge Bosons + 12 Standard Model Ghosts

28x1 = D4 = 12 Standard Model Gauge Bosons + 16 Gravity+Dark Energy Ghosts

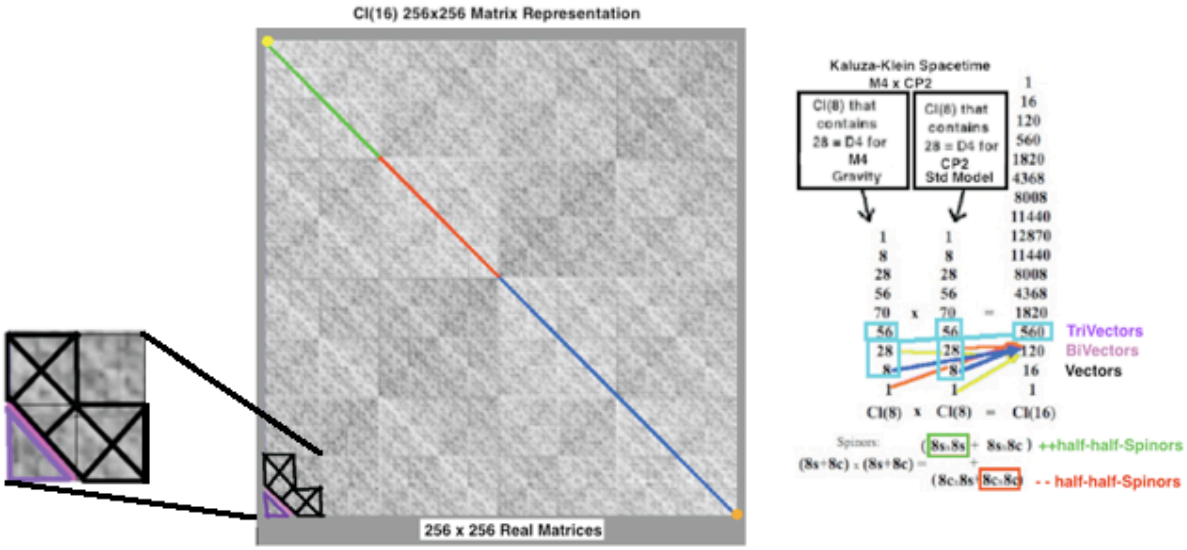
8x8 = A7+R = center of E8 Maximal Contraction Heisenberg Algebra =
= Creation / Annihilation of 8-dim Spacetime

The Goetheanum Form has two (**blue**) Vector 8-dim Spacetime Rods
one from the F4 in each of the two Cl(8)
so for Cl(16) Physics of Cl(16) Spacetime Geometry has 8-Complex-dim Structure
8+8 = 16-real dimensional D5 / D4 x U(1) Lie Sphere Symmetric Space Type BDI
with
8-complex-dim Bounded Complex Domain Type IV(8)

whose Real Part is
the Shilov Boundary = 8-real-dim RP1 x S7
which represents the M4 x CP2 Kaluza-Klein Spacetime M4 x CP2
(M4 = Minkowski and CP2 = SU(3) / U(2))
which represents
the Earthly World
in which Human Consciousness is based on Microtubules with 65,536 Tubulin Dimers

and

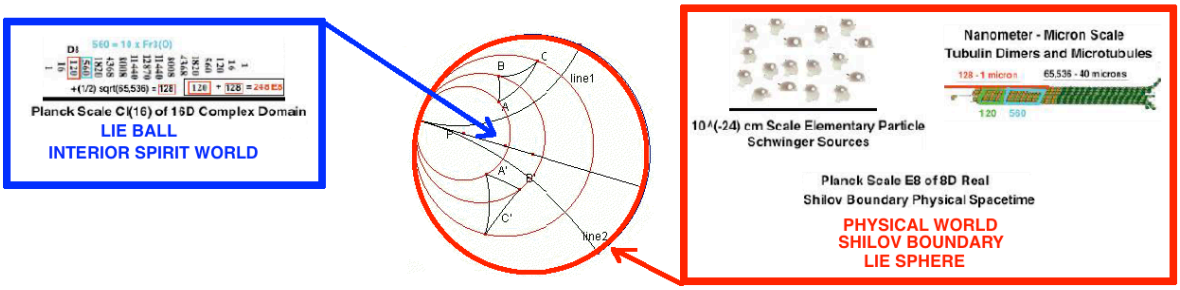
whose Imaginary Part is
the interior of the Lie Ball Bounded Complex Domain of Type IV(8)
which represents
the Sprit World
in which
the unit lattice cells have structure of Cl(16) with 65,536 elements



Therefore:

the art of the First Goetheanum
shows how Rudolf Steiner's Geisteswissenschaft works
so that

each Human Microtubule with 65,536 Tubulin Dimers
can have a Bohm Quantum Resonant Connection with
a Spirit World Unit Lattice Cell with 65,536-element Cl(16) Structure



The Earthly World is the 8-real-dim Lie Sphere Shilov Boundary RP1 x S7

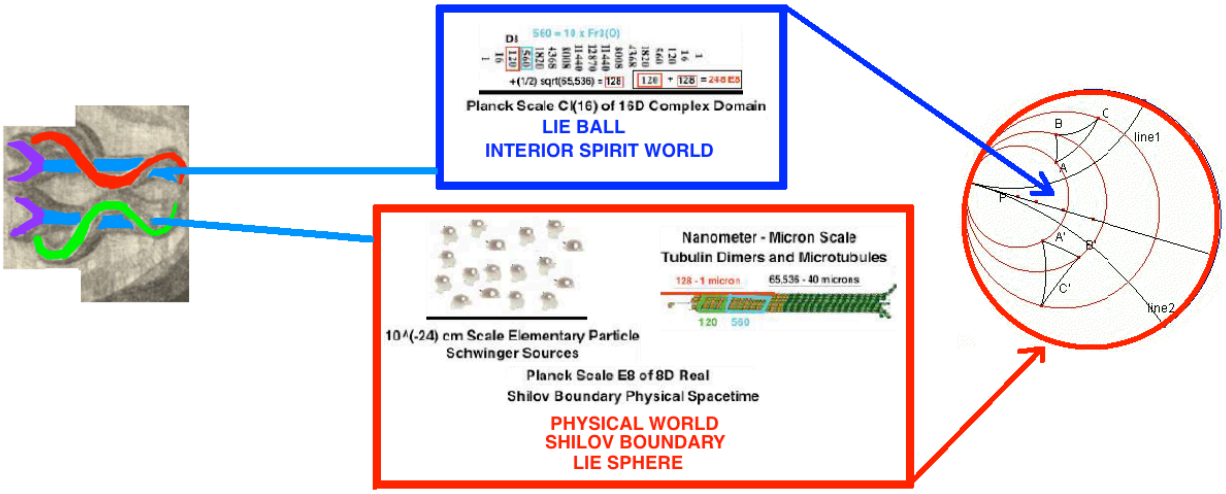
The Spirit World is the interior of that Shilov Boundary
which is the Type IV(8) Bounded Complex Domain
corresponding to the Lie Ball Symmetric Space D5 / D4 x U(1)

The 2-fold Complex Structure of Vector Spacetime carries over by Triality
to each of the two Fermion half-half-Spinors (green and red)
which therefore each have
the same Symmetric Space and Complex Domain and Shilov Boundary Structure
as the Vector Spacetime.

The Goetheanum Form has two (purple) D4 "wings",
one from the F4 in each of the two Cl(8),
representing the two D4 subalgebras of E8
D4 = 16 Gravity+Dark Energy Gauge Bosons + 12 Standard Model Ghosts
and
D4 = 12 Standard Model Gauge Bosons + 16 Gravity+Dark Energy Ghosts

Human History = 2 Tracks: Physical and Spirit

Just as the caduceus-like form of the First Goetheanum has two columns representing Real Spacetime of Physical Humans and Complex Domain Interior of Spirit Space



so **Human History moves along two tracks**. Now, with Physical Humans having Consciousness based Microtubules in Resonance with Spirit Space Cl(16) Cells, the two tracks of Human History are moving in concert together
but
in earlier times before the Physical Ancestors of Humans had fully developed Microtubule Quantum Consciousness
there was no Resonant Connection with Spirit Space Cl(16) Cells
and
the evolutionary History of the Spirits of Humanity was quite independent of and different from the evolutionary History of the Physical Ancestors of Humanity.

This was known to Rudolf Steiner in his 1909 book Cosmic Memory about the History of the Spirits of Humanity: "... this history ... is called the "A**kasha Chronicle**"
... **it should be said that spritual perception is not infallible** ...
the ... root races of our earth.
The first is called the **Polarean** ...
the second, the **Hyperborean** race ...
the third human root race ... inhabited the **Lemurian** Continent
...

Actually, one can only begin to speak of "races" in connection with the development attained in ... the ... third principal condition ... (Lemurian) ... originating the two sexes ...

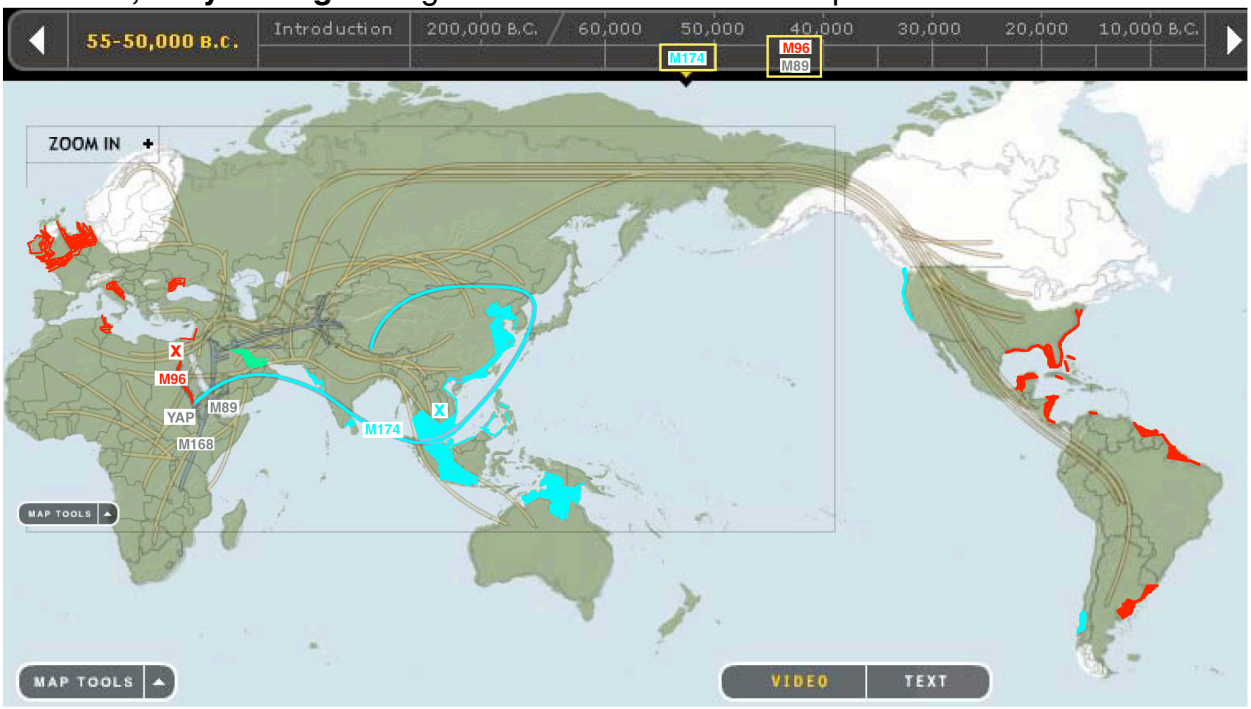
[comment by TS: this is when the two tracks of Human History Merged into Concert: when the unisex Spirit Beings, then the Hyperboreans, connected with the 2-sex Physical Lemurians emerging in Africa, thus giving Lemurians high Spiritual capabilities] ...

the main part of ... the Lemurian Continent ... lay south of contemporary Asia ...
the Lemurian could communicate with his fellow-men without needing a language. This communication consisted in a kind of "thought reading." ...
their ideas had a quite different strength from those of later men. Through this strength they acted upon their environment. Other men, animals, plants, and even lifeless objects could feel this action and could be influenced purely by ideas. ... The Lemurian derived the strength of his ideas directly from the objects which surrounded him.

