

## Chapter 5

# Time in Islamic Kalām

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### 1. Introduction

In Arabic “kalām” means speech (or a collection of words).<sup>1</sup> However, it also means “dialogue” or “discourse,” and this is the meaning which was intended for Islamic *kalām*. In its philosophical content, *kalām* is a collection of concepts, assumptions, principles and problems that attempt to explain the relationship between God and the physical world following the basics of the Islamic creed.

*Kalām* was classified into *Jaleel al-Kalām* and *Daqīq al-Kalām*. The former is the part dealing with problems related to the divine attributes, the resurrection of the dead, and questions related to the divine knowledge, will, and power. On the other hand, *Daqīq al-Kalām* deals with problems of natural philosophy, most prominent of which is the question of the temporality or eternity of the world and the question of causality. This led to discussions of the concepts of space, time, motion and many other aspects of the physical world. Using Ian Barbour’s terminology,<sup>2</sup> *Jaleel al-Kalām* may be called “natural theology,” whereas *Daqīq al-Kalām* is the “theology of nature.”

Despite the fact that the subject of *kalām* has been largely ignored, I feel that *Daqīq al-Kalām* has much to offer for philosophical and scientific interest, particularly to contemporary philosophy of physics.<sup>3</sup> Indeed, “The

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<sup>1</sup> This chapter is a revised version of the original version which was presented in a conference about Einstein, God and Time held at Ian Ramsey Center of Oxford University, 12–15 September 2005.

<sup>2</sup> Ian G. Barbour, *Religion and Science* (London: SCM Press, 1998), 100.

<sup>3</sup> Mohammed B. Altaie, “Daqīq al-Kalām: The Islamic Approach to the Philosophy of Nature,” paper presented at the Institute of Arabic and Islamic Studies, University of Exeter, January 2005. Also see Alnoor Dhanani, *The Physical Theory of Kalām: Atoms, Space, and Time in Basrian Mu’tazili Cosmology* (Leiden: Brill, 1994); Alnoor Dhanani, “Problems in Eleventh Century *Kalām* Physics,” paper delivered at the Conference

*Kalām* Cosmological Argument” devised by William Craig<sup>4</sup> is just one contemporary example in a whole field of ideas, concepts, and arguments that can be utilized by the modern philosophy of science. However, the subject is in such a state now that it cannot lend itself to an effective role without being purified, reformulated and harmonized with modern philosophy. A great deal of painstaking work needs to be done in order to qualify *Daqīq al-Kalām* for a contemporary role. Much of the contemporary debates about the existence of God and the philosophical implications of a universe that has a beginning in time<sup>5</sup> were subject matter of hot discussions among the *mutakallimūn* during the eight–eleventh centuries. Sometimes one can spot similarities between the old arguments of the *mutakallimūn* and contemporary arguments advanced by opponents and proponents of God’s existence.

The aim of this limited study is to expose some of the original thoughts of Muslims, namely the *mutakallimūn*, about the notion of time in the hope that it may provoke more detailed and fully accounted studies.

## 2. The Two Main Schools of *Kalām*

*Mutakallimūn* formed two main schools, the *Mu’tazilites* who were the first to be formed, and the *Ash’arites*. The main pioneers of the *Mu’tazilites* were Wasil Ibn Atta’ (d. 748), Amr Ibn ‘Ubaed (d. 762), Abul-Huthail al-Allaf (d. 841), Ibrahim al-Nazzām (d. 835), and al-Jahīz (d. 868). Later generations of *Mu’tazilites* include Abu Al-Hussein Al-Khayyāṭ (d. 912) and Abu al-Kāssim al-Balkhī (sometimes called al-Kabī, d. 931), Abu Ali al-Jubba’ī (d. 915) and his Son Abu Hāshim al-Jubbā’ī (d. 933). Some of the original works of these prominent *Mu’tazilites* were preserved through the monographs written by Qaḍī Abdul-Jabbār al-Hamadānī (d. 1024), who wrote an extensive monograph about *Mu’tazilites* that preserved much of their original thought, and his students Abu Rashīd al-Naysabūrī (d. 1048) and al-Hasan ibn Mat-taweyh (d. 1060), who wrote books preserving a good deal of the opinions of early *Mu’tazilites* on the subjects of *Daqīq al-Kalām*.

