Chapter 20: Qur'anic Cosmology and the Epistemology of Space Sciences

The Qur'an presents a worldview in which the cosmos functions simultaneously as a *created order*, a *dynamic system*, and a *text of signs (ayat)* that invites continuous intellectual engagement. Unlike pre-modern mythological cosmologies or modern reductive materialist interpretations of the universe, the Qur'an frames cosmology as a living epistemic field-one in which the heavens and the earth form a pedagogical arena designed to stimulate inquiry, contemplation, and discovery (Q. 3:190-191). Within this paradigm, space is not an empty void but a structured domain governed by divine laws, accessible to human cognition, and open to empirical exploration. The Qur'an repeatedly urges humanity to observe, study, and reason about the heavens (*samawat*) as an essential dimension of knowing (*ʿilm*), not merely as an act of worship but as a scientific imperative (Q. 51:20-22).

Contemporary scientific disciplines such as astrophysics, cosmology, orbital mechanics, planetary science, and space exploration resonate remarkably with Qur'anic discourse. Verses describing the expansion of the universe (Q. 51:47), the ordered motion of celestial bodies (Q. 21:33), the structural pathways in the cosmos (subulan fi al-samaʾ; Q. 51:7), and the rigour of cosmic balance (mizan; Q. 55:7) reveal a coherent cosmological ontology anchored in law, order, and intelligibility. These features constitute the very foundations of the epistemic legitimacy of modern scientific inquiry.

Yet, Qur'anic cosmology is not confined to physical description. It embeds a holistic epistemology that integrates empirical observation (naẓar), rational inference (ʿaql), and existential reflection (tadabbur). Thus, space sciences do not merely study physical phenomena but participate knowingly or unknowingly in a broader Qur'anic project: uncovering the signs of divine creativity in the vast canvas of the universe.

This chapter integrates Qur'anic cosmology with contemporary space sciences through a methodological framework rooted entirely in the Qur'anic text. It begins by establishing the Qur'anic cosmological ontology, outlining the fundamental nature of the universe-its creation, structure, laws, and purpose. It then examines specific scientific domains that find direct resonance in Qur'anic discourse: cosmic expansion, celestial order, orbital dynamics, relativistic interpretations of time, gravitational balance, and cosmic pathways. Each section demonstrates how Qur'anic epistemology supports scientific inquiry without collapsing into materialism or speculative metaphysics.

The chapter then moves toward ethical and philosophical dimensions, addressing the Qur'anic conception of human exploration as *amanah*-a trust that demands responsibility, humility, and stewardship. Finally, it traces the intellectual history of Islamic cosmology to show how earlier Muslim thinkers creatively engaged with the cosmos long before modern cosmological theories emerged.

This chapter thus serves as a bridge between Qur'anic epistemology and contemporary space sciences, showing that the study of the cosmos is not merely compatible with the Qur'anic worldview but is a continuation of a divinely mandated intellectual journey.

20.1 Qur'anic Cosmological Ontology

20.1.1 Cosmology as an Epistemic Foundation in the Qur'an

The Qur'an frames the cosmos (al-samawat wa al-arḍ) not merely as a physical environment but as a foundational epistemic structure -an intelligible system created with purpose, precision, and law (Q. 54:49). Qur'anic cosmology serves as an ontological gateway through which human beings understand the meaning of existence, the principles of order, and the nature of divine creativity. Unlike mythological cosmologies that depict the heavens as arbitrary or populated by competing gods, the Qur'an insists that the entire cosmos is unified under one Creator, governed by a coherent architecture and open to rational investigation (Q. 21:30; 67:3-5). This makes cosmology central to Qur'anic epistemology.

Thus, *cosmological ontology* in the Qur'an refers to the "being," structure, and purpose of the universe. It establishes:

- how the universe came into existence,
- what its governing principles are,
- how the physical order relates to metaphysical truth, and
- how humans respond epistemically to cosmic signs.

The Qur'an repeatedly invites humanity to contemplate the heavens (Q. 3:190), look upward (Q. 88:18), explore cosmic pathways (Q. 51:7), and investigate the alternating processes of day and night (Q. 10:67). These verses dismantle any notion that studying the cosmos is a secular or purely scientific endeavor; it is, in the Qur'anic paradigm, a divinely mandated intellectual responsibility.

20.2 Creation as Ontology: The Universe as Willed Existence

Qur'anic cosmology begins not with an empirical description of the universe but with an ontological declaration: creation (al-khalq) is an intentional act, rooted in divine will, wisdom, and command. The Qur'an repeatedly asserts that the cosmos is neither self-existent nor accidental; rather, it is brought into being through a purposeful fiat-*"kun fa-yakun" (Be, and it is)* (Q. 36:82). This formula encapsulates the central ontological principle of Islamic metaphysics: existence emerges through divine volition, not through autonomous or impersonal forces. Such an assertion shapes the entirety of Qur'anic epistemology, as knowledge becomes the human engagement with a divinely ordered reality.

20.2.1 The Ontological Status of Creation (al-khalq) as Willed Reality

The Qur'an explicitly rejects the idea of random or meaningless existence. Creation is described repeatedly as having been brought forth *bi'l-ḥaqq-"in truth,"* or *"with purpose"* (Q. 6:73; 16:3). The expression *bi'l-ḥaqq* signifies intentionality, coherence, and teleology, implying that the universe is permeated by meaning. Contemporary discussions of teleological cosmology in philosophical theology resonate with this Qur'anic framing, insofar as the universe is viewed as containing intrinsic order that reflects rationality and intention (Craig, 2013; McGrath, 2016).

This ontological view stands in direct contrast to naturalistic materialism, which interprets existence as a product of impersonal laws or chance events. The Qur'an, however, consistently emphasises divine agency: *"God is the Creator of all things."* (Q. 39:62)

This establishes a metaphysics of dependence: all entities-physical or metaphysical-are contingent upon the creative act of God (Nasr, 1996). Creation is therefore not merely the initial moment of cosmic origin but the ongoing grounding of existence. The Qur'anic emphasis on divine creative will means that existence itself participates in divine intentionality, making the universe a meaningful object of study.

20.2.2 Creation as Ordered Act: "He created the heavens and the earth in six days"

The Qur'anic refrain that God created *"the heavens and the earth in six days"* (Q. 7:54; 10:3) should not be read within literalist frameworks of temporal equivalence but as a thematic assertion of gradual, structured creation. The Qur'an clarifies that God is not constrained by time, since *"a day with your Lord is like a thousand years"* (Q. 22:47), and elsewhere *"like fifty thousand years"* (Q. 70:4). These verses emphasise the relativity of time and the transcendence of divine action (Rahman, 1980).

The Qur'anic emphasis on phased development (Arabic: *taqdir*, *taṣwir*, *tadbir*) reflects an ontological structure in which the cosmos emerges through deliberate structuring, aligning with modern cosmology's understanding of gradual cosmic evolution. The Qur'anic portrayal is philosophical rather than technical, but it emphasises the key principle that creation unfolds through intentional stages (Ghazali, 2000).

20.2.3 Unity of Origin: The Heavens and Earth were Once a Single Mass

One of the most profound ontological statements in the Qur'an concerns the primordial unity of the cosmos: *"Have not those who disbelieve seen that the heavens and the earth were joined together, and We separated them?"* (Q. 21:30)

This verse articulates an ontology of unity preceding multiplicity. Although exegetes historically interpreted this in theological terms, modern scholarship often notes its conceptual resonance with cosmological theories of an initial singularity (Krauss, 2012). The Qur'an's significance here is not scientific prediction but ontological framing: the universe originates from a unified state and unfolds through divine will.

20.2.4 Creation as Measured (taqdir): The Universe and Its Precise Determination

The Qur'an repeatedly states that creation is subject to precise determination: *"He created everything and determined it with precise measure (taqdir)."* (Q. 54:49)

Taqdir indicates proportioning, calibration, and lawful structuring. This corresponds conceptually to what philosophy of science identifies as "fine-tuning" (Collins, 2009)-the idea that cosmic constants and physical laws display remarkable precision.

In Qur'anic ontology, this precision is not emergent or accidental but rooted in divine wisdom (ḥikmah). Thus, cosmic fine-tuning becomes not only a scientific principle but a theological and epistemic one.

20.2.5 Divine Command as Ontological Ground: "Be, and it is" (kun fa-yakun)

The formula *kun fa-yakun* appears in multiple contexts- creation of Adam, Jesus, the heavens and earth (Q. 3:47; 6:73; 36:82). It signifies an ontological relationship between divine will and existence: the will of God is metaphysically sufficient to bring forth reality. This reflects the Qur'anic doctrine of continuous creation: *"Every day He is in a matter of creation."* (Q. 55:29)

Reality is thus dynamic, not static, constantly sustained and renewed. Modern philosophical cosmology similarly entertains models of continuous evolution, but the Qur'an embeds this principle within divine intentionality.

20.3 Order, Law, and Balance: The Governing Principles of the Cosmos

If Section 2 establishes cosmology as a divine act, Section 3 explains the principles governing this created order. The Qur'an repeatedly describes the universe as structured through law (qadar), balance (mizan), and harmony (taʿdil). These principles constitute the Qur'anic metaphysics of cosmological order.

20.3.1 Mizan (Balance) as Universal Order

One of the most foundational cosmological concepts in the Qur'an is mizan: *"And the heaven He raised, and He established the balance (mizan)."* (Q. 55:7)

- Mizan refers to perfect equilibrium, proportion, and calibration.
- It applies to cosmic structures, natural cycles, and moral order.

The Qur'an warns: *"Do not transgress the balance."* (Q. 55:8)

This suggests a profound epistemic symmetry: cosmic balance mirrors ethical balance. The moral law and physical law are parallel expressions of divine wisdom. Scholars such as Nasr (1993) and Chittick (2007) emphasise that the Qur'anic worldview is inherently holistic; the order in the natural world is inseparable from spiritual and ethical order.

20.3.2 Qadar (Law, Determination, Measurability)

The Qur'an describes cosmic order using the term qadar, meaning determination, measurement, and precise lawfulness: *"Indeed, all things We created with measure (qadar)."* (Q. 54:49)

This term underlies Islamic conceptions of natural law. It implies:

- mathematical structure
- physical constants
- predictability
- rationality embedded in nature

Modern cosmology affirms that the universe operates via stable laws-gravity, electromagnetism, and nuclear forces-allowing scientific predictability. The Qur'an anticipates this epistemic openness by emphasising lawfulness as a divine attribute.

20.3.3 No Deficiency or Rupture (fatur) in the Universe

The Qur'an challenges humans to empirically examine the cosmos: *"Look again: do you see any flaw?"* (Q. 67:3)

The term fatur means rupture, inconsistency, crack, or instability. By denying *fatur*, the Qur'an portrays the universe as coherent, harmonious, and stable. The instruction *"look again and again"* (Q. 67:4) is an explicit call for repeated observation and scientific verification. This establishes two principles:

- The universe is empirically examinable.
- Scientific inquiry is theologically encouraged.

20.3.4 Universal Laws and Fixed Pathways

The Qur'an describes celestial bodies moving according to fixed trajectories: *"Each one floats in an orbit (falak)."* (Q. 21:33; 36:40)

The term falak refers to a circular path or curved track. The Qur'anic cosmology of movement includes:

- orbital rotation
- solar-lunar dynamics
- day-night alternation
- axial motion
- gravitational structure

Qur'anic cosmology and astrophysics converge in their recognition of ordered, systemic celestial motion (Iqbal, 2013).

20.3.5 Structured Layers: The Seven Heavens

The Qur'an refers to *"seven heavens"* (Q. 67:3; 41:12). Contemporary scholars emphasise that this is not a literal reference to seven material skies but a structured, layered cosmology (Rahman, 1980). The Qur'anic use of layered ontology corresponds metaphorically to:

- physical dimensions
- cosmic fields
- multi-layered atmospheres
- zones of cosmic structure

Thus, the *seven heavens* express hierarchical cosmic structure, not mythological heavens.

20.3.6 The Firmament as "Pathways" (ḥubuk)

One of the most remarkable cosmological verses states: *"By the sky with its interwoven pathways (al-samaʾ dhat al-ḥubuk)."* (Q, 51:7)

Ḥubuk means:

- intricate weaving
- layered patterns
- structured pathways
- interlaced design

This resonates conceptually with:

- cosmic web structures
- gravitational filaments
- interstellar networks
- space-time curvature

The Qur'an thus conceives of the cosmos as a patterned architecture rather than an empty void.

20.3.7 Time and Motion: Day, Night, and Celestial Cycles

The Qur'an emphasises the precise interplay of night and day: *"He wraps the night over the day and the day over the night." (*Q. 39:5)

This description implies:

- rotation
- axial tilt
- curvature of the Earth
- periodic cycles

Furthermore, the sun and moon follow calculated courses (ḥusban) (Q. 55:5), which indicates astronomical precision.

20.3.8 Moral Implications: Cosmic Law as Ethical Template

Since cosmic order reflects divine wisdom, it becomes a guide for human conduct. The same principle of balance (mizan) governs:

- the physical universe (Q. 55:7)
- justice in human affairs (Q. 4:135)

Thus, ethical law mirrors cosmological law. Ethical transgression is seen as a disruption of the balance, akin to violating the mizan of creation.

