Proving Divine Providence is Responsible for Universe Evolution:

Scientific Confirmation of the Plane of Creation
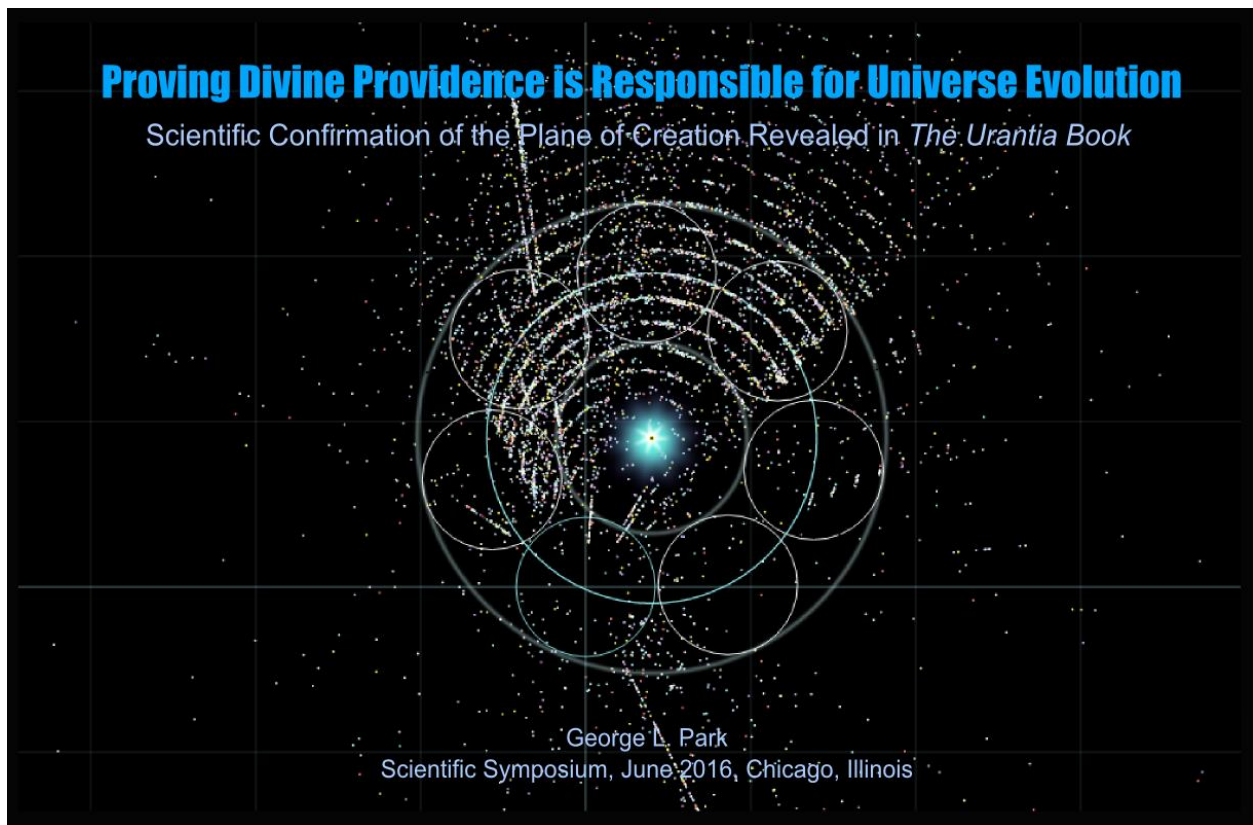Revealed in *The Urantia Book*

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June 2-5, 2016
Science Symposium, Chicago, Illinois

I.   The Challenge of Proving the Supernatural

This symposium considers the question of intelligent design in the universe. This theme recasts in modern terms the age-old search for evidence of God's supernatural intervention in the world. Science conceives of evolution as a mechanistic process which can only yield accidental developments. Intelligent design conceives of evolution as a purposeful process: It requires intelligent supernatural intervention in the chain of material causation to steer evolutionary developments toward a creative end. This paper first examines why the physical structure of the universe, as it is revealed in *The Urantia Book,* must be the result of intelligent design accomplished

through supernatural intervention. It then proves that the universe is organized in the way that revelation describes. It concludes with a brief consideration of the metaphysical relationship between this new scientific cosmology and the transcendent presence of God in the universe.

The first question which needs to be answered is: What would constitute proof of supernatural intervention? Being immaterial, the supernatural cannot be directly observed. Science can only infer the reality of supernatural causes, based upon the axiomatic assumption that every event must have a cause. For example, the force of gravity cannot be directly observed, but Newton inferred its existence, based upon predictable interactions between material bodies. If an event has no natural cause, we infer it must have a supernatural one. There must be a supernatural First Cause, because the universe must have a beginning and an uncaused cause must be a supernatural one. However, rapidly advancing science has made all such metaphysical inferences suspect. For most of recorded history, it was universally believed that the heavens must be a spiritual realm, because there was no apparent natural cause for celestial motions. Science disproved this belief and has gone much further. Einstein replaced Newton's mysterious force of gravity with the relativistic mechanism of curved spacetime. Cosmology has replaced a supernatural First Cause with a mechanistic one. Supposedly, random quantum fluctuations in the spacetime of an original gravitational singularity accidentally caused a Big Bang.

Science has demonstrated a prodigious ability to infer natural causes for phenomena. At this point in time, a persuasive proof of supernatural intervention requires phenomena for which science can never credibly infer a natural cause. But it is hard to imagine what such phenomena might be.

## II.   Revealed and Modern Theories of Universe Evolution

The Revealed Plane of Creation

(Credit: Image by Gary Tonge)

The Urantia Book overcomes this difficulty with a new concept of the universe. The preeminent feature in the universe is the plane of creation. God dwells on Paradise at the center of this universal plane. He continuously creates new energy here and there in the universe, which leads to the formation of new stars and galaxies. Galaxies are organized in concentric space levels, which revolve about Paradise under the force of absolute gravity. Space alternately expands and contracts from just beneath Paradise. All of these phenomena require God's supernatural intervention. But this revealed universe is just a theory, so far, and it completely contradicts the modern consensual theory of a Big Bang origin.

## The Big Bang Theory of the Origin and Evolution of the Universe
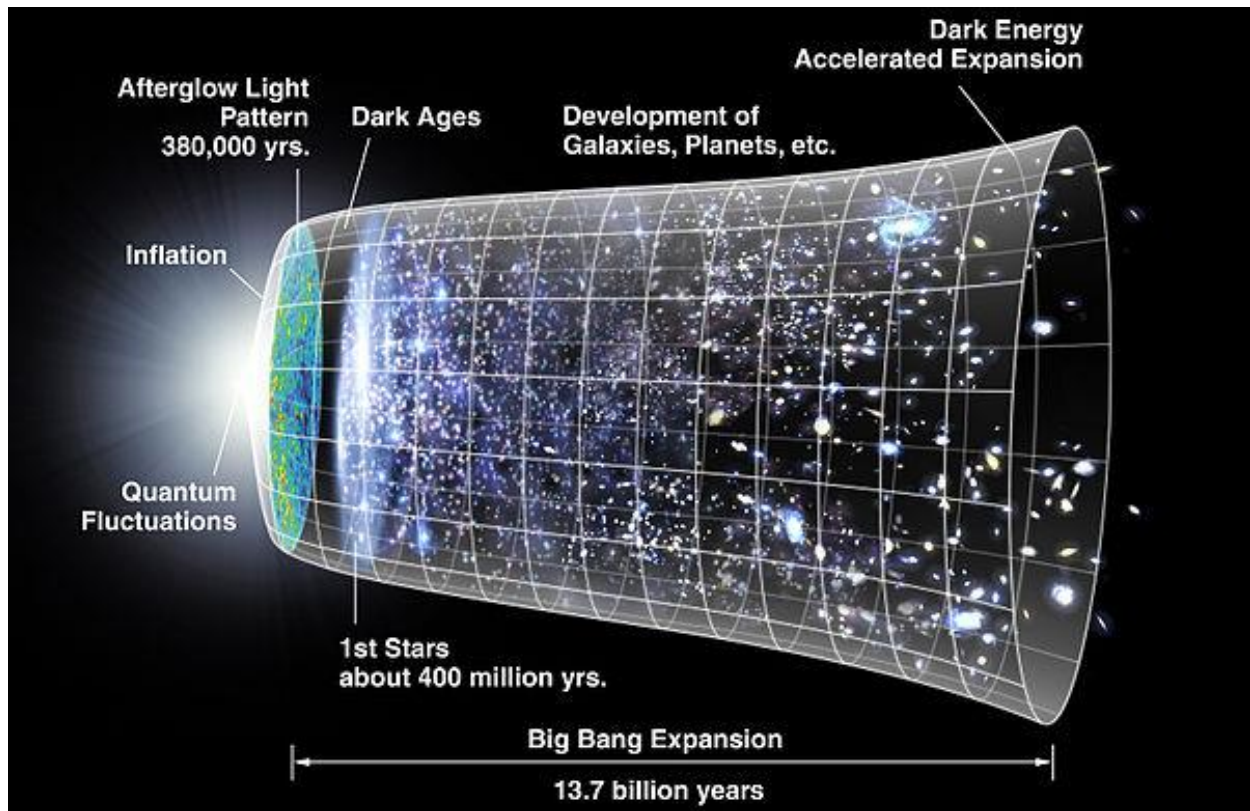
(Credit: NASA/WMAP Science Team)

In 1929 Edwin Hubble made the shocking discovery that the universe is expanding. This led to the inference that space expansion must have been caused by a Big Bang. Immediately after this primal explosion, the universe was completely filled with a dense superheated plasma of subatomic particles. As space expanded, this plasma cooled off, atoms formed, and randomly distributed stars and galaxies appeared. Looking forward in time, all galaxies must eventually disintegrate and all stars must finally burn out. This whole story of the origin and final "heat death" of the universe is governed by the law of entropy. Entropy is the natural tendency of work energy to dissipate, until energy is uniformly dispersed throughout a system. Entropy causes all hot things to radiate energy and cool off, all dynamic mechanisms run down and stop, and all complex structures to fall apart and become disordered. The law of entropy prevents the evolution of any complex universal structure, like the plane of creation, from the uniform distribution of matter caused by a Big Bang event.
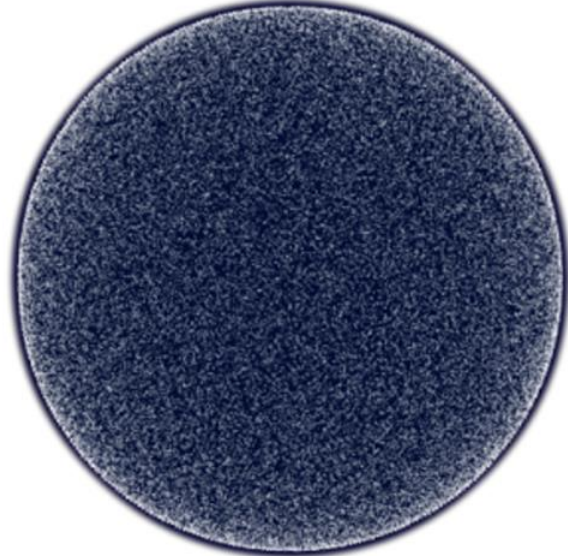
III.   The Evolution of the Plane of Creation Requires Supernatural Intervention

General Ideas about the Distribution of Galaxies in the Universe
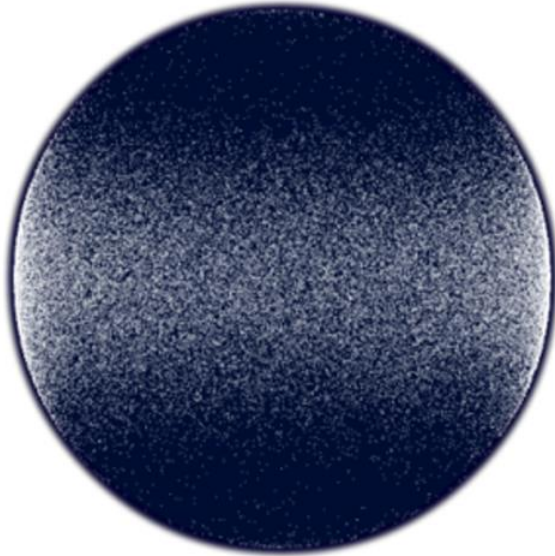
Revealed Plane of Creation   **Big Bang Universe**

These mutually exclusive theories about cosmic evolution result in completely different organizations of matter in the universe. This difference establishes an empirical test for these theories. If future observations confirm a uniform distribution of galaxies, this would validate the Big Bang theory. Confirmation of a planar concentration of galaxies would prove there is supernatural intervention in the universe, for the following reasons.

The universe is a physically isolated system, simply because it is the whole of all things material. The dynamics of a Big Bang origin cause a uniform distribution of matter in the universe. The universe begins in a state of disorder, and the law of entropy prevents any increase in its overall orderliness. This scientific premise is formalized in the cosmological principle; on sufficiently large cosmic scales, matter must be uniformly distributed in the universe throughout its entire history. The evolution of a universal planar structure from an initial state of disorder, therefore, contravenes entropy. Since this law governs all natural processes, it cannot be violated without undermining all scientific understanding. To avoid invalidating this physical law, the emergence of this universal plane requires the addition of work energy to the universe. It requires work to create order out of chaos. But the universe is an isolated system, so no external force can add energy to it. The only way to add work energy to the universe and save the law of entropy is by creating energy within the universe. However, the law of conservation of energy prohibits the creation or destruction of energy by any natural means or process. This fundamental law of physics cannot be violated without destroying the whole scientific enterprise. To save science, science must infer there is a supernatural cause for the creation of this energy.
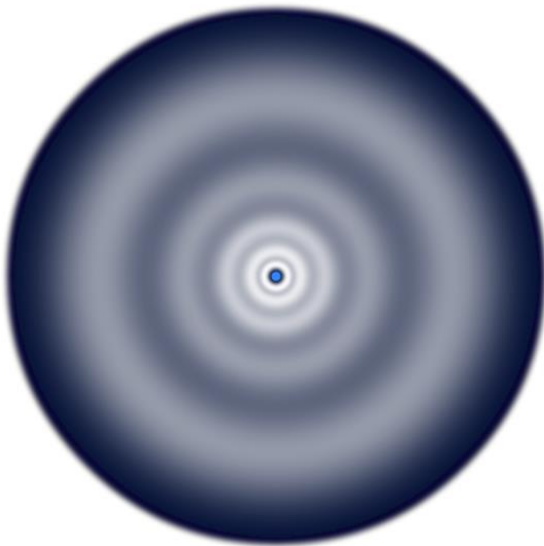
To summarize: Entropy prevents the overall order of an isolated system from increasing. If, in spite of this, its orderliness increases, the law of entropy can only be saved by adding work energy to the system. The only way to add work energy to an isolated system is by creating it within the system. Energy cannot be created in any natural way. To save the law of energy conservation, this energy must be created by a supernatural cause.