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on Science and Islam, the Royal Institute of Inter-Faith Studies, Amman-Jordan, August 2001.

<sup>4</sup> William L. Craig, *The Kalām Cosmological Argument* (London;Basingstoke: Macmillan, 1979).

<sup>5</sup> See for example: Quentin Smith, “Quantum Cosmology’s Implication of Atheism,” *Analysis* 57, no. 4 (1997): 295–304 and the references therein, doi:10.1093/analysis/57.4.295.

The *Ash'arites* school was formed by Abu al-Hasan al-Ash'arī (d. 935) who broke away from the *Mu'tazilites* and formed a new school of thought within the trends of *Kalām*. Beside al-Ash'ari the most prominent contributors to *Ash'arites kalām* was Abu Bakr al-Bāqillānī (d. 1012), and later Abu al-Ma'ālī al-Jūaynī (d. 1085) who wrote some excellent monographs on *Daqīq al-Kalām* and *Jaleel al-Kalām*. In later times, the *Ash'arite kalām* was reformulated by Azud al-dīn al-Ijī (d. 1355) who can be considered the last of the classical *Mutakallimūn*.

Ibn Ḥazm al-Zāhirī (988-1063) was one of the Islamic thinkers who summarized some of the most fundamental opinions and views of *Daqīq al-Kalām* in the first volume of his treatise *Al-fisal fi Al-Milal wa Al-Ahwa' wa Al-Nihal*,<sup>6</sup> in which he reviewed the different Islamic factions and religious groups. Abu Hamid Al-Ghazālī (d. 1111), a most prominent Islamic thinker, disputed the views of philosophers in his famous book *Tahāfut al-Falāsifa*, i.e., *The Incoherence of the Philosophers*.<sup>7</sup> In this he discussed at length the propositions of philosophers and countered them mostly with the views of other *mutakallimūn*. In this paper I will draw chiefly from these two thinkers.

### 3. Resources of Kalām

The resources of *kalām* are quite different from those of classical natural philosophy, including the philosophy of the Greeks. *Mutakallimūn* considered the Qur'an to be the prime source for their knowledge of the world, and accordingly they sought to achieve an understanding of the world based on the stipulations of the Qur'an. Richard Walzer summarized this by saying that "*Mutakallimūn* followed a methodology that is distinct from that of the philosophers in that they take the truth of Islam as their starting point."<sup>8</sup> This is the main reason why we find that *kalām* concepts are different in meaning and implication from their counterpart in the Greek and Indian philosophies.

The approach of the *mutakallimūn* to understand the world can be presented as follows:

<sup>6</sup> Ibn Ḥazm, *Kitāb al-Fiṣal fi al-Milal wa al-Ahwā' wa al-Nihāl*, Cairo, 1964.

<sup>7</sup> Al-Ghazālī, *The Incoherence of the Philosophers*, trans. Michael Marmura (Provo, UT: Brigham Young University Press, 1997).

<sup>8</sup> Richard Walzer, "Early Islamic Philosophy," in *The Cambridge History of Late Greek and Early Medieval Philosophy*, ed. Arthur H. Armstrong (Cambridge University Press, 1970), 648.

God → Reason → the World

This is just opposite to the approach of the Greek philosophers, which can be presented by the sequence

The World → Reason → God

Effectively, the same difference applies to Muslim philosophers as opposed to the *mutakallimūn*, except in that the Muslim philosophers adopted a more compromising approach. William Craig recognized this point clearly by saying that

The main difference between a *Mutakallim* (practitioner of *kalām*) and a *Failasūf* (philosopher) lies in the methodological approach to the object of their study: while the practitioner of *kalām* takes the truth of Islam as his starting-point, the man of philosophy, though he may take pleasure in the rediscovery of Qur'anic principles, does not make them his starting-point, but follows a method of research independent of dogma, without, however, rejecting the dogma or ignoring it in its sources.<sup>9</sup>

Obviously this does not rule out the possibility that some of the *mutakallimūn*, especially those appearing at later times, i.e., after the twelfth century and after, were probably influenced one way or another by Greek and Indian philosophies. Original studies, however, show that the Greek influence in *kalām* is very minor and only speculative<sup>10</sup>.

