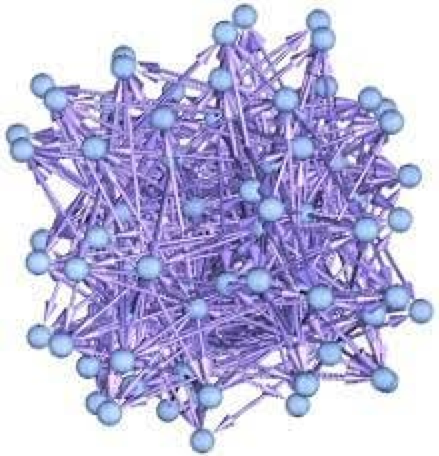
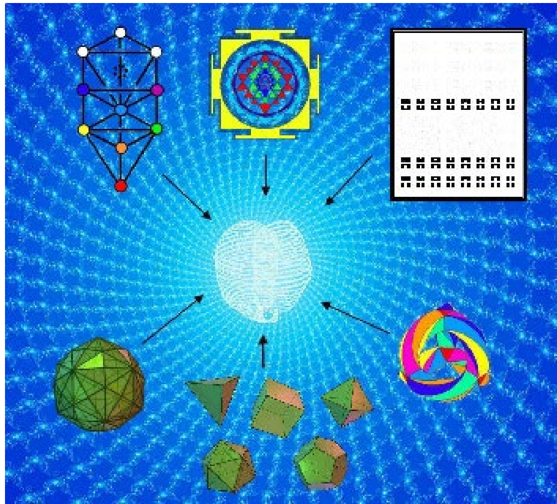
# The Sacred Geometry of the Eastern Tao

Alephtalks

Mysticism: Where Science, Art and Spirituality Meet

9 November 2023





# Outline

- The Need for More Dimensions to Hold Extra Energy
  - Matter Is 5% of Universe
  - Dark Matter Is 27% of Universe
  - Dark Energy Is 68% of Universe
- Kaluza-Klein Five Dimensional Electromagnetism/General Relativity
- String Theory Deals in Ten/Eleven Dimensions
- Calabi-Yau Manifolds
- How To Get More Dimensions
  - Orthogonal Dimensions: Complex Number Rotation
  - Compactified Dimensions: Rolled Up Dimensions
  - Vibrational Dimensions: Resonances from Sacred Geometry
- Interpretation of Subspaces of 26 Real Dimensional Universe

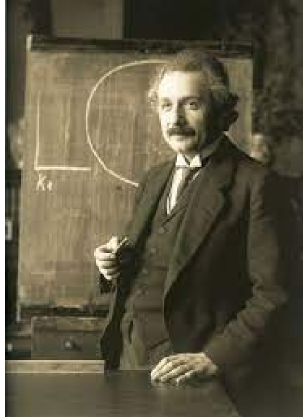
# Dark Matter

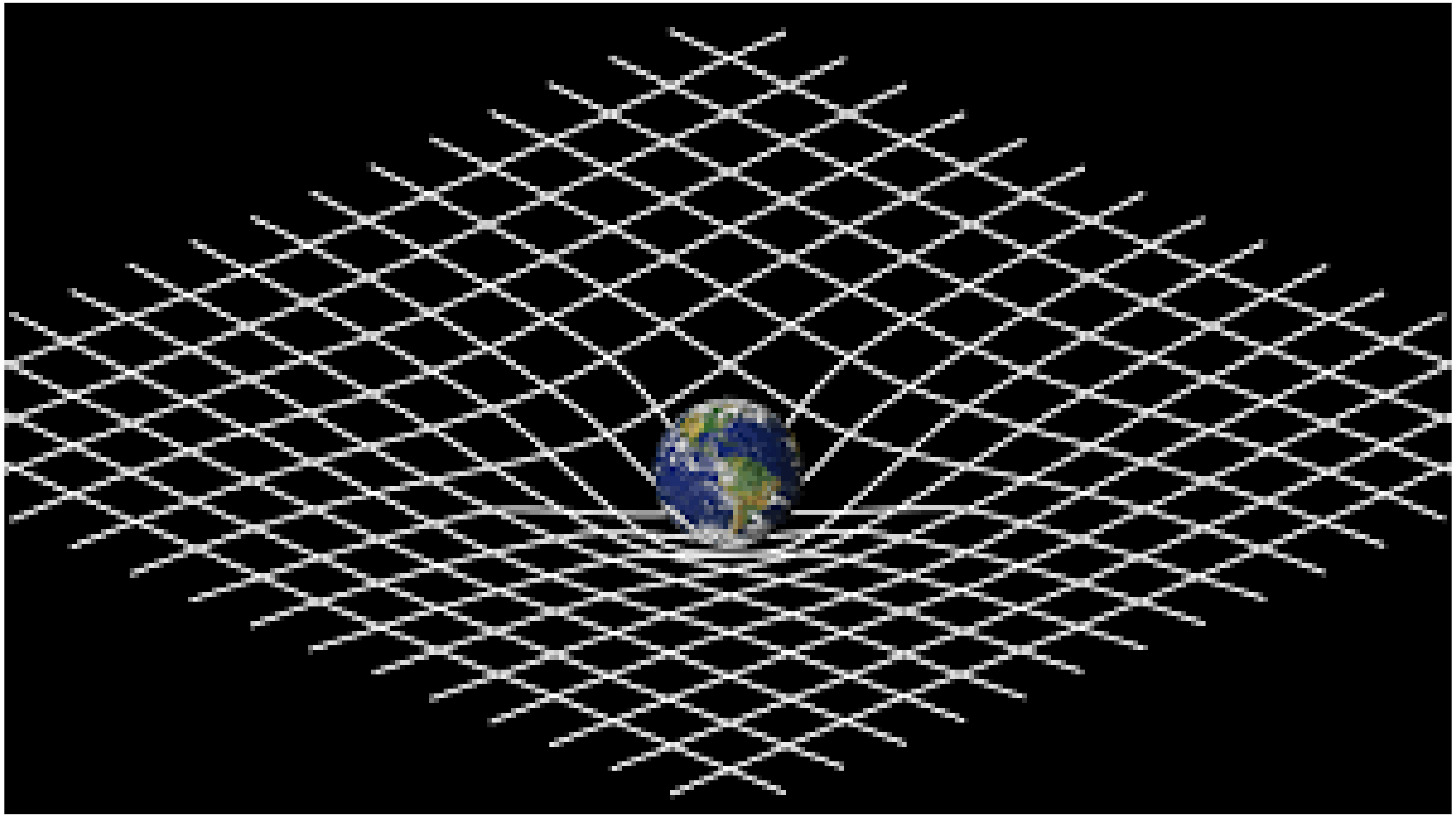
- Vesto Slipher in 1912 at Flagstaff and Edwin Hubble in 1924 at Mount Wilson recognized that smudges of light were in fact other galaxies, not stars or nebulae
- Zwicky in the 1930s did calculations based on an average mass of a star and the force of gravity, and realized that spiral galaxies would fly apart unless there was additional matter in these galaxies that attracted all the different stars; this matter was transparent or dark, it could not be observed at present
- Ruben in the 1970s carried out detailed observations and calculations to confirm what Zwicky had done

# Dark Energy

- George LeMaitre in 1922 used Einstein’s equations of general relativity to show that a homogeneous universe was unstable, it either had to expand or contract
- Hubble in 1924 observed that all the galaxies and stars are moving away from one another; the 2011 Nobel Prize in Physics was awarded for measurements showing the expansion is accelerating
- If everything is moving away from one another, something is driving this, stretching the fabric of space itself, and this force is due to unseen or dark energy
- If everything is moving away from one another, everything started out close to one another at an earlier point in time, which raises the question in the Bible of The Book of Genesis and the Gospel of John

# General Relativity Curvature of Space-Time





# Kaluza-Klein Five Dimensional Theory

- Einstein developed a theory of general relativity, showing that gravitation arises from distortions in space-time, in 1916
- Kaluza sent Einstein a manuscript in 1919 showing that if an additional dimension were added, electromagnetism could be included in this theory
- In physics, Kaluza–Klein theory (KK theory) is a classical unified field theory of gravitation and electromagnetism built around the idea of a fifth dimension beyond the common 4D of space and time and considered an important precursor to string theory.
- Gunnar Nordström had an earlier, similar idea. But in that case, a fifth component was added to the electromagnetic vector potential, representing the Newtonian gravitational potential, and writing the Maxwell equations in five dimensions.

