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# IDEAS OF MUSLIM PHILOSOPHERS ABOUT ATOM IN 9<sup>TH</sup> AND 10<sup>TH</sup> CENTURIES

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#### ABSTRACT

In this work, we examine the ideas of Muslim Philosophers' or so called Mutakallimun, who lived in 9<sup>th</sup> and 10<sup>th</sup> centuries, about atom, structure and properties of atom as well as the origin of their atomist ideas. Mutakallimun, were the first theologian-philosophers in the history of Islam who sought to affirm theology on rational principles of Kalam. El Allaf, Razi, Cubbai, Muammer, Hisham al Fuvadi, Bakillani, Ibn Furek, Nazzam, Zakariya Razi, are among the thinkers of this period. In the study, first the atomism in the Ancient Greek world is introduced. Second, the origin of the atomist ideas in the Islamic world will be discussed. Afterwards, atomist and non-atomist ideas of Muslim thinkers were introduced. Finally, atomism in the Greek, Islamic and Indian world compared and contrasted.

Keywords: Mutakallimun, Philosophy, Atom, Accident/Arad, Democritus

#### **1. INTRODUCTION**

Atomist ideas originally are put forward by Ancient Greek philosophers Leucippus and Democritus. Democritus (BC. 460-370), a young contemporary of Socrates, is the first philosopher who formally introduced the idea positing that if one continually kept dividing matter, eventually a particle would be reached that could not be divided anymore: an a-tom, i.e., "not divisible". The theory by Democritus stated that *The universe is composed of two elements: the atoms and the void in which they exist and move*. (Berryman, 2004). For atoms to change, motion is necessary. Motion is only made possible by a void or "a space entirely empty of matter through which atoms can move from place to place.

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Democritus hypothesized that atoms are eternal, *cannot be destroyed*, are always *moving*, *and are indivisible*. He believed that there are an infinite number of atoms. Democritus argued that multiplicity is nothing more than different combinations or regulations that come from one same thing which is atom. Everything in nature can be reduced to these elementary particles, which are indivisible particles of matter. So there are so many things in nature that can not be counted, but all of them can be reduced to one thing, to the atom, or substance. Therefore, really existed things are atoms or substances, and the multiplicity in the outer world is nothing more than appearance. Secondly, Democritus adopted the mechanical materialism, which claims that the essential property of matter is the movement. Consequently, there is no need to think of an outer causal agent for matter to be able to move (Cevizci, 2015).

According to Democritus, atoms have only several properties: size, shape, and mass; the differences in the substances derive from the differences in their atoms in terms of their size, shape, mass, positions and arrangement. However, Democritus argues that sensible properties are not intrinsic properties of the atom. He argued that properties we attribute to matter, such as color and taste, are unreal. He says:

Sweet exists by convention, bitter by convention, color by convention; atoms and void [alone] exist in reality...We know nothing accurately in reality, but only as it changes according to the bodily condition, and the constitution of those things that flow upon (the body) and impinge upon it. (cited by Kefee, 1997)

Furthermore, Democritus believed that the real properties of atoms determine the perceived properties of matter—for example, small, pointy atoms are responsible for the sharp taste, while large, round atoms constitute sweet things; the interactions of those atoms with the atoms of the tongue give the impression of taste. The reason for some objects are particularly solid because their atoms have hooks to attach to each other; and some are oily because they are made of very fine, small atoms which can easily slip past each other (Norman, 2002).

#### 2. IDEAS OF MUTAKALLIMUN ABOUT ATOM

Kalam, which can be defined as "the science of debate" denotes a discipline of Islamic thought generally referred to as 'theology' or (even less accurately) as 'scholastic theology'. The discipline, which evolved from the political and religious controversies that engulfed the Muslim community in its formative years, deals with interpretations of religious doctrine and the defense of these interpretations by means of discursive arguments (Radiman, 2019). Mutakallimun were the first theologian-philosophers in the history of Islam who sought to affirm theology on rational principles of Kalam (Bulğen, 2019).

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Ebu-l Huzeyl al Allaf, is the first thinker who brought Islamic thought the indivisible particle (cevher i ferd) or (cüzün la yetecezza) concept and put forward an atom-centered philosophy. Mutakallimun accepted theory of atoms. However, as Pines indicates, there were some critical differences between their atoms and of the Greeks (cited by Dhanani, 1994). Abul Hasan al Ash'ari (d.935) states that there is a strict difference between an atom and a body: a body (cism) is three dimensional (must have a length, breadth and depth), on the other hand, an atom (jawhar) does not posses each and every one of these properties. On his Makalat, Ashari describes the views of ninth century philosophers on the constitution of the smallest object out of atoms:

1) Abu al Hudhayl al Allaf (d. 841) described a body has a right and left (side ) a front and a back, and a top and a bottom. The smallest that a body can be is 6 atoms, the first of a pair is the right and the other left (side); the first of (the next) pair the front and the other back; and the first of (the third) pair the top and the other the bottom.

