



Sigma Theory

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I. The Discovery Beyond Physics

The Nuker Team was organized in 1985 to use Hubble Space Telescope high-resolution imaging and spectroscopy to investigate the central structure and dynamics of normal galaxies. In the year 2000, this team made a fantastic discovery and subsequently postulated an interesting theory that would change how we view galaxies.

Our own galaxy is a giant rotating disc 200,000 light years wide. It contains over 200 billion stars like our own sun, circling around the center. The answers to a few questions about galaxies have always eluded us:

- How are galaxies formed?
- What is at their center?
- Why are they shaped as they are?

These questions were at the heart of the Nuker team's work. In the summer of the year 2000, the Nuker team discovered a commonality among galaxies that seemed too consistent to be coincidence. The stars at the outermost regions of each galaxy had a linear velocity that was directly proportional to the size of the galaxy and, more importantly, the central glowing mass. This velocity of these outermost stars is known as sigma (σ).

The Nuker team gathered massive quantities of data that illustrated this relationship. They took Doppler measurements of the velocity of the outermost stars in several galaxies to obtain their results. The most interesting data, however, was not the measurement of sigma, but rather, the measurement of the velocities of the stars closest to the central mass of the galaxies. This data produced one, startlingly huge, problem.

The center of each galaxy was breaking some of the most fundamental laws of physics!

The linear velocity of the central stars that were orbiting the central galactic mass measured as multiple times the speed of light. This was a problem; a very big one.

In order to understand the results and to try and make sense of the data, the Nuker team made a choice. They decided to turn to a phenomenon known as "Black Hole Theory." They postulated that, at the center of the galaxy, there must be a super massive black hole. They decided that only a black hole of such proportions could explain the speeds displayed by their data. The black hole would, supposedly, exert gravitational forces that even light could not escape, thereby

propelling the surrounding stars to speeds beyond the accepted limits of physics.

II. The Inescapably Theoretical

Black Hole Theory states that there are regions of space where mass has concentrated so densely that there is no way for anything, including light, to escape its gravitational pull. In fact, the laws of physics do not apply here. Space and time do not exist in the traditional sense, and neither does light.

What do the scriptures state about this phenomenon?

D&C 88:36-37:

All kingdoms have a law given; And there are many kingdoms; for there is no space in the which there is no kingdom; and there is no kingdom in which there is no space, either a greater or a lesser kingdom.

D&C 88:12-13:

Which light proceedeth forth from the presence of God to fill the immensity of space— The light which is in all things, which giveth life to all things, which is the law by which all things are governed, even the power of God who sitteth upon his throne, who is in the bosom of eternity, who is in the midst of all things.

D&C 88:49:

The light shineth in darkness, and the darkness comprehendeth it not;...

As I understand the scriptures, light permeates all of space, including these so called, "Black Holes." Also, there are no places that exist without space. Black Holes, as described by modern physics, simply cannot exist, according to the revealed word of God.

The Nuker Team, finding itself with an unsolvable paradox, turned away from the world of rational physics and grabbed on to the purely theoretical. They turned to a solution that would allow them to break the laws of physics without recourse and still remain in good standing with the accepted "truths" of the scientific community.

III. What Time Is It? Where?

In the context of this paper, I would like to propose a different theory of what is happening in the galaxy, and in galaxies throughout the universe. The proposal I make does not “throw the book” on physics out the proverbial window, but rather, takes a different approach to the problem. You might even say it takes time to understand it.

What if the data that shows the linear velocities of the stars near the central mass of the galaxies is accurate, but only according to where we currently stand?

In other words, what if we are not in the correct location to take the measurements? As with all gathered data, context matters.

Example:

If I were an astronomer who was given the photograph of a star taken from the Earth’s surface and asked to accurately describe what heavenly body it was, I would need context.

What if the camera used was on time-lapse photography mode? The streak that appeared on the photo would certainly look like a comet with a trailing tail. The context necessary in this example is that of time.

I suggest that time makes all the difference in the world to explain the Nuker Team’s data.

My Timely Idea: *What if the time construct of our universe is not homogenous? What if the time construct of each galaxy is based on the central mass and dilates outwardly in exponential fashion? If this were true, what would be the result and what evidence should we see of this phenomenon?*

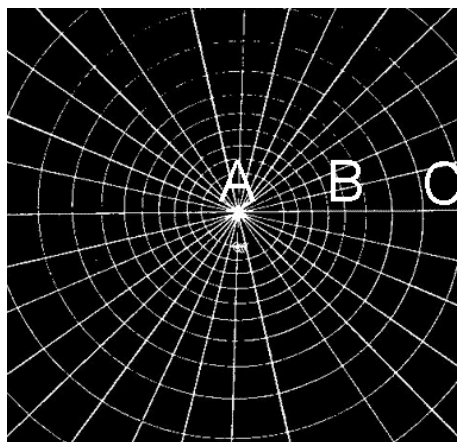


Figure 1

In Figure 1, time at point A would be measured as the standard. Time at points B and C would be determined based on their distance from point A. The measurement of time at point B would pass more slowly than that of time at point A and faster than at point C. In other words, the farther you get from the center, the slower the passage of time measurement is.

