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Aphelion and Perihelion in Islamic Cosmology Overview: The Integration between Revelation and Astronomy

Dini Rahmadani S [a,1,*], Hariyadi Putraga [b,2]
[a] Universitas Negeri Medan, Jl. Merbau no. 217, Kota Binjai 20723, Indonesia
[b] Universitas Muhammadiyah Sumatera Utara, Jl. Denai No. 217, Kota Medan 20271, Indonesia
[1]dn.rahmadani@gmail.com; [2]hariyadiputraga@umsu.ac.id*;
* Penulis Penanggungjawab (Corresponding Author): No. HP (085762057366)

Abstract: *The phenomena of aphelion and perihelion are two important points in the Earth's annual orbit around the Sun, which illustrate the order and balance of the universe system. In modern astronomy, these events are explained through Kepler's laws of motion and the concept of elliptical orbits. In contrast, in Islamic cosmology, celestial phenomena are understood as verses that convey theological messages. This article aims to examine the phenomena of aphelion and perihelion from two perspectives: modern astronomical Science and the perspective of Islamic cosmology based on revelation. The method employed is a qualitative-contextual approach, involving the analysis of Qur'anic texts, classical interpretations, and actual astronomical data. This study found that the integration between revelation and Science can strengthen people's understanding of celestial phenomena, not only as objects of scientific observation, but also as a means of tadabbur and strengthening their faith.*
Keywords: *Aphelion, Perihelion, Islam, Cosmology, Falak*

Abstrak: *Fenomena aphelion dan perihelion merupakan dua titik penting dalam orbit tahunan Bumi mengelilingi Matahari, yang menggambarkan keteraturan dan keseimbangan sistem semesta. Dalam ilmu falak modern, peristiwa ini dijelaskan melalui hukum gerak Kepler dan konsep orbit elips, sementara dalam kosmologi Islam, fenomena-fenomena langit merupakan ayat-ayat kauniyah yang mengandung pesan teologis. Artikel ini bertujuan mengkaji fenomena aphelion dan perihelion dari dua sudut pandang: sains falak modern dan perspektif kosmologi Islam berbasis wahyu. Metode yang digunakan adalah pendekatan kualitatif-kontekstual dengan analisis teks Al-Qur'an, tafsir klasik, serta data astronomi aktual. Kajian ini menemukan bahwa integrasi antara wahyu dan sains dapat memperkuat pemahaman umat terhadap fenomena langit, bukan hanya sebagai objek pengamatan ilmiah, tetapi juga sebagai sarana tadabbur dan penguatan akidah.*
Kata Kunci: *Aphelion, Perihelion, Islam*, Kosmologi, Falak

A. Introduction

When Earth is at perihelion, around early January, its orbit brings it about 147 million km from the Sun, making the planet move faster and causing the Northern Hemisphere to experience a slightly shorter winter. Conversely, in early July at aphelion, Earth is about 152 million km away, moving more slowly, which contributes to longer summers in the Northern Hemisphere. These small differences, only about 5 million km or 3%, also cause measurable variations in solar radiation intensity, seasonal length, and global temperature. Although the changes are subtle compared to the dominant influence of Earth's axial tilt, they still influence climate dynamics, ecosystems, and the functioning of satellites. Thus, the phenomena of aphelion and perihelion illustrate how even minor orbital variations can affect life on Earth in precise and predictable ways.

Recent studies in climate science and orbital mechanics have further emphasized the significance of these orbital variations. For example, research by (Laskar, J., Fienga, A., Gastineau, M., 2011) demonstrates that long-term orbital changes can drive glacial and interglacial cycles, highlighting their importance beyond seasonal variations. More contemporary studies have refined estimates of solar irradiance changes across aphelion and perihelion, linking them to subtle but measurable effects on Earth's energy balance. Meanwhile,

Islamic astronomy scholarship has revisited classical texts in light of modern science, showing how Muslim astronomers historically integrated precise observations with theological reflection. However, few studies have explicitly bridged modern astrophysical explanations of aphelion–perihelion dynamics with Islamic cosmological interpretations, leaving a gap in integrative approaches that connect empirical science with spiritual significance.

