

INSUBSTANTIAL CREATOR SUBSTANTIAL CREATION

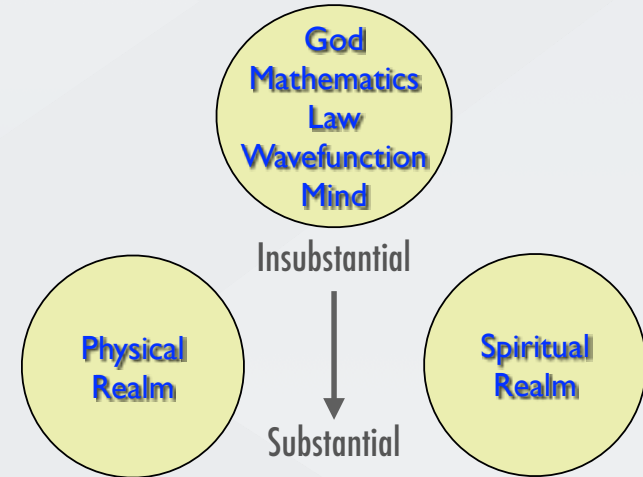
Richard L. Lewis PhD

**"A Future Paradigm for the Sciences:
Pursuing Universal Science"**

April 23rd, 2012 • IAAP Conference.

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Three Realms



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Scientific Numerology

Why Three?

- 3 types of fermions (pixels of matter)
- 3 types of bosons (pixels of force)
- 3 quantum forces (ignoring gravity)
- 3 colors in quantum chromodynamics
- 3 generations of fermions

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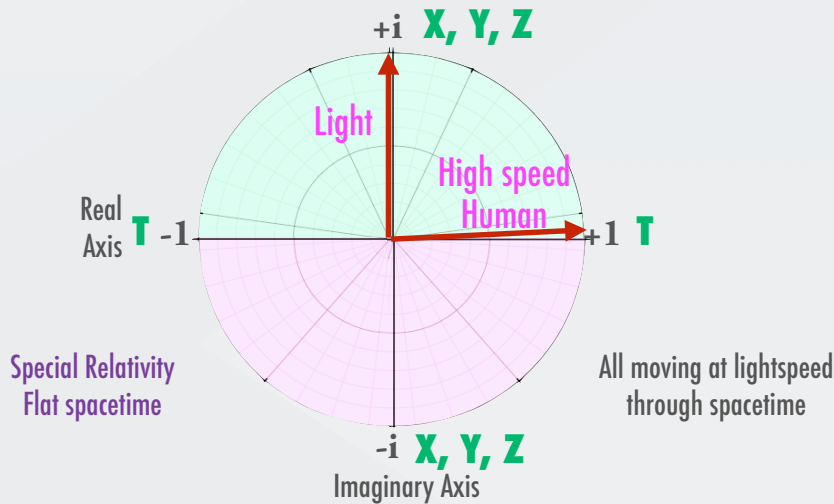
Spacetime

- Insubstantial
- Created during inflation period of Big Bang
- Not a nothing
- Can transform into transitory virtual particle-pairs
- Is a real entity with shape and properties
- Has four complex components
- 1 of time, 3 of space

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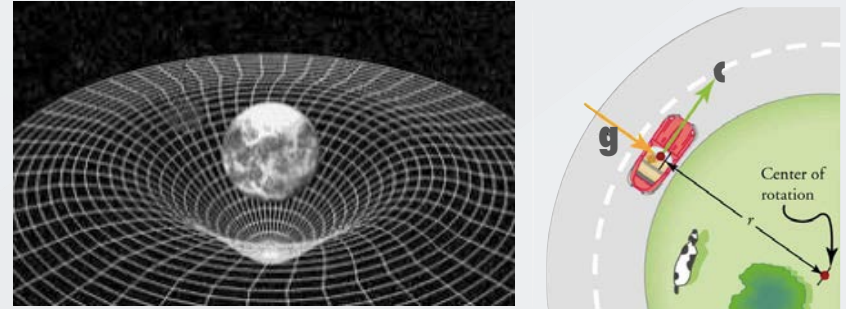
Complex Components