20.4. The Heavens as Signs (Ayat): Epistemology Rooted in Ontology

A central pillar of Qur'anic cosmology is the notion that the heavens (al-samawat) are not merely physical structures but *ayat*-signs, evidences, and intelligible symbols -designed to awaken human cognition and guide epistemic inquiry. In the Qur'anic worldview, ontology and epistemology are inseparably linked: the way reality *is* (ontological order) forms the basis of how humans *should know* (epistemological method). The universe becomes a readable text, an open book written in the language of cosmic order, movement, and harmony. Hence, every star, planet, nebula, or cosmic field participates in a grand semiotic system grounded in divine intentionality.

20.4.1 Ontological Status of the Heavens as Signs

The word ayah (آية)-singular of *ayat*-occurs over 380 times in the Qur'an. While commonly translated as "verse," its primary meaning is "sign," "indicator," or "pointer." The Qur'an repeatedly emphasises that the cosmos is full of such signs: *"In the creation of the heavens and the earth and in the alternation of night and day are signs (ayat) for those of understanding."* (Q. 3:190)

Here, the heavens are not merely objects of observation; they are evidentiary acts of communication from God. They invite contemplation (*tafakkur*) and deep interpretive engagement (*tadabbur*). As Nasr (1996) explains, the Qur'an positions the physical universe as "an extension of revelation," a form of non-verbal divine discourse.

This semiotic nature establishes a foundational principle of Qur'anic epistemology: To know the cosmos is to read the signs of its Creator.

20.4.2 Cosmological Signs as Epistemic Pathways

The Qur'an highlights numerous celestial phenomena as signs:

- the raising of the heavens without visible pillars (Q. 13:2)
- the precise pathways of celestial bodies (Q. 21:33)
- the highly structured "web-like" nature of the sky (Q. 51:7)
- the spread of stars and constellations (Q. 25:61)
- the protection provided by the atmosphere (Q. 21:32)

Each phenomenon serves as an epistemic stimulus that directs human thought toward ontological truths. Chittick (2007) argues that this establishes a vision of nature as "symbolic transparency," in which physical phenomena point beyond themselves toward metaphysical realities. Thus, the cosmos becomes a structured pedagogical environment.

The Qur'an further makes the *semiotic* nature of heaven explicit: *"We will show them Our signs (ayat) in the horizons and within themselves until it becomes clear to them that it is the truth."* (Q. 41:53) This verse establishes a dual epistemology: external signs in the cosmos and internal signs in the self, converging toward the same truth.

20.4.3 Reading the Heavens as a Method of Knowledge

The Qur'anic imperative to "look," "see," and "consider" the heavens is not passive but methodological: *"Do they not look at the sky above them: how We built it and adorned it?"* (Q. 50:6)

This command implies:

- Empirical engagement (naẓar-observational reasoning)
- Intellectual inference (ʿaql-rational interpretation)
- Reflective depth (tafakkur-analytic contemplation)

The heavens thus become epistemic laboratories. Human beings are urged to study:

- cosmic structure ("how We built it")
- cosmic aesthetics ("and adorned it")
- cosmic stability ("and it has no cracks") (Q. 50:6)

This triadic description-structure, beauty, coherence -forms the Qur'an's cosmological epistemology.

20.4.4 Signs as Proofs of Ontological Unity

A key epistemic theme is the unity embedded within cosmic diversity. The Qur'an repeatedly asserts that the order of the heavens points to tawḥid, the oneness of God: *"Had there been in them gods other than God, both would have been ruined."* (Q. 21:22)

Cosmic harmony indicates a single governing source. Thus, celestial order is not merely physical but metaphysical evidence of divine unity. McGrath (2016) calls this the "rational transparency of nature," meaning that the universe displays intelligibility consistent with a singular rational source.

In this sense, *ayat* operate as metaphysical indicators that bridge empirical cosmology and theological ontology.

20.4.5 The Aesthetic Dimension of Cosmic Signs

The Qur'an underscores the beauty of the heavens as an epistemic invitation: *"Indeed, We have adorned the sky of the world with lamps and stars."* (Q. 41:12)

Aesthetic experience becomes a form of knowing. Cosmic beauty leads to:

- gratitude (*shukr*)
- humility
- wonder and awe
- recognition of purpose

The Qur'an thus integrates aesthetic knowledge into epistemology, anticipating modern discussions on aesthetic cognitivism.

20.4.6 Ontological Depth of Signs: Beyond Material Phenomena

The Qur'an frequently shifts from physical description to metaphysical implication, as in: *"He created seven heavens in layers; you do not see any flaw in the creation of the Most Merciful."* (Q. 67:3)

Here, signs are not solely empirical. They express:

- unity (waḥdaniyyah)
- wisdom (ḥikmah)
- power (qudrah)
- mercy (raḥmah)

Thus, the cosmos functions as a multidimensional semiotic system, in which signs operate simultaneously at the physical, rational, moral, and spiritual levels. This aligns with Rahman's (1980) interpretation of the Qur'an as fundamentally ethical and teleological.

20.5. Dynamic Motion: Orbits, Cycles, and Cosmic Pathways

If Section 4 treats the heavens as signs, Section 5 examines the Qur'anic presentation of dynamic celestial motion-the constant movement of celestial bodies through precisely measured orbits and pathways. Motion, in the Qur'an, is not chaotic but governed by divine laws. Celestial movement thus becomes both a scientific reality and a theological demonstration of order, precision, and intentionality.

20.5.1 Motion as Divine Law

The Qur'an affirms that motion is a foundational feature of cosmic design: *"Each one travels in an orbit."* (Q. 21:33)

The phrase kullun fī falakin yasbaḥun literally means "each swims in a curved path." Key features:

- *kullun* - all celestial bodies
- *falak* - circular or elliptical track
- *yasbaḥun* - swimming, gliding, fluid motion

This description aligns conceptually with:

- orbital mechanics
- curved spacetime in general relativity
- gravitational fields influencing motion

It implies that motion itself is part of the cosmic mizan (balance).

20.5.2 Solar-Lunar Dynamics and Calculated Movement

The Qur'an underscores the calculated nature of celestial motion: *"The sun and the moon move by precise calculation (Ḥusban)."* (Q. 55:5)

Ḥusban signifies mathematical computation, suggesting an inherent numerical or quantitative order. This resonates with modern views of cosmology as governed by mathematically expressible laws (Kragh, 2015). Thus, cosmic motion reflects a rational structure, reinforcing the Qur'anic claim that God created all things with precise measure (Q. 54:49).

20.5.3 The Alternation of Night and Day: Rotation and Temporal Cycles

The Qur'an describes the interwoven nature of night and day: *"He wraps the night over the day and the day over the night."* (Q. 39:5)

The verb *yukawwiru* (to wrap or roll) conveys rotational movement. Modern exegetes note its conceptual resonance with the rotation of the Earth around its axis (Nasr, 1993). More importantly, the Qur'an treats these cycles as epistemic patterns:

- periodicity
- precision
- predictability
- temporal order

All these form the basis of scientific measurement of time.

20.5.4 Dynamic Expansion and Cosmic Growth

The Qur'an describes the cosmos as undergoing expansion: *"And the heaven We built with power, and indeed We are expanding it (musiʿun)."* (Q. 51:47)

Although not a scientific statement in the modern sense, this aligns metaphorically with contemporary cosmology, which describes the universe as expanding (Krauss, 2012). What matters epistemologically is that the Qur'an highlights dynamic change rather than static cosmology.

20.5.5 Celestial Pathways (Subul) and Gravitational Webs

The Qur'an refers to the sky as possessing pathways: *"By the sky with its pathways (al-samaʾ dhat al-ḥubuk)."* (Q. 51:7)

Ḥubuk denotes:

- interwoven paths
- networks
- structured trajectories

This conceptually aligns with:

- cosmic web structures
- galactic filaments
- gravitational corridors

- interstellar highways

Thus, the Qur'an presents cosmic motion through a vocabulary that emphasises structure, pattern, and interconnection.

20.5.6 Motion as Proof of Sovereignty

The Qur'an constantly connects motion with divine governance: *"It is He who subjected the sun and the moon, each running for an appointed term."* (Q. 13:2)

Thus, three principles emerge:

- Motion is universal ("each running").
- Motion is purposeful ("for an appointed term").
- Motion is divinely governed ("He subjected").

The cosmos moves not by blind force but by divine command. This aligns with the classical Islamic view that natural laws are manifestations of divine custom (*sunnat Allah*) (Ibn Taymiyyah, as cited in Hoover, 2010).

20.5.7 Orbits, Gravity, and the Invisible Order

Although the Qur'an does not explicitly mention gravity, it alludes to invisible forces: *"God holds the heavens so they do not collapse onto the earth."* (Q. 22:65)

This implies:

- sustaining power
- invisible restraint
- force maintaining stability

The ontological idea is not gravitational mechanics but divine sovereignty over cosmic order. Nevertheless, the conceptual parallel is clear: unseen forces bind celestial bodies into coherent systems.

20.5.8 Epistemic Implications: From Observation to Theorisation

By repeatedly urging humans to "look," "consider," and "reflect" upon cosmic motion (Q. 88:17-20), the Qur'an positions celestial dynamics as epistemic entry points into:

- scientific laws
- metaphysical truths
- ethical insights

The physical structure of cosmic motion illustrates:

- causality
- order
- predictability

- harmony

Thus, cosmological motion becomes part of the Qur'anic method of knowledge discovery.

20.6. Expansion, Movement, and Cosmic Evolution

A central theme of Qur'anic cosmology is that the universe is not static. Rather, it is a dynamic and continuously unfolding reality, shaped by divine command, sustained by stable laws, and characterised by perpetual movement, expansion, and transformation. The Qur'an presents a worldview in which the cosmos undergoes processes-emergence, ordering, expansion, and culmination- forming what modern scholars describe as "cosmic evolution." While the Qur'an is not a scientific textbook, it articulates metaphysical principles that resonate with the dynamic cosmological model recognised in contemporary astrophysics. These principles, grounded in the Qur'an's ontology of creation, provide an epistemic foundation upon which a Qur'anic philosophy of cosmic evolution may be articulated.

20.6.1 Expansion as a Permanent Feature of the Cosmos

The most striking Qur'anic reference to cosmic expansion appears in Sirat al-Dhariyat: *"And the heaven We built with strength, and indeed We are expanding it* (وَإِنَّا لَمُوسِعُونَ)." (Q. 51:47)

The term musiʿun derives from *wasiʿa*, meaning "to widen," "to expand," or "to make spacious." Classical exegetes interpreted this as referring to the vastness of the heavens, but the diction clearly conveys *ongoing expansion*, suggesting a continuous process. Contemporary cosmology observes that galaxies are receding from one another due to the expansion of space itself-a phenomenon discovered by Hubble and later affirmed through analyses of cosmic background radiation (Kragh, 2015). While the Qur'an does not describe expansion in scientific terms, it establishes three fundamental ontological principles:

- The universe has a structure that can expand.
- Expansion is active and continuous.
- Expansion is an expression of divine power.

Thus, the Qur'an's cosmology anticipates a universe characterised not by stasis but by unfolding dynamism.

20.6.2 Movement as the Universal Law

The Qur'an repeatedly affirms movement as the essential condition of celestial existence: *"The sun and the moon [each] travel with precise calculation."* (Q. 55:5) "*Each runs in its own orbit* (كُلٌّ فِي فَلَكٍ يَسْبَحُونَ)." (Q. 21:33)

The verb *yasbaḥun* ("they swim") conveys not only motion but fluid, uninterrupted motion. Orbits (falak) reflect a precise framework governed by balance (*mizan*), order (*taqdir*), and measure (*ḥisab*). In contemporary astrophysics, orbital motion is a function of gravitational interaction and spacetime curvature, illustrating that motion is structurally embedded in the universe (Krauss, 2012). For the Qur'an, motion is not accidental but ontological:

- Motion expresses the will of the Creator.
- Motion structures time (night-day cycles).
- Motion structures space (orbits, pathways).
- Motion structures purpose (appointed terms).

Thus, the cosmos operates according to dynamic intentionality.

20.6.3 Expansion and Contraction in Eschatological Time

The Qur'an also describes future cosmic contraction: *"On the Day when We will fold the heaven like the folding of a scroll."* (Q. 21:104)

This points to an eschatological reversal: just as the heavens expanded by divine command, they will be contracted by divine command. In modern cosmological models, some theories (e.g. Big Crunch scenario) predict a possible re-collapse of the universe, although not the dominant scientific consensus today. Regardless of scientific debates, the Qur'an's framework presents:

- Cosmic beginning (Q. 61:14; 21:30)
- Cosmic expansion (Q. 51:47)
- Cosmic contraction (Q. 21:104)
- Cosmic renewal (Q. 14:48) - *"the earth will be replaced by another earth."*

Thus, Qur'anic cosmology inherently articulates a cycle of cosmic evolution.

20.6.4 Evolution as Divine Design

Cosmic evolution in the Qur'an is not random but teleological. The Qur'an emphasises:

- order: *"He perfected everything He created"* (Q.32:7)
- purpose: *"Not without purpose did We create the heavens and earth"* (Q. 38:27)
- calibrated creation: *"He created everything in due proportion"* (Q. 54:49)

Unlike naturalistic evolutionary models, which often suggest impersonal mechanisms, the Qur'an posits evolution as:

- directed
- purposeful
- ordered
- value-laden

This does not contradict scientific descriptions of natural processes; rather, it provides a metaphysical interpretation of them.

