

Understanding the Universe in the Quranic Perspective

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Abstract

The spirit of the Quran is so broad based that it encompasses the whole span of life practically. Al Quran presents universe in its pure form. It presents a comprehensive, all embracing and all inclusive proofs for the complete understanding of universe. It constantly prompts to reflect upon the laws of nature that operate in this universe and which lie within the domain of comprehension of every human being. The place and position of science and scientific attitude under the Quran will be taken under the discussion. In the present paper, study of universe by observation and experimentation with Quranic references will be elaborated.

Keywords: Al Quran, Islam, Universe, Big bang

Introduction

The *Qur'ān* provides broader guidelines about a number of scientific facts and various phenomenons that take place in the universe. One important line of demarcation between the divine guidance about the natural phenomenon and the scientific laws and theories that is to be appreciated is that divine laws, facts and phenomenon and values are eternal and infallible while as scientific laws and theories are subject to change, modification and are even contestable. Physical sciences are not infallible and that scientific axioms are not necessarily the last word on the subject. There can be no such thing as an absolute scientific truth. Something that was universally accepted in the past as scientifically correct might not be accepted today in the light of latter day scientific experimentation and discoveries. Similarly, what is acceptable today in the world of science might be disputed and disproved in course of time. This does not, however, mean that no heed should be paid to purely science and scientific research or this does not mean that scientific research should be considered as an exercise in futility. Science is not divine revelation but it may serve as a means for betterment of mankind and may help to develop a better understanding of Allah's creation and its purpose.¹

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Universe in the Quranic Perspective

Science is that systematic knowledge of nature and physical world, which is based on observation, experimentation and measurement. These is the meaning of science accepted and described by scientists. No other explanation of science is acceptable to them that could lead to explore the scientific knowledge.²

Generally, we find rational arguments in the *Qur'ān*, these too on common sense level. The *Qur'ān* does not generally favour the attitude of showing by demonstration. However, at two places the importance and significance of experimentation is not only implicit but actual experiment has been set up as described in the Holy text. Once as given in *Al Baqarah*³ a man was kept dead for hundred years in response to his question. During this period his donkey also died, degenerated and decayed and only its bones remained un-decayed. But his water and food were kept preserved. When he breathed again after hundred years, his donkey was given flesh and skin before his eyes. The man thus witnessed one of the attributes of Allah (S.W.T) that He can infuse life in dead bodies according to His Will in an extra ordinary manner. Another event is related to the prophet Ibrahim (A. S.)⁴ who requested Allah to show how the dead ones will regain life. An experiment with four birds was suggested to the prophet but before that he was asked, "if he believe not". The prophet Ibrahim (A.S.) aptly responded, "of course I believe but it is for a bit of satisfaction of his own understanding"⁵. The conversation at this occasion points to the fact that Allah (S.W.T) does not like the attitude of making unnecessarily observations and experimentation in the matters of the unseen world. On the other hand, it also becomes explicit that in addition to *Imān*⁶ and *'Aql*⁷ the observation and experimentation is also a significant source of satisfaction. And these are the occasions when man is open to the danger of limiting the domains of knowledge to the material and sensual world. The scientists reject supernatural sources and methods of knowledge and develop a unique methodology for science and limit the concept of the entire world into the narrow confines. The reality thus sometimes skips from their vision because the method which they believe in does not always hold good. Contrary to this, the *Qur'ān* first tells about the reality and then provides evidences of the reality from the very world around man.⁸

The *Qur'ān* clearly looks supporting all positive aspects of scientific method as such it invites to ponder upon, study and try to understand the world and find its secrets, yet it explicitly tells many secrets beforehand. Then it guides the humanity that if man gives sound thought to the world there can be no reasonable ground for

rejecting the revealed Truth.⁹ Almost all vital aspects of science are mentioned in the *Qur'ān*.

