

Physical Phenomena: A Perspective of Quran and Modern Physics

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Abstract

Quran has emphasized on the thinking about different scientific phenomena of this universe in many verses. With the development science and technology, the truth described in the verses of the Quran has been revealed to the world. Different scientific facts of Physics and cosmology like expansion of universe, existence of black holes, gravitational waves etc. have been indicated in the Quran fourteen hundred years ago. The Quran give us concept about creation of this universe, about laws of nature, electromagnetic waves and black holes. The purpose of this paper is to explain the different physical phenomena from Qur'ānic perspective.

Keywords: Physical Phenomena, Quran, Modern physics

Introduction

Science is an organized study of universe created by Almighty Allah. The Universe is full of physical and biological phenomena which are happening all around us. Allah has also revealed the Quran on our beloved Prophet Muhammad (S. A. W.). There is a conceptual relationship

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between Quran and Science.² In Quran, Allah has repeatedly invited us to observe about the different phenomena of this universe as it is said: "Behold all that is in the heavens and on earth."³ Another verse speaks: "Travel through the earth and see how God did originate creation; so will God produce a later creation: For God has Power over all Things."⁴ The Holy Quran is full of verses in which Allah Almighty has laid stress on thinking about the universe and finding the reasons behind different physical phenomena happening in this universe.⁵

There is a general misconception that Islam is against the science and technology but different studies show that the Muslim scientists, keeping in view the Islamic spirit of observation and thinking, have made a lot of contribution in the different fields of science and technology.⁶ Muslim Scientists have successfully contributed in the development of science. The work of the Muslim scientist like Al- Zahrāwī, Ibn al-Haytham, Jābar Ibn Hayān, Al-Khawārizmī etc. in the medieval era, was so authentic and research based that it remained a part of the syllabus of many European universities for years. The Muslim scientists laid the foundations of

² M.M Qurashi, "Basic concepts of Physics in the perspective of the Quran." *Islamic Studies* 28, no. 1 (1989): 55-75.

³ Al-Yunus 10:101.

⁴ Al-Ankabūt 29:20.

⁵ Shahida Rafiq, "Physics, Meta Physics and Cosmology in the light of Holy Quran", *IST Journal on Business & Technology*. Vol. 8(1) (2017).

⁶ Saifullah Bhutto, Abdul Rehman Kalaoi and Hameedullah Bhutto, "Is Islam against Science & Technology?" *Indian Journal of Science and Technology*, 13 (10) (2020): 1148-1159.

experimentation in the field of science.⁷ Physical sciences include physics, chemistry, astronomy, cosmology etc. Physics deals with the matter, energy and the relationship between matter and energy. The main frontiers of Physics includes the behavior of objects under the action of forces, the nature and origin of force fields like gravitational field, electromagnetic field, nuclear force field and weak nuclear force field. The main purpose of the physical research is to discover the fundamental laws of nature and to formulate them in an organized way. The main branches of physics includes classical mechanics, Quantum mechanics, cosmology, gravitation, heat, thermodynamics, statistical mechanics, electricity and magnetism, Optics, Atomic and chemical physics, Condensed-matter physics, Nuclear physics, Particle physics etc. In Cosmology, we study the origin and evolution of the universe, from the Big Bang to present and to future. The definition of cosmology according to NASA "the scientific study of the large scale properties of the universe as a whole." In Physical cosmology, we study of the physical origins, nature and evolution of the Universe.

Methodology

For the study of the different physical phenomena in context of Quran, we will discuss them in the light of the verses of Quran. A comparative study has been made keeping in view the predictions made in the verses of Holy Quran and their explanation according to Modern Physics.

1. The Universe and its creation

⁷ Muhammad Adil Afridi, "Contribution of Muslim scientists to the world: An overview of some selected fields" Revelation and Science, vol. 03, No. 01 (2013): 47-56.