20.6.5 Evolution Through Time and Stages

The Qur'an repeatedly uses the concept of stages (*ṭawarit, maraḥil*): "*He created the heavens and the earth in stages* (طِبَاقًا)." (Q. 71:15) *"Then He turned to the heaven when it was smoke* (دُخَانٌ)." (Q. 41:11)

The reference to the heavens being "smoke" parallels the idea of a primordial gaseous or plasma state-an early stage of cosmic development. Again, the Qur'an is not describing particle physics but asserting that the heavens emerged through successive ontological phases, consistent with cosmological models involving early universe evolution.

20.6.6 Cosmic Evolution as Epistemic Invitation

The Qur'an urges human inquiry into cosmic processes: *"Travel through the earth and observe how He originated creation."* (Q. 29:20)

This call to reconstruct origins, from fossils to cosmic radiation, is a methodological imperative, encouraging:

- scientific discovery
- historical reconstruction
- astronomical investigation
- cosmological theorisation

Cosmic evolution thus becomes an epistemic gateway to understanding divine wisdom.

20.7. Light, Darkness, and Electromagnetic Ontology

Light (*mur*, نور) and darkness (*ẓulumat*, ظلمات) form one of the most profound dualities in Qur'anic cosmology. Far from being limited to metaphorical or ethical concepts, the Qur'an presents them as ontological realities, integral to both cosmic structure and human epistemology. The Qur'anic language surrounding light and darkness aligns remarkably with concepts that modern physics associates with electromagnetism, radiation, and the visible spectrum.

20.7.1 Light as Ontological Principle

The foundational verse of Qur'anic light metaphysics is: *"Allah is the Light (نُورُ) of the heavens and the earth."* (Q. 24:35)

This does not mean God is physical light, but rather:

- Light is the metaphor closest to divine intelligibility
- Light is the principle through which reality becomes knowable
- Light symbolises order, guidance, structure, and intelligibility

According to Nasr (1993), *mur* is the primordial substance of manifestation-the principle that makes reality perceptible and intelligible. In this sense, light is ontologically foundational.

20.7.2 Electromagnetic Ontology in the Qur'an

The Qur'an refers to:

- visible light

- invisible radiations
- cosmic energy structures

For example:

"We made a shining lamp (سِرَاجًا مُنِيرًا)." (Q. 25:61)

The term *siraj* refers to a luminous source (the sun), while *munir* implies radiance or emission-concepts aligned with stellar photon emission, nuclear fusion, and electromagnetic radiation. The Qur'an speaks of layers of darkness in the deep sea: *"Darknesses, one above another."* (Q. 24:40)

This corresponds to the loss of wavelengths penetrating ocean depths, where red light disappears first, then orange, yellow, and green, until total blackness. The Qur'an's plural ẓulumat (darknesses) reflects a layered ontology consistent with electromagnetic attenuation.

20.7.3 Darkness as Ontological "Non-Reception"

Darkness in the Qur'an is not an independent substance. It is described as:

- the absence of light
- the obstruction of light
- the inability to receive light

Thus:

"Whomever Allah does not give light, he has no light." (Q. 24:40) This aligns with physics: darkness is not a "thing" but the absence of photon reception.

20.7.4 Light as Epistemic Illumination

The Qur'an frequently parallels physical light with intellectual illumination:

- *basirah* (inner sight)
- *Furqan* (discernment)
- *rushd* (sound judgment)

Knowledge is described as *light*; ignorance as *darkness*. *"Is one who was dead and We gave him life and made for him a light by which he walks… like one in darkness?"* (Q. 6:122) Thus, Qur'anic epistemology mirrors electromagnetic ontology:

- Light → perception, knowledge, guidance
- Darkness → obstruction, ignorance, misguidance

20.7.5 Light-Speed and Cosmic Time

Several verses imply the relativity of time: *"A day with your Lord is like a thousand years of what you count."* (Q. 22:47) *"The angels ascend… in a day whose measure is fifty thousand years."* (Q. 70:4) Modern commentators, including Bucaille (1978), have noted the conceptual parallel with:

- varying frames of reference
- different rates of temporal experience
- non-uniform time scales in relativity

Although not a scientific description, the Qur'anic paradigm suggests that time is relative to space, speed, and energy-core principles of modern physics.

20.7.6 Cosmic Radiation as "Stretched Light"

The Qur'an speaks of: *"the sky… full of pathways"* (Q. 51:7), *"the penetrating piercing star"* (النَّجْمُ الثَّاقِبُ) (Q. 86:3). *Thaqib* means piercing, penetrating, language evocative of:

- high-energy radiation
- cosmic rays
- neutron stars
- gamma-ray bursts

The Qur'an's description of stars as sources of penetrating radiation corresponds to astrophysical realities discovered centuries later.

20.7.7 Light as the Metaphysics of Knowledge

The Qur'an repeatedly ties knowledge to light: *"Light upon light* (نُورٌ عَلَى نُورٍ)." (Q. 24:35). This signifies:

- layers of illumination
- interconnected modes of knowing
- harmonisation of physical, rational, and spiritual perception

In epistemology, light signifies:

- intelligibility
- guidance
- certainty (yaqin)
- awareness (shuhud)

Thus, the Qur'anic ontology of light becomes the foundation for a unified epistemology.

20.8 Cosmic Purpose and Moral Ontology

The Qur'anic cosmology does not merely describe the physical structure of the universe; it articulates a moral ontology rooted in cosmic purpose. The heavens and the earth are not accidental, mechanistic, or morally indifferent entities-they are constructed with intention (*ḥaqq*, حق), measure (*qadar*, قدر), harmony (*mizan*, ميزان), and ethical significance (*ḥikmah*, حكمة). In this worldview, the universe functions as a moral as well as a physical environment, shaping human cognition and ethical responsibility. Thus, cosmology becomes inseparable from morality; knowing the cosmos is simultaneously knowing one's place within

it. The Qur'an repeatedly asserts that the creation of the heavens and the earth is anchored in purposefulness: *"We did not create the heavens and the earth and everything between them in vain."* (Q. 38:27)

The negation of purposelessness (*baṭil*, باطل) is a foundational moral principle. A purposeless universe would produce purposeless action; a cosmos without meaning yields ethics without grounding. Therefore, by affirming purpose in cosmology, the Qur'an establishes purpose in human moral life. Ontology becomes inseparable from normativity.

20.8.1 Purpose (al-ghayah) as the Metaphysical Ground of Creation

The Qur'an defines cosmic creation as *bi'l-ḥaqq* (بالحق), a term that combines metaphysical truth, ontological reality, and moral rightness: *"He created the heavens and the earth with truth* (بالحق)." (Q. 16:3). Here, *ḥaqq* means:

- truth against falsehood
- purpose against futility
- justice against imbalance
- fixed reality against chaos

The universe is therefore structured in a way that reflects divine intentionality. In contemporary philosophical language, creation is teleological, not merely mechanical. Even natural causality is framed as a manifestation of divine intentionality rather than impersonal forces. This purposefulness is closely linked to moral accountability. If the universe is created with purpose, human action within it must also be purposeful: *"Did you think We created you without purpose and that you would not be returned to Us?"* (Q. 23:115)

Thus, the moral ontology of human beings is rooted in the cosmology that surrounds them.

20.8.2 The Cosmos as a Moral Text (Kitab al-Kawn)

The Qur'an repeatedly calls the universe a set of *ayat*-signs pointing to truth, justice, and moral certainty: *"We will show them Our signs in the horizons and within themselves until it becomes clear that this is the truth."* (Q. 41:53)

The cosmos thus becomes a moral pedagogy. Its structure and order mirror spiritual and ethical truths:

- Balance in nature → ethical balance
- Proportion in creation → moral proportion
- Interconnectedness of cosmos → social interdependence
- Cyclic patterns → cycles of accountability

The Qur'an's cosmology is not morally neutral; it "teaches" through its very structure.

Modern thinkers such as Seyyed Hossein Nasr argue that the Qur'an views the universe as a symbolic text, a physically manifested scripture (*al-Kitab al-mastur*) that parallels the written revelation (*al-Kitab*

al-mansur) (Nasr, 1993). This reinforces the Qur'anic epistemic unity between nature, revelation, and ethics.

20.8.3 Cosmic Order as Ethical Order

The universe is described as governed by *mizan,* a principle meaning balance, measure, and justice: *"And the heaven He raised, and He established the balance* (المِيزان)." (Q. 55:7)

Immediately afterwards, the Qur'an applies the same term to human ethics: *"So do not transgress in the balance."* (Q. 55:8)

This is an extraordinary linkage: cosmic balance → moral balance.

Human injustice (*ẓulm*) is a disruption of moral balance, just as physical disorder is a disruption of natural balance. Thus, moral ontology mirrors physical ontology.

20.8.4 Time and Mortality as Moral Dimensions

Time (*dahr*, دهر) in the Qur'an is not merely a physical parameter. It carries moral implications: *"It is He who made the night and day in succession-for whoever wishes to remember or to be grateful."* (Q. 25:62)

Night and day become ethical opportunities:

- Reflection
- Gratitude
- moral awakening
- correction of behaviour

Thus cosmic cycles-including lunar cycles (Q. 10:5) and orbital motion (Q. 36:40)-serve not only physical but moral purposes.

20.8.5 Human Place in the Moral Cosmos

The Qur'an conceptualises humans as:

- stewards (*khulafa'*, خلفاء) (Q. 6:165)
- trustees (*amanah*, أمانة) (Q. 33:72)
- witnesses (*shuhada'*, شهداء) (Q. 2:143)

The cosmos forms the environment in which these responsibilities unfold. Without a purposeful cosmos, vicegerency loses meaning; without a meaningful environment, ethical responsibility becomes incoherent. Thus, cosmic purpose becomes the ground of moral ontology.

20.9. Cosmological Ontology and Human Epistemic Function

The Qur'anic worldview assigns a profound epistemic role to human beings within the cosmic order. Humanity is not a passive observer of the universe but an active perceiver, interpreter, and moral agent

whose knowledge is part of the universe's unfolding purpose. The cosmos is not only *created* by God, but it is also *made knowable*: *"He taught Adam all the names."* (Q. 2:31) Here, naming (*asma'*) represents the human capacity for:

- categorization
- conceptualization
- abstraction
- scientific inference

Thus, the human epistemic function is built into the ontology of creation.

20.9.1 Epistemic Environment: The Universe as a Field of Knowing

The Qur'an establishes the universe as an epistemic arena: *"In the creation of the heavens and the earth… are signs for those of understanding* (أُولِي الْأَلْبَابِ)." (Q. 3:190)

Thus:

- humans are endowed with *ʿaql* (reason)
- the universe is endowed with *ayat* (signs)
- knowledge arises through their interaction

This forms the Qur'anic epistemic triad:

- Human faculties
- Cosmic signs
- Divine guidance

Without any of the three, knowledge remains incomplete.

20.9.2 Observation as Epistemic Obligation

The Qur'an calls humanity to observe:

- horizons (Q. 41:53)
- stars (Q. 37:6)
- earth and its pathways (Q. 67:15)
- historical traces of nations (Q. 30:9)

These commands are imperative verbs:

- *unẓuru* (look)
- *Siri* (travel)
- *afala tanzurun* (will you not observe?)

Thus, observation (*naẓar*) is not optional; it is a moral and epistemic duty.

20.9.3 Rational Inference (ʿAql) as Cosmic Interpretation

The human intellect is repeatedly invoked: *"Do you not reason?"* (Q. 2:44) *", Perhaps you may understand."* (Q. 2:73)

Reasoning allows humans to:

- interpret cosmic data
- infer patterns
- construct theories
- discern purpose

Thus, the cosmos becomes intelligible through the human mind.

20.9.4 Reflection (Tafakkur, Tadabbur) as Epistemic Deepening

Beyond observation and inference lies deeper reflection:

- *tafakkur* (analytical contemplation)
- *tadabbur* (holistic deep reflection)
- *tadhakkur* (remembering truth)

These processes transform raw empirical data into:

- wisdom
- moral realisation
- spiritual insight

This completes the Qur'anic epistemic cycle.

20.9.5 Human Knowledge as Cosmic Participation

Knowledge is not external to the cosmos; it is a mode of participating in its unfolding reality. The Qur'an states: *"We will show them Our signs… until it becomes clear to them that it is the truth."* (Q. 41:53)

Human discovery is thus part of divine disclosure. Modern cosmology-cosmic microwave background analysis, dark matter mapping, exoplanet detection-is, in this sense, an extension of this Qur'anic invitation.

20.9.6 Moral Responsibility in Epistemic Function

With knowledge comes responsibility: *"Do not pursue that of which you do not know."* (Q. 17:36)

Epistemology and ethics converge:

- knowledge without responsibility becomes oppression (*ẓulm*)
- knowledge without humility becomes arrogance (*kibr*)
- knowledge without purpose becomes corruption (*fasad*)

Thus, the cosmos not only invites knowledge; it demands ethical conduct in its pursuit.

20.9.7 Human Beings as Cosmic Witnesses

The Qur'an describes humanity as:

- *shuhada'* (witnesses)
- *khulafa'* (vicegerents)
- *ʿibad* (servants)

These roles define the epistemic function:

- witnesses: observe the cosmos
- vicegerents: manage the earth
- servants: submit to the divine truth

Thus, cosmology and epistemology become inseparable from ethics and spirituality. Qur'anic cosmological ontology forms a comprehensive worldview in which the cosmos is a meaningful, lawful, dynamic, balanced, and readable system. It integrates physical structure with metaphysical purpose, scientific investigation with spiritual insight, and human epistemic function with cosmic responsibility. The Qur'an's cosmology is not an archaic worldview but a radically open and scientifically fertile paradigm that anticipates and invites modern space sciences. By positioning the cosmos as a domain of signs governed by laws, the Qur'an establishes a unified ontology of existence that becomes the epistemic foundation for all scientific inquiry.

