Energy is the other form of matter. High compression pressure is one of the ways to convert matter to energy

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Abstract

The major energy source of the Sun is not hydrogen fusion reaction (Hwaung 1981, 1982, 1983, 1999, 2008). Then, what is the energy source of the Sun? How did the Supernova get so much energy to explode at the end of fusion reaction? Why do hot neutron stars have energy to radiate out x-rays? The gravitational field should shrink the universe, but why is the universe expanding? The anti-matter has negative energy -MC², but why does the positron (anti-matter of electron) generate the same positive energy as the electron does, when the positron meets an electron? These questions can be addressed by the fact that the matter under very high compression pressure may convert to energy.

Key words Matter – Compression pressure – Conversion – Energy

1. Introduction

The equation (Einstein 1952) $E = MC^2$ has implied that matter can be converted to energy in some ways, just as energy can be converted to matter. We are aware that three known interaction fields and kinetic energy need to be carried out by the matter. All of the electro-magnetic radiations from long wave television signals to gamma rays are radiated by matter. Thus, matter stores energy or in other words, matter is another form of energy. What can cause the transformation of matter to energy?

2. Assumptions

1. Matter occupies its own space. The compression pressure cannot push matter into the same space, but the compression pressure may convert the matter to energy, and follows the $E=MC^2$ relation. The higher the compression pressure, the higher the possibility of conversion. The compression pressure to the atoms will convert electrons and protons together to energy and leave neutrons. This is because neutrons need much more compression pressure to be converted to energy.

2. The thermal energy of the atom resists the conversion of matter to energy by compression pressure.

3. Positron is not an anti-matter of electron. The Coulomb force between positron and electron generates enough compression pressure to convert both positron and electron to two photons/energy. The black hole is the anti-matter. The matter occupies the space, and the anti-matter is the hole in the space. The anti-matter also has attractive gravitational field to matter.

3. Discussion

3.1 Positron and electron

We know that when a positron meets an electron, both the positron and electron disappear and generate two identical 0.511 MeV photons. We say that positron is the anti-matter of electron, but from the simple equation $E = MC^2$, the anti-matter -M should have -E (negative energy). When a positron meets an electron, we should have $E = (M + -M) \times C^2 = 0$. The positron and electron should not generate two identical 0.511 MeV photons. Therefore, it can be said that the positron is not a real anti-matter of the electron. Rather, it is just converting the matter of itself and the electron into energy. The positron and the electron have the same dimensions with opposite charge. The Coulomb force attracting them together is roughly about 0.723 Newton. The compression pressure will be more than 2.89×10^{28} N/m². This high compression pressure converts the positron and electron to two 0.511 MeV photons.

3.2 Supernova

Why are the proton and electron not attracted to each other and be converted to energy? It is a mystery of the hydrogen atom and other atoms. Why the electron does not drop into proton? There is some unknown barrier preventing the electron falling into proton. If the compression pressure is high enough to break the barrier, then the electron should fall to the proton, either forming a neutron or converting both the electron and proton to two photons. Let us examine the supernova. The supernova had an iron rich core before it exploded. At the end of the exothermic nuclear reaction, the center of iron core was under very high compression pressure, but the iron lost some kinetic pressure against the compression pressure. Therefore, the core collapsed, pushing the electrons into nuclei. If the electrons and protons form the neutrons as shown below:

$$e^- + p^+ + \Delta E \leftrightarrow n \quad (1)$$

A portion of the gravitational energy gained by the collapsed core contributed to the formation of neutrons as shown in equation 1. The rest of the gravitational energy was converted to the kinetic energy of neutrons, and the motions of the neutrons were toward the center. As we know, the high energy neutrons such as fast neutrons or relativistic neutrons do not radiate high energy photons during their life time of 10 minutes. In this case, we know that if the electrons and protons form the neutrons when the core collapses, it cannot cause the violent explosion of the supernova and radiate out strong intensity of photons. The violent explosion of the supernova requires the collapse of the iron core, i.e. the compression pressure pushing the electrons to the nuclei generates a large amount of photons/energy or outward particle kinetic energy instantly. Therefore, it is logical to think that when the electrons were pushed to the nuclei, both electrons and protons were converted to photons/energy. So the iron core of supernova was under very high compression pressure and a large number of iron atoms whose electrons were pushed into protons. Both of electrons and protons were converted to photons/energy, and that caused the violent explosion of the supernova. The neutrons of the nuclei of those iron atoms that were converted to energy were left in the center of the supernova to form neutron star.

3.3 Hot neutron star

The neutron requires higher compression pressure to be converted to energy. The compression pressure of the center of the 20 Km diameter hot neutron star is more than 8.82 x 10^{31} N/m². Some amounts of the neutrons are converted to energy per unit time under such high compression pressure, and the conversion energy is the energy source of the x-ray radiation of the hot neutron star.

