Abstract

This alternative model to Dark Matter, is supported by correlated studies of multiple galaxy surveys with increased velocities across their minor axis. Thus, velocity within the same body appears to increase per distance.

Time convergence (TC) proposes that time intervals appear to decrease and converge to a single event over great magnitude distance, as viewed from an observer at classic scale.

**TC explains accelerated expansion to be an illusion, as decreasing time intervals appear equivalent to acceleration.** See figure 3.

In the last chapter, I provide a vector calculation to distinguish accelerated expansion from TC (Time Convergence).

Note: Also included are sections showing how this same concept of time interval distortion is applicable to superposition at nanoscales.

Time Divergence (TD) proposes that an observer will view a nanoscopic particle with an expanded range of time, from past to present, in his single moment, like a time-lapse. For example, an electron orbital, viewed in a single moment represents a time interval from $-\Delta t$ (past) to $+\Delta t$ future. Unlike superposition, modulus states do progress in time between ground and excited.

In section 5, I provide a potential mesoscopic proof, with two observations, separated in time, representing the exact same event.

TD explains the orbital gaps as simply the portions of rotation that are outside of this time range.

TD predicts that wave collapse occurs when the introduction of an intermediate apparatus (such as a detector), brings the observation (from source to effect) to essentially the same scale.

TD offers an alternate explanation to the "undetermined probability wavefunction $\Psi". 

**Explanations, resolutions and insights gained:**

In macroscales: Accelerated expansion, Galaxy rotation and centripetal force, Superluminal recession of galaxies.

In nanoscales: The cloud appearance of electron orbits, The gaps between electron orbits, The shapes of orbitals, Collapse and duality, Why orbital density appears closest to nucleus, TD suggests that information about energy states and position can be gained from comparing observations at two separate points in time.
1. INTRODUCTION

TC and TD are best understood within the more broad framework of Cosmology. I begin with macroscales of Cosmology, then proceed to nanoscales in Quantum Mechanics. Predictions are well supported.

2. MACROSCALE - TIME CONVERGENCE (TC)

TC offers the following alternate explanation for accelerated expansion:

**Velocity with decreasing time intervals is equivalent to acceleration**

**Linear spatial interval perspective:**

TC can be thought of as a perspective in the time dimension, analogous to linear perspective in architecture. Time intervals appear to decrease and converge.

Imagine an observer, with a reference scale, measuring the ties of a railroad track in perspective. See figure 1. The scale will measure each successive tie \( n \) with decreasing spatial intervals, according to the inverse linear perspective equation: [1]

\[
n_p = \frac{n_\perp}{d}
\]

Where \( n_\perp \) is true orthogonal length and \( n_p \) is the skewed length, as a result of perspective.

**TC time interval perspective:**

Now, imagine the observer with a reference clock, measuring some motion with velocity \( v \) across \( x \). See figure 2. In TC, The clock will measure each successive \( d/v \) with apparent decreasing time intervals, according to the equation:

\[
t_p = \frac{t_\perp}{1 + (d^{1/2} \times K)}
\]

Where \( K \) is a minute constant (close to the coefficient of G). I'm using \( \sim 1/10^{-11} \) as a benchmark.

\( t_\perp \) is \( d/v_1 \) at the observer’s clock
\( d \) is distance from the observer to the event \( d/v_2 \)
\( t_p \) is the resulting converged time interval of event \( d/v_2 \), from Time Perspective (TC)

**A. Decreasing Time Intervals Appear Equivalent to Acceleration**

**FIG. 1. 2D linear perspective**

**FIG. 2. Time perspective**

**FIG. 3. Constant velocity with decreasing time intervals appear as acceleration**
Figure 3 illustrates Constant velocity with decreasing time intervals, per equation 2. Remote galaxies appear to be expanding with acceleration. However, the acceleration is only an illusion of perspective.

Note: TC does not attempt to contradict constant expansion rate

B. Decreasing time intervals and pulsars

TC suggests that the further away a pulsar is from an observer, the more frequent it’s flashes will appear to be, as a result of decreasing time intervals per distance.

