Chapter 14

Absolute Revolution of the Superuniverses

We are located near Uversa at the gravitational center of Orvonton. Uversa and the other six capitals of the superuniverses are located on the same orbital path about Paradise. There should be no relative velocity between these capitals, since they revolve as a single unit. There is a circular structure with a diameter of 18 million light-years in which galaxies have observed redshift velocities of zero. This circular structure passes directly over our location. Paradise is located at the center of this circular structure.

There is a dramatic increase in the density of galaxies per unit of volume in this circular orbit. About 14 percent of all objects within 5-36 million light-years are found within the tight confines of this zero velocity orbit, almost half of which is directly visible. The density of galaxies in this orbital region is 289 times greater than it is in general. This is comparable to the difference between the mass densities of a gas and a solid. This positively identifies the existence of the central core of superuniverse space level as consisting of the galaxies in this zero velocity orbit.

The angular velocity of the counterclockwise revolution of the superuniverses has been theoretically calculated at $2.3 \times 10^{-18}\,\theta/\mathrm{s}$. The theoretical orbital velocity can be calculated from this using a distance of 9 Mly to Paradise. This theoretical orbital velocity in conjunction with the clockwise rotation of the first outer space level substantially explains the peculiar velocity of the Local Sheet, which has recently been found by astrophysicists. The theory of absolute gravity explains six sevenths of the peculiar motion of Uversa relative to galaxies in the outer space.

1. The Zero Velocity Orbit

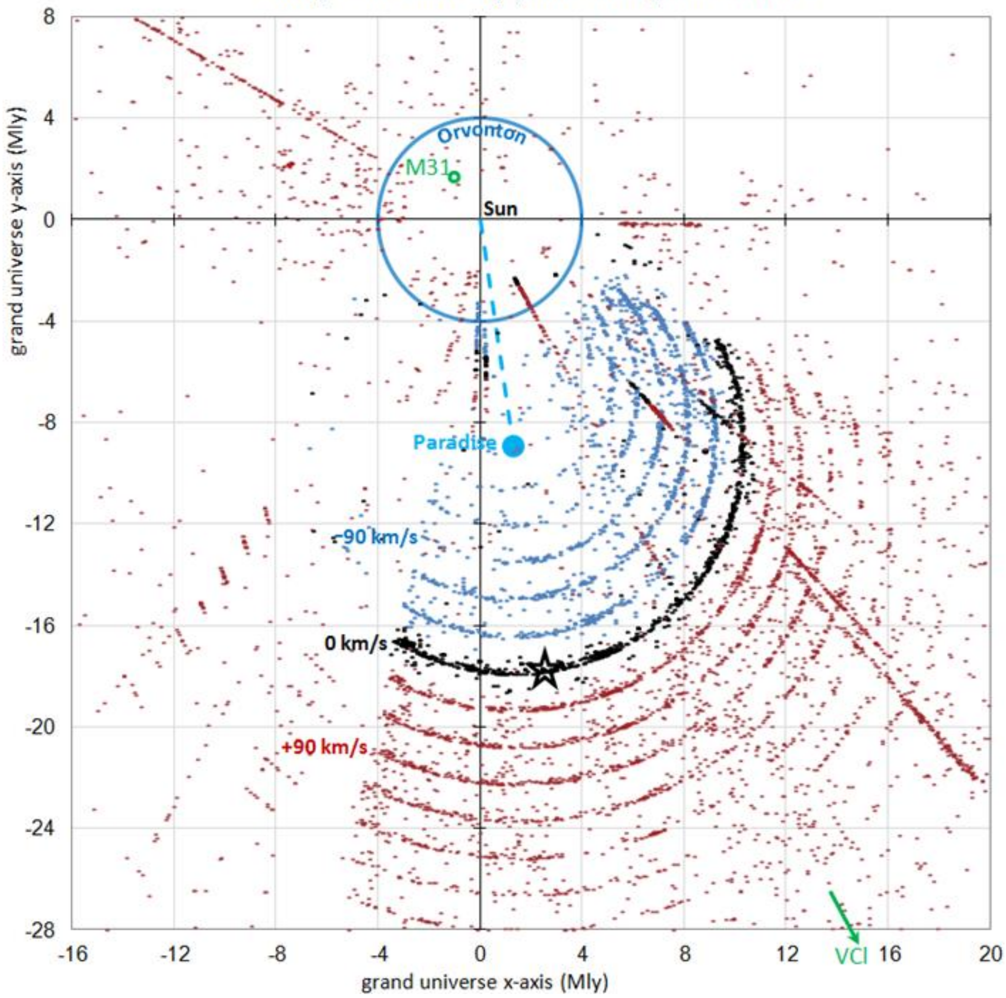
Uversa is at the gravitational center of Orvonton. It is reasonable to assume that the capitals of the other six superuniverses at also located at the respective gravitational centers of each. These seven superuniverse capitals are in gravitational revolution about the Isle of Paradise. A Universal Censor tells us, "We have long since discovered that the seven superuniverses traverse a great ellipse." [15:1.2] This elliptical orbit has the same form as the Isle of Paradise (6x7: minor axis is 85.7% of major axis), where the major axis of this orbit is aligned with Paradise North. For present purposes the orbital path of the seven superuniverse capitals will be treated as circular.

This is primarily because of the graininess of the current data. Most redshift measurements are approximations to the nearest 0.0001c or 30 km/s. Almost 60 percent of the 18,891 objects with heliocentric redshifts of $z < 0.0039$ have radial velocities (cz) which are whole multiples of 30 km/s. This is what accounts for the apparent crescent-shaped ribs in the fan pattern formed by the objects making up the Superuniverse Wall. A 6x7 elliptical path from one side of the fan to the other alters the distance to the orbit of superuniverse capitals by something on the order of 30 km/s. Given the coarseness of the currently available data, the identification of the elliptical orbit of the superuniverse capitals does not appear possible at this time.

If each superuniverse capital revolves at the same distance from Paradise with the same orbital velocity, there should be no relative velocity between them. Like points on the circumference of a solid rotating disk, they should be stationary with respect to each other. Since the relative velocity between them should be zero, there should be no observable redshift when examining the light from galaxies located on this orbital path. This is, in fact, what is seen. Current theory interprets these zero velocities as apparent and not real. They are believed to be the result of the proper velocity of space expansion away from our location minus an equal peculiar velocity of the sun towards them, resulting in an observed redshift of zero.

