

# **If background EM radiation forms a locality relative to which EM waves propagate their speed/wavelength energy mix then the time dilation theory is not needed.**

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## **ABSTRACT**

Observations that the speed of electromagnetic waves are reliably measured to travel at the speed of light "c" relative to the observer and proved to be independent of the emitters relative speed have resulted in the theory of the dilation of time as a practical interpretation of the theory of special and general relativity. This papers alternative theory suggests background EM radiation provides the locality that EM waves latch onto and set their speed/wavelength mix relative to. As such back ground radiation will exist locally to all emitters and observers of EM waves this would explain the observations that currently force the time dilation theory. In turn, if time dilation does not exist then the correlation between extended atomic half lives and speed are in fact an observation of a transfer of energy to the atoms stores during accelerating events they have experienced rather than proof of the rate of time slowing down at speed. This theory is applied to the results experiments bouncing laser pulses off a reflector on the moon as observational confirmation.

## **INTRODUCTION - HOW TIME DILATION BECAME ACCEPTED**

The evolution and subsequent apparent confirmation of the idea that the rate of time is variable and slows down at high speeds is surmised below -

### **The observational dilemmas**

1. Accepted recognised tests measuring the speed of electromagnetic waves emitted by a moving source all record an answer of c relative to the observer not the emitter.
2. The emitters speed cannot influence the subsequent speed of its EM waves because Earths observation of distant stars moving in an elliptical orbit is not distorted by the positive/negative relative motion of the emitter due to its orbit.

3. The idea that there is an "aether" covering the vacuum of space that emitted EM waves latch onto and set their speed relative to has been dismissed because tests all fail to detect a relative speed between that aether and an observer.

### **The resulting theory - Time slows at high speeds**

Current special relativity mainstream understanding therefore concludes that travelling at speeds slows down the rate at which time passes to thereby explain how light apparently supernaturally aligns itself with an observer that it has never come into contact with and possibly did not even exist when the light was originally emitted. The Lorentz transformation formula for the speed related "time adjustment" effectively force all adjusted distance/time speed calculations to have an upper limit of  $c$  and filters out any relative speed that existed between the emitter and observer.

### **Observational confirmation of the theory that time slows at high speeds**

This slowing down of time at high speeds is further confirmed by the observed slowing down of atomic activity and decay at high speeds. The observed correlation between the half life of Muons and their speed is a notable example.

## **DISCOMFORT WITH TIME DILATION**

We all instinctively perceive that the rate at which time passes is constant and is a non negotiable dimension of reality. The "difficulty understanding" the theory of relativity is not in fact a difficulty, it is simply an instinctive rejection of what it says due to its clear conflict with our observation of existence and reality. The vastness of the universe and the existence of black holes etc are so incredible they cannot be comprehended. Despite all that most of us are still comfortable with the instinct that an alteration to the rate of time would be super natural.

Although tests conclusively confirm the motion of an emitter does not influence the speed of its EM waves there is a lack of tests involving moving observers. Additionally as EM waves are known to alter their speed/wavelength mix as they transmit through mediums, it is not surprising that measures of the speed of an EM wave return a value of  $c$  relative to the measuring equipment.

The Apollo 15 mission left a reflector on the moon creating the opportunity to measure the average speed of EM waves across the vacuum of space between earth and the moon. The results reported that the EM pulses returned to the earth at the speed of  $c$  relative to the moon reflector and  $c + 200\text{m/s}$  relative to the receiver, the additional  $200\text{m/s}$  being the receivers speed due to the earth's rotation. In other words there is no supernatural alignment of the speed of the wave to the observer ahead of its contact with that observer.

## A THEORY TO FIT ALL WITHOUT TIME DILATION

Having considered the general theme of the observational results and the conflicts that have resulted in the dilation of time theory, I ask is it not more likely that -

**The speed of light is relative to a local aether, the form of which may vary but there must always be one.** - (Observational evidence for laser pulses between the earth and moon detailed at the end)

1. If there is a system with enough energy/matter to emit or observe(absorb) EM radiation then there is always a local aether of some form to which that EM radiation latches onto and sets its speed and wavelength energy mix relative to.