The *Hadith* of the Prophet Muhammad (S.A.W.S) are spread through 200 books and over the years Islamic scholars have tried to collect the *Hadith* exclusively dealing with disease and treatment separately. This has resulted in separate chapter *Kitab Al-tibb*¹⁰ in books on *Hadith*. The Prophet Muhammad (S.A.W.S) has encouraged the spirit of investigation and analysis of facts. A careful examination of *Ahadith* of the Prophet Muhammad (S.A.W.S) reveals treasures of information. It can be safely accepted that the Prophet (S.A.W.S) had a tremendous knowledge of the science. Many of the methods used by the Prophet (S.A.W.S) find use in different branches of science of the world, thereby indicating the knowledge of the Prophet (S.A.W.S).

Now let us attempt to explore our universe under the divine guidance provided by the holy *Qur'ān* and *Ahadith* of the Prophet Muhammad (S.A.W.S):

The creation of the universe is a subject that is given detailed treatment in the *Qur'ān*. The *Qur'ān* is replete with the verses that provide divine guidance about almost every stage and aspect of the creation and this fact continues to astound scientists today because of its very accurate agreement with 21st century knowledge.

All the evidences available today suggest an explosive origin to the universe that brought both space and time into existence. This is what is referred to as the Big Bang.¹¹ The theory of the Big Bang which has successfully taken over the place of the “Steady state theory”¹² was worked out in the 1920's by two scientists quite independently of each other. One was the Russian meteorologist Alexksandr Friedmann and the other Belgian Mathematician Georges Lemaitre.¹³ The Big Bang itself resulted from an extremely dense singularity. The theory of the creation of the universe is one of matter, space and time that are intimately linked together. Matter and space were joined as one and then were separated in the explosion. This is very accurately described in the *Qur'ān*:

أَوَلَمْ يَرَ الَّذِينَ كَفَرُوا أَنَّ السَّمَاوَاتِ وَالْأَرْضَ كَانَتَا رَتْقًا فَفَتَقْنَاهُمَا وَجَعَلْنَا مِنَ الْمَاءِ كُلَّ شَيْءٍ حَيٍّ أَفَلَا يُؤْمِنُونَ ﴿سورة الأنبياء﴾

“Have not the disbelievers pondered that the heavens and the earth were of one piece, then We separated them and that We made of water every living thing? Will they not then believe?”¹⁴

The subsequent history of the Big Bang indicates that the whole event took place at a very high temperature; it was a hot Big Bang. For every phenomenon, however the scientists believe in the cause and effect. In case of Big Bang theory, surprisingly they fail to address the issue of cause responsible for the Big Bang. This leaves a big question mark on their assertion. This view has been confirmed by the later discovery of the background microwave radiation. The eventual formation of galaxies resulted as a condensation, under gravitational pull, of hot gases which was mainly Hydrogen, but may also have contained Helium and a few other light elements as well. Over the ages, and with the formation of galaxies, the gas has gradually condensed into individual stars.¹⁵ The universe in its very early stages was, thus, still in the form of hot gases which is mentioned in the Qur’ān in the following verse:

ثُمَّ اسْتَوَىٰ إِلَى السَّمَاءِ وَهِيَ دُخَانٌ ... (سورة فصلت)

“Then He turned to the sky, which was smoke...”¹⁶

Once these stars were formed a system had to be devised to govern their motion. The kinetic energy stored in the forward movement of these bodies could not be relied upon on its own, otherwise stars and also planets would have shot off in straight lines dispersing into space. No planet would ever revolve around its mother star, which also applies to earth and, thus, life would not have evolved on earth, because the whole of life on earth is so dependent on the sun.

The gravity is the brilliant divinely created force, working as an equating factor to the centrifugal force to induce precise orbits for all heavenly bodies. The speed, mass and distance of two bodies have to be worked out very precisely to develop the perception of an orbit.¹⁷

A tennis ball thrown upwards towards the sky travels upwards as a result of the kinetic energy stored in the throw but, eventually, the gravity of the earth overcomes it and the ball falls back to the ground. But, the ball thrown at a very high speed (say 10km per second), escapes the gravity of the earth and leaves the

earth altogether. This is what is known as the Escape Velocity. It is the speed required for a moving body to enable it to escape the gravity of a planet or star.¹⁸

