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The Kalām-based Continous Re-creation Approach of Basil Altaie Compared to Quantum Divine Action Models from Christian Contexts

Basil Altaie'nin Kelâm'a Dayalı Sürekli Yeniden Yaratılış Yaklaşımı ve Onun Hristiyan Kökenli Kuantum İlahi Eylem Modelleriyle Karşılaştırılması

"Hakan Turan. 'Der Kalām-basierte Neu-Erschaffungsansatz von Basil Altaie im Vergleich zu christlich geprägten Quantum-Divine-Action-Modellen'. *Forum für Islamisch-Theologische Studien* 3/1 (2024), 25-54. https://doi.org/10.5771/2748-923X-2024-1-25"

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Öz

Yaygın kabule göre kuantum teorisi fiziksel alemin mikro süreçleri için bir indeterminizmi, yani mekanik zorunluluğu aşan bir gelecek belirsizliğini öngörür. Bu indeterminizmin ontolojik olarak ne anlama geldiği yaklaşık bir asırdır tartışılmıştır. Bu esnada ortaya atılan tezlerden bir tanesine göre her olguda mevcut olduğu varsayılan belirsizliklerin ve onlarla istatistiksel olarak örtüşen mikroskopik rastlantıların son gerçek olmadığı, bilakis kuantum belirsizliğin metafizik bir perde arkasına sahip olduğudur. Ona göre bu perde arkası her mikro olgunun somut neticesini aktif olarak takdir eden ve yaratan bir Tanrı'nın varlığıdır. Modern bilimi ve yaratıcı bir ilah konseptini birbiriyle bağdaştırma niyetiyle yola çıkan ve özellikle Hristiyan bilim adamları ve felsefeciler tarafından geliştirilen "kuantum ilahi eylem" modelleri bu indeterminizmden yola çıkmaktadır. Bu makale, Müslüman teorik fizikçi ve kelâm bilgini Basil Altaie'nin kelâm ilmine dayalı bir kuantum ilahi eylem modeli olarak yorumlanabilecek doğa felsefesini, Hristiyan yaklaşımlar ile mukayese ederek felsefi ve teolojik açılardan inceleyip tartışmaktadır.

Anahtar Kelimeler: Kelâm, İlahi eylem, Kuantum indeterminizmi, Doğa yasaları, Okasyonalizm.

Abstract

It is widely accepted that quantum theory predicts an indeterminism for the micro-processes of the physical realm, i.e. a future uncertainty that transcends mechanical necessity. What this indeterminism means ontologically has been debated for nearly a century. According to one of the theses put forward during this time, the uncertainties that are assumed to be present in every phenomenon and the microscopic coincidences that statistically coincide with them are not the ultimate reality, but rather quantum uncertainty has a metaphysical behind-the-scenes, namely the existence of a God who actively ordains and creates the concrete outcome of every micro phenomenon. It is from this indeterminacy that the "quantum divine action" models, especially those put forward by Christian scientists and philosophers with the intention of reconciling modern science with the concept of a creator God, start. This article analyses the natural philosophy of the Muslim theoretical physicist and scholar of Islamic Kalām theology Basil Altaie, which can be interpreted as a quantum divine action model based on Islamic theology. Altaie's approach is here discussed from different philosophical and theological perspectives and compared with Christian approaches.

Keywords: Kalām, Divine action, Quantum indeterminism, Natural laws, Occasionalism.

1. Introduction*

> "You know that the incomplete determinacy of events in atomic physics is sometimes used as an argument that there is now room again for the free will of the individual and also for God's intervention."[1]
> (Werner Heisenberg to Niels Bohr in a conversation in 1927)

Modern science describes animate and inanimate nature by means of general laws of nature, which are intended to mathematically describe and explain the universe from the smallest to the largest. The Qur'an in turn teaches: "*Verily, God is the One who cleaves the grain and the fruit-kernel asunder, bringing forth the living out of that which is dead, and He is the One who brings forth the dead out*

* This paper is an English translation of the German original in: Hakan Turan, "Der Kalām-basierte Neu-Erschaffungsansatz von Basil Altaie im Vergleich zu christlich geprägten Quantum-Divine-Action-Modellen", *Forum für Islamisch-Theologische Studien* 3/1 (2024), ed. Ergon Verlag, 25-54. DOI: 10.5771/2748-923X-2024-1-25. With kind permission from the editor.

1 Werner Heisenberg, *Der Teil und das Ganze* (München: Piper, 2022), 111.

of that which is alive."[2] The question of how these two seemingly contradictory perspectives relate to each other has been answered in different ways. In this article, we will examine a reconciliation approach to this question by the Iraqi theoretical physicist and Kalām scholar Basil Altaie. This represents an interpretation of modern quantum theory, which describes the basic building blocks of all things, in the light of the metaphysics of Islamic Kalām theology. This proposal, which Altaie refers to as approach of re-creation (*taǧaddud al-khalq*), claims the compatibility of a complete understanding of nature through natural laws in the sense of modern natural science with the idea of the continuous creation of even the smallest things by the Creator. It is thus a contemporary and Islam-based integration model for the relationship between modern natural science and Islamic belief in creation, respectively an *Islamic theology of nature*.[3] This approach combines elements of early Kalām theology with the current debate on the philosophical interpretation of quantum theory and also makes reference to similarly structured integration models from the Christian discourse.

Accordingly, section two of this article outlines the state of research on currently discussed models of compatibility between science and religion in both Christian and Islamic contexts ("science-and-religion" discourse). The focus here is on systematic theological approaches that address God's active involvement in the world, i.e. on "divine action" models, with a special look at models that start with a corresponding interpretation of quantum theory in the sense of Heisenberg's quote at the beginning and that are known as models of "quantum divine action". Section three outlines some of the foundations central to Altaie's approach from the fields of the philosophy of quantum theory, quantum divine action models and Islamic Kalām theology. Section four introduces a category model for the detailed analysis of quantum divine action models, to which Altaie's approach is also counted in this article. This category model is based on the comparative presentation of current divine action models by the theologian Wesley Wildman and leads to ten categories that cover scientific-theoretical, metaphysical and, in a narrower sense, theological aspects. Section five provides a detailed analysis of Altaie's approach in comparison with other perspectives from the philosophy of physics, with the Christian-influenced discourse on divine action models and with the traditional Islamic theological discourse. In section six, the results are summarized and discussed in the form of eight theses. These deal with the relationship of Altaie's approach to Occasionalism and Christian approaches, the role of physics in his model, the problem of theodicy and the theological significance of such models in general. In terms of its overall conception, this interdisciplinary study can be seen as a contribution to an *analytical Islamic theology*.

2. State of Research on the Science-and-Religion Discourse

2.1. The Christian Discourse

The Christian-influenced discourse on the relationship between science and religion is described

[2] *The Message of the Qur'ān*, transl. Muhammad Asad (Bristol: Book Foundation, 2008), al-Anʿām 6/95.

[3] Ian G. Barbour, *Naturwissenschaft trifft Religion. Gegner, Fremde, Partner?* (Göttingen: Vandenhoeck & Ruprecht, 2010), 17, 22ff.

in detail in Jeffrey Koperski[4] and Ian Barbour,[5] among others. Numerous independent theses and analyses were also discussed in the context of the so-called Divine Action Project by authors such as Nancey Murphy, Robert John Russell, John Polkinghorne, Philipp Clayton and many others in the period from 1988 to 2008. Of significance for this article is the summarized comparison of the divine action models developed and the in-depth discussion of the quantum divine action models by the theologian Wesley Wildman.[6] Wildman also reacts to Nicholas Saunders' profound criticism of the quantum divine action models.[7] A more general reaction to Saunders, also with interreligious references, can be found in Shoaib Ahmad Malik and Emil Salim.[8] Robert John Russell's quantum divine action approach continues to be discussed today.[9] There are also fundamental challenges to the basic structure of the science-and-religion discourse, which has been strongly influenced by the ways of thinking of physics since Barbour.[10]

2.2. The Islamic Discourse

Influential positions from the Islamic world on the relationship between science and religion were examined as examples by Leif Stenberg[11] and in interview form by Stefano Bigliardi.[12] Bigliardi's thesis is that in the twenty years since Stenberg's study, an increasingly visible "new generation"[13] has emerged among Muslim scientists who advocate a profound compatibility between modern science, including the theory of evolution and modern cosmology, and Islamic religion.

The topic of evolution in the Islamic context has been discussed from a historical perspective by Marwa Elshakry[14] and from a systematic theological perspective by Shoaib Ahmad Malik.[15] Quranic exegesis has also reacted to the theory of evolution in various ways.[16] One of the more detailed models on the relationship between modern science and creation from an Islamic perspective comes from the theoretical physicist Basil Altaie.[17] This is at the same time the focus

4 See Jeffrey Koperski, *The Physics of Theism* (Malden: Wiley-Blackwell, 2015).

5 See Barbour, *Naturwissenschaft*.

6 See Wesley J. Wildman, "The Divine Action Project, 1988-2003", *Scientific Perspectives on Divine Action. Twenty Years of Challenge and Progress,* ed. Robert John Russell et al. (Vatican City State: Vatican Observatory; Berkeley: Centre for Theology and Natural Sciences, 2008), 133-176.

