Chapter 15

First Outer Space Level

The far border of the grand universe is about 23 million light-years distant in the general direction of the Virgo Cluster. This massive cluster is 54 million light-years away, but it is not part the central core of the first outer space level. Beyond the border of the grand universe in most directions along its gravitational plane there is an enormous supervoid with a radius of roughly 500 million light-years. This supervoid is bisected by a plane that is nearly the same as the plane of the grand universe. The other identified voids within this distance are arranged about the grand universe plane with a degree of symmetry which does not appear to be accidental.

About 500 million light-years beyond the far border of this supervoid at a distance of one billion light-years is the Sloan Great Wall. This is the largest known structure in the universe and consists of tens of thousands of galaxies. This wall is the central core of the first outer space level. The gravitational plane of the first outer space level is identical to the gravitational plane of the grand universe, as predicted by revelation.

1. The Local Supervoid

The first outer space level begins about half a million light-years beyond the superuniverses at the outer border of an encompassing quiet space zone. At this distance there is "an unbelievable energy action which increases in volume and intensity for over twenty-five million light-years." [12:1.14] The change from the superuniverse to the first outer space level is confirmed by the fact that galaxies beyond the borders of the grand universe exhibit counter-rotation redshifts. There is also a sudden change in the rate of space expansion at this distance identified as the local velocity anomaly by R. Brent Tully. Looking in the general direction of Paradise, beginning at a distance of about 25 Mly away, there is an increasing concentration of galaxies as the center of the Virgo Cluster is approached. The center of this massive cluster is about 54 Mly distant.

The Virgo Cluster is the largest concentration of mass within at least 100 Mly. If it is part of the central core of the first outer space level, there should be a continuous torus-shaped structure encircling the superuniverses at a radial distance of about 54 Mly. "You may visualize the first outer space level, where untold universes are now in process of formation, as a vast procession of galaxies swinging around Paradise…" **11:7.7** "… a continuous belt of cosmic activity encircling the whole of the known, organized, and inhabited creation." **12:1.14** The evidence does not support this idea. The Virgo Cluster is not located on the plane of the grand universe; its center is about 14 degrees above the plane of creation. Secondly, it is not part of an encircling cosmic structure similar to the superuniverse space level. The Virgo Cluster is in the first outer space level, but it is not near or part of its central core.

Prior to 1989 it was assumed, in accordance with the Big Bang theory and the cosmological principle, that galaxies and galactic clusters were distributed more or less randomly throughout space on scales of a few Mpc and larger. In November of that year Margaret Geller and John Huchra published their findings on a Great Wall of galaxies discovered in data from the Center for Astrophysics (CfA) Redshift Survey. This survey was the first major attempt to map the large-scale structure of the universe. It was carried out in two projects running between 1977-1982 and 1985-1995. This Great Wall is about 200 Mly (61 Mpc) away and 500 Mly (153 Mpc) long. Part of their discovery included the identification of large voids containing relatively few galaxies. The identification of these large voids forced astrophysicists to increase the estimated scale at which the universe has a homogeneous and isotropic distribution of matter from several Mpc to at least 100 Mpc. The Great Wall and the CfA Redshift Survey demonstrated a pattern of voids and galactic superclusters in the large-scale structure of the universe which contradicts the cosmological theory below about 100 Mpc.

Numerous voids have been discovered in our cosmic neighborhood. These voids are not entirely empty, but they do not contain any superclusters or rich galactic clusters. A comprehensive 1994 study by Maret Einasto identified 27 voids within a redshift radius of $z = {\sim}0.1c$ (~400 Mpc). [59] The diameters of these voids range from 93 to 153 Mpc, with a median diameter of 116 Mpc (380 Mly). (Distances in this study are given in standard units of h^{-1} Mpc, where h is $100\ \mathrm{kms}^{-1}$. Multiplying these units by a factor of $100/73$ converts them to Mpc based upon a Hubble constant of $H_0 = 73\,\text{km/s}$.) The study confirms earlier findings of supercluster-void network with a characteristic scale of ~ 137 Mpc.

Rich galactic clusters and superclusters are concentrated in long filaments of galaxies, a few tens of Mpc thick. These galaxy filaments or supercluster complexes define the surfaces of large voids with an average size of roughly 100 Mpc. An examination of this supercluster-void network appears to show a randomly arranged structure of voids and galaxy filaments on scales of ~ 137 Mpc and above, satisfying the cosmological principle. This 1994 study does not include the Inner Local Void, which was first identified in 1987 in the *Nearby Galaxies Atlas* (Tully & Fisher).

Where Einasto identifies the Northern and Southern Local Voids as being separate regions, Tully considers these and the Inner Local Void to be portions of one extremely large void. Based upon data available in 2008, Tully characterizes this Local Supervoid as an "extremely large" and "almost empty region." [57] It has a long dimension of roughly one billion light-years (324 Mpc) or a radius of half a billion light-years as measured from our location. If Tully is correct in his identification of this structure, the Local Supervoid is the largest void yet identified.