As to the methodology which was followed by the *mutakallimūn*, one finds that they used rational argumentation in defense of their propositions and reasoning. None of them was concerned with any sort of mathematical proof, although most of them used profound geometric and physical realization of the world as one main argument in presenting their views. An example of this can be seen in the argument presented by al-Ghazālī in *Tahāfut*.<sup>11</sup>

<sup>9</sup> Craig, *The Kalām Cosmological Argument*, 17 and references therein.

<sup>10</sup> Shlomo Pines, *Beiträge zur Islamischen Atomenlehre* (Berlin: Heine, 1939). Arabic translation by Muhammad Aburida, (Cairo: Nanda, 1946), 120. It is notable that Wolfson, for example, failed to trace any Greek or Indian origin for Islamic atomism despite the fact that the concept of Atomism was already present with the Greek and Indians before *kalām*, so he had no choice but to resort to some speculative and unsound assumption that Muslims may have picked up their ideas “from spurious doxographies, either translated from the Greek or originally composed Arabic.” *Ibid.*, 474.

<sup>11</sup> Al-Ghazālī, *Incoherence*, 24–7.

#### 4. The Main Principles of Daqīq al-Kalām

Despite the differing views expressed by the *mutakallimūn* who followed different schools, we find that almost all of them have subscribed to certain common basic principles, which they proposed in order to understand nature. I will proceed to distinguish five main principles:<sup>12</sup>

##### (a) Temporality

The *mutakallimūn* proposed that the world is not eternal but was created some finite time in the past.<sup>13</sup> Space and time had no meaning and never existed before the creation of the world.<sup>14</sup> They defended this view using many logical and demonstrative arguments. Despite the fact that some of the *mutakallimūn* believed that the original creation took place out of a pre-existing form of matter, the dominant view of the *mutakallimūn* in this respect is that creation took place *ex nihilo*, i.e., out of nothing.<sup>15</sup>

##### (b) Discreteness

The *mutakallimūn* assumed that all entities in the world are composed of a finite number of fundamental elements which are called *Jawhar* (essence),<sup>16</sup> each of which is a non-divisible entity that has no parts. Although it is sometimes called “substance,” *jawhar* is rather an abstract entity that does not acquire its physical properties unless occupied by an *‘araḍ* (i.e.,

<sup>12</sup> Mohammed B. Altaie, “The Scientific Value of Dakik al-Kalām,” *The Journal of Islamic Thought and Scientific Creativity*, 4 (1994),. Maimonides in his book *The Guide to the Perplexed* calls these principles propositions. He mentions twelve of them. Here I summarize these in five principles articulated in a modern more economic form.

<sup>13</sup> The best available account of this principle was given by Al-Ghazālī in *The Incoherence of the Philosophers*.

<sup>14</sup> Craig, *The Kalām Cosmological argument*, 63.

<sup>15</sup> Husam M. Al-Alousī, *The Problem of Creation in Islamic Thought: Qur’ān, Hadith, and Kalām* (Baghdad: The National Printing and Publishing Co., 1965); also his *A Dialogue between Philosophers and Mutakallimūn* (Beirut: Arab Foundation for Studies, 1980), 59. Also, see Harry Wolfson, *The Philosophy of the Kalām* (Harvard University Press, 1976), 359–72.

<sup>16</sup> The term “*Jawhar*” and “*al-Jawhar*” are the same, however the term “*al-Jawhar al-fard*” is the term given to the non-divisible entity out of which all things of the world are composed. See S. Pines, *Beitrage zur Islamischen Atomenlebre* for a detailed account on this terminology. It is also of importance to point that the term atom (as originally defined within the Greek philosophy) does not accurately correspond to the Islamic atom. There are some basic differences between the Greek atom and the Islamic atom (see Wolfson, *The Philosophy of the Kalām*, 471–72).

attribute).<sup>17</sup> These are ever-changing attributes. This was expressed by saying that no attribute can be maintained for two successive instants. Discreteness applies not only to material bodies but also to space, time, motion, energy (heat), and all other properties of matter.

