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Exploring Quranic Astronomy and Contemporary Science

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Abstract:
Important rites have always been closely linked to the motion of heavenly bodies in Islamic history. The position of the sun in the sky has been matched with the times of daily prayers. Many a believer has had to use the stars or, more lately, a satellite connection to determine Mecca's direction. The apparent size of the moon has traditionally determined the start of each month, including Ramadan. Thus, astronomy has always played a significant role in Islamic culture. Even in the world we live now, Muslims can learn a lot about their faith by connecting it with scientific research and examining them considering Holy Quran and Sunnah. The Holy Quran encourages believers to think and explore the creation of the universe positively. The miraculous book of Holy Quran discusses celestial bodies and how they came together to begin with the creation of the universe. The Holy Quran beautifully drew the sketch for the infamous Big Bang Theory almost fourteen and a half centuries ago when scientists had no clue about the origin of universe. The Holy Quran also debates about other things like how the Earth tilts, planets spread out, the Sirius star, falling rocks from space (called meteorites), and planets outside our solar system (exoplanets). Even the way the moon moves has a special mention, and when we look at it now, it fits with what science says. These verses in the Holy Quran show how well they fit with what we know from modern science. These Quranic evidence of Astronomy tell believers to not just think about why the universe is here but also to explore it, look out for the signs of Almighty in His creation and draw a connection with divinity in light of it. The Holy Quran becomes like a guide, inviting believers to learn more about the world and showing that science and faith can go together. It's like a connection between old teachings and the new things we find out about the universe today. This link between religion and science not only makes Islamic knowledge richer in contemporary era but also shows how beliefs and logics can go hand in hand to understand the world.

Keywords: Islam, Astronomy, Universe, Creation, Science, Holy Quran, Earth, Planets, Explore

The last few decades have been pouring scientific advancements and technological developments into the lap of humanity with a sheer force. Human beings have discovered their mental as well as emotional potential like never before and there is no area of study or dynamic of life that remains left out of potential scientific evolution over time. One of these popular yet oldest domains of scientific study is Astronomy. Since the Holy Quran

is a miracle of Allah Almighty and it revels into every element of life from celestial bodies to the depths of oceans and from deadly creatures to life thriving plants, astronomy is quite an interesting topic of Holy Quran which deals with the creation and continuous exploration of Universe and its celestial bodies. Studying and proving the current scientific observations and evolutions in light of Holy Quran and its context become even more interesting. Given research provided a discourse of astronomical research conducted by science and proven by Holy Quran almost fourteen and a half centuries ago.

Introduction

The revelation of the Holy Qur'an is intended to stir up thought among humanity. What could be simpler than that in terms of how we behave here on Earth with regard of applying our intelligence to comprehend the world around us? In order to evoke a profound sense of wonder at the numerous signs of the Almighty that are visible to those who utilize intelligence, the holy Qur'an explores the myriad manifestations of Allah Almighty in the natural world, the environment around us, and even within our own selves. It is quite amazing that scientific understanding that has taken generations to acquire is contained in the Qur'an, which was revealed around 610 and 632 CE. This can only mean one thing: it is unquestionably of divine origin. As Muslims, we consider the original Arabic text of the Qur'an to be the divine word of Allah Almighty. Therefore, a grasp of science is equally necessary for a comprehensive knowledge of the Holy Qur'an. The Holy Qur'an does not aim to teach us science; rather, it invites people to consider the wonders of creation in order to acknowledge the grandeur of Almighty Allah.

Prior to delving deeper, it is imperative to clarify a crucial differentiation between Astronomy and Astrology. Many people mistakenly believe that the two disciplines have the same meaning. While astrology is a pseudoscience and is prohibited, astronomy is an academic discipline, a scientific study and is halal. In order to comprehend the fundamental ideas guiding the motion of the planets, stars, galaxies, and the universe as a whole, astronomy studies celestial bodies. Astrology makes the claim that it can foretell people's fates based on the "action" of planets and other celestial bodies in their lives. Yet, there isn't a single instance of a contradiction between modern astronomy and the Holy Qur'an.

Difference between Astronomy and Astrology

The scientific study of the universe, which includes stars, planets, and other celestial objects, is known as astronomy. Astronomy is a discipline that has thousands of years of history. Early civilizations used it to help with navigation, tell the season, and forecast eclipses, among other useful tasks.

