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REVIEWING THE INTERPRETATION OF 'ILMI ON THE COSMOLOGICAL VERSES OF THE QUR'AN IN CONTEMPORARY DISCOURSE

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ABSTRACT

The integration of science in the interpretation of the Qur'an (tafsir 'ilmi), especially in cosmological verses, has become an important phenomenon in contemporary Islamic studies. This literature review aims to map the development, examine methods, and identify epistemological and methodological challenges in the approach. The research uses a literature study method with thematic content analysis, sourced from classical interpretation, scientific-modern interpretation, and academic studies on the epistemology of interpretation and cosmology. The results of the study show that the integration of science is carried out through various patterns, such as technical correspondence, apologetic confirmation, and conceptual harmonization. Cosmological verses such as QS. Al-Anbiya' 30, QS. Adz-Dzariyat 47, and QS. Yasin 38–40 was the main focus. However, this approach has been criticized for the risk of imposing meaning, reducing the theological message, and relying on tentative scientific theories. The epistemological challenge of bringing together transcendent and normative revelation with immanent and descriptive science is also a crucial issue. This study confirms that the sustainability of tafsir 'ilmi requires a rigorous methodology by placing the linguistic authority and context of the Qur'an as the main foundation. It is recommended that there be clearer methodological guidelines, multidisciplinary collaboration, and further research on the theme of cosmology with a philosophical-hermeneutical approach. The integration of science should ultimately lead to the deepening of faith and obedience, not merely scientific proof.

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1. INTRODUCTION

The dialogue between science and religion has become one of the most dynamic intellectual discourses in recent decades. In the context of Islam, this dialogue is manifested through efforts to integrate modern scientific knowledge into the interpretation of the holy book of the Qur'an, which then gives birth to an approach known as tafsir 'ilmi. This approach seeks to bridge divine revelation with human empirical

findings, particularly in understanding verses that discuss the universe or cosmological verses (Habibullah et al., 2025; Salsabila et al., 2023).

The scientific cues in the Qur'an about the creation of the heavens, the earth, and other cosmological processes have long attracted the attention of Muslim thinkers. Verses such as QS. Al-Anbiya': 30 which mentions the origin of life from water, or QS. Adz-Dzariyat: 47 which hints at the expansion of the universe, is often the starting point of discussion. In the modern era, with the rapid advancement of cosmological sciences such as the Big Bang theory, attempts to re-read these passages through the lens of contemporary science are increasingly emerging (Habibullah et al., 2025; Akhtar & Akhtar, 2025).

However, this integration is not without challenges and criticisms. On the one hand, its proponents see it as a way to strengthen faith, demonstrate the Qur'an's eternal conformity with reality, and enrich religious understanding. On the other hand, critics warn of the risk of imposing meaning (taḥrīf al-ma'nā) and speculation, given that scientific theories are dynamic and subject to change, while sacred texts are fixed (Fanani, 2023; Salsabila et al., 2023; Anas, 2024). Classical scholars such as Al-Ghazali and Al-Shuthi have laid down the principle of prudence in this method.

This article aims to review the developments, methods, and debates surrounding the integration of science in the interpretation of the Qur'anic cosmological verses. By tracing the thoughts of classical to contemporary mufasirs, as well as looking at their application in certain contexts such as in Indonesia (Supriadi, 2018; Muttaqin et al., 2022), this article seeks to provide a critical map of discourse. The fundamental question to be answered is: How can the interpretation of 'ilmi be applied to cosmological verses in a methodologically responsible manner, so as to produce an authentic harmonization between faith and reason, rather than just a superficial and temporary match? Through this exploration, it is hoped that a balanced perspective can be obtained in responding to modern challenges to understand God's word in the midst of scientific advances.

2. METHODS

This research is a qualitative study with the literature study method (library research), chosen because of its relevance to study, analyze, and synthesize ideas, concepts, and secondary data related to the integration of science in the interpretation of the Qur'an, especially in cosmological verses (Salsabila et al., 2023). Through a comprehensive literature review, this study aims to map academic discourse, identify argumentative patterns, and formulate theoretical conclusions rooted in the work of previous researchers and thinkers.