... the **Lemurians ...[were the]... ancestors of the Atlanteans** ...

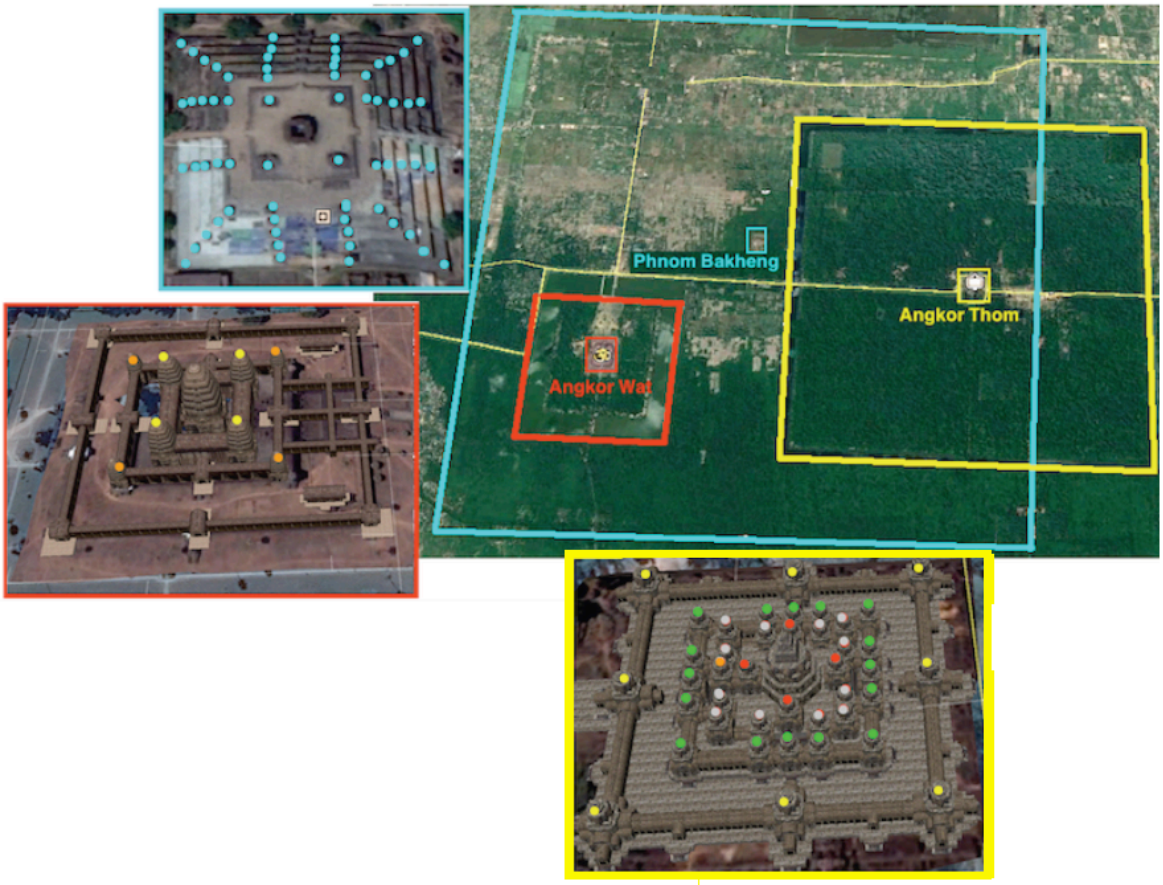
the ... Atlantean Continent ... was once ... the floor of the Atlantic Ocean ... the last remnants of this continent sank in the tenth millennium B.C. ...".

The National Geographic Genographic Project studied the migration of Humans out of Africa using Y-DNA data. The first group to leave Africa was **Lemurian M174 about 50,000 years ago** along the dark blue line in the map below:



At that time all the area colored cyan was dry land and home of many Lemurians.
The x colored cyan is the location of the Angkor Temple Complex that I think was built by the Lemurians shortly after they arrived. I think they also then developed Sanskrit and wrote the Rig Veda to preserve the high culture they had developed back in Africa.
Lemurians crossed the Pacific Ocean to the West Coast of the Americas.
About 50,000 years ago (National Geographic Genographic) YAP and M174 went out of Africa to Sunda (then dry land South of Angkor Wat and SouthEast of India)

and on to Japan and Tibet:



Angkor Thom, Angkor Wat, Phnom Bakheng
<->
Giza Great Pyramid Cl(8) (gde), Second Pyramid Cl(8) (sm), Sphinx Cl(16) (E8+Fr3(O))
Angkor Thom: 8 yellow Outer Towers + 16 green Middle Towers =
= 24-dim OxOxO of Fr3(O) 26-D String=World-Line Theory

1 orange Inner Tower = Bohm Quantum Potential from Cl(16) TriVectors
4 red + 12 Gray Inner Towers = Fundamental Lepton + Quark
Particles / AntiParticles from Cl(16) half-spinors

Angkor Wat: 4 yellow Inner Towers = 4-dim Minkowski Physical Spacetime
of Kaluza-Klein M4 x CP2 from Cl(16) BiVectors
4 orange Middle Towers = 4-dim CP2 = SU(3) / SU(2) x U(1) Internal Space
of Kaluza-Klein M4 x CP2 from Cl(16) BiVectors

Phnom Bakheng: 64 cyan Towers = D8 / D4 x D4 = by Cl(16) Triality =
= ++half-Spinor Fermion Particles (8 components) =
= - -half-Spinor Fermion AntiParticles (8 components)
= 64 + 64 = 128 = E8 / D8

Rig Veda

24 First Richa Syllables + 24 First Richa Gaps = D4sm + D4gde (purple box)

8x8 = 64 Last-8 Syllables of Last 8 lines = D8 / D4sm x D4gde (blue box)

8x8 = 64 (red box) plus 8x8 = 64 (green box) give 128 = E8 /D8 = Fermions
Middle-8 Syllables of Last 8 lines plus First-8 Syllables of Last 8 Lines

According to Wikipedia and emails from John Small:
"... **The Rig Veda is composed of ten books (called mandalas in Sanskrit)**
[that correspond to 10 Spacetime dimensions of 26D World-Line=String Theory] ...

The first book [RV1] is a collection of hymns from seers of different families
[encapsulating the whole Rig Veda] ...

Seven of the books [RV2 through RV8] each relate primarily to one great seer
[and represent the 7 imaginary Octonions] ...
The ninth book is [RV9] Soma hymns [and represent the Octonion Real Axis]
Terence McKenna postulates that the most likely candidate for soma is the mushroom
Psilocybe cubensis, a hallucinogenic mushroom that grows in cow dung ... the 9th
mandala of the Rig Veda makes ... references to the cow as the embodiment of soma ...

The tenth book [RV10] [complements the first and fills in the gaps]...".

RV2 through RV9 together represent
the Octonion Structure of Spin(0,8) = Spin(1,7)
and the RP1 x S7 LIe Sphere Shilov Boundary of Type IV(8) Complex Domain
of Lie Ball Symmetric Space Spin(2,8) / Spin(8) x U(1)

RV1 and RV10 together represent
the (1,1) Conformal Structure of Spin(1,9) = Spin(2,8) = SL(2,O)

According to **The Constitution of the Universe by Maharishi Mahesh Yogi**, printed in The Wall Street Journal (6 January 1992) a copy of which was sent to me in pamphlet form by John Small in August 2003:
"... the ancient Vedic wisdom ... identifies a single, universal source of all orderliness in nature ... the Constitution of the Universe ... is embodied in the very structure of the sounds of the Rik Ved, the most fundamental aspect of the Vedic literature ...
According to Maharishi's Apaurusheya Bhashya, the structure of the Ved provides its own commentary ... The knowledge of the total Ved ... is contained in the first sukt of the Rik Ved ... The precise sequence of sounds is highly significant; it is in the sequential progression of sound and silence that the true meaning and content of the Ved reside ...
The complete knowledge of the Ved contained in the first sukt (stanza) is also found in the first richa (verse) - the first twenty-four syllables of the first sukt (stanza 1).
This complete knowledge is again contained in the first pad,
or first eight syllables of the first richa, and is also found in the first syllable of the Ved, 'AK', which contains the total dynamics of consciousness knowing itself.
According to Maharishi's Apaurusheya Bhashya of the Ved,
'AK' describes the collapse of the fullness of consciousness (A)
within itself to its own point value (K).
This collapse, which represents the eternal dynamics of consciousness knowing itself, occurs in eight successive stages.
In the next stage of unfoldment of the Ved, these eight stages of collapse
are separately elaborated in the eight syllables of the first pad,
which emerges from, and provides a further commentary on,
the first syllable of Rik Ved, 'AK'.
These eight syllables correspond to the eight 'Prakritis' (Ahamkar, etc.) or eight fundamental qualities of intelligence ...
The first line, or 'richa', of the first sukt, comprising 24 syllables, provides a further commentary on the first pad (phrase of eight syllables);
The first pad expresses the eight Prakritis ... with respect to the knower ... observer ... or 'Rishi' quality of pure consciousness.
The second pad expresses the eight Prakritis with respect to the process of knowing ... process of observation ... of 'Devata' (dynamism) quality of pure consciousness.
The third pad expresses the eight Prakritis with respect to the known ... observed ... or 'Chhandas' quality of pure consciousness. ...

The subsequent eight lines complete the remainder of the first sukt - the next stage of sequential unfoldment of knowledge in the Ved. These eight lines consist of 24 padas (phrases), comprising 8x24 = 192 syllables. ... these 24 padas of eight syllables elaborate the unmanifest, eight-fold structure of the 24 gaps between the syllables of the first richa (verse). ... Ultimately, in the subsequent stages of unfoldment, these 192 syllables of ther first sukt (stanza) get elaborated in the 192 suktas that comprise the first mandal (circular cyclical eternal structure) of the Rik Ved, which in turn gives rise to the rest of the Ved and the entire Vedic literature. ...".

According to Wikipedia:
"... Indra is praised as the highest god in 250 hymns of the Rigveda ...
the earliest reference to a net belonging to Indra is in the Atharva Veda ...
"Indra's net" is the net of the Vedic deva Indra,
whose net hangs over his palace on Mount Meru,
the axis mundi of Buddhist and Hindu cosmology.
In this metaphor, Indra's net has a multifaceted jewel at each vertex,
and each jewel is reflected in all of the other jewels. ...
Aspects of Indra as a deity are cognate to other ... thunder gods
...
Chango is the most feared god in Santería ... Ṣàngó is viewed as the most powerful ... orisha ... He casts a "thunderstone" to earth, which creates **thunder** and lightning ... Chango ... had three wives ... Princess Oshun, Princess Oba, and Princess Oya ... Oshun is the deity of the river ... She is connected to destiny and **divination** ...
The abèbè is the ritual object most associated with Ọṣun. The abèbè is a fan in circular form ... with a **mirror** in the center ...".