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Gravity



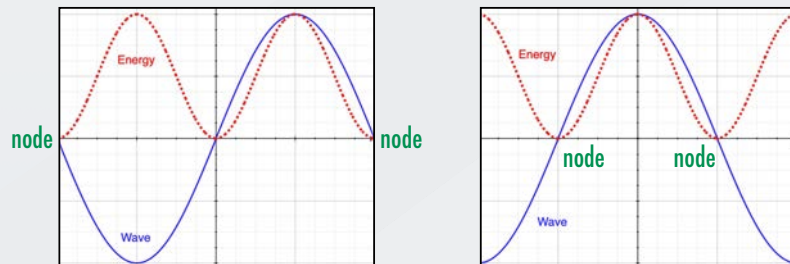
Moving at lightspeed through spacetime curved by matter
Gravity is the centripetal force keeping matter in the curve

General Relativity
Curved spacetime

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Standing waves, internal



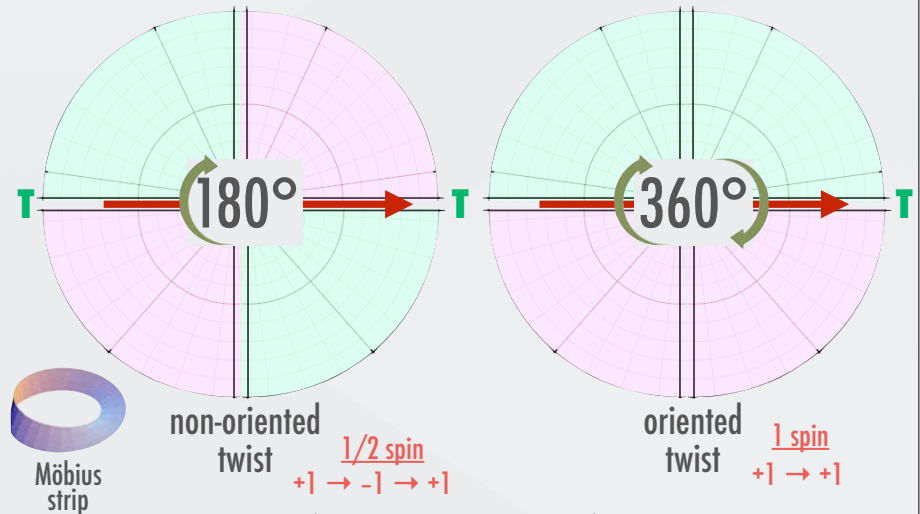
sine wave
zero energy boundary
closed wave
asymmetrical

cosine wave
high energy boundary
open wave
symmetrical

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Topological Twists, external



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Fundamental bosons

quanta of force

oriented twist • symmetrical open wave • essentially ephemeral

	Boson	Couples	Property
1 oriented twist	Z (W+/W-) woson	Weak interaction	massive, open wave
2 oriented twists	photon	Electromagnetic interaction	massless, resonance of electric/magnetic components
3 oriented twists	gluon	Chromodynamic interaction	Confined energy at surface

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Fundamental fermions

quanta of matter

nonoriented twist • asymmetrical open wave • essentially eternal

	Fermion	Charge	Property
1 nonoriented twist	neutrino	Weak charge	vigorous interactions over minuscule distances
2 nonoriented twists	electron	Weak + Electromagnetic charge	vigorous interactions over unlimited distances
3 nonoriented twists	quark	Weak + Electromagnetic + Chromodynamic charge	very strong, but severely confined, interactions

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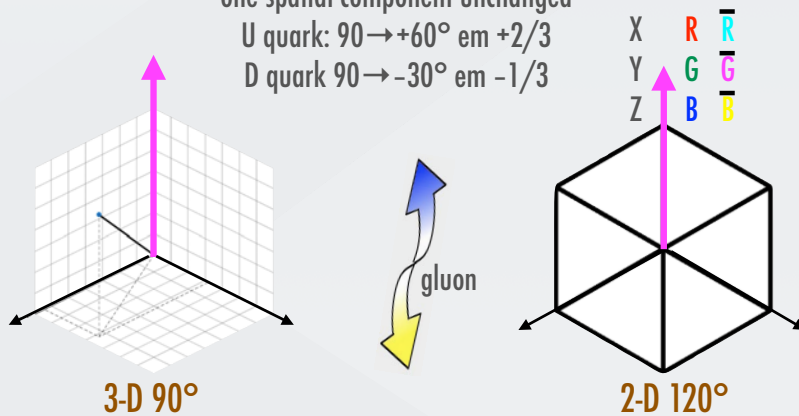
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Confined Hexagonal Space

