

Condensate Structure of Higgs and Spacetime

Frank Dodd (Tony) Smith, Jr. - 2017

“... The Nambu Jona-Lasinio model ...

is a theory of Dirac particles with a local 4-fermion interaction and, as such, it belongs to the same class of effective theories as the BCS theory of superconducting metals ...

the Nambu Jona-Lasinio model has very recently been applied to the standard model.

In this application the Higgs meson is a $t\bar{t}$ top quark mass excitation ...”.

(from Nambu Jona-Lasinio Models Applied to Dense Hadronic Matter, by Georges Ripka, in a Workshop on Nuclear Physics, Iguazu Falls, 28 Aug - 1 Sep 1989)

As to the Higgs in the E8 physics model (viXra 1602.0319),

consider a generalized Nambu Jona-Lasinio model in which

the Higgs is a Fermion-AntiFermion condensate. As the most massive fermion,

the Truth Quark - AntiQuark pairs would be so dominant that the Higgs could be

effectively considered as a condensate of Truth Quark - Truth AntiQuark pairs

but the detailed picture would be as a condensate of Fermion - Anti-Fermion pairs

where there are 24 types of Fermions, each Quark coming in color R, G, or B:

E-Neutrino and Electron

Down Quark (R, G, B) and Up Quark (R, G, B)

M-Neutrino and Muon

Strange Quark (R, G, B) and Charm Quark (R, G, B)

T-Neutrino and Tauon

Beauty Quark (R, G, B) and Truth Quark (R, G, B)

so that there are $24 \times 24 = 576$ Fermion-AntiFermion pairs for each Higgs and each Higgs can be in Bohm Quantum Resonance with 24×24 Bohm Quantum String states: dilaton; antisymmetric Planck-cell group; and symmetric Bohm Quantum Potential.

As to Spacetime in the E8 physics model (viXra 1602.0319),

consider a generalized Nambu Jona-Lasinio model in which

8-dim Classical Lagrangian Spacetime is a condensate of Geoffrey Dixon's

64-dim Particle spinor $T = RxCxHxO = \text{Real} \times \text{Complex} \times \text{Quaternion} \times \text{Octonion}$

and its corresponding 64-dim AntiParticle spinor $T\bar{a}$.

The T - $T\bar{a}$ pairs of the condensate form the 128-dim part of E8

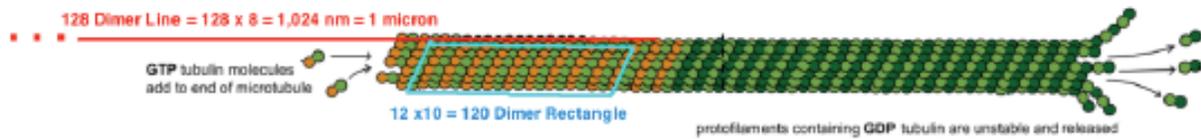
that lives in the $Cl(16)$ Real Clifford Algebra as

$$\mathbf{248\text{-dim E8} = 120\text{-dim bivector D8} + 128\text{-dim half-spinor D8}$$

By Triality, the $D8 / D4 \times D4 = 64\text{-dim}$ part of E8 representing Spacetime is equivalent to T and $T\bar{a}$, with T representing Fermions and $T\bar{a}$ representing AntiFermions.

