History of Our Universe

Frank Dodd (Tony) Smith, Jr. - 2017

Abstract

All Universes obey the same Laws of Physics and have the same Particle Masses, Force Strengths, and Spacetime Structure because they all begin with Void and evolve according to the Quantum Process of David Finkelstein's Iteration of Real Clifford Algebras. Our Universe began with a Big Bang Planck-Scale Compact Fluctuation in its Parent Universe, followed by an Octonionic Inflation of its Spacetime, and then its present state of Quaternionic Conformal Gravity + Dark Energy Expansion. This paper is only a sketch-overview of the History of Our Universe. For details and references, see viXra 1602.0319 , 1701.0495 , 1701.0496 , 11709.0265 , 1208.0145

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From Void to Algebraic Quantum Field Theory
via David Finkelstein's Iteration of Real Clifford Algebras

All Universes obey the same Laws of Physics and have the same Particle Masses, Force Strengths, and Spacetime Structure because they all begin with Void and evolve according to the Quantum Process of

David Finkelstein's Iteration of Real Clifford Algebras:

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

Cl(16) contains 248-dim Lie Algebra E8 = 120-dim BiVectors + 128-dim Half-Spinors.
The 120-dim BiVectors of Cl(16) form the D8 Lie Algebra of SO(16) subalgebra of E8.
By 8-Periodicity of Real Clifford Algebras Cl(16) can be factored into the tensor product

65,536-dim Cl(16) = 256-dim Cl(8) x 256-dim Cl(8)

so the Quantum Evolution Process does not use Iterated Clifford Algebra beyond Cl(16) but
uses Iterated Tensor Product of Cl(8) with E8 Lattice Vector Space

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

to get to the Leech Lattice 24-dim Vector Space
and
uses 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)
to get to M(2,Cl(24)) = Cl(1,25) with Lorentz Leech Lattice Vector Space.
Since all the matrix entries are Cl(0,24) = tensor product of 3 copies of Cl(0,8)
8-Periodicity allows formation of the tensor products of copies of Cl(1,25)

Completion of Union of All Tensor Products of Cl(1,25) = hyperfinite AQFT =
= Algebraic Quantum Field Theory containing

a copy of E8 within Cl(16) within each copy of Cl(1,25) The E8 is a Recipe for a Realistic Physics Lagrangian (viXra 1602.0319, 1701.0495, 1701.0496)

and

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 Spin 2 State is the Carrier of the Bohm Quantum Potential with Sarfatti Back-Reaction (viXra 1602.0319, 1701.0495)
and
24 of the 26 dimensions of 26D String Theory are
the off-diagonal parts of traceless part J(3,O)o of the Jordan Algebra J(3,O)
8v of Vector Spacetime +
8s+ of +half-spinor Fermion Particles +
8s- of -half-spinor Fermion AntiParticles

VOID

Cl(VOID) = 0-dim

C(0) = 1-dim

Cl(1) = 2-dim

Cl(2) = 4-dim

Cl(4) = 16-dim

E8 Lattice E8 Lattice

Cl(16) = 65,536-dim = 256 x 256 = Cl(8) x Cl(8)

E8 Lattice E8 Lattice E8 Lattice Leech Lattice

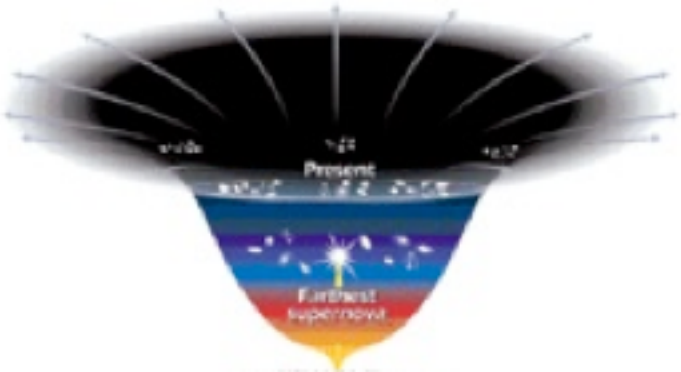
Cl(8) x Cl(8) x Cl(8) = Cl(24)

