

African Origins

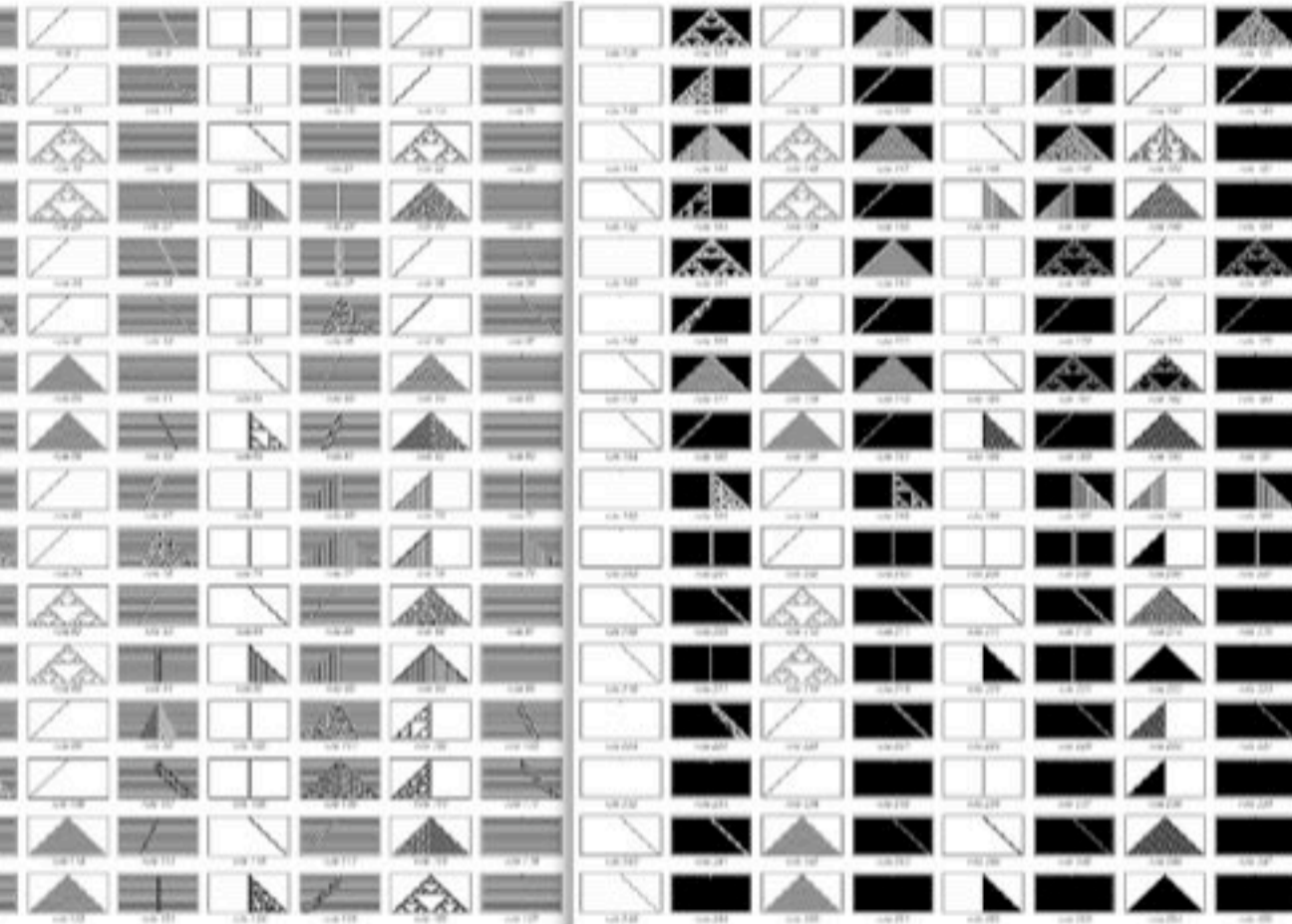


Africans developed IFA Oracle divination based on the square of 16 = 16x16 = 256 = 2⁸ corresponding to the vertices of an 8-dimensional hypercube and to the binary 2-choice Clifford algebra Cl(8) and so to related ones such as Cl(8) x Cl(8) = Cl(16).

