Is Physics = 4D Space–Time Geometry + Mathematics?
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Abstract

Cosmos means order. The universe is humming cosmic harmonies. Pioneers of this scientific frontier progressively fine-tune their observational acuity, experimental skillfulness and mathematical expressiveness to see, measure and describe their perceptions. Theoreticians, then, ponder all this data hoping to reveal the hidden mathematical beauty of this cosmic composition.

The Quest: 1. to share distinct perspectives (gained from Cognitive Science studies); 2. a systematic approach to discovering a deeper understanding of physics equations; 3. to identify a geometric paradigm that can explain many outstanding cosmological questions. Borrowing 8 excellent FQxi questions it will be shown how Mathematics + Combinatorial Quantum-wave Mechanics (CQM) describes the structure of 4D Space–Time and, herein, reveal The Grand Design.

1. Are we missing interesting physical theories because our commitment to a particular mathematical framework? Students, innocently, inherit the previous generation’s mathematical toolboxes that unwittingly limit their thinking to explicit geometric assumptions and hidden presuppositions.

2. What fundamental assumptions did science get wrong? What is the right framework?

<table>
<thead>
<tr>
<th>Question</th>
<th>Wrong Assumption</th>
<th>The Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. How should we interpret QM?</td>
<td>Science assumed Aether was a 3D medium blaming it rather than their faulty reasoning!</td>
<td>Quantum Mechanics needs a 4D Space–Time context. The Plank dimensions give reality physicality, and interacting quantum-wave geometries define its framework. Planck-(length, time, mass) are covariant, maybe more.</td>
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<tr>
<td>4. Whence the constants of nature?</td>
<td>Some constants, measured with covariant rulers, might not be!</td>
<td>However, gravity is an “effect” the Higgs Field inhibits particles progress thru time. Quantum Gravity will be explained.</td>
</tr>
<tr>
<td>5. Can QM be reconciled with gravity?</td>
<td>Gravity is the assumed fundamental cause of falling apples, orbiting planets and of space-curvature.</td>
<td>With time: Space expands and clock-rates slow. This is the 3rd Relativity Theory. To understand this we need distinct ideas for: now, duration, Planck-age, clock-rates, apparent &amp; absolute age. A spherical universe with constantly changing curvature – looks FLAT.</td>
</tr>
<tr>
<td>6. What is the True nature of Time? &amp; Space?</td>
<td>Is Age(Universe) = ( \int_0^\text{now} dt )</td>
<td></td>
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<td></td>
<td>Only if seconds and meters are fixed in a “Euclidean” sense. What if, as time progresses, the duration of a “second” slowly grows?</td>
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<tr>
<td>7. Dark Matter</td>
<td>As scientists, we love our mathematical models. Have we tricked ourselves? Typical math models need Dark Matter; but do universes?</td>
<td>There IS “something” invisible. When Observations are interpreted with the correct model then galactic spiral arm rotations and brightness’s of Type Ia supernova will make perfect sense. Cosmological Relativity resolves this and... Explains why!</td>
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</tbody>
</table>

Do we know what we think we know? Please be willing to set aside consensus & avoid appealing to “authority” to do your thinking for you. Step-by-step, as the geometries & maths yield understandings, construct these in your mind and see for yourself – the model itself – will answer these questions.

Higher Dimensional Perspective is the Key to Understanding Anything.¹
First let’s introduce Isaac Newton to Albert Einstein and Max Planck

Let’s backtrack one century of math to gain a deeper understanding... Consider the table below a hidden symmetry revealed by factoring Newtons out of the dimensional units of the coefficients used in Isaac Newton’s force equations: \( F_G = G \cdot m_1 \cdot m_2 / r^2 \); \( F_E = K_c \cdot q_1 \cdot q_2 / r^2 \); \( F_M = K_m \cdot p_1 \cdot p_2 / r^2 \)

Space~Time / Mass~Charge Equation Matrix:

<table>
<thead>
<tr>
<th>Interaction</th>
<th>Distance: ( h = \text{Energy} \div N(m) )</th>
<th>Time: ( c )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matter ( \leftrightarrow ) Space ( \leftrightarrow ) Time</td>
<td>( G \cdot [N(m/kg)^2] )</td>
<td>( c^2 )</td>
</tr>
<tr>
<td>EM ( \leftrightarrow ) Matter ( \leftrightarrow ) Propagation</td>
<td>( K \cdot [N(s/C)^2] )</td>
<td>( c^2 )</td>
</tr>
<tr>
<td>Wave Propagation</td>
<td>( [m/F] )</td>
<td>( \sqrt{-1} )</td>
</tr>
</tbody>
</table>

Max Planck showed that energy exchange happens in discrete increments, \( h \) at a frequency rate denoted by the Greek letter \( \nu \). \( c^2 \) also relates many other physical properties: \( K_\theta \) is the author’s discovery that “s/kg” says how much each kilogram of matter slows time & curves space, where “m/kg” is a radius of curvature per kilogram; which in turn slows space expansion around massive objects “m/s” obeying the inverse-square law.

For Electromagnetism, a Charge differential along the time-dimension (north-to-south magnetic poles) slows time “s/C” in a magnetic field. For electric fields “m/C” says space is curved by electric charge differential is space.

For Electromagnetic waves, \( h \sqrt{1/\varepsilon_0 c} \) defines a photon as an incremental packet of angular momentum propagating at the speed of light.

Where does the Mathematics of Cosmological Models come from?

Mathematical symbols, words & operators derive meaning, significance & value in the context of discrete entities (dimensions, objects, etc.) or real/imaginary geometries (vector/scalar fields). Grasping this enables us to see geometric connections between math & physics.

With Albert Einstein’s famous \( E=Mc^2 \) he modified space-time perceptions. But he missed a subtle aspect about Time. This author asserts that as space expands in 3-dimensions time itself (the local clock-rate) expands in 1-dimension. But wait! Might that statement be flawed? The Friedmann-Lamaitre-Robertson-Walker Metric applies a generic time-dependent scaling factor “a(t)” to space; NOT to time.

\[-c^2 d\tau^2 = -c^2 dt^2 + a(t)^2 \Sigma^2 dt^2 \]

Where \( \Sigma^2 \) is the sum of the squares of the spatial dimensions which are being scaled, \(-c^2 dt\) term is NOT. We “know” the value of \( c \) does not change, however it has dimensional units of distance/time. Consider two possible meanings for \( t \): (1) Let \( t \) be Planck-ticks since the Beginning, defining \( a(t) = 1 \) if \( t<year2000\); \( 39.37/36 \) if \( t>=year2000\). (This implies a switch from yards to meters at year 2000). You are changing the metric by which you measure distance, besides you can’t just add yards + meters! To fix this: \( c \) must be yards/second and apply \( a(t) \) to both terms. Ok, (2) \( t \) is measuring seconds. What does that do to the meaning of the equation? The equation describes expanding space. How do we “measure astronomical distances?” We use the distance that light travels/second as our ruler.
A VERY subtle yet significant point: this all has to do with our conceptualization of time and what “t” means in our equations. This generation needs to realize “time itself” grows (Planck-ticks/second) along with our ruler the entire duration of light’s journey! A century of cosmology to rethink!

**One Simple Paradigm** = Answer to 8 FQxI Questions + many more...

**Space~Time with a Twist:** Quantum physics talks about higher-dimensions being curled-up smaller than the Planck-length – and there is a debate within the physics community whether or not time is a dimension. The Cosmic Onion Model resolves these questions.

Imagine, in the timeless darkness above the cosmos, a mental perspective from which you could watch the whole universe expanding with time. But, unlike sensory perceptions this non-inertial reference frame is unaffected by Space~Time dynamics.