# Kaluza-Klein Five Dimensional Theory

- The five-dimensional (5D) theory developed in three steps. The original hypothesis came from Theodor Kaluza, who sent his results to Einstein in 1919 and published them in 1921. Kaluza presented a purely classical extension of general relativity to 5D, with a metric tensor of 15 components. Ten components are identified with the 4D spacetime metric, four components with the electromagnetic vector potential, and one component with an unidentified scalar field sometimes called the "radion" or the "dilaton".
- Correspondingly, the 5D Einstein equations yield the 4D Einstein field equations, the Maxwell equations for the electromagnetic field, and an equation for the scalar field. Kaluza also introduced the "cylinder condition" hypothesis, that no component of the five-dimensional metric depends on the fifth dimension. Without this restriction, terms are introduced that involve derivatives of the fields with respect to the fifth coordinate, and this extra degree of freedom makes the mathematics of the fully variable 5D relativity enormously complex. Standard 4D physics seems to manifest this "cylinder condition" and, along with it, simpler mathematics.

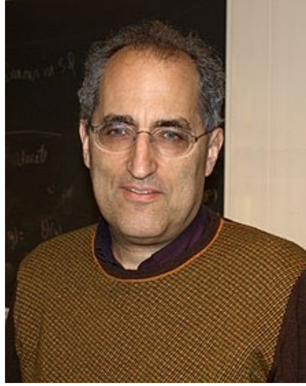
# Kaluza-Klein Five Dimensional Theory

- In 1926, Oskar Klein gave Kaluza's classical five-dimensional theory a quantum interpretation, to accord with the then-recent discoveries of Heisenberg and Schrödinger.
- Klein introduced the hypothesis that the fifth dimension was curled up and microscopic, to explain the cylinder condition. Klein suggested that the geometry of the extra fifth dimension could take the form of a circle, with the radius of 10−30 cm.
- More precisely, the radius of the circular dimension is 23 times the Planck length, which in turn is of the order of 10^(−35) meters.
- Klein also made a contribution to the classical theory by providing a properly normalized 5D metric.
- Work continued on the Kaluza field theory during the 1930s by Einstein and colleagues at Princeton.

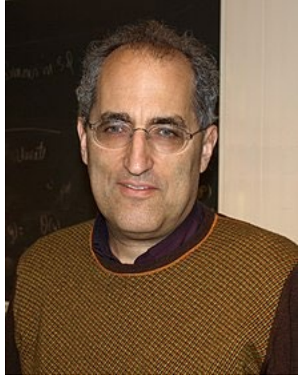
# Kaluza-Klein Five Dimensional Theory

- In the 1940s the classical theory was completed, and the full field equations including the scalar field were obtained by three independent research groups:
    - Thiry, working in France on his dissertation under Lichnerowicz;
    - Jordan, Ludwig, and Müller in Germany, with critical input from Pauli and Fierz; and
    - Scherrer working alone in Switzerland.
- Jordan's work led to the scalar–tensor theory of Brans–Dicke; Brans and Dicke were apparently unaware of Thiry or Scherrer. The full Kaluza equations under the cylinder condition are quite complex, and most English-language reviews, as well as the English translations of Thiry, contain some errors. The curvature tensors for the complete Kaluza equations were evaluated using tensor-algebra software in 2015 (Wolfram Mathematica/Language), verifying results of Ferrari and Coquereaux & Esposito-Farese.
- The 5D covariant form of the energy–momentum source terms is treated by Williams.

# Edward Witten



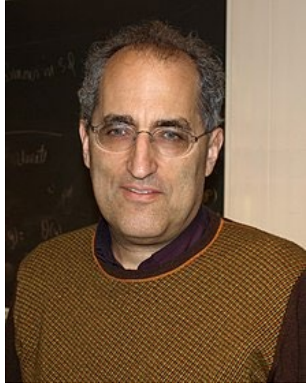
- Edward Witten (born August 26, 1951) is an American mathematical and theoretical physicist.
- He is a professor emeritus in the school of natural sciences at the Institute for Advanced Study in Princeton.
- Witten is a researcher in string theory, quantum gravity, supersymmetric quantum field theories, and other areas of mathematical physics. Witten's work has also significantly impacted pure mathematics.
- In 1990, he became the first physicist to be awarded a Fields Medal by the International Mathematical Union, for his mathematical insights in physics, such as his 1981 proof of the positive energy theorem in general relativity, and his interpretation of the Jones invariants of knots as Feynman integrals.
- He is considered the practical founder of M-theory.



# String Theory in 10/11 Dimensions

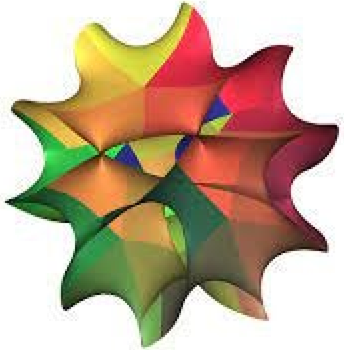
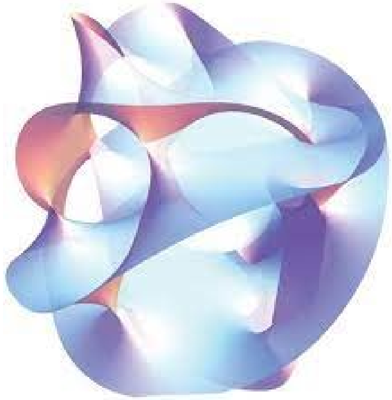
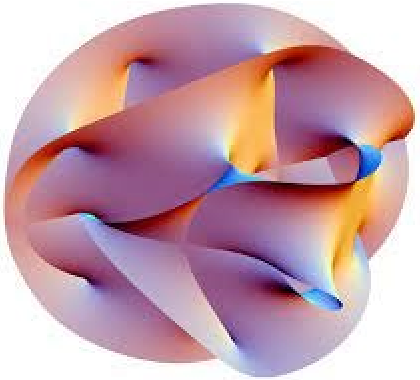
- In physics, string theory is a theoretical framework in which the point-like particles of particle physics are replaced by one-dimensional objects called strings.
- String theory describes how these strings propagate through space and interact with each other. On distance scales larger than the string scale, a string looks just like an ordinary particle, with its mass, charge, and other properties determined by the vibrational state of the string.
- In string theory, one of the many vibrational states of the string corresponds to the graviton, a quantum mechanical particle that carries the gravitational force. Thus, string theory is a theory of quantum gravity.

