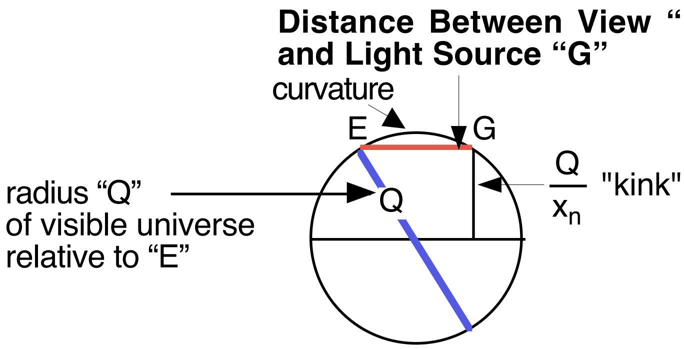
The Quantum Curvature of Space vs. An Expanding Universe

comparisons by Hubble's original redshift data

The best evidence that linear Euclidean distances in space becomes "kinked" upward to become curved by an intersecting quantum dimension may be the redshift in light frequencies reaching us from far galaxies. The linear distance between us and the source of the light is "kinked" into curvature and light follows the greater curved distance rather than the linear distance producing a redshift "Z". Wavelengths are "stretched" when distances are increased in a single dimension.[127] Light follows the curved arc between "E" and "G" in the strictly Euclidean illustration below.



This Euclidean illustration is not an accurate depiction of the quantum curvature of space. The astronomer Edwin Hubble provided the actual mathematical description of curvature, although he never fully understood his contribution. Hubble failed to recognize that the quantum curvature of space gives the universe an appearance of expansion without actually expanding it; that curvature generates an apparent variance in the velocity of light which is the exact equivalent of a recession velocity. Hubble's Constant identifies how the apparent variance in the velocity of light due to curvature varies with distance.

The expanding universe concept is built upon Hubble's discovery that the redshift measured from foreign galaxies is a function of the measured distance to the galaxies and fit a Doppler Effect explanation of the redshift. The Doppler Effect formula[128] for redshift "Z[129]" is the following:

$$Z = \frac{c}{c - v} \quad ; \ c = \text{speed of light} \ ; \ v = \text{velocity of recession}$$

$$cZ - c = vZ$$

$$v = \left(1 - \frac{1}{Z}\right) c$$

---

[127] This is the principle governing trombones and other wind instruments which are lowered in pitch by lengthening the distance of the air passage.

[128] $f_{rs} = f_o \left(c - H_o d\right) / c$; f_{rs} = redshifted frequency ; f_o = original frequency. Taken from the universal formula for the Doppler Effect.

[129] Z=(redshifted wavelength) / (original wavelength)

Hubble's Constant identifies the velocity of recession "v" as a function of the distance to the particular galaxy, hence redshift is also a function of the distance to the galaxy:

Hubble's Constant $= H_o$; d = distance to galaxy in mega parsecs (Mpc).

$$v = H_o d$$

$$Z = \frac{c}{c - H_o d}$$

Hubble didn't realize that the apparent change in velocity for the speed of light "c" due to the forced curvature of a linear distance is nearly the same as the Doppler equation for recession velocity, especially for the close distance of his data. For the curvature hypothesis, redshift "Z=(curvature distance)/(linear distance)." Both curvature distance and linear distance are measured between the observation point and the light-source:

$$Z = f\left(\frac{\chi}{d}\right) \approx Z = f(H_o d) \text{ for } 1.0005 \le Z \le 1.0036 \text{ or Hubble's data points } \textit{proof pending}$$

$$\chi = \text{curvature} \;\; ; \;\; d = \text{linear distance} \;\; ; \;\; Z = \frac{\chi}{d} \;\; ; \;\; \text{time of transition} = t = \frac{\chi}{c}$$

$$\text{change in distance by curvature} = \Delta d = \chi - d$$

$$\text{apparent } \Delta v \text{ for "c"} = \frac{\Delta d}{t} = \frac{\chi - d}{\chi / c} = \left(1 - \frac{d}{\chi}\right)c$$

$$\Delta v_{ap} = \left(1 - \frac{1}{Z}\right)c = \textit{equivelent of Doppler velocity of recession.}$$

That is, the apparent change in velocity "Δv_{ap}" for the speed of light in a static, curved-space universe is the same as Doppler recession velocity "v" in an expanding universe.

It is generally not recognized that Hubble's Constant —as used to convert redshift to the distance to the light source — is actually a time value (*distance/velocity=time*[130] ; as above). Hubble's Constant is measured in "velocity *per* unit of distance." Specifically, it is velocity in "kilometers *per* second (km/ sec)" *per* distance in "megaparsecs (Mpc[131])":

$$d = \text{distance} \;\; ; \;\; v = \text{velocity} \;\; ; \;\; t = \text{time}$$

$$H_o = \frac{v}{d} \quad ; \quad \frac{d}{v} = t \quad ; \quad \frac{v}{d} = \frac{1}{t} \quad ; \quad H_o = \frac{1}{t}$$

$$v = H_o d = d/t$$

Hubble's Constant is generally not thought of as a time value because its units of measure are different for "velocity (kilometers)" and "distance (megaparsecs)." Its application is thought restricted to "recession velocity" for an expanding universe as so many "kilometers/ second" *per* "megaparsec." Distance can be easily found by converting redshift to recession velocity (by Doppler formula) and dividing it by Hubble's Constant. The different units of measure are irrelevant to this conversion:

$$d = \frac{c}{H_0}\left(1 - \frac{1}{Z}\right)$$

However, when applied to the spacial curvature hypothesis, the fact that Hubble's Constant is a time value becomes extremely significant:

---

130 A common formula for velocity, distance and time.

131 1 Mpc=3 .261 63626 10^6 light years =3.08568025 10^{19} kilometers.