Given quantum-resolution vision, you could see this time domain as being a Cosmic Onion – a 4D Spherical standing wave where the radial coordinate is a count of Planck tick-tocks since the beginning. These Planck-time thin, transverse rotational oscillations compress the 4D medium as the outward waves (forward tick) pass through inward (reverse tock). Thus subdividing Space~Time into time quanta! Adjacent layers 180° out-of-phase with its neighbor, act as a conduit for photons to travel. When cosmic standing wave constructive-interference happens (Fig. below Eq.7) photons, which are synchronized with Onion-layers opening twice per Planck-time, pass on to the next Cosmic Onion-layer unimpeded, thus photon mass=0. Near the center we see the surface of the Cosmic Microwave Background (CMB), when the entire universe was filled with plasma. This surface happened just as space became translucent.

The normal vector at any point on an Onion-layer defines an Absolute Reference Frame for Mach’s Principle & Relativity Theories.

The “Big Flash”, rather than Big Bang more appropriately describes this abrupt, one Planck-time thin, 4D spherical 3D wavefront. It began at the center of the Cosmic Onion and has been expanding ever since. Quite literally, it defines what “Now” means throughout the Universe! Call it Unified Field or Now Manifold, it IS the whole universe as it exists right now. It encounters resistance penetrating the Onion-layers this regulates expansion rate.

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The expansion of Space = the forward flow of Time itself.
What is the True Nature of Time?

Before Einstein, measuring time was easy; just count clock ticks. elastic Space~Time? We need clear distinctions for these concepts:

(1) **Now**: is tied to the rate which time progresses forward in local inertial reference-frames. The Universe’s “Now” spans the slowest “Now” of the largest black hole compared to the quickest “Now” of the largest inter-galactic void of the cosmic filamentary structure.

(2) **Duration**: how long an event takes or between 2 events.

(3) **Plank-time**: is it constant? Relative to itself, Yes! But...

(4) **Clock Rates**: wait a second! Is the duration of a second constant? No. But Einstein, (et. al.) only understood two reasons why it is not – there is a **THIRD** that of Space~Time expansion.

(5) **Absolute Age**: count Onion-layers from the beginning till now.

(6) **Apparent Age**: 

\[ \sum_{i=1}^{N_{\text{Planck Ticks}}} N_{\text{Planck Ticks}} / \text{Planck Ticks Per Second}(\text{Now}) \]

**Aether, Space~Time Medium, or Niether? Just coined a new word!**

**Aether**: in Michelson & Morley's time, aether was at the forefront of popular theory. In their famous experiment: where did they go wrong? It was their assumptions about the properties of Space. Their words and actions seem to indicate they “thought” Space was a static 3D medium and time is the movement within that same volume of space. No.

**Niether**: the belief that light waves travel through the “nothingness” as massless particles called photons! *Does this reflect understanding or the lack thereof?* A better question: What’s waving?

The **Space~Time Medium**: Just as 3D elastic properties of air determine the speed of sound; this 4D medium has properties of a stretched elastic fluid. It’s a 4D SPHERICAL standing wave with properties from Planck’s constant, \( h \), Planck-dimensions: length, time, mass and charge & 4 constants: \( K_m, \mu_0, Z_0, \varepsilon_0 \), collectively define the foundational quantum framework.

**How do you know this is true? What mathematical evidence can you present?**

Take hold of 3 ideas: Abstract mathematical /geometric pattern-matching, Spatial-dimensions bend with cosmic curvature, Time is curled up at the Planck scale.