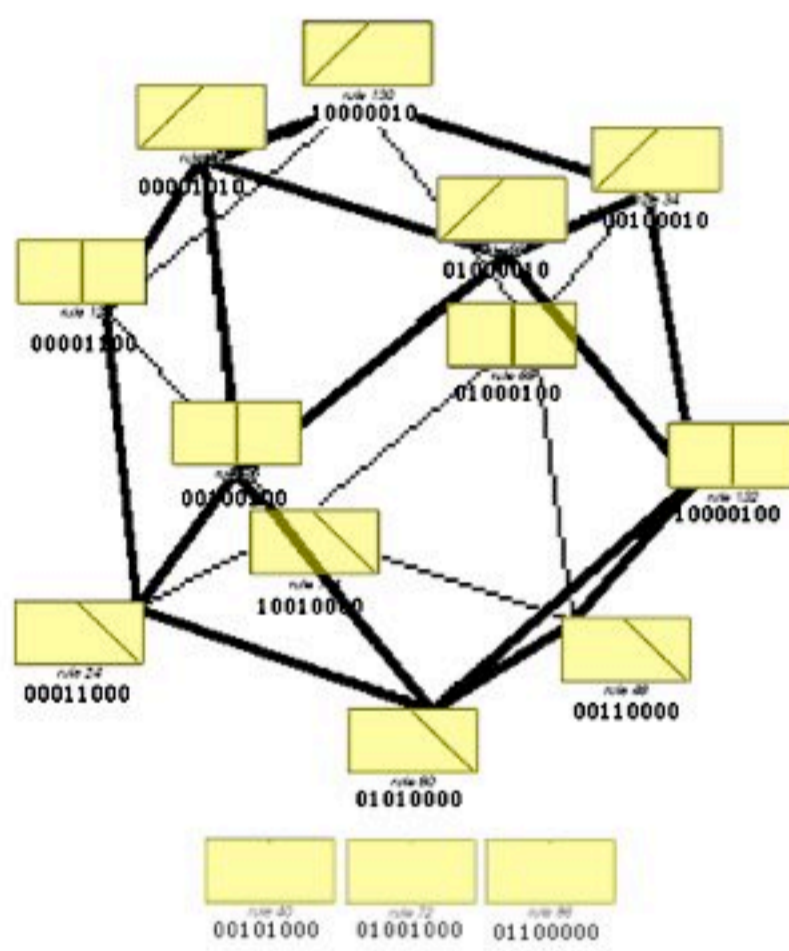
Since the number of sub-hypercubes in an 8-dimensional hypercube is 6,561 = 81x81 = 3⁸, the IFA Oracle has N=8 ternary 3-structure as well as binary 2-structure:

N	2 ^N	3 ^N
0	1	1
1	2	3
2	4 = 2x2	9 = 3x3
3	8	27
4	16 = 4x4	81 = 9x9
5	32	243
6	64 = 8x8	729 = 27x27
7	128	2187
8	256 = 16x16	6561 = 81x81

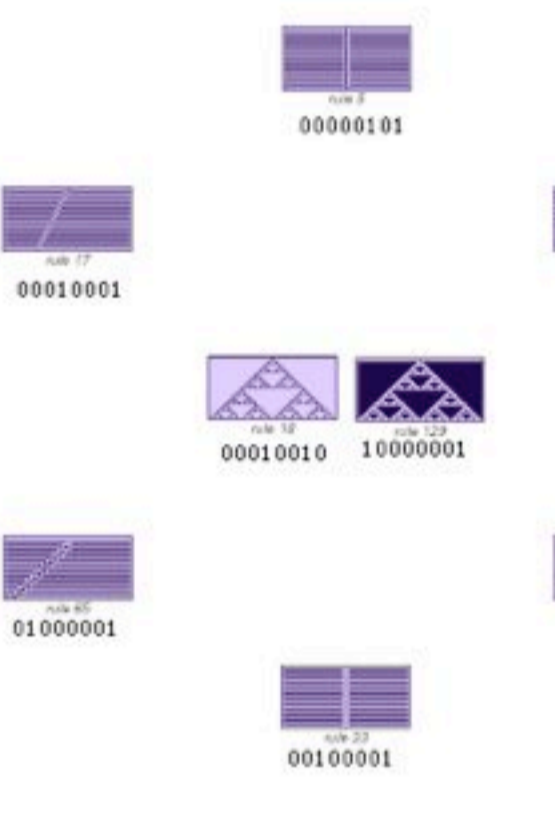
As ancient African games such as Oware show, binary 2-structure corresponds to static states and ternary 3-structure corresponds to dynamic states. Mathematically, using binary 2-choice static states to define dynamics on 3 ternary neighbor states produces the 256 Elementary Cellular Automata:



15 of the elements represent Conformal Spin(2,4) of Gravity:

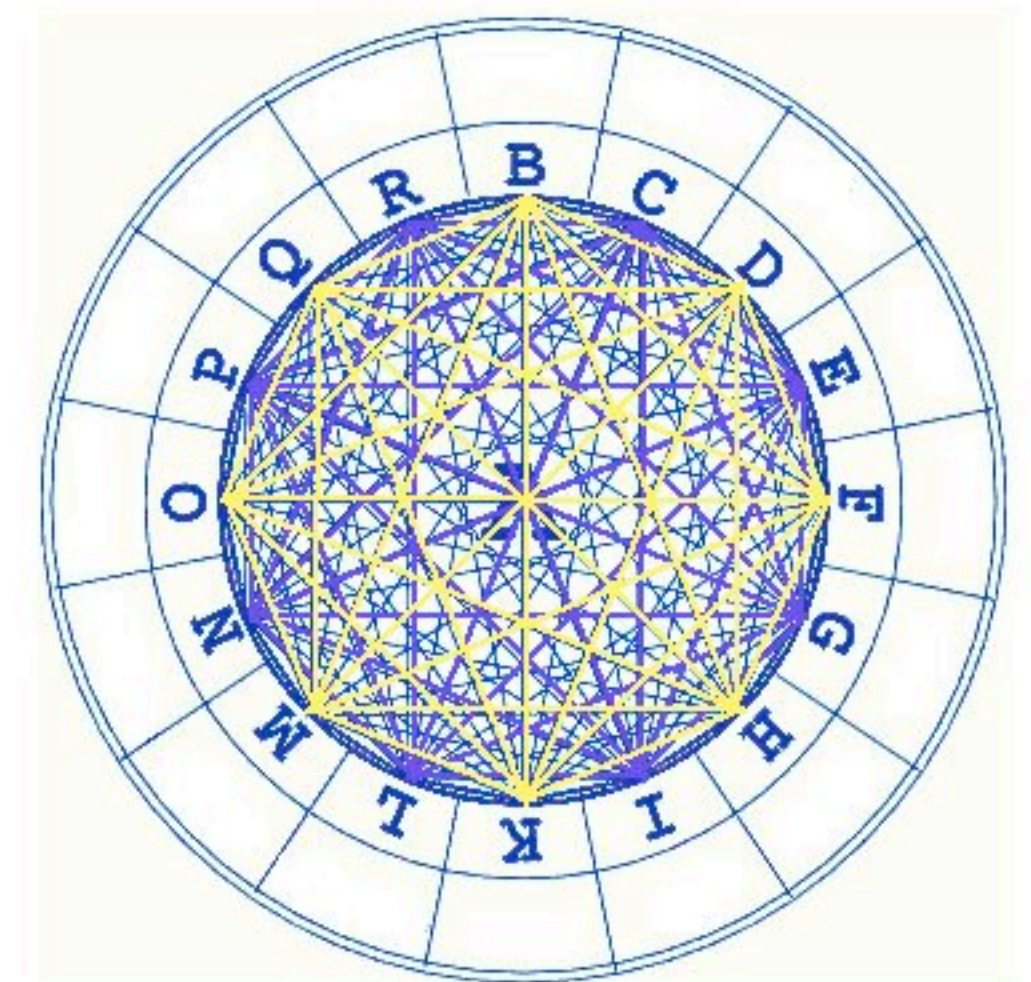
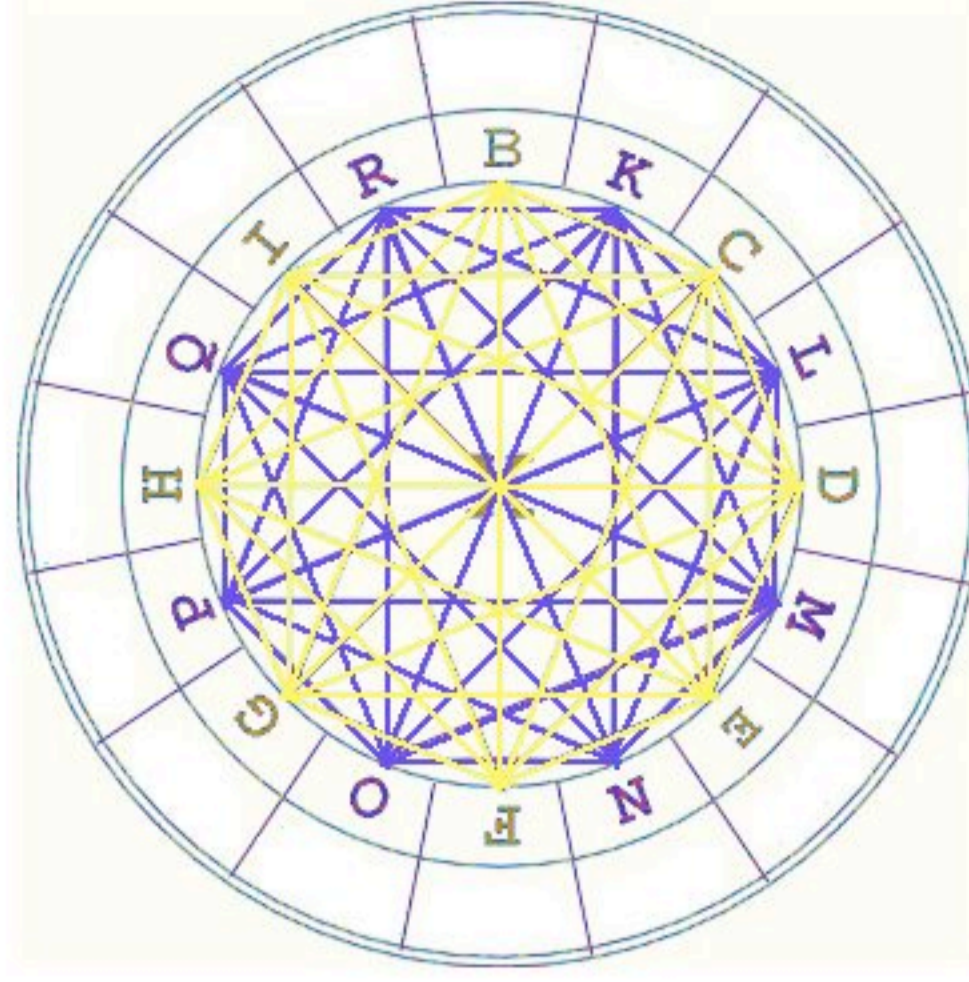