Fig 63: **Objects with Redshifts of Zero Kilometers per Second**

Looking down on the x-y plane of the grand universe

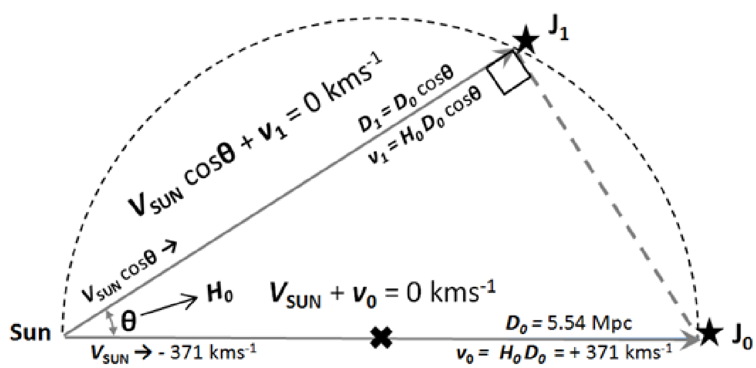


In the color coded chart (figure 63) of the Superuniverse Wall, galaxies with relative heliocentric velocities of zero kilometers per second (redshift $z = 0$) are shown in black. Between us and these apparently stationary galaxies, almost all galaxies are blueshifted and have negative heliocentric velocities, indicating a relative approaching velocity. Beyond the zero velocity orbit, all galaxies have redshifted heliocentric velocities due to their apparent motion of recession. This clear segregation of galaxies by relative heliocentric velocity is currently understood in terms of the sun's peculiar motion relative to the CMB.

The sun is believed to move at 371 km/s relative to the CMB frame of reference in the direction of Paradise. This motion is actually 5.66° of latitude below the longitude of Paradise, which lies on the gravitational plane of the grand universe. An object in the direction of Paradise, where the black star is located on the chart, has a relative heliocentric velocity of zero. The sun's peculiar velocity of 371 km/s toward this starred object is equal to the object's proper motion of space expansion away from us at 67 kms^{-1}/Mpc (per Tully). Galaxies in this direction which are closer than 18 Mly (5.54 Mpc) will have negative approaching velocities, because their proper velocities of recession will be less than the sun's peculiar motion of approach toward them. Beyond 18 Mly, recession due to space expansion is greater than the sun's peculiar velocity, resulting in the observation of positive receding velocities.

Since space is thought to expand from every point in every direction in the same way, there is nothing special about the sun's location. For any observer moving relative to the CMB, the observer and all objects with redshifts of zero will lie on the surface of a sphere, assuming the objects have no significant peculiar velocities. The sun is at one pole of the axis defining this sphere, and the axis extends toward the CMB dipole ($\boldsymbol{l}$ = 264.14°, $\boldsymbol{b}$ = 48.26°) for a distance of 18 Mly, using a Hubble constant of 67 kms^{-1}/Mpc.

Fig 64: **Spherical Surface Formed by CMB Distance Calculations**



From the geometry involved, it is seen that only those objects with a heliocentric redshift velocity of zero are part of this spherical surface formed by the calculation of distances relative to the CMB frame of reference. The center of the zero velocity orbit is 9 Mly distant from us. The granularity of redshift measurements implies a margin of error of about ± 0.7 Mly. The Isle of Paradise is at a distance of 9.0 ± 0.7 Mly in the direction $\boldsymbol{\alpha}$ = 278.13°, $\boldsymbol{\beta}$ = 0° ($\boldsymbol{l}$ = 258.96°, $\boldsymbol{b}$ = 52.87°). This gives a radius of 3.9 ± 0.7 Mly (9/2.31) for Orvonton, based upon the revealed internal structure of the grand universe.

2. Path of the Superuniverse Capitals

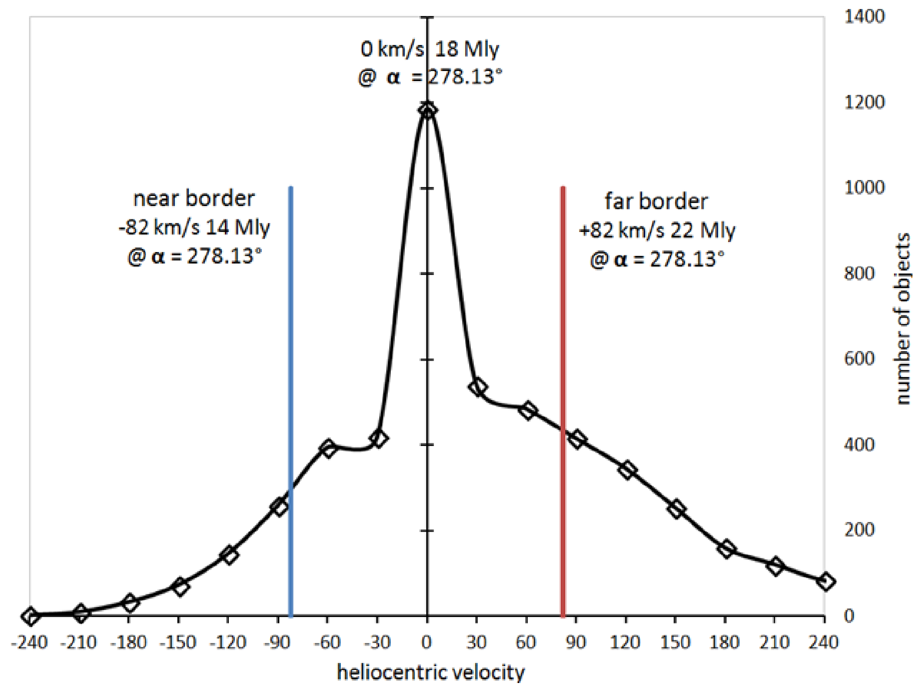
There is nothing surprising in the arrangement of distant objects with zero velocities along a spherical surface which includes our location. Given a relatively uniform distribution of objects within the Local Volume, the existence of a zero velocity shell is predictable under current theory, regardless of the direction or amplitude of the sun's peculiar motion relative to the CMB. What is neither predictable nor explicable under current theory is the excessively high number of galaxies with heliocentric redshift velocities of zero kilometers per second and the concentration of these galaxies in a planar structure.