Before the turn of this century, there was no evidence that the plane of creation exists. But over the last decade or so the number of identified galaxies has exploded from a few million to a few hundred million. Concealed within this superabundance of new observations is conclusive proof that the plane of creation exists. This discovery led to the publication three years ago of a work entitled *The Eternal Isle of Paradise*, which is accessible at www.ubcosmology.com. This paper highlights some of the findings detailed in this work.
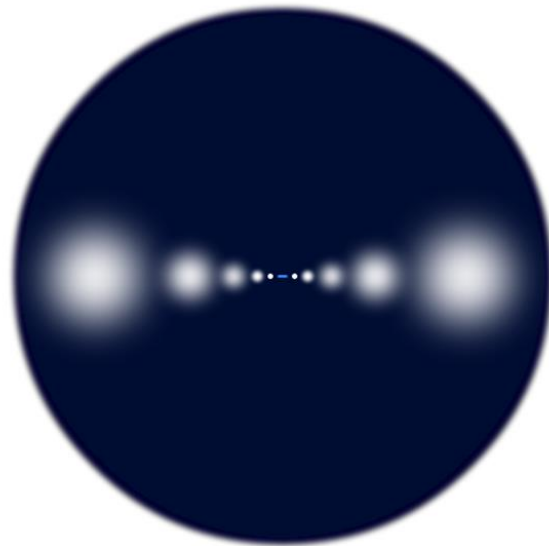
IV. Revelation of the Grand Universe

Havona, Superuniverse, 1st, 2nd, 3rd, and 4th Outer Space Levels

The plane of creation consists of six concentric space levels. God dwells on Paradise at the absolute center of the universe. The central universe of Havona, shown as the small blue circle at the center, encircles Paradise and contains a billion perfect worlds but no stars. We are located in the superuniverse space level, the white ring of galaxies immediately surrounding Havona. Havona and the superuniverse space level together form the grand universe, the domain of the Supreme Being.

The Revealed Internal Structure of the Grand Universe
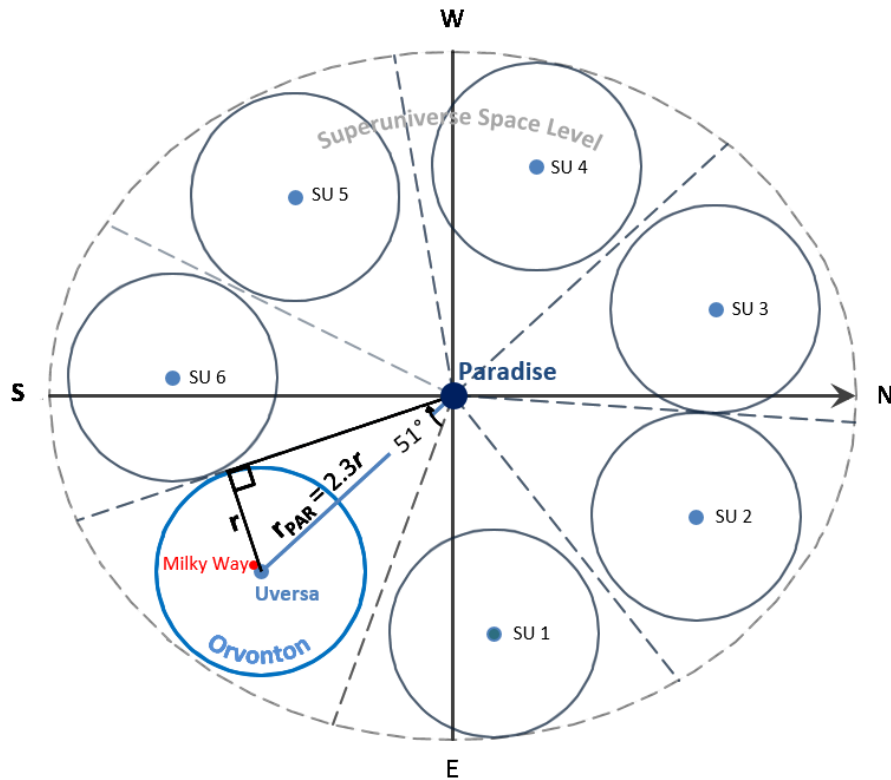
The superuniverse space level is described in detail by the Universal Censor in Paper 15. This ring-like structure contains seven superuniverses, one of which is our superuniverse of Orvonton. Everything in Orvonton revolves about its capital of Uversa, which we are told is between 200,000 and 250,000 light-years distant from us. This is outside our Milky Way galaxy, which has a radius of 50,000 light-years. While Orvonton revolves about Uversa, Uversa orbits Paradise in the superuniverse space level. This revealed sevenfold segmentation of the space of the grand universe yields a simple ratio: The distance from Uversa to Paradise is 2.3 times the radius of Orvonton.

The Superuniverse of Orvonton is the Local Group of Galaxies
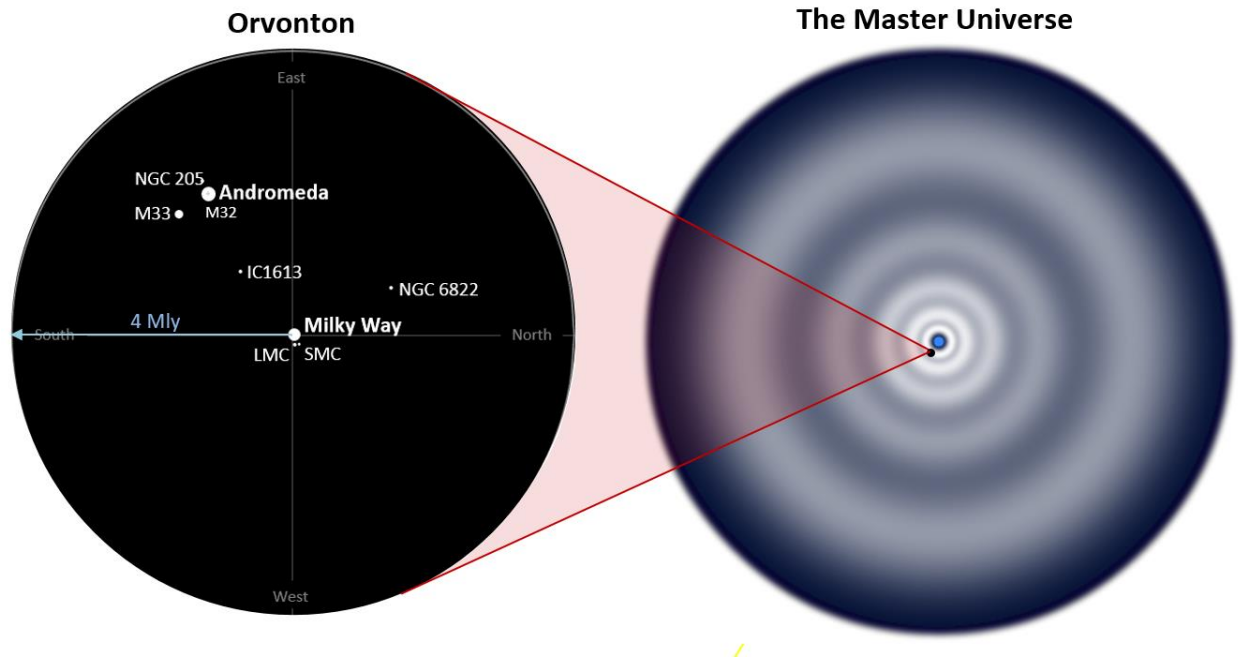
Numerous statements suggest that Orvonton is what astronomers call the Local Group of galaxies. This grouping was identified in the 1930s and includes the large Andromeda and Milky Way galaxies, dozens of normal size galaxies, and hundreds of smaller globular clusters. The approximate radius of the Local Group is 4 million light-years (Mly). If Orvonton is the Local Group, then the distance to Paradise should be 2.3 times 4 Mly or 9.2 Mly. Given this radius of 9 Mly, the other six superuniverses should be well within 36 Mly of us.

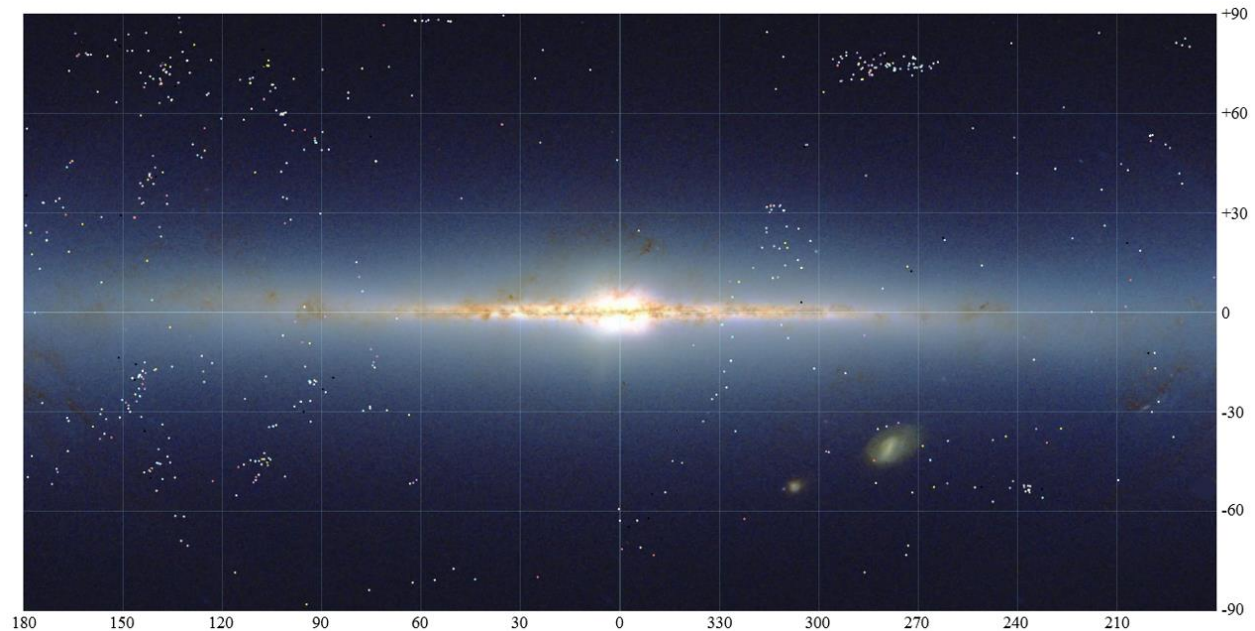## Galaxies in the Other Superuniverses Should Form a Belt across the Sky
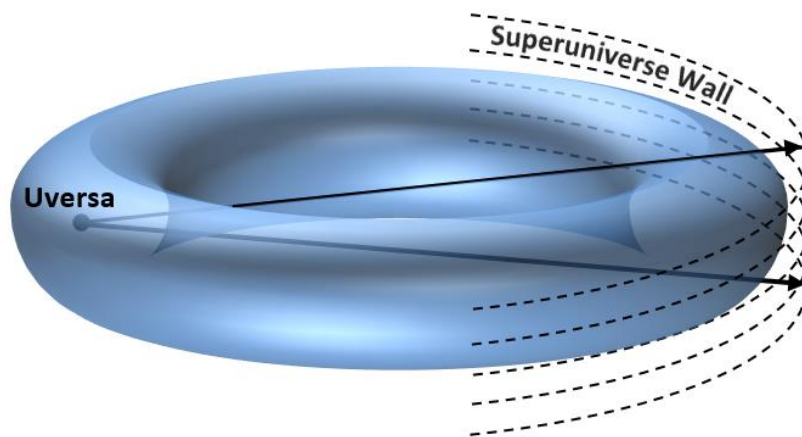
The superuniverse space level is a torus-like structure. We are near Uversa, which is located in the central orbital core of the space level. From this location the other superuniverses in the

grand universe should appear as a long belt of galaxies stretching across the sky. We can call this belt the Superuniverse Wall.

V.　　Empirical Proof of the Superuniverse Space Level

Year 2000 - 726 Galaxies were known to be within 5-36 Mly

Revelation gives us some idea of the size of the superuniverse space level and how it should appear to us. NASA's Extragalactic Database gives us the means to search for the other superuniverses. This database is the authoritative worldwide master list of all objects beyond our Milky Way. According to the historical record maintained in this database, in the year 2000 there were 726 galaxies known to be more than 5 Mly away and less than 36 Mly distant. This all-sky chart plots these galaxies relative to a 2008 NASA photo of the plane of the Milky Way. It shows that nothing like the expected Superuniverse Wall was visible within this volume at the beginning of this century.

2010 - 8,450 Galaxies within 36 Mly – 5,000 galaxies in the Superuniverse Wall
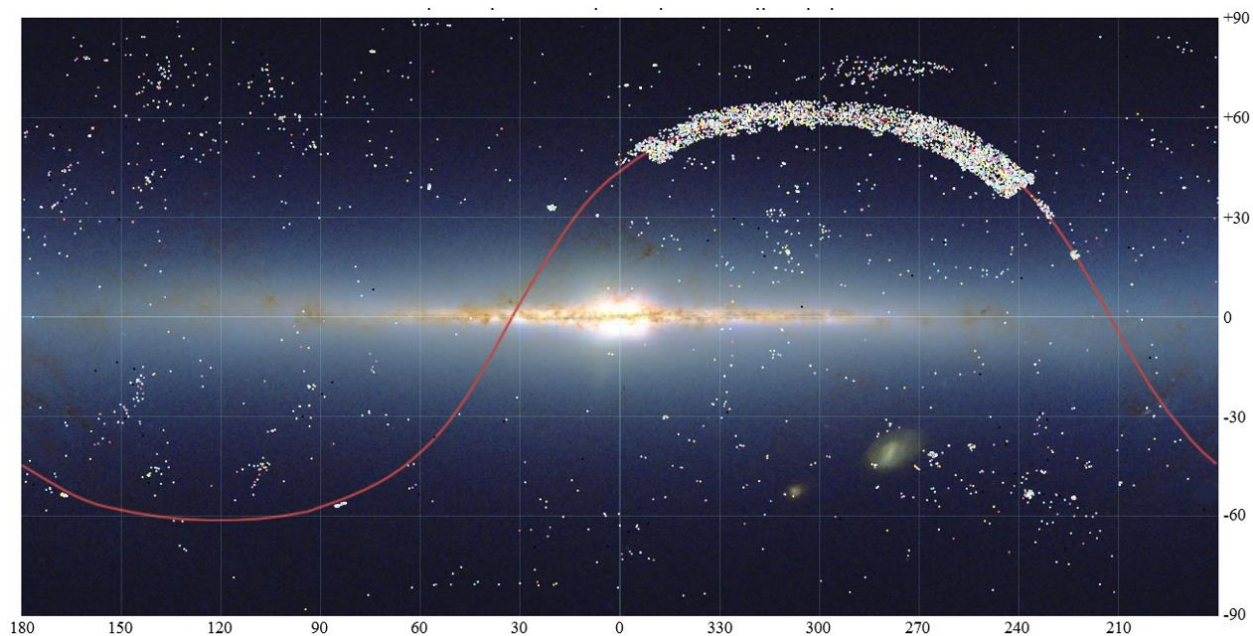
But just ten years later, the number of galaxies jumps more than tenfold. The Superuniverse Wall is obvious as a dense belt of over 5,000 galaxies. This belt follows the path of a great circle across the sky. The linear form of the Superuniverse Wall becomes apparent if everything is rotated 57 degrees around the north-south axis of the galactic plane and 61 degrees around its east-west axis.

