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Surah *Al-Kahf* and The Core of Relativity: How The Quran Foretold Spacetime Curvature, Gravity Wells and Wormholes

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Abstract

This research investigates the advanced scientific concepts of space-time curvature, wormholes, and time dilation as fundamental natural principles described in the Quran centuries before their modern discovery. Surah Al-Kahf is particularly significant in this context, as it directly addresses wormholes, space-time curvature, and gravitational effects. To fully comprehend this, firstly we must understand what "Al-Kahf" truly represents in the Quran. This study explores the scientific properties of Al-Kahf and its relation to relativity, gravitational lensing, and space-time warping. While modern science views spacetime curvature, wormholes and time dilation, as extraordinary phenomena, The Quran presents them as fundamental aspects of the universe, and are also utilized in divine operations. These principles are not isolated mentions but are woven throughout the Quran, highlighting the Quran's deep engagement with the fabric of space-time. By integrating Quranic insights with general relativity and modern astrophysics, this paper challenges conventional narratives of scientific history, advocating for a reassessment of the Quran's contributions to humanity's understanding of space-time and relativity. This interdisciplinary approach highlights that the Quran contains detailed direct descriptions of these cosmic phenomenon that align with cutting-edge physics, reinforcing the need for a historical reevaluation of scientific knowledge.

1. Introduction

Modern physics has revolutionized our understanding of space, time, and gravity, particularly through Einstein's Theory (Einstein, A. 1915) [1], which describes spacetime curvature, black holes, wormholes, and time dilation. These concepts have provided groundbreaking insights into the structure of the universe and the behavior of matter under extreme gravitational forces. However, a careful analysis of Surah Al-Kahf and other Quranic verses reveals descriptions of these physical phenomena, suggesting that these principles were clearly described in the Quran long before their formal discovery in modern science. The Quran frequently references gravitational effects, time dilation, and space-time distortions as part of the natural order created by God, just as it describes the water cycle, planetary orbits, and cosmic expansion etc.

1.1 The Significance of Surah Al-Kahf in Space-Time Physics

Among all Quranic chapters, Surah Al-Kahf holds a unique place in its references to space-time phenomena. The chapter contains multiple narratives that closely align with key discoveries in modern physics, some of important verses are given below:

i) The People of the Cave (18:17) – It directly/clearly explain how light bents near gravitational well/pit, space time curvature, in a very simple/amazing/unbelievable/fascinating way. In just few words it explains the core of the Theory of Relativity "in detail". "In detail" means that we can extract huge technical details from this single verse, and to make it clear, it's not interpretation of meaning what we are talking about here but a direct description. This verse is actually "interpreted *differently*" because people can't comprehend it's direct meaning without interpretation, but actually it doesn't need interpretation to understand but just its direct meaning blended with "thinking" only.

ii) The People of the Cave (18:25) – Demonstrates a time dilation effect where 300 years pass externally while the sleepers experience only a short duration (Day or a part of a day) (Surah Al-Kahf, 18:29) [8][9]. This aligns with gravitational time dilation, a fundamental prediction of Einstein's Theory of General Relativity (Einstein, 1915).

iii) The Junction of Two Seas (18:60-18:63) – Suggests the existence of a wormhole-like connection between two regions of space-time, as seen in the mysterious disappearance and revival of the fish (Surah Al-Kahf, 18:60-63). This matches the Morris-Thorne wormhole model (Morris & Thorne, 1988).

iv) Dhul-Qarnayn's Journey (18:86, 18:90) – Describes a black hole event horizon, where the sun appears to set in a dark, murky spring (Surah Al-Kahf, 18:86), and a possible wormhole exit, where the sun is found rising elsewhere (Surah Al-Kahf, 18:90).

To fully comprehend these scientific descriptions, it is crucial to first understand what "Al-Kahf" represents in the Quran. Al Kahf is not just a physical cave—it signifies a region of extreme space-time curvature where time flows differently. Without recognizing al-Kahf as a space-time phenomenon, one cannot fully grasp the deeper meaning of Surah Al-Kahf.

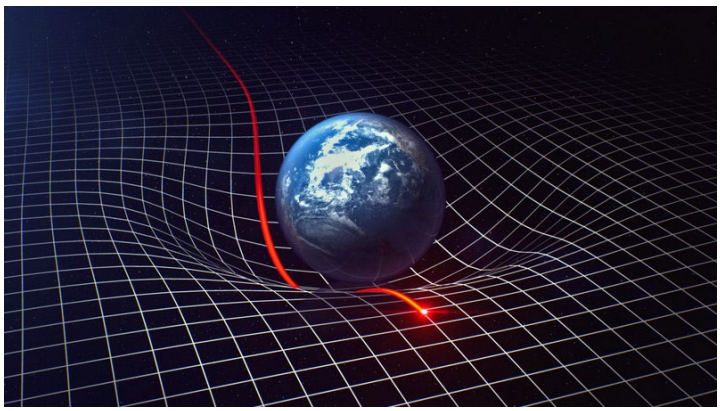

Fig. 1 *How light follow curved path in spacetime curvature*

1.2 Quranic References to Space-Time Curvature Beyond Surah Al-Kahf

While Surah Al-Kahf is particularly focused on space-time physics, these concepts are found throughout the Quran. Some of them are given below.

i) Time dilation (Surah Al-Baqarah 2:259) – The story of Prophet Uzair (A.S.), where he experiences a vastly different passage of time than the external world.
ii) Gravitational confinement (Surah Al-Ma'idah 5:24-26) – The confinement of Musa's (A.S.) people for 40 years, potentially representing a localized space-time anomaly.
iii) Eternal time loops (Surah Al-Furqan 25:11-14) – The concept of human and hell at opposite sides of wormhole, where time behaves differently and is experienced cyclically.
iv) Stable shadows (Surah Al-Furqan 25:45) – A description that matches gravitational lensing effects, where light is bent, keeping shadows static.

v) Instantaneous travel (Surah An-Naml 27:38-40) – The transportation of the Queen of Sheba's throne in an instant, closely resembling wormhole travel or quantum teleportation.