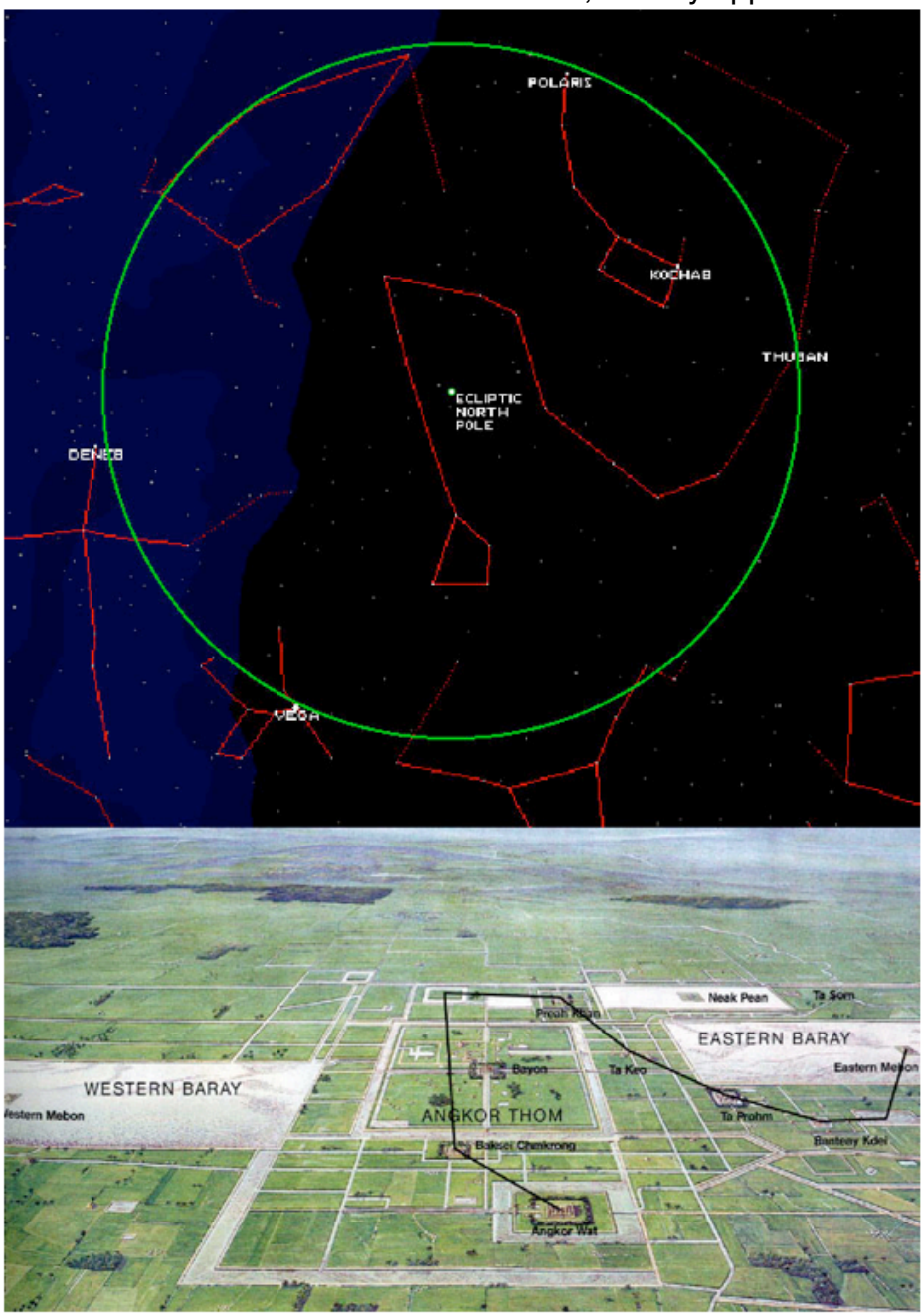
Chango and Indra both use Thunder,
and Chango's wife Oshun does Divination with a Mirror so
Chango and Oshun are two of the African IFA Orishas
who are precursors of Vedic Indra and Indra's Net.

Japan, the next stop beyond Sunda of Human M174 migration Out of Africa,
has 128-element (Dixon Spinor part of IFA) Futomani Divination and similar culture:



the sacred Yata no Kagami, or Eight-Handed Mirror - analogous to Indra Net Reflections
the Sword Kusanagi no Tsurugi - analogous to ThunderBolts
the curved Yasakani no Magatama Jewel - analogous to Indra Jewels

Graham Hancock, in Heaven's Mirror, said "... Our current world age is Pisces because on the spring equinox ... Pisces rises just ahead of the sun ... because of precession ... (1 degree in 72 years) ... the sun spends around 2160 years
[2160 = second layer vertices of all E8 Lie Algebra Lattices]
in each constellation - a complete revolution taking 26,000 years!
The great Hindu temple-complex ... spread over 200 square miles confirms that they correspond to the stars in the constellation of Draco, as they appeared in 10,500 BC! ...



The same star configuration of 10,500 BC = 12,500 years ago would have appeared in the previous precession period about 38,500 years ago, with Vega as North Star and Angkor Thom as the Ecliptic North Pole, about the time humans first arrived from Africa.

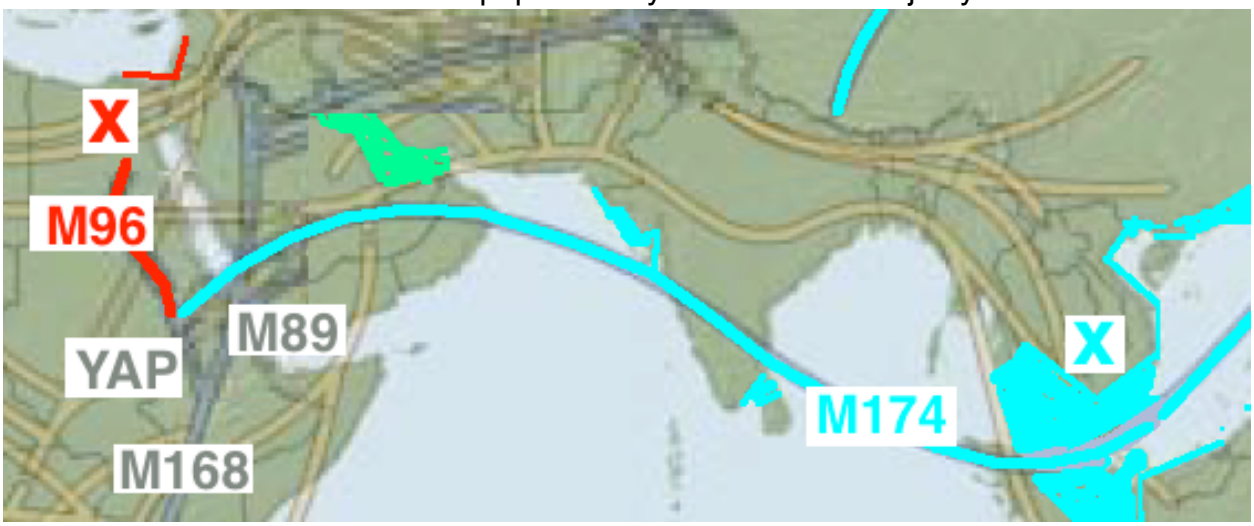
Somewhat later, **about 40,000 years ago, another group, the Atlantean M96,** migrated up the Nile River to Giza, marked by the x colored red, where I think the Atlanteans built the Great and Second Pyramids and the Sphinx shortly after they arrived in Giza, encoding African wisdom in those structures.
At that time all the area colored red was dry land and home of many Atlanteans. Atlanteans crossed the Atlantic Ocean to the East Coast of the Americas.

Yet another group, M89, ordinary Humans neither Lemurian nor Atlantean, migrated by crossing the Red Sea. Their descendants are now 90-95 percent of all non-Africans.

About 12,000 years ago, also about the time of the Vela X supernova,
the red part of Atlantis and the cyan part of Lemuria
were submerged by floods from melted glaciers.

The last 12,000 years have been marked by conflicts over the more limited resources that remained after so much productive land was flooded.

As M174 Lemurians and M96 Atlanteans merged with indigenous M89 ordinary Humans their Spiritual capabilities decreased and relatively recent conflicts resembled wars between M174 Lemurians to the East and M96 Atlanteans to the West of a Middle Ground near the Garden of Eden populated by the M89 vast majority of non-Africans



Some of the relatively recent Atlantean-Lemurian conflicts were
Egyptian-Babylonian battles of Megiddo and Carchemish around 2600 years ago
Greco-Persian Wars around 2500 years ago
Alexander the Great around 2300 years ago

After the victories of Alexander the Great, his friend, historian, and general Ptolemy I ruled Egypt and its cultural center Alexandria and commissioned Manetho to document history.

Manetho's history of Humans included:

36,525 years ago - Rule of Gods = M174 Lemurians and M96 Atlanteans -
- North Star Vega - Geminga Supernova Shock Wave hits Earth
22,625 years ago - Rule of Demigods
Lemurian and Atlantean Spiritual Capabilities begin to decline
17,413 years ago - Rule of Spirits of the Dead =
= Lemurians and Atlanteans have lost much of their Spritual Capabilities
and try to rule by remembering lost abilities
11,600 years ago - Rule of Mortal Humans = M89 ordinary Humans -
- Technology dominates Spirit -
- North Star Vega - Vela X Supernova - Taurid / Encke comet fragmented -
- floods due to melted glaciers

Vega was North Star at time of Pyramids-Sphinx and Angkor Temples.
were built when Vega was North Star.
Were they built 12,000 years ago or 38,000 years ago ?

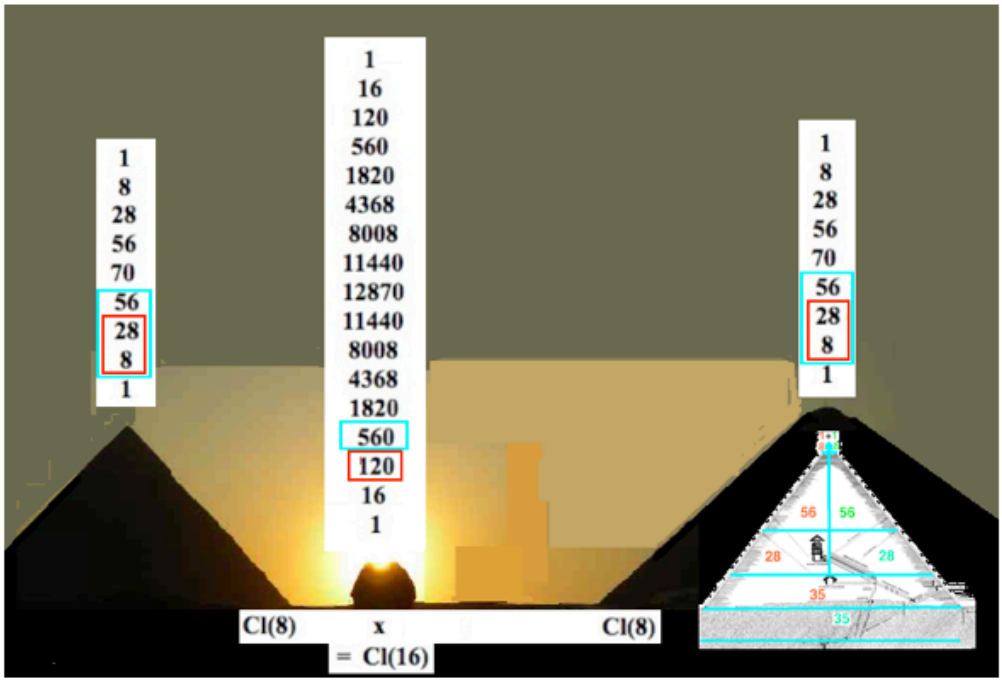
Gobekli Tepe Temple of Hunter-Gatherers favors earlier construction.

Wikipedia: "... Göbekli Tepe ... is an archaeological site in ... Southeastern Anatolia ...
The tell has a height of 15 m (49 ft) and is about 300 m (980 ft) in diameter.
It is approximately 760 m (2,490 ft) above sea level.
The tell includes two phases dating back to the 10th–8th millennium BCE.
At the first phase ... circular compounds or temene first appear. They range from 10 to 30 metres in diameter ... Scholars cannot interpret the pictograms ...
The ... structures ... not only predate pottery, metallurgy, and the invention of writing or the wheel, but were built before the socalled Neolithic Revolution, i.e., the beginning of agriculture and animal husbandry around 9000 BCE. But the construction of Göbekli Tepe implies organization of an advanced order not hitherto associated with Paleolithic, PPNA, or PPNB societies ... I**f indeed the site was built by hunter-gatherers ... then it would mean that the ability to erect monumental complexes was within ... [their]... capacities ... which would overturn previous assumptions** ...".