Rectangular to planar hexagonal
one spatial component unchanged

U quark: $90 \rightarrow +60^\circ$ em $+2/3$

D quark: $90 \rightarrow -30^\circ$ em $-1/3$



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Halo of bosons

all fermions are composite
shake off twist

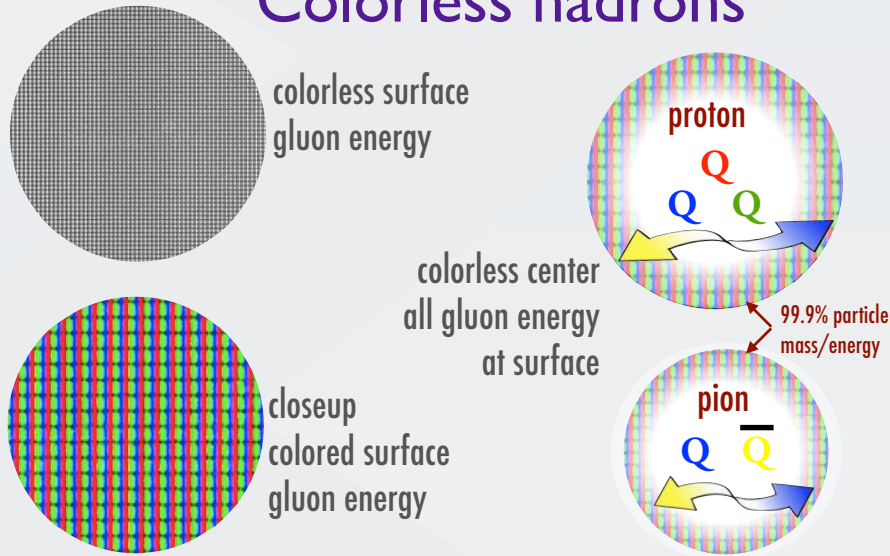


	Fermion	boson halos	charge
1 nonoriented twist	neutrino	Z/W \pm bosons	weak charge very short distance
2 nonoriented twists	electron	Z/W \pm bosons virtual photons	+ electromagnetic charge vigorous interactions over unlimited distances
3 nonoriented twists	quark	Z/W \pm bosons virtual photons gluons	+ color charge very strong, but severely confined

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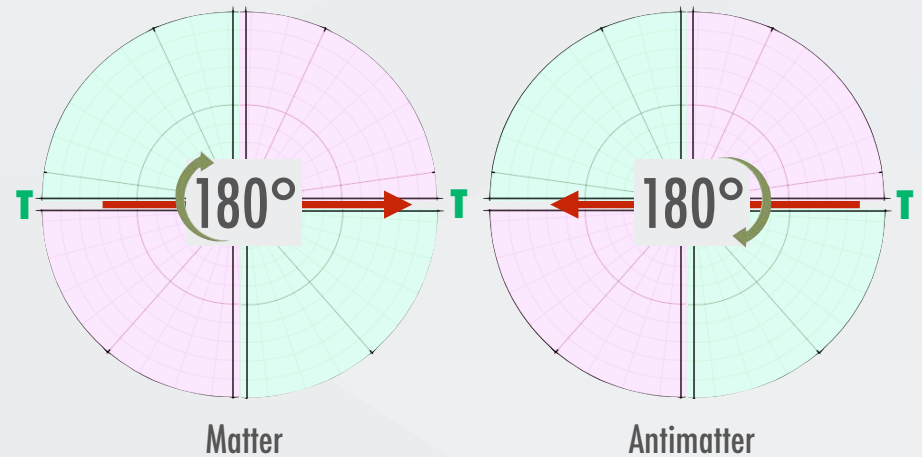
Colorless hadrons



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Antimatter Fermions



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Three Generations

initial twist	1	2	3
1st Gen x	e-neutrino	electron	U & D quark
2nd Gen x & y	μ -neutrino	muon	S & C quark
3rd Gen x, y & z	τ -neutrino	tauon	T & B quark

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Substantial material?