Data sources are classified into two main groups. First, primary sources include representative classical commentary books such as Al-Ṭabarī's Jāmi' al-Bayān 'an Ta'wīl Āy al-Qur'ān and Al-Qur'ān's Al-Jāmi' li Aḥkām al-Qur'ān to understand the tradition of conventional interpretation of cosmological verses. This group also includes modern commentaries that explicitly adopt a scholarly approach such as the work of Zaghloul El-Naggar, Tantawi Jawhari, and relevant parts of Tafsir Al-Mishbah by M. Quraish Shihab as representations of syncretic efforts between textual interpretation and contemporary scientific perspectives. Second, secondary sources consist of scientific literature such as journal articles, books, and dissertations that discuss the relationship between science and the Qur'an, epistemology of the interpretation of 'ilmi, as well as cosmological issues in the framework of Islam and modern science; works by Habibullah et al. (2025), Supriadi (2018), and Fanani (2023) are critical references for examining developments and methodological debates in this field.

Data analysis is carried out through a thematic qualitative content analysis approach. The analytical process begins with an in-depth reading of the selected texts to produce an initial coding based on emerging themes such as "definitions of 'science', "specific cosmological verses", "supporting

arguments", "methodological criticism", and "principles of integration". These codes are then consolidated into broader thematic categories such as "History and Development of 'Ilmi' Interpretation", "Key Cosmological Verses and Their Interpretation", and "Methodological Challenges and Limitations" as a categorization step. From these categories, thematic analysis is continued to formulate core themes that directly answer the formulation of research problems; This process is carried out comparatively by comparing classical and modern interpretations and evaluating claims of harmony between sacred texts and scientific findings. The final stage involves the interpretation and synthesis of findings in order to build a coherent understanding of the theoretical foundations, interpretive practices, and prospects for the integration of science in cosmological interpretation, as well as compiling conceptual contributions to existing scientific discourse.

3. DISCUSSION

Definition and Scope of Tafsir 'Ilmi

Tafsir 'ilmi is defined as an approach to interpreting the Qur'an that seeks to explain and connect the meaning of verses with the findings of modern science, both in the fields of cosmology, medicine, embryology, geology, and other disciplines (Salsabila et al., 2023). Its scope includes the identification of scientific cues (ishārāt 'ilmiyyah) believed to be contained in sacred texts, which can only be fully understood as human science advances. However, it is important to distinguish it from the attempt to "prove" the Qur'an with science. As emphasized by Fanani (2023), the main goal is to achieve a synthesis of understanding that enriches spiritual and intellectual meaning, where science functions as a tool to deepen tadabbur (contemplation) on the greatness of Allah SWT, not as a judge who determines the absolute truth of the text.

History of the Development of Scientific Interpretation (from Classical to Modern)

Its roots can be traced back to the classical period, although in different forms. Mufasirs such as Fakhruddin al-Razi (d. 1210 AD) in Mafātīḥ al-Ghayb often include discussions of philosophy and science (kalam, astronomy, and natural sciences) when interpreting kauniyah verses. However, this approach is not yet systematic and more philosophical-speculative. In the 19th and 20th centuries, the Islamic reform and modernism movements, coupled with the rapid progress of Western science, gave birth to a more structured form of 'ilmu tafsir. Figures such as Tantawi Jawhari (Egypt) with his work Al-Jawāhir fī Tafsīr al-Qur'ān are considered modern pioneers who explicitly and massively connect verses with science. In Indonesia, this development is reflected in the works of mufasir such as Mohammad Quraish Shihab and the thoughts of KH. Ahmad Tafsir, who adapts this approach while still considering the local and cultural context (Supriadi, 2018; Muttaqin et al., 2022). The contemporary phase is characterized by higher specialization, as did Zaghloul El-Naggar (geologist) who focused on scientific cues in his field.

