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Life Cycle of a Low Mass Stars

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Abstract

In the present work, I shall explain the gravity mechanism and life cycle of a low mass Stars. For this purpose, some mathematical equations, and MATLAB Program could be used to draw the shape of a gravity as a dark fabric distortion in three dimensions under the stress of a Solar mass Stars from the Birth to Death. Stellar structure and evolution are acting directly on the distortion of a dark fabric matter and energy. The Gravity is acting directly on the Formation, Structure, and Evolution of a Solar Mass Stars. Dark Fabric Geometry was curved and distorted differently under the stress of an ordinary Stars like the Sun, and Compact Stars. White dwarfs and black dwarfs are two dense and compact stars where dark fabric is warping strongly under their stress. Dwarf star is other type of a low mass Stars where its mass is very low to produce energy from nuclear fusion at its Centre.

Keywords: Nebula; Gravity; Low mass stars; Dark Fabric; Nuclear fusion.

1. Introduction

Recently, Birth and death of a Low Mass and High Mass Stars are well-known subjects in history of Astronomy and Astrophysics. There are one of two ways a star can die depending on its mass and size. If the star with a low mass died, its outer layers expand, creating a planetary nebula, and its core shrinking a white dwarf form from its core. A High mass star's death occurs in a massive explosion known as a supernova, the remaining core then transforms into a neutron star or a black hole. Life cycle of a Low mass stars is a main objective in a present work. Low mass stars can be classified into an average mass star like the Sun, and very low mass star as a dwarf star. A dwarf star is a star of relatively small size, with a low mass, gravity, temperature, and luminosity. Fortunately, nuclear fusion takes place at the heart of a Solar mass stars, otherwise the dwarf stars haven't enough mass, pressure and temperature to produce energy at its core from nuclear fusion.

A brown dwarf is a dwarf star not massive enough to ever fuse hydrogen into helium, but still massive enough to fuse deuterium, it is less than about 0.08 M⊙ and more than about 13 Jupiter masses.

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The surface temperature of a dwarf star is very low as compared to solar mass stars and high mass stars where nuclear fusion feeding them with extra temperature. The mass, gravity, pressure, and the temperature of a Star are active factors for producing energy and new atoms at the heart of Stars when starting with a nuclear fusion process. Stars are formed when interstellar gas clouds of a sufficient mass and energy collapse under their gravitational pull. This collapse transforms gravitational energy into thermal energy, thus heating the gas when nuclear fusion began at the heart of Stars. [1] When fuel of Star vanished at final stages of its life, it may explode with a big and luminous explosion which named a supernovae explosion, an example of a well - known supernova, namely the Crab Nebula. Crab Nebula contains the Pulsar at its core. A pulsar (from pulsating radio source) is a highly magnetized rotating neutron star that emits beams of electromagnetic radiations out of its magnetic poles. Sun is a low mass star, when the Star with a Solar Mass died, the white dwarf, and black dwarf may be born in the final stages of a low mass star evolution.

In this research work, the life cycle of a low mass stars are main objectives of our study. Significant objectives of this research to describe the space was filled with a dark fabric matter where distorted differently under the stress of a low mass stars from birth to death. Another aim of this study to discuss the ultimate fate of solar mass stars, and dwarf stars with a mass much lower than the mass of Sun.

2. Stellar Nebula

A nebula is a giant cloud of dust and gas that distributed in a large space. It is a birth and death place for Stars, Planets, and celestial objects. The Orion Nebula is an example of a diffuse nebula situated in the Milky Way, being south of Orion's Belt in the constellation of Orion. It is one of the brightest nebulae and is visible to the naked eye in the night sky. It is about 20 light-years away and is the closest region of a light and massive star formation to Earth. Stars that we believe to be young are always found close to clouds of interstellar dust and gas that named nebula, we argue that such clouds of cosmic matter and energy must be contracting slowly under its self-gravity, giving rise to increasingly compact condensations, and density some of which eventually collapse down to stellar size to form a protostar in the first steps of a star formation. [2] The protostar formed from crucial amount of mass when condensed together in the heart or edge of a nebula. The protostar has enough mass, density, volume, pressure, Gravity, friction, energy, and temperature to glow inside a nebula disc. It is more glow point of a hot plasma which shown clearly in the disc of nebula. It is a sign of a star formation from a violent environment, and giant tornados. In fact, Nebula is a main source of star formation and evolution. Nebulae have been divided into five major categories, these are emission nebulae, reflection nebulae, dark nebulae, planetary nebulae, and supernova remnants. Stellar nebula is a place where stars formed from it. Furthermore, nebulae have many shapes such as round, circular, Spiral, elliptical, and irregular shapes. The problems of a star formation and death are among the most important challenges facing modern astrophysical research. The physical natures and life histories of stars are well described by the famous theory of stellar structure and evolution, one of the great achievements of 20^{th} century for Astronomy field. According to this theory stars are self-gravitating plasma balls of mostly hydrogen gas that act as thermonuclear furnaces to convert the primary product of the Cosmic Big Bang (hydrogen) into the heavier elements of the periodic table. In the first moments after the Big Bang, the Universe was extremely in hot plasma state and very hard for electrons to be trapped in orbits around nuclei, and forming the first atoms in that hot state of the Universe.

Hydrogen didn't appear until the Universe annihilated, evaporated, had spread out and subsequently cooled enough for the first protons, and neutrons to combine together building up a nuclei and electron orbits it to form hydrogen atom, first hydrogen atoms formed Within about 3 minutes after the Big Bang, conditions cooled enough for these protons, neutrons and electron to form much stable hydrogen atom. The Universe still contains about 75% of Hydrogen isotopes. They are the fuel and building block of nebulae, and stars in first steps of star formation from nebula cloud. Stellar nebula contains about 95% of hydrogen and helium gas, and 5% of other materials. Stars are mostly formed from hydrogen and helium elements with a fraction of other atoms which existed in the structure of nebula. Hydrogen and Helium are two abundant elements in the nature. They are formed in the first stages of a Universe expansions, and Stars formations at whole. Especially hydrogen gas is a main element of a star structure, and its nuclear fusion at the core. The formation of stars from nebula cloud, and nuclear fusion in the heart of Stars are beginning from hydrogen gas share. Without hydrogen gas formation after big bang, the star formation and fusion processes may be impossible in the nature. Hydrogen is the mechanism of star formation, evolution, and its nuclear fusion processes. Hydrogen is a main fuel of fusion for solar mass stars [3]. The James Webb Space Telescope's Near-Infrared Camera reveals the iconic Pillars of Creation in spectacular detail. Stars are hot, and bright objects in the Nebula like diamond pieces. Figure 1 is the Pillars of Creation in the Eagle Nebula are clouds of dust and gas where new stars are forming from it. Newly formed stars are visible as bright red orbs that sometimes appear with eight diffraction spikes. Low mass and high mass stars are forming from Eagle Nebula, that located about 6,500 light-years away from Earth. This cute photo we see now is the light was travelling to Earth more than 6,500 light years ago. The speed of light is very low to see what is going on here in this nebula for this moment. The light in its journey will face to face fight with a dark fabric matter and energy to travel faster into our planet at shorter time. The space is not empty 100% to make light particles reach into our eyes at this moment when ejected directly from any source of light. It is interacted with a dark fabric matter that distributed in the whole structure of the visible Universe.

