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Shoaib Ahmed Malik
Zayed University

Nazif Muhtaroglu
Istinye University

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HOW MUCH SHOULD OR CAN SCIENCE IMPACT THEOLOGICAL FORMULATIONS? AN ASH'ARĪ PERSPECTIVE ON THEOLOGY OF NATURE

Shoaib Ahmed Malik¹ and Nazif Muhtaroglu²

¹ Zayed University, Dubai, UAE

² Istinye University, Istanbul, Turkey

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ABSTRACT

There have been many developments in the field of science and religion over the past few decades. One such development is referred to as 'theology of nature' (ToN), which is the activity of building or revising theological frameworks in light of contemporary scientific developments, e.g., evolution, chaos theory, and quantum mechanics. Ian Barbour, John Polkinghorne, and Arthur Peacocke, all of whom are Christian thinkers, are the most well-known advocates of this kind of thinking. However, this discourse has not been examined from an Islamic perspective. Given this gap, in this article, we view this strand of thinking from the Ash'arī school of thought that is part of the Sunnī Islamic kalām tradition. We first review how ToN manifests in the works of the thinkers mentioned earlier. Following this, we highlight the essential principles in Ash'arism relevant to God, His interaction with the created world, and science. These are then compared with the ideas of the said thinkers. Two conclusions are reached. First, we demonstrate that atomism, which is generally understood as a long-held position in the Ash'arī tradition, should not be held as a theological position but rather a philosophical or a scientific one. Second, an important distinction is made between science-informed theology (SIT) and contingency-informed theology (CIT). For Ash'arīs, a CIT is sufficient for understanding God, but they would find the SIT displayed in ToN problematic. The motivation and methodology of localising or modifying God's nature or attributes to fit the science of the day would be seen as theologically very costly and a form of scientism.

Keywords: science and religion; theology of nature; natural theology; divine action project; Ash'arism; occasionalism; contingency.

Introduction

The current landscape of science and religion is predominantly Christian-focused. This is due to the historical origins of the field, the subsequent developments, and the fact that most of the interlocutors in the area come from Christian backgrounds.¹ Moreover, all the currently available textbooks in science and religion are written from Christian perspectives (Barbour 1998; Barnes 2010; Morvillo 2010; Sweetman 2010; Southgate 2011; Harris and Pritchard 2017; McGrath 2020). However, while their productive outputs have undoubtedly elevated the discourse of science and religion, their ideas and proposals, though predominant, may not necessarily be shared by occupants of other faiths, given their non-Christian commitments. Muslims, for instance, do not share the theological concern of original sin or Jesus' redemption, two fundamental theological axioms in Christianity (Harris 2013; Malik 2021a). This raises the need for other religious voices in the field of science and religion that are currently marginal or non-existent.

The field of Islam and science is still relatively nascent and lacks an infrastructure, but it is slowly getting traction with steady publications coming out in the last three decades (Nasr 1993; Golshani 1998; Iqbal 2007; Jalajel 2009; Guessoum 2011; Yazicoglu 2013; Bigliardi 2014; Altaie 2016; Koca 2020; Malik 2021a). This article is another attempt at furthering Islamic perspectives on science and religion. It will evaluate a particular development in the broader field of science and religion known as the theology of nature (hereon referred to as ToN) from the perspective of a specific tradition known as Ash'arism, which forms part of Islamic Sunnī orthodoxy. The rationale for focusing on ToN and evaluating it from the standpoint of Ash'arism is explained as follows.

¹ Historically, the field of science and religion started to pick systematic traction in the 1960s. Since then, there have been many thinkers who have contributed to and advanced the field, such as Arthur Peacocke (1971, 1993, 1996, 2001), Christopher Southgate (2008, 2011), Ian Barbour (1966, 1974, 1998, 2001), John Polkinghorne (1989, 2001, 2008, 2011), Nancy Murphy (2006), Philip Clayton (1997, 2001), Russel John Peters (2008), Ted Peters (2003), Wesley Wildman (2009), and many more. These developments eventually led to the establishment of well-known forums and societies that promote dialogues between science and religion. There are also reputable science and religion publication outlets such as *Theology and Science* and *Zygon*, two international journals, and *Routledge's Science and Religion* monograph series. The points of discussion in science and religion are broad. They include areas such as classifications of science and religion, divine action models, quantum mechanics, evolutionary biology, cognitive science of religion, cosmology, design arguments, the relationship between science and ethics, and many more (Russel et al., 1995; Russel et al. 1996; Russel et al. 1999; Russel et al. 1999; Russel et al. 2001; Russel et al. 2005; Clayton and Simpson 2006; Murphy et al. 2007; Russel et al. 2008; Stewart 2010a; Stewart 2010b; Stump and Padgett 2012).

ToN is generally compared and contrasted with natural theology (Southgate 2011, 7). The latter attempts to present arguments for God's existence through reason and empirical findings in the absence of revelation. For instance, scientific discoveries like fine-tuning parameters of the universe have given proponents and critics much to discuss regarding how much they contribute to design arguments. ToN is a different exercise. In this domain, thinkers take the latest scientific developments seriously upon which they develop their theology and, if needed, reformulate doctrinal positions (a more detailed account will be provided shortly). This line of thinking has been predominant in the divine action project (hereon referred to as DAP), a recent movement in which participants, such as the thinkers mentioned earlier, try to construct various divine action models (hereon referred to as DAM) in light of developments in physics and evolutionary biology. The DAP and ToN have had a mixed reception amongst Christian thinkers (Porter 2001; Smedes 2004; Bolger 2012; Fergusson 2018; Ritchie 2019; Laracy 2022; Silva 2022). There has been no attempt to look at it from an Islamic standpoint. Therefore, given that ToN has played a very significant role in recent developments in science and religion, an Islamic evaluation of ToN is warranted.²

The focus on Ash'arism is maintained for several reasons. First, exploring science and religion issues in light of classical schools, like Ash'arism, though they were founded many centuries ago, is a relevant endeavour since these schools have a living continuity right up to the modern period and thus still define religious adherence and, indeed, religious identity, for a large percentage of Muslims today (Gesink 2009; Halverson 2010; Hamid 2011; Bano 2018; Nahouza 2018; Bano 2020). Of course, some artefacts of these theological systems might need updating, which will be discussed in this article. But this is a widely respected doctrinal school that is adopted by Muslims today and taught at some of the leading institutions in the world, e.g., Al-Azhar (Egypt), Zaytuna College (USA), and Cambridge Muslim College (UK). Second, the authors have previously looked into how Ash'arism can be applied to a variety of contexts. These include arguments for God's existence, discussion of divine action, metaethics, quantum mechanics, the biological theory of evolution, and intelligent design (Muhtaroglu 2016; Muhtaroglu 2017a; Malik 2019; Malik 2021a; Malik 2021b; Salim and Malik 2022; Malik et al. 2022). This article, then, is an extension of those works. To be sure, the adoption of Ash'arism in this article should not be taken as a dismissal of other theological perspectives, Sunnī or otherwise. There may very well be

² It should be noted that not all thinkers understand ToN and natural theology in the same way that are defined here, which, as we shall shortly see, are Ian Barbour's definitions. See Runehov (2010).

detailed treatments of other theological evaluations or appropriations of ToN, but this will be left to other researchers to follow up on.

The structure of this article is as follows. First, we shall explain what is understood by ToN and how it came to be an important development in the field of science and religion. This will include looking at three thinkers—Ian Barbour, John Polkinghorne, and Arthur Peacocke—who expressed slightly different formulations of ToNs. The second section will introduce Ash‘arism, through which we will look at several principles that came to be identified with this school of thought. This section distinguishes primary theological tenets from the secondary considerations pertinent to ToN. We then explain why ToN, at least how it is practised by Ian Barbour, John Polkinghorne, and Arthur Peacocke, would be seen as a theologically costly development and a form of scientism from the Ash‘arī point of view.

1. Theology of Nature

Before the twentieth century, the world was primarily seen as a deterministic machine in which entities could be measured and predicted with precision, like clockwork. With the advent of post-Newtonian theories, however, things began to change. Scientific theories like evolutionary biology, quantum mechanics, and chaos theory challenged the clockwork-like conception of the world and suggested that chance or chance-like operations play essential roles in our universe at various *levels*, *domains*, and *degrees* (DeWitt 2010; Southgate 2011). This newly revealed appreciation of chance in creation raised new questions about the nature of the world, the nature of God, and the relationship between the two. Understandings of teleology, providence, free will, and DAMs all became revitalised in light of these developments (Sanders 2002; Russel et al. 2008; Fergusson 2018).

A significant milestone that took these developments to new theological heights is Barbour’s book, *Issues in Science and Religion*, which was published in 1966. In that work, Barbour encourages exploring and building ToN:

Such a theology must take the findings of science into account when it considers the relation of God and man to nature, even though it derives its fundamental ideas elsewhere. (Barbour 1966, 415)

A more precise definition of ToN is more aptly spelt out in a later work:

(...) it starts from a religious tradition based on religious experience and historical revelation. But it holds that some traditional doctrines need to be reformulated in the light of current science (...). If religious beliefs are to be in harmony with scientific knowledge, some adjustments or modifications are called for (...). Theological doctrines must be consistent with the scientific evidence even if they are not required by it. (Barbour 1998, 100-101)

ToN, then, is a very different project from natural theology. The latter uses reason and empirical evidence *to argue for God's existence* (Barbour 1998, 98-100). By contrast, ToN uses reason and empirical evidence *to construct or revise a theology*. Barbour laid the foundations for a mode of thinking that thinkers in the field have adopted and advanced up to the modern period. To see how ToN is manifested in practice, we will look at the ideas of Barbour,³ Polkinghorne,⁴ and Peacocke.⁵ The reasons for focusing on these three scholars are their widespread reputations and voluminous scholarly contributions in the field. Given this point, the following should be treated as summaries and not as exhaustive commentaries.⁶

1.1. Ian Barbour

Barbour adopted and applied the principles of process philosophy, instigated and initially systematised by Alfred North Whitehead and developed theologically by other thinkers such as Charles Hartshorne, both of whom influenced Barbour's ideas (Laracy 2021, 55-72). In this system, *becoming* takes precedence over *being*: "transition and activity are more fundamental than permanence and substance" (Barbour 1998, 285). Accordingly, this perspective stresses the *interactions* of systems; components are intricately related to a web of influences in a broader

³ Ian Barbour was a physicist and later became a theologian. He was a prominent writer and promoter of discussions pertaining to science and religion and is arguably the father of field as we recognise it today. He passed away in 2013. Some of his prominent works include *Issues in Science and Religion* (1966), *Myths, Models and Paradigms* (1974), *Religion in an Age of Science, and Religion and Science: Historical and Contemporary Issues* (1998) and *Nature, Human Nature, and God* (2002).