1.3 Purpose of This Research

This study aims to analyze Surah Al-Kahf's references to space-time curvature and wormholes, define al-Kahf as a space-time gravity well, establish that relativity and gravitational effects are fundamental concepts in the Quran, compare Quranic descriptions with modern physics to demonstrate their alignment and advocate for a reassessment of scientific history in light of Quranic knowledge. The findings of this study challenges the conventional view that relativity, time dilation, and space-time distortions were only discovered in the 20th century. Instead, it presents compelling evidence that the Quran contains scientific insights into space-time phenomena that align with modern physics and even beyond current understanding, necessitating a historical re-evaluation of how we perceive scientific progress.

2. Methodology of Study

This study has used the thematic approach [Uslub Tafsir Al-Maudhu'i] (Kitota, A. 2023) and Quranic cosmology in reviewing and analyzing the Quranic verses; explores the scientific properties of Al-Kahf and its relation to relativity, gravitational lensing, and space-time warping. English translation, The Qur'an Introduction and Appendices by Qur'an project was used for the primary tafsir of all verses used in this study (Adam, 2023), Author was used to get the primary commentary of the verses of the glorious Qur'an related to scientific properties of Al-Kahf and its relation to relativity, gravitational lensing, and space-time warping. The leading ahadith books such as Sahihayn [Sahih al-Bukhari & Sahih al-Muslim] were used to get the interpretation of topic discussed and supported with scientific calculations and illustrations. These data were then analyzed by thematic to show how these verses have exposed scientific properties of Al-Kahf and its relation to relativity, gravitational lensing, and space-time warping are an act of greater significance in Quran and proven by scientific study.

3. Discussion on Surah Al-Kahf: The Space-Time Gravity Well

The Quran presents "Al Kahf" as a unique place (Quran, Surah Al-Kahf, Chapter 18), but what exactly is it? Rather than defining it outright, let Al Kahf itself describes its own nature through its properties given in Quran. To understand al-Kahfi, when we read Quran, Surah Al-Kahf, Chapter 18, we must ask questions like following, as mentioned in Al-Kahf:

i) What kind of place causes time to slow down significantly inside, while time outside flows normally or much faster? (Quran 18:19,18:25)
ii) Where does light bend, altering the apparent position of objects? (Quran 18:17)
iii) What kind of place makes a "day or part of a day" inside equivalent to "300 years" outside (Surah Al-Kahf, 18:25)[9]? (Quran 18:19,18:25)
iv) Where does even a small motion, like a dog's leg stretching, take an unnaturally long time to complete? Where does motion inside appear to be in extreme slow motion when viewed from the outside? (Quran 18:18, Slow motion dog's legs stretched)
v) Why sleeping people can make you flew away from them, and can fill you with horror/terror? Normally sleeping people are harmless. (Quran 18:18)
vi) What is junction of two seas? (Quran 18:60)
vii) How did cooked/dead fish made its path into the sea? (Quran 18:61,63)
viii) How That slave of God knew the information beyond time? (Quran 18:65)
ix) How Dhul-Qarnayn reached setting and rising place of sun, and how he met different people (species/aliens?), one of them didn't have protection against sun? (Quran 18:86-97)
x) Why it was needed to cover ears of sleeping people? (Quran 18:11)

These specific properties point to a well-known astrophysical phenomenon: A gravity well or a wormhole - a space-time region where time dilation and extreme gravitational effects occur. General relativity predicts that time slows down in a strong gravitational field (Einstein, 1915), which aligns with the Quranic description of the people of the cave experiencing time dilation. The Quran explains this in a simple way that even a layman can understand. The description of Al Kahf itself naturally leads us to the conclusion that it is a space-time anomaly—a wormhole or a gravity pit. But above that Quran 18:17 is a ultimate seal of conformity on this concept. Before exploring its scientific basis, let us analyze Surah al-Kahf 18:17, which amazingly describes al-Kahf's space-time properties.

3.1 Surah Al-Kahf 18:17 – The Key Verse in Understanding Core Nature of Al-Kahf

وَتَرَى ٱلشَّمْسَ إِذَا طَلَعَت تَّزَٰوَرُ عَن كَهْفِهِمْ ذَاتَ ٱلْيَمِينِ وَإِذَا غَرَبَت تَّقْرِضُهُمْ ذَاتَ ٱلشِّمَالِ وَهُمْ فِى فَجْوَةٍ مِّنْهُ ۚ ذَٰلِكَ مِنْ ءَايَٰتِ ٱللَّهِ

Meaning: And you would see the sun, when it rose, inclining away from their cave to the right, and when it set, passing away from them to the left, while they lay in an open space therein. That was from the signs of Allah. (Sahih International) (Surah Al-Kahf, 18:17)

"You could have seen the [light of the] sun as it rose, moving away to the right of their cave, and when it set, moving away to the left of them, while they lay in the wide space inside the cave. (This is one of God's signs: those people God guides are rightly guided, but you will find no protector to lead to the right path those He leaves to stray.)" (M.A.S. Abdel Haleem (Surah Al-Kahf, 18:17). This verse describes gravitational lensing gravity well/pit and space-time warping in unbelievable way, where light behaves unusually in the presence of a strong gravitational field (Thorne, 1994).

3.1.1 Scientific Analysis: What Happens in a Time-Dilated Region?

3.1.1.1 Flashlight and its Apparent Position

To understand this we have to understand the scenario described in this verse Quran 18:17 with the help of following usual example of "weight on fabric" with an addition of a flashlight to demonstrate spacetime curvature and light bending.