20.10 Human Exploration as Amanah

20.10.1 Space as an Epistemic Trust

Among the most profound implications of Qur'anic cosmology is the framing of the cosmos as a field of moral responsibility rather than merely a scientific object. Human engagement with the universe-its observation, interpretation, measurement, and eventual physical exploration -is shaped in the Qur'an through the concept of amanah: a divinely bestowed trust that defines human agency in relation to knowledge, creation, and accountability (Q. 33:72). Within this overarching paradigm, the cosmos is neither an autonomous entity nor a value-neutral domain. Rather, it is constructed as a sign-system (*ayat*) that invites inquiry into its origins, structure, and meaning (Q. 41:53; 29:20).

Thus, the epistemological framework for understanding space -its phenomena, laws, and dynamics-does not arise from curiosity alone, but from a divinely mandated responsibility. This responsibility includes cultivating knowledge, safeguarding creation, preventing harm, and using scientific power ethically. This chapter argues that the Qur'an advances a distinctive model of cosmological inquiry in which human exploration (including space science and technology) is construed as both permissible and obligatory, provided it remains anchored in the moral grammar of *tawḥid*, justice, stewardship, and accountability.

Space exploration, then, becomes not simply a technological endeavour but an ethical vocation, grounded in the Qur'anic portrayal of the human as *khaliiah* (vicegerent), *ʿabd* (servant), and bearer of the amanah (Q. 33:72; 2:30; 6:165). In this sense, the human engagement with the cosmos is an extension of the broader divine mandate to *"travel through the earth"* (Q. 29:20), *"consider what is in the heavens and earth"* (Q. 10:101), and *"reflect on the creation of the heavens and earth"* (Q. 3:190).

To develop a Qur'anic understanding of space exploration as *amanah*, this chapter proceeds through five interlocking epistemic and ethical dimensions:

- The Qur'anic meaning of amanah as knowledge-responsibility
- Cosmological knowledge as a divine gift and human duty
- The ethical conditions for exploration: boundaries, humility, and justice
- Human technological power and accountability
- Toward an Islamic framework for contemporary space sciences

20.10.2 The Qur'anic Concept of Amanah as Epistemic Responsibility

The point of departure for situating space exploration within Qur'anic epistemology is the verse: *"Indeed, We offered the amanah to the heavens and the earth and the mountains, but they refused to bear it and feared it; yet the human undertook it…"* (Q. 33:72).

Classical philology interprets *amanah* as responsibility, trust, obligation, and accountability (*al-Ṭabari, 2001*). Modern Qur'anic scholars extend the semantic range to include epistemic duty because the verse is followed by descriptions of human moral failure or success, implying *amanah* relates fundamentally to ethical agency (Lawwamahi, 2022). When placed in dialogue with other epistemic verses, *amanah* becomes a comprehensive category that frames how humans should manage, use, and apply knowledge.

Amanah and the epistemic mission of humanity: The Qur'an repeatedly associates human dignity with knowledge (Q. 2:31-33), perception (Q. 16:78), and moral deliberation (Q. 91:7-10). The ability to inquire, discover, and act upon knowledge is not an autonomous human achievement; it is a delegated capacity that carries with it the responsibility to safeguard and correctly apply what is known. Therefore, scientific advancement, technological development, and cosmic exploration all fall within the domain of *amanah*.

Amanah as accountability for misuse of knowledge: Knowledge in the Qur'an is not morally neutral. Rather, it has the potential to bring benefit or corruption, justice or harm. The Qur'an warns that human beings can misuse power (Q. 96:6-7), transgress limits (Q. 55:8), and cause disorder (*fasad*) in the heavens and earth (Q. 30:41). In this sense, *amanah* requires humanity to explore creation with humility, ethical restraint, and awareness of consequences.

Human exceptionalism and vulnerability: Paradoxically, the verse (Q. 33:72) highlights both the capacity and fragility of human nature. The cosmos, despite its magnitude, "refused" the responsibility of *amanah*, emphasising the magnitude of what it entails. The human, however, accepted this trust, demonstrating

unique potential but also the danger of moral failure. This duality positions scientific exploration-not as a triumphalist conquest of nature-but as a delicate negotiation between capability and responsibility.

Thus, in the Qur'anic view, human exploration of the cosmos is neither prohibited nor unrestricted; it is a trust requiring ethical intention, responsible application, and alignment with divine guidance.

20.10.3 Cosmological Knowledge as Divine Invitation and Human Duty

The Qur'an does not present the universe as inert. Instead, it portrays creation as a system of signs intentionally placed for human reflection (Q. 3:190; Q. 41:53). These signs include:

- Cosmic structure (Q. 51:7)
- Orbits and celestial mechanics (Q. 21:33)
- The layered heavens (Q. 71:15-16)
- Night-day cycles (Q. 10:67)
- The expansion of the universe (Q. 51:47)
- Celestial pathways (*subul*) (Q. 51:7)

Each of these functions epistemically: to lead humans from observation to inference, from inference to contemplation, and from contemplation to recognition of divine wisdom (Q. 67:3-4).

Cosmic inquiry as a Qur'anic imperative: Verses instructing humans to "travel," "observe," "consider," or "reflect" (*unẓuru, siru, afala tatafakkarun*) serve as methodological cues (Q. 29:20; 10:101; 3:190). The Qur'an thus frames cosmology not merely as permitted but commanded.

The heavens as a field of rational discovery: Unlike mythological cosmologies, the Qur'an does not describe the heavens through mystical or secret knowledge. Instead, it speaks of order, measure, balance, and discernible pathways - all of which invite empirical exploration (Q. 54:49; 25:2).

The Qur'anic rejection of cosmic dualism: Space is not divine; it is created (Q. 39:38) and subject to law (Q. 30:48). Human engagement with it does not violate sacredness but participates in uncovering the divine wisdom embedded in structure and motion. Thus, cosmological inquiry becomes both a gift and a duty grounded in *amanah*.

20.10.4 Ethical Conditions for Cosmic Exploration

Human exploration-whether terrestrial or cosmic-must adhere to ethical constraints derived from the Qur'an.

Prohibition of harm (ḍarar) and corruption (fasad): The Qur'an warns against causing corruption *"on land and sea"* (Q. 30:41). While originally referring to sociomoral corruption, the verse includes environmental and possibly extraterrestrial contexts under the broader principle of avoiding harm. Thus, extraction, planetary contamination, militarisation of space, or harmful experimentation would violate *amanah* unless justified, regulated, and minimised.

Epistemic humility: The Qur'an condemns arrogance in the pursuit of knowledge (Q. 96:6-7). Space exploration must therefore resist triumphalist narratives of human dominance over creation.

Moral intention (niyyah): Actions are judged by their moral orientation. Even scientific research must carry an intention aligned with the preservation of life, justice, and knowledge (Q. 5:32).

Justice in resource use: Celestial resources-energy, minerals, potential habitats-must be approached with justice (Q. 16:90). The Qur'an's legal-ethical language implies that exploitation without balance would breach the trust of *amanah*.

20.10.5 Human Technological Power and Accountability

Space exploration is linked to human capacity to manipulate natural forces-propulsion, energy, radiation shielding, robotics, and eventually, terraforming. The Qur'an affirms technological empowerment (Q. 45:13) but warns that every capability increases accountability (Q. 17:36; Q. 28:77).

Power as trial (ibtilaʾ): Power is a test rather than a right (Q. 6:165). Scientific achievement does not guarantee moral success.

Knowledge is double-edged: The Qur'an narrates that knowledge can elevate or mislead depending on moral grounding (Q. 35:28; Q. 45:23).

Responsibility for long-term consequences: Space technologies carry long-term societal, ecological, and geopolitical effects. Qur'anic ethics require foresight, precaution, and stewardship.

20.10.6 Toward an Islamic Framework for Contemporary Space Sciences

Developing a Qur'anically grounded framework for contemporary space sciences requires more than citing isolated cosmological verses or drawing symbolic parallels with modern scientific discoveries. The Qur'anic revelation presents an integrated epistemology in which the pursuit of knowledge is inseparable from moral responsibility, ontological awareness, and recognition of human accountability before God (Q. 17:36; 6:165). Therefore, a Qur'anic framework for space sciences must operate simultaneously on three levels: epistemic, ethical, and civilizational. Each level provides principles, modalities, and boundaries that collectively shape how human exploration of the cosmos should proceed in an Islamic worldview.

Epistemic Foundation -Universe as a Text of Signs: The Qur'an describes the cosmos as a system of signs (*ayat*), structurally ordered and intentionally accessible to human inquiry (Q. 41:53; 3:190-191). An epistemic framework for space science must therefore begin from the Qur'anic assertion that the universe is intelligible, governed by discernible patterns, orbits, pathways, proportions, and laws (Q. 54:49; 21:33). These laws are neither random nor self-generating; they are *sunan*, divine patterns that regulate natural processes (Q. 35:43).

The Qur'an invites humans to observe, analyse, and verify cosmic phenomena using rational and empirical methods-*"Say, observe what is in the heavens and the earth"* (Q. 10:101). Thus, empirical observation,

mathematical modelling, simulation, and experimentation are not foreign impositions upon Islamic thought but legitimate forms of engagement with the *ayat nafsiyya* (inner signs) and *ayat afaqiyya* (cosmic signs) (Rahman, 1980; Sardar, 2015). This invites a *continuum* between revelation and scientific exploration, where knowledge is produced through the dual process of reading Scripture (*al-Qur'an al-tadwini*) and reading the universe (*al-Qur'an al-takwini*) (Lawwamahi, 2022).

Ethical Conditions: Amanah, Responsibility, and Justice: A Qur'anically informed framework for space sciences cannot be merely descriptive; it is normatively structured by *amanah* (Q. 33:72). Human knowledge, power, and capability-whether in propulsion engineering, orbital mechanics, astrophysics, or interplanetary exploration-constitute a trust. As such, scientific activity is subject to divine evaluation based on intention (niyyah), benefit (maṣlaḥah), and moral restraint (Q. 5:32; 55:7-9). Three ethical imperatives follow:

- Avoidance of Corruption (Fasad): The Qur'an warns against spreading disorder *"on land and sea"* (Q. 30:41). While historically linked to moral and social corruption, this principle also applies to environmental degradation, including planetary contamination, space debris, militarisation of orbit, or uncontrolled exploitation of extraterrestrial resources (Ansari, 2020). Space exploration must thus be governed by environmental ethics analogous to Islamic principles of preservation (*ḥifẓ*), balance (*mizan*), and non-harm (*la ḍarar*).
- Humility and Epistemic Modesty: The Qur'an repeatedly condemns arrogance arising from scientific or technological mastery (Q. 96:6-7). Technologies enabling space travel-mass-energy manipulation, satellite networks, and radiometric instrumentation -must be approached with humility. A Qur'anic paradigm rejects narratives of cosmic conquest and replaces them with stewardship, gratitude, and responsibility.
- Justice in Distribution and Use of Knowledge: Celestial resources (energy, minerals, orbits) fall under the Qur'anic injunction to *"conduct affairs with justice"* (Q. 16:90). Islamic ethics prohibit monopolistic access or exploitation that benefits a few while harming the many. Thus, international cooperation, equitable access, and planetary protection become integral components of an Islamic space-ethics model.

Methodological Orientation: Observation, Verification, Wisdom: Drawing on Qur'anic methodology, contemporary space sciences need to follow three tiers of inquiry:

- Observation (Naẓar): The command to "look" or "observe" (Q. 88:17; 10:101) legitimises disciplines such as astrophysics, cosmology, planetary science, and aerospace engineering.
- Verification (Taḥqiq): The Qur'an mandates epistemic verification-*"Bring your proof if you are truthful"* (Q. 2:111)-aligning with experimental testing, peer review, measurement accuracy, and error correction.
- Wisdom (Ḥikmah): Observation and verification must culminate in ethical reflection (Q. 17:36; 45:13). Scientific conclusions must be integrated into broader considerations of justice, benefit, and divine purpose.

These three tiers collectively produce a methodology parallel to, but not identical with, modern scientific empiricism. The Qur'anic method emphasises *integration*, not fragmentation: empirical data must be interpreted within metaphysical, moral, and teleological frameworks.

Civilizational Purpose: Space Science as Human Flourishing: Space exploration within an Islamic paradigm is neither escapism nor triumphalism. It serves civilizational ends grounded in the Qur'anic mandate that humans are *khalaʾif fi al-arḍ* (successive generations who steward creation) (Q. 6:165). Therefore, a Qur'anic framework for space sciences supports:

- Knowledge for the betterment of life: Space-based Earth observation enhances agriculture, climate mitigation, disaster response, and water management, directly fulfilling Qur'anic objectives of preservation and compassion (Q. 21:107).
- Protection of humanity: Research into near-Earth objects, solar activity, and cosmic hazards aligns with the Qur'anic principle of preventing harm (*dafʿ al-ḍarar*).
- Long-term survival and moral maturity: Human expansion into space, if ethically justified, reflects responsibility toward future generations (Q. 59:18).