Emergent properties

- An electron is not a solid
- A proton is not a solid
- The product of their interaction, an atom, however exhibits the properties of a solid
- The exemplar is the Helium atom which behaves like a perfect billiard ball

"Emergent properties" refer to those properties that are entirely unexpected and include emergent phenomena in materials and emergent behavior in living creatures. They arise from the collaborative functioning of interacting subsystems, and they come from the Logos.

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Creator & Creation

Insubstantial cause, insubstantial result

- God is insubstantial
- The subsystems of matter are insubstantial
- The size of matter is a result of electromagnetic interaction
- The mass of matter is a result of the open gluon waves
- The solidity of matter is an emergent property
- No scientific challenge to an insubstantial Creator generating apparently substantial matter

Commentary for IAAP Presentation

by Richard L. Lewis PhD

Hello, I am Richard Lewis, and I am honored to be sharing with you at this IAAP conference. I will be covering a lot of ground rather quickly in the 15mins allotted so I have placed my email address on each slide if you wish to contact me with comments or questions. ↪

Slide 1

My topic is the apparent conundrum of an insubstantial God creating a world of substantial matter. This question only bothers those who do not believe in magic, such as scientists and the academics of Unification Thought. ↪

Slide 2

Unification Thought considers the Cosmos to contain three great Realms:

1. The insubstantial realm where God, mathematics, natural law, the wavefunction of modern physics and the mind reside.
2. The substantial physical realm that is the object of scientific study and today's topic.
3. The spiritual realm that we will leave for another conference. ↪

Slide 3

The astounding scientific advances into the details of fundamental physics have revealed a remarkable simplicity, along with an unexplained numerological enthusiasm for the number three. Ignoring gravity for reasons to be mentioned: There are 3 types of fermions—the pixels of matter, and 3 types of bosons—the pixels of force, there are 3 quantum forces, 3 colors of quarks, and 3 generations of fermions.

This numerology is a mystery in contemporary science. ↪

Slide 4


We will consider an explanation for this triplet obsession by looking at the nature of spacetime.

To the classical mind, space and time are a simple nothingness to be inhabited by matter.

To the contrary, in modern science the unified construct of spacetime is a real, albeit insubstantial entity, that was generated during the inflationary phase of the Big Bang.

Spacetime has a set of distinct properties:

- It can be curved,
- It has a distinct tendency to transform briefly into fundamental particles of force and matter,
- It has four complex components, one of time, three of space.

In this discussion we will show how the triplet obsession of fundamental physics is intimately related to the existence of just three spatial components. 


Slide 5

The mathematics of complex numbers used in Einstein's Special Relativity is not at all complicated. While the familiar numbers lie on a line, the complex numbers lie on a plane with two components—the horizontal real axis contains all the regular numbers based on the units plus and minus 1.

The units of the vertical imaginary axis are based on the units plus and minus i . This i is the mathematical operator that rotates the entire real axis by 90° , while the operator i^2 rotates by 180° , turning plus one into minus one, the reason why i is often called the square root of -1 .

The differences between time and space remains in relativity. The temporal component is the real axis—plus and minus one being very different, just as is moving forward and backward in time. The spatial components are imaginary axes—plus and minus i are as similar as clockwise and anticlockwise, just as are up and down, backward and forward.

Note that in the early days these assignments were reversed.

In spacetime, a single second along the time axis is equivalent to 186,000 miles along a space component. So, in Special Relativity, all entities in the physical realm move at lightspeed through spacetime, albeit along different components. A photon, for example, travels exclusively along the spatial component at lightspeed, while we humans travel at lightspeed almost exclusively along the time component—except when moving at very high speeds through space. Time goes slower for a cosmonaut speeding around the Earth. 

Slide 6

That everything moves at lightspeed through spacetime is why everything experiences the effect of gravity.

Einstein's General Relativity revealed how mass/energy curves spacetime. If we were stationary in spacetime, we would not sense gravity, just as a car in a traffic jam is quite indifferent to how curved the road is.

Speeding along the curve, however, is quite different as centrifugal force attempts to force us off the road and the centripetal force of the tires keeps us on course. Gravity wants us to fall to the center of the earth; it is the resisting force of the floor that prevents this.