“Astronomy remains a vital field of study, providing valuable insights into the origins and evolution of the universe. Astrology, on the other hand, is a belief system that posits a relationship between celestial bodies and events that occur on Earth” [1]

Numerous societies have employed astrology for thousands of years; the first known applications of astrology date to the ancient Egyptian and Babylonian cultures. In astrology, a person's personality, behavior, and life events are greatly influenced by the placements of celestial bodies at the moment of their birth. Astrology is still widely used today, with many individuals turning to it as a tool for life direction and self-discovery.

General Reflection of Celestial Bodies in light of Holy Quran

Heavenly bodies are frequently reflected upon in the Holy Quran. The Holy Quran makes reference to the plurality of Heavens and Earths, which is highly remarkable. It also describes an intermediary creation that exists "between the Heavens and the Earth," which has been confirmed by current science. A general notion of what is found in the

sky, or everything outside of the earth, is already conveyed in the verses that pertain to Creation.

The Holy Quran contains numerous verses that offer information on astronomy in addition to those that expressly explain the Creation. These verses serve to supplement what has already been spoken about astronomy. A few of them are merely meditations on the majesty of the Creator, who is the master organizer of the entire system of stars and planets.

Allah Almighty says in Holy Quran about heavens:

أَفَلَمْ يَنظُرُوٓاْ إِلَى ٱلسَّمَآءِ فَوْقَهُمْ كَيْفَ بَنَيْنَٰهَا وَزَيَّنَّٰهَا وَمَا لَهَا مِن فُرُوجٍ [2]

"Have they not then looked at the sky above them: how We built it and adorned it ˹with stars˺, leaving it flawless?"

Even though the major subject of this verse is mankind, who is being asked to ponder the sky above them and praise the grandeur of Allah Almighty. But the frequent mentions of these verses are signs enough to understand that the universe is not created out of nowhere without a creator or a reason. These verses emphasis human conscious to reflect and think about the purpose of creation of universe and draw connection with divinity. There are several other verses in Holy Quran that demand human beings to give thought to the creation of Allah Almighty. The Holy Quran states:

رَبَّنَا مَا خَلَقْتَ هٰذَا بَاطِلًا [3]

"We have not created all of this without purpose"

The verse emphasizes that everything in existence has a purpose, prompting believers to reflect on the details of creation. In the context of encouraging the believer to study science, Allah said at another place in the Holy Qur'an:

سَنُرِيْهِمْ اٰيٰتِنَا فِى الْاٰفَاقِ وَ فِىْٓ اَنْفُسِهِمْ حَتّٰى يَتَبَيَّنَ لَهُمْ اَنَّهُ الْحَقُّ [4]

"We will show them our signs in the universe and within themselves until it becomes clear to them that this Qur'an is truth"

Allah Almighty promises to show His signs in the universe and within believers, which inspires them to pursue scientific studies. The heavens and creation, including an intermediary creation that is supported by contemporary science, are discussed in the Holy Quran. About forty verses provide astronomical insights, highlighting the order of the celestial bodies and the magnificence of the Creator. Notably, the Quran explores the structure of the universe.

Allah Almighty wants us to think about the sky – how it's built, decorated, and perfectly designed. He asks a question in the Quran, making us wonder: Have you ever really looked at the sky above you? It's like an invitation to check out the amazing craftsmanship of the heavens, with everything fitting together beautifully and looking flawless.

It is also stated in Surah Luqman:

خَلَقَ السَّمٰوٰتِ بِغَيْرِ عَمَدٍ تَرَوْنَهَا [5]

"He created the heavens with no pillars that you can see"

Allah Almighty mentions how He created the heavens without any visible pillars. It's a way of saying that if you look up at the sky, you won't see any support holding it up. This verse emphasizes the incredible power and design of Allah, who crafted the heavens in a way that appears free-standing and majestic.

In Surah Al-Anaam, Allah Almighty said:

وَ هُوَ الَّذِىْ جَعَلَ لَكُمُ النُّجُوْمَ لِتَهْتَدُوْا بِهَا فِىْ ظُلُمٰتِ الْبَرِّ وَ الْبَحْرِ [6]

"And He is the only one who has made the stars as your guide through the darkness of land and sea"

This verse highlights that Allah Almighty is the One who created the stars to serve as guides for navigation in the darkness of both land and sea. The stars, in their celestial arrangement, provide a natural and reliable source of direction, aiding travelers and navigators in finding their way through the vast expanses of the earth and oceans. When one learns to read the constellations and stars in the sky, they can never be lost in any part of the world. They are genuinely a beacon of guidance within the canopy of the heavens. No matter where you are in the world, you can look up at the night sky and instantly determine your latitude, which will tell you where the north is and all other directions. You can also determine the time of year, even in the absence of a calendar. It is quite fitting that Muslims use the crescent moon and stars as symbols to symbolize religious matters, since the moon is a crucial component in the Muslim calendar. This verse also emphasizes the thoughtful design of the universe, and the practical benefits bestowed upon humanity by the Creator.

