

Speed of Light

A Scientific Evidence

Abstract:

According to Physics; speed of light is a unified speed for all waves of the electromagnetic spectrum, and the uppermost speed in vacuum. In contrary to motion of objects which is **relative**; it is constant; not affected by the motion of either the observer or the source, so it is denoted "c" which represents "**the universal constant of motion**". Its value is **299792.458** km./ sec., which is finite but so huge, that cannot be defined by usual earth measures, except by an astronomical measure by units of distance in a unit of time, and our earth-moon (E-M) system is the choice. For a constant equation forever to be made; parallel to the absolute speed c in vacuum, i.e. its motion is isolated from any external effect; the E-M system should be also isolated, which means that it is considered motionless around sun "**as it was reckoned**". In a context of uppermost speed; it is cited in all Monotheism books that "**1000 year is like a day** (as it was **reckoned**)", speed of light value in vacuum is found really to be "**comparable to**" the distance of 1000 lunar years (12000 moon's cycles) relative to a far star in a period of one day (one earth rotation period).

According to NASA; the moon's average orbital velocity is about: **1.023** km./ sec., considering the value: **1.022794272** (about **1.023**) km./ sec.; hence the lunar distance in 1000 lunar years in the isolated E-M system is: **2583134723** km., the day length relative to a far star is: **86164.09966** sec., hence, the uppermost speed in vacuum is: $2583134723 / 86164.09966 = 299792.458$ km. per sec., which is the exact accepted value in Physics since 1983 in Paris conference for measurements.

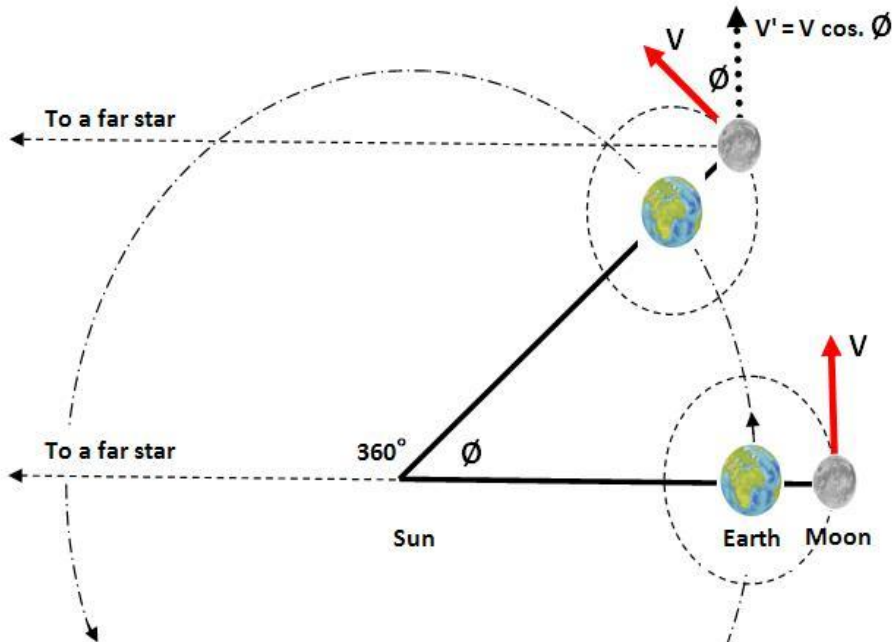
By analysis of this constant equation to reveal the initial condition of the E-M system in the solar nebula; it is found that initial density of earth is similar to that of sun and moon and it was so low reflecting a nebula character. The day length relative to sun (synodic day) is found 4 hours only, and the moon was near the earth, which means that the moon is receding and day is increasing. The present annual moon's recession rate by using lasar telemetry is found to be 3.82 cm./ year.

The solar disc rotation period, and initial earth average revolution velocity were defined, hence the present mean earth distance from sun, earth average revolution velocity, or the earth year are defined exactly as in Astronomy, Verifying that this equation linked to speed of light is not accidental, but a **key** to disclose the **knowledge of ALLAH**, because Olas Romer was the first to prove in 1676 that speed of light is finite, and its value was not accepted except in 1983. This equation reveals also world Unification in origin, dynamics, and a Universal Unified Constant speed. It reveals more Universal Order; as everything is carefully planned and ingeniously designed, with no coincidence, chance, or chaos. In brief; this simple highly informative equation is a **Reserved Evidence** through Prophets for **Monotheism**, to the sage man to know for certain that; **ALLAH is One and Only**: the Creator, the Eternal; not visible or divisible, with Infinite Greatness and a Supreme Dignity.

(1) Earth-Moon System:

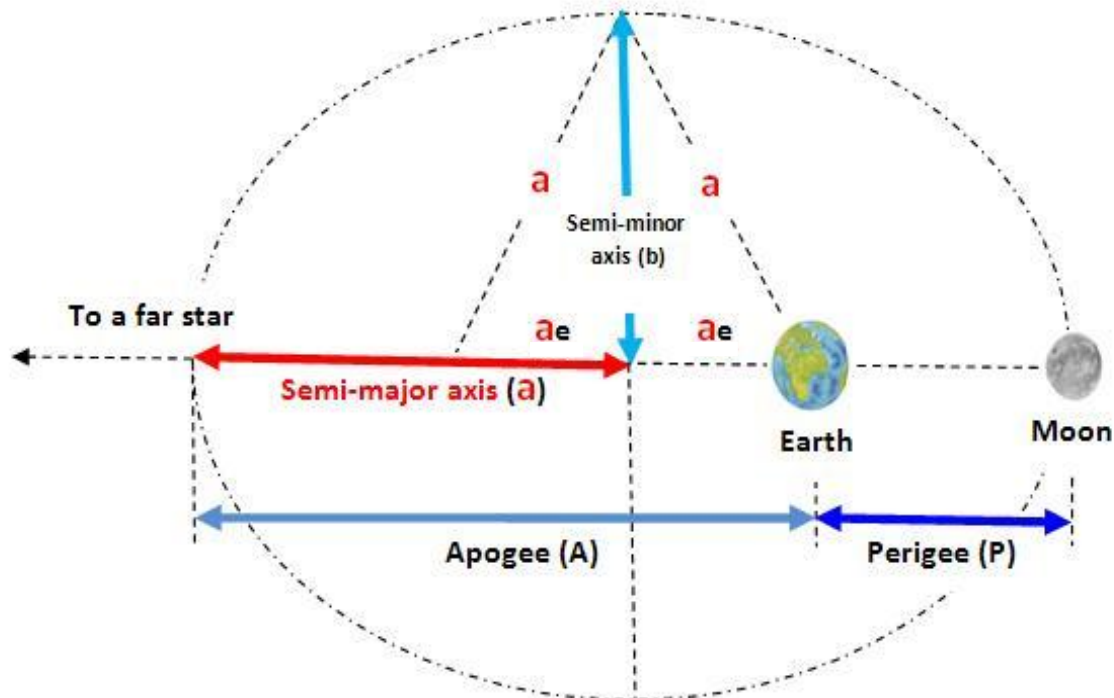
In Physics; the velocity is a **vector** quantity like force and acceleration; i.e. it has a magnitude and a direction. To accelerate in a certain time an object moving uniformly in a perfectly circular orbit; is to increase its velocity magnitude, or to change its direction relative to a far fixed point. When the direction changes; then it has an acceleration due to an external effect from outside its isolated system of motion. The angle of the change reflects the degree of the outside effect.

