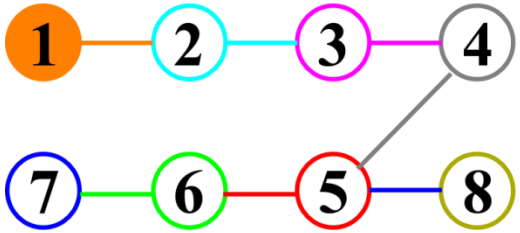
Constructing an E8 Based Standard Model (SM)

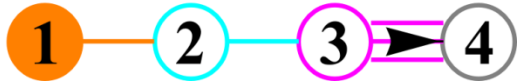
An approach to a
Theory of Everything (ToE)

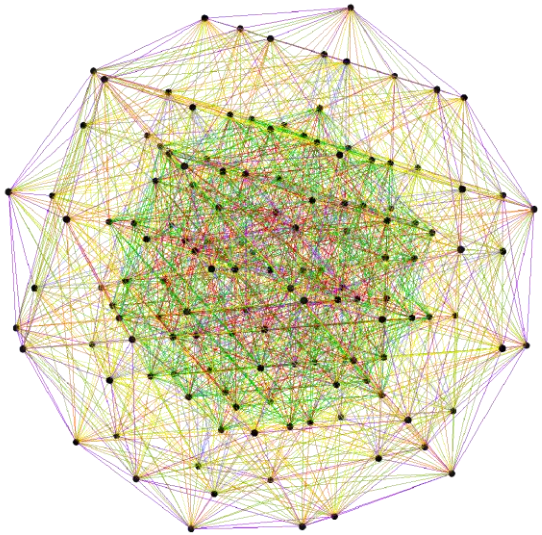
J Gregory Moxness

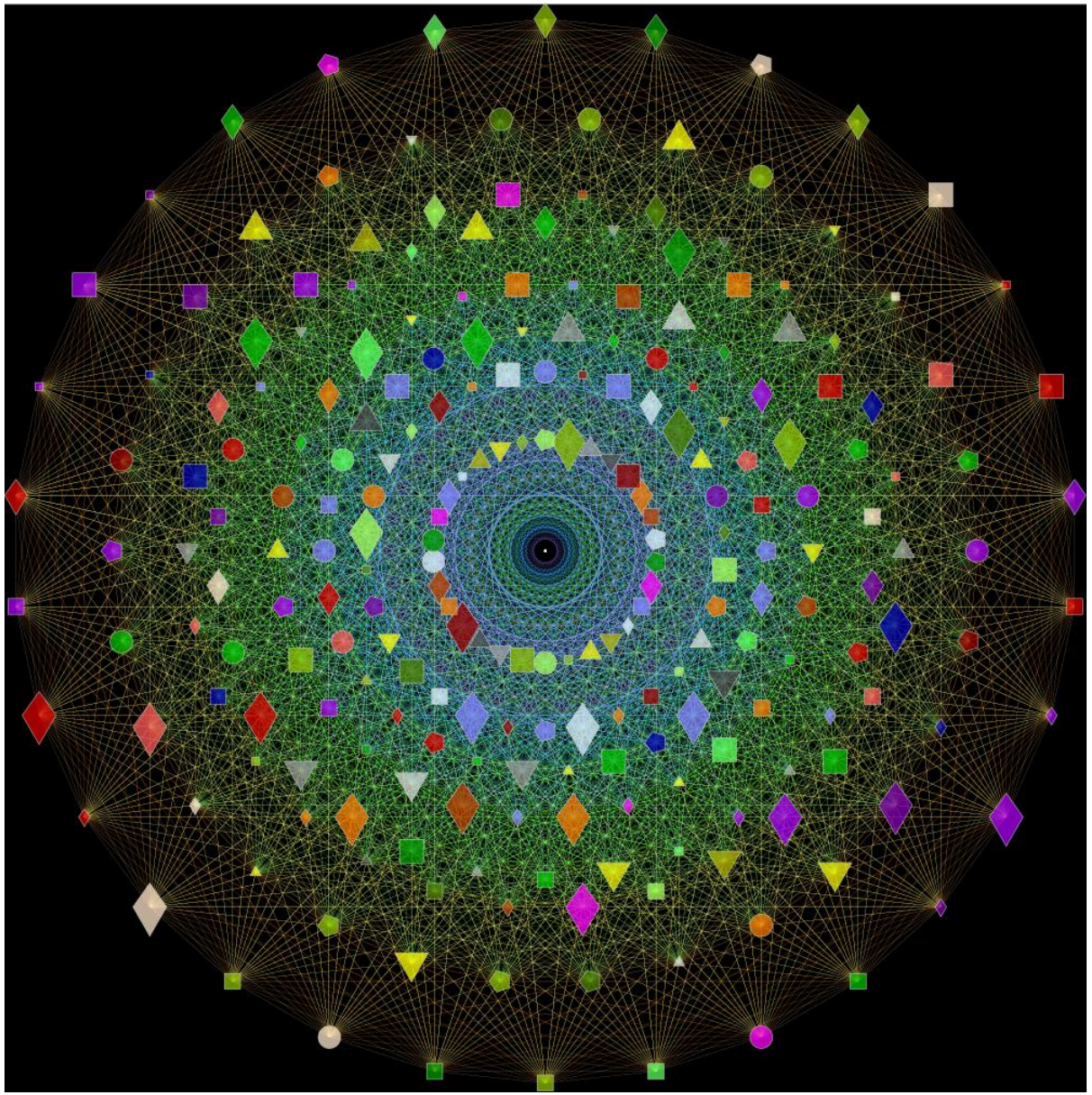
E8 Petrie Projection and H4+H4ϕ



H4







Golden Ratio ($\Phi^n = f_n\Phi + f_{n-1}$)

Fibonacci Sequence (f_n)

Point.....{1,1,2,3,5,8,13,21,34,...}
T(ime)...{1,1},
Length...{1,2,1},
P(arity)...{1,3,3,1},
C(harge)..{1,4,6,4,1},
Mass....{1,5,10,10,5,1},
Space.{1,6,15,20,15,6,1},
CP.....{1,7,21,35,35,21,7,1},
CPT...{1,8,28,56,70,56,28,8,1}

A1=BC1
(2 int./2 vertices- rank n 0's and 1's)

Pascal Triangle

Dimension or Rank n
(2n excluded generator vertices)

