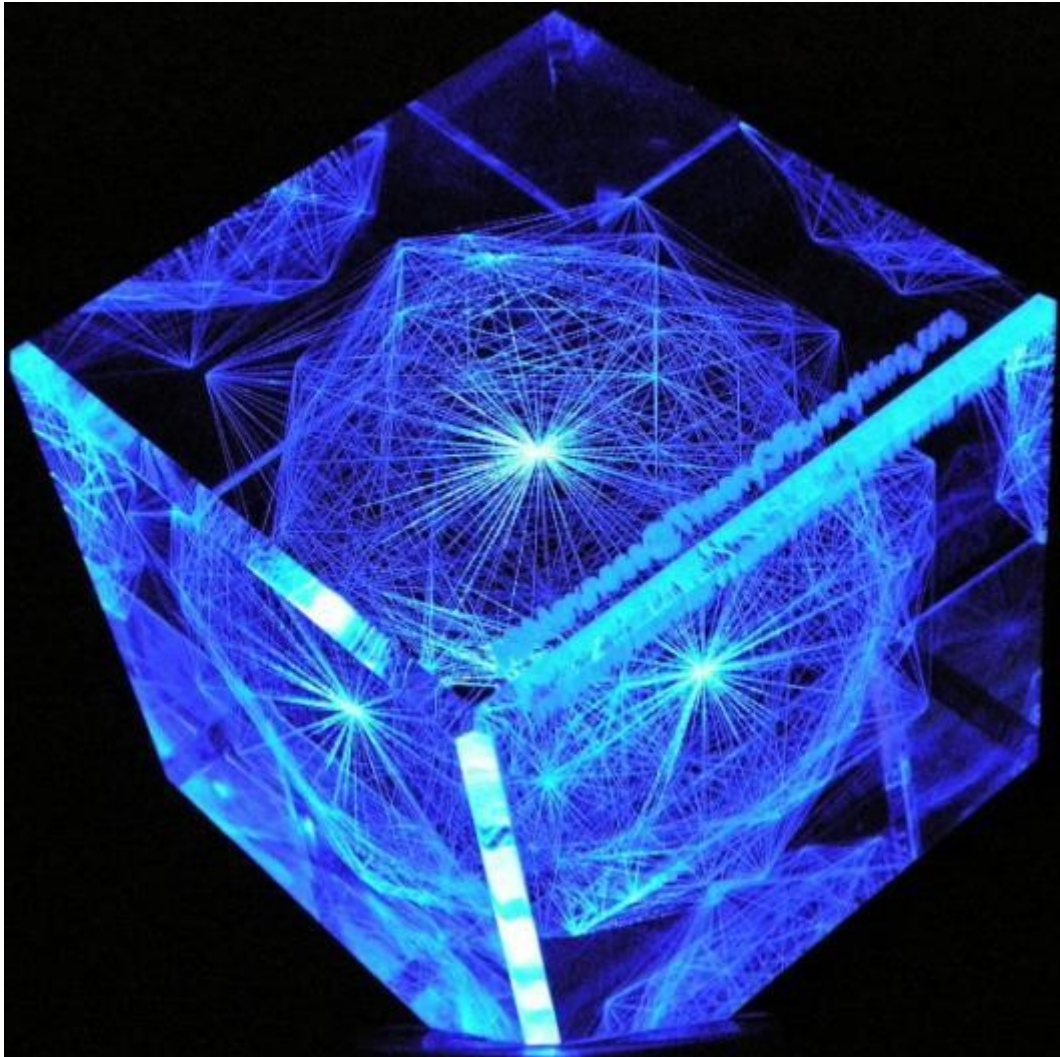

PLEASE CLICK [HERE](#) TO GO TO MY DETAIL MATH/PHYSICS WEBSITE.

A POSSIBLE THEORY OF EVERYTHING



ABOUT THE ART

INTRODUCTION

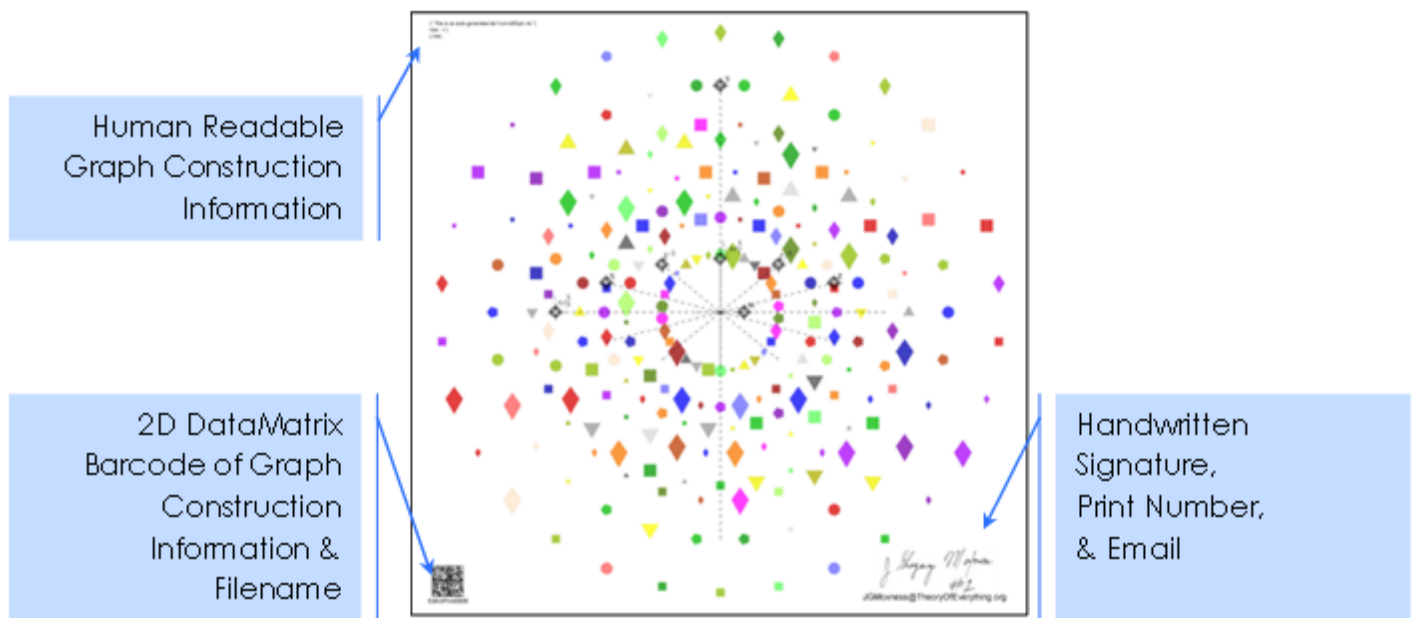
These samples are from my virtual "E8 Math, Science, and Art Gallery" located on the web at www.TheoryOfEverything.COM. They are unique 2 and 3 dimensional perspectives of the Universe's subatomic particles. The theoretical positions of these fundamental particles form highly symmetric patterns as shown in these works. The visualization techniques are implemented in a tool written by the author using Mathematica™ (the e8Flyer.nb).

ARCHITECTURE

All explanations are divided into Aesthetic and Scientific. These provide some information about of the artist's motivation as well as information related to the construction of each work. The scientific explanations are themselves divided into two sections, one which focuses on the mathematics of the work and the other on the physics. The scientific explanations may require some technical background and can be skipped.

As called out in Figure 1 below, the lower left corner has a 2D DataMatrix barcode which contains information used to generate the work for verification and easy scanning into the e8Flyer. The human readable filename is below the barcode for tracking purposes. In the lower right corner is a handwritten artist signature, sequential print number, and email address. Optional human readable graph construction information is available in the upper right corner, default on white background prints.

FIGURE 1 EXAMPLE PRINT



All 2D works are Mathematica™-generated Giclée prints of resolutions between 250-300dpi on 16"x16"x1.5" gallery-wrap canvas. Each will be custom made by customer request and hand signed and numbered at purchase in the lower right corner and sold for US\$240. For each work there are also available Mathematica™ generated laser stereo-lithography 3D models that are up to 100mm (4"x4"x4") etched inside a jewel-cut crystal cube from US\$128 to US\$256 depending on size. Some models can be grown in 3D printers as ultraviolet-resin/plastic or even grown out of metal for US\$256 to US\$1024. These 3D versions are also available as very high prim count rezz'able objects in the virtual world of Second Life (SL) for L\$16,000 (or approximately US\$64 depending on the exchange rate).

AESTHETIC

For humans, visualizing more than three dimensions (or four when including time by using animation) is not possible, so the author/artist has used several innovative techniques in the e8Flyer tool for visualizing this high-dimensional information. In addition to using color, shade, shape, and size to sort out the information, this tool manipulates the 8 dimensions of each vertex in E8 using a mathematical technique called "projection" in order to get them down to the 2 or 3 spatial dimensions that humans visualize. This tool is also capable of showing animation when using a computer for viewing.

SCIENTIFIC MATHEMATICS

E8 derives from a branch of mathematics known as Lie Group Theory, named after its discoverer S. Lie in ~1872. It studies the geometric transformation symmetries of groups of numbers. All of the objects in the gallery were constructed from the same group of $2^{2^2+1}=2^8=256$ nodes (or vertices). Within this binary set of 256 vertices is a set of 240 vertices that form the E8 Lie Group, which was discovered by W. Killing and categorized by T. Gosset in ~1898 and subsequently proven by E. Cartan. The Gosset 4_{21} E8 Polytope is arguably one of the most complex symmetric structures, making it ideal for the study of visualizing complex information.

The example in Figure 1, which is also the second object ("Object 0010" which is 2 in binary) in the gallery, represents the skew orthogonal Petrie polygon projection. For more information, see http://en.wikipedia.org/wiki/E8_polytope. It is the default perspective for the E8Flyer tool with all other perspective graphs constructed and recorded as changes to this configuration.

In 2D it can be manually constructed by taking four complex roots of a certain equation (which describe 4 2D vertices) and rotating them around the center in 30 rotation steps. This creates the skew orthogonal Petrie polygon projection of what is known in Group theory as the H4 or the 120-Cell. From a conjecture of isomorphism by D. Richter, it can then be copied and scaled using the Golden Ratio to produce the second half of the 240 vertices of E8 in the same projection.

The works shown here are not constructed manually as described, but are true projections using 2 or 3 8D projection vectors. The author has identified the precise projection vectors for the split real E8 vertices used in the e8Flyer tool. Interestingly these projection vectors are constructed from several rotations of selected real and complex coordinates of Richter's roots. This 2D isomorphism is then the basis for mapping particles to other polychora data sets, like the 600-Cell (which is the 4D dual of the 120-Cell).

Each vertex can be connected by lines called "edges". There are an exponentially-increasing number of edges based on the number of vertices. E8 has 6720 edges of length $\sqrt{2}$. When projected to 2 or 3D, these lengths change and are color coded in the e8Flyer based on the projected edge lengths.

PHYSICS

E8 is also used by theoretical physicists to study the sub-atomic or nuclear structure of the Universe. In a controversial theory by A. Lisi, it has also been conjectured to be the basis for the unification of General Relativity (GR) and the Standard Model (SM) of Quantum Mechanics (QM). If this unification is achieved, it would be known as a "Theory of Everything (ToE)". The author has modified this theory to incorporate his own work in theoretical physics in the pursuit of a ToE.

Each vertex in E8 has associated with it 8 numbers (or coordinates) creating an 8 dimensional vector space which represents one of the 240 fundamental physics particles in the Universe (plus 8 dimension and 8 anti-dimension particles explained later in reference to Object 0001). These are displayed in 2 or 3D, as different shapes/colors/sizes based on their fundamental physics particle assignment from the SM.

In addition to an edge line, another type of line highlights interesting relationships within E8 called "triality". This is related to concepts in physics that describe the inner workings of the fundamental particles, the bosons and fermions (or quarks and leptons). The thicker all-blue lines are visualizations of triality relationships.

A third type of line capable of being shown in the e8Flyer involves using the concept of particle interactions. These can be displayed as "PhysEdges" which highlight the possible particle pairs which can decay into it (with two thick red lines and a thick green line between them).

GALLERY

AESTHETIC

The 16 objects in the exhibit are a representation of the de-evolution of the symmetry of the Universe from its beginning to its end. It uses the beauty of the symmetry of geometry to visualize the very early stages of this process. Most objects are computer-generated Giclée prints produced using the e8Flyer. The one mixed media acrylic "The Unfinished Process" is a representation the idea that humans are living in the middle of this process.