The celestial phenomenon has been the centre of attention in Islamic scientific treasures since the early days of Islamic civilisation. In the Qur'an, many verses encourage humans to observe the sky and natural phenomena as a sign of Allah's greatness and power (Ogaba, 2021). Observation of the movement of celestial bodies is not only carried out for worship, such as determining prayer times (Qomariyah, 2021) and calculating the Hijri calendar (Nurussaadah et al., 2024), but also as a means of *tadabbur* to understand the order of the universe. Therefore, the development of astronomy became an integral part of the intellectual heritage of Islam, reflecting the close relationship between science and spirituality in Muslim civilization. However, as modern astronomy has developed into a highly rational and law-based field, an important question arises: to what extent can Muslims understand celestial phenomena such as aphelion and perihelion not only scientifically, but also as a means of strengthening their faith through Islamic cosmological perspectives?

The development of astronomy (Islamic astronomy) in the Middle Ages demonstrates that Muslims not only inherited knowledge from the Greek, Indian, and Persian civilisations but also developed it through systematic observation and the creation of precise mathematical models. Astronomical scholars such as al-Battani(Shuriye, 2011), al-Zarqali, and Ulugh Beg have made significant contributions to understanding the motion of celestial bodies through the use of instruments and observations of the open sky. The Science of astronomy in Islam is not just an exact science (Nurhuda, 2022). It is an applied science that functions directly in determining the times of worship. However, in the current context, an epistemological gap exists between the empirical scientific study of astronomy and the spiritual and theological values contained in revelation. The problem studied in this article lies in the effort to bridge the two approaches, namely how the phenomena of aphelion and perihelion can be read integratively through modern astronomy science and Islamic cosmology, thus resulting in a comprehensive understanding of the celestial system as a *kauniyah* verse.

In the Earth's annual orbit, there are two critical points known as aphelion and perihelion. Aphelion is the farthest point from the Sun, while perihelion is the position when Earth is closest to the Sun. These two points appear as a consequence of the Earth's elliptical orbital shape. Although the difference is only about 5 million kilometres, or approximately 3%, this event reflects very regular dynamics in the solar system. In modern astronomy, this phenomenon is explained through Kepler's laws of motion and Newton's theory of gravity (Kossovsky, 2020). However, in the context of Islamic cosmology, this order is also a reflection of the Creator's order and wisdom.

The phenomenon of aphelion and perihelion indicates that the position and speed of the Earth's orbit change periodically but regularly. This variation not only has scientific implications for the solar energy distribution and the duration of the seasons, but it also holds

theological significance in Islamic cosmology. Any order that can be calculated with this precision is evidence that the universe operates under established laws. It is in line with the belief in Islam that nothing in the heavens and on Earth moves without the permission and provision of Allah SWT (Laelani & Komarudin, 2023).

The verses of the Qur'an, such as QS. Yā Sīn [36]: 38-40 and QS. Al-Anbiyā [21]: 33 describes the order of the motion of the celestial bodies. In the view of classical mufassirs such as Fakhruddin al-Rāzī and al-Baghawi (Rahman et al., 2022), these verses indicate that the heavens do not operate randomly, but are governed by a system determined by Allah SWT. The obedience of celestial bodies in their orbits is a symbol of the submission of creatures to God's law, which is referred to as *sunnatullah*. The phenomena of aphelion and perihelion, although only scientifically described in recent centuries, remain in harmony with the principle of order that revelation has affirmed for more than 14 centuries.

Within the framework of contemporary Islamic epistemology (Ogaba, 2021). Natural phenomena such as aphelion and perihelion are categorized as *āyāt kauniyyah*, which are considered signs of God's existence and power embedded in the universe's creation. Modern Islamic philosophy of science emphasizes the importance of reading and understanding this *āyāt kauniyyah* not only scientifically, but also spiritually and theologically. By understanding how the Earth moves away from and closer to the Sun at regular intervals, humans become aware of a delicate yet stable balance that maintains the continuity of life. The ±3% difference in distance that occurs at the points of aphelion and perihelion affects the solar radiation intensity received, as well as having an impact on climate patterns and seasonal distribution on Earth. In this context, the phenomenon is not just the result of the laws of gravity and orbit alone, but rather a manifestation of the divine wisdom that governs life precisely.