x(right) & anti-x(left)

BC8=8-demicube
(128 int./2 vertices = 16 Hamming + 112)

C8s=D8
(112 odd vertices)

$2^8=256=128+112+8+8$

E8
(240 vertices)

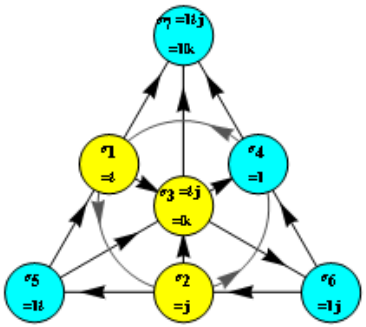
{Real,Complex,Quaternion, Octonion}
Cayley-Dickson doubling
1 Subsets[Range@7,{0}]
7 Subsets[Range@7,{1}]
21 Subsets[Range@7,{2}]
35 Subsets[Range@7,{3}]
480=16*30 sets of 7 (of 35) triples that cover 21 pairs

Permutations[{1,1,1,1,1,1,1,-1/2]
Permutations[{1,1,1,1,1,1,0,0} -1/2]
Permutations[{1,1,1,1,1,0,0,0} -1/2]
Permutations[{1,1,1,1,0,0,0,0} -1/2]
Permutations[{1,1,1,0,0,0,0,0} -1/2]
Permutations[{1,0,0,0,0,0,0,0}]
Permutations[{0,0,0,0,0,0,0,0} -1/2]

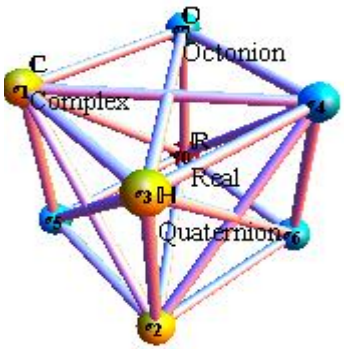
Excluded(**Dim**+AntiDim)