SCIENTIFIC

MATHEMATICS

The works in this exhibit are created by using the dot product of 2 or 3 n-dimensional projection vectors. This projection gives:

- Representation of information objects (the vertices)
- Normalized 2, 3 and n-dimensional distances (the edges)

Adding the dimension of time (video frames in online versions) gives:

- n-dimension rotational and translational flight paths
- 3D spins
- Dynamic edge builds
- Dramatically beautiful video content produced from highly symmetric information

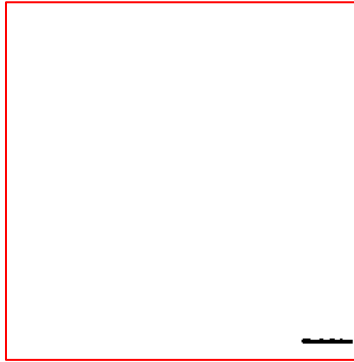
PHYSICS

In the beginning, there was what science calls "The Big Bang", occurring 13.66 billion years ago.

In the end, based on the known evidence and understanding to date, the Universe will most likely experience a process known as heat death. As recently as 1998, it was discovered that the Universe is not only expanding at a rate equal to the Hubble constant ($H_0=71.58$ km/s/Mpc) but that it is accelerating. This acceleration has put the nail in the coffin for the Universe, for it creates a slim chance that it will avoid a heat death far in the future.

The measure of this process is known as entropy with its ever-increasing disorder. The second law of thermodynamics defines how entropy works. It tells us that time moves in only one direction, that it has an arrow, time's arrow. This implies that the Universe started in a state of pure order and decays into disorder.

The laws of physics do not suggest that time should have an arrow. Yet, everyone knows intuitively that it does. Humans live on an outer arm of a spiral galaxy known as the Milky Way. It is in a stable solar system with a handful of surrounding planets. This low entropy garden is ideal for the increasing order and **decreasing** entropy. This seemingly runs counter to the second law of thermodynamics and is observed in the genetic bio-chemistry of RNA and DNA, otherwise known as Life. Yet science tells us that even Life obeys the second law of thermodynamics. One needs to look at the overall entropy of the solar system to see the entropic process accurately.



OBJECT 0000: "IN THE BEGINNING"

AESTHETIC

The first and last objects, which bookend this exhibit, are not produced by the e8Flyer. Object 0000 is an empty canvas. It is the analog of a universe waiting to be born, waiting for the emergence of the dimensions of space, time, and matter; existence.

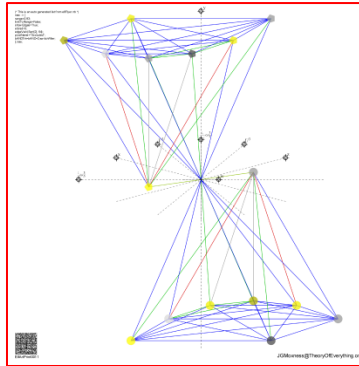
SCIENTIFIC

MATHEMATICS

Interestingly, the concept of zero (0) or nothingness did not always exist in mathematics. Its earliest appearance was over 3,000 years ago in Babylonian mathematics.

PHYSICS

In a 1905 paper, Einstein introduced the concept of the quantization of light as particles (photons) versus exclusively being thought of as waves in a medium called "the aether". This introduced to the world the idea of Quantum Mechanics (QM). This ultimately allowed the idea that something could be created using a particle with its anti-particle. It is theorized that the Universe itself emerged from this process - something from nothing.



OBJECT 0001: "DIMENSIONS AND THE 16-CELL"

AESTHETIC

This work uses the 8 dimensional particles along with their 8 anti-dimensional particles from the set of 256. Notice the similarity of the particles (above) as it mirrors the anti-particles (below), along with the position of the projected dimension lines. The 64 colored lines represent the "edges" between them which have a length $\sqrt{2}$ in 8 dimensions. The colors of these lines are defined by their "projected" lengths.

SCIENTIFIC

MATHEMATICS

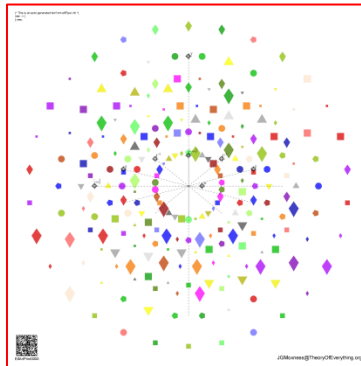
This projection is the default for the e8Flyer. It shows only the 16 excluded vertices not formally part of the 240 vertices of E8. Although, 8 of these represent the dimensionality of E8 because they contain only one non-zero element in the vertex coordinate. These are sometimes included in the 248 dimension count of E8. There are several patterns of similarity to the 16-Cell polytope (the dual of the ever popular 4D Tesseract).

PHYSICS

Science tells us that there are at least 4 dimensions in the Universe (3 dimensions for space, 1 for time) and that they are integrally related to what can be thought of as the dimensions or attributes of the matter particles (and/or waves) in the Universe (specifically, mass, charge, and the forces between them). My ToE model in a modification of A. Lisi's is based on E8. It suggests there are 8 added dimensions related to the properties for charges and forces. These are combined in such a way that the single dimension of time is actually made up of these 8 dimensions. This creates an 11 dimensional framework, much like but very different from String Theory (ST) or M-Theory. Mass can be derived from this information.

Einstein's 1905 Theory of Special Relativity (SR) deals with the idea of non-accelerated relative motion or velocity. This, along with the universal speed limit (the speed of light c), leads us not only that the notion that time is integrally linked to space and matter, but also to the idea behind that famous equation $E=mc^2$; the basis of atomic energy.

Einstein's 1915 Theory of General Relativity (GR) deals with accelerated motion. It suggests that space tells matter how to move and matter tells space how to curve in a symbiotic relationship.



OBJECT 0010: "E8 AND FUNDAMENTAL PARTICLES"

AESTHETIC

This pattern of shapes and colors show all 240 vertices of E8. The colors are the standard physics assignments based on A. Lisi's theory.

SCIENTIFIC

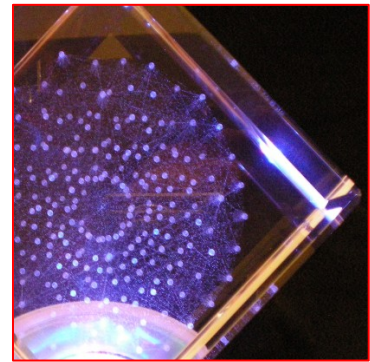
MATHEMATICS

The 2D shapes in all works are either simple polygons or circles. The black dotted lines with text and locators at one end show the axes made from the 8 dimensional vertices in E8. The anti-dimensional vertices are not represented.

This Gosset Petrie polygon pattern is special in that it forms 8 concentric rings of 30 particles each. There are 2 sets of 4 rings which are related by the Golden Ratio which has special significance to geometry and nature.

PHYSICS

Each vertex is assigned to a fundamental particle in physics. The particle shape, size, color, and shade are defined by its anti, type, spin, generation, etc.



OBJECT 0011: "E8 SYMMETRY IN 2D"

AESTHETIC

This is precisely the same pattern as the previous object with the addition of edges between vertices. The particle shape and color assignments have been removed along with all but 435 of the possible 28,680 edge lines. The edge color assignments are based on their projected lengths.

The photo to the right is an actual 3D stereo-lithography model laser etched inside a 4"x4"x4" cube. Notice the 8 concentric rings of 30 particles which match the 2D projection. The parallax in the 3D image emerging from the left effectively scatters the particles in this camera angle.

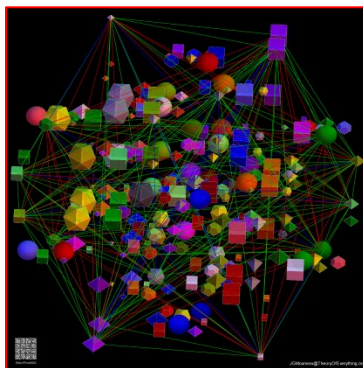
SCIENTIFIC

MATHEMATICS

This graph is similar to an original hand drawn version by Peter McMullen in the 1960s based on prior work of over 120 years. It was recently recreated using computers by John Stembridge in honor of the completion of the mapping of E8 in 2007 by a group of mathematicians over 4 years using super computers. Since then, several artistically inclined mathematicians have created similar constructions.

PHYSICS

The color, shape, and size of each particle indicating its identity have been removed, along with the physics dimension indicated by the axes.



OBJECT 0100: "E8 SYMMETRY IN 3D"

AESTHETIC

This is the same projection as the previous object except that it is shown in 3D. Notice the dramatic visual difference obtained by simply adding a single dimension to the perspective.

SCIENTIFIC

MATHEMATICS

The 3D shapes in all works are either Platonic Solid Polyhedrons or spheres. In this perspective there are 1294 edge lines of length $\sqrt{2}$ in 8 dimensions.

PHYSICS

Notice the complexity in the color/shading, shapes, and sizes which indicate the identity of each particle. In the online versions of the e8Flyer, mouse-over information completes the identification, including the theoretical mass and lifetime of each particle.



OBJECT 0101: "HEXERACT TRIALITY"

AESTHETIC

There are 4 concentric rings of 12 vertices in this symmetry. The nearly 6,000 edge lines are taken from the default Mathematica™ gradient called "Bright Bands". The thicker blue lines represent the triality relationships.

SCIENTIFIC

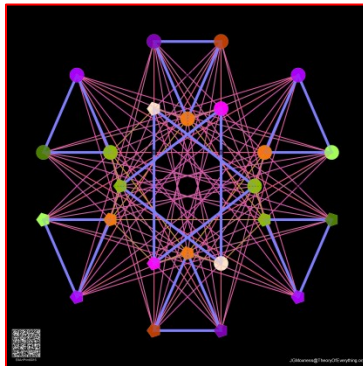
MATHEMATICS

The Hexeract is also known as a 6-cube.

As in the simpler concept of duality, triality is an interesting pattern in which a specific rotation matrix is applied to a particle position producing a second position. The rotation is applied to the second creating a third. Applying the rotation again reproduces the first position.

PHYSICS

Each triangle represents a triple of particles found to match a selected rotation matrix applied in this manner.



OBJECT 0110: "FUN WITH E6, F4/D4 AND THE 24-CELL"

AESTHETIC

This work is fun in the sense that it uses the Fruit Punch gradient for edge colors. Looking closely, it is not quite 2 concentric rings of 12 vertex particles.

SCIENTIFIC

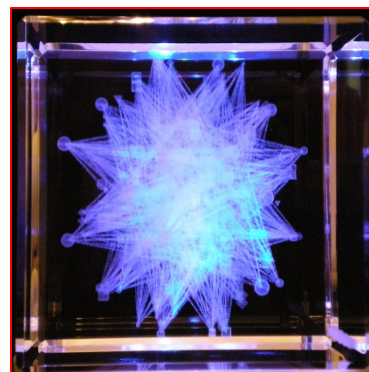
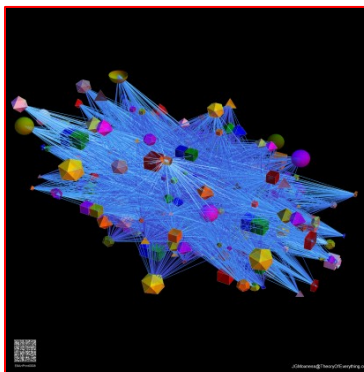
MATHEMATICS

As in the previous work, this shows triality relationships with thick blue lines. The edge colors are assigned based on the 2D projected edge length. Each edge has an 8 dimensional length of $\sqrt{6}$ and is only an approximate projection for the listed sub-groups in E8.

Because of the 2 concentric rings of 12 vertex particles, it resembles orthogonal projections inside Petrie polygon graphs of the Coxeter groups E6, F4, D4 as well as the self-dual 24-cell (also known as an icositetrachoron, octaplex (short for "octahedral complex"), and a polyoctahedron). If it used edges of length $\sqrt{2}$ instead of $\sqrt{6}$, it would look even more like the traditional orthogonal projections.

PHYSICS

This graph filters the 240 E8 vertex particles to 24 consisting of the ElectroWeak W/ ω and Gravitational Higgs $e\Phi/B$ bosons. The ElectroWeak force bosons exchange fermion flavors while the Higgs force bosons are responsible for supplying mass to the particles.



OBJECT 0111: "FAVORITE 24"

AESTHETIC

This is simply an interesting perspective. They are color coded based on their 3 dimensional length using the gradient Deep Sea Colors.