The effects of aphelion and perihelion on life on Earth include small but significant changes in the duration of the seasons, annual fluctuations in global temperature, and variations in the length of days and nights. For example, when the Earth is at perihelion, its orbital speed increases, causing winter in the Northern Hemisphere to be shorter than summer when it is at aphelion. It also has an impact on the dynamics of the atmosphere, ecosystems, and biological rhythms of living things. From an Islamic perspective, this order reflects the concept of tadbīr ilāhī, God's wise arrangement of the universe of His creation. Therefore, the scientific understanding of celestial phenomena like this should not stop at the rational dimension alone, but should be directed towards strengthening faith and awareness of man's position in the cosmic order.

The integrative study between revelation and modern astronomy has become a significant epistemological approach in the development of a comprehensive Islamic science. Especially during a contemporary era marked by the dominance of secular paradigms in Science, this integrative approach offers a harmonious synthesis between the dimensions of theology and scientific observation. Through this approach, Science not only explains how nature works but also why it works in an orderly and beautiful manner. Revelation and reason, as two complementary sources of knowledge in Islam, form a framework of thought that allows Muslims to not only know the mechanical structure of the universe but also to explore the

spiritual meaning behind it. Therefore, this article aims to examine the phenomena of aphelion and perihelion not only from the perspective of astronomy and orbital dynamics, but also from the perspective of Islamic cosmology, which emphasises the values of faith, contemplation, and monotheism in interpreting the universe's order.

B. Methods

This research employs a qualitative, contextual approach, utilizing library research and mathematical formulas to examine the phenomenon in depth within two primary domains: modern astronomy and Islamic cosmology. Scientific studies are conducted by analyzing the latest astronomical data from reliable sources, such as NASA and scientific journals in the field of astrophysics, particularly related to eccentricity, Earth's orbit parameters, aphelion and perihelion distances, orbital velocity, and variations in solar irradiation. Meanwhile, Islamic studies focus on the Qur'an, which contains the order of celestial motion, as seen in QS. Yāsīn [36]: 38–40 and QS. Al-Anbiyā [21]: 33, with the primary references to classical commentaries such as al-Rāzī's Tafsir al-Kabir and al-Baghawi's Ma'ālim al-Tanzīl, as well as contemporary commentaries such as Wahbah al-Zuhaili's Tafsir al-Munīr. These verses are analyzed using the method of thematic interpretation (maudhū'ī) to gain a comprehensive understanding of cosmic order from an Islamic perspective.

To bridge the scientific and spiritual dimensions, an integrative approach based on monotheistic epistemology is used. In this approach, astronomy is understood not only as an exact science that explains the phenomena of orbit and celestial motion, but also as a vehicle for reflection on the verses of the Quran. This integration model refers to the framework of bayani (interpretation of revelation), burhani (scientific rationality), and 'irfani (spiritual awareness), as developed in contemporary Islamic thought. With this methodology, the research is not only descriptive and analytical, but also reflective, as it associates astronomy with the strengthening of faith and monotheistic values within the framework of Islamic cosmology.

C. Result and Discussion

1. Aphelion and Perihelion Phenomena in Modern Astronomy

In celestial mechanics, the Earth's orbit is not a perfect circle, but rather an ellipse with an eccentricity score about 0.0167. This variation results in the Earth–Sun distance changing throughout the year, leading to the occurrence of perihelion and aphelion phenomena. Perihelion occurs when the Earth is at its closest to the Sun (approximately 147.1 million km) around January 3, while aphelion occurs around July 4 each year when the Earth is at its farthest point (approximately 152.1 million km), as shown in Figure 1.

