

A Three Curvatures Universe Model

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Abstract

All matter has parity, charge and time reversed antimatter coexisting congruently with it. Two nested half sphere universes exist.

Keywords

Antimatter, universe omega, light cones, PCT point mirror

Contents

Claims of Novelty	1
Chapter 2 Cosmology.....	2
A Three-Curvatures Model of the Universe.....	2
Compress 3D to 2D Flatland.....	4
Observer's Space Diverges Proportional to Distance	11
The Stable Universe	12
Light Cones and Divergent Space.....	14
Antimatter.....	15
Misconception of PCT Point Mirror	17
Correct Concept of PCT Point Mirror	18
Collapse Sphere into a Double Wall Cup.....	19

Claims of Novelty

- Spin, charge and time are the root unit rotations which exist at the universe center and connect all points in the universe. The distance from every 3D point to the universe center is zero. The angular separation of all 3D points from one another is measured using the universe center as a pivot point.
- All particles have parity, charge and time (PCT) reversed antiparticles coexisting congruently.
- All reactions have congruent PCT reversed particles and motions.
- Two nested half sphere universes exist.
- When antimatter particles are visible, their matter pair half becomes invisible.

- Redshift of distant objects is due to time dilation between the observer and the observed space rotated with respect to the space wherein the photon was created.
- Cause-effect direction is the same as matter velocity direction. Cause-effect direction is opposite of antimatter velocity direction. Without congruent matter and antimatter, cause-effect cannot occur.

Dedication

This work is dedicated to Ginger

Previous Work

The text and diagrams are substantially the same as my paper posted on the physics archive <https://vixra.org/abs/2209.0057>.

Chapter 2 Cosmology

The existing literature regarding the shape of the universe is portrayed using the omega (Ω) density parameter. "The local geometry of the universe is determined by whether the density parameter Ω is greater than, less than, or equal to 1.

- Zero curvature flat pane ($\Omega=1$): a drawn triangle's angles add up to 180°
- Negative curvature hyperbolic paraboloid ($\Omega<1$): a drawn triangle's angles add up to less than 180°
- Positive curvature sphere ($\Omega>1$): a drawn triangle's angles add up to more than 180° ¹

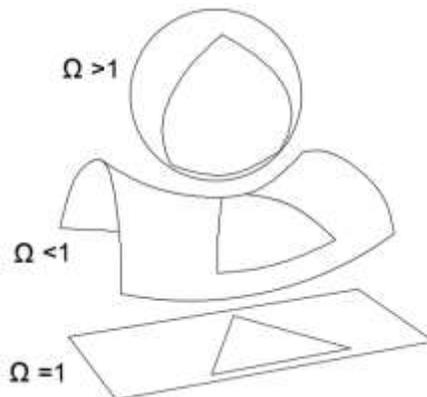


Figure 1 - Three Types of Universes

A Three-Curvatures Model of the Universe

The "all of the above" universe model is this paper's beginning postulate. Each of the three has a best-fit application. The sphere is closed and bounded, and is the best model for circular propagation of a wave and for geodesic travel of a particle.

¹ [Shape of the universe - Wikipedia](#)

The illustration of a “saddle shaped” hyperbolic paraboloid is not the best understanding of omega being less than 1. There is another way of looking at “open and unbounded”. Rather than space folding to create more of the same type of space at a distance that you would expect with a given solid subtended angle, this paper postulates that space exists less at a distance due to space rotating out of the 3D plane to exist as what is normally known as time.

Flat 3D is open and unbounded and matches our real-world observation. Since all our astronomical maps are made in 3D, theories of cosmology must reconcile with it.

In the following diagram the sphere maps to a hyperboloid via a velocity parameter. The hyperboloid then maps to the flat 3D surface via projective geometry. These two steps create a one-to-one mapping relationship among the three shapes.

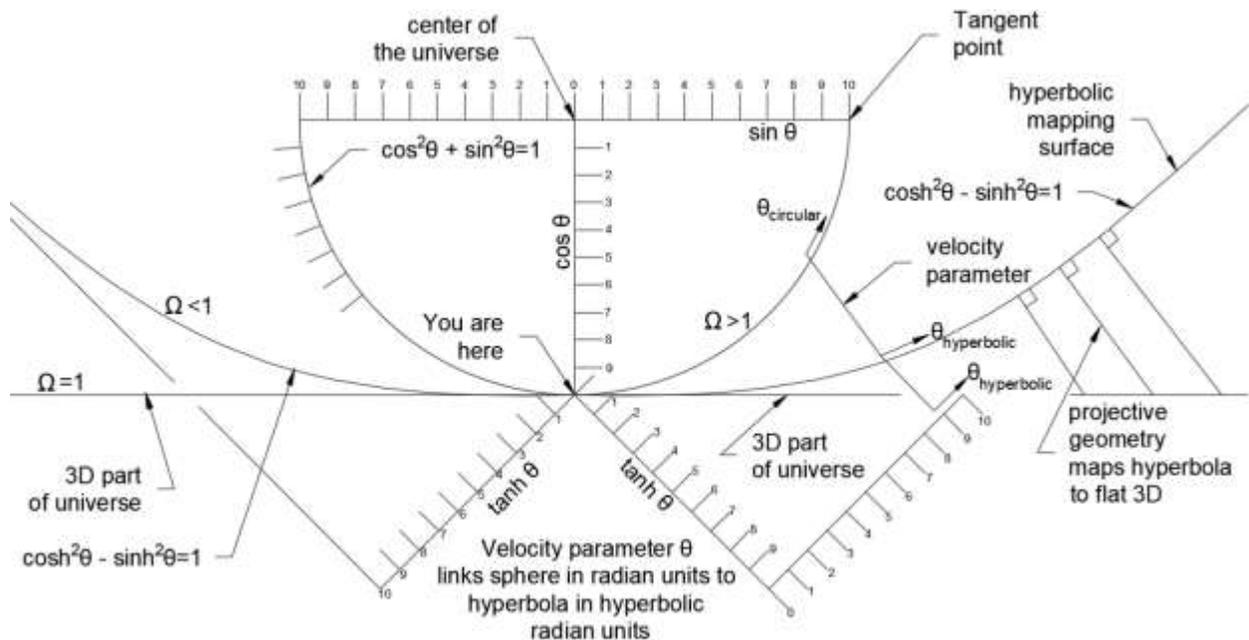


Figure 2 - A Three Curvatures Model of the Universe

Who is at the Center of the Universe?

Two observers, separated by a large distance from one another, observe the edge of the universe populated with the most redshifted galaxies. This set of most redshifted galaxies cannot be the same for both observers, otherwise they would be at the same location. Let us investigate the special condition where observers A and B are mutually at the end of each other’s universe.

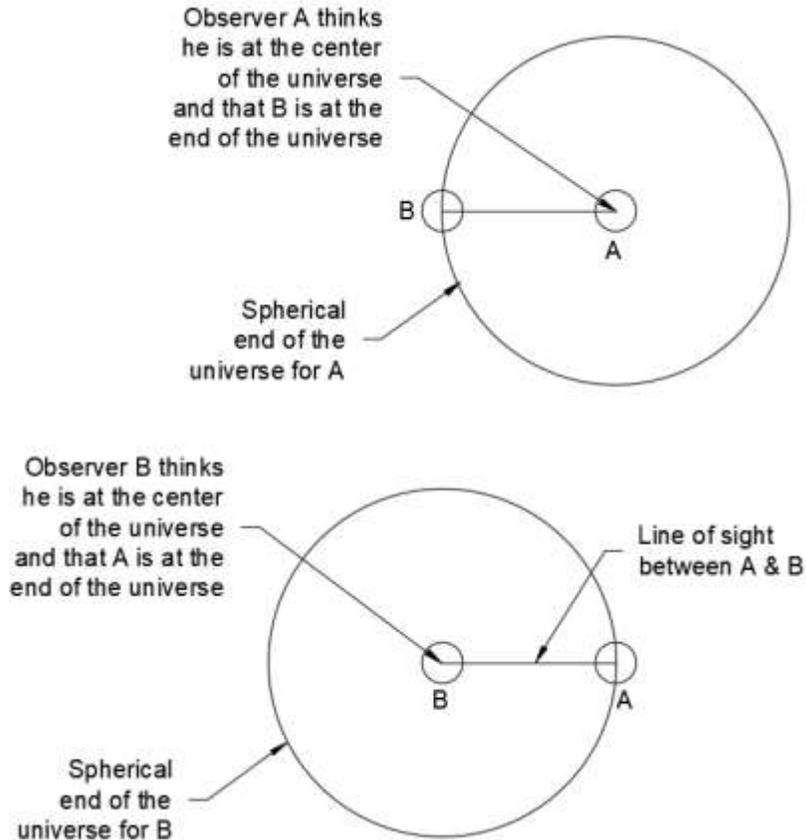


Figure 3 - The Problem of the Correct Observer in a Flat 3D Universe

Compress 3D to 2D Flatland

All of 3D has existence in the surface of the spherical universe. The concept “flat land” is where 3D is reduced one dimension to be flat 2D and lying on the sphere surface. Which dimension was flattened? That is indeterminate. Indeterminate in this context means, “if it can be any of the three dimensions, then it must be all dimensions, flattened one at a time”. Indeterminate does not mean unknown. It means simultaneously satisfying more than one condition.