According to the geocentric model; it was reckoned that the earth is motionless; i.e. its motion around sun is zero, and the moon circles it uniformly in a perfectly circular orbit. In this case, the moon's orbital velocity (v') is constant because it is forever tangential (90°) to the line between the two centers of the earth and moon, but its direction changes every moment; hence it is accelerating every moment. After one cycle (360°); it comes back again to its original direction relative to a far star, so, in every cycle there is no acquired acceleration due to an external force from outside the isolated earth-moon (**E-M**) system, as if the motion of the moon is in a straight forward linear motion forever by the same magnitude. By analysis; the component of the orbital velocity (v') in the original direction after one cycle; has the same magnitude and direction exactly as its original value (v) and direction at the beginning of the cycle ($v' = v \cos 0^\circ = v \times 1 = v$). In this case; the moon's orbital velocity is basic, i.e. it is devoid from any acquired acceleration because the E-M system is considered isolated from any external effect.



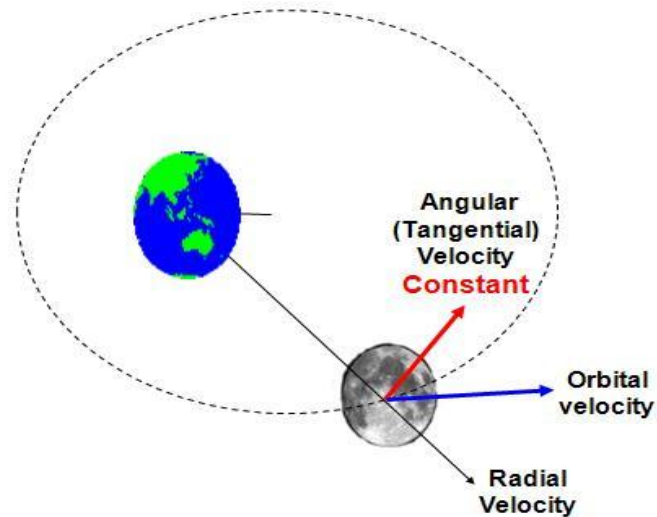
According to the heliocentric model; the moon circles the earth, and it circles the sun also to cover an angle (ϕ) around sun, each cycle around earth, relative to a far star. Hence; the direction of the moon's average velocity is changed by the same angle each cycle, because the whole E-M system is transferred each moon cycle to cover this angle around sun relative to a far star.

Because of the change of the moon's average velocity each cycle relative to a far star; there is an acceleration in the moon's average velocity. In this case; the E-M system should not be considered isolated. Rather than a perfectly circular moon's orbit as reckoned before; it is an ellipse due to the effect of implied ratio of motion around sun in the average velocity.



According to the basics of an ellipse; all values of the motion of the moon can be defined: The eccentricity (deviation from a circle) $e = ae/a$, Apogee (far distance) $A = a(1 + e)$ & Perigee (near distance) $P = a(1 - e)$; where the semi-major axis $a = (A + P)/2 = 2R / \{1 + (1 - e^2)^{0.5}\}$. The mean distance $R = (a + b)/2$; the semi-minor axis $b = \{a^2 - (ae)^2\}^{0.5}$. The variation ratio in the average velocity or the mean moon's distance: $(A - P)/a = 2(A - P)/(A + P) = 2ae/a = 2e$. The orbit length $L = 2\pi R = V \times T'$; where V is the average velocity, T' is the moon's revolution period and the value $\pi = 3.1415926535898$. The angle $\emptyset = 360(T'/Y)^\circ$, where Y is the revolution period of the earth.

Relative to a far star; a revolution period of the moon (a sidereal month) is: **27.32166088** mean earth days, and a revolution period of the earth (a sidereal year) is: **365.25636** mean earth days, hence the angle \emptyset is: $360 \times (27.32166088/365.25636) = 26.92847817^\circ$ (about 27°). By mathematical analysis; the average velocity (V) component in the original direction after one cycle; represents the ratio of the basic velocity (v') if the motion around sun is zero, i.e. if the system of moon's motion around earth is isolated from any external effect: $v' = V \cos \emptyset = V \cos 26.92847817^\circ = 0.8915725423 V$. The rest value to complete 1: $1 - 0.8915725423 = 0.1084274577$ (about 11%)^{1&2} represents the variation ratio (2e) due to motion around sun; hence the ratio $(V \cos \emptyset)$ should equal the ratio $(1 - 2e)$ since formation of the E-M system, and the mean orbit eccentricity e now should be: $e = 1 - \cos \emptyset / 2 = 0.05421372885$ (about **0.055**).



In Astrophysics, the orbital velocity of the moon can be analyzed at any point of the orbit into two components, one of them is the radial velocity which changes from one point to other, while the other is the angular velocity, and it is **constant** because it is always tangential. so it represents the constant (basic) fraction of the moon's average velocity (Astrophysics, Zeilik & Smith, p.17)³.

(2) Earth-Moon System as a measure for speed of light:

Since 1983 the accepted value of the speed of light (c) is huge: **299792.458** km. per second in vacuum, so what is the distance should be covered by the speed of light in a day, it is an out of imagination value, no distance on the surface of earth is suitable, it necessitates to be described an astronomical measure by the motion of a celestial object with a known motion, hence the moon is the choice; because it is the nearest celestial object and its motion around earth is known well.

In Physics; the light and all physical forces in nature have a unified uppermost magnitude of speed, in vacuum, i.e. in a system of motion isolated from any outside effect. So, to use the E-M system as a measure in a Balanced Equation with light; it should be isolated also from any outside effect, i.e. as it was reckoned before that earth has no motion around sun, and the moon is devoid from the variation ratio in distance; that cannot be detected by the naked eye.

By using the isolated E-M system as a measure to the distance covered by the speed of light in a day; the motion should be relative to a far star, hence the moon's mean orbital velocity should be analyzed in the original direction after a cycle; and the rotation period of earth (a sidereal day) is considered, which is: **86164.09966** seconds. According to NASA; the moon's average orbital velocity is about: **1.023** km./ seconds (Revised 08-01-2014)⁴, By calculation using the value: **1.022794272** (about **1.023**) km./ seconds; the distance covered by the speed of light in a day is comparable to the distance covered by the moon in 1000 lunar years (12000 cycles), as the lunar year is considered in the lunar calendar since ancient times as 12 cycles of the moon around earth.

The average moon's velocity is: [1.022794272](#) km./ seconds, the basic ratio is: [0.8915725423](#); so the basic moon's velocity is: $(1.022794272 \times 0.8915725423) =$ [0.9118952893](#) km./ second. The moon's revolution period (T') is: [27.32166088](#) mean earth days = $27.32166088 \times 24 \times 60 \times 60 =$ [2360591.5](#) seconds, hence the length of the basic moon's orbit (L') after one cycle = $v' \times T' = 0.9118952893 \times 2360591.5 =$ [2152612.269](#) km., the lunar distance in 12000 cycles = [2583134723](#) km., then the speed of light in vacuum is: $2583134723 / 86164.09966 =$ [299792.458](#) km. per second, which is the exact known and accepted value in Physics for speed of light in vacuum since 1983.

(3) Speed of light as a measure for radius & age of the universe:

According to the Edwin Hubble notion that have been proclaimed in 1929; far galaxies out of our own local group of galaxies seems to be receding by velocities proportional to their distances. The maximal receding velocity should not exceed the speed of light, hence the Hubble equation: [a distance of a celestial object = receding velocity/ Hubble constant](#). The barrier of receding velocity is equivalent to the barrier of the observable distance and the age of the universe, hence the Hubble equation that: [the age of the universe = \(speed of light × 1000,000\)/ Hubble constant](#).

The value of Hubble constant was controversial, hence the age of the universe was so. The gap between different estimations is now narrow, the recent values are limited to: [10-15](#) billion earth years. but all are based on a universe with no gravity. Recently (based on a variation in the background radiation); Charles L. Bennett has found in 2001 an age of: [13.75](#) billion years. And based on the notion that the age of the universe should be at least as old as the age of the oldest thing in it; Roger Cayrel and his colleagues in many observatories in France, Sweden, Italy, United states, and Brazil, have found in 2001, using the decay detection method of Uranium-238 for the first time in the oldest observable celestial objects that; the age of the universe should be at least: [12.5](#) billion years. It is confidently and most precisely as a lower limit estimation. All previous estimates for age of the universe overlap with this figure but have a larger uncertainty.