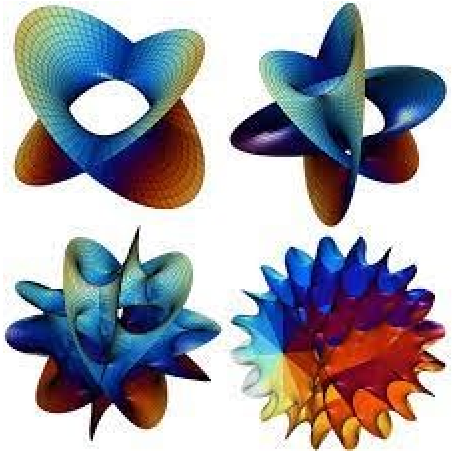
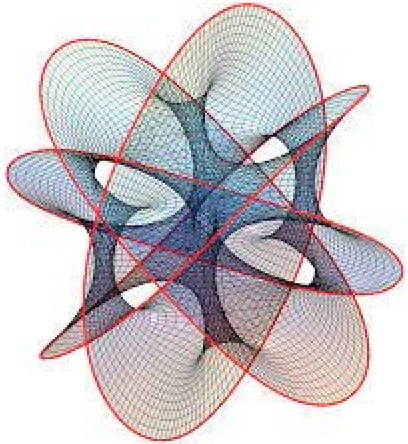
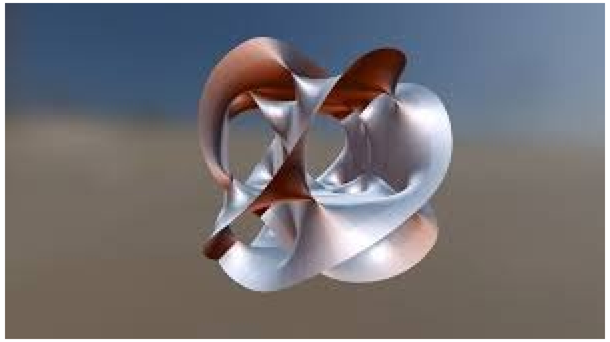
# String Theory in 10/11 Dimensions



- String theory was first studied in the late 1960s as a theory of the strong nuclear force, before being abandoned in favor of quantum chromodynamics.
- Subsequently, it was realized that the very properties that made string theory unsuitable as a theory of nuclear physics made it a promising candidate for a quantum theory of gravity.
- The earliest version of string theory, bosonic string theory, incorporated only the class of particles known as bosons.
- It later developed into superstring theory, which posits a connection called supersymmetry between bosons and the class of particles called fermions.
- Five consistent versions of superstring theory were developed before it was conjectured in the mid-1990s that they were all different limiting cases of a single theory in 11 dimensions known as M-theory.

# Different Calabi-Yau Manifolds


# Calabi-Yau Manifolds

- In algebraic geometry, a Calabi–Yau manifold, also known as a Calabi–Yau space, is a particular type of manifold which has properties, such as Ricci flatness, yielding applications in theoretical physics. Particularly in superstring theory, the extra dimensions of spacetime are sometimes conjectured to take the form of a 6-dimensional Calabi–Yau manifold, which led to the idea of mirror symmetry. Their name was coined by Candelas et al. (1985), after Eugenio Calabi (1954, 1957) who first conjectured that such surfaces might exist, and Shing-Tung Yau (1978) who proved the Calabi conjecture.
- Calabi–Yau manifolds are complex manifolds that are generalizations of K3 surfaces in any number of complex dimensions (i.e. any even number of real dimensions). They were originally defined as compact Kähler manifolds with a vanishing first Chern class and a Ricci-flat metric, though many other similar but inequivalent definitions are sometimes used.

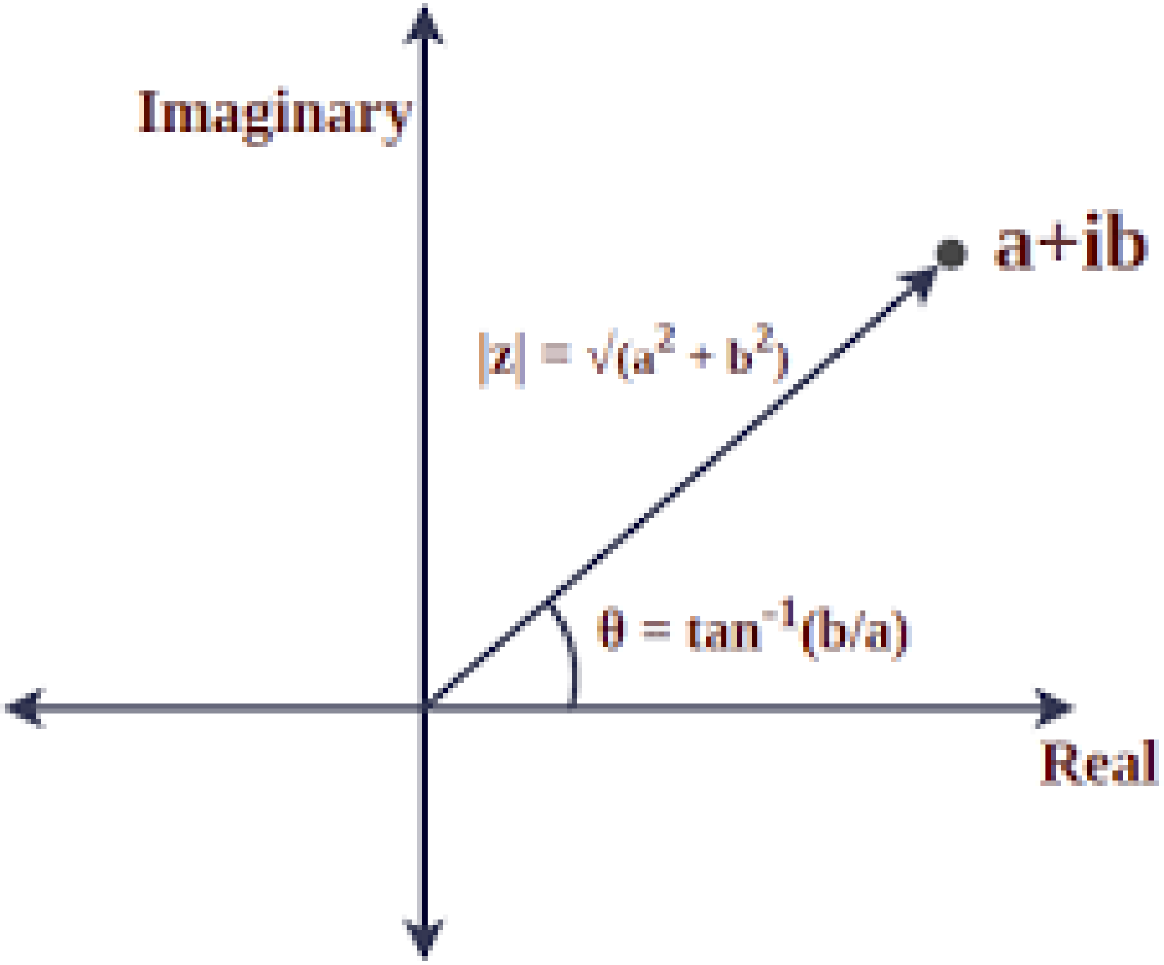
# Calabi-Yau Manifold

- The motivational definition given by Shing-Tung Yau is of a compact Kähler manifold with a vanishing first Chern class, that is also Ricci flat.
- There are many other definitions of a Calabi–Yau manifold M used by different authors, some inequivalent.
  - The canonical bundle of M is trivial
  - M has a holomorphic n-form that vanishes nowhere
  - The structure group of the tangent bundle of M can be reduced from U(n) to SU(n)
  - M has a Kähler metric with global holonomy contained in SU(n)
- These conditions imply that the first integral Chern class c1(M) vanishes. Nevertheless, the converse is not true. The simplest examples where this happens are hyperelliptic surfaces, finite quotients of a complex torus of complex dimension 2, which have vanishing first integral Chern class but non-trivial canonical bundle.