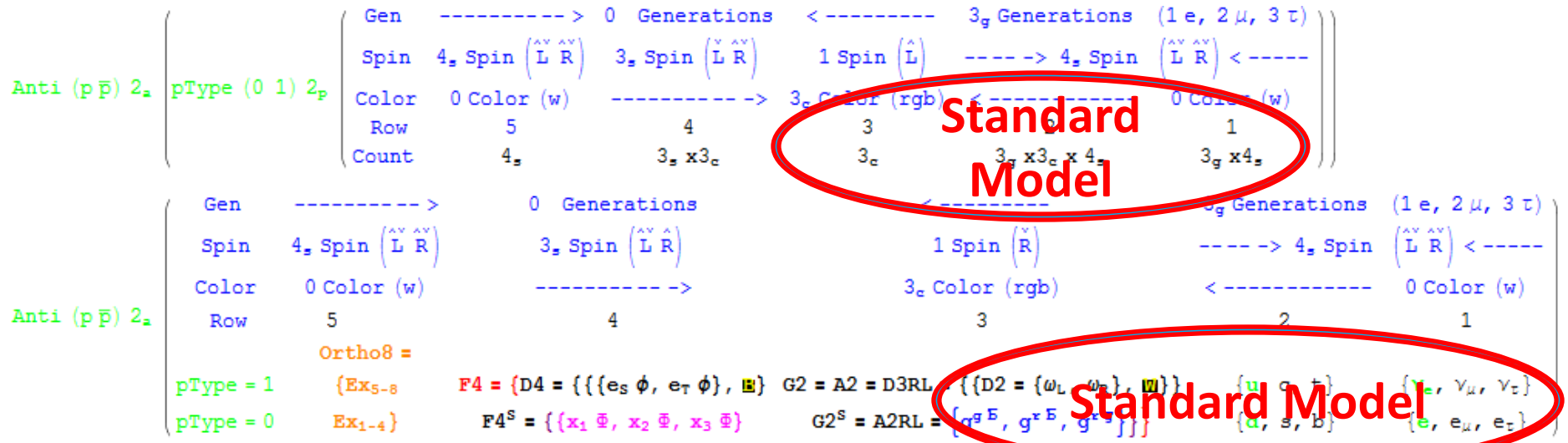
Binary 1:1 w/
Permutations[{1,1,0,0,0,0,0,0}]
Permutations[{0,0,0,0,0,0,-1,-1}]
&
Permutations[{1,0,0,0,0,0,0,-1}]

Fano plane



Fano cube





The Algorithms and Resulting Symmetries

Note: For a more detailed explanation of new particle notation, this model is a modification of: http://arxiv.org/abs/0711.0770.

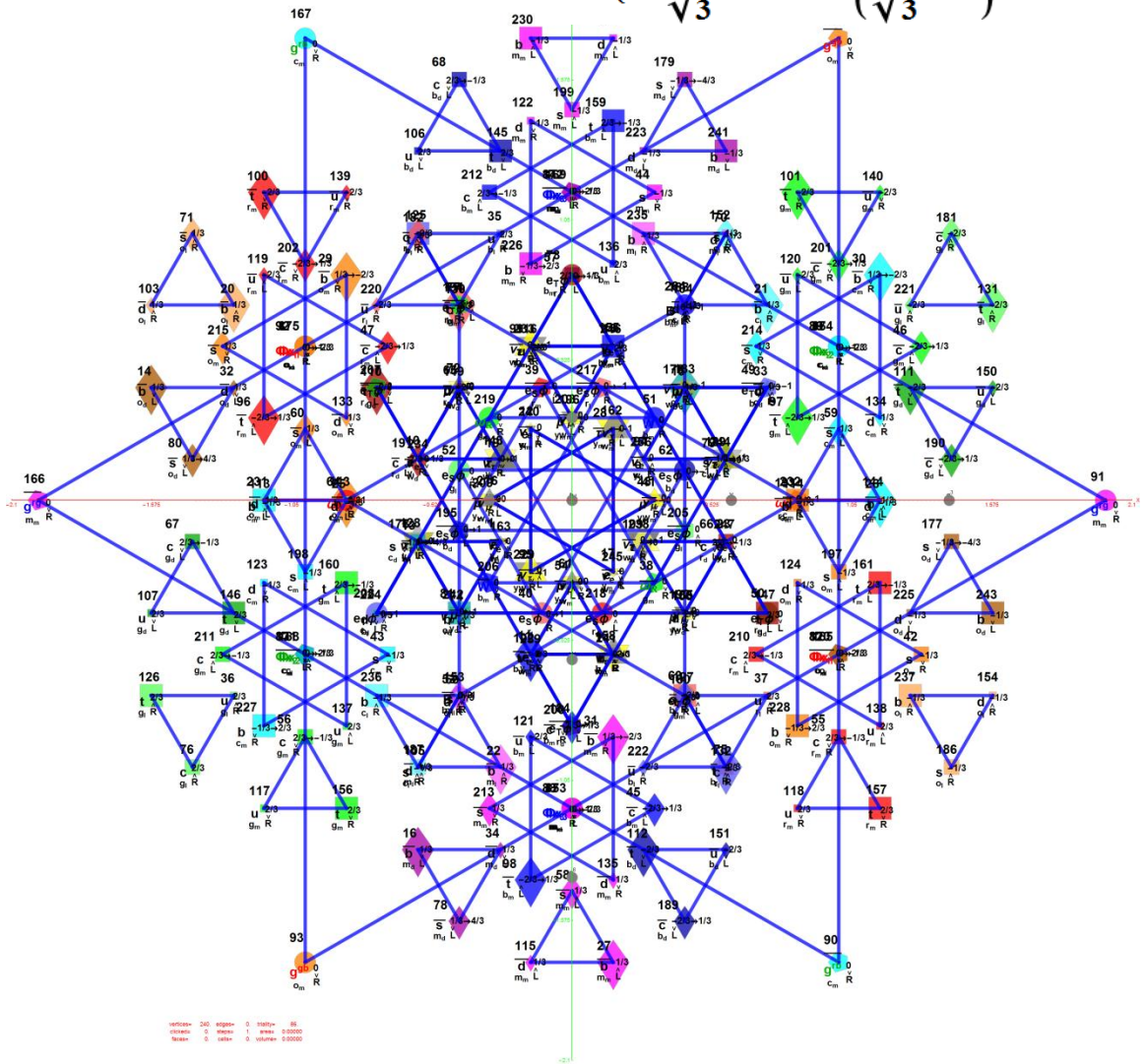
E8 QUANTUM PARAMETER PARTICLE ASSIGNMENTS