Since each superuniverse is bound together by linear gravity, the greatest concentration of objects should be near the orbital path followed by their headquarters worlds. Depending upon the model used to describe the gravitational dynamics of galaxies or galactic clusters, the density of objects about a center of mass is roughly inversely proportional to the radial distance or to its square. [60] This general pattern should hold for the superuniverses, which results in a higher density of galaxies along the path followed by the superuniverse capitals. If the zero velocity circle is the orbital path followed by the superuniverse capitals, there should be far more objects in the immediate region of this ring than anywhere else within 36 Mly. There is a clearly identifiable circular arrangement of zero velocity objects in a single plane. The density of galaxies along this path is, in fact, much greater than it is anywhere else in the Local Volume.

There are 8,450 objects with valid CMB distances within 5-36 Mly. There are 5,163 objects (61% of 8,450) within the borders defined by the Superuniverse Wall coordinates $(258°, 3.7°)$, $(258°, -5.1°)$, $(333°, 3.7°)$, and $(333°, -5.1°)$. Objects within the Superuniverse Wall have radial velocities ranging from -240 to +1140 km/s. Redshift velocities tend to be rounded to multiples of 30 km/s. The number of objects within 15 km/s, plus or minus, of $0\ \mathrm{km/s}$ can be counted. Those with velocities of $30\ \pm 15\ \mathrm{km/s}$, $60\ \pm 15\ \mathrm{km/s}$, and so forth can be counted in the same way. If the zero velocity circle is the orbital path of the superuniverses, the highest concentration of galaxies should be found in the redshift velocity range of $-15\ \mathrm{km/s} < cz < +15\ \mathrm{km/s}$.

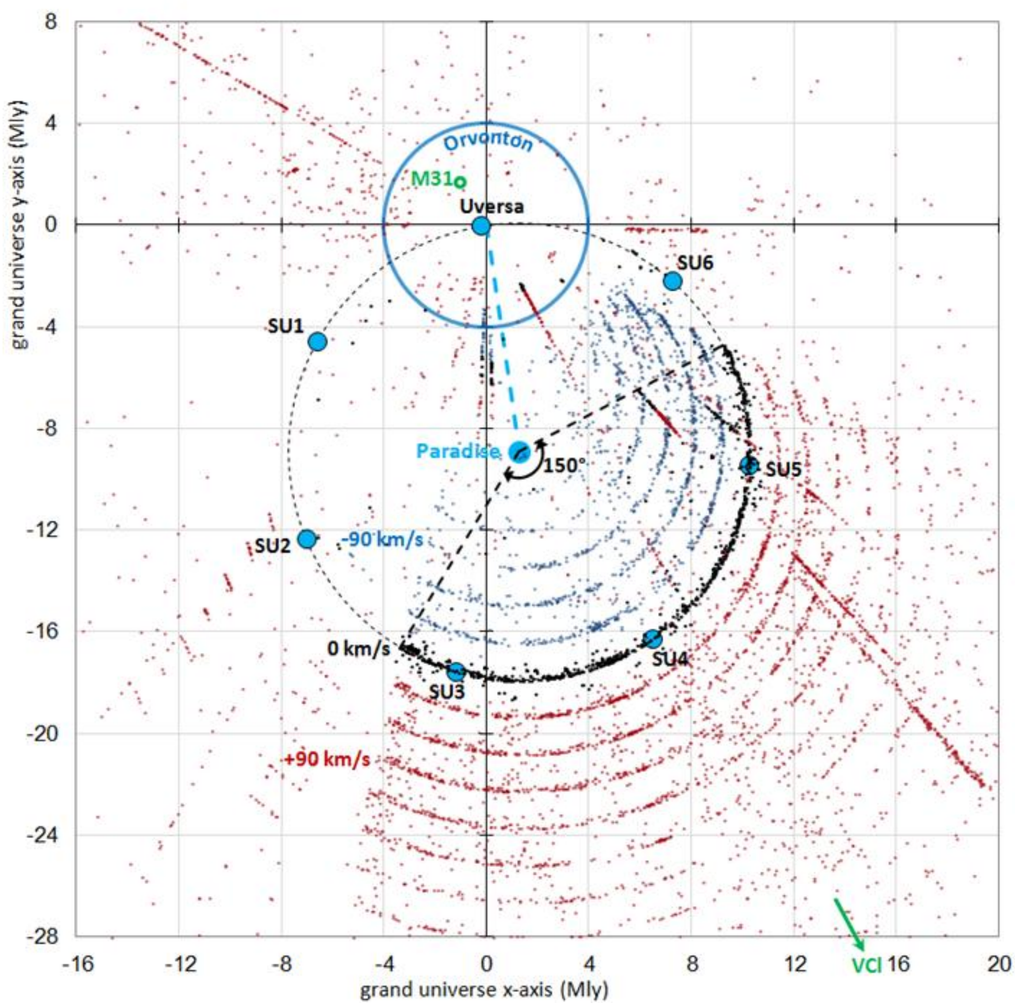
There is, in fact, a dramatic spike in the number of galaxies within $\pm\ 15\ \mathrm{km/s}$ of the zero velocity orbit. A little more than 14 percent of all objects (1,186 out of 8,450) within 5-36 Mly have an observed velocity of 0 ± 15 km/s and are also located in the Superuniverse Wall. Relative to all objects within the celestial borders of this wall, 23 percent are found in the zero velocity orbit (1,186 out of 5,163). At $+30 \pm 15$ km/s the count drops by more than half to 540 objects. At -30 ± 15 km/s the count is 419 objects. Looking in the direction of Paradise, the far border of the grand universe is 22 Mly away ($v = +82$ km/s) and the near border is 14 Mly distant ($v = -82$ km/s), based upon a radius of 3.9 Mly for Orvonton. Over 36 percent of all objects (3,068/8,450) within 5-36 Mly are found within this portion of the wedge-shaped circular section making up the Superuniverse Wall in the distance range 14-22 Mly. On the basis of galaxy counts, one-seventh of all mass within 5-36 Mly lies within the Superuniverse Wall between radial velocities of -15 and +15 km/s, and over one-third is in this wall with velocities of between −82 and +82 km/s.