The age of the universe is connected to its expansion, i.e. it must be measured by the distance covered by the maximal speed in the universe, in the maximal time unit in our local world, which is the period covered by sun to complete a cycle around the centre of our galaxy. It reaches about [0.25](#) billion earth years and called the galactic year or the cosmic year. It is a suitable unit of time to be covered by the speed of light for measuring the huge astronomical distances. Because the minimal age of universe was found recently to be about [12.5](#) billion earth years, this maximal period can be expressed simply by the galactic year ($12.5 / 0.25$) to be only [50](#). Hence the maximal distance should be [50](#) (of maximal unit of time) by speed of light, or in brief: [50 by speed of: a day; its measure is 1000 years](#). This distance can't be covered by a mass bearing matter, except by light in the same age of the universe, or spiritual observers to measure instantly its curved path; if so.

(4) Speed of light as a measure for the motion values of E-M system:

Using the constant value of the speed of light (**c**) in the equation as a measure for the moon's motion around the earth; all values of the motion can be defined. The derived equation is that: $c = (12000 v' T') / t' = 12000 (2\pi R') / t'$; where **c** is the constant value of the speed of light in vacuum, the value **t'** is the earth rotation period, the value **T'** is the moon rotation period, the value **v'** is the constant fraction of the moon's average velocity, and the value **R'** is the constant fraction of the moon's distance. The value: $v' = V \cos \phi = V - 2e$, and $R' = R \cos \phi = R - 2e$.

At the present time; the ratio $\cos \phi$ is: **0.8915725423**, the value of one sidereal day **t'** is: **86164.09966** seconds, and the value of one moon's revolution period **T'** is: **27.32166088** days (2360591.5 seconds). then; the value $v' = 24.98270483 t' / T' = 0.9118952894$ km./ sec., hence the moon's average velocity ($V = v' / \cos \phi$) is: **1.022794272** km./ sec. (about **1.023** km./ sec.). $R' = 342598.8833$ km., hence the moon's mean distance ($R = R' / \cos \phi$) should be: **384263.6096** km.

The value $a = 2R / \{1 + (1 - e^2)^{0.5}\} = 384546.3753$ km., hence the far distance $\{A = a (1 + e)\}$ is: **405394.0683** km., and the near distance $\{P = a (1 - e)\} = 363698.6824$ km. These values are more or less equivalent to the values in Wikipedia Encyclopedia⁵, and Zeilik & Neilson astrophysics (p.53)⁶.

Value	e	R	a	A	P
Equation	0.05421372885*	384,263.6096 km.	384,546.3753 km.	405,394.0683 km.	363,698.6824 km.
Wikipedia	0.0549006 (0.026 – 0.077)	385,000 km.	384,748 km.	405,400 km. (404000–406700)	362,600 km. (356400–370400)
Zeilik & Neilson	0.055	(384,114 km.)**	384,405 km.	405,547 km.	363,263 km.

* Based on the essentials of the lunar elliptical orbit: $e = 1 - \cos \phi / 2$, $\phi = 26.92847817^\circ$, $\cos \phi = 0.8915725423$, hence: $e = 0.05421372885$.

** Based on the value (a) and value (e): $R = (a + b)/2$; $b = \{a^2 - (ae)^2\}^{0.5}$, hence: $b = 383,823$ km. and $R = 384,114$ km.

The small difference of results calculated by the astronomical observations than that given by the equation may be due to approximation, or the effect of the near celestial bodies. At least there is a similarity to support that the distance covered by the universal uppermost constant speed in a day is **comparable to** the distance covered by the lunar motion in 1000 lunar years using the basic values in the isolated E-M system as a measure, as if earth is motionless as **reckoned** before.

(5) Speed of light in

Monotheism books:

It seems that speed of light value was inspired much more earlier than the 17th century; in which it was defined for the first time to be infinite. It may be transmitted as a secret knowledge. It has been cited in Monotheism books that: "A day is comparable to a thousand years". The plausible interpretation is that: a time of a day cannot be compared to a time of a thousand years except in distance, that the distance covered in a thousand year by near celestial object motion upon which calendar year is usually based; is covered only in a day due to the uppermost speed.

In the Bible: "For a thousand years in your sight are like a day that has just gone by, or like a watch in the night" Psalm 90/ 4., "But do not forget this one thing, dear friends: With the Lord a day is like a thousand years, and a thousand years are like a day" 2Peter 3/ 8. The relation may appear ambiguous, hence it is explained by the creator Eternity, as He should be out of time, i.e. the time; either long or short, doesn't mean anything for Him. But the context is related to the speed of forces coming to destroy our world: "You ought to live holy and godly lives, as you look forward to the day of God and speed its coming. That day will bring about the destruction of the heavens by fire, and the elements will melt in the heat" 2Peter 3/ 11&12. Hence, the speed of the coming forces can't be exceeded by anything else, therefore their coming is described like a thief, i.e. suddenly without warning: "The day of the Lord will come like a thief" 2Peter 3/ 10 (NIV).

In the Qur'an: "And yet they ask you to hasten on the Punishment! But Allah will not fail in His promise. Verily a Day in the sight of your Lord is like a thousand years of your reckoning" 22/ 47, that is, no more speed than the coming punishment speed for disbelievers to hasten its coming; as it is coming by the uppermost speed in the universe, "He directs what He had ordered to exist; from the heaven to the earth, then at the end it returns back to Him in a lame-like (curved) path; in a day its measure is a thousand years of your reckoning" 32/ 5. The lame-like curved path is specific to the physical forces, and in Physics the universe is described as curved. The usual calendar of Arabs is still the a lunar calendar, and the year is based on the moon's motion in 12 cycles, and without the insisted expression "of your reckoning" to describe a relative motion; the balanced equation to define the speed of light value cannot be established.

But; in describing the universal maximal observable distance the overall expression is enough: "The angels and the Spirit are traveling in a lame-like (curved) path until everything returns back to Him at the end, in a tremendous expanse, a day of its measure is fifty, of thousand years" 70/ 4. In the context of the universe expanse; number fifty is adequate to define the maximal unit of time in our local world; the sun revolution period (0.25 billion years), and the 1000 years distance covered in a day to define uppermost speed unit. This distance can't be measured by any physical observer due to the time barrier during the measure in a dynamic universe by a limited speed. Excluding speed of light unit, the age of the universe will be at least: $(50 \times 0.25) = 12.5$ billion years; which is the exact known value based on the age of oldest observable celestial object since 2001.

Any mass bearing matter cannot travel by speed of light, only when its mass is zero. It has been said that Tachyons are particles able to exceed speed of light, but this is something imaginary because they have negative masses. In reality nothing has mass beyond zero. There are situations in which it may seem that matter, energy, or information travels at speeds greater than light, but they do not. In neither case does any matter, energy, or information travel faster than light⁷.

