



PHYSICS AND ISLAMIC VIEWS ON THE EARTH'S SPINNING

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Abstract

From a physics perspective, the earth's rotation is the rotation of the earth on its axis, which causes the change of day and night, while the earth's revolution is its movement around the sun, which causes the change of seasons. The physics learning material on the Earth's rotation includes important formulas, one of which is the Earth's rotation period, which is represented by time. This explanation is based on Newton's laws of motion and other physical principles that provide a deep understanding of the mechanisms and effects of these two movements. Meanwhile, the science of monotheism views these natural phenomena as manifestations of Allah SWT's greatness and power, as explained in the verses of the Qur'an. By integrating these two perspectives, this article seeks to provide a comprehensive understanding of the Earth's rotation and revolution, as well as highlighting how scientific and religious approaches can complement each other to enrich our insight into the universe and strengthen our faith and devotion to Allah SWT. This article uses a descriptive qualitative research method. Data was collected using three methods, namely interviews, carrying out observations, and documentation. Data were analysed using three techniques, namely reducing, displaying, and drawing conclusions. In Surah Al Luqman, there is a verse that explains how humans reflect on the greatness of Allah SWT through His closest creation, namely the cycle of night and day. Allah turns or makes the night and day spin. This verse shows that God's greatness can be seen in His beautiful and complex creation, including the revolution of the Earth.

Keywords: Earth's Rotation, Earth's Revolution, Tauhid.

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INTRODUCTION

The earth's movement within the solar system is explained by two important concepts: rotation and revolution. The daily and annual cycles that influence life on earth are determined in large part by the earth's rotation, or the movement of the planet on its axis, and its revolution, or the movement of the planet around the sun. Studying physics can help you gain a thorough understanding of how these two movements work, speed, and effects. However, the science of monotheism explains these natural events as a manifestation of Allah SWT's majesty and omnipotence. According to physics, the earth's rotation determines day and night, while the earth's revolution determines seasons. Newton's laws of motion and other physical concepts, which provide scientific explanations for how and why planets move in certain ways, can be used to explain these movements. For example, the Earth's rotation affects weather patterns, ocean currents, and time gaps between regions on the planet. Earth's rotation is the movement of the planet Earth around its axis. The turnaround time takes 24 hours. With the earth rotating, the sun rises from the east and sets in the west, resulting in a change in day and night. The earth's revolution is the circular movement carried out by the planet Earth in its orbit around the Sun. The earth's revolution takes approximately 365 days or one year in the Gregorian calendar (Parisita et al., 2023). Meanwhile, according to monotheistic science,

every natural phenomenon, including the earth's rotation and revolution, is seen as a sign of Allah SWT's greatness and wisdom. As proof of His power, the Qur'an explicitly mentions the change of day and night, as well as the change of seasons. These holy verses invite humans to reflect on God's creation and increase awareness of His existence and power. According to Burhanuddin (2020), physics teachers integrate monotheistic values into their teaching in an effort to bridge the understanding of science with religious knowledge. This will result in a comprehensive understanding of how to use science to acknowledge God as the creator of the universe. The study aims to explore these two views in depth, integrating scientific understanding with spiritual values and highlighting how the two can complement each other in providing comprehensive insight into the phenomena of Earth's rotation and revolution.

METHODS

Descriptive qualitative methods are research approaches used to describe and understand phenomena or experiences that occur in certain contexts. When research activities are carried out, the approach and type of descriptive qualitative research can be used to reveal facts that occur in the field. Data was collected using three methods, namely interviews, carrying out observations, and documentation. Data was analysed using three techniques, namely reducing, displaying, and drawing conclusions. Meanwhile, to test the validity of the data, source triangulation, time triangulation, and technical triangulation techniques were used to test the data's validity. According to Lexy (2006), qualitative research aims to comprehensively understand the phenomena that research subjects encounter, including behavior, perceptions, motivations, actions, etc., through the use of descriptive language. The steps taken are to provide descriptive analysis by forming an abstraction using a method of interpreting data based on the object's perspective.

RESULTS AND DISCUSSION

Earth rotation is the rotation of the Earth on its axis. This axis is an imaginary line that passes through the North and South Pole. One complete rotation takes about 24 hours, called a sidereal day. However, because the Earth also moves in its orbit around the Sun, the duration from one midday to the next (solar day) is about 24 hours.