Lorentz Leech Lattice

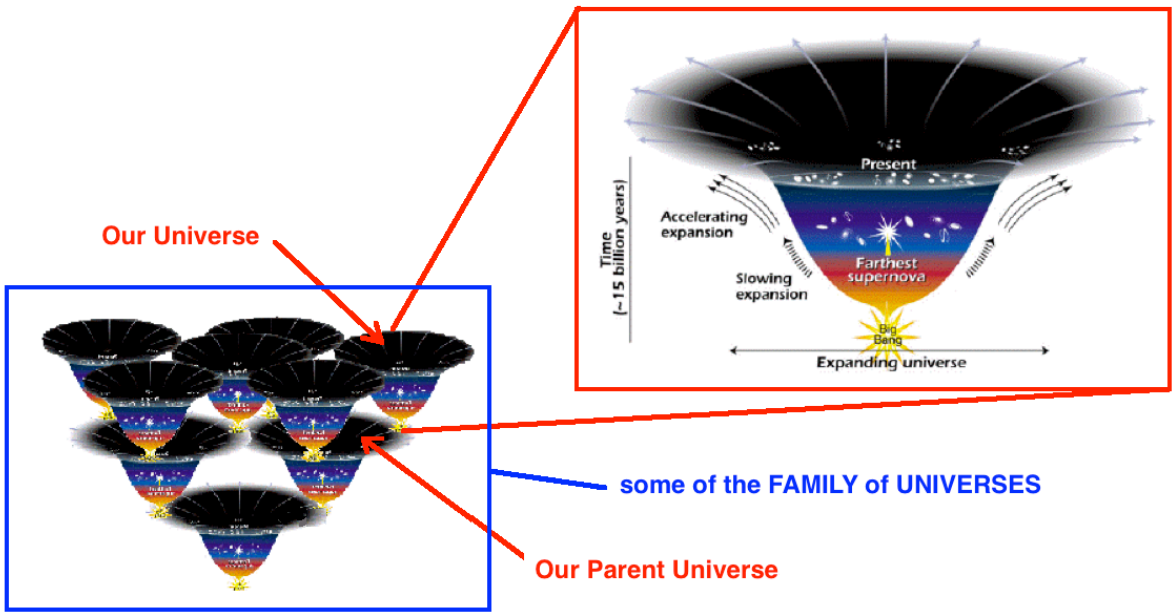
$$\begin{pmatrix} Cl(24) & Cl(24) \\ Cl(24) & Cl(24) \end{pmatrix} = M(2,Cl(24)) = Cl(1,25)$$

AQFT = Cl(1,25) + Cl(1,25)xCl(1,25) + ... + Cl(1,25)x ... x Cl(1,25) + ...

Consider the Evolutiion of Our Universe



which emerged from Our Parent Universe which is only one of many Universes in the huge Family of Universes:



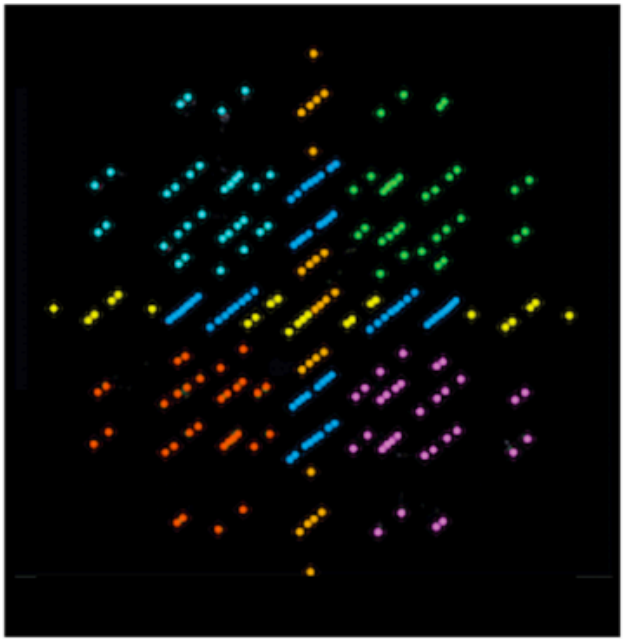
The First Stage of the Evolution of Our Universe
was the Initial Planck Cell Big Bang

a compact vacuum fluctuation in a single Planck-scale cell of Our Parent Universe. That Planck cell (like all other Planck cells in any Universe) can be described by taking the quotient of its 24-dimensional subspace modulo the 24-dimensional Leech lattice. Its automorphism group is the largest finite sporadic group, the Monster Group, of order 8080, 17424, 79451, 28758, 86459, 90496, 17107, 57005, 75436, 80000, 00000 =
= 2^46 .3^20 .5^9 .7^6 .11^2 .13^3 .17.19.23.29.31.41.47.59.71 or about 8 x 10^53.

E8 describes the physics in that Big Bang Planck Cell which is Compact so that the Real Form of E8 representing the physics of the Big Bang Planck Cell
is E8(-248) with symmetric space E8 / SO(16) of dimension 128 and rank 8 and isotropy representation Spin(16) that is Rosenfeld's Elliptic Projective Plane (OxO)P2 .