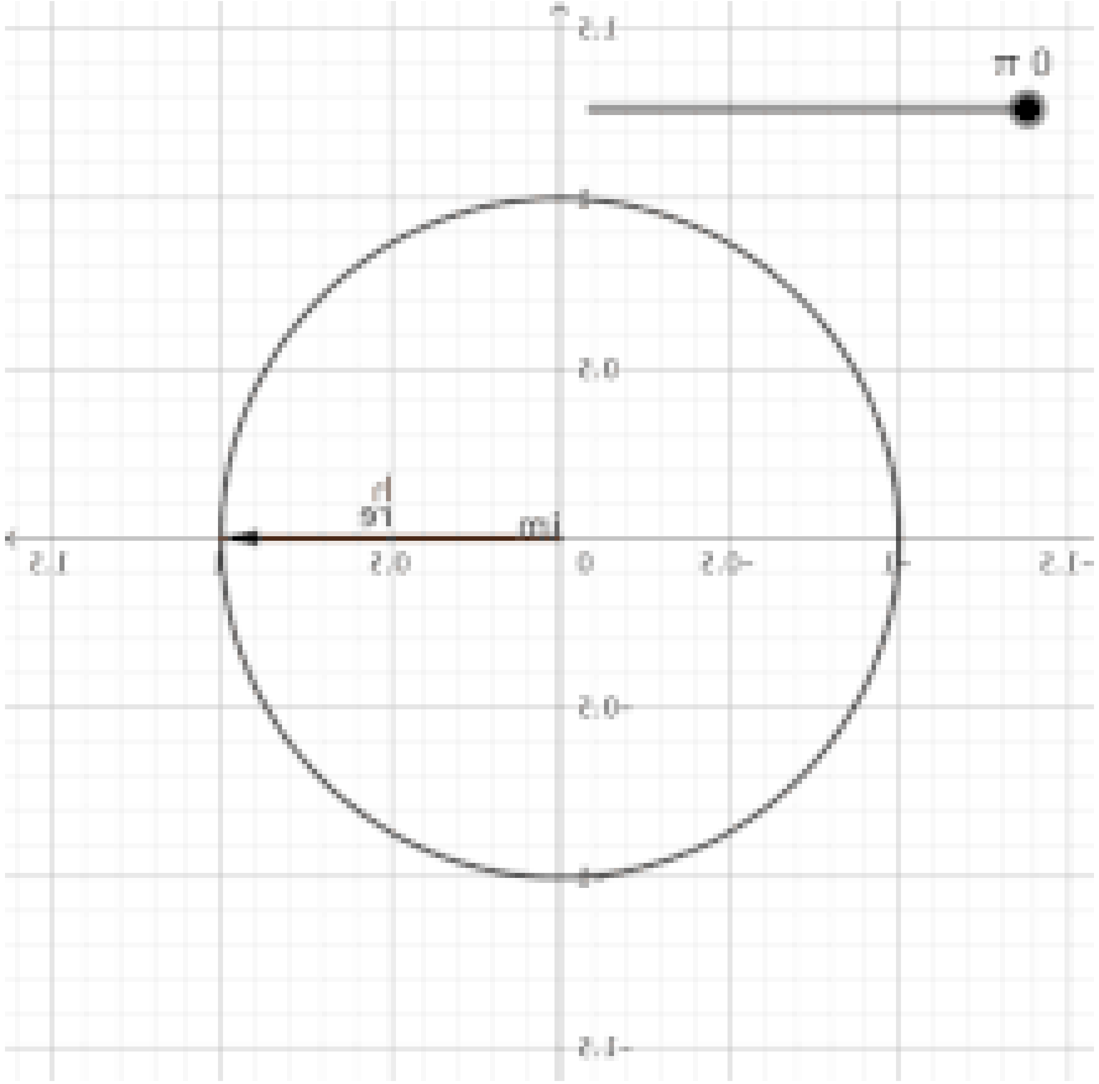
# Orthogonal Rotated Dimensions

- A single complex number involves a real number added to a second real number multiplied by square root of minus one, or a real part and imaginary part
- If we think of a complex number lying on a circle of radius one, and we rotate a point around this circle, we start at the real axis, then rotate up all the way to the imaginary axis, then down to the real axis, then down to the imaginary axis, then up to the real axis
- If we look at four dimensional space time (x,y,z,ict) we see that the time dimension is multiplied by the speed of light so ct has dimensions of length just like (x,y,z), but time is rotated up by ninety degrees away from the real axis being multiplied by minus one

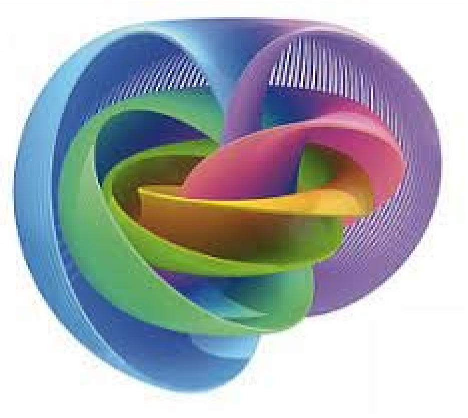
# Graphic Representation of Complex Numbers