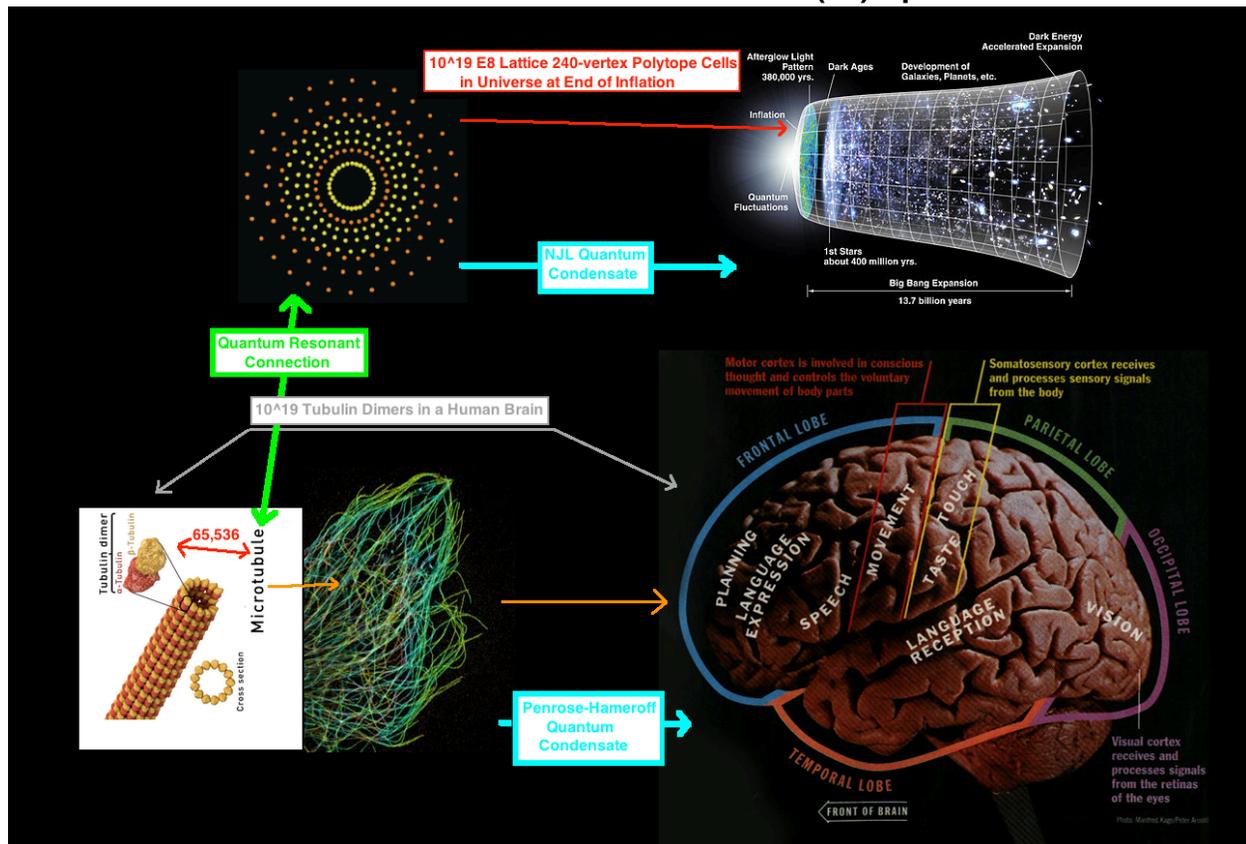
Each cell of E8 Classical Lagrangian Spacetime corresponds to 65,536-dim CI(16) which contains 248-dim E8 = 120-dim D8 bivectors +128-dim D8 half-spinors

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 CI(16) Spacetime cells



(image from Wikipedia and Time)

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 Classical Lagrangian Spacetime NJL 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 by the process of Gehinnom whereby the Soul is prepared for Gan Eden.

Humans (NJL Higgs Mass) have Resonant Interaction with Spirits (NJL E8 Spacetime) through Bohmions of Bohm Quantum Potential

E8-Cl(16) Physics (viXra 1602.0319) gives a realistic model of the workings of psychic / spritual / shamanistic phenomena based on resonant connections between

the information pattern of microbules in the human brain =
= human body

and the information pattern
of a subset of Planck-scale cells of E8-Cl(16) Quantum Spacetime =
= human soul / spirit / part of Universal Consciousness

based on three facts:

1 - the Planck scale unit cell of E8-Cl(16) Quantum Spacetime has 65,536 elements - each is a binary Creation / Annihilation state of the 2^{16} -dim Cl(16) Clifford Algebra - the 248-dim E8 part has Creation / Annihilation generalized Heisenberg Algebra = $H_{92} + A_7$ with graded structure $28 + 64 + (63+1) + 64 + 28$

2 - the number of tubulin dimers in a human maximal 40-micron microtubule is 65,536 - each dimer is a binary Superposition Separation state



(images adapted from nonlocal.com/hbar/microtubules.html by Rhett Savage)

Conformation Electrons Similarly Aligned (left image) - State 0

Conformation Electrons Maximally Separated (right image) - State 1

3 - $2^{65,536}$ (also calculated by Ray) is the VERY LARGE number in the Clifford Algebra sequence:

Start with nothing = Empty Set and form its Clifford Algebra:

Cl(Empty Set) = 0-dim

Then form the Clifford Algebra of that and continue:

Cl(0) = 1-dim

Cl(1) = 2-dim

Cl(2) = 4-dim

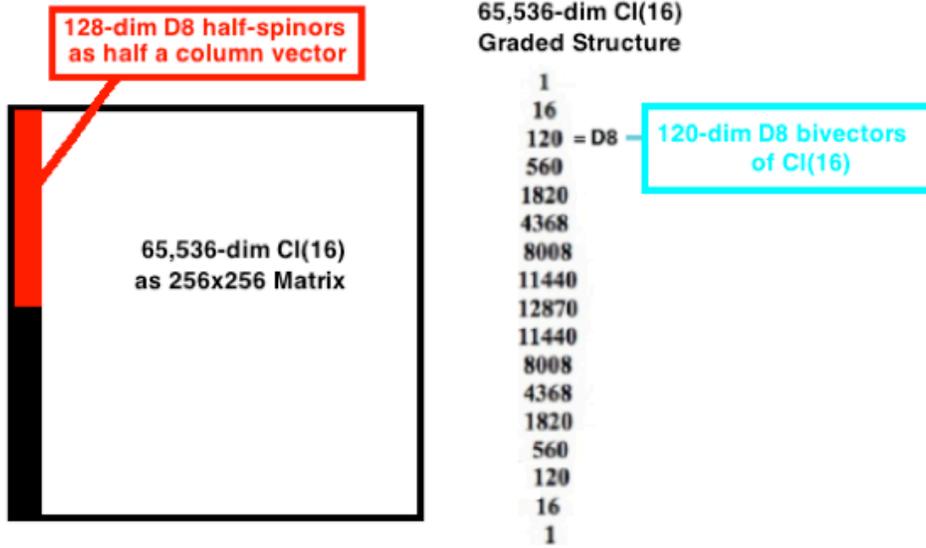
Cl(4) = 16-dim

Cl(16) = 65,536-dim

Cl(65,536) = $2^{65,536}$ -dim = MUCH larger than the number of particles in Universe.

How do the Cl(16) Creation/Annihilation states Resonate with the Dimer Superposition Separation States ?

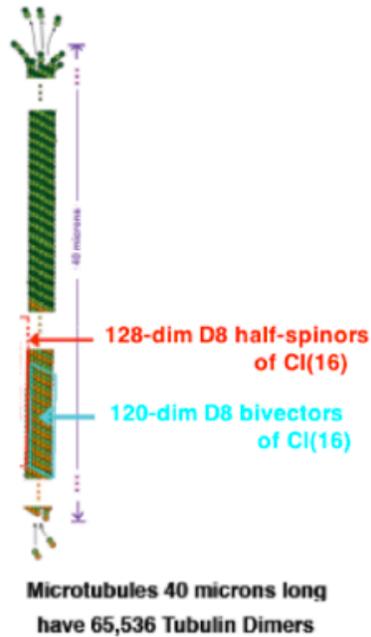
Resonance between Cl(16) Creation/Annihilation states



that live in 26D String Theory Cl(1,25) Planck-Scale Cells

and

Dimer Superposition Separation States



that live in Human Cells such as Brain Neurons

is based on Quanta of the Bohm Quantum Potential

Bohm Quantum Potential is based on

World-Lines = Strings and 26-dim String Theory

Green, Schwartz, and Witten say in their book "Superstring Theory" vol. 1 (Cambridge 1986) "... For the ... closed ... bosonic string [26D String Theory that is NOT supersymmetric] 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 2 state = Bohmion = Carrier of the Bohm Force of the Bohm Quantum Potential.