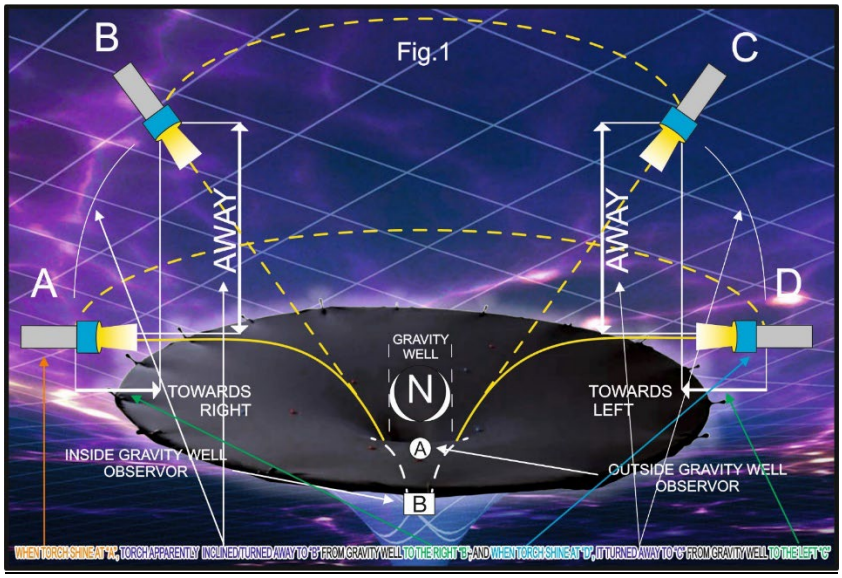

Fig. 2 *Flashlight and its apparent position*

1. Position A (Parallel to the Fabric, Moving Right and Away from Gravity Well):
   - Initially, the flashlight is positioned at point A, and the light travels parallel to the fabric (representing flat space-time). The direction of the light is towards the right.
   - As the light moves closer to the gravity well, it will be bent due to the curvature of space-time.
2. Position B (Apparent Position Due to Light Bending):
   - As the light bends toward the gravity well, its apparent (Flash light) position will shift from point A to point B.
   - The apparent position of the flashlight at point B will appear to be towards the right and away from the gravity well due to the curvature, for an external observer "A". This is because the space-time around the gravity well is distorting the light's path.

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3. Position D (Parallel to the Fabric, Moving Left and Away from Gravity Well):
    - When the flashlight is positioned at point D, and the light again travels parallel to the fabric (representing flat space-time). The direction of the light is towards the left.
    - As the light moves closer to the gravity well, it will be bent due to the curvature of space-time.
4. Position C (Apparent Position Due to Light Bending):
    - As the light bends toward the gravity well, its apparent (Flash light) position will shift from point D to point.
    - The apparent position of the flashlight at point C will appear to be towards the left and away from the gravity well due to the curvature, for an external observer "A". This is because the space-time around the gravity well is distorting the light's path.

3.1.1.2 Verse 18:17 Written Below and Its Direct Explanation in Figure

Now with above understanding we can easily understand/comprehend following Quranic verse 18:17, with the help of following diagram:

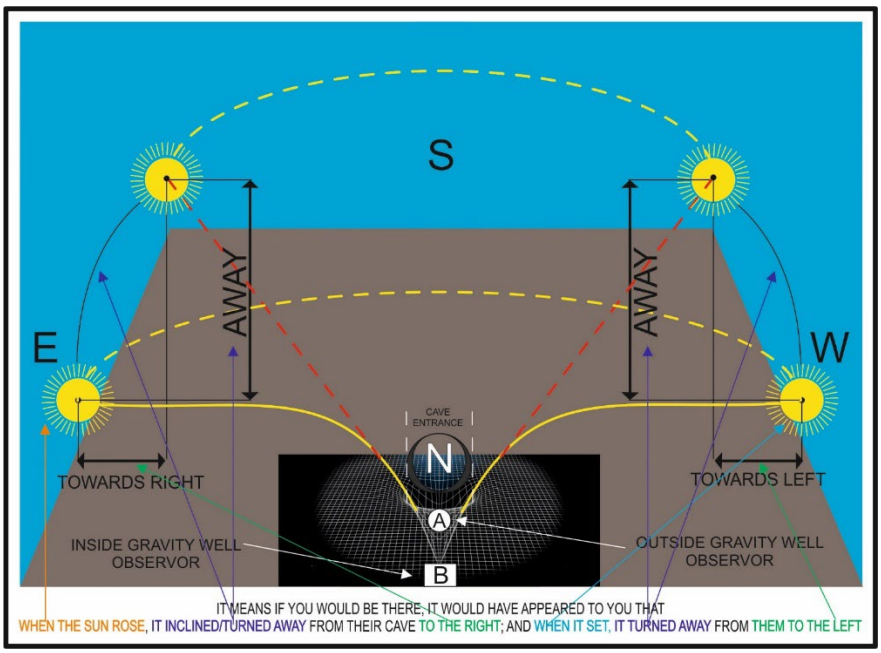

Fig. 3 *Shows verse 18:17 (written below) and its direct explanation in figure*

It shows the sun and its apparent position (relativity/spacetime curve). At sunrise (light from the east): the sun appears shifted southward, away from the observer ("a"), and toward the west (right). At sunset (light from the west): the sun again appears shifted southward, away from the observer ("a"), and toward the east (left). To understand this deeply, first we have to understand with clarity the scenario described in this verse (quran 18:17).

- Observer ("A") is facing south will see the sun moving east to west, which is one of the conditions in this scenario. As we know sun rises from the east and goes towards west.
- As observer must be facing south, his back is towards the al-Kahf (The cave) opening/entrance.
- Al-Kahf is in vertical plane with its mouth/opening/door/entry facing south.
- When sun rises, it appears (Apparent position) moved away from the vertical plane of the cave and towards the right, (this happens due to bending of light because of space time curvature).
- When sun about to set it appears (Apparent position) moved away from the vertical plane of the cave and towards the left, (this happens due to bending of light because of space time curvature).