Fig 65: **Object Counts in the Superuniverse Wall by Radial Velocity**



All of these objects counts are taken in volumes of different sizes. The volume of a sphere 36 Mly in radius from which the volume of a sphere with a radius of 5 Mly is subtracted equals 194,909 Mly^3. The average density of 8,450 objects divided by this volume equals 0.043 objects/Mly^3. The volume of the region in which the 1,186 zero velocity ($\pm$ 15 km/s) objects are found equals 94.6 Mly^3. The density in this region equals 12.534 objects/Mly^3. The galactic density in the zero velocity region is 289 times greater than it is within the 5-36 Mly shell. This is a much greater difference in mass density than that between air at sea level and the cork from a wine bottle, which has 200 times the mass density of the sea level atmosphere. A difference in mass density of 289 is comparable to the difference between a gas and a solid. The relative density in the −30 km/s region is 105 times greater. In the +30 km/s region it is 133 times greater. In the entire region between −82 and +82 km/s, in which the volume is 0.38 percent of the total, the density is 120 times greater in the Superuniverse Wall than the average density within 5-36 Mly. This is comparable to the mass density difference between Styrofoam and carbon steel, which has 107 times the density.

Fig 66: **Orbit of the Superuniverse Capitals about Paradise**



There is a high over-density of galaxies and galactic mass in the −82 to +82 km/s region. There is a dramatic spike in galactic density occurring in the zero velocity region. This region is 2.8 Mly high, 1.5 Mly deep, and 23.4 Mly long. It exactly follows 150 degrees of the circumference of a circle centered on Paradise. The concentration of galaxies in this circular structure is not an artifact of the sun's peculiar motion relative to the CMB, since this structure would be observable regardless of the direction and velocity of the sun's peculiar motion. The only viable explanation for this concentration of mass in such a well-defined circular structure within the Superuniverse Wall is gravitational revolution. There is no other credible cause for this long, elegant, geometrically precise, and high density structure.

The circular path of this region passes directly over our location. The Milky Way galaxy is near the center of Orvonton and must be part of the structure of the whole Superuniverse Wall. Uversa is no more than 250,000 ly away from us and lies in the approximate direction of $\boldsymbol{\alpha} = 212°$, $\boldsymbol{\beta} = 0°$, which also places it on this orbital path. Although future advances will improve the accuracy of distance calculations, the exact direction and approximate distance to Paradise can be empirically determined at this time.

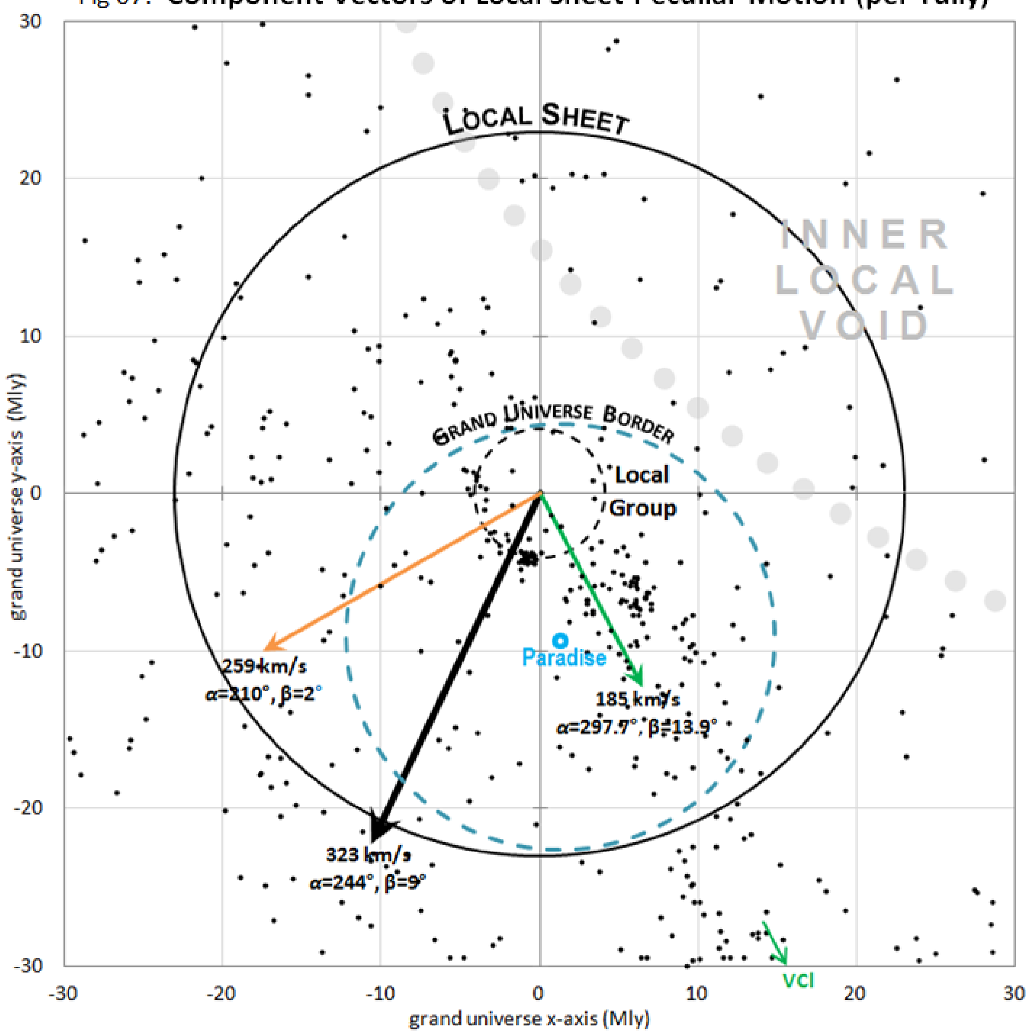
Structures formed and held together by linear gravity always exhibit an increasing mass density as the center of revolution is approached. This is not seen here. Instead of mass density decreasing as the distance from the center of gravity increases, it increases with distance up to a distance of 9 Mly and then decreases. The highest mass density occurs at 9 Mly away from Paradise instead of at the center of revolution. There are no observable objects (at this time) within 250,000 ly of Paradise. From the speculative model of the central universe, it is estimated that the dark gravity bodies revolve about Paradise at a radial distance on the order of 300 ly. The presence of this void surrounding the location of Paradise and Havona is consistent with the predicted absence of any visible objects in the region of the central universe.