2. The level of influence that local aether has on EM waves varies depending upon the type of aether, but at the very minimum will provide a locality against which an EM wave sets its speed wavelength mix relative to in the direction of projection of that EM wave transmission. For some aether mediums that level of influence may extend to reducing the speed to below  $c$  in a vacuum and/or altering or drifting the line of travel.

3. The local aether is large enough to contain any motion of an emitting object thereby preventing that motion distorting the emitted EM transmission as its speed wave length mix is relative to the aether and not the emitting object. For example a system of two stars orbiting each other create an aether that is large enough to accommodate all of their motions relative to each other.

4. What provides the local aether that EM waves choose to latch onto and travel at a speed wavelength mix relative to is variable and has a relative seniority of taking control of the EM waves configuration. I suggest that pecking order of aethers is approximately as follows.

High density mediums (glass or water)

Over ride

Low density mediums (gas, air)

Over ride

Back ground or traversing EM radiation

Over ride

Gravitational fields

The observation of EM waves reconfiguring their speed/wavelength mix as they travel through different mediums is undisputed although the quantum mechanics is not yet agreed. The first two categories in this list are therefore nothing new. However the many tests in vacuum sealed chambers etc suggests back ground radiation and even gravity are also controlling aethers in the absence of an overriding aether medium.

The above pecking order of controlling aether influences on EM radiation also indicates why there is always going to be such an influence at both the points of emission and observation. At least one of them will be present as a containing aether for a system of matter/energy capable of emitting or absorbing EM radiation due to their evolutionary formation being interlinked. At the very least you cannot have matter without a surrounding gravitational field.

5. For an EM wave that has travelled light years across space it will be continuously aligning itself with different over riding aethers. The final average speed attained for an EM signal from emitter to

observer will therefore depend upon the local aethers and their relative motion that it was influenced by across its journey.

6. The relative speed of the emitter and the observer therefore translates into an alteration to the observed frequency energy as follows-

-If the separating velocity of the emitting star and the observer =  $v$

-Emitted frequency energy =  $c/\lambda$ , where  $c$  is relative to the surrounding aether for that emitting star.

-The measured frequency by the observer =  $(c-v)/\lambda$

-But that relative frequency energy will have been reconfigured by the aether local to the observer to a revised  $c'$  which is  $c$  relative to that local controlling aether and a revised corresponding wavelength  $\lambda'$  for that frequency. =  $c'/\lambda'$ . In experimental practice the aether at the observer end will be the medium of the actual measuring equipment.

- $c'/\lambda'$  is less than  $c/\lambda$  due to the relative speed  $v$  being negative. I suggest we call this "Red Shift"

**Atomic activity slows as a result of energy transfers during accelerating events which can force an observed apparent correlation with speed.**

1. It is the ageing/ functioning of an atomic system that slows down relative to a time period that can be observed in fast moving objects such a Muons, it is not an observation of time slowing down.

2. As speed is relative, it cannot be speed that causes the slowing down of atomic activity, it must be different levels of acceleration that have been applied to that atomic system that alter the rate of atomic ageing/functioning activity.

3. The slowing down of atomic activity in response to accelerations experienced must be compounding with each accelerating event regardless of the direction of the acceleration. eg slowing a fast moving object back down will not increase the atomic activity, it is an additional accelerating event that further slows the atomic activity down even though the object is no longer travelling at the higher speed.

4. Accelerating events are a transfer of energy to the internal energy stores of the atom. In the event that the energy transfers across time exceed an atoms capacity the atom will increase mass and change form.  $E = MC^2$

$$t' = \frac{t}{\sqrt{1 - \frac{v^2}{c^2}}}$$

5. Lorentz transformation This is not about time being distorted by speed, Its quantifying the change to the rate of atomic activity and decay across a given time period where the answer is in terms of additional time needed for the atoms to complete the original level of atomic activity. Although calculated as a function of the objects speed and the "normal time lapsed" the rate of atomic activity difference was in fact defined at the point it was accelerated up to that speed.