The above figure directly illustrates Quran 18:17 without any unnecessary or illogical interpretation. Light bending and time dilation in a wormhole/gravity well (Earth-based) in vertical plane with its opening/entrance facing south. It also describes a region where the movement of light and the passage of time are significantly altered.

i) The sun's movement appears unusual – It does not shine normally into the al-Kahf (The Cave) but bends its light. This can be clearly understood with the help of gravitational lensing.
ii) Inside the cave, time flows differently – People inside perceive only a day or part of a day, while 300 years pass externally (18:19, 18:25).
iii) Objects and beings inside move in extreme slow motion – As we know Quran describes the dog with its legs stretched at the entrance etc. (suggesting slow motion similar to a deep gravitational well).

This verse serves as the core foundation of Surah al-Kahf, signifying that without a deep understanding of this verse, one cannot fully grasp/comprehend the comprehensive knowledge embedded within the entire Surah Al-Kahf and other verses of different chapters, which could lead us to unveil further secrets of nature, hidden knowledge and the intricate workings of the universe. There are so many verses in Quran related to time dilation, spacetime distortion, but this verse stands as a masterpiece in itself, encapsulating profound scientific concepts such as relativity, light bending, space-time curvature, gravitational wells/pits, and more with detail and precession way before relativity was explained by Einstein, and relativity description is so obvious in Quran that after this research it looks like that Einstein may have comprehended/grasped it from Quran, and formulated its equations. Einstein, though a physicist, required mathematical tools to formalize this vision. It was his classmate and mathematician, Marcel Grossmann, who introduced him to the advanced mathematics of tensor calculus and Riemannian geometry—essential to model the curvature of spacetime. This framework, originally developed by the great mathematician Bernhard Riemann, he provided the geometric basis needed to describe gravity not as a force, but as a deformation of spacetime itself. Later, the eminent German mathematician David Hilbert contributed by independently deriving the gravitational field equations using variational principles, reinforcing the structure of Einstein's general relativity. While Einstein provided the physical insight, it was these mathematical giants—Grossmann, Riemann, and Hilbert—who helped translate his ideas into rigorous mathematical form."

3.1.2 Scientific Explanation

Now to understand this verse and full Surah Al-Kahf even more deeply we will try to understand light bending and time dilation in a wormhole/gravity well (Earth-based) in vertical plane with its opening/entrance facing south, and its effects on internal and external observer, in the light of Quran - Al Kahf and our scientific understanding of relativity.

3.1.2.1 Gravitational Lensing in an Earth-Based Wormhole/Gravity Well

A localized gravity well that would introduce extreme space-time curvature, affecting both light propagation and time flow [19,20]. Gravitational lensing occurs when space-time curvature alters the trajectory of light. This effect is described by:

$$\theta = \frac{4GM}{bc^2}$$

This describes the deflection angle θ, which quantifies the amount by which light is bent as it passes near a gravitational source (in this case, a wormhole or another massive object). Let's break down the components:

- G: The gravitational constant ($G = 6.674 \times 10^{-11}\ \mathrm{m^3\ kg^{-1}\ s^{-2}}$).
- M: The effective mass of the gravitational object (in this case, a wormhole's mass).
- b: The impact parameter, which is the closest distance from the light ray to the center of the gravitational source (the distance at which the light passes closest to the wormhole or massive object).
- c: The speed of light ($c \approx 3 \times 10^8\ \mathrm{m/s}$).

Explanation of Gravitational Lensing:

i) Deflection of Light: When light passes near a massive object like a wormhole or black hole, the spacetime curvature caused by the object bends the light's path. This is a direct consequence of Einstein's general theory of relativity, which predicts that mass and energy can curve spacetime. The amount of bending is proportional to the object's mass M and inversely proportional to the distance of closest approach b (i.e., the impact parameter).

ii) Eddington's 1919 Experiment: The first observational confirmation of gravitational lensing came from Arthur Eddington's famous 1919 solar eclipse experiment. During a solar eclipse, starlight passing near the Sun was observed to bend, confirming that gravity could affect light's trajectory. This provided one of the earliest confirmations of Einstein's general theory of relativity.

iii) Wormhole Lensing: A wormhole, if it existed, would create a significant curvature in spacetime. As with other massive objects, light passing near the wormhole would experience a bending of its path, causing an apparent shift in the positions of celestial objects, much like gravitational lensing observed around black holes and stars.

Wormhole's Gravitational Lensing Effects:
If a wormhole were located on Earth or nearby, it could create a localized gravity well capable of producing significant gravitational lensing effects. These effects would cause light from distant celestial objects (like stars or galaxies) to bend as it passed near the wormhole, altering the apparent positions of those objects. This could make the sky look quite different, depending on the location and mass of the wormhole. Such an effect would be similar to, but likely more pronounced than, the lensing effects caused by black holes or other massive objects, especially if the wormhole's mass and curvature were extreme. This phenomenon was first confirmed in Eddington's 1919 solar eclipse experiment, where starlight appeared displaced due to the Sun's gravitational field [9]. A wormhole on Earth would cause similar gravitational lensing effects, significantly altering the apparent position of celestial objects.

3.1.2.2 Solar Position Shift Due to Wormhole Lensing (Ref. Figure 2)

For a vertically oriented wormhole facing south, light bending would vary based on observer location:

- External Observer (Position A):
    - At sunrise (light from the east): The Sun appears shifted southward (away from the observer) and toward the west (right) to the observer.
    - At sunset (light from the west): The Sun appears shifted southward (away from the observer) and toward the east (left) to the observer.
- Internal Observer (Position B):
    - The sun's apparent position differs significantly from its actual astronomical position, even at noon, due to lensing effects [22].

Gravitational lensing creates an optical illusion where the Sun's observed position is displaced from its actual location, affecting celestial navigation and perception of time for an observer inside or near the wormhole.

3.1.2.3 Time Distortion and Space-Time Curvature Model

Extreme time dilation in a strong gravitational field results from space-time curvature, as predicted by General Relativity (Einstein, A. (1922). The time dilation effect follows the equation:

$$t' = t\sqrt{1 - \frac{2GM}{rc^2}}$$

Where:

- t' is the time experienced inside the wormhole (or near a massive object, like a black hole),
- t is the time observed externally (far from the gravitational source),
- r is the radial distance from the center of the gravitational field (the mass creating the field),
- G is the gravitational constant,
- M is the mass of the object creating the gravitational field (such as the central mass of a black hole or wormhole),
- c is the speed of light.