Elapsed Time

The below diagrams are without the time rate slowing effect of gravity.

Successive time fronts are shown as concentric circles in the left-side “layman’s world view” below as approaching a person who is at the center of the universe. Successive time fronts are shown as concentric circles in the right-side “cosmologist’s universe view” as emanating from the center of the universe and approaching everyone simultaneously.

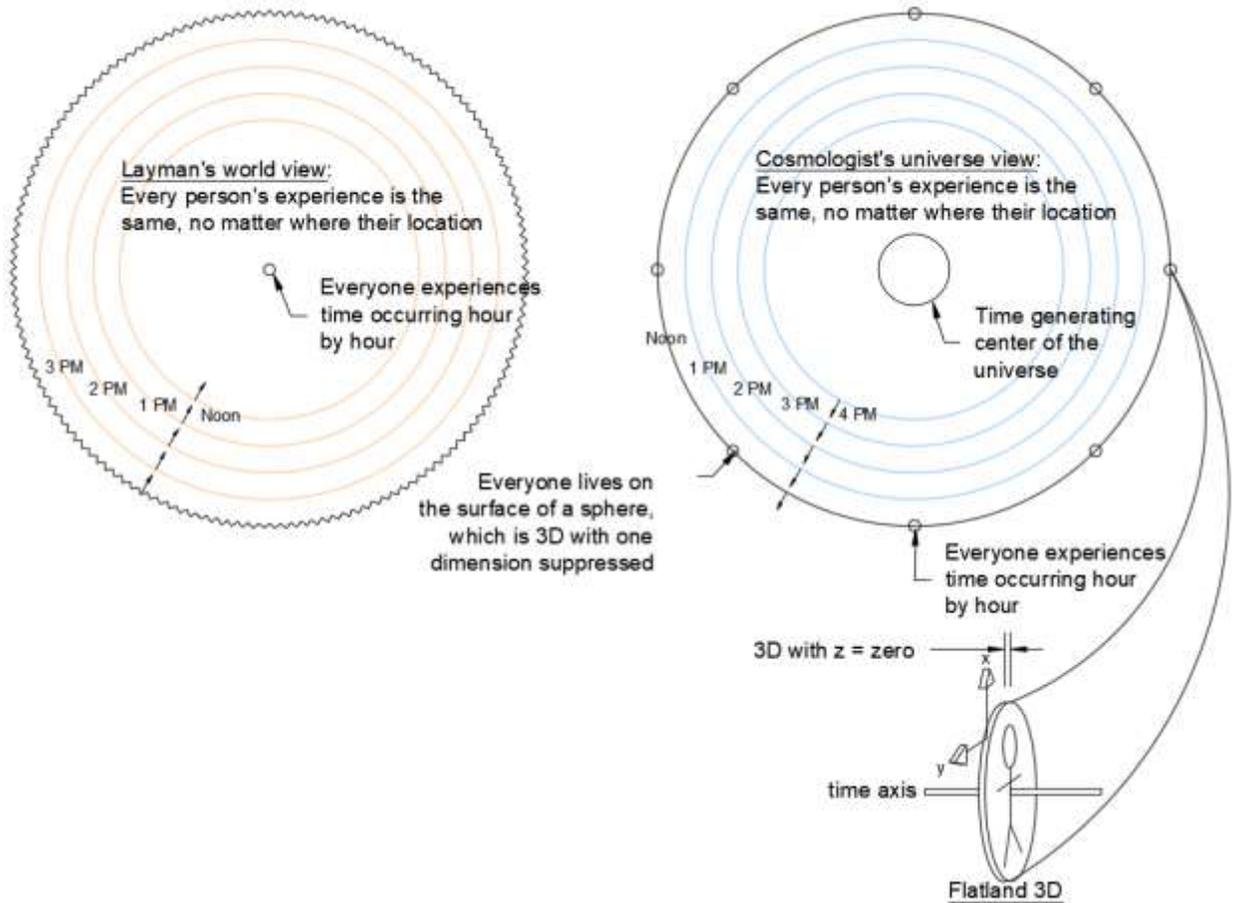


Figure 4 – Person's View versus Cosmology View

Time Flows Thru Center of Universe

Successive time fronts are show in the next diagram as flowing thru the center of the universe from “A₋₁” to “A”, which means from the antimatter side of the universe to the matter side of the universe. We matter individuals on the matter side of the universe experience time fronts passing thru our position, and also experience time reversed time fronts at the same time. We experience 1 PM and the reverse of negative 1 PM [- (-1 PM)] at the same instant, where the **minus sign** is time reversal of antimatter. We experience matter's 1 PM before we experience its 2 PM. We experience antimatter's -2 PM before we experience its -1 PM.

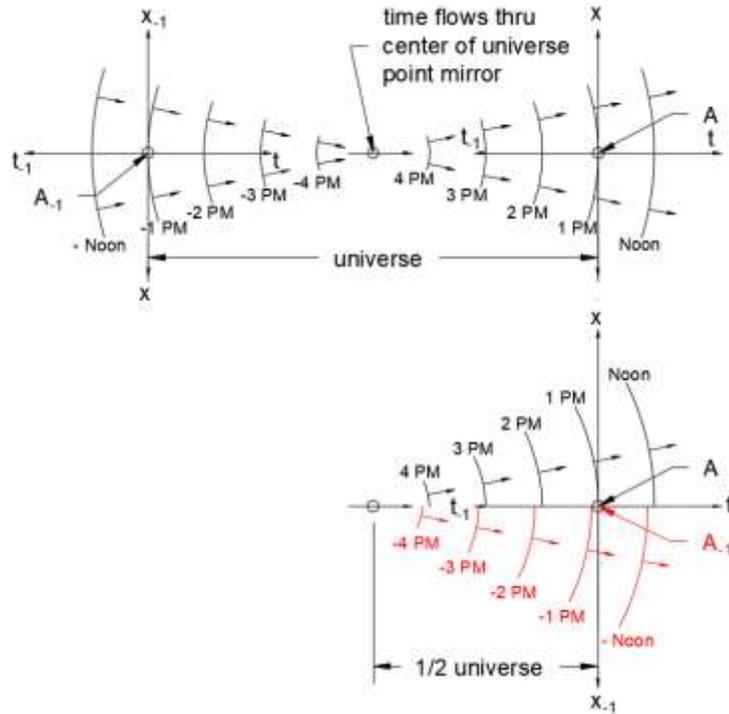


Figure 5 - Time Flows Thru Center of Universe Point Mirror

Spherical Universe

In the below diagram, the complete sphere model of the universe is shown. The path from A to B in the sphere part of the universe is along a curved geodesic.

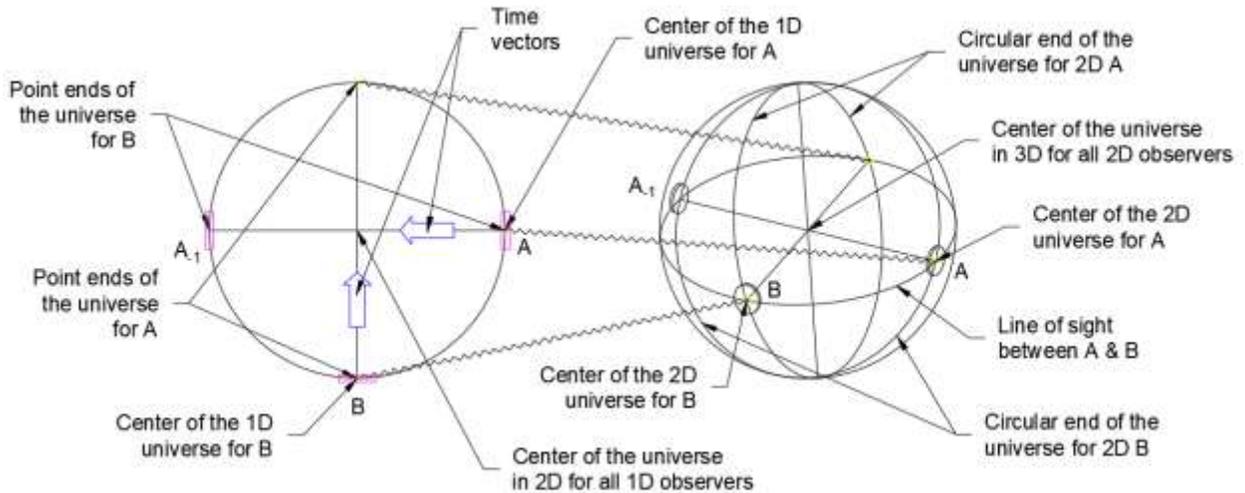


Figure 6 – Line of Sight Between A and B

No matter where the observer travels, the observer never reaches the edge of the universe because that spherical edge moves with the observer.

