

# God particles in the perspective of The AlQuran Surah Yunus: 61 and modern science

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**Abstract.** The Qur'an is the book of Allah revealed to guide human beings, setting the rules of life to enable them to achieve happiness in this world and hereafter. The Qur'an has mentioned various scientific nature detailly and accurately so we are able to find new knowledge which is previously unknown by human being. One was about the God particle (Higgs Boson). This article aims to provide a deeper understanding of the concept of the Higgs Boson, the Higgs Boson explained this concept in detail related to 1) Perspective of science 2) Perspective of Al-Qur'an 3) Development of technology or science and technology. This study is a qualitative research using library research (library research) that examines and analyzes the books relating directly or indirectly. The results of the analysis states that 1) The concept of the Higgs Boson particle in terms of basic science is also the reason why almost all elementary particles have a greater mass, 2) The concept of the Higgs Boson in the Qur'an is implied from the results of the comparison interpretation of the commentators in Surah Yunus paragraph 61 related to Atom concepts and smaller particles theory of (Higgs Boson), interpretation of Al-Maraghi, and Al-Misbah. 3) The concept of the Higgs Boson in science and technology provide the most advance technology and it is the greatest achievement in the world of science and technology.

## 1. Introduction

The progress of science in modern times accelerates the technology and vice versa [1]. As a result of both the developing and growing faster than in other social institutions, frequently cultural gaps are attended by some social tensions and psychology. Gaps and tensions on the one hand due to the delay of man in anticipation of the development of science and on the other because the human delay in meeting the challenges and demands as a result of technological advances.

Science news in the book of the Qur'an proved aligned with the findings of contemporary science and modern science. Although the Qur'an is not an encyclopedia of science, but it gives the general principles of scientific studies and motivation for Muslims to understand the universe and its contents to get closer to God [2], and every word in the sentence which tells the phenomena of science comes from the Possessor of Science, so it has a very precise meaning.

The scope of physics in the teachings of the Qur'an is very confront thinking that underlies his efforts, as well as various conceptions, just as we find some verses that are relevant to the development of physics itself. As in Q.S. Yunus verse 61 that uses the word small ant to refer something smallest, and the prevalent word of these words is small ants or tiny dust particles, since this word is associated with the smallest item referring to an atom, then the small ant in this surah is often interpreted as an atom [3], when referring to the implied meaning in surah Yunus verse 61, the Qur'an since 15 centuries ago



has hinted that the atom as small ant or small. This statement is in accordance with the word of God in the Al-Qamar verse 49

إِنَّا كُلَّ شَيْءٍ خَلَقْنَاهُ بِقَدَرٍ ۙ ٤٩

Meaning: We have created everything according to size

The atom that although there is a small size. God created everything, including quark which is smaller than protons and neutrons which have the size and mass vary according to place and they work. Thus some object has the size and weight (mass), although the object was a small thing though.

It is known that the mass of an object is related to the amount of material it contains, and which forms the material, namely the collection and combination of atoms [4]. And in translation of QS. Yunus verse 61 uses the word does not exist (also) smaller than that and bigger, can mean that there is something smaller than the atoms called protons, neutrons, and electrons. But now the composition is increased because of god particle findings (Higgs Boson) which is now the concept is still developed. It discusses the process of the mass forming in which the beginning of a process that happens in an empty room into a Higgs field which later this Higgs particle boson will attract some of the particles will form larger particles and massless. This quadruple mass of particles fused with other particles includes mass to be a matter that will become an object which is commonly observed.

One element in the development of physics is an analysis of the data collected from the various measurements of the magnitudes of physical looks done through a process of critical thinking, which then proceeded with the evaluation of the results with the reasoning sound to reach the conclusion that a rational [ 5]. In the theory, if people with enough energy are capable of separating the Higgs Boson particle of an object, then the object cannot be seen or loss of form, but it is not meant missing. It is necessary for an in-depth study of the development of the concept of the God particle Higgs Boson in view point of modern science and Quran Surah Yunus verse 61.

