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The Energy is An Accumulation of a Kind of Masses of Virtual Particles $E=mC^2$ is Nothing but Transformation of One Form of Mass to Another Form

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Abstract: ***Basically, the virtual particle has that amount of mass and that amount of energy which are equivalent by Einstein's famous equation $E=mC^2$ approximately and reasonably with good accuracy. The mass m of the virtual particle is so small that it can be termed as $m \leq m_c$ where m_c is the critical mass below which all particles are virtual particles and above which all particles are real particles. Nuclear fission splits radioactive heavy elements into two stable elements of lesser masses combination which separates with tremendous kinetic energy. In other words, the produced kinetic energy is nothing but formation of enormous amount of virtual particles from the original real particle. When photon is absorbed by any real particle, the process converts virtual particle into real particle. Because the mass of the virtual particle with its equivalent energy content into it is converted into mass of real particle; and because real particles have more mass than the critical mass m_c, they can never achieve the speed of light (C). If they do accelerate to the speed of light (C) with enormous energy applied to the real particle which can be termed as critical energy E^c, there will be tremendous explosion (might be more vigorous than Supernova) to convert real particle into virtual particles (or force carrying particles), in other words energy. Because energy is huge and uncontrolled, the mass to energy conversion is a destructive process, if the whole process cannot be controlled in totality. The reason for that is the multiplication of C^2 term with mass m of the real particle. But the reverse process is very safe as enormous energy will be divided by C^2 term to produce tiny little real particles. In such a case, the increment of mass is too small to be measured directly; even with the most sensitive balance.***

Keyword: The speed of light, real and virtual particles, critical mass and critical energy, the strong and weak nuclear forces, Supernova.

1. Introduction

There is no net velocity of electrons without any presence of an electric field [1]. Without an electric field, electrons move surprisingly slow, slower than a snail which we call it as the „drift velocity" of electron [2]. The wave travels at the speed of light in a vacuum and almost the same velocity in air [3]. The drift velocity of electrons is of the order of millimeters per hour [4]. How fast the electrons can move on application of external force, assuming the simplest possible real particle is the electron. The rudimentary answer can be as fast as we want them to travel through; actually not quite correct [5]. For some strange (not very clear) reasons, one of the fact of the Universe discovered in the 20th century is that the ultimate universal speed limit of the Universe is the speed of light i.e. 1, 86,000 miles per second or 3, 00,000 kilometers per second [6]. As we add energy to the electrons, it will travel faster but as we get it to move close to the speed of light, we find that we have to add even more energy just to bump a bit faster. For example, with just over 2, 20, 000 eV (which stands for convenient unit of energy called the electron volt, we can move the electron up to 90% of the speed of light. But to get it to 99.9% (just another 9.9%, we need a total of over 11 million eV. One way of looking at this is that the electron gets heavier (more massive) as it goes ever faster. So, it is harder to push it faster. At Jefferson Laboratory, a typical energy for the electrons in the beam is 4 GeV which is 4 billion eV; that means electrons are moving at 99.9999992% of the speed of light but still not 100%.

2. On the Virtual Particle and the Real Particle

The photon moves with a velocity C which is 1, 86,000 miles per second or 3, 00,000 kilometers per second [7]. It has the property of wave-particle duality which means that sometime it behaves like a particle and sometime it behaves like wave [8]. If we consider it as a particle, then it must be virtual particle which cannot be detected by particle detector [9]. But we can confirm its existence although indirectly [10]. If the particle has a mass m and the energy E in it that forces the particle to move with velocity C, then according to the classical theory, the momentum of each photon = mC. Suppose the photon has energy content E that makes it travel with the velocity of light C, then by well known conclusion of Maxwell"s theory, it has a momentum $=\frac{E}{C}$.

According to the Einstein"s famous equation of mass and energy equivalence-

$$E=m\,C^2$$

$$\text{Or, } mC=\frac{E}{C}$$

The above equation proves that both momentums are equal which ultimately proves the conservation of momentum of the photon. It means that the momentum due to mass m (according to the classical theory) and the momentum due to the energy content E (according to Maxwell"s theory) in the photon have to be equal for virtual particles like photon. Thus, if a mass m travels at a speed C which is the universal speed limit of the Universe, has to be a virtual particle with energy content E which is equivalent to the mass m of the

virtual particle or has the mass m which is equivalent to energy content E that obeys Einstein"s mass-energy equivalent equation-

$$E=m\,C^2$$

The photon must have fixed energy E in it for given fixed mass m [11]. If mass of virtual particle varies over a range then the energy content must also vary over the equivalent range defined Einstein"s famous mass-energy equivalent equation. It implies that for a mass $m_1 > m$, the energy of the virtual particle must be $E_1 > E$. The virtual particle carries that much mass m and that much energy E to meet the mass energy equivalence $E=m\,C^2$. There must be some limit in the mass (critical mass) below which particles can be treated as virtual particles, which have mass and energy equivalent property inherently, in other words, mass and energy have symmetry for virtual particles. The symmetry gets broken when mass is above the critical mass to be treated as real particle, because the symmetry of mass and energy equivalence given by Einstein"s famous mass-energy equivalence equation is broken inherently. Because of the broken symmetry, no matter how much energy we put in the real particle, still it cannot reach the velocity of light C. The symmetry can be attained for real particles by applying very high energy in the real particles which can be termed as critical energy E_C. There must a limit of energy E_C beyond which all real particles must start getting converted into virtual particle. The simplest example of real particle is an electron which travels at around 2,200 kilometers per second [12]. That"s less than 1% of the speed of light but its fast enough to get around the Earth in just over 18 seconds [13].