About the creation of universe, Quran says: "Then He turned to the heaven when it was smoke..."⁸ In another place it is said: "Have not those who disbelieved known that the heavens and the earth were one connected entity, then We separated them?"⁹ Another verse reveals: "Verily in the creation of the heavens and the earth, and the alternation of night and day - there are indeed signs for men of understanding; Men who remember Allah, standing, sitting, and lying down on their sides, and contemplate the creation of the heavens and the earth (with the thought): 'Our Lord! Not for nothing have You created (all) this.'"¹⁰

In the verses described above, Allah says that the heavens and earth were a combined entity in the beginning. The heavens were in the form of 'smoke'. The recent research in the field of cosmology indicates that a certain time, our whole universe was in the form of a cloud of 'smoke'. This 'smoke' was highly dense and was in gaseous form¹¹. Moreover, it has been observed that new stars formed out of remnant of this 'smoke'. Our Solar system was just a cloud of gas and dust (smoke) about 4.6 billion years ago which contracted slowly under the action of gravity. This cloud became a disc. Most of the mass gathered at the center of this disc. The center became the sun. The matter that is gathered outside the center of disc became planets including our earth. Our earth was very hot and in molten state at an early stage. In this molten state, the denser liquid forms the center while lighter liquid rose to top which later converted into the

⁸ Al-Fussilat 41:11.

⁹ Al-Anbiya 21:30.

¹⁰ Al-Imrān 3:190.

¹¹ Dr. Haluk Nur Baki, Verses of Qur'an and Facts of Science, Trans. Syed Muhammad Feroz Shah, (Karachi, Indus Publishing Cooperation, 2000), 123.

atmosphere¹². So as described in the Holy Quran, our earth, heavens, sun, moon and galaxies have been formed from this 'smoke' i.e. cloud of gas and dust. From this 'smoke', the earth and heavens were formed and separated. The above verses of the Holy Quran predicts about the beginning of this universe from a 'smoke'. Furthermore, these verses also indicate that the earth and heavens were connected entity. Then Allah separated these in the present form.

The concept of joint earth and heavens, their separation and beginning of universe is also explained in the following verse as Quran says: "Do not the unbelievers see that the heavens and the earth were joined together, then We split them apart."¹³ This verse also indicates that earth and heavens were a joined entity. This concept of joint entity according the latest theories of Modern Physics refers to a single point called singularity. The separation of these from this singularity leads to the concept of Big Bang model. According to this model, the universe and all its matter emerged from a singularity in a burst about 13.8 billion years ago. After its emergence from the singularity, the matter expanded at a very high rate. The temperature of the universe which was initially very high, decreased with the expansion of the universe. All the forces including gravity were formed within fractions of a second. The formation of atom completed after 300,000 years which leads to the formation of clouds of Hydrogen and Helium. The higher elements are formed after billions of years at the center of stars due to burning of Helium and Hydrogen. The expansion of

¹² Columbia University, "The origin of the universe and the earth", Accessed December 25, 2020. <http://www.columbia.edu/~vjd1/origins.htm>.

¹³ Al-Anbiya 21:30

universe remained continuous and new galaxies and planets were formed that we observe today. This theory which was presented by Gamow in 1948, was confirmed in 1965 when cosmic microwave background radiation were observed¹⁴.

The formation of the universe from a smoke is also indicated in the following verse: "Moreover He comprehended in His design the sky, and it had been (as) smoke: He said to it and to the earth: 'Come ye together, willingly or unwillingly.' They said: 'We do come (together), in willing obedience.' So He completed them as seven firmaments in two days, and He assigned to each heaven its duty and command. And We adorned the lower heaven with lights, and (provided it) with guard. Such is the Decree of (Him) the Exalted in Might, Full of Knowledge."¹⁵ Again in the above verse, it has been emphasized that the creation of this universe started from a singularity and smoke. This verse also indicates that the earth and sky were a single entity before its formation and Allah has arranged them in present form according to His orders.

The universe is constantly expanding. The expansion of universe is indicated in the Holy Quran in the following verse: "And it is We who have constructed the heaven with might, and verily, it is We who are steadily expanding it."¹⁶ The modern research in the field of Physics and Cosmology has proved that this universe is constantly expanding. The expansion of the universe was theoretically predicted by Lemaitre and first confirmed by Edwin Hubble in 1929 from his observational data.

¹⁴ Stephen Hawking, *The universe in a Nutshell* (London, Bantam Press, 2001), 78.