Plots of the eight nearest voids in grand universe coordinates challenge the idea of a random supercluster-void distribution above a scale of 137 Mpc. The centers of the three nearest voids – Inner Local, Northern Local, and Southern Local – are all located on the plane of the grand universe, within the margin of error. Three points define a plane, and the centers of the three nearest voids essentially define the same plane as the gravitational plane of the grand universe. If Tully's conclusion that these three voids are part of a Local Supervoid is correct, then the plane of the largest identified void within billions of light-years is the same as the gravitational plane of the grand universe.

Under current theory, there is no reason why the plane of this supervoid should be identical to the gravitational plane of the grand universe. Under the assumption of a random distribution of voids and superclusters, it is very improbable that these two planes would be the same by coincidence. Revealed cosmology describes a plane of material creation. This leads to the expectation that large cosmic structures, such as this supervoid, should exhibit some significant degree of symmetry relative to this plane. The plane of the Local Supervoid is essentially the same as the plane of creation. Symmetry of direction, size and distance relative to Paradise and the grand universe plane is also apparent in the five other nearby voids identified by Einasto.

Fig 70: **The Local Supervoid Surrounding the Grand Universe**
Looking down on the x-y plane of the grand universe

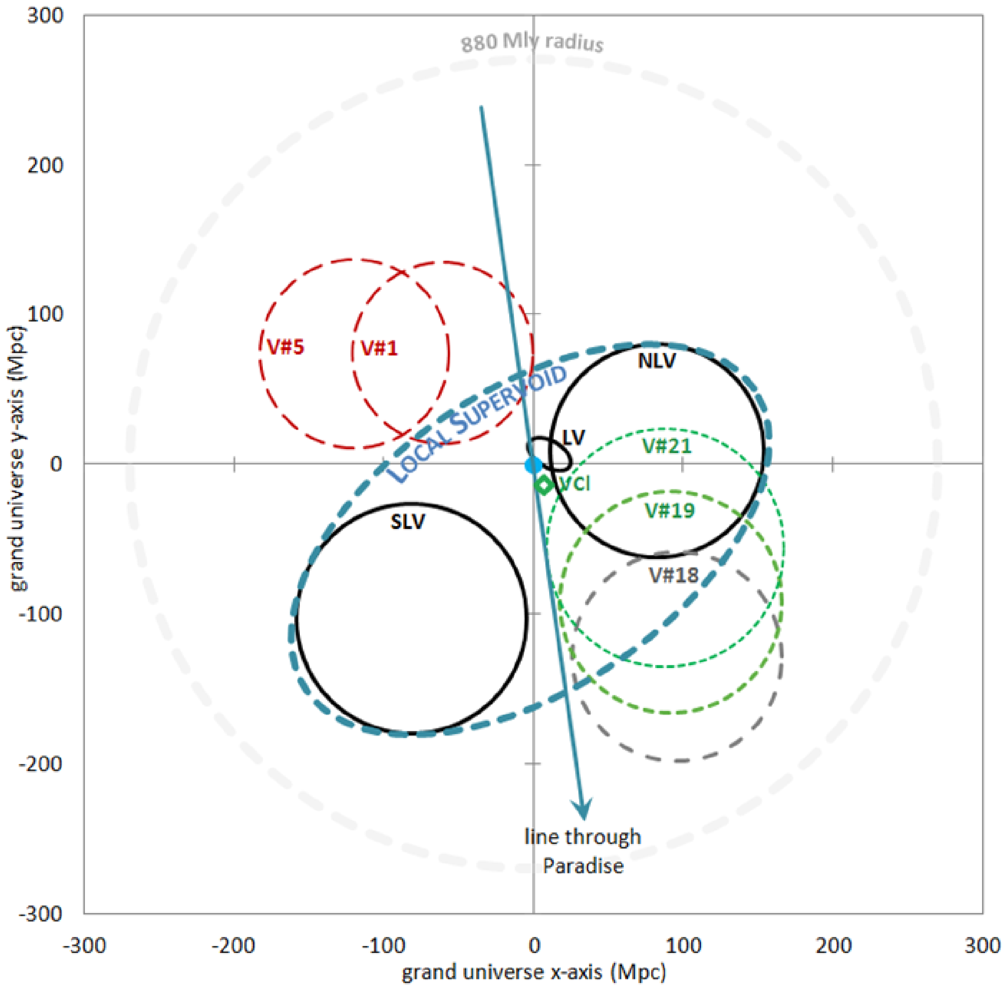
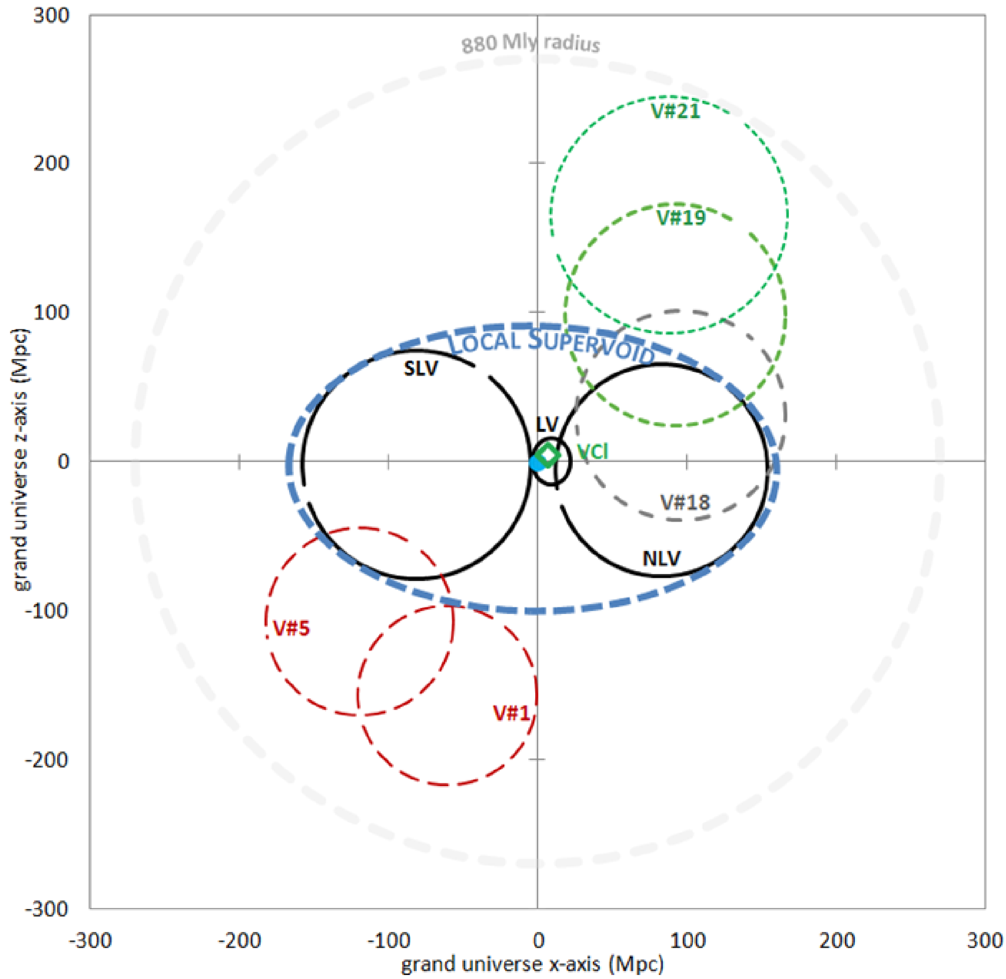