In the initial Big Bang Planck Cell there is no physical spacetime
and

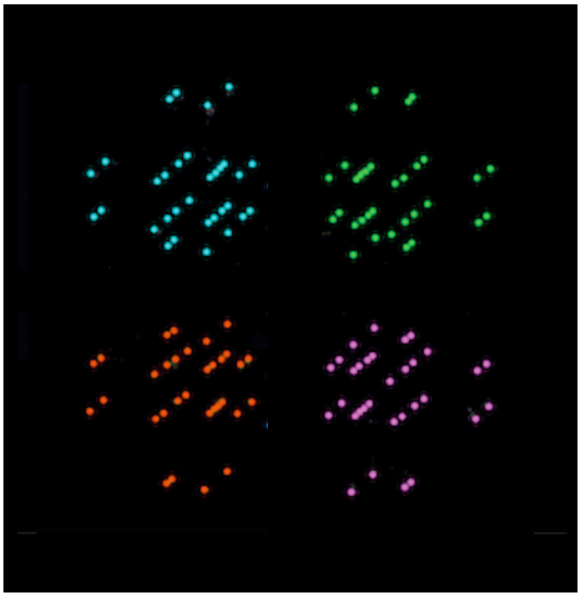
the 240 Root Vectors of E8 are

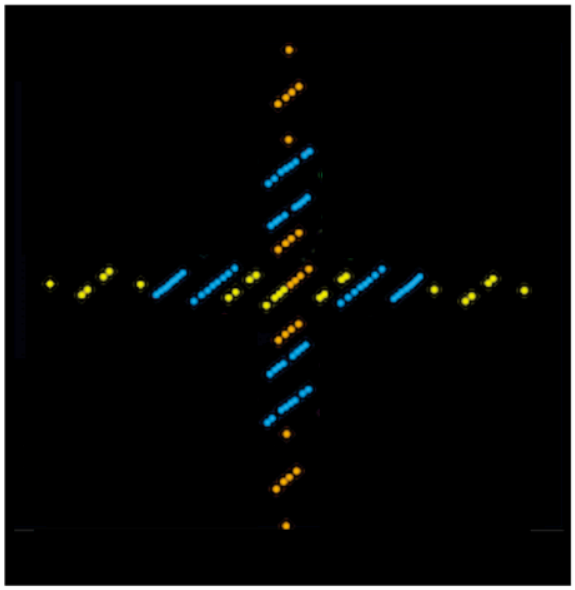


where the 128 of E8 / SO(16) in the left figure below represent 8 components
of 8 Fermion Particles and 8 Fermion AntiParticles

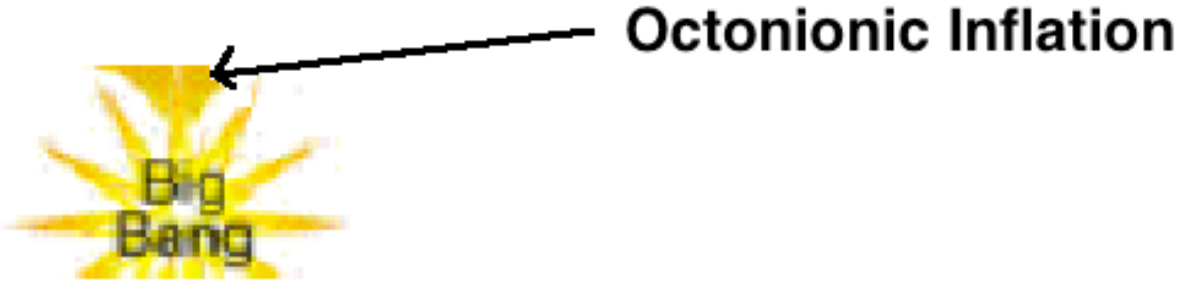
and

the 112 in the right figure below represent
28 (orange) Standard Model Gauge Bosons and Gravity Ghosts and
28 (yellow) Gravity-Dark Energy Gauge Bosons and SM Ghosts and
64 (blue) generators of the A7 + R center of the
Maximal Contraction Heisenberg Algebra of E8





The Second Stage of the Evolution of Our Universe was Octonionic Inflation

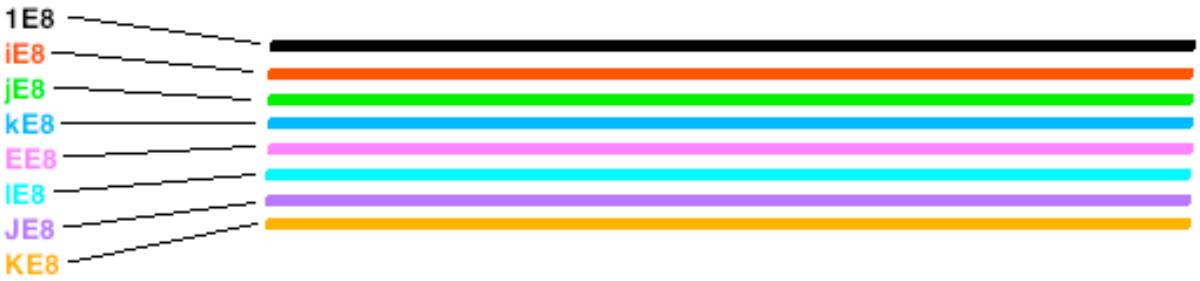


The Real Form of E8 representing the physics of Octonionic Inflation is E8(8) with symmetric space E8 / SO(8,8).