IV. **Evidences Left In Time**

If this model is true, then we should see some evidence to support it.

Evidence #1:

If one were to measure the velocity of moving bodies which were traveling closer to the center of the system than the observer, the speed could appear more rapid than it actually is. The speed could even appear to break the ultimate speed limit, the speed of light.

This proof comes from a basic understanding of velocity. We measure velocity as a distance covered in a period of time ($v=d/t$). If we measure the velocity of an object whose measurement of time is not consistent with our own, then our algebraic results would surely be incorrect.

Example:

If you try to measure the speed of a turtle by looking out the window of a car traveling at 65mph without taking into account that your car is moving, your turtle will appear to be traveling much faster than most turtles generally travel. The measurement of velocity presupposes a fixed location for observation and that time be constant in its measurement. This is not a new idea, and is generally described in Einstein's theory of general relativity.

So, if time is not constant throughout our galaxy, we could easily misinterpret the speed of the stars that are traveling in different radial locations from own. They might even appear to streak together at the center of the galaxy, much like a time-lapse photograph of a star streaking across our sky at night. The entire galaxy would appear to be in a spiral shape, as the stars in each different radius would travel at different velocities (slowing as you moved outward from the center). This is easy to see mathematically in $v=d/t$ (if t is different for each distance then the measured velocities would certainly vary as the time field varied, exponentially outward.)

Evidence #2:

Currently, man-made satellites have to be synced from time to time due to time loss as they orbit the Earth. The clocks in the satellites seem to lose time in their present orbits. This behavior is also predicted in Einstein's theory of special relativity.

V. Scriptural Space-Time

Within the pages of the Book of Mormon, Alma states the following:

Alma 12:24

And we see that death comes upon mankind, yea, the death which has been spoken of by Amulek, which is the temporal death; nevertheless *there was a space granted unto man* in which he might repent; therefore this life became a probationary state; *a time to prepare to meet God*; a time to prepare for that endless state which has been spoken of by us, which is after the resurrection of the dead.

Alma 40:6

Now there must needs be a *space* betwixt the time of death and the time of the resurrection.

Why does he seem to use the word *space* for time in the "Most correct book of any book on Earth?"

It is interesting to note that modern physics teaches us that space and time are so tightly integrated that they are known as a single entity known as "space-time." We have often heard about the space-time continuum, which further states that space-time continues throughout the known universe. To return for a moment to an earlier discussion, it is funny that this continuum does not supposedly continue within "black holes."

Einstein stated that space and time were like the lines of a Cartesian grid (crossing each other perpendicularly).

VI. Einstein, Newton and Gravitational Field Theory

I would like to now turn the discussion to a bit of field theory in order to better understand this new time field that we are evaluating. I refer you again to Figure 1. This diagram helps one to visualize a field emanating from a central location. The lines that circle outward help us to visualize that the strength of a field will decrease as we move farther away from the center of the field. This idea was explored by Newton and Einstein alike. They both desired to describe what gravity is and how it works.

Newton eventually arrived at an equation known now as Newton's Universal Law of Gravitation (see Figure 2).

Law of Universal Gravitation

Every object in the Universe attracts every other object with a force directed along the line of centers for the two objects that is proportional to the product of their masses and inversely proportional to the square of the separation between the two objects.

$$F_g = G \frac{m_1 m_2}{r^2}$$

F_g is the gravitational force
 m_1 & m_2 are the masses of the two objects
 r is the separation between the objects
 G is the universal gravitational constant

Figure 2

This equation/law teaches us how to calculate the gravitational pull of any mass within the gravitational field of another object. It shows that the distance between the two objects results in an exponential effect between the two objects.

Earlier in this discussion it was mentioned that Einstein believed that space and time formed a perpendicular grid throughout the universe. He

believed that the mass of any object would have an effect on that grid (see Figure 3).