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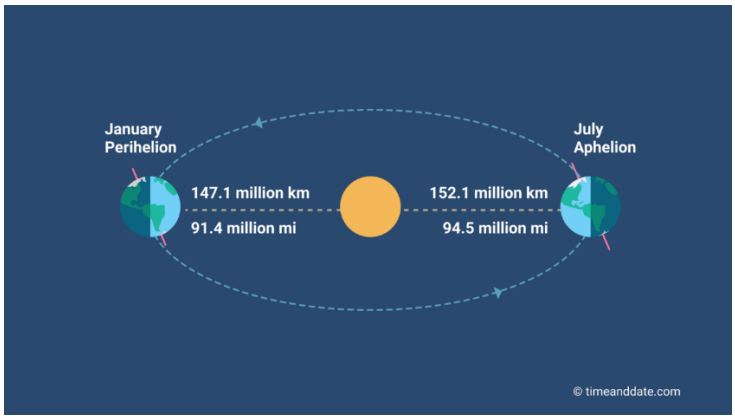

Figure 1. Earth Orbit in Perihelion and Aphelion (Source: timeanddate.com)

Although this difference in distance is approximately 5 million km, or about ±3%, the impact on temperature and seasons is not directly significant. It is because the seasons are more influenced by the tilt of the Earth's axis of rotation (23.5°) than by the Earth's distance from the Sun. Nevertheless, small changes in the intensity of solar radiation can still be measured precisely by satellites such as SORCE (Solar Radiation and Climate Experiment) and TSIS (Total and Spectral Solar Irradiance Sensor), which record annual variations in global solar irradiation (TSI) of ±6.3 W/m² or about 0.3% of the total (Scafetta, 2023).

This phenomenon is explained mathematically through Kepler's Law. In this case, Kepler's second law, which reads that "every planet sweeps the same area at the same time", implies that the speed of the Earth's orbit increases as it approaches perihelion and slows down as it approaches aphelion. The Earth's orbital velocity at perihelion is approximately 30.29 km/s, while at aphelion, it is approximately 29.29 km/s (Saefullah et al., 2023). These changes can not only be predicted with elliptical orbit models, but are also monitored in real-time by observatories and space missions owned by NASA and ESA. Additionally, differences in radiation intensity also have a minor impact on the length of the seasons on Earth. In the Northern Hemisphere, winter occurs when the Earth is at perihelion, resulting in shorter winters and longer summers compared to the Southern Hemisphere (Raisal et al., 2021).

From a scientific perspective, the regularity of this phenomenon serves as proof that the solar system operates according to the laws of universal gravity and Newtonian dynamics. However, the precision of observation and prediction of such phenomena has reached a very high level, which allows the determination of the timing of aphelion and perihelion on the scale of seconds. The development of astrometry, satellite, and orbital modelling technologies has made this study relevant in both purely scientific and practical aspects, such as in the adjustment of geostationary satellites, space manoeuvring, and the study of Earth's climate.

a. Mathematical Studies

The phenomena of aphelion and perihelion, when viewed through the lens of revelation, offer a meaningful opportunity to integrate modern astronomical studies with Qur'anic guidance. In contemporary discourse, misinformation and hoaxes often spread rapidly, such as exaggerated claims that aphelion causes extreme cold or that perihelion triggers extreme heat on Earth.

However, mathematical and observational studies consistently show that the variation in Earth's distance from the Sun, only about 3%, does not significantly alter surface temperatures compared to the dominant effect of Earth's axial tilt. These findings underline the importance of verifying scientific claims before accepting or spreading them, aligning directly with the Qur'anic principle of *tabayyun*, the verification of information emphasized in Surah al-Hujurat (49:6). Kepler's laws of planetary motion provide a robust mathematical framework for understanding the motion of planets in the Earth's elliptical orbit. The elliptical orbit form is shown in Figure 1.