$$\chi = \text{curvature} = Zd \quad ; \quad d = \text{linear distance} \quad ; \quad Z = \frac{\chi}{d} \; ; \quad d/c = t_1 \quad ; \quad \chi/c = t_2$$

$$H_{o/t} = \frac{(\text{Mpc}/\text{sec})}{(\text{Mpc})} = \frac{v}{d} = \frac{1}{t_{constant}} = (H_o)3.2407764868\ 10^{-20}\ \text{sec.}^{-1}$$ [132]

$$H_{o/t}\, d = \frac{d}{t_{constant}} = v = \left(1 - \frac{1}{Z}\right)\left(c = 9.7153959817\ 10^{-15}\ \text{Mpc}/\text{sec}\right)$$

$$= \left(1 - \frac{d}{\chi}\right) 9.7153959817\ 10^{-15}\ \text{Mpc}/\text{sec}$$

$$H_{o/t} = \frac{(1 - d/\chi)c}{d} = \frac{c}{d} - \frac{c}{\chi} = \frac{1}{t_1} - \frac{1}{t_2} = \frac{1}{t_{constant}} = (H_o)3.2407764868\ 10^{-20}\ \text{sec.}^{-1}$$

$$(H_o)3.2407764868\ 10^{-20}\ \text{sec.}^{-1} = \frac{1}{t_1} - \frac{1}{t_2}$$

$$\frac{1}{t_1} - \frac{1}{t_2} = \frac{9.7153959817\ 10^{-15}\ \text{Mpc}/\text{sec}}{d} - \frac{9.7153959817\ 10^{-15}\ \text{Mpc}/\text{sec}}{Zd}$$

$$(H_o)3.2407764868\ 10^{-20}\ \text{sec.}^{-1} = \left[\left(\frac{1}{d} - \frac{1}{Zd}\right) 9.7153959817\ 10^{-15}\ \text{Mpc}/\text{sec}\right] \text{sec.}^{-1}$$

Hubble actually discovered that the variance in time of transition at the speed of light between the linear distance and the forced curvature is a time constant (in seconds^{-1}). As distance increases, spacial curvature also increases by the redshift "Z" factor, but the increase is constrained by the time constant. Time^{-1} for the distance *minus* time^{-1} for the curvature always equals the constant time^{-1}.

$$\frac{H_0\left(3.2407072701\ 10^{-20}\right)}{1\text{Mpc}} = \frac{1}{t_{con.}}$$

$$\frac{1\text{Mpc}}{H_0\left(3.2407072701\ 10^{-20}\right)} = t_{con.} = \text{time required to reach 1Mpc at velocity.}$$

t_1 = time required to reach "d Mpc" at speed of light.

t_2 =time required to reach "Zd Mpc" at speed of light.

(1/time to reach 1 Mpc at velocity)= (1/time to "d" Mpc at c)-(1/time to "Zd" Mpc at c)

Hubble's time constant becomes the amount of time required to facilitate the apparent change in velocity for the speed of light which is induced by the curvature of space. Curvature increases the time of transition for light . This translates into an apparent change in velocity for the speed of light. The time of light-transition for the linear distance "d," as measured in megaparsecs, is "t_1." The time of light-transition for the curved distance "Zd" is "t_2 ." The variance between the two time values in "sec.$^{-1}$" is always equal to the Hubble time constant in "sec.$^{-1}$."

Hubble's time required per megaparsec of space becomes the time value for all apparent changes of velocity. The apparent change in velocity becomes "(d Mpc)/ $t_{con.}$" With time

---

[132] 1 km / sec = 3.2407072701 10^{-20} Mpc / sec.

held constant, the apparent changes in velocity increase linearly with changes in distance. That is, Hubble's "recession velocity" is actually the apparent change in the velocity of the speed of light due to the forced curvature of space. Further, the apparent change in velocity of "c" due to curvature increases linearly as distance increases because time of transition is held constant:

$$\Delta v_{ap} = \frac{d}{t_{con.}} = d\ \frac{H_0\left(3.2407072701\ 10^{-20}\right)}{1}\ \text{Mpc/ sec.}$$

Without having recognized it, Hubble has proved that the time structure of quantum space extends to intergalactic distances. All distances in vacuous space represent summations of a time variance "ΔT" which we have shown above sum to a time force of "$\Delta t^2 / d^2 = 1/c^2$" which has an equivalence of 1.11265e-7 amp-Newtons *per* meter^2 *per* second^2:[133] .

$$\text{total } F_t^2 = \frac{1.11265\ \left(10^{-7}\right)\ \text{amp-Newtons}}{m^2\ /\ sec.^2}\left(d^2\right)$$

The curvature of space, itself, is enforced by the time constant of 3.34 10^{-24} seconds separating 10^{-15} meters of space as a factor of the r[134] .

Hubble has shown that the variance in the speed of light over intergalactic distances due to the forced curvatures of space is also sustained by a time constant. The ratio between curvature and linear distance determines redshift "Z" which increases with distance. However, that ratio is sustained by Hubble's time constant. As distance increases so does curvature, but the difference in time of transition between the curvature and the linear distance— the variance which determines the apparent change in velocity in the speed of light — is time constant. The variance in light transition-times between linear and curved space is a time constant.

It is a dark irony in the history of science that quantum geometry must now rise to the defense of Hubble's discovery against succeeding generations of his own students. Hubble left no "constant" as his legacy. Hubble's misinterpretation of his discovery led his students to unsupported revisions. Since Hubble's death in 1953, the "Constant" has been continuously adjusted downward from Hubble's empirically determined "500 km/ s/ Mpc" to the current estimate of "65-50 km/ s/ Mpc.[135] " With Hubble out of the way, his data was deserted in favor of an estimation which is approximately ten percent of his original determination.

In 1956, Allan Sandage, Hubble's successor at the Mt. Wilson and Palomar Observatories, began the revisions downward. Sandage revised Hubble's "500 kg/ s/ Mpc " to "180 km/ s/ Mpc." In 1958 Sandage published a value of "75 km/s/Mpc," and by the early 1970's estimates from Sandage and his longtime collaborator Gustav Tammann were hovering around "55 km/s/Mpc[136] ," or very near the modern accepted range.

In the National Institute of Standards and Technology report "*CODATA Recommended*

133 See p.p. 14-15

134 1.668e-17 Newtons per 10e-15 meters of separation.

135 Harvard University web page *"Hubble's Constant."*

136 ibid.

Values of the Fundamental Physical Constants: 2006"[137] the authors give two reasons for the revision of scientific constants besides improvement in measurement and lab techniques. One of these is "time variation of the constant[138]" However, they admit that "there has been *no laboratory observation of time dependence* of any constant that might be relevant to the recommended values." (italics mine) The Hubble revisions are "time variation" revisions without "laboratory observation."

In quantum geometry, a straight Euclidean line is forced into curvature relative to the quantum dimension. Light must follow this curvature since it is quantum space which conducts light as a waveform. The only time value of significance is the time of light transition across the distance. This is not true of the expanding universe model which applies a different time factor.

Both the static, quantum curvatured universe and the expanding, Doppler Effect universe provide the same redshift mathematics. The great divide between the two hypothesis —and the only effective test of them— is in their distinct treatments of time.

The hypothesis that the volume of vacuous space is determined by the quantum squared —with redshift being explained by the forced curvature of quantum space— replaces Edwin Hubble's speculative cosmological geometry supporting the expanding universe concept. Hubble's "Big Bang universe" expands around an unseen "fourth dimension" like the surface of an expanding balloon which curves back upon itself. The further any point is from a single reference point on the surface of the balloon, the faster will be the recession velocity as the balloon expands.

