QUALITATIVE ANALYSIS OF THE LAW OF CONSERVATION OF ENERGY, ITS PROBLEM AND FINDINGS, REFERENCING SOLAR ENERGY TO EXPLAIN THE PREEXISTENCE OF ENERGY

YAHAYA SAADU ITAS

Physics Department, BAUCHI STATE UNIVERSITY,GADAU, Nigeria
E-mail: Ysitas03@yahoo.com

Abstract: A careful observation of the law of conservation of energy has been made through making researches and consultations, problems of the law have been figured out in this paper where it is conclusively understood that contrary to the saying of the law that; energy can neither be created nor destroyed, this paper suggests that ***"energy pre – exists, it is infinite and can neither be recreated.*** The purpose of this paper is to present in a simple and concise form, some of the views by the law of conservation of energy and its limitations. The first chapter gives a brief introduction of energy while the third chapter gives the theoretical problem regarding the creation of energy.

I. INTRODUCTION

1.1 The brief history of energy:

The word enrgy derived from the Greek word *(enegeia)* appeared for the first time in the work Nicomachean Ethics of Aristotle in the 4th century BCE. However, Thomas Young was the first to use the term energy in the modern sense.The concept of energy emerged from the idea of **visa viva** (living force), which Leibniz defined as the product of mass of an object and its velocity squared; he believed that the total visa viva was conserved. To account for solving due to friction, Leibniz claimed that heat consisted of the random motion of the constituents' parts of matter. (A view shared by Isaac Newton), although it would be more than a century until this was generally accepted.

Emliemarsquise du chatelet, in her book institutions de physique ("lessons in physics"), published in 1740, incorporated the idea if Leibniz with practical observations of gravsande to show that the quantity of motion of a moving object is proportional to its mass and the square of its velocity (not the velocity itself as Newton taught-what was later called momentum).In 1802 lectures to the royal society, Thomas Young was the first to use the term energy in its modern sense, instead of visa viva. In the 1807 publication of those lectures, he wrote,The product of mass of a body in to the square of its velocity may properly be termed as its energy.Gustave-Gaspard Coriolis described kinetic energy in 1829 in its modern sense, and in 1853, William Rankinecoined the term potential energy.

was a substance (the caloric) or merely a physical quantity.

1.2 Energy and Thermodynamics

The development of steam engines required engineers to develop concepts and formulas that would allow them to describe the mechanical and thermal efficiencies of their systems. Engineers such as Sadi Carnot, physicists such as James Precott Joule, mathematicians such as Emile Clapeyron and Hermann von Helmhotz and amateurs such as Julius Robert von Mayer all contributed to the notion that the ability to perform certain tasks, called work, was somehow related to the amount of energy in the system.

In the 1980s, the Glasgow professor of natural philosophy, William Thomsonand his ally in engineering science William Rankine began to replace the older language of mechanics with terms such as actual, kinetic energy and potential energy. William Thomson amalgamated all of these laws in to the laws of thermodynamics, which aided in the rapid development of explanations of chemical processes using the concept of energy by Clausius, Josiah Willard Gibbs *and* Walther Nernst. It also led to a mathematical formulation of the concept of enthrophy by Clausius, and to the introduction of laws of radiant energy byJozef Stefan. Rankine, coined the term potential energy in 1881, William Thompson stated before an audience that;

The very name **energy**, though first used in its present sense by *Dr.* Young Thomas about the beginning of this century, has only come in to use practically after the doctrine which defines it had been raised from mere formula of mathematical dynamics to the position it now holds of a principle pervading all nature and guiding the investigator in the field of science.

Over the following thirty years or so this newly developing science went by various names, such as the dynamical theory of heat or energetics, but after the 1920s generally came to be known as thermodynamics, the science of energy transformations.

Stemming from the 1850s development of the first two laws of thermodynamics, the science of energy have since branch off in to a number of various fields such as biological thermodynamics and thermo economics to a name couple; as well as related terms such as entropy, a measure of the loss of useful energy, or power, an energy flow per unit time, etc. In the past two centuries, the use of the word energy in various non-scientific vocations; eg, social studies, spiritually and psychology has proliferated the popular literature.

II. ENERGY FORMS AND CONSERVATION LAW

Energy being the quantity which can thermodynamically transform from one form to another, has various forms some of which are; solar energy, mechanical energy, electric energy, sound energy, wind energy, heat energy and so on.

2.1 conservation law of energy

One of the most basic laws of science is the law of conservation of energy. Energy can neither be created nor destroyed; it can only be converted from one form to another.