6. Special relativity and general relativity really are "equivalent". As special relativity is in fact about atomic activity being slowed down by accelerating events, the same applies for general relativity. Gravity is an accelerating force although it does not necessarily result in an objects motion changing. It follows that gravity will slow atomic activity down in exactly the same way an actual change in motion type of acceleration does.

**If the above is correct the double entry book keeping for opening and closing energy suddenly becomes much easier to understand. -**

1. If you accelerate an object in space then decelerate it, if you assume any heat and light generated by the rocket is an unavoidable by product of the process, then it would appear to destroy the kinetic energy formed then eliminated. However as the energy stores within the atoms are increased with every accelerating event regardless of the direction of the acceleration no such loss or destruction of energy has occurred. The energy to accelerate and decelerate the object has transferred to the energy stores within the atoms that were accelerated/decelerated.

2. Grounds reaction to an object = is constantly accelerating the object at  $10\text{m/s}^2$  upwards on earth. That appears to be a force that consumes no energy, however it is in fact no such free of energy cost force. The energy needed to deliver that constantly accelerating force is being delivered by the atoms. The force is using up the atoms store of energy and they are ageing faster as a result of having to provide the reacting force on the object. Atoms are mostly empty space yet they manage to provide such reaction forces due to their energy stores.

3. Friction cancelling out kinetic energy - The difference is atomic damage to the atoms under friction. The moving objects deceleration is simply additional acceleration compounding to the energy stores in the atoms that have been accelerated then decelerated. That plus the noise heat by products of the friction are fuelled by atomic energy extracted from the atoms involved in providing the friction.

## **OBSERVATIONAL EVIDENCE**

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### Extracts from the paper -

#### LUNAR LASER RANGING TEST OF THE INVARIANCE OF $c$

DANIEL Y. GEZARI NASA/Goddard Space Flight Center, Laboratory for ExoPlanets and Stellar Astrophysics, Code 667, Greenbelt, MD 20771 and American Museum of Natural History, Astrophysics Department, New York, NY 10024

"OBSERVATIONS Laser light pulses were launched to the Moon from the Apache Point Lunar Laserranging Operation (APOLLO) facility (Murphy et al. 2004, 2007) installed at the 3.5- meter telescope at Apache Point Observatory (APO) on 11 November 2007. The pulses were returned by the AP15RR retro-reflector deployed on the lunar surface during the Apollo 15 mission.