E8 Particle Assignment Symmetry

Projection from physics rotation of Split Real Even (SRE) E8:

$$X = \left\{2 - \frac{4}{\sqrt{3}},\ 0,\ 0,\ \sqrt{\frac{2}{3}}\left(\sqrt{3} - 1\right),\ 0,\ 0,\ \sqrt{2},\ 0\right\}$$

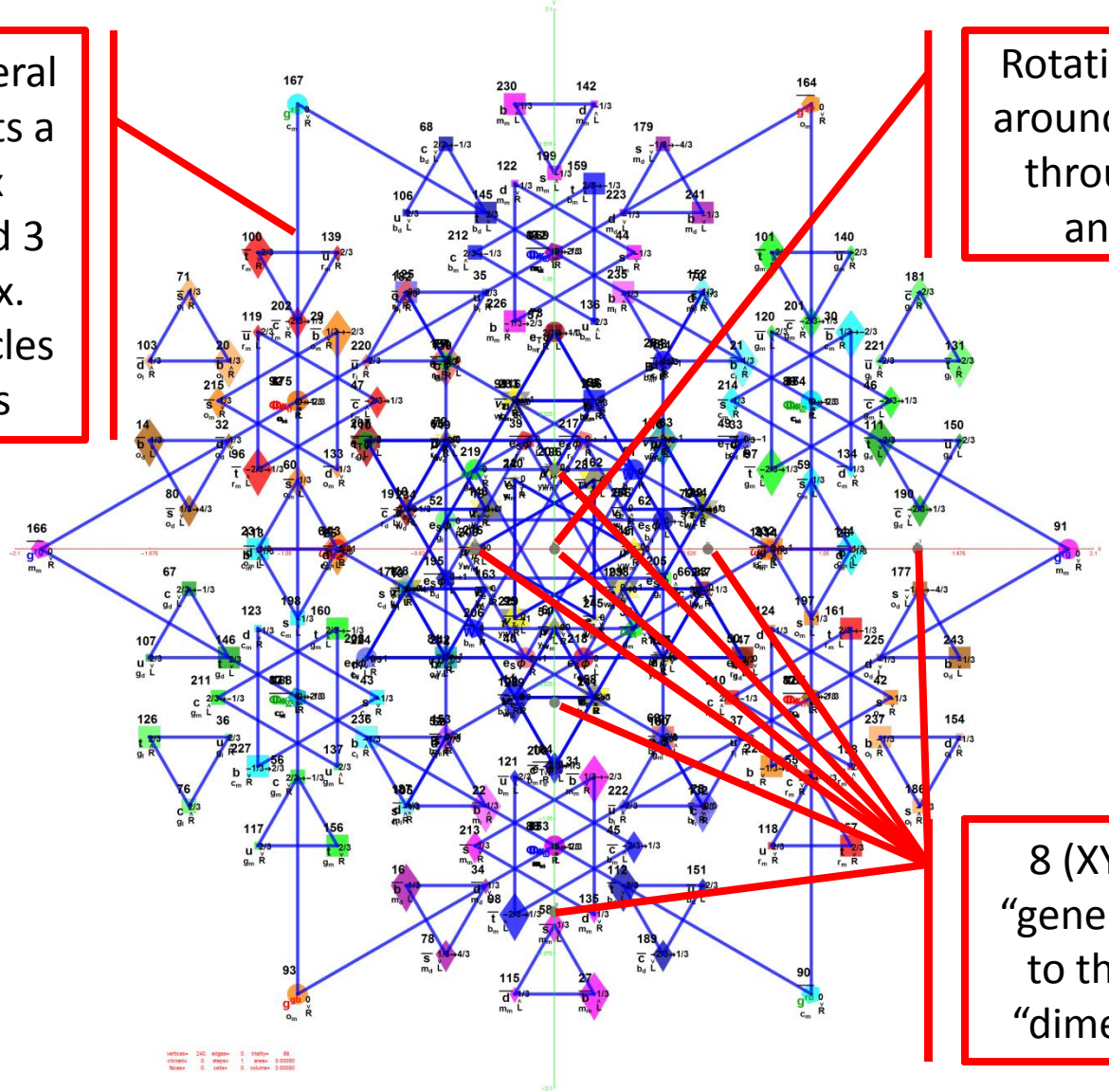
$$Y = \left\{0,\ \frac{4}{\sqrt{3}} - 2,\ \sqrt{2}\left(\frac{1}{\sqrt{3}} - 1\right),\ 0,\ 0,\ 0,\ 0,\ -\sqrt{2}\right\}$$