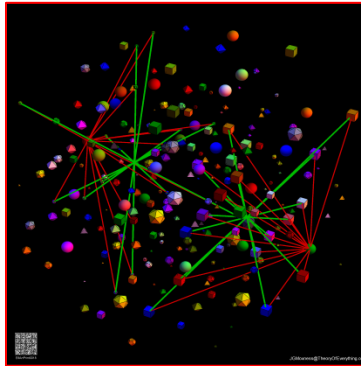
SCIENTIFIC

MATHEMATICS

There are 5,256 edge lines with an 8 dimensional length of $\sqrt{6}$.

PHYSICS

No scientific relevance that I can determine. Enjoy.



OBJECT 1000: "DEVOLUTION"

AESTHETIC

Notice the symmetry.

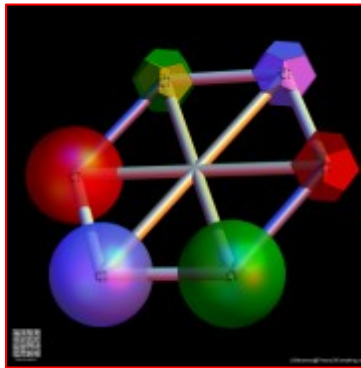
SCIENTIFIC

MATHEMATICS

This is a skew orthogonal Petrie polygon projection in a rotated E8 data set called the "physics" rotation. This is accomplished by performing a dot product operation with a particular 8x8 matrix constructed so that the 8D location of each particle is more easily assigned with traditional physics group theoretic identifications. It also simplifies the traditional calculation for particle charge.

PHYSICS

This is a very special representation in that it shows the relationships derived from the natural ability of particles to transmutate into others through interaction. When one particle decays into two others or two particles interact to form one, their 8D vectors will add (or subtract) precisely. The sum of the 8D vector locations (or identity) of the particles between the green line will equal the particle at the intersection of the red lines. This is the mechanism for the devolution of the heavier 3rd generation particles to the lighter first generation which makes up the natural state of particles we see today in the Universe.



OBJECT 1001: "G2 GLUONS"

AESTHETIC

Simple yet beautiful. Notice the physics particle labels shown on each vertex.

SCIENTIFIC

MATHEMATICS

G2 is an exceptional Lie group within E8.

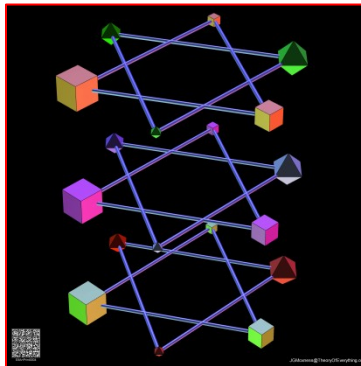
PHYSICS

This object is a hexagonal pattern representing three red, green, blue pairs of gluon boson/anti-boson pairs. The job of the gluons is to exchange color between the quarks and this holds them together. Which they do very well indeed, since they are never seen apart!

Quarks do not have color in the sense of the colors humans perceive in their mind. They are always combined to form a neutral color representation, thus the quark color concept is an analog to the color wheel used in art.

They are never seen independent of these combinations. While not really colored as shown, they are only seen in color neutral combinations given their color assignments.

As an interesting aside, the perception of the qualia of color in the mind is a process that occurs when visible light from a photon particle, which is also a decohering wave of a specific frequency, gets translated into a neural electro-chemical impulse in the brain after hitting one of 3 types of light cones tuned to specific frequencies in the retina.



OBJECT 1010: "QUARK COLUMN"

AESTHETIC

This is an interesting 3D pattern of quark/anti-quark colors forming a column.

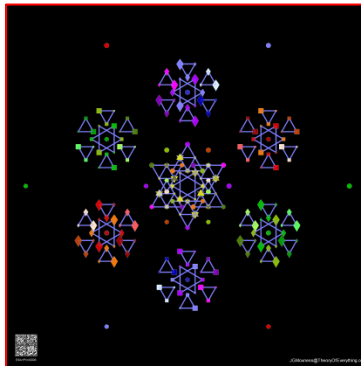
SCIENTIFIC

MATHEMATICS

As introduced earlier, notice the triality relationships designated using the triples of blue lines. Also notice the 3D perspective and axes metrics.

PHYSICS

Quark triples, called baryons, make up the nucleus of atoms. The proton and neutron are only two of many permutations of baryons. Quarks can also form in pairs called mesons.



OBJECT 1011: "NUCLEAR PHYSICS"

AESTHETIC

This is a beautiful pattern with deep theoretical import.

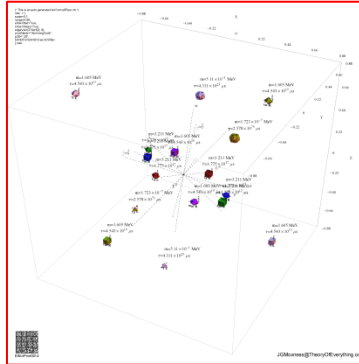
SCIENTIFIC

MATHEMATICS

The thick blue lines are triality relationships between the particles.

PHYSICS

This pattern represents the Strong Pati-Salam model in theoretical physics. The 6 red, green, blue sets of 8 trialities represent the nuclear quarks. The leptons are in the inner F4 hexagonal star pattern along with the 3 sets of 6 red, green, blue boson(circles)/anti-bosons(pentagons).



OBJECT 1100: "HAMMING-CODE FERMIONS"

AESTHETIC

This is a 3D perspective showing dimension and particle labels with particle mass/lifetime information. Coloring is from theoretically assigned patterns.

SCIENTIFIC

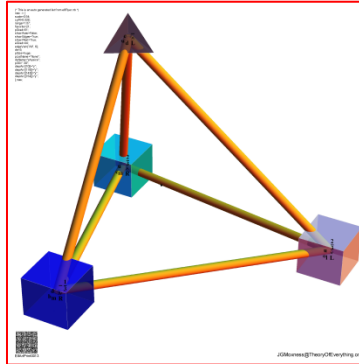
MATHEMATICS

An interesting connection between E8 and binary structures exists. The Hamming code defines a certain binary pattern of interest to information theorists.

PHYSICS

Interestingly, when applied to the underlying structure producing E8 and filtering the fundamental particles associated with it, it produces 16 of 64 first generation fermions (the leptons and quarks).

The mass and lifetime labels in this work are theoretical based on my ToE model. While some are within experimental standard error, no corrective calculations (such as perturbation theory) has been applied. The experimental values have been obtained from the many years of experimental physicists using accelerators such as the Large Hadron Collider (LHC), the biggest and best coming online soon at CERN. The goal of the LHC is to observe the Higgs boson(s).



OBJECT 1101: "HYDROGEN TETRAHEDRON"

AESTHETIC

The simplest form of the Hydrogen atom is constructed from a single electron and a proton. The particle colors are assigned from the theoretical patterns in E8 (red, green, and blue for the quarks, and no color (gray and yellow) for the leptons (the electrons and neutrinos). The 3D edge lines (or cylinders) are aesthetically assigned using the Solar Colors gradient. Particle labels are included in this work.

SCIENTIFIC

MATHEMATICS

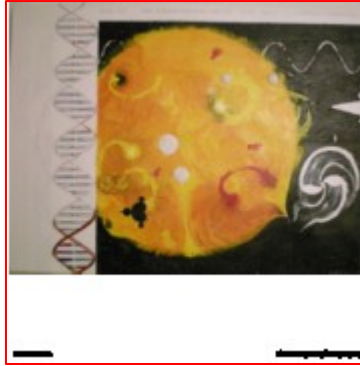
The tetrahedron shape at the top is the electron and the 3 cubes make up the up-up-down quarks which make up the proton. The 4 particles in this projection form a tetrahedron.

PHYSICS

This is the simplest atomic structure and uses only first generation fermions.

Beginning with the discovery of the nucleus in atoms, they were (and for many still are) mistakenly visualized with a nucleus as a central sphere with electrons orbiting around it like planets around the Sun. From QM we know this is not accurate, since particles have statistical and beautiful spherical wave-like qualities which seem to prevent them from being in a specific place as would be indicated in a planet-like orbit around the nucleus.

The representation in this work is also not a physical one. It is a theoretical representation based on the position of its components in the E8 ToE model. Notice the theoretical quark color assignment of the red, green, and blue quarks, along with the neutral color electron.



OBJECT 1110: "THE UNFINISHED PROCESS"

AESTHETIC

This is a 48"x36"x 1.5" gallery wrap mixed media acrylic. It represents the pursuit of a ToE. It is, as the name implies, not finished.

The DNA molecule representing Life is on the left.

SCIENTIFIC

MATHEMATICS

Near the lower left are the Mandelbrot set fractal and the Lorenz chaotic attractor, representing the beautiful and the chaotic in Mathematics.

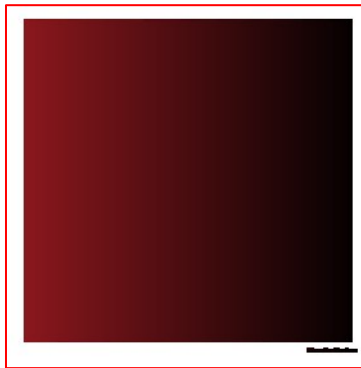
A pure sine wave is shown across the top.

Embedded in the canvas are lines which are spaced in proportions of the Golden Ratio forming a spiral of Golden Squares.

PHYSICS

Across the top are Hebrew text "And God said:", with Maxwell's equations for Light. This line also includes the author's ToE relationships between the fundamental constants of c , \hbar , G_{Newton} , H_0 (Hubble), and α (Fine Structure). The right side of the canvas shows the result of the now famous two-slit experiment which determined the particle/wave duality of light.

The main theme is the solar system, with a seething Sun at the center. The position of the planets is as they were at the start of the 3rd Millennium. There are two scales involved in order to fit the planets on the canvas. The radii of each planet, which are actually 3D using a plaster for hemispherical depth, are in proper proportion to the Sun's radii. The orbital radii are set at a second proper scale with the Earth near the center and the recently demoted dwarf planet Pluto, along with its newly discovered larger cohort Eris, near the right side of the canvas just above the white Galactic vortex. This and the vortices coming off the Sun are being sucked into a textured black hole, which of course is not easy to see in the lower right corner.



OBJECT 1111: "IN THE END"

AESTHETIC

As it was "In The Beginning", it is "In The End". This object was not created with the e8Flyer tool. It is simply a smooth gradient from red to black. It represents the heat death of the Universe.

SCIENTIFIC

MATHEMATICS

Intimately related to the concept of zero, infinity is $1/0$.

PHYSICS

the Universe's decay into total entropy occurs when everything that exists is made up of a very cold radiation near absolute zero degrees Kelvin. Unless some as yet unknown law of physics exists to change this idea, this is how the Universe will end.

ABOUT THE E8FLYER

The e8Flyer is a program written by the author/artist that produces the dramatic visualizations of E8 and theoretical particle physics. Any changes made by the artist are able to be recorded as a simple text file. This file can be read by the tool to reproduce the work at a later time. The e8Flyer has many capabilities beyond the production of high fidelity artwork. It is also used to study the symmetries of E8, hyper-dimensional polychora, as well as any data sets that are read in from a simple spreadsheet. It produces many output formats including .avi for animations, as well as a custom format for rezz'ing into the 3D virtual world of Second Life (SL).



ABOUT THE ARTIST

J GREGORY MOXNESS

As most very inquisitive young boys, I began pondering the scientific aspects of the Universe. I still remember what might be called “an awakening”, an early evening walk home from a friend’s house where I stopped to stare at the stars to wonder about our origins. This, along with my father’s physics education and engineering career, motivated me to the study of physics while pursuing a bachelor of science in Electrical Engineering, which was completed in 1982.

The lure of comfortable paychecks and distaste for what I perceived to be an overly bureaucratic and self-serving academic process led me to start my career in 1983. While I was happy with that choice, I never forgot my boyhood dreams of understanding the Universe.

While attending a time management session in the late 80s, we were asked to document a life goal. The process included generating a plan to achieve this goal, complete with initial tasks and allocation of time, etc. Well, needless to say, my goal was to complete that boyhood dream. The deadline for this plan was not fixed, but I thought it would be great to complete it before I turned 40. I knew this was going to require that I go back to school in order to learn and collaborate with those in the theoretical nuclear astrophysics community. So what to do, given my career?

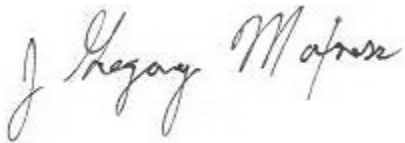
The initial plan called for generating enough income to be able to quit work and attend graduate school. The attempt to parlay my career talents as a consultant and troubleshooter into that income failed due to the fact that it didn’t generate the desired income and I didn’t really have the stomach for business. My passion was physics.