Recent Physics predicts that all matters and forces in the universe are referred to a single essential building block; in origin and structure, from which the atomic and sub-atomic particles like electron or quark, as well as the constellations and the super constellations of stars and galaxies; all are made. The speed of this single building unit is described in a verse to be like the speed of glimpse of the clouds light barely espied by the vision due its high speed: In a verse: "**Verily, We have created everything** (to be perfectly designed and well measured) **by destination. And Our Command** (for everything to be existed in world beginning) **is** (in origin) **but a single** (essential building unit) **like** (in its speed) **a glimpse of light in the sight**" 54/ 49&50. The Arabic word (بالبصر) means: by the vision, by the visual perception, by the sight, or by the ability of the eye to see. Hence it should indicate something could be seen by the eye from outside its structure. The Arabic plural word (لَمَجٍ) means: glimpse of light, or glance, glint, flash, and flare of light (e.g. of clouds). Hence the translation of the Arabic expression (كَلَمَجٍ بِالْبَصْرِ) should be: like a glimpse of light in sight, i.e. barely espied due to its high speed ; rather than: like the twinklings of an eye in the eye or sight, which is a mistranslation. Then, the plural expression (لَمَجٍ) means even a small glimmer from clouds is subdivided into minute quantities of light units (Photons), and not as a continuous stream, which is the main concept in the Quantum Mechanics Principle in Physics.

Due to the limited speed of the light transmission; the instaneous events in the universe are verily unknown to Man, except for ALLAH who knows even the future event before it has been occurred. In Monothesm books; the around universe is expressed, relative to the observer as: "the heavens and earth". In a medium than vacuum; the beam of light is bent, so its speed in the atmosphere may appear slightly reduced. And in a verse; the coming forces to destruct our world, all have the same speed like the speed of light glint barely espied by vision due to its high speed, but rather speed of the coming destructive forces outside the earth atmosphere are the highest. In a verse: "**For ALLAH** (alone the kowledge by) **the unknown of the heavens and earth, and the matter of the Hour** (of the end of the world) **is but like** (in its speed) **a glimpse of light of the sight, or even nearer** (quicker), **ALLAH** (has the power and) **is Able to do all things** (Omnipotent)" 16/ 77. The far galaxies appear in recession based on red shift of their light in spectrum, hence universe appears expanding. But this light reflects only past events that happened in a time suitable with that far distance, and the real universe condition can be known from near galaxies that reflects the more recent events. The nearest galaxy; Andromeda, appears oncoming, hence universe should be collapsing. This may explain the insisted Monotheism books proclamation that the hour of world end is so near and so fast, and it will come suddenly without warning due to its uppermost speed.

(6) Can Monotheism Books tell

Us more about the Universe:

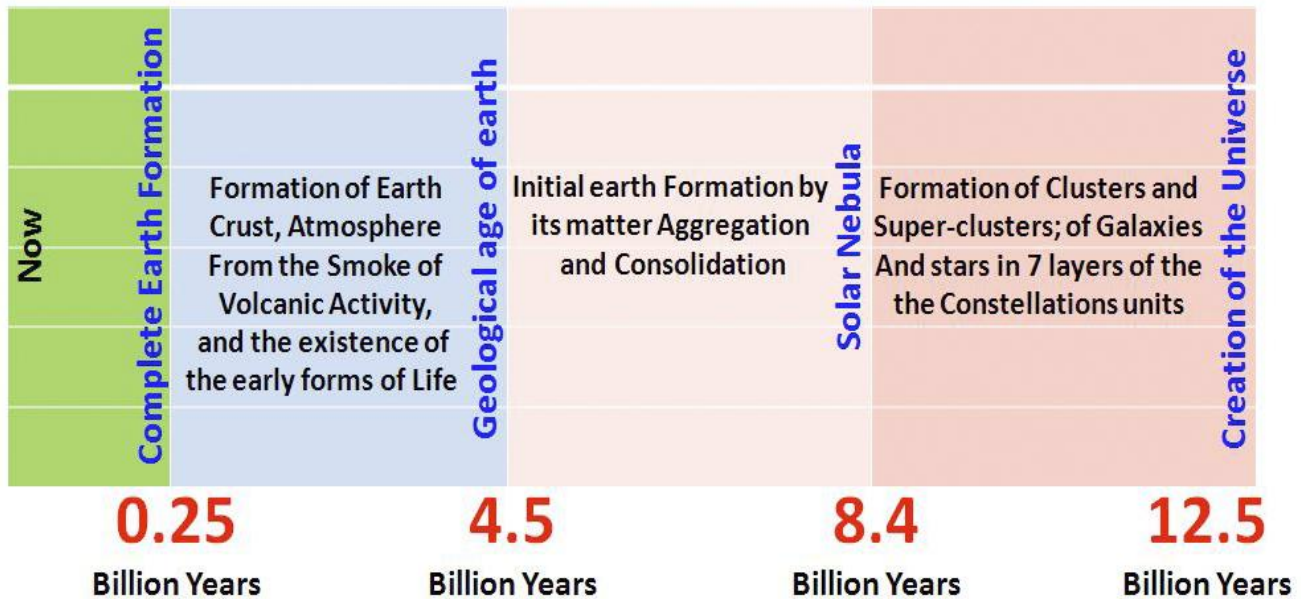
What is the age of the universe?, at what time the earth-moon dynamic system has been started to work in the solar nebula?, what is the geological age of the earth?, and at what time the process of earth formation has been finished?, The answers of these questions are not expected to be given directly in belief books of old cultural systems like the experimental knowledge today. But Monotheism books also relate humanity to an order of existence, hence the creation narratives that are intended to explain origin of the existence could be verified.

In Monotheism books; it has been cited that the whole existence was completely formed in six days, that can be interpreted as six days-like periods because there was neither sun or earth in the beginning to estimate time. In a figurative expression of a verse (Q: 41/ 9-12): "You disbelieve in the One who created the earth in two days-like periods, and you set up idols to rank with Him, though He is the Lord of the universe. And He made in it mountains above it, and He blessed therein and made therein its foods, in four days-like periods: alike for the seekers (early animals). Then (after the early two days-like period) He turned to the (adjacent; near) sky (atmosphere) when it was smoke (of the fiery earth by volcanos), so He said to it and to the earth: Come both, willingly or unwillingly. They both said: We come willingly. So He ordained them seven skies (layers) in two periods, and revealed in every sky (layer) its concern (for you). And We adorned (this) lower heaven by lamps-like (brilliant) bodies (meteors) and (provided it) with guard (to you; the defending magnetosphere). Such is the design of the Almighty, the Omniscient".

These verses can be interpreted based on the recent scientific knowledge as follows: the earth occupied four of six days-like periods of the universe creation, the first two days-like era was for the matter of the initial earth in the solar nebula to aggregate and consolidate, and the second two days-like era was for the early forms of life to be flourished on the initial continents, and for initial atmosphere to be formed from the smoke of initial volcanic activity, and to move with it in its course around sun without dispersion in space as before, and to be stratified in seven layers with a peculiar role of each to concern by early life on the earth, particularly the coming Man later on.

Because the creation periods are like successive equal days; they should be equal periods. And because there is a distinctive event each double days-like periods; the creation timeline should be divided into three main eras. One era for the cluster and supercluster tree of galaxies, that has been finished by the earth formation in the solar nebula. The second creation era has been finished by the beginning of earth crust and atmosphere formation. The last creation era has been finished by the stabilization of the initial continents and flourishing by early forms of life.

In Biology; there are three geologic eras; The Paleozoic (ancient life) era is the earliest. Its end was since about **0.25** billion years ago⁸ by the end of the Permian period. It is followed by the Mesozoic Era (middle life; the age of reptiles), that began by the Triassic period. The Permian- Triassic junction is so distinctive, because at which the greatest extinction in the history of life on the earth has been happened. It is the Earth's most severe known extinction event, with up to 96% of all marine species and 70% of the terrestrial vertebrate species becoming extinct⁹. At which the continents was formed in one mother continent (Pangea). Therefore; it can be considered the time at which the earth formation has been finished.