## 2. Numerical Methods

The approach used in this study is qualitative research library technique, namely the research literature by examining and analyzing the books relating directly or indirectly to the title which the author discussed [6]. Based on the source, the data can be divided into two: 1) the primary data, the source that contains information or data about the God particle theory in the concept of hig Bosson either of the previous research as well as articles in journals and books. The materials relating to the concept of the God particle higgs Bosson in the Qur'an used the method of interpretation of the various sources of commentators, especially for the interpretation of the Qur'an surah Yunus verse 61 [7]; 2) secondary data are data obtained from sources obtained from ungenuine sources, the information or data [8]. Data analysis techniques performed are: 1) Mechanical Inductive Thinking, it is the process of organizing facts or observations are separated into a series of relationships or generalization (Saifudin Azwar, 1998: 40). 2) deductive method, it is a process approach that departs from the general truth about a phenomenon (theory) and generalizes the truth at an event or specific data which typically similar to the phenomenon in question; 3) Mechanical comparative Tafsir, exegesis is a method using a comparison among one another [10]. This method is used to identify similarities and differences of objects, people, working procedures, ideas, and criticism of a case.

## 3. Results and Discussion

The development of science is driven by the discovery of a phenomenon that cannot be explained by the old theories. The physicists have been researching the origin of the material. Wood fibers, for example, are composed of cells. Most of the cells are made of molecules. The larges composition of molecules is composed of atoms, and lastly, the atoms are made of subatomic particles, and subatomic particles are composed of elementary particles. In other words, the "material" is actually a set of patterns that are not obvious. Searches the base material of the universe ends with the conclusion there was not any.

### 3.1. Analysis of the concept of God Particles Higgs Boson Science Perspective

All matter in the universe is composed of elementary particles, and the behavior of these particles can be understood through four fundamental forces [11]. Matter and the fundamental forces cannot be treated as two different things. Three of the four fundamental forces affect all particles. Except for gravity, the force of gravity was a universal force, because the force of gravity is very weak, the effect is negligible for elementary particles. It is known that there are two classes of elementary particles, namely the fermions and bosons. Fermions are composed of quarks and leptons. While the boson is composed of elementary particles that have some styles, such as the electromagnetic force (photon) and the nuclear force (gluon). This means that the gluons are responsible for holding quarks together, and the weak nuclear forces (W boson and Z) are intermediary by gauge boson. These particles were discovered in the 1980s. Gluons and quarks cannot be observed but there is no evidence for their existence. Photons, W and Z bosons, and particles are observed so that they both theoretically and experimentally proved [12]. Strength carrier particles to gravity are not observed even though scientists claim that there must be particles called gravitons which are responsible for gravity. Although the standard model describes the strong nuclear force, the electromagnetic force and the weak nuclear force, the standard model cannot explain gravity. Also, the quantum and relativity cannot be fitted into the standard model together with being mathematically compatible [13]. Therefore, the standard model still needs to be improved. Bosons are elementary particles (or a collection of elementary particles), which can occupy the same quantum state, unlike fermions adhere to the principle of the prohibition of Wolfgang Pauli.

### 3.1.1. *The Fermi-Dirac statistics*

This statistics in quantum mechanics is one of two possible ways in which the system of indistinguishable particles and can be distributed among a set of energy states. Fermion, named after Enrico Fermi as they obey Fermi-Dirac statistics, is proposed by Fermi and Paul Dirac independent. Unlike the Bose-Einstein statistics, Fermi-Dirac statistics only apply to the types of particles that adhere to the restriction known as the Pauli principle of prohibition. Such particles have a value of hemispheric spin and named fermions after the correct statistics describe their behavior. Fermi-Dirac statistics apply, for example, for electrons, protons, and neutrons.