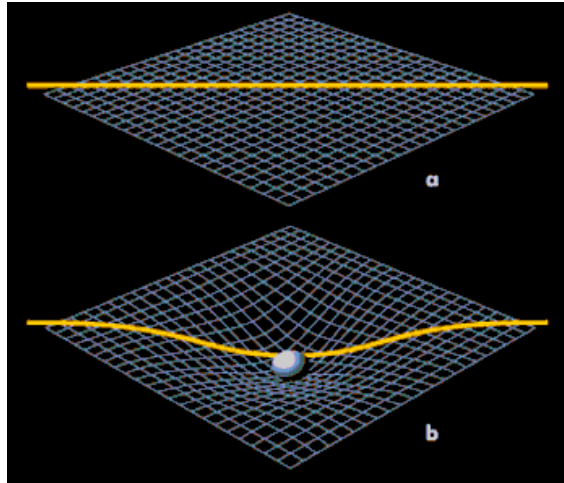


Figure 3

The effect of multiple objects within the grid would cause objects to follow the warped lines caused by other objects; thus creating a tendency for objects to fall toward each other (especially larger objects that create a larger warping effect).

This falling towards one another is, simply put, by Newton or Einstein, as acceleration.

Newton, in his second law of motion, stated that a force will accelerate a mass in the direction of the force. ($F=ma$)

Einstein, in his relativity theory, stated that there was no difference between a standard acceleration and a gravitational acceleration.

Example:

If you were floating in mid-air and saw a surface moving upwards to meet you; how would you know if you were falling towards the surface or if the surface were the one moving to meet you?

According to Einstein, you could not tell a difference. It is all relative,

Both Einstein's and Newton's views of gravity can be described using our Figure 1 field theory analogy. It is interesting to note, however, that gravity has its strongest effects closest to the center of the field.

Having discussed gravity as acceleration, let us now consider its fundamental equation. We have already seen that a force causes a mass to accelerate ($F=ma$). The generally accepted equation for acceleration is:

$$a = v/t$$

Notice that the equation for acceleration is very similar to our velocity equation. Velocity was measured as the change in distance over time. Acceleration is simply measured as the change in velocity over time. This teaches us that the acceleration of a mass towards another must be caused by some force.

Is there another explanation besides force in the case of gravity?

VII. The Gravity of the Situation

At this point, you may be wondering why there is so much talk about gravity when we started by talking about time dilation throughout our galaxy. Let me know attempt to answer that for you.

We have already seen that gravity behaves according to general field theory (Figure 1). We have also supposed that time dilates throughout the galaxy, in a predictable pattern according to radius from the center. The question to ask now is:

If time measurement is different based on radius from the center of the galaxy, what does that tell us about velocity and acceleration within this new time field?

Velocity and acceleration depend on time being constant. If it is not, the equations will have a very different meaning to observers in different locations with respect to the center of the time field (recall our previous discussion regarding the speedy turtle).

If time is measured differently in a radial direction, then according to the equations, time changes based on location in the field. This next point is harder to grasp, so follow along closely. A velocity is present when distance is changed over time. Likewise, acceleration is present when velocity changes with respect to time. What if time itself is changed?

A dilating time field creates acceleration towards the center for anything within the field.

Consider closely. Time moves more rapidly towards the center of the field. Velocity and acceleration are achieved, not through physical movement, but rather, through the movement of time measurement itself. It is all relative.

Example:

When a car travels at a constant velocity of 60mph it will cover a distance of 60 miles (distance) within the time frame of 1 hour. If the same car

accelerates 10 mph in every 10 seconds it will travel much farther in the same time period.

- Constant velocity of car $v = 60 \text{ miles} / 1 \text{ hour}$
- Acceleration of car $a = 10 \text{ miles} / 1 \text{ hour} / 10 \text{ seconds}$

(Note that in acceleration, constant distance is divided by exponential time measurement)

Now consider that in a time field, as you measure from distance B to distance C (see Figure 1) you are measuring a constant distance and your measurement of time has an exponential change from B to C (in other words, the equation is equal to an acceleration).

The very existence of the time dilation field generates an acceleration field towards the center. We call this acceleration field gravity.

VIII. Universal consequences

If true, time dilation throughout the galaxy is the very reason that gravitation exists! If this is true for the galaxy, then perhaps it is true for all space. The universe itself may have galaxies orbiting in different radii from a central location where time is the universal standard. Galaxies have time fields were different radii have time measured differently. Solar systems have time fields. Planets like Earth have time fields where satellites in orbit lose time compared to the radius we call the surface. Perhaps even atoms have time fields.

IX. Atomic consequences

If atoms themselves have a time field then their orbiting electrons would measure time differently in their respective orbits. Of course, if this crazy idea were true then we would probably have no end of trouble trying to measure the exact location and position of each electron. The trouble would arise in an uncertainty of such parameters without taking into account the time measurement difference. Without this knowledge of time dilation, you might even end up thinking that it was impossible to determine such things. This might lead us to create "principles" that state that all things are "Uncertain." An "Uncertainty Principle" we could call it.