Dimer Superposition Separation States

Consider the Superposition of States State 0 and State 1 involving one Tubulin Dimer



with Conformation Electron mass m and State1 / State 0 position separation a .
The Superposition Separation Energy Difference (SSEDIFF) is the internal energy

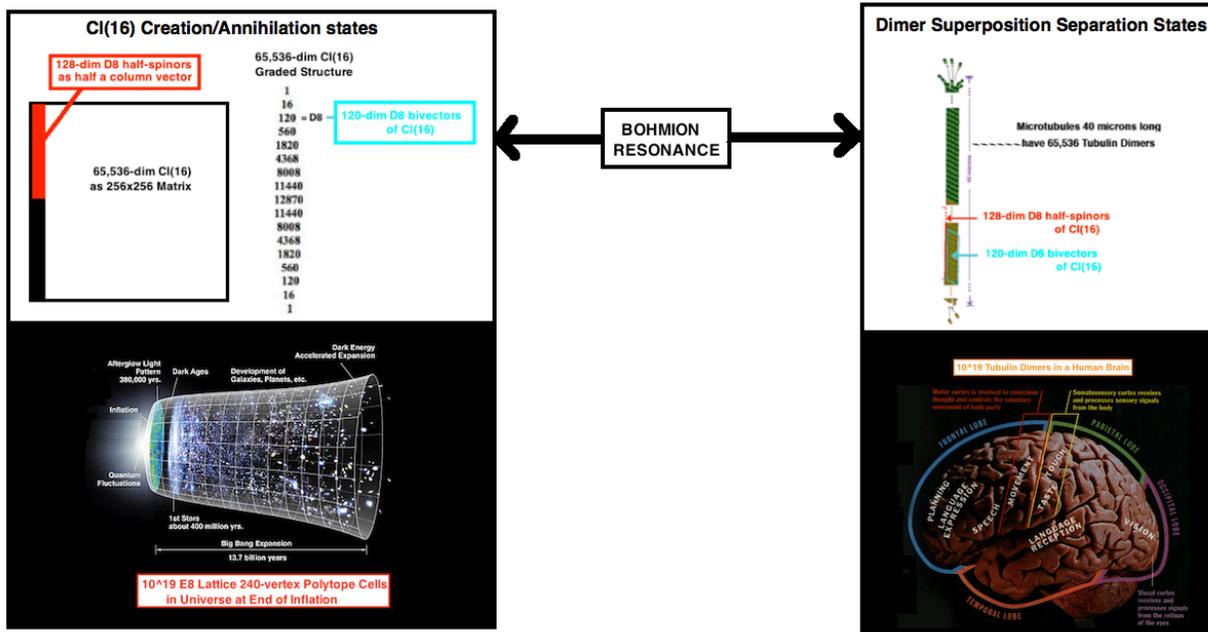
$$E_{ssediff} = G m^2 / a$$

The Bohmion carrier of the Bohm Quantum Potential being massless spin 2 it acts with respect to the SSEDIFF as a spin 2 graviton would act, seeing its energy as Bohm Quantum Potential internal energy.