### 3.1.2. *The Bose-Einstein statistic*

This statistic was first proposed by Satyendra Bose in a letter to Albert Einstein (which he translated into German) in 1925. A real case is "Bose-Einstein condensation." The phenomenon of Bose-Einstein condensation is a condition in which a substance has a new nature, where all the particles that are in the energy minimum [14]. Statistics of Bose-Einstein specify statistical distributions for bosons at various energy levels in equilibrium thermal. Unlike fermions, bosons are particles berspin round so it does not comply with the principle of the prohibition of Pauli; a large number of particles bosons can occupy the same state at the same time. Statistics of Bose-Einstein was introduced by Bose (for photons). So the electrons are fermions and photons are bosons. Fermi-Dirac and Bose-Einstein statistics are important in quantum mechanics in particular, because it is not possible in principle to say exactly, where very small particles are, and how fast the particles are: we can only talk about a common position and momentum in probabilistic terms (Statistics). It is an improper statement of the Heisenberg uncertainty principle (Werner Heisenberg, 1927).

Boson relationship with the standard model, the three basic styles naturally besides gravity, resulted from the exchange of energy between the particles in a group called Boson, i.e. Gauge boson and the Higgs Boson. Gauge bosons act as an intermediary for the natural three basic styles while Higgs Boson is elementary particles that are the main reasons why almost all elementary particles have a greater mass.

### 3.1.3. Higgs boson in the mass formation

Higgs boson mass fill and interact with the Higgs field, the massless particles can interact strongly with the Higgs field, which are then observed as a mass. Particles that do not interact with the Higgs field are massless and will pitch kale granted.



Figure 1. particle interaction to the Higgs field [12]

Illustration Higgs Boson in mass formation in the eyes of physicists.

- (a) Professor David Miller of University College London provides a simple analogy. In a room, there is a collection of people who are cool crowd talking. In this analogy, the room was a Higgs field that contained a set of particles. Then a celebrity came. Her presence instantly influenced on the interaction in the room. Animals were then further packed crowd. In this analogy, each in the crowd behaved like the Higgs boson, which gave mass to the particle/celebrity. The stronger the interaction runs, the more severe the masses will be. The phenomena as mentioned means that boson interaction gets stronger, and this also then leads to formulation of the material.
- (b) Based on the theory that is stated by Joao Guimaraes da Costa physicist from Harvard University, particles passing through the Higgs field would acquire mass, like a swimmer moving through the pool which were wet. If there is no such mechanism then arbitrarily will be massless. So he found the Higgs boson discovery further confirms that the Higgs mechanism for particles to acquire mass is correct [15].

The easiest way to prove the existence of the Higgs field is to find the Higgs boson. How to find the Higgs boson is by driving a large number of protons. When two protons collide, they will break into constituent particles, namely quarks and gluons. Two gluons then are fused to form the Higgs boson. However, the age of the Higgs boson is very short: In the blink of Higgs boson decays into other particles directly. There are various ways Higgs boson decays, one of which is by emitting a photon.

In addition to being a pair of photons, Higgs boson can decay into two pairs, among other lepton or quark pairs [16]. Because these reactions are not as what scientists are looking for, then these are collectively called as a response to the background (background) while the feedback of the Higgs boson decays into a pair of photons in receiving to the signal. What can happen toward the two-photon collision reactions known as subatomic, and what percentage chances of each reaction will occur. Higgs boson can decay into other particles. In addition to being a pair of photons, Higgs boson can decompose into two pairs, among other leptons or quark pairs. Other ways of decay of the Higgs boson is also examined, and the results are then combined. Researchers observed that this excess is much different from what is expected from background. From the combined analysis of various ways of decay is concluded that the probability of excesses discerned is due to the background only a billionth, or just 0.0000001% only.

Search Higgs boson thus do not by finding the Higgs boson itself, but by looking for particles decay products of the Higgs boson. Gluon energy in a bind quark into protons is very large. Therefore, the researchers needed a machine that can accelerate particles up to speed greatly, at least it is not up to 99.99998% the speed of light. In this condition, a proton has enormous-momentum and if it collides with another proton, the energy of the collision will be so great, and it can rival the binding energy of the gluons. Higgs Boson is very rarely. Of the approximately 10 billion collisions, it is estimated that there will be only one Higgs boson which appears. Therefore, the number of experiments carried out should be very much and it was done over the years. Within one second about 40 million collisions in

the LHC and the experiments took place at any time: 24 hours a day, seven days a week. It is calculated that every day happens  $> 3.4$  trillion collisions.