Now by the mid 90s, I had determined that I would just have to do it by using the hours between 6PM and 3AM to read, study, theorize, analyze, calculate and document a view of the Universe that might integrate the Standard Model, quantum mechanics and general relativity. So with support from my wife and son, without the support of academia, my adventure began with work on what some would begin to call a “theory of everything” (ToE). I pulled on a few threads of insight and found patterns relating the fundamental universal constants which had yet to be realized.

Of course, the devil is in the details and all adventures have ups and downs. A few early attempts to collaborate were understandably rejected by academia and confused by those outside academia on Bulletin Board systems (BBSs) and the Internet. Yet, it was exciting to begin to understand some of these fundamental workings of the Universe as I realized that my theory could have predicted the discovery of an accelerating universe in 1998.

As an artist, the beauty of the symmetries in these physics models compelled me to produce these works which could be appreciated by both academician and layman alike. I hope you find that I have achieved that goal.

Sincerely,

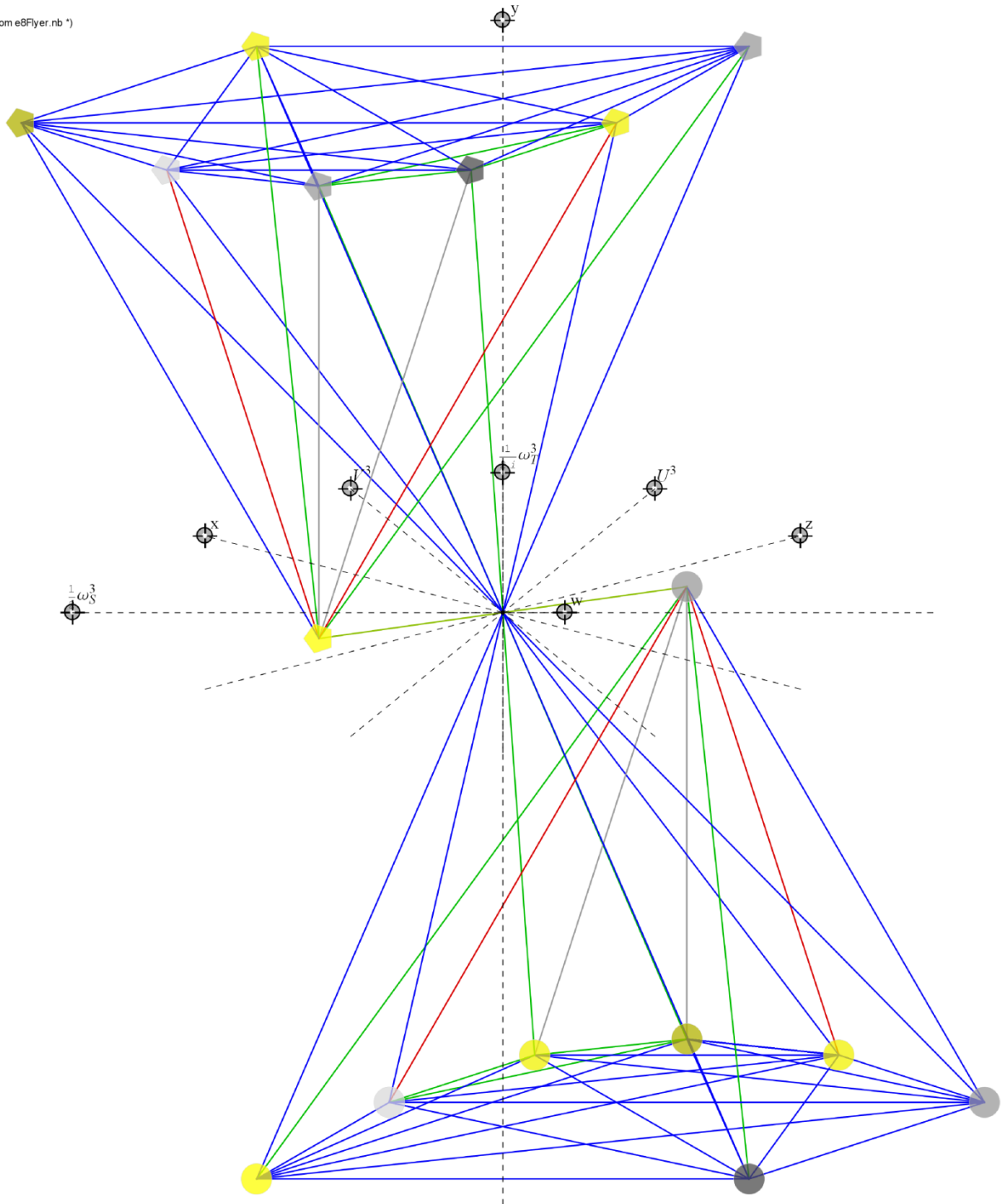


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OBJECT 0001: "DIMENSIONS AND THE 16-CELL"

(* This is an auto generated list from e8Flyer.nb *)

```
new := {  
  range=0.93;  
  limitToRange=False;  
  showEdges=True;  
  eGrad=0;  
  edgeVal={Sqrt[2], 64};  
  pListName="Excluded";  
  bANDTrk=bAND=2, switchFilter;  
};new;
```

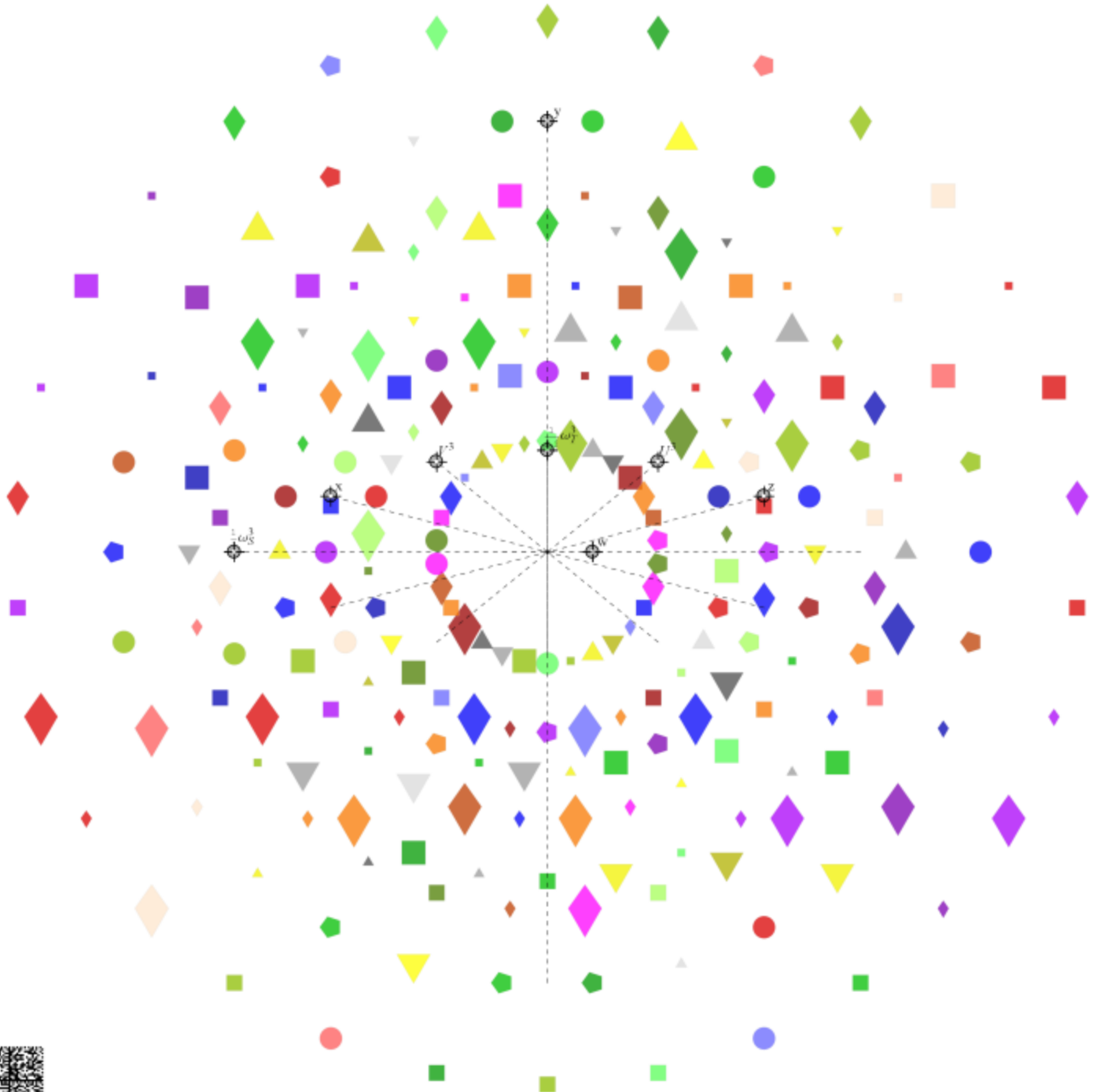


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OBJECT 0010: "E8 AND FUNDAMENTAL PARTICLES"

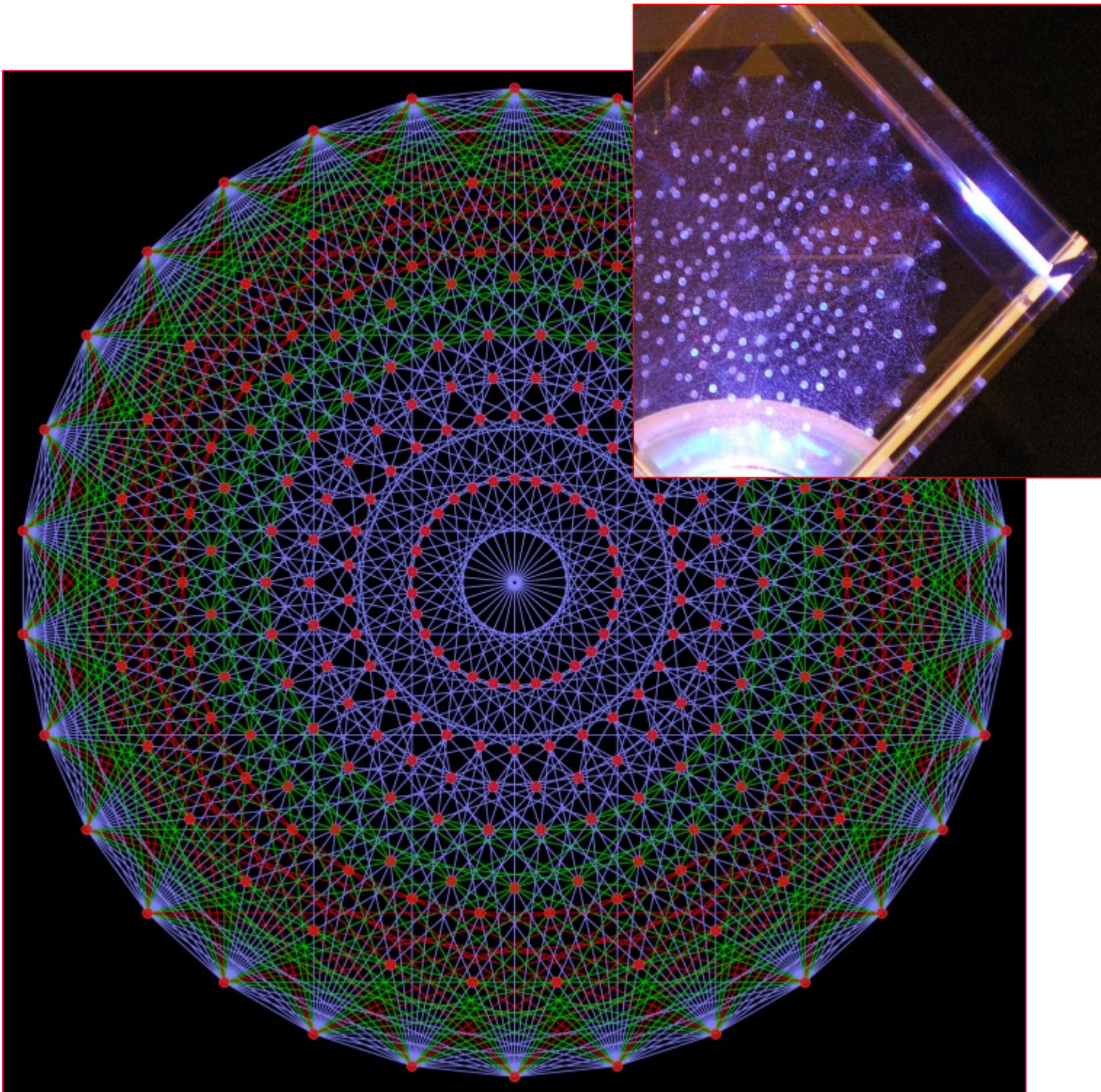
(" This is an auto-generated list from e8fyer.nb ")
new := [
];new;