8 of the elements represent the SU(3) Color Force:



Hispanic Development

Ramon Llull (1232-1316) of Mallorca studied the 16 possibilities of the Ilm al Raml, which are derived from 16 of the 16x16 = 256-element African IFA divination system, and found a structure that he summarized in Wheel Diagrams with 16 vertices connected to each other by lines and in Cubic 4x4x4 = square 8x8 = 64-element Elemental Figures (Images adapted from lullianarts.net web site):



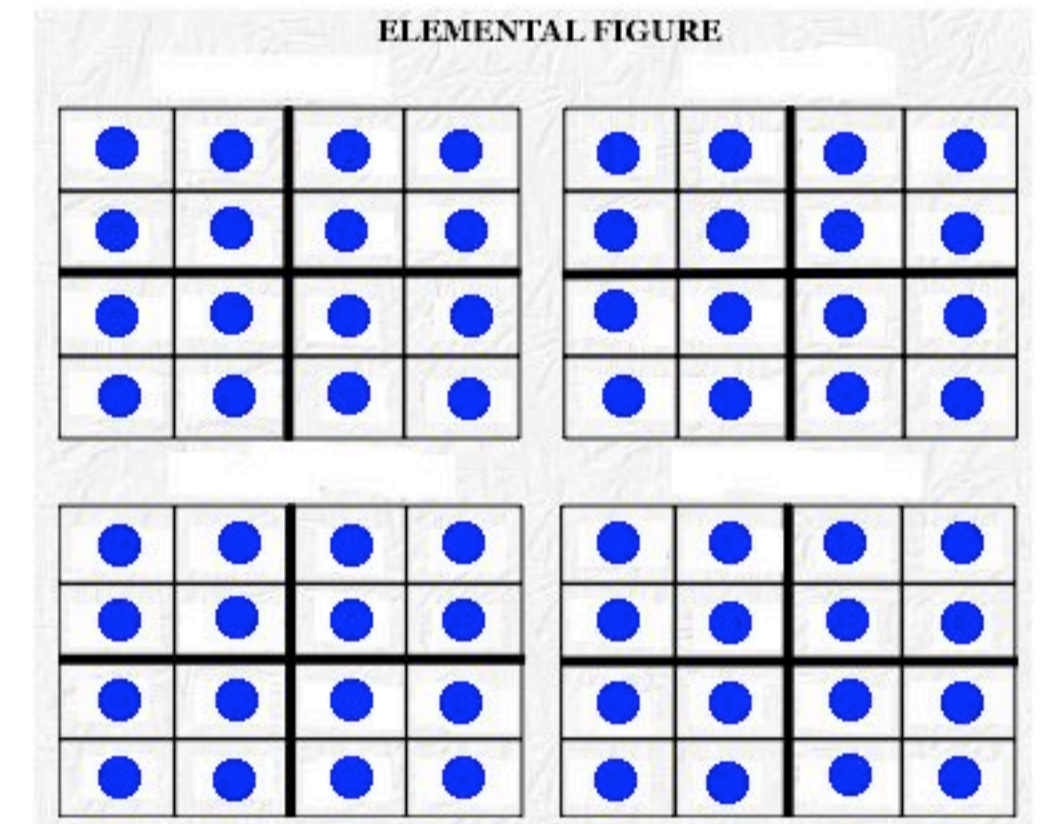
The 28 gold lines (gold 8-HyperCube points) represent Gravity and the 28 purple lines (purple 8-HyperCube points) represent the Standard Model.

Adding in 64 blue lines (blue 8-HyperCube points without white dots) gives 120 lines that represent the Spin(16) BIVector Lie Algebra of the Clifford Algebra Cl(16) = Cl(8) x Cl(8):