According to Khotimah (2023), the material of the earth's rotation and revolution is one of the materials that explains natural processes that cannot always be observed directly. This material has a significant impact on everyday life. One of the natural movements carried out by the Earth and other planets is rotation. Rotation is the movement around its axis (Barus et al., 2004).

According to Khaimah (2022), Based on statistical data about the Earth's rotation and revolution:

1. Earth rotation time: about 23 hours, 56 minutes, and 4 seconds.
2. Earth's revolution time: about 365.24 days (or one year) in the Gregorian calendar.
3. Average speed of the Earth in its orbit: about 107,000 km/h.
4. Average rotation speed of the Earth at the equator: about 1,670 km/h.
5. The average rotation speed of the Earth at the north and south poles is close to zero because these points rotate around the Earth's rotation axis.
6. The tilt of the Earth's axis to the ecliptic plane (the plane of the Earth's orbit around the Sun) is about 23.5 degrees.
7. Change in the tilt of the Earth's axis to the ecliptic plane: fluctuates between 22.1 to 24.5 degrees in a cycle of about 41,000 years.

According to Wijaya (2010), due to the Earth's rotation and the daily apparent circulation of celestial bodies, every day we observe the orbit of the Sun and objects moving from east to west. The movement of the Sun and celestial bodies from east to west is called the apparent daily circulation of celestial bodies. This is because the movement we observe is not only caused by the movement of the Sun and these celestial bodies but also by the rotation of the Earth from west to east. Alternation of day and night. The hemisphere of the Earth that is exposed to sunlight experiences day, whereas the hemisphere that is not exposed to sunlight experiences night. Because the Earth rotates continuously from west to east, half of the Earth is exposed to sunlight and constantly rotates. In other words, in a particular place in a day, there is always a change between day and night.

The Earth rotates only in one direction, east or counterclockwise. From the surface, we can feel the various impacts caused by that rotation. One is that there is day and night, but the duration varies depending on the location. The moon's gravitational pull slows the Earth's rotation.

The Earth's revolution is the movement of the Earth around the Sun. The Earth's path around the Sun is elliptical, with the Sun at one focus of the ellipse. One complete revolution takes about 365.25 days, a sidereal year. Because there is an extra quarter day each year, we add an extra day every four years in the calendar (leap years). According to Firdaus (2017), the Earth's revolution is the movement of the Earth in its orbit around the Sun. The plane of the Earth's orbit around the Sun is called the ecliptic.

The Sun rises every day to the eastern horizon, moves to a higher point climax, gradually emerges from the core peak point Z, and finally sets on the next horizon west. The Sun then goes to a lower culmination in the north and finally returns to the starting point (Nurdiansyah, 2020).

As a result of the Earth's revolutionary motion, there will be changes in seasons. Because Earth tends to tilt towards its axis of rotation, changes in Earth's position in revolution result in changes in seasons in various parts of the world. Changes in star positions: During the Earth's revolution, the positions of the stars in the sky will appear different at different times and in different places around the world. Change in position of planets: With Earth's revolution, the planets' positions and planets in the solar system also change, as all the planets revolve around the Sun in different orbits. Climate change: The Earth's revolution also affects the global climate because changes in the Earth's position result in changes in the amount of sunlight received by the Earth in various Earth regions and times (Rahmatiah, 2017).

Every year, on or around 3 January, the Earth reaches perihelion, its closest point to the Sun, which marks the start of the Earth's revolution. The Earth will continue to move away from the Sun in the coming months, reaching aphelion, or the farthest point from the Sun, around 4 July each year. The Sun will appear across the sky during the Earth's revolution due to changes in the Earth's position. During the day, the Sun will appear to move from east to west, then return to its starting point in the east in the morning. The Earth's revolution process influences Earth's weather and climate.

In Islam, several hadiths mention the rotation and revolution of the Earth. One of the hadiths. Bukhari Muslim as follows:

From Abu Dzar al-Ghifari, he said: "I heard the Messenger of Allah say, 'Indeed the Sun moves in a certain orbit, and when it has reached its setting time, it is under the arsh of Allah. Then he prayed, and Allah permitted him to pray. Then Allah said, "Go back to where you were." Then the Sun moved until it reached another sunset. This is the will of Allah, the Almighty and the All-Wise.'" (HR. Bukhari Muslim).