Calculating the true flash time intervals of pulsars

Figure 4 shows three pulsars, at points: a, b and c, with the exact same time interval of $t_{\perp}$, at respective distances: $x_a$, $x_b$ and $x_c$

Since TC proposes that perceived time intervals $t_p$ appear to decrease with distance, per TC equation 2, then the flashes will appear to decrease in time, giving the illusion of increased rotational velocity.

Thus, pulsar at distance $x_c$ will appear to be flashing more frequently than the pulsar at distance $x_b$, and $x_b$ will appear to be flashing faster than $x_a$

However, the perceived difference is due to effect of TC time perspective.

Note the following:

true time interval = $t_{\perp} = 1$ second period

$t_p = \text{perceived time interval}

distance \ x_a =100,000 \text{ LY} = 9.461 \times 10^{20} \text{ m}

distance \ x_b =150,000 \text{ LY} = 1.892 \times 10^{20} \text{ m}

distance \ x_c =200,000 \text{ LY} = 2.838 \times 10^{20} \text{ m}

$TC = \text{factor from equation 2}$

From equation 2, $t_p$ at distance $x =

\begin{align*}
  t_{pa} &= \frac{1}{1 + (9.461 \times 10^{18})^{1/2} \times (10^{-11})} \\
  t_{pa} &= 0.970 \text{ s (perceived period)} \\
  t_{pb} &= \frac{1}{1 + (1.892 \times 10^{19})^{1/2} \times (10^{-11})} \\
  t_{pb} &= 0.958 \text{ s (perceived period)} \\
  t_{pc} &= \frac{1}{1 + (2.838 \times 10^{19})^{1/2} \times (10^{-11})} \\
  t_{pc} &= 0.949 \text{ s (perceived period)}
\end{align*}$

Thus, TC makes the bold assertion that pulsar flashes are actually slower than they are perceived here in Earth, due to TC time perspective distortion.

C. Superluminal expansion

Note that TC effects all measurements involving time over magnitudes, including electromagnetic wave shifting.

To reiterate, TC only contradicts the prime of expansion and not constant expansion. the true recession velocity ($v_{\perp}$) can be obtained from high red-shifted galaxies by calculating $t_{\perp}$.

\begin{align*}
  Solving \ for \ t_{\perp},
  t_{\perp} &= t_p \times (1 + d^{1/2} K) \quad (3) \\
  t_{\perp} &= 1 \times (1 + (3.027 \times 10^{26})^{1/2} \times (10^{-11})) \quad (4) \\
  t_{\perp} &= 175 \quad (5) \\
  v_{\perp} &= \frac{295,050}{175} = 1,687 \text{ km/s} \quad (6)
\end{align*}$

Table 5 lists the perceived and adjusted values (per TC) of galaxy GN-z11.

Note: Although GN-z11’s apparent red-shift indicates a radial recession approaching c, TC provides an adjustment factor of $\sim 175$.

<table>
<thead>
<tr>
<th>superluminal galaxy</th>
<th>$d_p$</th>
<th>$Z_p$</th>
<th>$V_p$</th>
<th>$t_{\perp}$</th>
<th>$V_{\perp}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>GN-z11</td>
<td>32 GLY</td>
<td>11.09</td>
<td>295,050 km/s</td>
<td>175</td>
<td>1,687 km/s</td>
</tr>
</tbody>
</table>

FIG. 5. perceived and adjust values (per TC) of galaxy GN-z11. Although GN-z11’s apparent red-shift indicates a radial recession approaching c, TC provides an adjustment factor of $\sim 175$. 
D. Rotational Velocities Appear to be greater over magnitudes

Figure 6 shows a remote, inclined galaxy and observer on Earth. TC time intervals appear to be decreasing from observer’s perspective.