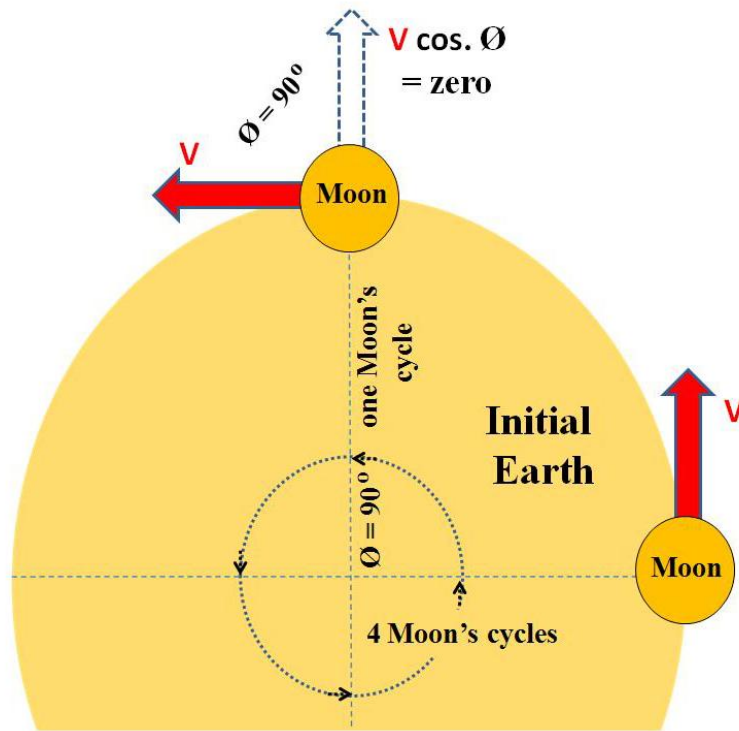


The timeline scale of the main events in the history of the universe

In a verse (Q: 9/ 36): "**The number of (lunar) months in the sight of Allah is twelve (in a solar year); so ordained by Him, the day He had created the heavens and the earth; of them four are sacred**". The solar (Tropical) year was 12 of the present months (29.5305881 mean earth days) at the full creation of the universe since about **0.25** billion years, and at the present time it is: 365 days, 5 hours, 48 minutes, and 46 seconds (12.36826703 present months). This means that the time is relative, as there is an increase of 0.36826703 present months in **0.25** billion years, so the increase of 12.36826703 present months since the age of solar nebula and beginning of E-M system dynamics should be in about **8.4** billion years. Hence the geological age of the earth should be about **4.5** billion years; exactly as the recent estimations in Geology. And the age of universe is confirmed to be about **12.5** billion years. This result is exactly as the recent estimations in the Astronomy and Physics, in the contrary to the James Ussher (1581-1656) assumption in the 17th century that universe was created in a night preceding Sunday, 23 October 4004 BC, and assumption of John Lightfoot (1602 –1675) who dated the Creation to 3929 BC.

(7) A Unitarian equation of Motions:

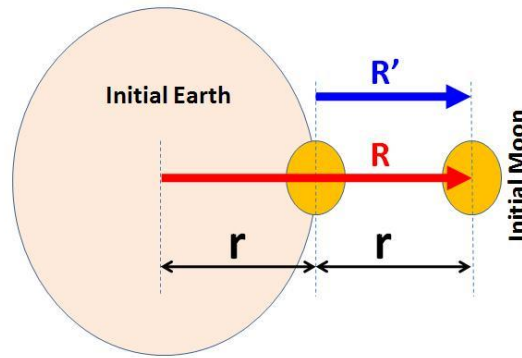
The equation is that: $c = 1200 (V'T'/ t') = 12000 (2\pi R/ t')$; where $c = 299792.458$ km./ sec. and the value $\pi = 3.1415926535898$. The equation in brief: $24.98270483 t' = v' T'$ & $3.976120968 t' = R'$. According to the analysis of the average velocity of the moon (V) relative to a far star; the ratio (cosine \emptyset V) represents the fraction due to the motion around the earth, and the ratio (2e V) represents the fraction due to the motion around sun. These ratios each moon cycle, are also true in case of the moon's mean distance; the ratio (cosine \emptyset R) represents the fraction due to the motion around earth, and the ratio (2e R) represents the fraction due to motion around sun.



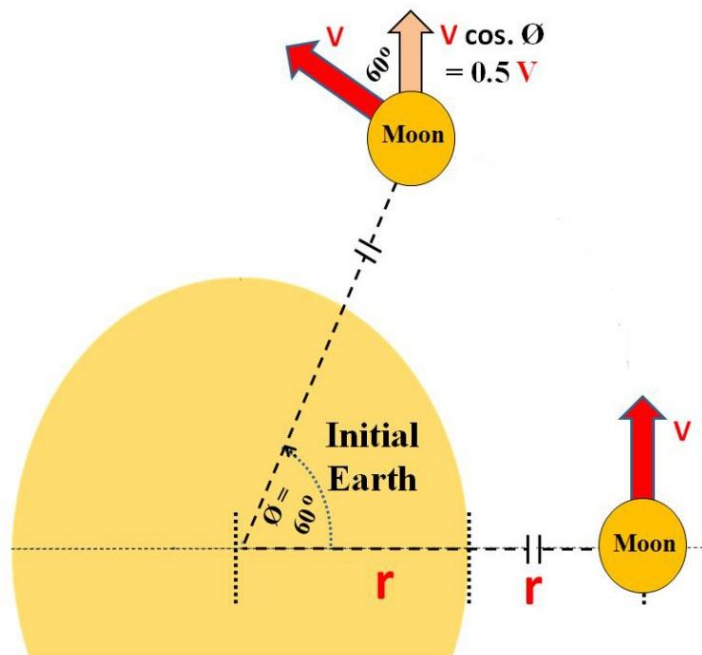
When the value (cosine \emptyset) equals zero; the value (2e) should equals: 1, this means that the actual average velocity of the moon is tangential to sun at formation of the E-M system, i.e. the component of which in the original direction after one cycle equals zero, and the whole motion of the moon with the earth was around sun, with no separate motion of the moon far from the earth. This means that the moon was prone to be separated from the earth, when the earth was in contact with sun. Based on the relation ($24.98270483 t' = v' T'$); T' should equals t' at contact, hence the velocity of earth rotation should be: 24.98270483 km./ sec. Treating the moon as an escaping split at earth periphery, hence its average velocity should be the same as earth rotation velocity. But treating it as a separate split with an average velocity representing the escape velocity from the earth, hence its average velocity should be 4 times less; because the initial earth revolution period is 4 times larger than a moon revolution period. To compensate; the moon's initial velocity should be: $24.98270483/ 4 = 6.245676208$ km./ sec., and the revolution period of the moon (T') should be: $4t'$, hence the value ($V'T'$) is still preserved.

At contact of the moon with the earth; the actual mean distance of the moon from the earth (R) should equal the mean radius of the initial earth (r), i.e. the value (r) should always equal the value ($R - R'$) as a fingerprint of the early E-M system, subsequently the ratio (r / R) should always equals the ratio ($2e$) or ($1 - \cosine \emptyset$) at any time through the history of the system.

The present actual moon's mean distance from the earth R is: **384263.6096** km., the constant fraction of moon's distance R' ($R' = R \cos \emptyset$) is: **342598.8833** km. So, the mean radius of the initial earth r should be: **41664.7263** km., then the earth circumference should be: $2\pi r = 2 \times 3.1415926535898 \times 41664.7263 = 261787.1961$ km., hence the rotation period of the earth relative to a far star (one sidereal day) = $261787.1961 / 24.98270483 = 10478.73711$ seconds. These results are in a full concordance with the relation ($3.976120968 t' = R'$): $3.976120968 \times 10478.73711 = 41664.7263$ km. And the average velocity of the moon (V) should be an infinitude value ($V = v' / \text{zero} = \infty$); indicating that the moon is Imminent to be separated from the earth.