Explanation:

- Time Dilation: The term $\sqrt{1 - \frac{2GM}{rc^2}}$ represents the factor by which time is dilated near a massive object. The closer you are to the source of the gravitational field (smaller r), the stronger the time dilation effect.

At $r = \frac{2GM}{c^2}$ (the Schwarzschild radius, often referred to as the event horizon), this factor becomes zero, meaning time stops for an external observer.

- Wormhole Context: For a wormhole, if the time dilation is significant near the entrance or the throat of the wormhole, time for someone inside the wormhole will pass differently compared to an observer at a distance from the wormhole.

This formula is analogous to the gravitational time dilation seen near black holes, especially in the context of Schwarzschild geometry, and would apply in wormhole scenarios where intense gravitational fields or spacetime curvature cause noticeable differences in the passage of time. If time moves slower inside, an external observer sees the internal observer in slow motion [23]. If time moves faster inside, the internal observer perceives the outside world in fast-forward motion. This phenomenon has been experimentally verified through atomic clock measurements on Earth, orbital satellites, and GPS system corrections, which account for relativistic time discrepancies.

3.1.2.4 Space-Time Curvature Model for Extreme Time Dilation (Quran 18:19, 25)

Below are points related to following question.

- What kind of place makes a "day or part of a day" inside equivalent to "300 years" outside (Surah Al-Kahf, 18:25)? (Quran 18:19,18:25)

To explain this scenario we will consider 1,000 years outside correspond to only 1 day inside. We using this time ratio as it's the only relative time mentioned in Quran with reference to Human and Allah (GOD). Quran 22:47 And indeed, a day with your Lord is like a thousand years of those which you count. (Saheeh International Surah Al-Hajj - 1-78 - Quran.com)

a) Time Conversion – How Long is 300 Years Outside?

If 1,000 years outside = 1 day inside, then:

$$\frac{1000 \text{ years}}{1 \text{ day}} = \frac{300 \text{ years}}{\text{x days}}$$

Solving for x:

$$\text{x} = \frac{300}{1000} = 0.3 \text{ days} = 7.2 \text{ hours}$$

This means that if someone spends 7.2 hours inside the wormhole, 300 years would pass outside.

b) The Time Dilation Effect in a Wormhole/Gravitational Well (Quran 18:*19,25*)

If an observer enters the wormhole, they experience time much slower relative to an external observer. The key effects include:

- For the external observer: The person inside the wormhole moves in extreme slow motion [23].
- For the internal observer: The outside world appears to speed up significantly.

Specific examples:

- If 1,000 years will pass outside, the person inside will experience only a Day.
- If 300 years pass externally, only about 7.2 hours elapse inside.

This extreme time dilation suggests profound implications for time travel or interstellar exploration, allowing travelers to age significantly less than those outside the wormhole.

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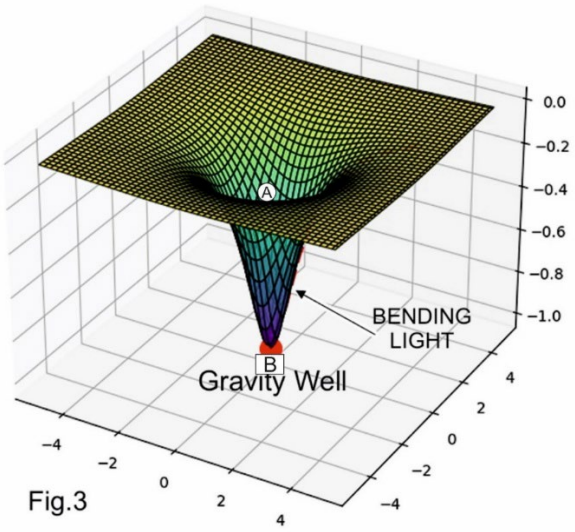

Fig. 3 *Blending or light (red) inside gravity well (spacetime curvature) / time dilation*

3.1.2.5 Observer Perception: Internal vs External Observers (Quran 18:18)

Now we will discuss points about following question in accordance with Gravity well.

- Why sleeping people can make you flew away from them, and can fill you with horror/terror? But normally sleeping people are harmless. (Quran 18:18)

Time Perception Distortion

As we know one of the most profound effect of gravity well/pit is time dilation, where time moves at different rates for the internal and external observers.

External Observer (A) Perspective:

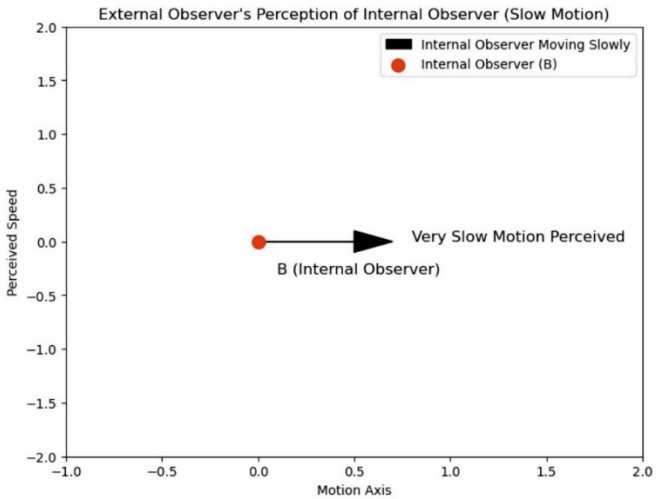

Fig. 4 *Shows very slow movement of observer (b) When observed from outside [23]*

The internal observer appears to be moving in extreme slow motion due to the slowed time rate inside the wormhole. If an external observer watches someone blinking inside the wormhole, it may take several minutes or even hours to complete a blink. If a person inside the wormhole raises their hand, the motion would appear almost frozen in time. Any movements from inside the wormhole seem unnaturally delayed, as if they are caught in slow motion, reinforcing the feeling of watching a scene from another dimension. Due to gravitational lensing, light from the internal observer may be distorted before reaching the external world. The image of the internal observer may appear blurry, stretched, or oddly elongated. If an internal observer is sleeping, their tiny unconscious movements may be slowed to such an extent that they appear both asleep and awake simultaneously.