Scientifically proven Astronomical Research through the lens of Holy Quran

1. Bing Bang Theory

Long ago, scientists didn't know that the universe was getting bigger. Then, they came up with a big idea called the Big Bang hypothesis. It says that about 13.8 billion years ago, everything in the universe came from a super tiny, super dense, and super-hot point called a Singularity [7]. At first, nobody knew the universe was expanding. But later on, scientists figured out something amazing – the Singularity started growing, and that's how our universe began to exist like it does today.

According to the big-bang model, the universe expanded rapidly from a highly compressed primordial state, which resulted in a significant decrease in density and temperature. Soon afterward, the dominance of matter over antimatter (as observed today) may have been established by processes that also predict proton decay. During this stage many types of elementary particles may have been present. After a few seconds, the universe cooled enough to allow the formation of certain nuclei. The theory predicts that definite amounts of hydrogen, helium, and lithium were produced. Their abundances agree with what is observed today. About one million years later the universe was sufficiently cool for atoms to form. The radiation that also filled the universe was then free to travel through space [8].

The concept not only explains the existence of radiation and ordinary matter, but it also suggests that neutrinos—basic particles devoid of mass and electric charge—should be prevalent throughout the current cosmos. There's a chance that further artefacts from the early universe will one day be found.

Allah Almighty said in Quran:

اَوَ لَمۡ یَرَ الَّذِیۡنَ کَفَرُوۡۤا اَنَّ السَّمٰوٰتِ وَ الۡاَرۡضَ کَانَتَا رَتۡقًا فَفَتَقۡنٰہُمَا ؕ وَ جَعَلۡنَا مِنَ الۡمَآءِ کُلَّ شَیۡءٍ حَیٍّ ؕ اَفَلَا یُؤۡمِنُوۡنَ[9]

“Did the disbelievers not observe that the heavens and the earth were closed, then We opened them? And We created every living thing from water. Would they still not believe it?”

This verse talks about how the universe started. At first, everything was stuck together, and then it opened up. The verse also says that all living things are made from water, which matches what scientists know.

The Arabic word "ratqan" means a locked-up mass or darkness. It's amazing because this fits with what we know about the early universe – it was dark and closed. After that, the heavens and the Earth unfolded, and we got the big universe we see today.

This verse is like a strong sign, especially when some people don't believe. It shows a cool connection between ancient wisdom and what science tells us now.

The idea that later became the Big Bang theory was first discussed by a scientist and priest, Georges Lemaitre. He wrote about it in 1931 in a paper called "The Beginning of the World from the Point of View of Quantum Theory. [10]

So, even though scientists talked about the Big Bang theory in 1931, the Quran mentioned something similar 1400 years ago. It's like the Quran knew about the beginning of the universe before scientists figured it out.

The concept of Bing Bang theory was first proposed in 1931, but the Quran described it 1400 years ago.

2. Axial Tilt

Axial tilt, also known as obliquity, is a fundamental aspect of planetary dynamics, defining the angle between a celestial body's rotational and orbital axes [11]. In simpler terms, it is the tilt of a planet's axis relative to the planet of its orbit around the sun.

Axes on several planets, including Mercury, Venus, and Jupiter, are nearly entirely perpendicular, or straight up and down. The axis of Earth is not parallel. It is ubiquitous or has an axial tilt. The angle formed by the planet's orbital axis and rotational axis is known as its axial tilt. The thin disc that encircles the sun and extends to the border of the solar system is known as the ecliptic or orbital plane, and it is perpendicular to the orbital axis of each planet.

In Holy Quran, Allah Almighty says:

اَلَمْ تَرَ اَنَّ اللّٰهَ يَسْجُدُ لَهٗ مَنْ فِى السَّمٰوٰتِ وَ مَنْ فِى الْاَرْضِ وَ الشَّمْسُ وَ الْقَمَرُ وَ النُّجُوْمُ وَ الْجِبَالُ وَ الشَّجَرُ وَ الدَّوَآبُّ وَ كَثِيْرٌ مِّنَ النَّاسِ [12]

"Have you not seen that all those who are in heavens and all those who are in earth prostrate themselves before Allah; and so, do the sun and moon, and the stars and the mountains, and the trees, and the beasts, and so do many human things."