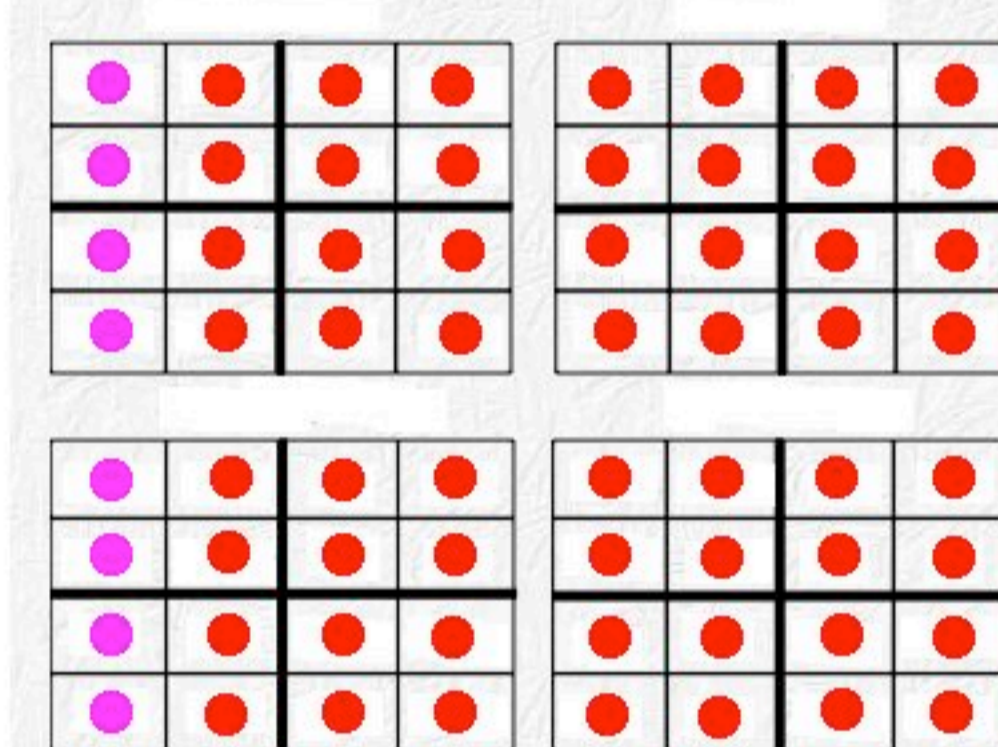
The 64 blue lines, and the 64 pure blue 8-HyperCube points, represent 8-dimensional Kaluza-Klein Vector SpaceTime and can be shown as a 64-element Elemental Figure.

By Triality Automorphisms, the 8+56 = 64-element magenta and red 8-HyperCube points that represent 8 Fermion Particles can also be shown as a 64-element Elemental Figure and the 8+56 = 64-element cyan and green 8-HyperCube points that represent 8 Fermion AntiParticles can also be shown as a 64-element Elemental Figure.

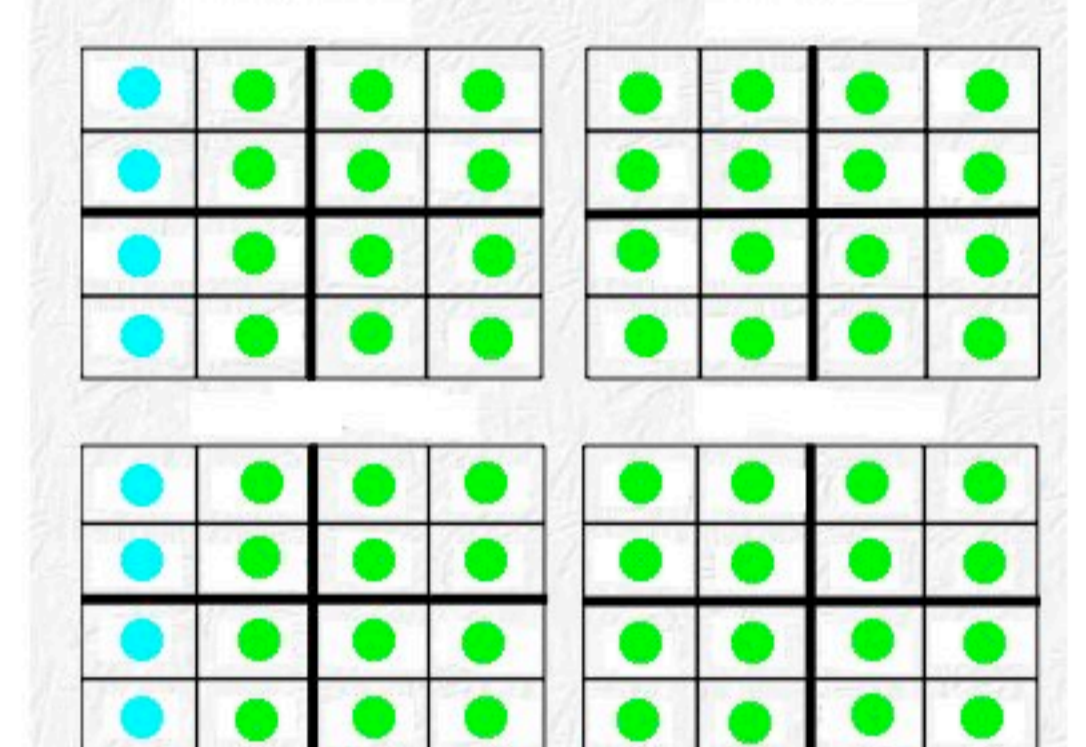
The 64 red-magenta Fermion Particle elements plus the 64 green-cyan Fermion AntiParticle elements form the 128 elements of one Half-Spinor representation of Spin(16).