The Concept of Cosmology in Islam and Modern Science

Islamic cosmology is built on a theocentric foundation, with the Qur'an as the primary source describing the universe (kaun) as God's creation that is orderly (sunatullāh), finite, and purposeful (Habibullah et al., 2025). Key concepts include: creation from nothing (ex nihilo), the gradual process of creation in the "six times", the hierarchy of heaven and earth, and the end of the universe to be destroyed. Modern science, on the other hand, departs from the empirical-rational paradigm and develops through theories such as the Big Bang, the Expanding Universe, and the Formation of Galaxies and Stars. The common ground between the two is often sought in conceptual alignment, for example: the similarity of the narrative of "the origin of a single point" (the Big Bang and the ratqan verse), the phenomenon of the expansion of the universe, and the regularity of the laws of physics that reflect sunatullāh. However, fundamental differences remain, especially in terms of

prime causes (God vs. independent laws of physics) and the purpose of creation (worship and testing vs. random processes) (Akhtar & Akhtar, 2025).

Principles of Integration of Science and Religion (Alignment, Limitations, and Challenges)

To produce healthy integration, several principles have been formulated by Muslim scholars and scientists:

1. Principle of Harmony and Harmony: Departing from the belief that the truth of revelation and valid scientific truth will not contradict, because it comes from the same source, namely Allah SWT.
2. Principle of Autonomy and Limitations: Each domain has its own authority and methodology. Science deals with "how" nature works, while religion answers "why" and "for" nature was created. Integrations should not confuse or confuse each other mistakenly (Fanani, 2023).
3. Principle of Prudence: The scientific findings used must be qat'ī (definite, established, and widely accepted by the scientific community), not just speculative theories or hypotheses. This is to avoid the trap of associating verses with theories that are later proven to be false, as happens with geocentric theories (Anas, 2024).
4. Principle of Priority of Interpretation: Scientific meaning should not ignore or deny the linguistic (lughawī), contextual (asbāb al-nuzūl), and explanations of established Prophetic traditions (sunnah). Science acts as an additional explainer, not a single interpreter.

Main Challenge: Facing the ever-changing dynamics and scientific revolution, as well as avoiding reductionism (reducing the spiritual meaning of verses to mere scientific facts) and apologetism (only looking for justifications for religion) (Salsabila et al., 2023).

Classification of Cosmological Verses

A study of various sources of interpretation shows that the cosmological verses in the Qur'an can be classified into several main themes that reflect a comprehensive picture of the origins, processes, and structure of the universe. First, the theme of the origin and creation of the universe is reflected in verses such as QS. Al-Anbiya' [21]: 30 and QS. Fussilat [41]: 11. QS. Al-Anbiya' [21]: 30 which refers to the heavens and the earth as something "solid" (ratqan) before being separated becomes one of the important foundations in the discourse of tafsir 'ilmi. Classical scholars such as Al-Ṭabarī understood ratqan as a state of unity without separation, often associated with water or smoke (dukhan) as primordial matter. This meaning is in harmony with the linguistic methods and historical traditions of his time. However, modern interpretations such as those proposed by Zaghloul El-Naggar link the term to the concept of singularity in the Big Bang theory, when the entire matter and energy of the universe was in one solid point before undergoing a major expansion (Habibullah et al., 2025). As for QS. Fussilat [41]:11 which describes the sky as "smoke" is seen by modern scholars as an indication of the early phases of the universe which were still in the form of hot gas masses or nebulae before the formation of cosmic structures such as galaxies and stars.

The second theme is related to cosmological processes, as seen in QS. Adz-Dzariyat [51]: 47. This verse states that the heavens were built by the power of God and "We have indeed enlarged them". Classical scholars such as the Qurṭubī interpret this expansion as a metaphor for the breadth of Allah's favor and power. However, modern interpretations highlight the word lamūsi'ūn as an indication of the expansion of the universe, which was later reinforced by modern astronomical discoveries such as the galactic redshift observed by Edwin Hubble in the 20th century. Thus, this verse is often used as an example of harmonization between the Qur'anic text and the findings of contemporary cosmology.

The third theme is the structure of heaven and earth, which can be seen in QS. Al-Baqarah [2]: 22 and QS. An-Naba' [78]: 6–7. These verses describe the heavens as a preserved "roof" and the earth as an "expanse" reinforced by mountains like "pegs." The classical scholars understood the picture in the functional sense that the sky covered the earth and the mountains confirmed the surface of the earth for human survival. Meanwhile, the reading of the 'ilmi interpretation connects it to the concept of the atmosphere as a protector of the earth from harmful radiation and meteors, as well as the function of mountains in the stability of the earth's crust according to the theory of isostasis in modern geology. This approach emphasizes the integration between the signs of nature (kauniyah verses) and the physical structure of the earth as a manifestation of God's power.

