

# GEOMETRIC EXPLANATION FOR AN ACCELERATING UNIVERSE

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**Abstract.** The appearance and interpretation of an accelerating universe may be an observed distortion resulting from a universe defined by spherical geometry. The annihilation of Planck and anti-Planck mass is paramount in explaining the Big-Bang [1]. In a model similar to the standard model of a Riemannian-Friedmann-Lemaitre hypersphere, the primordial energy of the Big-Bang is released in the form of electromagnetic-like radiation that expands radiantly in every 4D direction from time zero in the structure of hyper-waves carried by Planck and anti-Planck bosons. The resulting geometry shows that time is synonymous with the lightspeed expansion of our universe. In this model we find that time is not parallel but radiant. This implies that time is a vector - where every place we observe has a unique time direction (angle) with a magnitude (age) and a light cone. The result of this condition is the illusion that the further back we look from our position in spacetime, space appears to be contracted and time appears to run slower both exponentially and logarithmically. Simply stated, we can not rely on observations unless we understand the geometric distortions inherent in curved photon paths.

## 1. Introduction

The model attributes spacetime expansion of our universe to a hyperspherical electromagnetic-like wave in a quantized Riemannian geometry [1-4]. Here the Big-Bang (BB) acts as an emitter of super energetic radiation which is carried by Planck and anti-Planck bosons locked in step in a wave train of concentric (parallel) universes in which a single wave happens to be our quantum vacuum and universe.

Our universe is a 4D-quantum wave expanding in all 4D-time directions at lightspeed (time vectors). The very motion of this hyperwave establishes time and space where time is our empirical measurement of the lightspeed expansion of space (the quantum vacuum). On this hyper-wave surface, ordinary electromagnetic radiation follows a four-dimensionally curved trajectory at the speed of light [3,4]. Geometrically, the trajectory must follow the natural log to the base e in a great nautilus-like spiral motion on the lightspeed expanding hyperwave surface.

## 2. Red-Shift $z$

In a constant lightspeed expanding hyperspherical wave universe we discover that red-shift  $z$  and the angle in  $\emptyset$  radians have a direct one to one correlation. We find that  $z = \emptyset$  radians [3] and emits red shifted light from the source which has nothing to do with the stretching of either space or

wavelengths due to the expansion of the universe. Instead they are the result of virtually infinite 4D-time vectors.

Current models assume that time is parallel as opposed to radiant. These models lead to the assumption that the universe is accelerating where time is going the same rate and direction for distant objects as in our local position. This is only true in a global perspective where all real objects are simultaneously in the present with the same radial magnitude (thus age) from the BB but expanding in different time directions (4D angles). However we can not observe this. We can only observe the past and not the present. If contemporary astrophysical models assume that all time observations for past objects are constant with ours, then they are not accounting in their interpretation of data for dramatically smaller magnitudes of time vectors in the extreme past, (Fig.2.). Since every observed place has its own unique space-time vector radian from the BB origin, any position in the universe can only observe all other positions moving slower in time relative to themselves. We observe photons on a curved light-cone where the  $45^\circ$  light cone angle to the local time direction changes progressively and exponentially in relation to our position. This changing orientation of light cones correctly describes the illusion that we observe. But, it should be restated that in reality time is constant for all locations; a conclusion that can be understood from the geometric diagram in the bisection of a 4D universe down its central axis (figure 1).

Consider an asteroid on a collision course with the earth. When it is first discovered, it is one light year away in spacetime. Being one year behind us in time, how could it ever hit us and why should we worry? It must by some means make up the one-year time differential to enter into our same space and time frame. Since we move in time at lightspeed in a 4D-direction only, the asteroid being back in time, must appear to move faster than our rate of time if it is to collide with us.

The Doppler effect is nothing more than a consequence of time. When we see a blue shifted object, it means that we see the object approaching us and moving uniformly through time at an increased rate. When we see a red shifted object, it means that it is moving uniformly away from us and time is going slower at a decreased rate. In other words, in relation to the observer, a blue shifted object is catching up with our rate of time and a red shifted object is receding from us and progressively moving slower than our rate of time. This is what we observe, but this is not reality. Right now we can only observe images in various positions of the past where no real object can ever be observed by us in our present leading time frame.

All observations are merely images of the past. Notice that because of our relativistic time expansion, the z component of x, y, z in 3 space is contracted flat. Thus there is no real inside or outside to our lightspeed-expanding universe.