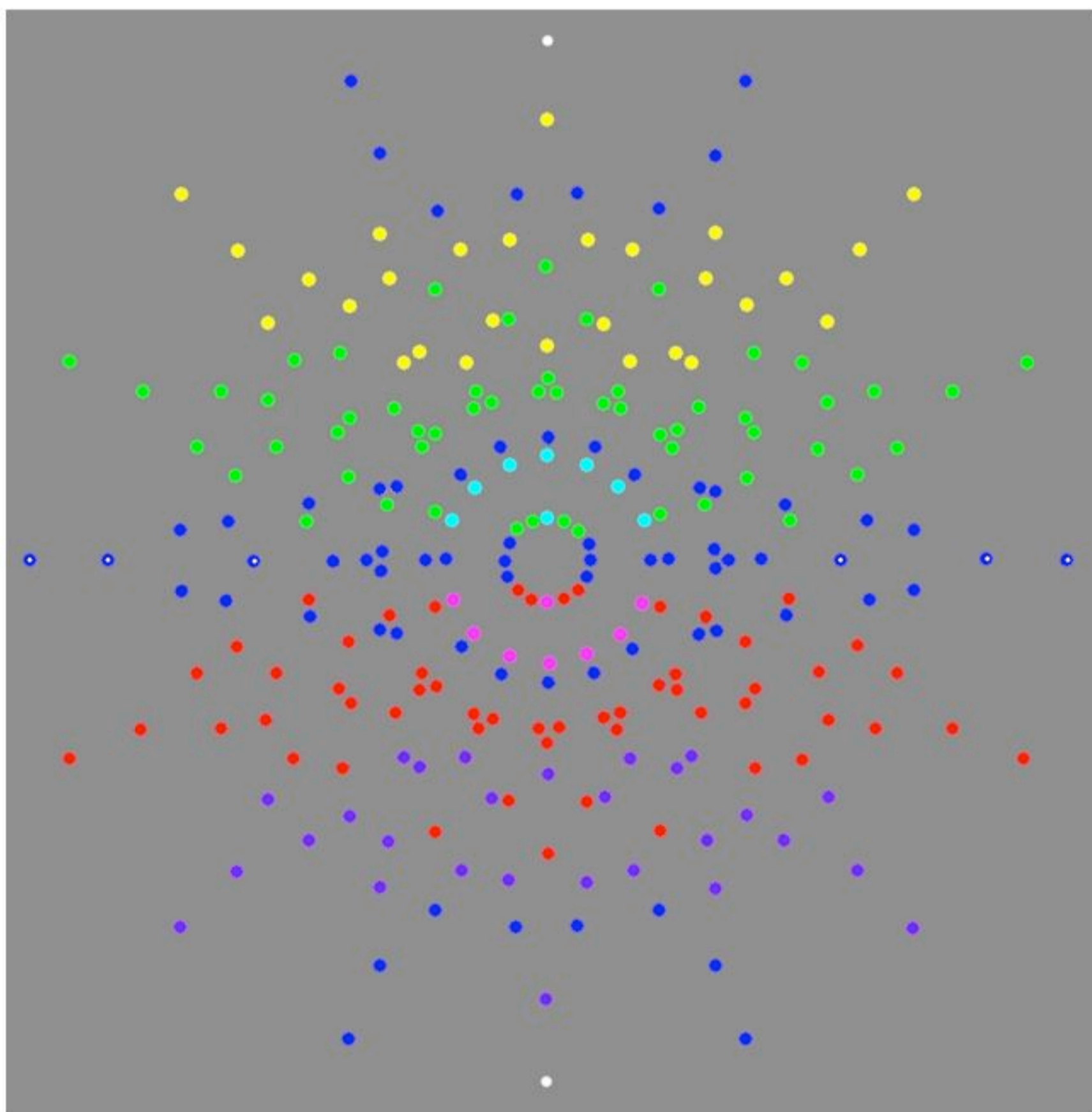
ELEMENTAL FIGURE



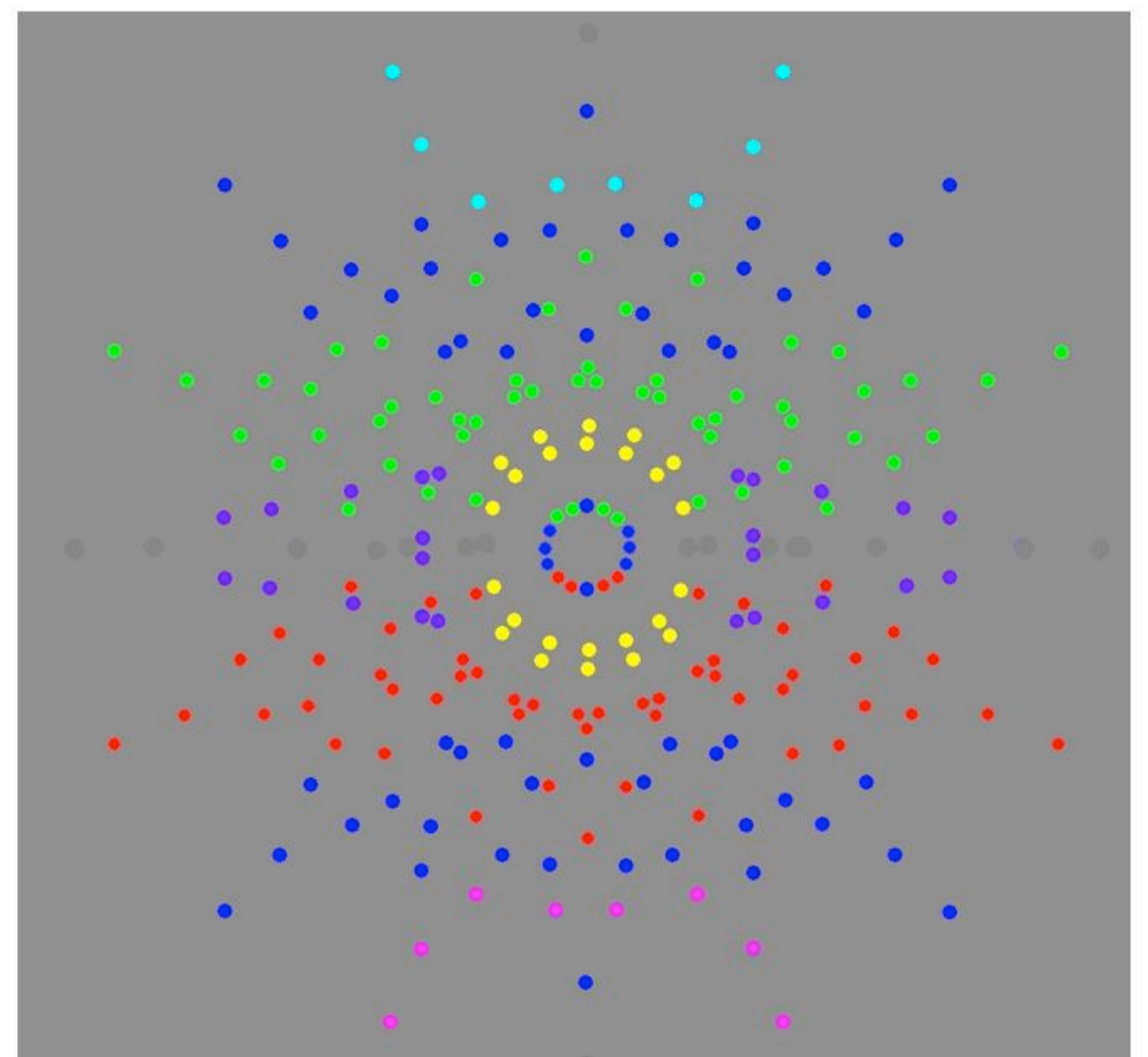
ELEMENTAL FIGURE



The 120 elements of the Spin(16) BIVector Lie Algebra plus the 128 elements of a Half-Spinor representation of Spin(16), both of which live in the Clifford Algebra Cl(16) = Cl(8) x Cl(8), combine to form the 120+128 = 248-dimensional E8 Lie Algebra:



$$8\text{-HyperCube} = 256 \text{ vertices} = 1 + 8 + 28 + 56 + (8+48) + (3+3) + 56 + 28 + 8 + 1$$