When an artificial satellite is placed in orbit around the earth, what happens is that at a required distance, while the satellite is shooting out of the earth's gravitational field, its speed is reduced which reduces its kinetic energy and with some directional adjustments its kinetic energy is equated with the earth's gravity.¹⁹ All these adjustments are very precisely executed at a precise distance and speed otherwise it can not find its desired orbit. When one looks at the endless intricate orbits and mathematical precision in the universe one can only gasp in. All the planets revolve around stars, which in turn revolve round the centre of gravity of their own galaxies. These very accurate balances are mentioned in the following verses:

الشَّمْسُ وَالْقَمَرُ بِحُسْبَانٍ ﴿ (سورة الرحمن)

“The sun and the moon are bound by a schedule.”²⁰

وَالسَّمَاءَ رَفَعَهَا وَوَضَعَ الْمِيزَانَ ﴿ (سورة الرحمن)

“He elevated the sky and set up the balance.”²¹

The orbits of the heavenly bodies are mentioned in the verse:

...وَالشَّمْسُ وَالْقَمَرُ كُلٌّ فِي فَلَكٍ يَسْبَحُونَ ﴿ (سورة الأنبياء)

“...and the sun and the moon, each one²² is floating in (its own) orbit.”²³

In the next stage these massive newly formed stars start to shrink under their own gravitational pull. As a result, their central regions become denser and, thus, hot. When the material in the centre of the star has heated up sufficiently, to be exact, at least seven million degrees Kelvin²⁴, nuclear reactions begin. These reactions, which are similar to those which take place in a hydrogen bomb, continue throughout the life of the star. These reactions are distinctly different from ordinary combustion (as in burning wood). What actually takes place inside a star is that hydrogen is converted to helium with the emission of huge energy.²⁵ The *Qur'ān* precisely refers to it as:

اللَّهُ نُورُ السَّمَاوَاتِ وَالْأَرْضِ مِثْلُ نُورِهِ كَمِشْكَاةٍ فِيهَا مِصْبَاحٌ الْمِصْبَاحُ فِي زُجَاجَةٍ الزُّجَاجَةُ كَأَنَّهَا كَوْكَبٌ دُرِّيٌّ يُوقَدُ مِنْ شَجَرَةٍ مُبَارَكَةٍ زَيْتُونَةٍ لَا شَرْقِيَّةٍ وَلَا غَرْبِيَّةٍ يَكَادُ زَيْتُهَا يُضِيءُ وَلَوْ أَلَمْ تَمْسَسْهُ
 ... (سورة النور)

Allah is the light of the heavens and the earth. The example of His light is as a niche wherein is a lamp. The lamp is in a glass, the glass is as it were a shining star. It is lit from a blessed tree, an olive, neither of the east nor of the west, whose oil would almost glow forth though no fire touched it....²⁶

A part of this verse mentions a star, its fuel, and a reaction which is not combustion (fire) but a sort of “nuclear reactions” the verse is a very accurate description of what goes on inside a star. These nuclear reactions cause the stars to radiate all types of radiation into space, from x-rays and gamma rays in the short waves to the longer radio waves. The visible section of those waves which are found between the ultra-violet and the infra-red is what we call sunlight.²⁷

On the other hand, planets do not emit any light of their own, but instead shine by reflected light.²⁸ The *Qur’anic* guidance in this regard runs as follows:

تَبَارَكَ الَّذِي جَعَلَ فِي السَّمَاءِ بُرُوجاً وَجَعَلَ فِيهَا سِرَاجاً وَقَمَراً مُنِيراً (سورة الفرقان)

“Blessed is He who has placed in the heaven constellations of stars and has placed in it a lamp and a moon enlightening.”²⁹

هُوَ الَّذِي جَعَلَ الشَّمْسَ ضِيَاءً وَالْقَمَرَ نُوراً... (سورة يونس)

“It is He who gave the sun his brightness and the moon her light.”³⁰

In 1965, a very important discovery was made, and that was the background radiation which supported the Big Bang theory. But, the Big Bang theory, together with the detection of the red shift in the spectrum of far away galaxies, gave birth to yet a new concept and that was the universe is expanding.