Dark fabric matter and energy is a great problem and obstacle in the road of a light. It is the hidden dimension of the Universe that effected on us from the moment of a Universe creation to the future. Fortunately, the dark fabric matter not combined and compacted for that level to keep light particle for a long time. It is like a fabric and space between its structure high enough to give light particle much chance to pass through it easily. Dark fabric matter and energy is another reason of keeping the Universe in the darkness beside many trillion stars, and galaxies are forming continuously in the Universe. The photon particles maybe reflected, bended and disappeared beyond the dark matter particles. It is a difficult to see the actual position of stars in the Universe and much tough for light particle to reach us at the short time, its journey being late because of its interaction with a dark fabric matter in the road. We can see only the observed images of whole stars and celestial objects of the Universe. To see the actual images of the stars in the Universe is much problem faced us in the history of science for a long time. The dark fabric matter is existed in the nature and light bended under its effect. To capture the images of the distant stars in the universe, we much needed to a new technology to capture the cosmic fabric waves that travel in the universe faster than the speed of a light particles. The world needed to new field of astrophysics and new technology to capture the photos of stars in instant time. Most of galaxies and stars were died long time ago and we see their observed photos during that moment. The photos of stars and galaxies return to many thousands or billion years ago. We are living with past moments of the Universe. The

instant photos of the Universe to be captured with instant events of the Universe to see, we much needed to a new field of physics and new technology to understand another dimension of the Universe. World urgently and strongly needed to understand Cosmic Fabric Theory to complete this vacuum in the field of Physics. Without studying cosmic fabric theory, the world will stay with classical astrophysics and live with a past moments of the Universe. Time comes to think about new theory and work for it deeply and strongly to change the concept of people deals the fate of our elegant Universe. Cosmic fabric theory is our dream to swim by it into the edge of the giant, cute, golden and yellowish visible Universe that captured by the giant strings of a dark fabric.

Figure 1: Pillars of Creation in the Eagle Nebula.

Figure 2 shown clearly the protostar was formed from stellar nebula. The protostar is a first stage of a star evolution. It is gathering enough mass and energy from its surrounding to increase its core pressure and temperature, and to ignite nuclear fusion process. An average star like solar mass stars may begin with a nuclear

fusion process in the second stage of a star evolution. The sun is a low mass star in the middle of its age about five billion years ago nuclear fusion process was started in its heart. Nuclear fusion is a main source of energy for all stars in second stage of a star evolution that named main sequence stars. Sun fused hydrogen isotopes to form helium atom. Nuclear fusion maybe suspended at the core of Sun after five billion years when its fuel exhausted at whole. Main sequence star with the same mass of a sun may survive about 10 billion years. The sun will become a red giant when its fuel runout at third stage of a solar mass star evolution. The red giant will expand into space, its density, pressure, and temperature will decrease. When a red giant expanded high enough, its core will shrink strongly inward, and its shell may expand outward in the fourth stages of a low mass star life which named planetary nebulae. The remnant core of a planetary nebula called white dwarf. White dwarf is a five stage of a low mass star evolution. It is a tiny celestial object with a density more than million tons per meter cube that crashed in the tiny size. It is a white and smooth sphere of electron degeneracy matter. An electron degeneracy pressure supporting its energy and heating its surface to many thousands of degrees. The white dwarf can radiate different radiations to many billion years. Black dwarf maybe born from white dwarf when its radiations suspended after trillions of years. Black dwarf was produced from white dwarf death in sixth stage of an average star life. It is dense, dark and tiny celestial object of the Universe. The radius of a solar mass black dwarf is about three kilometers. When sun died and became a black dwarf its radius may remain 3 kilometers. Black dwarf is a final fate of our star mass the Sun. The Sun was feeding solar system with light and heat more than 5 billion years. It is still adult and strong which filled with enough hydrogen fuel for burning to next 5 billion years. The sun is a main source of energy and gravity for all solar system family. Without the sun's formation and its huge energy, the solar system may stop from life and combination.

The dark fabric which distributed in the body of a solar system will save it from possible collapsing. Dark fabric matter and energy was distorted slightly under the stress of a protostar, main sequence star, red giant star, planetary nebula. Furthermore, the dark fabric matter and energy is warping strongly under the pressure of compact stars like white dwarf, and black dwarf. The density and pressure of a white dwarf and black dwarf are high enough, they are drowning deeply into the structure of a dark fabric. Black dwarf falls down deeply into the structure of a dark fabric as shown here clearly in the following second figure. Super distortions and curvatures occurred in the dark fabric matter under the density and pressure of compact stars. Dark fabric represents the space matter and gravity. For best understanding dark fabric distortions, it is needed to equation (1) and MATLAB program to draw the shape of a gravity as dark fabric distortions in three dimensions (x,y,z) for next second and third figures coming. To reach this goal, it needs to write and explain following equation. By pure mathematical equations much difficult to draw the shape of a gravity, to reach this goal we used the MATLAB program to draw the geometry of a gravity as a dark fabric distortion in three dimensions. [4] Furthermore, following the formula of a distortion equation to draw the effect of Stellar Structure evolutions in a Dark Fabric Structure:

$$\boldsymbol{z = \frac{1}{\cosh(x^2+y^2)} - \frac{\coth(x^2+y^2)}{\tan(x^2+y^2)}} \qquad (1)$$

Dark fabric was distorted differently under the stress of a low mass stars from birth to death, by using MATLAB Program, and using Equation (1) to draw the effect of low mass stars, suppose (-pi/2 < x < pi/2, -pi/2 < y < pi/2),

or it can be written in the following mathematical form: $-\frac{\pi}{2} < x < \frac{\pi}{2}$, $-\frac{\pi}{2} < y < \frac{\pi}{2}$.

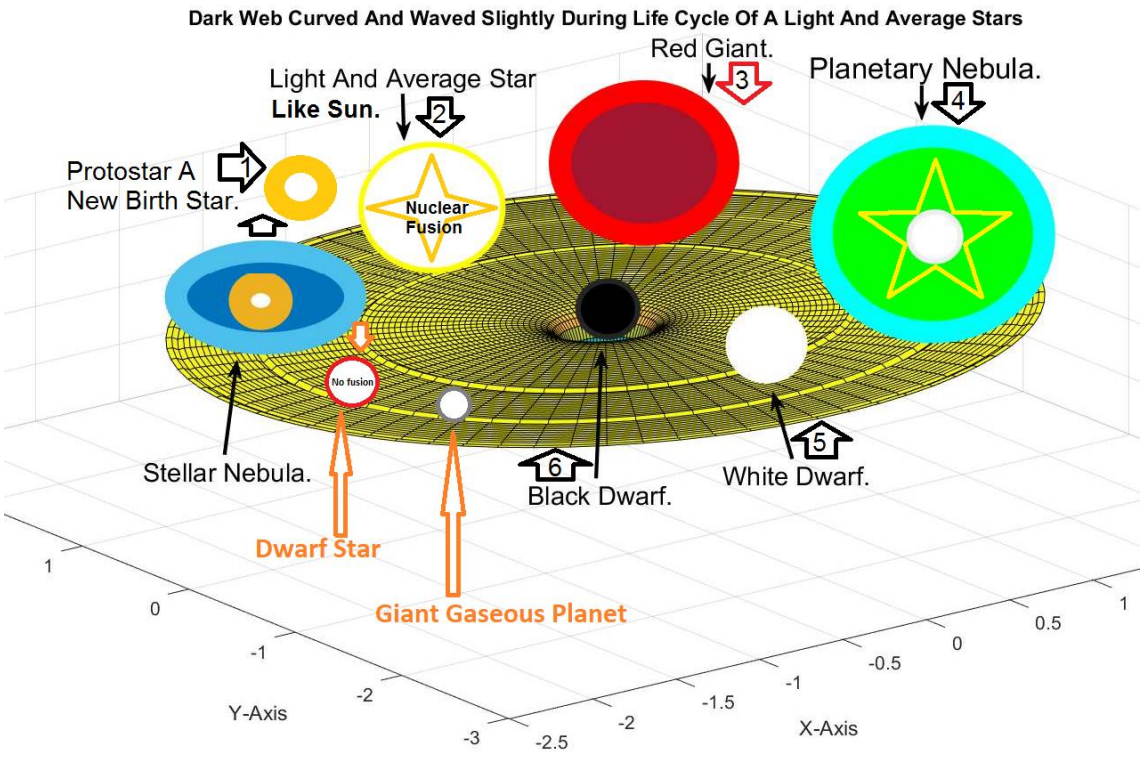

Figure 2: Life Cycle of a Low Mass Stars.