TC makes the bold assertion that the actual galaxy rotational velocities are much less than the conventionally accepted values, which defy physics. In order to calculate the true rotational velocity \( v_\perp \) from the perceived velocity \( v_p \), we must solve for \( t_\perp \) from equation 12

Note: TC requires that if the distances of galaxies are based solely on red-shifting, then distance must also be adjusted per equation 2

The following is based on Messier 31

\[
\begin{align*}
 d &= 2.54 \times \text{mly} = 2.403 \times 10^{22} \text{m} \\
 t_p &= 1 \text{s} \quad \text{(Can be any time period)} \\
 t_\perp &= (\text{adjusted, true time}) \\
 v_p &= 250 \text{km/s} \quad \text{(perceived, false rotational speed)} \\
 v_\perp &= (\text{adjusted, true rotational speed})
\end{align*}
\]

per equation 4,

\[
\begin{align*}
 t_\perp &= 1 \times (1 + (2.403 \times 10^{22})^{1/2} \times 10^{-11}) \\
 t_\perp &= 2.550 \text{s}
\end{align*}
\]

\( t_\perp \) is the true time period. To clarify, the observer perceives a remote event that occurred in 2.55 seconds to be only 1 second. (This would sound radical, however it explains the physics defying receding and rotational velocities (approaching c) of very remote galaxies)

To find the corrected velocity, we simply divide the numerator by \( t_\perp \). Thus,

\[
\frac{v_\perp}{t_\perp} = \frac{250}{2.550} = 98.039 \text{km/s}
\]

Note that In TC, Physics are unaltered, and orbital paths do not deviate from Keplers laws.

The principle in my manuscript, TC only predicts perspective distortions resulting in the appearance of altered velocity. Proportional to the distance from the observer.

3. PREDICTIONS

A. Galaxy rotation will appear to increase on the far side from the observer and decrease on the near side.

Figure 7 shows two points on a spiral galaxy, at equal distance from the center, but on opposite sides with respect to the viewer.

Per the rotational velocity formula:

\[
v = \sqrt{\frac{GM}{r}} \quad (9)
\]

If points \( a \) and \( b \) measure different velocities per equation 2, that would be in support of my theory.

Calculating the perceived differences from points \( a \) and \( b \):

\[
\begin{align*}
 v_p &= 250 \text{km/s} \\
 d \,(\text{at core}) &= 2.54 \times \text{mly} = 2.403 \times 10^{22} \text{m} \\
 r &= 1.229 \times 10^{20} \text{m} \\
 \text{compensating for 12.7R inclination}, \\
 \Delta d &= r \times \cos(12.7R) = 1.199 \times 10^{20} \\
 d_a &= 2.403 \times 10^{22} m - 1.199 \times 10^{20} m = 2.39104 \times 10^{22} m \\
 d_b &= 2.403 \times 10^{22} m + 1.199 \times 10^{20} m = 2.41529 \times 10^{22} m \\
 \text{From equation 8}, \\
 v_\perp &= 98.039 \text{km/s}
\end{align*}
\]
Calculating $v_p$, for point $a$, using equation 2:

\[
t_p \text{ at } x_a = \frac{1}{1 + (2.39104 \times 10^{22})^{1/2} \times (1 \times 10^{-11})} \\
= 0.393
\]

$v_p \text{ at } x_a = 98.039/0.393$

$= 249.463 \text{ km/s}$

Calculating $v_p$, for point $b$, using equation 2,

\[
t_p \text{ at } x_b = \frac{1}{1 + (2.41529 \times 10^{22})^{1/2} \times (1 \times 10^{-11})} \\
= 0.392
\]

$v_p \text{ at } x_b = 98.039/3.915$

$= 250.419 \text{ km/s}$

Thus, the difference in rotational velocity between points $a$ and $b = 0.956 \text{ km/s}$

B. TC Predicts that Supernovae Remnant Velocity will Appear to Vary with the Distance From the Observer

Supernovae particles are expelled without bias to an observer. However, if the expelled electron x-rays (observed from x-ray space telescopes) of supernovae have measured velocities with a bias of greater velocity away from the Earth and less velocity toward the earth, that would be in support of my theory.

Figure 8 shows a hypothetical remnant cloud of $r$ radius, and $x$ distance from the Earth.