The Superuniverse Wall defines the Gravitational Plane of the Grand Universe
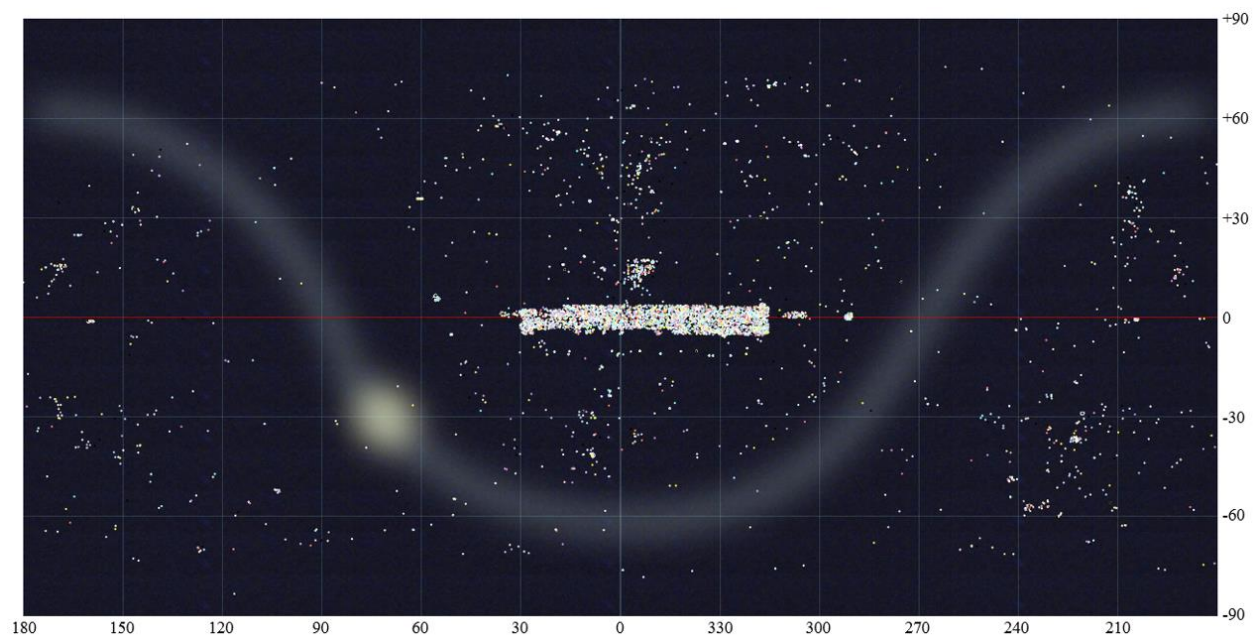
After these rotations, the galaxies in the Superuniverse Wall form a well-defined linear structure. The change in spherical coordinates transforms the appearance of the Milky Way from a linear to a sinusoidal form. Gravitational revolution is the only credible explanation for this linear structure. We know that stars cluster about the disk-like plane of the Milky Way, because they are in gravitational revolution about its center. For the same reason, the Superuniverse Wall must be the appearance of a disk-like plane of galaxies formed by gravitational revolution about some center.

Polar View of the Central Core of the Superuniverse Space Level
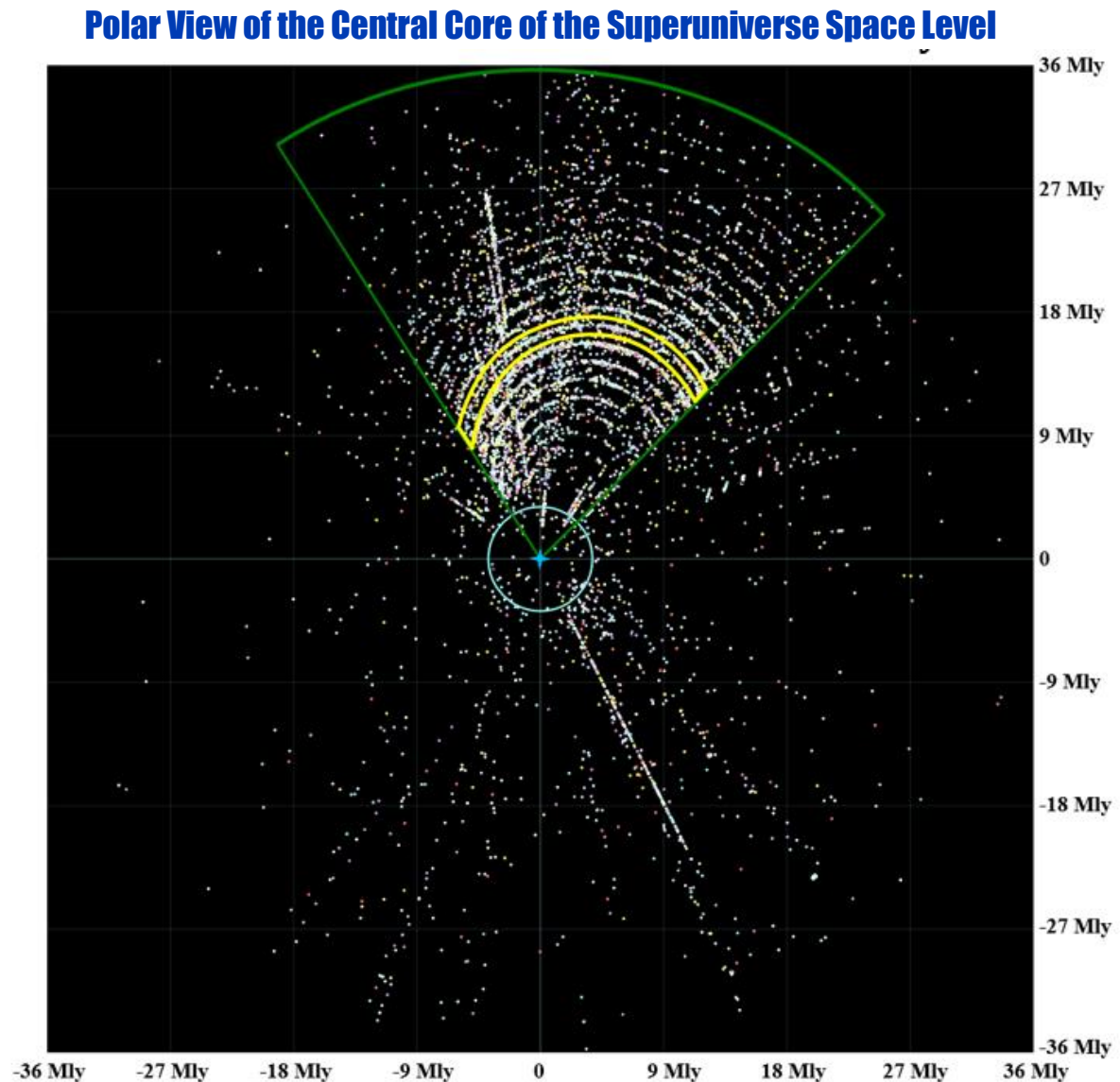
This hypothesis of a disk-like plane of galaxies is confirmed in this overhead view of the grand universe out to 36 Mly. The green wedge marks the left and right edges of the Superuniverse Wall. The blue four point star at the center is the location of Uversa. The blue circle

defines the 4 Mly radius of Orvonton. Moving up and away from Uversa, the galactic density rapidly increases to a maximum in the arc outlined in yellow and then rapidly decreases. There is a sharp spike in galactic density here that is 289 times the average density. This is comparable to the difference between a solid and a gas. This yellow-outlined arc must be a segment of the dense central core of the superuniverse space level. If it is, it defines the orbital path of the superuniverse capitals around Paradise and should pass directly over Uversa.

VI.   Identifying the Location of the Isle of Paradise

Paradise-Havona is 9 Mly away at the Center of the Superuniverse Space Level
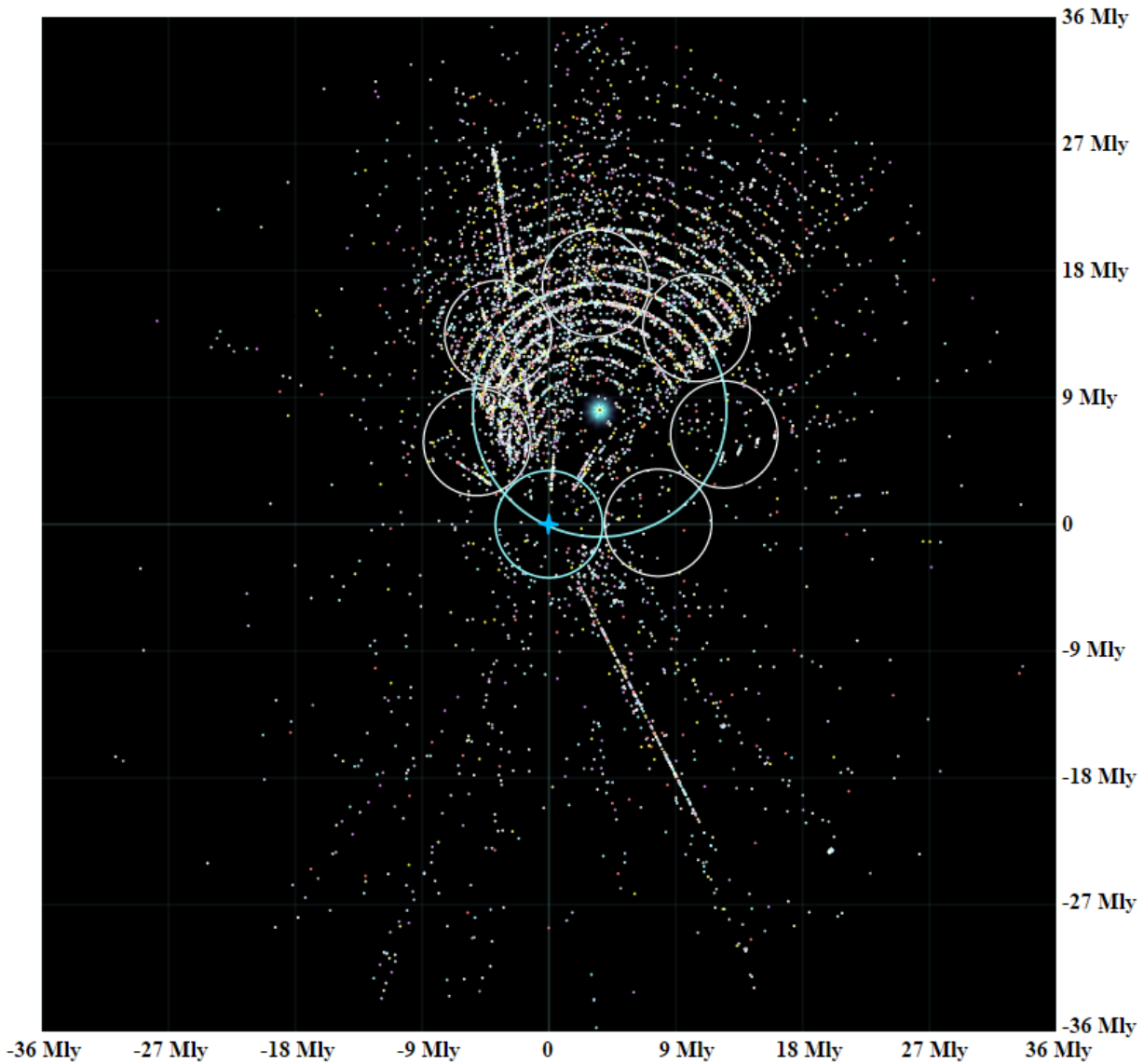
An extension of this arc describes an orbital path which passes exactly over Uversa. Seven galaxy groups the size of the Local Group exactly fill up this orbital path. The Local Group is part

of a larger circular structure whose center is 9 Mly away, which is almost exactly the predicted distance of 9.2 Mly. Gravitational revolution is the only credible explanation for this ring-like central core defining the orbital path of the superuniverse capitals. If the galaxies in this central core are revolving about Paradise, there should be no relative motion between them. This is analogous to the absence of any motion between fixed locations along the equator of a revolving sphere. This strict empirical test is satisfied: There is no detectable relative motion between us and the thousands of galaxies in this central core. These multiple confirmations of revelation conclusively prove that Orvonton is the Local Group and this larger circular structure is the revolving superuniverse space level.

We have good reason to believe that Paradise is located at the center of this circular structure. The historical evidence proves that no one could have known about this circular structure before the turn of this century. Nevertheless, its form, internal structure, relative size, and gravitational revolution were all known to the authors of *The Urantia Book* before 1955. This demonstration of superhuman knowledge justifies our trust in the authors, who tell us that the Isle of Paradise is located at the center of this circular structure.

VII.   Empirical Proof of the First Outer Space Level

The Grand Universe at the Center of the Master Universe
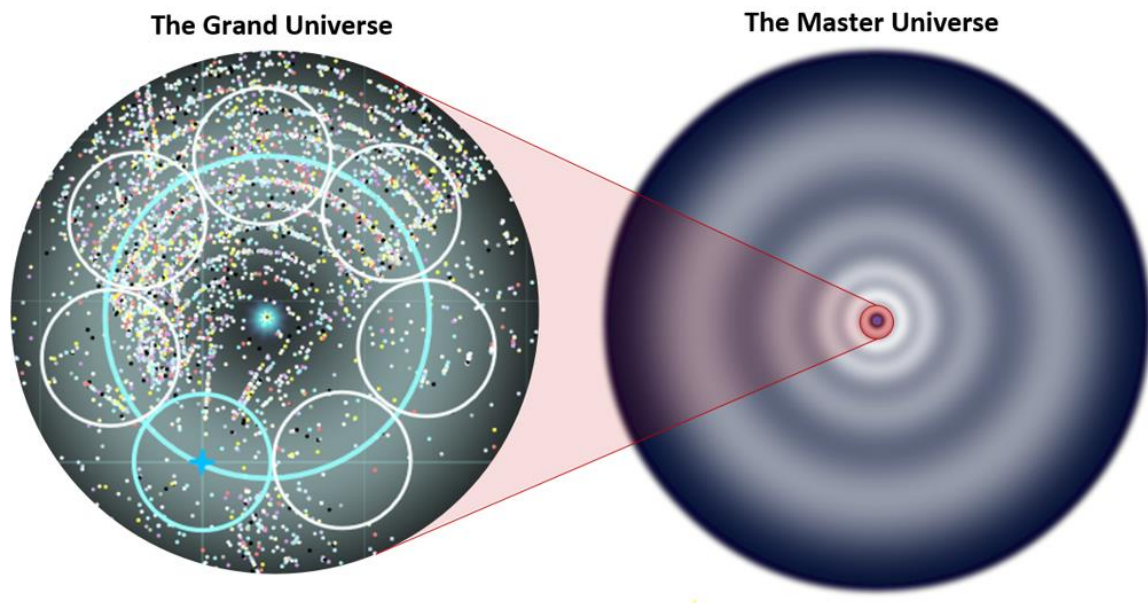
We can now map the grand universe at the center of the master universe. The 1st outer space level is "a continuous belt of cosmic activity encircling" [12:1.14] the superuniverse space level. This annular belt contains at least 70,000 aggregations of matter, "each of which is greater than any

one of the present superuniverses." [31:10.19] The stellar mass of this space level is 10,000 times that of all seven superuniverses. To accommodate all of these stars in an annular structure, the radius of the central core of the 1st outer space level needs to be very roughly 100 times the 9 Mly radius of the superuniverse space level. The gravitational plane of the 1st outer space level is the same as that of the superuniverses. It should appear as a belt of galaxies directly behind the Superuniverse Wall.