Under current understanding, it may still be possible to speculate that there is some unobservable concentration of mass at the location of Paradise, which is on the order of tens of trillions of solar masses. However, admitting this possibility still does not account for the general increase in galactic density as the distance from the center of gravity increases. The well-defined orbital path of the superuniverse capitals and the apparent absence of galactic mass at the center of this structure is substantial circumstantial evidence supporting the existence of absolute gravity, which is fundamentally different from linear gravity.

3. Component Vectors of the Local Sheet's Motion

In his 2008 paper analyzing the relative motions of 1,791 galaxies with redshift-independent distances, Tully finds that the Local Sheet as a whole has a peculiar velocity relative to surrounding galaxies of 323 km/s toward $\boldsymbol{l} = 220 \pm 7°$, $\boldsymbol{b} = 32 \pm 6°$ ($\boldsymbol{\alpha} = 244 \pm 7°$, $\boldsymbol{\beta} = 9 \pm 6°$). He notes that this motion is not towards any significant concentration of galaxies, whose gravitational pull upon the Local Sheet might account for this motion. From this he concludes that the motion must be the result of at least two component motions.

Fig 67: **Component Vectors of Local Sheet Peculiar Motion (per Tully)**



The first component motion (green arrow) is 185 ± 20 km/s toward $\boldsymbol{l}$ = 284°, $\boldsymbol{b}$ = 74° ($\boldsymbol{\alpha}$ = 298°, β = 14°) in the direction of the Virgo Cluster. There are as many as 2,000 galaxies in this very dense cluster, which has a total estimated mass greater than 1,000 times that of the Milky Way or Andromeda. Several previous studies by others appear to show a gravitational pull by this cluster upon the Local Group / Local Sheet causing a peculiar velocity of ~200 km/s, according to Tully. Taking this pull from the Virgo Cluster as one of two component velocities responsible for the resultant velocity of 323 km/s, Tully calculates that there must be a second component velocity of 259 ± 25 km/s toward $\boldsymbol{l}$ = 210 ± 7°, $\boldsymbol{b}$ = -2 ± 6° ($\boldsymbol{\alpha}$ = 210°, β = 2°). This vector (orange arrow) also does not point toward any large concentration of mass, which might be attracting the Local Sheet. However, this direction is 180 degrees from the center of the Inner Local Void at $\boldsymbol{l}$ = 30°, $\boldsymbol{b}$ = -0.6° ($\boldsymbol{\alpha}$ = 32°, β = -3°). Since there is nothing which might attract the Local Sheet and give it a peculiar velocity toward $\boldsymbol{l}$ = 210°, Tully hypothesizes that the Inner Local Void is "pushing" the Local Sheet away at 259 km/s, based upon gravitational instability theory.

Tully's reasoning depends upon a peculiar approaching motion between the Local Sheet and the Virgo Cluster. The redshift-independent distance to the Virgo Cluster has been measured at 16.5 ± 1.1 Mpc (53.8 Mly). [94] The galaxies making up the Virgo Cluster have an average redshift of $z = 0.0036$ for a velocity of recession of 1,079 km/s ($v = cz$). [95] This gives an average rate of space expansion of 65.4 $\text{kms}^{-1}/\text{Mpc}$, since $H_0 = v/D$. This is too low an expansion rate, based upon numerous in-depth studies of the Hubble constant over the last few decades. If NED's Hubble value of 73 $\text{kms}^{-1}/\text{Mpc}$ is used a velocity of 1,205 km/s is expected at 16.5 Mpc. Since the observed redshift velocity is significantly less than expected, it can be inferred that there is a peculiar approaching motion between the sun and Virgo of 126 km/s. This is only two-thirds of 185 km/s. But the heliocentric redshift velocity of Virgo differs from the Local-Sheet-centric redshift velocity, because the sun is moving relative to the Local Sheet.

Tully finds that the sun has a peculiar velocity relative to the Local Sheet frame of reference of 318 ± 20 km/s in the direction of $\boldsymbol{l} = 95°$, $\boldsymbol{b} = 4°$. There are 101 degrees of separation between this direction and the Virgo Cluster at $\boldsymbol{l} = 283.4°$, $\boldsymbol{b} = 74.5°$. The sun is generally moving away from Virgo, and its peculiar motion adds 63 ± 20 km/s (318 km/s $*$ cos 101°) to its observed redshift velocity. This additional motion of recession is included in the observed velocity of 1,079 km/s for the Virgo Cluster. The redshift velocity between the Local Sheet and the Virgo Cluster is actually 63 km/s less than 1,079 km/s or 1,016 km/s, according to Tully's findings. The difference between the expected and measured redshift velocities is 189 km/s, which is therefore the approaching velocity between the Local Sheet and the Virgo Cluster. This is a clear and consistent explanation for the 185 km/s vector Tully incorporates into his dynamic analysis of the cause of the Local Sheet's observed peculiar motion of 323 km/s toward $\boldsymbol{l} = 220°$, $\boldsymbol{b} = 32°$.

The above reasoning assumes there is a single fixed rate at which space expands from our location. In fact, there are significantly different values for the Hubble constant, depending upon the data examined. The most accurate determination of the constant using optical wavelengths is $74.3 \pm 2.1\,\mathrm{kms}^{-1}/$ Mpc, which was published in 2011 by the Hubble Key Project Team. [5] The most accurate determination using CMB temperature data from the Planck Satellite is $67 \pm 1.2\,\mathrm{kms}^{-1}/\mathrm{Mpc}$, which was published by the European Space Agency (ESA) in 2013. [96] A key difference between the two sets of data is their age, the distance from which energy is emitted. The Hubble Team considered all optical data, the most distant of which is SN1992aq, a Type Ia supernovae at 1.5 Bly (467 Mpc). The microwave data analyzed by the ESA is believed to have been emitted at a distance of 13.8 Bly. The difference in age may be related to these significantly different rates of space expansion.