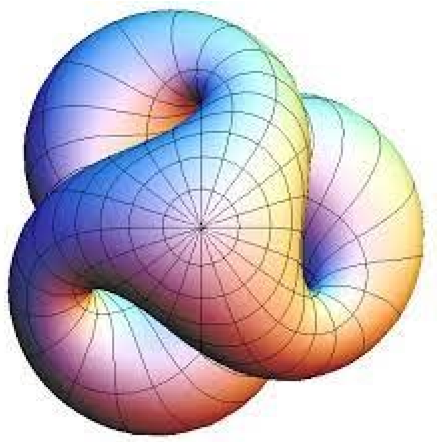


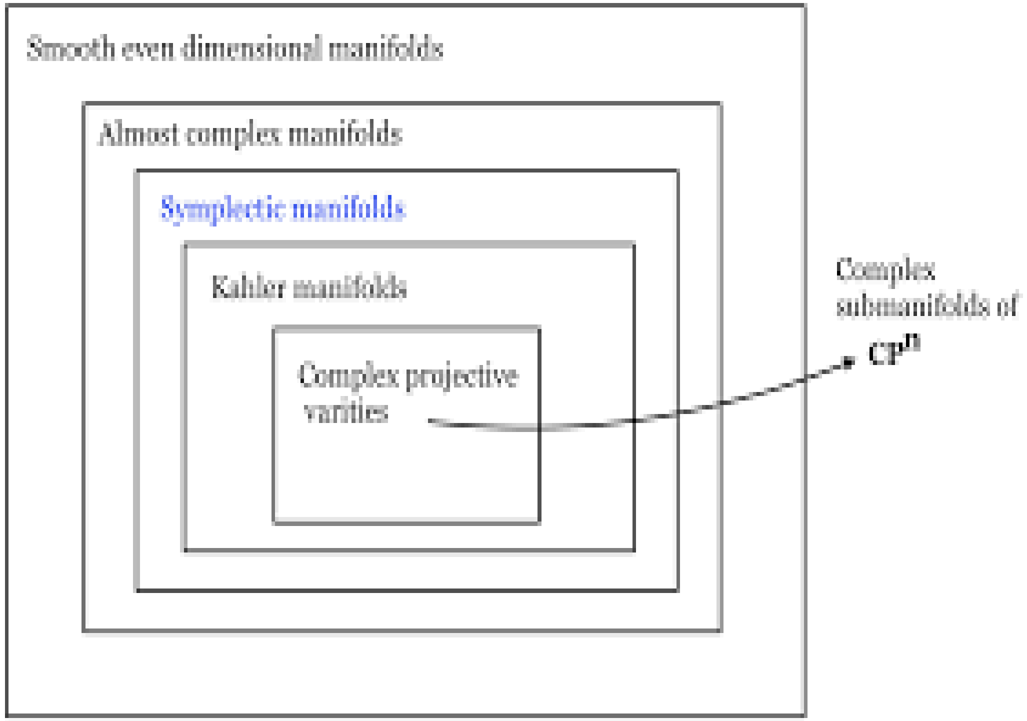

# Unit Circle in the Complex Plane



# Symplectic Manifolds



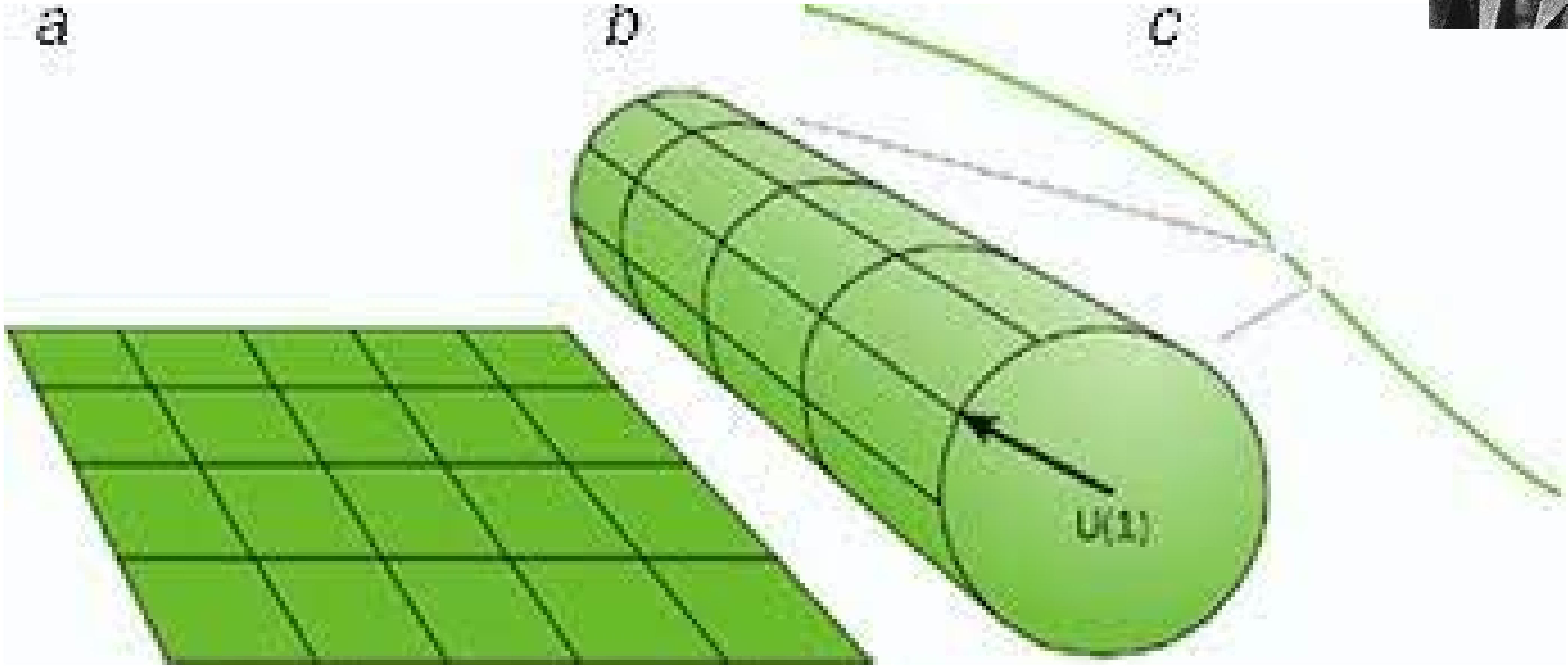




# Symplectic Manifolds

- **Symplectic geometry** is a branch of differential geometry and differential topology that studies symplectic manifolds; that is, differentiable manifolds equipped with a closed, nondegenerate 2-form. Symplectic geometry has its origins in the Hamiltonian formulation of classical mechanics where the phase space of certain classical systems takes on the structure of a symplectic manifold.
- The term "symplectic", introduced by Weyl,is a calque of "complex"; previously, the "symplectic group" had been called the "line complex group". "Complex" comes from the Latin *com-plexus*, meaning "braided together" (co- + plexus), while symplectic comes from the corresponding Greek *sym-plektikos* (συμπλεκτικός); in both cases the stem comes from the Indo-European root *pleḱ- The name reflects the deep connections between complex and symplectic structures.

# Two Symplectic Compactified Dimensions



# Compactified Dimensions

- In theoretical physics, **compactification** means changing a theory with respect to one of its space-time dimensions. Instead of having a theory with this dimension being infinite, one changes the theory so that this dimension has a finite length, and may also be periodic.
- Compactification plays an important part in thermal field theory where one compactifies time, in string theory where one compactifies the extra dimensions of the theory, and in two- or one-dimensional solid state physics, where one considers a system which is limited in one of the three usual spatial dimensions.
- At the limit where the size of the compact dimension goes to zero, no fields depend on this extra dimension, and the theory is dimensionally reduced.

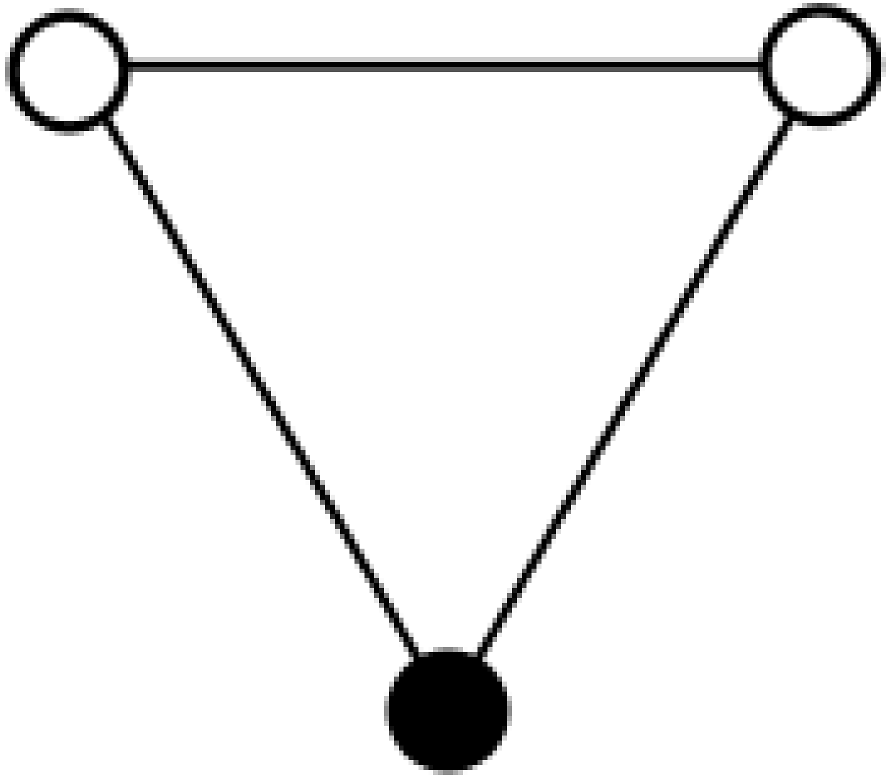
# Compactified Dimensions in String Theory

- In string theory, compactification is a generalization of Kaluza–Klein theory. It tries to reconcile the gap between the conception of our universe based on its four observable dimensions with the ten, eleven, or twenty-six dimensions which theoretical equations lead us to suppose the universe is made with.
- For this purpose it is assumed the extra dimensions are "wrapped" up on themselves, or "curled" up on Calabi–Yau spaces, or on orbifolds. Models in which the compact directions support fluxes are known as *flux compactifications*. The coupling constant of string theory, which determines the probability of strings splitting and reconnecting, can be described by a field called a dilaton. This in turn can be described as the size of an extra (eleventh) dimension which is compact. In this way, the ten-dimensional type IIA string theory can be described as the compactification of M-theory in eleven dimensions.