Figure 9 Calculates the effect of TC (apparent velocity decrease) using $\theta$ degrees at point $A$ (which is on the cloud outer boundary) by first deriving $\Delta x$ (the $x$ component displacement from the epicenter) then $d = (x - \Delta x)$ in equation 12.

The following parameters are similar, in magnitude, to Cassiopeia A,

\[
r = 2500 \text{ ly} = 2.365 \times 10^{19} \text{ m} \\
\theta = \frac{\pi}{4} \text{ radians} \\
x = 10000 \text{ ly} = 9.461 \times 10^{19} \text{ m} \\
\Delta x = r \cos \theta = 1.672 \times 10^{19} \text{ m} \\
d = x - \Delta x = 7.789 \times 10^{19} \text{ m} \\
t_\perp = 1 \text{ s} \\
v_\perp = \frac{5000 \text{ km/s}}{s} \text{ (true expansion velocity)}
\]

Note:

- $t_\perp$ can be any time period measured, using $\bar{d}$, because $d$ varies with any non-perpendicular trajectory.

from equation 12,

\[
\frac{1}{1 + (7.789 \times 10^{19})^{1/2} \times (1 \times 10^{-11})} \\
= 0.919
\]

Between the scale of the observer and 10k ly, the observer measures velocity with a time perspective distortion factor of 0.919. That is to say that he measures velocity with a $t$ at 0.919 of its actual value.
To arrive at the observer’s perceived velocity $v_p$, we simply divide the correct velocity by $t_p$ thus,

\[
v_p = \frac{5000\text{km}}{0.919\text{s}} \quad (10)
\]

\[
v_p = 5441\text{km/s} \quad (11)
\]

**Super nova multiple point study**

Figure 10 shows multiple points of $\theta$ degrees, in orientation to the direction of observation:

![Figure 10](image)

FIG. 10. Points a thru d of $\theta$ degrees, in orientation to the direction of observation

The table in figure 11 lists the perceived (false) velocities observed at points a thru d. Notice that the farther away a point is, the faster the velocity appears to be.

<table>
<thead>
<tr>
<th>point</th>
<th>$\theta$</th>
<th>$V_\bot$ (true)</th>
<th>$V_p$ (perceived falsely)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>$\pi/4$</td>
<td>5000 km/s</td>
<td>5441.288 km/s</td>
</tr>
<tr>
<td>b</td>
<td>$3\pi/2$</td>
<td>5000 km/s</td>
<td>5486.667 km/s</td>
</tr>
<tr>
<td>c</td>
<td>$3\pi/4$</td>
<td>5000 km/s</td>
<td>5527.916 km/s</td>
</tr>
<tr>
<td>d</td>
<td>$\pi$</td>
<td>5000 km/s</td>
<td>5543.852 km/s</td>
</tr>
</tbody>
</table>

FIG. 11. Points a through d, of $\theta$ degrees correspond to various distances from the observer, and resulting perceived velocities

4. **QUANTUM SCALE - TIME DIVERGENCE (TD)**

**Understanding Time Divergence**

With great respect to the accurate mathematics of wavefunction, the “time divergence” model of quantum mechanics offers alternative and novel concepts which provides a more intuitive understanding of quantum mechanics: Concepts of Time Divergence:

- Observations from the nanoscopic scale to the classic scale are biased with a linear time perspective.
- The effect, on such observations, is a divergence of time (both in past and present).
- Thus, this observation (between $\Delta$ scales) does not represent just single point in time, but rather a time range from $-\Delta t$ past to $+\Delta t$ future.
- The observer, who is at classic scale, sees this range all at one moment (from his perspective) like a time-lapse.

TDMS is labeled: $t_p\epsilon$, per the following equation:

\[
t_p\epsilon = \frac{h}{td} \quad (12)
\]

Most significantly, an analog proportional relationship occurs between $\Delta$ scales and the amount of time divergence: As the scale between the observer and quantum event increases, the appearance of wavelength increases in proportion. Note that in DeBroglies wave equation $\lambda$ is inversely proportional to mass.