E8 Particle Assignment Symmetry

256=2(anti)*2(pType)*4(spin)*4(color)*4(generation)

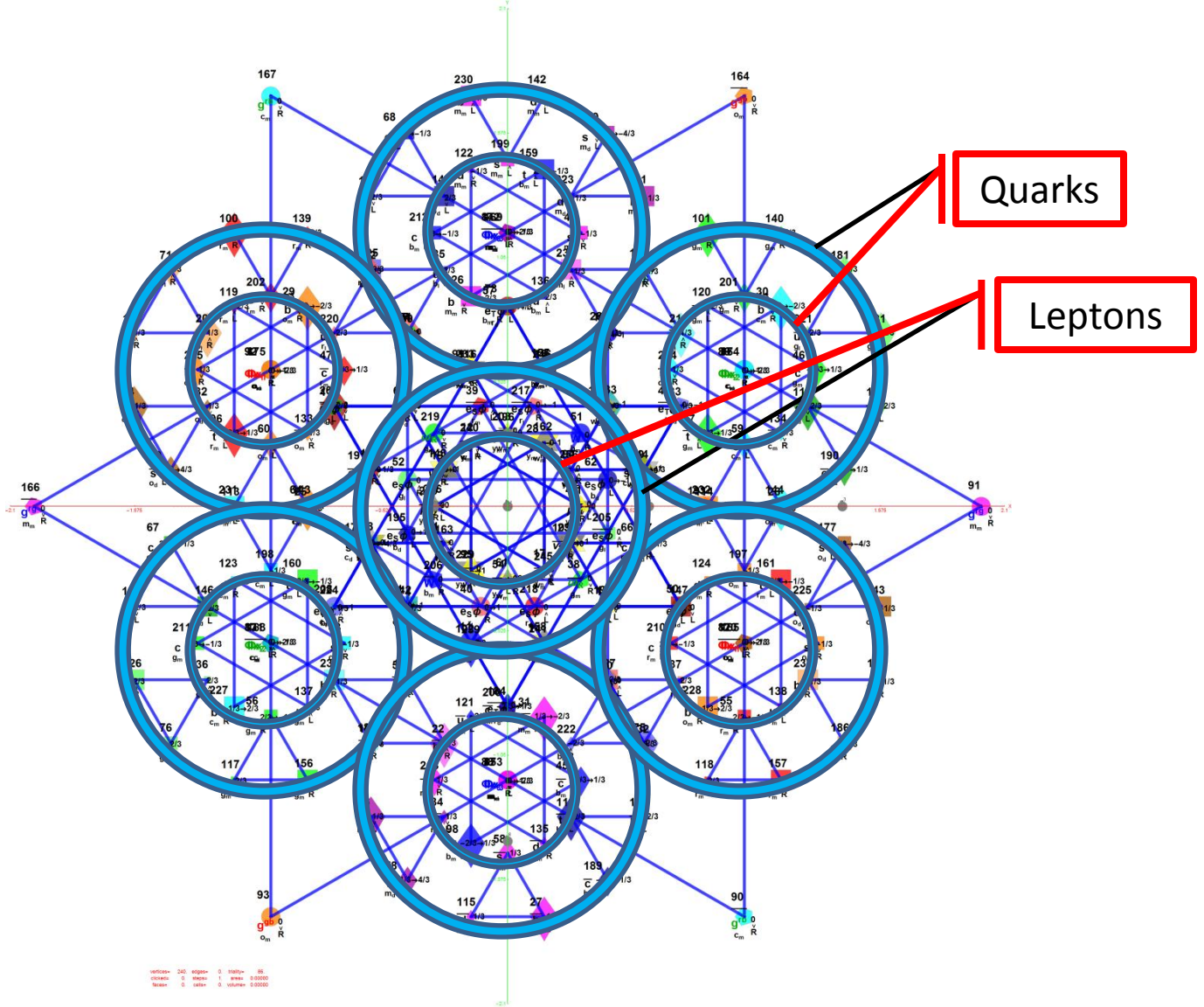
Each blue equilateral triangle represents a rotation matrix operation applied 3 times to a vertex. They are all particles or anti-particles