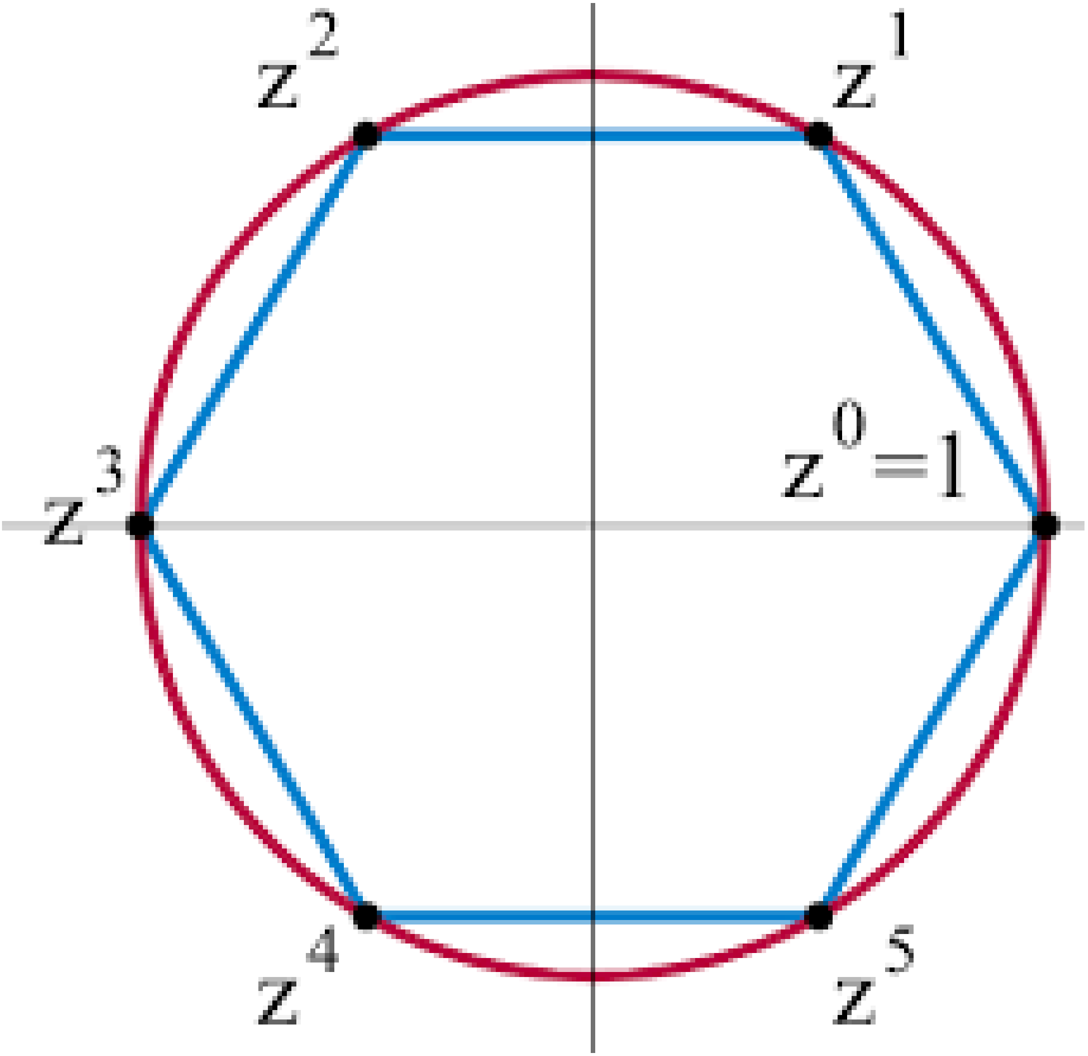
# Six Real Dimensional Symplectic Subspaces

- There are three subspaces each of six real spatial dimensions
- Each subspace has two three dimensional subspaces, with the coordinates of one (x,y,z) being orthogonal to the coordinates of the other (ix, iy, iz)
- Each six real spatial dimensional subspace is also a three complex dimensional subspace
- A symplectic geometry is defined on a smooth even-dimensional space that is a differentiable manifold. On this space is defined a geometric object, the symplectic 2-form, that allows for the measurement of sizes of two-dimensional objects in the space.
- Etymology of symplectic: A calque of complex, coined by Hermann Weyl in his 1939 book **The Classical Groups: Their Invariants and Representations**.

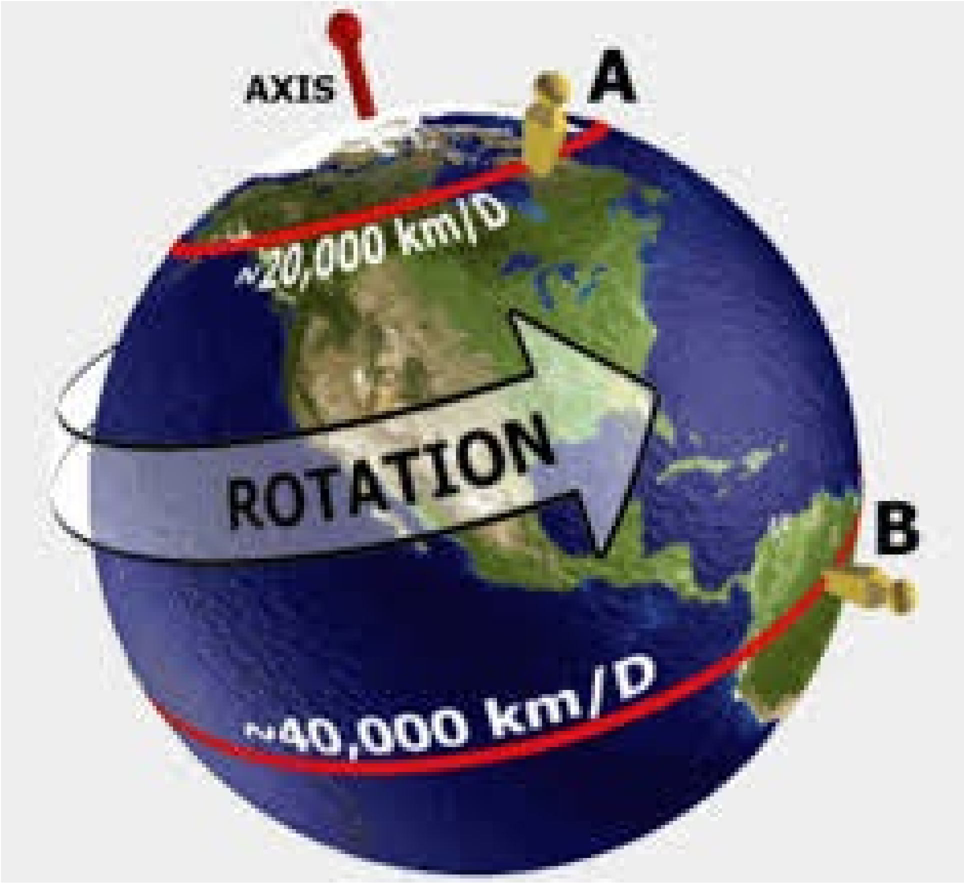
# Alternating Groups



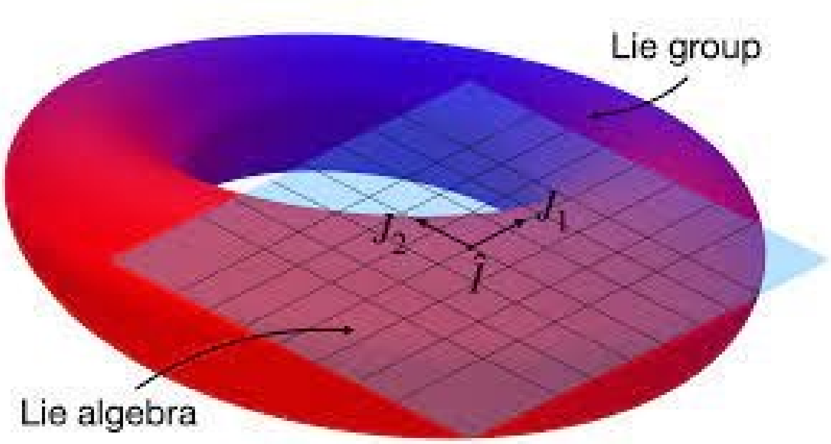
# Illustrative Geometry of Finite Simple Groups