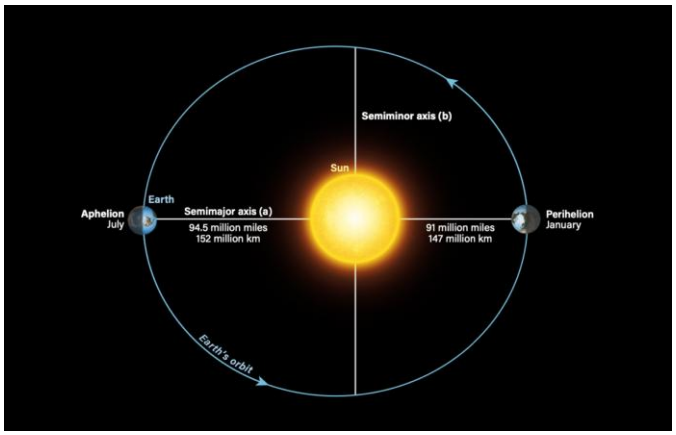

Figure 2. The elliptical Earth Orbit Shapes (Source: astronomy.com)

The shape of the Earth's orbit follows the general equation of an ellipse (1):

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \ldots (1)$$

where:

- a refer to the semi-major axis (about 149.6 million km),
- b refer to the semi-minor axis,

Then, the eccentricity equation (2):

$$e = \sqrt{1 - \frac{b^2}{a^2}} \approx 0{,}0167 \ldots (2)$$

From equation (2), the minimum distance (r perihelion) and maximum distance (r aphelion) between the Earth and the Sun can be calculated by applying the basic formula of orbital mechanics:

1) Perihelion:

$r_p = a(1 - e) \approx 149{,}6 \times (1 - 0{,}0167) = 147{,}1$ million kilometers.

with a = 149.6 million km (semi-major axis) and e = 0.0167 (orbital eccentricity), the distance is calculated as 147.1 million km. This proximity increases the intensity of solar radiation received on Earth because irradiance is inversely proportional to the square of distance. Consequently, solar energy at perihelion is about 3.4% higher compared to the mean distance, and approximately 6.9% higher than at aphelion. While this additional energy does not

significantly alter seasonal temperatures (since axial tilt dominates), it can influence subtle phenomena such as the brightness of the twilight sky and the background contrast for observing faint celestial objects like the thin lunar crescent (hilal). At perihelion, the stronger solar glare can make early crescent visibility slightly more difficult.

From an observational standpoint, this enhanced solar brightness slightly brightens the twilight sky, potentially reducing the visibility of faint objects such as the first lunar crescent, which is a critical concern in traditional Islamic moon-sighting (hilal) practices. According to (Raharto & Sopwan, 2012), the Arc of Vision (ARCV), defined as the angular difference between the altitudes of the Moon and the Sun at sunset, serves as a key criterion for predicting crescent visibility. Their study found that for perihelion groups, the ARCV range for successful visibility falls roughly within:

- ILVn 217: 7.73° < ARCV < 10.71°
- ILVn 155: 7.68° < ARCV < 10.18°
- ILVn 019: 7.79° < ARCV < 10.82°

In other words, only when the Moon is sufficiently separated in altitude from the Sun's glare is the slender crescent likely to be seen at or around perihelion.

2) Aphelion:

$r_a = a(1 + e) \approx 149{,}6 \times (1 + 0{,}0167) = 152{,}1$ million kilometers

The calculated distance is 152.1 million km. At this position, the Earth receives slightly less solar radiation because of the increased distance, leading to about 3.4% less irradiance compared to the mean distance, and about 6.9% less than perihelion. This reduction in solar intensity contributes to slightly milder summers in the Northern Hemisphere, since aphelion occurs in early July, though again the effect is minor compared to axial tilt. From an observational perspective, the weaker solar glare during aphelion results in a marginally darker twilight sky, which may enhance the visibility of faint objects, including the lunar crescent, though the difference is subtle and requires precise observation to detect. This greater distance yields a slight reduction in solar irradiance. This decrease is minor compared to the impact of axial tilt, which still chiefly governs Earth's seasonal shifts. This subtly dimmer sunlight at aphelion results in marginally darker twilight skies, potentially enhancing the visual contrast needed to detect the early lunar crescent. The same ARCV criterion applies for aphelion groups, with practical thresholds as follows:

- ILVn 223: 7.82° < ARCV < 10.87°
- ILVn 186: 7.82° < ARCV < 10.52°
- ILVn 087: 7.86° < ARCV < 10.86°

These ranges reflect when the Moon's altitude relative to the Sun is sufficient for visibility, even when its illumination fraction is very low (0.5%–1%).