⁴ Polkinghorne was a physicist before he turned to theology and eventually became an Anglican priest. He recently passed away in 2021. He left behind a huge corpus, with 26 titles in the field of science and religion, including *Science and Providence* (1989), *Belief in God in an Age of Science* (1998), *Faith, Science and Understanding* (2001), *Theology in the Context of Science* (2008), and *Science and Religion in Quest of Truth* (2011).

⁵ Peacocke was a biochemist before he was ordained as a deacon and priest. He passed away in 2006 and, like the preceding authors, left behind several publications, including *Science and the Christian Experiment* (1971), *Theology for a Scientific Age: Being and Becoming—Natural, Human and Divine* (1993), *From DNA to DEAN: Reflections and Explorations of a Priest-Scientist* (1996), and *Paths from Science Towards God: The End of All Our Exploring* (2001), to name a few.

⁶ For the intrigued reader, further details can be found in the extended literature (Peacocke 1996; Smedes 2004; Laracy 2021).

whole. Furthermore, *events* are understood as things in of themselves rather than as meeting points of interactions. Collectively, these points reinforce the idea that becoming is ontologically more foundational than being (Barbour 1998, 285).

Concerning theology, Barbour (1998, 294) sees God as an entity which *experiences* time with the flux of the universe. This has consequences for how Barbour sees God's omnipotence and omniscience. God's knowledge is open to change as events occur. Similarly, God cannot determine the outcome of events but instead achieves His intents through persuasion:

This is a God of persuasion rather than coercion (...). Process theologians stress God's *immanence* and participation in the world, but they do not give up *transcendence*. God is said to be temporal in being affected by interaction with the world but eternal and unchanging in character and purpose. Classical ideas of omnipresence and omniscience are retained, but not even God can know a future which is still open. (Barbour 2002, 34)

All this is upheld to allow dynamic reciprocity between the divine and creation:

For process theologians, God is not an omnipotent ruler but the leader and inspirer of an interdependent community of beings. John Cobb and David Griffin speak of God as 'creative responsive love', which affects the world but is also affected by it. God's relation to human beings is used as a model for God's relation to all beings. (Barbour 2002, 34)

For Barbour, process theology aligns much better with contemporary developments in science, like quantum mechanics and evolution, as they stress dynamicity and continuous change. The indeterministic features of these scientific developments offer possible loci through which God's persuasions can percolate through creation without violating any of the physical laws (Barbour 1998, 281-322). While acknowledging the potential problems between process philosophy and traditional Christian theism, Barbour believes that Christian theology and theologians should be open to entertaining pluralistic metaphysical paradigms: "Christianity cannot be identified with any metaphysical system. The theologian must adapt, not adopt, a metaphysics" (1998, 325). In other words, a ToN does not have to be absolute; it could be provisional and open new horizons for science and religion.

1.2. John Polkinghorne

Polkinghorne ended up adopting a kenotic interpretation of God. Kenosis refers to some form of self-limitation of God, which, in the case of Polkinghorne, is a limitation of God's omnipotence and omniscience. This is a voluntary self-constraint. The motivation behind this is divine love: "The world created by the God of love and faithfulness may be expected to be characterised both by the openness of chance and the regularity of necessity" (Polkinghorne 1988, 52). The openness is indicated by indeterministic theories like quantum mechanics, chaos theory, and evolution, while the necessity is about laws of nature (Smedes 2004, 64). To be sure, however, this does not entail that creation is *absolutely* independent of God. Instead, he believed that creation has *relative* independence.

Concerning God's omnipotence, Polkinghorne maintained that God is absolutely free and could do anything He so wills. However, God must act according to His nature, which entails that He does not act irrationally. This has implications for how God acts in creation:

The faithful one must show reliability in his relationship with his world. He will not be an arbitrary intervener in its processes, but they will have about them a consistency which reflects his character. On this view, the laws of nature are signs of God's fidelity. (Polkinghorne 1988, 51)

In other words, Polkinghorne does not see an intervening God reflecting a rational God. To explain miracles, Polkinghorne resorts to indeterministic features of the universe wherein God has room to affect creation without violating scientific laws of nature. For Polkinghorne, quantum mechanics, chaos theory, and the human mind offer these opportunities.

Divine love also explains Polkinghorne's stance on God's omniscience. Since creation is unfolding independently, God does not know the full details of the future (Polkinghorne 2001, 104). God may have some idea about future possibilities, but which will materialise along with the finer details is unknown. Accordingly, while God is eternal, He also has a temporal pole, as God "(...) has truly embraced the experience of time" (Polkinghorne 2001, 103).

1.3. Arthur Peacocke

Peacocke's ideas are very close to Polkinghorne's. Like Polkinghorne, Peacocke believes that God is potentially omniscient and omnipotent unless He voluntarily wills a limitation upon Himself (Smedes 2004, 111-112). Also, like Polkinghorne, Peacocke believes that God limits Himself to let creation be and evolve due to divine love (Peacocke 2001, 59). With this in mind, Peacocke sees domains like quantum mechanics as revealing ontological and irreducible indeterminacy in creation, such that even God does not know what will occur (Peacocke 2001, 102). Moreover, God does not arbitrarily meddle or intervene with the affairs of the world, as this would contradict His rational nature and jeopardise a scientific world:

A God who intervenes could only be regarded, by all who adopt a scientific perspective on the world, as being a kind of semi-magical arbitrary Great Fixer or occasional Meddler in the divinely created, natural and historical networks of causes and effects. (Peacocke 2001, 45)

Up to this point, Peacocke is identical to Polkinghorne. However, what distinguishes him from Polkinghorne is his DAM. Peacocke (2001, 57) was sure to stress that his DAM is *panentheism* as opposed to *pantheism*. The latter states that God and the created world are one, i.e., there is no ontological distinction between them. By contrast, panentheism asserts that God intersects or interpenetrates with every part of the created world but also extends beyond it. In other words, the universe is part of God but isn't the entirety of God.⁷

Peacocke's adoption of panentheism is interwoven with how he sees the ontological fabric of creation, which is influenced by self-organising systems (Smedes 2004, 122). He sees it as layers of hierarchy with increasing ontological complexity, so higher levels are not reducible to lower levels. Moreover, higher levels can influence lower levels through whole-part causation, or what he sometimes refers to as 'downwards' or 'top-down causation'. In other words, he adopts an emergent philosophy. This is how God, who is ontologically in unison but also beyond creation in the pantheistic outlook, can influence creation. For Peacocke, God can create an information flow in a top-down fashion through the causal networks developed in this framework. To be sure, this does not sidestep the laws of nature, but rather uses the hierarchal organisation where God's

⁷ Laracy (2021, 214-218) claims that Barbour also adopted panentheism, but it is implicit in his works.

intent can trickle its way down through the myriad of causal systems (Peacock 2001, 109).

1.4. Summary

From this brief review, it should be evident that all three thinkers considered science a very important part of their theological constructions. This influenced two aspects of their thinking. First, they believed that scientific developments warrant reconsiderations of God's nature and attributes, which leads them to reject or move away from the traditional understanding of the Christian God (Smedes 2004; Laracy 2021). Second, all of them viewed indeterministic scientific theories or interpretations thereof as essential loci for God being able to influence creation. Indeterministic theories are seen this way because God can act in or through creation without violating the laws of nature or science, as they believe a God who intervenes in his creation goes against his nature. With this made apparent, we can now turn to Ash'arism.

2. Ash'arī Principles

There have been many kinds of theological currents in Islamic thought. One distinctive strand is the tradition known as *kalām*.⁸ Mu'tazilism was the first systematic school in this intellectual current that was eventually superseded by others. One of them was Ash'arism and came to be recognised as one of three doctrinal schools under Sunnī orthodoxy (Winter 2008; Jackson 2009; Schmidtke 2014).⁹ The initial ideas of Ash'arīs were laid down by Abū al-Ḥasan al-Ash'arī (d. 936) in the formative period of Islam and since then developed into a fully-fledged doctrinal school that gained prominence in Islamic history.¹⁰

Several theoretical positions can be identified with this particular school. However, relevant to ToN are the following four principles (that are summarised in Figure 1):

⁸ Practitioners of this field are referred to as *mutakallim* in the singular form and *mutakallimūn* in the plural form.

⁹ The other two are the Māturīdī and Atharī schools of thoughts.

¹⁰ Other pivotal thinkers in the history of the school include Abū Bakr al-Bāqillānī (d. 1013), al-Juwaynī (d. 1085), Abū Ḥāmid al-Ghazālī (d. 1111), and Fakhr al-Dīn al-Rāzī (d. 1210), to name a few.