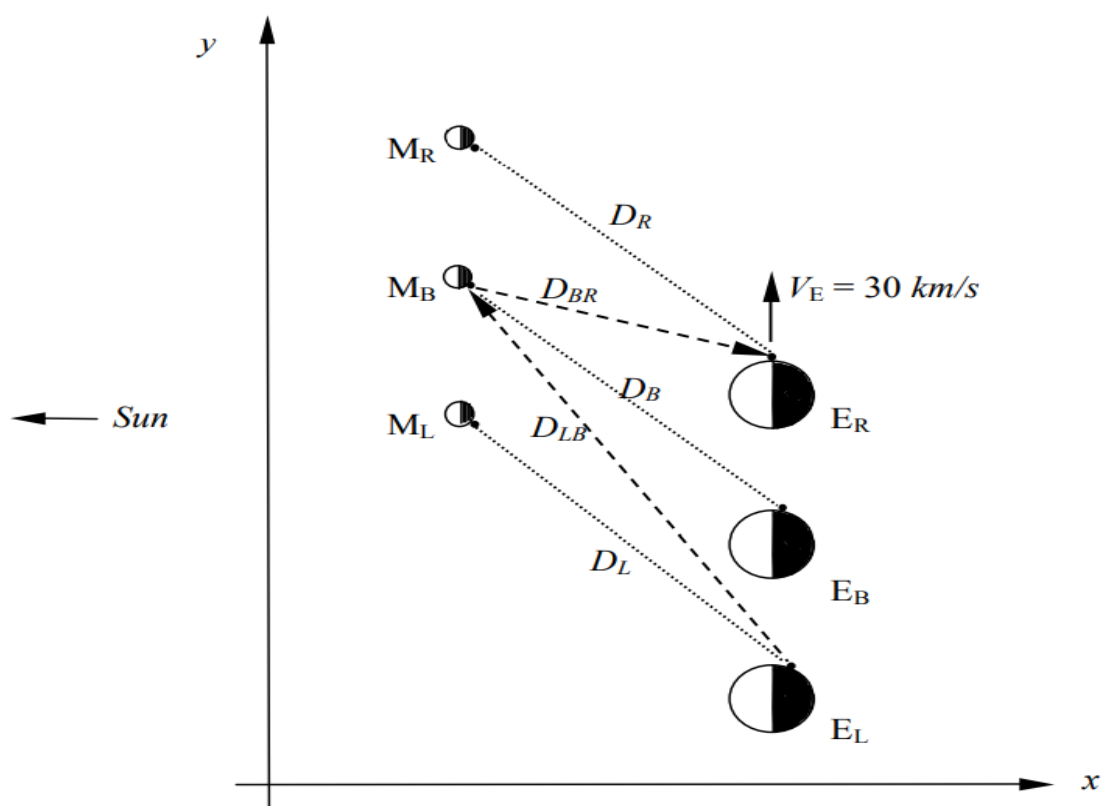


Figure 2: Schematic illustration of the  $x,y$  positions of the Earth (E) and Moon (M) in the non-rotating solar system barycentric J2000 inertial frame. The distances  $D_L$ ,  $D_B$  and  $D_R$  are the actual separations of APO and A15RR calculated in the J2000 frame at the moments of launch (L), bounce (B) and receive (R). The distances  $D_{LB}$  and  $D_{BR}$  are the optical path lengths travelled from launch to bounce (LB) and from bounce to receive (BR), each derived from the position of APO and the position of A15RR at times separated by  $\sim 1.3 \text{ sec}$ "

In the table below, the data for T, DL, DR, DLB and DBR are extracted from the Gezari paper test results records.  $V_a$ , Loss and  $V_o$  are my calculations based thereon.

Laser pulse reading	Recorded Time pulse launch to pulse reception	Distance at launch = Pulse emitter to reflector	Distance at reception = pulse receiver to reflector	Average Speed for the total round trip	Difference between measured average and c in a vacuum	Speed of projector and receiver due to earths rotation
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For distances travelled relative to the earth and moon, the rotation of the earth being the relative motion

Number	T Nsec	DL km	DR km	Va = (DL+DR)/T m/s	Loss = Va - c m/s	Vo = (DL-DR)/T m/s
1	2637147909	395298.7883	395298.2404	299792448.53	-9.47	207.78
2	2637147394	395298.7152	395298.1673	299792451.56	-6.44	207.77
3	2637147393	395298.7048	395298.1569	299792443.82	-14.18	207.77
4	2637147055	395298.6630	395298.1151	299792450.53	-7.47	207.77
5	2637145958	395298.4960	395297.9482	299792448.59	-9.41	207.75
2632	2636467152	395196.7306	395196.2106	299792447.88	-10.12	197.24
2633	2636466870	395196.6910	395196.1709	299792449.83	-8.17	197.24
2634	2636466849	395196.6811	395196.1611	299792444.76	-13.24	197.24
2635	2636466755	395196.6711	395196.1511	299792447.86	-10.14	197.24
2636	2636466623	395196.6513	395196.1313	299792447.90	-10.10	197.24

For distances travelled relative to the sun, the rotation of the earth plus its orbit around the sun being relative motions