These measurements of the Hubble constant are taken at large scales. It may be valid to apply them generally on larger scales, but they are not necessarily applicable to the specific distance of 16.5 Mpc between the center of the Local Sheet and the Virgo Cluster. Within this distance Tully identifies three different regimes of space expansion. There is no space expansion inside the Local Group's radius of 1.2 Mpc; $H_0 = 0\,\mathrm{kms}^{-1}/\mathrm{Mpc}$ within ~4 Mly. Tully measures an expansion rate of $67\,\mathrm{kms}^{-1}/\mathrm{Mpc}$ between 1.2 and 7 Mpc (4-22.8 Mly) and then a rate of $74\,\mathrm{kms}^{-1}/\mathrm{Mpc}$ between 7 and 16.5 Mpc (22.8-53.8 Mly). Between 1.2 and 7 Mpc the velocity of space expansion increases from zero to 387 km/s (5.8×67). Between 7 and 16.5 Mpc the velocity increases by another 703 km/s (9.5×74). The final proper velocity is, therefore, 1,090 km/s, which is just 11 km/s greater than the observed velocity of 1,079 km/s. If the component of the sun's peculiar motion directed toward Virgo of 63 km/s is considered, the redshift velocity between the Local Sheet and Virgo is 1,027 km/s. In this case there would be a small peculiar receding velocity of 52 km/s between the Local Sheet and Virgo, not an approaching one.

Based upon Tully's findings, over 99 percent of the heliocentric redshift and over 95 percent of the Local-Sheet-centric redshift relative to the Virgo Cluster is explained by the proper motion of space expansion alone. There is no significant peculiar velocity between the sun or the Local Sheet and the Virgo Cluster.

Without this peculiar velocity of the Local Sheet toward Virgo to act as a first component vector, Tully's inference of a second component vector of 259 km/s toward $\boldsymbol{l}$ = 210°, $\boldsymbol{b}$ = -2° does not follow. Although the speculative hypothesis of the Inner Local Void "pushing" the Local Sheet away at this velocity in this direction may still be possible, it is no longer a viable explanation for the Local Sheet's peculiar velocity. The resultant of this vector and the observed motion of the Local Sheet at 323 km/s toward $\boldsymbol{l} = 220°$, $\boldsymbol{b} = 32°$ would yield a vector of 555 km/s toward $\boldsymbol{l} = 215°$, $\boldsymbol{b} = 17°$, and no evidence which supports this.

From an analysis of the dynamics of more than 1,500 galaxies beyond 7 Mpc Tully finds that the Local Sheet has a peculiar motion of 323 km/s toward a nearby region of space in which there are no large concentrations of mass. This motion is not due to gravitational attraction by a large nearby concentration of mass. It also cannot be explained as a resultant vector arising in part from an approaching motion between the Local Sheet and the Virgo Cluster, if Tully's identification of three distinct regimes of space expansion between us and Virgo is correct. There is no explanation for this peculiar motion of the Local Sheet based upon the currently identified dynamics within 50 Mly.

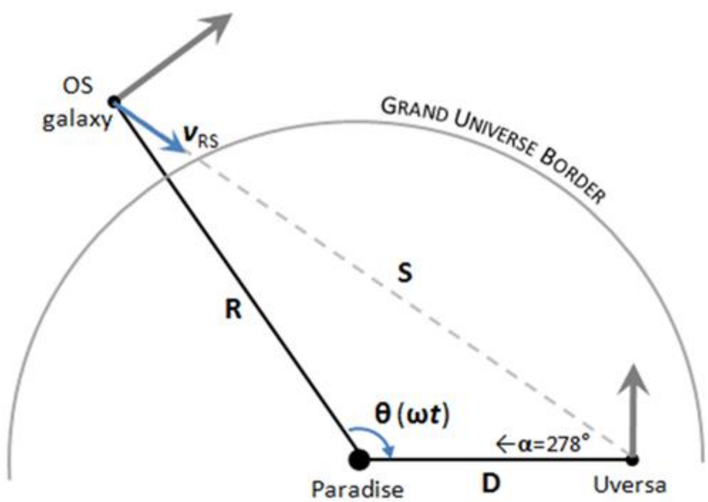
4. Counter-Rotation Induced Redshift Velocities

The Local Group (Orvonton) is known to be part of a massive circular structure that is in gravitational revolution about a central point (Paradise) about 9 Mly away in the direction $\boldsymbol{\alpha}$ = 278° in grand universe longitude. Uversa must have an orbital velocity whose direction is ~90 degrees from this and also aligned with the gravitational plane of the grand universe. We are informed that Orvonton is in counterclockwise revolution, so its orbital velocity is toward $\boldsymbol{\alpha}$ = 188°, β = 0° ($\boldsymbol{l}$ = 200°, $\boldsymbol{b} = -21.6$°). At a radius of 9 Mly and an angular velocity of 2.3×10^{-18} θ/s (Ch. 7 Sec. 3), Uversa has an orbital velocity of 196 km/s ($v = r\omega$). Intuitively, this revolution of the superuniverse space level should cause outer space galaxies in the general direction of $\boldsymbol{\alpha}$ = 188° to be blueshifted, while those in the opposite direction are redshifted.

Tully measures a peculiar velocity of the Local Sheet of 323 km/s toward $\boldsymbol{\alpha}$ = 244°, β = 9°. The angle of separation between Uversa's vector of motion and that of the Local Sheet is 56.7 degrees. The component vector of 323 km/s which lies in the direction of Uversa's revolution is 177 km/s (323 cos 56.7°). This is just 19 km/s less than the theoretical velocity of 196 km/s, but Uversa's orbital velocity is not equivalent to a linear vector. The constant linear velocity of 323 km/s does not decompose into an orbital velocity whose direction is constantly changing because of rotation.

It makes sense for it to appear that Uversa is moving toward nearby regions of outer space in one direction and away from them in the opposite direction, since these two space levels revolve in opposite directions. A 2008 paper by the mathematician Philip Calabrese, *Doppler Red Shifts Due to Universe Rotations,* [61] derives a formula for calculating apparent redshifts induced by the counter-rotation of concentric space levels revolving about Paradise. This formula provides a means of testing this intuitive idea about the dynamics of the grand universe against Tully's finding of a peculiar velocity of 323 km/s.