TDMS predicts that introducing an intermediate apparatus, such as detection devices, will essentially bring the two events to the same scale. Thus, the effect of perspective time divergence is no longer significant (wave collapse).
How is time divergence distinct from superposition?
A detection of an electron orbit, is between the two greatly differing scales of classic and nanoscopic space. The effect of time divergence is significant per equation 12. During a single moment (to the observer) he detects a range of time from past to present of electron rotations. Thus, there appears to be an integration of total phases of energy and position. However, TD proposes that the appearance is actually a projection in perspective, and that electrons actually do orbit from ground to excited states (Bohr model). Over a range of time they are superimposed, as opposed to a superposition of all probable states. Figure 12 illustrates observed multiple rotations over a range of time and what the observer sees (detects), in his single moment; a more dense shape which is actually multiple orbits over an expanded range of time (Similar to a time lapse).

FIG. 12. Time Divergence model of superposition

Time divergence can be thought of as being similar to viewing a convex mirror, which reflects a larger range of light over the same amount of incidence.

Time divergence is more like a time-lapse photography, which is superimposed in a progression of time, instead of superposition. See figure 13

Gaps between electron orbits:
Since time divergence occurs at a specific range, whatever occurs outside of that range is not detectable to the observer at classic scale. Now Consider the case where the orbit is greater than the range of divergence; The observer would detect a particle’s world-line path from the present to a future point and then vanish. He would also detect a path from the present back into the past and vanish at some point, as well. Figure 14 illustrates both a graph of orbit paths over time, within an integrated viewable range.

FIG. 13. Similar to time-lapse photography; A progression in time

FIG. 14. Time Divergence (multiple time) explains gaps in electron orbit
Why "orbitals" are more dense toward center

Superimposed multiple orbits, within a range of time, form an s-sphere which naturally has more geodesic paths toward the center. See figure 15

FIG. 15. Geodesic paths are naturally more dense toward center

TD offers an alternate explanation to the undetermined probability wavefunction $\Psi$, in favor of a more objective reality. See "On the reality of the quantum state" [2].

TD, in magnification, proposes that time has the same geometric divergence, and convex distortions, as does spatial magnification [1]. See figure 16

FIG. 16. Spatial perspective in magnification.

The naive failure to consider time divergence is analogous to assuming that train tracks actually get smaller, without considering the concept of linear spatial perspective. TD is a corollary to the proposition that "Whatever happens to space also happens to time".

TD calculation in the Bohr atom:

Figure 17 is a simple case 3D graph of the Bohr model electron orbit, at Bohr radius' The $t$ dimension shows the range of time divergence at that scale, giving the false appearance of the conventionally accepted "1s-orbital cloud". Notice that only scale affects Time-Divergence. $v$ is only significant in density.

FIG. 17. Bohr radius, at ground state viewed in Time Divergence perspective

\[ t = 5.3910^{-44}\text{s} \quad \text{(the time duration that the observer measures. Assume one plank second)} \]

\[ d = 1.058354\times10^{-10}\text{m} \quad \text{(2 x the Bohr radius, at ground state)} \]

\[ h = 6.626\times10^{-34} \quad \text{(Planck's constant)} \]

From equation 12,

\[ t_{p\epsilon} = \frac{6.626\times10^{-34}}{(5.39\times10^{-44}) \times (1.058354\times10^{-33})} \]

\[ t_{p\epsilon} = 1.162 \times 10^{13} \]

So, the range of time divergence $t_{p\epsilon}$ approached a scale much closer to a nanosecond.

5. TD LEMMA: POTENTIAL MESOSCOPIC STATE EXPERIMENTAL PROOF

A potential lemma of TD would be an electron cloud, in mesoscopic state, observed at two minutely spaced points in time, will mutually overlap at the same point
in their diverged range of time. Example: If an electron, in the first instance, is at position \( x \) approaching \(+\Delta t\) then the second instance will contain the electron at the same point \( x \), only it will be approaching \(-\Delta t\). The two observations will be of the exact same event, at the exact same time.