By detailing these orbital positions and linking them with empirical Hilal visibility criteria (ARCV), the paper demonstrates how precise mathematical modeling and observational thresholds are essential. It clarifies that although aphelion and perihelion introduce measurable

changes in solar distance and irradiance, their effect on seasonal extremes is minor. Where they matter more is in optical and observational contexts, such as detecting the lunar crescent, especially when combined with rigorous criteria such as ARCV. Thus, Earth's orbit produces a variation of about 5 million km, or roughly 3% of the mean Earth–Sun distance. The difference in distance causes slight variations in the intensity of solar radiation received by the Earth (Zioutas et al., 2022), since the intensity of light is inversely proportional to the square of the distance:

$$I \propto \frac{1}{r^2}$$

Thus, the intensity in perihelion is slightly greater than that of aphelion. However, because the Earth's eccentricity axis is minor, this energy difference is only about 6.9%, and it is not large enough to cause significant seasonal changes.

This means that at perihelion, the Earth receives slightly more solar energy than at aphelion. Although subtle in terms of seasonal impact, this energy difference has observational implications for celestial phenomena. For instance, increased solar brightness during perihelion can make the background sky marginally brighter, which in turn can influence the visibility of faint objects such as the thin lunar crescent (hilal). The crescent Moon, already a delicate object to observe due to its low surface brightness and proximity to twilight glare, becomes even more challenging to detect when the Sun is at its closest distance. Conversely, at aphelion, the slightly reduced solar intensity results in marginally darker twilight conditions, which may improve the contrast between the crescent and the sky, although the effect remains small (Raharto et al., 2018).

Furthermore, the Qur'an repeatedly encourages believers to contemplate the order of the cosmos as signs of divine wisdom. Surah Ali Imran (3:190) describes how the alternation of the heavens and the earth is a source of reflection for people of understanding. In the context of aphelion and perihelion, this verse reminds Muslims that precise orbital dynamics are not arbitrary but part of a divinely established system that sustains life and timekeeping. By combining empirical evidence with *tadabbur* of these phenomena, Muslims can develop a balanced perspective that strengthens both intellectual clarity and spiritual faith.

From an Islamic perspective, these results are significant not only scientifically but also spiritually. The Qur'an urges believers to practice tabayyun (verification) when encountering information (Q.S. al-Hujurat: 6), which is especially relevant today in the face of hoaxes claiming that aphelion causes extreme cold or perihelion extreme heat. Scientific calculations disprove such exaggerations, showing that these orbital variations cannot account for drastic temperature anomalies. At the same time, the Qur'an commands *tadabbur* (reflection) upon the universe.

This integration of revelation with astronomical study highlights how science and religion are not contradictory but complementary. Modern astronomical calculations debunk misleading narratives, while Qur'anic injunctions provide ethical and epistemological guidance on how to approach such knowledge responsibly. Thus, the study of aphelion and perihelion becomes not

only a scientific pursuit but also an act of faith, embodying the harmony between empirical inquiry and divine revelation.

The combined effects of Earth's orbital eccentricity and axial tilt provide important implications for both astronomical science and religious practice. Axial tilt is primarily responsible for changes in the Sun's declination, which govern the varying length of days and nights throughout the year. These declination changes are directly related to the determination of Islamic prayer times, such as the shifting times of Maghrib, Isha, and Subh, since they depend on the Sun's apparent position relative to the horizon.

Perihelion and aphelion, though primarily the result of Earth's orbital eccentricity rather than axial tilt, interact with this system by subtly modifying solar intensity during different seasons. Currently, perihelion occurs in early January during the Northern Hemisphere's winter, slightly increasing solar irradiance during shorter days, while aphelion in early July moderates summer heat by reducing irradiance during longer days. This interplay ensures that prayer times, which are determined by solar altitude and twilight conditions, remain stable and predictable within natural margins. For example, the increased solar brightness at perihelion may prolong twilight slightly, while reduced brightness at aphelion may shorten it, affecting the practical observation of Isha and Subh entry times (Saefullah et al., 2023).