Number	T Nsec	DLB km	DBR km	Va = (DLB+DBR)/T m/s	Loss = Va - c m/s
1	2637147909	395328.4104	395268.6244	299792450.88	-7.12
2	2637147394	395328.3373	395268.5514	299792453.90	-4.10
3	2637147393	395328.3269	395268.5410	299792446.17	-11.83
4	2637147055	395328.2851	395268.4992	299792452.88	-5.12
5	2637145958	395328.1180	395268.3323	299792450.94	-7.06
2632	2636467152	395226.3238	395166.6236	299792450.23	-7.77
2633	2636466870	395226.2841	395166.5840	299792452.18	-5.82
2634	2636466849	395226.2742	395166.5741	299792447.11	-10.89
2635	2636466755	395226.2643	395166.5642	299792450.21	-7.79
2636	2636466623	395226.2445	395166.5444	299792450.25	-7.75

The Gezari paper concluded -- "(the test) implies that a preferred reference frame exists for the propagation of light. However, the present experiment cannot identify the physical system to which such a reference frame might be tied."

**Speculatively applying this papers theory that back ground EM radiation provides an influencing locality or aether to this data -**

Taking the first set of time distances between the earth and moon and ignoring their motion relative to the sun, the story is a very simply one of the light pulses travelled across the vacuum of space between the earth and the moon at the speed of light relative to that earth/moon coordinate

reference frame. The recorded average speed is slightly less which can be attributed to a loss at the point of reflection plus due to part of the journey going through earth's atmosphere.

Thinking of this journey as having an average speed of  $c$  relative to a given medium, this journey can be thought of as having 4 controlling medium stages -

**1st Stage** From the emitter to the vacuum of space through earth's atmosphere -

As we know light does reconfigure itself in actual observational reality for different mediums it is fair to conclude that the laser pulses of this test travelled through the atmosphere at a speed of  $c$  relative to that atmosphere. On the outbound path they therefore accelerated as the atmosphere's refractive index reduced with altitude. As the atmosphere was moving towards the reflector on the moon at 200 m/s due to the earth's rotation, it follows that the laser pulses would therefore try and accelerate up to=

+ a speed of  $c$  in a vacuum relative to the atmosphere, where that atmosphere's refractive index reduced to that of a vacuum's due to the atmosphere phasing off into a vacuum.

+ 200 m/s speed of the atmosphere relative to the reflector on the moon

However stage 2 tells us some other influence took over to prevent this being the resultant speed to the moon's reflector.

(For the commentary on the next two parts to the round trip the possibility that the outbound trip was at  $c + 200\text{m/s}$  and the return journey was at  $c - 200\text{m/s}$  is ignored on the basis that makes no sense at all and there is no reason to even try and look for such a possible explanation)

**2nd stage.** From the edge of earth's atmospheric influence through the vacuum of space to the reflector on the moon-

The observed average speed across the vacuum of space was simply  $c$  for in a vacuum relative to the moon and earth frame of reference. As explained in stage 1 of this round trip, the inherent speed from the laser pulse launch through earth's atmosphere towards the moon's reflector was =

+ ( $c$  in a vacuum relative to the moon)

+ (200 m/s speed of earth's atmosphere towards the moon due to its rotation)

As the actual result was simply  $c$  in a vacuum relative to the moon something must have taken over influencing the laser pulse's speed/wavelength mix after it left the earth's atmospheric influence.

(The transition of influence may have been phased). Whatever that influence was, it deleted or prevented the 200m/s earth's rotational speed influence and somehow aligned the speed to  $c$  in a vacuum relative to the line from the earth's surface to the moon's surface. This is consistent with established principal/observations that the motion of the emitter does not influence the speed of its EM radiation emissions and distort the resultant signals.

**The question is** --- what took over being the controlling influence? Looking at the schematic diagram there is only one suspect, it is the background radiation of the sun which these test laser pulses have to traverse to get from the earth to the moon. In the vacuum of space between the earth and the moon there is nothing else to suspect.