Before the discovery of axial tilt, it was a myth that planets spin but do not bow. Recent scientific discoveries highlight the axial tilt of celestial bodies, including Earth, the sun, and the moon. The concept of prostration in the Quran aligns metaphorically with the axial tilt observed in heavenly bodies, including the moon and sun which shares a remarkable resemblance to the act of bowing or inclining [13].

The Quranic reference to the prostration of these entities gains an astonishing correlation with the scientific understanding of axial tilt. The axial tilt is like how much the planet is leaning while it spins. It's like tilting a spinning top and seeing at what angle it leans. So, this tilt is about the angle between two imaginary lines. One line goes around the planet like it's spinning (we call this the rotational axis). The other line goes through the planet's poles (the top and bottom points) and is like the planet's path around the sun (we call this the orbital axis).

Earth is a bit tilted as it moves around the Sun, about 23.5 degrees. This tilt, along with Earth going around the Sun, makes different parts of the Earth get sunlight in different ways [14].

When one part is tilted toward the Sun, it's summer there with strong sunlight. When tilted away, it's winter with weaker sunlight. In between, we get spring and autumn when it's not tilted either way. So, this tilt and the changing sunlight create our seasons, making the weather change in a cool way.

3. Scattered Planets

According to the International Astronomical Union (IAU), a planet is defined as a celestial body: [15]

1. Orbits a star, specifically in our cosmic neighborhood, the Sun.
2. Is large enough for its self-gravity to shape it into a nearly round or spherical form.

3. Has sufficient gravitational influence to clear its orbital path of other objects that are comparable in size.

Allah Almighty says:

وَ اِذَا الۡکَوَاکِبُ انۡتَثَرَتۡ [16]

"When the planets are scattered"

The Quranic verse uses the term "scattered," suggesting a dispersion or movement beyond gravitational constraints. 1400 years ago, nobody knew how planets orbit stars. But the Quran said: "They are scattered". In the past, it was said that there were no roaming planets, they were all gravitationally bound to their stars. Recently, scientists have discovered that the planets can escape the gravitational hold of their stars and can roam in space. They found scattered planets roaming in space.

4. Sirius Star

Sirius is the brightest star visible in Earth's night sky. Its remarkable brightness made it widely recognized by ancient civilizations. Sirius is by far the brightest- almost twice as bright as its nearest rival, the star Canopus [17].

As stars shine through the Earth's atmosphere, which is made up of different densities, turbulent air currents, and particles, all stars can appear to be sparkling or flickering.

Due to the exaggeration of these atmospheric effects by its brightness, Sirius seems to twinkle/flicker more than other stars. Because of its denser atmosphere, Sirius is located lower in the sky for people living in the northern hemisphere.

Sirius was known as Sothis to the ancient Egyptians, who were aware that it made its first heliacal rising (i.e., rose just before sunrise) of the year at about the time the annual floods were beginning in the Nile River delta. They long believed that Sothis caused the Nile floods, and they discovered that the heliacal rising of the star occurred at intervals of 365.25 days rather than the 365 days of their calendar year, a correction in the length of the year that was later incorporated in the Julian calendar [18].

Allah Almighty said in the Quran in Surah Najm:

وَ اَنَّهٗ هُوَ رَبُّ الشِّعۡرٰی [19]

"And he alone is the lord of Sirius"

Allah mentions in this verse that He is the Lord of Sirius, emphasizing His sovereignty over the brightest star in Earth's night sky.

Allah Almighty also states in Surah Najm:

فَکَانَ قَابَ قَوۡسَیۡنِ اَوۡ اَدۡنٰی 20

"Until he was two bow's lengths away and even closer"

Scientists have discovered that Sirius is the collection of two stars: Sirius A and Sirius B. Sirius A is the brightest star, and we can see it with naked eyes. However, Sirius B cannot be seen with the naked eye. The Sirius double stars orbit ellipses about one another in a double bow. The orbital period of Sirius A and B about their common center of gravity is 49.9 years [21].

It is a miracle of the Holy Quran that the Sirius twins also orbit ellipses after 49 years and the ayah number of surah Najam in which Sirius star is described is 49. The word "two bows" is also significant because the Sirius is also a combination of two stars.

5. Meteorites

Meteors look like stars that are falling from the sky. They're not like regular rocks here and are super old. These rocks give us pieces from other parts of our solar system, like planets and even stars before our Sun. Scientists study them to learn about how our solar system, planets, and asteroids formed. They appear as a sudden bright streak in the night sky. The meteors that reach Earth's surface are called meteorites [22].