Table 10: **The Eight Nearest Voids [59]**

void #	Dia. (Mpc)	*Ctr (Mpc)*	*Gal. Coord. of Ctr* **l**	**b**	*GU Coord. of Ctr* **α**	**β**
Inner Local Void [57]	18 (32)	11	29.87	-0.60	31.97	-2.94
Northern Local Void (#24)	142	84	15.52	21.17	6.05	-4.10
Southern Local Void (#9)	154	132	223.15	15.98	231.78	-1.06
#18 void (4th closest)	140	163	315.59	71.98	306.86	10.97
#19 void (5th closest)	148	163	76.00	76.70	315.05	37.15
#5 void (6th closest)	126	177	242.12	-67.03	148.29	-37.45
#1 void (7th closest)	120	184	296.32	-59.71	129.25	-58.57
#21 void (8th closest)	158	196	99.39	56.05	327.64	57.86

Fig 71: **The Local Supervoid Surrounding the Grand Universe**
Looking along the y-axis at the x-z plane of the grand universe



Voids #19 and #5 are more or less symmetrically arranged relative to the grand universe plane. They are approximately in opposite directions with an angle of separation of 170 degrees. They have the same inclination of ~37° above and below the gravitational plane of the grand universe. They are comparable in diameter (148 and 126 Mpc) and in their distance from us (163 and 177 Mpc). Voids #1 and #21 manifest a similar degree of symmetry. They also have an angle of separation of 170 degrees and the same inclination of ~58° above and below the grand universe plane. Their diameters (120 and 158 Mpc) and the distances to their centers (184 and 196 Mpc) are also comparable.

Void #18 does not have apparent symmetry with the other nearby voids. However, the center of this void is only 11 degrees above the grand universe plane and its surface touches that of the Northern Local Void, when looking down on the plane from above. The Northern Local Void and void #18 may form a single void. Since the Northern Local Void is part of the Local Supervoid, void #18 would then also be part of this supervoid. The border of void #18 is also less than about 25 Mpc from the border of the Southern Local Void, which supports the idea that it is part of the Local Supervoid.