7 Nicholas Saunders, *Divine Action & Modern Science* (Cambridge: Cambridge University Press, 2000), 94ff.

8 Shoaib Ahmed Malik – Emil Salim, "Creatio Continua and Quantum Randomness", *Abrahamic Reflections on Randomness and Providence,* ed. Kelly James Clark – Jeffrey Koperski (Istanbul: Palgrave Macmillan, 2022), 257ff.

9 See Emily Qureshi-Hurst, "Does God Act in the Quantum World? A Critical Engagement with Robert John Russell", *Theology and Science* 21/1 (2023), 106-121.

10 See Taede A. Smedes, "Beyond Barbour or Back to Basics? The Future of Science-and-Religion and the Quest for Unity", *Zygon* 43/1 (2008), 235-258.

11 See Leif Stenberg, *The Islamization of Science* (Lund: Religionshistoriska Avd., Lunds Univ. et al., 1996).

12 See Stefano Bigliardi, *Islam and the Quest for Modern Science* (Istanbul: Swedish Research Institute in Istanbul, 2014).

13 Bigliardi, *Quest*, 10.

14 See Marwa Elshakry, *Reading Darwin in Arabic, 1860-1950* (Chicago: The University of Chicago Press, 2013).

15 See Shoaib Ahmed Malik, *Islam and Evolution* (London: Routledge, 2021).

16 See Hakan Turan, "Von Adam, Evolution und den Gewohnheiten Allahs", *Frankfurter Zeitschrift für Islamisch-Theologische Studien* (5/2020), 105-152.

17 See Basil Altaie, *Islam & Natural Philosophy* (Oldham: Beacon Books, 2023); Id., *God, Nature and the Cause* (Abu Dhabi: Kalam Research and Media, 2016); Mehmet Bulgen et al., "Daqiq al-Kalam and Modern Physics (2)", *YouTube* (27.11.2020).

of this article. Astrophysicist Nidhal Guessoum, on the other hand, provides a comprehensive, up-to-date presentation of relevant discourses and positions in the Islamic world on the relationship between science and religion in his work "Islam's Quantum Question".[18] In its appendix there is a brief outline of current work on Islamic divine action models.[19] Altaie's approach is not included. A Turkish-language reception of the quantum divine action models can be found in the work of the Muslim philosopher of religion Caner Taslaman.[20] However, he also fails to mention Altaie's approach, just as there is no other Muslim author in his extensive bibliography when it comes to the interpretation of quantum physics.

3. Theoretical Foundations of Altaie's Approach: Quanta, God and Kalām

3.1. Insights into the Philosophy of Quantum Theory

The central starting point of the philosophy of quantum physics is that, unlike classical mechanics, quantum physics can only make probabilistic statements, i.e. probability statements, about the future of a particle.[21] According to the common view, this is not due to our ignorance of the detailed information about a particle, but to the fundamental nature of the world. On the one hand, a particle is no longer described by a classical trajectory, but by means of a wave function that does not assign a fixed location to the particle for a certain point in time, but rather a large number of wave-like distributed locations as possible points of stay - locations that in quantum physics are all *simultaneously* realized in a still mysterious sense, as long as the particle is not forced to "decide" on a location, for example by hitting a measurement screen, whose possible outcomes are given by the wave function.

The so-called Copenhagen interpretation of quantum theory, which together with John von Neumann's theory of measurement was its *standard interpretation* until the 1970s, interprets this to mean that the particle is in a quantum mechanical superposition of all conceivable locations before it hits the screen, since the wave function of the particle is spread over an entire spatial area. Only the measurement - for example in the form of the impact on the screen - causes the particle to "decide" on a location absolutely by chance and thus become part of our classical and objective reality.[22] Since the physicist von Neumann, the resulting "decision" for a specific location has been referred to as "reduction of the wave packet" or as "collapse of the wave function". The more general term for the rapid transition from a superposed to a localized state is "measurement process". However, the realized location of impact can never be predicted exactly: nature behaves indeterministically. However, the probabilities for all possible impact locations can be calculated exactly from the wave function. Thus, the Copenhagen interpretation, together with the collapse model, introduced the concept of ontological randomness into physics. The indeterministic behavior becomes less and less visible with ever larger objects, since the fluctuations of their measured values around the corresponding mean values become smaller and smaller - but these fluctuations are still there in principle. Accordingly, our "classical" world, in

18 See Nidhal Guessoum, *Islam's Quantum Question* (London: I. B. Tauris, 2011).

19 Guessoum, *Question*, 339-341.

20 Caner Taslaman, *Kuantum Teorisi, Felsefe ve Tanrı* (Istanbul: Istabul Yayınevi, 2017).

21 Gennaro Auletta, *Foundations and Interpretation of Quantum Mechanics* (Singapore: World Scientific, 2000), 104ff.

22 Auletta, *Foundations*, 220-230.

which the laws of mechanics with their unambiguous predictions seem to apply, is only an "extension" of the more fundamental quantum world.

Besides the standard interpretation, there are numerous other interpretations of the measurement process, some of which also extend the established quantum theory in its equations, but always under the condition that they must be empirically equivalent to the previous (successful) theory (unless there are really new phenomena to be discovered). There is no space here to go into the immense variety of interpretations of the measurement process and, more generally, of many other puzzling aspects of quantum theory.[23] However, it should be noted that Altaie also develops his own approach in confrontation with some of these interpretations, which he also addresses, criticizes and in some cases rejects in his works.[24] We will therefore address these interpretations in this article where necessary.

3.2. Basic Idea of the Quantum Divine Action Models

Recognizing God as a possible element of philosophical interpretations opens up new perspectives on the philosophy of quantum theory and on discussions about the relationship between God and nature. One of these discussions revolves around the question of whether the indeterministic behavior of the smallest building blocks of the world could represent the interface between nature and the active action of God in the world as Creator. Metaphysical models that affirm this are in the following referred to as quantum divine action models. They differ from creationist approaches and intelligent design models in that they recognize the state of research in modern natural science, especially in the anthropologically sensitive areas of modern cosmology, evolutionary theory and neurobiology. At the same time, they stand for their theistic interpretations, which for their part are mostly rooted in the Abrahamic religions. In the Christian discourse, quantum divine action models were developed in an intensive discourse, especially in the Anglo-Saxon-speaking world. The American theoretical physicist and Episcopal priest William Pollard is regarded as the first systematizer of this school of thought[25], although the basic idea can already be found in the German systematic theologian Karl Heim.[26]

3.3. Islamic Kalām Theology as the Basis of Altaie's Divine Action Model

The Islamic world reacted rather late to these new and very specific discourse strands. One of these reactions is the re-creation approach of the theoretical physicist and Kalām scholar Basil Altaie. This ambitious approach represents a synthesis of elements of the models of nature as

23 See Auletta, *Foundations*.

24 Altaie, *Natural Philosophy*, 156-160.

25 Saunders, *Divine Action*, 4, 105 ff. William G. Pollard, *Chance and Providence* (London: Faber & Faber, 1958), 104 f.

26 Saunders, *Divine Action*, 94, 101-105. At the same time, the interest of German-speaking Christian theology in the quantum divine action models was and still is rather low compared to the Anglo-Saxon-speaking world. The reasons for this are complex and relate to European specifics with regard to the topic of theodicy and the historical discourse of the Enlightenment. As an example of the effect of the latter on the history of theology, Taede Smedes summarizes a conclusion of the Protestant theologian Wolfhart Pannenberg with the words: "[...] theology after Kant can be summarized as a turn to anthropology and subjectivity", Smedes, "Beyond Barbour", 239.

formulated by the Islamic Kalām scholars from the period between the 9th and 12th centuries and modern natural science, particularly in the form of quantum theory.

The Kalām theologians, who were received intensively by Altaie, especially in "Islam & Natural Philosophy", endeavored to secure and emphasize the Islamic creed, as it emerged from the Qur'an and Sunnah, with rational arguments.[27] In the course of a century and a half, they developed an atomistic and increasingly occasionalistic understanding of nature and creation, in which God recreates all the accidents - i.e. variable properties - of the atoms at every moment, since, according to many of these theologians, accidents can only exist for an extremely short moment and there is no second effective cause apart from God.[28] The regularities we observe in nature are therefore not an immanent necessity of nature, but the empirically accessible form of active divine creative action, which shows regularity und uniformity. These regularities can, in principle, be interrupted by God at any time, for example, in miracles. But usually such irregularities do not occur: fire burns cotton - practically always. The Muʿtazilite Abū ʿAlī al-Ǧubbāʾī (d. 915) coined the term *ʿāda* (habit, custom) for these observed regularities in God's creative actions.

Altaie worked up this model, including its historical development, and already in the 1990s presented an attempt to update it in the light of modern physics, which adopts much from the Kalām.[29] In doing so, Altaie has devoted himself both to the original texts and to contemporary presentations of the Kalām's natural philosophy, including those of Shlomo Pines, Harry Wolfson and Alnoor Dhanani. One of Altaie's original conclusions is that natural philosophical elements can be extracted from the Kalām that were common to the majority of Kalām scholars, apart from gradual differences. Altaie summarizes these under the term "*Daqīq al-kalām*". This is also a classical term for the "subtleties of Kalām", which included natural philosophical questions. Altaie sees his Daqīq al-Kalām project as a possible starting point for a contemporary "new kalām"[30], as it is also known in Turkey, for example, as "yeni ilm-i kelâm". Altaie identifies five core principles of Daqīq al-kalām: atomism (*dharrīya*), temporality (*ḥudūth*), re-creation (*taǧaddud al-khalq*), contingency or indeterminism (*taǧwīz/imkān*), intertwining of space and time (*tadākhul al-zamān wa-l-makān*).[31] There are also some important points in classical Kalām that Altaie contradicts, especially regarding the status of the laws of nature. These will be discussed later.