Sloan Great Wall is Part of the Central Core of 1st Outer Space Level
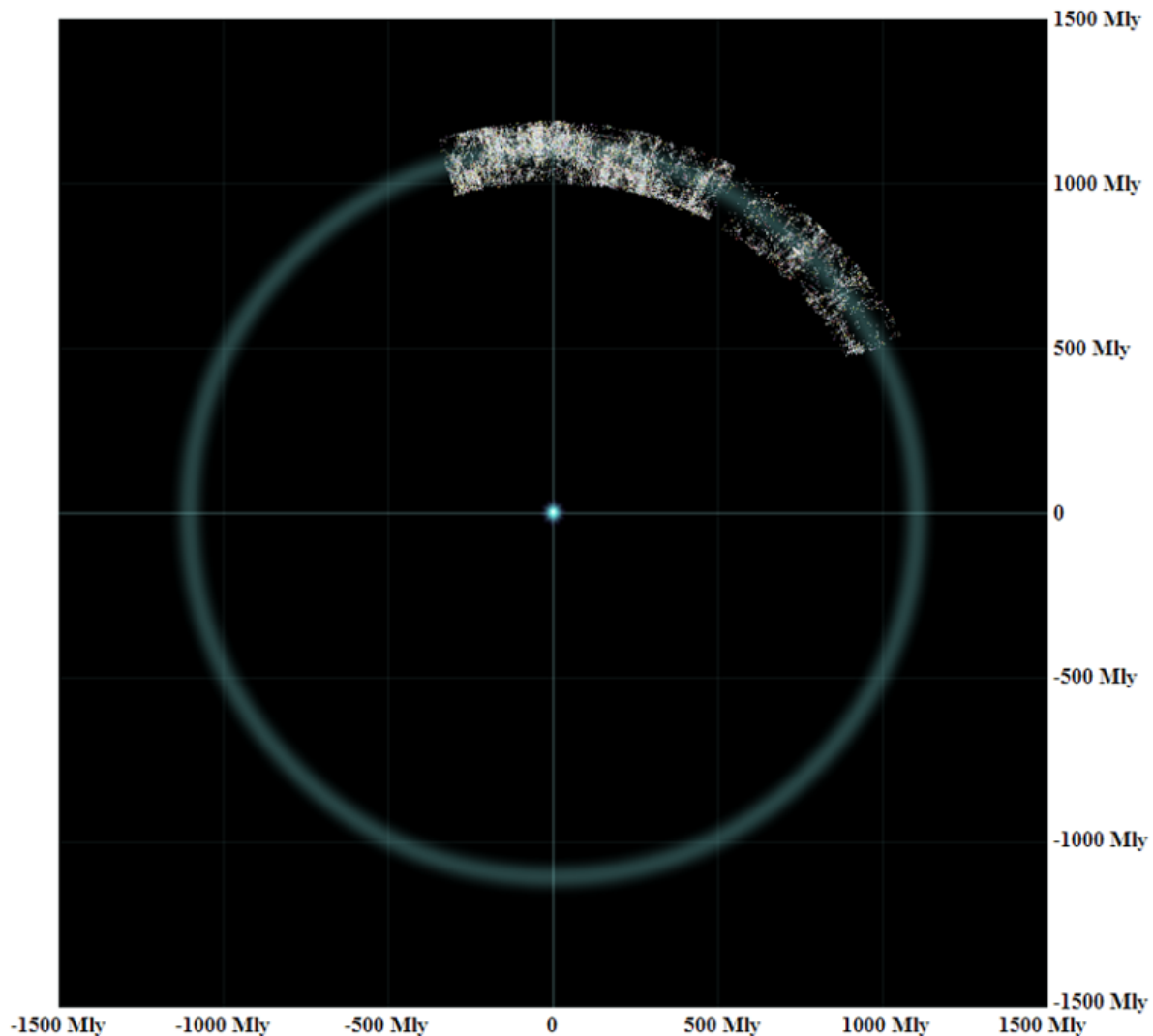
There was no evidence of anything matching the description of the 1st outer space level before 2003. In that year, J. Richard Gott of Princeton University discovered the Sloan Great Wall. This overhead view of the plane of creation out to 1.5 billion light-years (Bly) plots the galaxies in this stupendous planar structure. Paradise is at the center of this chart. With a length of 1.4 Bly the

Sloan Great Wall is currently recognized as the largest fully observable structure in the universe. It follows an approximately circular path at a radial distance of 1.1 Bly from Paradise. This is 122 times the radius of the superuniverse space level. There are roughly 18,000 galaxies in the Sloan Great Wall. This equates to about 80,000 galaxies projected over the whole orbit, which is consistent with the expectation of at least 70,000 galaxies. The density of galaxies in the Sloan Great Wall is about 6 times greater than surrounding regions of space, which clearly distinguishes its form.

The 1st OSL has the Same Gravitational Plane as the Superuniverse Wall
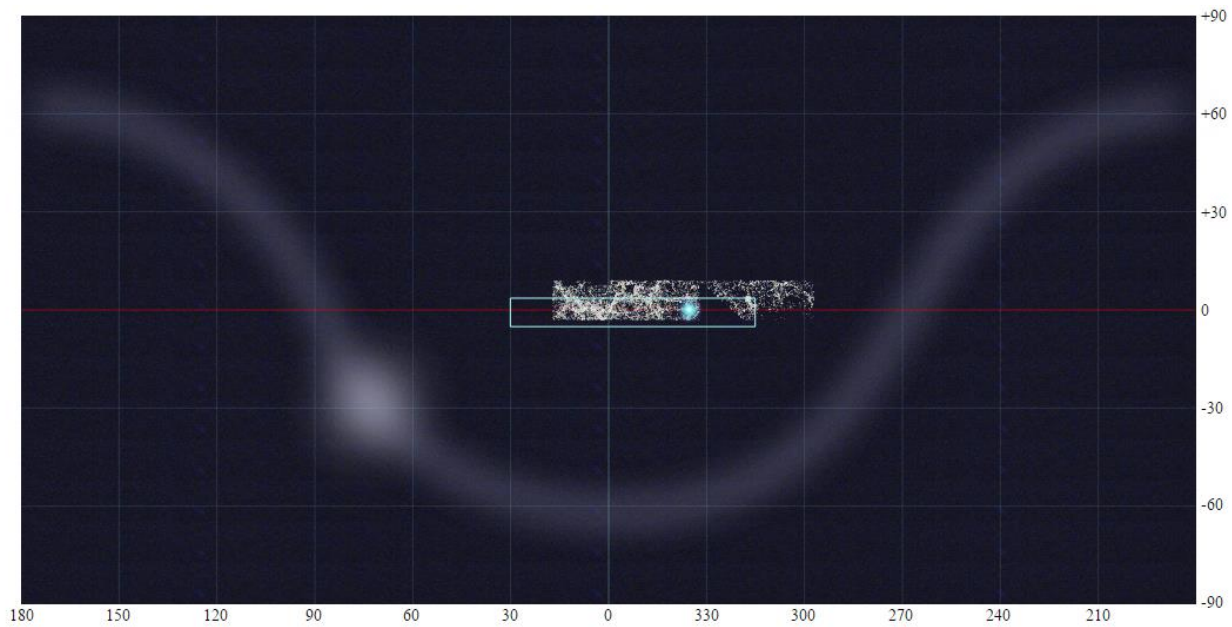
In this all-sky map, the galaxies in the Sloan Great Wall are shown behind the blue outline of the Superuniverse Wall. Paradise is the bluish dot. Its gravitational plane is the same as that of the superuniverse space level. It has the annular form, stellar mass, cosmic alignment, and relative size described by revelation. These multiple confirmations of revelation prove that the Sloan Great Wall is a segment of the central core of the 1st outer space level.

VIII.   Empirical Proof of the Second and Possibly Third Outer Space Levels

The authors say very little about the galaxies in the 2nd outer space level, even less about those in the 3rd, and nothing about those in the 4th. If we assume that the Sloan Great Wall is in the middle of the 1st outer space level, the 2nd outer space level should begin at about 2 Bly. Revelation leads us to expect that the galaxies in the 2nd outer space level form a linear belt directly behind the Sloan Great Wall.

Typical galaxies are difficult to observe beyond 2 Bly. However, quasars are extremely luminous galaxies, which are currently observed out to 28 Bly. This is about 60 percent of the universe's theoretical radius of 42 Bly. As of 2013 about 150,000 quasars were identified and over 99.8 percent of these are more than 2 Bly distant. Since quasars are thought to have hundreds of times the mass of galaxies like Andromeda and the Milky Way, they can be used to investigate the distribution of matter in the universe at distances between 2 and 28 Bly.

3-D View of 150,000 Quasars out to 28 Billion Light-years
side view looking along the plane of creation
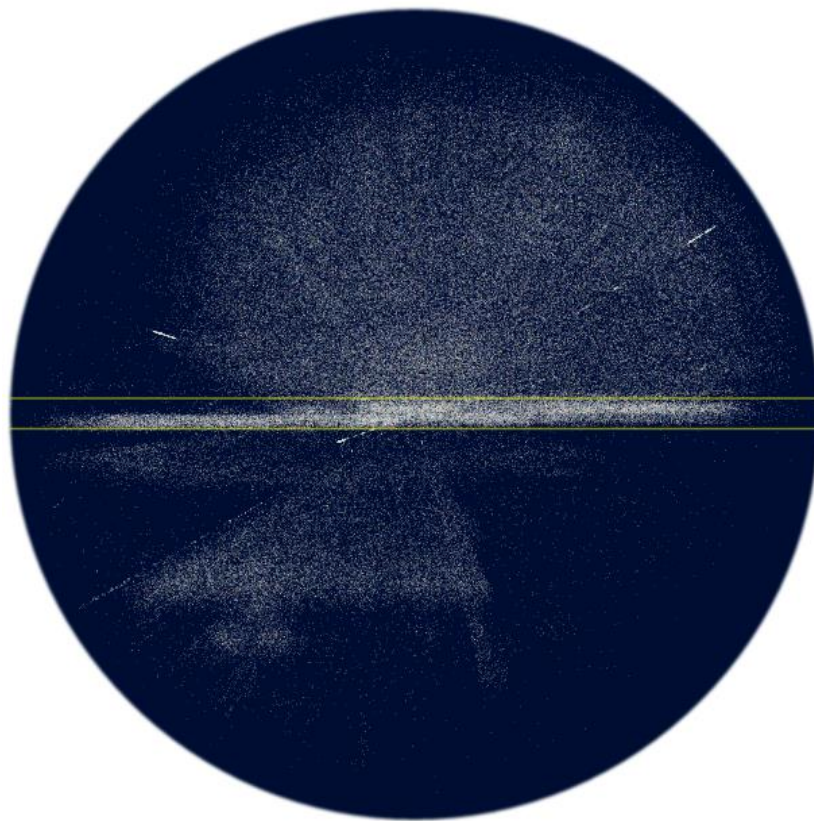
The above graphic plots the 3-dimensional positions of 150,000 quasars, as viewed from the side, looking along the plane of creation. Quasar density between the two yellow lines bracketing the plane of creation is about three times greater than the average density. However, there are large areas with no quasars, because only about one third of the sky has been systematically surveyed.

73,000 Quasars in a Completely Surveyed Area – the Wall of Quasars
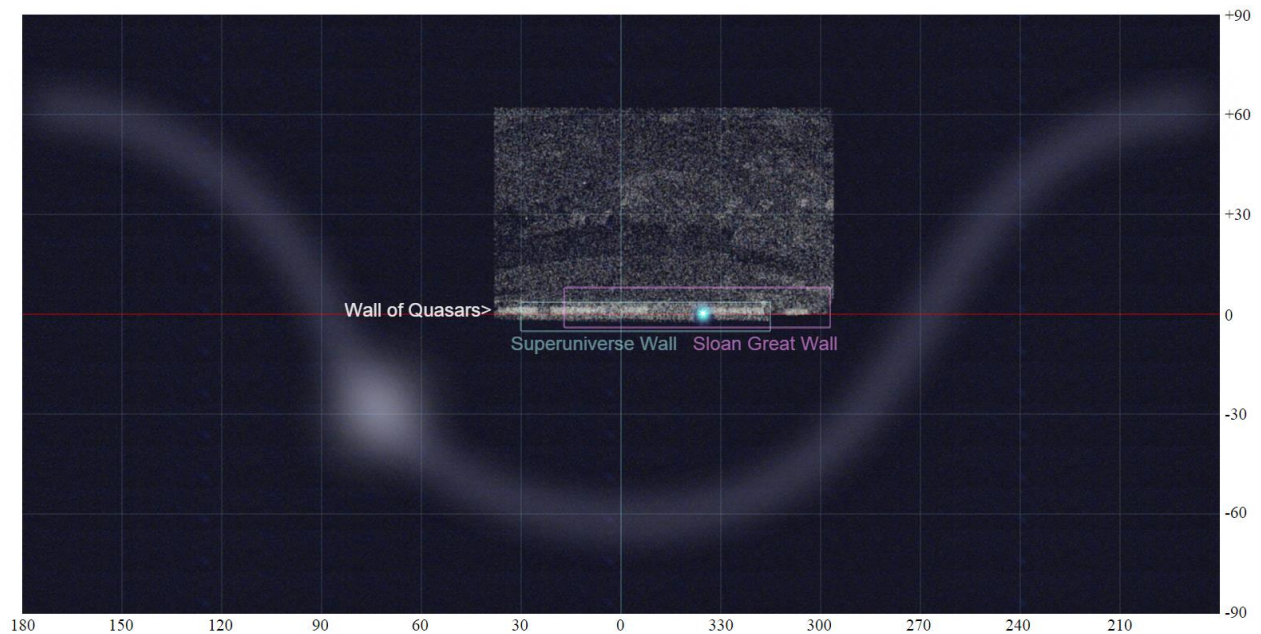
A more accurate analysis of quasar distribution is obtained by using a completely surveyed area. The Sloan Digital Sky Survey covers the sky from the left edge of the Superuniverse Wall to the right edge of the Sloan Great Wall up to a height of more than 60 degrees of latitude. Over 73,000 quasars are found in this survey area. Plotting these, a dense Wall of Quasars is obvious running along the plane of creation.

The Wall of Quasars Aligns with the Superuniverse and 1ˢᵗ Outer Space Levels
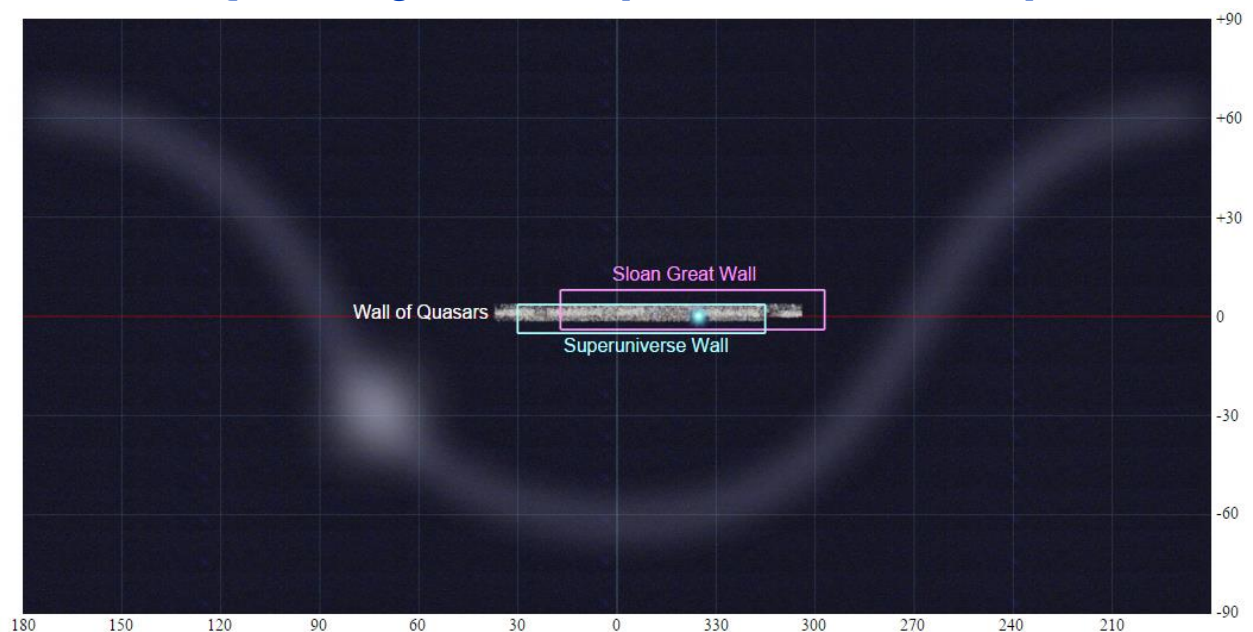
This planar concentration of quasars has a density that is more than 4 times the average in the survey area. This over-density extends from 2 to 20 Bly and clearly distinguishes the Wall of Quasars from surrounding space. The gravitational plane of this structure aligns with the plane of the superuniverse and 1st outer space levels to within one degree. The Wall of Quasars can only be our view of the 2nd outer space level. Because it is 18 Bly deep, it may also include some or all of the 3rd outer space level. In its longest dimension, this planar structure is about one-third of the universe's theoretical diameter of 93 Bly. This conclusively proves that galaxies are not uniformly distributed in the observable universe. This refutes the cosmological principle and disproves the Big Bang theory.