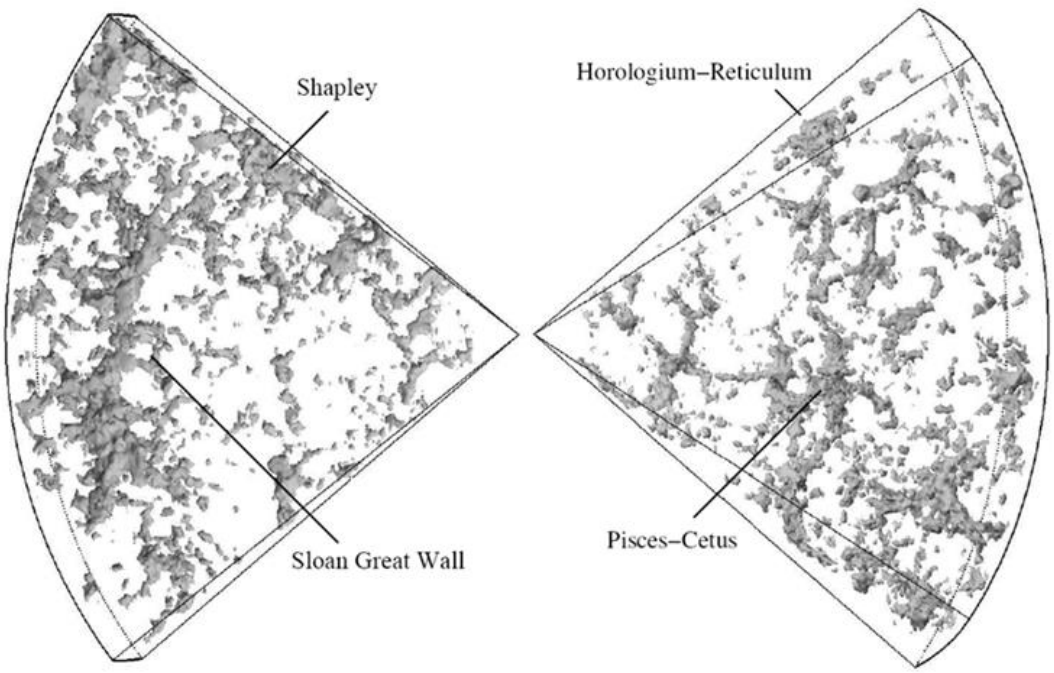
Altogether, it is extremely improbable that all of these various symmetries and alignments could have occurred by accident. The degree of symmetry in the arrangement of these eight nearest voids relative to the grand universe plane is improbable. The far surfaces of the Northern and Southern Local Voids are about 530 Mly distant (~162 Mpc). The central core of the first outer space level must, therefore, be no less than half a billion light-years away from us.

2. The Sloan Great Wall

The Sloan Great Wall (SGW) was discovered by J. Richard Gott in 2003. [4] It is currently the largest identified structure in the universe with a length of almost 1.4 billion light-years. It presents a severe challenge to the theory of cosmic inflation and the cosmological principle. In a 2011 paper on the two largest superclusters in the SGW, Maret Einasto of the Tartu Observatory in Estonia reports that "cosmological simulations have been unable to reproduce very rich extended systems as the SGW" [62] It is commonly recognized that this cosmic structure cannot be held together by (linear) gravity. Some physicists have even proposed that it should not be recognized as a single structure because it cannot be gravitationally bound together. The SGW is directly observable, but current theory is unable to explain its formation or continued existence. It is too large to form under linear gravity, even with the hypothetical presence of dark matter. Under the theory of absolute gravity, a very large structure like the SGW is both predictable and expected.

In revealed cosmology, galaxies are most heavily concentrated in the plane of creation. Beyond the superuniverse space level, the density of galaxies should be highest near this universal plane. Moving out along this plane, galactic density should also be greatest near the central core of the first outer space level. The first outer space level should have the general form of a torus. It should have the appearance of a wall of galaxies, similar to the Superuniverse Wall in both extension and orientation on the celestial sphere. If the SGW is actually a visible portion of the central core of the first outer space level, it must exist on the plane of creation. Furthermore, the galaxies forming this central core must all be at approximately the same distance from us, since we are relatively near the universal center of gravity. Finally, its length should be much greater than either its depth or height.