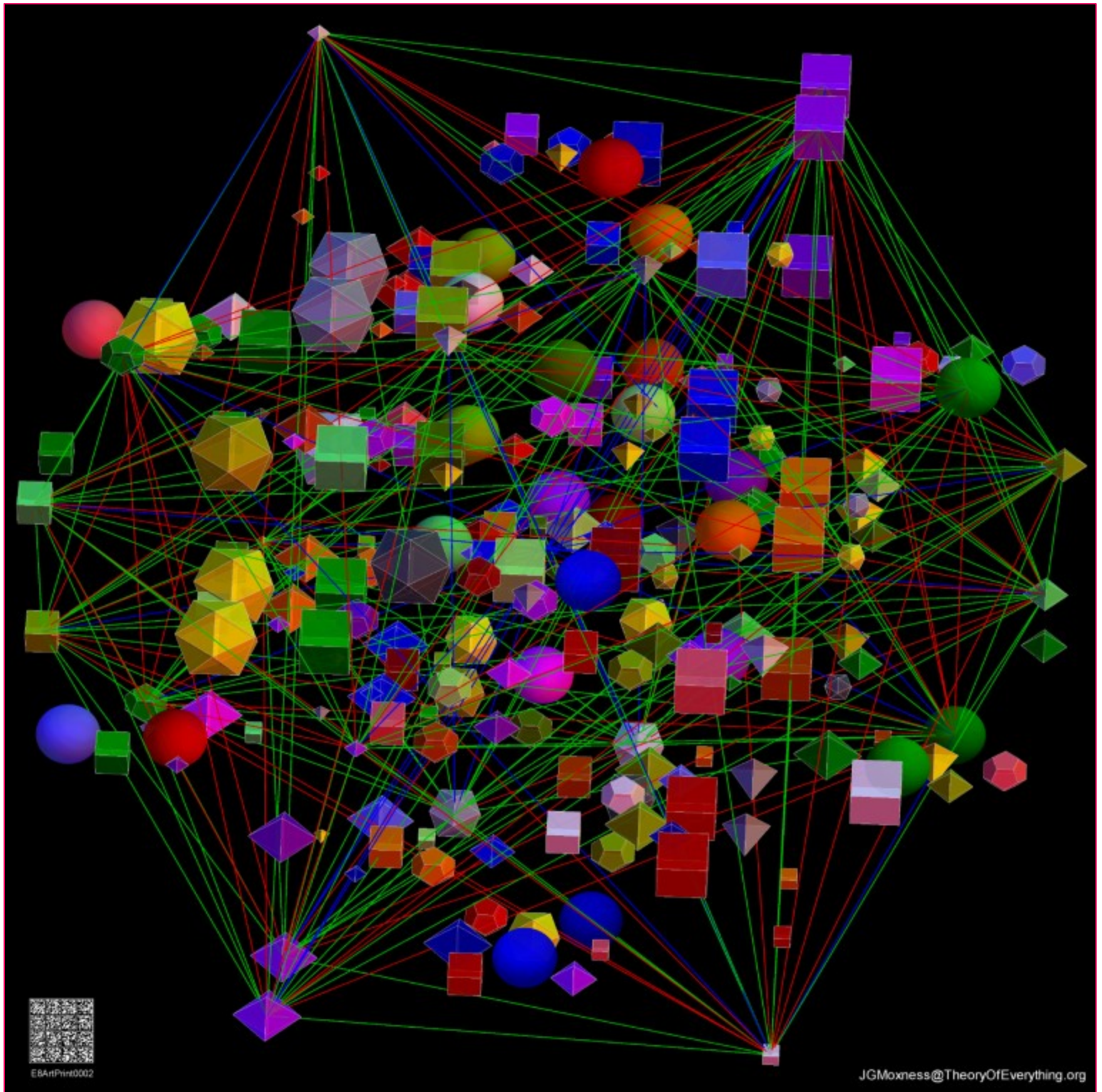
E8ArtPrint0000

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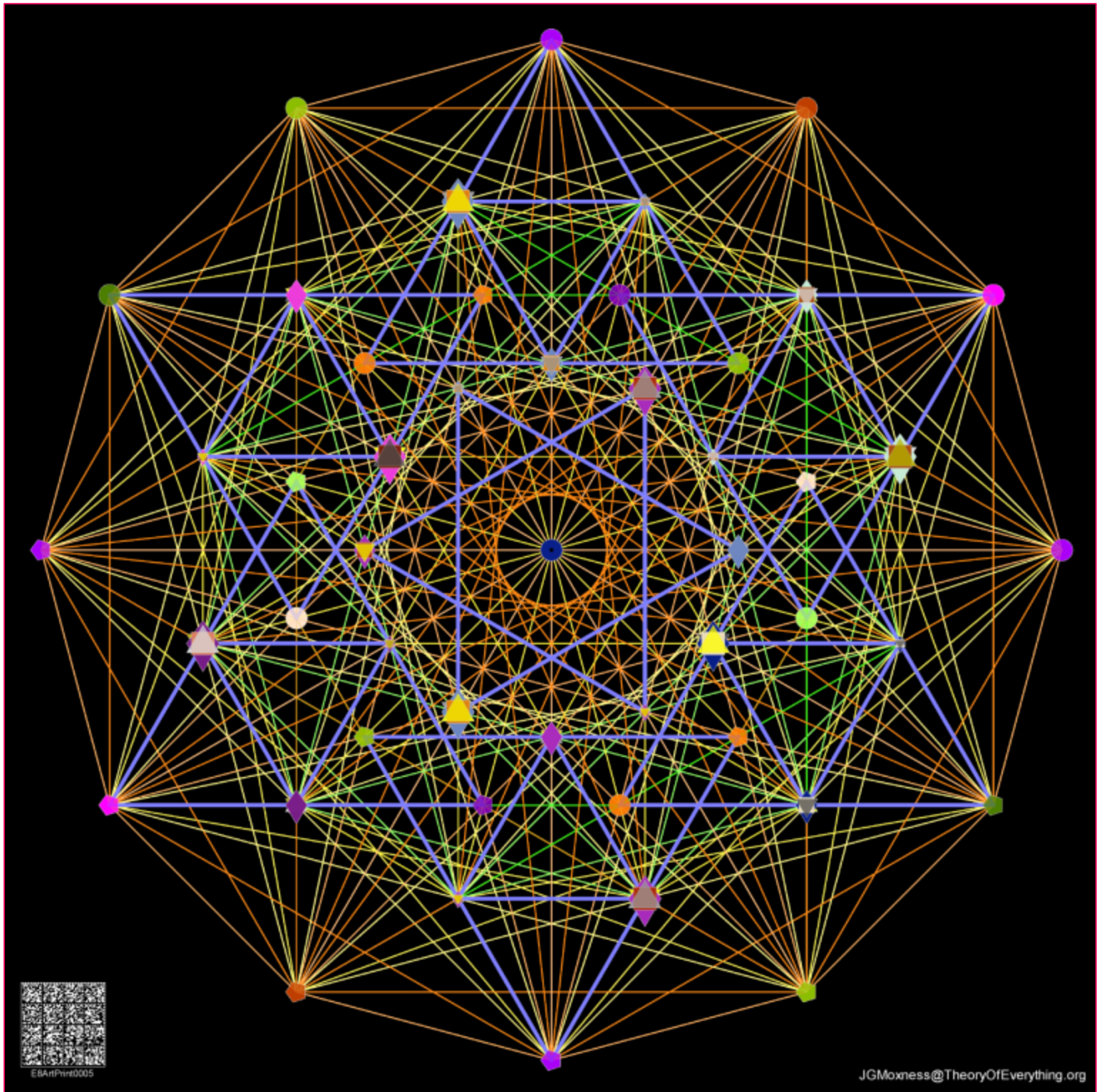
OBJECT 0011: "E8 SYMMETRY IN 2D"



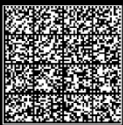
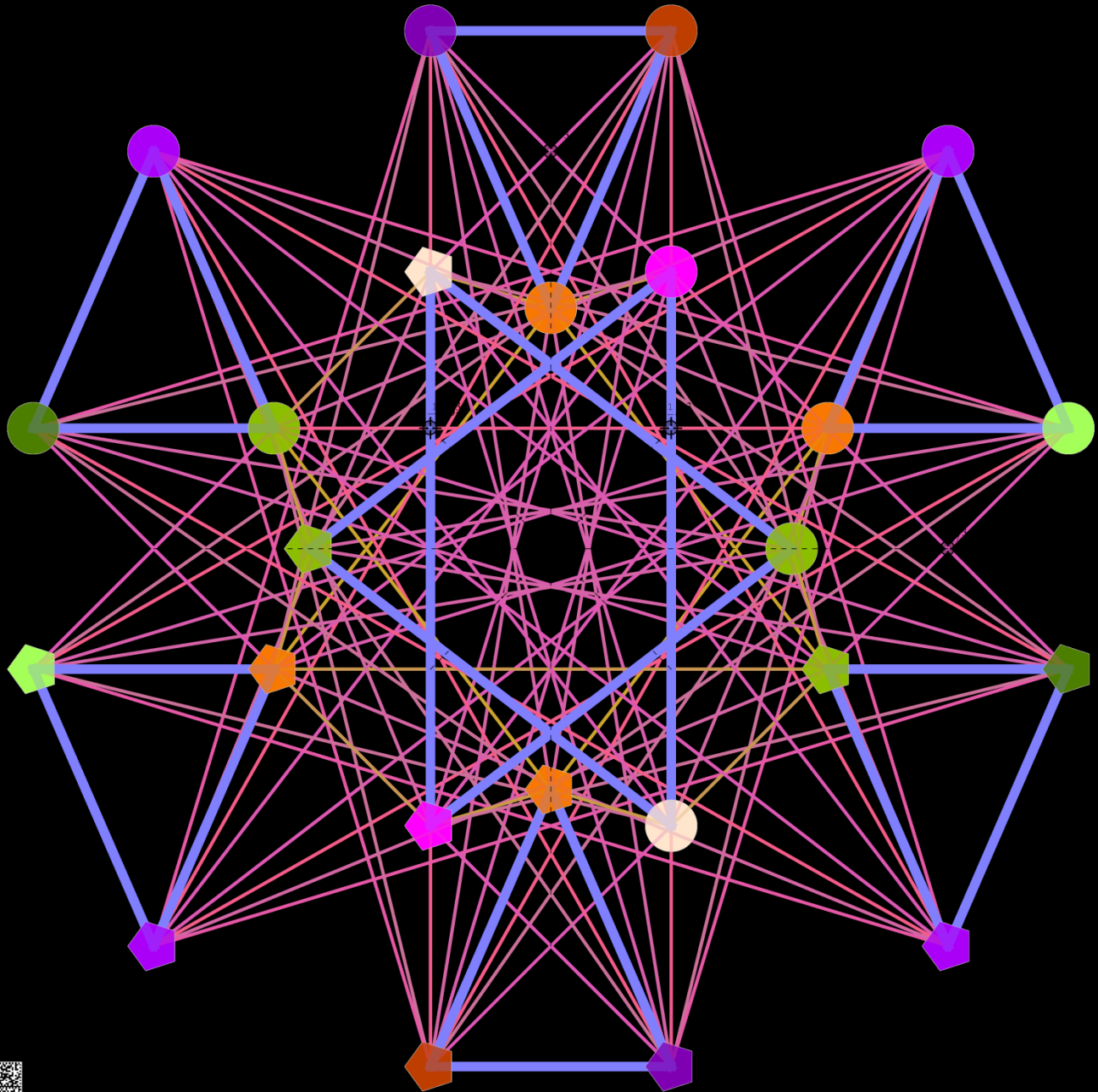
OBJECT 0100: "E8 SYMMETRY IN 3D"



OBJECT 0101: "HEXERACT TRIALITY"