Therefore, when Atlantean Humans reached Giza they built
two large Pyramids - each representing Cl(8)
whose 8 Vectors + 28 BiVectors + 16 Spinors = F4 Lie Algebra

one for F4gde = Conformal Gravity + Dark Energy
one for F4sm = Standard Model
and the **Sphinx - representing Cl(16)**

whose 120 BiVectors + 128 half-Spinors = E8 = Lagrangian
and
whose 560 TriVectors = 10 copies of Fr3(O) = 26D World-Line-String Theory



Each Pyramid represented a copy of Cl(8) with graded structure

256 = 1 + 8 + 28 + 56 + 70 + 56 + 28 + 8 + 1 = (8L+8R) x (8L+8R)

so that each contained a copy of 56-dim Fr3(O)

and of 52-dim F4 = 8 + 28 + (8L+8R)

By 8-Periodicity of Real Clifford Algebras the tensor product **Cl(8) x Cl(8) = Cl(16)**

Cl(16) contains 10 copies of Fr3(O) = 1x56 + 8x28 + 28x8 + 56x1 = 560 elements

related to 26D World-Line=String Theory

Cl(16) contains (1x28 + 8x8 + 28x1 = 120) + (8Lx8L + 8Rx8R = 128) = 248-dim E8

248-dim E8 structure came from the F4gde and F4sm of the two Pyramids:

tensor product Cl(16) = Cl(8) x Cl(8)

induces the product

E8 = F4gde x F4sm

120-dim Cl(16) BiVectors = 1 x 28 + 8 x 8 + 28 x 1 of Cl(8) x Cl(8)

128-dim Cl(16) Half-Spinors = 8L x 8L + 8R x 8R of Cl(8) x Cl(8)

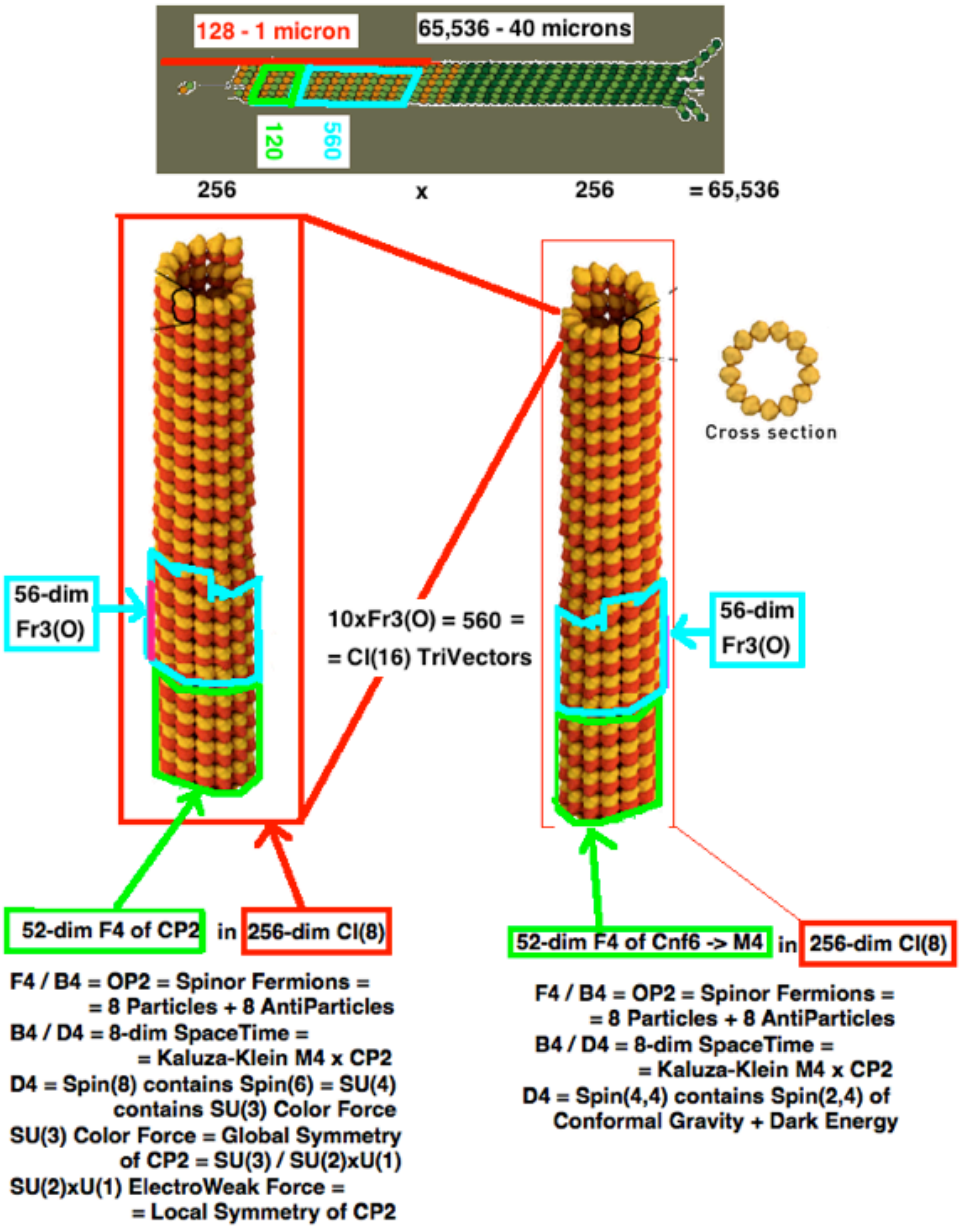
where 8L denotes left-handed Half-Spinors of Cl(8)

and 8R denotes right-handed Half-Spinors of Cl(8)

and

8Lx8L + 8Rx8R are the Half-Spinors of Cl(16) with consistent handed-ness structure.

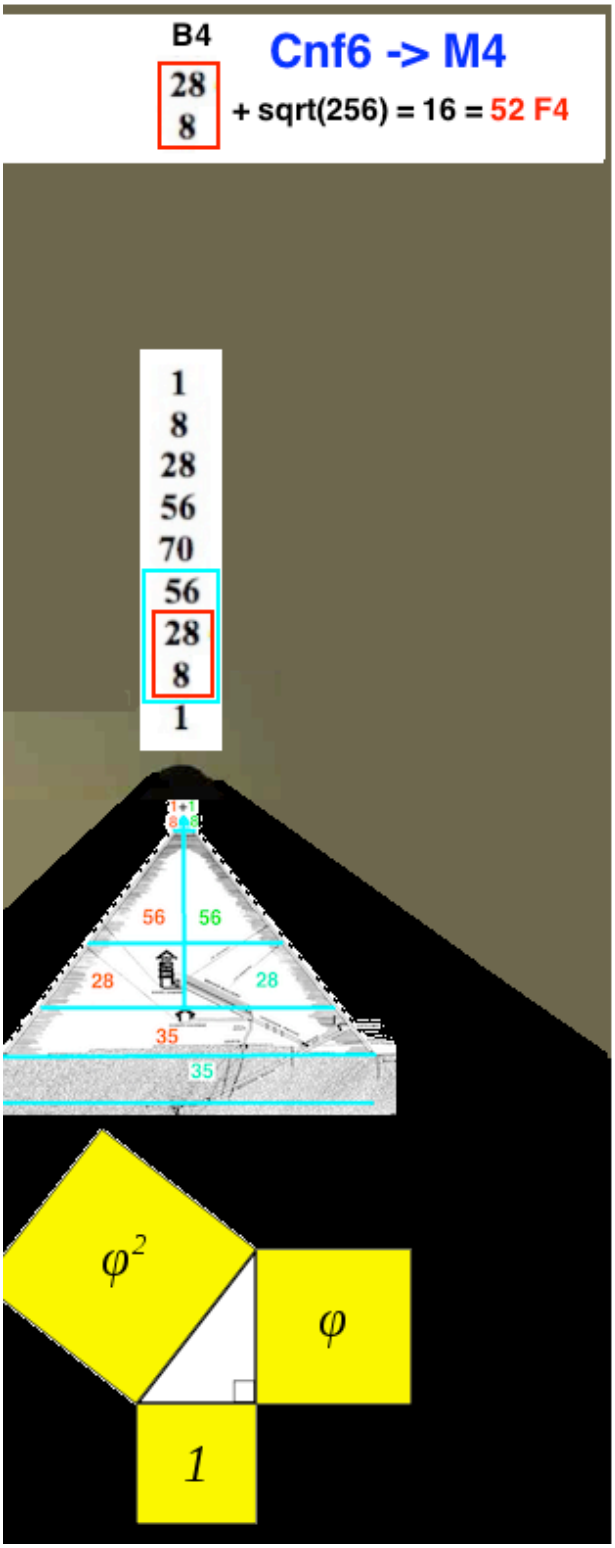
256-dim Cl(8) x 256-dim Cl(8) = 65,536-dim Cl(16) Clifford Algebra structure is also present in **Microtubules = 40 micron size aggregates of 65,536 tubulin dimers that are the basis of Penrose-Hameroff Bohm Potential Quantum Consciousness**.

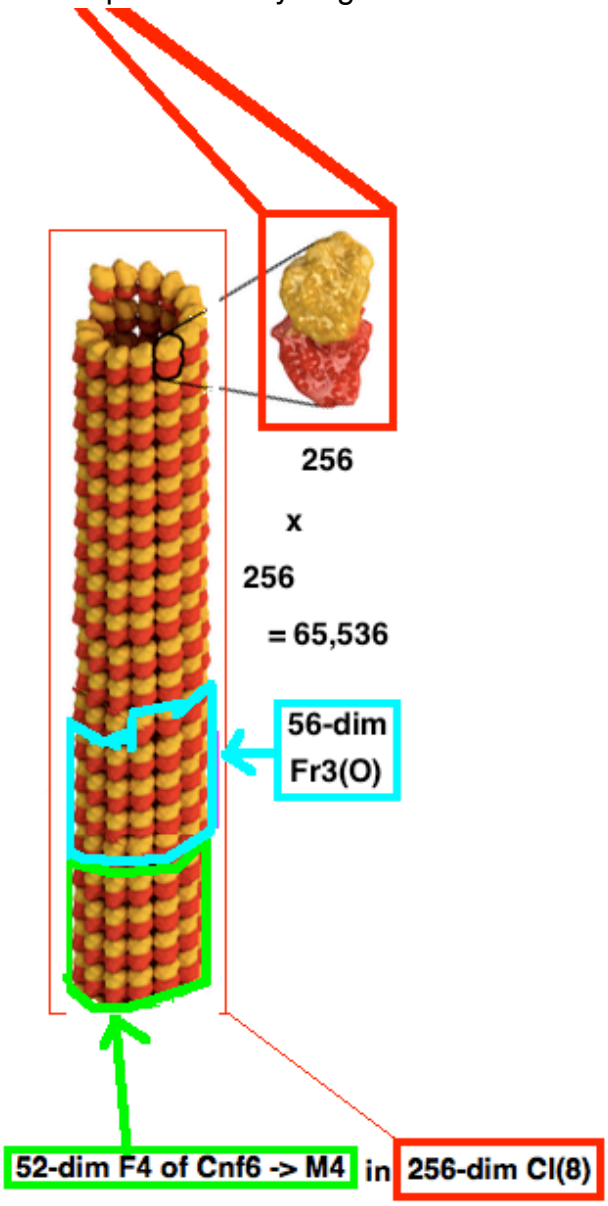


Assembly of 65,536 tubulins into a 40-micron microtubule can be seen to be analogous to the 256 x 256 tensor product Cl(8) x Cl(8) where
one 256-dim Cl8) represents Conformal Gravity+Dark Energy with F4gde related to the Minkowsi M4 of Kaluza-Klein M4 x CP2 and
the other Cl(8) represents Standard Model U(1) SU(2) SU(3) with F4sm related to the CP2 = SU(3) / SU(2)xU(1) of Kaluza-Klein M4 x CP2

The E8 and 10 copies of Fr3(O) of Cl(16) only use 248 + 560 of the 65,536 elements so that 64,728 Cl(16) elements are available for Quantum Consciousness thought processes