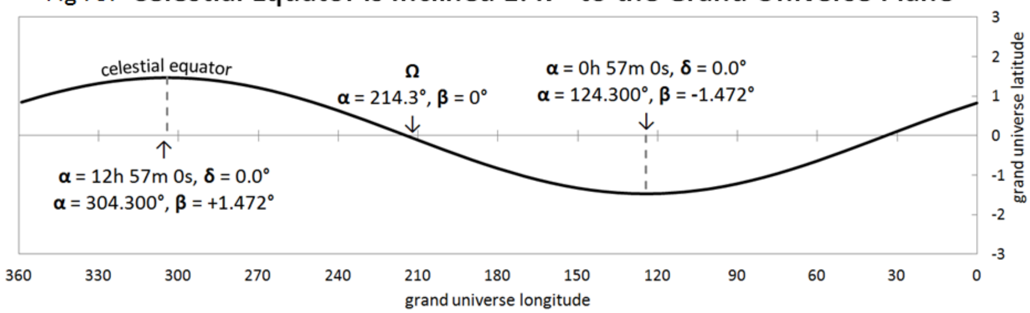
Fig 72: **The Sloan Great Wall**



Credit : W. Schaap (Kapteyn Institute, U. Groningen) et al., 2dF Galaxy Redshift Survey

The SGW begins at a consistent radial distance of about 1.01 Bly (310 Mpc) throughout its length of 1.37 Bly (419 Mpc). It spans 80 degrees of equatorial longitude ($\boldsymbol{\alpha}$) from $8.7^{\mathbf{h}}$ to $14.0^{\mathbf{h}}$ ($130.5°$ to $210.0°$ in equatorial decimal coordinates). [4] The SGW runs along the great circle of the celestial equator, which is a projection of the earth's equator onto the celestial sphere. It is about 0.18 Bly deep (55 Mpc) on average. [63] The largest supercluster in the wall by far is SCL 126, which contains 3,162 galaxies. [62] It is 1.14 Bly (351 Mpc) distant and the location of its maximum density is at $\boldsymbol{\alpha} = 13^{\mathbf{h}}\,06^{\mathbf{m}}$, $\boldsymbol{\delta} = -02^{\mathbf{d}}\,34^{\mathbf{m}}$ ($\boldsymbol{\alpha} = 306.59°$, $\boldsymbol{\beta} = -1.10°$). Based upon the angular extent of SCL 126, the height of the SGW subtends roughly 12 degrees of equatorial latitude ($\boldsymbol{\delta}$) from $-04^{\mathbf{d}}$ to $08^{\mathbf{d}}$. At a beginning distance of 1.01 Bly, this arc of latitude equates to a height of 0.21 Bly (65 Mpc). Its height is slightly greater than its depth, and its length is 6.5 times its height. The galaxies forming the densest part of this wall are all at approximately the same distance. This structure also lies on the earth's celestial equator. Coincidentally, the equatorial plane of the earth is almost the same as the gravitational plane of the grand universe.

Fig 73: **Celestial Equator is Inclined 1.47° to the Grand Universe Plane**



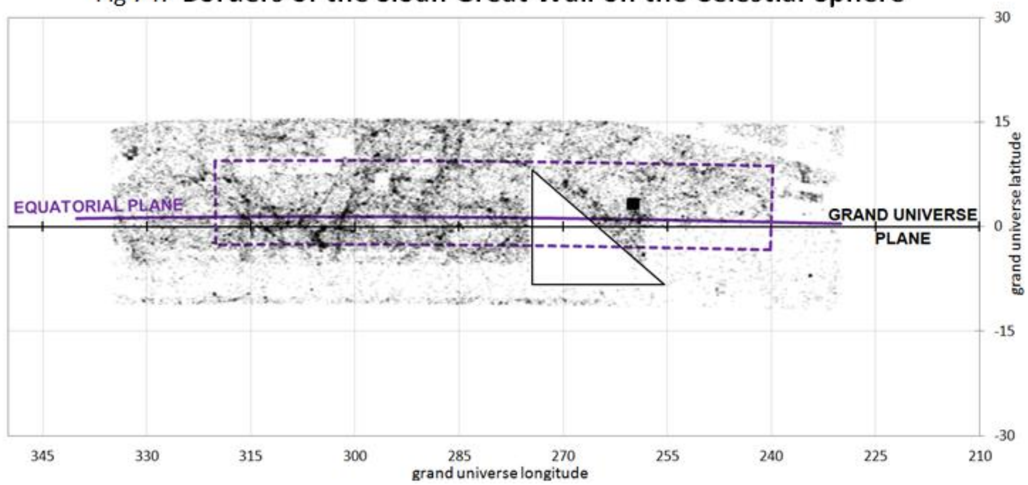
Gott first noticed this wall as a concentration of galaxies within $\pm 2°$ of the celestial equator. The axis of the earth's rotation precesses through one revolution every 25,800 years. It so happens that the earth's equatorial plane is currently tilted at just 1.47 degrees to the gravitational plane of the grand universe. The ascending node for the equatorial plane occurs at grand universe coordinates $\boldsymbol{\alpha} = 214.3°, \boldsymbol{\beta} = 0°$.

The alignment of the SGW with the celestial equator is also an alignment with the grand universe plane. The equatorial longitudes of $8.7^{\mathbf{h}}$ and $14.0^{\mathbf{h}}$ delimiting the length of the SGW convert into grand universe longitudes of 240° and 320°. The upper and lower equatorial latitudes of $-4°$ and 8° for the SGW convert into grand universe latitudes of $-3.36°$ and 8.64° at $\boldsymbol{\alpha} = 240°$ and latitudes of $-2.58°$ and 9.42° at $\boldsymbol{\alpha} = 320°$. The SGW meets all of the specific criteria required to be the central core of the first outer space level.