Rotation by π (180°) around (or reflection through) {0,0} for anti-particles

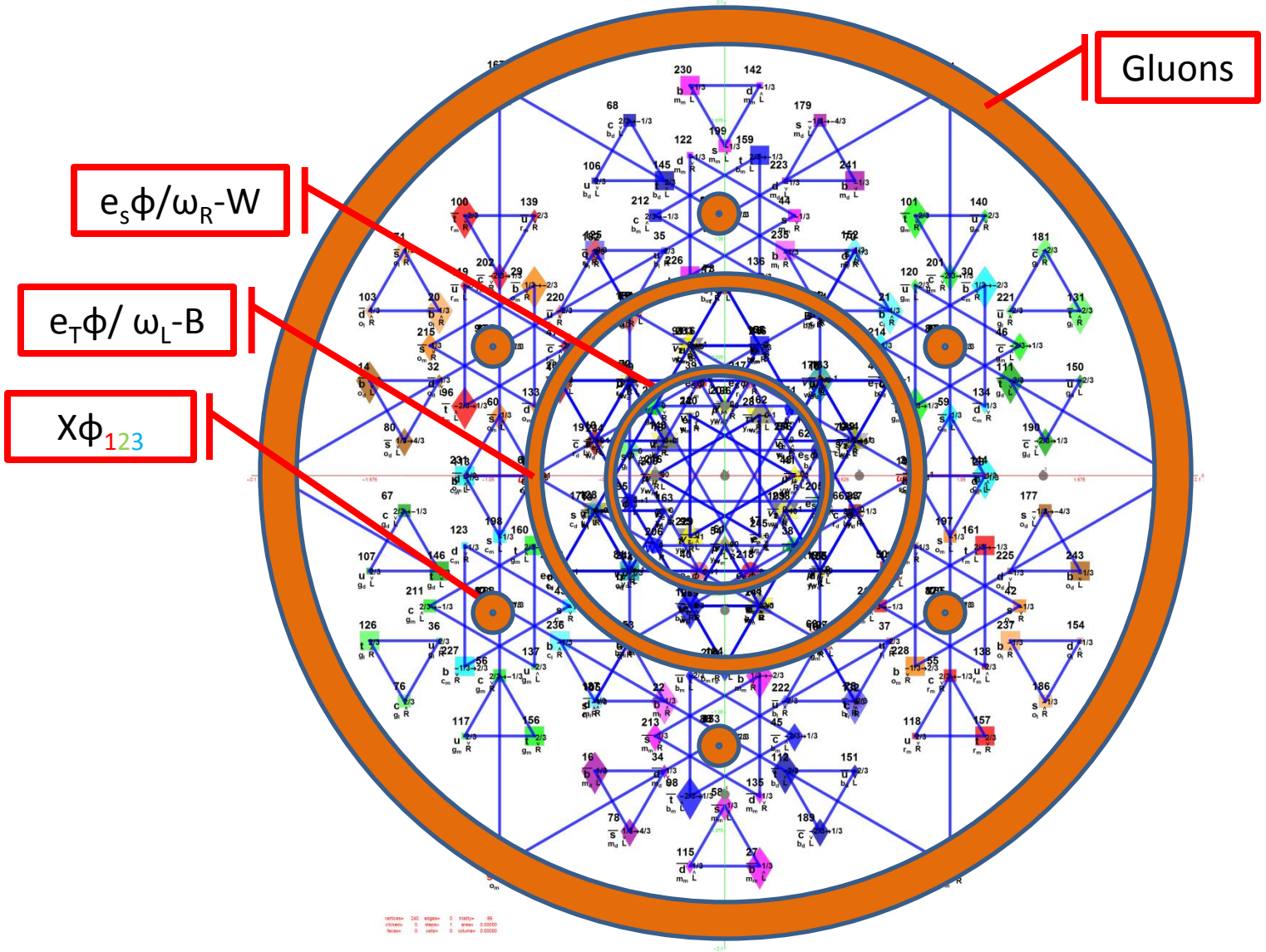
8 (XY) axis are E8 “generators “ added to the 240 vertex “dimension count”