X. Time Travel and Splitting the Arc

Does this mean that traveling through the universe is really like traveling through time? It all depends on relativity. If we travel a straight line then we would need to ask if we are moving with respect to the center of a time field.

*Are we moving towards the center?
Away from the center?*

*Along a radial line?
How could we measure the differential?*

These questions prove difficult to answer.

First, if we are moving along a radial path, our time measurement should be constant.

Example:

On the surface of the Earth, we are all very close in radial distance from the center of the Earth, and therefore, should experience very similar measurements of time, and therefore, velocity and acceleration.

Next, if we are moving away or towards the center of the field, there should be a difference in how time is measured, but that difference is only with respect to other locations.

Finally, it would seem that the larger the field, the more effect it would have, but larger distances would be required to be traversed in order to notice an effective time differential.

Example:

On the surface of the Earth, we are all at the same radius with respect to the center of the Earth's time field, but one side of the Earth is at a very different radius from the far side in regards to the distance from the center of our galaxy. However, because the galaxy's field is so much larger, the difference in radius is almost negligible in regards to the total size of the field.

The really interesting question is whether or not a travel route could be plotted that would geometrically allow a traveler to always take advantage of the time measurement differential in order to actually decrease the time required for a trip with respect to his origin.

XI. One Final Pearl of Wisdom

Within the pages of the Pearl of Great Price we find a Facsimile with the following interpretations by the LDS Prophet Joseph Smith:

On the measurement of time and the changing scale of time:

Fig. 1. Kolob, signifying the first creation, nearest to the celestial, or the residence of God. First in government, ***the last pertaining to the measurement of time. The measurement according to celestial time, which celestial time signifies one day to a cubit. One day in Kolob is equal to a thousand years***

according to the measurement of this earth, which is called by the Egyptians Jah-oh-eh.

Fig. 4. Answers to the Hebrew word Raukeeyang, signifying expanse, or the firmament of the heavens; also a numerical figure, in Egyptian **signifying one thousand; answering to the measuring of the time of Oliblish, which is equal with Kolob in its revolution and in its measuring of time.**

On the hierarchal governance of stars, planets, and systems:

Fig. 5. Is called in Egyptian Enish-go-on-dosh; this is one of the governing planets also, and is said by the Egyptians to be the Sun, and to borrow its light from Kolob through the medium of Kae-e-vanrash, which is the grand Key, or, in other words, the governing power, **which governs fifteen other fixed planets or stars, as also Floese or the Moon, the Earth and the Sun in their annual revolutions. This planet receives its power through the medium of Kli-flos-is-es**, or Hah-ko-kau-beam, the stars represented by numbers 22 and 23, receiving light from the revolutions of Kolob.

Within other verses of modern day scripture we find a few more references of note.

On the different measurements of time:

D&C 130:4-5

In answer to the question—Is not the reckoning of God's time, angel's time, prophet's time, and man's time, according to the planet on which they reside? I answer, Yes.

On the hierarchy of time:

Abraham 3:4-9

4 And the Lord said unto me, by the Urim and Thummim, that Kolob was after the manner of the Lord, according to its times and seasons in the revolutions thereof; that one revolution was a day unto the Lord, after his manner of reckoning, it being one thousand years according to the time appointed unto that whereon thou standest. This is the reckoning of the Lord's time, according to the reckoning of Kolob.

5 And the Lord said unto me: The planet which is the lesser light, lesser than that which is to rule the day, even the night, is above or greater than that upon which thou standest in point of reckoning, for it moveth in order more slow; this is in order because it standeth above the earth upon which thou standest, therefore the reckoning of its time is not so many as to its number of days, and of months, and of years.

6 And the Lord said unto me: Now, Abraham, these two facts exist, behold thine eyes see it; it is given unto thee to know the times of reckoning, and the set time,

yea, the set time of the earth upon which thou standest, and the set time of the greater light which is set to rule the day, and the set time of the lesser light which is set to rule the night.

7 Now the set time of the lesser light is a longer time as to its reckoning than the reckoning of the time of the earth upon which thou standest.

8 And where these two facts exist, there shall be another fact above them, that is, there shall be another planet whose reckoning of time shall be longer still;

9 And thus there shall be the reckoning of the time of one planet above another, until thou come nigh unto Kolob, which Kolob is after the reckoning of the Lord's time; which Kolob is set nigh unto the throne of God, to govern all those planets which belong to the same order as that upon which thou standest.

10 And it is given unto thee to know the set time of all the stars that are set to give light, until thou come near unto the throne of God.