**3rd stage.** From the moon's reflector to the earth's atmosphere -

The reflected pulse travelled at  $c$  across the space vacuum relative to the moon's reflector, which is also the same as relative to the background EM radiation of the sun due to there being no



atmosphere on the moon. Therefore the pulses must have impacted with the earth's atmosphere at a relative speed of  $c$  + the 200m/s relative motion of the atmosphere due to earth's rotation. This is in conflict with the mainstream understanding of relativity and the resultant time dilation theory.

**4th stage.** From the edge of earth's atmosphere to the receiver -

Having impacted upon the earth's atmosphere at a total relative speed of =

+  $c$  in a vacuum relative to the moon's reflector (and the sun's background radiation)

+ the 200 m/s relative motion of the atmosphere due to the earth's rotation,

The earth's atmosphere takes over control of the light's speed/wavelength configuration mix reducing it at any time to  $c$  for the atmosphere's refractive index at that point in time and there by steadily decelerating it as the atmosphere's refractive index increases as altitude decreases. At the point of contact with the receiver it will have decelerated down to  $c$  relative to the atmosphere and refractive index local to the receiver and its wavelength will have shortened by a corresponding amount to keep the frequency energy the same as earlier higher speed stages in the pulse's journey.

### **To what extent does background EM radiation influence EM waves?**

The motion of denser mediums such as glass are known to influence the speed and direction of light transmitting through them. If background EM radiation also forms such a controlling aether on EM waves then in the scenario of this test the laser pulses could have configured themselves to a speed relative to the sun being the stationary local point to the controlling aether medium. If the speed  $c$  was relative to the sun then the path travelled at that speed would have been DLB and DBR and not DL and DR. Unfortunately the total distance of these two round the trip journeys are the same and therefore both deliver the same  $c$  average speed. This table of possible relevant data does not therefore tell us which one is the frame of reference and in turn fails to advise us of the true extent of the sun's background EM radiation's influence on the laser pulses.

The test did however detect no "drift" or evidence of an aether despite the sideways velocity of 30km/s of the earth moon coordinates relative to the sun. Additionally if background radiation has an influence on EM waves that is comparable to that of atomic based transmitting mediums then the relative speed of the photons to that background radiation could be expected to corrupt the paths and relative speeds travelled by EM waves. This test clearly demonstrates that the laser pulses were not under any such level of influence when traversing across the sun's background EM emissions. Additionally it is well observed that photons do not interact with each other, incidents where they do is an exceptional high energy contrived event. For example EM wave interference is competing photons delivering opposing signals, it is not photons actually interacting with each other. The general theme of quantum mechanics is one of electromagnetic fields interacting rather than particle interaction.

It is therefore credible and consistent with observational evidence that background EM radiation has a sufficient influence to persuade an EM wave to configure its wavelength/speed mix to be relative to the local vicinity in which it is currently travelling, but only in its projected line of travel and the radiation does not influence that projected line of travel. In the case of this test the vicinity relative to which  $c$  was set was that of the sun's solar system, however as  $c$  only applied in the line of projection the actual path travelled at speed  $c$  was the basic earth to moon coordinates DL and DR.

The relative vector speeds DLB and DBR if they could be observed by the sun would therefore return speeds higher and lower than  $c$ , but as the pulses were not in the sun's direction could not be observed by the sun.

## CONCLUSION

Background EM radiation forming the reference frame relative to which EM waves propagate their speed/wavelength frequency mix would mean there is no need for the time dilation theory to reconcile observations. The background radiation theory also provides a better fit for the current observational data that needs to be reconciled, most notably covering the unique average speed results measured by the lunar laser range tests. Finally it does not suffer the inherent discomfort we have with time dilation due to its total conflict with our daily experience and perception of reality. This paper offers no quantum mechanical explanation for the physical behaviour it suggests as an alternative to time dilation but there is nothing remotely unusual with that status. Even the quantum mechanics of light's propagation through atomic mediums is still a moving target. On the balance of probabilities this paper suggests this alternative reconciliation of observations to be the more credible and rewarding one to investigate further and even apply to actual practice.

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