Fermions: 192=2a*2p*4s*4c*3g (128 ½Integer E8 gen 1,3)



Fermions: 192=2a*2p*4s*4c*3g (128 ½Integer E8 gen 1,3)

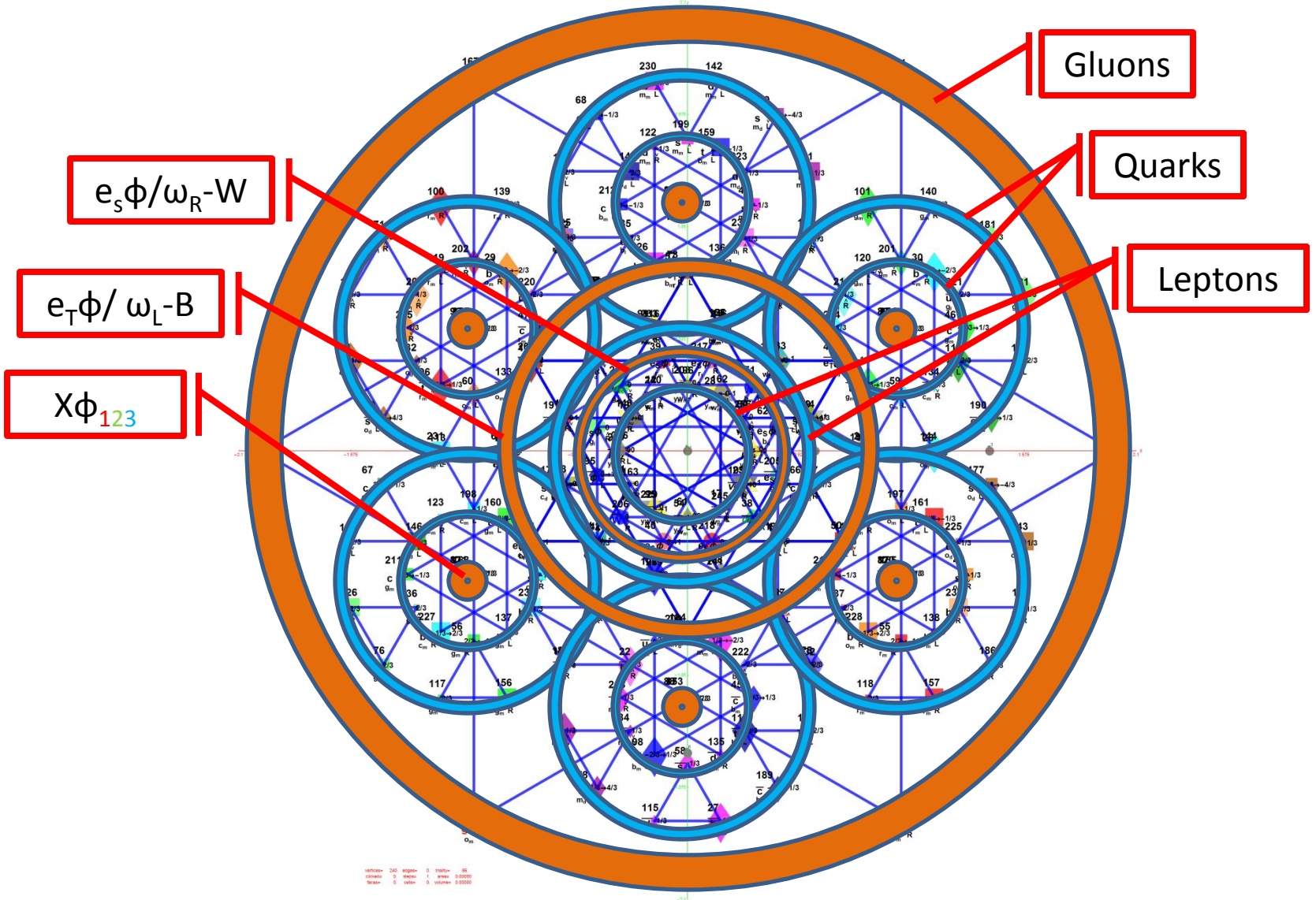
Bosons: 48=2a*2p*4s*3c (Integer E8 vertices)



Fermions: 192=2a*2p*4s*4c*3g (128 ½Integer E8 gen 1,3)