Our Universe expands by Octonionic Inflation beyond its initial Big Bang Planck Cell to form an Octonionic 8-dim Spacetime based on the 64 generators of the A7 x R center of the Maximal Contraction Heisenberg Algebra of E8. Effectively, the 64 generators correspond to 8 position x 8 momentum components of an 8-dim base manifold of an E8 Lagrangian in which Spacetime 8v of 26D String Theory is represented by 8-branes whose Planck-Scale Lattice Structure is that of superpositions of 8 types of E8 Lattice: There is a 1-1 correspondence between Octonion Basis Elements and E8 Integral Domains

1 <=> 0E8
i <=> 1E8
j <=> 2E8
k <=> 3E8
E <=> 4E8
I <=> 5E8
J <=> 6E8
K <=> 7E8

where 1E8,2E8,3E8,4E8,5E8,6E8,7E8 are 7 independent Integral Domain E8 Lattices and 0E8 is an 8th E8 Lattice (Kirmse's mistake) not closed as an Integral Domain.



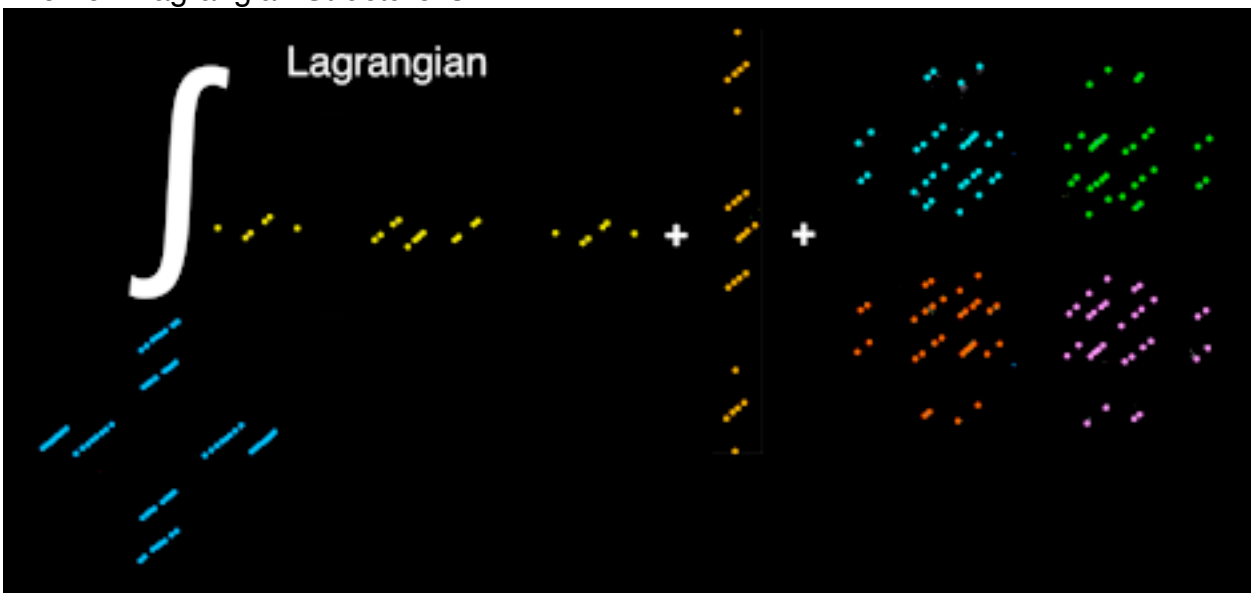
and

Gauge Boson / Ghost terms are represented by the 28+28 = 56 axis root vectors other than the 64 (blue) that correspond to A7 + R

and

Fermion (8s+ and 8s- of 26D String Theory) terms are represented by the 128 = (8+8)x8 off-axis root vectors of E8