Redshift is explained as Doppler Effect from this expansion. Using the standard Doppler Effect formula[139], the Hubble predicted red shift is the following:

$$Z = \frac{(\lambda_{\text{redshift}})}{(\lambda_{\text{original}})} \;;\quad \lambda_{\text{redshift}} = \text{ redshifted wavelength } \;;\; \lambda_{\text{original}} = \text{ original wavelength}$$

$$Z = \frac{c}{(c - H_o d)} \;;\; H_o = \text{Hubble's Constant;}\quad d = \text{distance to object; } c = \text{speed of light}$$

In all of science, there is not another case of an alleged "constant" being revised downward by nearly 90% and still holding credibility. Hubble's "expanding universe" concept became part of an origins belief system which was immunized from Hubble's own scientific rigor; his use of astronomical data to determined the constant. Hubble's data-determined constant was thought incompatible with assumed age issues for the universe[140].

Hubble's "Big Bang universe" requires expansion by acceleration over time in order for the universe to have reached its current size. As the distance to any galaxy "G" increased relative to us its velocity of recession also increased and "G" would be accelerating away from us.

---

[137] National Institute of Standards and Technology, Gaithersburg, Maryland 20899-8420, USA; report authors: Peter J. Mohr , Barry N. Taylor , and David B. Newell:
http://physics.nist.gov/cuu/Constants/codata.pdf

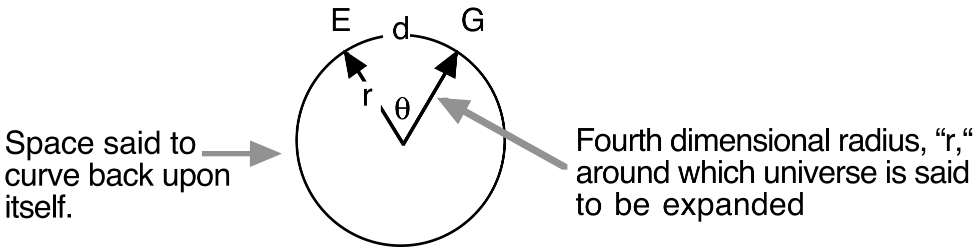
[138] Page 5

[139] $f_{rs} = f_o\,(c - H_o d)/c$; f_{rs} = redshifted frequency ; f_o = original frequency.

[140] Harvard web site. *op. cit.*

Hubble's "Big Bang" as Curvature Around an Expanding 4D Radius

$r = \frac{\Delta r}{sec.} t$; t = time of expansion $\quad d = \frac{\theta}{2\pi} 2\pi r = \frac{\theta \Delta r}{sec.}(t)$



Recession Velocity as Integration of Acceleration over Time

recession velocity at "d" $= v_d = \frac{\Delta d}{sec.}$; (*as per Hubble's constant*)

$\Delta d = \int_0^t \frac{\theta \Delta r}{sec.} d(t)$; (*from above*)

$$v_d = \frac{\int_0^t \frac{\theta \Delta r}{sec.} d(t)}{sec.} = \int_0^t \frac{\theta \Delta r}{sec.^2} d(t) = \textit{integration of acceleration}$$

Any two points in Hubble's universe have a fixed angle of curvature "θ." This angle remains constant as the distance between the two points expands. The velocity of recession between the two points also has a fixed rate of acceleration, if the expansion of the 4D axis "r" is a constant. The angle *times* fourth dimensional expansion determines acceleration ($\theta \Delta r / sec.^2$).

The velocity in "km/ s" would increase as the distance in "Mpc" increases. Change in velocity over time is acceleration. Acceleration *times* time equals velocity. Therefore Hubble's recession velocity would be the following:

$v = H_o d = \frac{\theta \Delta r}{sec.^2}(t)$; t = time since "Big Bang"

Acceleration is a constant for all foreign galaxies. It changes with the galaxy's distance from the earth, as a function of the distance's angle of curvature "θ." Because "θ" is constant, the distance "d" between any two points is always a fixed proportion of the total circumference of curvature around the universe. Distance changes in direct proportion to change in circumference. The greater the angle "θ" the greater the change in distance over time and the higher the recession velocity. As distance increases so does recession velocity. Therefore, recession is actually constant acceleration, the rate of which is determined by the angle "θ."

If acceleration rates differ, the amount of time in the expanding universe model is the same for all accelerations between foreign galaxy . The time "t" is the time since the Big Bang. The greater the angle "θ", the greater the acceleration rate, but that rate has not changed since the "Big Bang." Velocity has increased in direct proportion to time.

Distance has also increased in direct proportion to time: $\quad d = (\theta \Delta r / sec.)(t)$
Current distance "d" over time since the "Big Bang" equals the velocity of the 4D axis

expansion *times* angle:

$$\frac{d}{t} = \theta\left(\frac{\Delta r}{sec.}\right) \qquad \textit{a constant velocity modified by the angle}$$

The function "d/ t" is equal to the *velocity of arc expansion*. It is not the equivalent of the rate of recession. A rate of recession exists between a fixed point on the circumference and and any foreign point. All recession motion is centered by and relative too the fixed point. The rate of recession is an acceleration rate and is not the same thing as the velocity of arc expansion. Velocity of arc expansion is motion relative to the center point for the circumference. In the Hubble model, velocity of arc expansion is motion relative to a center point, a center point which exists only in four-dimensional space. In contrast, recession motion is motion relative to a point (the earth for example) which exists in three dimensional space. Recession motion and arc expansion are not equivalents. Recession is the rate of motion relative to any fixed point on the circumference. Velocity of arc expansion is the rate of change for any one arc of the circumference.

Hubble's "expanding universe" model can only be accurately described by its presumed geometry. By that geometry, Hubble's Constant is reduced to the following:

$$H_o = \frac{\theta\Delta r}{sec.^2}\left(\frac{t}{d}\right) = \frac{(\text{recession acceleration from fixed point})}{(\text{velocity of arc expansion})} = \text{a constant.}$$

"d / t" is the "velocity of arc expansion." Current distance over time of expansion.

The "expanding universe" and the "quantum curvature" models provide completely different mathematical interpretations of Hubble's Constant and the difference between them is time:

Expanding Universe (EU)

$$H_o = \frac{\theta\Delta r}{sec.^2}\left(\frac{t}{d}\right) = \frac{(\text{recession acceleration from fixed point})}{(\text{velocity of arc expansion})};$$

Time is time of expansion since the "Big Bang."