3.4. Basic Idea of Altaie's Re-Creation Approach

According to Altaie, God recreates all the physical characteristics of the smallest particles of nature at every moment. The time interval between two moments of this re-creation is extremely short. Accordingly, the "re-creation rate" of a particle is unobservably high. During re-creation, the physical values of the particle are always created differently[32], whereby the concrete variation

27 See Altaie, *Natural Philosophy*.

28 Ulrich Rudolph – Dominik Perler, *Occasionalismus* (Göttingen: Vandenhoeck & Ruprecht, 2000), 28-56.

29 Altaie, *Natural Philosophy*, xi ff.; Id., "The Scientific Value of Dakik al-Kalam", *Islamic Thought and Scientific Creativity* 5/2 (1994), 7-18.

30 Altaie, *Natural Philosophy*, xiv.

31 See Altaie, *Natural Philosophy*; see Id., *Daqīq al-Kalām* (Abu Dhabi: Kalam Research and Media, 2018).

32 In the standard interpretation, the origin of the difference in Altaie's values would be found in the large number of superposed states in the wave function.

of each individual value occurs by God's decision and is neither determined by natural laws nor subject to ontological randomness. The overall process of creation nevertheless takes place in accordance with natural laws decreed by God. But these are probabilistic, i.e. they always allow several outcomes, each with a different but fixed probability, and thus leave God the freedom to create a value of his choosing in each new creation process without violating the natural law decreed by him. Our will can have an effect on the world because God takes note of our will and takes it into account in his work of creation. The same applies to the interaction of objects within the world: their current states are taken into account by God in the further creation by means of the laws of nature, which appears phenomenologically as the physical effectiveness of the objects. This effectiveness is reliable, but cannot be traced back ontologically to an effective causality of the particles themselves. The laws of nature, according to which God continues to create the world at every moment, are reproduced by us as laws of physics, without ever having a guarantee that we have recognized the laws as they really are. In the following sections, the model outlined here will be subjected to a differentiated analysis.

4. Category Model and Methodology

The aim of our analysis of Altaie's Kalām-based Islamic natural philosophy is to classify it in the thematically related academic discourses in order to gain an overall picture of his synthesis and to be able to assess it with regard to its viability in various directions. The basis for this are Basil Altaie's descriptions in his works "Islam & Natural Philosophy" (2023), the Arabic original of which was first published in 2010, as well as "God, Nature and the Cause" (2016) and Stefano Bigliardi's interview with Altaie published in 2014.[33] In addition, a publicly accessible video recording of a webinar with Altaie's statements on individual thematic queries from Muslim philosophers of religion and theologians was used.[34] The analysis of Altaie's model is carried out in a category system based on the theologian Wesley Wildman, who has presented a comprehensive analytical comparison of over a dozen competing models from the Divine Action Project and its discursive environment.[35] These include the four quantum divine action models of Nancey Murphey, Robert John Russell, Georg Ellis and Thomas Tracey. As these show similarities to Altaie's re-creation model and Altaie himself refers in some places to these and other models in the context of the Divine Action Project, Wildman's theoretical framework is suitable for an initial analysis. Eight categories were taken from Wildman's presentation and two (relating to the measurement process) were added due to special features in Altaie's work, so that the extended Wildman category model used here has ten categories. These categories are listed below in thematic order. In the analysis chapter, Altaie's model is presented along these categories, each of which is briefly introduced at the beginning. In total, the following ten categories and questions are covered:

General theological assertions

33 See Altaie, *Natural Philosophy*; Id., *Daqīq al-Kalām*; Id., *God, Nature and the Cause* (Abu Dhabi: Kalam Research and Media, 2016). See Bigliardi, *Quest*.

34 See Bulgen, "Daqiq al-Kalam".

35 See Wildman, "The Divine Action Project, 1988-2003", 133-176.

1) The question of God's goal-directed intervention in the course of the world ("Is there room for Special Divine Action / SDA?")

Questions on the general philosophy of science: relationship to natural science

2) The question of orientation on current physics ("Indeterminism based on known or as yet unknown physics?")

3) The question of empirical falsifiability ("How closely is the model interlinked with natural science?" / "Traction")

Question on the philosophy of the laws of nature

4) The question of the inviolability of natural laws respectively interventionism vs. non-interventionism ("Can natural laws be violated?")

Questions on the philosophy of quantum theory

5) The ontology of quantum mechanical randomness

6) Definition of an elementary event in divine determination

7) Interpretation of the quantum mechanical measurement process

Questions on the resulting theology of nature

8) Scope of divine action in quantum mechanical indeterminism

9) The question of the freedom of creatures

10) Proximity or distance to Occasionalism

5. Analysis of Altaie's Model in Wildman's Extended Category Model

5.1. General Theological Question: Is There Room for "Special Divine Action" (SDA)?

The first question is to what extent Altaie's model provides possibilities for an intentional specific providential action of God (*ʿināya*) that is distinct from God's general action ("General Divine Action" or GDA), such as the maintenance of creation and its universal processes.[36] This point is not trivial. For example, there were also voices within the Divine Action Project that rejected any form of objectifiable "Special Divine Action", particularly with regard to the problem of theodicy. Wesley Wildman himself is one of them.[37]

The most important fields for such a specific action of God are an intentional control of creation (e.g. as theistic evolution) or the salvation history (e.g. through revelations) as well as the possibility of miracles and the fulfillment of prayers. Altaie confirms all four of these possibilities. Biological evolution is therefore God's intentional creation process, especially with regard to humans. According to Altaie, the only aspect of the (neo)Darwinian approach that is incompatible with the core of Islamic dogma is the interpretation of mutations as undirected chance.[38] According to Altaie precise analysis of the Qur'an also shows that the Qur'an leaves room for an evolutionary creation of Adam.[39] Altaie thus advocates a theistic reading of the theory of

[36] Wildman, "Divine Action Project", 140.

[37] Wildman, "Divine Action Project", 146 f.

[38] Altaie, *Natural Philosophy*, 270.

[39] Altaie, *Natural Philosophy*, 264-269.

evolution. Similar to Russell, he emphasizes the role of specific quantum mechanical processes at the micro level in chemical and biological evolution, whose indeterministic uncertainties are interpreted as spaces of God's intentional work without circumventing natural laws.[40] Altaie also makes references to natural philosophical interpretations of evolution such as that of "quantum evolution" by molecular biologist Johnjoe McFadden.[41]

At the same time, he recognizes macroscopic miracles, such as those described in the Qur'an as prophetic miracles, in accordance with the Islamic Kalām tradition, as possible in principle and at the same time extremely rare events, which, according to him, should be regarded as the subject of religious doctrine rather than natural science. According to Altaie, the quantum-physical probabilities of miraculous events are extremely low, but still non-zero due to indeterminism. It is precisely this that enables God to allow very rare processes to take place at singular points in the history of the universe, which appear miraculous to the people involved, but nevertheless do not violate physical laws. The complex question of how macroscopic effects can result from microscopic quantum fluctuations is not at the center of Altaie's texts.[42] Overall, it is important for Altaie to emphasize that even miracles cannot lead to fundamental deviations from fundamental laws of nature.[43] But more fundamental than proving the possibility of miracles is for Altaie to make plausible the direct connection of God to all processes in nature, i.e. in particular to its constant and non-miraculous processes. Furthermore, in addition to God's revelations to prophets, Altaie also considers the fulfillment of prayers by God, which is more subtle than miracles, to be possible.[44]

5.2. Questions on Philosophy of Science: Relationship to Natural Science

5.2.1. Indeterminism Based on Known or yet Unknown Physics?

Altaie's approach and all comparable models presuppose an ontological indeterminism in nature, which, depending on the model, manifests itself either in the unpredictability of chaos theory or in the quantum physical uncertainty in the measurable variables of the particles within which God can act determining according to these models.[45] The question now is whether the model

40 Robert J. Russell, "Special Providence and Genetic Mutation: A New Defense of Theistic Evolution", *Evolutionary and Molecular Biology*, ed. Robert J. Russell et al. (Vatican City State: Vatican Observatory; Berkeley: Centre for Theology and Natural Sciences, 1998), 206-208. Altaie, *Natural Philosophy*, 271f.

41 Altaie, *Natural Philosophy*, 272f.

42 Altaie only touches on the problem of the necessary amplification of guided quantum events up to a macroscopic effect in passing, pointing to open questions and possible perspectives in the context of chaotic quantum systems (in the sense of John Polkinghorne) that have yet to be researched (Altaie, *God*, 117). Russell, on the other hand, sees no need to wait for such still speculative developments, since at least biology already knows several amplification mechanisms, such as the sensory cells of the retina, the workings of the mind or the phenotypic expression of genetic mutations (Robert J. Russell, "Divine Action and Quantum Mechanics: A Fresh Assessment", *Quantum Mechanics*, ed. Robert J. Russell (Vatican City State: Vatican Observatory; Berkeley: Centre for Theology and Natural Sciences, 2001), 299f.). According to Koperski, the problem of the lack of a convincingly explained reinforcement mechanism is the central weakness of all quantum divine action approaches (Koperski, *Physics*, 171-174).