Light is made up of waves, and redshift is a change, caused by the object’s motion, in the wavelength of light radiated by an object. Redshifts occur because of a phenomenon scientist’s call the Doppler Effect. The Doppler Effect occurs when a wave-emitting object moves toward or away from an observer, and the observer sees or hears the waves differently than he or she would if the object were

stationary relative to the observer. If a light-emitting object is moving away from an observer, each wave of light leaves the object from a point slightly farther away from the observer than the previous wave. Therefore, the distance between waves (called the wavelength) that the observer sees is longer than it would be if the object were stationary. Austrian physicist Christian Johann Doppler describes this effect in sound waves in the mid-1800s, and it became known as the Doppler Effect for all types of waves.³¹ When applied to light waves it was found that if the source of light is approaching its light would be shifted towards the blue end of the spectrum, while as light from a receding source would be shifted towards the red end of the spectrum. While analyzing the light we receive from distant galaxies it was found that they all had a red shift meaning that they were flying away from us. That contribution of the red shift analysis meant that the universe is indeed expanding. This finding is literally mentioned in the *Qur'ān*:

وَالسَّمَاءَ بَنَيْنَاهَا بِأَيْدٍ وَإِنَّا لَمُوسِعُونَ ﴿سورة الذاريات﴾

“And the sky, We created with might (power) and we are expanding³² it”.³³

During the period of the revelation of the *Qur'ān* (7th century C.E.), it was still believed that all the stars in the sky including our sun were eternal and are made of a material that never fades or decays. No one was really aware of the nature of the reactions that take place inside stars. The Sun cannot shine forever, because it will eventually use up its present fuel. The nuclear fusion reactions that make the Sun glow depend on the element hydrogen, but the hydrogen in the Sun's core will eventually run out. Nuclear reactions have converted about 37 percent of the hydrogen originally in the Sun's core into Helium. Astronomers estimate that the Sun's core will run out of hydrogen in about 7 billion years.

The Sun will grow steadily brighter as time goes on and more quantity of Helium accumulated in its core. Even as the supply of hydrogen dwindles, the Sun's core must keep producing enough pressure to keep the Sun from collapsing in on itself. The only way it can do this is to increase its temperature. The increase in temperature raises the rate at which nuclear reactions occur and makes the Sun brighter. As such it is presumed that in 3 billion years, the Sun will be hot enough to boil Earth's oceans away. Four billion years thereafter, the Sun will have used up all its hydrogen and will balloon into a giant star that engulfs the planet Mercury. At this point in its life, the Sun will be a red giant star. The Sun will then be 2,000 times brighter than it is now, and hot enough to melt Earth's rocks. At this time the

outer solar system will get warmer and more inhabitable. The icy moons of the giant planets may warm enough to be covered by water instead of ice.

It is further presumed that when the giant Sun uses up its fuel, it will no longer be able to support the weight of its inner layers, and they will begin to collapse toward the core, eventually producing a small, dense, cool star called a white dwarf. The Sun will then have about the same radius as Earth has, but it will be much denser and more massive than Earth. The Sun will become a white dwarf star about 8 billion years from now. After it becomes a white dwarf, it will cool slowly for billions of years, eventually becoming so cool that it will no longer emit light.³⁴ Here, the Qur'ān uses the very accurate scientific words:

فَإِذَا النُّجُومُ طُمِسَتْ ﴿سورة المرسلات﴾

“Then when stars will fade out”.³⁵

The finite life of stars is also referred to:

...وَسَخَّرَ الشَّمْسَ وَالْقَمَرَ كُلٌّ يَجْرِي لِأَجَلٍ مُّسَمًّى... ﴿سورة الرعد﴾

...He has ordained the sun and the moon, each one runs (it's course) for an appointed time...³⁶

Chapter 81 of the *Qur'ān* at its outset describes the end of heavenly bodies as follows:

إِذَا الشَّمْسُ كُوِّرَتْ ﴿وإِذَا النُّجُومُ انْكَدَرَتْ﴾ ... وَإِذَا الْبِحَارُ سُجِّرَتْ ﴿سورة التكويد﴾

“When the sun will be folded up, and when the stars will lose their luster...and when the oceans will be made to boil”.³⁷

It is very significant to note that verse reveals “When the stars will lose their luster” and not “When the sun will lose its luster”, because the boiling of the oceans will be a result of the expansion of the sun (red giant stage) and not it's folding or collapse, that is, the ocean will boil over long before the sun starts to fold or collapse. Also, the term “انْكَدَرَتْ” means foldup or collapse”, as used in the *Qur'ān*, is the precise term used by today's astronomers to describe that stage of a star's life.