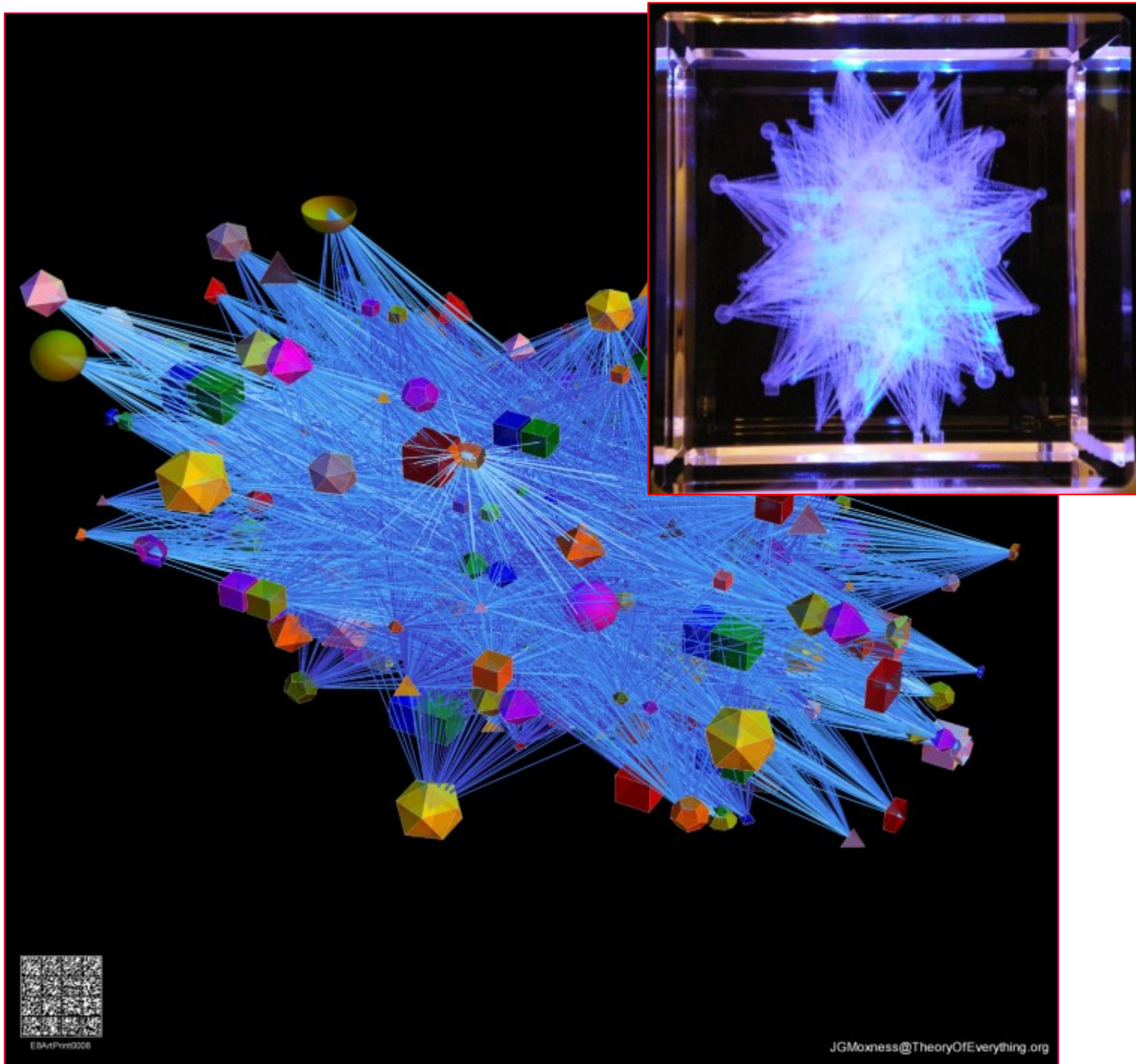
OBJECT 0110 "FUN WITH E6, F4/D4 AND THE 24-CELL"



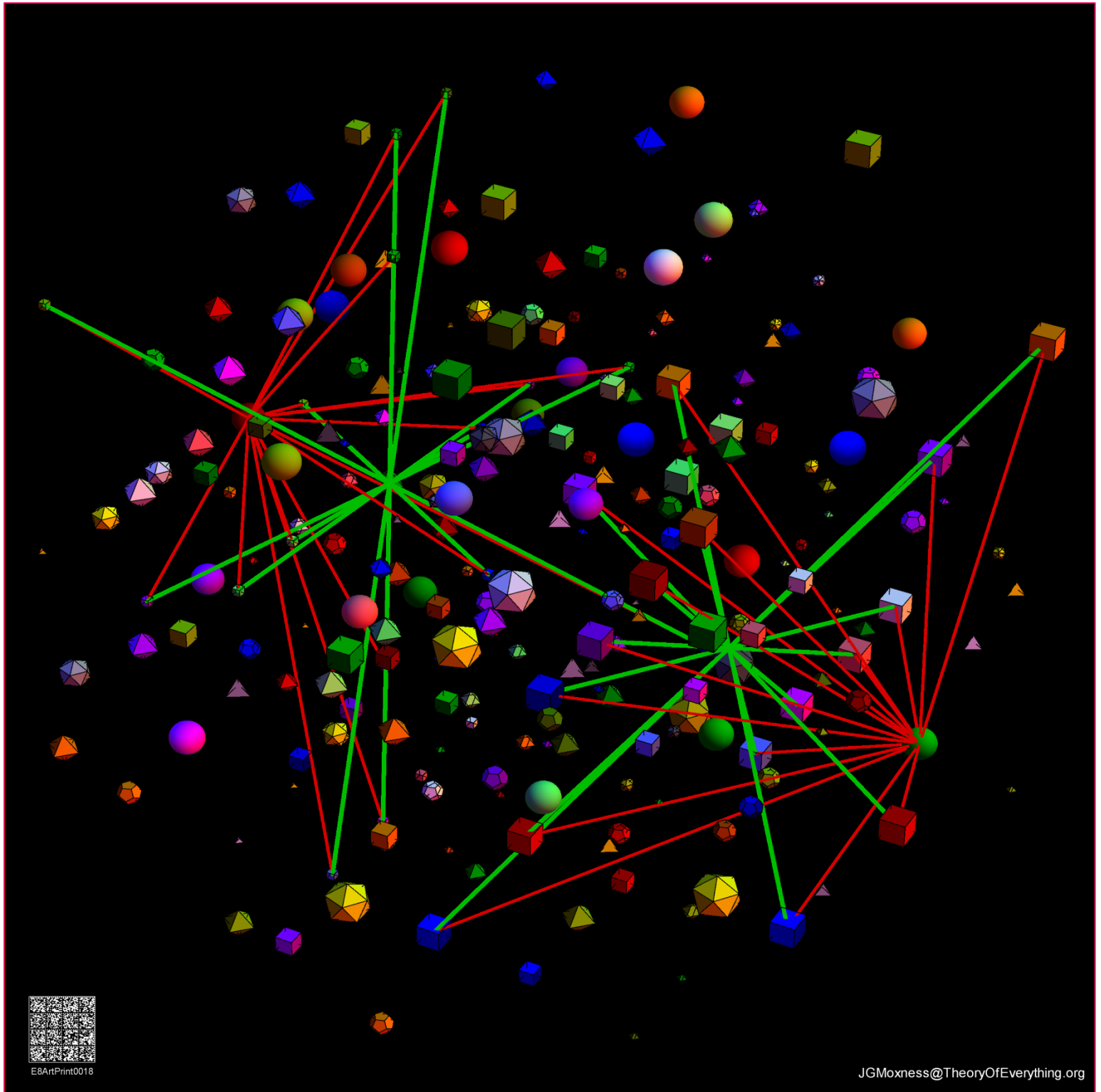
E8ArtPrint0016

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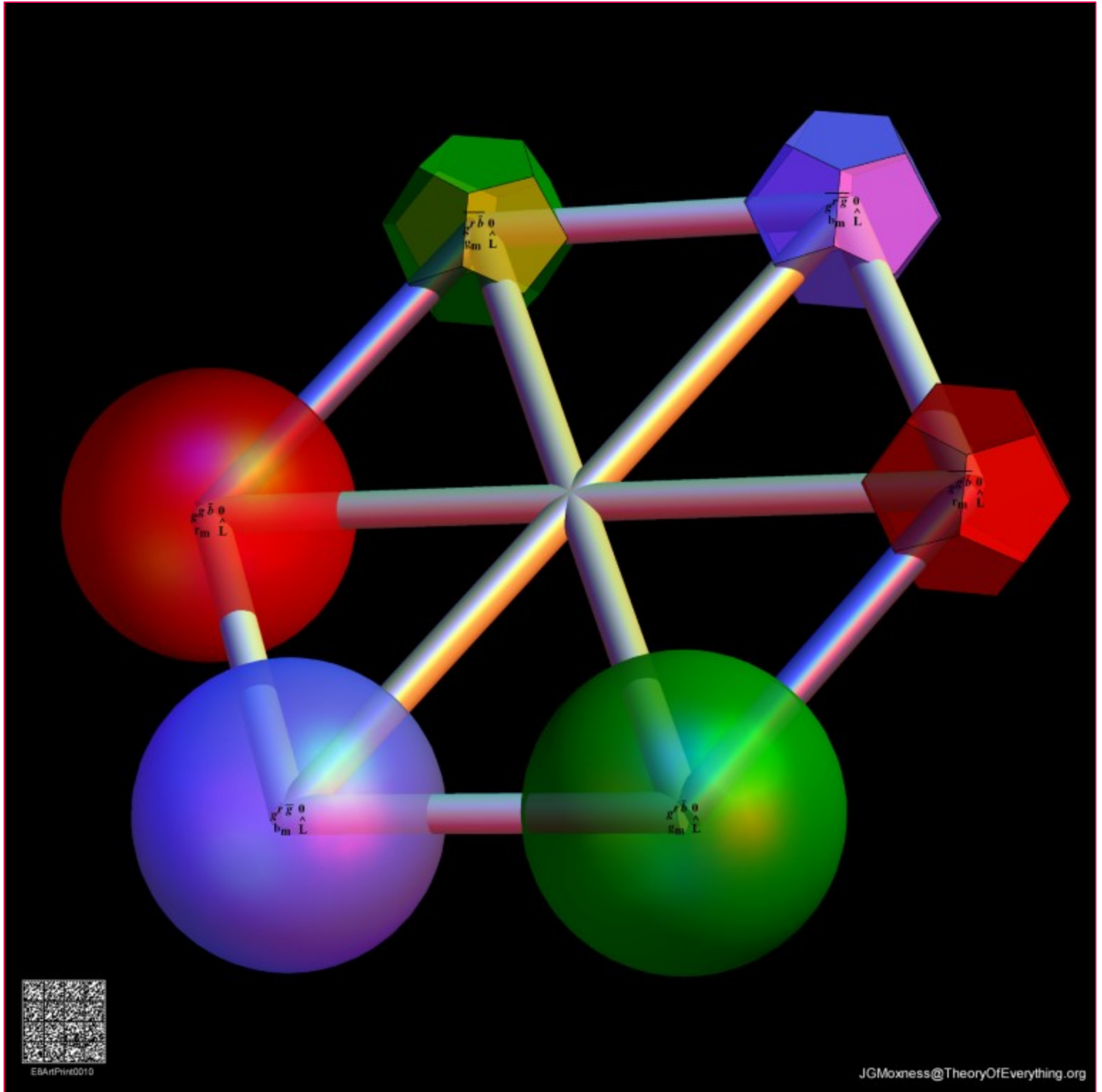
OBJECT 0111: "FAVORITE 24"



