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# Life and Death of Stars: An Analysis from Islamic and Modern Astronomy Perspectives

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**Abstract.** Stars are celestial objects having their own life cycles. Stars are born, grow up, mature and eventually die. This paper is aimed to study the explanations for the life and death of stars according to the Islamic perspective from the Quran and the Hadith (Prophetic Traditions) and its correlation and comparison to the modern astronomy context. As a sacred source, it must be noted that the Quran and the Hadith is accepted as the ultimate source of truth. Contrarily, the exegesis of the verses of Quran (namely *tafseer*) and explanation the Hadith texts given by Muslim Scholars are dynamic, relative and changeable. The author employs inductive and deductive analysis of the verses of the Quran and the Hadith texts related with the life and death of stars. The results show that the life and death of the stars from Islamic and Modern astronomy has some similarities and differences. Islamic perspective shown that that life and death of stars not only changes on their physical aspects but explained the purpose creation of the stars and its beneficial to human life. However, Modern Astronomy explained more details part of changes on the physical aspect of stars in every stages of their life. Therefore, the verses, the exegesis and the hadith texts from Islamic perspectives were correlated to the modern astronomy context throughout analysis on literal descriptions life and death of the stars.

**Keywords:** Star, Life, Death, Lifecycles, Al-Quran, Al-Hadith.

## 1. Introduction

Stars are celestial bodies that have their own life cycles. They are alive and they can live much longer than a human. The human's life is measured by years of living compared to the stars which are measured by millions years of living. Even though they can live that long, it is not possible to know the life cycles throughout the modern astronomical research. Meanwhile, in Islamic perspectives, there are verses in Quran and in the Hadith discussing the life circle of the stars especially the life and the death of the stars. Thus, this research is aimed to identify and to explain the similarities and the differences of the life and death of stars throughout the Islamic and the modern astronomy perspectives.

## 2. Methodology of Study

The collecting of data in this research is through the library research method to obtain the information for the two perspectives. In order to collect and examind the data from the Islamic perspectives, the researchers use the *Mu`jam Mufahras Li Alfaz al-Qur'an al-Karim* to identify the verses in Quran's index which giving information about the stars. Then, the researchers refer to the authority exegesis like *Ibn Kathir*, *al-Zamakhshari*, *al-Qurtubi*, *al-Baghawi*, *al-Tabari* and *Fakh al-Din al-Razi* for the analysis purposes. The data accumulation of the al-Hadith texts are referred to the authority book in the research of the Hadith which is *Sunnah Sittah*. Other than that, the researchers are referring to the explanation for hadith book such as Sahih Bukhari in the *Kitab Fath al-Bari* by Ibn Hajar al-'Asqalani and *Sharah Sahih Muslim* by al-Nawawi as the second source of the research. The accumulations of data in the modern astronomical perspectives are referring to the journals and the selected reading materials. Throughout the collection of the data, this

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research is analyzed in the inductive and deductive ways to measure the similarities and the differences of the life and death of stars in both perspectives.

## 3. Result and Discussion

According to the Islamic cosmology which follows by Quran and al-Hadith, every creation has the reason and its role for the balance of the universe. One of the basic principles of the balancing cosmos is the 'pairing system'. For instance, the creation of the atmosphere gives us the rain and the heat, tide phenomenon for rise and fall the sea level, day and night phenomenon including life and death of the creation. Hence, every creation through the life and death are based on the duration including the stars which are one of the creations of Allah the Almighty in this universe.

مَا خَلَقْنَا ٱلسَّمَٰوَٰتِ وَٱلْأَرْضَ وَمَا بَيْنَهُمَآ إِلَّا بِٱلْحَقِّ وَأَجَلٍ مُّسَمًّىۚ وَٱلَّذِينَ كَفَرُواْ عَمَّآ أُنذِرُواْ مُعْرِضُونَ ٣

Translation: "We did not create the heavens and the earth and what is between them two save with truth and (for) an appointed term; and those who disbelieve turn aside from what they are warned of".

Thus, through the analysis made in this research, researchers found out that the living and the death concept of the stars are connected with the traits and the role of the stars explained in the exegesis of the verses of Quran and al-Hadith.

إِنَّ رَبَّكُمُ ٱللَّهُ ٱلَّذِي خَلَقَ ٱلسَّمَٰوَٰتِ وَٱلْأَرْضَ فِي سِتَّةِ أَيَّامٍ ثُمَّ ٱسْتَوَىٰ عَلَى ٱلْعَرْشِۖ يُغْشِي ٱلَّيْلَ ٱلنَّهَارَ يَطْلُبُهُۥ حَثِيثًا وَٱلشَّمْسَ وَٱلْقَمَرَ وَٱلنُّجُومَ مُسَخَّرَٰتٍۭ بِأَمْرِهِۦٓۗ أَلَا لَهُ ٱلْخَلْقُ وَٱلْأَمْرُۗ تَبَارَكَ ٱللَّهُ رَبُّ ٱلْعَٰلَمِينَ ٥٤

Translation: "Surely your Lord is Allah, Who created the heavens and the earth in six periods of time, and He is firm in power; He throws the veil of night over the day, which it pursues incessantly; and (He created) the sun and the moon and the stars, made subservient by His command; surely His is the creation and the command; blessed is Allah, the Lord of the worlds".