Quantum Curvature (QC)

$$(H_o)3.2407764868\ 10^{-20}\ sec.^{-1} = \frac{1}{t_{constant}} = \frac{1}{t_1} - \frac{1}{t_2}$$

Time is transition time across curvature and linear distances at speed of light.

For "QC" time is the time of light-transition for the curvature versus the linear distance between two points. Time is mathematically constrained by an accurate measure of linear distance. Quantum curvature is measurable as redshift *times* this linear distance. The fourth quantum dimension is completely accessible using the "QC" model.

This is not true for "EU." Time is the time since the "Big Bang." Recession velocity equals an unmeasurable acceleration rate *times* the time since "Big Bang." The acceleration rate is the change in an inaccessible and unmeasurable fourth dimensional axis. There simply is no way to measure "Δr."

Recession velocity is determined by redshift, but its formula is not constrained by a knowable acceleration rate. This leaves the time factor, the time since Big Bang, an open ended variable. Since acceleration is not independently knowable, it is adjusted by choosing a time value for the age of the universe using other time indicators such as the radioactive decay of rocks[141].

The problem occurred when Hubble's empirically determined value for his constant did not fit other extraneous measures for the age of the universe. Since there was no explanation for the redshift other than the "EU" model, Hubble's constant was modified to fit other age measures and the constant's data base support was deserted. The Quantum Curvature model is the missing alternative.

After Hubble's death, the constant was shifted downward 90% so that "time since Big Bang" would be increased by an equivalent 90% :

$$H_o = \frac{v}{d} = \frac{(1-1/Z)\,c}{d} = \frac{\theta\Delta r}{sec.^2}\left(\frac{t}{d}\right) \text{ ; } \textit{time and distance must vary proportionally}$$

To reduce Hubble's Constant by 90%, increases "distance" by 90% and "time" by 90%, since time and distance must vary proportionally according to the Expanding Universe model.

If the Hubble constant, as determined by actual measurement, is incompatible with other-source time measurements, science should have recognized this fact as a defect in the Expanding Universe theory. However, since they had no alternative to "EU," they responded by deserting Hubble's empirical foundations for his constant in favor of a better time "fit."

The time-scheme shifting of Edwin Hubble's "constant" downward began only after his death in 1953. Hubble remained faithful to his measurements —the data by which he established his constant.

The 1929 Hubble Data Table Presumes Doppler Redshift and Estimates "H_o"

Object Name	Dist. (Mpc)	Vd. (km/s)	Object Name	Dist. (Mpc)	Vd. (km/s)	Object Name	Dist. (Mpc)	Vd. (km/s)
SMC	0.032	+170	5194	0.5	+270	1055	1.1	+450
LMC	0.034	+290	4449	0.63	+-200	7331	1.1	+500
6822	0.214	-130	4214	0.8	+300	4258	1.4	+500
598	0.263	-70	3031	0.9	-30	4151	1.7	+960
221	0.275	-185	3627	0.9	+650	4382	2.0	+500
224	0.275	-220	4826	0.9	+150	4472	2.0	+850
5357	0.45	+200	5236	0.9	+500	4486	2.0	+800
4736	0.5	+290	1068	1.0	+920	4649	2.0	+1090

SMC = Small Magellenic Cloud; LMC = Large Magellenic Cloud; All object numbers are preceded by "NGC." 1 parsec = 3.26 light years; 1 Mpc = megaparsec = 10^6 parsecs.

Edwin Hubble calculated his constant value by his 1929 data table[142] arraying redshift measurements from nearby galaxies to the distances which were measured by an

[141] Harvard web site. *op. cit.*

[142] *"A Relation between Distance and Radial Velocity among Extra-Galactic Nebulae"* by Edwin Hubble. 1929 PNAS Vol 15, Issue 3, pp. 168-173

independent method. Hubble primarily used individual Cepheid[143] stars he had detected in the foreign galaxies.
Characteristically, Hubble data tables present redshift measurements as converted to "recession velocities." The formula for this conversion is absolutely quantum. Specifically, apparent recession velocity is the negation of the subdivision of the speed of light using the redshift value "Z" as the subdivisional unit:

$$v = \left(1 - \frac{1}{Z}\right) c$$ *as "Z" increases, "v" is a larger percentage of "c."*

The measurement of redshift is also characteristically quantum. The primary index is the Rydberg visible frequency (Balmer Series) absorption lines for hydrogen, hydrogen being the primary stellar material. The absorption lines for the Balmer Series are harmonically regular. In star light, the two highest frequencies in the Balmer Series (n'=8, n'=7) are output as light. The four lowest frequencies in the series (n'=6, n'=5, n'=4, n'=3) are "absorb light frequencies" (wavelengths missing in spectrum) :

Balmer Series Formula

$$\left(\frac{1}{2^2} - \frac{1}{n'^2}\right)\frac{1}{(\lambda_r = 91.14\ \text{nm})} = \frac{1}{\lambda}$$

Example

Calculated Wavelengths missing from spectrum	*Measured Wavelengths (redshift=1.0036)*
n'=6; 410.13 nm	n'=6; 411.61 nm
n'=5; 434.00 nm	n'=5; 435.56 nm
n'=4; 486.08 nm	n'=4; 487.83 nm
n'=3; 656.21 nm	n'=3; 658.57 nm

When Balmer Series missing wavelengths (absorption lines) are spectrographically measured at the wavelengths in the right column above, redshift "Z" is determined by dividing the measured wavelengths by the calculated wavelengths.

In his 1929 data table, Hubble had independent measures for distance to the galaxy (from Cepheid calculations) and redshift as measured above.

From these 24 independent determinations of redshift (given as velocity) and distance determined by Cepheids detected in the galaxies, Hubble selected approximately 14-17 cases to determine his constant value using the formula:

$$H_o = \frac{v.}{d}$$ *v=Vd. and d=Dist. in table*

Hubble rejected data points which were obvious aberrations to the expansion pattern. For example, both the Large and Small Magellenic Clouds give much to high Constant values (H_o=5312.5 for Small Magellenic Cloud ; H_o=8529.4 for Large Magellenic Cloud) indicating possible high-energy event redshifts.

It is crucial to recognize the difference between continuous light redshift due to distance and high energy event redshift. Scientists are currently reporting redshifts in the range of "Z=6" with gamma-ray bursts and high-energy quasar events. A redshift of "6" would shift the highest visible light wavelength in Balmer series (388.9 nm) to the mid-infrared Brackett Series (2333.4 nm). All visible frequencies would be shifted out of the visible range into mid and far infrared. Before distance interpretations are made of such high-energy redshift events, scientist should explain why hydrogen-fusion bombs are also known to cause characteristic redshifts in the light flashes released[144] .