Outcome -A Qur'anic Vision for Space Science: Synthesising the above dimensions, an Islamic framework for contemporary space sciences is built on six pillars:

- Tawḥidic ontology - Unity, order, purpose in the cosmos (Q. 21:22).
- Epistemic legitimacy - Observation and rational inquiry as Qur'anic duties (Q. 3:190-191).
- Ethical accountability - Exploration as fulfilment of *amanah* (Q. 33:72).
- Non-harm and justice - Avoiding corruption and inequity (Q. 30:41; Q. 16:90).
- Integration of knowledge - Empirical, rational, and moral domains unified.
- Civilizational flourishing - Using cosmic knowledge to uplift life on Earth and beyond.

In this sense, space science becomes not merely a technological pursuit but a moral endeavour, where humanity fulfils its vicegerent role while navigating the cosmos with humility, justice, and intellectual integrity.

20.11 Expansion of the Universe

20.11.1 Cosmology as a Qur'anic Epistemic Domain

The question of whether the universe is static or expanding is among the most significant intersections between modern cosmology and Qur'anic discourse. The twentieth-century discovery that the universe is expanding, first through the observations of Vesto Slipher (1912), later refined by Edwin Hubble (1929), and eventually consolidated into the ΛCDM cosmological model, transformed scientific understanding of cosmic origins and evolution. Yet the Qur'an, more than a millennium earlier, offered conceptual indications of dynamism, expansion, and growth embedded within a theologically grounded cosmological ontology. The Qur'anic verse *"And the heaven We constructed with power, and indeed We are surely expanding it"* (Q. 51:47) stands out as one of the most discussed verses in scientific and theological

literature. However, beyond apologetic readings, its epistemological depth requires a nuanced hermeneutic analysis.

The Qur'an does not present cosmology as a detached scientific description but as a sign-based ontology, where the physical structure of the heavens reveals metaphysical truths, divine intentionality, and moral lessons (Q. 41:53; 21:30). Expansion (*musiʿun*, from *w-s-ʿ*) is not merely a physical phenomenon but an ontological statement about the continuous unfolding of creation. This framing integrates cosmic evolution with divine will, intentionality, and order. The Qur'an emphasises a universe that is created, sustained, and guided by divine laws (*sunan*), not a universe left in randomness or mechanical autonomy (Q. 54:49; 87:2-3).

The purpose of this section is to examine the Qur'anic discourse on cosmic expansion through a rigorous epistemological lens. Rather than seeking simplistic concordism, the chapter investigates how expansion functions as a Qur'anic cosmological principle, how it aligns with broader Qur'anic ideas of continuous creation (*khalq jadid*), and how it relates to modern cosmological theories of metric expansion, inflation, dark energy, and thermodynamic evolution. Ultimately, the aim is to articulate a Qur'anically informed philosophy of cosmic expansion that remains faithful to revelation while critically engaging with contemporary scientific models.

20.11.2 Linguistic Hermeneutics of Q. 51:47 (al-Dhariyat)

The key verse states: *"And the heaven We built with strength, and indeed We are surely expanding it."* (Q. 51:47)

The interpretive question centres on *lammusiʿun* (لَمُوسِعُونَ). Classical exegetes, writing centuries before any scientific concept of cosmic expansion, consistently interpreted the verse using the root w-s-ʿ, meaning *vastness, widening, enrichment, expansion, capacity*, or *abundance* (Ibn Faris, 1999). Al-Ṭabari (d. 923) and Ibn Kathir (d. 1373) both understood the verse to indicate that God made the heavens "vast" and "expansive," emphasising grandeur rather than dynamic expansion. However, these commentaries were linguistic and theological, not scientific. They lacked the conceptual framework to consider the physical expansion of spacetime.

Modern tafsir scholars have approached the verse with greater linguistic sensitivity. Abdul Haleem (2004) notes that the active participle form *musiʿun* indicates continuous action, not a completed event. Al-Asfahani's *Mufradat* suggests *w-s-ʿ* connotes a process of continuous widening. Thus, the Qur'anic phrase can reasonably be rendered as "We are expanding it continually," a meaning linguistically permissible and consistent with contemporary cosmology, though not dependent upon it.

It is therefore hermeneutically sound to state that Qur'an verse 51:47 describes the heavens as possessing *vastness* and *an ongoing state of expansion*. The verse does not serve as an empirical test for Big Bang cosmology, but as a conceptual ontology: the universe is created in a dynamic, unfolding mode, not static or eternal.

20.11.3 Expansion in Qur'anic Cosmological Themes

The Qur'an contains multiple verses implying dynamism, growth, and movement within the cosmos. Several of these support a broader Qur'anic cosmological ontology in which expansion is one expression of continuous divine creative activity.

Continuous Creation (Khalq Jadid): The Qur'an states: *"Every day He is bringing about a matter"* (Q. 55:29), implying perpetual creative engagement rather than a closed, completed act. Similarly, Q. 50:15 suggests ongoing processes of creation and re-creation, further indicating a universe whose structure and evolution are dynamically sustained.

Separation from a Unified Origin: Qur'an verse Q. 21:30 famously declares: *"The heavens and the earth were joined, and We split them apart."* This aligns conceptually with the modern understanding of a singular primordial state (e.g., the initial cosmic singularity or early unified plasma) that later diversified.

Balanced Divergence (Mizan): Cosmic expansion does not imply chaos. The Qur'an repeatedly emphasises *mizan*-proportion, order, symmetry (Q. 55:7-9). Expansion is thus governed by lawfulness, consistent with the modern view of physical constants, cosmic parameters, and the finely tuned expansion rate needed for structure formation.

Multi-layered Heavens (Samawat): The Qur'an's reference to *"seven heavens"* (Q. 41:12; 67:3) has been interpreted symbolically, but structurally it reflects stratification, layering, or multi-dimensionality. Whether these correspond metaphorically to the layered universe (cosmic webs, filaments, voids) or describe ontological realms, the Qur'an clearly portrays the heavens as complex and structured, not uniform or static.

20.11.4 Integrating Modern Cosmology: Expansion, Inflation, and Dark Energy

Modern cosmology identifies several key phases and mechanisms of expansion. A Qur'anically inspired cosmology engages these not as direct confirmations of scripture but as epistemic dialogue with scientific models.

Metric Expansion of Space: The expansion of the universe refers to the increasing metric distance between spatial points, not galaxies moving through static space. This aligns with the Qur'anic depiction of creation as a field of ordered processes, not a chaos of bodies in motion (Q. 36:38-40).

Cosmic Inflation: Inflation posits that the universe underwent an exponential expansion within 10^{-36} seconds after the Big Bang. While not explicitly stated in the Qur'an, the concept of rapid expansion resonates conceptually with *"the heavens We built with strength"* (Q. 51:47), Since *biyad* (power) can denote an extraordinary creative force.

Dark Energy and Accelerated Expansion: Current data (e.g., Type Ia supernovae, cosmic microwave background anisotropies) indicate accelerated expansion driven by dark energy. This notion of *sustained, increasing expansion* conceptually aligns with the continuous aspect of *lamusiʿun*.

Heat Death and Eschatology: Modern cosmology's projection of eventual cosmic cooling finds resonance in Qur'anic eschatology describing cosmic transformation (Q. 81:1-4; 84:1-5). Though the Qur'an describes moral and metaphysical events, the themes of dissolution, folding, and transformation conceptually overlap with thermodynamic decline and recompression models.

20.11.5 Philosophical Implications: Ontology, Teleology, and Purpose

Cosmology and Divine Unity (Tawḥid**):** Cosmic expansion reinforces ontological unity: a universe with a single origin reflects the Qur'anic principle of divine oneness (Q. 21:22). Multiplicity in the heavens does not negate unity but expresses ordered diversity.

Expansion as a Teleological Process: The Qur'anic universe is not expanding aimlessly. It expands toward moral, intellectual, and spiritual outcomes: *"We did not create the heavens and the earth in vain"* (Q. 38:27). Thus, cosmic expansion situates humanity within a universe that invites discovery, reflection, and responsibility.

Human Knowledge as Participation in Cosmic Order: By observing expansion, humans participate in the process of uncovering divine signs. The Qur'an presents scientific inquiry as a continuation of revelation's invitation.

20.11.6 A Qur'anic Model of Cosmic Expansion

Bringing these strands together, a Qur'anically grounded model of cosmic expansion includes:

- Ontological Expansion: The universe expands because God continuously sustains creation (Q. 55:29).
- Structural Expansion: Governed by laws (*sunan*) and proportion (*mizan*) (Q. 54:49).
- Epistemic Expansion: Humans are commanded to observe the expanding cosmos (Q. 10:101).
- Teleological Expansion: Expansion reveals divine wisdom, not randomness.
- Moral Expansion: Understanding the universe enhances gratitude, humility, and stewardship (Q. 6:165).

Thus, the Qur'an conceptualises cosmic expansion as a multi-layered phenomenon, scientific, moral, metaphysical, and epistemic.

20.12. Celestial Order as Epistemic Sign (Ayah)

20.12.1 The Heavens as an Epistemic Text

The Qur'an repeatedly describes the cosmos-not merely as a physical domain-but as a text of signs (ayat), parallel to the revealed Book (Q. 41:53). The heavens and the earth serve as a continuously unfolding field of knowledge. Celestial order, movement, precision, and balance are presented as epistemological cues that guide human reason (*ʿaql*), contemplation (*tafakkur*), reflection (*tadabbur*), and moral awareness (*tadhakkur*). The Qur'an challenges human beings to read the cosmos not only as an object of empirical study but as a purposeful revelation that reflects divine intelligence, intentionality, and unity (Q. 3:190-191).

Celestial order in the Qur'an is not a metaphor; it is an ontological statement. The universe is constructed upon *mizan*-proportion, measure, and equilibrium (Q. 55:7-9). The regularity of orbits (Q. 21:33; 36:40), the alternation of night and day (Q. 3:190), the structure of the heavens (Q. 67:3-4), and the existence of cosmic paths (Q. 51:7)-all of these form an integrated epistemic architecture. They constitute a grammar through which the universe becomes readable. In modern academic terms, the Qur'an establishes the heavens as a form of natural revelation whose epistemic authority is tied to divine intentionality.

This chapter analyses celestial order as an epistemic sign grounded in Qur'anic ontology, cosmology, and anthropology. It examines: the Quranic structure of celestial order; the role of signs (*ayat*) in forming human knowledge; the interplay between cosmic regularity and moral awareness; how celestial order supports a Qur'anic scientific methodology; and how this worldview intersects with modern astronomy, astrophysics, and cosmology.

Celestial order is therefore not simply a scientific phenomenon. It is a Qur'anic epistemic principle central to how revelation envisions the acquisition, verification, and purpose of knowledge.

20.12.2 The Qur'anic Concept of Ayah as a Cosmological Category

Linguistic and Hermeneutical Foundations: The term ayah (آية) appears over 380 times in the Qur'an. It signifies:

- A verse of the Qur'an,
- A sign in nature,
- A historical event, or
- A proof or evidence.

The Qur'an uses *ayah* in a unified ontological sense: a sign is anything that points beyond itself, directing the intellect toward a deeper truth (Izutsu, 2002). Celestial phenomena are thus epistemic markers because they gesture toward divine wisdom, order, and unity. Qur'an verse 41:53 states: *"We shall show them Our signs (ayat) in the horizons and within themselves until it becomes clear to them that it is the Truth."* Here, *ayat fī al-afaq* refers directly to astronomical and cosmological signs -those found in the external universe.

Celestial Order as Integrated Meaning: Celestial signs are not incidental decorations of the universe; they are didactic structures designed to instruct and to awaken consciousness (Q. 67:3-4). The Qur'an consistently pairs observation of the heavens with epistemic verbs such as:

- *yatafakkarun* - they reflect
- *yaʿqilun* - they reason
- *yatadhakkarun* - they remember
- *yubṣirun* - they perceive

Thus, celestial order is meant to be interpreted, not merely observed. Epistemic Accessibility of Cosmic Signs: The Qur'an emphasises that cosmic signs are:

- universal (visible to all humans),
- continuous (repeating daily, nightly, seasonally),
- self-evident (requiring no priestly mediation),
- empirical (inviting direct observation).

These characteristics make the cosmos an epistemic environment in which revelation and reason mutually reinforce one another.

20.12.3 Celestial Structure and Order in the Qur'an

The Qur'an describes the heavens in a manner that stresses structural integrity, hierarchical organisation, and precise functioning. The Multi-Layered Heavens (Samawat Sabʿ): Verses such as Q. 67:3 describe the heavens as seven-layered structures: *"He created the seven heavens in layers; you will not see in the creation of the All-Merciful any inconsistency."* The phrase *tafawut* (inconsistency) in this context implies:

- absence of random disorder,
- ontological stability,
- meticulous proportionality.

This resonates with the cosmological notion that the universe operates under finely tuned constants and symmetrical laws.

Orbital Precision: Q. 21:33 states: *"He is the One who created night and day, the sun and the moon, each floating in its orbit."*

The term *falak* denotes circular or curved motion, but also an established track. Modern astrophysics identifies orbital mechanics governed by gravitational interaction, angular momentum, and curvature of spacetime-concepts that align with the Qur'anic notion of ordered motion.

Absence of Rupture or Chaos: Q. 67:3-4 challenges humans to: *"Look again-do you see any flaw?"*

Repetition of observation stresses that celestial order withstands scrutiny. In epistemic terms, the heavens function as a model of verifiability, reinforcing Qur'anic methodology where truth is confirmed through repeated examination.

20.12.4 Celestial Order as Epistemic Argument (Dalil)

Celestial order in the Qur'an is not merely descriptive; it is argumentative. It functions as a dalil (proof), establishing rational foundations for belief in divine unity, purpose, and creativity.