Some researchers doubted the existence of this particle, but other researchers mainly follow the development of the research, and the researchers who participated directly in the research convince that these particles are real. That the inventor of the Higgs boson particle, the European Nuclear Research Organization or the European Organization for Nuclear Research (CERN), has managed to discover the findings of the so-called 'Particle Higgs boson.' The conviction was upheld because CERN has two independent teams for comparing these discoveries, namely: 1) ATLAS (A Toroidal LHC Apparatus); 2) CMS (Compact Muon Solenoid). They did the same experiment, so the results of the research and the data collected can be mutually tested and research-diversified. The result ranking is from zero to five-sigma (five sigmas). In December of 2012 1, the two teams also have stated that their data indicate two similar levels (two sigmas), which prove that the Higgs-Boson particle was indeed there.

Higgs field unlike another particular branch of study in physics. Although the space is completely emptied, then the space will still contain a terrain that refuses to leave the room. The field is the Higgs field. Higgs field is like air for fish. But without this sphere, humans could not exist, because the particles can only acquire mass through interactions with the Higgs field.

All sorts of elementary particle electrons, quarks, photons, etc. before interacting with the Higgs field does not have a mass (symmetry). Higgs field interaction is different from these elementary particles that damage symmetry and give different masses. Massless particles like photons do not interact with the Higgs field, but other such particles; electrons and quarks interact with the terrain and mass produce by the nature of their interactions. The larger the particle interacts with the Higgs field the greater will be its mass. In elementary particles, photon includes in the boson while the electrons and quarks are the fermions.

The interaction of particles with the Higgs field is analogized with the pieces of papers sucking or absorbing the ink. In comparison of pieces of the paper and the ink, an individual particle is the mass. Just like a piece of paper of different sizes and thickness to absorb varying amounts of ink, different particles "absorb" the various mass number [17]. In quantum mechanics, a boson is a particle that follows Bose-Einstein statistics. An important characteristic of the boson is that statistically, they do not restrict the number of those who occupy the same quantum state. On the other hand, there are fermions obey Fermi-Dirac statistics and the Pauli principle of prohibition. : "Should not there are two electrons in an atom with the same four quantum number." More generally, there are no two identical fermions (particles with fractional spin) may occupy the same quantum state simultaneously. Fermions are sometimes said to be constituents of matter, while bosons said particles that transmit interactions (force carriers), or parts of radiation.

Fermi-Dirac and Bose-Einstein can only speak about the position and momentum in probabilistic terms. This statement is not correct from the Heisenberg uncertainty principle. Although both contain elements of "uncertainty", the basic thinking between the two is very different. In Heisenberg's concept, "uncertainty" is in the context of measurement [18]. It is almost impossible to measure the two quantities simultaneously, such as position and momentum of a particle. However a rigorous measurement is made, there must be certain inaccuracies in scale.

The simple correlation between the particle and its spin as bosons or fermions is that each boson has spin integer: 0, 1, 2, etc while each fermion has a plus half-integer spin:  $\frac{1}{2}$ ,  $\frac{3}{2}$ ,  $\frac{5}{2}$ . Etc. The relationship is so close that people often define boson as "particles with a round integer" and fermions as "particles with half-integer spin." Because it is not very precise, we define that the Higgs can be piled on top of each other while fermions take space, is a true difference between the two classes of particles.

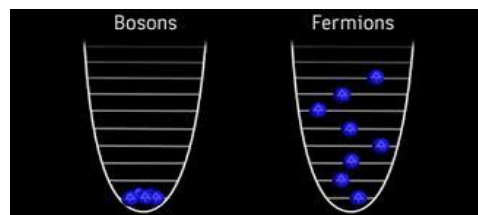


Figure 2. Differentiation fermions from bosons [12]

The distinction of the two is that fermions take up a space, while bosons can be piled on top of each other. Bosons do not take up space at all. Two bosons, or two trillion bosons, can easily sit in the same location, right on top of each other. That's why boson is a particle that carries force because those fermions obey the Pauli Exclusion Principle.