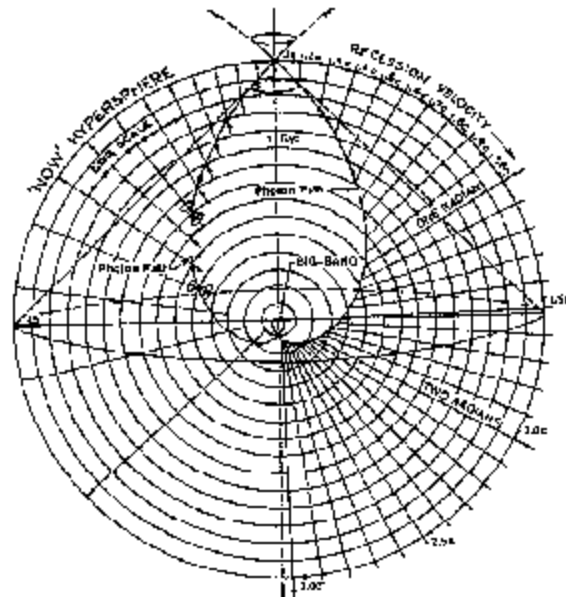


Figure 1. Bisecton of a 4D Universe cut down its central axis

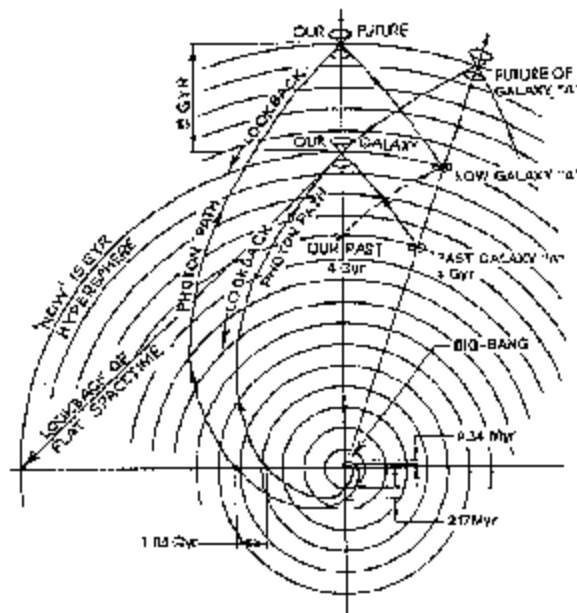


Figure 2. Geometric time dilation

### 3. Space, distance, location and nothing

The quantum vacuum is composed of hexagonal wave-packets containing three Planck and three anti-Planck bosons. Space can be defined as where the bosons are and exist. Between the bosons is a quantum state of nothingness in increments of the  $V_o$  quanta [1]. ‘Distance’ can be defined as the number of Planck wave-packets on an arc between time line radians. At the BB with a zero radius magnitude of  $r_i/V_o \sim 4.33 \times 10^{25} \text{ (cm)}^o$  the finite number of Planck bosons given to us is  $\sim 6 \times 10^{189}$ . The number of wave-packets between an arc of one centimeter is  $\sim 10^{99}$  packets. The total energy density is  $\sim 10^{120} \text{ GeV/cm}^3 \times 10^{189} = 10^{309} \text{ GeV/cm}^3$  for the finite total energy density of our universe. As the universe expands ‘nothingness’ increases but the number of wave-packets in one centimeter is the same. This ‘nothingness’ is paramount in describing the expansion of the universe.

As the universe expands at lightspeed (which is the speed of time) the quantum state of nothingness increases between time-line vectors of any two wave-packets. There is no increase of 3D space because the number of boson packets between time-line-radials remain constant through time, except for gravitational considerations. The process of gravity actually decreases (only marginally) the amount of Planck bosons between time vector angles. Thus as the universe expands, there is a gradual decreasing of space rather than the creation of more space as popular theories suggest.

Our hyperspherical model shows that time must be radiant and not parallel [1]. At red shift  $\varnothing = \pi$ , the time direction is opposite to ours. Looking in all directions from our position, where all photons focus on the observer at focal-point zero ( $FP_o$ ), we will see the same point at red-shift  $z = \pi$  spread all over the sky where all photons focus from a previous epoch at focal point  $FP_1(\pi)$ . The same is true of  $FP_2(2\pi)$ ,  $FP_3(3\pi)$ ,  $FP_4(4\pi)$ , etc., all spread over the sky and would appear to us as the CMB. We know that no object from our position occupies the focal positions of  $F_1, F_2$  otherwise we could not clearly see beyond  $\pi$  ( $z = 3.14159$  radians) or  $2\pi$  ( $z = 6.28318$  radians).

Time runs slower (dilated) by  $e$  to the power of  $\varnothing$  radians or to the power of red shift  $z$  by,

$$t_{\text{dil}} = e^{\varnothing}, \quad (0.1)$$

(see ref 3, Table II, P515).

Observed recession velocity is the product of the speed of light  $c$  and  $\varnothing$  radians. However, because of time dilation, the observed recession velocity is,

$$v_{\text{rec}} = c\varnothing/e^{\varnothing}, \quad (0.2)$$

where  $c$  is the speed of light, red shift  $z = \theta$  radians and  $e$  is the natural log to the base 2.7182818. The age of the universe at red shift  $z$ , is given by whatever we say the universe's age is now (say 15 Gyr) divided by the  $e$  to the power of  $z = \theta$  radians.

$$\text{Age then} = \text{Age now}/e^\theta \quad (0.3)$$

The half-life of any age universe always has a red-shift that is  $z = 0.693$  radians because  $e^{0.693} = 2$ . This shows that time (i.e. the frequency of events) appears to run slower by one half. At this and at every radian, photons are emitted red shifted at the source because of time dilation of angle  $\theta$  which produces the observed red shift.