CI(16) Creation/Annihilation states

The Bohmion carrier of the Bohm Quantum Potential acts on the CI(16) Creation-Annihilation Operators of E8 Physics as Bohm Quantum Operators. The CI(16) Bohm Quantum Creation / Annihilation Operators are represented by the E8 Maximal Contraction generalized Heisenberg Algebra $h_{92} \times A_7 = 28 + 64 + ((SL(8,R)+1) + 64 + 28$

**Bohmions mediate Resonance between
Planck-scale CI(1,25) cells of E8-CI(16) Quantum Spacetime
and
Microtubule Quantum Consciousness Patterns in the human brain**



Dennis, de Gosson, and Hiley (arXiv 1412.5133) say

**“... Bohm’s Quantum Potential
can be viewed as an internal energy of a quantum system ...”**

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 ...".**

Therefore:

Resonant Connections can exist among Spatially Distant Elements.

How does an Element find a Spatially Distant Resonant Connection Element ?

Feynman's Path Integral formulation of Quantum Theory shows that the amplitude for any Real Quantum Path from state A to state B is the sum the amplitudes of All Virtual Possible Paths from A to B.

Therefore,

Virtual Bohmions must connect the Initial Element A

to each and every Intermediate Element on each and every Virtual Path from A to B and

the Initial Element must Virtually see every other Element in Our Universe

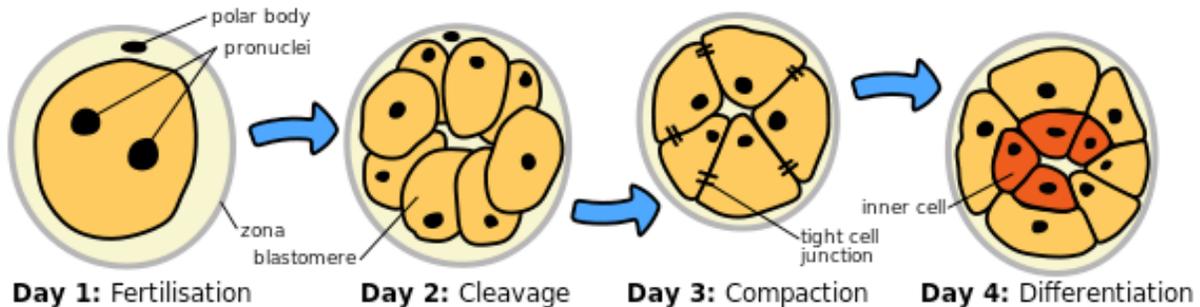
and be able to evaluate (effectively instantaneously) whether or not it is Resonant.

If ANY other Element (no matter how distant) is Resonant with the Initial Element, a Resonant Connection is established, effectively instantaneously.

Some properties of Resonance are discussed (from the point of view of electromagnetic interactions) by Carver Mead in his book Collective Electrodynamics (MIT 2000): "... Any energy leaving one resonator is transferred to some other resonator, somewhere in the universe. ... With the two resonators coupled, the energy shifts back and forth between the two resonators in such a way that the total energy is constant ... The conservation of energy holds despite an arbitrary separation between the resonators; it is a direct result of the symmetry of the advanced and retarded potentials. There is no energy "in transit" between them. ... the universe contains a truly enormous number of resonators ...".

Is there a Resonant Copy of You in the Planck-scale Cells of Spacetime ?

When You were conceived You were a Single Cell whose Microtubules could resonate



(image from Wikipedia on Human_embryogenesis)

with a corresponding Resonant Set of Planck-scale Cells of Spacetime.

Then Your Single Cell divide by mitosis into 2 cells and your Resonant Cell also divides.

After 2 more divisions You and your Resonant Set have cleaved into 8 similar Cells.

When the cells divide into 16, cleavage continues as cellular differentiation.