3. How To Convert Mass Into Energy

Energy is nothing but virtual particles or force carrying particles [14]. The mass in it and the energy in it are equivalent with the relationship $E=m\,C^2$. If we want to convert into mass M from energy E completely, we need to apply the amount of energy $E \geq MC^2$ where M is the mass of real particle that is produced from the energy in mass-energy conversion process. In fact, this is not feasible by human being till date in respect to present economic scenario because we need a particle accelerator as large as our own solar system to produce 10^{19} GeV to produce a black hole from real particle [15]. Human body is an excellent example of creating energy from mass (food). That is the reason, a soccer player use tremendous energy on the field even if he took a little food. The Sun as well as other stars is ideal example of kitchen to convert mass into energy using nuclear fusion.

4. How to Convert Energy Into Mass

Energy is nothing but virtual particles or force carrying particles with mass $m < m_C$. Thus, energy to mass conversion is nothing but mass of one kind to mass of another kind in mass-energy conversion process. In other words it is mass $m\,(m < m_C)$ to mass $M\,(M > m_C)$ conversion. Enormous amount of energy (virtual particles) required to produce tiny mass of real particle $M\,(M > m_C) = \frac{E}{C^2}$. The critical energy required to produce mass of real particle is $E \geq E_C$, where $E_C = mC^2$, m is the mass of virtual particle.

5. On The Matter Wave

All real particles have wave like characteristics [16]. But because the mass of the real particles is massive ($M > m_C$), their wave characteristics cannot be noticeable. But if we accelerate the real particle close to the speed of light, its wave characteristic is more and more noticeable. A 90% of the speed of light will display less wavy than 99.99% of the speed of light for real particles. As the energy is added more and more in the real particle [17], it becomes biased gradually towards wave characteristic. For example, in a conductor, electrons behave like real particles as its speed is 2, 200 kilometers per second [18]. Which is less than 1% of the speed of light (C) [19]; but if we through an electron with more than 90% of the speed of light, it behaves like wave [20].

6. Are the Fundamental Forces Man Made?

We know, we have four fundamental forces, such as strong nuclear force that binds together everything and that is responsible for stable nucleus [21]; the weak nuclear force which is responsible for radioactive decay [22]; the electro-magnetic force that is responsible for electron revolving around the nucleus [23]; the gravity that every matter feels with the other matters with an quantitative measurement given by Sir Isaac Newton"s Law of Gravity-

$$G = \frac{m_1 m_2}{d^2}$$

Where m_1 is the mass of first body.

m_2 is the mass of second body.

d is the straight distance between the bodies.

G is the gravitational force between the bodies.

A slight variation of masses ($m < m_C$) makes the virtual particles to change its force carrying characteristics, these distinct and different characteristics of virtual particles made us to conclude that there are four fundamental forces in the nature. A stationary charge gives us an electric field while a moving charge gives us a magnetic field [24]. The added force on the moving charge over the stationary charge made the virtual particle to change its mass slightly so that it looks like a different force to us. Although Maxwell proved that both forces are of different facets of the same thing [25, 26]. Charge is a particular state of matter and it contains a particular mass $m\,(m < m_C)$ to display electromagnetic force. An uncharged body like Earth is also a state of matter where the mass of the virtual particle $m_1\,(m_1 < m_C)$ which display gravity and that is different than $m\,(m < m_C)$ which display electromagnetic force. All fundamental forces

are different states of same virtual particles with different masses content i.e. different $m\,(m < m_C)$. Thus the distinctions ate purely man made stories.

7. Why God Is Not Omnipotent If He Exists

Suppose God is asked to present on Earth and in the Mars at the same time. But light needs one second to reach from Mars to Earth which is the ultimate universal speed limit of the Universe. If God is on Mars, He cannot reach on Earth on the same time but after one second if He travels as maximum as the speed of light. How you can term Him as omnipotent? If a radioactive element has half life of 16 years, who is going to describe the underlying process that which atoms are going to decay and which are not. There are many processes of the same kind which we do not have even abstract idea.

8. Conclusion

$E = mC^2$ denotes a transformation of mass of one form to the mass of the other form. According to Newton‟s law of gravity, the gravity is independent of the type of matter (real particle) because being the weakest force of all fundamental forces of nature by a long way (one part of million million million million million million million compared to other forces i.e. one part of one after forty two zeroes), the type of matter hardly effects any noticeable change in the gravity for us; but there are changes in gravity with the different matter types. There are natural processes to convert energy into mass and vice versa. All real particles behave like waves but their wave like property is hardly noticeable under normal conditions. When they are accelerated closer and closer to the speed of light (C), they gradually start displaying more and more wave like property, i.e. they look like more and more wavy. All fundamental forces are made of the same virtual particle ($m < m_C$) but with the slightest mass variations and its equivalent energy content variations in it. Thus all fundamental forces are manmade classifications. By the laws of the Universe, God cannot be said as omnipotent, if He exists. If any mass can be converted into tremendous energy with m multiplied by the C^2 term, why it was unnoticed for so long time, it is because masses and energies are in stable state almost all the time, so the conversion process is very very rare in normal conditions that human race interacts with. The reason it was unnoticed for so long time by human race.

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