In point of fact, redshift measurements of continuous-light sources are consistent with the

[143] Cepheids are pulsing, variable light-intensity stars. The period of pulse establishes a known and absolute brightness.
[144] Natural observation of the author.

quantum geometric maximum of "Z=1.571." NASA telescopes focused on continuos light sources measure such redshift ranges. The Sloan Digital Sky Survey (SDSS), is ongoing as of 2005 and aims to obtain measurements on around 100 million objects. The highest redshifts SDSS has recorded for galaxies (continuous light sources) is "Z=1.4.[145]" Further, the Two-Degree Field (2dF) Galaxy Redshift Survey of the Anglo-Australian Observatory measured redshift for 221 thousand Galaxies obtaining a maximum "Z" value of approximately 1.25.[146]

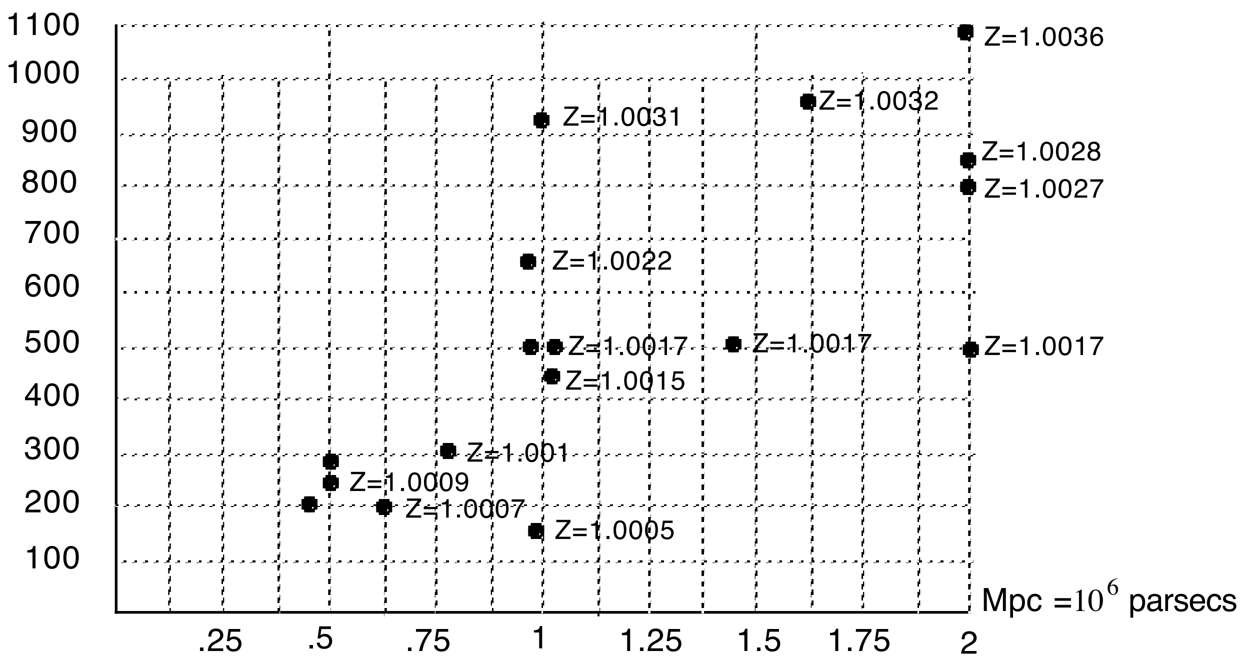
The Magellenic Cloud redshifts were much to high to explain by distance alone and were eliminated from the data.

Other data points were eliminated for a second reason. The galaxies NGC 6822, NGC 598, NGC 221, NGC 224, and NGC 3031 are not receding but closing towards us at velocities determined by blue shifting. For these galaxies, gravitational effect is producing an opposite motion to that of the proposed expansion. They also are rejected as aberrations to the hypothesis being tested.

The remaindered cases from the 1929 data table were used to estimate the constant. They are presented in the following table, with the redshift measures reinserted. . Nearly all redshift measurements were within the "threshold range" for redshift detection which the contemporary 2dF Galaxy Redshift Survey[147] had identified. That range was "lower case 'z[148]'<.003 and >.0000 (margin of error ±.0003)."

Presumed Recession Velocities

velocity (km/s) $= (1 - 1/Z)c$; *from Doppler equation*



Source: *Hubble 1929 data table.*

[145] The Sloan Digital Sky Survey home page; *http://www.sdss.org/*
[146] The 2dF Galaxy Redshift Survey: Final Data Release, —June 30, 2003; *magnum.anu.edu.au/~TDFgg/*
[147] op. cit.
[148] lower case 'z'=Z-1 and represents the precentage of wavelength increase.

Hubble's conversion of redshift "Z" to apparent recession velocity is accurate, but not for the reason he supposed. It does not represent a real recession— as with his expanding universe concept— but is caused by light being forced to travel across the curvature of space. There is an "apparent recession velocity" because light travels over the arc appearing to slow down relative to the linear distance. From this data, an estimated value for the constant can be calculated for every data point. The value which Hubble settled upon "$H_o \approx 500$ km/ sec./ Mpc" is close to the the mean of the data points:

$\overline{x} = 472.2$ km/ sec./ Mpc

See data table below.

d (in Mpc)	v (in kg/s)	$H_o = \frac{v}{d}$	$Var. = H_o - \overline{H_o}$
2	1090	545	72.82
2	800	400	-72.18
2	850	425	-47.18
2	500	250	-222.18
1.7	960	565	92.82
1.4	500	357	-115.18
1.1	500	455	-17.18
1.1	450	409	-63.18
1	920	920	447.82
.9	500	556	83.82
.9	150	167	-305.18
.9	650	722	249.82
,8	300	375	-97.18
.63	200	317	-155.18
.5	270	540	67.82
.5	290	580	107.82
.45	200	444	-28.18
mean ($\overline{H_o}$)		472.17647059	
standard deviation $\sigma = \left(\frac{\sqrt{\sum Var.^2}}{\sqrt{n}} \right)$		177.11727587	

The current constant estimate is "65 km/sec/Mpc." It is 2.3σ (standard deviations) from Hubble's 1929 mean estimated constant of 472.2 km/sec./Mpc". Using the confidence interval for " 2.3σ (approx. .97)[149]," the current estimate of "H_o=65" has only a 0.015 probability of occurring by chance within the Hubble data set[150] .

Further, the greatest redshift value for the Hubble data using the revisionist "65 km/sec/Mpc" constant value would only be Z=1.00043, almost outside the detectable range as determined by the 2dF Galaxy Redshift Survey. All other "Z" values from the Hubble data table, using "65 km/sec/Mpc" would fall outside the 2dF threshold.