*al- A`raf : 54*

وَسَخَّرَ لَكُمُ ٱلَّيْلَ وَٱلنَّهَارَ وَٱلشَّمْسَ وَٱلْقَمَرَۖ وَٱلنُّجُومُ مُسَخَّرَٰتٌۢ بِأَمْرِهِۦٓۗ إِنَّ فِي ذَٰلِكَ لَءَايَٰتٍ لِّقَوْمٍ يَعْقِلُونَ ١٢

Translation: "And He has made subservient for you the night and the day and the sun and the moon, and the stars are made subservient by His commandment; most surely there are signs in this for a people who ponder"

*al-Nahl :12*

According to the analysis of the exegesis in the verse *al- A`raf : 54* and verse *al-Nahl :12*, stars are the Allah's creatures which obey and follow the Allah's command and order. Refers to the researcher's points of view, the meaning of "obey and follow" is the motion and the movement of the stars which is according to the rules and the regulations of Allah. Same goes to the analyses exegesis of the verses of Quran in the verse al-Hajj. The stars are one of the creatures which obey to Him. Thus, the stars have their own rules and regulations for the purpose and the role of creating like the composition of the human. The composition of the human is explained in the verse *al-Dhariyat: 56*

وَمَا خَلَقْتُ ٱلْجِنَّ وَٱلْإِنسَ إِلَّا لِيَعْبُدُونِ ٥٦

Translation: "And I have not created the jinn and the men except that they should serve Me."

Thus, the life of the stars from Islamic perspective means that the stars can shine on their own. These are explained through the physical traits in Quran which is the stars are like a lamp *(al-Masabih dan al-Kawkab)*. This most important physical trait is connected to their roles. Because of the stars shining at night and their circulation can be measured, hence they can be referred for directions, as well as the measurement of time. Stars are one of the beautiful objects which come out at night which becomes the symbolic of the hundreds of thousands of the members of heaven.

The stars life cycles are following some stages according to modern astronomy research. It is refers to changes that take place in stars as they are ageing or changing stage of life. The basic stages during their lifetimes are how they born, grow up as a protostar, mature in main sequence and old aged stages before die. However, different stars varies in term of colour, size and brightness. The bigger a star, the hotter and brighter it is. Hot stars are blue in colour while smaller stars are less bright, cooler and red in colour. Because they are so hot, the bigger stars actually have shorter live span than the small and cool ones. The life cycles of star depends upon its initial mass and chemical composition. Their life cycles changes in every stages are following y this explanations:

Birth of Stars: Stars are born in giant clouds of dust and gas. Sometimes cloud shrinks because of gravity. The shrinking cloud becomes hotter until it is hot enough to produce a nuclear reaction at the core, then a star called is born. This stage is the earliest phase in their life cycle.

The Main Sequence: The second stage of stars life cycles is the main sequence. All stars are in the main sequence after totally achieved the hydrostatic equilibrium. It is the inward force which tends to compress the star, balanced by the outward force due to the pressure. All main sequence stars are powered by the fusion of hydrogen into helium in their cores. High-mass main sequenced stars have shorter life span than low-mass main sequenced stars.

Old Star: Before stars die, they become old stars. After the hydrogen fuel in the core of the star is used up, no new heat is produced and gravity will take over and the core of the star will shrink. This makes the very outside of the star "float up" and cool down, making star changed into a big and red body called - a Red Giant or Supergiant star. As the centre collapses, it becomes very hot again, eventually getting hot enough to start a new kind of nuclear fusion with helium as the fuel. Then the Red Giant shrinks and the star looks "normal" again. This does not last very long, though, as the Helium runs out very quickly and again the star forms a Red Giant. Red Giant star turns to second phase when helium shell burning begins around the inert carbon core after the core helium is exhausted. Condition for Supergiant stars (massive stars) in second phase begins when the fusion of heavier elements starts in the core after helium runs out. The stars fused many different elements in a series of shells while iron collected and clumped in the core.