To compensate guided by the equation to predict the values of the real motion of the moon when it was separating. The actual distance of the moon (R) should be doubled ($R = 2R' = 2r$) as a projectile. In this case; the ratio $r / R = 2e = 1 - \cos \emptyset = 0.5$. Hence the initial moon was formed at an equilibrium point between the earth and sun effect with an equilibrium angle = 60° .



It seems that the mechanism of the moon's formation and the E-M system stabilization is that; a split was separated and still grasped by sun and earth at an equilibrium point of effect of both, with the same motion characteristics of the initial earth periphery at the time of separation.

The projectiles law for an object is: $V^2 = 2MG/r$; where V its escape velocity, M its mass, r its radius, and G the gravity constant, while its density is: $3M/4\pi r^3$; where M its mass and r its radius. Due to unification in a mother body; this relation can be used: $V_1/V_2 = r_1/r_2$, and $V_1^3/V_2^3 = M_1/M_2$. The initial masses of sun earth and moon may be more or less different, but the present values are enough to guess the situation during the system formation; not necessarily the exact values. Consider the present masses of sun (1.99×10^{30} kg.) earth (5.9736×10^{24} kg.) & moon (7.35×10^{22} kg.), so the escape velocity or rotation velocity, and the mean radius of sun and moon can be defined.

Sun escape velocity was: 432.963991 km. /sec., its mean radius was: 2888290.327 km., moon's escape velocity was: 1.441882483 km. /sec., its mean radius was: 9618.756561 km., earth density was: $3 \times 5.9736 \times 10^{24} / 4 \times 3.1415926535898 \times 41664.7263^3 = 19.7170496$ kg. /m³. The present value (5520 kg. /m³) is larger about **280** times supporting a nebula character before. To compare the mean density of the solar nebula; the density of the distilled water is: 1000 kg. /m³ (about 50 times larger), and the mean density of air at sea level is: 1.3 kg. /m³ (about 15 times smaller).

The earth density was: 19.7170496 kg. /m³, hence the sun and moon densities should be the same value if calculations for the prospective Unitarian origin are true. Density of sun ($3M/4\pi r^3$) was: $(3 \times 1.99 \times 10^{30}) / (4 \times 3.1415926535898 \times 2888290.327^3) = 19.7170496$ kg. /m³, and of the moon was also: $(3 \times 7.35 \times 10^{22}) / (4 \times 3.1415926535898 \times 9618.756561^3) = 19.7170496$ kg. /m³. The present sun mean density is: 1409 kg. /meter³, hence its initial volume was about **70** times larger. Similarly, the present moon mean density is: 3342 kg. /meter³, hence it was **170** times larger.

The second proclamation of the equation is that the moon is receding and sidereal day is increasing by a definite relation: $3.976120968 t' = R'$. The accumulated value of the moon recession since the birth of E-M system ($R' - r$) is: 300934.1569 km., while the accumulated value of the sidereal day increase (present t' – initial t') is: 75685.36255 sec., which are exactly matched values with the equation ($3.976120968 t' = R'$): $3.976120968 \times 75685.36255 = 300934.1569$ km. The value of the annual moon's recession rate at the present time by Lasar telemetry after putting reflectors on the surface of the moon since Apollo 11 mission in 1969 is: 3.82 (about **4**) cm./ year, but it is expected to be smaller in the past. Knowing that the age of the solar nebula is about 8.4 billion years, hence the mean moon's recession rate is slightly smaller: 3.6 (about **4**) cm./ year.

According to the relation: $(\text{sidereal year} / \text{synodic day}) = (\text{sidereal year} / \text{sidereal day}) - 1$; initial mean solar day (synodic day), from sunrise moment in a day to the sunrise moment of the following day; can be defined. Initial sidereal day (t') was: 10478.73711 sec., and initial sidereal year was: $4t'$, hence; the initial mean solar day should be: 13971.64948 seconds (about **4 hours**).

The third proclamation of the equation for the Unitarian origin of E-M system with sun is that; the velocity of a mother body (V^0) of any isolated system of twins objects is a preserved quantity. The **celestial twins equation** is: $V^0 = c / n = v' T' / t' = 2\pi R' / t' = V \cos. \phi T' / t' = 2\pi R \cos. \phi / t'$; where (t') the central object rotation period, (v') is the velocity of its natural satellite, (T') is the satellite revolution period, (R') is its distance, and (n) is a numerical value makes a conjunction with the speed of light value (c). Applying the equation in case of the isolated E-M system is true at the this moment and at its formation, and it should be so in case of the sun-earth (S-E) system.

Relative to a far star; consider the system of the earth motion around sun is isolated; due to the negligible effect of far celestial objects. The initial velocity of solar nebula disc; at formation of the earth and moon with sun, derived from E-M system equation (V^0) is: **432.963991** km. /sec., hence the numerical value (n) for the system of motion of sun with earth (c / n) is: **692.4189176**.

Applying the celestial objects twins equation for S-E system: $c / 692.4189176 = 432.963991 = v'$
 $_{\text{earth}} \times T'_{\text{earth}} / t'_{\text{sun}}$; where t'_{sun} should equal T'_{earth} at contact of the earth with sun. At present; t'_{sun} value is around **25** mean earth days, the value: **25.12694896** mean earth days; gives the exact present value of the average orbital velocity of the earth: **29.78473558** km./ sec., or instead: the exact present value of the earth revolution period (sidereal year): **365.25636** mean earth days. Moreover; the twins equation for the S-E system should be: $R'_{\text{earth}} = 432.963991 t'_{\text{sun}} / 2\pi = 68.90835936 t'_{\text{sun}}$, hence the value: **25.12694896** mean earth days (t'_{sun}); gives the exact value of the present mean distance of earth from sun (R'_{earth}): **149597870** km. It is termed in Astronomy the "Astronomical Unit", because it is used as a measure unit for distance inside the solar system. This is not coincidence; because it is a derivative of an insisted relation that defines speed of light. And these results should be a conclusive evidence for a Unitarian origin of the E-M system with sun, by the same building matter of a mother celestial object, which is the solar nebula, and a forever correlated motion; emphasizing that there is a constant relation linked to the universal constant of motion, which is the speed of light value in vacuum since beginning. So the present condition of the main objects of our local world is a fingerprint of their initial condition, reflecting their formation in a certain Order, and their evolution in a well arranged succession.

(8) Speed of light was

Inspired for what Aim?:



Olas Romer (1644-1710) was the astronomer who has found in [1676](#) the first evidence that the speed of light is finite although highest. And its definite value was not accepted except recently in [1983](#). therefore; the reasonable question is: how, and why; it is cited in the Monotheism books in a constant balanced relation that reveals more aspects of the Unity and Order?. The reasonable answer is that: this is a reserved message through Prophets that; the unified speed of all electromagnetic spectrum wave lengths, the Unitarian origin, the unified essential building block, the definite age of the universe with no space or time at the beginning, the present tremendous universe expanse with a still preserved certain Order,

the well arranged succession in the evolution of beings; all are sure signs for sage man to know for certain that; there is no possibility for a chance, as everything is carefully planned and ingeniously designed, and the Creator should be One and Only, with infinite Greatness and a Supreme Dignity.

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The Physicist Raef Fanous view¹⁰:

299,792.458 km/s is the speed of light in vacuum. But 1400 years ago it was stated in the Quran, the book of Islam, that the travel by the uppermost speed in one day, the same distance that the moon travels in 1000 lunar years, that is, **12000 Lunar orbits/ Earth day**. If we remove the Earth-moon system from the gravitational field of the sun all observers will see the speed of light outside gravitational fields to be equivalent to **12000 Lunar orbits/ Earth day**.