43 Bigliardi, *Quest*, 84-86.

44 Altaie, *God*, 114.

45 These models are - somewhat irritatingly - referred to as incompatibilist, as they consider God's freedom to be incompatible with a nature that is completely determined by laws. This contrasts with compatibilist models, which

under consideration precisely locates indeterminism in physics known today and thus relies on *short-term intelligibility* or whether it sees indeterminism in an anticipated future physics in which the open questions of current fundamental physics have been clarified. In the latter case, the priority would be the *long-term stability* of the model.[46]

Altaie sees indeterminism in the quantum world as empirically proven beyond doubt. He also recognizes all empirically relevant quantum-physical calculations of common phenomena.[47] At the same time, however, he emphasizes that even the most elaborate formalisms, such as those of quantum field theory, are ultimately approximations, so that they should not be misunderstood as a description of the ultimate ontology. Due to its completely discrete structure, Altaie's Kalām approach is not compatible with quantum field theory, which works in the continuum limes, but according to Altaie it is compatible with the currently hypothesized string theory or superstring theory, for example.[48] However, he could not present a definitive physical theory, which has been sought in fundamental physics for decades. This explicit relativization of quantum field theory, which is ubiquitous in particle physics, reduces the *short-term intelligibility* of his approach. At the same time, such a relativization of even the most successful theories is today the undisputed state of research in modern theoretical physics due to their limited scopes of validity.[49] Altaie is even more critical of those interpretations and extensions of quantum physics which, like those of David Bohm or Mehdi Golshani, attempt to restore physical determinism.[50] With this understanding of nature that has only been approximated, while at the same time introducing and comparing it with an indeterministic model of nature that draws its basic concerns from theology, Altaie sees himself close to the critical realism of John Polkinghorne, even if the two authors differ on many other individual issues.[51]

5.2.2. How Closely is the Model Linked to Science? ("Traction")

The question here is: to what extent is the model under consideration concrete enough and empirically relevant so that it can, in principle, come into conflict with natural science? The greater this potential, the greater the "traction" (following Philipp Clayton's using of the term "traction") between natural science and a religiously motivated model. According to Wildman, this also increases the falsifiability and thus also the credibility of the respective model.[52] This can also be understood to mean that natural science can thus contribute to the correction of theologically motivated models.

consider such a simultaneity of God's freedom and complete determinism in nature to be possible. Compatibilist scenarios often refer back to Kant's transcendental concept of freedom. According to Wildman, most compatibilist models are still in their infancy (Wildman, "Divine Action Project", 143, 148, 166).

46 Wildman, "Divine Action Project", 144, 151-155.

47 Altaie, *Natural Philosophy*, 167, 201f.

48 Bulgen, "Daqiq al-Kalam", 01:13:40-01:16:00.

49 Michael E. Peskin – Daniel V Schroeder, *An Introduction to Quantum Field Theory* (Boulder (Colorado): Westview Press, 1995), 798-800.

50 Altaie, *Natural Philosophy*, 76, 207.

51 Altaie, *God*, 109-112, 115.

52 Wildman, "Divine Action Project", 140.

Altaie claims for his model that some of the resulting specific predictions can be tested experimentally. For example, according to the general theory of relativity, the re-creation rate of a particle or system in very strong gravitational fields should be subject to a noticeable time dilation, which should be noticeable in his model due to the lowered re-creation rate in the form of more apparent quantum properties of the system under consideration. Altaie also mentions other predictions that can be tested in principle on the basis of his model.[53] Regardless of these predictions, Altaie's model is a priori oriented towards congruence with empirically proven physics.

5.3. Question on the Philosophy of the Laws of Nature: Can the Laws of Nature be Violated?

Does God's specific action take place through a selective suspension of the laws of nature (interventionism) or is God's specific action assumed to be in accordance with the laws of nature, which leave room for divine action (non-interventionism)? The declared aim of most divine action models was to remain completely or almost always completely non-interventionist, i.e. to think of God's specific action as realizable within the fundamental laws of nature, which increases the "traction" (see above) accordingly.[54]

It is immediately apparent from the above that Altaie's approach is highly non-interventionist in structure.[55] Altaie writes about the world: "[...] it was originally designed to respect certain laws - that is the laws of nature - which are firm and immutable."[56] What can change are only our scientific models of these laws of nature, which are inherently indeterministic at a fundamental level and thus of statistical nature. This will be explained in more detail in the following points.

5.4. Questions on the Philosophy of Quantum Theory

5.4.1. The Ontology of Quantum Mechanical Randomness

A critical question from the philosophy of physics for all non-interventionist quantum divine action models concerns the nature of the probabilities that stand for the indeterminism of nature.[57] Only one contentious point of the complex debate will be reproduced here, namely what exactly the probabilities for a quantum mechanical state that can be calculated from the wave function refer to. According to Wildman, there are two main alternatives: do these quantum mechanical probabilities refer in an ontological and objective sense to every single particle that has not yet been measured? If so, then there is a strong ontological interpretation of the laws of nature and, in particular, of quantum mechanical probabilities, in which each particle is covered individually and a priori by the physical theory and thus by the superposition of states with

53 Altaie, *Natural Philosophy*, 162ff.

54 Wildman, "Divine Action Project", 141. In contrast, Jeffrey Koperski, for example, argues that interventionist models do not have to contradict natural science. Koperski, *Physics,* 177ff.

55 This term is used here for better comparability with other models. Taken literally, it would be misleading, especially in the context of God's continuous active creative action in Altaie.

56 Altaie, *Natural Philosophy*, 210.

57 Wildman's analysis of the quantum mechanical measurement process and the possible locations for God's causal effects without abolishing natural laws is illuminating, but cannot be explored in depth here. Wildman, "Divine Action Project", 155-161.

different probabilities. According to Wildman, this case is critical for any non-interventionist approach, since a determination of the measured value of an individual particle by God would ontologically downgrade the laws of nature and thus the probabilities and subordinate them to the empirical individual events. Or do these probabilities refer to the statistical distribution of measured values in a very large ensemble of particles that are in the same quantum mechanical state? If this is the case, then quantum physical theory is not concerned with the specific measured values of a particular particle, but always only with the overall statistics in the particle ensemble, which is ontologically preceded by the probabilities.[58] Here, the physical description would remain consistent even in the case of a divine determination of individual measured values.[59] Robert Russell formulates the associated ambiguity in a striking way: "[...] God's direct action at the quantum level is hidden in principle from science [...]".[60]

Of course, this presupposes both that God's determinations respect the a priori statistics related to the ensemble and that one accepts the aforementioned ensemble interpretation of the wave function. The latter is not self-evident, as can be seen from the criticism formulated by Nicholas Saunders and relativized by Wesley Wildman concerning the conceptual tenability of the quantum divine action approaches.[61] According to Saunders, all these approaches lead to the ontological relegation of a priori probabilities behind the given individual event if the result of the collapse is left to God, and thus to the interventionism that one wanted to avoid. According to Wildman, however, this criticism would only apply to a strong ontological interpretation of quantum theory. For precisely this reason, however, no voice in the Divine Action Project advocated such an interpretation. Accordingly, only ensemble interpretations of quantum theory were represented there, which were ultimately physically blind to the occurrence of individual events. Ensemble interpretations with ontologically preceding overall probabilities, on the other hand, were not considered by Saunders despite his systematic analysis.[62]

Interestingly, in contrast to Wildman, Altaie has fundamentally confirmed Nicholas Saunders' criticism, but with a different thrust.[63] Although Altaie himself is also in favor of an ensemble reading of the probabilistic laws of nature in the sense of Wildman, he rejects the interpretation of the measurement process as an irreversible collapse of the wave function, as this would lead to discontinuity in the physical description and would therefore be inconsistent.[64] Altaie himself would like to strengthen the statistical character of quantum physics, whereby he does not require an ensemble of individual particles as a statistical whole. Rather, the extremely rapidly alternating values (e.g. the position coordinate) of a single particle, which exist even without interaction, are sufficient due to the rapidly repeating re-creation.[65] Nicholas Saunders himself kept the door open for a new interpretation of quantum theory and especially of the measurement

58 In addition to an ontological reading related to the ensemble, there is also a purely descriptive reading related to the ensemble without ontological judgments. This distinction is based on different ideas of natural laws.

59 Wildman, "Divine Action Project", 144f.

60 Russell, "Quantum Mechanics", 296.

61 Saunders, "Divine Action", 154f.

62 Wildman, "Divine Action Project", 134f, 161-165, 173.

63 Altaie, *God*, 86, note 2.

64 Altaie, *Natural Philosophy*, 156f.

65 Altaie, *Natural Philosophy*, 161.

process that is compatible with quantum divine action.[66] Altaie obviously sees his approach as such a solution.[67]

5.4.2. Definition of an Elementary Event in Divine Determination

This raises the question, not discussed in depth by Wildman, as to what the elementary events are whose outcomes could be connected to the (non-interventionist) action of God. In the case of the quantum divine action models from the Divine Action Project, this is consistently the collapse of the wave function.[68] In addition to the general difficulties of the collapse model, this approach has been criticized for being too "episodic" (John Polkinghorne) - as a result of an interaction between the micro- and macro-world as in a typical measurement - to be suitable as God's sphere of action. Russell counters this criticism by pointing out that there are many more irreversible events in nature that lead to collapse than just encounters between the macro and micro worlds.[69] Nevertheless, it should be noted that the wave functions of physical systems between collapse events are described for a comparatively long time by the deterministic equations of quantum physics. If one therefore defines only the moments of collapse as the elementary events of God's intervention, then this leads to a correspondingly limited potential for "Special Divine Action".