3. Structure of the First Outer Space Level

The galaxies in the SGW are at a median redshift of $z = 0.07746$ or 318.3 Mpc. [63] A redshift range of $0.065 < z < 0.095$ (217-390 Mpc) more than encompasses the estimated radial depth of the SGW. An area defined by the grand universe coordinates of $230° < \boldsymbol{\alpha} < 335°$ and $-11° < \boldsymbol{\beta} < 15°$ more than encompasses its estimated borders. There are 57,609 galaxies in NASA's Extragalactic Database in this volume (as of Dec. 2012).

Fig 74: **Borders of the Sloan Great Wall on the Celestial Sphere**



A celestial plot of these galaxies discloses a possible pattern of concentration along the plane of the grand universe, but the upper and lower borders of the SGW are not clearly visible. If the SGW is a structure like the Superuniverse Wall which is externally formed under absolute gravity and internally bound together by linear gravity, the latitude at which the highest concentration of galactic mass occurs will identify its gravitational plane. The number of galaxies in bands of 80 degrees of grand universe longitude ($240° < \boldsymbol{\alpha} < 320°$), where each band has a height of 0.1° of latitude, can be counted. Over- and under-densities in each tenth of a degree bin can be smoothed by averaging the counts in the bins within ± 0.5 degrees.

Doing this gives a peak galaxy count at +3.2 degrees of grand universe latitude. This is significantly different from the plane of the grand universe, although the SGW is still approximately aligned with it. However, a prominent feature in the celestial plot of the SGW (figure 74) is the absence of any redshift data in the large triangular region defined by grand universe coordinates $(274.4°, 8.2°)$, $(274.4°, -8.7°)$, and $(257.2°, -8.7°)$. This data void covers about 10 percent of the area within the borders of the SGW. Its triangular shape significantly skews the peak galaxy count toward higher latitudes, because the quantity of data missing in each 0.1° bin of latitude increases moving toward lower latitudes.

Fig 75: **Gravitational Plane of the First Outer Space Level at $\beta = 0.0°$**

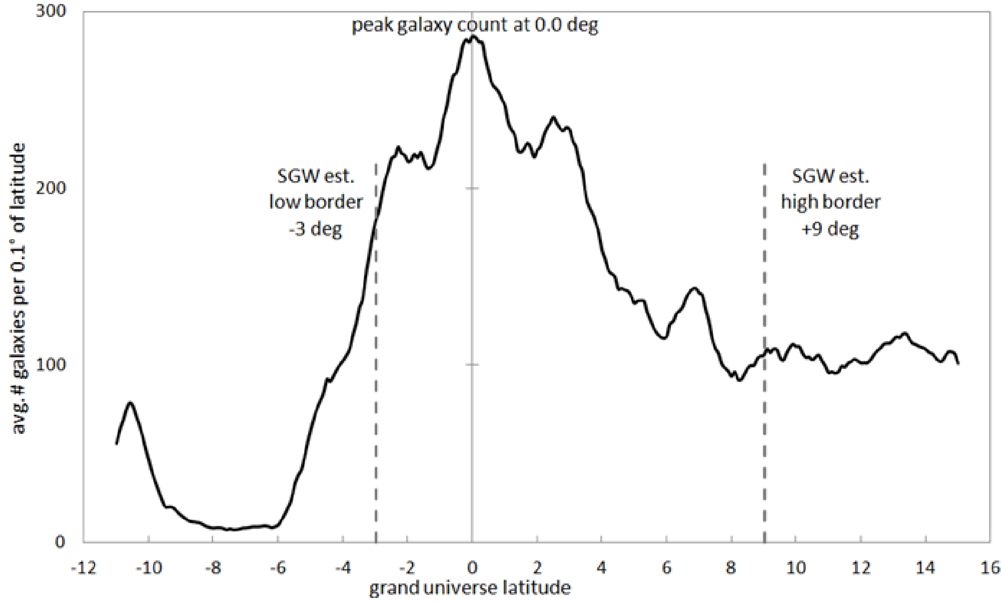
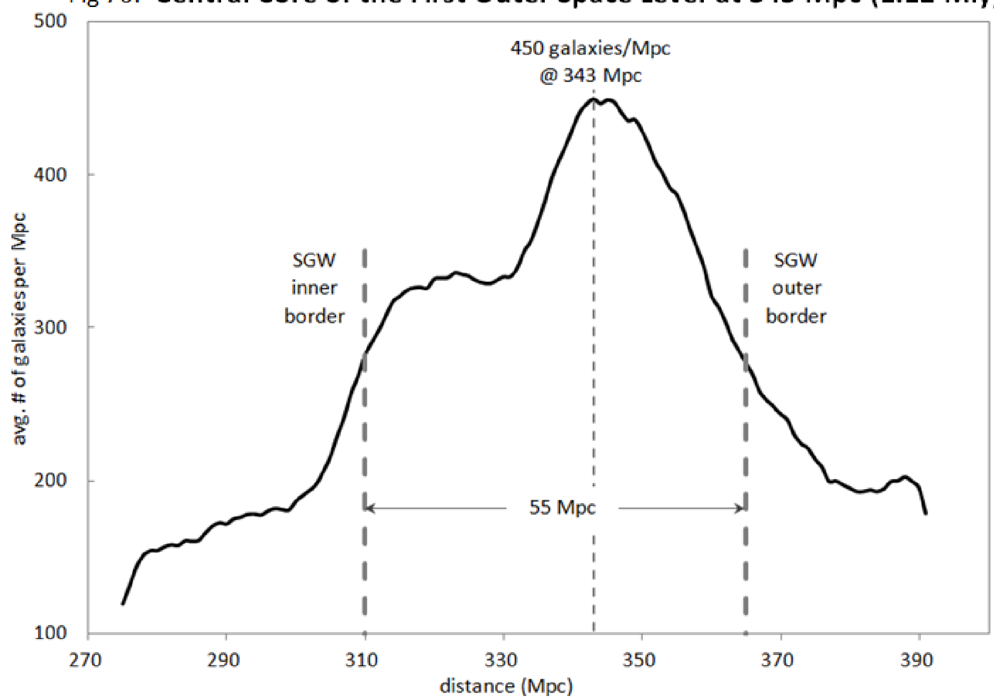