2) Muammer (d. 830) described a body as three dimensional. The smallest body consists of eighth atoms. He claimed that when an atom is joined to another atom length is formed; breadth is the joining of two atoms to these two; and depth is formed when four atoms are placed on top of these for atoms. Therefore, eight atoms are a body which is long, broad, and deep

3) Hisham el Fuwati(d. First half of ninth century) held that the smallest body consists of 36 atoms: there were 6 building blocks (arkan) each block consists of 6 atoms. Therefore, what abu al Hudhayl said was a minimal body, according to Hisham is a building block (Dhanani, 1994).

According to this report it is seen that these three Mutakallimun accept the idea that atoms constitute bodies, yet they argued that atoms are not three dimensional, therefore several of them must be united to form a body. Besides, Mutakallimun have different views on how many of them needed to combine together to form a smallest object.

While it is unreasonable for atoms, which are regarded as point-like entities with no extension, to come together and form bodies having dimensions, why did these thinkers have such a claim? Perhaps, at that specific era, the idea of a particle's - which is so small that cannot be seen-possessing all the characteristics of the visible entities might have seemed to be impossible for them.

Mutakallimun also posited that all matter composed of identical atoms which do not possess any distinctive properties, an idea opposite to the views of Greek philosophers. According to Mutakallimun atoms did not have properties such as smell, color, taste and temperature on their own, they only accept these properties. These properties are called *accidents (arad)*. Arad(accident) is defined as something that emerges accidentally and suddenly; which has not a

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continuous presence in the dictionary. According to the majority of Mutakallimun, the presence of accidents is known by sensation, observation and mental necessities, so there is no need to prove them. However, some Mutakallimun used some evidences in order to determine the existence of accidents. For example, they argued that the situations such as movement-rest, separation-unite seen in an object are separate from the object itself. If these were in the essence of an object, it would not have been possible for such opposing things to occur in it, as long as the object existed. Therefore these qualities are out of the essence of the object and they are arad (Günaltay, 2008).

Accidents are considered as a category of ontological entities by Mutakallimun. Any differences between objects derive from differences between inherent *accidents* of their atoms. Atoms acquire quantitative properties of width, height, and breadth when two or more of them unite; and they only acquire qualitative properties such as color, temperature, speed or rest as well as knowledge, power etc. when an *accident* is created within them. Atoms, by accepting accidents, form different objects with different properties; and these entities are continuously created. Mutakallimun strongly believed that both atoms and accidents were created and therefore were not eternal (Erdemci, 2016).

Mutakallimun also posited that "no accident can last two successive instances of time". In other words, as soon as an accident is created it ceases to exist. This means that if an object were to say remain in a state of rest, the accident of rest must be continually created and recreated at each successive instant in time for the object remain so. Mutakallimun believed that each and every accident was created by God on each and every instance of time which means that the entire universe was directly controlled by God at each specific instance (Radiman, 2019).

Certain Mutakallimun's ideas about the atom were extremely different from the majority. For example, ideas of Zakariya al- Razi(864-925) who is known as the father of Chemistry was very similar to the ideas of Greek philosophers, Razi theorized that matter made up of invisible particles(atoms) which were separated by void. According to Razi, the lightness or heaviness of an object depends on the void between its atoms. The greater the density of material atoms, the heavier and more solid the resulting object; conversely, the larger the portion of void, the lighter and less solid. Atoms produce the five elements, namely, earth, water, air, fire, and the heavenly element depending on the proportion of the atoms and the void (Nadawi, 2015). For example, what is more compact becomes the substance of the earth, what is more rarefied than the substance of air, and what is still more and more rarefied becomes the substance of fire. (Ansari, 1977). Razi believed that the absolute or first matter is composed of atoms and each atom has

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volume. According to Razi if atoms did not have extension, it would not be possible for them to form a body.

Razi also claims that atom is eternal, because it is impossible to admit that a thing comes from nothing. He gives two proofs to establish the eternity of matter: 1. If God is eternal, then his creation, which is his act must be eternal, therefore, the existence of matter is co-eternal with the existence of the Creator. 2. He maintains that it is far easier for the Creator to create than to compose (Ansari, 1977).

Another Mutakallimun who opposes atomist views is Nazzam, who is a student (and nephew) of abul Hudhayl al Allaf. He opposed to the atom-accident ontology held by most Mutakallimun and argued that everything around us is a body. Moreover, bodies, as well as space, did not have an atomic structure, but a continuous one (McGinnis, 2018). However, continuous space and motion idea caused Nazzam to deal with Zeno-style paradoxes. Abu Hudhayl al Allaf openly confronted him with the ant-sandal paradox. Allaf claimed that if continuity of space and motion is accepted; an ant who wants to cross a sandal from one end to other end will never reach the other end since on his way there is always a half he must pass at first and continues like that infinitely (Nadawi, 2015).