Dwarf star is another type of a low mass stars. It has very tiny mass as compared to solar mass stars. Its mass, density, pressure, and temperature not much enough to initiate nuclear fusion at its core. If dwarf star collects enough gas, dust, from its surrounding, it may start with nuclear fusion processes. When dwarf star lost most of its materials during continuous annihilations, and plasma evaporation, it may become a giant gaseous planet at its final steps of its life. The Jupiter planet is a giant gaseous planet maybe formed from the remnant of a dwarf stars that failed to become main sequence star. Jupiter is the fifth planet from the Sun and the largest in the Solar System, it has high mass and size as compared to other planets of a solar system. There are maximum number of natural satellites orbit the Jupiter. Its mass, and gravity high enough to call it the giant gaseous planet. Jupiter is a giant Planet, it has very high mass about 1.898 x 10^{27} kg, normally its mass 320 times bigger than the mass of the Earth. It is one of external planets of a solar system. It is a cold planet because of its position far away from the Sun. Dark fabric was distorted slightly under the stress of a dwarf stars and gaseous planets.

3. Solar Mass Stars

Solar mass star is a low mass star where nuclear fusion takes place at its heart under massive conditions. It has enough mass, density, pressure, and temperature to be continue with a nuclear fusion at its heart for next five billion years. The sun is a main sequence star, its mass not very low like dwarf stars, and not so high like

massive stars. It is only an average star. The sun will die like any star in the Universe after five billion years when its fuel of hydrogen isotopes ended entirely, it will become a red giant. The red giant will expand more to become a planetary nebula. The remnant core of a planetary nebula may become a white dwarf, and black dwarf at the final stages of sun's life. There are six stages of a solar mass stars from birth to death. The fate of sun may become clear in the next stages of a solar mass star evolution.

3.1 Protostar

Protostar is a first stage of a star formation and evolution. It is a Star begins to form from a large cloud of gas and dust which distributed in space. Protostar was formed from violent tornado that occurred in the structure of any stellar nebulae, when much enough mass and energy squeezed together to form hot celestial object is a primary star. Nebulae is a greatest gravitational wall where protostars needed to high temperature and kinetic energy to break this huge wall. It may need to high speed and kinetic energy to exceed this gravitational potential energy. The protostar needs to spend much energy and give a blue light colour, its surface much hotter and luminous in this Universe transition. A protostar is a very young star that is still gathering mass from its parent cloud [5]. The protostellar phase is the earliest one in the process of a stellar structure and evolution. For a low-mass star such as Sun or lower mass star, its process lasts about 500,000 years to 10,000,000 years. Star formation begins in relatively small molecular clouds called dense cores [6]. Each dense core is initially in balance between self-gravity, which tends to compress the object, and both gas pressure and magnetic pressure, which tend to inflate it. Protostar is a first stage of star evolution where nuclear fusion was not beginning at its core to form new atoms, because of its low mass, density, pressure, and temperature. It is under process of growing and gathering mass from its surrounding to increase its self-gravity and thermal pressure to begin nuclear fusion process. As the dense core collecting enough mass and energy from its surrounding cloud of gas and dust, the self-gravity begins to overwhelm pressure, and internal collapse begins to compress the core of protostar. The protostar phase begins when a molecular cloud fragment first collapses under the force of self-gravity and an opaque, pressure supported core forms inside the collapsing fragment. A protostar looks like a star but its core is not yet dense and hot enough for fusion process to take place. Its luminosity comes exclusively from the heating of protostar as it contracts on itself. Protostars are usually surrounded by dust and gas clouds, which block the light that they emit, so they are difficult to observe in the visible spectrum. Its phase ends when the infalling gas is depleted, leaving a pre-main-sequence star, which contracts to later become a main-sequence star at the onset of hydrogen fusion producing helium since nuclear fusion is beginning at the heart of a main sequence stars in second stage of star evolution. Protostar in the phases of evolution to become main sequence star when collecting much enough mass from its surrounding. It is first stage of a stellar structure evolution. The nuclear fusion is main condition of a main sequence stars, it is another step of a star evolution.

3.2 Main Sequence Star

Main sequence star is a second stage of a star evolution which fuses hydrogen atoms to form helium atoms in its core. Nuclear fusion takes place at the heart of a main sequence stars to produce some new atoms and energy. Nuclear fusion is a nuclear reaction process that occurred naturally in the heart of stars under high pressure and temperature conditions where low mass atoms fused together to form high mass atoms with an ejection of

subatomic particles and radiations. The majority of stars in the Milky Way Galaxy, including our Sun, Sirius A, and Alpha Centauri A are all main sequence stars. [7] The nebular hypothesis says that the Sun and Solar System formed from the gravitational collapse of a fragment of a giant molecular cloud. [8] The currently accepted method by which the planets and satellites formed is accretion disc, in which the planets began as dust grains in orbit around the central protostar. [9] When the Sun or any other star gathering enough mass from its surrounding, its density and high opaques may not allow radiation to escape from the heart of star, as a result its temperature may increase high enough to begin a nuclear fusion at temperature degree when reaches 10 million K. The Sun is a main sequence Star, its central temperature was reached 15 million kelvin and nuclear fusion continuous at its center more than 5 billion years ago. It is an average star with normal mass and temperature. It is a G-type star that feeding our planet the Earth and all Solar System family with enough radiation and energy more than 4.5 billion years ago. Under high conditions of pressure and temperature the Sun fuses hydrogen isotopes to form helium atom to produce energy during nuclear fusion processes in its heart. The Sun fuse about 700 million tons of hydrogen to produce 695 million tons of helium atoms with losing and converting about 5 million tons of its mass into energy at every second. It is greatest nuclear reactor in the Solar system. It is a main source of energy for our solar system. The life on our planet the Earth is continuous because of solar energy. Without the solar radiation and its heat, the life may suspend here to forever. Its continuous in melting and boiling to give us life and civilizations. Already the Sun is a low mass star, and very young and so soon for it to die, it can produce energy for more than 5 billion years later, it may expand to be a red giant when its fuel runout after 5 billion years. Next 5 billion years the Sun will expand into space to become a red giant at the third stage of its evolution.

The simple model of any main sequence star is of a dense gas fluid and hot enough in a state of hydrostatic equilibrium. The inward acting force is the gravity which balanced by outward acting forces of gas pressure and the radiation pressure. The ideal balance between gravity force and thermal pressure was kept the Sun and any other stable stars from explosion more than millions of years. Corona the extremely hot solar atmosphere layer but tenuous, the pressure and temperature of stars basically increases as you approach the core of star where nuclear fusion takes place. Dark fabric is another important factor that protecting stars and planets from explosion and perturbation. Dark fabric is acting and interacting directly with an ordinary matter and energy inside the structure of a visible Universe. Figure (2) explained that the cosmic dark fabric warped and curved under the pressure of Sun during nuclear fusion processes to produce energy for total solar system especially for our planet the Earth. Nuclear fusion in the core of a Sun takes place when two hydrogen isotopes fused together and produced helium atom with low mass because some of its mass converted to energy according to Einstein's law of energy conversion. Nuclear fusion keeps the hydrostatic balance in stars and sun because the thermal pressure equals to the gravity. Cosmic fabric distorted and waved actively during nuclear fusion process that leads to keep hydrostatic balance, and spherical shape of the sun. The Sun got spherical shape because of a tussle between the gravity and thermal pressure. The gravity is caused by the mass of Sun and dark fabric that surrounding it from outside. Dark fabric gives to the Sun, Stars, and Planets an additional pressure and weight, for this reason their shapes are stayed spherical at whole. Stars and planets are drowning deeply into a dark fabric to capture enough mass and energy from its surrounding. Stars and planets got spherical shapes when gathering enough mass and energy. Dark fabric is an important factor for the evolution of stars and planets. It is

a hidden hands in the evolution of the Sun and its planets. Cosmic fabric divided into dark fabric and bright fabric. Dark fabric is a dark matter and dark energy that distributed in the large distances between stars, planets, galaxies, and subatomic particles. Bright fabric is a visible fabric of the visible Universe from atoms to Stars, planets, galaxies, compact stars, and black holes. Bright fabric contains an ordinary matter and energy that named atoms and electromagnetic spectrum. Cosmic fabric is the dark fabric and bright fabric of the total structure of the Universe which distorted when interacting together directly. The Sun and Earth are two objects of a bright fabric interacting together during space about 150 million kilometers through the dark fabric which distributed between them. Dark fabric is an important factor to be curved and distorted under the pressure of a bright fabric to keep the general dynamical balance of the Universe. The density of a bright fabric much higher than that the density of a dark fabric, because the bright fabric that named an ordinary matter and energy was formed from compacted world before a big bang when the Universe was much compacted and smaller in size than today. Stars and planets kept their dynamical balances through direct interaction between them. Without the direct role of a dark fabric the interaction may cut off between whole celestial objects of the visible Universe. Dark fabric is a main medium of space which existed here to transfer energy between celestial objects of the Universe and keeps the whole balance of the Universe. Dark fabric energy is the vacuum energy that acting directly on the shape of all celestial objects, and all evolutions when occurred at the Universe.