Fig 76: **Central Core of the First Outer Space Level at 343 Mpc (1.12 Mly)**

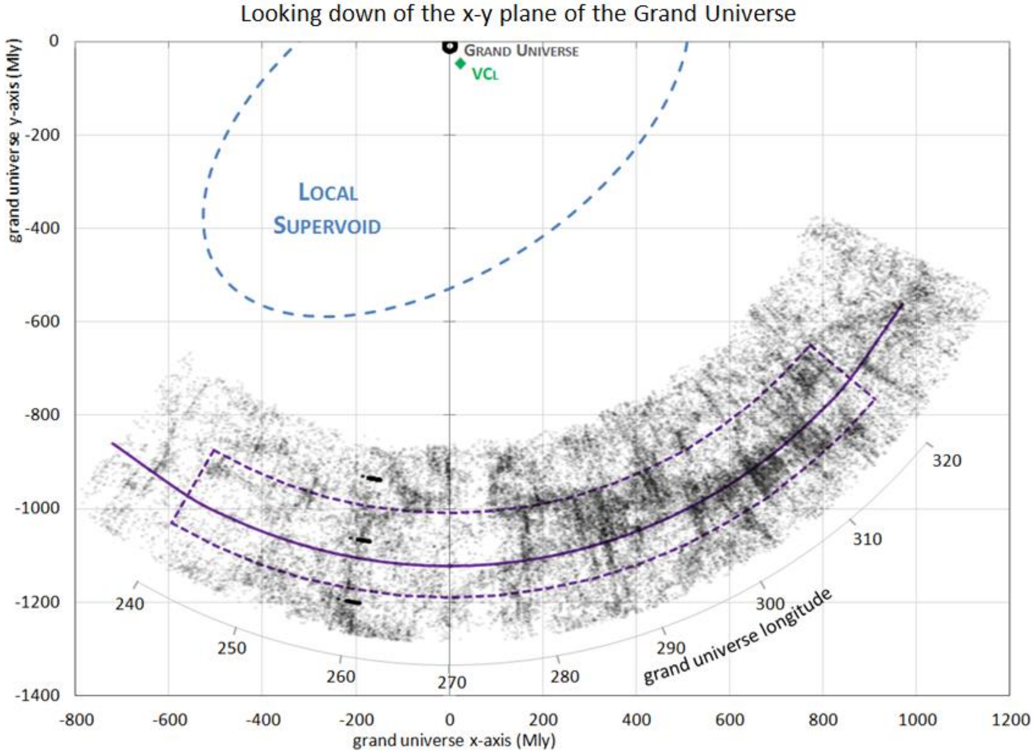


The redshift data between 275° < α < 320° appears to be relatively complete. Using the data in this 45 degree range should overcome the skewing of galaxy counts toward higher latitudes due to missing data. This longitude range covers about 56 percent of the length of the SGW and should be representative of the mass distribution throughout its entire length. Counting the number of galaxies in bands 45 degrees long and 0.1° of latitude high gives a peak galaxy count of 286 at latitude $\boldsymbol{\beta} = 0.0°$. This more complete set of data places the gravitational plane of the SGW exactly on the gravitational plane of the grand universe.