Gravity is a result of global curves in spacetime, which is why we ignored it earlier as it is unique. All the other fundamentals of matter and force, as we shall describe, are a result of local twists and deformations in the spatial components along the temporal component of spacetime. ↪

Slide 7

In modern science, all things have an internal wave aspect and an external particle aspect, both of which have two types of local deformation.


First the internal wave. The internal is always expressed as its square in the external—the square of a wave's amplitude is its energy, which is always positive.

The internal standing wave aspect has two basic types, one akin to a sine wave, the other akin to a cosine wave with complementary properties. The sine wave is asymmetrical and closed—it has zero energy, a node, at its boundaries and center. The cosine wave is symmetrical and open—it has maximum energy at its boundaries and center. ↪

Slide 8

The external aspect is called 'particle' as if it were a tiny solid. In this view, however, the external is a twist about the time axis in spacetime that also comes in two varieties.

A half-twist of 180° of a spatial component about the time axis creates a non-oriented component. A familiar example is the Mobius Strip where a two-sided strip becomes single-sided. A single translation about the strip turns a state upside down, it takes two trips to return to the starting state. This is called a spin-half state.

A full-twist of 360° about the time axis creates a oriented space that does not alter components. A single translation about it returns to the starting state. This is called a spin-one state. 

Slide 9

The combination of an internal open wave and an external oriented twist is called a boson. These are the pixels of force that are readily created and destroyed given the right conditions.


As an aside, the putative graviton would be a boson with spin 2, but it is not needed in this view. The Higgs is also a boson with spin zero, and is spacetime in an untwisted excited state and we will not discuss it further.

One oriented twist in a spatial component is called a Z weak boson, or woson. It has an open wave and an energetic boundary. This abrupt transition at the boundary is very stressful to spacetime and highly energetic, giving the Z boson a rest mass of 93 billion eV.

This excessive energy makes it highly unstable and it rapidly decays into simpler entities. However, some of this excessive Z-woson energy can be reduced by generating an electron or positron, and resonating with it. This results in a positive-W or negative-W woson with an electric charge and an energy of only 81 billion eV.

Oriented twists with open waves in two spatial components is called a photon. This avoids the energy of a standing open wave by shifting the energy back and fore between the two waves and moving along the third, untwisted component at the speed of light. All the energy is in the waviness, the frequency of the wave.

This generates a pixel of action, called a Planck's Constant, the basic quality possessed by all photons, from radio to gamma.

Oriented twists with open waves in all three components is called a gluon. The energy of the open wave, as we will discuss, is the energetic component of hadrons, and is the source of their rest mass. 

Slide 10

The combination of an internal asymmetrical closed wave and an external non-oriented twist in spacetime is called a fermion. These are the pixels of matter that are essentially eternal and can only be generated or destroyed in pairs of complementary twists.

A non-oriented twist in a single spatial component is called a neutrino. The closed wave hardly stresses spacetime and it has a tiny energy of ~ 1 eV. As will be discussed, the neutrino has a weak charge and can participate in the weak interaction which has a very limited reach.

Non-oriented twists in two spatial components—one labeled electric vector, the other magnetic spin—is called an electron. This is more stressful, and an electron has a rest mass energy of 500,000 eV. The electron has a weak charge and an electromagnetic charge, and can participate in the weak interaction and the electromagnetic interaction which has an essentially infinite reach.


Non-oriented twists in all three of the spatial components is called a quark. ↪

Slide 11

Non-oriented twists in all three spatial components—called spin, electric and color—severely stresses spacetime and deforms it from a 3-D rectangular form to a 2-D hexagonal form with two deformed axes. This entity is called a quark.

There are two ways to deform a rectangular form of 90° into a planar hexagonal form of 60° . This results in the two types of quark. The electric vector can be 60° along negative time resulting in the positive $2/3$ positron charge on a U quark—or 30° along positive time as the negative $1/3$ electron charge on a D quark.

As any one of the three spatial components can be the undeformed color component, there are three chromodynamic colors, called red, green and blue; and in antimatter, anti-colors which could be called cyan, magenta and yellow. Gluons carry a color and an anti-color.