Space is curved because it is closed and continuous, but it is not a smooth surface. The large-scale radius of this curvature is due to the entire mass of the universe but locally due to masses in the vicinity. The gravity field of one hydrogen atom has a gravitational field extending throughout the universe.

Because space is curved as shown in the above diagram, each increment of travelling a segment of curved space has a corresponding length of space seen by observer A that is not curved. In the below diagram, “ ds ” is the segment of space traveled by the rocket and “ dL ” is the line-of-sight distance traveled in the 3D space of observer A.

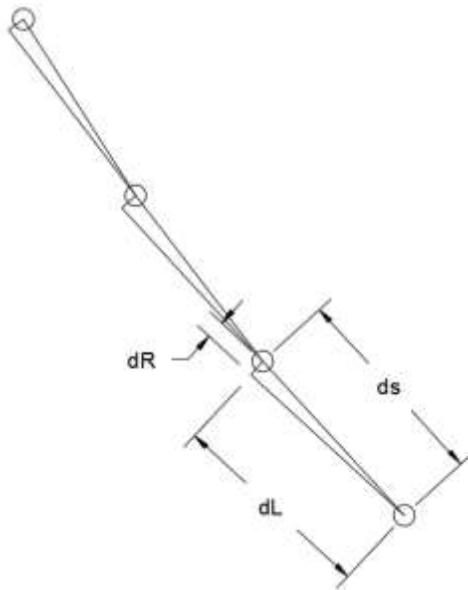


Figure 7 - Incremental Curvature of Space

If you add the incremental curvatures, you get the below diagram, which is circular. Assume an observer can only see along their line of sight in 3D. We take this line-of-sight vector from A to B and place it incrementally at points along the path to B. This translation of a vector without rotating it is parallel transport. “Comparison by parallel transport is the foundation on which rests the gradient of a tensor field”². The observer’s time vector follows a similar parallel transport. The observer can only measure time passing in the direction of his time vector, not in the time vector of a rocket with a rotated coordinate system.

² Gravitation by Misner, Thorne, Wheeler 1972, § 8.5, equation 8.16, page 208

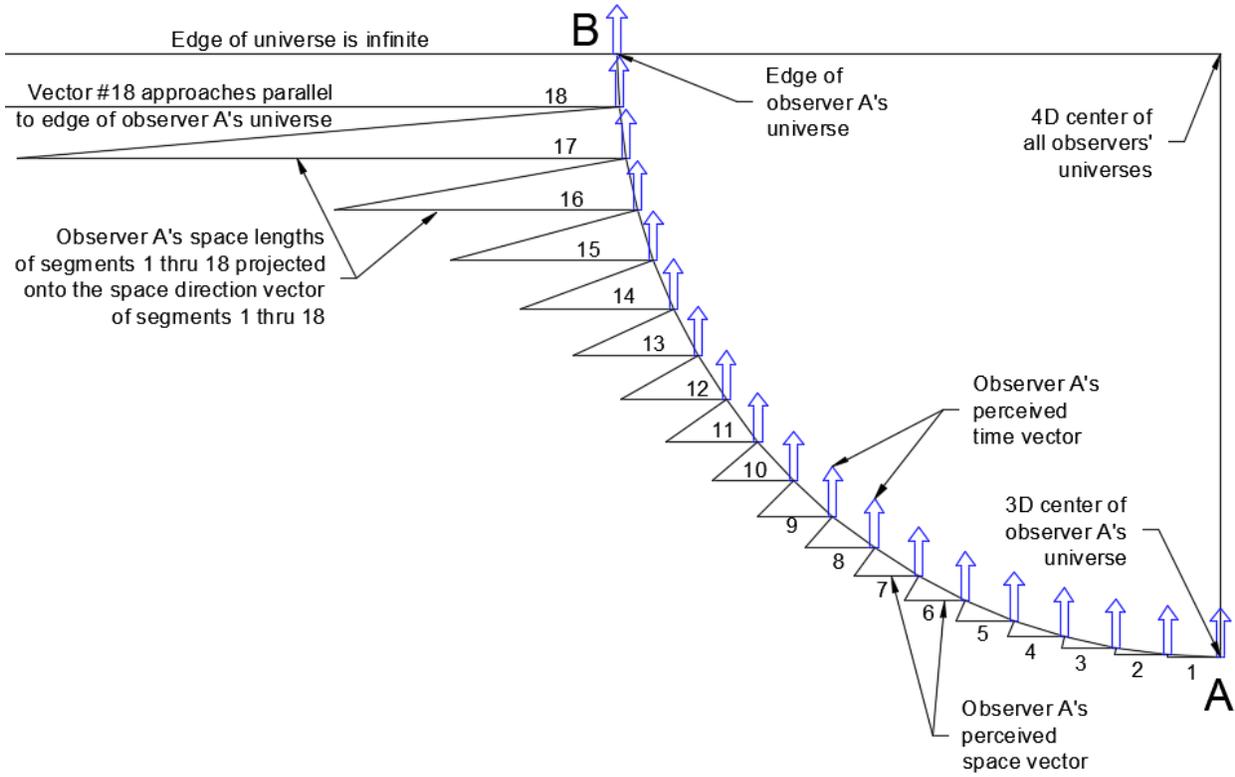


Figure 8 - Observer A's Space Vector Always Points in the Same Direction

The radial divergence of space away from the observer is as follows:

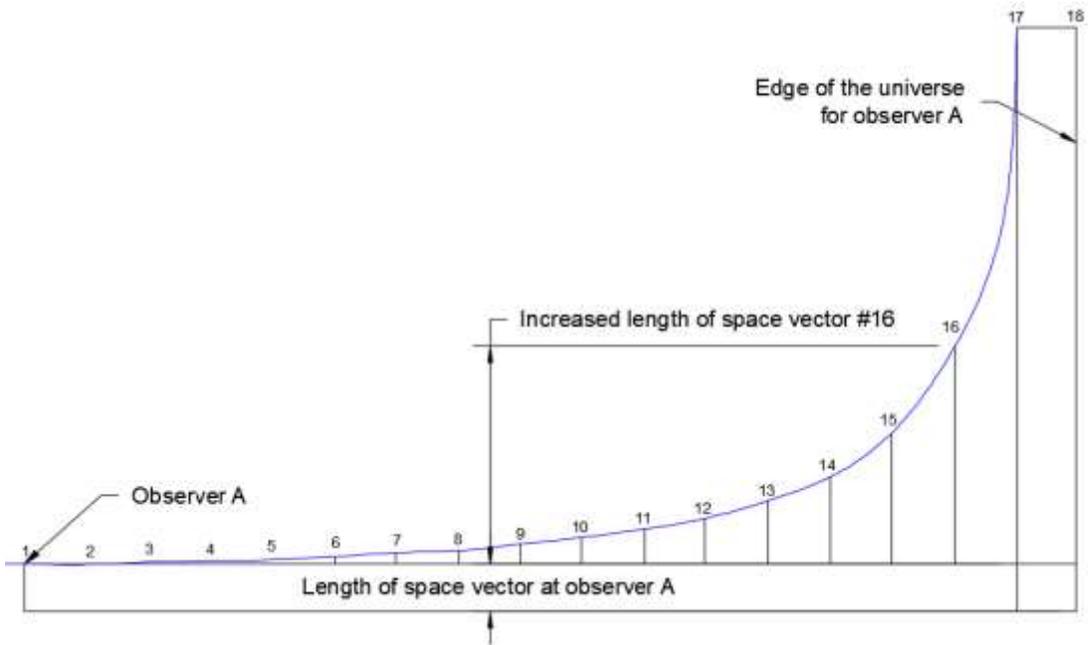


Figure 9 - Shape of the Space Curve Going from Observer A to Edge of Universe

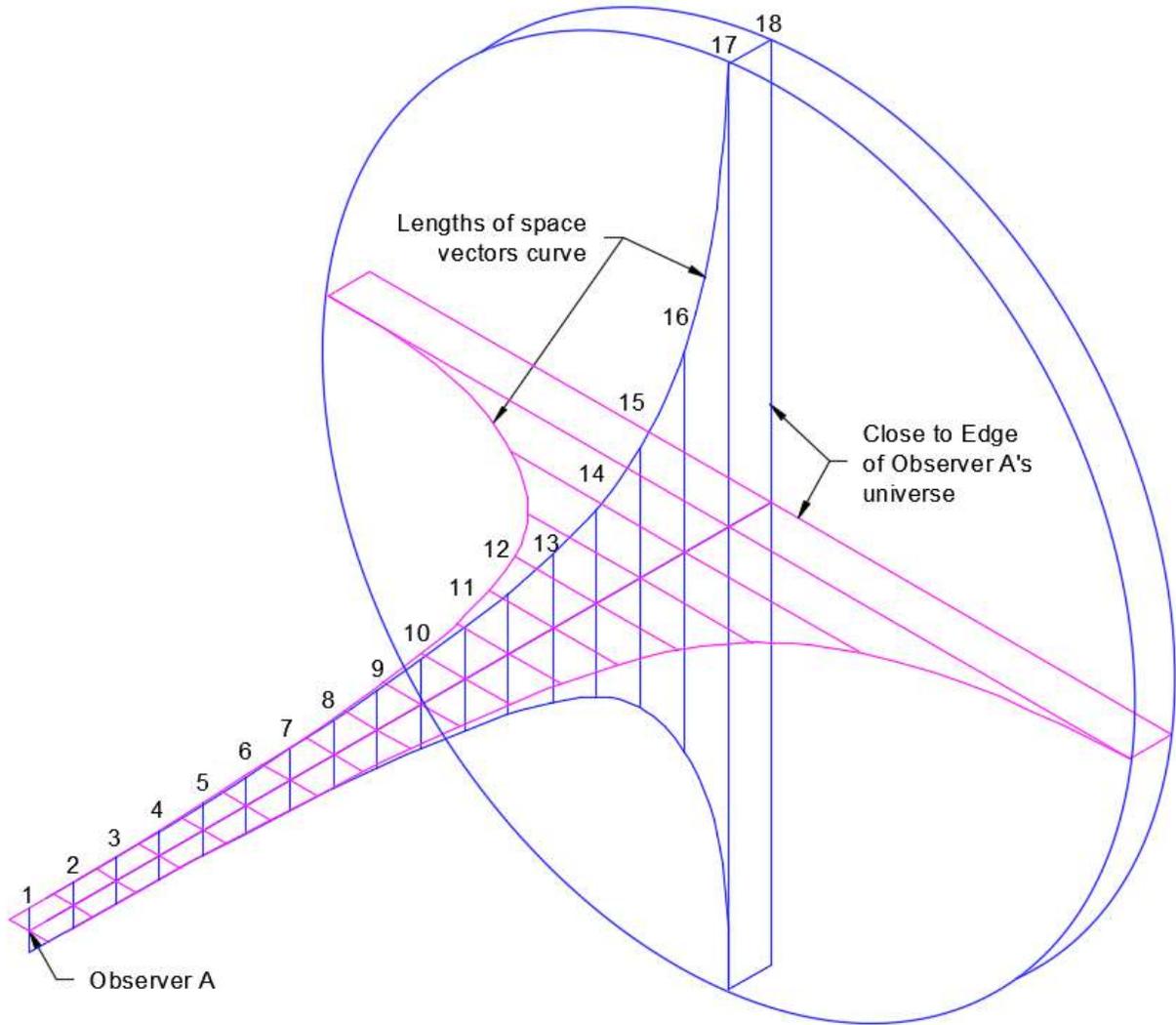


Figure 10 - Trumpet Shape of Space Going from Observer "A" to Edge of Universe

The axial diagram is added:

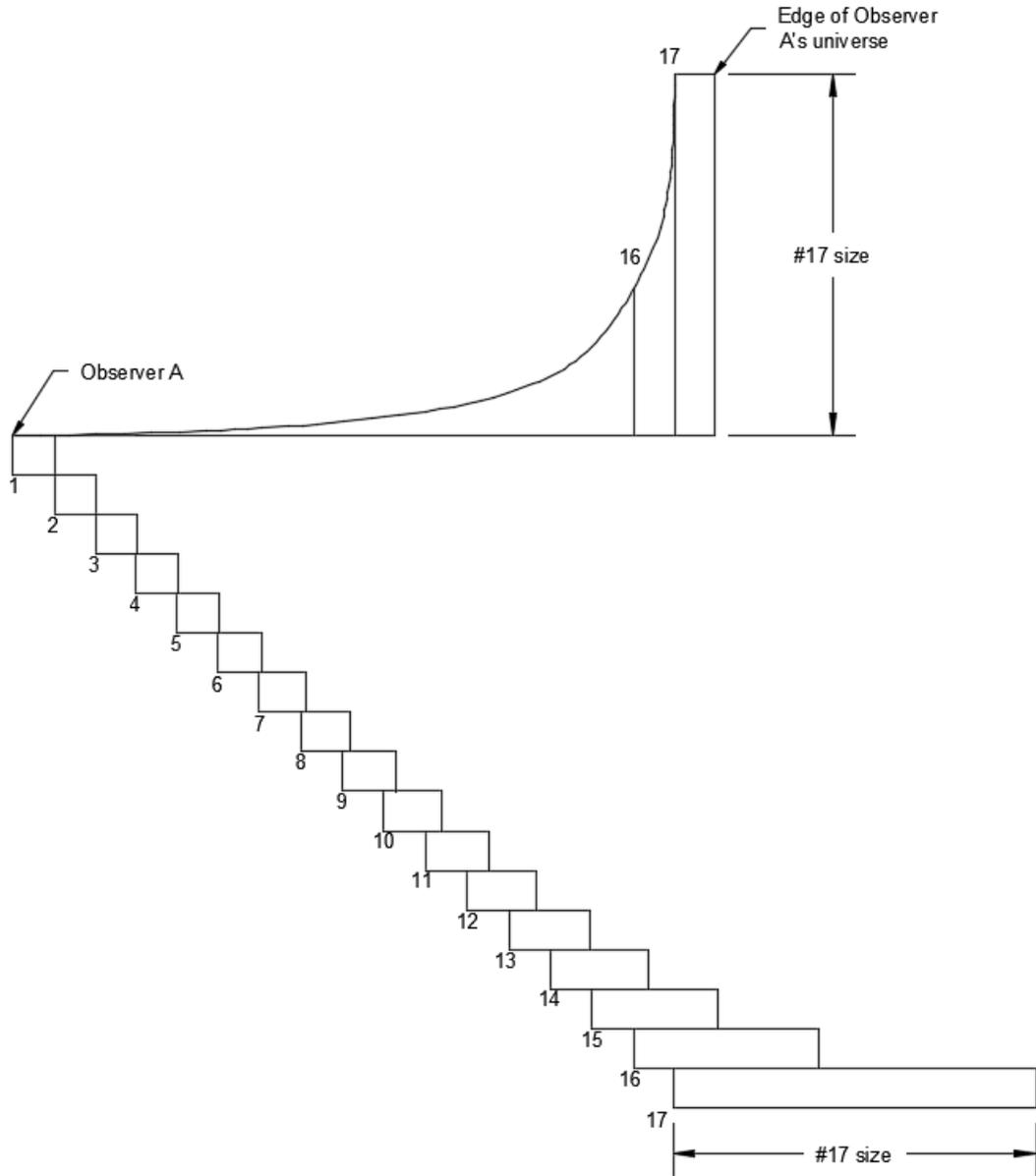


Figure 11 - Vector Lengths Are Not Axially Additive

Make Axial Lengths Cumulative

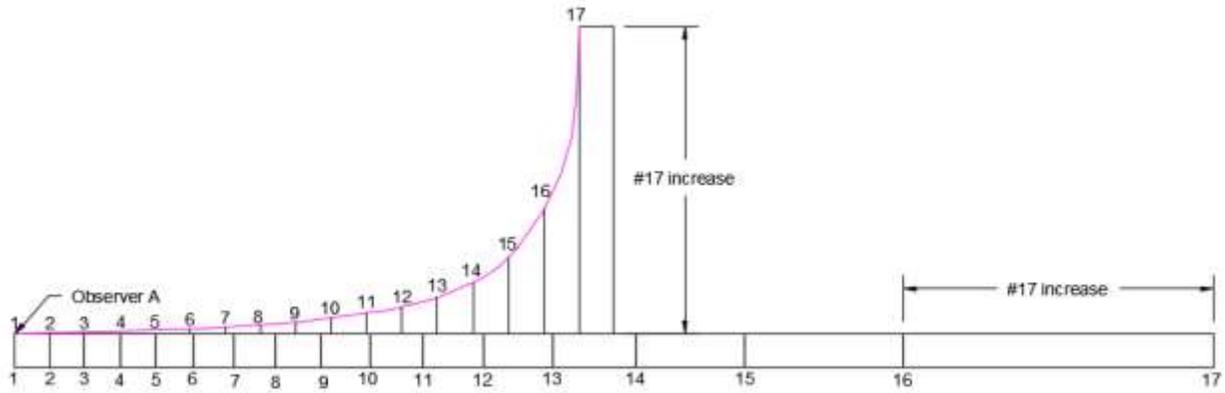


Figure 12 - Graph of Vector Lengths

The combination of radial and axial divergence is shown below, which looks like a trumpet. This conclusion is per “parallel transport” of the observer’s frame of reference to near the end of his observed universe.

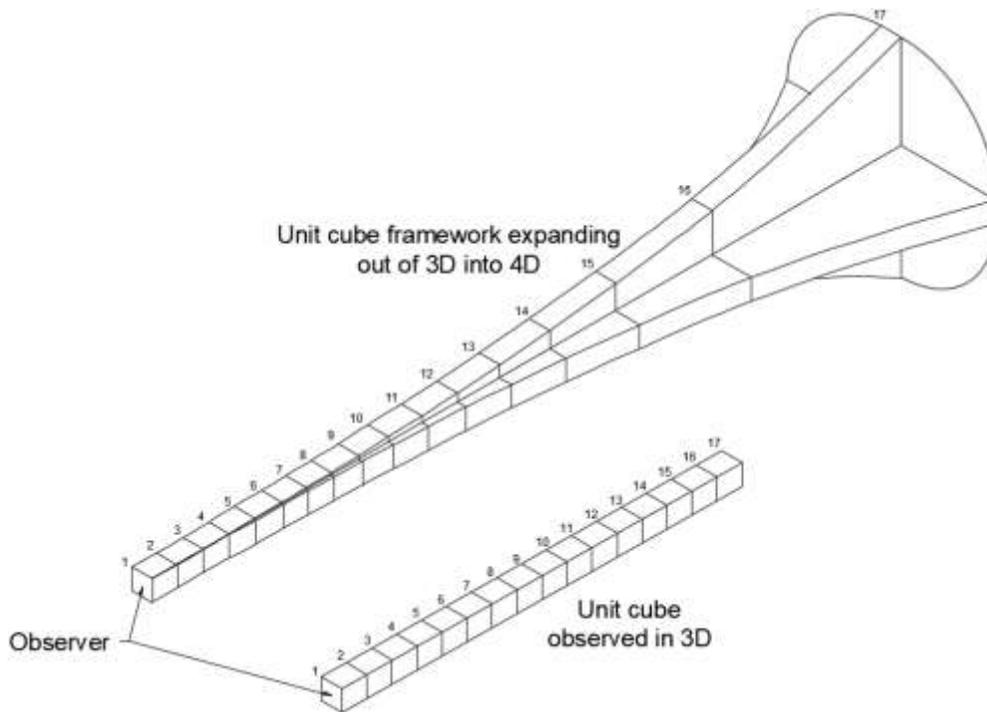


Figure 13 - Unit Cube Expansion Axially

Observer's Space Diverges Proportional to Distance

The below non-mathematic diagram shows a photon created in space rotated with respect to observer. Projecting the wavelength of the photon onto the perceived line of sight, the wavelength is longer. The cumulative effect of curvature is space rotated away from the 3D perceived line of sight. The “10 degrees” and “20 degrees” labels show the rotation caused by traveling on a curve for a distance. A mathematic treatment of this is in the special relativity section.

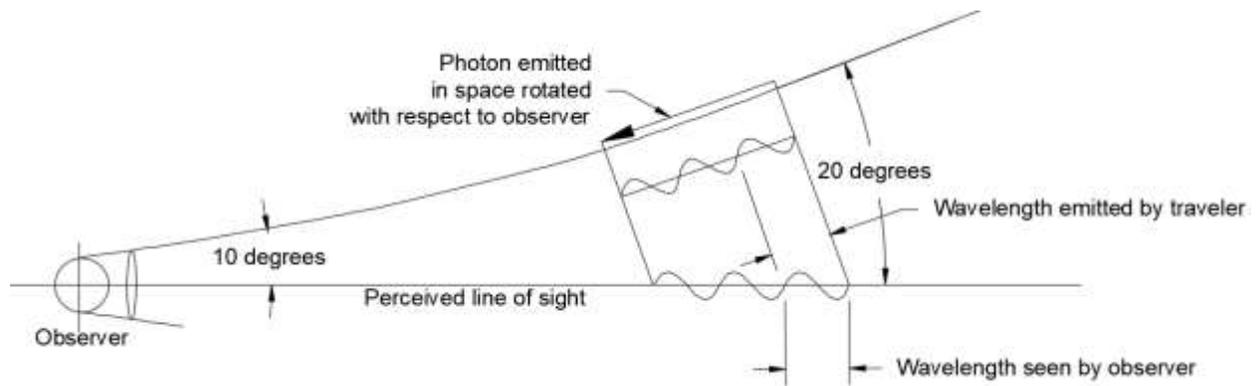


Figure 14 - Photons Created in Distant Space are Dimensionally Rotated

Observer's Space Diverges the Further Viewed

Concluding the redshift section, we see that photons emitted by distant objects have been created in a space that is rotated with respect to the observer. This is the cause of redshift, not expansion velocity of the universe. This argument began with the premise that an observer can only see along straight lines of sight in their local environment. The next section on special relativity will expand on this argument. Put the sphere model and diverging space trumpet together and you get:

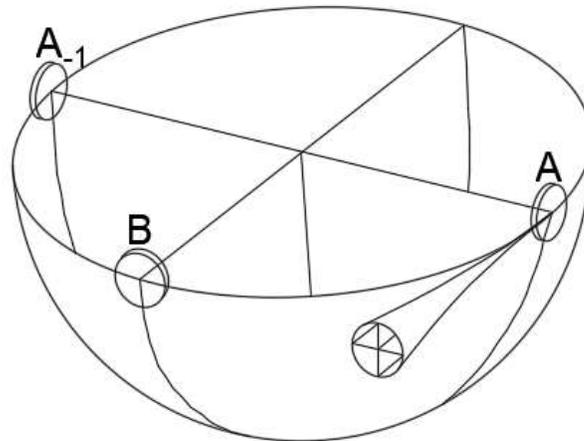


Figure 15 - Observer's Space Diverges the Further Viewed

The Stable Universe

The problem with antimatter being at the opposite side of the universe from matter is that only works for one position. The location of antimatter cannot depend on position, velocity or acceleration, so the universe geometry cannot assign the location of matter and antimatter.

Two half spheres satisfy the closed universe for all observers, with the special condition that the tangent point between the two halves is where the direction is indeterminate to the observer at "You are here". The following figure rotated in a half circle around the vertical axis would create these surfaces.