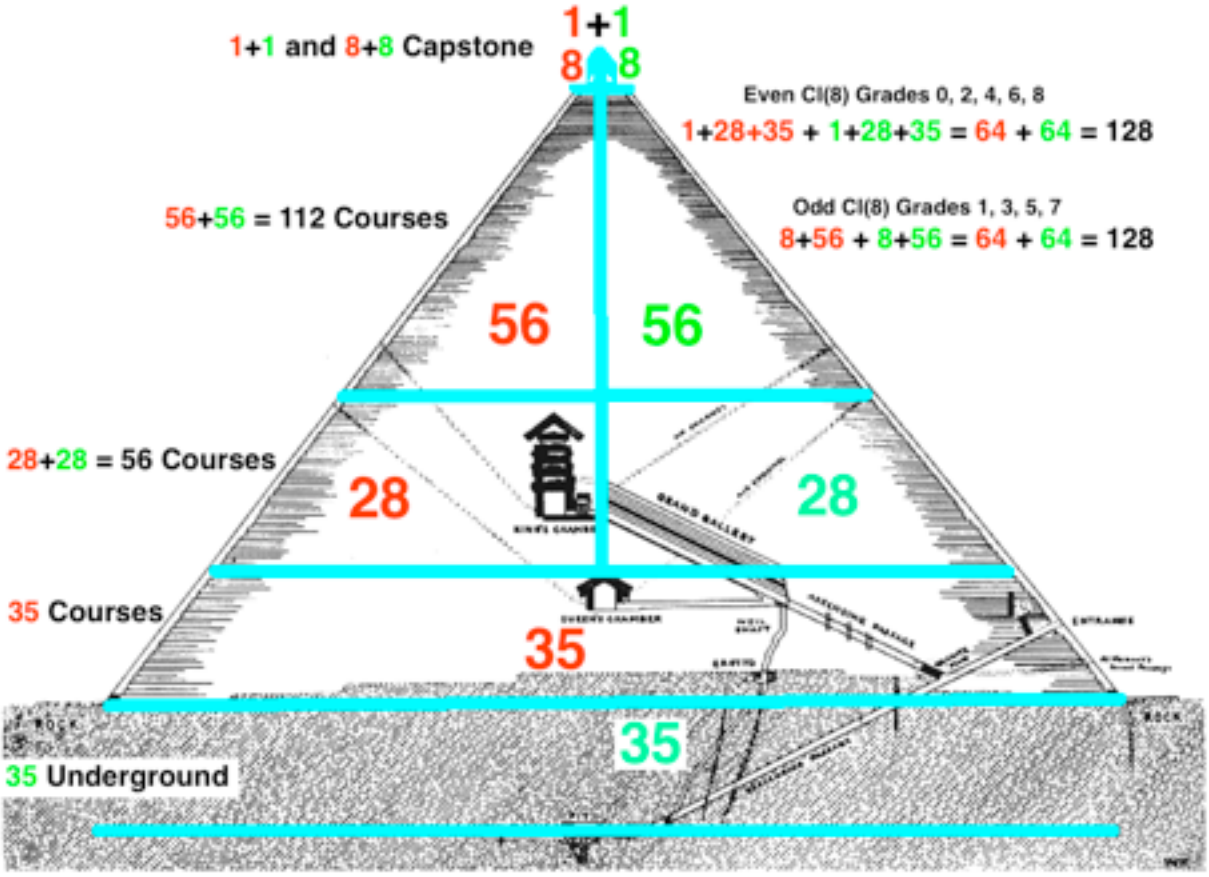
The Great Pyramid slope is of a Golden Ratio Right Triangle representing Conformal Gravity+Dark Energy with Gauge Group Spin(2,4) = SU(2,2)
It represents M4 of Kaluza-Klein M4 x CP2 and is represented by F4gde





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

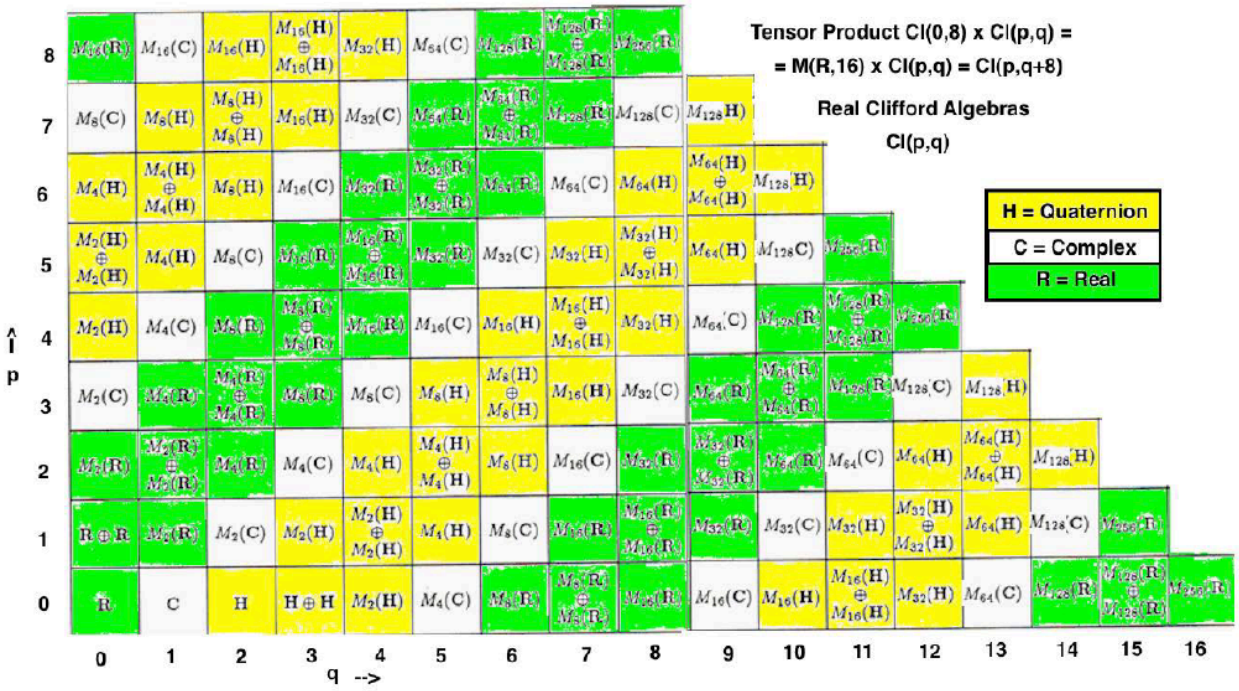
Clifford Algebras were not known to European mathematicians until Clifford in the 19th century and not known to European physicists until Dirac in the 20th century but it seems to me that their structure was known to Africans in ancient times. The courses of the Great Pyramid of Giza correspond to the graded structure of 256-dim Cl(8):



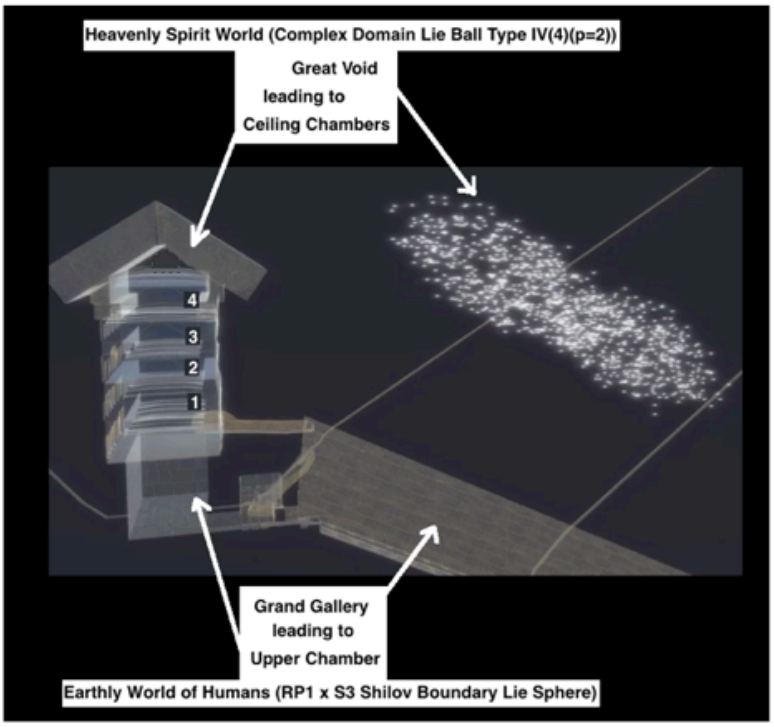
(image adapted from David Davidson image - for larger size see tony5m17h.net/GreatPyrCl8.png)

William KIngdon Clifford (1845 - 1879) described that Geometry in terms of his invention: Real Clifford Algebras, which he called “mind-stuff”, saying:
“... That element of which ... even the simplest feeling is a complex,
I shall call **Mind-stuff**.
A moving molecule of inorganic matter does not possess mind or consciousness ; but it possesses a small piece of mind-stuff. ...
When molecules are ... combined together ... **the elements of mind-stuff which go along with them ... combine ... to form the ... beginnings of Sentience**.
When the molecules are so combined as to form the brain and nervous system ... the corresponding elements of mind-stuff are so combined as to form some kind of consciousness ... changes in the complex which take place at the same time get so linked together that the repetition of one implies the repetition of the other.

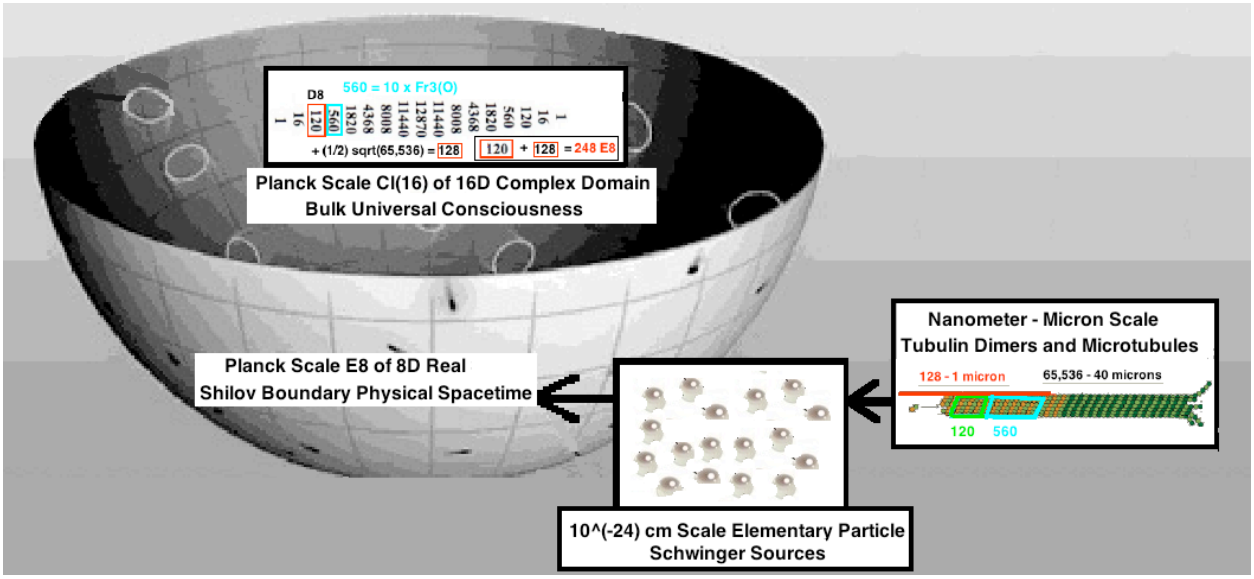
When matter takes the complex form of a living human brain,
the corresponding mind-stuff takes the form of a human consciousness ...".
(Wikipedia - (1878, "On the Nature of Things-in-Themselves", Mind, Vol. 3, No. 9, pp. 57–67))