After Hubble's death in 1953, assaults were made upon his measures, claiming that he had underestimated distances. Walter Baade argued that Hubble's Cepheids were part of "star clusters" and therefore had a much greater light intensity than originally estimated by Hubble. In the 1950's, Baade[151] had discovered the dimmer "Population II Cepheids." He had tried to recalibrate the "Classic Cepheids" which Hubble had used[152] — arguing Classic Cepheid's were brighter and Hubble's calculation of his constant too high. However, Baade's recalibration has not been universally accepted.

It wasn't until 1997 that an actual empirically founded challenge was made to the Cepheid brightness scale which Hubble had used. Feist and Catchpole took data from the parallaxes satellite, Hipparcos[153] and compared parallaxes triangulations to the nearest Classical Cepheids with distance measurements based upon the Cepheidic period. Their study proposed an upward revision of original Cepheid brightness by .2 magnitude[154] . The Feist and Catchpole revision would downshift Hubble's original calculations from a constant of "500 km/sec./Mpc" to nearer "400." However, the Feist and Catchpole revision does not fully meet the test of scientific reliability because the distances to nearby Cepheids (1000 light years or more) are on the verge of being outside parallaxes triangulation range for the Hipparcos satellite and therefore subject to error.

Curiously, it is only the Feist and Catchpole study which offers any experimental evidence to contradict Hubble's 1929 calculations. Yet that data was issued forty years *after* Hubble's Constant was revised downward by Sandage *et. al.* The Feist and Catchpole Cepheid brightness revision does not warrant anything like the 90% emendation which Hubble's Constant suffered after his death. Feist and Catchpole say their revision results in a 10% increase in distances. By extension, it would therefore result in a 10% decrease in Hubble's 1929 constant value.

---

149 Weisstein, Eric W. "Standard Deviation." From MathWorld--A Wolfram Web Resource. http://mathworld.wolfram.com/StandardDeviation.html

150 Below I will show that the revisionist constant of "65-70 km/s/Mpc" predicts distance measures for the 1929 Hubble data set which are so high as to be beyond the range of possibility.

151 Wilhelm Heinrich Walter Baade (March 24, 1893–June 25, 1960) was a German astronomer who emigrated to the USA in 1931. He took advantage of wartime blackout conditions during World War II, which reduced light pollution at Mount Wilson Observatory, to resolve stars in the center of the Andromeda galaxy for the first time, which led him to define distinct "populations" for stars (Population I and Population II).

152 Harvard University "The Hubble Constant" web page. Op. Cit.

153 *"The Cepheid PL Zero-Point from Hipparcos Trigonometrical Parallaxes (1997);"* M. W. Feast, R. M. Catchpole; http://astro.estec.esa.nl/Hipparcos/pstex/feast_ceph.ps

154 magnitude $= \left(100^{.2}\right)^n$ "standard candle"

The desertion of the rigorous empiricism of the 1929 data table for “age of the universe” schemes is misfortunate, if accuracy in measurement is the goal. Because quantum curvature measures redshift as apparent change in velocity, “age of the universe” is an irrelevant time factor, and Hubble’s data can be evaluated independently.

Hubble’s original data identifies a contradictory motion to apparent recession velocity. The “negative recessions” identified by blue shifting (NGC 6822, 598, 221, 224 and especially 3031) are motions of contraction due to gravitational influence. Most of the gravity “negative recessions” galaxies are the closest foreign galaxies, being in the “.2-.3 Mpc” distance range. There is one exception. NGC 3031 is at .9 Mpc, within the distance ranges used to estimate “H_o.” Since gravitational force equals the multiple of the two masses divided by distance squared, “3031” is obviously of greater mass than the other closer “negative recession” galaxies.

Within the data set used to estimate the constant, a galaxy of sufficient mass can be affected by reverse gravitational motion and its “H_o” calculation will be low. Gravitational contraction provides a “negative variance bias” to the “H_o” estimations.

The greatest negative variation is NGC 4826 at a variance of -305.18 from the mean “$\overline{H_o}$.” Significantly, “NGC 4826” is at the same distance (.9 Mpc) as “NGC 1068” which has a negative apparent recession velocity. This indicates that motion of galaxies at this distance can be influenced by gravitational interaction, depending upon their mass.

“Positive variation bias” to the “H_o” calculations is probably not explained by the Magellenic Cloud data which Hubble obviously included for that purpose. A better explanation is probably offered by the Baade observation that some of Hubble’s Cepheid indicators may have been contained within star clusters and thus were brighter and gave an artificially low distance estimation. For example, NGC 1068 has a higher redshift measurement (higher apparent recession velocity) at distance of “1 Mpc” than all galaxies of greater apparent distance, except one.

This resulted in the highest positive variance from the mean for NGC 1068 at + 447.83 or two standard deviations from the experimental mean value of the constant. If the actual constant value were the mean, NGC 1068 would be “1.9484240688” times as far as the Cepheid measurement made it out to be. NGC 1068 would actually be four times as bright (indicating a cluster) than the single phase measured Cepheid it was assumed to be.

It is true that bias from Cepheid/ star-clusters misidentification will have greater influence on the mean than bias from gravitational negation of (apparent) recession velocity. The actual value of Hubble’s Constant will be lower than the experimental mean.

However, the true constant could not possibly fall to the currently presumed value of “65 km/ sec./ Mpc.” This is lower than the constant as calculated from gravitationally-biased “NGC 4826” (167 km/ sec./ Mpc). The true constant could not be lower than that calculated from a measured redshift — known to be biased by negative motion from gravity. Statistically, “NGC 4826” establishes the lowest possible limit of the true value of Hubble’s Constant.

The post-Hubble revisions represent the desertion of empirical science in the defense of incorrect theory. The post-Hubble constant was not chosen by the empirical method by; by the measure of redshift determining (apparent) recession velocity and an independent measure of distance to the galaxy which originated that redshift:

$$H_o = \frac{(1-1/Z)\ c}{d}$$ *Accurate measures of "Z" and "d" give "H_o."*

Instead, the post-Hubble revision was chosen by an "age of the universe" time-factor required by the expanding universe model. That model is incorrect and the proof of this is that it has required abandonment of Hubble's 1929 data.

The quantum curvature model explains distance-proportional redshift and Hubble's mathematical description of it as an apparent difference in the velocity of the speed of light traveling a quantum-produced curvature over a linear distance.

Any distance, "d," between ourselves and stellar light source is a partial or subdivision of the quantum, "Q." "Q" establishes the diameter of the visible universe by providing maximum curvature which is the circumference of the semicircle with a "diameter=Q."