The philosopher of religion Jeffrey Koperski therefore points out that the Girardi-Rimini-Weber interpretation of quantum theory may be better suited as a starting point for quantum divine action than the usual collapse model. In this extended quantum theory, even without interaction, the wave function of a single particle in a body constantly collapses, causing the wave functions in the entire body to collapse. This means that every second 10^5 collapse events of a body could occur every second, which could be a sufficiently high rate for effective control of the collapse results by God.[70]

Altaie's elementary events, on the other hand, by definition no longer depend on collapse models, but on the postulate that all measured quantities of a particle are newly and unambiguously created by God at fixed time intervals according to indeterministic laws. The deterministic development of the wave function between the usually assumed collapse events is no obstacle to this, as it does not determine individual values, but the overall statistics. The basic idea behind this approach is due, as described at the beginning, to the philosophical-theological speculations of the Islamic Kalām theologians between the 9th and 12th centuries, who on the one hand assumed a discrete structure of space, time and matter and at the same time regarded each accident of an atom as existing for only a brief moment, so that it had to be permanently recreated by God and was not subject to any clear physical determination.[71] This classical Islamic theology of nature is the origin of Altaie's fixed time interval for the re-creation of a particle or its principally observable quantities, which is associated with a constant change in the descriptive

66 Wildman, "Divine Action Project", 170f.
67 Altaie, *Natural Philosophy*, 150 ff.
68 Wildman, "Divine Action Project", 170, note 66.
69 Russell, "Quantum Mechanics", 310.
70 Koperski, *Physics*, 171. Auletta, *Foundations*, 408-410.
71 Rudolph, *Occasionalismus*, 48f. Alnoor Dhanani, *The Physical Theory of Kalam* (Leiden: Brill, 1994), 43f.

quantities. Altaie specifies an extremely small value for the concrete duration of this time interval. According to this, a single electron would be recreated 10^{22} times per second with a new location coordinate.[72] This is far above the 10^5 collapse moments per second in the Girardi-Rimini-Weber interpretation of quantum theory. Altaie calculates this extreme numerical value using the correspondingly reinterpreted fundamental Planck-Einstein relationship, which relates energy and quantum mechanical frequency.[73] Overall, the rate of new particle creation at Altaie is therefore not a constant for all particles.

In an interview with Stefano Bigliardi, Altaie named an even more extreme time scale for the time interval of God's interventions in the world: "God is assumed to intervene in the universe one part in ten to the power 44 seconds, or even less than that."[74] This would mean that God carries out (at least) 10^{44} creation processes in one second on a certain object. This seemingly surreal number also has a physical meaning: the associated time interval between two moments of creation corresponds to the so-called Planck time t_p. This is the shortest physically conceivable time interval in which the continuous structure of space-time still exists. The rate stated by Altaie is therefore no longer about the re-creation rate of individual real particles, but about something like the actualization rate of the time dimension we are familiar with. The Planck time associated with this can be obtained from a combination of elementary formulas from general relativity and quantum theory or from a combination of three natural constants.[75] Several speculative theories of quantum gravity today extend this finding and assume a discrete, i.e. "atomized" structure of space-time on this scale. It is only in these theories that Planck time takes on the role of something like the smallest possible units of time, which is obviously what Altaie is aiming for. In the context of Planck time, the analogous Planck length always comes into play, which in some currently discussed models of quantum gravity describes something like the physically smallest possible length. With this as the edge length, minimal Planck cubes can be constructed as "atoms" of space.[76] It can therefore be assumed that Altaie, according to his quote, would like to start his re-creation model at the most fundamental level with these Planck quantities, i.e. with the most elementary building blocks of space-time itself. This would also mean that the visionary atomization of space and time, in the form discussed in Islamic Kalām theology, would have been recreated in a new context.[77]

However, Altaie's written descriptions concentrate on the new creation processes of ordinary particles. Whether something similar can also be formulated on the Planck scale for spacetime quanta using a theory of quantum gravity has not yet been explored. A special feature of the latter would be that the re-creation rate, if it relates to spacetime quanta, would be a constant, as was presumably also assumed in the Kalām. In any case, both extremely short time intervals

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72 Altaie, *Natural Philosophy*, 176.

73 Bulgen, "Daqiq al-Kalam", 00:41:25-00:41:45. The mentioned relationship reads $E = h \cdot f$. E is the energy of the particle, h is Planck's quantum of action and f is the frequency of the wave function of the particle.

74 Bigliardi, *Quest*, 80.

75 The Plancktime is $t_p = \sqrt{\hbar \cdot G/c^5} \approx 5{,}391 \cdot 10^{-44}\ s$ where $\hbar$ is the Planck constant divided by 2π, G is Newton's gravitational constant and c is the speed of light.

76 See Lee Smolin, "Quanten der Raumzeit", *Spektrum der Wissenschaft* (March 2004).

77 Dhanani, *Physical Theory*, 130-132f. Rudolph, *Occasionalismus*, 46-48.

mentioned lead to models of a continuous creation process whose individual steps are extremely far below the time scale for typical measurements or collapse events, but still remain "granular" on the inside. This corresponds to the intuition of the Islamic Kalām theologians, who wanted the smallest building blocks of nature to be created by God at every elementary moment, but did not formulate a time interval for the re-creation process.

5.4.3. Interpretation of the Quantum Mechanical Measurement Process

Altaie's interpretation of the measurement process can now also be explained in more detail. Due to the tenor of the Divine Action Project, Wildman himself primarily addresses the Copenhagen interpretation in connection with the collapse model. In our context, this states in simplified terms that undisturbed particles are in a superposition of several states that are mutually exclusive in classical physics, such as in the form of existence in several places at the same time. This state is described by the Schrödinger equation respectively by the wave function as its solution. However, at the moment of interaction with the environment, for example during a measurement, the particle appears as a classical and localized particle, whereby the wave function has collapsed. This means that the particle now happens to be in one of the previously superimposed states, for example at the specific location so-and-so as an objective reality. It is never possible here to realize the superposed and the localized mode of existence of the location coordinate at the same time. They are complementary to each other. Furthermore, according to Heisenberg's uncertainty principle, it is not possible in this interpretation for the particle to have a clearly defined location and a clearly defined velocity at the same time. This shows the deeply rooted quantum mechanical indeterminism, which always leaves uncertainty at one point. Even at the moment of measurement, when the wave function collapses and the particle accidentally receives a location from the unsharp interval of superimposed spatial states, there is a second quantity (here: the velocity) that is now unsharp in a fundamental sense.[78]

Wildman's only discussed alternative to this interpretation is the many-worlds hypothesis, particularly in the form of the exotic many-minds interpretation. All other interpretations, which according to him number around two dozen, are disregarded - as he considers them to be yet half-baked - in particular also the decoherence model favored by many physicists today as an alternative to the abrupt collapse of the wave function.[79]

So, what does the measurement process in Altaie's approach look like? In this case, the resulting value of a measurement in the laboratory, for example, is the temporal average of the underlying values of the corresponding measured variable, which vary very quickly due to the creation of new values. The specific values are not created by the measurement, but exist also without measurements or interactions in an objective, but rapidly changing form over time. Altaie thus reintroduces the concept of an objective reality into the quantum world, both before and during the measurement process, as is also assumed in the Kalām tradition, and which had largely

78 Auletta, *Foundations*, 117ff., 135ff.

79 Wildman, "Divine Action Project", 156-161. Auletta, *Foundations*, 263-289.

disappeared from the theory of the particle world with the Copenhagen interpretation. According to Altaie, this solves some essential problems in understanding the measurement process.[80]

Since, according to Altaie, every new creation of the position coordinate of a particle is also associated with a new creation of the momentum or velocity of the particle, the values of which are not physically determined, there is still room for Heisenberg's uncertainty principle, but only as an empirical regularity in the measured values and not as an expression of ontological complementarity or uncertainty.[81] Here, in contrast to the Copenhagen interpretation, position and momentum (or the associated velocity) are always sharply defined at the same time (although not necessarily just as "sharply" measurable experimentally), and their statistical fluctuations over time are coupled via the Heisenberg uncertainty principle.