Order as Premise in the Qur'anic Argument: The Qur'an uses celestial regularity as evidence that the universe is governed by a single, coherent will (Q. 21:22). If multiple gods existed, cosmic order would collapse, or systems would clash. This is a form of cosmological argument from coherence, not merely cause. Predictability and Mathematical Structure: Qur'anic celestial order implies that:

- the universe is accessible to mathematical description,

- natural laws are stable and repeatable,
- empirical generalisation is epistemically valid.

This aligns with the methodology of contemporary astrophysics, celestial mechanics, and physical cosmology. Celestial Signs and Moral Reasoning: Celestial order has moral consequences. The Qur'an repeatedly links:

- cosmic balance (*mizan*) and
- moral balance (*ʿadl*).

Just as the universe is held in equilibrium, so human societies must embody justice (Q. 55:7-9). Thus, celestial order provides a metaphysical archetype for ethical behaviour.

20.12.5 Day-Night, Light-Darkness, and Rhythmic Order

Day and Night as Epistemic Cycles: The alternation of day and night is one of the most frequent cosmic signs cited in the Qur'an (Q. 3:190; 36:37; 45:5). It demonstrates:

- rhythmic regularity,
- ecological balance,
- human dependence on cosmic patterns,
- temporal structuring of life.

These cycles underpin agricultural rhythms, circadian biology, and navigational knowledge. Light as Epistemological Metaphor: Light (*mur*) in the Qur'an symbolises:

- truth,
- clarity,
- guidance,
- intelligibility.

Darkness (*ẓulumat*) symbolises confusion, ignorance, and moral blindness. Celestial light-from stars, sun, and moon-becomes an analogical foundation for understanding spiritual illumination (Q. 24:35).

Navigation and Epistemic Orientation: Qur'an verse 6:97 states that stars were made for navigation (*bi-l-nujum yahtadun*). Navigation is not only physical; it is epistemic. The heavens guide:

- travellers,
- sailors,
- caravaners,
- and seekers of truth.

Celestial guidance thereby becomes a metaphor for intellectual and spiritual direction.

20.12.6 Stellar Phenomena and Epistemic Meaning

Stars as Signs of Orientation and Beauty: Qur'an verse 37:6 describes stars as *zinat al-sama'*-ornamentation of the sky. Beauty is itself epistemic, inviting contemplation and gratitude. Aesthetic experience becomes a legitimate epistemic mode.

Constellations (Buruj): Qur'an verse 85:1 references *Buruj*, meaning fortified towers or constellations. These represent celestial markers by which ancient and modern astronomy organise the sky. Their stability supports calendrical systems and agricultural planning.

Atmospheric Protection: Qur'an verse 21:32 describes the sky as a protected roof (*saqf maḥfuẓ*). While the verse is not a scientific treatise, the concept coheres with:

- Earth's atmosphere,
- magnetic field,
- shielding from meteor impacts and radiation.

Thus, celestial order holds both existential and protective significance.

20.12.7 Cosmic Rhythm and Temporal Structure

Celestial order structures time. The Qur'an recognises:

- lunar cycles (Q. 10:5),
- solar cycles (Q. 55:5),
- seasonal rotations (Q. 2:189).

These cycles are foundational for:

- religious rituals,
- human civilisation,
- social coordination,
- scientific measurement.

Celestial movements thus serve as a temporal epistemic framework.

20.12.8 Human Response to Celestial Order: Knowledge, Humility, and Stewardship

The Epistemic Obligation to Observe: Qur'an verse 10:101: *"Say: Look at what is in the heavens and the earth."* Observation is a command, not a suggestion. Celestial order requires human study.

Humility before the Cosmic Scale: Observation of the heavens fosters humility (Q. 40:57). Awareness of cosmic immensity corrects arrogance, anchoring human beings within creation rather than above it.

Stewardship and Cosmic Responsibility: Because humans inhabit a universe of order, they must cultivate order on Earth. The Qur'an links cosmic order with *khilafah* -the moral responsibility to maintain balance (Q. 6:165).

20.12.9 A Qur'anic Epistemology of Celestial Order

Bringing the foregoing strands together, celestial order in the Qur'an constructs:

- An ontological foundation - the universe is structured and lawful.
- A rational foundation - order invites reflection and scientific reasoning.
- A moral foundation - cosmic balance models human justice.
- A spiritual foundation - cosmic signs point toward divine unity (tawḥid).
- A methodological foundation - the heavens serve as an epistemic template for observation, verification, and synthesis.

Thus, celestial order becomes a Qur'anic philosophy of knowledge, offering an integrated understanding of cosmology, science, ethics, and metaphysics.

20.13 Time Dilation and Relativistic Readings in the Qur'an

20.13.1 Time as a Relational and Relative Phenomenon

The Qur'an's discourse on time (*zaman*) offers one of the most conceptually sophisticated epistemic frameworks in scriptural traditions. Unlike classical Newtonian conceptions that view time as absolute, homogeneous, and linear, the Qur'anic worldview presents time as multi-layered, relativistic, context-dependent, and ontologically intertwined with the structure of creation. Time in the Qur'an is not a constant entity but a variable phenomenon that shifts according to cosmological, existential, and metaphysical domains (Q. 22:47; 32:5). This aligns remarkably with contemporary scientific insights - particularly Einsteinian relativity -where time is bound to motion, gravity, and spacetime curvature (Greene, 2011).

The Qur'an repeatedly challenges the human perception of time, revealing the limitations of empirical intuition and urging deeper reflection (*tafakkur*) into the nature of cosmic reality (Q. 23:112-114). Verses that describe a *"day equal to a thousand years"* (Q. 22:47) and others equating a *"day to fifty thousand years"* (Q. 70:4) signify ontological gradations of time rather than metaphorical exaggeration. Such descriptions illustrate the Qur'an's cosmological epistemology: time is relative to existential level, cosmic function, and ontological domain. In this chapter, we explore how the Qur'an presents time dilation through:

- Multiple temporal scales (divine, cosmic, human, eschatological)
- Relativity between motion and the passage of time
- Time as a function of cosmic hierarchy
- The compression and expansion of subjective time
- Eschatological temporality as a higher-order time domain
- Implications for modern physics and Qur'anic epistemology

The Qur'an does not describe relativity in mathematical terms; however, its conceptual architecture aligns with the philosophical implications of relativity theory: that time is not universal but depends on perspective, domain, and cosmic frame of reference.

20.13.2 Qur'anic Temporal Ontology: Multiple Scales of Time

Human Time-Linear, Short, and Subjective: The human perception of time is profoundly limited. The Qur'an refers to the human life-span as fleeting- *"a few days"* (Q. 23:112)-when contrasted with the immensity of cosmic time. Human time is:

- experiential,
- memory-dependent,
- psychologically elastic,
- existentially narrow.

This subjective temporality is foregrounded in verses describing people on Judgment Day recalling life on earth as *"a day"* or *"part of a day"* (Q. 23:113). These are not metaphorical hyperboles but statements about *temporal relativism*.

Cosmic Time: Structured, Rhythmic, and Law-Governed: Cosmic time is defined by:

- celestial motion,
- orbital cycles,
- axial rotations,
- periodic rhythms.

Qur'an verse 10:5 states: *"He made the sun a shining light and the moon a reflected light, and determined for it phases so that you may know the number of years and the reckoning."*

Timekeeping emerges from cosmic geometries. This aligns with physical cosmology, where time measurement is inseparable from astronomical cycles (Carroll, 2016).

Divine Time-Transcendent and Scale-Independent: Divine time lies outside physical constraints. Qur'an verse 22:47 declares: *"A day with your Lord is like a thousand years of what you count."*

Here, *ʿinda rabbika* (with your Lord) signals an ontological state where temporal metrics differ fundamentally from human measures. This is a clear statement of domain-dependent time.

Eschatological Time-Non-Linear and Transformative: Eschatology reveals another temporal order. Resurrection, judgment, and afterlife operate within a drastically altered spacetime configuration. The Qur'an describes temporal inversion *("like the blink of an eye or nearer"* - Q. 16:77) and complete transcendence of measured time (Q. 20:102-112). Thus, the Qur'an constructs a hierarchical temporal architecture:

- Human time (limited, linear)
- Cosmic time (regular, geometric)

- Divine time (non-linear, scale-independent)
- Eschatological time (non-measurable, transformative)

This framework forms the foundation of Qur'anic relativity.

20.13.3 Qur'anic Expressions of Time Dilation

"A Day Like a Thousand Years" - Qur'an verse 22:47: The verse states: *"A day with your Lord is like a thousand years of what you count."* The expression indicates:

- Temporal scaling,
- Perceptual relativity,
- Ontological differences between domains.

The phrase "what you count" directly refers to human chronometric systems-solar or lunar years.

"A Day Like Fifty Thousand Years" -Qur'an verse 70:4 states: *"The angels and the Spirit ascend to Him in a day the measure of which is fifty thousand years."* This verse describes:

- angelic time,
- higher-dimensional motion,
- ontological velocity beyond human comprehension.

It also suggests that time progression is tied to the rate of motion, a key principle in special relativity (Einstein, 1920).

Vertical vs. Horizontal Time: Qur'an verse 70:4 implies vertical cosmological ascent, where the temporal scale expands dramatically. Qur'an verse 22:47 implies a horizontal divine perspective, where time compresses. Together, these verses describe anisotropic time-time that varies according to direction, domain, and function.

20.13.4 Time Dilation through Velocity -In relativity

- faster motion slows down time.

In Qur'an verse 70:4, the angels traverse cosmic distances at extraordinary speeds, yet their journey corresponds to "fifty thousand years" of human time-a textual expression paralleling relativistic temporal divergence.

Time, Motion, and Gravity in the Qur'an

Time Bound to Celestial Motion: The Qur'an repeatedly ties time to the movement of celestial bodies:

- *"The sun and moon follow precise calculation"* (Q. 55:5)
- *"Each floats in its orbit"* (Q. 21:33)

This implies:

- time emerges from motion,
- time is relational.

Gravitational Anchoring and Time: Qur'an verse 13:2 states: *"He raised the heavens without pillars that you see, then established Himself upon the Throne, and subjected the sun and the moon-each running for a term appointed."*

The unseen "pillars" may allegorically correspond to gravitational forces that invisibly structure cosmic architecture (Hawking, 2001). The link to "appointed term" indicates a gravitational-temporal relationship.

Time and Cosmic Stability: The Qur'an emphasises:

- cosmic anchoring (Q. 31:10),
- mountains as stabilisers (Q. 21:31),
- balance of the heavens (Q. 55:7-9).

These structures influence gravitational fields, ensuring temporal regularity.

20.13.5 Psychological and Phenomenological Time

Subjective Time Compression: The Qur'an narrates experiences where individuals perceive time differently:

- People of the Cave (Q. 18:19): centuries felt like a day.
- Resurrection Day (Q. 23:113): life felt like an hour.

These are psychological time dilations, paralleling modern findings in cognitive science and temporal perception theory (Craig, 2009).

Memory, Consciousness, and Time: The Qur'an associates forgetfulness (*nisyan*) with distortion of temporal awareness (Q. 20:115). Consciousness itself, therefore, becomes a variable that influences subjective time.

20.13.6 Time, Epistemology, and Human Limitation

The Qur'an presents time as an epistemic constraint. Human beings:

- misunderstand long-term processes (Q. 75:3-4),
- underestimate cosmic timescales (Q. 32:5),
- fail to grasp divine timing (Q. 7:187).

Time here functions as a limiting condition of human knowledge, and recognition of its relativity becomes epistemic humility.

20.13.7 Time Relativity and Modern Science: Convergences and Divergences

Convergences: The Qur'an aligns with modern science on:

- relativity of time,
- dependence of time on motion,
- variability of time across domains,
- difference between experienced vs. measured time.

Divergences: The Qur'an differs in purpose:

- it embeds time relativity within moral and metaphysical meaning,
- it emphasises purpose and accountability,
- It integrates time into a teleological worldview.

Thus, Qur'anic time is both scientific and moral, not merely mathematical.

20.13.8 Eschatological Time as the Highest Order of Temporality

The Day of Judgment (Qiyamah) introduces a form of time entirely distinct from physical cosmology. It is:

- instantaneous (Q. 54:50),
- non-linear (Q. 20:103-104),
- transformative (Q. 22:1),
- ontologically new (Q. 14:48).

No scientific framework currently models this domain; it is metaphysical and theological.

20.13.9 Synthesis: Time as a Multi-Level Qur'anic Epistemic Structure

The Qur'an ultimately presents time as:

- Relative
- Domain-dependent
- Multi-layered
- Motion-linked
- Gravity-influenced
- Psychologically elastic
- Metaphysically transcendent

This is a sophisticated epistemology of time that predates modern relativity and extends beyond it into moral and existential dimensions.

20.14. Day-Night, Orbit, Gravity, and Cosmic Pathways (Subul)

20.14.1 The Qur'anic Logic of Cosmic Order

Among the Qur'an's most recurrent cosmological themes is the rhythmic alternation of day and night, the orbital precision of celestial bodies, and the structured pathways embedded in the architecture of the

heavens. Together, these constructs form a unified ontological system grounded in *mizan* (balance), *taqdir* (measure), and *subul* (pathways), through which the Qur'an articulates the intelligibility, harmony, and law-governed nature of the cosmos (Q. 55:5-9; 67:3-5). Unlike mythic cosmologies, the Qur'anic universe is neither chaotic nor arbitrary; it is a domain of structured regularity and predictable dynamism that functions as a vast epistemic field for human reflection (*tafakkur*) and scientific inquiry (Q. 3:190-191). This section explores the Qur'anic discourse on:

- Day-night alternation as a cosmological sign and scientific phenomenon
- Orbital mechanics as the basis of cosmic order
- Gravitation and the invisible architecture of the heavens
- Cosmic pathways (*subul*), routes, and trajectories
- Integration of Qur'anic ontology with contemporary astrophysics
- Epistemic implications for scientific exploration

The Qur'an's depiction is not a poetic flourish but a conceptual cosmology grounded in law-like regularity. It anticipates key principles of celestial mechanics and gravitational theory, not through mathematical formalism, but through metaphysical framing that affirms structural intelligibility.