The fourth theme includes celestial bodies, as explained in QS. Yasin [36]: 38–40 mentions the movement of the sun towards its place of circulation (mustaqarr) and the regularity of the orbits of the moon and the sun so that it is impossible for the two to precede each other. Classical interpretations such as Ath-Ṭabarī understand mustaqarr as a specific location or condition related to the rising and setting of the sun according to human perception. As for the modern interpretation, one of which was popularized by Maurice Bucaille, it is associated with the concept of a heliocentric solar system, in which the sun itself moves around the center of the Milky Way galaxy, and all celestial bodies follow a certain orbit in a stable gravitational system. This interpretation expands the cosmological perspective of the Qur'an by placing celestial phenomena within the framework of modern astronomy.

Comparative Study of Interpretation

A comparison between classical interpretation and modern science-oriented interpretation shows fundamental differences in epistemological approaches, sources of reference, and interpretive objectives. In classical interpretation, as found in the works of Ath-Ṭabarī and Al-Qurṭubī, its main characteristic lies in the dominance of linguistic analysis (lughah), the history of the Prophet and the Companions (atsar), and the historical context of the descent of verse (asbābun nuzūl). Natural phenomena were understood descriptive-phenomenologically based on the sensory observations available at the time, without attempting to elaborate on deeper scientific mechanisms. For example, the concept of separation of heaven and earth in QS. Al-Anbiya' [21]:30 is interpreted as a separation from an initial physical unit, but without a technical explanation of its cosmological process. The cosmological framework used also tends to be geocentric, reflecting the dominant scientific understanding in the scientific tradition of the classical period. This type of interpretation is more directed at the strengthening of monotheism and strengthening spiritual awareness through the observation of the signs of Allah's power in nature.

In contrast, modern interpretations that integrate science such as those developed by Tantawi Jawhari, Maurice Bucaille, and Zaghloul El-Naggar take an interdisciplinary approach by linking the text of the Qur'an to the conceptual framework of contemporary science. Tantawi Jawhari, through Al-Jawāhir, tried to link almost every verse with scientific findings from various disciplines, so that the Qur'an appears to have an encyclopedic dimension. Maurice Bucaille, in The Bible, The Qur'an and Science, developed the method of "confirmation", which is to make modern scientific facts an indicator of the scientific truth of the Qur'an compared to other holy books. Meanwhile, Zaghloul El-Naggar occupies a more moderate methodological position, emphasizing that the scientific cues in the Qur'an are global and principled; not a technical description, but a guide that encourages Muslims to research nature and develop science (Habibullah et al., 2025).

Critically, the main difference between these two approaches lies in their epistemological sources. Classical interpretation relies on Arabic science, religious traditions, and historical authority,

so that it is more methodologically stable and there is less risk of anachronism. In contrast, modern interpretations rely on contemporary scientific references so that they are more responsive to scientific developments, but at the same time face methodological challenges. Fanani (2023) reminds that science-oriented interpretations have the potential to make a direct and reductive analogy, especially when the meaning of the Qur'anic text is forced to be in line with scientific theories that are still tentative. Thus, both classical and modern interpretations have their own strengths and limitations: the former excels in methodological conservatism, while the latter excels in epistemic relevance for today's readers.

Integration Model

The approach of 'science interpretation to cosmological verses can basically be mapped into three main models that often intersect with each other. First, the correspondence model, which is an approach that seeks to literally match the text of the Qur'an with certain scientific findings, for example, associating the term ratqan with QS. Al-Anbiya': 30 with the Big Bang singularity or the phrase lamūsi'ūn in QS. Adz-Dzariyat: 47 with the Hubble constant; Although popular, this model is considered the most fragile because it is susceptible to disruption by changes in scientific theory and is often accused of imposing meaning (Salsabila et al., 2023). Second, the confirmation model, which is an approach that makes science an instrument for justifying the miracles of the Qur'an, as seen in Maurice Bucaille's work which affirms that the findings of modern science have been confirmed by the text of revelation; This model is effective in da'wah but has been criticized for shifting the epistemic authority of revelation so that it seems as if its truth depends on the development of science (Anas, 2024). Third, the harmonization model, which is a more conceptual and methodological approach because it does not seek specific technical compatibility, but emphasizes the principled harmony between the universal message of the Qur'an and the broad framework of scientific theory, as Quraish Shihab did when understanding the process of creation of the "six ages" as an indication of the gradual cosmological process, not as a specific period of time; This model is considered more stable because it does not bind itself to the details of science that can change, but to the principle of order and creation that is the meeting point between religion and science (Supriadi, 2018).