Nazzam's solution to this paradox was to maintain that a moving object, such as an ant, could cross a continuous space with its infinite number of halfway points by means of a leap (*tafra*). The general idea was that a moving body could cover a continuous space by making a finite number of leaps and that during each leap the moving body is not in the intervening spaces. In other words, a moving body leaps from some first place to a third place on a continuous magnitude without having passed through any second place between the two (Demir, 2019).

There were other ideas that were held by most of the Mutakallimun that Nazzam rejected. Nazzam presented a profound argument, asking highly reasonable questions:

How can, an atom without extension, acquire extension when combine with another atom without extension like itself?

If it does not have an extension how can it come together with one or more atoms?

Even if so, it can combine with other atoms only from different directions, however if atom does not possess extension it does not possess different directions as well.(cited by Nadawi, 2015)

#### 3. DIFFERENCES AND SIMILARITIES AMONG THE IDEAS OF MUSLIM, GREEK, AND INDIAN PHILOSOPHERS

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There are differences between Muslim, Greek, and Indian atomism although there are similarities in terms of conceptual and qualitative properties. Muslim philosophers use the Jewher-i ferd (atom), arad(accident) and body as proof of the existence of God and as proof of the continuous creation. According to them, atoms do not have qualitative properties such as shape, color, taste, and temperature, so they need "arad (accident)" to gain these properties and accidents are continuously created. However, Epicurus and Democritus have used the atom to explain the nature without needing a God. According to them, while atoms were eternal, according to Muslims, atoms were created from nothing. Indian philosophers, similar to Greeks claimed that God created universe from eternal atoms. Although the Indian atomism is different from Kalam atomism since they accept atoms as eternal, still it is similar to Kalam atomism since they don't regard atoms as physical beings which can move mechanically, rather as entities which are created or destructed by divine intervention (Karadaş, 2002).

In the Greek philosophy, atoms can not be separated from their qualities such as hardness, size and weight, since they are regarded as possessing their own beings. For this reason, they do not have an accident concept. However, Mutakallimun have an accident concept and they regard accident as a separate entity category. According to the thought of all Mutakallimun except Nazzam, atoms are different from accidents that are attached to them. By means of accidents, atoms acquire properties such as temperature, movement, taste, and smell. Accidents are not permanent, they are continuously created and ceased to exist (Bulğen, 2010). Accident concept also exists in Indian atomism. Similar to Mutakallimun, Indian philosophers held accident idea. The accidents are color, shape, smell, taste, volume, quantity, combination, separation, before, after, knowledge, love, and so on...That is they have immaterial accidents as well as material. They also believe that every substance has a soul (Günaltay, 2008).

Kalam atomism is much like the Indian atomism rather than the Greek atomism (Günaltay, 2008). According to Indian atomism, the first element that constitutes matter is dimensionless- it does not fill up space (Vaisheshika philosophy). Indian philosophers believed that objects are formed by the conjunction of atoms and at least three atoms are required to form an object which is very similar to ideas of Mutakallimun. However, Democritus claims that every atom has a certain shape and volume therefore three-dimensional. As mentioned before, according to Democritus sense-perceived properties of matter such as sweetness or color are unreal and just impressions. Indian atomists also believed that perceived qualities of matter (visesa) must be logically inferred, since atoms and immaterial substances imperceptible. They also conferred that physical change is due to the combination and dissolution of atoms (Tablan, 2012). Ideas of Mutakallimun, on the other hand completely different since they regard these properties as a separate ontological entity category (arad/accidents).

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Greek atomists have the void and entity idea. According to Democritus, there must be void for atoms to move into, i.e., a space that they do not currently occupy. Indian atomist philosopher Kanada also argues that void is essential "to render intelligible the non-existence of an originated thing both before it comes into being and after it ceases to exist, as well as the determinateness of its characteristics which excludes from it those qualities which would make it some other thing which it is not" (Hacket, 1970, cited by Tablan, 2012).

#### **4. CONCLUSION**

In this paper, ideas of Muslim philosophers about atom in the 9<sup>th</sup> -10<sup>th</sup> centuries were examined. The relationships between their ideas and the Greek and Indian philosophers were explained. The most significant difference between them: According to Greek philosophers, there are different types of atoms; and atoms exist with properties specific to them, and they are eternal. However, Muslim philosophers claimed that all atoms are dimensionless, they do not have distinctive properties, and what make objects different are the arads (accidents) which are attached to them. The atoms and accidents are different categories of entities; and they need to unite to form a body. Indian philosophers' ideas are similar to those of Muslim philosophers in terms of accident concept and dimensionless atoms.

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