1. *God is an eternal and necessary being*—everything other than God is (radically) contingent, while God Himself is an eternal and necessary being¹¹ and He
 - a. Has a will (*irāda*)—God is a volitional agent as opposed to a non-volitional being.
 - b. *Is omniscient* (*‘ilm*)—God’s knowledge has no bounds, and God knows everything that has occurred, is occurring, and could occur in all the finest level of details, all truths that are necessary or contingent and what is impossible.
 - c. *Is omnipotent* (*qudra*)—God’s power is the ground for the existence and sustaining of all contingent creations. His scope of power is defined by what is logically or metaphysically possible.¹²
2. *Occasionalism*—this is the DAM that characterises the type of creative link between God and the world and how God interacts with the created world, which includes the belief in *creatio ex nihilo*.
3. *Contingency*—the created world is radically contingent and can be configured by God as He so wishes.
4. *Atomism*—the ontological fabric of creation is based on an atomistic conception of the world.

Proponents of the Ash‘arī school divide all that exists into what is necessary and contingent. God is the sole necessary being (*wājib al-wujūd*), while everything else is radically contingent (*imkān al-wujūd*). The Ash‘arīs understand the contingency of the world to mean that the world and its constituents are temporally generated (*ḥādith*)—meaning the world and its parts each have a temporal beginning to their existence. Given that all of creation’s constituents are contingent, they must be

¹¹ Early Ash‘arīs described God to be eternal, meaning that God is uncaused. In time, they extended the meaning of being eternal. Al-Baqillānī asserted that whatever is eternal will be impossible of non-existence. Al-Juwaynī noticed that the impossibility of non-existence implies the necessity of existence and remarked that the eternal is that whose existence is necessary. Al-Ghazālī explicitly stated that what is eternal is a necessary being (*wājib al-wujūd*). For more details, see Wisnovsky (2004, 90-95).

¹² For Ash‘arīs, God creates through His attribute of power, which is directed by His will and acts by His knowledge. These divine attributes are not regarded as identical to the divine essence. So, Ash‘arīs reject the idea of divine simplicity. They consider these attributes among the entitative attributes (*ṣifāt ma‘nawīyya*) and to be additional to the divine essence but not separable from it. Likewise, the mainstream Sunnī *mutakallimūn* held that divine attributes are neither identical with God’s essence nor distinct in that they exist outside God.

grounded in a necessary being.¹³ Furthermore, God is a volitional being who can choose to create whatever He so wishes, i.e., He can choose otherwise. For this reason, Ash'arīs reject the idea of a necessary creation. They defend this view of divine will against Muslim Peripatetics, who believed that creation emanated necessarily. It is why Ash'arīs consider the stance of Muslim Peripatetics to be one of a non-volitional God.¹⁴ The Ash'arīs also stress that God is omniscient, as His knowledge knows no bounds. Furthermore, Ash'arīs strongly advocated for his omnipotence. They believed that God's will is not curtailed by any moral or physical necessities and is only governed by some eternal norms, as expressed in metaphysical or logical truths.¹⁵ In other words, God can create everything that is metaphysically or logically possible, but His power does not apply to metaphysical or logical impossibilities. In this kind of framework, God can create worlds that are totally chaotic with no laws at all and worlds with different laws from ours. He can equally create worlds that do not look designed and are more straightforward than ours or even more complex than our world. Furthermore, God can even alter natural regularities in our current world to create momentary local events. Accordingly, Ash'arīs have no problem with accepting miracles as genuine possibilities in the actual world. God could very well split the sea before Moses, turn his staff into a snake, and split the moon. Moreover, Ash'arīs believe in an occasionalist DAM in which God is the sole efficient cause of all phenomena. No created being can have ontological autonomy outside or beyond God's power. Using animations as an analogy, God wills each moment to define every detail from one timeframe to another (Jackson 2009; Koca 2020; Malik 2021a, 177-264).

¹³ It should be noted that the idea of contingency used by the Ash'arīs is primarily linked to temporality in the pre-Ghazalian period. Something is contingent because it has come into existence. Yet later some Ash'arīs assumed for the sake of the arguing for the existence of God eternal beings or infinite totalities of objects could be contingent. That assumption is made just to show that God's existence is provable even in this scenario. It does not mean that they accepted the eternity of the world. They continued to criticise the Muslim Peripatetics' view of the world as eternal and contingent.

¹⁴ To look further into this debate, see Al-Ghazālī (2002) and Ruffus and McGinnis (2015).

¹⁵ Logical truths are truths simply governed by the principle of non-contradiction. Metaphysical truths concern the basic categories of reality. For instance, that a body like a pot could not turn into an accident like blackness is a metaphysical truth.

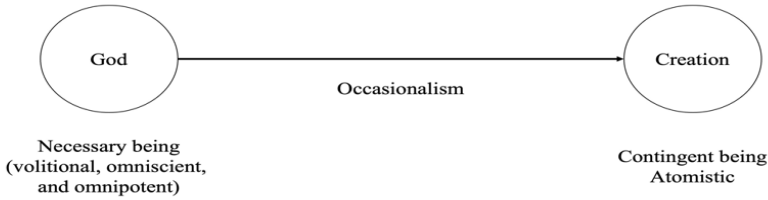


Figure 1 – Schematic outline of the Ash‘arī school relevant to ToN.

Finally, the Ash‘arīs are famously known for their commitment to atomism. In their view, everything is made up of atoms (*al-jawhar al-fard*) and accidents (*‘arad*). Atoms are indivisible, self-subsisting, space-occupying (*mutahayyiz*) units that cannot be divided any further (*al-juz‘ alladhī lā yatajazzā*), while accidents are properties that adhere to atoms. These properties include colour, taste, odour, life, and death. Accidents cannot exist on their own, and they need a locus to manifest themselves, which is why they subsist in atoms. In effect, atoms are small-scale, unextended indivisible scaffolds. When atoms aggregate into various combinations, they form a body (*jism*).¹⁶ This forms the basic ontology of creation upon which everything else is built in Ash‘arism (al-Juwaynī 2000; al-Ghazālī 2013; Salim and Malik, 2021).

We feel it is necessary to probe further into why atomism was and perhaps still is held as an important principle in the Ash‘arī school, which is discussed as a historical detour in the next section. This is done for two specific purposes. First, to show how the listed principles interplayed with one another in the development of Ash‘arism. Second, to better appreciate how far Ash‘arism could engage with ToN.

2.1. Atomism

Abū al-Ḥasan al-Ash‘arī was formerly a member of the Mu‘tazilī school of *kalām*. He found some of the Mu‘tazilī theses problematic and eventually left the school of thought. Through his pioneering efforts, he became the founder of Ash‘arism, which historically became one of the main schools of *kalām* within the Sunnī orthodoxy (Fakhry 2004, 210).

¹⁶ The Ash‘arīs classify four types of coming to be (*akwān*), which are in themselves accidents. These include (1) movement, for example, rotational or translational; (2) rest, where an entity remains in the same position for two or more moments of time; (3) combination or aggregation of atoms or bodies; and (4) separation of atoms and bodies.

Nevertheless, al-Ash'arī retained some ideas from his Mu'tazilī background. Atomism is one of these ideas, though he modified it appropriately. Al-Ash'arī thought that everything in the universe is constituted of homogenous indivisible particles that are always found with some accidents (Ibn Fūrak 1987, 204). Accidents inhere in substrates such as atoms or bodies and cannot exist alone without substrates. All accidents exist momentarily and perish in the next moment of their existence. Thus, accidents must be created continuously over time (Ibn Fūrak 1987, 237-238). This atomist ontology enabled al-Ash'arī to express some basic tenets of the Sunnī creed effectively. God's continuous and direct control over the universe is in line with occasionalism and divine omnipotence. Since atoms are homogenous, they can be differentiated only by accidents. God can choose whatever accident to bestow on any atom or body at any time. This feature of contingency enabled the Ash'arīs to explain the possibility of miracles easily.¹⁷

Since Ash'arī atomism postulates a finite number of indivisible particles, this ontology is consistent with the idea of a finite universe that is coherent with considering God to be the only infinite being. Apart from these advantages, al-Ash'arī (1953) thought that some Qur'ānic verses imply atomism. For example, he quoted from the Qur'ān (36:12): "(...) And We have counted all things in a clear registry".¹⁸ Using this verse, he argued that counting what has no limit is impossible. Thus, if a single thing can be divided *ad infinitum*, then its parts cannot be counted

In short, this atomist ontology plays a crucial role in expressing al-Ash'arī's theological ideas effectively. Furthermore, to him, atomism is theologically binding because he believed it follows from the Qur'ān. Thus, al-Ash'arī saw atomism as a theologically significant doctrine. However, al-Ash'arī did not suggest using atomist metaphysics to argue for the existence of God for the common public. In one work, he stresses that appealing to atomist metaphysics would complicate arguments for God more than necessary (al-Ash'arī 1928, 89). Arguments relying on atomism would include premises such as that accidents exist, that they cannot exist by themselves, that they are different from atoms, that they must inhere in atoms, that they have different types, and that they cannot be infinite. One should not expect everybody to understand them and respond to many objections that may come from those who do not accept these premises (al-Ash'arī 1928, 89). Thus, al-Ash'arī claimed that Prophet

¹⁷ Although God follows a habit of creating accidents with regularity, He can also develop accidents that do not fit any regularities. Such extraordinary cases exemplify miraculous events, as in the example of Abraham, who was not affected by the fire. For an overview of al-Ash'arī's atomism, see Muhtaroglu (2017b, 6-7).

¹⁸ The English translation of the verse is from Nasr et al. (2015, 1072-3).