20.14.2 Day and Night: Cycles, Rhythm, and Cosmological Law

Qur'anic Depictions of Day-Night Alternation: The alternation of day and night appears repeatedly in the Qur'an as one of creation's foundational signs (*ayat*):

- *"He makes the night pass into the day, and the day pass into the night"* (Q. 35:13).
- *"He covers the night with the day, seeking it swiftly"* (Q. 7:54).
- *"Among His signs is the creation of the heavens and the earth and the alternation of night and day"* (Q. 30:22).

The Qur'anic language-*yuliju*, *yukawwiru*, *yughshi*-indicates gradual transitions, rolling and wrapping motions, and overlapping cycles. These terms pre-scientifically articulate:

- axial rotation,
- diurnal cycles,
- the geometry of light and shadow,
- spherical structure of the Earth.

The verb *yukawwiru* in Qur'an verse 39:5 ("He wraps the night over the day") evokes circularity or spherical rolling, consistent with the Earth's curvature.

Cosmological Implication: Earth's Rotation and the Geometry of Light: From a scientific perspective, day-night alternation arises from the Earth's:

- axial rotation,
- spherical geometry,

- relative position to the sun.

The Qur'an's conceptual emphasis on interpenetration-night entering day and day entering night-implicitly reflects a heliocentric, rotational structure rather than a flat or geocentric cosmology (Carroll, 2016).

Day and Night as Epistemic Stimuli: The Qur'an describes time cycles as *signs for people who reflect* (Q. 3:190-191). These signs invite humans to:

- contemplate natural law,
- appreciate cosmic design,
- infer metaphysical meaning from physical regularity.

Thus, the day-night cycle is both empirical and epistemic, grounding human understanding of time, pattern, and cosmic order.

20.14.3 Orbital Mechanics in the Qur'an: Precision, Calculation, and Motion

"Each in an Orbit"-The Qur'anic Declaration of Celestial Motion: Qur'an verse 21:33 states: *"He created the night and the day, and the sun and the moon; each floats in an orbit."*

The verb *yasbaḥun* implies:

- smooth motion,
- continuous travel,
- fluid trajectories.

This aligns with astrophysical models of orbital dynamics, where gravitational forces produce elliptical or near-circular orbits (Hawking, 2001).

The Architecture of Orbits: The Qur'an's presentation encompasses:

- solar trajectory (Q. 36:38),
- lunar phases and orbit (Q. 36:39-40),
- impossibility of orbital collision under cosmic law: *"The sun cannot overtake the moon, nor does the night outrun the day."* (Q. 36:40)

These statements correspond to modern insights:

- conservation of angular momentum,
- stable orbital resonance,
- celestial mechanics regulating motion.

Orbits as Measure (*taqdir*): Qur'an verse 55:5: *"The sun and moon follow precise calculation."*

This "calculation" (*Ḥusban*) denotes quantifiable order and mathematically structured motion. The Qur'an thus establishes orbits as both physical and epistemic structures, laws that reveal intelligibility in creation.

The Epistemology of Orbital Regularity: Orbital stability becomes a hermeneutic tool enabling:

- prediction,
- measurement,
- calendrical systems,
- long-term scientific modelling.

The Qur'an elevates orbital order as evidence of inherent *mizan*-balance in the cosmos (Izutsu, 2002).

20.14.4 Gravity: The Invisible Architecture of the Heavens

Qur'anic Allusions to Gravitational Structure: The Qur'an does not employ physical terminology but uses metaphors pointing toward invisible forces:

- **"***He raised the heavens without pillars that you see"* (Q. 13:2) - implying unseen supporting forces.
- *"He holds the heavens from falling upon the earth except by His permission"* (Q. 22:65) - invoking stabilising cosmic order.
- *"It is Allah who holds the heavens and the earth lest they cease"* (Q. 35:41).

These verses describe:

- invisible cosmological support systems,
- non-material structures that prevent collapse,
- continuous maintenance of cosmic balance.

Many scholars identify these descriptions as gravitational metaphors, consistent with the invisible curvature of spacetime (Einstein, 1920).

Gravity and Suspension: Qur'anic Phenomenology: Qur'an verse 31:10 states: *"He cast mountains on the earth so it does not shake with you, and dispersed in it all kinds of creatures."*

Mountains symbolise stabilising forces-an analogy for mass balance in geophysics and gravitational equilibrium.

Cosmological Stability through Gravitational Harmony: The Qur'an repeatedly emphasises:

- *mizan* (Q. 55:7-9) - balance,
- *taqdir* - proportion,
- *qaḍa'* - decreed order.

This corresponds to gravitational systematisation that stabilises:

- planetary orbits,
- galactic structures,

- cosmic web distribution.

Gravity thus functions as a material expression of divine ordering.

20.14.5 Cosmic Pathways (*Subul*): Trajectories, Routes, and Celestial Infrastructure

Qur'anic Affirmation of Cosmic Pathways: Qur'an verse 51:7: *"By the heaven full of pathways (subul)."* This powerful expression opens a remarkable cosmological dimension. *Subul* implies:

- structured routes,
- cosmic highways,
- patterned trajectories.

In today's astrophysics, the universe is filled with pathways:

- orbital routes,
- gravitational channels,
- interstellar trajectories,
- cosmic filaments connecting galaxies.

The Qur'an's lexicon anticipates the idea that the universe is not random, but structured with traversable pathways.

Pathways of Celestial Bodies: Celestial movement follows:

- gravitational corridors,
- orbital resonances,
- interstellar drift along galactic trajectories.

These are literal *subul*-not metaphorical but structural.

Human Use of Cosmic Pathways: Qur'an verse 78:6-12 describes:

- elevated heavens,
- lamps (stars),
- protective layers,
- structured paths.

Humanity's modern space navigation depends on:

- orbital transfer routes,
- gravitational slingshots,
- Lagrange points,
- interplanetary trajectories.

Thus, the Qur'anic *subul* provides theological grounding for spacefaring.

20.14.6 Qur'anic Cosmology and Contemporary Astrophysics: Points of Convergence

Predictability and Mathematical Order: The Qur'an repeatedly emphasises:

- precision (Q. 54:49),
- measure (Q. 65:3),
- determinacy (Q. 87:3).

These attributes align with scientific cosmology, where mathematical laws govern motion and evolution.

Structural Harmony: Modern astrophysics shows:

- orbital resonance,
- gravitational equilibrium,
- cosmic filaments.

The Qur'an's framework describes:

- pathways (Q. 51:7),
- balance (Q. 55:7),
- stability (Q. 67:3-4).

Layered Heavens: Qur'anic references to *"seven heavens"* (Q. 67:3) may reflect:

- multi-layered cosmological scales,
- hierarchical structure of the universe,
- nested layers of cosmic organisation.

20.14.7 Epistemic Implications: Cosmological Order as an Invitation to Scientific Inquiry

The Qur'anic cosmos is a research-enabling universe. The structured order invites:

- observation (*naẓar*)
- inference (*istidlal*)
- reflection (*tafakkur*)
- systemisation (*tadabbur*)

The Qur'an treats the universe as epistemically transparent: knowable, intelligible, structured.

Scientific inquiry becomes:

- a fulfilment of Qur'anic mandate,
- an extension of *khilafah* (vicegerency),
- an act of reading the "book of creation" alongside the Book of Revelation.

Thus, cosmic order is both ontology and methodology.

20.15. Space Sciences in Islamic Intellectual History

20.15.1 The Qur'anic Impulse Behind Scientific Observation

The rise of Islamic civilisation as a global centre of scientific advancement between the eighth and fifteenth centuries cannot be understood apart from the Qur'an's persistent invitation to observe, measure, and contemplate the heavens. Qur'anic cosmology, built upon principles of *mizan* (balance), *taqdir* (proportion), and celestial order, functioned as an epistemic catalyst for the development of sophisticated astronomical sciences. The Qur'anic emphasis on celestial precision-*"The sun and moon follow calculated orbits"* (Q. 55:5), *"He set up the balance so that you do not transgress the measure"* (Q. 55:7-9)-provided intellectual foundations for mathematical astronomy, observational science, and cosmological theorising.

Islamic civilisation inherited no single cosmological system wholesale but synthesised Greek, Persian, Indian, and Syriac astronomical traditions into a unified epistemology grounded in Qur'anic monotheism. This synthesis produced one of history's most advanced scientific cultures, generating star catalogues, observatories, computational innovations, critiques of Ptolemaic astronomy, and conceptual models of the cosmos that anticipated early modern advances. Yet contrary to secular narratives, the driving force behind this scientific flourishing was *not* imitation but hermeneutic integration: a Qur'an-centred cosmological worldview informing empirical inquiry.

This section examines key phases and figures in Islamic space sciences-from early Abbasid translation circles to the observatories of Maragha and Samarkand-and analyses how Qur'anic cosmology shaped scientific motivation, methodological structures, and theoretical horizons.

20.15.2 Early Motivation: Qur'anic Signs and the Rise of Precision Astronomy

Cosmological Verses as Epistemic Entrances: Verses describing celestial order served as epistemic triggers. For example: *"It is He who made the sun a radiant lamp and the moon a reflected light, and determined its phases so that you may know the number of years and calculation."* (Q. 10:5)

This links lunar phases to calculation, implying a mathematical dimension to cosmology. The Qur'an's depiction of celestial bodies as *ayat* (signs) rooted empirical observation in epistemic purpose. Early Muslim astronomers understood astronomical study as a mode of reading a second "book"-the book of creation, whose signs correspond with revelation.

Translation, Transformation, and Integration: Between the eighth and tenth centuries, Islamic intellectual centres (Baghdad, Damascus, Basra, Harran) translated and expanded upon:

- Greek astronomical texts (Ptolemy's *Almagest*),
- Persian observational records,
- Indian trigonometric tables (*Siddhanta* tradition).

However, these sources were not merely adopted but critically reinterpreted. The Qur'anic methodological ethos-observe, reflect, verify- shaped how Muslim scholars assessed inherited cosmological claims.

Where Greek metaphysics conflicted with Qur'anic monotheism, re-interpretation occurred; where mathematical tools could help quantify celestial order, they were incorporated.

20.15.3 The Early Abbasid Period: Foundations of Islamic Astronomy

Al-Khwarizmi and the Mathematical Reformation: Muḥammad ibn Musa al-Khwarizmi (d. 850), drawing inspiration from the Qur'an's insistence on precision, developed:

- algebra (*al-jabr*),
- trigonometric methods,
- astronomical tables (*Zij al-Sindhind*).

His work formalised the mathematical precision implied in verses such as Q. 54:49 *("We created everything with precise measure")*. Al-Khwarizmi's tables helped determine qiblah directions and prayer times, practical applications of celestial knowledge within a Qur'an-informed cosmology.

Al-Farghani and Spherical Astronomy: Aḥmad al-Farghani (Alfraganus) produced *Elements of Astronomy*, synthesising Ptolemaic theory with empirical corrections. His emphasis on spherical geometry parallels Qur'anic references to the Earth's *"wrapping"* of night over day (Q. 39:5). Al-Farghani's calculations of Earth's circumference influenced both Islamic and later European astronomical thought, including Columbus.

20.15.4 The Golden Age: Maragha, Rayy, and the Rise of Observational Science

The Maragha School and the Critique of Ptolemy: The Maragha Observatory (1259 CE), led by Naṣir al-Din al-Ṭūsi, represented the height of Islamic scientific institutionalisation. Motivated not by secular curiosity but by the Qur'an's insistence on *taḥqiq* (verification), Maragha scholars challenged Ptolemaic models that lacked physical coherence.

Al-Ṭusi's "Tusi Couple," converting circular motions into linear oscillations, anticipated Copernican solutions by three centuries. The methodological principle was Qur'anic: truth must be coherent-the cosmos is built in *ḥaqq* (reality, truth), not fiction (Q. 10:5; 21:16).

Ibn al-Shaṭir-The Forgotten Pioneer of Planetary Theory: Ibn al-Shaṭir (d. 1375) developed non-geocentric planetary models, eliminating Ptolemy's equant. His solar model mirrors Copernicus yet predates him. Unlike Greek astronomers, Ibn al-Shaṭir was driven by:

- the Qur'anic insistence on celestial harmony (Q. 67:3-4),
- the need for physically coherent orbits,
- rejection of ad hoc adjustments in cosmic modelling.

20.15.5 Samarkand and the Zenith of Islamic Observatories

Ulugh Beg's Observatory: The Samarkand Observatory (1420s), led by Ulugh Beg, produced star catalogues more accurate than Tycho Brahe's (16th century). Ulugh Beg's *Zij* included:

- arc-minute precision star charts,

- methods for measuring axial tilt,
- calculations of Earth's obliquity.

Ulugh Beg inherited Qur'anic cosmology, which demanded precision (Q. 25:2) and rejected randomness in the heavens.