The approximate distance to the central core of the SGW can be determined by counting the number of galaxies in one Mpc increments from 217 to 390 Mpc in the 45 degrees of longitude between 275° and 320°. A high number of 450 galaxies is found at a distance 343 Mpc (1.12 Bly). This is about 60 percent of the distance from the inner to the outer border of the SGW, which is a reasonable placement. This is only two percent less than the estimated 351 Mpc to the densest part of SCL 126, which must be part of the central core of the first outer space level.

Fig 77: **The First Outer Space Level and the Local Supervoid**

Looking down of the x-y plane of the Grand Universe



Plotting these galaxies on the plane of the grand universe shows a concentration of galaxies in a region 180 Mly deep (55 Mpc). The inner and outer borders of the SGW, as viewed from above, are shown by the dashed purple lines. Beneath this is a scale marking off the grand universe longitude. The higher density of galaxies within the borders of the SGW is visible between longitudes 275-320°. The Local Supervoid, which is comparable in scale to the SGW, is also shown. The border of the grand universe is drawn to scale at the chart origin.

The first outer space level is currently uninhabited, but at some time in the future it will be "…peopled with new orders of exquisite and unique beings, a material universe sublime in its ultimacy…" **31:10.11** The Corps of Finality will serve in the material creations of outer space.

> It is increasingly the belief of all Uversa that the assembling Corps of the Finality are destined to some future service in the universes of outer space, where we already are able to identify the clustering of at least seventy thousand aggregations of matter, each of which is greater than any one of the present superuniverses. **31:10.19**

We are informed that "In the not-distant future, new telescopes will reveal to the wondering gaze of Urantian astronomers no less than 375 million new galaxies in the remote stretches of outer space." **12:2.3** NED is already approaching a total of 200 million unique extragalactic objects. The reference to aggregations of matter which are larger than a superuniverse clearly refers to galactic clusters in the first outer space level. There are at least 70,000 aggregations of galaxies which cluster together in the central core of the first outer space level to form "…a continuous belt of cosmic activity encircling the whole of the known, organized, and inhabited creation." **12:1.14**

The SGW is a portion of the continuous central core of the first outer space level, encircling the superuniverse space level. In the 45 degree span $275° < \boldsymbol{\alpha} < 320°$ between $-2.6° < \boldsymbol{\beta} < 9.4°$ there are 8,751 galaxies and galactic groups in the distance range 1.01 to 1.19 Bly. This 45 degree segment is a one-eighth of a circle. This is a significant and representative portion of the whole, so there should be 70,008 objects arranged in a continuous torus-like structure about the superuniverse space level, which is the number given by the Divine Counselor. The mass content of the SGW is comparable in scale to that of the central core of the first outer space level.

This space level begins several million light-years away and its central core is about one billion light-years distant. In the transition zone between the superuniverse and first outer space levels there is a velocity anomaly where the rate of space expansion suddenly changes from 67 to 74 $\mathrm{kms}^{-1}/\mathrm{Mpc}$, according to Tully. This transition zone is also where the counterclockwise revolution of the superuniverses changes into the clockwise revolution of the first outer space level. Like the superuniverses, the second outer space level revolves in a counterclockwise direction, which also requires a transition zone. This transition zone is 50 Mly in width.

> Still greater activities are taking place beyond these regions, for the Uversa physicists have detected early evidence of force manifestations more than fifty million light-years beyond the outermost ranges of the phenomena in the first outer space level. These activities undoubtedly presage the organization of the material creations of the second outer space level of the master universe. **12:1.15**

As discussed in the next chapter, a change in the rate of space expansion has been detected at a distance of ~2 Bly. Within this distance the rate is approximately 73-74 $\mathrm{kms^{-1}/Mpc}$. Beyond this distance the Hubble constant appears to drop to about 65 $\mathrm{kms^{-1}/Mpc}$. If the central core of the first outer space level is symmetrically located about halfway between its inner and outer borders, the transition zone between the first and the second level would be at about 2 Bly. A change in the rate of space expansion would then be expected at this distance where the clockwise revolution of the first outer space level transitions into the counterclockwise revolution of the second outer space level, based upon what happens between the superuniverse and first outer space levels.

The transition between the superuniverse and first outer space levels occurs in "a space zone of comparative quiet, which varies in width but averages about four hundred thousand light-years." **12:1.14** Looking in the direction of Paradise, this transition zone is about 22.8 Mly (7 Mpc) away where Tully identifies a sudden change in the rate of space expansion. This is about 13.8 Mly from Paradise. The width of the transition zone is 2.9 percent of the radius of the superuniverse space level. If this ratio applies to the first outer space level and its transition zone is 50 Mly in width, then its radius would be about 1.725 Bly. This is in reasonable agreement with the distance at which a significant decrease in the rate of space expansion has been measured.

In revealed cosmology the largest cosmic structures must align with the plane of material creation. In particular, the SGW must do so, since it is the largest cosmic structure observed to date. All of the identifiable features of the SGW meet the predictions made by revealed cosmology about the first outer space level.