<table>
<thead>
<tr>
<th>The ratio between Magnetic Force constant, ( K_m ), ( 1 \times 10^7 ) and Magnetic Permeability of Space, ( \mu_0 ), is 4( \pi ) – envision these inward versus outward rotationally opposing oscillations with an amplitude of ( K_m ). Thus, ( \mu_0 IS ) the manifestation of the differential of these quantum-scale standing waves.</th>
<th>( 2\pi K_m - (-2\pi K_m) \to \mu_0 ) (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The interaction of the Now Manifold wave-front as it penetrates the Magnetic Permeability of the Cosmic Onion layers manifests as 376.7303135 Ohms – exactly the value, dimensional units <em>and meaning</em> of the Impedance of Free Space. Essentially the Higgs Field.</td>
<td>( \mu_0 \times c \to Z_0 ) (3)</td>
</tr>
<tr>
<td>The Now Manifold experiences this Impedance while ripples on its surface propagate at the speed of light, 299792.458 km/sec — yeilding the inverse of Electric Permittivity of the Vacuum.</td>
<td>( \mu_0 c^2 = Z_0 c \to \frac{1}{\varepsilon_0} ) (4)</td>
</tr>
</tbody>
</table>
Cosmic Onion Context: Every Wave-Action has an Equal Wave-Reaction

\[
\frac{e}{c^2} = \frac{\ell}{m} = K_\theta = K_m \left( \frac{q_i}{m_i} \right)^2 = \frac{k_m}{\alpha} \left( \frac{e}{m} \right)^2 \tag{5}
\]

\[
\alpha = \left( \frac{e}{q_i} \right)^2 = \frac{k_m e^2}{\ell m_i} = \sqrt{2R_m \hbar cm_e} \tag{6}
\]

Put Planck-mass into Schwarzschild’s solution to Einstein’s field equations we get \( K_\theta \times 2 \) Planck-masses:

\[
r_S(m) \frac{2Gm}{c^2} = K_\theta (m + m) \tag{7}
\]

Along a radial timeline inward vs. outward waves rotate \( 1.855 \times 10^{44} \) times per second (the reciprocal of the Planck-time, \( t_\ell = 5.391 \times 10^{-44} \) second). The yellow arrows are a tiny cross-section of the Now Manifold.

Within the **elasticity** of the Planck-medium these oscillations create Planck-sphere “virtual particles”. Within the context of this model the Higgs Boson* would be one of these Planck-spheres. Weighing in at only \( 1.1733 \times 10^{-48} \) grams or \( 6.5821 \times 10^{-25} \) GeV/c^2/Planck-tick – 1 second worth of these defines what Planck-mass means: \( 2.1764 \times 10^{-5} \) grams.

\[
m_\ell t_\ell \left( \frac{1}{h} \right) \left( \frac{E_{\ell}}{c} \right) = \frac{c^2}{\omega_\ell} = \frac{f_{\ell}}{K_\theta} \tag{8}
\]

**A concise way of representing quantum framework – cross reference all equation sets in this document**

Let \( c \) & \( \hbar \) be perspectives from which to view other physical constants. How many equations do you see?

\[
c = \frac{\ell}{t_\ell} = \frac{Z_0}{\mu_0} = \frac{1}{\varepsilon_0 Z_0} = \frac{\hbar}{\ell m_\ell} = \frac{Gm^2_\ell}{\mu_0} = \frac{A^{2}_\ell \mu_0}{\ell m_\ell} = \frac{2a_\ell h}{\mu_0 e^2} = \frac{K_\ell}{K_m} = \frac{\text{Stiffness}}{\text{Inertia}} = \frac{1}{\varepsilon_0 \mu_0} = \frac{\hbar c^2}{M} \tag{9}
\]

\[
\hbar = \frac{m_\ell t_\ell^2}{t_\ell} = E_{\ell} t_\ell = \frac{\text{Photon}}{c} = \frac{c^2}{\omega_\ell} = \eta \ell^3 \frac{f_{\ell}}{K_\theta} \tag{10}
\]