Muḥammad would disapprove of using such complicated arguments for everybody (al-Ash‘arī 1928, 90). Instead, he thought that Prophet Muḥammad used a simpler argument for the existence of God. Roughly speaking, a proper argument would show the existence of a unique cause (*muḥdith*) of all the beings that have a beginning (*ḥādith*). The order and purpose observed in finite beings enable one to ascribe infinite wisdom (*ḥikma*) and mercy (*rahma*) to this causal agent (al-Ash‘arī 1928, 81-84).

However, we see that atomist ontology appears in the arguments of some later Ash‘arīs for the existence of God. For instance, al-Juwaynī (2000, 11) appealed to atoms and accidents in formulating an argument for the temporal origination of the world.¹⁹ Furthermore, al-Juwaynī considered atomism to be essential to the Islamic creed. He stated that rejecting the idea of dividing matter *ad infinitum* is one of the essential pillars of religion because, if it is permitted, the creation of the universe out of nothing, i.e., *ex nihilo*, cannot be shown. Al-Juwaynī’s argument for the temporal origination of the universe depends on the idea that temporal beings are limited. According to al-Juwaynī, the number of temporal beings that actually exist cannot be infinite. Yet, if atomism is rejected, it would imply that temporal beings are not limited. If a physical object could be divided *ad infinitum*, it would mean that temporal beings are not limited (al-Juwaynī 1969, 147-148). Al-Juwaynī makes this point by criticising the view of Ibrāhīm al-Nazzām (d. 835), a Mu‘tazilī thinker, who held the view that matter could be divided *ad infinitum* (Bulgen 2021, 83). Al-Juwaynī considered al-Nazzām’s position to be an attempt to ruin the essential pillars of religion (al-Juwaynī 1969, 143).²⁰

A rational argument for atomism widespread among the Ash‘arīs appeals to the difference between a mustard seed and a bigger object such as an elephant or a mountain. Both kinds of objects have finite limitations; one kind typically has a bigger size than the other. If they can be divided *ad infinitum* without stopping at a certain point, i.e., *kalāmīc* atom, both kinds

¹⁹ For an analysis of al-Juwaynī’s argument for the temporal origination of the world, see Davidson (1987, 142-143). Al-Juwaynī’s appeal to atomism in the context of arguing for the existence of God may seem contrary to what al-Ash‘arī suggested. Although al-Ash‘arī emphasises providing simple arguments for the existence of God, he does not necessarily deny the possibility of complicated arguments. Such complex arguments could be used in the scholarly context. In *A Vindication of the Science of Kalām (Risāla fī Istiḥsān al-Khawḍ fī ‘Ilm al-Kalām)*, al-Ash‘arī (1953) criticises those who reject talking about issues such as motion and rest, atom and leap just because the Prophet and his companions did not talk about them. Al-Ash‘arī notes that the Prophet did not say, “do not inquire about those issues”. In addition, he says that the basic principles of some intricate issues discussed in *kalām* are found in the Qur’ān. It is in this context that he derives atomism from the Qur’ān (36:12). See Al-Ash‘arī (1953, 121-127).

²⁰ Ibn Fūrak reports that al-Ash‘arī considered those rejecting atomism on the same side with the infidels (*malāhida*) in respect of denying the finitude of particles. Yet, according to this report, al-Ash‘arī does not claim explicitly that they are infidels (Ibn Fūrak 1987, 202).

of objects would have infinite parts. This is regarded as logically absurd because a mustard seed and a mountain cannot have the same number of constituents as they are obviously different in size (al-Bāqillānī 1957, 17-18).

From this brief review, we can identify three main reasons why the Ash'arīs favoured atomism. First, there is an argument that derives atomism from the Qur'ān. Second, atomism is considered to be essential to affirming the temporal origination of the world, thus to creation *ex nihilo*. Third, atomism is presented as the solution to explain the difference between various sizes of objects in the created world.

The history of *kalāmīc* atomism cannot be considered complete without looking at the criticisms of atomism by the eminent Muslim Peripatetic known as Ibn Sīnā (d. 1037) and the subsequent developments in the Ash'arī school. Ibn Sīnā penned very detailed criticisms against atomism.²¹ One particular point apparent in some of his arguments is quite relevant to the cogency of the reasons cited above on behalf of atomism. Ibn Sīnā's point appeals to the distinction between *potential* infinity and *actual* infinity. Potential infinity is not a real infinity. It refers to a process that continues without an end, like counting one by one without stopping. Yet, this process never reaches a definite point called 'infinity' or 'an infinite totality'. Each stage of this process is finite. On the other hand, actual infinity refers to a complete infinite totality, which is a genuine collection of infinitely many elements. Ibn Sīnā considers dividing matter as a process that could go on *ad infinitum*. Thus, dividing physical objects this way does not imply that there are actually infinite parts inherent in these objects. The process of division *ad infinitum* is only potentially infinite and thus does not entail accepting real infinite totalities (Ibn Sīnā 2009, 304-305).

Given the crucial distinction between potential infinity and actual infinity, all the reasons stated by the Ash'arīs for atomism lose their cogency. First, let us reconsider the reference to the Qur'ān (36:12). Al-Ash'arī thought that it is impossible to number what has no limit. The parts of any object cannot be counted if they can be divided *ad infinitum*. In this argument, al-Ash'arī may be criticised for confusing an object's actual parts with potential parts. God knows the number of all actual parts, which is a finite number. And for each possible division, God also knows the number of the actual parts concerning that division. But it does not make sense to ask

²¹ For a more detailed study on Ibn Sīnā's criticism of atomism and its impact on *kalām*, see Dhanani (2015). For a general study of various criticisms of atomism in Islamic intellectual history, see Bulgen (2021).

about the number of particles for the dividing process *ad infinitum* because it is a never-ending process. At each stage of this process, there is always a finite number of particles.

Second, arguments that appeal to atomism may be regarded as one way to establish the existence of God but not the only way. As seen earlier, even al-Ash'arī suggested using simpler arguments for God's existence, especially for common people. In addition, the *mutakallimūn* after al-Ghazālī had also relied on the argument from contingency that does not appeal to creation *ex nihilo* to argue for the existence of God.²² This does not mean that they denied creation *ex nihilo*. In both pre-Ghazālīan and post-Ghazālīan periods, Ash'arīs upheld the doctrine of creation *ex nihilo* but defended it with various types of arguments, some of which rely on the contingency argument. Furthermore, al-Juwaynī's worry about the limited number of temporal beings could be addressed by the distinction between potential infinity and actual infinity. Divisibility *ad infinitum* does not imply the existence of an infinite number of parts. So, rejecting atomism does not require one to admit an infinite number of temporal beings. Yet, as we will see, some *mutakallimūn* considered atomism more coherent and convenient with their belief that the whole universe is finite in all its respects.

Third, the difference between the various sizes of physical objects could be explained without appealing to atomism. That a mustard seed or a mountain could be divided *ad infinitum* does not imply that either actually has infinitely many parts. Division is a process. Objects will have a finite number of particles at each stage of this process. Given this, one does not have to accept that objects actually have an infinite number of parts. If so, there is no need to accept that a mustard seed and a mountain are equal in size. In short, one does not have to accept that finite objects include actual infinities if atomism is denied.

After Ibn Sīnā's criticisms, we encounter diverse attitudes in the emphasis on atomism within the Ash'arī school. Al-Ghazālī (1997), for instance, harshly criticises some of Ibn Sīnā's ideas. But nowhere in this book does he consider atomism a significant issue that deserves a proper discussion. In his *Moderation of Belief (al-Iqtisād fī al-I'tiqād)*, a defining treatise of Ash'arī *kalām*, he explicitly states that the created universe is made of

²² See al-Jurjānī (2015, Volume 3, 14-28). We also need to note that there are arguments for the temporal origination of the world suggested by those who even deny atomism. See al-Kindī (1974).

atoms accompanied with accidents (al-Ghazālī 2013, 27). Yet, he does not seem to give much importance to this idea in presenting his theses and arguments.²³

In the later periods of Ash'arī *kalām*, we see explicit suspicions about atomism. For instance, after carefully analysing arguments for and against atomism, Sayf al-Dīn al-Āmidī (d. 1233) explicitly states the need to suspend judgment on the issue of atomism (al-Āmidī 2002, Volume 3, 73; see also Hassan 2020, 166-167). Qādī al-Baydāwī (d. 1286), however, tries to find a middle way for atomism. After reviewing arguments for and against atomism, he concludes that bodies could be divided *ad infinitum* in mind but not in actuality (al-Baydāwī 2014, 131). Thus, there must be particles that cannot be actually divided further. With this position, we see that he recognised the strength of the objection that claims the potential divisibility of bodies *ad infinitum* yet tried to avoid it by distinguishing between conceptual and actual divisibility. Fakhr al-Dīn al-Rāzī (d. 1210) also pays serious attention to atomism. In various works, he presents lengthy arguments for and against atomism. During various phases of his life, he seems to have held different positions on the epistemic strength of atomism, with some of his works indicating that he eventually held a position of theological non-commitment (*tawaqquf*).²⁴

²³ Laura Hassan (2020, 166-167) also observes this reading: "His [al-Ghazālī's] discussions (...) show that he is far more interested in the metaphysics of the process of causation, given its theological implications, rather than in the formation and constitution of the physical world per se. In al-Ghazālī's thought, we see a radical reduction in the attention given to questions of physical theory, as compared with classical Ash'arism. Al-Ghazālī does not hold physical theory to have much place within theological discussions, nor in the refutation of views which he considers heretical. Neither is he interested in physical theory as a separate field of inquiry. This makes sense against the background of theological pragmatism—al-Ghazālī is interested in protecting the belief of ordinary folk by providing evidence for theological doctrine, which is simple and convincing. For al-Ghazālī, natural philosophy is not an end unto itself, and the theologian should focus on matters which strictly serve the cause of defending sound doctrine."