Bosons: 48=2a*2p*4s*3c (Integer E8 vertices)

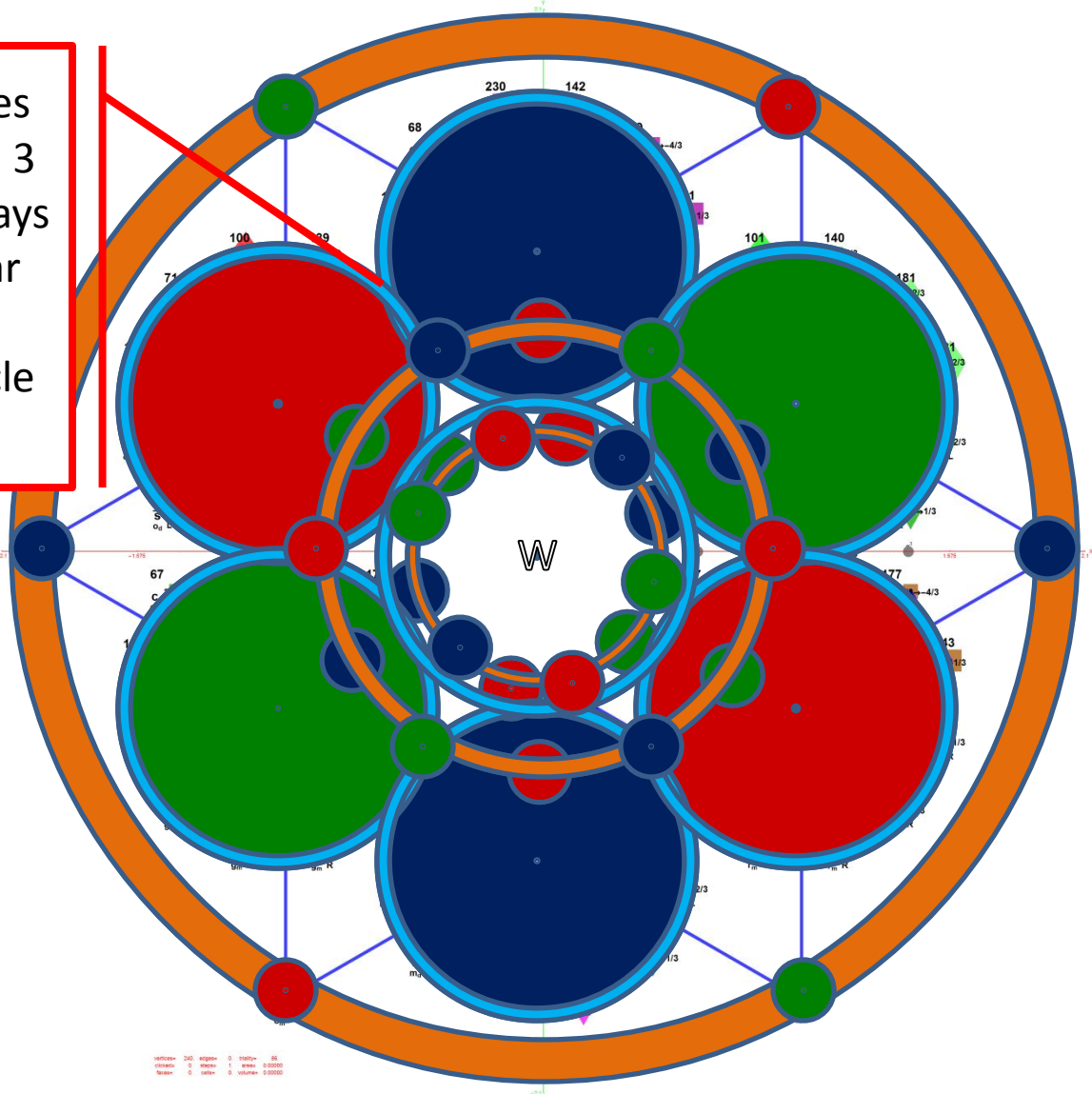
Excluded: 16=2a*2p*4s (E8 generators 8-orthoplex axis)



WRGB Color Triality

Each triality rotates clockwise through 3 colors and stays within a particular

particle/antiparticle type



Fermion Generational Triality

spin(ᵛL^R^LᵛR) and pType (uct-$\gamma_{e\mu\tau}$/dsb-eμτ)

Each triality rotates clockwise through 3 generations and stays within a particular spin, color and particle/antiparticle type

Rotation by π (180°) around (or reflection through) {0,0} for AntiParticles