¹⁵ Al-Fussilat 41:11-12.

¹⁶ Al-Adh-Dhariyaat 51:47.

According to him, the stars and galaxies are constantly moving away from each other.¹⁷ The expansion of universe was already described in the Holy Quran fourteen hundred years ago in the verses described above.

2. Contraction of Universe and time reversal

The concept of contraction of universe is also described in the Holy Quran as Allah says: "The day" when, We shall roll up the heavens as a recorder rolls up a written scroll. As, We began the first creation, We shall repeat it¹⁸". This verse indicates about the contraction of the universe. Different physicist like Michael Berry, Stephen Hawking and Thomas Gold have the opinion that the time reversal may occur which leads to the contraction of the universe. This theory is called big crunch. According to this theory, for a certain critical amount of mass of this universe, the gravitational attraction between the galaxies will cause them to slow down and eventually these galaxies will stop flying apart. The expansion of universe will stop. After this, the galaxies will fall towards each other and a big crunch will occur. This will cause the end of universe¹⁹.

About the Day of Judgment and time reversal, Quran says: "And you will see each nation humbled, each nation called to its record. And it will be said to them: This day you are repaid for what you used to do."²⁰ The reversal of time mentioned in the above verse of Holy Quran. On the day of judgment, Allah will show the people what they have done in their life.

3. Electromagnetic spectrum and visible light

¹⁷ Hawking, The Universe in a Nutshell, 73-77.

¹⁸ Al-Anbiya 21: 104.

¹⁹ Hawking, The Universe in a nutshell, 95-96.

²⁰ Al-Jathiyah 45: 28.

The nature of light is explained in the Quran as: "All praise is due to Allah, Who created the heavens and the earth and made the darkness and the light; yet those who disbelieve set up equals with their Lord."²¹ According to Modern Physics, the light is a form of energy which exhibit itself in form of electromagnetic waves in space. The energy of electromagnetic waves depends upon frequency of light. These waves are made up of oscillating electric and magnetic fields. There is a wide range of frequencies of electromagnetic waves. Visible light is only a small part of this whole electromagnetic spectrum with a frequency range of 5×10^{14} Hz to 7.5×10^{14} Hz. In the verse mentioned above, the word "darkness" (Zulumāt) has plural meanings. As the visible light has a wide range of frequencies so this word has been used very accurately as plural in Quran. The word "light" (Noor) is used in singular form in the Quran. So it can be concluded in terms of Quran that the word "light" (Noor) is used for the visible part of the electromagnetic spectrum while the word "darkness" (Zulumāt) is used for invisible part of electromagnetic radiations like gamma rays, X-rays and ultraviolet rays. Moreover, darkness is defined as absence of light. For our naked eye, it can be termed as electromagnetic waves which are not in the visible part of the spectrum. So when Allah says about 'making of darkness', it means the part of electromagnetic spectrum except its visible part i.e. ultraviolet rays, X-rays and gamma rays²².

²¹ Al-An'am 6:1.

²²The Miraculous Quran, "Surah Al An'aam (6:1) Electromagnetic spectrum and ratio of visible light and darkness", Accessed December 15, 2020.

<http://miraculousquran.blogspot.com/2009/08/surah-al-anaam-61-electromagnetic.html>.

4. Fundamental forces of nature

Quran says: "If you like to know the laws of nature, then look at the universe, Allah is He Who has risen up the heavens (huge cosmic bodies or solar system) without any pillars (support), that you can see."²³ There are four fundamental forces of nature, gravitational force, electromagnetic force, strong nuclear force and weak nuclear force. Out of these forces, nuclear force is the strongest force among all forces whereas gravitational force is the weakest²⁴. All functions of this universe are being carried out by these forces under the laws of nature i.e. Commands of Allah.

5. Gravitational force

Quran asserts: "Without any pillars that you can see."²⁵ At another place in the Quran says: "Allah (God) is the one Who raised the heavens without any pillars that you can see."²⁶ According to the Newton's law of gravitation, every point mass of the universe attract every other point mass with force that is directly proportional to the product of their masses and inversely proportional to the square of distance between them²⁷. There is a force of gravity between sun and other planets. The sun's force of gravity pulls the planets towards it as it is much heavier than planets. Now the question arises, why planets do not fall towards the earth. The reason is that the planets are also

²³ Al-Ae-Ra'd 13:3.