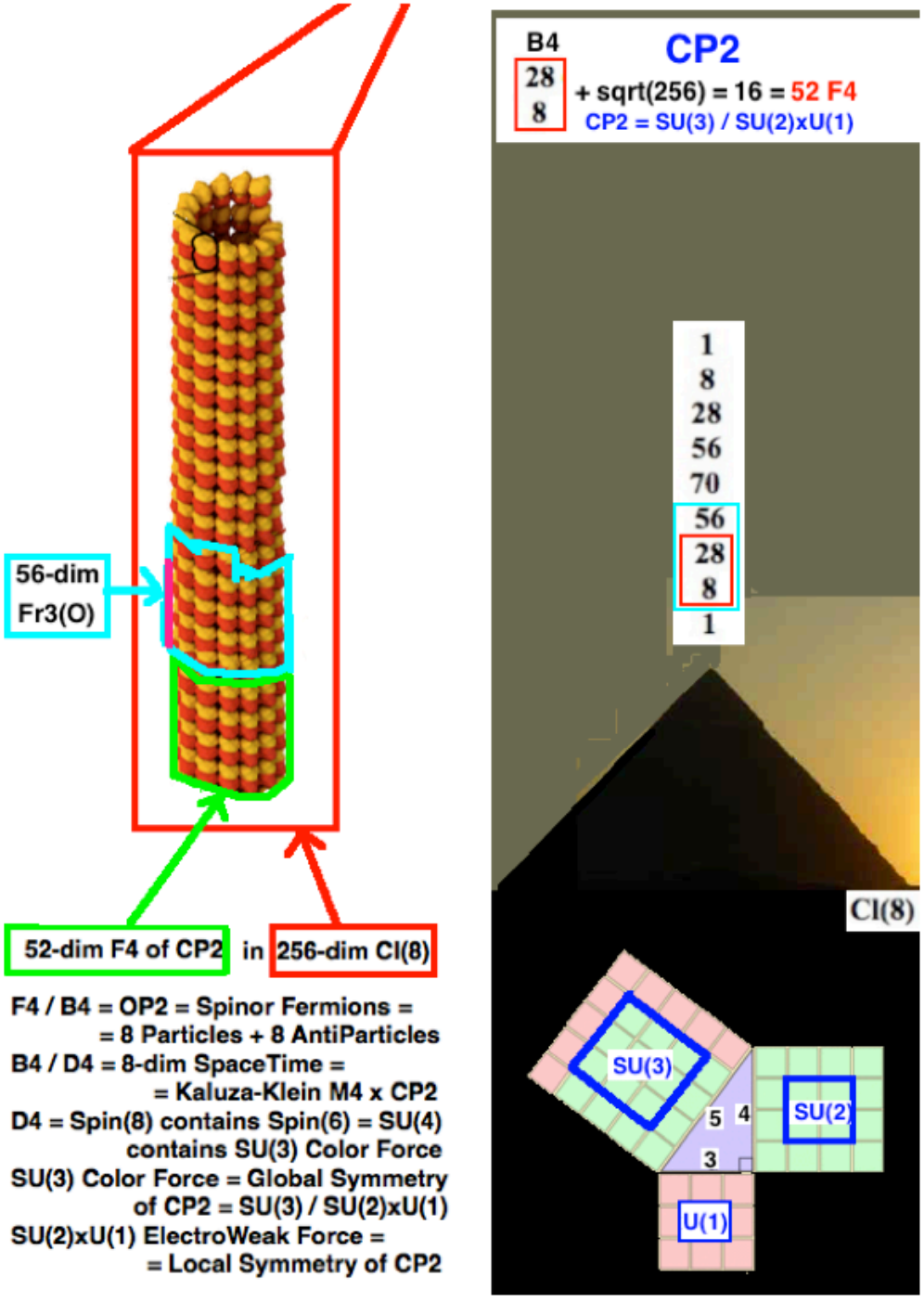
Above the Grand Gallery is a Great Void leading to Ceiling Chambers above the Upper Chamber - (image from ScanPyramids web site)



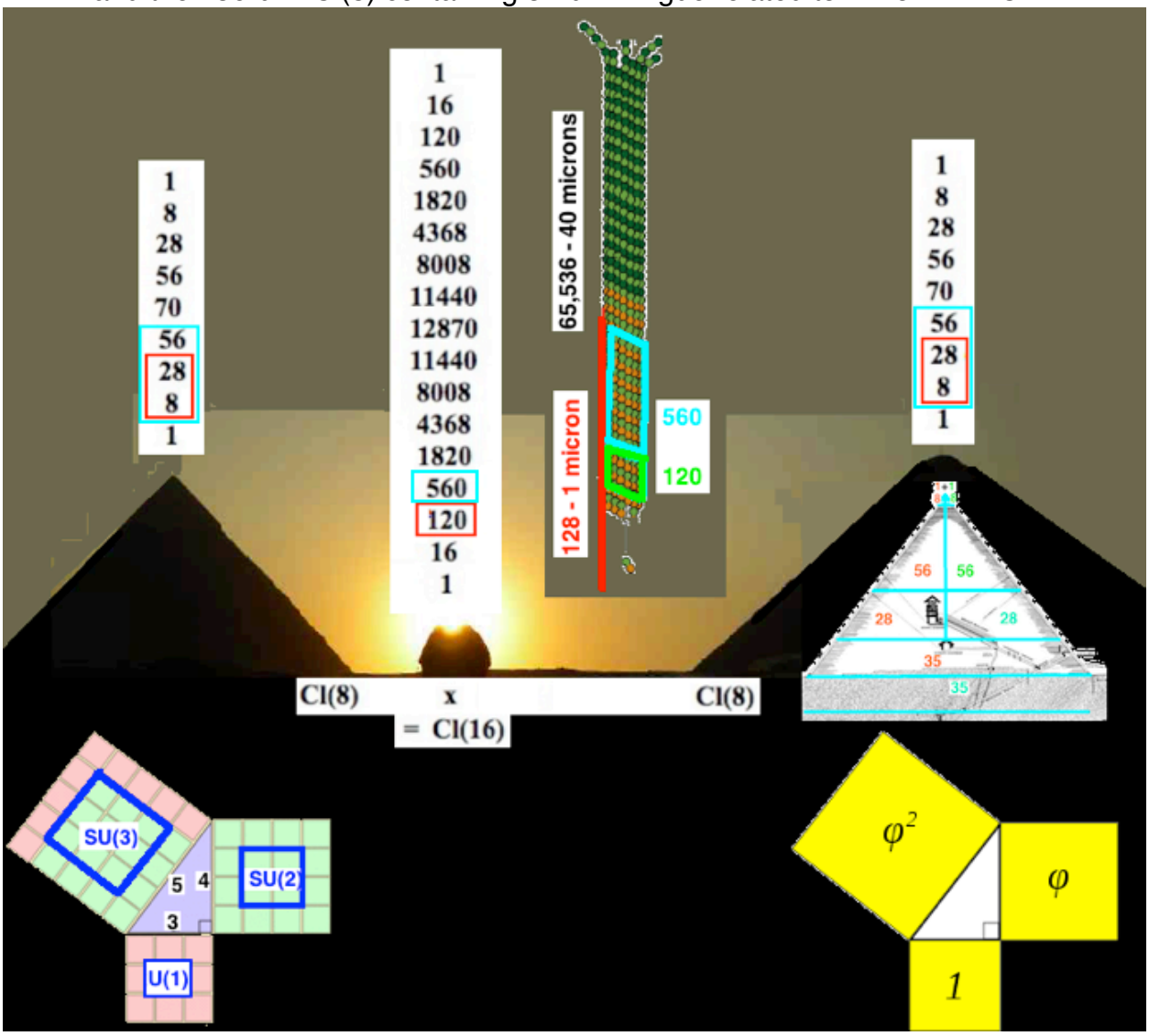
The Builders of the Great Pyramid represented the Real Shilov Boundary Physical world by the Grand Gallery and Upper Chamber that are easily accessible by Humans with Microtubule Quantum Consciousness and
they represented the Imaginary Complex World of Cl(16) Spacetime Cells mirroring the Human Microtubule World as Ceiling Chamber spaces and the Great Void that are more accessible to Souls of the Spirit World than to Physical Humans.



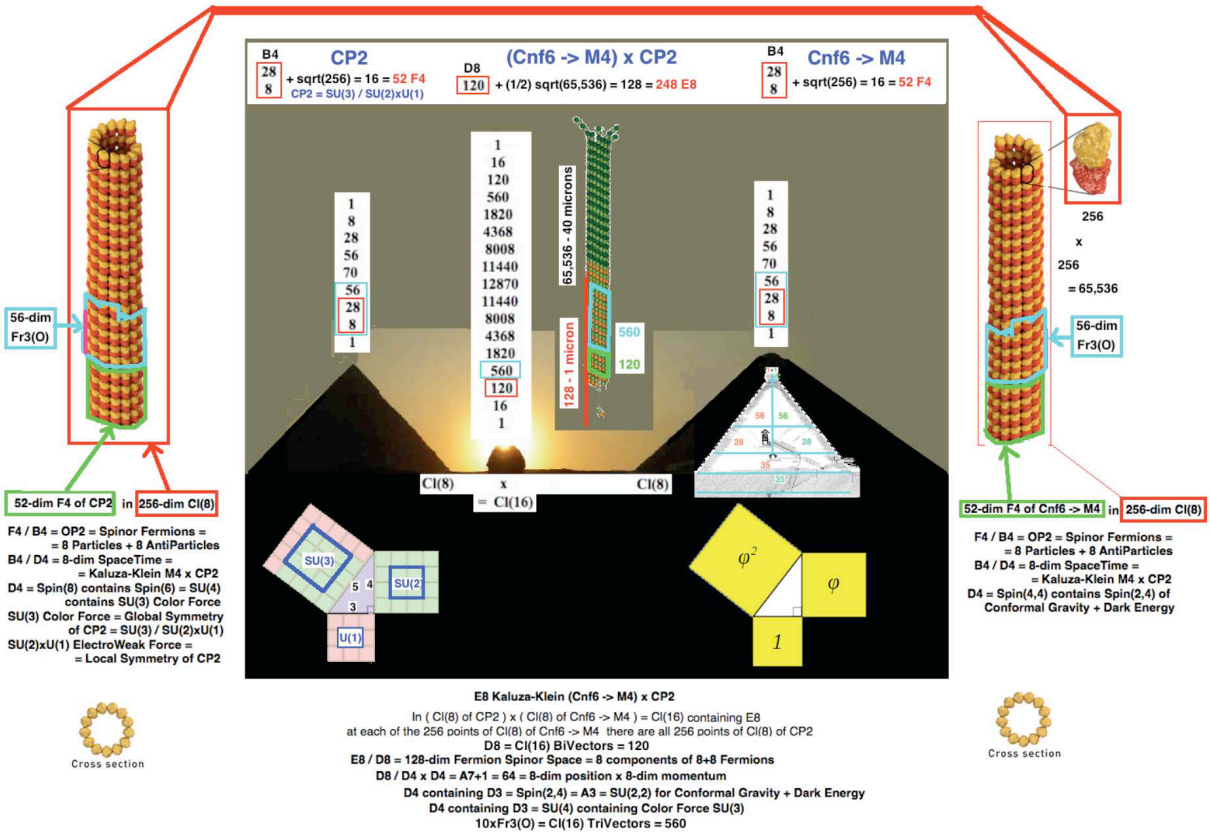
The Second Pyramid slope is of a 3-4-5 Right Triangle representing the Standard Model with Gauge Groups U(1) SU(2) SU(3) It represents CP2 of Kaluza-Klein M4 x CP2 and is represented by F4sm



The Sphinx represents 65,536-dim Cl(16) containing 248-dim E8
as the tensor product combination of
the 256-dim Cl(8) containing 52-dim F4sm related to CP2 of M4 x CP2
and the 256-dim Cl(8) containing 52-dim F4gde related to M4 of M4 x CP2



**The image on the following page summarizes how the Sphinx represents
the Cl(16) combination of the two large Cl(8) Pyramids
and also
the 65,536-element 40 micron Microtubules of Bohm Quantum Consciousness**



two large Pyramids - each representing Cl(8)
whose 8 Vectors + 28 BiVectors + 16 Spinors = F4 Lie Algebra

one for F4gde = Conformal Gravity + Dark Energy

one for F4sm = Standard Model

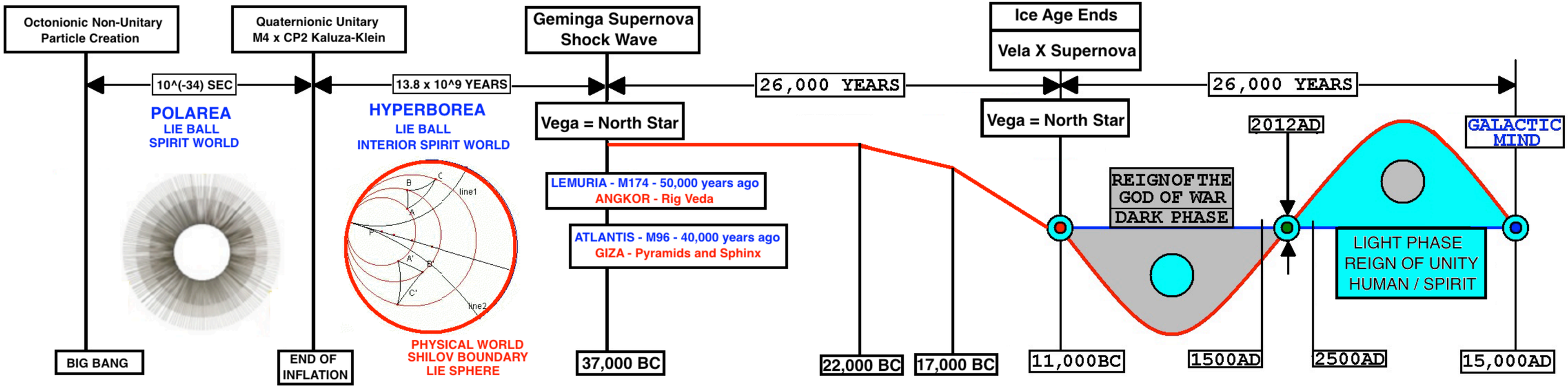
and

the **Sphinx - representing Cl(16)**

whose 120 BiVectors + 128 half-Spinors = E8 = Lagrangian

whose 560 TriVectors = 10 copies of Fr3(O) = 26D World-Line-String Theory

Here is a diagram (adapted from diagram of Henry Montieth) that indicates my view of Manetho's history of Humans and how it is likely to extend into the future :