The particles of the Standard Model have a very specific spin. All known fermions charged quark-lepton and neutrino is a spin-1/2. Gauge bosons more photons, gluons, and the W and Z bosons all the spin-1. Higgs boson, stood apart from the rest, is a spin-0. Particles with zero spin are called "scalar," and fields from which they arise are called "scalar field."

Before Higgs came together to break the symmetry, the gauge boson mass of weak interaction partner for left-handed fermions (clockwise) and right-handed. That's the way nature works. All couples of the nuclear force, gravity, and electromagnetic are equally well for left-handed and right-handed particles (counter-clockwise); one of the power couples will be weak but not with others. It also explains why the weak interaction violates the rules. This occurrence can only happen if they move at the speed of light. It means that they should have zero mass as the result. It indicates that the particles which have zero mass are those which move at the speed of light. The phenomena will make the couple power become weak. As the result, there will be a weak interaction toward the Higgs field.

### 3.2. Analysis of the concept of God Particle Higgs Boson: Al-Qur'an Perspective

The Qur'an has mentioned various nature sciences detailly and accurately. These evidents enable us to find some new knowledge which is previously unknown by human. Although science has grown so fast, none of the scientific theories is contrary to the Qur'an. The theories that have not been scientifically proven yet do not have to be compared with Kalam of God. Perhaps the progress of science and technology in the future will reveal the truth and mistakes. One example is in the word of surah Yunus verse 61 as follows:

وَمَا تَكُونُ فِي شَأْنٍ وَمَا تَتْلُوا مِنْهُ مِنْ قُرْآنٍ وَلَا تَعْمَلُونَ مِنْ عَمَلٍ إِلَّا كُنَّا عَلَيْكُمْ شُهُودًا إِذْ تُبِضُّوْنَ فِيهِ وَ مَا يُعْرَبُ عَنْ رَبِّكَ مِنْ مِّثْقَالِ ذَرَّةٍ فِي الْأَرْضِ ذَلِكَ وَلَا أَكْبَرَ إِلَّا فِي كِتَابٍ مُبِينٍ ٦١ وَلَا فِي السَّمَاءِ وَلَا أَصْغَرَ مِنْ

Meaning: You are not in any matter or recite any of the Qur'an or do any action without Our witnessing you while you do it. Not hidden from thy Lord even of zarrah (atoms) in the earth or in the heavens. There is nothing more small and not (also) greater than that, but (all recorded) in a Clear Book (Lawh Mahfuz)

The implied meaning of Qs. Yunus verse 61 the word "not hidden from your Lord even of zarrah (atom)." The word (قرد) "small ant" in this surah is understood by scholars in a variety of meanings. Some of them are the animal which is very small even its head, or flying debris that are only visible in the gap nuclei did not stand alone. They are composed of particles called protons, electrons, and neutrons. But now the composition is increased by the discovery of the Higgs Boson or often called the God Particle. An object formed from some of the particles, without exception, be it a piece of wood, the car to the human body is made up of particles. God created everything, including Quark which is smaller than protons and neutrons. It has the various size and mass according to its place and work.

Table 1. Thought science scientists and commentators of the Qur'an about the Higgs Boson.

Scientists science	Interpreter [Mufassir] (Qs. Yunus verse 61)
1. Peter Higgs	1. Quraish Shihab
Higgs Boson is a particle that makes up an	Kata (قرد) is understood by scholars in a variety

object. We know that electrons, protons, and neutrons are particles found in atoms. Higgs Boson is the physical mass of the atom, a physics theory which cannot explain from where the mass of an object is finally revealed. Higgs Boson is a particle-forming mass. In its development, with sufficient energy when people can separate the Higgs Boson particles of matter, then in the theory they may not look or loss of form, but the object is not meant to disappear.

## 2. Leon Lederman

According to Leon Higgs field works like black magic through the particles. These particles go by the name Higgs boson.