Stars are main sources of energy and electromagnetic radiations. Sound is a mechanical wave needs to a medium to transfer. Light is an Electromagnetic wave and particle, it needn't to a medium to transfer by it. It can move through the medium and space too. The vacuum between Stars and Planets, Sun and Earth are filled with a dark fabric matter and energy. Dark fabric structure is not closed and compacted 100%, its structure contains gates, corridors, vacuums, and tunnels. Radiations can move and transfer throughout the tunnels and gates that existed in the structure of a dark web. The light can move and pass throughout the distance between Sun and planets after multi collisions with many dark fabric particles and its strings. Radiations from Sun reached the Earth at 8.3 minutes. Light particles at its journey directly interacted and collided with many particles and strings of a dark fabric. Zigzags, ripples, curvatures, and distortions occurred in the structure of a dark fabric when light particles directly interacted and collided with dark fabric strings, these interactions between Photons and dark matter particles lead to build tunnels and gates in the structure of a dark fabric so as to move and pass throughout them. Light can't pass throughout the dark fabric easily; it needs to build gates and tunnels to move through them quickly because wave length of the electromagnetic waves are different with the diameter of gates and tunnels which existed in the structure of a dark fabric. Wave length of most radiations are higher than the diameter of gates and tunnels which existed in the dark fabric structure. Radiations need to make enough vacuum in the gates and tunnels of a dark fabric to pass through them quickly and successfully.

Speed of light through dark fabric in space is 300,000 km/sec, it is a limited velocity and lazy particle to move into the edge of the Universe at a short time, because light particle interacted and collided with many dark fabric particles to exceed its speed. Light can't move with a giant speed because of dark fabric particles that obstacle its road. Scientists believed that the diameter of a known visible Universe is about 93 billion light years, it means light needs to 93 billion years to move from one side of the Universe to another side. It is boring and huge time for travel to the edge of the Universe. Today we need to benefit from dark fabric matter, and its energy to exceed our speed in order to reach the final borders of our Universe during short time. It needs to

much work and best understanding the hidden power of a dark fabric and exploit it for the benefit of all humanity. The light speed is not absolute speed of the Universe, it is a weak particle when interacted with a dark fabric needed to build up the tunnels to pass through them. All radiations in the spectrum of electromagnetic wave are moving at same speed of light. There are other power and speed to move with it into the edges of the Universe or move between galaxies, it is the cosmic speed when mankind exploited dark fabric energy to travel by it in the future. Without new speed we can't reach the edges of the Universe. Dark fabric energy is our main target to use it and travel by it between galaxies in the next time. It is the future energy and our time machine. We can't reach our goal without dark fabric energy participation. It is the future energy, and it is abundant every time and everywhere in the Universe. It is existed around us, and needed to deep thinking and hardworking time to use it as soon as possible. The direct interaction of an ordinary matter and energy with a dark fabric matter and energy leads to accelerate the vibration of a cosmic fabric at whole. These interactions may distribute like curvatures, waves, and distortions at whole points of the Universe. We can exploit these interactions to travel into all points of the Visible Universe.

From following figure shown clearly the Sun produced greatest circular and elliptical distortions in the structure of a dark fabric matter, because the Sun has high mass and strong stress on a dark fabric. Furthermore, light produces only tiny zigzags and distortions in the structure of a dark fabric because light particle has very limited mass and energy, it is a tiny and weak particle that well known in the history of all mankind. Further examples, circular waves and distortions occurred in the structure of standing water in the pool when stone with enough mass and potential energy falls down into water directly, also tiny distortions and zigzags take place on the surface of water when accelerated air interacted with it directly because the mass and kinetic energy of air particles very small as compared to that stone which falls down vertically into the water. Stone and water are close examples for celestial objects of the Universe with different masses when dark fabric distorted strongly under their high masses and energy. Also, air is another good example for light interaction with a dark fabric matter when it is warping like tiny zigzags, and waves. The figure 3 shown clearly the hydrostatic balance between thermal radiation pressure which try to explode the Sun and gravitational pressure that contracting star to inward. Both of gravity and radiation pressure in perfect balance where together kept the Sun from explosion more than five billion years. Nuclear fusion is a main source of energy which feeding Sun for long time ago. The Sun is an average star where fusion takes place at its core, otherwise the dwarf stars where nuclear fusion not starting at their hearts for a long time because of its limit gravity and temperature. Dwarf star is a failure star that failed to start fusion. The sun is a star with much enough mass, pressure, and gravity to start fusion.

In this research, we have to learn basic production of solar energy from nuclear fusion that began in the heart of the sun. [10] The sun is a main source of energy in a solar system, beside the sun, there are many stars in a milky way galaxy can emit radiations to reach us on the Earth. Physic scientists believed that the sun converts hydrogen isotopes to helium atoms by means of nuclear fusion [11]. The term fusion means combining together. Hydrogen fusion requires extremely very high temperature at least 15 million℃. Our Star the Sun needed hydrogen fuel for burning, at every second it is burning about 700 million tons of hydrogen to form 695 million tons of helium with conversion 5 million tons of its mass into energy according to Einstein's famous equation of energy. During nuclear fusion process, solar energy created with a spectrum of different radiations that emitted from the sun. Solar radiations can pass through 150 million Km to reach the Earth during 8.3 minutes. When

sunlight passed through the atmosphere, some of its energy was absorbed and scattered by water vapor, gas, dust particles and dark matter particles which available here in the atmosphere layers. [12] Much radiation particles reflected back into space, and few number of solar radiations may reach the earth's Surface, especially visible light and infrared light are two important radiations for life will reach the surface of the Earth to support our life and plants. Benefits of our star the Sun are infinity and higher than human beings' imaginations. The sun was nearest star to the Earth's planet, for this reason it became important for our life and our ideology, even some nations worshiped it during past history.