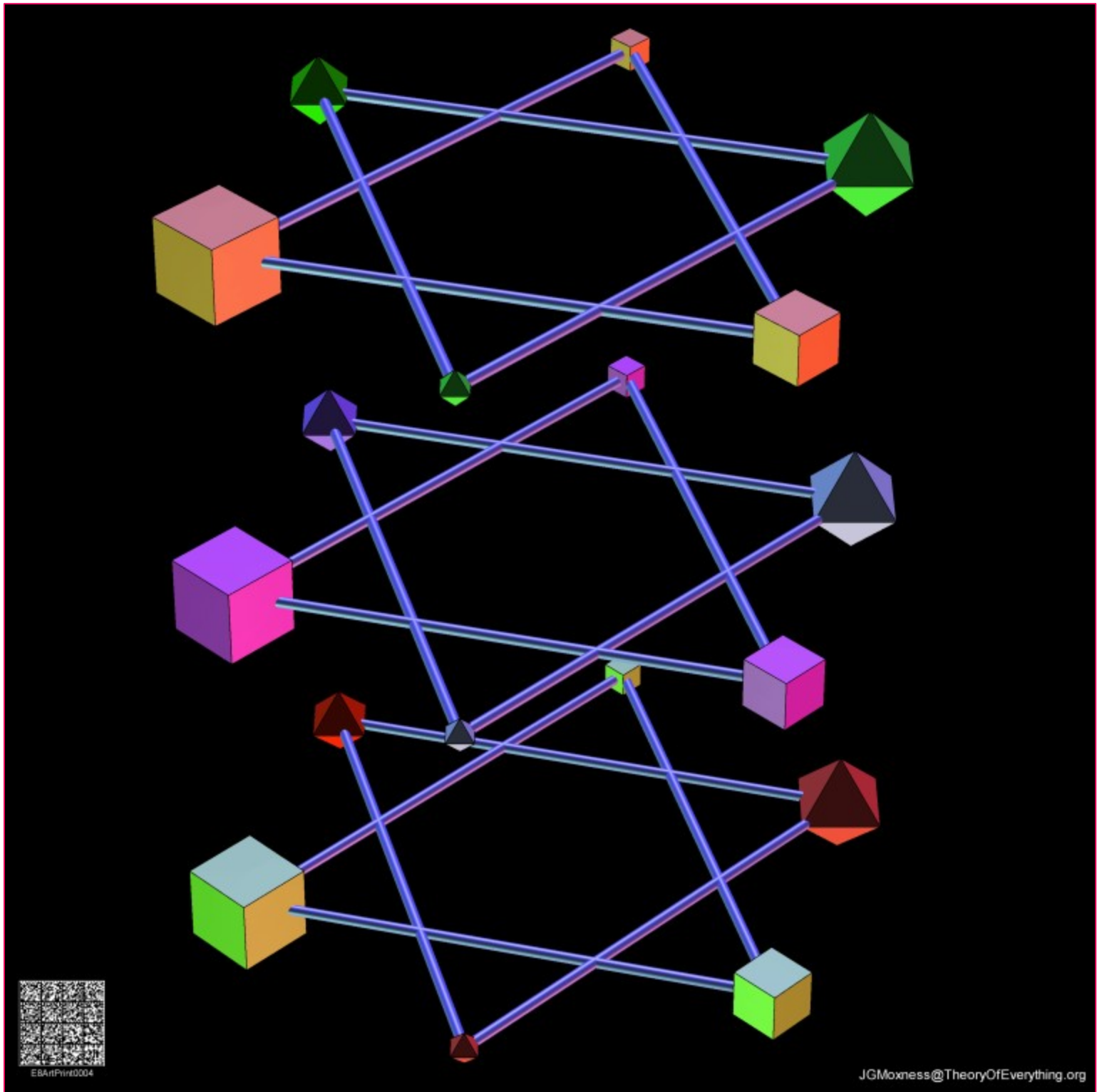
OBJECT 1000: "DEVOLUTION"



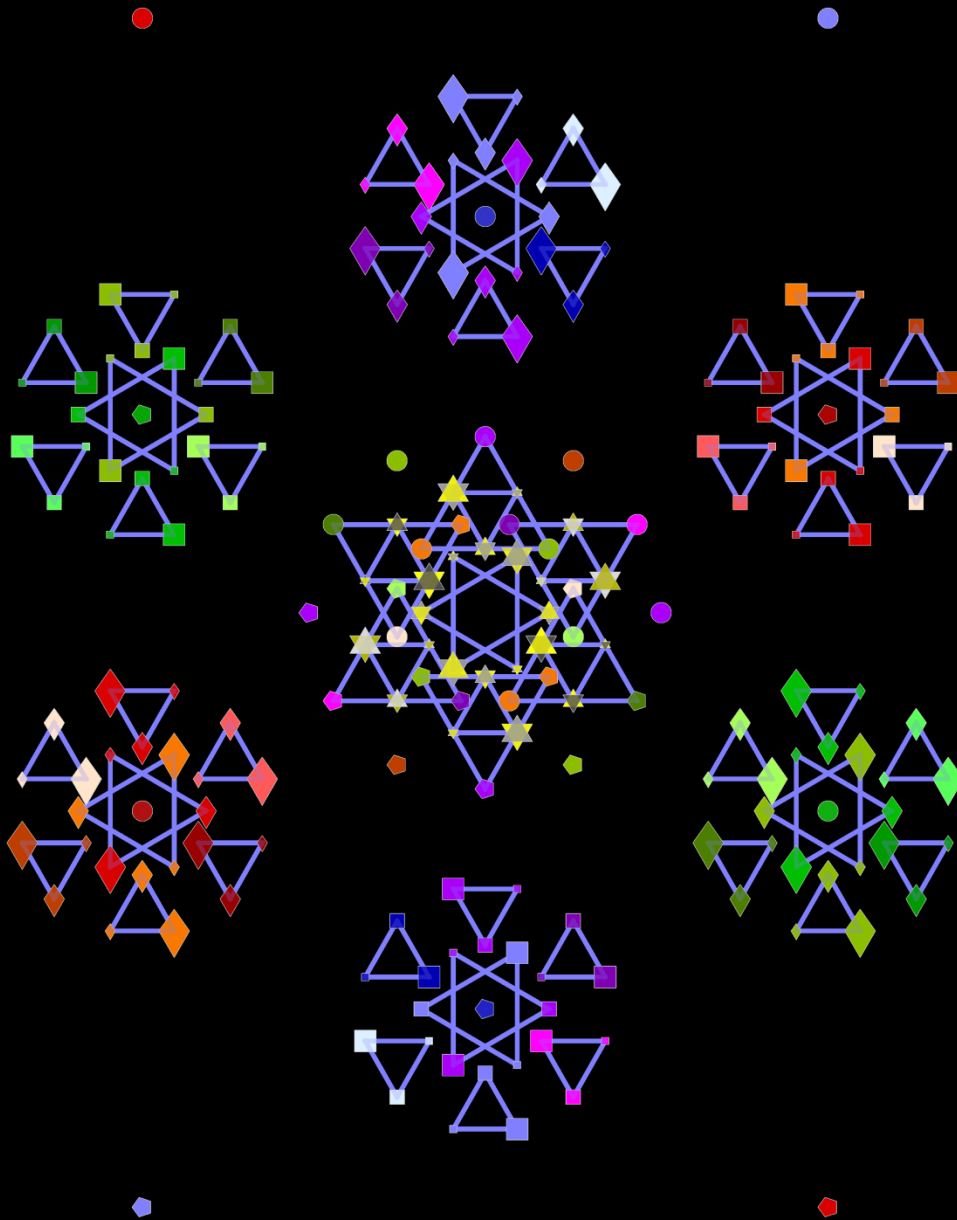
OBJECT 1001: "G2 GLUONS"



OBJECT 1010: "QUARK COLUMN"



OBJECT 1011: "NUCLEAR PHYSICS"



E8ArtPrint0006

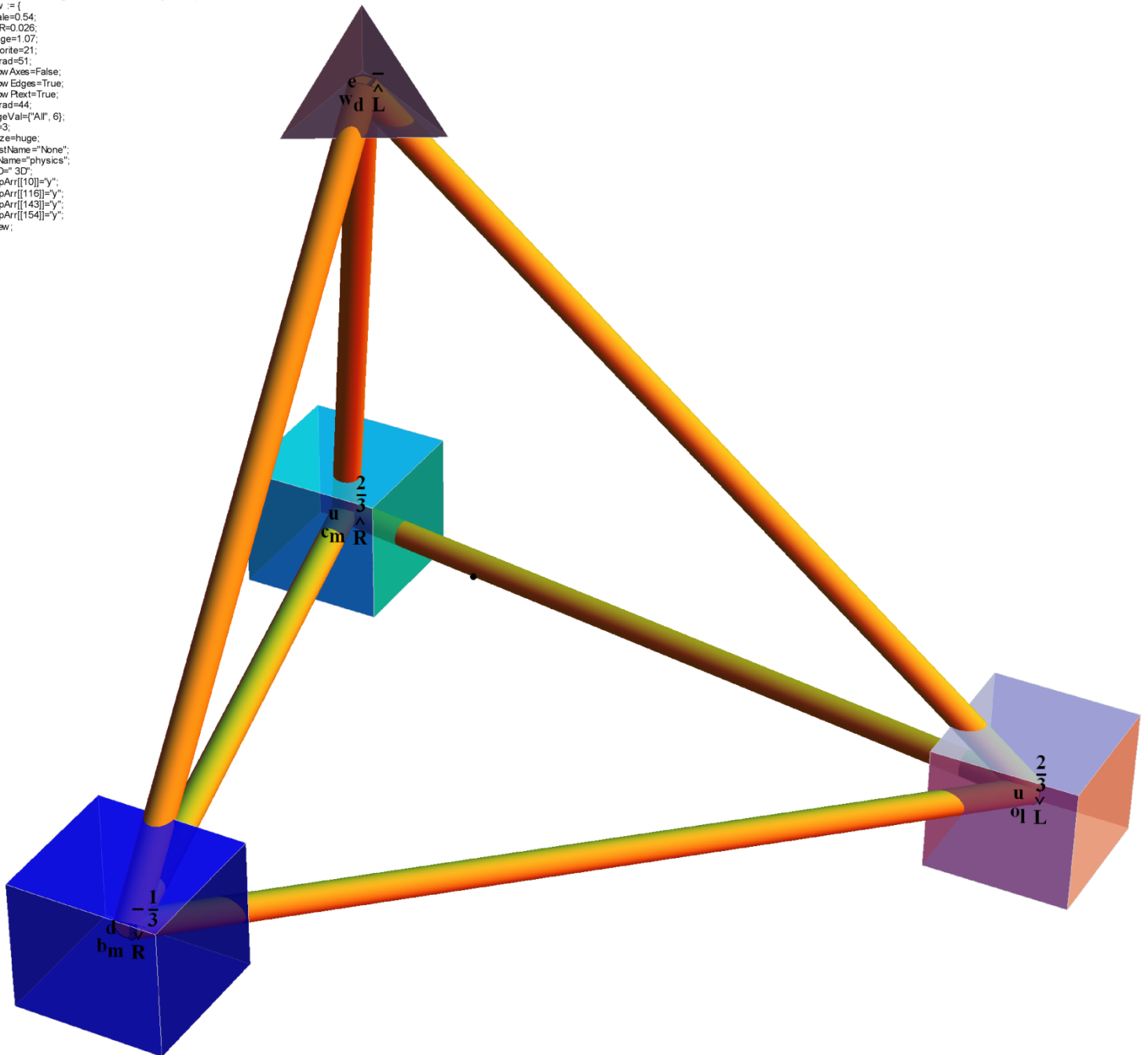
JGMoxness@TheoryOfEverything.org



OBJECT 1101: "HYDROGEN TETRAHEDRON"

(* This is an auto generated list from e8Flyer.nb *)

```
new := {
scale=0.54;
cylR=0.026;
range=1.07;
favorite=21;
pGrad=51;
showAxes=False;
showEdges=True;
showPtext=True;
eGrad=44;
edgeVal={"All", 6};
ds=3;
pSize=huge;
pListName="None";
dsName="physics";
p3D="3D";
dispArr[110]=y";
dispArr[116]=y";
dispArr[143]=y";
dispArr[154]=y";
};new;
```



E8ArtPrint0013

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OBJECT 1110: "THE UNFINISHED PROCESS"



The Unfinished Process

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OBJECT 1111: "IN THE END"