Fig 68: **Redshift Velocity Induced by Counter-Rotation (Calabrese)**



$$v_{RS} = \frac{\mathrm{D}\omega \sin\theta}{\sqrt{1 + \left(\frac{D}{R}\right)^2 - 2\left(\frac{D}{R}\right)\cos\theta}}$$

The redshift velocity (v_{RS}) is determined by four variables: the relative angular velocity ω between the two orbits of opposite revolution; the distance D from Paradise to Uversa rotating in a counterclockwise direction; the distance R to a galaxy in the first outer space level rotating in a clockwise direction; finally, the angle of separation θ formed by Uversa, Paradise, and the outer space galaxy. This angle θ equals the angular velocity multiplied by the time, ωt. (In his original equation ωt appears where θ is.) If these four variables are known, the apparent positive or negative redshift velocity induced by counter-rotation can be calculated.

Tully performs a vector analysis of galactic motions using a list of galaxies with redshift measurements and redshift-independent distances. This vector analysis is three-dimensional, while Calabrese's equation is applicable to rotation in a two-dimensional plane. There is, however, a general manner in which to apply his equation to Tully's data to arrive at an estimate of the redshift velocity induced by counter-rotation.

Galaxies in nearby outer space are held in orbit by absolute gravity, which increases in direct proportion to the distance from Paradise. This causes the absolute angular velocity of all galaxies to be the same, regardless of their distance from Paradise. If outer space galaxies are in clockwise revolution under the force of absolute gravity, they should be distributed equally above and below the gravitational plane of the grand universe; that is, the average of their latitudes should equal zero. There are 1,556 galaxies in Tully's list with distances greater than 22.8 Mly. The average of their latitudes equals 0.45 degrees, which means they are essentially symmetrically distributed above and below the gravitational plane of the grand universe. (Taking the average of their galactic instead of grand universe latitudes equals 18.9 degrees, demonstrating their asymmetrical distribution relative to the galactic plane.) These 1,556 galaxies can be represented by the idea of an average outer space galaxy with latitude of $\boldsymbol{\beta} = 0°$.

The average radial distance for these 1,556 galaxies is 80 Mly. However, the average outer space galaxy is on the grand universe plane at zero degrees of latitude, and this average distance of 80 Mly includes many galaxies significantly above and below the plane. To find the radial distance of a single average outer space galaxy, the radial distance for each galaxy in the x-y plane can be used. This gives an average distance of 63.9 Mly. These 1,556 galaxies can be represented by a single average outer space galaxy on the gravitational plane of the grand universe at a radial distance 63.9 Mly.

The longitudes of these 1,556 galaxies can be averaged to find the central tendency of longitude, which equals $\boldsymbol{\alpha} = 233.43°$. The direction to this average outer space galaxy of $\boldsymbol{\alpha} = 233.4°, \boldsymbol{\beta} = 0°$ is 13.8 degrees from the direction of net motion identified by Tully at $\boldsymbol{\alpha} = 244°, \boldsymbol{\beta} = 9°$. From our location the angle of separation between this average outer space galaxy and Paradise is 44.7 degrees ($278.13° - 233.43°$). The distances to the average outer space galaxy S and Paradise D are 63.9 and 9 Mly, respectively. The distance R between Paradise and the outer space galaxy can be found using the law of cosines.

$$R = \sqrt{S^2 + D^2 - 2SD\cos(44.7°)} = 57.8 \text{ Mly}$$

The length of the three sides of the triangle SDR are known, so the angle of separation θ between Uversa and the outer space galaxy, as measured from Paradise, can be found using the law of cosines.

$$\cos(129.02°) = \frac{S^2 - D^2 - R^2}{-2DR}$$

The variables D, R, and θ required for Calabrese's counter-rotation Doppler shift equation are known. The last variable of relative angular velocity is the sum of Uversa's angular velocity in one direction and the outer space galaxy's angular velocity in the opposite direction. The angular velocity of Uversa is $2.3 \times 10^{-18}\ \theta/\text{s}$, which equals the orbital velocity of 196 km/s divided by a radius of 9 Mly. Neither the orbital nor the angular velocity of the outer space galaxy can be found from the data on Tully's 1,556 galaxies. Its orbital velocity can be found under the assumption that this galaxy is in gravitational revolution about Paradise.

If this galaxy was held in orbit by linear gravity, its orbital velocity would be $v_2 = \sqrt{GM/r_2}$, where r_2 is its distance R of 57.8 Mly from Paradise. Under linear gravity Orvonton's orbital velocity v_1 of 196 km/s equals the square root of GM divided the its distance r_1 from Paradise of 9 Mly: $v_1 = \sqrt{GM/r_1}$. Since GM is common to both equations, they can be combined to give $v_2 = \sqrt{(v_1{}^2 r_1)/r_2}$. The variables on the right hand side of the equation are known, and the orbital velocity of this average galaxy is 77 km/s under linear gravity. At 57.8 Mly and 77 km/s the angular velocity equals $1.41 \times 10^{-19}\ \theta/\text{s}$ ($\omega = v/r$). The relative angular velocity between the Orvonton and this galaxy is the sum of the two component angular velocities or $2.44 \times 10^{-18}\ \theta/\text{s}$. Using this relative angular velocity in Calabrese's equation gives an approaching velocity of 146 km/s, which is only 45 percent of Tully's value of 323 km/s. If this average galaxy did not revolve at all about Paradise, this equation yields a result of 138 km/s. Under linear gravity acting from Paradise the orbital velocity of this outer space galaxy does not significantly affect the induced redshift, and the revolution of Uversa does not explain even half of the Local Sheet's peculiar velocity.

More significantly, linear gravity cannot explain the extremely small centripetal acceleration holding Orvonton in orbit about Paradise. The acceleration acting upon Orvonton is 266 times smaller than the minimum acceleration possible under linear gravity. Galactic rotation curves demonstrate that centripetal acceleration never falls below $1.2 \times 10^{-10}\ \mathrm{m/s^2}$. The centripetal acceleration acting on Orvonton equals:

$$a_c = v\omega = 196\ \frac{\mathrm{km}}{\mathrm{s}} * 2.3 \times 10^{-18}\ \frac{\theta}{\mathrm{s}} = 4.5 \times 10^{-13}\ \frac{\mathrm{m}}{\mathrm{s}^2}$$

It might be expected that galactic clusters which are revolving as a unit would have centripetal accelerations below this minimum. However, studies of such galactic clusters find that they all have centripetal accelerations equal to or greater than the empirically determined minimum of $1.2 \times 10^{-10}\ \mathrm{m/s^2}$. Nevertheless, there must be a relative velocity between our location and the galaxies of outer space, because there is no doubt that Uversa is revolving under a central force.