The deformed spacetime is hidden away by confining quarks into sets where the deformation is neutralized. The energy of an isolated quark would be infinite, which is impossible, so quarks are always in colorless sets, called hadrons. A quark has a weak charge, an electromagnetic charge, and chromodynamic (color) charge which, like the quark, is severely confined. 

Slide 12

While current science calls the fermions 'elementary particles' they are actually all composite. Spacetime is constantly trying to undo the non-oriented twists but can only throw off oriented twists that have no real energy but are virtual entities. Fermions interact with each other by coupling with these virtual bosons subsystems from their structure.

All types of fermions are surrounded by a halo of virtual bosons which gives them all a weak charge. The borrowed energy of the bosons is so much that, even at lightspeed, they cannot get far before the borrowed energy has to be returned before it amounts to a Planck Constant. This is why fermions have to be extremely close for a weak coupling to occur.

The electron also has a halo of virtual photons which is its electromagnetic charge. These, being massless have an unbounded range and fermions can couple with them at a distance.

The quark also has a halo of gluons which is its color charge, and quarks couple strongly with the gluons in their very confined hexagonal spacetime. 

Slide 13

The deformation of spacetime by the quarks has to be hidden from the regular spacetime—rectangular and hexagonal space cannot exist together—the hexagonal has to be confined and hidden in colorless combinations.

There are two basic combinations:

- Three quarks with the three colors—making colorless white—e.g. protons and neutrons
- A quark and an antiquark with color and anticolor—making colorless black—e.g. the pions that couple the strong nuclear force.

The coupling gluons are open waves with energetic boundaries. Their color and anti colored ends have a uncolored center, and quarks shake off all their color onto the gluon sphere that surrounds them and reside in the colorless center of the sphere.

The energetic ends of the gluons are the surface of the composite, it is speckled with color and anticolor that appears colorless at a small distance.

It is astonishing to think that 99.9% of our mass is in the open waves of gluons. ↪

Slide 14

While symmetrical bosons look the same twisted along the positive or the negative time component, asymmetrical fermions are very different.

Fermions twisted along positive time are called matter particles; fermions twisted along negative time are called antimatter particles. As mentioned, the internal is expressed externally as the square, which is always positive, so both matter and antimatter move in the same direction in external time.

A neutrino has a left spin, an antineutrino has a right spin. An electron has a negative electric charge, an antielectron (positron) has a positive charge. Quarks have RGB colors, antiquarks have CMY anticolors.

While spacetime readily generates electron-positron pairs, matter and antimatter in equal amounts, all of the negative charge generated in the Big Bang ended up on electrons and D quarks, while all the equal amount of positive charge ended up on U quarks. The lawful principle that accomplished this reorganization of matter and antimatter is not currently known. ↪

Slide 15

Finally, the fermions can be thought of as all constructed on the foundation of a neutrino with extra twisted components added to it. The first twist can be in a single component—the electron neutrino—or in two components—the muon neutrino—or in all three components—the tau neutrino.

Adding a second twist to an electron neutrino creates an electron, adding a third is a U or D quark.

Adding a second twist to a muon neutrino creates a muon, adding a third is a S or C quark.

Adding a second twist to a tau neutrino creates a tau, adding a third is a T or B quark.

These are the three generations of fermions, only the first being stable. In addition, of course, all the fermions have their antimatter counterparts. ↪

Slide 16

To conclude: Spacetime is insubstantial, its twists and deformations are insubstantial mathematical operations. The electrons and quarks that matter is constructed of are all insubstantial.

Neither electrons nor quarks are solid, but in their interactions appear the emergent property we call solid that comes from the Logos, from natural law, a topic for another time.

An emergent property of a system is one that is not possessed by its interacting subsystems. While a helium atom behaves like a solid sphere, like a billiard ball, none of its subsystems—the interacting quarks and electrons, coupling photons and gluons—are solids. ↪

Slide 17

God is insubstantial, and the physical world of matter is made up of insubstantial entities, so being this similar, there is no problem of one causing the other.

All the properties we associate with matter are actually insubstantial:

- The property of size is a consequence of electromagnetic exclusion
- The property of mass is a consequence of open gluon waves

The solidity of matter is an emergent property from the Logos, the extension of insubstantial Natural Law in Unification Thought.

We conclude that there is no inherent contradiction with an insubstantial creator generating an insubstantial physical realm.

The End