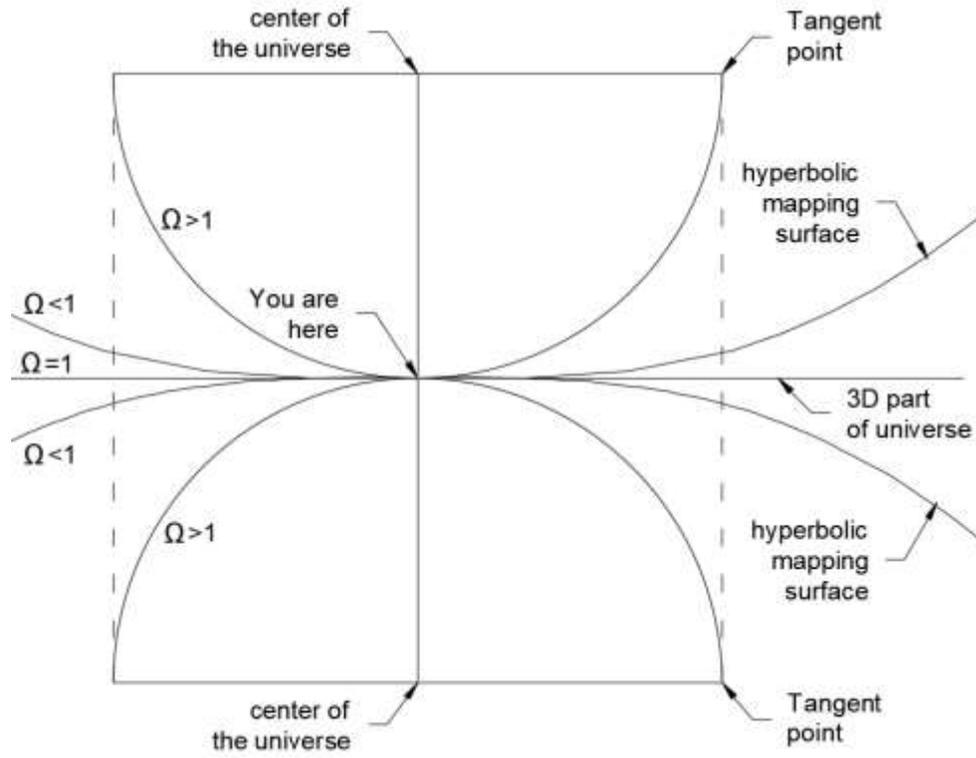


Figure 16 - The Stable Universe

Light Cones and Divergent Space

Recall the previous figure "Observer A's Space Vector Always Points in the Same Direction". In the below diagram, the space grids of "A" and "B" are at right angles to one another. The "A" and "B" time vectors are also at right angles to one another.

Observer "A" cannot see anything at point "B" because time dilation between "A" and "B" has slowed time at "B" to a standstill. "A" sees space at "B" diverged to infinity.

Observer "B" sees time has slowed at "A" to a standstill and diverged "A" space to infinity. There are three ways to understand this:

An observer can only perceive objects as they exist only if their space grid and time vector are parallel. If there is an angle difference, the observer will see a fraction of the object's length less than 1, as determined by length contraction. The observer will see motion slowed to a fraction less than 1, as determined by time dilation. Time dilation means the time to complete an action takes longer, so the speed of occurrence is slower.

This phenomenon is reciprocal, meaning neither A nor B has primacy as being the correct observer. This phenomenon also does not involve velocity. It is due to the spherical curvature of the universe. For observer A, B is the end of the universe because space there has diverged to infinity and time has slowed to zero. This is an example of time dilation and length contraction occur by position.

Time dilation and length contraction also occurs by velocity, as occurs in a particle accelerator. The observer standing beside the accelerator sees a time dilated and length contracted particle. The particle sees a time dilated and length contracted observer.

In the diagram below, the light cones are correct in the sense the time vector is perpendicular to the 3D grid. However, they are incorrect extending outward from the grid - they are concentric circles in the grid.

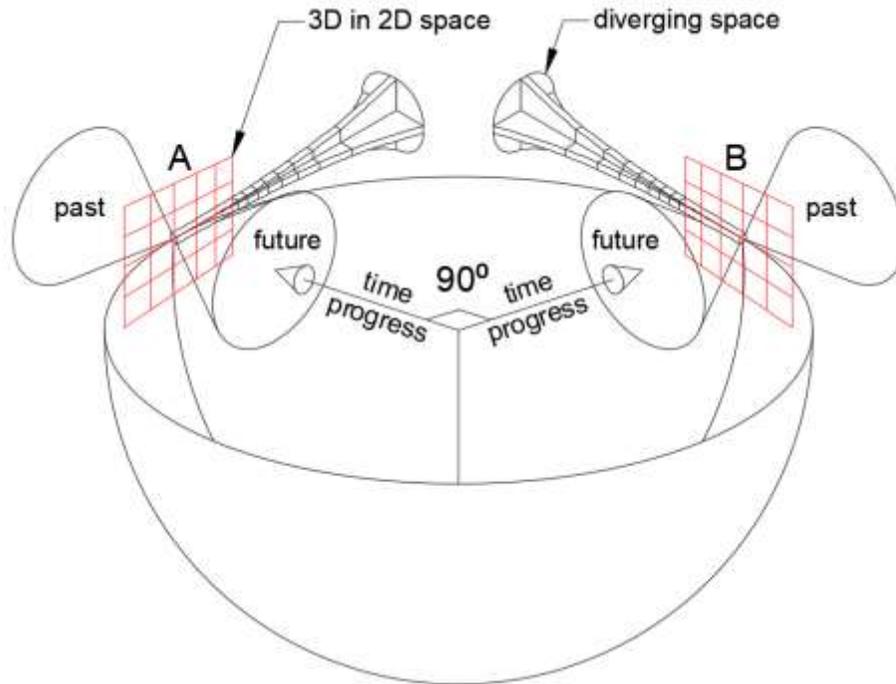


Figure 17 - Light Cones and Divergent Space

Antimatter

To find the nature of antimatter, we use the parity, charge and time reversal that is used by particle physics. The difference here is the concept is scaled up to macroscopic objects.

The Clock and Anti-clock

The PCT reversal can be illustrated in objects, as in the 3 steps of a clock being transformed below. The first step is a planar mirror, which reflects left to right and back to front, but does not change top to bottom. Top to bottom reflection does not change charge or direction of clock hand rotation, so that reflection is omitted.

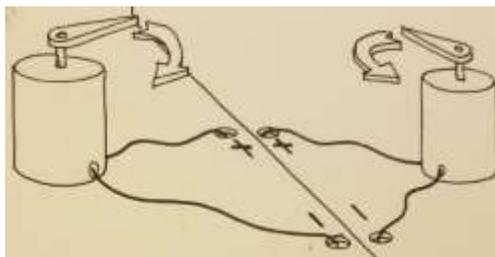


Figure 18 - Parity Mirror

The second step is changing polarity while maintaining the parity mirror. Changing polarity and rotation together would not be a charge inversion.

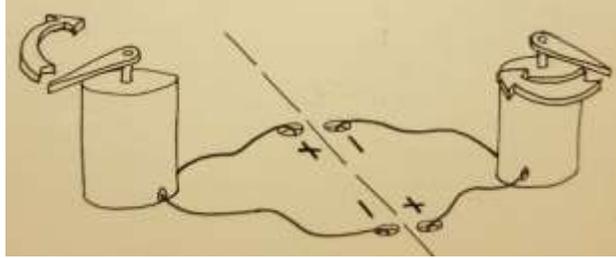


Figure 19 - Charge Mirror

The third step is reversing time which reverses the clock hand rotation. Remove the mirror. As a rigid body, move and rotate the parity, charge and time reversed clock and its wires, to be congruent with the original clock. Since the matter and antimatter clocks have opposite time directions, they do not annihilate. They are congruent but instantaneously moving away from one another in their own time sense.

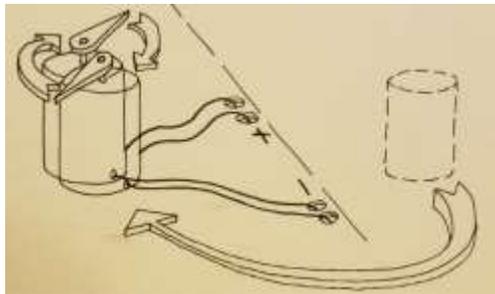


Figure 20 - Time Mirror

The Car and Anti-car

For comparison, the open, flat universe is depicted below. There is no way to depict an open, flat universe with a parity point mirror.