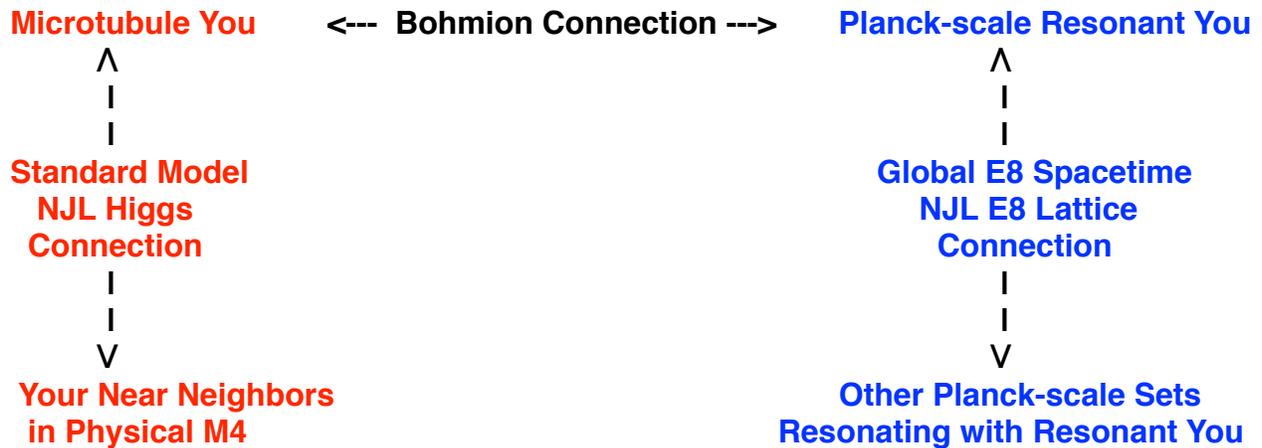
8 cells represent the CI(8) level of information,

$2^8 = 256$ only on the order of 248-dim E8, so all cells are similar.

16 cells represent the CI(16) level of information,

$2^{16} = 65,536$ much more than the 248 of E8, so there is enough information for differentiation.

**Your growth is mirrored
in a corresponding Resonant Set of Planck-scale Spacetime Cells.**

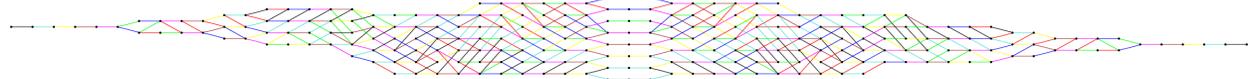


The Higgs NJL Condensate mediating the Connection between You and Your Neighbors is Short-Range as it does not extend much beyond the scale of the Standard Model Fermions and Bosons to which the Higgs mechanism gives mass. Therefore, You may get a lot of detailed information from Your Near Neighbors, but You will not get much information from Neighbors that are Distant in Space or Time.

The E8 Spacetime NJL Condensate mediating between Your Resonant Set and Other E8 Resonant Sets is Long-Range as it extends throughout E8 Spacetime of Our Universe. D8 brane Spacetime has Planck-scale Lattice Structure superposition of 8 E8 Lattices:



As aimath.org/E8/e8graphinfo.html states: "... Crystal Graph for E8 ...



... This is a picture of the 248-dimensional Lie algebra of E_8 There are 248 nodes in the picture, one for each basis element of the Lie algebra. ... The Lie algebra of E_8 is generated by 8 pairs of elements (X, Y) , one pair for each of the colored nodes in the Dynkin diagram. ...".

Since the E8 Spacetime lattices extend throughout Our Universe, Your Resonant Set is a part of an NJL Condensate that is connected by E8 lattices to ALL Resonant Sets in Our Universe, and can be in Resonant Connection with ANY of them.

For example, if Beethoven's Opus 131 14th String Quartet is in Your Consciousness, then Your Spirit Resonant Set can make Resonant E8 lattice Connection with the Spirit Resonant Set of Beethoven, and then by Bohmion Connection, Beethoven's Spirit can have Resonant Connection with You.