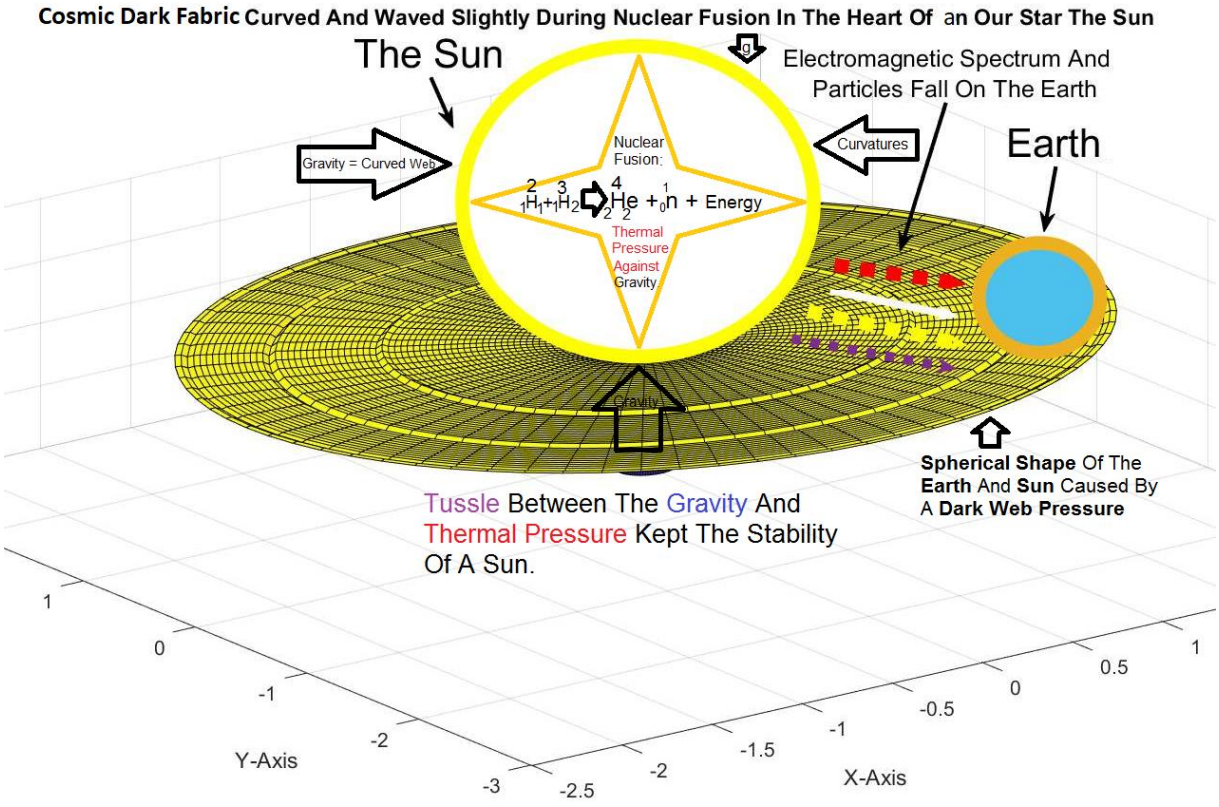

Figure 3: Cosmic Fabric Distortions During Nuclear Fusion Processes.

In the fusion process, the total mass of the matter created is less than the total mass of all the ingredients. For example, the mass of a reacted hydrogen isotopes is higher than the mass of a helium atom that produced in the fusion. The missing mass is converted into energy according to the well-known Einstein's equation of energy conversion as below:

$$E = mc^2 \qquad (2)$$

Where E is the energy in joules, m is the missing mass in kilograms, and c is the speed of light, equal to approximately $3\,x\,10^8$ meters per second. The sun produces a tremendous amount of energy when hydrogen isotopes are converted to helium nuclei continuously in vast numbers. According to equation (2) about 5 million

tons of Sun's mass converted to energy at every second, and it equals to $(4.5\ x\ 10^{26}\ Joules)$. There is enough matter in the sun to keep its hydrogen fusion process going for millions of millennia yet to come. Eventually the hydrogen fuel supply will run out, but not in your lifetime. Fusion two light nuclei such as those of Deuterium and Tritium (H^2 and H^3) fuse together to form a heavier nucleus, (in this case ${}_2^4He$ plus a neutron and 17.6 Mev) produced from reaction. Nuclear fusions in the core of stars are main sources of Energy for all stars. A typical reaction is written clearly as the following hydrogen fusion equation:

$$\boldsymbol{H^2 + H^3 \rightarrow {}_2^4He + {}_0^1n + 17.6\ MeV} \qquad (3)$$

Because of the Coulomb repulsion between the deuterium and tritium (H^2 and H^3) nuclei very large kinetic energies of the order of 1MeV, are needed to get the nuclei close enough together for the attractive nuclear forces to become effective and cause fusion to begin. The foundation of power from the fusion of light nuclei such as hydrogen isotopes has the potential for future use because of the relative abundance of the fuel and the absence of some of the hazardous presented by fission reactors and nuclear bombs. Because of public concerns about nuclear fission in the United States, Hydrogen fusion has been recommended as a way to take advantage of the properties of the atom in order to generate electric power. In theory, this is a huge idea, Hydrogen fusion is more efficient in converting matter to energy than nuclear fission, and no radioactive waste is produced. But a workable hydrogen fusion reactor has not been yet developed. Nuclear energy is polluted and harmful to us and environment. Today we need to replace it with new clear and peaceful energy is a fusion power plant. It is still under test to be use in a soon future, because it is needed to a strong magnetic field to control it and exploit it for the benefit of humanity and environment. It still used for military purposes successfully like hydrogen bombs tests. It is one of human being achievements in the history. But still dangerous on human's life and hazardous for environment. The Sun still producing its power from nuclear fusion processes. It is useful energy for us and environment. It is clear and renewable energy to be used instead of other hazardous sources of energy. The nuclear fusion is feeding solar atmosphere with extra heating. The photosphere layer is the most visible to the human eyes, here the temperature of a photosphere layer reaches (5800 ℃), and chromosphere region its temperature may become a (10,000 ℃), corona is the outermost layer of a Star's atmosphere, it is a hot plasma region where its temperature exceeded many million kelvins. Sunspots are darker appearing areas on the photosphere, and they seem to fluctuate in frequency over about an 11-year cycle. They appear darker because they are a cool region about 4,000 °C relative to the surrounding 6,000°C surface. The Sun's corona lies above the chromosphere and extends millions of kilometers into outer space. It is most easily seen during a total solar eclipse, but it is also observable with a coronagraph. [13] Spectroscopic measurements indicate strong ionization in the corona and a plasma temperature in excess of 1000,000 kelvin, much hotter than the photosphere and chromosphere. The word "corona" is Latin for 'crown'. Low mass stars as Sun may become a red giant, when its fuel runout and fusion process suspended at the third stage of its life. The stars are hot plasma spheres and luminous objects in the heaven. They radiate radiations in all directions with different frequencies and wavelengths. A star's luminosity can be determined mathematically from two stellar characteristics: area and effective temperatures according to equation (4) as shown as here clearly. The stars have their different effective temperatures, the surface temperature of our star the sun is about 5800 kelvins. The Sun is the normal mass star that located at the center of the Solar System. It is a nearly perfect ball of hot plasma, heated by nuclear fusion reactions in its core. The Sun radiates this energy mainly as visible light, ultraviolet UV, and infrared radiation,

and is the most important source of energy for life on our planet the Earth when mostly useful radiations passed through the atmosphere to the surface of the Earth.

The Stefan–Boltzmann equation applied to a black body gives the value for luminosity for a black body, an idealized object which is perfectly opaque and non-reflecting:

$$\boldsymbol{L = \sigma A} T^4 \tag{4}$$

$$\boldsymbol{L = \sigma 4 \pi r^2} T^4 \tag{5}$$

Where **L** is the luminosity of Stars, ***A*** is the surface area of a spherical objects with a radius **r** that determined and measured in meters for stars and light sources, where the radius of the Sun is 696,340 km, ***T*** is the effective surface temperature of Stars and black body radiations that measured (in kelvins), and $\boldsymbol{\sigma}$ is the Stefan–Boltzmann constant, with a value of $5.670374419 \times 10^{-8}$ $W \cdot m^{-2} \cdot K^{-4}$. According to eq.(4) and eq.(5) Solar luminosity is calculated mathematically and defined by the International Astronomical Union to be 3.828×10^{26} W. The star become a red giant and much luminous when its fuel runout, but its size increased and its temperature decreased.