In classical astronomy, the distance and motion of celestial bodies are also explained using units of degrees on the zodiac circle and the deferential-epicycle system. Although they differ in their coordinate systems and paradigms, the principle of seeking to understand the order of celestial motion remains the main similarity. This mathematical study shows that the phenomena of aphelion and perihelion can be predicted with high precision through modern astronomy. It is in line with the *kauniyah* verse in the Qur'an, which describes the order and harmony of the sky:

الَّذِيْ خَلَقَ سَبْعَ سَمٰوٰتٍ طِبَاقًاۗ مَا تَرٰى فِيْ خَلْقِ الرَّحْمٰنِ مِنْ تَفٰوُتٍۗ فَارْجِعِ الْبَصَرَۙ هَلْ تَرٰى مِنْ فُطُوْرٍ

"Do you not see that God created the seven heavens in tiers? There is no imbalance in God's creation" (QS. Al-Mulk: 3).

Also in Surah Yunus (10:5):

هُوَ الَّذِيْ جَعَلَ الشَّمْسَ ضِيَاۤءً وَّالْقَمَرَ نُوْرًا وَّقَدَّرَهٗ مَنَازِلَ لِتَعْلَمُوْا عَدَدَ السِّنِيْنَ وَالْحِسَابَۗ مَا خَلَقَ اللّٰهُ ذٰلِكَ اِلَّا بِالْحَقِّۗ يُفَصِّلُ الْاٰيٰتِ لِقَوْمٍ يَّعْلَمُوْنَ

Underlines that Allah created the Sun as a source of radiant light and the Moon as a reflected light with determined phases so humans can measure time and calculate years. Implicit in this description is the precise order of celestial orbits, where the Sun and Moon follow fixed paths to regulate cycles of time and serve as natural calendars. The verse suggests that these orbital systems are not random but divinely designed with accuracy, functioning as signs for people of knowledge to reflect upon the harmony and lawfulness of the universe.

2. Islamic Cosmological Perspective

Islamic cosmology views the universe as a creation full of order, harmony, and purpose. Unlike the purely scientific approach that emphasises the mechanistic aspect, Islamic cosmology views the phenomenon of the sky as a manifestation of Allah's will and power, as expressed in the form of kuniyah verses. Phenomena such as the motion of the Sun, Moon, and Earth are not the result of chance, but rather the creation of a system precisely established by the Creator.
The Qur'an mentions in QS. Yā Sīn [36]:38:

وَالشَّمْسُ تَجْرِيْ لِمُسْتَقَرٍّ لَّهَاۗ ذٰلِكَ تَقْدِيْرُ الْعَزِيْزِ الْعَلِيْمِ

“And the Sun walks in its circulation. Such is the decree of the Mighty, the All-Knowing.”

This verse is understood by mufassirs such as Fakhruddin al-Rāzī in Tafsir al-Kabir as evidence of a celestial system that is subject to divine provisions, which does not deviate in the slightest from its path (Maulida & Bashori, 2024). Similarly, QS. Al-Anbiyā' [21]:33 affirms that:

وَهُوَ الَّذِيْ خَلَقَ الَّيْلَ وَالنَّهَارَ وَالشَّمْسَ وَالْقَمَرَۗ كُلٌّ فِيْ فَلَكٍ يَّسْبَحُوْنَ

“And it is He who created the night and the day, the Sun and the Moon. Each of the two circulates in its distribution line.”

This verse is associated with the orbit and the celestial bodies regularity concept in the heliocentric system, as explained by modern muftis such as Sayyid Qutb and Wahbah al-Zuhaili, who argue that this verse contains both scientific and theological value.