IX.   The Universe Location of Space Respiration

All-Sky Temperature Map of the Cosmic Microwave Background Radiation
Radiation supposedly emitted 13.8 billion years ago
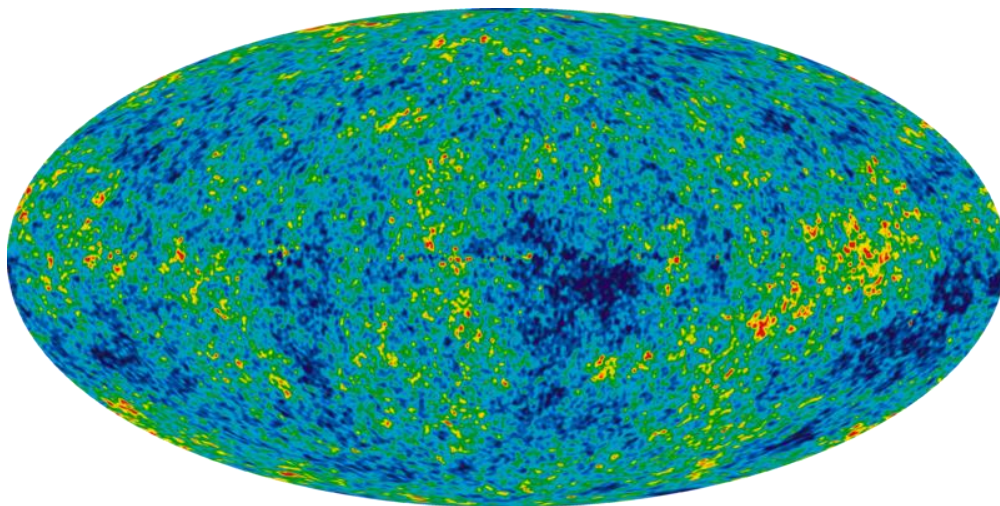
(Credit: NASA/WMAP Science Team)

The strongest evidence offered in support of the Big Bang theory is the cosmic microwave background (CMB) radiation. This radiation has a highly uniform temperature in every direction in the sky of 2.7 degrees above absolute zero. It also has an extremely high redshift ($z = 1090$). This redshift places its point of origin at the outer limits of the expanding universe. This supports the hypothesis that this radiation was emitted very shortly after the Big Bang. This all-sky temperature map of the CMB radiation is interpreted as direct evidence of the chaotic state of the plasma-filled universe some 13.8 billion years ago.

CMB Multipoles are Improbably Aligned with the Ecliptic Plane
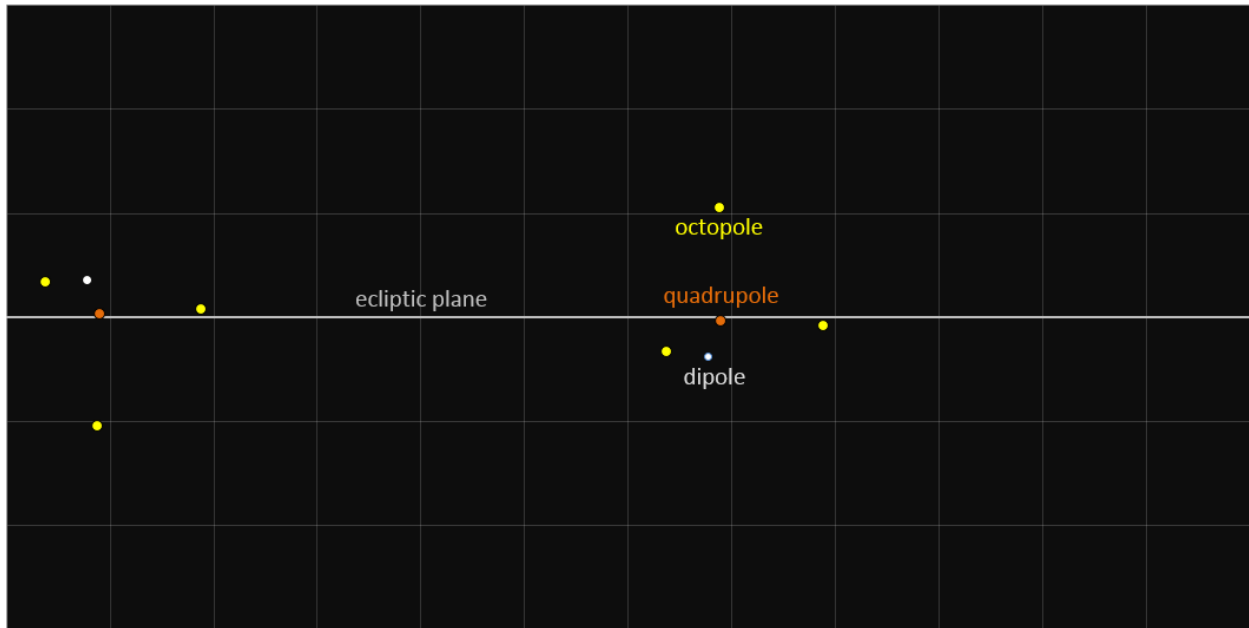
This hypothetical origin of the CMB radiation has run into difficulties. In 2004 Dominik J. Schwarz, an astrophysicist at CERN, found that large areas of the sky have temperatures very slightly warmer or colder than the average of 2.7 degrees above absolute zero. The centers of these areas, their so-called multipoles, are improbably aligned with the ecliptic plane, the plane of our solar system. He put the odds of this alignment occurring by accident at less than 1-in-1000. This makes it very improbable that this radiation was emitted by a chaotic superheated plasma, contradicting the Big Bang theory. However, no causal connection can be found with our solar system. This has led to the conclusion that this finding is an insignificant statistical anomaly.

The CMB Dipole Points to the Location of Space Respiration beneath Paradise
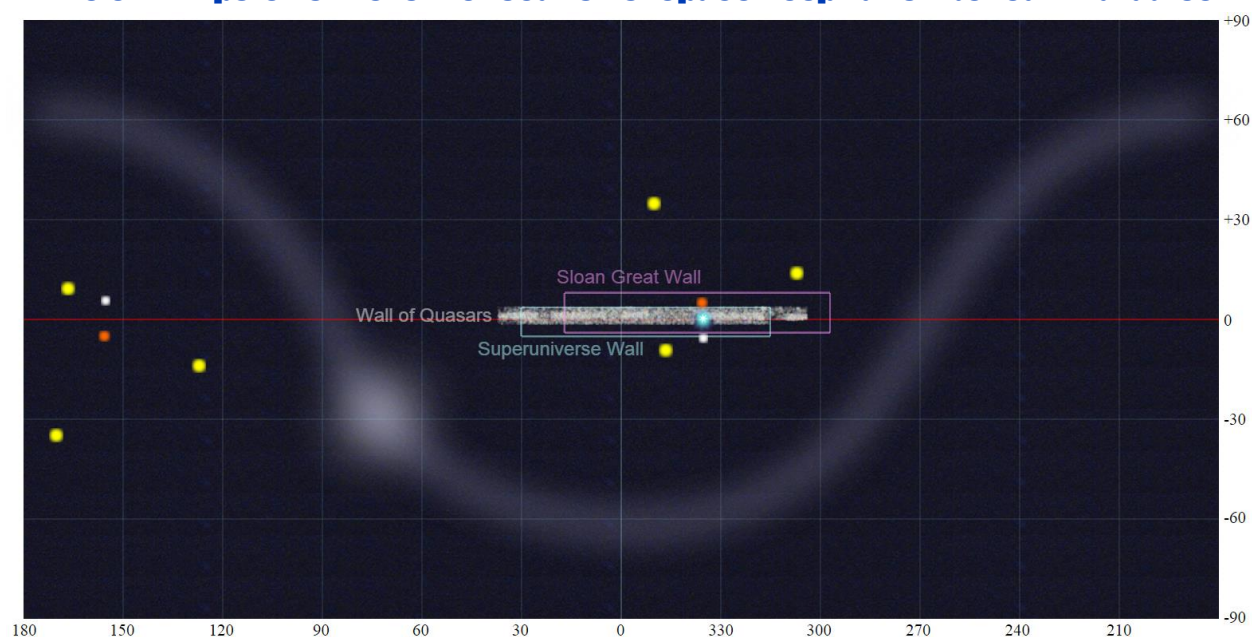
It turns out this conclusion is wrong. Compared to the ecliptic plane, these multipoles correlate twice as strongly with the plane of creation. Unlike our insignificant solar system, the plane of creation is the largest possible structure in the universe. The high correlation of these CMB multipoles with the plane of creation supports the strong inference of a causal relationship between the two. This inferred causal relationship is consistent with a universal extension of the plane of creation.

A striking feature in this all-sky chart is the location of the CMB dipole, the white dot directly beneath Paradise, which is shown as the bluish dot. This dipole is the warmest location in the background radiation, which makes it the least redshifted. This reduced redshift can be explained by a relative approaching velocity between the sun and this radiation in the direction of the CMB dipole. Modern theory attributes this velocity to the sun moving in the direction of the dipole. In revealed cosmology this relative velocity is attributed to space expanding from the direction of the dipole toward the sun, which is relatively stationary. The measured rate of space expansion and this velocity relative to the cosmic microwave background place the point of space expansion 900,000 ly directly beneath Paradise. This location is consistent with revelation: "There is a confluence of pervaded and unpervaded space just underneath nether Paradise." [11:6.2] "Space seemingly originates just below nether Paradise." [11:2.11] The CMB dipole beneath Paradise is a physical manifestation of the phenomenon of space respiration. [see Addendum for further discussion on space respiration]

X.   The Scientific Recognition of the First Source and Center

The First Source of Energy at the Absolute Center of the Universe

Revelation inspires the search for the plane of creation. But once discovered, it becomes an independently verifiable scientific fact confronting modern cosmology. This planar concentration of galaxies proves that space expansion was not caused by a Big Bang. There is no longer any possible natural cause for space expansion, so it must have a supernatural cause. The universe may be far older than 13.8 billion years, since its age can no longer be measured from the beginning of space expansion. Gravitational revolution is the only credible explanation for the plane of creation. But the linear gravity of Newton and Einstein cannot be the cause. Linear gravity causes a curvature in spacetime which lays out orbital paths of least inertial resistance around a central mass. It has been recently determined that the spacetime of the observable universe has no detectable curvature: It is "flat" like the ideal space of Euclidean geometry. It is necessary to infer the existence of a supernatural gravitational force which acts from the center of universal revolution 9 Mly away. The theory of relativity denies the possibility of absolute motion, but universal revolution is necessarily an absolute motion about an absolutely stationary location. The actual evidence for space expansion, the redshift-distance relation, only demonstrates that space is expanding outward from a location not too far from us. Since space expansion is a universal phenomenon, this location must be absolutely stationary. The only absolutely stationary location is the center of universal revolution 9 Mly away.

The universe is evolving a planar structure, which requires the supernatural creation of work energy in the universe. This creation of energy is necessary but not sufficient to explain universe evolution. This created energy cannot be added in an indiscriminate and haphazard manner,

since this would disrupt the evolution of any universal structure. It must be added in a coordinated way which constructively evolves the plane of creation. This universal coordination and control over the creative addition of energy requires science to recognize the theoretical reality of some supernatural agent. The dynamic unity manifest in universe evolution requires a single supernatural agent at the center of the universe who is responsible for the creation of energy and the absolute motions of universal revolution and universal space expansion. It would be reasonable to call this transcendent supernatural agent the First Source and Center, "the primal cause of the universal physical phenomena of all space." **3:2.3**

XI.   A Metaphysical Connection between Science and Religion

Divine Providence Governs the Evolution of the Universe of Universes
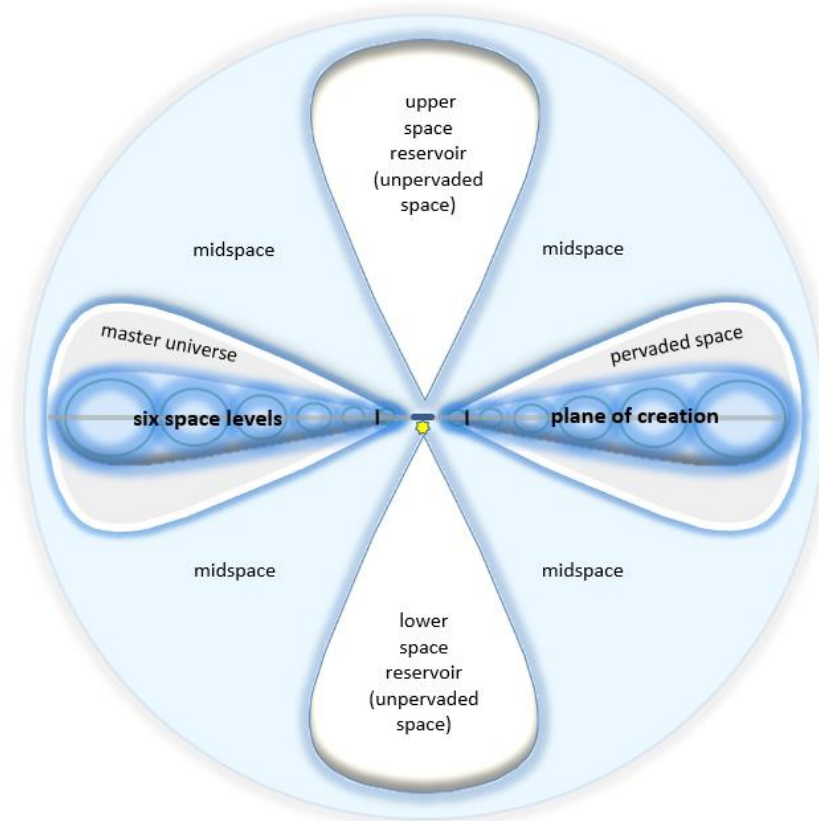
Science is compelled to recognize a supernatural First Source and Center but cannot identify its nature. Philosophy can. While inanimate mechanisms obey the law of entropy, living organisms overcome entropy. They grow from simple into complex structures through the constructive use of work energy. And they always manifest the unifying animation of mindedness, because "Life is both mechanistic and vitalistic – material and spiritual." **36:6.1** Only a living cosmic intelligence could be the metaphysical cause behind the creation of energy and

the orderly evolution of the plane of creation. The evolution of a universal order proves this cosmic intelligence is executing some intelligent design. But metaphysics cannot discover the final purpose behind this creative plan. Religion can: "God created the heavens and formed the earth … to be inhabited." [1:0.2] The spiritual purpose behind this plan is revealed in the Eternal Son, the first created person to inhabit the universe. The infinite will behind this spiritual purpose is revealed in the Universal Father, the creator of the first dwelling place in the universe, the Isle of Paradise. The cosmic intelligence carrying out this purpose is revealed in the Infinite Spirit, the first executive of divine providence in the universe. "Providence is the sure and certain march of the galaxies of space and the personalities of time toward the goals of eternity." [118:10.23]

A little more than four hundred years ago, Galileo turned his newly invented telescope to the heavens and suddenly saw hundreds of times as many stars. His discoveries destroyed the ancient belief that the universe revolves around the earth. Now hundreds of times as many galaxies are suddenly visible in greatly improved telescopes. The worldwide discovery of the plane of creation only waits for an astronomer to find the Wall of Quasars directly behind the Sloan Great Wall. This discovery will destroy the modern worldview of a chaotic mechanistic universe. The long, grim ideological struggle between science and religion is ending. A new era of cosmic enlightenment dawns with the realization that the First Source and Center and the Universal Father are one and the same. Revealed cosmology becomes a powerful scientific truth working in metaphysical harmony with true religion to advance the supreme purposes of epochal revelation.