The 26D Lagrangian Structure is



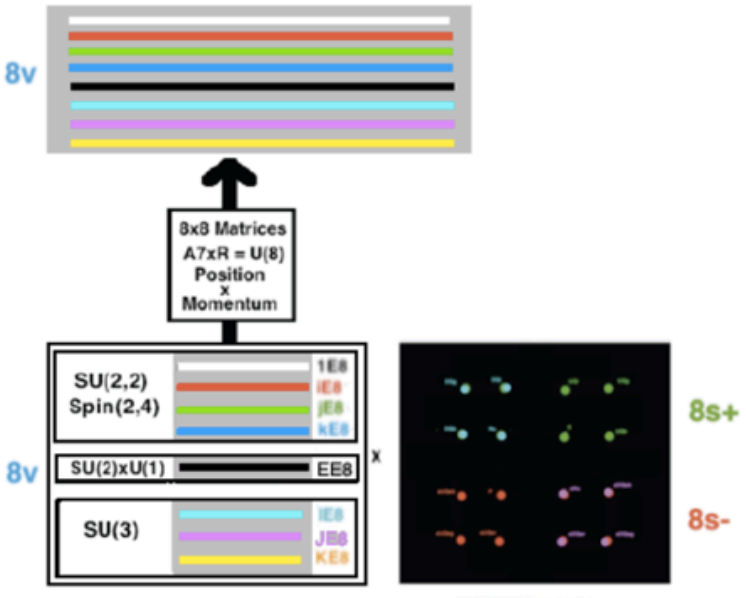
Each Fermion part of the Fermionic Term has in 8-dim Spacetime units of mass^(7/2).
Each Gauge Boson + Ghost part of the Bosonic Term has units of mass^(1)
Since (8+8)x(7/2) = 56 = 28 + 28 the Fermionic Terms cancel the Bosonic Terms
the Lagrangian is UltraViolet finite.

(see Steven Weinberg's 1986 Dirac Memorial Lecture)

The 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 Chapter 32 of Steven Weinberg's book Quantum Theory of Fields, Volume III)

and
the 26D String Theory Structure is



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
"... Bohm's Quantum Potential can be viewed as an internal energy of a quantum system ..." according to Dennis, de Gosson, and Hiley (arXiv 1412.5133) and
Peter R. Holland says in "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 ...".

Penrose-Hameroff-type Quantum Consciousness is due to Resonant Quantum Potential Connections among Quantum State Forms.

The Quantum State Form of a Conscious Brain is determined by the configuration of a subset of its 10^18 to 10^19 Tubulin Dimers described by a large Real Clifford Algebra.
Paola Zizzi in gr-qc/0007006 describes the Octonionic Inflation Era of Our Universe as a Quantum Consciousness Superpositon of States ending with Self-Decoherence after 64 doublings of Octonionic Inflation, at which time Our Universe is
"... a superposed state of quantum ... [qubits].
the self-reduction of the superposed quantum state is ... reached at the end of inflation ...[at]... the decoherence time ... [Tdecoh = 10^9 Tplanck = 10^(-34) sec] ... and corresponds to a superposed state of ... [10^19 = 2^64 qubits]. ...".
64 doublings to 2^64 qubits corresponds to the Clifford algebra

$$Cl(64) = Cl(8x8) = Cl(8) \times Cl(8) \times Cl(8) \times Cl(8) \times Cl(8) \times Cl(8) \times Cl(8) \times Cl(8)$$

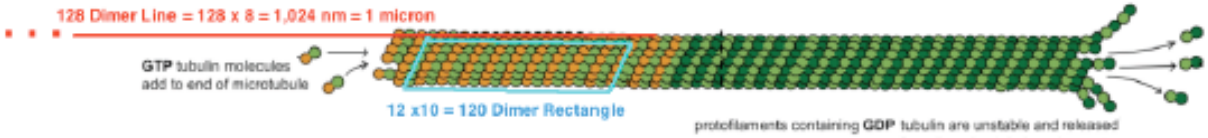
By the periodicity-8 theorem of Real Clifford algebras, Cl(64) is the smallest Real Clifford algebra for which we can reflexively identify each component Cl(8) with a basis vector in the Cl(8) vector space.
This reflexive identification causes our universe to decohere at N = 2^64 = 10^19.
Octonionic Quantum Processes are Not Unitary and so can produce Fermions.
(see Stephen Adler's book "Quaternionic Quantum Mechanics ..." at pages 50-52 and 561).

At the end of 64 Unfoldings, Non-Unitary Octonionic Inflation ended having
produced about (1/2) 16^64 = (1/2) (2^4)^64 = 2^255 = 6 x 10^76 Fermions.
At the End of Inflation Our Universe had Temperature / Energy 10^27 K = 10^14 GeV
so each of the 10^77 Fermions had energy of 10^14 GeV and collisions among them
would for each of the 10^77 Fermions produce jets containing about 10^12 particles of
energy 100 GeV or so so that the total number created by Inflation was about 10^89.

The End of Inflation time was at about 10^(-34) sec = 2^64 Tplanck
and
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 2^64 qubits created by Inflation is roughly 10^19 which is roughly
the number of Quantum Consciousness Tubulins in the Human Brain.
Therefore

the Human Brain Quantum Consciousness has evolved in Our Universe
to be roughly equivalent
to the Maximum Consciousness of Our Inflationary Era Universe.

Further,
each cell of E8 Lagrangian Spacetime corresponds to 65,536-dim Cl(16)
which contains 248-dim E8 = 120-dim D8 bivectors +128-dim D8 half-spinors
Human Brain Microtubules 40 microns long have 65,536 Tubulin Dimers



(image adapted from 12biophys.blogspot.com Lecture 11)

and so
can have Bohm Quantum Resonance with Cl(16) Spacetime cells
so that **at any and all Times**
the State of Consciousness of a Human is in exact resonant correspondence with a subset of the cells of E8 Classical Lagrangian Spacetime
Therefore

E8 Lagrangian Spacetime (as a Nambu-Jona-Lasinio Condensate)
is effectively the Spirit World
in which the Human States of Consciousness = Souls exist.