Criteria and Limitations in Tafsir 'Ilmi

In maintaining the integrity of the tafsir 'ilmi, scholars such as Al-Ghazali and Al-Suyuthi emphasized a number of limiting criteria that must be met so that interpretation does not fall into speculation and imposition of meaning. First, the scientific references used must be based on scientific certainty (qaṭ'iy al-'ilmi), i.e. findings that are well established, tested, and widely accepted by the scientific community, not just hypotheses or temporary theories that have the potential to change. Second, scientific interpretation must be in harmony with linguistic meaning (al-muqābalah al-lughawiyyah), so that scientific meaning remains within the semantic scope of authentic Arabic words and does not impose foreign meanings from outside the language tradition (Fanani, 2023). Third, the interpretation must be consistent with the context of the verse (al-munāsabah al-siyāqiyyah), i.e. it does not decide the meaning of the flow of the verse; for example, the explanation of the expansion of the universe in QS. Adz-Dzariyat: 47 must still be placed within the framework of the signs of Allah's power for the thinker. Fourth, scientific interpretation should not ignore the interpretation of ma'tsur, which is the interpretation that comes from the Prophet, Companions, and Tabi'in, especially in matters related to law or creed, so that the position of scientific interpretation is only as a complement and enrichment, not a substitute for established meaning. This whole principle is essentially a continuation of Imam Al-Ghazali's warning not to arbitrarily associate revelation with any uncertain philosophical or scientific theory, as well as Imam Al-Suyuthi's assertion that interpreting the

Qur'an based on knowledge that has not yet qaṭ'ī is a reprehensible act.

Advantages and Disadvantages of Scientific Approach in Tafsir

The scientific approach in tafsir has a number of advantages that make it stand out in the contemporary context, including its ability to answer the needs of the modern generation who live in the advancement of science so as to make the Qur'an seem relevant and alive; its potential in strengthening faith and functioning as an effective means of da'wah because it is able to display the uniqueness and miracles of the Qur'an; his contribution in encouraging scientific research among Muslim scientists by viewing nature as a field for reading kauniyah verses (Hilmi et al., 2024); and its role in expanding the insight of interpretation through opening up new dimensions of meaning that did not appear in classical times. However, this approach also has fundamental weaknesses, especially because the scientific basis used is fragile considering that scientific theories are always changing and can make interpretations seem wrong or outdated (Anas, 2024); its tendency to produce reductionism, which is to narrow the meaning of multidimensional verses to mere physical or empirical explanations; the risk of imposing meaning (taḥrīf al-ma'ānī) when the text is pulled to fit a particular scientific theory; and the potential to erode the epistemological autonomy of the Qur'an because it makes science the main standard of truth so that revelation seems to need to be validated by scientific findings.

Criticism from Tafsir Scholars

The integration of science in interpretation, especially cosmology, has drawn sharp criticism from orthodox and methodological scholars. The main criticism centers on two fundamental issues:

1. Risk of Meaning Imposition (al-Ilhād fī al-Ma'ānī / Taḥrīf): This criticism states that attempts to match verse with scientific theories often do violence to the original structure of the Qur'anic language and context. Words such as ratqan (solid) or dukhan (smoke) which in Arabic have a wide and contextual meaning space, are forcibly narrowed down to modern scientific technical terms such as "singularity" or "hot gas nebula". This practice is considered a form of ta'wīl bi al-ra'y al-madzmūm (interpretation based on reprehensible opinions) because it ignores authoritative explanations from the traditions of the Prophet and Companions in favor of constructing a narrative of conformity with science. As reminded in the tradition of interpretation, any interpretation that deviates from the external meaning of the text without strong evidence is prohibited.
2. The Problem of Changing Theories of Science (Taghayyur al-Naẓariyyāt al-'Ilmiyyah): This criticism targets the fragile foundation of the tafsir 'ilmi. Science, by its very nature, is provisional knowledge that is always open to falsification and revision. The history of science is filled with theories that were considered true and then dropped (such as Einstein's model of the static universe). Associating the eternal meaning of the Qur'an with theories that may be wrong in the future is considered a reckless act that can bring down the credibility of the Qur'an itself. If today a verse is interpreted according to the Big Bang, and tomorrow the theory is revised, then the interpretation becomes obsolete or even wrong. Therefore, critics argue that the Qur'an should not be "anchored" to something impermanent (Anas, 2024).