Islamic cosmology also discusses the universe’s physical structure and encompasses metaphysical aspects related to the existential purpose of creation. In this case, every celestial movement is an expression of the rosary and the celestial body's obedience to God's law (see QS. Al-Isra' [17]:44)(Afni, 2023). Therefore, phenomena such as aphelion and perihelion are not solely the result of gravitational interaction between the Sun and the Earth, but also contain spiritual meanings that can strengthen monotheism and a sense of majesty towards His creation.

This approach aligns with the principle of tawḥīd epistemology, an Islamic perspective that integrates reason, revelation, and the senses in understanding reality. In this view, Science is not neutral, but plays a role in guiding humans to knowledge of their God through the observation of His signs in nature (Amril et al., 2023). Its approach is in line with the principle of tawḥīd epistemology, which is an Islamic perspective that integrates reason, revelation, and the senses in understanding reality. In this view, Science is not neutral, but plays a role in guiding humanity to knowledge of its God through the observation of His signs in nature.

3. Integration of Epistemology of Revelation and Astronomy

The integration between revelation and astronomy is an epistemological approach that combines two primary sources of knowledge in Islam: al-Naql (revelation) and al-‘Aql (reason) (Hasibuan et al., 2024). In this context, astronomy is not only understood as an empirical science that studies the movement of celestial bodies, but also as a means of *tadabbur* to the

kauniyah verses scattered throughout the universe. This integration is rooted in the monotheistic paradigm, which rejects the dichotomy between religious Science and secular Science, as affirmed by al-Ghazali and further developed by contemporary thinkers such as Syed Muhammad Naquib al-Attas and Seyyed Hossein Nasr.

The concept of integrative epistemology is highly relevant to the learning and research of astronomy in the modern era. For example, the teaching of the phenomena of aphelion and perihelion can be juxtaposed with verses of the Qur'an that emphasize the order of the heavens and universal obedience to God's law. This not only enriches the cognitive aspects of students through mastery of astronomy but also hones their affective and spiritual dimensions, as explained in the framework of integrated holistic education.

In practice, this approach has been implemented in several Islamic educational institutions in Indonesia, including the State Islamic University (UIN), the University of Muhammadiyah, and science-based Islamic boarding schools. The *bayani–burhani–irfani* approach, proposed by Amin Abdullah (Ulviana, 2024), becomes a theoretical framework for this scientific integration. Bayani represents texts and interpretations, *burhani* represents scientific rationality, and *'irfani* represents spiritual experience; these three approaches can be harmonized in the study of falak as a multidimensional science.

Phenomena such as aphelion and perihelion, when taught in an integrative context, can raise awareness that Science is not an autonomous value-free entity, but rather part of the human way of recognizing and witnessing God's greatness through the order of the universe. Thus, astronomy becomes a bridge between faith and Science, between contemplation and calculation.

Furthermore, this approach supports the development of Islamic Science in the sense that it does not secularise the reality of nature, yet also does not deny the scientific method. He revived the principle that studying and observing nature is part of intellectual worship, as reflected in many verses of the Qur'an that invite humans to think, reflect, and observe (Usman, 2024).

D. Conclusion

The phenomena of aphelion and perihelion are part of the order of the celestial system, which can be understood scientifically through Kepler's laws and orbital mechanics, and interpreted spiritually through the view of Islamic cosmology. In modern astronomy, variations in the Earth's distance to the Sun can not only be measured precisely but also explain the dynamic aspects of a planet's orbit, which have implications for the orbital velocity and distribution of solar radiation. Meanwhile, from the perspective of revelation, this order is a *kauniyah* verse that shows the power and wisdom of Allah SWT in creating and regulating the universe.

By integrating scientific and theological approaches, Muslims will gain not only a scientific understanding of celestial phenomena but also experience a strengthening of their faith and spiritual appreciation. This integrative epistemological approach offers a model of astronomical learning that is not only rational and empirical but also reflective and transcendental. This study recommends that astronomy education in Islamic institutions,

particularly in Indonesia, strengthen its integrative approach through curriculum development, effective teaching methodologies, and interdisciplinary research. Thus, the Science of astronomy will continue to develop not only as an exact science, but also as a means of *tadabbur* and strengthening the faith.

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