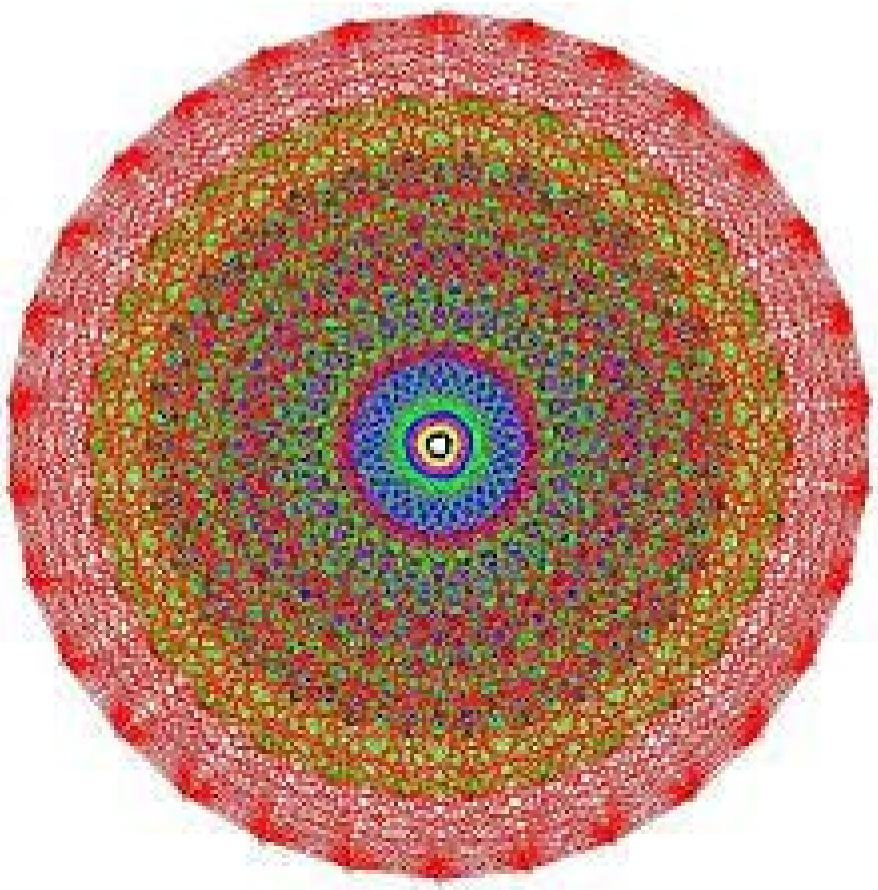


# Orthogonal Rotation Lie Groups



# Lie Groups



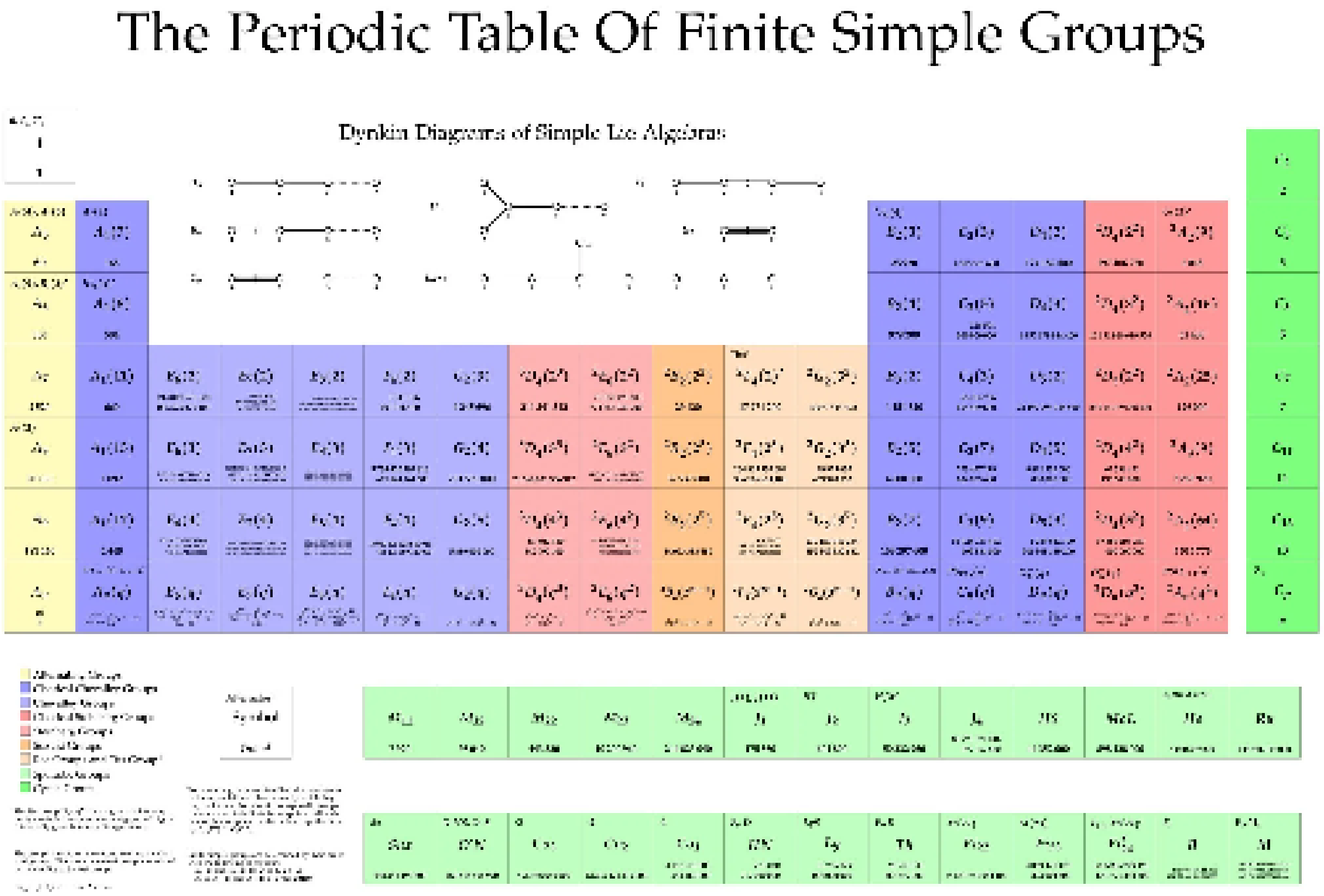
# Finite Simple Groups

- In mathematics, the classification of finite simple groups states that every finite simple group is cyclic, or alternating, or in one of 16 families of groups of Lie type, or one of 26 sporadic groups.
- Cyclic:In group theory, a branch of abstract algebra in pure mathematics, a **cyclic group** or **monogenous group** is a group, denoted $C_n$, that is generated by a single element.[1] That is, it is a set of invertible elements with a single associative binary operation, and it contains an element *g* such that every other element of the group may be obtained by repeatedly applying the group operation to *g* or its inverse.