Epistemological Challenges

The deeper challenge in the interpretation of 'ilmi is epistemological because it concerns the different nature and sources of knowledge between revelation and science. The revelation in the Qur'an comes from Allah, is transcendent, normative, and qat'ī in its main teachings, and is transmitted

through the prophetic path as an absolute form of knowledge. On the contrary, science is derived from the human mind and senses through observation, experimentation, and logical reasoning, so that it is immanent, descriptive, and zannī, that is, in the form of strong conjectures that are always open to revision. Bringing these two fundamentally different sources of knowledge together without confusing their epistemological authority is a serious challenge. The difference in purpose between the two widens the gap: revelation is revealed to guide man to the happiness of the hereafter, convey supernatural things, and establish moral and spiritual values, while science aims to explain the observed mechanisms of nature and predict phenomena. Therefore, making science the primary interpreter of cosmological verses risks reducing the teleological and spiritual message of the verse to a mere mechanistic description of the universe; A verse about the creation of heaven and earth that actually aims to affirm God's power and invite humans to think can be reduced to a mere cosmological narrative of physics (Fanani, 2023).

Finding a Balance between Textual Meaning and Scientific Findings.

Faced with various criticisms and epistemological challenges in the interpretation of science, the effort to find a balance point is a must so that the relationship between revelation and science remains harmonious. This balance can be built through several important principles, including by placing revelation and science in a different but complementary hierarchy, where revelation is the ultimate source of truth and a framework of great meaning, while science functions to unravel the details of "how" God's creation works without shifting the function of revelation as an answer to the "why" and "why". In addition, a loose approach to scientific cues (al-Ishārāt al-'Ilmiyyah) needs to be prioritized, i.e. understanding cosmological verses as global clues that inspire scientific thought without imposing certain technical compatibility, such as interpreting the word lamūsi'ūn as a cue of the dynamics of the universe without tying it to the Hubble constant. The next principle is to make science a means of interpretation, not a final tool of interpretation, so that scientific theories only serve to enrich contemplation and admiration for the greatness of Allah without shaking the foundation of the meaning of the verse that remains rooted in the language and context. To realize a stronger harmony, the presence of "bridge-scholars" is also needed, namely scholars who master the epistemology of revelation and science at the same time, so that they are able to bridge the dialogue between the two in a healthy and productive manner at the methodological and philosophical levels (Hilmi et al., 2024).

4. CONCLUSION

Based on a review of the literature on the integration of science in the interpretation of the cosmological verses of the Qur'an, it can be concluded that the discourse of tafsir 'ilmi has developed in a variety of approaches that are not monolithic, but move dynamically from its roots in the classical tradition to modern forms through a more careful model of technical correspondence, apologetic confirmation, and conceptual harmonization, all of which reflect the response of Muslims to the challenges and opportunities for scientific advancement. In practice, this integration of science requires a strict methodology to avoid speculative and fragile interpretations, because enthusiasm in finding harmony often has the potential to ignore the hermeneutic principles of the Qur'an, especially regarding the danger of imposing meaning and dependence on unestablished scientific theories, so that linguistic traditions, the context of verses, and ma'tsur interpretation must remain the main foundation. In the end, the most essential goal of the integration of science in tafsir is not to make science a judge of revelation, but to use it as a means of tadabbur that expands the appreciation of the greatness of Allah and strengthens the spiritual and scientific ethos of monotheism, so that the relationship between āyāt qauliyyah and āyāt takwīniyyah can be

understood in a complementary and enriching manner.

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