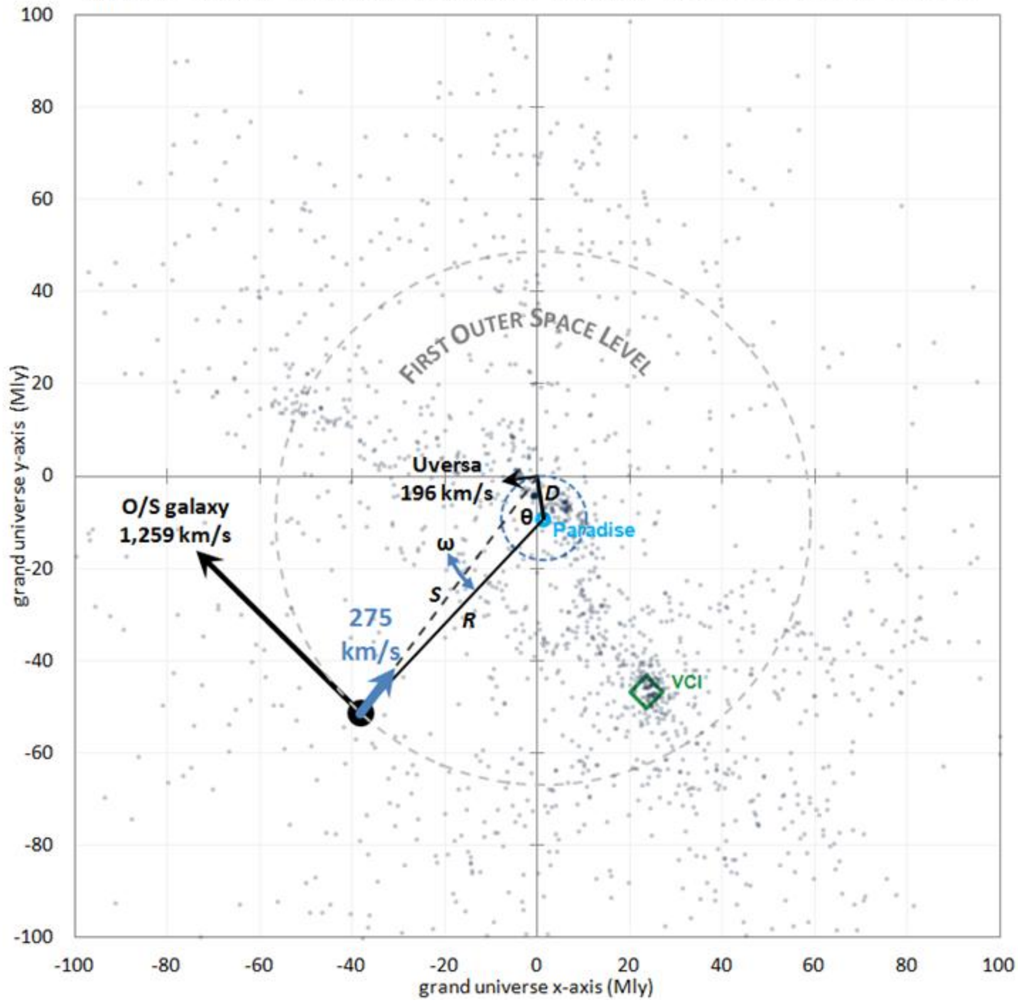
Under the theory of absolute gravity the angular velocity of the average outer space galaxy is the same as Uversa, and we are told that it is in the opposite direction. This makes the relative angular velocity ω used in the counter-rotation redshift equation twice Uversa's or $4.6 \times 10^{-18}\ \theta/\mathrm{s}$. At a distance of 57.8 Mly and an angular velocity of $2.3 \times 10^{-18}\ \theta/\mathrm{s}$, the average outer space galaxy has an orbital velocity of 1,259 km/s.

$$v_{RS} = \frac{\mathrm{D}\omega \sin\theta}{\sqrt{1 + \left(\frac{D}{R}\right)^2 - 2\left(\frac{D}{R}\right)\cos\theta}}$$

$$v_{RS} = \frac{(8.51 \times 10^{22})(4.6 \times 10^{-18}) \sin 129.02°}{\sqrt{1 + \left(\frac{8.51 \times 10^{22}}{5.47 \times 10^{23}}\right)^2 - 2\left(\frac{8.51 \times 10^{22}}{5.47 \times 10^{23}}\right)\cos 129.02°}} = -275\ \mathrm{km/s}$$

The distance D of 9 Mly equals 8.51×10^{22} meters and R's distance of 57.8 Mly is 5.47×10^{23} meters. The angle θ formed by Uversa, Paradise, and the outer space galaxy is 129.02°. Solving the equation with these values of D, R, θ, and ω yields an approaching (blueshift) velocity of −275 km/s between Uversa and this average outer space galaxy. This is 85 percent of Tully's approaching velocity of 323 km/s. There is an angular separation of 13.8 degrees between the direction of $\boldsymbol{\alpha} = 233.43°, \boldsymbol{\beta} = 0°$ to the average outer space galaxy and Tully's direction of $\boldsymbol{\alpha} = 244°$, $\boldsymbol{\beta} = 9°$.

Fig 69: **Redshift Velocity Induced by Counter-Rotation of Space Levels**



Counter-rotation of the superuniverse and first outer space levels under the central force of absolute gravity substantially explains the Local Sheet's peculiar motion with respect to all galaxies beyond 7 Mpc. Tully finds a resultant blueshift velocity of 323 km/s from a vector analysis of peculiar radial velocities of all galaxies beyond the Local Sheet. The counter-rotation redshift equation finds a resultant blueshift velocity of 275 km/s in approximately the same direction. The ability of the counter-rotation redshift equation to substantially explain both the direction and magnitude of Uversa's observed peculiar velocity is reasonably good confirmation of the theory of absolute gravity and the dynamics of the superuniverse and first outer space levels.