# Sporadic Groups

- In mathematics, a **sporadic group** is one of the 26 exceptional groups found in the classification of finite simple groups.
- A simple group is a group *G* that does not have any normal subgroups except for the trivial group and *G* itself. The classification theorem states that the list of finite simple groups consists of 18 countably infinite families[a] plus 26 exceptions that do not follow such a systematic pattern. These 26 exceptions are the sporadic groups. They are also known as the sporadic simple groups, or the sporadic finite groups. Because it is not strictly a group of Lie type, the Tits group is sometimes regarded as a sporadic group, in which case there would be 27 sporadic groups.
- The monster group, or *friendly giant*, is the largest of the sporadic groups, and all but six of the other sporadic groups are subquotients of it.

# Resonant Music of the Spheres



# Sacred Geometry of the Universe

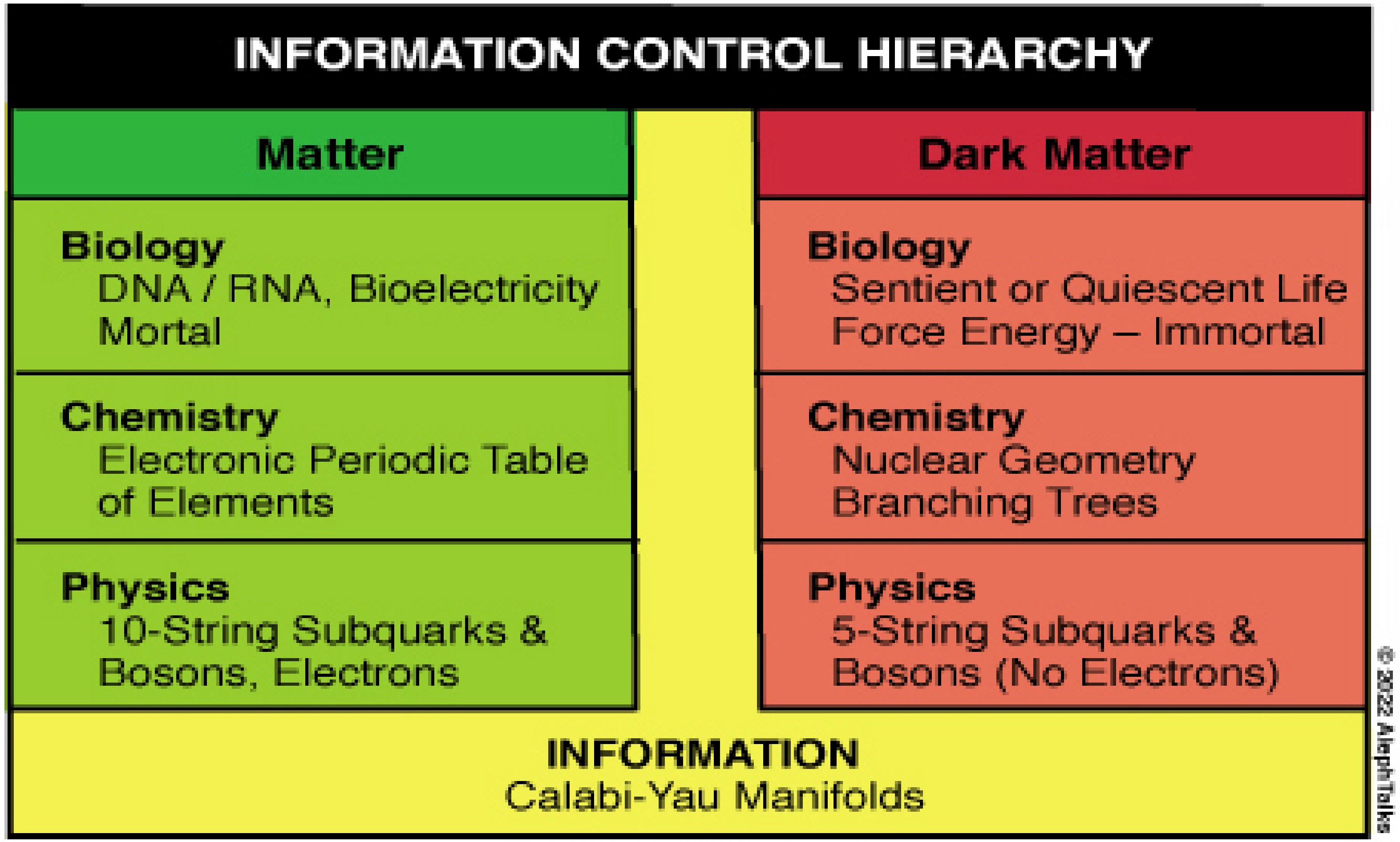
| 26 REAL DIMENSIONAL SYMPLECTIC[1] UNIVERSE | |
|---|---|
| **10 Matter Dimensions** | **10 Dark Matter Dimensions** |
| Space-Time<br>4 Dimensions<br>(x,y,z,ict[2]) | Space-Time<br>4 Dimensions<br>i * (x,y,z,ict) = (ix,iy,iz,-ct) |
| Symplectic Calabi-Yau Manifold<br>6 Compactified Dimensions<br>3 Holes – Genus 3<br>Hodge Diamond (9,11,6,7) | Symplectic Calabi-Yau Manifold<br>6 Compactified Dimensions<br>4 Holes – Genus 4<br>Hodge Diamond (17,12,21,12) |
| Symplectic Calabi-Yau Manifold<br>6 Synchronizing Compactified Dimensions<br>8 Holes – Genus 8<br>Hodge Diamond (8,23,21,17) | |

[1] Symplectic = real and imaginary pairs.
[2] ict = √(-1) * speed of light * time.

# What Ingredients Live Where

- 26 Real Dimensions
  - Photons/Higgs Boson/Space Compartments/Information Scans
- 10 Real Dimensional Matter Subspace
  - Matter fermions (electron, neutrino, up/down quark plus resonances) live in 10 real dimension subspace of universe
  - Etheric matter lives in 6 compactified real dimensions subspace and controls forces in 4 dimensional space time
- 10 Real Dimensional Dark Matter Subspace
  - Dark matter subquarks live in 10 real dimension subspace of universe
  - Etheric matter lives in 6 real compactified dimensions subspace and controls forces in 4 dimensional space time
- 6 Real Dimensional Dark Energy Subspace
  - Etheric dark energy lives in 6 real dimensions subspace and controls forces in space time

# Sacred Geometry of the Universe



# Religion Ties to 26 Real Dimensional Universe

- Trinity (Christianity, Islam, Hinduism)
  - Three compactified subspaces of six real dimensions each or three complex dimensions each—Unitarianism links all eighteen compactified dimensions
  - Christianity/Islam: father, son and holy spirit
  - Hinduism: Brahma the creator, Vishnu the preserver, Shiva the destroyer
- Judaism/Kabbalah and See Also Stephen Phillips
  - There are three holes in compactified matter subspace which connect to three of the eight holes in the etheric subspace
  - There are four holes in compactified dark matter subspace which connect to four of the eight holes in the etheric subspace
  - One of the eight holes in etheric subspace connects to another dimension
  - 18 dimensions-8 holes=10 actual dimensions
  - The Tree of Life has ten sephiroth

# Curvature of the Compactified Subspaces

- Ron Cowen observed the Hodge diamond of each of the three compactified six dimensional subspaces
- He came up with four numbers for each subspace which are related to the curvature of each of the subspaces
- At the present time there appears to be some confusion about how to interpret his numbers, so this is left as an open issue