### (c) Continuous Creation

The *mutakallimūn* assumed that the world has to be re-created every moment;<sup>18</sup> they say “the ‘*araḍ* do not stay two moments.” They accommodated this idea by proposing that the world is in a state of continuous creation, i.e., that once it is created, it is immediately annihilated, and so forth. For some reason or another, the *mutakallimūn* associated this action of re-creation with ‘*araḍ* rather than with the *jawhar*. But once we know that the *jawhar* cannot stand without ‘*araḍ*, we realize that the process of re-creation is for both. By such a process God stands as the sustainer of the world.

### (d) Indeterminism

The *mutakallimūn* considered the laws of nature (the natural phenomena) to be contingent and undetermined.<sup>19</sup> Consequently they considered events taking place in nature to be probabilistic rather than deterministic. This resulted in rejecting the existence of natural deterministic causality.<sup>20</sup> The *mutakallimūn* also rejected the Greek four basic elements.<sup>21</sup>

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<sup>17</sup> It is sometimes claimed that the *jawhar* is a magnitudeless entity (see Wolfson, *The Philosophy of the Kalām*, 472), but in fact this identification is not unanimous since, although Mu‘tazilites have considered the *jawhar* to be magnitudeless. Ash‘arites consider it to have some magnitude, see Al-Juwayni, *Al-Shāmil Fi Usul Addīn* (Cairo, 1969), 159.

<sup>18</sup> Apart from Al-Juwayni’s *Al-Shāmil Fi Usul Addīn*, see also Wolfson, *The Philosophy of the Kalām*, 392–409.

<sup>19</sup> This view echoes with the philosophy of quantum theory viewed according to the interpretation of the Copenhagen school; see Max Jammer, *The Philosophy of Quantum Theory* (New York: Wiley, 1974).

<sup>20</sup> However, this does not mean that that the *mutakallimūn* rejected causal relation or the existence of cause and effect, rather they believed in such relations but only to the extent that it would reflect our own logic rather than having to play the role of full control of nature by itself. This is perhaps one of the most misunderstood problems of *kalām*.

<sup>21</sup> See, for example, Al-Bāqillānī, *Kitāb Tamhīd al-Awāil*, ed. ‘Imad Aldīn Hayder (Beirut: Mū‘ssasat al-Kutub al-Thaqāfiyyah, 1987).

### (e) Integrated Space-time

The *mutakallimūn* had the understanding that space has no meaning on its own; without having a body we cannot realize the existence of space. So is the case with time, which cannot be realized without the existence of motion which, in turn, needs a body to be affected. This means that space, time, and the body are interconnected to form a composed entity. This is the main point that will be investigated in this paper.

The fact that different schools of *kalām* presented different details of these general principles has sometimes given an undue appearance of contradiction. However, the main trend of their works fell on the opposite side to the views of Islamic philosophers like Avicenna, al-Fārābī and Averroes. On the other hand, it should be pointed out that some of al-Kindī's propositions concerning space and time agree, to large extent, with those of the *mutakallimūn*, especially the views of Ibn Ḥazm and al-Ghazālī.<sup>22</sup> I will not take this point any further in this paper since I will be limiting its scope to an examination and discussion of Ibn Ḥazm and al-Ghazālī.

## 5. The Definition of Time

First let us briefly discuss the definitions of time according to the *mutakallimūn*. Al-Ash'arī quotes Abul-Huthaīl saying that "time is the duration between one action and another,"<sup>23</sup> while Al-Jurjānī (d. 1413) in his short dictionary of *kalām* and philosophical terms defines time as "a known renewable that is used to specify another which is unknown."<sup>24</sup> This may be explained by saying that time is always defined to mean "timing" so that it is always connected with an event. This meaning was pointed to by al-Ash'arī when he said: "some [*Mutakallimūn*] considered time to be the timing of a thing; if you say I will come when Zaid comes then you have timed your coming with that of Zaid."<sup>25</sup> Obviously this kind of definition is very condensed and would be more readily understood in the original Arabic. However, according to Ibn Ḥazm, time is defined to be "the duration within which a particle would exist motionless or in motion, and if it

<sup>22</sup> Husam Al-Alouṣī, *Time in Ancient Religious and Philosophical Thought* (Beirut, 1980), 144.