²⁴ The scholarship on this also varies. Considering the complete oeuvre within the whole lifetime of al-Rāzī, Eşref Altaş (2015, 95-96) suggests the following changes in al-Rāzī's views of atomism. In his earlier works, such as his *The Pointers in Kalām (al-Ishāra fī al-'Ilm al-Kalām)*, al-Rāzī accepts atomism and uses it to argue for bodily resurrection. In a later work *Eastern Studies in Metaphysics and Physics (Mabāhith al-Mashriqiyya fī 'ilm al-Ilāhiyyāt wa-l-Tabi'iyyāt)*, in which he explores Ibn Sīnā's philosophy, he criticises both atomism and the hylomorphism. In his middle-period works such as *Compendium on Philosophy and Logic (al-Mulakhkhaş fī al-Manţiq wa-l-Hikma)*, *The Mind's Attainment in Understanding Legal Principles (Nihāya al-'Uqūl fī Dirāya al-Uşūl)*, and his *Commentary on Ibn Sīnā's Remarks and Admonitions (Sharḥ al-Ishārāt wa-l-Tanbīhāt)* al-Rāzī again presents arguments for and against atomism. But in this period, al-Rāzī suspends judgement on the truth of atomism. In *Nihāya al-'Uqūl fī Dirāya al-Uşūl*, he says: "Since we also preferred this *tawaqquf* [theological non-commitment] way, we do not consider it necessary to respond to the philosophers' arguments" (al-Rāzī 2015, Volume 4, 19). In the works that he wrote during the second half of his life, such as *The Indivisible Atom (al-Jawhar al-Fard)*, *Forty Principles of Theology (al-Arba'in fī Uşūl al-Dīn)*, and his *Commentary on Ibn Sīnā's Elements of Philosophy (Sharḥ 'Uyūn al-Hikma)*, among

After reviewing some arguments for atomism, Sa‘d al-Dīn al-Taftāzānī (d. 1390) considered these arguments weak. He also stated that al-Rāzī suspended judgement on this issue because of the weakness of these arguments (Al-Taftāzānī 1950, 32). Yet, al-Taftāzānī does not suspend judgment on atomism even though he considers the arguments for it weak. On the contrary, he clearly accepts atomism for what are likely pragmatic reasons:

If the question is raised whether there is any benefit resulting from this position which is different [from that of the Philosophers], we reply that there is. In establishing the pure atoms, we escape many of the obscurities of the Philosophers, such as the positing of primary matter (*hayūlī*) and form (*ṣūra*), which leads to the eternity of the World, the denial of the resurrection of the body, and many of the fundamental laws of measurement (*al-handasa*), upon which obscurities rests the continual motion of the heavenly spheres; and also the denial of the rending (*al-kharq*) of them and their coalescence together again (*al-ilti‘ām*). (al-Taftāzānī 1950, 32)

If one accepts Ash‘arī atomism, one can easily accept the possibility of demolishing the order on the earth and heaven and re-establishing a new order in the afterlife. There is no necessary connection between atoms. God can create them in various ways and even could choose not to sustain them anymore. So, the orthodox teachings of Islam, such as creation *ex nihilo*, afterlife, and bodily resurrection, fit in more coherently with the atomist ontology developed by the Ash‘arīs. The Muslim Peripatetics’ teachings of the eternal universe, the fixed and necessary order of the universe, and the unchangeable motion of heavenly spheres could be rejected altogether

others, al-Rāzī accepts and defends atomism. In one of his last works, *The Sublime Goals of Metaphysics (al-Maṭālib al-‘Āliya min al-‘Ilm al-Ilāhī)*, he states that atomism conflicts with the geometry of continuous magnitudes. Yet, he holds that arguments for atomism are strong enough to refute such a geometry. He thinks accepting continuous magnitudes is only presumptive and has no strong epistemic justification and considers the philosophical arguments against atomism to be akin to a spider web (al-Rāzī 1987, Volume 6, 195). In saying this, al-Rāzī has the geometrical arguments in mind, which rely upon accepting continuous magnitudes. Yet, accepting continuous magnitudes is only presumptive and has no strong epistemic justification (al-Rāzī 1987, volume 6, 195). Setia (2006) also argues that al-Rāzī criticised hylomorphism and defended atomism in his early works. Setia (2006) considers al-Rāzī to be an “articulate, erudite and effective defender of atomism” in his mature work, *al-Maṭālib al-‘Āliya min al-‘Ilm al-Ilāhī*. By contrast, Ayman Shihadeh discovered and published a booklet titled *A Treatise on the Censures of the Pleasures of this World (Risāla Dhamm Ladhdhāt al-Dumyā)* of al-Rāzī. Shihadeh (2006, 11) thinks this is the last work of al-Rāzī. Interestingly, in this work, al-Rāzī reaffirms the position of *tawaqquf*. He considers the arguments for and against atomism equally strong and suspends judgement on the truth of atomism (Shihadeh 2006, 255). For a more recent survey, see Ibrahim (2020).

with this atomist ontology. Thus, al-Taftāzānī considered this theoretical advantage of atomism and accepted it for this reason.

In his *Stations in Kalām (al-Mawāqif fī ‘Ilm al-Kalām)*, ‘Aḍūd al-Dīn al-Ījī (d. 1355) presented several arguments for atomism along with some criticisms and ended the discussion by saying that “there is a hidden satisfaction in these arguments” (al-Jurjānī 2015, volume 2, 787). In his gloss on this passage, al-Sayyid al-Sharīf al-Jurjānī (d. 1413) admitted that the arguments for atomism could be responded to dialectically but affirmed al-Ījī’s final decision by saying that they suggest a hidden persuasion and satisfaction for anyone who wants to be fair (al-Jurjānī 2015, volume 2, 787). However, some later commentaries on this passage in *al-Mawāqif fī ‘Ilm al-Kalām* seem to present a radically different view. Hasan Chalabi Fanārī (d. 1486) and Muḥammad al-Siyalqūtī (d. 1657), for instance, claim that the arguments for atomism do not even deliver minimal rational opinion (*ẓann*), let alone persuasion or satisfaction (Fanārī and al-Siyalqūtī 1998, Volume 7, 21). The view of Hasan Chalabi and Siyalqūtī seem to be in conflict with those of al-Ījī and al-Jurjānī. Yet, one way to resolve this conflict may be to appeal to al-Taftāzānī’s emphasis on the pragmatic value of atomism. Atomism may be considered an epistemically weak position to defend, but its value lies in its pragmatic deliverances. Accepting this theory solves many problems for the orthodox creed of Islam. Thus, its perfect coherence with the orthodox creed provides a strong pragmatic reason for choosing atomism over alternative theories. What al-Ījī and al-Jurjānī meant by “hidden persuasion or satisfaction” might be just this pragmatic justification. If we go by this interpretation, we can say that, with al-Taftāzānī onwards, most of the *mutakallimūn* came to agree that atomism is not epistemically justified well but must be affirmed on pragmatic grounds.

In the modern period, especially in the nineteenth century, when Muslims started to engage with European ideas, we see attempts to relate Ash‘arī atomism with modern science. Ali Sedad (d. 1900), an Ottoman scholar, argued that modern science, especially thermodynamics and the chemical atomic theory, come very close to Ash‘arī atomism and supports it more than the hylomorphic model of the Muslim Peripatetics like Ibn Sīnā (Muhtaroglu 2016). Yet, Sedad does not forget to draw attention to the following point. Although Ash‘arī atomism is supported by modern science, the fundamentals of the Islamic creed could also be expressed within various types of ontologies. One should not see atomism to be essential to the creed:

It is necessary to notice that the ideas of the *mutakallimūn* are not based only upon atomism. On the one hand, they altogether accepted atomism to reject the ideas of the Muslim Peripatetics categorically. Thus, the *mutakallimūn* were able to eliminate all the details of the Hellenic doctrines without dealing with them separately. On the other hand, the *mutakallimūn* took the propositions of the Muslim Peripatetics for granted to show their logical conclusions and use them against the Muslim Peripatetics. In conclusion, the *mutakallimūn* demonstrated that no weapon could be derived against the manifest religion conveyed by the famous prophet, whatever philosophical school is to be followed. (Sedad 1882, 186)

Ali Sedad's point is that the *mutakallimūn*, via atomism, were able to eliminate several of the Hellenic doctrines without dealing with them separately is telling. Probably, while having al-Taftāzānī in mind, he adopted the pragmatic value of atomism. Yet, Ali Sedad also noted that atomism is not essential to the foundations of *kalām*.²⁵ If atomism is challenged or refuted, the fundamental foundations are not shaken. Nonetheless, he saw great value in atomism, as it cohered nicely with the modern sciences of nineteenth-century Europe.

2.2. Summary

Our assessment shows that the first three listed principles are primary tenets of the Ash'arī system. Given the simultaneous stress on God's absolute power and creation's complete dependency on God in this framework, we believe that compromising on any of them will radically change its internal coherency. Accordingly, Ash'arism will not remain internally coherent if any one of these principles and their interdependencies are revised. These principles, then, are invariable and insensitive to scientific developments. In other words, these doctrines are not open to reformulation in light of scientific developments.

²⁵ The following quote clarifies this: "No progress or change in scientific theories can challenge the foundations of *kalām*. For many years current science has approached the truth as a result of painstaking diligence. The ideas of prime matter, form, abstract substances and intellects are now outdated. Hopefully, these ideas will be completely eliminated one day as sciences progress much more. A *mutakallim* doesn't need to rely upon a single school of philosophy to justify his essential theses. Thus, changes and alterations in philosophical ideas do not affect the essential truths defended by the *mutakallimūn*" (Sedad 1882, 186-187).