Here is an overview of the Fundamental Structure of my E8 Physics model:

**Fundamental TOE = Algebraic Quantum Field Theory (AQFT) =
 = Completion of the Union of All Tensor Products of $Cl(1,25)$**
 (generalization of hyperfinite II1 von Neumann factor fermionic fock space)

$Cl(1,25)$ = Real Clifford Algebra of Lorentz Leech Lattice of 26D String Theory =

(Strings = World-Lines gives Bohm Quantum Potential and Bohmions)

(26D String Theory corresponds to traceless 3x3 Hermitian octonion matrices:

$$\begin{matrix} a & Y & X \\ Y^* & b & Z \\ X^* & Z^* & c \end{matrix}$$

which form $J(3,0)_o$ = traceless part of 27-dim Jordan Algebra $J(3,o)$.

X, Y, Z are 8-dim octonions, * is conjugation, and a, b, c are real numbers.

the octonion X determines a position in 8-dim spacetime;

the octonion Y determines an identity as a fermion particle;

the octonion Z determines an identity as a fermion antiparticle.)

= $M(2,Cl(0,24))$ = 2x2 Matrices of Clifford Algebra of 24D Leech Lattice

(2x2 matrices of Linear Fractional Conformal Mobius structures)

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

(8-Periodicity tensor product of $Cl(0,8)$)

(Leech Lattice as 3 copies of E8 Lattice - shown by Dixon)

$Cl(0,16)$ contains E8 as 120-dim D8 BiVectors + 128-dim D8 half-spinors

E8 contains recipe for Local Lagrangian

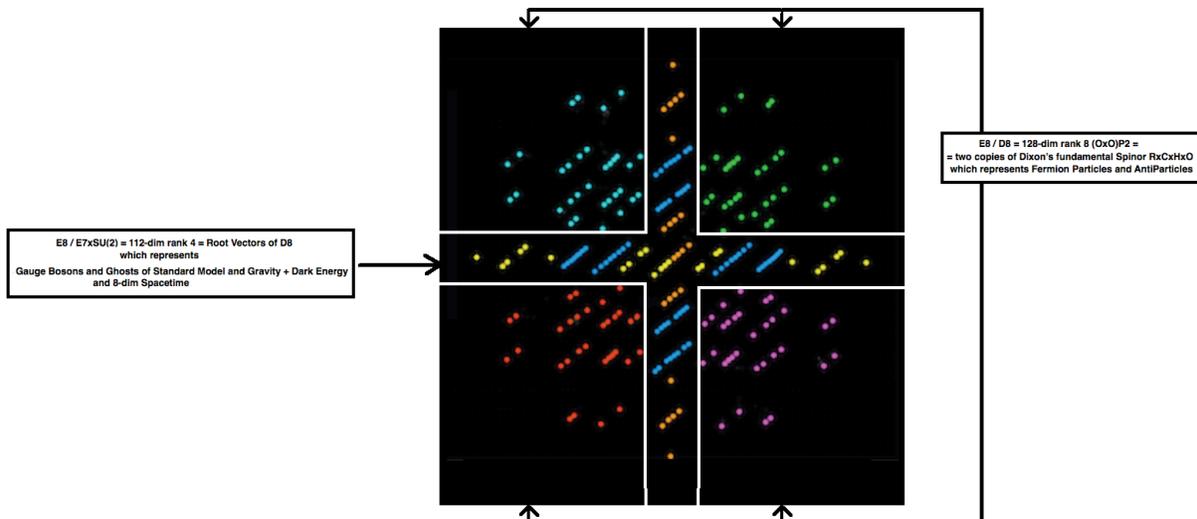
of Standard Model and Gravity + Dark Energy

240 Root Vectors of E8 are represented by two Symmetric Spaces:

$E8 / D8 = 128$ -dim rank 8 $(OxO)P2 =$

= two copies of Dixon's fundamental Spinor $RxCxHxO$

which represents Fermion Particles and AntiParticles



$E8 / E7 \times SU(2) = 112$ -dim rank 4 = Root Vectors of D8

which represents 8-dim Spacetime and

Gauge Bosons and Ghosts of Standard Model and Gravity + Dark Energy