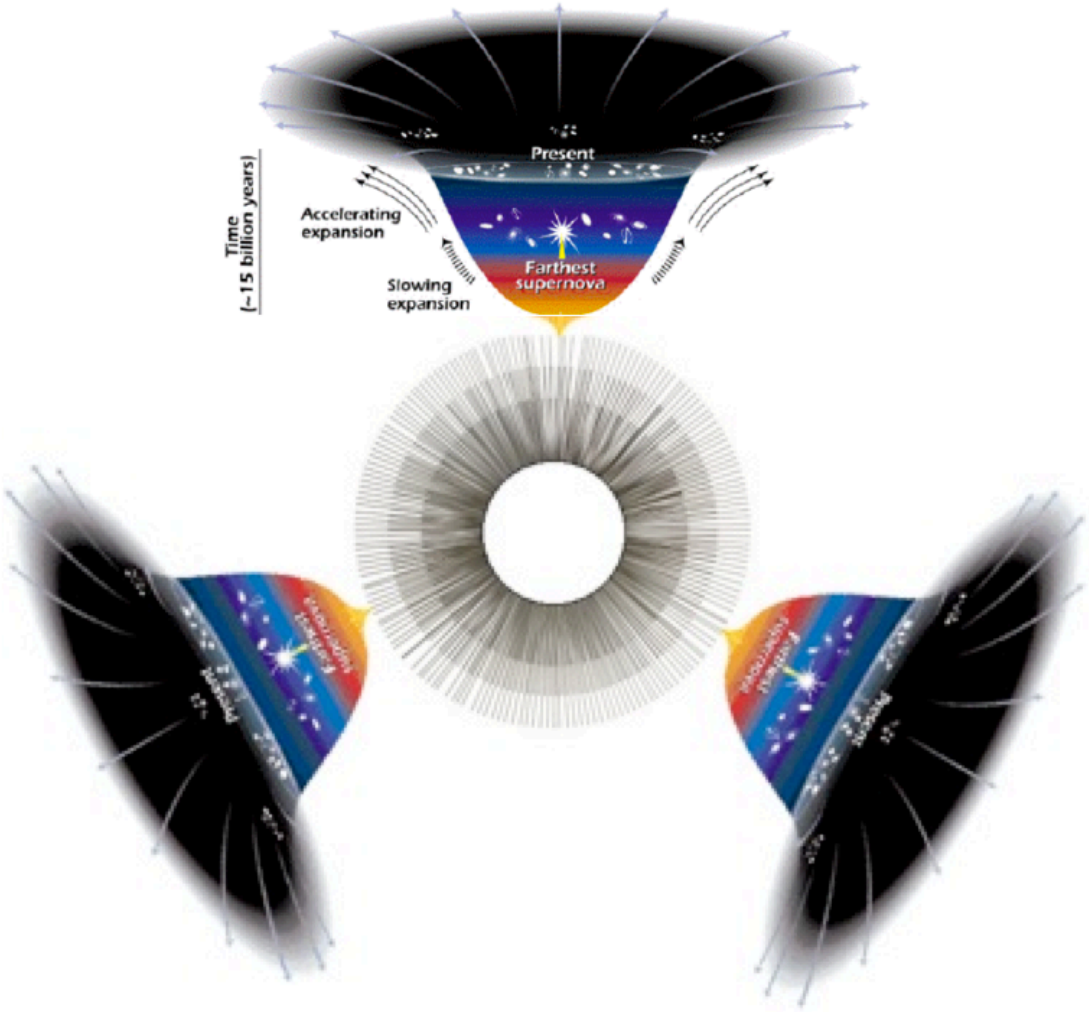
After the death of the Human Physical Body the Spirit World interactions with its Soul
are no longer constrained by Physical World interactions with its Body so that
the Spirit World can harmonize the individual Soul with the collective Universal Soul.

The Third Stage of the Evolution of Our Universe is
Quaternionic Conformal Expansion

The Real Form of E8 representing the physics of Quaternionic Conformal Expansion is E8(-24) with symmetric space E8 / SO*(16)

The Zizzi Inflation phase of Our Universe ends with decoherence "collapse" of the 2^64 Superposition Inflated Universe into Many Worlds of Quantum Theory, only one of which Worlds is our World. The central white circle is the Inflation Era in which everything is in Superposition; the boundary of the central circle marks the decoherence/collapse at the End of Inflation; and each line radiating from the central circle corrresponds to one decohered Universe World. Only one is Our Universe. Since Our Universe World is only a tiny fraction of all the Worlds, it carries only a tiny fraction of the entropy of the 2^64 Superposition Inflated Universe, thus solving Penrose's Puzzle: "... in our universe ... Entropy ... increases ... the low-entropy states in the past are a puzzle. ...".