²⁴ Stephen Hawking, A brief history of time, (London, Bantam Press, 1996), 74-77.

²⁵ Luqmān 31:10.

²⁶ Al-Ar-Ra'd 13:2.

²⁷Encyclopedia Britannica, "Newton's law of gravitation", Accessed December 15, 2020.

<https://www.britannica.com/science/Newtons-law-of-gravitation>.

moving sideways²⁸. So, the earth and other planet revolves around the sun without falling towards the sun. The above mentioned verses indicates this gravitational force which hold the heavenly bodies apart from each other and stop them from colliding with each other.

6. Black holes

Quran says: "And heaven is opened and becomes as gates."²⁹ At another place it is said: "The stars will stop shining as the light moves back with reversal of time. They will also be hidden from view from within the hollowed earth. When the stars are put out³⁰."

A black hole is a region in the space time where gravity is so strong that nothing even the light cannot escape from it³¹. In the above verses, the concept of the gate opening of sky is discussed. This concept is very similar to the concept of black holes as the black holes are considered to be the gateways to the other universes and higher dimensions. Also there is concept of Warm hole in the space time which can be considered as a tunnel in the space time leading to the other universes. Warm holes have not yet been observed but the opening of gates in the above verses may be an indication of this warm hole. Quran say: "So, I swear by the place where the stars fall. And that is indeed a mighty oath, if you but knew."³²

²⁸ Space Place, "Why do the planets go around the Sun?", Accessed December 26, 2020.

<https://spaceplace.nasa.gov/review/dr-marc-solar-system/planet-orbits.html>.

²⁹ Al-An-Naba 78:19.

³⁰ Al-An-Naba 78: 8.

³¹ Hawking, A brief history of time, 90.

³² Al-Waqi'a 56: 75-76.

The black holes have very strong gravity and they attract the matter and nearby stars and swallows them along with light. In the above verse, "the place where the star fall" is an indication to the black hole as they are formed by collapse of stars due to its strong gravitational force³³.

7. Gravitational waves

Quran speaks: "It is He Who created the night and the day, and the sun and the moon: all (the celestial bodies) swim along, each in its rounded course."³⁴ On another place it is said: "It is not permitted to the Sun to catch up the Moon, nor can the Night outstrip the Day: Each (just) swims along in (its own) orbit (according to Law)."³⁵ General relativity predicts that heavy bodies moving under the action of gravity emit gravitational waves. Gravitational waves are the ripples in the space time which are caused by some most violent and energetic event like merger of black holes in the universe³⁶. These waves were first predicted by Albert Einstein in 1916 and were first observed in 1974. But these waves have been physically confirmed in 2015 when two massive black holes collided. They can be considered as waves in space time as we have waves in our seas. In the verse mentioned above, the word 'swim' is chosen by Allah to describe the motion of the celestial bodies in space time under gravitational waves. The celestial bodies 'swim' in space time under the gravitational waves just like the ships in the sea.

³³Australian Muslim Times, "Hawking's black hole: a rediscovery of Quran", Accessed December 15, 2020.

<https://go.shr.lc/2UTQSBL>.

³⁴ Al-Anbiya 21:33.

³⁵ Al-Yaseen 36:40.

³⁶Hawking, The universe in a nutshell, 190-193.

5. Conclusion

The Holy Quran is full of scientific facts that have been proved by the researchers these days. Quran describes about the creation of this universe and its evolution to the present state. It states the evolution of life in this universe. All the scientific facts that are described in Quran fourteen hundred years ago are in accordance with the modern Physics and the discoveries made by it. The statements which are being made in the Quran are clearly connected with the science, technology, Physics and Cosmology. Different physical phenomena like big bang, creation of the universe, formation of stars, black holes etc., as indicated in the verses of the Holy Quran are in complete agreement with the predictions, observation and discoveries made by the modern physics now. Thus the Holy Quran is not only a book of guidance but also insist it followers to understand such a marvelous universe in detail and find out the truth behind the physical phenomena happening in this universe.