Furthermore, the re-creation rate of a particle or system - according to Altaie's interpretation of the Planck-Einstein relationship - is proportional to the total energy.[82] This means that the more macroscopic an object, the greater the number of times it is recreated during a measurement process. As the measurement only provides an average value, a higher rate of new creations leads to a lower scattering of the measured values around the theoretical average value. This is how Altaie explains why macroscopic bodies almost always show "classical" behavior in our measurements.[83] Individual particles, on the other hand, have a lower re-creation rate, so that a measurement averages over fewer values. This leads to measured values that deviate from the classically expected measured values (or the "expectation values" of the observables), so that the strongly indeterministic basic behavior and thus the typical quantum properties become more apparent. However, Altaie sees an open problem in the question of when one must assume a common increased re-creation rate in composite systems and when the particles retain their own re-creation frequencies.[84]

5.5. Questions on the Resulting Theology of Nature

5.5.1. Scope of Divine Action in Quantum Mechanical Indeterminism

The question here is whether the outcomes of *all* quantum events in nature are determined by God (as in Nancey Murphy, William Pollard and Karl Heim) or only some, such as in the absence of consciousness in the system under consideration (as in Robert John Russell) or even exclusively in God's contact with the consciousness of a living being (as in George Ellis).[85]

For Altaie, it is clearly *all* elementary quantum events in the sense of the last section whose outcomes are determined by God and whose overall statistics must correspond to the quantum

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80 Altaie, *Natural Philosophy,* 164. At the same time, according to Altaie, the perturbation of the measured system by the measurement would have to be adequately absorbed in the potential term of the Schrödinger equation so that this model can be thought of consistently. It would have to be clarified to what extent Altaie's idea of a "passive measurement" can be realized in this way. Altaie, *Natural Philosophy*, 155f.

81 Altaie, *Natural Philosophy*, 161.

82 According to $E = h \cdot f$ energy and frequency of the wave function are proportional to each other. f is interpreted as the rate of re-creation in Altaie's model.

83 Altaie, *Natural Philosophy*, 160.

84 Altaie, *Natural Philosophy*, 282.

85 Wildman, "Divine Action Project", 169-172.

physical laws also decreed by God. Altaie mentions parallels here between his approach and that of William Pollard and emphasizes the stronger dependence of quantum physical laws on God himself in Altaies model compared to Pollard.[86]

5.5.2. The Question of the Freedom of Creatures

The question now arises as to what extent there is still room for the freedom of creatures in view of God's omnipresent creative activity. Here Altaie is clearly in favor of human freedom of will, but without formulating a more precise ontology of will. According to him, God is still the sole creator of the world and its individual physical events, including human actions, but he does so in full consideration of the volitional decisions of free beings such as humans. Altaie writes on the question of the extent to which God cooperates with his creation that such cooperation must be limited to beings with intellect and will:

> "The divine cooperation is best restricted to humans, as they are known to have a mind and a manifested free will. Accordingly, the cooperation can be realized by saying that God has created the world and has allowed us to make our choices within this world according to our own free will; nonetheless, bringing those choices about is subject to God's will, which either endorses or denies them [...] God's will plays the prime part and, at the same time, allows for the contribution of man's free will to play a role in selecting an outcome."[87]

This vaguely formulated passage can be understood in connection with Altaie's overall model as following: The wishes mentioned here are not initially about prayers, but about man's constant volitions and intentions. The aforementioned primary role of God does not refer to the inner choices of man, but to the physical realization of this will, initially in the form of elementary neuronal alignments in the brain at the particle or quantum level, which take place parallel to the metaphysical will process of man or his soul. Due to God's orientation towards laws, this correlation really does take place in a reliable way. Altaie should now be understood in this way: The determination of the brain is not carried out by the human will itself, but by the omniscient God by acting on the brain via the indeterministic nature of the quantum world and thus linking the will to the quantum mechanical constellations in the molecules of the neurons. Depending on this first realization, God then creates the further lawfully correlated reactions in the organism and all subsequent effects up to the external realization of the action. Altaie does not discuss the fact that human will and decisions are largely determined by the neuronal structure of the brain, but concentrates only on the one free element that is not quantified.

Within the traditional Kalām schools, this approach stands between the Ashʿarite concept of the tendentially passive (and ambiguous) appropriation (*kasb)* of a deed created by God for man[88] and the Muʿtazilite concepts of man as an autonomous secondary cause (e.g. *tawlīd*), who becomes the effective cause of his deeds.[89] At the same time, it recalls the Māturīdite theory of action, in which

86 Altaie, *God*, 110.

87 Altaie, *God*, 113f.

88 Nazif Muhtaroglu, "An Occassionalist Defense of Free Will", *Classic Issues in Islamic Philosophy and Theology Today*, ed. Nazif Muhtaroglu et al. (Dordrecht: Springer Science+Business Media B.V., 2010), 48 f.

89 Rudolph, *Occasionalismus*, 42f.

the subject freely chooses and God, if he wills, physically creates the associated act,[90] even if Altaie himself makes no reference to Matūrīdīya. Altaie's sole role of God as creator is not altered by the fact that at one point in his texts he figuratively refers to humans as "secondary creators".[91] By this he means that God creates man's deeds according to man's will, whereby this will is understood as part of a causal relationship. For Altaie, however, causal relationship does not mean that a material cause (or the will) becomes the *causa efficiens* of a physical event, but that the presence of certain characteristics (here: a concrete will) is accompanied in a law-like manner by a certain phenomenon (here: the intended action) as an "effect", the physical realization of which, however, comes solely from God.[92] Taking into account his self-imposed laws, God creates a suitable effect based on the existing characteristics of things and the will decisions of conscious beings. But this effect is not produced by an intrinsic causal power of matter, but is selected by God from a defined set of possibilities. This also seems to be Altaie's general understanding of secondary causes: these are states in the world produced with the intention to be intermediates that force a certain progression of things, not as *causa efficiens,* but as *causa formalis* and an occassion for further creation. This further creation is shaped by God's mathematical-law-like orientation towards the prior states of nature during his permanent creative activity.[93] For Altaie, therefore, secondary causes do not open up a causal but a formal cooperationism between God and the conscious part of his creation. For this reason, he also criticizes approaches such as that of Nancey Murphy, which also seem to attribute a cooperationist participation in creation to inanimate nature, which has no conscious decision-making capacity.[94]

5.6 Proximity or Distance to Occasionalism

With the previous discussion, we have now arrived at the final question: is Basil Altaie's approach an occasionalism, as advocated in part by the Muʿtazilite Kalām, in full by the Ashʿarite Kalām and equally later by the Māturīdite Kalām? Wildman reads the question differently: to what extent is divine determination necessary in every quantum event in order for nature to remain intact at all? This point in particular is important to Wildman in distinguishing the degrees of overall rejection of the Divine Action Project contributors to Occasionalism, with Karl Heim and William Pollard and then Nancey Murphy being classified by Wildman as closest to Occasionalism.[95] This

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90 Yusuf Ş. Yavuz, "Mâturîdiyye", *Türkiye Diyanet Vakfı İslâm Ansiklopedisi* (Ankara: TDV Yayınları, 2003), 28/174. Muhtaroğlu, *Defense*, 49f.

91 Altaie, *Natural Philosophy*, 124.

92 Altaie, *Natural Philosophy*, 179.

93 Altaie, *Natural Philosophy*, 209.

94 Altaie, *God*, 113 f. Altaie's criticism is directed against Murphy's following statement "*I further suggest, on the strength of a similar analogy with the human realm, that we speak of all created entities as having 'natural rights', which God respects in his governance. This is the sense in which his governance is cooperation, not domination*" (cited in Altaie, *God*, 113). According to Altaie, however, unconscious things do not have something like a will that would be analogous to that of humans and would make cooperation possible in the first place. This criticism may be relativized if one understands Murphy's "natural rights" only in the sense of relevance for natural laws. A completely different line of argument, which Altaie touches on in passing, arises if one were to assume a weaker type of will in simpler animals or even in inanimate nature, for which there is no scientific evidence according to Altaie. The alternatives mentioned and rejected here by him, on the other hand, are answered positively by panpsychism, for example. Altaie, *God*, 113.

95 Wildman, "Divine Action Project", 170-172.

discussion is relevant to our topic, as occasionalism is today the most influential model for God's work in the Muslim context, and Altaie must also position himself on this.

To classify Altaie's approach in this context is not very easy, since, as can also be seen in the previous descriptions, he has two opposing tendencies, the contrast of which can be seen particularly clearly in the following summarizing passage: "In our model, God is not a spectator but is a fully active driver who recreates, prescribes laws that He respects, and then selects the outcome."[96] This sentence contains four points:

1) God is the permanent recreator of all things.
2) He prescribes the (indeterministic) laws according to which these things are (re)created by him.
3) He respects these (indeterministic) laws.
4) He selects the result of an event within the framework of these (indeterministic) laws.

Points 1) and 4) in particular speak in favor of occasionalism, which can be understood as a complete rejection of effective causes other than God. Point 2) is ambivalent. On the one hand, it contains an emphasis on laws. On the other hand, the laws or regularities in the Kalām, at least in Ashʿarite Occasionalism, were clearly softer than the natural necessities assumed by the philosophers, since the former were only considered habits (*ʿādāt*) of God or habits in natural events, which could be changed or violated (*kharq al-ʿāda*) at any time by the almighty Creator. However, point 3), namely the emphasis that God consistently observes these laws and thus allows even such great events as miracles to occur only within the framework of the probabilistic laws of nature, seems completely un-occasionalistic.