<sup>23</sup> Al-Ash'arī, *Maqālāt al-Islamiyyīn wa Ikhtilaf al-Muṣallīn*, ed. Helmut Ritter (Wiesbaden: Franz Steiner Verlag, 1980), *Maqālāt*, 443.

<sup>24</sup> Al-Jurjānī, *Kitāb Al-Ta'reefat*, ed. G. ustav Flügel (Leipzig: Vogell, 1845), 19.

<sup>25</sup> Al-Ash'arī, *Maqālāt al-Islamiyyīn wa Ikhtilaf al-Muṣallīn*, ed. Helmut Ritter (Wiesbaden: Franz Steiner Verlag, 1980), *Maqālāt*, 443.

(the time) is separated from the body, then the body will cease to exist and the time will cease to exist too.”<sup>26</sup> In this definition time is directly connected with motion and the existence of a body that is the subject of the motion. This is why Ibn Ḥazm repeatedly referred to this definition of time throughout his discussion of the creation of the world.

## 6. The Main Aspects of Time in *Kalām*

The problem of time was discussed in Islamic *kalām* within the context of the subject of the creation of the universe. I can specify the main aspects of time in Islamic *kalām* by the followings<sup>27</sup>:

### (a) Space-time Integrity

In Arabic the term *space* means: the surface that confines a body from all or part of its sides. They used this term to describe the volume occupied by the body. *Mutakallimūn* considered space and time always to be co-existing, and that neither space nor time can exist independently. On the other hand, both space and time were considered to be a property of the physical world that would not exist in the absence of bodies. Ibn Ḥazm says,

Time is the duration through which an object stays at rest or in motion, and if the object is to be deprived of this [rest or motion] then that object will cease to exist and time will cease to exist too. Since the object and the time both do exist, therefore they both co-exist.<sup>28</sup>

Bodies themselves would not exist without motion; rest itself was considered by some of the *mutakallimūn* to be a kind of simultaneous motion in two opposite directions. al-Ash‘arī, who is famous for his collection of the *kalām* heritage, says that he read a book of al-Nazzām in which he says, “I cannot understand rest except that the body has moved there in two instants.”<sup>29</sup> This I understand to be successive movements in two opposite directions.

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<sup>26</sup> Ibn Ḥazm, *Fisal*, 61.

<sup>27</sup> Mohammed B. Altaie, *Daqīq al-Kalām* (Amman: 2009). An English translation of this book is in press.

<sup>28</sup> Ibn Ḥazm, *Fisal*, 61.

<sup>29</sup> Al-Ash‘arī, *Maqālāt*, 318.

### (b) The Relativity of Time

Space and time were both considered to be dependent on the relative position of the observer: forward and backward, “above” and “below” are all considered to be spatial assignments that depend on the reference; likewise “before” and “after” were considered to be relative. Al-Ghazālī expressing his views on this point said:

All this is due to the inability of the estimative [faculty] to comprehend an existence that has a beginning except by supposing a (before) for it. This (before) from which the estimation does not detach itself is believed to be a thing realized and existing, namely, time. This is similar to the inability of the estimation to suppose the finitude of body overhead, for example, except in terms of a surface that has an above, thereby imagining that beyond the world there is no place, either filled or void. Thus, if it is said that there is no “above” above the surface of the world and no distance more distant than it, the estimation holds back from acquiescing to it, just as if it is said that before the world’s existence there is no (before) which is realized in existence, [and the estimation] shies away from accepting it.<sup>30</sup>

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*Mutakallimūn* rejected the notion of absolute space and absolute time. When discussing the notion of absolute space and absolute time according to the understanding of the philosophers, Ibn Ḥazm says,

And their time and space is not the space that we know, nor is it the time that we know, because the space that we know is the one that surrounds the localized [body] from all or some of its sides, ... and the time that we know is the duration through which an object would stay at rest or in motion or the duration of the existence of the accident in a body, or in general we would say the duration of an orbit, ... and they say that absolute time

<sup>30</sup> Al-Ghazālī, *Incoherence*, 32–33.