Whilst the Big Bang provided an explanation as to the origin of the universe, it still remained necessary to calculate its age. To do so, astronomers once again rely on red shift to calculate the speeds and distance of the farthest galaxies³⁸ and quasars³⁹.

Allah (S.W.T.) has not 'finished' creation; rather, it is an ongoing process. The Qur'an mentions:

...وَيَخْلُقُ مَا لَا تَعْلَمُونَ ﴿سورة النحل﴾

"...and He creates that which you do not know".⁴⁰

...يَخْلُقُ اللَّهُ مَا يَشَاءُ إِنَّ اللَّهَ عَلَىٰ كُلِّ شَيْءٍ قَدِيرٌ ﴿سورة النور﴾

"...Allah creates what He will. Verily Allah has power over all things".⁴¹

This is very significant from a scientific point of view because man is gradually beginning to observe and understand certain natural phenomena which are still in a process of formation. One prime example is our observation of still-emerging galaxies from huge clouds of nebulae. Another is the creation of new species, with its associated evidence of strange and exotic "intermediate" life forms turned into fossils.

A significant number of scientists and writers have come to realize that the ability of the physical world to organize itself constitutes a fundamental, and deeply mysterious, property of the universe. The fact that nature has creative power, and is able to produce a progressively richer variety of complex forms and structures, challenges the very foundation of contemporary science. The greatest riddle of cosmology, writes Karl Popper, the well-known philosopher, is that "The universe is, in a sense, creative".⁴²

The orbits of the infinite number of the stars and all the galaxies are the result of immaculately precise balances. These very accurate balances are clear indications of the existence of a supreme governing power that is responsible for creating as well as sustaining the universe. The Qur'an speaks of these fine balances:

وَالسَّمَاءَ رَفَعَهَا وَوَضَعَ الْمِيزَانَ ﴿سورة الرحمن﴾

“He elevated the sky and setup the balance”.⁴³

If the moon was closer to the earth, the tides would rise causing gigantic waves that would destroy life on islands and coastal areas. If the moon was further away from the earth the tides would come to a standstill leading to the stagnation of seas, the result of which would be grave damage to marine life. These very precise measurements of such variables as distance, mass, speed etc. are referred to in the following verses:

الشَّمْسُ وَالْقَمَرُ بِحُسْبَانٍ (سورة الرحمن)

“The sun and the moon are bound by a schedule”.⁴⁴

The earth spins on its axis once every 24 hours. If it does not spin, the oceans would empty all their waters and if it spins much faster it would disperse into empty space. The spinning movement is also responsible for the night and day, without which one half of the earth would be under continuous sunlight and heat up excessively while the other half would be submerged in total darkness and freeze to death.⁴⁵ The Spinning of the earth is also mentioned in the Qur’ān:

خَلَقَ السَّمَاوَاتِ وَالْأَرْضَ بِالْحَقِّ يُكَوِّرُ اللَّيْلَ عَلَى النَّهَارِ وَيُكَوِّرُ النَّهَارَ عَلَى اللَّيْلِ وَسَخَّرَ الشَّمْسَ وَالْقَمَرَ كُلٌّ يَجْرِي لِأَجَلٍ مُّسَمًّى أَلَا هُوَ الْعَزِيزُ الْغَفَّارُ ﴿١٠١﴾ (سورة الزمر)

He has created the heavens and the earth with truth. He makes night to succeed day and He makes day to succeed night, and He made the sun and the moon obedient, each running for an appointed term. Lo! He is the Mighty, the Forgiver.⁴⁶