When the geocentric frame is **inertial**; **12000 Lunar Orbits/ Earth Day** turned out to be the known speed of light. The motion of an object is considered **inertial** when it is devoid from any external effect out of its **isolated system**, as if it is in a uniform **strait line**. So if you want to make a comparison with "299792.458 km/sec" then you have to make it in a "**local inertial frame**". Special Relativity requires the frame of reference to be **inertial** (travel in a straight line). Since Earth is orbiting the sun; then it is not traveling in a straight line, hence its motion is **non-inertial**. So when we compare speed of light with **12000 Lunar Orbits/ Earth Day** inside the gravitational field of the sun (non-inertial frame) we get **11%** difference; however when the geocentric frame is inertial we get **zero%** difference.

You cannot talk about the speed of light without defining your **frame of reference**. The measured speed of light in **local inertial frames** is 299792.458 km/sec. So if you want to make a comparison with "299792.458 km/sec" then you have to make it in a "**local inertial frame**". Special Relativity requires the frame of reference to be **inertial** (travel in a straight line). Since Earth (our local frame of reference) is orbiting the sun then it is not traveling in a straight line, hence it is **non-inertial**. As long as Earth is not traveling in a straight line then any geocentric frame is **not inertial**, hence NASA's **measurement** of the lunar orbit is made in a **non-inertial** frame. So we have to **calculate** the lunar orbit in an **inertial frame** starting from the measured one in this non-inertial frame. We need to calculate **12000 Lunar Orbits/ Earth Day** when the geocentric frame travels in a **straight line**.

In respect to stars; the moon is actually moving in the orbit by the same angle Earth orbits the sun. When the Earth-moon system exits the solar system the geocentric frame travels in a straight line and becomes **inertial**, then **12000 Lunar Orbits/ Earth Day** becomes equivalent to the speed of light.

Those people back then measured the distances how much time they needed to walk. For example, a village two days away meant a distance equivalent to walking for two days; ten days away meant a **distance** equivalent to walking for ten days, Those people back then followed the **lunar calendar** and counted **12 lunar months** each year. These months are related to the moon and not related to the sun. Since this verse is referring to **distance**, then the travel in one day the same distance that the moon travels in 12000 lunar orbits. **12000 Lunar Orbits/ Earth Day** = distance/time = rate of motion (speed). However this speed depends on the frame of reference. If you want to compare it with the speed of light in local inertial frames, then you need to make the comparison by the motion of the moon around earth in a **local inertial frame**.

The total energy of the Earth-moon system is a function of the distance from the sun, that is, as the distance to the sun changes the total energy of the Earth-moon system changes, hence the length of the lunar orbit changes. Since the distance to the sun is not a constant then a definition using Lunar Orbits/Earth Day inside the gravitational field of the sun is impossible. However when the Earth-moon system exits the solar system and becomes isolated; 12000 Lunar Orbits/Earth Day becomes equivalent to the speed of light. For any valid comparison all measurements should be taken in the same frame. In a heliocentric frame non-rotating with respect to stars light travels in a straight line, hence this is a perfectly **inertial frame**, and both sides of the equation becomes inertial, i.e. in the same frame of reference, as if in the motion of either the light or the moon in a straight line.

In a geocentric frame non-rotating with respect to **stars**, the moon is actually moving in the orbit by the same angle Earth orbits the sun. In this frame there is a rotational force around Earth. This means that the lunar orbit is influenced by a torque-like force around Earth (twist). As the distance to the sun increases to infinity the angle θ Earth orbits the sun decreases to zero, and lunar orbit loses this twist. When we remove the energy gained from this twist we can calculate the total energy and hence the length of the lunar orbit outside gravitational fields.

Distance traveled in one day by uppermost speed = 12000 x Length of lunar orbit. $\Rightarrow C t' = 12000 L'$ Where: C is the speed, which we intend to calculate and then compare to the known speed of light (no external forces, no acceleration, no deceleration). t' is Earth Day outside gravitational fields i.e. time for one rotation of Earth with respect to stars. L' is the length of the lunar orbit outside the gravitational fields (no external forces, no acceleration, no deceleration).

This table below shows the lunar month and Earth day in both sidereal system (with respect to stars) and synodic (with respect to sun):

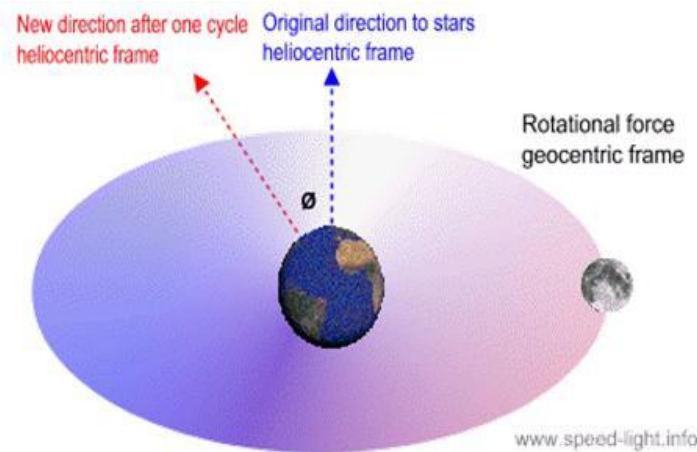
Period	Synodic (sun)	Sidereal (stars)
Earth day t	24 hours = 86400 sec	23 h 56 min 4.0906 sec = 86164.0906 sec
Lunar Month T	29.53059 synodic days	27.321661 synodic days = 655.71986 hours

Every new moon (29.5 days) the moon will not return to the same point in the orbit (it will be at a different point). The moon returns to the same point in the orbit after only 27.3 days. When the moon returns to the same point with respect to stars the Earth-moon system would have moved 26.9 degrees around the sun (not 29.1 degrees). The sidereal system is a local frame non-rotating (in a straight line) with respect to stars, while the synodic system is a local frame non-rotating with respect to sun, however this frame is rotating with respect to the stars.

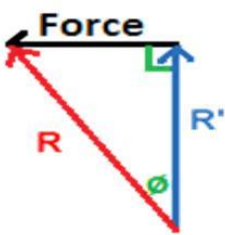
Frame non-rotating with respect to sun is actually rotating with respect to stars. From Special Relativity we know that in inertial frames light should travel in a straight line, consequently an inertial frame cannot rotate with respect to stars. Why? Because in rotating frames with respect to stars light **DOES NOT** travel in a straight line, and the measured speed of light in these frames is undefined. Rotating frames with respect to stars by definition are **non-inertial**. In General Relativity the **local inertial frames** where the measured speed of light is **299792.458** km/sec are actually **frames non-rotating with respect to stars**. From Special Relativity we know that in inertial frames light should travel in a straight line, consequently an inertial frame cannot rotate with respect to stars. Even if a frame does not rotate with respect to stars it should **not change direction** (frame should travel in a straight line).

The gravity obvious effect on frames is to change their direction of travel (makes frames travel in a curve). Consider a heliocentric frame non-rotating with respect to stars; in this frame light travels in a straight line, hence this is a perfectly **inertial frame**. But as Earth circles the sun then in a geocentric frame light will make a long sine wave (not a straight line). This is proof enough that the geocentric frame is **non-inertial**. General Relativity describes the effects of gravity on frames of reference: **Gravity causes perfectly inertial frames to rotate.** It is confirmed that inside gravitational fields it is impossible to define a non-rotating frame with respect to stars unless this frame exits the gravitational field. When the magnitude of the velocity vector is constant but the direction changes, the motion is non-inertial. So when we calculate **12000 Lunar Obits/Earth Day** outside the gravitational field of the sun then this frame would travel in a straight line and would not rotate with respect to stars, hence becomes **inertial**.