An experiment to verify this prediction might involve some event such as a photon emission. Figure 18 shows two images (points \( t_1 \) and \( t_2 \)) of orbits at the mesoscopic state, which are separated minutely in time.

**FIG. 18.** Two images at metascopic state represent the same single event at two points in time

Although the two images are separated in time, they demonstrate the same event at different locations.

6. **DAVVISON-GERMER EXPERIMENT**

My theory does not attempt to contradict the proven Davvison-Germer Experiment. Rather, it addresses the novel concept of the difference in scales between events. This is not particular to the DG experiment. It is equally applicable to all particle-wave duality experiments.

**Note the following observations about the relative scales within particle-wave duality experiments:**

**Davvison-Germer**

- The Farady Box detector is at a classical scale (familiar classical mechanics).
- The emitted electron beam is at a nanoscopic scale of quantum mechanics.
- The observation is between an event from the classic scale and an event which emanated at the quantum scale
- An interference pattern is demonstrated.

**Double-Slit with optical plate**

- The optical plate (similarly) is at a classical scale.
- The electron is, of course, at a nanoscopic scale of quantum mechanics.

**Double-Slit with optical plate and detection at the slits**

- The optical plate is at a classical scale.
- The event of a detection apparatus at the slits (although very small) is also at a classical scale.
- Thus, the observation is between two events at the same scale.
- A particle is demonstrated.

**TD recognizes that there are two distinct observational conditions:**

1. An observation between two events at scales greatly differing in magnitude, demonstrating wave interference.
2. An observation between two events at the same scale in magnitude, demonstrating particles.

**TD raises the question, in the Davvison Germer experiment:**

What would happen to the electron charge, over the same angle, if the two events of (particle emission and detection) could be brought to the same essential scale during the observation?

The two logical approaches to achieve this would be:

1. By adding a system, such as a field of photons and thereby causing an observable event of scattered photons for each individual electron, between the emitter and the nickel target.
2. By replacing the Farady box with nanoscopic detection near the point of beam scattering.

The principle behind TD is a linear perspective of events, similar to linear perspective of spatial dimensions, which are represented by the inverse proportionate formulas: 2 and 12.

**Wave collapse explained:**

To reiterate; TD predicts that introducing an intermediate apparatus, such as detection devices, will essentially bring the two events to the same scale. Thus, the effect of perspective is no longer significant. This novel concept of bringing events to the same scale is best described by the Double-Slit Experiment. See Section 7
7. ALTERNATE EXPLANATION FOR THE MEASUREMENT PROBLEM

Time divergence only occurs between scales, which is the key to resolving the "measurement problem" [3]. In the experiments below, note that (s) is the source and (e) is the effect.

Figure 19 shows the case where (s) is at the quantum scale and (e) is at the observer's scale. Since the measurement between these two scales is of great magnitude difference, \((t_p \epsilon)\) then becomes significant and TD is demonstrated. Consequently, a wave / interference pattern is observed.

FIG. 19. Without a detector present, is a measurement between scales.

Figure 20 shows the case where (s) is the detector, which is at the observer's scale, and (e) is the optical plate, which is also at the observer's scale. Since, the measurement is precisely within the same scale, \((t_p \epsilon)\) then does not become significant and TD is not demonstrated. Consequently, a particle is observed.

FIG. 20. With detector is a measurement within the same scale.

The Time Divergence model interprets the interference pattern (alternatively), as overlapping events, viewed between two scales (of significant magnitude difference), with resulting perspective divergence and distortions since this perspective divergence is in time, a range of present, past and future are all represented in the distribution. The diffracted distribution of values are more dense toward the center, which captures more photons within the \(t_p \epsilon\) time range.

Two overlapping distributions, at \(n\) multiples of \(t_p \epsilon\), either mutually cancel or mutually reinforce (at fringe separation). This effect depends on their alignment in time, as opposed to the conventionally accepted phase alignment ("wave and Trough") model. Within this range of past and future events, overlapping alignment of \(\Delta - t\) and \(\Delta + t\) cancel. No energy is absorbed, because this effect is only a distortion of perspective.