**How do particles of matter fit into this framework? Quantum Gravity Explained**

A particle at rest is really a spring-shaped wave that wraps around a radial timeline. A particle’s mass is energy density \( \hbar c = mc^2 \). An electron’s charge-curl aligns with inward (red curved arrows above) cosmic standing waves thus manifesting **negative** charge. Likewise, proton’s charge-curl aligns with (green) forward time – thus **positive**. Particles may appear spherical but are torus shaped in 4D. An electron torus’ major radius = Bohr radius, \( a_0 \) from (8) solve for \( \hbar \), simplify; the minor is the charge radius, \( r_e \):

\[
a_0 = \frac{\hbar}{ac m_e} = \frac{m_e c^2 t_\ell}{ac m_e} = \frac{m_e c t_\ell}{a} = \frac{m_e \ell}{a} \quad a_0 a^2 = r_e = \frac{m_e}{m_e a} \ell \tag{11a-b}
\]

While Cosmic Onion-layers resist Space-Time expansion, they remember particles — each layer being like holographic film where the Now Manifold is the coherent *(single frequency)* reference beam. As time progresses locations of all “wave-icles” get holographically encoded.

Now Manifold / Cosmic Onion-layers are a super-fluid, zero NET viscosity; it does not inhibit a particle’s motion through space, rather, it only **resists** wave-icles’ progress through time.

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* As far as I can tell 125 GeV/c^2 is a kind of resonant “ping” of proton collisions: \( \text{mass}_{\text{proton}} / \alpha \)
Planck-to-(neutron+proton+electron) mass: \( m_p = (m_n + m_p + m_e) \times 6.5 \times 10^{18} \) image credit viii

Electron-waves repeatedly quantum tunnel \( 2.3893 \times 10^{22} \) Planck-ticks, then say “here I am”, thus: the speckled appearance (pictured right); the probabilistic nature of quantum interactions; & slowing local-Now by 1 Planck-tick. (Likewise protons & neutrons tunnel for \( 1.3013 \times 10^{19} \) & \( 1.2995 \times 10^{19} \) Pts, respectively. Wave-icles are double-curved; charge radius curls around “\( \alpha \)” tighter than mass radius (Eq. 6, Fig. 5)

\[
2\pi \tau f_{waveicle} = \frac{m_e}{m_{particle}}
\]  

Where “here I am” = \( -i\hbar \nabla \Psi \), an incremental dent in time aka Graviton-wave emission; \( \Psi = \exp(i\mathbf{kx} - i\omega t) \). The pictured bluish onion-rings area is when the electron behaves as a particle. Ring thickness = charge radius. The horizontal center part is the brief “dark” moment when cosmic standing wave constructive-interference happens, this is when particles behave as waves and photons freely advance to the next Onion layer. Charge manifestations happen \( 6.24 \times 10^{18} \) times per second (1/e): electrons say “\( \nabla \times e \Psi \)”, protons “\( +\nabla \times e \Psi \)” (advancing “Now” by 1 extra Planck-tick) and neutrons “\( i\nabla \times e \Psi \)”. When neutrino-emissions happen, they are probably scalar wave-icles!

Three Relativity Theories? Please Explain.

<table>
<thead>
<tr>
<th>Theory</th>
<th>Relative to</th>
<th>Type of Red/Blue Shift Phenomena</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Relativity</td>
<td>Onion-layers’ normal vectors</td>
<td>Doppler Shift happens instantaneously only when objects actually move: blue-shifting in front and red-shifting behind — affecting emitted &amp; received waves.</td>
</tr>
<tr>
<td>General Relativity</td>
<td>Center of the massive object</td>
<td>Redshift happens while light emerges from a massive object. Blueshift happens while light enters into a gravity well. Bending occurs as it passes thru space curved by a massive object.</td>
</tr>
<tr>
<td>Cosmological Relativity</td>
<td>Center of the Cosmic Onion</td>
<td>This cause of Redshift is NOT the motion of objects through space it is a percentage of universe growth since the time light was emitted from its source to when it is received at a destination.</td>
</tr>
</tbody>
</table>

Special Relativity: Doppler Effect

Einstein introduced Special Relativity in his 1905 paper “On the Electro Dynamics of Moving Bodies”. Bodies consist of “wave-icles” having electrodynamic properties.