If an animal (such as a dog) is inside, any stretching motion (e.g., extending its legs) would remain frozen for an unnaturally long period, creating a disturbing sight. The internal observer may appear to hover or move in an unnatural floating manner, further enhancing the eerie illusion. If an external observer looks into the wormhole, the bending of light can create duplicate images of the internal observer, making it seem like they are present in multiple locations at once. If an internal observer spends what feels like a single day inside, they may exit to discover that centuries have passed outside. These all points explain what verse Quran 18:18 referring to, and can fill external observer with horror/terror

3.1.2.6 Sound Perception and Distortion (Quran 18:11)

Below are points related to following question.
Why need to cover ears of sleeping people? (Quran 18:11)

Since sound waves travel via molecular vibrations, their propagation is also affected by time dilation. This creates drastic sound distortions for both observers.

How the Internal Observer Hears the External Observer's Voice:

Because time is moving faster outside, logically external sound waves will be compressed when entering the wormhole. Voices from outside appear high-pitched and accelerated, making them difficult to understand. A normal 1-minute conversation outside might sound like a few seconds (for example) of high-speed, chipmunk-like noise inside the wormhole. Background noises from nature, wind, or traffic would be perceived as rapid, continuous bursts of chaotic sound. If a person inside attempts to sleep, the external sound compression might make it unbearable, as even faint sounds would be amplified and accelerated into an overwhelming auditory experience. The internal observer may "need to cover their ears" due to the excessive auditory stimulation, otherwise it will be impossible for them to sleep.

How the External Observer may Hear the Internal Observer's Voice:

Because time is moving slower inside the wormhole, internal sound waves are stretched and delayed when leaving the wormhole. The voice of an internal observer appears deep, slow, and ghostly when heard by the external observer. A single word spoken inside could take several minutes (for example) to reach the external world. If an internal observer shouts, it may sound like a prolonged, eerie wail outside, similar to a slowed-down recording of a human voice. This distortion in sound could be perceived as unnatural or otherworldly, making communication between the two extremely difficult without advanced frequency correction mechanisms.

3.1.2.7 Apparent Solar Position Shift and Its Impact on Perception (Quran 18:17)

Below are points related to following question.
Where does light bend, altering the apparent position of objects? (Quran 18:17)

Gravitational lensing shifts the apparent position of the sun, causing solar displacement effects visible to both observers (Wormhole/Gravity well opening facing South).

For the External Observer (A): At sunrise: The sun, which is physically in the east, appears shifted southward (away from observer) and towards the west (right). At sunset: The Sun, which is physically in the west, appears shifted southward (away from observer) and towards the east (left).

For the Internal Observer (B): The sun and celestial objects appear to shift unpredictably, making time perception difficult. The Sun may never appear to set normally as light bends around the wormhole, making it seem as if dusk or dawn lingers for an abnormally long time. Due to light bending, the sun might appear duplicated or stretched into arcs, creating a surreal visual illusion.

3.2 Key Conclusions from Kahf's Space-Time Properties

Al-Kahf is not just a physical cave—it is a gravity well or a wormhole where extreme time dilation occurs. Surah al-kahf 18:17 explicitly describes the bending of light, proving space-time curvature. The sleepers experienced time dilation, demonstrating einstein's relativity in a quranic narrative. Understanding al-Kahf is the key to unlocking the deeper meaning of surah al-Kahf and its space-time connections.

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4. The Junction of Two Seas (Bahr) As A Wormhole

4.1 Introduction: What Does "Junction of Two Seas" Mean?

Surah Al-Kahf describes a fascinating event where Prophet Musa (A.S.) and his servant reach a mysterious location called the "Junction of Two Seas" (Majma' al-Bahrayn). Many traditional interpretations assume this refers to a physical meeting point of two water bodies. However, a deeper analysis of the Quranic text, with understanding of "Al-Kahf" and modern scientific insights suggests something far more profound:

i) The phrase "Majma' al-Bahrayn" (Junction of Two Seas) logically signifies a wormhole or a space-time bridge connecting two separate realms.

ii) The description of (the dead/cooked/food) fish "slipping away" into the sea and coming back to life suggests a time-reversal event, aligning with physics of wormholes.

iii) The movement through this location exhibits characteristics of gravitational anomalies and Einstein-Rosen bridges.

Spacetime, as described in Einstein's general theory of relativity, is a four-dimensional continuum in which all celestial bodies move (Einstein, 1915). The Quranic descriptions of the sun and moon floating in orbits (Quran 36:40, 21:33), the junction of two seas (Quran 18:60), and the sun setting in murky water (Quran 18:86) (Mohd Mudassir (2025)) provide intriguing parallels to modern cosmological theories. Here we will examine these verses from a scientific perspective, understanding them within the framework of astrophysics.

4.1.1 Floating in an Orbit: Spacetime as a Medium

Surah Yasin (36:40): "It is not for the sun to overtake the moon, nor does the night outstrip the day, but each is in an orbit floating (Yasbahoon)."

Surah Al-Anbiya (21:33): "And He is the One who created the night and the day, and the sun and the moon, each floating in an orbit."

In these Quranic verses 21:33,36:40 "Kullun Fi Falak" translates to "Each [celestial body] is swimming in its orbit." The sequence of letters in the Arabic phrase—كُلٌّفِيفَلَكٍ (k-l-f-y-f-l-k)—offers profound insights into the circular motion of celestial bodies:

i) The arrangement of letters mirrors the structure of orbits, with yā (ي) at the center, symbolizing a central point or axis, and other letters like kāf (ك) and lām (ل) revolving around it.

ii) The circular arrangement reflects the perpetual motion of celestial bodies described in the verse.

This linguistic artistry highlights the Quran's precision in describing celestial mechanics, where the letters themselves align with the motions of objects in the universe.