(Roger Penrose in his book The Emperor's New Mind, pages 316-317)



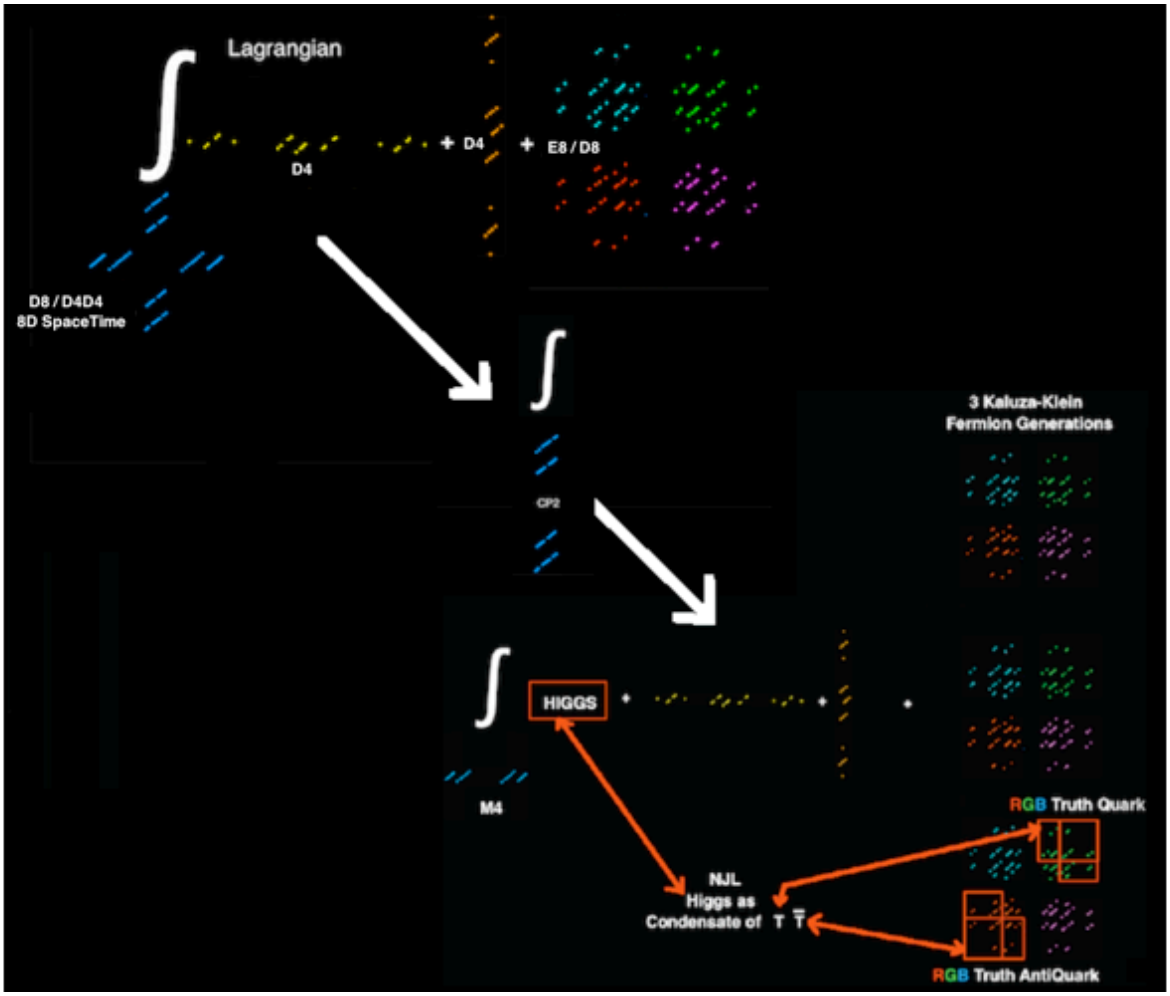
Immediately after the End of Inflation the Consciousness of Our Universe was fragmented into 2^64 Many-Worlds Universes, each of which tries to regain its Conscious Awareness. Only one of them was and is Our Universe.