This illustration is a tiny cross-section of Space~Time. The near future is the top purple section; while the bottom is the past. The center section is the amount the universe expands in 1 second. The horizontal lines represent Cosmic Onion-layers. The spring on the left is a particle truly at rest; its centerline intersects the Onion-layers at 90º. The right spring is a particle moving at half-c. From an “at rest” observer’s perspective, the additional oscillations per second means the particles manifest more mass. But, from the particle’s own viewpoint its momentum tilts its time-axis so it experiences its own rest mass; Planck-ticks per “its relatively shortened” second remain the same. Its momentum twists the Now Manifold so it remains in motion.

Crucial Distinction: properly understood Doppler only happens when an object is moving relative to Onion-layer’s normal vectors. “Moving” means that to go one direction requires the object to be
moving away from the opposite direction. Such motion compresses wavelengths in front and stretches wavelengths behind — an entirely separate phenomenon from Cosmological redshift, which happens slowly the entire duration of the light’s journey.

**Galactic Velocities vs. Cosmological Space–Time Expansion:** Imagine motionless galaxies at each latitude-longitude crossing below — in this simplified illustration their fixed spatial coordinates remains so. The ever expanding globe is our Now Manifold. As light leaves each galaxy there is some red/blue shift from galactic rotation, a little more redshift while light is leaving the galaxy’s gravity well, and a whole lot of red shifting while the globe is expanding the entire duration of light’s journey.

**General Relativity: Gravitational Red/Blue Shift**

Gravity is relative to centers of mass. (1) An Objects’ particles slow the Now Manifold. (2) Creating a dent in time proportional to object’s mass, at a gradient proportional to its density; (3) which slopes off according to the inverse square law. (4) The steeper the temporal slope is the more the gravitational field strength is and the more space curves in that region. Light traversing gravity wells gets bent spatially while wavelengths compress entering & stretched while exiting. Gravitational curvature is relative to the Onion-layers cosmological curvature — contributing to the universe’s FLAT appearance.

**Dark Matter Only Exists in Math Equations.**

99.86% of Solar System mass is the Sun so Newtonian equations work fine. Galaxies unevenly distribute mass, so the Space~Time dent takes the form of a rotating whirlpool. A star’s acceleration vector is NOT towards the center of the galaxy, but is aimed slightly outside-forward of center. The net effect is stars are constantly accelerating in order to keep up with Space~Time expansion. Interstellar expansion is much slower than inter-galactic. The presumed “extra fast” outer arm speeds are really a way to measure interstellar expansion. We share the same galactic gravity well; local time is covariant so we don’t notice large redshifts within our own galaxy.

Most 3D people you meet live, perceive, and think in 3D. This NASA illustration of comparative sampling distance of the HUDF and the earlier Hubble Deep Field is a good example of a perspective for 3D audiences.
Cosmological Relativity: Space~Time Expansion Redshift

However, the universe spans 4D Space~Time. We need to scale-down dimensions to see the cosmos from above; to visualize light's pathway during its journey to our here-and-now reference frame.

Inside-looking-out Perceptions need to be Outside-looking-in...

Imagine our galaxy top-center on the yellow Now Manifold where the blue & purple spirals intersect – these are stair-stepped photon propagation paths. Naturally, the distance/time slope of these spirals is $c$. In this special case near the image bottom & CMB core we see these pathways intersect twice. These focal points are locations of Dark Flows where galaxies appear to be moving at high velocities into or out of a point in space. Teams studying this should turn their telescopes around 177-183° to look for the backsides of those same galaxies. One such location is between constellations of Vela & Centaurs — Hydra. As time progresses the depths of Dark Flow anomalies change and even disappear for a while. It depends if the focal point is near galactic clusters or intergalactic voids. Gazing into curved space of the earlier universe magnifies both space & time! It will be fun finding out how many times look-back curves intersect.