Fig. 5 *Arabic phrase—كُلٌّفِيفَلَكٍ (k-l-f-y-f-l-k)—*

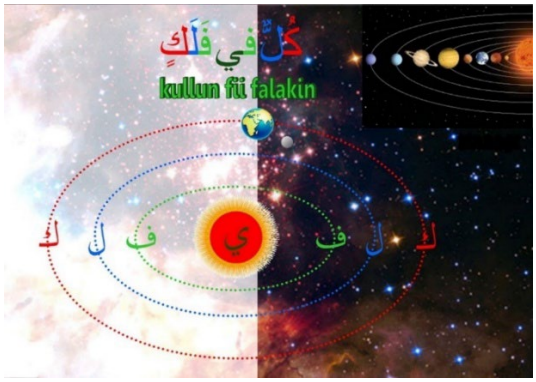

Fig. 6 *Arabic phrase—كُلٌّ فِي فَلَكٍ (k-l-f-y-f-l-k)— in aplication*

Scientific Interpretation: The use of the term "floating" (Yasbahoon) suggests movement through a medium. In modern physics, celestial bodies do not float in a fluidic medium, but rather in spacetime, which is affected by gravity (Hawking, 1988). This implies that spacetime behaves similarly to a medium, allowing celestial bodies to move within it, much like objects floating in a sea. The Quran's use of "floating" metaphorically aligns with our understanding that planets and stars move within the fabric of spacetime (Thorne, 1994).[2]

4.1.2 The Junction of Two Seas: A Wormhole?

> "And [mention] when Moses said to his servant, 'I will not give up until I reach the junction of the two seas or continue for a long period.'" (Quran 18:60 Sahih International)

4.1.3 Linguistic Breakdown of Bahr (Sea)[1]

مَجْمَعَ ٱلْبَحْرَيْنِ (Majma' al-Bahrayn) – "The Meeting of Two Seas"

The word "Bahr" (بَحْر) in classical Arabic does not strictly mean water; it also refers to vastness and immensity. The Quran uses "Bahr" in different contexts, sometimes metaphorically referring to vast expanses, which could include cosmic dimensions or space-time realms. Islamic scholars such as Fakhr al-Din al-Razi and Ibn Kathir mention that "Bahr" can represent domains beyond the physical world.

Scientific Interpretation: If we consider "Bahr" as referring to two space-time domains, the Junction of Two Seas refers to a wormhole connecting two separate regions in the universe. A wormhole in physics is a theoretical shortcut through spacetime, allowing passage between distant points instantaneously (Einstein & Rosen, 1935). The story of Moses meeting Khidr at this location suggests a significant event involving time and knowledge We will see further, At this junction, a fish comes back to life, which logically suggest a distortion of time, similar to effects near a wormhole (Morris & Thorne, 1988). As this verse describes two different spacetime regions meeting, it aligns with the idea of a wormhole.

4.1.4 The Sun Setting in Murky Water: A Black Hole?

Surah Al-Kahf (18:86): "Until, when he reached the setting of the sun, he found it [as if] setting in a spring of dark, murky water, and he found near it a people."

Scientific Interpretation: The "spring of dark, murky water" is black hole/wormhole (A spring of singularity), human body was created from singularity, all stars were created from singularity. Sun was setting in singularity. (Mohd Mudassir, 2025). In modern astrophysics, a black hole is a region where light cannot escape, making it appear dark (Hawking, 1974). This suggests that Dhul-Qarnayn's journey led him to a region resembling a black hole's event horizon/singularity, where light and matter appear to disappear. (Mohd Mudassir, 2025).

[1] Note: Seas "bahr (Arabic)" Originally, Bahr was a broad term for vast, deep waters (including oceans, seas, and even great rivers), as well as a metaphor for depth, knowledge, and limitlessness. Over time, translations narrowed it down to just "sea," reducing its broader implications. ('al-bahr' in the Holy Quran and Translation Variations: A Study upon Three Translations of the Holy Quran)

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4.1.5 Connecting The Three Verses: A Unified Concept of Spacetime

By analyzing these three Quranic verses together with the understanding of Al-Kahf, we found a coherent scientific pattern:

i) Floating in an orbit → Suggests spacetime as a medium (Einstein, 1915).
ii) Junction of two seas → Logically indicates a wormhole connecting two points in spacetime (Morris & Thorne, 1988).
iii) Setting in murky water → describes a black hole/Singularity/event horizon, where matter disappears into a singularity (Hawking, 1974).

Each of these verses uses water-related metaphors, reinforcing the idea that spacetime itself behaves like a fluidic continuum (Penrose, 2004).