Addendum: Some Thoughts on Space Respiration and Absolute Gravity

The CMB radiation can no longer be explained by a Big Bang, even though it has the physical characteristics of being emitted at an extremely high redshift ($z = 1090$). This redshift puts its point of emission at the edge of an expanding universe. These equidistant points of emission describe an expanding frame of reference, and the sun's motion can be measured relative to this frame. Doing so, the sun is apparently moving at 370 km/s in the direction of the CMB dipole that is located directly beneath Paradise. But the sun is near Uversa and we now know that it moves with Uversa as it orbits about Paradise, which is at the stationary center of the universe. So, the sun can't have a significant motion toward Paradise. Its velocity relative to the expanding frame of CMB radiation can only be explained by space expanding toward the sun from the direction of the CMB dipole. Since the sun is relatively stationary in this direction and is displaced from the center of expansion, the velocity of the expanding CMB radiation measured at the sun's

location is half the measured value or 185 km/s. Space moves from the center of expansion towards the sun. This is equivalent to space contracting over this distance, which cancels out an equal amount of space expansion occurring on the far side of the expansion point. The rate of space expansion and this relative velocity place the point of universal space expansion 900,000 ly directly beneath Paradise. The CMB dipole beneath Paradise is the location of space respiration.

Modern cosmology conceives of space expansion as occurring from the sun's location while, at the same time, the sun has a velocity relative to its own location in the direction of the CMB dipole. Universal revolution requires space to expand from a location near Paradise, which gives space an approaching velocity from Paradise toward the sun. Instead of the sun moving through space like a boat moving through water, space moves past the sun, like a river flowing past a boat at anchor. This is impossible under Einstein's general theory, which describes linear gravity in terms of the relativistic mechanism of curved spacetime. In this theory universal space can only expand when matter universally disperses. Space is taken as a manifestation of energy-matter and its curvature is determined by the density and distribution of energy-matter. There can be no space expansion between two material bodies which remain at a relatively constant distance from one another, like the sun and Paradise.

However, the evidence of universal gravitational revolution about Paradise is overwhelmingly conclusive, and this is also impossible under general relativity. If universal revolution was the result of linear gravity, the spacetime of the universe would have a very noticeable curvature. This is not the case. The 2013 final report of the European Space Agency's Planck Mission fully confirms that the spacetime of the universe has no curvature. [1] There is persuasive evidence of curved spacetime in phenomena like gravitational lensing in the neighborhood of suns and galaxies. But there is no spacetime curvature on larger cosmic scales. Universal revolution and this absence of curvature in the spacetime of the universe prove that general relativity does not apply on universal scales. The plane of creation leads to the necessary inference of a central force (absolute gravity) acting on larger cosmic scales which does not cause a universal curvature of spacetime. Since space expansion is a universal phenomenon, it cannot be described by the short-range linear gravity of general relativity.

General relativity conceives of space as being a derivative of matter; space is an unrealized potential in an original gravitational singularity of matter until this singularity explodes in a Big Bang, which releases the potential of space. The coincident phenomena of universal revolution and space expansion disproves this derivation of space. Revelation tells us that space originates from Paradise. "Space is not infinite, even though it takes origin from Paradise; not absolute, for it is pervaded by the Unqualified Absolute. " [12:5.2] Energy-matter may emerge in space, but it is derived from the Unqualified Absolute. This severance of space expansion from any material cause leaves only the possibility that it has a non-material supernatural cause. It is, therefore, reasonable to suppose that space is expanding from a location beneath Paradise and that the CMB dipole is physical evidence of this point of universal space expansion. Given this supernatural

cause, it is also reasonable to suppose that space expansion alternates with space contraction, since the universe created by God is everlasting.

A paper published in 2015 by Ringermacher and Meade [2] of the University of Southern Mississippi appears to confirm the phenomenon of space respiration. They report simple harmonic cycles of acceleration and deceleration in the rate of space expansion, where each cycle lasts 2 billion years. This cycle length matches the 2 billion year cycle of space respiration. "The cycles of space respiration extend in each phase for a little more than one billion Urantia years. During one phase the universes expand; during the next they contract." [11:6.4] They build on the 1998 discovery [3] that the rate of space expansion began accelerating ~7 billion years ago from 65 km s^{-1}/Mpc to 73 km s^{-1}/Mpc (Mpc = megaparsec = 3.26 Mly). This discovery of the "accelerating universe" won the 2011 Nobel Prize in Physics. Since an increase in the rate of expansion requires work energy, physicists were compelled to hypothesize the existence of a so-called dark energy to explain it. Dark energy exerts a repulsive force between galaxies, causing the rate of space expansion to accelerate. The only theoretical source for this dark energy is the quantum vacuum energy in empty space. But the potential of vacuum energy is 120 orders of magnitude greater than what is required for the repulsive force of dark energy. There is no hypothesis for how just a little dark energy might emerge from the unimaginable potential of vacuum energy. Any hypothesis would first require a theory of quantum gravity, a unification of quantum mechanics and general relativity, which no one has yet been able to even imagine.

The weakness of the hypothesis of dark energy is compounded by its decidedly metaphysical nature. Dark energy only interacts with one of the four fundamental forces, gravity. It does not interact with the other three: electromagnetic, strong nuclear, and weak nuclear. Dark energy is empirically undetectable in any direct way by scientific instrumentation, making it similar to a metaphysical force. But physicists were forced into this hypothesis in order "to save the phenomena." A similar thing happened a decade earlier, when astronomers discovered that the rotation speeds of galaxies cannot be explained by linear gravity. In order to save the general theory, physicists hypothesized the existence of massive halos of dark matter enveloping galaxies. These halos add just the mass needed in just the way required to explain galactic rotations in terms of linear gravity. There is no hypothesis explaining the origin of dark matter. Like dark energy, dark matter is also metaphysical in nature, since it only interacts with gravity and is empirically undetectable. Everyone understands that dark matter is simply an *ad hoc* hypothesis tailored to explain galactic dynamics in terms of linear gravity. A decade before this cosmologists were forced to hypothesize an event of cosmic inflation to save the standard model. Immediately after the Big Bang, "something" supposedly caused the radius of the universe, with all of its eternally self-existent energy, to suddenly expand by 50 orders of magnitude in an instant (10^{-35} seconds). This is yet another unverifiable *ad hoc* hypothesis.

All of this has resulted in a somewhat embarrassing situation. In order to get the equations of general relativity to produce results that agree with observations, the universe must be 70 percent dark energy and 25 percent dark matter. Only 5 percent is baryonic matter, "normal"

energy-matter which interacts with all four fundamental forces. Cosmology's dependence upon general relativity has backed it into a corner where it must hypothesize that over 95 percent of all energy-matter in the universe consists of quasi-metaphysical types of energy and matter. It has become difficult to see this theory as scientifically credible, since science supposedly deals with empirically verifiable realities, not unverifiable forces. Because of this, astrophysicists are increasingly talking openly about the "crisis in cosmology." [4] [5]

The 2015 discovery of cycles of acceleration and deceleration in space expansion makes the hypothesis of dark energy even less credible. New hypotheses are now required to explain why the strength of the repulsive force of dark energy oscillates in 2 billion year cycles, causing the repeated speeding up and slowing down of space expansion. By Occam's razor, this excessive multiplication of speculative hypotheses indicates that cosmologists are on the wrong track. The discovery of universal revolution identifies the key error: general relativity is not applicable on large cosmic scales. Universal space expansion cannot be explained by general relativity.

Two Billion Year Cycles of Space Expansion Acceleration/Deceleration
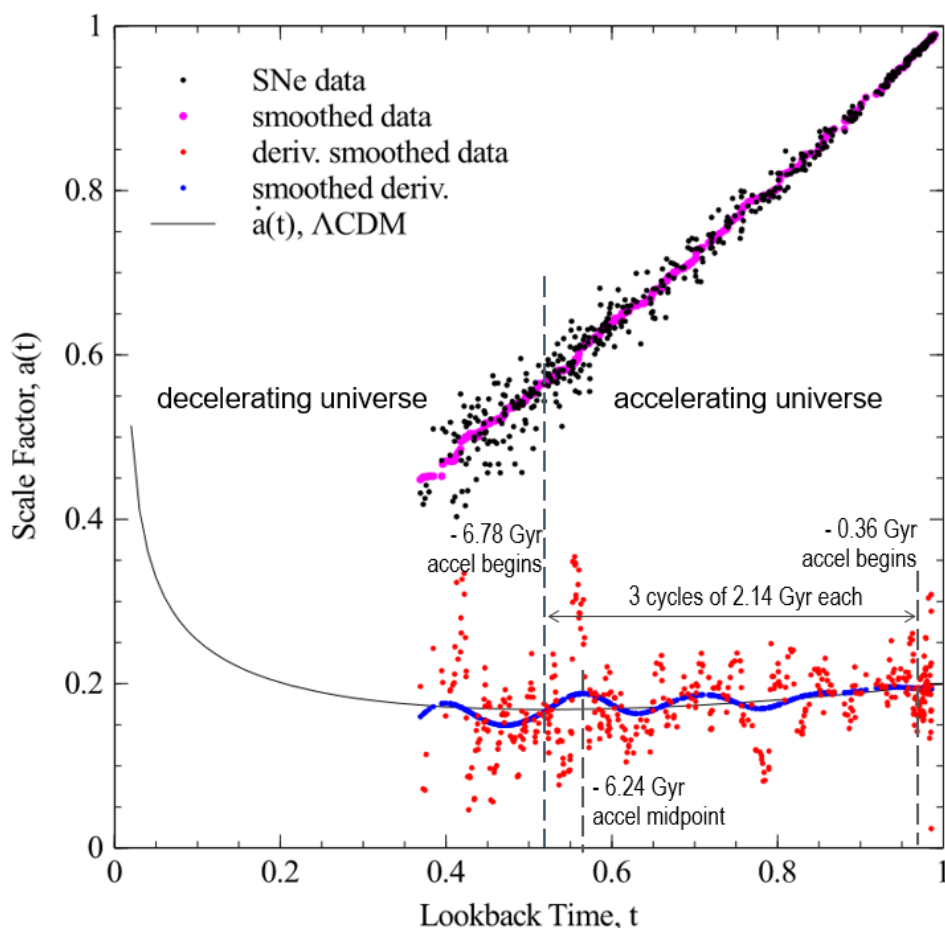
Credit: Ringermacher, Meade, [2] – graph annotated

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The findings of Ringermacher and Meade point in a new direction. In their 2015 paper they measure an average cycle length of 2.14 billion years in the acceleration and deceleration of space expansion. This agrees precisely with the period of space respiration. "It thus requires **a little over two billion Urantia years** to complete the entire expansion-contraction cycle." [11:6.5] The earliest cycle of acceleration they can clearly identify from the data begins 6.78 billion years ago. This is when the 1998 study found that space expansion stopped decelerating and began accelerating. The rate of space expansion at this time was 65 km s^{-1}/Mpc. After this, expansion increased to a rate of 73 km s^{-1}/Mpc. The midpoint of this first acceleration phase occurred 0.535 billion years later (1/4 cycle) at 6.24 billion years ago. Three times the cycle length of 2.14 billion years equals 6.42 billion years, so we are in an acceleration phase that began 0.36 billion years ago. This phase will hit its midpoint 0.17 billion years from now, so we are approaching its midpoint. This is exactly where revelation says the current phase of space expansion is. "Pervaded space is now approaching the mid-point of the expanding phase." [11:6.4] The commonality of cycle lengths plus this synchronization of the midpoints of accelerating space expansion and the expanding phase of space respiration is beyond any possible coincidence.

The same cyclical phenomenon is being described from two different perspectives, which are easily related. The cycle of acceleration-deceleration can be turned into a cycle of expansion-contraction by subtracting a space expansion rate of 69 km s^{-1}/Mpc from the minimum rate of 65 km s^{-1}/Mpc and the maximum rate of 73 km s^{-1}/Mpc found in the 1998 study. This produces a simple harmonic cycle of expansion and contraction with amplitudes of $\pm$ 4 km s^{-1}/Mpc. We can infer from this that space alternately expands and contracts at the rate of $\pm$ 69 km s^{-1}/Mpc, which causes galaxies to alternately recede from and approach Paradise at the rate of $\pm$ 4 km s^{-1}/Mpc. We are approaching the midpoint of an expansion phase, so galaxies emitting light 6.42 billion years ago (3 complete cycles of 2.14 billion years each) were also approaching the midpoint of an expansion phase. They were receding from Paradise at +4 km s^{-1}/Mpc due to space expansion. Space is currently expanding from Paradise at +69 km s^{-1}/Mpc, so we measure a net rate of +73 km s^{-1}/Mpc. Galaxies emitting light 5.35 billion years ago (2.5 cycles of 2.14 billion years) were approaching the midpoint of a contraction phase and were moving towards Paradise at -4 km s^{-1}/Mpc, because space was contracting at -69 km s^{-1}/Mpc. Since space is currently expanding at +69 km s^{-1}/Mpc, these galaxies appear to be receding from us at a net rate of +65 km s^{-1}/Mpc.

The findings of Ringermacher and Meade appear to be explained by space respiration. This explanation also seems to reconcile two apparently incompatible facts: the redshift-distance relation and universal revolution. We are told that space is currently expanding outward from beneath Paradise, and the redshift-distance relation is direct empirical evidence of space expansion. This relation is expressed in the Hubble constant, the rate of space expansion, which is currently estimated at 70 $\pm$ 7 km s^{-1}/Mpc. The Hubble constant is the most extensively validated of all cosmological variables. It is telling that after decades of effort, looking at many thousands of galaxies, a more precise value has not been found. We are also told, and can now

empirically confirm, that the galaxies of creation are revolving in relatively stable orbits around Paradise. But then we are told of "the present outward and uniform expansion of the physical creations of all pervaded space… The entire seven superuniverses participate in the two-billion-year cycles of space respiration along with the outer regions of the master universe." **12:4.12** This creates an apparent problem: Galaxies cannot be in stable orbits about Paradise while at the same time receding from Paradise at the radial velocities indicated by their redshifts. These velocities would cause galaxies to spiral outward and away from Paradise, disrupting the stability of any orbits about it.