This hadith explains that the Sun moves in a certain orbit and prays to Allah when the time for it to set comes. After that, Allah orders the Sun to return to its original place. This shows that the Earth revolves around the Sun and not vice versa.

In the Islamic view, the rotation and revolution of the Earth are seen as natural phenomena created by Allah S.W.T. Surah Al-Anbiya verse 33 states, "And He is the One who makes night and day alternate for those who want to learn a lesson or be grateful." In this verse, Allah S.W.T. explains that He created the change between night and day, which occurs due to the rotation of the Earth on its axis (HambEarthali, 2013).

According to Wilujeng (2022), Islamic views are taught to develop science and technology while maintaining balance and harmony with nature. In the context of the Earth's rotation and revolution, the Islamic view teaches that knowledge and understanding of this phenomenon must be based on objective scientific methods, not just on belief or assumption. By developing science and technology, Muslims are expected to be able to utilize natural resources sustainably and maintain the balance of the environment created by Allah S.W.T.

In the physics learning material regarding the Earth's rotation, there are essential formulas related to the Earth's rotation. One of these is the Earth's rotation period, the time required to complete a rotation on its axis. The Earth's rotation period is expressed in time units, usually hours, minutes, or seconds.

For example, in the Qur'an, a verse teaches that Allah S.W.T.'s creation has a meaningful purpose and is not in vain. With night and day, humans can work and rest alternately and use daytime for activities and nighttime for rest. In this case, it is related that time has a relationship that has been explained in the holy verses of the Koran, where the change of day and night time will always occur with the rotation of the Earth or the rotation of the Earth on its axis. Therefore, the formula for the period of the Earth's rotation ($T = 24 \text{ hours/rotation speed}$) helps calculate the time needed for the Earth to make one complete rotation on its axis or the Earth's rotation period.

In the physics learning material regarding the Earth's revolution, there are essential formulas related to the Earth's revolution. One of these is the Earth's revolution period, which is the time needed for the Earth to make one complete revolution around the Sun. The period of Earth's revolution is expressed in units of time, usually in years or months.

In Surah Al Luqman, a verse explains how humans reflect on the greatness of Allah S.W.T. through His closest creation, namely the cycle of night and day. Allah spins or makes the night and day spin with His absolute power; in this case, Allah also shows His extraordinary greatness over all His creation. This surah also contains valuable lessons for human life, including living life the right way and obeying Allah S.W.T. There is no direct link between Surah Al-Luqman and the Earth's revolution.

"And among the signs of His greatness is the creation of the heavens and the earth and different languages and colours of human skin. Verily in these there are signs for those who know." (QS. Luqman: 22).

This verse shows that God's greatness can be seen in His beautiful and complex creation, including the revolution of the Earth (Arif, 2020).

Therefore, as intelligent creatures, humans are expected to appreciate the beauty of the universe created by Allah and pay attention to the signs of His greatness visible in every natural phenomenon, including the revolution of the Earth.

CONCLUSION

The rotation of the Earth on its axis, which ends at the North and South Poles, is called earth rotation. These 24 hours, which include the sun, moon and stars, are visible from east to west, coupled with the rotation of the Earth on its axis. The rotation of the Earth on its axis is the general process of the Earth's rotation. There is only one direction of rotation of the Earth: east or counterclockwise. The rotation of planets around the sun is known as the Earth's revolution. Apart from the rotation of the Earth on its axis, which is also called the rotation of the Earth, the revolution of the Earth is also caused by the gravitational pull of the sun on the Earth. The Earth's rotation period, or the length of time

it takes to complete one complete rotation on its axis, is one of the main formulas for Earth's rotation contained in physics learning materials. The time units that indicate the Earth's rotation cycle are usually hours, minutes or seconds.

In Surah Al Luqman, a verse explains how humans reflect on the greatness of Allah S.W.T. through His closest creation, namely the cycle of night and day. Allah spins or makes the night and day spin. This verse shows that God's greatness can be seen in His beautiful and complex creation, including the revolution of the Earth.

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