<sup>31</sup> Al-Ghazālī, *Incoherence*, 32–33.

and absolute space are something else other than what we have defined by space and time and those are independent.<sup>32</sup>

Ibn Ḥazm rejected the independence of absolute space and absolute time that was adopted by philosophers. Beside his basic objection to the notion of absoluteness, he says

And they say that this [absolute] space and absolute time are independent of each other, so we ask if they are as such what then separated them apart? Then if they claim that something separated them apart, they have to admit some composition to them of their genus which would have separated them.<sup>33</sup>

Al-Ghazālī treated space and time on an equal footing in respect of being both relative in extension, and being observer dependent, he said:

Similarly, it will be said that just as spatial extension<sup>34</sup> is a concomitant of body; temporal extension<sup>35</sup> is a concomitant of motion. And just as the proof for the finitude of the dimensions of the body prohibits affirming a spatial dimension beyond it, the proof for the finitude of motion at both ends prohibits affirming a temporal extension before it, even though the estimation clings to its imagining it and its supposing it, not desisting from [this]. There is no difference between temporal extension that in relation [to us] divides verbally into “before” and “after” and spatial extension that in relation [to us] divides into “above” and “below.” If, then, it is legitimate to affirm an “above” that has no above, it is legitimate to affirm a “before” that has no real before, except an estimative imaginary [one] as with the “above.”<sup>36</sup>

### (c) Time Finiteness and Discreteness

Discreteness was one main principle, among several others, that *Mutakallimūn* proposed as being a basic feature of the physical world. The discrete structure was applied to everything in nature. Specifically time was thought to be composed of tiny units, each of which was called “ānah.” *Mutakallimūn*, believing that the age of the universe was finite, assumed that the number of instants is denumerable. Ibn Ḥazm says:

Any object in the world and every accident in an object and every time are all finite and have a beginning. We see this sensibly and objectively because the finiteness of an object is obvious through its size and through the time of its existence. The finiteness of time happens though what comes next to the past, and the exhaustion of every time [period] after its existence, as now is the limit of it, and it is this [now] which separates the two times; the

<sup>32</sup> Ibn Ḥazm, *Fisal*, 72.

<sup>33</sup> Ibn Ḥazm, *Fisal*, 75.

<sup>34</sup> In the original Arabic text it is called “spatial dimension.”

<sup>35</sup> In the original Arabic text it is called “time dimension.”

<sup>36</sup> Al-Ghazālī, *Incoherence*, 31.

past and the future and it is as such that one time ends and another would start.<sup>37</sup>

He also says: “And every period of time is composed of finite instants that have beginnings.”<sup>38</sup>

While other *mutakallimūn* contributed to the concept of discrete time,<sup>39</sup> it seems that al-Ghazālī did not have much to say on this point, perhaps because overall he had little interest in the principle of discreteness.

Today physical time is considered to be continuous; however, the known laws of physics are valid only to a limit defined by the so-called Planck time of about  $10^{-43}$  seconds. Moreover, unifying quantum theory with general relativity may require some sort of time quantization. This is very much expected in the light of new theories of quantum gravity.<sup>40</sup>

## 7. The Concept of Motion

From their conception of space and time the *mutakallimūn* formulated their understanding of motion as being discrete, and asserted that the trajectory of motion is composed of successive “stationary instants.”<sup>41</sup> Accordingly they maintain that a body is seen moving faster than another only because the number of “stationary points” along its trajectory is small compared to that along the trajectory of the other slower body.<sup>42</sup> However, the famous *Mu'tazilite* al-Nazzām believed that motion on the microscopic level takes place in discrete jumps called “tafra.” According to my understanding, al-Nazzām was driven to this conclusion because although he believed in a non-discrete space, he believed in discrete time, so he had to explain motion by assuming that the particle is covering space through jumps or leaps.<sup>43</sup> Max Jammer held this understanding of al-

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<sup>37</sup> Ibn Ḥazm, *Fisal*, 57.

<sup>38</sup> Ibn Ḥazm, *Fisal*, 57.

<sup>39</sup> See Ibn Matawayh, *Althakira Fi al-Jawaher wa al-A'radh*, ed. Samī Naṣr Lutf, Fayṣal Bader 'Ūn and Ibrahīm Madkor (Cairo, 1973).

<sup>40</sup> Arkady Kheyfets and Warner A. Miller, “Geometrodynamical Quantization and Time Evolution in Quantum Gravity,” 1994, arXiv:gr-qc/9412037v1.