3.3 Red Giant Star

Red giant is a third stage of a Star evolution when fusion processes suspended at the core of a star after its fuel runout and its size expanded like a big ball of a cold plasma that shown clearly in a red color. The star's outer layers expand as the core contracts, its surface temperature decreased, the new, much-expanded, and cooler outer layers can reach temperatures as low as 3500 K and will glow with a very distinctive reddish tint, as can be explained by Wien's Law. [14] The star has now become a red giant star. The Sun is an average star. It has limited mass and energy as compared to high mass stars and supergiant stars. The Sun is burning its fuel step by step because its mass, pressure, and temperature not great that level to accelerate fusion process. The sun is about 30,000 light years far away from the center of Milky way galaxy. Also, the Sun is located in optimum position is far away from the supermassive black hole or far away from the centre of our galaxy to accelerate fusion process in order to escape quickly from giant gravitational pull of a supermassive black hole according to conservation law of angular momentum, and distortion equation. The dark fabric incredibly curved and distorted at the border of a supermassive black holes that located at the centre of all active galactic nuclei. Most stars are massive, hot, and in blue colours are travelling with a high speed in the border of a supermassive black hole because the dark fabric matter and energy at this region in a high acceleration and distortion, where the dark fabric energy pushes on the stars in this region to increase their orbital velocity, to escape successfully from ultimate fall into the accretion disc of a supermassive black hole. Stars are heating up and glowing more when travel in the region much closed to the centre of a galaxy that contained a supermassive black hole which acting directly on the speeding up of the star's velocity and accelerating nuclear fusion in the core of stars, because the gravity, dark fabric distortion and energy incredibly great at the region where much closed to the borders of a supermassive black hole. About 5 billion years ago the fusion process was beginning at the core of a Sun. It has enough hydrogen fuel to use it in its burning for another next 5 billion years later. Hydrogen supply much

enough for our Star the Sun to finalize on its life at this moment. It is still young and rich with enough fuel to be continue with burning hydrogen gas during nuclear fusion processes. It is the general source of light, heating, and energy for all the planets and objects which located in the Solar System. The solar system will stay in great darkness when nuclear fusion suspended at the core of a Sun, it is a life star, and all types of life will stop from motion without its energy support, for this reason antient people around whole the world worshiped it as a respect for its nice light and its infinity benefits for green environment and farming. The life cycle of stars looks like the life and death of all living creatures, when they born, grow enough, and die in final steps of their lifespans.

All celestial objects and living creatures are created to grow in the limited time, and die in the soon future. The sun and stars are formed from ordinary matter and energy, they are formed to grow more and more, when their fuel supply finalized will die in the next time. The sun is a main sequence star at this moment, when its fusion process in its core suspended at whole, its shell will expand much enough to become a big, cold and red plasma ball. The sun become a red giant at third stage of a star life. The red giant is a cold star, and huge in size with low temperature and high luminosity. Red giant is one step of star evolution, it is at the final steps of star life and evolution. Nuclear fusion maybe suspended entirely at the core of a Sun when its hydrogen runout, and its external shell expanded enough to become a red giant, and cold enough to be looked by naked eyes, without harm to eyes. The sun becomes a red giant as a big plasma sphere when its radius 81 times increased. At that time the Sun existed as a red giant, but its light not enough to support life, and environment to stay green at whole. It is the final stage of a solar system life. Everything created to grow and die at this Universe according to Universe laws, we are living in this magic Universe, it is the test Universe from its history of creation and evolution. All celestial objects will follow its conditions.

3.4 Planetary Nebula

Planetary Nebula is a fourth stage of a star evolution. It is an exploding star. The planetary nebula phase is a final stage of a low-mass star's life when its outer layers sheds and expanded into space. A planetary nebula is created when a star blows off its outer layers after its fuel run out to burn continuously. These outer layers of gas and dust particles are expanding into space, forming a nebula which is often the shape of a ring or bubble. [15] Also, planetary nebula is a type of emission nebula consisting of an expanding, glowing shell of ionized gas ejected from red giant stars in final steps of their lives. [16] Solar Nebula is a dusty and gaseous cloud from which, in the so-called nebular hypothesis of the origin of the solar system, the Sun and planets formed by condensation. Swedish philosopher Emanuel Swedenborg in 1734 proposed that the planets formed out of a nebular crust that had surrounded the Sun and then broken apart. The term "planetary nebula" is a misnomer because they are unrelated to planets. The term originates from the planet-like round shape of these nebulae observed by astronomers through early telescopes. The first usage may have occurred during the 1780s with the English astronomer William Herschel who described these nebulae as resembling planets; however, as early as January 1779, the French astronomer Antoine Darquier de Pellepoix described in his observations of the Ring Nebula, "very dim but perfectly outlined; it is as large as Jupiter and resembles a fading planet". Though the modern interpretation is different, the old term is still used. When planetary nebulae passed through two types of explosions are an internal explosion to form white dwarf in the centre of a planetary nebulae, and second

explosion is an external explosion where ionized gaseous ring formed around the white dwarf. The gaseous ring orbits the white dwarf and attracted to it strongly according to the law of gravity, Planetary nebula is a dynamic system. White dwarf is a remnant core of a planetary nebulae when a low mass star died at its final stages of its life. White dwarf is a much-squeezed object, the density of a white dwarf is incredibly high because its mass was squeezed inward in a tiny point.

3.5 White Dwarf

White Dwarf is a fifth stage of a star evolution when its fuel runout and expanded into space. The remnant core of a planetary nebula named a White Dwarf. A white dwarf, also called a degenerate dwarf star which composed mostly of electron-degenerate matter, it is a remnant core of a planetary nebula after its shell's expansion. A white dwarf is a small and very dense star. [17] Its mass is comparable to that of the Sun, while its volume is comparable to that of our planet the Earth. White dwarf with a high mass has smaller size and compacted more because of its high density, pressure, and electron degeneracy. A white dwarf's faint luminosity comes from the emission of residual thermal energy; no fusion takes place in the heart of a white dwarf. The nearest known white dwarf is Sirius B, at 8.6 light years away from us. White dwarfs are thought to be the final evolutionary state of stars whose mass is not high enough to become a neutron star or black hole. After the hydrogen-fusing period of a main-sequence star of low or medium mass ends, such a star with a low mass will expand to become a red giant during which it fuses helium to carbon and oxygen in its core by the triple-alpha process. If a red giant star has insufficient mass to generate the high core pressure, and temperature which required to fuse carbon around 1 billion K, an inert mass of carbon and oxygen will build up at its centre. After such a star sheds its outer layers and forms a planetary nebula, it will leave behind a core, the remnant dense tiny object which named a white dwarf. Usually, white dwarfs are composed of carbon and oxygen where named (CO white dwarf). According to the physics of material degeneracy, the maximum mass for any white dwarf star is the Chandrasekhar limit that approximately equal to 1.44 times the mass of a Sun, beyond which it cannot be supported by electron degeneracy pressure. The Chandrasekhar limit is the maximum mass of a stable white dwarf star. The currently much accepted value of the Chandrasekhar limit is about 1.4 $M_{\odot}$ or (2.765×10^{30} kg) [18]. When the star runs out of its nuclear fuel, the density in the interior increases with a pressure, but the temperature does not change much, the electrons become degenerate to form the radiations.

The white dwarf exposed to degeneracy pressure which directly forced on electrons to be compacted and combined according to the laws of Quantum Mechanics. The matter in the white dwarf can be explained by using the Fermi Gas Distribution Equation for degenerate electrons and the Pauli exclusion principle. The Pauli exclusion principle states that no two electrons with the same spin can occupy the same energy state in the same volume. Once the lowest energy level is filled, the other electrons are forced to move quickly into higher and higher energy states. These fast-moving electrons in the such violence environment create a pressure (electron degeneracy pressure) which is capable of supporting a star to become a white dwarf. In electron degeneracy pressure is what supports white dwarfs against gravitational collapse, and the Chandrasekhar limit (the maximum mass a white dwarf can attain) arises naturally due to the physics of electron degeneracy. An electron degenerate pressure was prevented the white dwarf from further shrinking. When the mass of a white dwarf approaches the Chandrasekhar limit, gravity attempts to squeeze the star into a smaller volume, forcing electrons

to occupy higher energy states and attain faster velocities. Electron degeneracy occurs at densities of about 10^6 kg/m^3 or even exceeds its density to billions of tons per meter cubic. An Earth-sized white dwarf has a density of 1 x 10^9 kg/m^3. Earth itself has an average density of only 5.5 x 10^3 kg/m^3. That means a white dwarf is about 200,000 times as dense as Earth. This makes white dwarfs one of the densest collections of matter and energy, surpassed only by Neutron stars. Neutron star is a more compact object, and denser than a white dwarf Stars. At the Chandrasekhar limit, the pressure exerted by the electrons travelling into higher levels at close to the speed of light becomes insufficient to support the star, and the white dwarf collapses into a much denser state. When the mass of a star exceeds the Chandrasekhar limit, the pressure exerted by the electrons to travel into higher levels with a speed of light, the white dwarf may collapse into a much denser state to produce Neutron Star or black hole. White dwarf is thought to be the final evolutionary state of star when its mass not high enough to become a neutron star or black hole. When the white dwarf died, the black dwarf may be born in the final steps of a star evolution. The escape velocity inside event horizon of a black dwarf exceeded the speed of light. It has a very tiny size and giant density as compared to all stages of star's life.