$$E8 \text{ Lie Algebra} = 120+128 = 248 \text{ vertices} = 8 + 28 + 56 + (28+8+28) + 56 + 28 + 8$$

E8 Physics

The resulting E8 Physics Model has:

EPR structure similar to that of Joy Christian;

E8 structure modified from that of Garrett Lisi;

Cl(16) = Cl(8) x Cl(8) Clifford Algebra structure anticipated by Ramon Llull;

Higgs mechanism produced by formation of M4 x CP2 spacetime as shown by work of Meinhard Mayer;

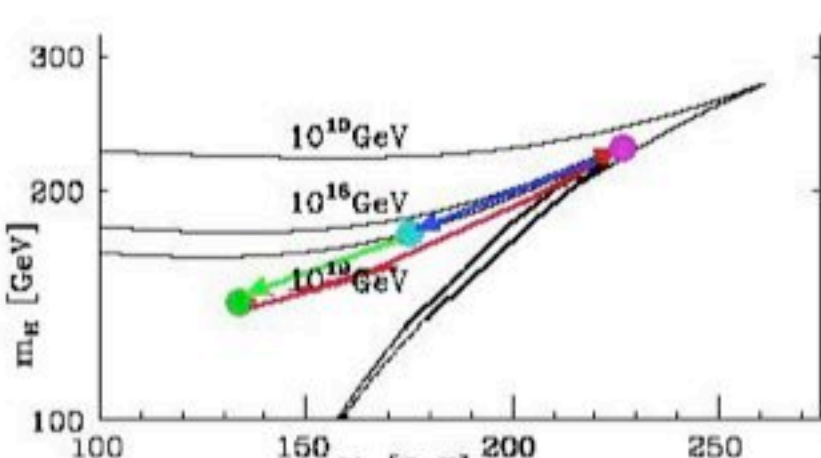
Standard Model Gauge Groups produced therein as shown by work of N. A. Batakis;