And physics scientist named the particles as "God particles" (God Particle). The reason is the publisher would not let us call it Goddam Particle (particle damned) although it may be a title more appropriate, given the nature of evil and the cost of it that causes these particles like damned.

## 3. Stephen Hawking

According to his opinion "Higgs Boson could destroy the universe, Professor of Mathematics at Cambridge University explained that in the highest energy level, God particles can become unstable and result in catastrophe. There will be no more space and time." Higgs is potential to change the future of the world after becoming unstable at energies above 100 billion giga-electron-volts (GeV), "said Hawking. In these conditions, there will be quantum fluctuations that creates the vacuum bubbles in the universe. Because of the low energy, the gas will inflate with the speed of light and sweep everything. "It can happen anytime. We will never know when disaster comes," said theoretical physicist.

Humans do not realize or may not know much important the Higgs boson is, especially in the formation of the masses. People cannot imagine how the shape of the Higgs boson and what its structure is until it can form a mass or object that shapes the universe. It is all God's great power away from human reasons. Replies of God to man it is by the recognition of deeds, according to the result of achievement scales deeds he has done while living in the world. Word of Allah:

وَمَنْ خَفَّتْ مَوَازِينُهُ فَأُولَٰئِكَ الَّذِينَ خَسِرُوا أَنْفُسَهُمْ فِي جَهَنَّمَ خَالِدُونَ ۝ ١٠٣ فَمَنْ ثَقُلَتْ مَوَازِينُهُ فَأُولَٰئِكَ هُمُ الْمُفْلِحُونَ ۝ ١٠٢

Meaning: He who weigh scales [goodness] it then they are the ones that can be luck. And whoever lightweight scales, then they are the people who are harming themselves, they are eternally in Hell. (Q.S. Al-Mukminun: 102-103)

This verse describes the people interacting with his Lord. If they interact hard, then will be higher faith so then more good deeds but if they interact weakly, usually ted not many good deeds. In other words, the Qur'an has explained the interaction of particles toward the Higgs field. If the particles

of meanings, including very small ants, its head, and particles of dust which is only visible at the crack of sunlight. While at the present, [*darroh*] is interpreted in the sense of the atom. And indeed the word that is now used to designate atoms, even during the descent of the Qur'an atom yet known. Previous use of the word was to indicate the smallest things. Therefore, there are various meanings as pointed out above. And on the basis of that we cannot thanks once found particles smaller than atoms, and we are familiar with protons, neutrons, electrons, leptons, quarks and the Higgs Boson, we cannot say that this verse has hinted at the existence of something smaller from the atom by His word: "there is no smaller or larger than the small ant."

## 2. Al-Maragi

There is no anything that is smaller than the atom among the secrets of nature that you cannot see, nor greater than that, even the magnitude of such 'Throne of Allah Ta'ala, but it is known by Him and counted on His side in the great notebook containing records of all the existing, in order to enhance the natural system and match the entire act.

To convey the same as this paragraph, is the word of God:

فَلَا أَقْسَمُ بِمَا تَبْصُرُونَ 83 وَمَا لَا تَبْصُرُونَ 93  
Meaning: I swear by what you see. And what you do not see (Q.S al-Haqqah: 38-39)

The paragraph indicates a sign that there are many things in the universe that are not visible. Physicists have proven the particles making up the object. The latest discovery is a particle of God (Higgs Boson) which never comes to people mind in the time of Al-Qur'an revelation. However, now it is evident to anyone.

interact strongly, they will have masses and if these particles interact weakly, they have no mass. The Higgs particle is the basic element which creates a mass to form stars and planets, including Earth. Higgs particles interact with the Higgs field to get the mass on other particles. In this case, there are two interactions, namely the weak interaction and the strong interaction. The first mentioned does not get the mass as a discussion of the weak interaction to God which will not produce high scales and of weak interactions which will get heavy scales. God will know every behavior even though it is amounted to *dzarah*. This is the purpose of God for man to exploit his life as well as possible, always work, seek knowledge, and grateful all of God's creation. All of this was shown to increase one's faith to the creator of this universe.

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