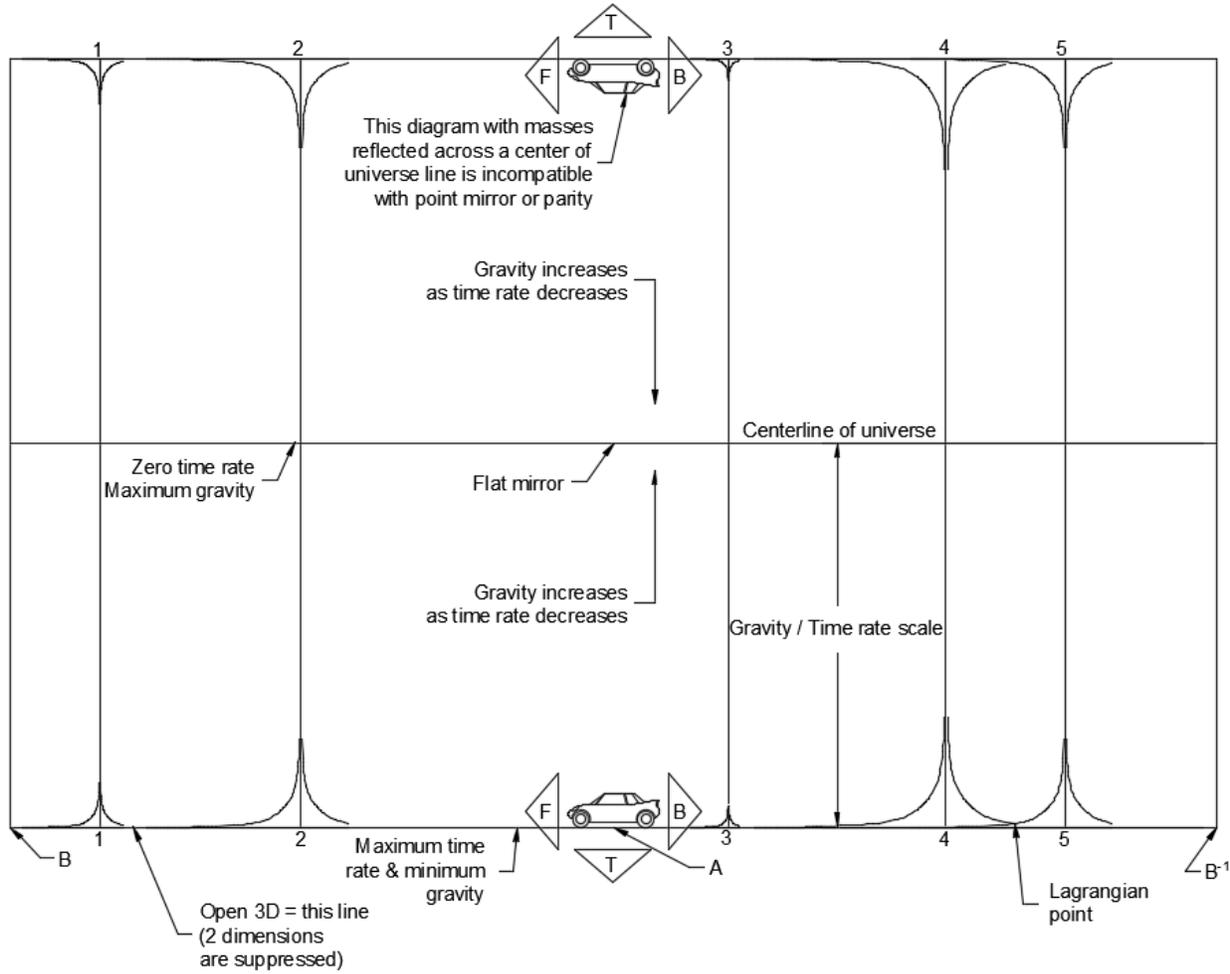


Figure21 - Open, Flat Universe

Misconception of PCT Point Mirror

Although the PCT mirror reverse has been done in the below diagram, the velocities have not been reversed. That makes it an erroneous conception.

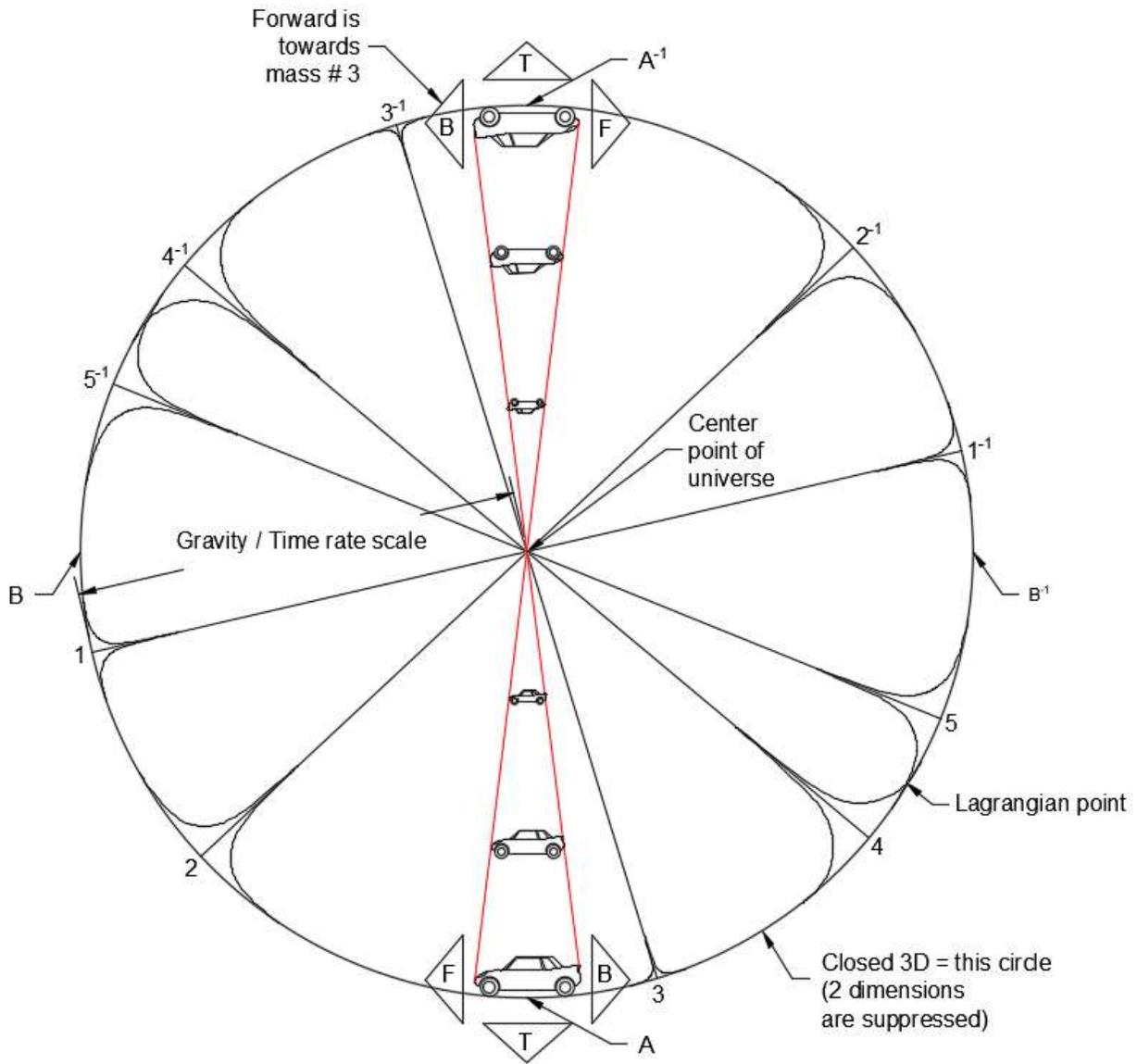


Figure 22 - Misconception of a Point Mirror

Correct Concept of PCT Point Mirror

The below diagram shows how the parity reversal and time reversal cancel out. The result is a congruent car and anti-car.