Death of Stars: The last stage in stars life cycles or the way it finally dies depends on its mass. Low massed stars from Red giant stage turns to Planetary Nebula when outer parts drifted off into space and cool down. They are not able to fuse carbon or heavier elements into their cores and ended their lives by expelling their outer layers and leaving behind a White Dwarf; or a carbon star. For massive stars at old age stage, iron cannot provide fusion energy, so it accumulates in the core until degeneracy pressure can no longer support it. Then the core collapse causes huge explosion called Supernova. The core collapse forms a ball of neutrons which may remain as neutron stars; super dense object, or collapse further to form a black hole.

However, in the Islamic perspective, explanation the death of the stars when the stars cannot be functioning and the main physical trait is gone. The analysis shown that there are four words in four verses in the al-Quran told how death of stars occured. First words that refers to the death of a star is *hawa* on verse *Sura al-Najm*: 1 "By the Star when it goes down". Second word is "*tumisat"* on verse 8 *Sura al Mursalat*: "Then when the stars become dim". Third word is "*inkadarat*" on verse 2 *Sura al-Takweer*: "When the stars fall, losing their luster" and fourth word is *"intatharat"* on verse 2 *Sura al-Infitaar*: "When the Stars are scattered".

Refer to word *"hawa"* in the verse "By the Star when it goes down", this verse is symbolic to the end of stars life cycles. According to contemporary Muslim scholar, 'Abd al-Da'im al-Kahil when he was discussing that the word *hawa* is the most accurate to represent the end of a star life cycle (fall, *nihayah*, *saqata*), and not the word death (*maut*). He explained that stars do not experience death because death means that stars cease to move, which is simply not the case, as stars turns to other forms as previously discussed. Therefore, he insisted that *hawa* or fall (*saqata*) and disintegrate into other objects are the most accurate. This describes the end of stars as currently occurring and not referring to the end such as in the Resurrection Day. A lot of *Mufassireen* in their exegesis agrees that *"tumisat"*- becoming dim, means loss of light. Al-Razi, among early Muslim Scholars added essential information by saying that word *"tumisat"* means burning. According to al-Asfahani, the word *"tumisat"* means dying out undetected or losing light. In

discussing the word *"inkadarat",* Ibn Kathir narrated all the views that synonymize *"inkadarat"* with *"intatharat"* which means falling. This kind of interpretation is not really accurate because the two words are different. It is undeniable that Arabic dictionary and rhymes did not justify clearly the difference of the words when referring to books related to the miracles of the Quran. As a result from the views of various scholars, it most likely that *"indakarat"* means changing and falling. This word meanwhile means change that occurred on the star and it starts to fall down while the word *"intatharat"* means falling down and scattered.

Moreover, the analysis of the al-Hadith texts shown that the traits and the roles of the stars have the connection in each other explained the life and death of stars. The shining stars have become the symbolic of the roles of the Prophet friends *(sahabah)* and the Muslim Scholar *(Ulama)* which become the reference for the human. When the light is gone, stars cannot be functioning like explained before.

Based on discussion shown above, we can conclude that life and death of star from Islamic and modern astronomy perspective has some similarities and differences. Figure 1 below shown and given the explanation similarities and differences from both perspectives:

| Similarities and Differences | Islamic Perspectives | Modern Astronomy Perspectives |
|---|---|---|
| Similarities:<br>The explanation from the changes physical aspect of the stars | Life of stars: explained in the form of physical traits: able to shine, and the measure of the movement and the dead stars are dissolved in the form of the lost of the light, fall down scattered around. | Explained the life of stars which depends on the physical traits : the light, temperature and the colour (magnitude and luminosity) and the dead stars explained being dim and leaving the carbon core (nebula planetary) or emit the core which consist of various the heavy element layer (supernova explosion) |
| Differences :<br>Islam explained the purpose of the creation and the modern astronomy explained in the physical aspect changes only | The life of stars explained the purpose of creation; actualize the roles which can be useful for human beings and the death of the stars is the sign of the Destruction Day which is the destruction of the universe. | Life of the stars depends on the hydrogen in their core. Death of the stars: Their not able to fuse carbon or heavier elements into their cores and ended their lives by expelling their outer layers. |

Fig. 1: Similarities and Differences the Life and Death of the Stars from Islamic and Modern Astronomy Perspectives

## 4. Conclusion

The obtained results show the understanding from the verses of Quran and prophetic traditions and sayings from Islamic perspective are related to the physicals aspects of life and death of stars; and is still consistent with Modern astronomy context. However, Islamic perspectives also explained that life and death of stars has connection with human life and it is beyond the astronomical descriptions. Modern astronomy provide detailed explanations empirically to elaborate the understanding though it is limited to the physical dimension of the life and death of the stars. As new advances in astronomical discoveries grow at exponential rate today, there is time to reflect and appreciate the Islamic contribution to astronomy. It is for this reason that the discoveries and astronomical revelation in al-Quran and Hadith should not be ignored for forgotten.

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