3.6 Black Dwarf

Black dwarf is a sixth and final stage of a low mass star evolution. It is a theoretical stellar remnant core of a solar mass stars, when a white dwarf that has cooled sufficiently that it no longer emits significant heat or radiations. Black Dwarf is a compact star; its density and gravity incredibly high even light can't escape from its powerful gravitational force. Nuclear fusion was suspended in the heart of a black dwarf long time ago when the Sun became a red giant and white dwarf in the final stages of a star evolution. It is a dim and black object swimming in the space. It has the ability to capture and collect gas, dust particles, and electromagnetic radiations from its surrounding when materials fall into its gravitational field. Black dwarf like any stellar black hole is much dense object in the Universe even light can't escape from its great attraction force [19]. Materials may orbit the black dwarf in accretion disc, they become luminous, glow clearly and radiate different types of radiations when materials interacting together during direct frictions and collisions were occurred between them. Stars are fueled by thermonuclear fusion, where high temperature and pressure overcome atomic nuclei's natural electric repulsion, and allowing atoms to fuse into new heavier elements. Stars are luminous and glow enough when nuclear fusion in the heart of stars support it. When materials fall into the capture of a black dwarf, it will accelerate them and radiate radiations. The speed of materials may reach the speed of light or exceed it in the border of a black dwarf, for this reason materials will radiate energy and show for us the location and existence of a black dwarfs or black holes. Black dwarf is the great cleaner and accelerator of the visible Universe. It has the capacity to capture materials and accelerate them to incredible speeds. It can grow more and more when collecting high enough matter and energy from its surrounding. It is the massive and more powerful objects of the Universe. It can grow more to become a black hole after its mass increased when collecting enough materials from its environment or tearing and collecting materials from a companion star. It can go and develop in other steps of a star evolution when its mass increased or decreased. Black dwarf may become a black hole with a high mass when two or more black dwarfs are merging together in a violent environment. The giant collision between two black dwarfs may form a black hole with a high mass or split them into a very tiny black holes with very low masses in the size of grains or atoms. The silent black dwarf will stay much stable for a long time, without changing in its mass and density to many billion years when it stayed saved and away from any

type of collisions or changing in its mass. It is most stable and quite stage of black dwarfs in the nature. Also, it is a final stage of star evolution and ultimate fate of it at whole. Black Hole is a region of a cosmic fabric where the gravitational field is so strong that nothing, no subatomic particles and even electromagnetic radiations such as light or gamma rays can escape from its powerful gravity. We can predict that a sufficiently compact mass can deform a cosmic fabric to form a black hole [20]. The boundary of a black hole where no chance for any objects and radiations to escape from it directly is called the Event Horizon. The event horizon is a dark region in the centre of a different black holes, such as tiny black holes, black dwarfs, stellar black holes, supermassive black holes, and Supergiant black holes. Black holes can grow and expand more and more when gathering materials from space or merging together in giant collisions, the cosmic fabric may vibrate strongly during such collisions, as evidence of a violent collisions.

Black hole is a remnant core of a died Star with high density and gravity, nothing can escape from its giant gravity easily even light particles, because the Cosmic dark fabric incredibly curved, distorted and compacted in the region around the singularity that named event horizon. In fact, black hole is a great regression region where all types of matter and energy captured and sucked into its center quickly. Black hole consists of a singularity, event horizons, Photosphere or Ergosphere, and accretion disc. Singularity is a region located at the centre of a black hole body, where all types of matter and energy incredibly crushed, distorted, and compacted at this tiny point, it is a no return region because the density and gravity very and very high in this combined region, the distance between atoms and particles is very tiny and narrow even light can't pass throughout it easily, the quantum tunnel is very narrow for photon particles to move. It needs too much years to escape from this violence environment. Escape velocity inside singularity closed to the speed of soul. Singularity is a darkest region in the Universe where all physics laws are failed to describe this region at the moment. The singularity surrounded by an event horizon; it is a dark region because light can't reach to our eyes directly from this region. Fortunately, outer an event horizon that named external event horizon the light can escape successfully with a speed 300,000 km/s to reach our eyes, because in this region the density and gravity not so big to capture the light particle forever. The photon sphere is a spherical boundary of smaller thickness in which photons that move on tangents to that sphere would be trapped in a circular orbit about the black hole. A photon sphere or photon circle is an area or a region of space where gravity is so strong that photons are forced to travel in orbits, it is sometimes called the last photon orbit. The ergosphere is a region located outside a rotating black hole's outer event horizon, the size of the Ergosphere is the distance between the ergosurface and the event horizon. An accretion disk is another region of a black hole's structure (often a circumstellar disk) formed by diffuse dark and visible materials in orbital motion around a massive central body, the central body is typically Stars, nebulae, protostars, Neutron Stars, Planets, and Black holes. The Gravity, Friction, uneven irradiance, magnetohydrodynamic effects, angular momentum, and other forces of nature induce instabilities causing orbiting materials in the disk to spiral inward towards the central body [21]. According to conservation law of angular momentum the materials are speeding up in their motions to orbit around massive centre in an elliptical or circular paths [22]. The Gravitational and frictional forces compress the density of materials, increase the collisions between them, and raise the temperature of the materials, causing the emission of electromagnetic radiations in different frequencies, and wavelengths, those around neutron stars and black holes emit in the X-ray and gamma radiations are other parts of an electromagnetic spectrum. Black hole like anything in the

Universe has limit life circle began from birth to death [23], it was created from a remnant core of died Stars, and compacted objects of the Universe like Planets, Satellites, Asteroids and even from the tiny fraction of materials and Atoms. Eventually, the black hole may develop and expand more and more when collect and swallowing any type of matter and energy from space that closed to its border. The density of low a mass and high mass objects can be calculated mathematically by following equation:

$$\rho = \frac{M}{V} \tag{6}$$

Where ρ is a density of any objects and stars, M is the mass of star, V is the volume of Star.

$$V = \frac{4}{3}\pi r^3 \tag{7}$$

Where r is the radius of sphere, especially stars have spherical shapes.

Stellar radiations and their intensities are two important factors used to describe the distance of stars from Earth. The Sun is 150 million kilometers far away from Earth, and the sunlight intensity is 1400 watt/m^2. The intensity (or brightness or irradiance) of sunlight or other linear waves radiating from a point source (energy per unit of area perpendicular to the source) is inversely proportional to the square of the distance from the source, so an object (of the same size) twice as far away receives only one-quarter the energy (in the same time period). The inverse square law is what determines the value of light intensity and sound intensity from the source of radiation and voice, the Sun's energy output is inversely proportional to the square of the distance away from the Sun, the farther away from the source of radiation you get, the weaker the intensity of the radiation. Inverse square law of a sunlight radiation can be written as below:

$$I = \frac{P}{A} = \frac{P}{4\pi r^2} \tag{8}$$

Where P is the total power of output radiations from the source of radiations, intensity symbol I is the radiation intensity, and r is the distance of radiations from the source of radiations. Since the surface area of a sphere A of radius r, the intensity I (power per unit area) of radiation at distance r. At Earth's average distance from the Sun is about 150 million kilometers, the average intensity of solar energy reaching the top of the atmosphere directly facing the Sun is about 1400 watts per square meter, according to measurements I made by using Pyranometer. Pyranometer is a device that measures solar irradiance from a hemispherical field of view incident on a flat surface. The SI units of irradiance are watts per square meter (W/m^2).