In 1918 it was proved that the law of conservation of energy is the direct mathematical consequence of the translational symmetry of the quantity conjugate of energy, namely time. That is, energy is conserved because the laws of physics do not distinguish between different moments of time. During 1961 lecture for under graduate studies at the California Institute of Technology, Richard Feynman, a celebrated physics teacher and Novel Laureate, said this about the concept of energy:

There is a fact, or if you wish, a law, governing natural phenomena that are known to date. There is no known exception to this law - it is exact so far we know. The law is called conservation of energy; it states that there is a certain quantity, which we call energy that does not change in manifold changes which nature undergoes. That is a most abstract idea, because it is a mathematical principle; it says that there is a numerical quantity, which does not change when something happens. It is not a description of a mechanism, or anything concrete; it is just a strange fact that we can calculate some number, and when we finish watching nature go through her tricks and calculate the number again, it is the same.

2.2 Theories on the formation of the sun and the pre-existence of energy

The Sun is the star at the Centre of our solar system. It provides our planet with light, warmth and energy.

Being the star at the center of the solar system, it is by far the most source of energy for life on Earth. The Sun is a nearly perfect spherical ball of hot Plasma, with internal convective motion that generates a magnetic field via a dynamo process. The diameter of the diameter of the sun is about 109 times that of the Earth, and it has a mass about 330,000 times that of Earth, accounting for about 99.86% of the total mass of the solar system. Chemically, about three quarters of the Sun's mass consists of Hydrogen, whereas the rest is mostly Helium, and much smaller quantities of heavier elements, including Oxygen, Carbon, Neon and Iron.

2.3 Formation of the sun

The sun was formed about 4.5 billion years ago from the collapsed of part of a giant molecular cloud that consisted mainly of Hydrogen and Helium and that probably gave birth to many other stars. This age is estimated using computer models of stellar evolution and through nucleocosmochronology. The result is consisted with the radiometric date of the oldest solar system material, at 4.567 billion years ago. Studies of ancient meteorites reveal traces of stable daughter nuclei of short lived isotopes, such as Iron-60, that form only in exploding, short lived stars. This indicates that one or more supernovae must have occurred near the location where the sun is formed. A shock wave from a nearby supernova would have triggered the formation of the Sun by compressing the matter within the molecular cloud and causing certain regions to collapse under their own gravity. As one fragment of the cloud collapsed, it also began to rotate due to conservation of angular momentum and heat up with the increasing pressure. Much of the mass became concentrated in the Centre, whereas the rest flattened out in to a disk that would become the planets and other solar system bodies. Gravity and pressure within the core of the cloud generated a lot of heat as it accreted more matter from the surrounding disk, eventually triggering nuclear fusion. Thus the Sun was born.

2.4 Composition of the sun

The Sun is composed primarily of the chemical elements Hydrogen and Helium; the account for 74.9% and 23.8% of the mass of the sun in the atmosphere, respectively. All heavier elements called metals in astronomy, account for less than 2% of the mass. The most abundant metals are oxygen (roughly 1% of the Sun's mass), Carbon (0.3%), Neon (0.2%), and Iron (0.2%).

The Sun inherited its chemical composition from interstellar medium out of which it formed. The Hydrogen and Helium in the Sun were produced by Big Bang nucleosynthesis and the metals were produced by stellar nucleosythesis in generations of stars that completed their stellar evolution and returned their materials to the interstellar medium before the formation of the Sun. The chemical composition of the photosphere is normally considered representative of the composition of the primordial Solar system. However, since the sun formed, some of the helium and heavy elements have gravitationally settled from the photosphere.

Therefore, in today's photosphere the Helium fraction is produced and the metallicity is only 84% of that in the protostellar phase (before nuclear fusion in the core started). The protostellar Sun's compositon was reconstructed as 71.1% Hydrogen, 27.4% Helium and 1.5% metals.

In the inner portions of the Sun, nuclear fusion has modified the composition by converting Hydrogen to Helium, so the innermost portion of the sun is now roughly 60% Helium, with the metal abundance unchanged. Because the interior of the Sun is radiative, not convective, none of the fusion products from the core have risen to the photosphere.

The reactive core zone of Hydrogen burning, where Hydrogen is converted to Helium, is starting to surround the core of Helium ash. This development will continue and will eventually cause the Sun to leave the main sequence, to become a red giant.

2.5 Development of scientific understanding

In the early first millennium BC, Babylonian astronomers observed that the Sun's motion along the ecliptic was not uniform, though they were unaware of why this was; it is today known that this is due to the movement of the Earth in the ecliptic orbit around the sun, with Earth moving faster when it is nearer to the sun at perihelion and moving slower when it is farther.

One of the first people to offer a scientific or philosophical explanation for the Sun was a Greek philosopher Anaxagoras, who reasoned that it was a giant flaming ball of metal even larger than the Peloponnesus rather than the chariot of Helios, and that the moon reflected the light of the Sun.