Any subdivision of "Q," designated as "d," Follows the quantum law of elliptical curvature. The distance "d" is kinked into an elliptical curvature with an eccentricity squared equal to the negation of the square of "d as subdivision of Q" [155] :

$$\frac{d}{Q} = \text{subdivision of Q} \ ; \ \varepsilon = \text{elliptical eccentricity}$$

$$\varepsilon^2 = 1 - \left(\frac{d}{Q}\right)^2$$ *The negation of subdivision^2 of Q*

This kinking of stellar distances into elliptical curvature is the actual source of the redshift as light follows the path of curvature. The redshift can be predicted for all values of "d" if the value of the quantum "Q" is known:

$$Z = \frac{\text{elliptical periphery}}{2d}$$

The peripheries of ellipses of known eccentricity and major axis can only be estimated using conventional three-dimensional Euclidean geometry[156] . However, an exact formula for the periphery of the ellipse has been developed using quantum geometry[157] :

$$\chi = \text{circumference of ellipse} \ ; \ r_1 = \text{minor axis} \ ; \ r_2 = \text{major axis}$$

$$\chi = 2\sqrt{3\ r_1^2 + r_2^2}\left(\frac{2\ r_1}{\sqrt{r_1^2 + 3\ r_2^2}}\ \left(\frac{\pi - 3}{3}\right) + 1\right) + 2\left(r_1\ \left(\frac{\pi - 3}{3}\right) + r_2\right)$$

This formula can be used to provide a predicted redshift "Z" for any stellar distance "d," as a subdivision of the diameter of the visible universe, "Q"[158] :

$$Z = \sqrt{\frac{3}{4}\left(\frac{d}{Q}\right)^2 + \frac{1}{4}}\left(\frac{2d}{\sqrt{d^2 + 3Q^2}}\ \left(\frac{\pi - 3}{3}\right) + 1\right) + \left(\frac{d}{2Q}\ \left(\frac{\pi - 3}{3}\right) + \frac{1}{2}\right)$$

Hubble's 1929 data table has proved inconsistent with the expanding universe model and was ignored by later generations of astronomers. They proposed a constant revision which, I will show, is completely incompatible with Hubble's 1929 data. That data confirms the

[155] *The Quantum Law of Ellipses and the Elliptical Kink* in Appendix

[156] The best estimation uses the MacLaurin Derivative Series which is based upon derivatives of eccentricity.

[157] *Quantum Determination of Elliptical Periphery and the Detection of Systemic Error in the Maclaurin Derivative Series;* master's thesis, The Virtual University; Dawson, Lawrence

[158] *The Quantum Formula for Redshift* in Appendix.

quantum curvature model and eliminates the post-Hubble revision.

Quantum geometry seeks a scientifically accurate measurement of the physical world. The 1929 data table represents the serious attempt of very competent astronomer to compare measured redshift with measured distances in the relatively close distances such measurements are possible. There is however a variance between measured distance and mathematically predicted distance for the measured redshift This is true whether that mathematical prediction is made by Hubble’s expanding universe model and Doppler effect or it is made by the quantum curvature model. Clearly other factors are affecting the redshift measurement, the primary one being gravitational influence between nearby galaxies. Galaxies rushing towards one another from gravitational influence produce blue shifting of the light, a phenomenon clearly identified by Hubble’s data (objects 6822, 598, 221, 224 and 3031 have antirecession velocities).

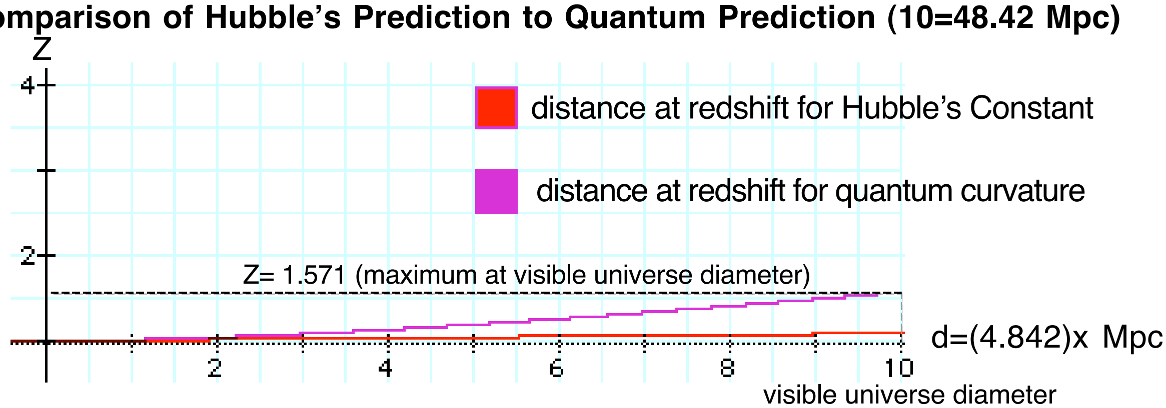
Any redshift measurement can be affected by extraneous influences and will generate a variance between measured distance and the distance mathematically predicted for the measured redshift. In the competition between the expansion universe mathematical model and the quantum curvature mathematical model, the model which best eliminates the variance is the correct one. Since variance is caused by modification of the predicted redshift at the distance, the more correct the mathematical determination, the less the mean variance will be. The quantum curvature model wins this competition.

Hubble’s “expanding universe” constant and its predicted redshift at distance can be compared with redshift at distance predicted by quantum curvature.

Quantum Curvature Graph of Distance at Redshift (d=10 at Z=1.571)

$$Z = \sqrt{3\frac{d^2}{4\left(10^2\right)} + \frac{1}{4}\left(2\frac{d}{\sqrt{d^2+3\left(10^2\right)}}\frac{\pi-3}{3}+1\right)} + \frac{1}{2}\left(\frac{d}{10}\frac{\pi-3}{3}+1\right)$$

Comparison of Hubble’s Prediction to Quantum Prediction (10=48.42 Mpc)



Hubble's 1929 data were used to find the most probable visible universe diameter for the quantum formula. Starting with Hubble's predicted distance at "Z=1.571" (217,8773 Mpc), trial-and-error was used to establish a quantum "Q" value which provided the best quantum curvature "fit" to the 1929 data. The best fit was found to be a partial of Hubble's predicted "Q" distance of 217.8773: Q=(217.8773)/ 4.5=48.42 Mpc

$Q=\frac{1}{4.5}$Hubble at redshift Z=1.571. $Q=\frac{1}{4.5}$ (217.8773)=48.42 Mpc