4. Results and Discussion

Everything in the Universe has its own history of creation and destruction. Star like anything in the Universe has its own history and different phases of evolution from Birth to Death. The origin of Sun was formed from solar nebulae and will die to become black dwarf in the final stages of its evolution [24]. Both of Black dwarf and black hole were described in General theory of relativity [25]. Reference [26] much denser region of a black hole called singularity, it is located at the center of a black hole. In the first stage of a star evolution called

protostar, it is created from Stellar nebula when it has a limited mass, density, pressure, and temperature that not high enough to start with a nuclear fusion process. The protostar has very tiny density, and few million years lifespan, but its radius and luminosity are 1000 times the radius and luminosity of the Sun. Protostar is gathering high enough mass from its surrounding, during few million years may start nuclear fusion at its heart in the second stage of a star evolution that named a Main sequence star. The Sun is a main sequence star, at its heart nuclear fusion takes place more than 5 billion years ago when its central pressure, density, and temperature incredibly increased. Hydrogen isotopes fused together to produce helium atom with the ejection of neutrons, and radiations during nuclear fusion processes. Total Nuclear fusion may sustain in the core of our star the Sun more than 10 billion years, about 5 billion years ago nuclear fusion was started at the heart of the Sun, it may continue with burning hydrogen for next other 5 billion years. The average density of the Sun is $1400\ kg/m^3$, its surface temperature reaches 5800 kelvins, its radius 700,000000 meters, and its luminosity about $4.0\ x\ 10^{26}\ watt$. Nuclear fusion in the heart of Sun will suspend after next 5 billion years when its fuel of hydrogen runout at whole, the new stage of star life may start that named a red giant star in the third stage of a star life. Red giant has a limited density, pressure, and temperature, but its radius, volume, and surface Area are so giant as a result its luminosity is one hundred times bigger than the luminosity of the Sun according to eq. (4) of a luminosity, also its life time about 5 million years very low as compared to the age of Main sequence star the Sun. The red giant may expand more and more to become a Planetary Nebulae in the fourth stage of a Star life. Its radius increases high enough to become 10,000 times luminous as the Sun. Its radius so big, but its density is very low about $1.7\text{x}10^{-10}\ kg/m^3$, and its lifespan very short about 30,000 years.

Furthermore, the White Dwarf was born from the remnant core of a planetary nebula in the fifth stages of a low mass star death. Its density very high exceeds billion kilogram per meter cube. Its radius and surface area are very low as a result its luminosity lower than the luminosity of the Sun more than 1000 times. But its life time may exceed 20 trillion years to stop from radiation emission entirely and become a black dwarf in the stage sixth of a star life. Black dwarf is the final fate of a solar mass stars evolutions. It is a dark and cold sphere of a dense star in the space. Its radius is only 3000 meters for a black dwarf with a same solar mass star, its Surface temperature is very low, below to 600 kelvins. Sometimes it emits no visible light, only a very faint infrared radiation. Because of its small size and high mass, its density is very high, over 1 million times that of the Sun. Its radius and surface area are very low as a result its luminosity is very low about $8.3.0\ x\ 10^{11}$ watts. Its luminosity lower than the Sun's luminosity about 1000 trillion times. It can be detected in the space because its accretion disc may emit radiations when captured any materials or radiations from its surrounding. Sometimes black dwarf stayed as a silent dark sphere with zero emission of radiations, its luminosity is zero. Also, its luminosity incredibly increases to infinity level, when it is gathering high enough mass from its surrounding to radiate like hot object. The life time for a black dwarf may exceed to infinity number about 100 trillion years to evaporate at whole. The black dwarf is much stable state of matter and energy, it is very compacted and combined object of the nature. It may need to incredible great time to be annihilated, if not merged together or effected by other powerful force of the nature to accelerate its evaporation. It is a theoretical object of the Universe. It is needed to next trillion years to be produced from the remnant of a white dwarf death. As we know the age of our visible Universe is only 13.8 billion years. Already the age of the Universe is only a step of Universe expansion from big bang that we know about it. The future evolution of the Universe is much

complicated that our understanding to the Universe at these moments. The remnant of died stars will survive to be annihilated entirely for more than next trillion years coming according to stellar structure evolution theory. According to Equations (2) & (5) the Luminosity and fate of low mass stars explained.

According to my understanding to the fate of Universe, if the remnant core of dead stars stayed protected from any Universe accidents to accelerate its evaporation and annihilation, it will survive to many trillion years coming. In fact, the compact objects like white dwarf and black dwarfs maybe annihilated and evaporated entirely that needed to google number of times. They are much stable and dense to be evaporated quickly like any ordinary matter. Compact stars are much stable objects in the universe, they are dense enough to be evacuated into space, even dark matter particles could not interact with their structures easily to expand them into outside. They have amazing properties are exploding into inside to keep them denser and denser for a long time. Compact stars maybe evaporated and annihilated during direct collisions or massive accidents. The accidents like those are much little to be occurred in the universe because of role of a cosmic fabric of the universe that make the universe to be combined and protected together [27]. Cosmic fabric gravitation is a great preserver and protector for all celestial objects of the Universe, where all objects in the visible Universe interact with one another through cosmic fabric distortions and waves to save total balance of the Universe. Cosmic fabric divided into a dark fabric and visible fabric, both of them interacted together to make a cosmic fabric of the whole Universe. General properties of a low mass star explained here in (Table 1). The sun is a low mass star, and its properties discussed here in the following table.

Table 1: General Properties of a Solar Mass Stars from Birth to Death.

Stellar Objects	**Density = ρ (kg/m^3)**	**Luminosity = L (*Watt*)**	**Life Time = T ($Years$)**
Protostar	$1.4\ x\ 10^{-13}$	$4.0\ x\ 10^{29}$	1.0 million
Sun	1400	$4.0\ x\ 10^{26}$	5.0 billion
Red giant	0.100	$4.0\ x\ 10^{30}$	5.0 million
Planetary Nebula	$1.7x10^{-10}$	$4.0\ x\ 10^{23}$	30,000
White Dwarf	$1.0\ x\ 10^{9}$	$8.3\ x\ 10^{11}$	20 trillion
Black Dwarf	$1.4\ x\ 10^{12}$	0 - infinity	100 trillion

5. Conclusion

Life cycle of a low mass stars and their properties was explained in detail, especially the birth and death of a Solar mass stars as the Sun. Eventually, it may be concluded that the Sun has its own life cycle when it was born from a stellar nebula as a protostar that formed in the first stage of a star evolution, and it may die and end at whole in the final stages of a star's evolution as a red giant, planetary nebulae, white dwarf, and black dwarf. The Universe is contained low and high mass stars. The Sun is a low mass star because its mass, density, radius,

size, and luminosity are very low as compared to high mass stars. Fortunately, its lifespan as a main sequence star may reach 10 billion years to die at whole when its fuel of hydrogen burning and runout entirely. The protostar, main sequence star, red giant, and planetary nebulae are contained an ordinary matter and energy where dark fabric slightly distorted under their masses and stresses. In another hand, the dark fabric is warping strongly under the effect of a compact stars as white dwarfs and black dwarfs, they are two small, dense and very smooth objects of the Universe where drowning deeply into the structure of a dark fabric. Super distortions in the Structure of Universe occurred under the effect of an object which contained a dense and compressed matter and energy, especially White Dwarfs, Neutron Stars, and Black holes are very compacted staff of matter and energy. Dwarf Brown Star is another type of a low mass stars where nuclear fusion never started at its core to combine hydrogen isotopes to form helium atom and release an energy, because of its low mass, gravity, pressure, temperature, and density, also its life cycle not clear. There are two probabilities for the future of a dwarf stars, first probability is that the dwarf star may collect much enough mass and energy from its surrounding to increase its mass, gravity, pressure, density, and temperature like any average mass stars to fuse hydrogen isotopes and produce helium atoms. Second probability is that the dwarf star will lose much of its mass and energy during itself of plasma evaporations and annihilation to become giant gaseous planet at its final stages of its life. Jupiter is an example of a giant gaseous planet. It still active with its famous tornados.

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6. Conflict of Interest

Author declares that have no conflict of interest.

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