<sup>41</sup> The different views of *Mutakallimūn* of this concept of motion is presented in more details in the book of Al-Ash'arī (see *Kitab Makalat*, 21–5).

<sup>42</sup> Moses Maimonides, *The Guide of the Perplexed*, trans. M. Friedländer, 2<sup>nd</sup> ed. (London: Routledge / New York: Dutton, 1904), 202.

<sup>43</sup> This idea of Al-Nazzām and the motivations behind it need to be studied in much more details. Unfortunately we have no original documents of Al-Nazzām and whatever we know about him is drawn from books of his followers or critiques.

Nazzām to be the oldest realization of a quantum motion. According to him, “in fact al-Nazzām’s notion of leap, his designation of an analyzable inter-phenomenon, may be regarded as an early forerunner of Bohr’s conception of quantum jumps.”<sup>44</sup>

## 8. What can be Outside the Universe?

Starting from their original concept that space, time, and matter do exist simultaneously, are inter-dependent, and would not exist without the existence of matter, the *mutakallimūn* asserted that there is no outside to the world. Al-Ghazālī discussed this point at length in his book *Tahāfut al-Falāsifa* while trying to refute the philosopher’s views in respect to their claim that the world is eternal. After a somewhat lengthy argumentation, al-Ghazālī says, “It is thus established that beyond the world there is neither void nor filled space, even though the estimation does not acquiesce to accepting [this].”<sup>45</sup> In fact this point was already raised by Ibn Ḥazm while discussing the notion of absolute space.<sup>46</sup>

## 9. Time and God before the Creation of the Universe

Because space, time, and motion do not exist without the matter that is given its existence in the physical universe, the *mutakallimūn* did not see any meaning in the idea of space and time before the creation of the universe.

As for the presence of God before the creation of the universe, they assumed that God exists outside the effect of space and time. This, in fact, is an essential part of the basic Islamic creed. God is not a physical entity, so it would be logical not to assign any physical existence to him. This is why believing in God in Islamic faith is actually a matter of “surrender” or “submission” rather than a rational problem that can be analyzed, proved or disproved by reasoning. And although the pioneering *mutakallimūn* discussed the existence of God in much detail, they considered the rational approach to be a sort of guide to believers rather than a path to solid proof. “Proving” or “disproving” the existence of God are by definition futile enterprises: the matter is best left to faith.

Al-Ghazālī was a prominent thinker who discussed the question of the existence of time before the creation of the universe. He first discusses the question of the meaning of “before” and “after” to show that these two terms are relative and observer-dependent, similar to the terms “above”

<sup>44</sup> Jammer, *The Philosophy of Quantum Theory*, 259.

<sup>45</sup> Al-Ghazālī, *Incoherence*, 33.

<sup>46</sup> Ibn Ḥazm, *Fisal*, 73–75.

and “below.” Al-Ghazālī further discusses the possibility for the universe to have been created smaller or larger and he concludes that there is nothing against this possibility<sup>47</sup>; consequently he asks whether such an outside is void or full. His answer was that it can be neither void nor full, as in such a case it would be part of our universe. Therefore he concluded that there should be no outside to the universe. Analogously, he argued that there is no time before the creation of the universe. Al-Ghazālī says: “When one means by outside the world something other than its surface, then one should say there is no exterior to the world.”<sup>48</sup> This agrees very well with the up to date vision of spacetime as viewed by the general theory of relativity.

## 10. Summary

The notion of time in Islamic *kalām* can be summarized with the following aspects:

1. Time is the measurable duration between events. It has no meaning without events and without the existence of the universe.
2. Time is interconnected with space.
3. Time is discrete, being composed of individual non-divisible tiny instances.
4. Time is observer-dependent in respect of the definition of priorities, like space.
5. Absolute time and absolute space do not exist.

Substantiated studies in this topic are needed in order to establish broader and more precisely focused views on this subject.

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<sup>47</sup> Mohammed B. Altaie, “The Size of the Universe between Al-Ghazālī and Averroes” [in Arabic], *Abhath Al-Yarmouk* 22, no. 1 (2006).

<sup>48</sup> Al-Ghazālī, *Incoherence*, 35.

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