8. SUPPORTIVE DATA

I submit the follow correlation study, specifically on the subject of increased velocity on the far sides of multiple galaxies. It directly and explicitly adds support to my prediction. Although not conclusive, it does justify consideration to my supposition.

All academic credentials, laboratory, sources of data, correlation values and publisher are included.

**Title:** "On Possible Systematic Redshifts Across the Disks of Galaxies"

**Staff:** T. Jaakkola\(^1\), P. Teerikorpi\(^2\) and K.J. Donner\(^3\)

**Academic credentials:**
\(^1\)Professor of Astronomy at Helsinki
\(^2\)Department of Physics and Astronomy, University of Turku, Vaisalantie 20, 21500 Piikkio, Finland
\(^3\)University of Helsinki

**Laboratory:**
Observatory and Astrophysics Laboratory, University of Helsinki

**Sources of data:** Listed in figure 21.

**Publisher:** Astronomy and Astrophysics 40, 257-266 (1975)

**Note, in the Summary:**
"Velocity observations in 25 galaxies have been examined for possible systematic redshifts across their disks: a possible origin for the redshifts could be the radiation fields. Velocities increase towards the far sides in most cases. This is so for the ionized gas, for neutral hydrogen, and in some cases for the stars."

**Correlation coefficients:**
Figure 21 shows 'table 1', on page 258 which lists 25 galaxies, correlation coefficients and relevant columns (including sources of data):
9. MATHEMATICAL TEST TO DISTINGUISH TC FROM ACCELERATED EXPANSION

Note: Not to be confused with total expansion. This section is only limited to the derivative of constant expansion.

Vector calculation in TC (with constant expansion) differs from the accelerated expansion, as demonstrated in Figure 22 which shows two vectors observed at $d = 1\text{ mpc}$, with different radial velocities.

For simplicity, assume two SNLA. One at $1\text{ mpc}$ and the other at $2\text{ mpc}$, allows for the following measurements of distance and velocity:
initial velocity \((v_i)\) of \(\vec{A} = 50\) km/s

initial velocity \((v_i)\) of \(\vec{B} = 100\) km/s

distance \((d)\) of \(\vec{A} = 1\) mpc

distance \((d)\) of \(\vec{B} = 1\) mpc

Both objects travel from \(d = 1\) mpc to \(d = 2\) mpc

resulting velocity, at mpc = 2, of \(\vec{A} = \vec{A}_2\)

resulting velocity, at mpc = 2, of \(\vec{B} = \vec{B}_2\)

Calculating \(\vec{A}_2\) and \(\vec{B}_2\), using \(H_o\):

Using \(H_o\), both \(\vec{A}_2\) and \(\vec{B}_2\) will be determined by summing two vectors, since they are both at the same distance of accelerated expanding space. Thus,

\[
\vec{A}_2 \text{ (using } H_o \text{)} = 50 + 68 = 118 \text{ km/s}
\]

\[
\vec{B}_2 \text{ (using } H_o \text{)} = 100 + 68 = 168 \text{ km/s}
\]

Calculating \(\vec{A}_2\) and \(\vec{B}_2\), using TC

TC calculates the illusion of acceleration as velocity proportional to distance. Thus, the distinction is in the difference between \(\vec{A}_2\) and \(\vec{B}_2\). Because \(\vec{B}_2\) is 2x the value of \(\vec{A}_2\), \(\vec{B}_2\) will appear to increase by a factor of 2

Using equation: 2,

\[
\vec{A}_2 \text{ (using TC)} = t_p = \frac{t_\perp}{1 + (d_a * K)}
\]

\[
\vec{B}_2 \text{ (using TC)} = t_p = \frac{t_\perp}{1 + (2d_a * K)}
\]

Thus, between 1 mpc and 2 mpc \(\vec{B}_2\) will increase by 2x \(\vec{A}_2\), because it’s initial velocity \((v_i)\) was twice the rate.

Again, keep in mind that this distinction is only limited to the prime of constant expansion.


Contact: artpletcher@gmail.com