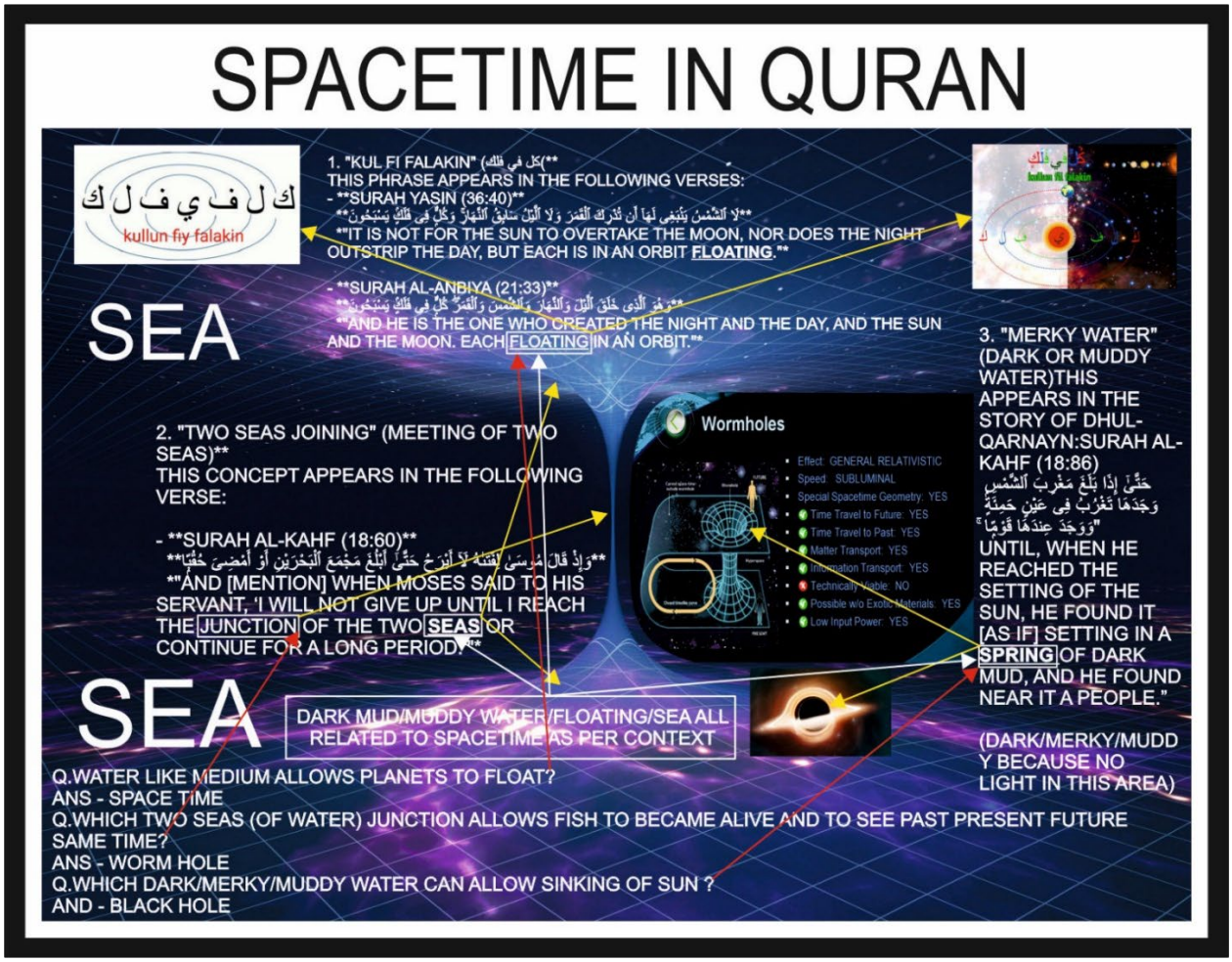

Fig. 7 *Shows how sea, floating, spring, junction, wormhole are connected together*

Quranic descriptions of celestial events appear to align with modern astrophysical concepts and suggests a deep understanding of the nature of spacetime long before modern physics. The understanding that these verses reference black holes, wormholes, and the movement of celestial bodies within spacetime opens a fascinating dialogue between science and scripture. This section explored the linguistic meaning of bahr and why it may refer to vastness, not just water. The quranic verses describing this event and their scientific implications. How wormholes allow for time reversal, space-time warping, and interdimensional travel.

5. Conclusion

This study explores a fundamental question: What is the only condition where an object's shadow length remains constant? Through mathematical modeling and astrophysical evidence, we conclude that this phenomenon can only exist inside a wormhole or a symmetric gravity well, where light bending forces all incoming rays into parallel trajectories. Key Findings are shadow length (L) remains unchanged only in a wormhole or symmetric gravity

well, with respect to sun. Gravitational lensing naturally aligns light rays into parallel paths. This is the only physical mechanism where external light movement does not alter shadow dimensions. It clearly explains/leads us to bending of light (Core of relativity) directly. It clearly explains/leads us to curvature of Spacetime. This contributes to both theoretical physics and astrophysical applications, offering a unique perspective on gravitational lensing, shadow projections, and space-time distortions.

Through a detailed analysis of Surah Al-Kahf and other Quranic verses, this paper has demonstrated that the Quran describes spacetime curvature, gravitational time dilation, wormholes, and relativistic effects very clearly centuries before modern science formally discovered them. Surah al-Kahf (The Cave) is not just a physical location but a space-time gravity well where time dilation occurs (18:17, 18:25). The Junction of Two Seas (18:60-18:63) aligns with a wormhole connection between two regions, explaining time-reversal effects (Surah Al-Kahf, 18:60-18:63). Dhul-Qarnayn's journey (18:86, 18:90) describes a black hole event horizon and a potential wormhole exit (Surah Al-Kahf, 18:86, 18:90). Other Quranic verses reference space-time distortions, including but not limited to the concept of Hell as a wormhole (25:11-14), the stable shadow due to gravitational lensing (25:45), and instantaneous travel (27:38-40). (Surah Al-Furqan, 25:11-14). These descriptions, when analyzed scientifically, align perfectly with modern physics principles such as general relativity, black holes, and Einstein-Rosen bridges (wormholes), especially after understanding of Quran 18:17.

For centuries, modern science has credited western scientists such as Einstein, Hawking, and Penrose with the discovery of relativity, space-time curvature, and wormholes. However, the Quran presented these concepts over 1,400 years ago. The scientific revolution is often portrayed as a purely Western achievement, ignoring earlier Islamic contributions. Scholars like Al-Biruni and Ibn Sina (Avicenna) explored relativity-based ideas centuries before Einstein. The Quran describes space-time warping, light bending, and gravitational effects using simple, direct language. The findings of this study open the door for further interdisciplinary research, where physics, cosmology, and Quranic exegesis can be combined to develop a new understanding of space-time and the universe. We should use Quran and acknowledge its role in advancing our understanding of the universe. The historical narrative should be rewritten to include Quranic insights in the development of modern physics.

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Conflict of Interest

The author declares that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors are responsible for the study conception, research design, data collection, data analysis, result interpretation and manuscript drafting.

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Sahih Muslim 2565 – Hadith: Allah Created 100 Parts of Mercy; Only One Is on Earth (Entropy/Compassion Dispersion Analogy in Cosmological Terms)

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