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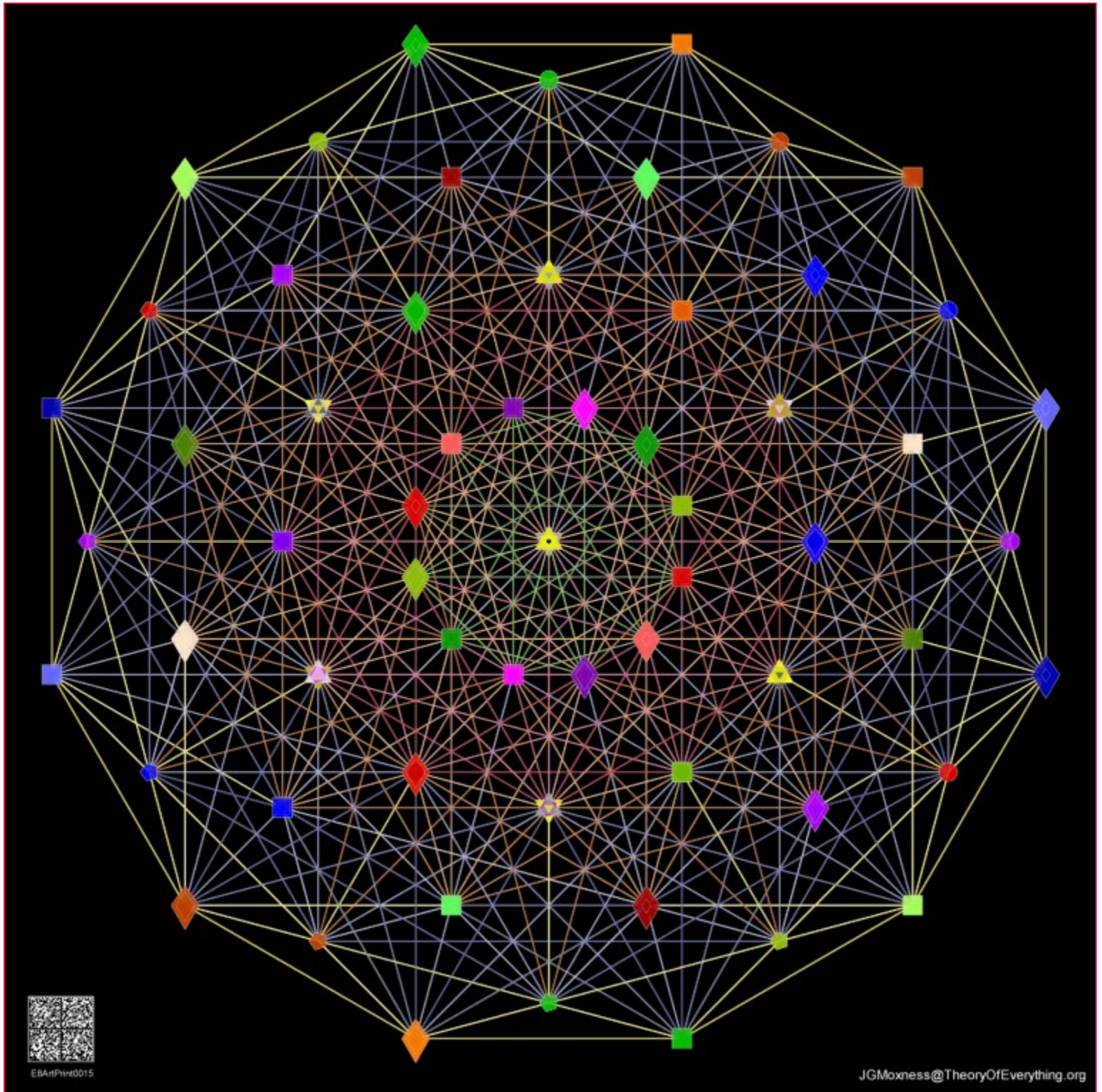
VIRTUAL WORLD OBJECTS”



MY AVATAR (PCGURU XI) STANDING NEXT TO

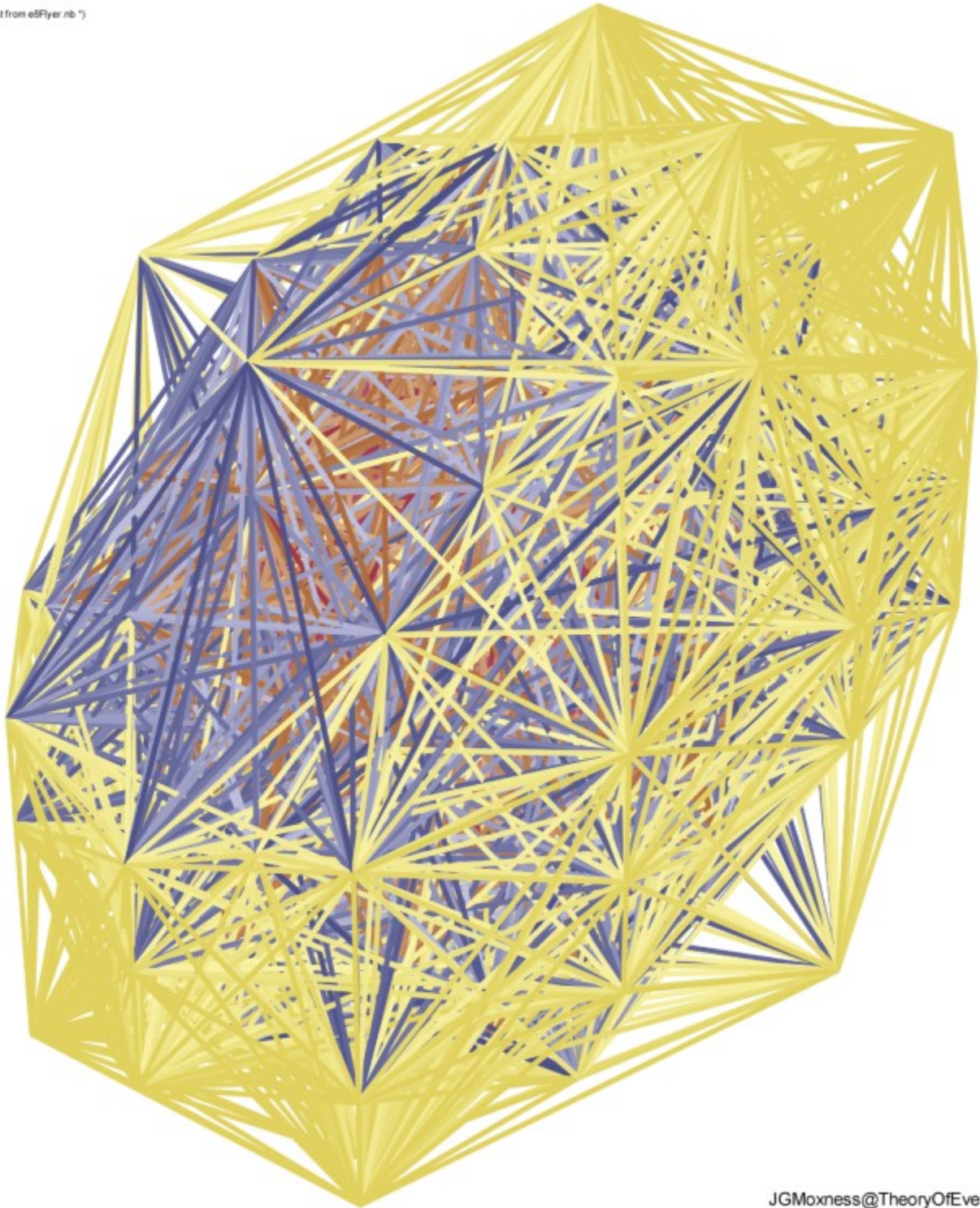
E8ARTPRINT0000, E8ARTPRINT0004, & E8ARTPRINT0013

"5 RINGS OF 12 PARTICLES IN 2D"



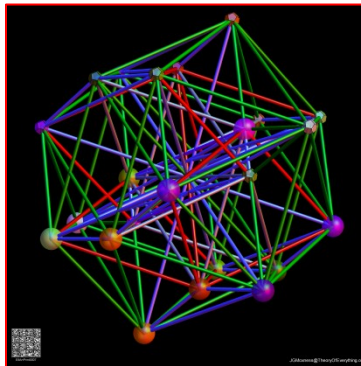
"5 RINGS OF 12 PARTICLES IN POVRAY 3D"

```
(* This is an auto generated list from e8Flyer.nb *)  
new := [  
  favorite=18;  
  showAxes=False;  
  showEdges=True;  
  eGrad=18;  
  ds=3;  
  dsName="physics";  
  p3D="3D";  
  ],new;
```



E8ArtPrint0017

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OBJECT 07: "3D F4 24-CELL"

AESTHETIC

I hope you enjoy the aesthetics.

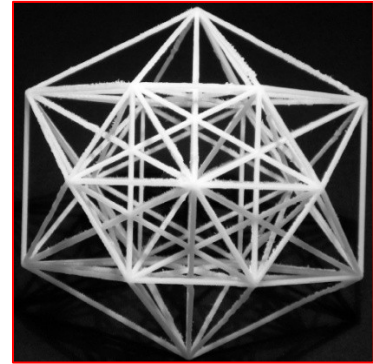
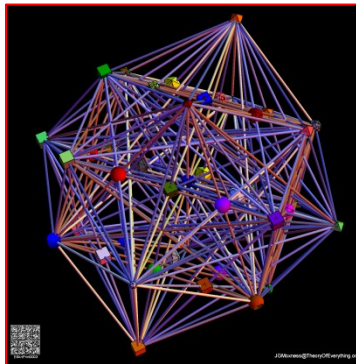
SCIENTIFIC

MATHEMATICS

This is a 3D representation of Object 06 in a similar projection showing the F4 Lie Group and/or 24-Cell.

PHYSICS

As in Object 06, this graph filters the 240 E8 vertex particles to 24 consisting of the ElectroWeak W/ ω and Gravitational Higgs $e\Phi/B$ bosons.



OBJECT 0111: "E6"

AESTHETIC

Notice the 3D symmetry and complexity in one graph.

The photo to the right is an actual 3D stereo-lithography model grown from plastic. It is a 4"x4"x4" cubic size. It took 1 day to grow and 2 days to dissolve the support structures.

SCIENTIFIC

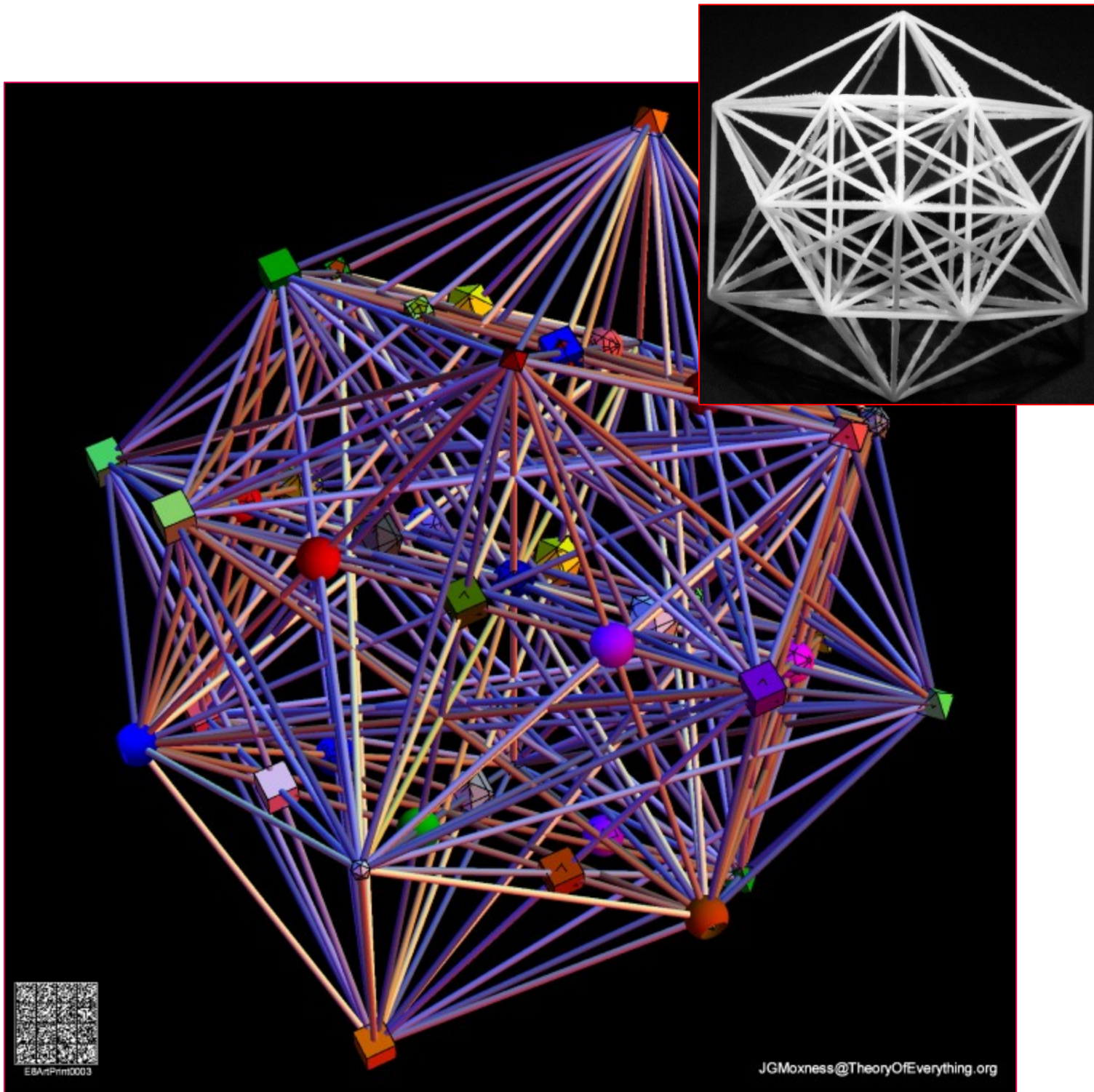
MATHEMATICS

A 3D representation closely related to E6 with a 2D pattern of 2 concentric rings of 12 vertices.

PHYSICS

No special physics related information in this representation.

OBJECT XXXX: "3D F4 24-CELL"



OBJECT XXXX: "ABC"