In 1666, Isaac Newton observed the Sun's light using prism, and showed that I was made up of light of many colors. In 1800, William Herschel discovered infrared radiation beyond the red part of the solar spectrum. The 19th century saw advancement of the spectroscopic study of the Sun; Joseph Von fraunhofer recorded more than 600 absorption lines in the spectrum, the strongest of which are still often referred to as Fraunhofer lines. In the early years of the modern scientific era, the source of the Sun's energy was a significant puzzle. Lord Kelvi suggested that the Sun was gradually cooling liquid body that was radiating an internal source of heat. Kelvin and Hermnnn von Helmholtz then proposed a gravitational contraction mechanism to explain the energy output, but the resulting age estimate was only 20 million years, well short of the time span of at least 300 million years suggested by some geological discoveries of that time. In 1890 Joseph Lockyer, who discovered Helium in the solar spectrum, proposed a meteoritic hyphothesis for the formation and evolution of the Sun.

Not until 1904 was a documented solution offered. Earnest Rutherford suggested that the Sun's energy could be maintained by an internal source of heat, and suggested radioactive decay as the source. However, it would be Albert Einstein who would provide the essential clue to the source of the Sun's energy output with his mass – energy equivalence relation $E = mc2$. In 1920, Sir Arthur Eddington proposed that the pressures and temperatures at the core of the Sun could produce a nuclear fusion reaction that merged Hydrogen (protons) in to Helium nuclei, resulting in a production of energy from the net change in mass. The preponderance of Hydrogen in the Sun was confirmed in 1925 by Cecilia Payne, using the ionization theory developed by MeghnadSaha, an Indian physicist. The theoretical concept of fusion was developed in the 1930s by the astrophysicists SubramanyanChadrasekhar and Hans Bethe. Hans Bethe calculated the details of the two main energy producing nuclear reactions that power the Sun. In 1957, Margaret Burbidge, Geoffrey Burbidge, William Fowler and Fred Hoyle showed that most of the elements in the universe have been synthesized by nuclear reactions inside stars, some like the Sun.

III. THEORITICAL PROBLEMS AND FINDINGS

3.1 Coronal heating problem

The temperature of the photosphere is approximately 6,000 K, whereas the temperature of the corona reaches 1,000,000 – 2,000,000 K. The high temperature of the corona shows that it is heated by something other than direct heat conduction from the photosphere.

It is thought that the energy necessary to heat the corona is provided by turbulent motion in the convection zone below the photosphere, and two main mechanisms have been proposed to explain coronal heating. The first is wave heating, in which sound, gravitational or magneto hydrodynamic waves are produced by turbulence in the convection zone. These waves travel upward and dissipate in the corona, depositing their energy in the ambient matter in the form of heat. The other is magnetic heating , in which magnetic energy is continuously built up by photospheric motion and released through magnetic reconnection in the form of large solar flares and myriad similar but smaller events – Nano flares.

3.2 Faint Young Sun problem

Theoretical models of the Sun's development suggests that 3.8 to 2.5 billion years ago, during the Archean period, the Sun was only about 75% as bright as it is today. Such a weak star would not have been able to develop. However, the geological record demonstrates that Earth has remained at a fairly constant temperature throughout its history, and that the young Earth was somewhat warmer than it is today. The consensus among scientists is that the atmosphere of the Young Earth contained much larger quantities of greenhouse gases (such as carbon dioxide, methane and ammonia) than are present

today, which trapped enough heat to compensate for the smaller amount of solar energy reaching it.

3.3 Findings

After careful understanding of the theories of the formation of the Sun and its problem, the following findings were made;

The theory of the formation of the sun could not explain why the shock waves from nearby supernova triggered the formation of the Sun and why it causes a fragment of the cloud to collapse under its own gravity. Similarly, where do we get energy that was so enough to collapse some part of a giant molecular cloud?

According to the corona heating problem, it is unclear whether waves are an efficient heating mechanism. All waves except Alfven waves have been found to dissipate or refract before reaching the corona. In addition, Alfven waves do not easily dissipate in the corona. Current research focus has therefore shifted towards flare heating mechanisms

The law of conservation of energy could not explain what are the actual sources of pre-existing energy to the Sun; how do all components of the Sun combined together to make what we called Sun today; what keeps the chemical reactions that keep the sun steady in terms of energy production and so on.

The law of conservation of energy shows that all sources of energy are interconvertible hence one can imagine only one central source of energy.

Since energy can neither be created, it means no amount of energy so far exists, as nothing can create energy according to the law. Then why does exist the energy today?

CONCLUSION

Energy is currently being created. The universe could not have created itself using natural process because nature did not exist before the universe came in to existence. Something beyond nature must have created all the energy and matter that we observe today. Present measures of energy are immeasurably enormous, indicating a power source so great that INFINITE is the best word we have to describe it.

The logical conclusion is that our supernatural creator with infinite power created the universe. There is no energy source capable of originating what we observe today, hence

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