By contrast, given the stress on creation's radical contingency, Ash'arism has the internal flexibility to keep the exact nature of physical ontology, atomistic or otherwise, an open variable based on our earlier discussions and observations, i.e., *tawaqquf*. These include: (1) the indifferent or tentative attitudes shown towards atomism by some of the representative scholars; (2) the acceptance of it pragmatically for some, which entails the possibility of abandoning it pragmatically; and (3) the lack of clear scriptural basis.²⁶ Accordingly, atomism should be best understood as a philosophical or a scientific claim, not a theological one.²⁷ So even if atomism turns out to be false, it will not have any bearing on the theological system. In case we are misunderstood, we are not saying that atomism is false; atomism could be a valid position in modern science or philosophy, but it is one possible physical ontology out of several other possibilities. An Ash'arī could adopt or develop an atomistic or a non-atomistic framework.²⁸ Both positions would be legitimate within the context of

²⁶ The distinction between the context of *discovery* and the context of *justification* is essential here. Certain Qur'ānic verses might have inspired the authors and thinkers we reviewed earlier in formulating atomism, but those verses do not necessarily prove atomism (context of *justification*); instead, they seem to inspire atomistic thought (context of *discovery*). Al-Ash'arī himself may have believed that the verse in discussion implied atomism, which could be understood as a context of justification. However, later scholars understood that the implication was not valid.

²⁷ By this mean we that atomism should not be seen as a creedal matter.

²⁸ Consider string theory, multiverses, quantum mechanics, general relativity, quantum chromodynamics, and atomism. Every one of these theories is compatible with the primary tenets of Ash'arism. Given that contingency is the main emphasis of Ash'arī theology of any created thing, the properties of contingent creations can occupy a variety of different settings no matter their scientific novelty, e.g., block time, hyper-dimensional space, determinate and indeterminate structures, and local and non-local causality, among others. For this reason, we believe that physical ontology should be left as an open variable in the Ash'arī framework, as it offers the attractive benefit of absorbing and integrating with any scientific theory. It could be countered that atomism may still have a role to play in light of modern science. Quantum mechanics, for instance, suggests that the universe may be fundamentally discrete, closely aligning with atomism in Ash'arī thought (Bulgen 2021). While it is possible to correlate some modern developments with atomism, we argue that this is a potentially slippery slope if done definitively. Consider Nancy Cartwright (2005), who has insightfully pointed out that we might be living in a 'dappled world.' In her view, our scientific theories are undoubtedly our best attempts to understand natural phenomena, but they are inevitably localised to specific domains. Quantum mechanics is one of the best scientific theories of our *microscopic* world. However, it radically conflicts with general relativity, a theory about the *celestial* world, leading to very different metaphysical conclusions (Monton 2011, 143). On the interpretation of time, for instance, quantum mechanics regards the flow of time to be universal and absolute. At the same time, general relativity leads to a malleable and relative interpretation, two contradictory interpretations. It is why physicists are trying to find a more fundamental theory that connects quantum mechanics with general relativity. Accordingly, adopting a localised body of physics for theological or metaphysical construction or adoption may not be in the best interest, given the (apparent) contradiction and the potential tentativeness of such approaches (Monton 2011). Moreover, a scientific theory may have multiple interpretations. As it stands, quantum mechanics has several indeterministic and deterministic interpretations, each of which has its metaphysical extensions (Myrvold 2022). The question that may be asked, then, which interpretation should be the theological position? We believe such philosophical and scientific nuances and disagreements are best left to the philosophers and scientists who want to argue for their respective positions. For an Ash'arī, these considerations do not have any theological

Ash‘arism's doctrine of the world’s radical contingency. In effect, we are claiming that atomism is not the only legitimate perspective in the Ash‘arī view, or at least should not be seen as such on theological grounds.²⁹

3. Ash‘arism and Theology of Nature

The preceding sections should indicate that the proposals of Barbour, Polkinghorne, and Peacocke (hereinafter referred to as BPP) are at fundamental odds with what we identify as the primary tenets of Ash‘arī theology. The dividing line seems to be how much evidential weight is given to science. For BPP and others who adopt a similar approach, scientific theories are taken very seriously in their theological projects. BPP take indeterministic theories such as quantum mechanics, chaos theory, and evolution as important loci and use them to argue for potential ‘spaces’ within which God has room to act. This is done so that God’s involvement with the affairs of creation is maintained while simultaneously preserving scientific narratives.³⁰ This has serious ramifications for the kind of God and DAM that are entertained in their proposals, which have received sharp criticisms from other Christian thinkers. By entertaining process theology (Barbour), kenotic conceptions of God (Polkinghorne) and pantheism (Peacocke), their proposals become radically different from classical theism held in Christianity. Accordingly, critics believe that all three, while daring and commended for their approaches, make for a very

bearing. As long as a scientific theory is not committed to *philosophical naturalism*, which no scientific theory should be, as this is a metaphysical position and not a scientific one, and scriptural concerns are not violated, which are to be judged on a case-by-case basis, Ash‘arī theology theologians can embrace a wide variety of scientific theories along with their nuances (Malik 2021a). Raising a particular scientific theory or interpretation of a scientific theory to a theological status can be dangerous, particularly if there is no theological necessity. In short, we believe that *tawāqquf* on the physical nature of the universe offers the beneficial advantage of not over-committing to any one theory, which then leaves the theologians, philosophers, and scientists to their respective enterprises.

²⁹ Bulgen (2021, 951) thoroughly investigates the classical *kalām* works and observes that they made an essential distinction between major matters of *kalām* (*jalīl al-kalām*) and subtle or obscure matters of *kalām* (*daqīq al-kalām* or *laṭīf al-kalām*) wherein “issues pertaining to Islam’s fundamentals, such as God’s essence and His attributes, prophethood, afterlife, and revelation, are termed *jalīl al-kalām*; matters related to epistemology, ontology, physics, and cosmology are named *daqīq al-kalām* or *laṭīf al-kalām*”. He observes that *daqīq al-kalām* is “not directly a component of faith principles and counted as subsidiary” and “it does not lead to sectarian divisions” (Bulgen 2021, 951). We believe our first three principles would fall under *jalīl al-kalām* while atomism is a discussion under *daqīq al-kalām*, which it indeed was. Therefore, while we maintain the stance of *tawāqquf* on physical ontology, atomism could still very well play ongoing investigations in *daqīq al-kalām*. For a modern example of this kind of investigation, see Altaie (2016).

³⁰ It is possible to interpret their viewpoint (BPP’s) as one in which scientific narratives point to metaphysical realities, not merely physical accounts. Accordingly, if something is indeterministic on the physical level, then it must be so on the metaphysical level for science to be genuinely a reflection of the world.

limited God, and seem to be scientific (manifesting scientism) in their approaches (Smedes 2004; Laracy 2021).

By contrast, Ash'arism starts with contingency, with the scientific considerations understood as secondary points of consideration. However, this did not stop the majority of the Ash'arī thinkers from exploring and committing themselves to atomism. This physical ontology was historically shaped by the philosophical challenges of their day. We have argued that atomism should not be taken or seen as a theological position and Ash'arism should instead adopt a position of *tawaqquf* on physical ontology. If contingency is understood as the starting principle, any scientific theory can be compatible with the primary principles. This 'thin' approach to theology is better for theology, science, and their practitioners.

Subsequently, and in line with the critical appraisals, the approaches adopted by BPP would be seen as forms of religious scientism, where religious discourse is filtered and validated through science. This is most clearly seen when BPP localise God's activity to potential gaps in nature. BPP's understanding of God undermines the first three principles of Ash'arism. God is active in the world's affairs all the time and can easily work through, with, and against scientific regularities if He willed it that way. It is why both science and miracles are possible within an Ash'arī framework. At the same time, while Ash'arī theology does have a (positive) place for science, it is not necessarily the starting point for theological foundations. Furthermore, God's omnipotence and omniscience are lost in the approaches taken up by BPP and would be considered a radical break for Ash'arīs. For these reasons, Ash'arīs would see the approaches of BPP as theologically too costly and manifestations of scientism (Malik 2021a, 179-211).

In short, and as a clearer way of demarcating between the two, the approach taken by BPP represents a *science*-informed theology (SIT), while Ash'arism is better understood as a *contingency*-informed theology (CIT). These differences make for distinctive approaches and conclusions. From the lens of Ash'arism, SIT is theologically costly, as it defines God based on tentative foundations. A CIT provides appreciable space for theology and science without them intruding into each other's spaces, which we believe is healthier for both domains and their practitioners.

Conclusion

In this article, ToN was evaluated through the lens of Ash‘arī theology. To this end, BPP's thoughts were reviewed, and two main conclusions were reached. First, BPP uses science to reformulate God, which moves them away from traditional understandings of orthodox Christianity. Second, they rely on indeterministic loci for God to be able to influence the world without violating the laws of nature or science. Subsequently, the principles of Ash‘arism were reviewed, and it was argued that they are insensitive to scientific developments and thus would remain intact. However, if Ash‘arism did engage in a ToN, atomism could and should be reconsidered. Since atomism does not strictly have any scriptural backing, and not all Ash‘arīs view it as a very sturdy position, it need not be held so rigidly. Furthermore, with modern science and philosophy engaging with and entertaining several possible ontologies, many if not all of which could be embraced under the primary three principles, atomism may not have any significant standing in the contemporary period. Accordingly, we believe atomism should be abandoned as a theological foundation and should be seen more so as a philosophical or scientific position. In other words, we argue that a position of *tawaqquf* should be maintained for physical ontology in Ash‘arīsm. Finally, the approaches and ideas adopted by BPP would be seen as too radical for Ash‘arī theology. The biggest contention that Ash‘arīs would have with BPP's approaches is the primacy they give to science. Ash‘arism is a CIT, not an SIT, which BPP adopt, leading to the radical differences between the two.