Today we know that the Earth is oval shaped, bulging at the equator. Fourteen centuries ago it was believed that the earth is flat. It was not known then that the earth is round oval. The *Qur’ān* again states that the earth is oval:

وَالْأَرْضَ بَعْدَ ذَلِكَ دَحَاهَا ﴿١٠٥﴾ (سورة النازعات)

“And after that He spread the earth [like a dahiya].⁴⁷

The word “dahiya” in Arabic means an egg, hence the oval shape. But the verse also includes a further remarkably accurate scientific fact. The words ‘after that’

clearly indicate that the earth acquired the oval shape at a later stage after its formation. Modern science will testify that the bulging of the earth at the equator is a result of the continuous spinning of the earth on its axis, and thus had to occur sometime after the formation of the earth. The earth spins on its axis at a speed of one thousand kilometers per hour. The earth rotates round the sun once every 365.25 days. Whilst doing so it is tilted on its axis at an angle of 33 degrees. As a result, the seasons occur making it possible for the habitation on the planet. If the earth was not tilted on its axis the poles would have been submerged in continuous cold darkness preventing the seasonal thaw of the polar ice. The accumulating ice would eventually result in non shifting frozen poles and little water elsewhere.⁴⁸

The rotation of the earth around the sun was not known in the 7th century C.E. At that time it was still believed of the earth as a non moving planet at the centre of the universe. Due to the apparent movement of the sun, moon and stars in the sky, it was assumed that they are moving around the earth. The movement of the earth in space is confirmed in the following verse:

وَتَرَى الْجِبَالَ تَحْسَبُهَا جَامِدَةً وَهِيَ تَمُرُّ مَرَّ السَّحَابِ صُنْعَ اللَّهِ الَّذِي أَتَقَنَ كُلَّ شَيْءٍ إِنَّهُ خَبِيرٌ بِمَا تَفْعَلُونَ
 (سورة النمل)

“And you see the mountains, you think they are firm, (but) they will be flying like clouds: the doing of Allah who has perfected all things. Verily He is aware of what you do”.⁴⁹

Since the earth is moving in space thus everything on earth is moving with it, including the mountains. If the earth’s crust had been thicker than its present thickness all the oxygen would have been absorbed into the earth. Without oxygen no life would be possible. Similarly, if the oceans were much deeper, all the oxygen and carbon dioxide would have been absorbed into the oceans with similar results. All these precise specifications are referred to in the following verse:

وَهُوَ الَّذِي خَلَقَ السَّمَاوَاتِ وَالْأَرْضَ بِالْحَقِّ ... (سورة الأنعام)

“It is He who created the heavens and the earth in truth (with a purpose)...”⁵⁰

Conclusion

The Quran encourages study of universe by observation and experimentation and produces a universal longing for scientific inquiry. It is this spirit of logic and reasoning which the Quran inculcates among Muslims that later got manifested in the form of different sciences as physical and biosciences. Thus, whatever is obtained through revelation, observation, experimentation, experiences and measurement is to be collated in the Quran to seek intelligence and wisdom. If the world is studied with this methodology and the knowledge thus obtained and developed in correspondence with the Quranic worldview then it is highly appreciable, significant and inevitable for establishing peace and tranquility on the earth.

Notes and References:

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- ¹Dr. Mohammad R. Mirza and Muhammad Iqbal Siddiqi (ed.), *Muslim Contribution to Science*, Delhi, New Era Publishers, 1997, p. 2-3.
- ²Abdul Ali and Sayyid Ahsan, *The Quran and Science*, India, The Institute of Islamic Studies Aligarh Muslim University, 2003, p. 6.
- ³*Al- Qur'ān*, 2:259.
- ⁴Alayh Al Salam means peace be upon the Prophet Ibrahim..
- ⁵*Al- Qur'ān*, 2:260.
- ⁶The conviction or certainty that Allah is indeed the one and only God and that Muhammad (Salla Allahu 'Alayhi wa Sallam) is His last prophet.
- ⁷Reason or collectively the faculties through which 'ilm (knowledge) is achieved.
- ⁸Abdul Ali and Sayyid Ahsan, *op.cit.*, p. 10-11.
- ⁹*Ibid.*, p. 12.
- ¹⁰Kitab Al tib means book of medicine.
- ¹¹Big Bang Theory is currently accepted explanation of the beginning of the universe. The big bang theory proposes that the universe was once extremely compact, dense, and hot. Some original event, a cosmic explosion called the big bang, occurred about 10 billion to 20 billion years ago, and the universe has since been expanding and cooling.
- ¹²The steady-state theory holds that the universe looks; on the whole, the same at all times and places. The Austrian-British astronomer Hermann Bondi and the Austrian-American astronomer Thomas Gold formulated the theory in 1948.
- ¹³*Microsoft Encarta Reference Library*, U.S.A., Microsoft Corp., CD Rom. edition 2003, s.v. "Big Bang theory"
- ¹⁴*Al- Qur'an*, 21:30.
- ¹⁵*Microsoft Encarta Reference Library, op.cit.*, s.v. "stars"
- ¹⁶*Al- Qur'ān*, 41:11. Here the verse did not say clouds or gas, but smoke, which is a very accurate description as smoke is hot gas, whilst clouds are cold.
- ¹⁷*The New Encyclopedia Britannica*, Chicago USA, Ency. Britannica Inc., 1992, s.v. "Gravity"
- ¹⁸Satish K.Gupta, *Modern's abc of Physics*, Jalandhar, Modern Publishers, 2002, vol.1, p.488.
- ¹⁹*Ibid.*, p.467.
- ²⁰*Al- Qur'ān*, 55:5
- ²¹*Al- Qur'ān*, 55:7
- ²²Here the word "كُلُّ" i.e. "each one" indicates that the reference to the sun and the moon is symbolic and it applies to all other heavenly bodies also.
- ²³*Al- Qur'an*, 21:33.
- ²⁴The SI unit of absolute temperature, equal to 1/273.16 of the absolute temperature of the triple point of water, equivalent to one degree Celsius. A temperature in kelvin may be converted to Celsius by subtracting 273.16.
- ²⁵*Microsoft Encarta Reference Library, op.cit.*, s.v. "How stars produce energy"
- ²⁶*Al- Qur'an*, 24:35.
- ²⁷*Microsoft Encarta Reference Library, op.cit.*, s.v. "light"
- ²⁸*Ibid.*, s.v. "planet"
- ²⁹*Al- Qur'an*, 25:61.
- ³⁰*Ibid.*, 10:5.

³¹ *Microsoft Encarta Reference Library, op.cit.*, s.v. "Redshift"

³² Here the word "expanding" is used in the present tense and not in the past which again is in agreement with the fact that the expansion of the universe is a continuous process.

³³ *Al- Qur'an*, 51:47.

³⁴ *Microsoft Encarta Reference Library, op.cit.*, s.v. "The sun's remote past and distant future"

³⁵ *Al- Qur'an*, 77:8.

³⁶ *Ibid.*, 13:2.

³⁷ *Ibid.*, 81:1, 2, 6.

³⁸ Galaxy is a group of billions of stars and their planets, gas, and dust that extends over many thousands of light-years and forms a unit within the universe. Held together by gravitational forces, most of the estimated 50 billion galaxies are shaped as spirals and ellipses, with the remainder being asymmetrical.

³⁹ Quasar is a compact object in space, usually with a large red shift indicating extreme remoteness that emits huge amounts of energy, sometimes equal to the energy output of an entire galaxy.

⁴⁰ *Ibid.*, 16:8

⁴¹ *Ibid.*, 24:45

⁴² *www.najaco.com*, s.v. "on the ongoing process of creation"

⁴³ *Al- Qur'an*, 55:7

⁴⁴ *Ibid.*, 55:5

⁴⁵ *Microsoft Encarta Reference Library, op.cit.*, s.v. "moon"

⁴⁶ *Al- Qur'an*, 39:5

⁴⁷ *Ibid.*, 79:30

⁴⁸ *Microsoft Encarta Reference Library, loc.cit.*

⁴⁹ *Al- Qur'an*, 27:88

⁵⁰ *Ibid.*, 6:73