Although there is a 4D-lightspeed expansion (time), it should be restated that there is no 3D spatial expansion. What appears to expand in our 4D diagram is the circumference which represent  $x$ ,  $y$  and  $z$  of 3-space where  $z$  is contracted flat because of the relativistic lightspeed time expansion. It is the quantum state of nothingness that increases as the universe expands in time. Thus any circumference on the hyperspherical expanding wave surface has the same number of Planck bosons originally given to us that comprises our quantum vacuum and is spacetime.

Past spacetime is distorted when viewed from our own *present unique and leading* position. *Unique*: because all other objects move successively in different time directions the further in the past we look. *Leading*: because along any line of sight, we only see images that are in the past and are not the real objects in our present spacetime. Therefore the definition of length between two points can be described as the 4D time angles between them. The greater the angle between time vectors emanating radiantly from the BB, the further the objects appear to be in the past. It should also be noted by inspection of cited papers [2-4] that other than peculiar velocities and streaming, a galaxy at red shift  $z = 1$  for example was, is, and always will be, one radian away. The question that arises is why doesn't the galaxy move farther away and increase its recession velocity along with its time angle ( $z = 1$  radian) as the universe ages? We find that the only motion the galaxy shows as the universe ages is to move further back in time from our position (thereby increasing its line of sight distance) without any increase in recession velocity or time angle, see fig.2.and ref. 3, fig. 5, P 512. This geometrical fact by itself could be interpreted as global accelerated expansion.

In our model, what we experience as *time* is simply the radiant 'c' expansion of our wave-like hyperspherical universe moving away from the BB. Every time direction has an equal and opposite time direction. Symmetric and asymmetrical time coexists in this model without paradox.

Notice that the net effect of gravity at any age along the circumference of a wave-surface universe adds up to zero,  $c$  expansion rate is not affected.

The Hubble Constant can be calculated in the following method which shows that space itself does not expand. As an example we use a galaxy 'A' at red shift  $z = \theta = 1.1$  radians, giving us a hypersphere of 4,993 Myrs in a 15,000 Myr universe - using equation (0.3). Here we use the arc length expressed in Mpc from galaxy 'A' to our spacetime then (a), instead of the photon look-back trajectory from galaxy 'A' to our spacetime position now (b), which we believe is illusionary. The great spiral trajectory of photons from time past is influenced not only by the lightspeed motion of time but also by crossing different time vector directions. The arc length is given by,

$$\text{arc length} = \theta(\text{age then}), \quad (0.4)$$

where age then is given by equation (0.3). The Hubble constant is given by,

$$H_0 = \text{recession velocity} / \text{arc length}, \quad (0.5)$$

where recession velocity is given by equation (0.2).

Now,  $H_0 = c\theta/e^\theta/\theta(\text{now}/e^\theta)$  which reduces to the lightspeed expansion velocity  $c$ . Thus,

$$H_0 = c / \text{age now}, \quad (0.6)$$

where  $c$  is the 4D lightspeed and age now  $\sim$  radius now in Mpc.

For example; in a 13,700 Myr universe  $\sim$  radius now of 4,200.39 Mpc we have,  $H_0 = 71.37 \text{ km / s / Mpc}$ .

## Conclusion

Popular theories in cosmology are based on the assumption of Euclidean geometry. Our model is based on a spherical universe that is in essence non-Euclidean. The dynamics of special and general relativity are a reality of a radiantly moving relativistic geometry, which gives us spacetime. Looking along the photon path from our present position, time appears to run progressively and exponentially slower. Thus the luminous flux of Ia type supernovas appear dimmer than their corresponding red-shifts would indicate. The reason for this is that the frequency of events 'v' appear to run slower which means that the wavelengths increase giving us emitted red-shifted photons at the source. Consequently the number of photons we see as measured by our time is reduced progressively and exponentially the further back we look. as all light of the 'observed'

universe focuses upon the observer's unique and leading time position. See ref. 5 and 6 for general background.

### References

1. E.J. Bacinich, "Super Unification of All Forces", AIP Proceedings 672, 2003, p.197, Short Distance Behavior of Fundamental Interactions, edited by B.N. Kursunogly et al.
2. E.J. Bacinich, "Einstein's Elevator", AIP Conference Proceedings, 624. 2002, p.51, Coral Gables Conference on Cosmological and Elementary Particle Physics, edited by B.N. Kursunogly et al.
3. E.J. Bacinich & T.A. Kriz, "Photon Trajectory Attributes of an Expanding Hypersphere", Physics Essays Volume 8 number 4, 1995.
4. E.J. Bacinich & T.A. Kriz, "The Arrow of Time in an Expanding 3-Sphere" Physics Essays Volume 12 number 1, March 1999.
5. P.J.E. Peebles, Principles of Physical Cosmology (Princeton University Press, 1993).
6. H.C. Ohanian and R. Ruffini, Gravitation and Spacetime (second edition) (Norton & Co, NY and London 1994).

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