Conformal Gravity produced as in the MacDowell-Mansouri mechanism;

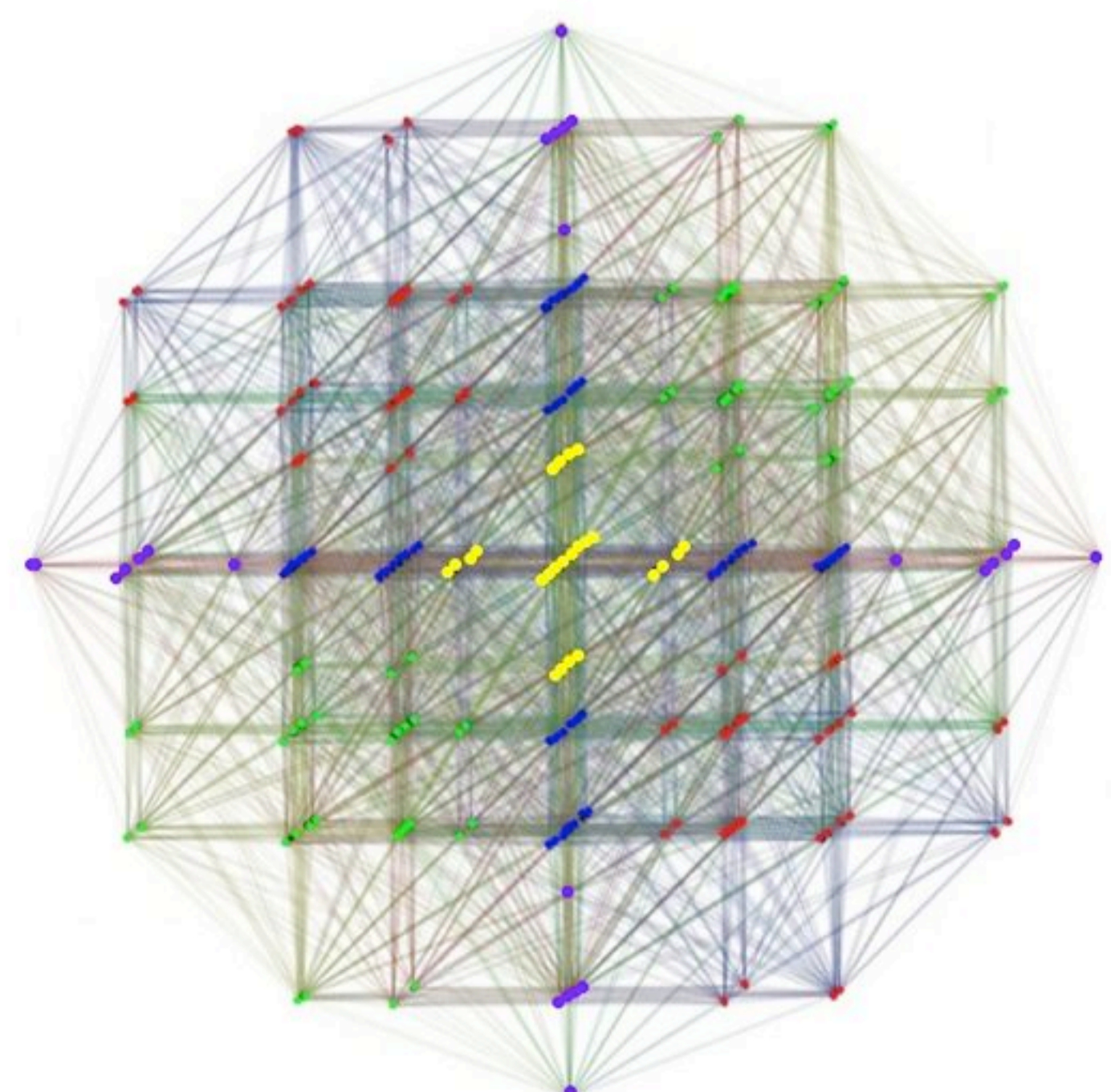
Dark Energy : Dark Matter : Ordinary Matter ratio 75 : 21 : 4 produced by conformal structures similar to those of Irving Ezra Segal;

Force Strength and Particle Mass calculations done using the Work of Hua Luogeng, particularly work on the Geometry of Complex Domains;

T-quark composite Higgs model based on the work of Yamawaki et al, resulting in a 3-state T-quark - Higgs system;



and Algebraic Quantum Field Theory (AQFT) constructed from a Clifford Real-Periodicity-8 hyperfinite II1 von Neumann algebra factor.



$$E8 \text{ Root Vectors} = 112+128 = 240 = 8 + 28 + 56 + (24+8+24) + 56 + 28 + 8$$