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REFERENCES

- Al-Ash‘arī, Abū al-Hasan. 1953. *Risāla fi Istihsān al-Khawḍ Khawḍ fi ‘Ilm al-Kalām*. In *The Theology of al-Ash‘arī*, edited by Richard J. McCarthy. Beyrouth: Imprimerie Catholique.

- Al-Ash'arī, Abū al-Hasan. 1928. *Risāla ilā al-Ṭagr bi-Bāb al-Abwāb*, Published by Kıvameddin Burslan with an Introduction, *Darulfunun İlahiyat Fakultesi Mecmuası*, 8: 50-108.
- Al-Āmidī, Alī ibn Abī 'Alī. 2002. *Abkār al-Afkār fī Uṣūl al-Dīn*. Edited by Aḥmad al-Mahdī. 5 Volumes. Cairo: Dār al-Kutub wa-l-Wathā'iq al-Qawmīya.
- Al-Bāqillānī. 1957. *Kitāb al-Tamhīd*. Edited by R. McCarthy. Beirut.
- Al-Bayzāwī. 2014. *Tawālī al-Anwār min Matāli al-Anzār. (Kelam Metafizigi)* [Turkish-Arabic Parallel Text]. Edited and translated by İlyas Çelebi & Mahmut Çınar. Istanbul: Türkiye Yazma Eserler Kurumu.
- Al-Ghazālī. 2002. *The Incoherence of the Philosophers (Tahāfut al-Falāsifa)*. A parallel English-Arabic text, edited and translated by Michael Marmura. Utah: Brigham Young University Press.
- . 2013. *Al-Ghazālī's Moderation in Belief (Al-Iqtisād fī al-I'tiqād)*. Translated by Aladdin M. Yaqub. Chicago: University of Chicago Press.
- Al-Juwaynī. 1969. *Al-Shāmil fī Uṣūl al-Dīn*. Edited by Ali Sāmi al-Neshshār & Suhayr Muhammed Muhtār-Faisal Bedir Avn. Alexandria: Munshāt al-Maārif.
- . 2000. *A Guide to Conclusive Proofs for the Principles of Belief (Kitāb al-Irshād ilā Qawāṭi' al-Dilla fī Uṣūl al-I'tiqād)*. Translated by Paul E. Walker. Reading: Garnet Publishing.
- Al-Jurjānī, Al-Sayyid al-Sharīf. 2015. *Sharḥ al-Mawāqif. (Mevâkif Şerhi)*. [Turkish Arabic Parallel Text]. Edited and translated by Ömer Türker. 3 Volumes. Istanbul: Türkiye Yazma Eserler Kurumu.
- Al-Kindī. 1974. *Al-Kindī's Metaphysics/On the First Philosophy (fī al-Falsafah al-Ulā)*. Translated by Alfred Ivry with Introduction and Commentary. Albany: State University of New York.
- Al-Rāzī. 1987. *Al-Maṭālib al-'Āliya min al-'Ilm al-Ilāhī*. Edited by Ahmad Hijāzī al-Saqa. 9 Volumes. Beirut: Dār al-Kitāb al-'Arabī.
- . 2015. *Nihāya al-'Uqūl fī Dirāya al-Uṣūl*. Edited by Sa'īd Fūdah. 5 Volumes. Beirut: Dār al-Dhakhā'ir.
- Al-Taftāzānī, Sa'd al-Dīn. 1950. *A Commentary on the Creed of Islam*. Translated by E. E. Elder. New York: Columbia University Press.
- Ali Sedad. 1882. *Kavāidu't-Taḥavvūlāt fī Ḥarekāti'z-Zerrāt*. Istanbul: Matbaa-i Osmāniye.
- Altaş, Eşref. 2015. "An Analysis and Editio Princeps of Fakhr al-Dīn al-Razī's Risalah: *Al-Jawhar al-Fard*". *Nazariyat Journal for the History of Islamic Philosophy and Sciences* 1 (3): 77-178.

- Altaie, Basil. 2016. *God, Nature, and the Cause: Essays on Islam and Science*. Abu Dhabi: Kalam Research and Media.
- Barbour, Ian. 1966. *Issues in Science and Religion*. New Jersey: Prentice-Hall, Inc.
- . 1974. *Myths, Models and Paradigms*. New York: Harper and Row.
- . 1998. *Religion and Science: Historical and Contemporary Issues*. New York: SCM Press.
- . 2001. *Nature, Human Nature, and God*. Minneapolis: Fortress Press.
- Bano, Masooda, ed. 2018. *Modern Islamic Authority and Social Change—Volume 2: Evolving Debates in the West*. Edinburgh: Edinburgh University Press.
- Bano, Masooda. 2020. *The Revival of Islamic Rationalism: Logic, Metaphysics, and Mysticism in Modern Muslim Societies*. Cambridge: Cambridge University Press.
- Barnes, Michael Horace. 2010. *Understanding Religion and Science: Introducing the Debate*. London: Continuum.
- Bigliardi, Stefano. 2014. *Islam and the Quest for Modern Science: Conversations with Adnan Oktar, Mehdi Golshani, Mohammed Basil Altaie, Zaghoul El-Naggar, Bruno Guiderdoni and Nidhal Guessoum*. Istanbul: Svenska Forskningsinstitutet.
- Bolger, Robert. 2012. *Kneeling at the Altar of Science: The Mistaken Path of Contemporary Religious Scientism*. Oregon: Wipf and Stock Publishers.
- Bulgen, Mehmet. 2021a. *Klasik İslam Düşüncesinde Atomculuk Eleştirileri*. 3rd edition. Istanbul: Marmara Üniversitesi İlahiyat Fakültesi Yayınları.
- . 2021b. “Science and Philosophy in The Classical Period of *Kalām*: An Analysis Centered upon The *Daqīq* and *Laṭīf* Matters of *Kalām*”. *Kader* 19 (3): 938-967.
- Cartwright, Nancy. 2005. *The Dappled World: A Study of The Boundaries of Science*. Cambridge: Cambridge University Press.
- Clayton, Philip. 1997. *God and Contemporary Science*. Michigan: Wm. B. Eerdmans Publishing.
- . 2000. *The Problem of God in Modern Thought*. Michigan: Wm. B. Eerdmans Publishing.
- Clayton, Philip, and Zachary Simpson, eds. 2006. *The Oxford Handbook of Religion and Science*. Oxford: Oxford University Press.
- DeWitt, Richard. 2010. *Worldviews: An Introduction to the History and Philosophy of Science*. West Sussex: Wiley-Blackwell.

- Dhanani, Alnoor. 2015. "The Impact of Ibn Sīna's Critique of Atomism on Subsequent Kalam Discussions of Atomism". *Arabic Sciences and Philosophy* 25 (01): 79-104.
- Fakhry, Majid. 2004. *A History of Islamic Philosophy*. New York: Columbia University Press.
- Fanārī, Hasan Chalabi, and Muḥammad al-Siyalqūtī. 1998. *Sharḥ al-Mawāqif* of al-Jurjānī. Edited by Mahmood Umar al-Dimyāti. 8 Volumes. Beirut: Dār al-Kutub al-'Ilmiyya.
- Fergusson, David. 2018. *The Providence of God: A Polyphonic Approach*. Cambridge: Cambridge University Press.
- Gesink, Indira. 2009. *Islamic Reform and Conservatism: Al-Azhar and the Evolution of Modern Sunnī Islam*. London: I.B. Tauris.
- Golshani, Mehdi. 1998. *From Physics to Metaphysics*. Tehran: Institute for Humanities and Cultural Studies.
- Guessoum, Nidhal. 2011. *Islam's Quantum Question: Reconciling Muslim Tradition and Modern Science*. London: I.B. Tauris.
- Haag, James W., Gregory R. Peterson, and Michael L. Spezio, eds. *The Routledge Companion to Religion and Science*. Abingdon: Routledge.
- Halverson, Jeffrey R. 2010. *Theology and Creed in Sunnī Islam: The Muslim Brotherhood, Ash'arism, and Political Sunnism*. New York, NY: Palgrave Macmillan.
- Hamid, Sadek. 2011. *Sufis, Salafis and Islamists: The Contested Ground of British Islamic Activism*. London: I.B. Tauris.
- Harris, Mark. 2013. *The Nature of Creation: Examining the Bible and Science*. Abingdon: Routledge.
- Harris, Mark, and Duncan Pritchard, eds. 2017. *Philosophy, Science and Religion for Everyone*. Abingdon: Routledge.
- Hassan, Laura. 2020. *Ash'arism Encounters Avicennism: Sayf al-Dīn al-Āmidī on Creation*. Piscataway: Gorgias Press.
- Ibn Fūrak. 1987. *Mujarrad Maqālāt al-Ash'arī*. Edited by Daniel Gimaret. Beyrouth: Dar el-Machreq Editeurs Sarl.
- Ibn Sīnā. 2009. *The Physics of the Healing (Al-Shifā: Al-Samā al-Tabī'ī)*. A parallel English-Arabic text, edited and translated by Jon McGinnis. Utah: Brigham Young University Press.
- Ibrahim, Bilal. 2020. "Beyond Atoms and Accidents: Fakhr al-Dīn al-Rāzī and the New Ontology of Postclassical Kalām". *Oriens* 48: 67-122.
- Iqbal, Muzaffar. 2007. *Science and Islam*. London: Greenwood Press.
- Jackson, Sherman. 2009. *Islam and the Problem of Black Suffering*. Oxford: Oxford University Press.