Observing nearby galaxies we look OUTWARD while seeing backward into the depths of times past. Looking deeper still the universe was smaller & more curved. Near the left/right sides of this image, our look-back curve starts looking INWARD. This divergence-to-convergence of light rays along with logarithmic look-back effect is why our 3D friends think the expansion rates were fast-slowed-and speed up again. One factor for dimmer Supernova is light spreads more than Euclidean geometry.

Dark Energy: Today our Earth-based frame-of-reference: a second is about $1.855 \times 10^{43}$ Planck-ticks. When the universe was half of its current size a second was half as many Planck-ticks, yet $(\ln 2) \approx 69.3147\%$ of time exists before this halfway point, and so on... each “halving” back to tick One. Inflationary Models need this exponential beginning – this logarithmic look-back time relation translates to perceptions of the size and age of the universe seeming exponential yet recent times seem linear.

Consider the announced age of the Universe: 13.72 Billion years... timestamp each measurement and use the same equations, I predict that each year calculations will say the AGE of the universe is accelerating. Actually, universal expansion is NOT accelerating, rather this relativistic affect says positions within gravity wells regulate Planck-ticks/second increases as everything expands: meter sticks, mass of objects grow linearly and Earth & we ourselves are moving & perceiving in slow motion compared to times past. Equation (10) implies that when the universe was half its current size, $h$ was $1/\sqrt{2}$ of current value — another factor why Type Ia supernovae are dimmer than expected, $\text{Photon} = c \text{h}$ vs. $c \text{h}/\sqrt{2}$. 

— 8 —
Below, we see the CMB’s hyper-surface. This will slowly morph with time. Especially noticeable is a region that either converges to a spot or emerges as a ring that *envelops* the sphere as the image suggests. This Cosmological Lensing effect lets us see into the CMB-surface thickness at different times as this hyper-surface cooled.

Planck’s anomalous sky: the hemispheric asymmetry and the cold spot. Credit: ESA and the Planck Collaboration.

**Conclusion**

Physically, we are all 3D humans — it’s not easy to achieve a 4D perspective. Creating projections of 4D helps *and* extrapolating our 2D/3D math to higher dimensions can enable us to model and visualize the quantum-scale world and our place in the cosmos.

Imposing 3D thinking on our 4D physical reality leads people to think galaxies fill a 3D volume: \( \frac{4}{3} \pi r^3 \). However, calculations should be based on a 4D Space-*Time* volume: \( \frac{\pi^2}{2} r^4 \). Note: a 4D-sphere’s 3D-surface \( 2\pi^2 r^3 \) shares the same \( 2\pi^2 \) factor as a 3D torus’ volume: \( 2\pi^2 Rr^2 \). Therefore, growing 3D Torii fit on a growing 4D spherical surface like cosmic puzzle pieces.

*Science progresses, slowly, by building on past successes, it progresses quickly by realizing past mistakes.*

This paper is just the tip of an iceberg. One I have been adrift on while contemplating its depths and assembling this cosmological model—nick named “Humpty.” Occasionally a ship passes nearby. I jump up-n-down, waving my arms, hoping to get someone’s attention. Perhaps, someday I’ll see a great ship coming my way. Will they help? Or, will Mainstream Science say “full steam ahead” and crush me? The words of the nursery rhyme echo in my ears:

“All the King’s horses and all the King’s men
couldn’t put Humpty together again.”

When an old paradigm suddenly encounters a new one there’s a chance of exposing a hole in the old. “Is it time to jump ship?” *The cosmic clock is ticking...* Seeking refuge? My friendly iceberg is a peaceful place. Perhaps FQxI or the John Templeton Foundation can fulfill the role of diverting Modern Science from its current course — or — *as the RMS Carpathia?* Time, “t”, will tell.


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