This problem can be resolved if galaxies "participate in the two-billion-year cycles of space respiration" to only a limited extent. Building on the findings of Ringermacher and Meade, universally expanding "flat" space pushes against the curved spacetime encompassing a galaxy. This flowing of flat spacetime at $+69 \text{ km s}^{-1}$/Mpc around the curved spacetime containing a galaxy conveys to the galaxy a velocity of $+4 \text{ km s}^{-1}$/Mpc. This concept is actually somewhat consistent with current theory, which holds there is no space expansion within a galaxy or a group of galaxies like the Local Group. [6] This is because the curved spacetime encompassing the Local Group is gravitationally bound together into a stable unit. This was first supposed by Hubble, later confirmed by observation, and is validated by revelation: "…more powerful telescopes will disclose that many island universes [i.e. galaxies] formerly believed to be in outer space [i.e. first outer space level] are really a part of the galactic system of Orvonton…. some of the nebulae [i.e. galaxies] which Urantian astronomers regard as extragalactic are actually on the fringe of Orvonton and are **traveling along with us**." **12:2.3** (*circa* 1934) The Local Group moves as a whole, because there is no space expansion within its borders. Under current theory, space expansion only occurs outside the borders of the Local Group in gravitationally unbound space. The non-expanding space containing the Local Group is moving as a whole at 631 km/s relative to the universal frame of expanding space defined by the CMB radiation. If the static curved space in the Local Group moves through flat expanding space, it is logical to assume under current theory that it must push this flat space out of the way. And this concept is validated by revelation: "It may help to an understanding of space relationships if you would conjecture that, relatively speaking, space is after all a property of all material bodies. Hence, when a body moves through space, it also takes all its properties with it, even the space which is in and of such a moving body." **118:3.6**

This idea that the space contained by a moving body goes with it and interacts with the space through which the body moves was tested by NASA's Gravity Probe B experiment. [7] The angular momentum of a gyroscope causes its axis to continuously point in the same direction, unless some external torque acts upon it. In the Newtonian physics of absolute space and time, a free-floating gyroscope orbiting the earth experiences no external torque, and its axis maintains a perfectly constant orientation relative to the distant stars. In the physics of general relativity, this orbiting gyroscope moves through the curved spacetime surrounding the earth, instead of absolute space. This motion through curved space should cause a geodetic effect, which results in an external

torque acting on the gyroscope. This mechanical torque should change the orientation of its axis over time. The experiment confirmed a change in the orientation of the gyroscope's axis of 0.002 degrees per year, and this almost exactly agrees with the prediction of general relativity. The gyroscope is spinning in the flat Euclidean space of an inertial frame. As the gyroscope's flat space orbits in the earth's curved space, a measurable mechanical effect occurs, the geodetic effect. In principle, a relative motion between the curved spacetime containing a galaxy and the flat spacetime of the universe should also result in a mechanical effect.

Given this theoretical and empirical justification of mechanical interaction between flat and curved space, it is reasonable to suppose that an expansion rate of +69 km s^{-1}/Mpc for flat space mechanically pushes against the curved-gravitationally-bound space of a galaxy, causing it to recede from Paradise at +4 km s^{-1}/Mpc. This would give Orvonton (Local Group) a radial velocity of just +11 km/s away from Paradise. A 2008 study by the well-known astrophysicist R. Brent Tully [6] found that the Local Group has a velocity of 259 ± 25 km/s away from a region he calls the Local Void. The direction of this motion is almost exactly aligned with the gravitational plane of the grand universe and almost exactly perpendicular to the direction to Paradise. [8] From this study we know that Orvonton is orbiting Paradise at about 259 km/s in a counterclockwise direction. This counterclockwise orbital motion about Paradise is what revelation describes. At this orbital velocity Orvonton can be in a stable orbit, while having a small radial velocity of +11 km/s away from Paradise. If space expands at +69 km s^{-1}/Mpc past galaxies, giving them a rate of recession of +4 km s^{-1}/Mpc, then their redshift is still related to distance and the Hubble constant is still valid. Redshift only discloses relative velocity. This relative velocity can be caused by a light-emitting object moving with the flow of space expansion or by expanding space flowing around and past the light-emitting object. Both of these dynamics are in play, so the relative velocity measured by redshift gives a distance that is within ± 5.8 percent (± 4/69) of the actual distance, depending upon when a galaxy emits light in the expansion-contraction cycle of space respiration. The facts of universal revolution and universal space expansion relative to the absolute center of the universe can be reconciled.

Revelation describes the galaxies in the master universe as revolving in concentric space levels aligned in a single plane. This revolution occurs in an inertial frame which has a Euclidean geometry. The 2013 Planck results confirm the flat Euclidean spacetime of the universe, consistent with a universal inertial frame. At the same time the space of the master universe is moving relative to this inertial frame.

> Space is, from the human viewpoint, nothing—negative; it exists only as related to something positive and nonspatial. **Space is, however, real. It contains and conditions motion. It even moves.** Space motions may be roughly classified as follows:
> 1. Primary motion—space respiration, the motion of space itself.
> 2. Secondary motion—the alternate directional swings of the successive space levels. **12:4.7-9**

Revelation goes on to explain that space respiration - the primary absolute motion of space - does *not* cause galaxies to recede at the rate of space expansion.

The present relationship of your sun and its associated planets, tends to convey the impression to astronomic observers that you are comparatively stationary in space, and that **the surrounding starry clusters and streams are engaged in outward flight at ever-increasing velocities as your calculations proceed outward in space**. **But such is not the case**. [12:4.12]

Many influences interpose to make it appear that the recessional velocity of the external universes increases at the rate of more than one hundred miles a second for every million light-years increase in distance. By this method of reckoning, subsequent to the perfection of more powerful telescopes, it will appear that these far-distant systems are in flight from this part of the universe at **the unbelievable rate of more than thirty thousand miles a second**. **But this apparent speed of recession is not real**; it results from numerous factors of error embracing angles of observation and other time-space distortions. [12:4.14]

The recessional velocity of galaxies indicated by redshift is apparent and not real. Space is expanding at $\sim$70 km s^{-1}/Mpc, but galaxies are relatively stationary, receding at $\sim$4 km s^{-1}/Mpc. In this revealed model redshift is caused almost entirely by the expansion of flat space past the curved-gravitationally-bound space of galaxies, which are at relatively constant distances from Paradise. The velocity of space expansion in this model increases in proportion to distance, $d \approx cz/H_0$.

This explanation of redshift is compatible with Hubble's final thoughts on the idea of an expanding universe. Hubble is credited with discovering space expansion, and he initially interpreted it as a Doppler shift caused by the recessional velocity of galaxies. Under this interpretation, recessional velocity equals the velocity of light c times the redshift z: $v = cz$. Later on, he changed his mind. In the end he was convinced that the redshift-distance relation is not caused by the recession of galaxies; that is, cz should not be interpreted as velocity. He thought the data was best "accounted for if the redshifts are not velocity shifts." [9] However, he never proposed a cause for this cosmological redshift, except to say that it was probably due to some unrecognized process (such as Fritz Zwicky's 1929 hypothesis of "tired light") or "some unknown law of nature." [9] Hubble's final assessment was rejected in the standard cosmological model derived from general relativity. In this model, galaxies are carried along with the expansion of space (Hubble flow), and space expansion causes their light to be redshifted. As the velocity of galaxies increases with distance, relativistic factors are introduced, which causes the redshift-distance relation to change from a simple linear relationship to a non-linear one.

Whether or not the redshift-distance relation is caused by the recessional velocities of galaxies can be empirically determined by the Tolman surface brightness test. In the 1930s Richard Tolman proposed a definitive test to distinguish between a static and an expanding universe. By examining the surface brightness of galaxies (brightness/area of object), it is possible to determine whether or not their redshifts are caused by recessional velocities. The well-known American astronomer Alan Sandage gives a succinct description of this empirical test.

The Tolman surface brightness test is particularly interesting because its principle is so clear as to give a major predicted difference in observational data between an expanding manifold and a stationary one where the redshift would then be due to "an unknown law of nature". Tolman (1930, 1934) discovered the effect that the surface brightness of a "standard" radiating object that is receding with redshift z will be fainter than a similar stationary "standard" object at rest by $(1 + z)^4$. However, if the manifold is stationary but nevertheless has a redshift due to an "unknown law of nature", the factor is only $(1 + z)$. [9]

If redshift measures the recessional velocity of galaxies, their surface brightness should decrease by a factor of $(1 + z)^4$. If galaxies are at rest with respect to the observer, then their surface brightness should be constant at all distances. This is because both the brightness (total bolometric flux) of a galaxy and its surface area decrease with the square of the distance, so its surface brightness ratio is the same regardless of distance. In a static universe where the redshift-distance relation, $d = cz/H_0$, is caused by some "unknown law of nature," the surface brightness should decrease by a factor of $(1 + z)$, instead of by $(1 + z)^4$. In Sandage's 2010 paper [9] he examines 34 galaxies at redshifts up to z = 0.9. He finds that surface brightness decreases by a factor of $(1 + z)^{\sim 3}$ instead of the predicted factor of $(1 + z)^4$. He attributes the missing factor of $(1 + z)^{\sim 1}$ to an evolution in the luminosity of galaxies; that is, galaxies become dimmer over time by a factor of $(1 + z)^{\sim 1}$. More distant galaxies are younger and inherently more luminous, while older galaxies are nearer and less luminous. While this finding does not fully pass the Tolman test, because of the need to hypothesize luminosity evolution, it does appear to rule out a static universe. But the universal revolution of the plane of creation precludes the possibility that galaxies are receding from us at the velocities indicated by their redshifts. While the plane of creation is directly observable in the distribution of hundreds of thousands of galaxies, Sandage's implementation of the Tolman test uses only a few galaxies and depends upon numerous assumptions and adjustments. The far greater weight of the empirical evidence establishing the existence of the plane of creation suggests that his findings are incorrect.

Sandage's findings are disputed by Eric Lerner in a 2014 study [10] examining the surface brightness of hundreds of galaxies at redshifts up to z = 5. Lerner rejects the standard (Big Bang) model in favor of a static model in a flat Euclidean spacetime, which he refers to as a static Euclidean universe (SEU). He accepts the validity of the empirically determined redshift-distance relation, $d = cz/H_0$, but believes, like Hubble, that cz does not represent the recessional velocity of galaxies. In the SEU model the surface brightness of galaxies is constant over all distances, but is then redshifted by a factor of $(1 + z)$, due to some "unknown law of nature." This model conforms to the Tolman test parameters for a static non-expanding universe. Lerner examines hundreds of galaxies, instead of just 34, in the UV spectrum characteristic of young galaxies, which eliminates the need to consider luminosity evolution. These young galaxies have redshifts up to z = 5, instead of just z = 0.9. He finds that surface brightness varies almost precisely by a factor of $(1 + z)$, instead of by the factor of $(1 + z)^4$ predicted by the standard model. He reconciles this finding with Sandage's 2010 study. This implementation of the Tolman test appears to demonstrate that galaxies are relatively stationary with respect to us; they are not

receding from us at the velocities indicated by their redshifts. The redshift-distance relation has some cause other than the recessional velocities of galaxies, as Hubble supposed.

There is additional evidence supporting Lerner's model of a static Euclidean universe. Quasars typically have high redshifts, giving them high velocities of recession in the standard model. These high velocities should cause all physical processes in the quasars, like the emission of light, to slow down by a factor of $(1 + z)$ due to relativistic time dilation. A 2001 study [11] by M. R. S. Hawkins of the University of Edinburgh, Royal Observatory, of 600 quasars with redshifts between $z = 0.1$ and $z = 3.5$ showed no evidence of the time dilation effect expected under the general theory. A larger study carried out by Hawkins in 2010 produced exactly the same conclusion. Hawkins' finding contradicts the standard model but is consistent with a non-expanding static universe, such as that supposed by Hubble, Lerner, and others.

Lerner's model is compatible with the revolving-expanding universe (REU) model in certain respects: (1) Galaxies have relatively little radial motion with respect to our location; they are not receding from us at the velocities indicated by their redshifts. (2) The spacetime of the universe is flat, consistent with the Euclidean space of an inertial frame. Universal revolution in the REU model necessarily requires an inertial frame of flat Euclidean space. (3) The empirically verified linear redshift-distance relation, $d = cz/H_0$, is (essentially) valid for all distances, but it has some unknown cause. To this extent Lerner's implementation of the Tolman test validates both the static and revolving-expanding universe models. Given the confirmed existence of the plane of creation, which requires galaxies to have relatively little recessional velocity from Paradise, we can conclude that Lerner's findings are correct and Sandage's are incorrect.

The immediate difficulty facing Lerner's or any static model is finding a credible explanation for the redshift-distance relation which does not involve space expansion. More than a few static universe models have been proposed by astrophysicists. A paper published in 2016 by Louis Marmet [12] summarizes 59 theories for cosmological redshift which offer alternative explanations for the redshift-distance relation. All of them are far more speculative and complicated than the simple Doppler shift interpretation used in the standard model. This is problematic, since the simplest explanation which makes the fewest assumptions is typically the best one. If the redshift-distance relation is linear, as both Lerner and Hubble assume, this linear relationship is most simply described by a Doppler shift mechanism, which they both reject.

In the standard model space expands outward from the location of the sun at a rate of $H_0 = v/d$. Since the Hubble flow carries galaxies along with it, galaxies have a velocity of recession equal to the velocity of space expansion. A photon emitted by a galaxy creates a wave phenomenon, and it requires a finite time for the wavelength to appear. Since photons have a velocity of c, the time it takes for a wavelength to be emitted is $t = \lambda_{emit}/c$. This time is simply the frequency with which the wave is emitted, and the actual wavelength is $\lambda_{emit} = ct$. During the time of propagation, t_{prop}, the space between us and the galaxy expands until its velocity is $v = cz = H_0 d$. This increases the distance light must travel through space to reach us by $d =$

vt_{prop}. Space expansion causes the wave we observe to increase in length by the ratio of $\lambda_{obs}/\lambda_{emit} = (d + vt_{prop})/d = 1 + vt_{prop}/d$. Light travels a distance d at velocity c over the same time, so $d = ct_{prop}$. Substituting for d in the equation gives $\lambda_{obs}/\lambda_{emit} = 1 + vt_{prop}/ct_{prop} = 1 + v/c$. Since $z = v/c$, this is the linear redshift equation of $(1 + z) = \lambda_{obs}/\lambda_{emit}$.

At non-relativistic velocities, the redshift is $z = v/c$. If galaxies are moving with expanding space, their receding velocities are proportional to their redshifts and their distances: $v_{galaxy} = cz = dH_0$. If galaxies have relativistic velocities, redshift is the result of two different effects. The first, $z_{special-relativity}$, is caused by the velocity of the galaxy. If the galaxy has a significant relative velocity, this causes time dilation at the point of emission under special relativity and $(1 + z) = \sqrt{(1 + v/c)/(1 - v/c)}$. This factor is generally ignored, but it can be significant. During the time of propagation from the galaxy to the sun, an electromagnetic wave moves through space which is expanding. The scale of the universe a increases during this time, stretching wavelengths. Expanding space causes a cosmological redshift, $z_{cosmological}$, under general relativity of $(1 + z) = a_{now}/a_{then}$. The universe is twice as large now as it was when a galaxy with a redshift of $z = 1$ emitted its light. This causes the wavelengths of light emitted by this galaxy to be twice as long when we finally observe them. This cosmological redshift is caused by the expansion *of* space itself during propagation and not by the relative velocity of the galaxy. During space expansion, the distance between points in space increases. The total redshift is $z_{total} = z_{special-relativity} + z_{cosmological}$.