3.4 The radiation energy of the Sun

Hwaung (1981, 1982, 1983, 1999, 2012) considered the surface temperature of the Sun (about 5780 °K), the conservation of energy law, the black body radiation law and some simple arguments to prove the surface temperature of the core of the Sun i.e. the temperature at 1 x 10^8 m from the center of the Sun to be less than 15,249 °K. It follows that the hydrogen fusion reaction is not the energy source of the Sun and the core of the Sun consists mostly of iron (Hwaung & Manuel 1981, 1982, 1983, 1999, 2012). There are billions of stars in the universe, some of which may be just like the Sun. Hydrogen fusion reaction may not be the energy source of them. The cores of those stars may also be iron rich. Iron has the most stable nuclei; therefore no exothermic fusion reaction with iron will take place. So the radiation energy of the Sun and those stars may be from the conversion of the electrons and protons into energy under high compression pressure, and leaves the neutrons of the iron nuclei in the center of the Sun and those stars. The compression pressure of the iron core (Hwaung 1981, 1982) is about from 10^{12} N/m² to 10^{18} N/m².

The rate of conversion of electrons and protons of iron in the high compression region of the iron core of the Sun is dependent on the compression pressure and temperature. It acts like the decay process of a radioactive material in that we cannot tell which atom will decay (convert to energy). We can only tell how many atoms will decay (convert to energy) in a certain time at temperature T_i and pressure P_j. It is shown in the equation (2)

$$N(T_i, P_j) = M(T_i, P_j) \times (1 - e^{-k(i,j)t}) \qquad (2)$$

$N(T_i, P_j)$ is the number of iron atoms at temperature T_i and pressure P_j converts to energy during the time t, k(i,j) is the conversion constant at temperature T_i and pressure P_j ,$M(T_i, P_j)$ s the number of iron atoms at temperature T_i and pressure P_j at time 0. The total number of iron atoms in the core of the Sun that are converted to the energy per unit time t can be expressed as below:

$$N_{total} = \Sigma_i \Sigma_j N(T_i, P_j) \qquad (3)$$

The total mass of protons and electrons of iron converted to energy per unit time t, $M_t = 26 \times (1.67\times 10^{-27}\text{ kg} + 9.11 \times 10^{-31}\text{ kg}) \times N_{total}$.The total energy the Sun radiates out per second is 3.76 x 10^{26} watts, $M_t =$ 4.18 x 10^9 Kg per second, $N_{total} =$ 9.63 x 10^{34} numbers of iron atoms per second. The numbers of neutrons left in the core per second is 2.89 x 10^{36}. The Sun is about 4.5x 10^9 years old. Therefore, in the past 4.5 billion years, the Sun has consumed 5.79 x 10^{26} Kg of protons and electrons of iron, and leaves 6.68 x 10^{26} Kg of neutron in the core. If most of those neutrons went to the center, the density of a neutron ball is 3.97 x 10^{17} Kg/m³. The volume of the neutron ball in the center of the Sun is 1.68 x 10^9 m³. The radius of the neutron ball in the center of the Sun is 1.59 x 10^2 m.

Some other scientists, Manuel and co-workers (2001, 2003, 2006) suggested that the repulsive interactions between neutrons are the major energy source for the Sun.

3.5 The expansion of the universe

The universe should be shrinking because of gravitational field. But why is the universe expanding? The original universe was shrinking to bulk body. The compression pressure converted a huge amount of matter to energy to explode the body. This explains the expansion of the universe despite the gravitational field.

3.6 Black hole

The black hole was not created from the collapse of the huge matter; rather it is a real anti-matter. When the matter drops into the black hole, the matter and energy disappear. The anti-matter also has attractive gravitational field to matter. When the black hole absorbs matter, it reduces the total anti-mass. So when it absorbs enough matter, the black hole will become a flat space i.e. absence of matter.

4. Conclusion

The four questions: (1) why the positron meeting the electron produces two photons, but does not cancel out both matter and energy? (2) What is the major energy source of our Sun? (3) How did the iron rich core of supernova obtain the enough high energy to explode and radiate out strong intensity of photons? (4) Why the universe expands despite the gravitation field? The property of the matter i.e. the matter occupies its own space strongly implies that my assumption is right i.e. when matter is pushed into the same space at very high compression pressure, the matter changes its form to become energy. Besides, my assumption can also be proved by an experiment: the very high energy proton and electron can be made to collide head to head from opposite direction inside the super collider to see if energy/photons are produced.

There are some other ways to convert the matter to energy, fusion and fission reactions are two of them.

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