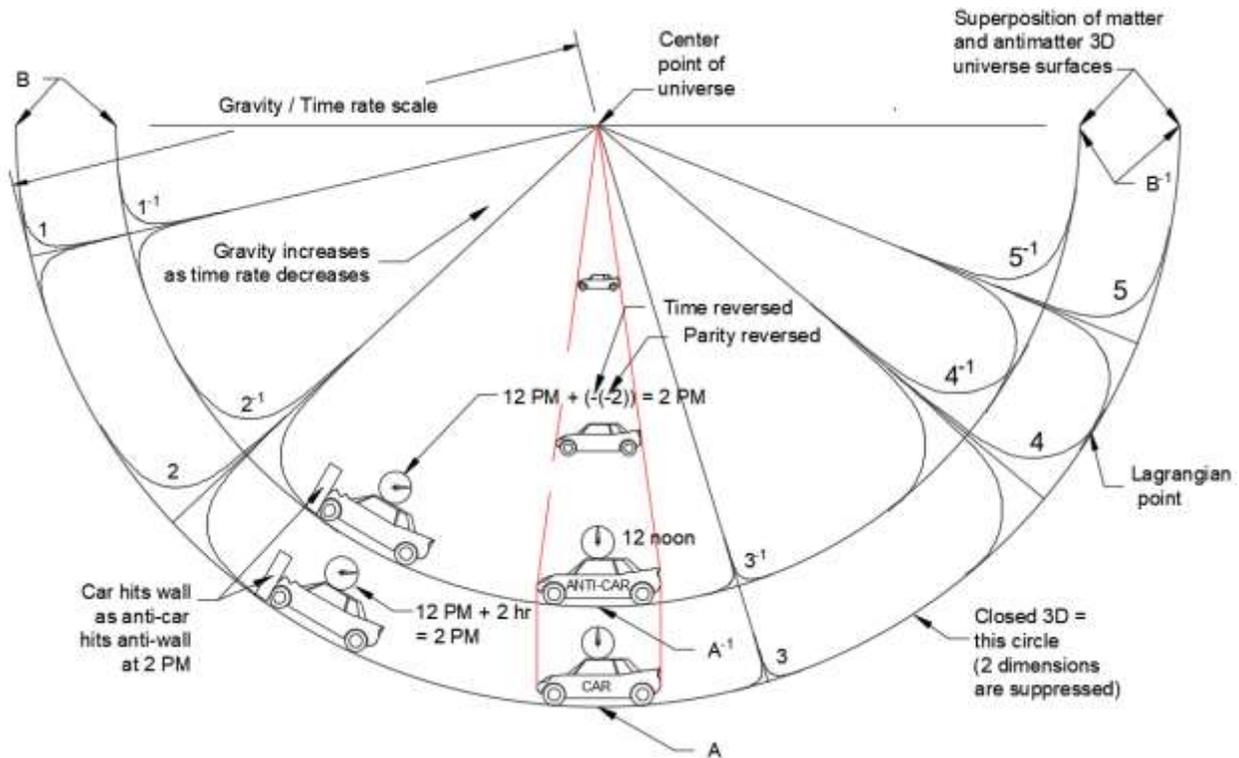


Figure 23 - Correct Concept of a 3D Mirror at the Center of the Universe

The above illustration shows that a car and anti-car can coexist congruently if they don't annihilate. As we later will conclude, they do not annihilate because their time arrows are opposite. They are never approaching annihilation with one another because they have never been apart.

Anti-car travels in the same direction as car because its distance and velocity coordinates are reversed with respect to car, and its time runs backwards with respect to car, making them travel congruently. The parity and time reversal effects cancel one another. In the 4th dimension mutually perpendicular to 3Ds, distance to center of universe is measured in rate of time units. In 3D, the direction to the center of the universe is toward the cumulative map of mass surrounding.

Parity, Charge, Time (PCT) reversal

1. Linear parity (distance and direction, velocity, acceleration) is reversed
2. Angular parity (clocking, angular velocity, angular acceleration) is reversed
3. Time is reversed, so linear and angular parity revert to original
4. Matter and antimatter are PCT reversed, so objects travel congruently

Collapse Sphere into a Double Wall Cup

Showing the universe as a collapsed sphere presents the entire universe in a simplified comparison with a sphere.

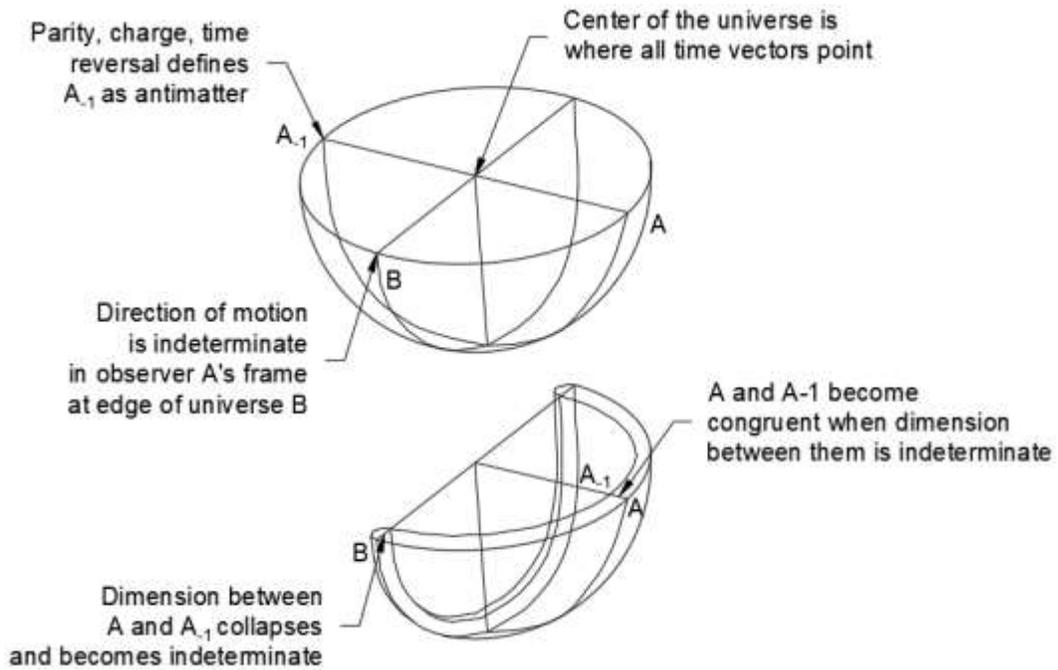


Figure 24 - Collapse Sphere into a Cup

The below diagram shows separation mapping. Distance is in 3D, whereas separation is an angular measurement

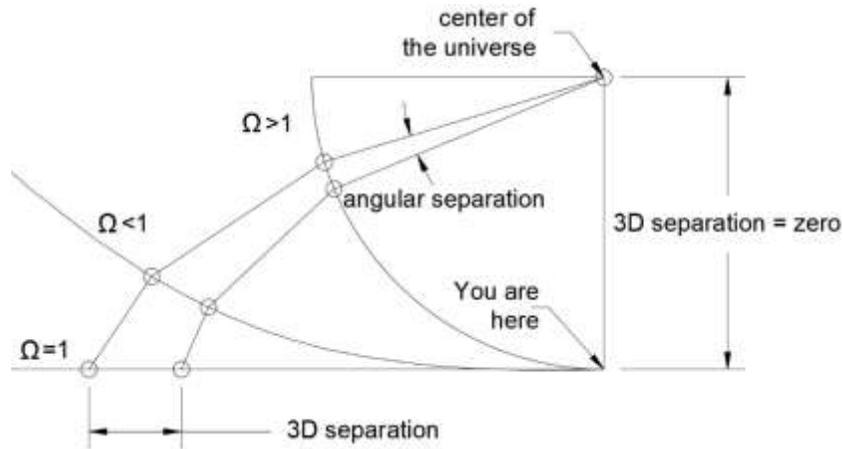


Figure 25 - Separation of 3D Points as Measured by Angular Separation

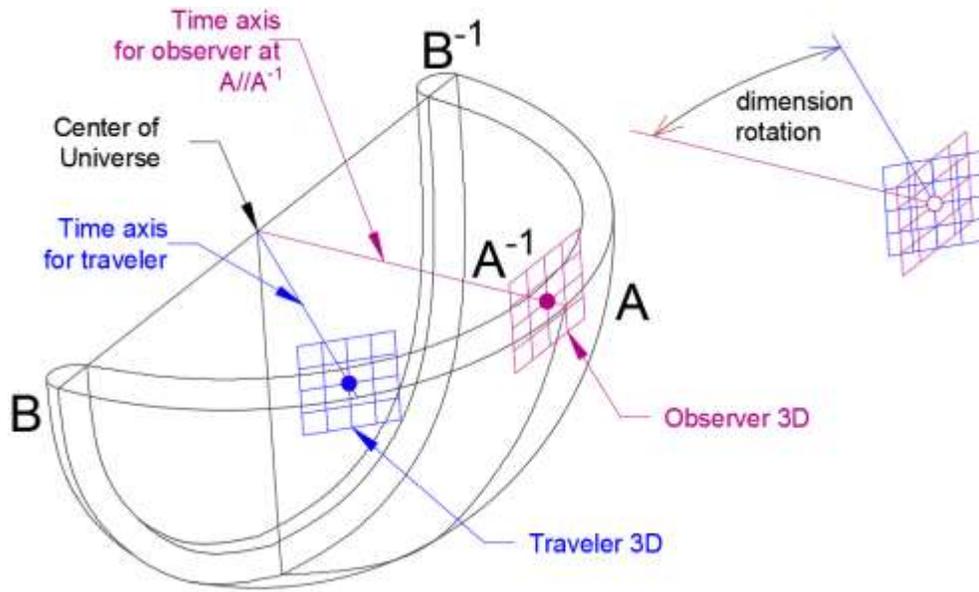


Figure 26 - Rotated Space and Time Axes