What does Our Universe do to regain Conscious Awareness ?
Inflation ended with transition from Non-Unitary Octonionic processes to Unitary Quaternionic processes, so Octonionic Lagrangian Density is integrated over CP2 part of M4 x CP2 Kaluza-Klein Spacetime giving:

the present-day Quaternionic Lagrangian to be integrated over Quaternionic M4 ;
3 Generations of Fermions ;

Higgs by Meinhard Mayer's mechanism as Nambu-Jona-Lasinio type system
with 3 mass states for Higgs and Truth Quark ; and

Schwinger Sources, similar to Kerr-Newman Black Holes of radius about 10^(-24) cm,
with Green's Function / Kernel Function geometric structure
of Complex Domains and their Shilov Boundaries
allowing Armand Wyler-type calculation of Particle Masses and Force Strengths



A summary list of Wyler-type calculation results is on the next page:

Results of Calculations:

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

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

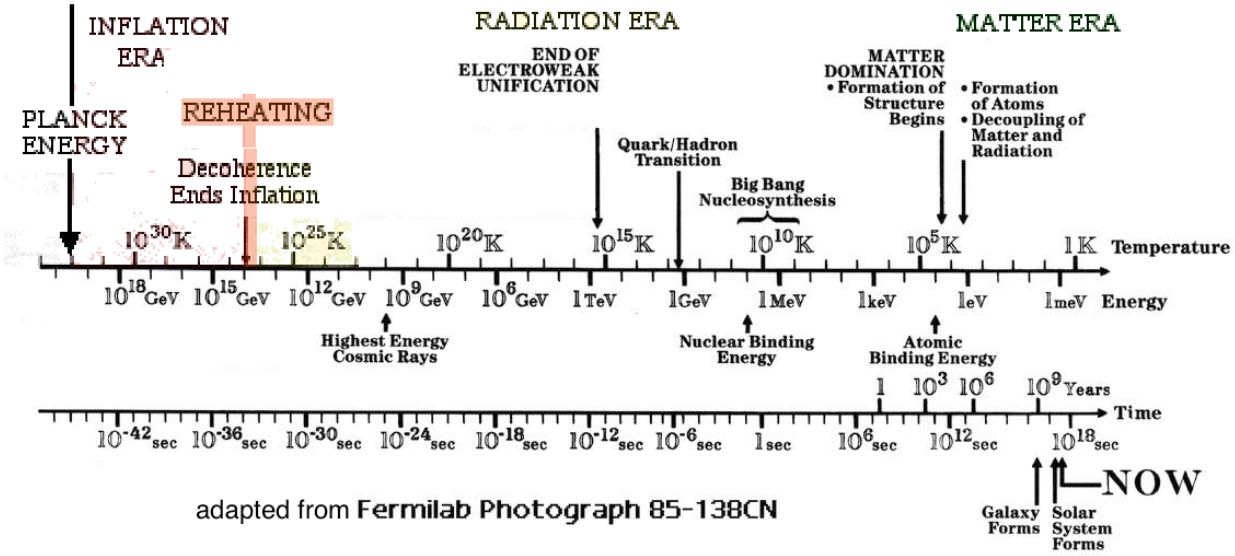
Kobayashi-Maskawa parameters for W+ and W- processes are:

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

The phase angle d13 is taken to be 1 radian.

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

Here is an adaptation of a Fermilab Timetable History of Our Universe:



In this Quaternionic Conformal Expansion Era, after the end of Inflation and Reheating:

during Universe Ages 10^(-44) sec Planck Time to 10^(-34) sec Inflation Era
Conscious Universe as Superposition of 10^19 States

at Universe Age 10^(-34) sec and 10^14 GeV Inflation ends, Radiation Era begins

at Universe Age 10^(-12) sec and 250 GeV Higgs gives mass to Particles

at Universe Age 10^(-6) sec and 1 GeV Quarks combine into Hadrons

at Universe Age 1 sec and 1 MeV Nuclei form

at Universe Age 10^4 years and 10 eV = 10^4 K Atoms form, Matter Era begins

at Universe Age 10^9 years and 10 K Galaxies form

at Universe Age 10^10 years and 1 K Solar Systems form

NOW Human Brain Microtubules with 10^19 Tubulins

The above is obviously a very crude outline. On my web site I have more details about:
Human History at http://valdostamuseum.com/hamsmith/Hist.html
my personal history at http://valdostamuseum.com/hamsmith/TSCV.html
my personal ancestry at http://valdostamuseum.com/hamsmith/TSancestorhistory.pdf

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The 2^64 qubits created by Inflation is roughly 10^19 which is roughly
the number of Quantum Consciousness Tubulins in the Human Brain.
Therefore

the Human Brain Quantum Consciousness has evolved in Our Universe
to be roughly equivalent
to the Maximum Consciousness of Our Inflationary Era Universe.

Each cell of E8 Lagrangian Spacetime corresponds to 65,536-dim Cl(16).
Human Brain Microtubules 40 microns long have 65,536 Tubulin Dimers.
So, **at any and all Times the State of Consciousness of a Human**
is in exact Resonant Correspondence with
a subset of the Cells of E8 Lagrangian Spacetime

and

E8 Lagrangian Spacetime (as a Nambu-Jona-Lasinio Condensate)
is effectively the Spirit World
in which the Human States of Consciousness = Souls exist.
Spirit Souls continue to exist in Our Universe after death of Physical Body.