They also help us understand how big space rocks hitting Earth in the past affected our planet and life. Meteorites are like special clues that tell us about things in space beyond our Earth. By examining meteorites, scientists unlock secrets about the early days of our solar system, shedding light on the incredible stories of planets and stars, and the impact of cosmic events on Earth's history. These ancient rocks hold valuable information that helps us piece together the cosmic puzzle of our existence.

Allah talks about meteorites in the Quran in these words:

وَ اِنْ یَّرَوْا کِسْفًا مِّنَ السَّمَآءِ سَاقِطًا یَّقُوْلُوْا سَحَابٌ مَّرْکُوْمٌ [23]

"If they were to see a deadly piece of the sky fall upon them, still they would say, this is just a pile of clouds"

In the past, people believed that objects fell intact. Nobody believes that a falling object can turn into ash. When these meteorites enter into the earth's atmosphere, heat is generated. This generated heat burns the meteorites into ash. This ash looks like clouds. The Quran portrayed this Scientific phenomenon 1400 years ago.

6. Exoplanets

Every planet in our solar system orbits around the Sun. Planets that orbit stars outside our solar system are known as exoplanets. Detecting exoplanets directly with telescopes is challenging. The first exoplanet was observed in 1917. They search for exoplanets by observing the effects these planets have on the stars they orbit [24].

They come in all shapes and sizes are similar to Earth, while others are massive gas or ice giants like Jupiter or Neptune. Scientists study them to figure out how planets are born if some could be good for living on, and to explore the diverse types of planets out there in space.

Allah said in the Quran:

اَللّٰهُ الَّذِیْ خَلَقَ سَبْعَ سَمٰوٰتٍ وَّ مِنَ الْاَرْضِ مِثْلَهُنَّ [25]

"It is Allah who has created seven heavens and of the earth, like of them."

In the past, people knew about the Earth, the sun, and the moon. Nobody knew about planets that are outside of our solar system. But the Quran described that Allah has created seven heavens and earth and like of them. The word "like of them" is noticeable. It describes that there are plants like of earth. Now scientists have found the planets on which life can exist at [26].

Now, people know about exoplanets, but the Quran described the existence of exoplanets 1400 years ago.

7. The moon's orbit

The Moon does not follow a regular orbit like the satellites of other planets. As it goes around the Earth, the moon alternates between being behind it and in front of it. It also travels with the Earth around the sun. There are nine phases of the moon.

وَ الْقَمَرَ قَدَّرْنٰهُ مَنَازِلَ حَتّٰی عَادَ کَالْعُرْجُوْنِ الْقَدِیْمِ [27]

"And the moon- We have ordained for it phases until it returns like the old date branch."

The moon does not follow a regular orbit. It follows a constant pattern resembling the letter S in space. This route is described in the Quran in the words of "old date branch". Date branches are S-shaped. People couldn't have known about the Moon's orbit 1,400 years ago; it's considered impossible. The way that this pattern, identified by modern

technology and accumulated knowledge, was revealed in the Book is yet another scientific miracle in the Quran.

Conclusion

Islam is the only religion that encourages people to study and comprehend the Heaven and its celestial objects. To appreciate Islam, one must have a solid understanding of the scientific discipline of astronomy. Islam is also the only religion that employs the skies and the movements of the sun, moon, and stars as its calendars and means of maintaining time. We are encouraged to think about and comprehend the amazing universe that Allah Almighty has created in order to be able to perform our religion as fervently and rationally as possible. We are confined to the earth by the rules of Allah Almighty, the laws of physics, yet Almighty Allah has given us sight, intellect, and knowledge that allow us to see far beyond the scope of our normal vision. These things are undoubtedly evidence of the sovereignty of our Creator.

In our era of scientific progress, unlocking a deeper understanding of religion is facilitated by its connection with modern science, particularly for Muslims who can delve into the relationship between religion and science through the Holy Quran and Sunnah. The Holy Quran emphasizes the profound bond between the Creator and His creation, underscoring the significance of positive inquiry and understanding its purpose. Allah urges believers to embrace scientific learning, recognizing His signs in both the world around them and within themselves. Notably, the Quran delves into astronomy, describing the heavens and creation in a manner consistent with contemporary scientific discoveries. This alignment serves as a guide, seamlessly merging ancient wisdom with contemporary scientific knowledge. By bridging religious teachings with current scientific insights, this symbiotic relationship not only enriches Islamic understanding but also demonstrates how faith and intellect can synergize, offering a cohesive approach to comprehending the universe.

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