Manetho decline of the Gods:

Gods -> Demigods -> Spirits of the Dead -> Mortal Humans

INFLATION ERA

RADIATION ERA

MATTER ERA

PLANCK ENERGY

Decoherence Ends Inflation

END OF ELECTROWEAK UNIFICATION

Quark Hadron Transition

Big Bang Nucleosynthesis

MATTER DOMINATION
• Formation of Structure Begins

• Formation of Atoms
• Decoupling of Matter and Radiation

10^{30}K 10^{25}K 10^{20}K 10^{15}K 10^{10}K 10^{5}K 1K Temperature

10^{18}GeV 10^{15}GeV 10^{12}GeV 10^{9}GeV 10^{6}GeV 1TeV 1GeV 1MeV 1keV 1eV 1meV Energy

Rest Energy of Flea

KE of Sprinter

Highest Energy Cosmic Rays

CM Energy TeV I

CM Energy TeV II

Nuclear Binding Energy

Atomic Binding Energy

10^{-30} 10^{-25} 10^{-20} 10^{-15} 10^{-10} 10^{-5} 1 Size

10^{97}gm/cm^3 10^{81}gm/cm^3 10^{65}gm/cm^3 10^{49}gm/cm^3 10^{33}gm/cm^3 10^{17}gm/cm^3 10gm/cm^3 10^{-15}gm/cm^3 10^{-30}gm/cm^3 Density

Nuclear Matter

Water

Air

1 Atom cm^3

7 x 10^9 Years

2 x 10^17 sec

inflation

universe expansion decelerating

accelerating expansion

1 10^3 10^6 10^9 Years

10^{-42}sec 10^{-36}sec 10^{-30}sec 10^{-24}sec 10^{-18}sec 10^{-12}sec 10^{-6}sec 1sec 10^{6}sec 10^{12}sec 10^{18}sec Time

Pyramids Sphinx

Galaxy Forms

Solar System Forms

Ice Age Ends

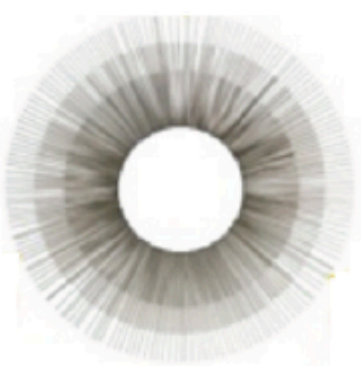
Vela X Supernova

10^(-34) SEC

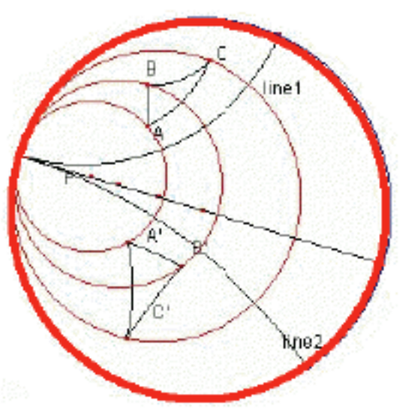
13.8 x 10^9 YEARS

26,000 years = 10^12 sec

POLAREA
LIE BALL
SPIRIT WORLD



HYPERBOREA
LIE BALL
INTERIOR SPIRIT WORLD



PHYSICAL WORLD
SHILOV BOUNDARY
LIE SPHERE

Vega = North Star

Vega = North Star

LEMURIA - M174 - 50,000 years ago
ANGKOR - Rig Veda

ATLANTIS - M96 - 40,000 years ago
GIZA - Pyramids and Sphinx

BIG BANG

END OF INFLATION

37,000 BC

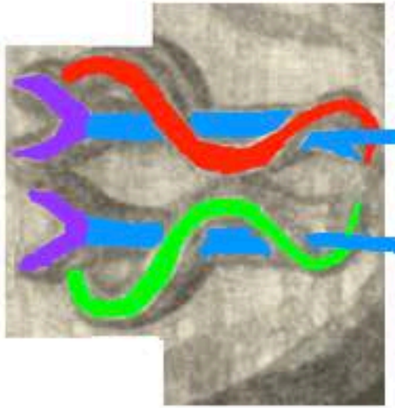
22,000 BC

17,000 BC

11,000BC

Manetho decline of the Gods:

Gods -> Demigods -> Spirits of the Dead -> Mortal Humans



Planck Scale Cl(16) of 16D Complex Domain

LIE BALL

INTERIOR SPIRIT WORLD

$10^{(-24)}$ cm Scale Elementary Particle

Schwinger Sources

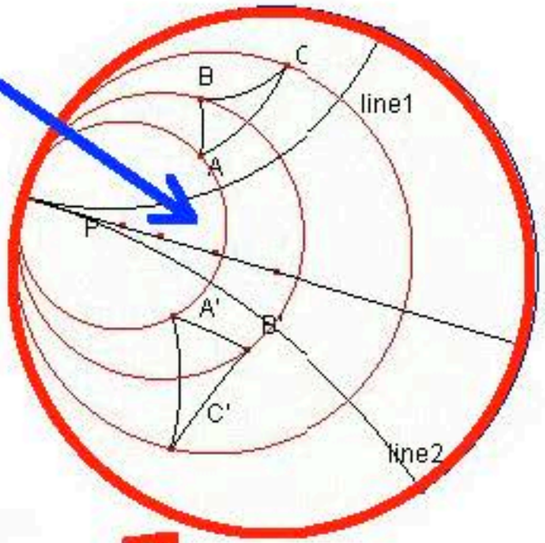
Planck Scale E8 of 8D Real

Shilov Boundary Physical Spacetime

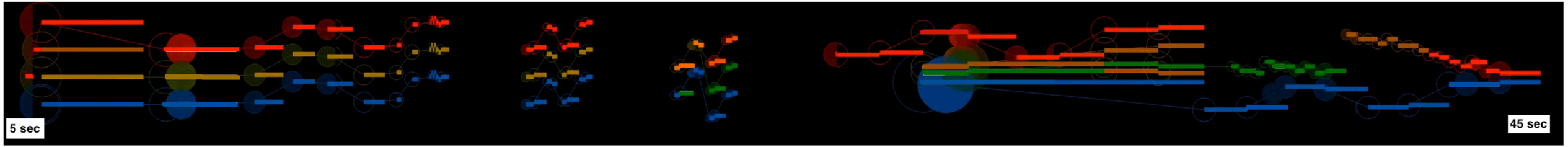
PHYSICAL WORLD

SHILOV BOUNDARY

LIE SPHERE

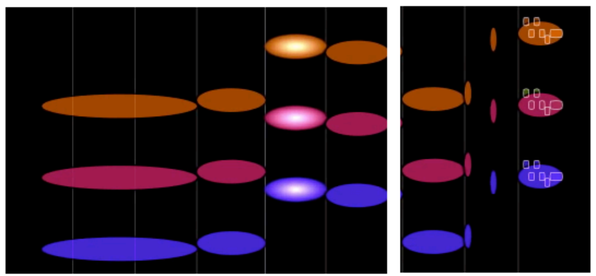


Beethoven's Grosse Fugue Opus 133 Overture



E8 Lattice 8-dim Spacetime

E8xE8xE8 = 24-dim Leech Lattice of 26D String=World-Line Theory

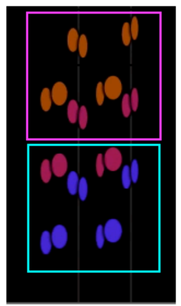


M4 CP2 = SU(3)/U(2)

M4 x CP2 Kaluza-Klein Quaternionic Spacetime

Gravity D4

12 Standard Model Ghosts

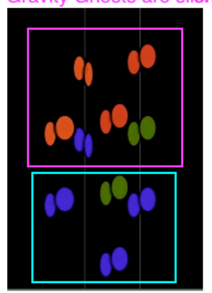


12 SU(2,2) Root Vectors

Standard Model D4

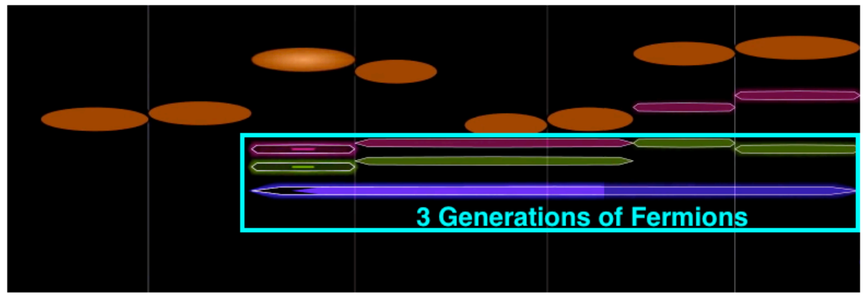
12 of 16 Gravity Ghosts

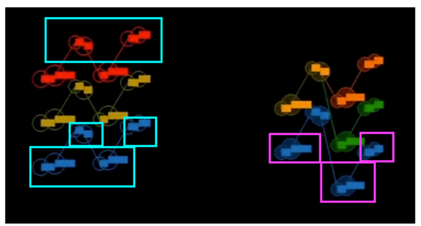
4 Gravity Ghosts are silent

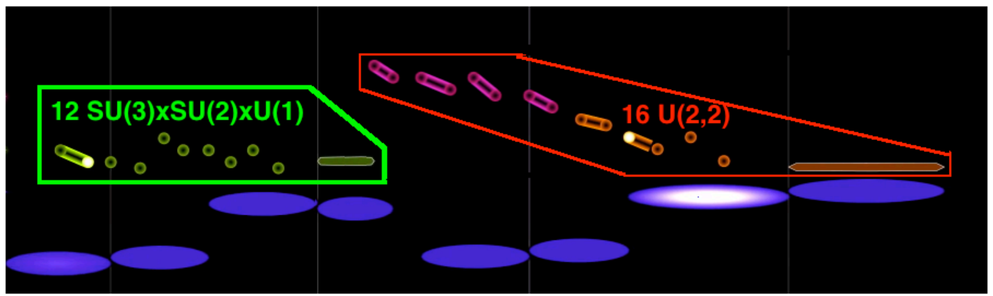


8 Standard Model Root Vectors

8 Fermion Particles







8 Fermion AntiParticles

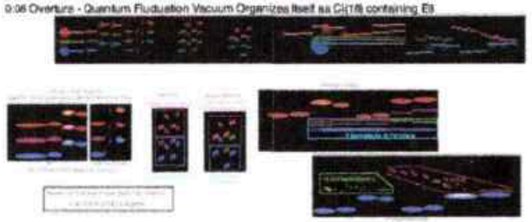
Beethoven's Grosse Fugue Opus 133 Overture

is an Outline of E8 Lie Algebra

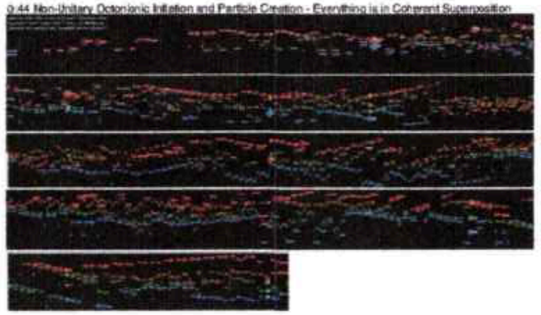
Grosse Fugue Structural Correspondence with Cl(16) - E8 and History

0:04 4 Generators from M4 of Parent Universe - Clifford Iteration of M4 = Cl(16)