- Jalajel, David Solomon. 2009. *Islam and Biological Evolution: Exploring Classical Sources and Methodologies*. Cape Town: University of the Western Cape.
- Koca, Özgür. 2020. *Islam, Causality, and Freedom: From the Medieval to the Modern Era*. Cambridge: Cambridge University Press.
- Laracy, Joseph R. 2022. *Theology and Science in the Thought of Ian Barbour: A Thomistic Evaluation for the Catholic Doctrine of Creation*. New York: Peter Lang.
- Malik, Shoaib A. 2019. “God, Information and the World: The Metaphysics of William Dembski and Al-Ghazālī”. *Philosophy* 94 (4): 547-576.
- . 2021a. *Islam and Evolution: Al-Ghazālī and the Modern Evolutionary Paradigm*. Abingdon: Routledge.
- . 2021b. “Al-Ghazālī’s Divine Command Theory: Biting the Bullet”. *Journal of Religious Ethics* 49 (3): 546-576.
- Malik, Shoaib A., Hamza Karamali, and Moamer Yahia Ali Khalayleh. 2022. “Does Criticizing Intelligent Design (ID) Undermine Design Discourse in the Qur’ān? A Kalāmīc Response”. *Zygon* 57 (2): 490-513.
- McGrath, Alistair. 2020. *Science and Religion: A New Introduction*. West Sussex: Wiley-Blackwell.
- Ruffus, Anthony, and Jon McGinnis. 2015. “Willful Understanding: Avicenna’s Philosophy of Action and Theory of the Will”. *Archiv für Geschichte der Philosophie* 97(2): 160-195.
- Monton, Bradley. 2011. “Prolegomena to Any Future Physics-Based Metaphysics”. In *Oxford Studies in Philosophy of Religion*, edited by Jonathan L. Kvanvig, Vol. 3, 142–165. Oxford: Oxford University Press.
- Morvillo, Nancy. 2010. *Science and Religion: Understanding the Issues*. West Sussex: Wiley-Blackwell.
- Muhtaroglu, Nazif. 2016. “Al-Baqillānī’s Cosmological Argument from Agency”. *Arabic Sciences and Philosophy* 26 (2): 271-289.
- , ed. 2017a. *Occasionalism Revisited: New Essays from the Islamic and Western Traditions*. Abu Dhabi: Kalam Research and Media.
- . 2017b. “Al-Māturīdī’s View of Causality”. In *Occasionalism Revisited: New Essays from the Islamic and Western Traditions*, edited by Nazif Muhtaroglu, 3-22. Abu Dhabi: Kalam Research and Media.
- Murphy, Nancey. 2006. *Bodies and Souls, or Spirited Bodies?* Cambridge: Cambridge University Press.
- Murphy, Nancey, Robert John Russell, and William R. Stoeger S. J., eds. 2007. *Physics and Cosmology: Scientific Perspectives on the*

- Problem of Natural Evil*. Indiana: Vatican Observatory and the Centre for Theology and the Natural Sciences.
- Myrvold, Wayne. 2022. "Philosophical Issues in Quantum Theory". *The Stanford Encyclopedia of Philosophy*. Accessed on the 29th of March.
<https://plato.stanford.edu/archives/sum2022/entries/qt-issues/>
- Nahouza, Namira. 2018. *Wahhabism and the Rise of the New Salafists: Theology, Power and Sunnī Islam*. London: I.B. Taurus.
- Nasr, Seyyed Hossein. 1993. *The Need for a Sacred Science*. New York: State University of New York Press.
- Nasr, Seyyid Hossein, Caner Daglı, Maria Massi Dakake, Joseph E. B. Lumbard, and Mohammed Rustom, eds. 2015. *The Study Qur'ān*. New York: HarperCollins Publishers.
- Peacocke, Arthur R. 1971. *Science and the Christian Experiment*. Oxford: Oxford University Press.
- . 1993. *Theology for a Scientific Age: Being and Becoming—Natural, Human and Divine*. Minneapolis: Fortress Press.
- . 1996. *From DNA to Dean: Reflections and Explorations of a Priest-scientist*. Norwich: Canterbury Press.
- . 2001. *Paths From Science Towards God: The End of all Our Exploring*. New York: Oneworld Publications.
- Peters, Ted. 2003. *Science, Theology, and Ethics*. Abingdon: Routledge.
- Polkinghorne, John. 1988. *Science and Creation: The Search for Understanding*. London: SPCK.
- . 1989. *Science and Providence: God's Interaction with the World*. Boston: Shambhala.
- . 1996. *Belief in God in an Age of Science*. Yale: Yale University Press.
- . 2001. *Faith, Science and Understanding*. Yale: Yale University Press.
- . 2011. *Science and Religion in Quest of Truth*. Yale: Yale University Press.
- Porter, Andrew P. 2001. *By the Waters of Naturalism: Theology Perplexed Among the Sciences*. Oregon: Wipf and Stock Publishers.
- Ritchie, Sarah Lane. 2019. *Divine Action and the Human Mind*. Cambridge: Cambridge University Press.
- Runehov, Anne L.C. 2010. "Natural Theology or Theology of Nature and the Natural?" In *The Human Project in Science and Religion*, edited by Anne L.C. Runehov, Niels Henrik Gregersen, and Jacob Wolf, 39-52. Copenhagen: The Copenhagen University Network of Science and Religion.

- Russel, Robert John. 2008. *Cosmology: From Alpha to Omega—The Creative Mutual Interaction of Theology and Science*. Minnesota: Fortress Press.
- Russel, Robert John, Nancey Murphy, and Arthur R. Peacocke, eds. 1995. *Chaos and Complexity: Scientific Perspectives on Divine Action*. Indiana: Vatican Observatory and the Centre for Theology and the Natural Sciences.
- Russel, Robert John, Nancey Murphy, and C. J. Isham, eds. 1996. *Quantum Cosmology and the Laws of Nature: Scientific Perspectives on Divine Action*. Indiana: Vatican Observatory and the Centre for Theology and the Natural Sciences.
- Russel, Robert John, William R. Stoeger S. J., and Francisco J. Ayala. 1998. *Evolutionary and Molecular Biology: Scientific Perspectives on Divine Action*. Indiana: Vatican Observatory and the Centre for Theology and the Natural Sciences.
- Russel, Robert John, Nancey Murphy, Theo C. Meyering, and Michael A. Arbib, eds. 1999. *Neuroscience and the Person: Scientific Perspectives on Divine Action*. Indiana: Vatican Observatory and the Centre for Theology and the Natural Sciences.
- Russel, Robert John, Philip Clayton, Kirk Wegter-McNelly, and John Polkinghorne, eds. 2001. *Quantum Cosmology and the Laws of Nature: Scientific Perspectives on Divine Action*. Indiana: Vatican Observatory and the Centre for Theology and the Natural Sciences.
- Russel, Robert John, William R. Stoeger S. J., and George V. Coyne S. J., eds. 2005. *Physics, Philosophy, and Theology: A Common Quest for Understanding*. Indiana: Vatican Observatory and the Centre for Theology and the Natural Sciences.
- Russel, Robert John, Nancey Murphy, and William R. Stoeger S. J., eds. 2008. *Scientific Perspectives on Divine Action: Twenty Years of Challenge and Progress*. Indiana: Vatican Observatory and the Centre for Theology and the Natural Sciences.
- Salim, Emil, and Shoab A. Malik. 2022. “*Creatio Continua* and Quantum Randomness”. In *Abrahamic Reflections on Randomness and Providence*, edited by Kelly James Clark and Jeffrey Koperski, 243-264. Cham: Palgrave Macmillan.
- Saunders, Nicholas. 2002. *Divine Action and Modern Science*. Cambridge: Cambridge University Press.
- Setia, Adī. 2006. “Atomism versus Hylomorphism in the Kalām of Al-Fakhr al-Dīn al-Rāzī: A Preliminary Survey of *Al-Matālib al-‘Āliyyāh*”. *Islam & Science* 4 (2): 113-140.
- Shihadeh, Ayman. 2006. *The Teleological Ethics of Fakhr al-Dīn al-Rāzī*. Leiden: Brill.

- Smedes, Taede A. 2004. *Chaos, Complexity, and God: Divine Action and Scientism*. Leuven: Peeters.
- Silva, Ignacio. 2022. *Providence and Science in a World of Contingency: Thomas Aquinas' Metaphysics of Divine Action*. Abingdon: Routledge.
- Southgate, Christopher. 2008. *The Groaning of Creation: God, Evolution, and the Problem of Evil*. Louisville: Westminster John Knox Press.
- , ed. 2011. *God, Humanity and the Cosmos: A Textbook in Science and Religion*. London: T&T Clark.
- Stewart, Melville Y, ed. 2010a. *Science and Religion in Dialogue: Volume One*. West Sussex: Wiley-Blackwell.
- . 2010b, ed. *Science and Religion in Dialogue: Volume Two*. West Sussex: Wiley-Blackwell.
- Stump, J. B., and Alan G. Padgett, eds. 2012. *The Blackwell Companion to Science and Religion*. West Sussex: Wiley-Blackwell.
- Sweetman, Brendan. 2010. *Religion and Science: An Introduction*. London: Continuum.
- Wildman, Wesley. 2009. *Science and Religious Anthropology: A Spiritually Evocative Naturalist Interpretation of Human Life*. Surrey: Ashgate.
- Wisnovsky, Robert. 2004. "One Aspect of the Avicennian Turn in Sunnī Theology". *Arabic Sciences and Philosophy* 14 (1): 65-100.
- Yazicioglu, Isra. 2013. *Understanding the Qur'ānic Miracle Stories in the Modern Age*. Pennsylvania: Penn State University Press.