The same mechanism explains the redshift-distance relation in the revolving-expanding universe. Galaxies have relatively little radial velocity away from Paradise during the expansion phase of space respiration. Since they are relatively stationary, over a period of time t the emission of a photon has a wavelength of $\lambda_{emit} = ct$. During the time of propagation, the space between us and the galaxy expands until its velocity is $v = cz = H_0 d$. This increases the distance light must travel through space to reach us, which causes the wavelength we observe to increase, so that redshift is $(1 + z) = \lambda_{obs}/\lambda_{emit}$. The wavelengths of light emitted by a galaxy with a redshift of $z = 1$ are twice as long when we finally observe them. Space expands at the Hubble rate in both the standard (ΛCDM) and revolving-expanding (REU) models, $v_{space} = cz = dH_0$, and the total redshift is composed of the elements: $z_{total} = z_{special-relativity} + z_{cosmological}$. However, this cosmological redshift is not described by general relativity, since this theory does not apply on large cosmic scales. Instead, the cosmological redshift is described by the linear redshift-distance equation: $z_{cosmological} = dH_0/c$. The total redshift is given by $z_{total} = z_{special-relativity} + dH_0/c$. At relativistic velocities the cosmological redshift calculated using dH_0/c is significantly different from that calculated using general relativity's determination of a_{now}/a_{then}.

This new interpretation of cosmological redshift reconciles the conflicting data supporting static and expanding models by severing the unrecognized assumption of a relationship between matter and space expansion underlying both. In the static model this assumption leads to the conclusion that space cannot be expanding, because galaxies are not receding from us. In the

standard expanding model, galaxies cannot be stationary because space is expanding. In the revealed model, the recessional velocities of galaxies can be minimal while space expands at much higher velocities, because the motion of space is not mechanically dependent on the motion of matter on large cosmic scales. Space is neither finite nor infinite. It is an ultimate reality that is not ontologically derived from the reality of energy-matter, either finite or ultimate. It is derived from the absolute reality of Paradise. "Space is neither a subabsolute condition within, nor the presence of, the Unqualified Absolute, neither is it a function of the Ultimate. It is a bestowal of Paradise." [11:7.4] The cosmological expansion of ultimate space cannot be mechanically explained by the motion of matter. Space expansion can only have a non-material supernatural cause.

In the standard model flat expanding space is "pulled" along by material galaxies as they recede from us. In the universal inertial frame of the revolving-expanding model, flat expanding space "pushes" the curved space of a galaxy away with a small fraction of the velocity of space, under the principle of the geodetic effect. This interaction of flat and curved space mechanically transmits a small percentage k (perhaps 5 percent) of space's velocity to the galaxy: $v_{galaxy} = k \cdot v_{space}$. A galaxy acquires some relative velocity from space expansion, causing it to recede in the observer's inertial frame. This introduces a relativistic time dilation factor into redshift calculations. Incorporating both the non-relativistic (v_{space}/c) space expansion factor and the (special) relativistic time dilation factor caused by the recessional velocity of a galaxy gives the redshift equation for the revolving-expanding universe model:

REU redshift equation

$$(1 + z) = \frac{v_{space}}{c} + \sqrt{\frac{1 + \frac{k \cdot v_{space}}{c}}{1 - \frac{k \cdot v_{space}}{c}}}$$

where k is a constant ratio of v_{galaxy}/v_{space}

There is no apparent theoretical limit to the size or age of a static Euclidean universe, if the redshift-distance relation is strictly linear. The origin of the CMB radiation cannot lie at the infinitely distant edge of the universe in a static model, because it would take an eternity to reach us. Whatever mechanism is proposed for the redshift-distance relation in a static model of the universe needs to explain why the CMB radiation has an apparent redshift of $z = 1090$, which implies an extremely remote origin. Static model theorists must argue that this redshift is apparent and not real, since it is not caused by space expansion. However, this radiation appears to be the nearest thing ever observed to the idealized form of black body radiation, which is the radiation emitted by a body in perfect thermodynamic equilibrium. Since the nearly ideal form of this radiation is not observed anywhere else in nature, this strongly suggests the CMB radiation has a unique and common origin. It is difficult to imagine any nearby mechanism which could produce this almost ideal form of radiation and also simulate an extremely high redshift.

The standard model explains this by supposing the radiation was emitted 13.76 billion years ago by a superheated plasma at a temperature of ~3000° Kelvin, which was then redshifted by space expansion until it cooled off to the current temperature of 2.725° Kelvin. Since the standard model is based upon general relativity, a redshift of $z = 1090$ gives a recessional velocity that is 3.3 times the velocity of light. ($z = 1090$ gives a current co-moving distance of 45.5 Bly and an elapsed time of 13.72 Gyr. [13]) This superluminal velocity of 3.3c does not contradict the universal speed limit of c, upon which the special theory of relativity is based. Special relativity limits the velocity of energy-matter *through* space to c, but the expansion velocity *of* space itself is not limited by the special theory of relativity.

The standard model breaks down because the existence of the plane of creation proves there was no Big Bang event. But a superheated plasma, or some other intense energy activity, at the edge of the universe might still explain the CMB radiation. Space expansion can still explain its extremely high redshift in the revolving-expanding model. The universal gravitational revolution of the plane of creation proves that general relativity does not apply on larger cosmic scales. This invalidates the distances calculated using general relativity, but it does not prove that the linear redshift-distance relation is unrelated to space expansion. In the revolving-expanding universe model space expands past galaxies which causes them to have relatively small recessional velocities (perhaps 5 percent of the velocity of space expansion) with respect to Paradise. The REU redshift-distance calculation results in a linear relation out to $z \approx 7$.

Redshift-Distance Relation for $z < 8$ in Different Models
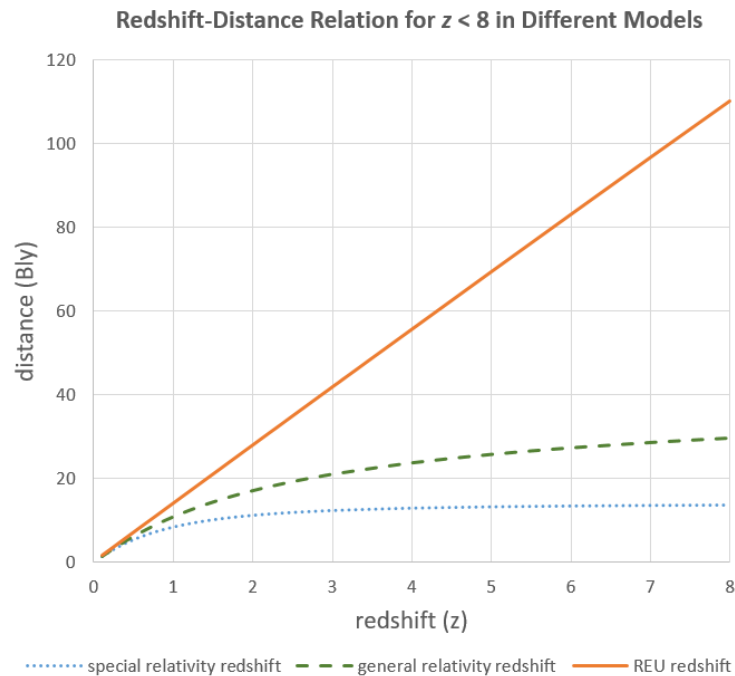
A redshift of $z = 7$ equals 28.6 Bly in the non-linear calculation used in the standard model based on general relativity. Under special relativity, a redshift of $z = 7$ gives a distance of 13.5 Bly, which is nearly the radius of the Hubble sphere. The REU model gives a distance is 96.6 Bly.

This is just one percent less than the distance of 97.7 Bly found using the strictly linear redshift equation assumed by Hubble and adopted by Lerner's SEU model, $d = cz/H_0$.

Redshift-Distance Relation for z < 60 in REU Model
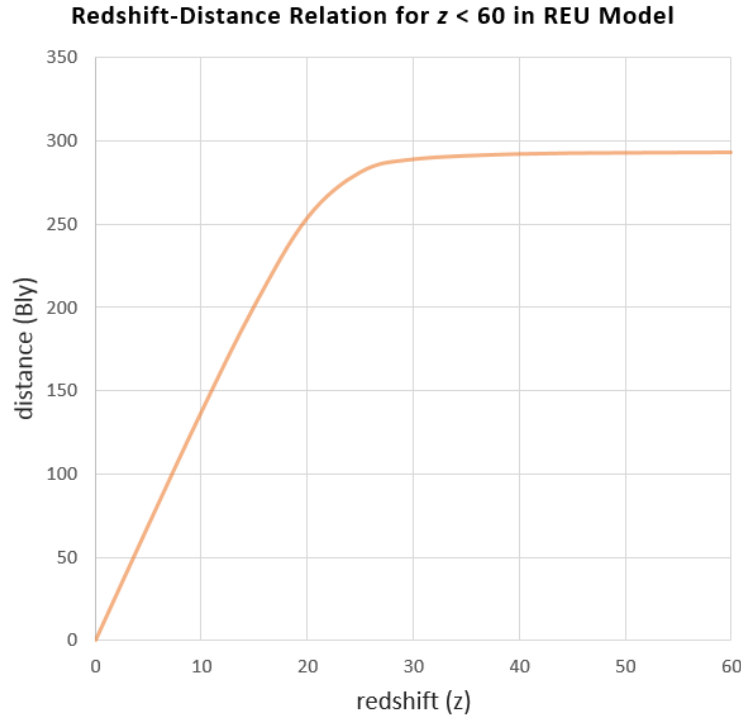
In a static model, there is no theoretical limit to the size or age of the universe. In the REU model, the redshift-distance relation is approximately linear up to $z \approx 20$. Above $z \approx 20$ the redshift-distance relation rapidly becomes asymptotic near a maximum distance of 293 Bly. Unlike a static universe model, there is a theoretical limit to the size of the revolving-expanding universe model. The REU model has a radius that is more than six times the 46 Bly radius of the universe calculated using the standard model. (Depending upon the value adopted for the constant k.) The standard model assumes that the CMB radiation has traveled 46 Bly through expanding space and reaches us in 13.72 billion years. In the REU model, if the CMB radiation was emitted near the edge of the universe, it has traveled 293 Bly. Its observed redshift of $z = 1090$ consists of a non-relativistic cosmological redshift of $z = v_{space}/c = 19.999965$ and a relativistic redshift of $z = \sqrt{(1 + k \cdot v_{space}/c)/(1 - k \cdot v_{space}/c)} = 1070.005$. The distance of 293 Bly is measured in the observer's inertial frame of reference. The velocity of light cannot exceed c in this frame, so it takes 293 billion years for the CMB radiation to reach us. The universe is at least 21 times older than the 13.8 billion years estimated using the rate of space expansion.

A necessary requirement for the revolving-expanding universe model is a new type of gravity. We can observe that the plane of creation is formed by gravitational revolution, but the empirically confirmed flatness of universe spacetime eliminates linear gravity as the possible cause. If linear gravity is not the cause, what is? In the late 19th century the French mathematician

Joseph Bertrand developed an analytic proof which provides the answer. Bertrand's Theorem demonstrates that out of all possible central forces only two types can produce stable orbits. The first type of gravitational force varies inversely with the square of the distance. This describes the central force of linear gravity discovered by Newton and refined by Einstein. A satellite at twice the distance is acted upon by one-quarter of the force. The second type of gravitational force varies directly with the distance; a satellite at twice the distance is acted upon by twice the force. By Bertrand's Theorem, absolute gravity must be a central force which increases in direct proportion with the distance from Paradise. Such a central force is modeled by Hooke's law of elasticity and causes satellites to orbit with a simple harmonic motion. This concept of modeling absolute gravity as an elastic force is confirmed by revelation:

> The universal presence of the Unqualified Absolute seems to be equivalent to the concept of a potential infinity of **gravity extension**, **an elastic tension** of Paradise presence. This concept aids us in grasping the fact that **everything is drawn inward towards Paradise**. The illustration is crude but nonetheless helpful. [11:8.9]

The simple harmonic motion produced by an elastic force requires a fixed point. Paradise is this fixed point, since it is absolutely stationary in the universe. There is no possible material mechanism, like curved spacetime, which might explain how this model of elastic tension works. While "linear gravity is an interactive phenomenon" [12:3.8] for which general relativity gives a mechanical explanation, the cause of absolute gravity is absolute and centered on Paradise.

> The universal circuits of Paradise do actually pervade the realms of the seven superuniverses. These **presence circuits** are: the personality gravity of the Universal Father, the spiritual gravity of the Eternal Son, the mind gravity of the Conjoint Actor, and **the material gravity of the eternal Isle**. [15:9.1]

The absolute gravity of Paradise is a manifestation of the Universal Absolute. The Universal Absolute functionally unifies the dynamic Deity Absolute and the static Unqualified Absolute; it resolves the reality tension between them. [Since inertia is the complement of resistance to force, it would appear that the mystery of inertia and inertial frames in the universe also traces back to the Universal Absolute.]

> The Unqualified Absolute upholds the physical universe, while the Deity Absolute motivates the exquisite overcontrol of all material reality; and both Absolutes are functionally unified by **the Universal Absolute**. This cohesive correlation of the material universe **is best understood** by all personalities—material, morontia, absonite, or spiritual—**by the observation of the gravity response of all bona fide material reality to the gravity centering on nether Paradise**. [56:1.2]

The "cohesive coordination of the material universe" by absolute gravity results in orbits characterized by simple harmonic motion. This causes all galaxies, regardless of their distance from Paradise, to orbit it with the same angular velocity; that is, the period of revolution is the same for all galaxies in the universe. According to Tully's study, Orvonton orbits Paradise at 259 ± 25 km/s. At a radial distance of 9 Mly this gives an angular velocity in the range of $0.065 - 0.080$ billionths of a degree per year. This is less than one-ten-millionth of the Gravity Probe B measurement of 0.002 degrees per year, which is one of the most technically advanced experiments ever performed. This is beyond the current limits of what can be technically

observed. This explains why the revolution of distant galaxies about Paradise has not yet been observed. Their angular velocity is so small they appear to be stationary. A complete revolution at this angular velocity requires between 59 and 72 billion years.

There is a curious symmetry between absolute gravity and quantum mechanics. Max Planck modeled his quantum of action h on a simple harmonic oscillator, whose cyclical motions can be described by the law of elasticity. The Planck-Einstein relation $E = hf$ associates quanta with the energy and frequency of electromagnetic waves. These can described by sine waves, which can be modeled with simple harmonic motion. Space respiration can also be modeled by simple harmonic motion. Absolute gravity can be modeled by an elastic force which produces orbits characterized by simple harmonic motion. What is the significance of the fact that simple harmonic motion can model quantum phenomena, electromagnetic phenomena, space respiration, and absolute gravity? Is the "circle of infinity" with its "endless cycles of eternity" [104:3.13] reflected in the time-space phenomena of simple harmonic motion?

There was absolutely no astronomic evidence in 1955 of either universal revolution or space respiration. Neither did anyone suspect these things at that time. Now there is conclusive proof of the first and substantially conclusive proof of the second. The discovery of the redshift-distance relation changed the static universe into an expanding one, and this is still the single most defining feature of modern cosmology. This relation is simply explained within a revolving-expanding universe. No evolutionary theory coherently and credibly explains all three of these universal facts – universal revolution, space expansion, and the redshift-distance relation. Revealed cosmology can and does, which makes it the only scientifically credible theory of the universe.

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"Ask most cosmologists what they think dark energy will be, and you will grudgingly receive the answer that it is probably a vacuum energy. Ask most cosmologists if they think Einstein's theory is correct on cosmic scales, and you will grudgingly receive the answer that yes, it probably is correct."

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