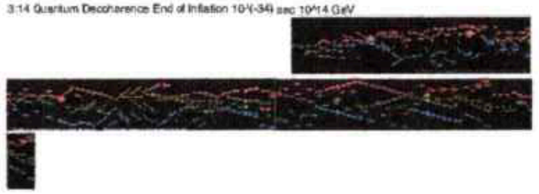
0:06 Overture - Quantum Fluduation Vacuum Organizes Itself as Cl(16) containing E8



0:44 Non-Unitary Octonionic Inflation and Particle Creation - Everything is in Coherent Superposition



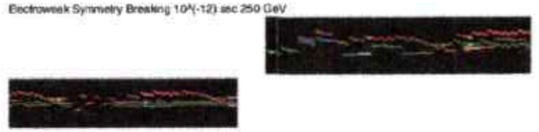
3:14 Quantum Decoherence End of Inflation 10^{-34} sec 10^{14} GeV



4:04 Reheating

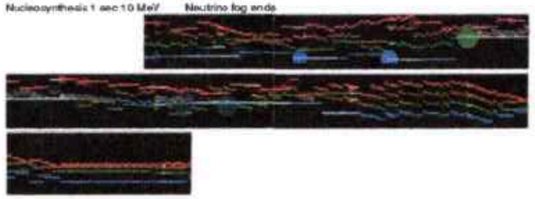
4:43 Quaternionic Radiation Expansion Begins 10^{-33} sec 10^{13} GeV

Electroweak Symmetry Breaking 10^{-12} sec 250 GeV

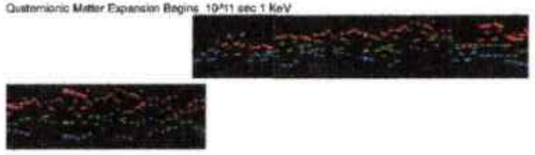


Quark-Hadron Transition 10^{-6} sec 1 GeV

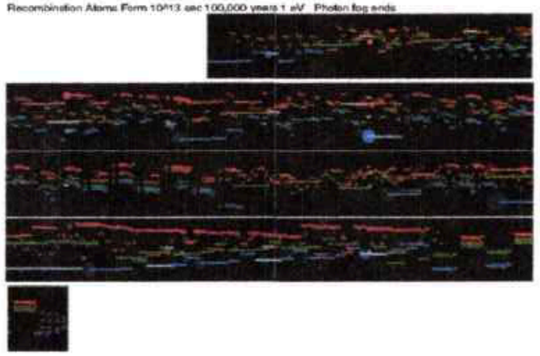
Nucleosynthesis 1 sec 10 MeV Neutrino fog ends



Quaternionic Matter Expansion Begins 10^{11} sec 1 KeV

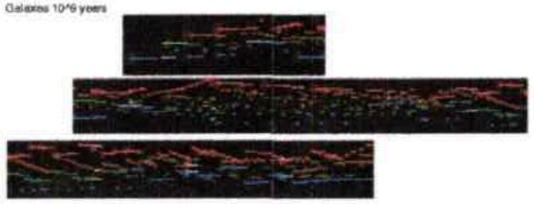


Recombination Atoms Form 10^{13} sec 100,000 years 1 eV Photon fog ends



First Stars burning H and He Reionization 400 x 10^6 years

Galaxies 10^9 years



Dark Energy Accelerated Expansion begins at about 8 x 10^9 years = 7.5 x 10^9 years ago

Solar System 4.5 x 10^9 years ago

Earth 4.5 x 10^9 years ago

Moon by Collision 4.4 x 10^9 years ago

Bacteria Life 4 x 10^9 years ago

Cambrian explosion of Life 500 x 10^6 years ago

Dolphin Life 20 x 10^6 years ago

Humans Evolve in Africa 100,000 years ago

Hyperborean Spirit Consciouaness Connects with Human Consciousness 50,000 years ago

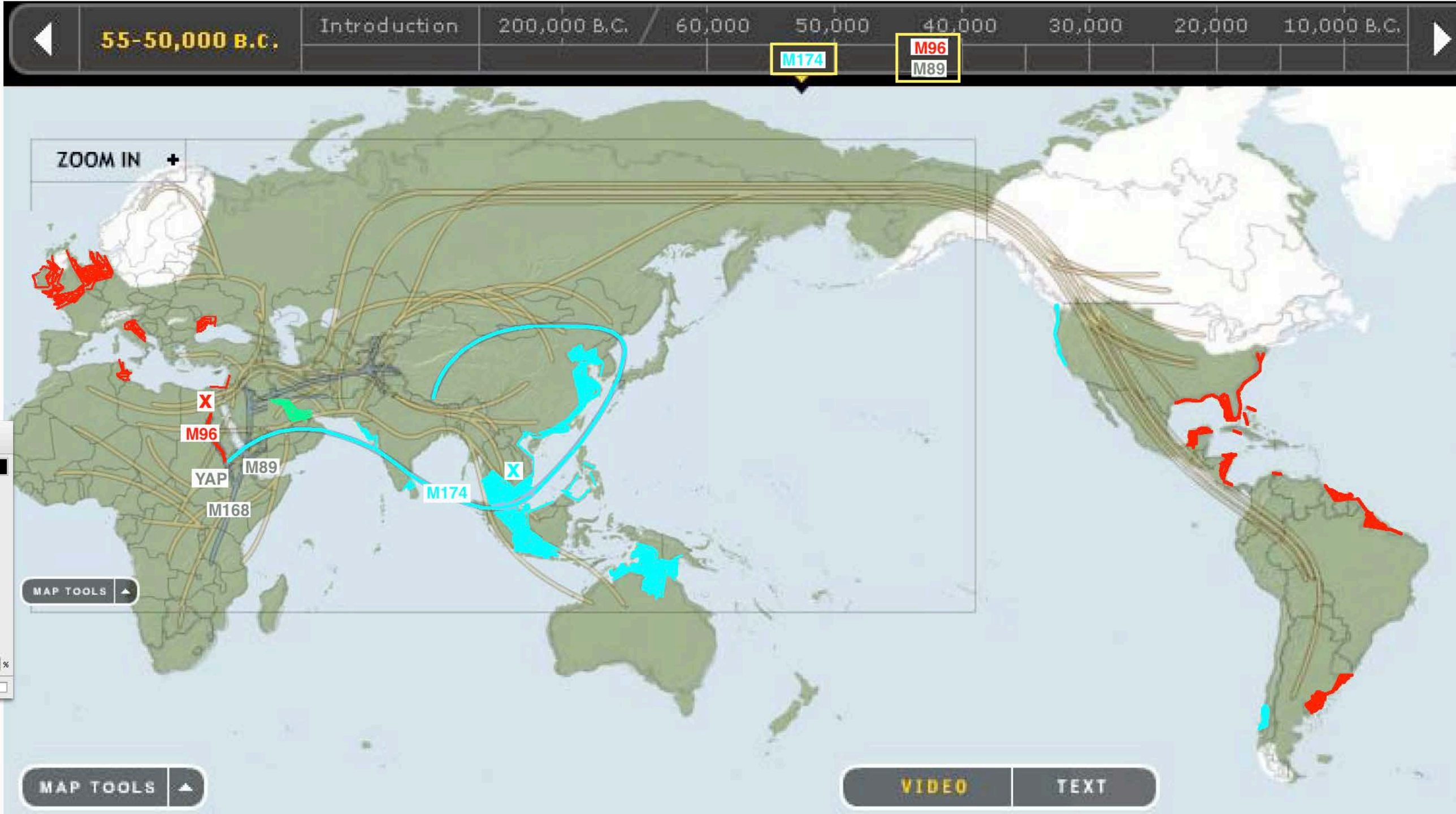
Hyperborean / Human Connection is Harmonious

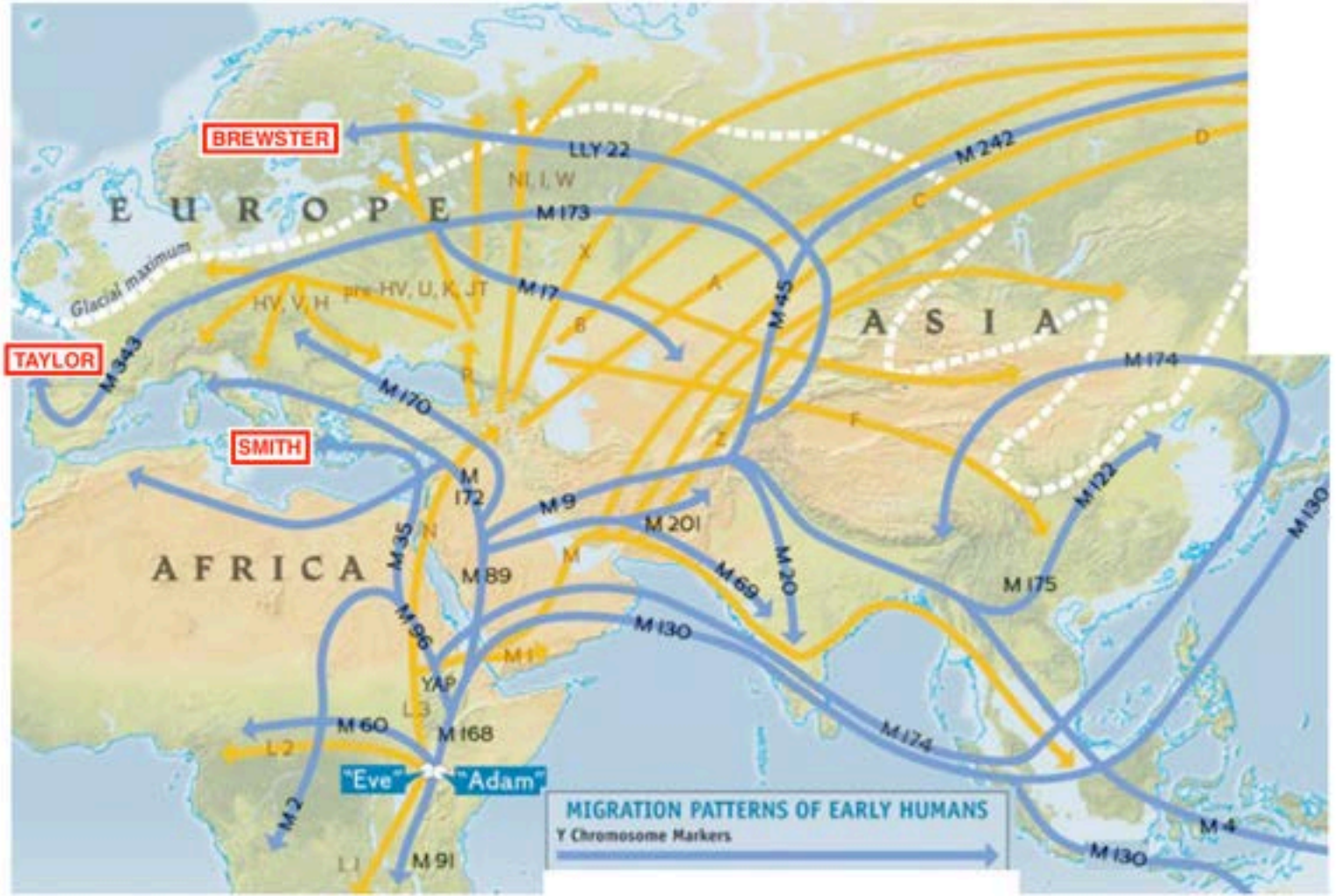
Original African IFA - Lemurian Anglor Rig Veda - Atlantean Giza Britain America 40,000 years ago

Humans Disconnect from Hyperboreans

after Flood 12,000 years ago Humans use Technological Consciousness

The Grosse Fugue History ends in 2012,
as do the Mayan Calendar and the Timewave of Terrence McKenna derived from the I Ching.


55-50,000 B.C.
Introduction
200,000 B.C.
60,000
50,000
40,000
30,000
20,000
10,000 B.C.
M174
M96
M89
ZOOM IN +
X
M96
YAP
M89
M168
M174
X
MAP TOOLS
MAP TOOLS
VIDEO
TEXT


BREWSTER
TAYLOR
SMITH
EUROPE
ASIA
AFRICA
Glacial maximum
LLY22
M173
M343
M170
M172
M35
M89
M96
M60
M2
M91
M9
M201
M69
M20
M45
M242
M174
M122
M175
M130
M4
M168
YAP
M1
"Eve"
"Adam"
MIGRATION PATTERNS OF EARLY HUMANS
Y Chromosome Markers