Hubble's Formulation; v=recession velocity ; H_o= Hubble's Constant

$v=\left(1-\frac{1}{Z}\right)c \qquad H_o=\frac{v.}{d} \quad ; d=\frac{v}{H_o}$

measured Z	predic. Post-Hubble revision *H=70 km/s/Mpc* ***(in Mpc)***	predic. Hubble ***(in Mpc)*** *H=500 km/s/Mpc*	predic. elliptic. ***(in Mpc)*** *Q=48.42 Mpc*	Measured "d" ***(in Mpc)*** ***object name***
1.0005	2.14	0.3	0.424	0.9 obj. *4826*
1.00057	2.42	0.34	0.4713	0.032 obj. SMC
1.00066	2.86	0.4	0.536	0.63 and 0.45 obj *4449/ 5357*
1.0009	3.86	0.54	0.707	0.5 obj *5194*
1.001	4.29	0.6	0.769	0.8 obj *4214*
1.0015	6.43	0.9	1.075	1.1 obj *1055*
1.0017	7.14	1	1.19	.9/ 1.1/ 1.4/ 2.0 obj *5236, 7331,4258, 4382*
1.0022	9.29	1.3	1.452	0.9 obj *3627*
1.0027	11.43	.1.6	1.69	2.0 obj. *4486*
1.0028	12.14	1.7	1.74	2.0 obj *4472*
1.0031	13.14	1.84	1.878	1.0 obj *1068*
1.0032	13.71	1.92	1.92	1.7 obj *4151*
1.0036	15.57	2.18	2.09	2.0 obj. *4649*

The above table identifies several important facts. In the first place, the modern revised Hubble's constant of "65-70 km/s/ Mpc" is completely rejected by the empirical data. Alll distance prediction for "Z" values by the modernist revision are between 2 and 10 times the actual measured distances. The predicted distance for the lowest "Z" value (Z=1.0005) is greater than the furthest distance measured in the table. All variances are whole number multiples of measured distances. The modernist revision simply cannot estimate the measured distances with any credibility.

There is too much variance within the 1929 Hubble data set to establish anything but a trend. The higher redshift "Z" values tend to be at greater distances. However, the inclusion of the quantum curvature model along with Hubble's distance predictions may have refined that trend. Notice that the quantum predicted distances are higher than Hubble predicted distances starting at "Z=1.0005" and increasingly so until the two graphed lines reach "Z=1.0017." At this point, the two begin approaching one another again and cross at "Z=1.0032." After this point the Hubble predicted distances will always be greater than the quantum predicted distances. Tantalizingly, Hubble's predicted distances begin to pull away from measured distance at the "Z=1.0036." At higher redshifts from sources outside the measurable range for distances, Hubble's Constant may be giving unrealistically high distance predictions. The visible universe may actually be much smaller than modernists currently believe. If the quantum curvature model is correct, these data indicate that the edge of the visible universe may only be 1.5793 (10^8) light years away from the earth. This is in contrast to the 4.65 (10^{10}) light years currently believed. Modernists may have overestimated the visible universe by a factor of 294 times.

Differences Between the Hubble and the Quantum Distance Predictions

measured Z	Variance squared (σ^2) between Hubble prediction and measured distance	Variance squared (σ^2) between quantum prediction and measured distance	Difference in predicted distance between Hubble and quantum $\text{diff} = d_Q - d_H$.
1.0005	0.36	0.227	0.124
1.00057	0.094864	0.1929	0.131
1.00066	0.0529 0.0025	0.008836 0.0074	0.136
1.0009	0.0016	0.042849	0.167
1.001	0.04	0.000961	0.169
1.0015	0.04	0.000625	0.175
1.0017	0.01 0.01 0.16 1	0.0841 0.0081 0.105625 0.6561	0.190
1.0022	0.16	0.305	0.152
1.0027	0.16	0.0961	0.09
1.0028	0.09	0.0961	0.04
1.0031	0.7056	0.770884	0.038
1.0032	0.0484	0.0484	0
1.0036	0.0324	0.0081	-0.09
$\overline{\sigma}^2$	**0.1746**	**0.1564**	

Expanding Universe May Be in Error

It is possibility that the expanding universe assumption, which has guided science for over 70 years, may be in error. This possibility is confirmed by the above table; by the comparison of the mean variance of Hubble's expansionist model and that of quantum curvature. The variance between Hubble's prediction and actual measured distance is greater than the variance between prediction and measurement for quantum curvature. The mean variance for Hubble's prediction is 12% greater, at 0.1746, than the mean variance for quantum curvature at 0.1564.

Quantum curvature is a better fit with Hubble's own data. This is not definitive proof in that the variance between the two means is not statistically significant using the two tailed t-test for matched pairs. However, the t-test may not be adequate under conditions which might be termed "biased variance." 60% of the variance between predicted and measured distance is on the low side. The measured distance is less than predicted and this bias favors the lower of the two tested models which, in this case, is the Hubble model. The t-test assumes that variance outside tested variables must be random and unbiased.

The possibility of a non-expanding universe is especially significant because the Hubble expansionist concept has proved detrimental to theoretical physics in general. Specifically, Einstein's "cosmological constant, " which emerged from the field equations for General Relativity, had to be abandoned. The "cosmological constant" is a tension attached to space itself, sometimes described as "nonzero vacuum energy."

> *Einstein included the cosmological constant as a term in his field equations for general relativity because he was dissatisfied that otherwise his equations did not allow, apparently, for a static universe: gravity would cause a universe which was initially at dynamic equilibrium to contract. To counteract this possibility, Einstein added the cosmological constant. However, soon after Einstein developed his static theory, observations by Edwin Hubble indicated that the universe appears to be expanding......Since it no longer seemed to be needed, Einstein called it the '"biggest blunder" of his life, and abandoned the cosmological constant. However, the cosmological constant remained a subject of theoretical and empirical interest. Empirically, the onslaught of cosmological data in the past decades strongly suggests that our universe has a positive cosmological constant.*[159]
>
> .

Quantum geometry has identified the cosmological constant as a time force of separation sustaining the spatial quantum. Heaviside's magnetic permeability/ electric permittivity formula for free space equals time force ($1/c^2$) and is given as a field value, in Newtons per geometric unit of space. The constant force of time sustaining spatial vacuoles is shown to be the equivalent of .01668 Newtons *per* meter of vacuum[160] . This is not directly transferable to the constant as used by astronomers because their cosmological constant is not given in standard international units (SI units) for fields, in force per unit of area or volume.

[159] *Cosmological Constant;* Yale University Wiikipedia entry; en.wikipedia.org/wiki/Cosmological_constant#cite_note-Yale-0

[160] See Chapter 1 .