Due to its importance, point 3) will now be further substantiated using other quotes from Altaie. Altaie himself distanced himself from classical Occasionalism several times by emphasizing the mathematical law-like nature of God's work: "Note that with this vision the explanation of causality no longer follows an apologetic approach or an occasionalist understanding; rather it is a scientific vision that is based on mathematical description and proof."[97] He expressed this even more drastically in his interview with Stefano Bigliardi: "But the will of God is so designed, apparently, as to follow certain algorithms, that is to say, certain laws, which we call laws of nature."[98] With such statements, however, it must be noted that Altaie, like John Polkinghorne, distinguishes between the ontological "laws of nature" and the "laws of physics" that we model, so that we can never be certain that we have recognized the absolute truth about nature, let alone about God's mind,[99] or as Altaie puts it pointedly:

> "[...] the laws of physics are, in fact, our realizations of how the world would act; in no way are these laws necessarily expressing true and actual divine algorithms. These laws are our algorithms

96 Altaie, *God*, 110.

97 Altaie, *Natural Philosophy*, 210.

98 Bigliardi, *Quest*, 80.

99 Altaie, *God*, 27ff. John Polkinghorne, "The Laws of Nature and the Laws of Physics", *Quantum Cosmology and the Laws of Nature*, ed. Robert Russell et al. (Vatican City State: Vatican Observatory; Berkeley: Centre for Theology and Natural Sciences, 1993).

> for the world. Therefore, I would say that we are far from conceiving of how the 'mind of God' works, and we are far from being able to 'catch God at work'."[100]

This means that the omnipotence of God, as emphasized in Occasionalism, is supplemented here by a rational structure of God's creative action, which replaces the non-binding character of *ʿādāt* in favour of a strictly law-like understanding of natural laws, which at the same time have a probabilistic character, but which are themselves controlled in a law-like manner. These laws of nature are not to be confused with a direct projection of our most current theories about nature into the mind of God.

As for the question of causality, we have already seen above that for Altaie God is the sole cause of every elementary event, but that the physical state of the world as well as the volitional decisions of free beings are always bindingly taken into account by the laws of nature, which in turn are mathematically encoded. This can be read as a compromise between the efficient secondary causes of the Islamic philosophers and aspects of the teachings of the Muʿtazila on the one hand and the strictly occasionalistic understanding of the Ashʿarites on the other.

Finally, a relatively new position of Altaie on the question of Occasionalism should be pointed out, which he formulated in a webinar in response to Nazif Muhtaroğlu's objection that Altaie's understanding of causality is compatible with Occasionalism, contrary to Altaie's statement. Altaie responded to this:

> "In occasionalism there is no clear role of the law. In my occasionalism, if you like to express it [in this way], I say there is a law which is devised by God. And again I take it from the Qur'an: *khalaqa s-samāwāti wa l-arḍa bi-l-ḥaqq*.[101] *Bi-l-ḥaqq* to me means there must be a law. A law, persistent law. It's not 'every time they change'. For example: 'now gravity is attractive, tomorrow the gravity will be repulsive because God wills so.' God has devised gravity to be attractive."[102]

Muhtaroğlu replied: "It's a new modern form of occasionalism." And Altaie replied: "Yes, of course."[103]

6. Discussion and Outlook in Eight Theses

In the following, some of the central topics and questions that have arisen in the context of dealing with the Altaies model will be presented and discussed in the form of eight theses. The eight theses touch on scientific, philosophical and theological aspects.

Thesis 1: *Altaie's approach is a formal "Theory of Everything" based on an Islamic-theologically founded particle ontology*

It is remarkable that the basic structure of Altaie's approach does not, for example, start with the collapse of the wave function and from there draws on metaphysical interpretations. Instead, it starts with a classical model from Islamic theological metaphysics, but does not deal with it

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100 Altaie, *God*, 113.

101 "*He has created the heavens and the earth in accordance with (an inner) truth [al-ḥaqq]*", at-Taġābun 64/3. The central term here, *al-ḥaqq,* includes also meanings such as justice and law.

102 Bulgen, "Daqiq al-Kalam", 00:55:13-00:56:00.

103 Bulgen, "Daqiq al-Kalam", 00:56:00-00:56:07.

dogmatically, but adapts it in the sense of critical realism to the empirically assured state of knowledge of the sciences, without, however, adopting the philosophical interpretations of nature that are widespread today. Accordingly, Altaie reinterprets the accidents of the atomic theory of the Kalām theologians from the former Baghdad and Basra as physical observables known today. However, Altaie did little to change the fundamental particle ontology of these scholars, as his relativization of fundamental field ontologies and realistic interpretations of the wave function show. This combination of pragmatic adaptation of the atomistic Kalām model at its periphery while at the same time insisting on its basic structure makes Altaie's approach a coherent, comprehensive ("traction") and compact model of nature that represents a possible compatibility model for the doctrine of continuous creation and modern natural science. It is at least in principle capable of interpreting cosmology and the theory of evolution theistically within the same framework as physical events in everyday life and at the particle level - in extreme cases even with the ability to "absorb" miracles. God consistently appears omnipresent in Altaie's model, but always in the clearly defined role as the metaphysical realizer of one physical possibility out of many possibilities that are probabilistically given by the laws of nature - laws of nature that were in turn enacted by God himself, on the basis of a wisdom that is no longer the subject of natural science. However, this also means that if, instead of God, another cause could be given for the transition from pure possibilities to a concrete reality of particles, then the model would lack a "safeguard" for the actually decisive theological component at this point. This can be interpreted as both a disadvantage and an advantage, depending on the claim to the "theology-ladenness" of a divine action model.

Thesis 2: *Altaie's approach is an occasionalism with a strong isonomy*

As much as Altaie does not want to describe his model as occasionalist, the arguments for regarding it as a borderline case of occasionalism nevertheless prevail. The borderline case arises from the binding charactere of the laws of nature along which God carries out his work of creation. Even though these laws are enacted by God, they limit the overall course of his creation. The constant and homogeneous nature of the laws of nature - i.e. the *isonomy* of nature - can be understood in a weak sense, as a fact of habit and intuitive expectation that has always been confirmed. Most *ʿādāt* conceptions that refer to regular natural processes go in this direction.[104] However, isonomy can also be understood in a strong sense, which would imply that the principles of the creative activity of the primal ground of being - nature or God - are ontologically invariant. Altaie advocates a strong isonomy. However, he absolves God from being a strict follower of physics as we know it - rather, it is the ontological laws of nature that God has decreed and which we can at most model approximately. The most important intersection with scientific knowledge, which is necessary for his model, is the concept of physical indeterminism at the particle level. This axiom is also the Achilles' heel of Altaie's model: If one were to opt for an interpretation of quantum theory that is deterministic in its physical foundation, an important role of God, namely the absolutely free decision about the concrete outcome of an individual particle event, would be omitted from Altaie's model. But even then, God would still remain the

[104] Rudolph, *Occasionalismus*, 43-46.

law-giver and the reality-giver of events whose outcome is now clearly determined by law. This would place the Kalām model in the group of compatibilist models.

Thesis 3: *Altaie's approach inverts the nomological-deductive explanatory model towards an ontology*

Altaie's concept of nature is phenomenologically largely equivalent to naturalistic conceptions, but metaphysically free of any autonomous nature in the full sense of the word. This can be illustrated with the following comparison: a model of scientific explanation widely used today is the nomological-deductive approach of Carl Gustav Hempel and Paul Oppenheim. According to this approach, an individual phenomenon is considered to be scientifically explained if it can be derived from a general (and scientifically acceptable) theory by applying the boundary conditions of the individual case. Competing theories can lead to competing explanations of an individual phenomenon, so that a further consideration can become necessary. This explanatory model, which is fundamental in physics in particular, makes no statement about the metaphysical status of laws in general or about the ontology of causality: all that counts here is the fit between empirical data and the prediction of the theory. Altaie's approach can now be interpreted as an ontologically inverted reading of this nomological-deductive approach: every elementary particle event is an act of God's creation, the form of which is conditioned on the one hand (a) by a universal law of nature that exists in God's knowledge and which we can at most approximate, and on the other hand (b) from the boundary conditions of the current properties of a particle and its environment, which God knows and takes into account in a binding way in his further creation. In this way, the law of nature is ontologically upgraded, causality is theocentrically reduced and the boundary conditions of the physical situation become parameters of future creation. From this it becomes immediately apparent that this is a model of creation that is very much based on physics. Its compatibility with physics should therefore not come as a surprise. On the other hand, it *is* precisely physics that has provided the modern basic models for the other natural sciences. Islamic theology is therefore certainly not wrong to seek advice from philosophizing and theologizing natural scientists (not just physicists) in its desire to make theological statements with objective relevance about nature and creation. This is not an uncommon approach. A publication of the Divine Action Project on the subject of evolution begins with an appreciative greeting from Pope John Paul II, who asks the researchers to advise the Church scientifically and to enter into a dialogue with its world view.[105] The result was a project that has significantly stimulated and shaped the global science-and-religion discourse.

Thesis 4: *Altaie's approach challenges the philosophy of quantum theory and is challenged by it*

Altaie emphasizes at various points that neither his model nor the models of classical Kalām can claim to be certain. At the same time, his model calls many of the physicists' habits of thought into question. These include not only the abandonment of the collapse of the wave function as an irreversible and discontinuous event, but also, for example, a questioning of the ontology of the superposition principle.[106] Another open question would be to what extent there are already comparable approaches to Altaie's model in the philosophy of quantum physics. In his works,

[105] Robert J. Russell et al., *Evolutionary and Molecular Biology* (Vatican City State: Vatican Observatory; Berkeley: Centre for Theology and Natural Sciences, 1998), 2 ff.

[106] Altaie, *Natural Philosophy*, 281.