20.15.6 Cosmological Debate and Theoretical Innovation

Islamic thinkers debated cosmology within a Qur'anic framework:

Al-Farabi: Viewed the cosmos as harmoniously structured, reflecting Qur'anic *mizan*.

Ibn Sina: Proposed metaphysical models of celestial spheres but insisted on rational coherence, echoing Qur'an verse 67:3-4.

Fakhr al-Din al-Razi: Questioned geocentrism and suggested the possibility of multiple worlds (*ʿawalam*) based on Qur'an verse 1:2 *("Lord of the worlds").* Modern cosmologists cite Razi as an early advocate of multiverse discussions (Ovenden, 1993).

Ibn Rushd: Insisted on harmony between philosophical demonstration and Qur'anic cosmology, arguing that the universe reflects divine rationality.

20.15.7 Decline, Fragmentation, and Continuity

Political Decline and Institutional Fragmentation: After the 15th century, political instability (e.g., Mongol invasions, collapse of the Abbasid centre) reduced institutional patronage.

Preservation Through Manuscripts: Despite decline, Islamic astronomical texts influenced:

- Renaissance Europe,
- Byzantine scientific communities,
- Ottoman astronomical reforms.

Ideas such as the Tusi Couple directly influenced Copernican astronomy (Saliba, 2007).

20.15.8 Qur'anic Epistemology as the Underlying Engine of Islamic Space Sciences

Motivational Core: The Universe as Sign: Muslim astronomers viewed the heavens as layers of *ayat*-epistemic indicators pointing toward divine order (Q. 41:53).

Rational and Mathematical Structures: The Qur'an's emphasis on *ḥisab* (calculation) and *ʿilm* (knowledge) created:

- a mathematically oriented scientific culture,
- preference for precision over speculation,
- rejection of cosmological fictions.

Empiricism Rooted in Tawḥid: Belief in divine unity implied cosmic coherence; thus, contradictions within models required correction. This theological principle inspired innovations now recognised as proto-scientific revolutions.

20.15.9 Epistemic Lessons for Contemporary Space Science

Islamic cosmological history provides modern science with three major principles:

The Principle of Epistemic Unity: Revelation, rationality, and empiricism form one cognitive spectrum, not competing authorities.

The Principle of Coherent Cosmology: The cosmos must be:

- intelligible,
- systematic,
- governed by consistent laws.

This aligns with modern physics' assumption of universal symmetry and order.

The Principle of Purposeful Exploration**:** Human engagement with space is not random but part of:

- *khilafah* (vicegerency),
- *ʿibadah* (worship through knowing),
- *amanah* (moral responsibility).

This gives space exploration an ethical orientation and cosmological grounding.

20.16 Time Dilation and Relativistic Readings

20.16.1 Time as a Qur'anic and Cosmological Problem

The Qur'an repeatedly foregrounds time (al-zaman) not as a passive backdrop to creation, but as a dynamic dimension interwoven with the structure of the heavens. Temporal variation, differential duration, and relativity between cosmic frames appear across multiple verses-often expressed through contrasts such as a *"day equal to a thousand years"* (Q. 32:5), or *"a day equal to fifty thousand years"* (Q. 70:4). These statements invite careful hermeneutic attention. They are not metaphors of eternity nor poetic exaggerations; rather, they stand as epistemic openings into a cosmology where time behaves differently under different cosmic conditions.

Modern physics, especially special and general relativity, demonstrates that time is not absolute. It contracts, dilates, and bends according to velocity, mass, gravity, and curvature of spacetime. Surprisingly, the Qur'anic discourse on differentiated days, cosmic ascent, and layered heavens illustrates a worldview where time is experienced differently depending on the ontological frame of reference. This chapter explores such Qur'anic time-relativity through rigorous analysis, comparing Qur'anic cues with contemporary physics without collapsing revelation into scientific reductionism.

Our goal is epistemological: to show how the Qur'an constructs a multi-layered theory of time integral to understanding the cosmos, human existence, eschatology, and cosmic motion.

20.16.2 Time as Created, Not Eternal

Qur'anic Ontology of Created Time: The Qur'an asserts that time emerges through creation. It begins with the act of "decreeing" (*qaḍa'*) and "measuring" (*taqdir*):

- *"He created everything and determined it with precise measurement."* (Q. 54:49)
- *"He regulates the command from heaven to earth."* (Q. 32:5)

Creation is simultaneously the creation of spacetime. Time is not co-eternal with God; rather, it begins with the heavens and the earth:

- *"Indeed, your Lord is Allah who created the heavens and the earth in six periods."* (Q. 7:54)

The "six periods" (*sitta ayyam*) are not 24-hour Earth days, because Earth did not yet exist. Qur'anic "days" during creation are cosmic intervals, not terrestrial rotations. This ontological distinction anticipates modern cosmology, where "time" in the early universe differs fundamentally from the present time.

Time as Measured Through Motion: The Qur'an ties time to celestial motion:

- *"The sun and the moon are by precise calculation."* (Q. 55:5)

In physics, time is defined by periodic motion. Qur'anic cosmology aligns with this: time is not external to matter but emerges from relational motion. This allows for differing temporal rates depending on the scale or environment of motion.

20.16.3 "A Day Equal to a Thousand Years": Relativistic Readings

The Qur'an refers to differentiated durations:

- *"A day with your Lord is like a thousand years of what you count."* (Q. 22:47)
- *"He arranges affairs… then it ascends to Him in a day whose measure is a thousand years of what you count."* (Q. 32:5)

Linguistic and Hermeneutic Analysis: The Qur'an uses explicit comparison: *"mimma taʿuddun"* (of what you count), indicating:

- two different frames of reference,
- two different time metrics,
- a scale difference between human experience and divine/cosmic time.

This is consistent with relativistic statements: time depends on reference frames.

Velocity Time Dilation (Special Relativity): In physics, time slows down for an observer travelling at high velocity. Qur'anic references to angels traversing cosmic distances ("ascending") imply velocities outside human experience. Thus, "a day = 1000 years" may correspond to a relativistic velocity frame.

Gravitational Time Dilation (General Relativity): Einstein demonstrated that clocks run slower in stronger gravitational fields. The Qur'an's mention of layered heavens (*"seven heavens,"* Q. 67:3) suggests cosmic regions with different gravitational densities. Time would differ across these layers. Therefore, Qur'anic differentiated days illustrate a relational ontology of time, aligned with modern physics.

20.16.4 "A Day Equal to Fifty Thousand Years": Eschatological Relativity

Qur'an verse 70:4 states: *"The angels and the Spirit ascend to Him in a day whose measure is fifty thousand years."*

This higher magnitude indicates

- multiple temporal layers within cosmic structure,
- gradients of duration based on cosmic distance or density,
- non-uniform temporal fields across creation.

Eschatological and Cosmological Dual Application: Unlike Qur'an verse 32:5 and 22:47, which describe cosmic processes, Q. 70:4 references eschatological ascent. The Qur'an thus presents two distinct relativistic scales:

Qur'anic Scale	Duration	Context
1 day = 1,000 years	cosmic management (Q. 32:5)	cosmological
1 day = 50,000 years	eschatological ascent (Q. 70:4)	transcendental

This suggests layers of increasing temporal dilation as one moves from the created cosmos toward transcendent presence.

Meta-Temporal Ontology: The Qur'an indicates that human time is not universal. Divine time is not merely "more" time-it is structurally different: *"He is above time but regulates time."* (inferred from Q. 32:5; 55:29) Modern physics echoes this: different observers experience different "rates" of time depending on gravitational and relativistic conditions.

20.16.5 Time Perception in the Afterlife: A Qur'anic Model of Temporal Elasticity

Temporal Compression: *"The Day they see it, it will be as if they had stayed only an evening or its morning."* (Q. 79:46)

Temporal Expansion: *"Their punishment will be doubled."* (Q. 33:30)

These verses indicate that psychological time also differs in the afterlife. Physics distinguishes between:

- physical time (measured by the clock),
- psychological time (perceived).

The Qur'an incorporates both temporal dilation and temporal compression/expansion, which is experiential.

20.16.6 Time and the Speed of Light: "The Angels Travel in a Day…"

Some contemporary scholars (e.g., Bucaille, 1978) attempted to link Qur'anic statements to the speed of light mathematically. While such attempts are often methodologically weak, one consistent epistemic point remains: The Qur'an describes non-human velocities that produce different temporal frameworks.

- Angels traverse cosmic distances *"in a day"* (Q. 70:4).
- Human time cannot measure their motion.

Thus, the Qur'an acknowledges:

- velocity-based time dilation,
- different temporal frames for different entities.

20.16.7 Time in the Heavens vs. Time on Earth

Qur'anic Description of Cosmic Layers: *"He created seven heavens in layers."* (Q. 67:3)

Cosmological layering may imply:

- diverse gravitational densities,
- different curvature of spacetime,
- different rates of temporal flow.

Modern Cosmology-Time Varies Across the Cosmos: Relativity teaches that:

- time flows more slowly near massive objects,
- faster in empty, low-gravity regions.

Qur'anic "seven heavens" may be read epistemologically as zones of differing cosmic behaviour, including temporal behaviour.

"The Day of Gathering" as meta-time: Eschatological "Day" is described as:

- unified and absolute (Q. 40:16),
- collapsing all temporalities,
- transcending cosmic time.

This resembles theories of "block universe" or "meta-time," but Qur'anic metaphysics differs: time is not a fixed geometric block but a created sequence brought to a culmination.

20.16.8 Cyclic Time, Linear Time, and Eschatology

The Qur'an employs:

- cyclical time (day-night cycles, seasons, orbits),
- linear time (history, eschatology),
- transcendent time (divine decree beyond physics).

This triadic model anticipates modern cosmological theories:

Qur'anic Category	Description	Scientific Parallel
Cyclical Time	orbit-based periods	periodic motion, orbital mechanics
Linear Time	historical movement, entropy	arrow of time, thermodynamics
Transcendent Time	divine realm	meta-time, external boundary conditions

Thus, Qur'anic time is multidimensional.

20.16.9 Measurement, Observation, and Time in Qur'anic Epistemology

Time as a Tool for Epistemic Verification: *"So that you may know the number of years and calculation."* (Q. 10:5) Time measurement becomes part of scientific inquiry.

Time as Evidence of Divine Order: *"He subjected the sun and the moon… each running for an appointed term."* (Q. 13:2)

Time Variability as a Sign of Purpose: Temporal differences reflect purposeful design.

20.16.10 Toward a Qur'anic Theory of Relativity: Epistemic Synthesis

Not Scientific Reductionism**:** The Qur'an is not a physics textbook. It provides epistemic orientation, not technical formulas. Qur'anic Time as Relational

- depends on context,
- differs across cosmic realms,
- links directly to motion and gravity,
- incorporates eschatological timelessness.

Human Epistemic Humility-The Qur'an highlights the limits of human temporal perception: *"You know only little."* (Q. 17:85) Modern physics agrees: time is not as it seems.

The Qur'an establishes a cosmology that is not merely descriptive but profoundly epistemic, inviting humanity to investigate the structure, origin, and dynamics of the universe as part of fulfilling the Divine trust of knowledge-seeking. Unlike mythological cosmologies of antiquity, the Qur'anic worldview frames the cosmos (*al-ʿalam*) as an intelligible, law-governed, expanding, and purposeful system -an arena in which signs (*ayat*) are woven into the very fabric of physical reality. This chapter argues that Qur'anic cosmology is not a peripheral theological curiosity; rather, it forms one of the most powerful intellectual foundations for a contemporary Islamic philosophy of space sciences.

From the earliest revelations, the Qur'an draws human attention upward: *"So do they not look toward the heaven above them-how We structured it and adorned it and how it has no rifts?"* (Q. 50:6). The heavens (*al-samawat*) are repeatedly described as both ordered and dynamic, held together by gravitational equilibrium (*mizan*), operating through orbital paths (*falak*, *subul*), and sustained by continuous expansion (Q. 51:47). These Qur'anic motifs collectively form a proto-scientific conceptual framework that aligns with the deepest defining themes of modern astrophysics and cosmology: origin, expansion, structure formation, and cosmic order.

Yet the Qur'an's cosmology is not reducible to scientific description. It embeds cosmic observation within an ethical and theological frame. Human beings are repeatedly commanded to examine the heavens not as detached spectators but as moral agents whose search for knowledge is an aspect of vicegerency (*khilafah*) on earth. In this sense, space research is not a neutral pursuit: it is a form of *amanah*-a trust in which human intelligence and empirical capability must be used responsibly, ethically, and in harmony with the unity of Divine truth (*tawḥid*).

This chapter also emphasises that Qur'anic cosmology offers an alternative epistemic paradigm to the secular scientific worldview. Rather than a fragmented, value-neutral universe governed by blind laws, the Qur'an presents a cosmos that is coherent, purposeful, and intelligible precisely because it is grounded in Divine wisdom (*ḥikmah*). The laws of physics become signs of meaning, not accidents of chaos. Space-time, gravity, cosmic orbits, expansion, and celestial order are thus integrated into a *tawḥidic* epistemology that binds empirical observation to rational reflection and spiritual insight.

Thus, Chapter 20 develops a comprehensive Qur'an-based epistemological framework for exploring space sciences. It demonstrates how Qur'anic ontology, cosmological concepts, and epistemic directives not only anticipate major themes of contemporary astrophysics but also offer a richer, unified foundation for interpreting the universe, one in which scientific discovery and spiritual understanding converge in a single pursuit of truth.