When the Earth-moon system is still inside the solar system the position of the sun relative to Earth with respect to stars changes; this means that the moon has to make more than 360 degrees with respect to stars in order to point to the sun again. However when the Earth-moon system exits the solar system the position of the sun relative to Earth with respect to stars remains the same, that is, the moon now only has to make 360 degrees with respect to stars in order to point to the sun again. Hence, the synodic period becomes equal to the sidereal period. This means that the lunar month with respect to the sun becomes equal to lunar month with respect to the stars, and the Earth day with respect to the sun becomes equal to the Earth day with respect to stars. So the 1000 lunar years with respect to the sun become equal to 12000 lunar months with respect to stars. Length of Lunar Orbit = Velocity x Time ($L = V T$). Average lunar velocity is $V_{avg} = 3682.8 \text{ km/hr}$ (1.023 km/sec).



Most astronomers calculate the length of the lunar orbit in a local frame non-rotating with respect to stars by the following equivalent circle method: $L = VT = 2\pi R \Rightarrow V = 2\pi R / T$. But the moon's velocity is under the influence of the gravitational pull of the sun. The gravitational field of the sun creates a net **rotational force** on the lunar orbit (**twist**).



In a local frame non-rotating with respect to sun the moon speeds up when it heads towards the sun and then slows down by the same amount when it heads away from the sun. However in a local frame non-rotating with respect to stars the sectors where the moon speeds up and slows down are actually moving forward inside the orbit by the same angle Earth orbits the sun. Today's lunar orbit is a very low eccentricity ellipse (very close to a perfect circle) but when the moon first formed it was a very high eccentricity ellipse, Hence $\cos\theta$ is the only solution $\Rightarrow R' = R \cos\theta$. The lunar orbital radius R is a function of total energy, however the total orbital energy comes from two sources: **ocean friction** and **gravitational twist** (two sources, not one). As the distance to the sun increases to infinity the lunar orbit loses this twist; but without the energy gained from this twist the orbital radius decreases to $R' = R \cos\theta$. Hence when inertial the length of the lunar orbit becomes $L' = 2\pi R' = 2\pi R \cos\theta = L \cos\theta$ (i.e. $12000 L' / t' = 12000 L \cos\theta / t'$) and the orbital period decreases.

Today when the moon makes 360 degrees around Earth with respect to stars; the Earth-moon system moves 26.92952225 degrees around the sun. Hence the lunar orbit's twist angle $\theta = 26.92952225$ degrees. We can calculate θ from the period of one heliocentric revolution of the Earth-moon system (365.2421987 days): $\theta = (360 \text{ degrees} / 365.2421987 \text{ synodic days}) \times 27.32166088 \text{ synodic days} = 26.92952225$ degrees. Similarly, Earth's spin slows down by 6 seconds i.e. the isolated Earth day t' becomes 86170.43114 sec. So finally we can check accuracy of this equation in Quran: **$C t' = 12000 L'$** . The distance traveled by light in one Earth Day = $C t' = 299792.458 \text{ km/sec} \times 86170.43114 \text{ sec} = 25833245358 \text{ km}$. This distance is **comparable** to the distance traveled by unknown speed = $12000 L' = 12000 \times 3682.8 \text{ km/hr} \times 655.71986 \text{ hr} \times \cos(26.92952225) = 25836303825 \text{ km}$.

Since the distance to the sun is not a constant then if it is defined inside the gravitational field of the sun; then this definition will be wrong with time; however since it is defined outside the gravitational field of the sun then this definition will be true forever. Ocean friction causes the rotation of Earth to slow down, that is, for the days to get longer (t' increases). And as Earth's rotation slows down the moon recedes (R' increases): $c = 12000 L' / t' = 12000 2\pi R' / t'$. Both R' and t' are increasing, but due to a fundamental law in astrodynamics; the ratio R' / t' remains the same. The force decelerating Earth is the same force pushing the moon. Since the force pushing the moon is gravitational, then it is inversely proportional to the square of the distance to the moon ($F \propto R'^{-2}$). Similarly, this same force decelerating Earth is proportional to the change in kinetic energy in Earth's spin, that is, it is inversely proportional to the square of Earth day ($F \propto t'^{-2}$). This makes the square of the distance to the moon to be directly proportional to the square of Earth day ($R'^2 \propto t'^2$). This implies that the distance to the moon remains proportional to Earth day ($R' \propto t'$). Hence R' / t' is a constant. So when inertial R' / t' is a constant equal to 3.976120966 ($R' / t' = R \cos\theta / t'$). **But this means that there are no variables in this equation: $c = 12000 L' / t'$.** So when inertial $c = 12000 \text{ Lunar Orbits/ Earth Day}$ is a constant forever.

For the geocentric frame system to be inertial then the distance to the sun has to increase to infinity. And as the distance to the sun increases to infinity the lunar orbit loses this twist; but this also means that the moon would no longer have enough kinetic energy to stay long at the compounded radius R , instead it becomes the isolated radius $R' = R \cos\theta$. To calculate the isolated lunar orbit we only need the isolated radius $R' = R \cos\theta$. Hence the moon's isolated orbital length becomes $L' = 2\pi R' = 2\pi R \cos\theta = L \cos\theta$ (i.e. $12000 L' / t' = 12000 L \cos\theta / t'$). **Simply put Outside the gravitational field of the sun all observers will see the speed of light equal to $12000 \text{ Lunar Orbits/ Earth Day}$.** In the isolated Earth-moon system (no sun) all external forces are screened out.

Recalling the very famous postulate of **Special Relativity** declared by Einstein (1905): "The velocity c of light in vacuum is the same in all inertial frames of reference in all directions and depend neither on the velocity of the source nor on the velocity of the observer". Einstein's theory of special relativity says that the speed of light in vacuum is always measured the same (at 299,792.458 km/s) however this is only true locally for systems that are **inertial**, which means **not accelerating**, i.e. if forces exist the implied acceleration. The other factor besides acceleration is gravity. Albert Einstein emphasized in his paper in 1917: "The results of the special relativity hold **only** so long as we are able to disregard the influence of gravitational fields on the phenomena". In 1915 Einstein developed another theory called **General Relativity** that deals with gravitational fields and according to this latest theory the velocity of light appears to vary with the intensity of the gravitational field. The speed of light outside gravitational fields is 299792.458 km/s. In the presence of gravity the speed of light becomes **relative**. The speed of light in a gravitational field is actually not a constant. Light appears to travel slower in a stronger gravitational fields near bigger mass.

For the geocentric frame system to be **inertial** then the distance to the sun has to increase to **infinity**. And as the distance to the sun increases to infinity the lunar orbit becomes isolated with $V' = V \cos\theta$, and $R' = R \cos\theta$. Hence the moon's isolated orbital length becomes $L' = 2\pi R' = 2\pi R \cos\theta = L \cos\theta$, i.e. $12000 L' / t' = 12000 L \cos\theta / t'$. **Simply put Outside the gravitational field of the sun; all observers will see the speed of light equal to $12000 \text{ Lunar Orbits/ Earth Day}$.** In the isolated Earth-moon system (no sun) all external forces are screened out.

The equation in the Quran $c = 12000 \text{ Lunar Orbits/Earth Day}$ has been true in the **isolated system** ever since the early creation of the Earth-moon; is true today and as the moon continues to recede this equation in the Quran **will always be true**. By using classical orbital mechanics we discovered that **all observers** will see the speed of light outside gravitational fields equal to: $12000 \text{ Lunar Orbits/ Earth Day}$. It is common to all observers. Hence **the Quran gave us a better definition for the time and the distance: A definition common to all observers, forever!**. In the same time; **the three-body problem** is the problem of taking an initial set of data that specifies the positions, masses and velocities of three bodies for some particular point in time and then determining the motions of the three bodies, in accordance with laws of classical mechanics (Newton's laws of motion and of universal gravitation).

SO, HOW COULD A SIMPLE EQUATION WAS CITED SINCE 1400 YEARS AGO; HAS FIGURED OUT IN RECENT PHYSICS: THE THREE-BODY PROBLEM, SPEED OF LIGHT, AND THE GENERAL RELATIVITY?.

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