Altaie has taken a position on numerous interpretations of quantum theory, but not yet, for example, on the Girardi-Rimini-Weber interpretation, which postulates a very frequent spontaneous collapse of the wave functions of the particles in a body, which leads to regular localizations of all particles even without measurement processes or classical interactions. Similar to Altaie, it is assumed here that the localization rate increases the more macroscopic the body is.[107] One could critically question Altaie's model as to whether it does not ultimately achieve a very similar effect to the Girardi-Rimini-Weber interpretation, but not by laboriously extending the Schrödinger equation, but by reinterpreting the Planck-Einstein relationship and adding empirically unnecessary metaphysical postulates. On the other hand, the Girardi-Rimini-Weber interpretation is an example of how the solution of a problem by mathematical extensions of the theory can give rise to new problems and points of criticism - among other things to the effect that the central equation of this theory has similarities to the decoherence master equation, which, however, manages entirely without spontaneous collapse.[108] In this respect, Altaie's approach is more economical insofar as it remains with the interpretation of already given equations and theories. Whether this is an advantage or disadvantage overall is, of course, another question.

Thesis 5: *Altaie's divine action approach is a non-theodicy-sensitive approach*

Theodicy-sensitive divine action models, which attempt to consistently align their entire structure with the theodicy problem, want to show that God cannot be omnipotent or capable of intervening in the sense that one could justifiably ask him why he allows suffering. Non-theodicy-sensitive approaches, on the other hand, point e.g. in Islamic theology to reasons such as the testing nature of the world or the only temporary delay in making amends for suffering.[109] The question of theodicy is not denied, but it is decoupled from questions of God's omnipotence and creative activity. Like Pollard, Murphy and Russell, Altaie's approach sees no reason to fundamentally question the omnipresent and direct action of God in the theodicy problem in the sense of this article. The causal approach pursued by Altaie is correspondingly uncomplicated and homogeneous, and his response to the possibility of theodicy-sensitive divine action models that limit God's influence on the world a priori is surprisingly succinct: "But the question remains of how a merciful and compassionate God could order an evil act of nature to take place. It seems to me that God did not create this world to entertain humans; otherwise, He would not have created the qualities and laws that enable natural evil to happen in the first place."[110] Ultimately, however, this also means that for God the observance of universal natural laws is more important than the avoidance of local suffering. A model such as Altaie's should therefore be questioned as to why God should have elevated the *isonomy* of the world to one of the most fundamental principles of creation, despite the possibility of adaptively circumventing it at any moment. However, it should also be considered whether an isonomy of the world, if it is not caused by a metaphysical natural

107 Auletta, *Foundations*, 410.

108 Auletta, *Foundations*, 367, 410.

109 See Cafer S. Yaran, "Theodizee im Islam", *Handeln Gottes - Antwort des Menschen*, ed. Klaus von Stosch – Muna Tatari (Paderborn: Ferdinand Schöningh, 2014), 55-70.

110 Altaie, *God*, 112.

necessity but by the nature of God as the sole Creator, could not also be a consequence of the unity of God in the sense of the doctrine of *tawḥīd:* the laws of nature are simple, unified and highly productive because God himself is simple, one and highly productive in a certain sense. This would be a reading of the cosmos in the sense of a "best of all worlds possible" (al-Ġazālī; Leibniz), which does not define the "best" solely in terms of minimizing suffering, but considers it in a totality with mathematical and nomological perfection of all creation. However, if isonomy is not metaphysically distinguished in such a way, but represents only one of many equivalent possibilities with which suffering could have been reduced, then the theodicy problem is exacerbated.

Thesis 6: *Altaie's approach demonstrates the potential of natural science for interreligious dialogue - also with regard to Occasionalism*

Until modern times, the study of natural science and philosophy was not an endeavor that could have been understood as an essential characteristic of a single culture or religion. With colonialism, however, the impression arose, especially in the Islamic world, that there was only one modern natural science, shaped by the *West*, whose "natural" interpretation had to correspond to a materialistic naturalism that was considered unacceptable to devout Muslims. This led to ideological polarization in the Islamic world, the devastating consequences of which continue to this day. The fact that this monolithic view is a mistake is demonstrated by the great efforts of Christian and Muslim thinkers to show that one and the same natural science can be interpreted in several ways, and that even modern Abrahamic theism allows for many different interpretations of the state of knowledge of natural science. The intensive reception of Christian-influenced scientists and philosophers by Altaie in their search for a theistic interpretation of nature is an example of how intellectual exchange between the various religious traditions can once again become a matter of course. The need for interreligious dialogue in questions of the interpretation of natural science is also emphasized on the Christian side. In leading journals in this field (Zygon, Theology and Science), Muslims are also taking part in the interdisciplinary discourse on religion and science.

Another important aspect that has become visible in this study is the controversial role of Occasionalism. While it is largely avoided in the Christian context, although there have been many Christian occasionalists since the Cartesians of the 17th century, in the Muslim context it is still highly praised by many authors today, among other things because of its conceptual simplicity, the clear role of God as the sole and omnipotent creator and the possibility that rational human beings - despite the uniqueness of God as a genuine cause of action - can still possess freedom of will. Therefore, the status of Occasionalism would certainly be a fruitful interreligious field of discourse in the science-and-religion context.

Thesis 7: *Altaie's approach is an example of the potential of Islamic theology for topicality and communication*

There are some disadvantages when theological thinking makes itself dependent on the current state of knowledge of natural science. But as long as a distinction is made between core theses and changeable additions, this can also become an advantage through genuine topical relevance. Natural science itself can only benefit very little from metaphysical interpretations of its results.

But religious scientists in particular and all people interested in science can benefit from it, as such interpretations make it possible to interpret the world in a large and naturally subjective context. A reflective Islamic theology can provide the intellectual tools to be able to think of seemingly alien or even opposing areas of life such as natural science and (not only Islamic) religion as a harmonious unit in a higher educational synthesis. This also means that it can help to break down the dichotomy between Islamic-religious identity and modern scientific-rational identity, which is still perceived today, and show possibilities for coherent syntheses of identity. Altaie has shown that the Kalām can be an interface here, as it has a mature repertoire of approaches that touch on our relationship to the unconditional and reach far beyond theological subtleties. In contrast to the Falsafa, for example, the Kalām also has the advantage that it enjoys a high reputation within Islam, even in many traditionalist circles, so that Altaie did not have to invent anything completely new in the presentation and use of *daqīq al-kalām*, but only made the old known and thus revived and partially revised it. In view of the challenge posed by modern science, Altaie succeeds in relativizing intra-theological disputes and directing attention to the essentials of the Kalām. He thus comes to the conclusion that the Muʿtazilite and Ashʿarite Kalām are much closer to each other than is often claimed and that, in retrospect, in most cases it is only gradual differences that separate the theologians.[111] At a time when the Islamic world is suffering from disputes between representatives of different schools of law and Islamic schools of thought, Altaie's message that Islamic theology can bring Muslims together both within Islam and with modern science and people of other religions is a valuable one. One disadvantage of the Kalām is that it hardly comments on the *ʿādāt* or the laws of nature itself, while the atoms and their accidents receive a great deal of attention. These are places where the traditions of Falsafa and theoretical Sufism can offer important impulses for a holistic interpretation of modern natural science from an Islamic perspective, since both look more at the big picture, including the abstracts, than the *daqīq al-kalām,* which focuses on the atoms. Thus, in the commentaries of Averroes on Aristotle's Metaphysics, there are considerations that the manifold forms in the world that define the essence of things and their causal potentials, with the increasing ascent of the intellect towards God, are increasingly unified in a single eternal primordial form (*ṣūra ūlā*), which already carries the entire diversity of natures in the most elegant and simple way. A comparison with the unification of natural laws common in theoretical physics up to the still speculative concept of a physical "Theory of Everything" is obvious.[112]

Thesis 8: *An integrated view of modern science and Islamic faith is possible*

Even if Altaie's model should not endure: the interpretation of the physical world as a *creatio continua* or permanent re-creation (*taǧaddud al-khalq*) by God, starting with the smallest things, is one of those core theses of the Kalām whose "long-term stability" (Wildman) can be considered relatively secure even in the face of scientific progress, though it is not unrivaled even in Islam. It is a possible formulation of the universal core of the Islamic faith and is therefore not necessarily bound to a specific physical theory. A believer who looks at the world through this

111 Altaie, *Natural Philosophy*, 119f.

112 See Hakan Turan, "Die Metaphysik des Averroes neu gelesen. Der Andalusier und die Weltform(el)", *Islamische Philosophie (Band 5)*, ed. Muhammad Sameer Murtaza (Hamburg: Tredition, 2024), 105-152.

lens can see the omnipresent work and care of Allah in all things, no matter how small. This does not require knowledge of quantum physics or the Kalām's theory of accidents. Rather, it requires openness to a sensual and spiritual experience of reality. Such a view can lead to an awareness of the comprehensive presence of God in all things, without equating the world with God. Intellectual efforts that allow people to feel spiritually at home in the here and now in this or a similar way should be taken seriously by contemporary Islamic theology. And if such efforts succeed in conveying an integrative view of modern science and faith in creation beyond the present moment, then they can also become the offer of meaning that religions once promised people, regardless of their religious beliefs, especially in times of a crisis in the legitimacy of religion.[113]

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