

The Particle Universe

Edwin Zong*

Oasis Medical Group Inc., Las Vegas, NV, USA

*Corresponding author: Edwin Zong, Oasis Medical Group Inc., Las Vegas, NV, USA, Tel: +(661) 633-9753; E-mail: r4gomed@yahoo.com

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Abstract

The photon mass was initially described in the Compton equation where the Compton wavelength of a particle is equivalent to the wavelength of a photon whose energy is the same as the “rest”-mass energy of the “particle”. The m is the photon mass, C is the speed of light and h is Planck’s constant: $\lambda=h/mc$. However, most scientists deny photon’s mass status. In this paper, the author will assure you that photons have mass, which also happens to serve the base for all gravitational power/positional energy that exists today after a big bang. Furthermore, the photon as an energy carrier has its actual physical existence which can be inferred by nuclear force: at distances less than 0.7 fm (fm, or 1.0×10^{-15} metres), the nuclear force becomes repulsive where the phenomenon of such repulsive component is responsible for the physical size of the nuclei. All nuclear power (strong or weak) existing after a big bang derives from a big bang’s photon/radiation.

In this paper, the author also assures you that neutrinos are dark matter that floats in the space chilling with electrons ($-$ and $+$) where the gamma ray burst is just a cosmic-sized volume of our well-studied experiment in our lab: $e^- + e^+ \rightarrow \gamma + \gamma!$

The primary objective of this study is to uncover the unified origin for both mass and energy in the universe along with their evolutionary path in the discipline of Newtonian physics.

Keywords: Gamma ray; Big bang; Neutrino; Dark matter

Introduction

The Compton equation $\lambda=h/mc$ states the Compton wavelength of a particle which is equivalent to the wavelength of a photon whose energy is the same as the “rest”-mass energy of the “particle”. The m is the photon mass, C is the speed of light and h is Planck’s constant. In recent years, an upper limit to the photon mass has been placed by satellite measurements of planetary magnetic fields. The Charge Composition Explorer spacecraft was used to derive an upper limit of 6×10^{-16} eV with high certainty. The data was slightly improved in 1998 by Roderic Lakes in a laboratory experiment which looked for anomalous forces on a Cavendish balance. The new limit is 7×10^{-17} eV [1]. The photon bonding/coupling has recently been accomplished in a human lab—a remarkable discovery called the Rydberg blockade by coaxing photons into bonding together to form “molecules” – a state of matter by a group led by Harvard Professor of Physics Mikhail Lukin and MIT Professor of Physics Vladan Vuletic [2].

According to the conservation law of mass, the mass of new “molecules” must come from somewhere rather than from nothing, therefore photons have mass. The biological photosynthesis is another common natural phenomenon where photons are captured and incorporated in the mass [3].

At the beginning of a big bang or spontaneous combustion, the temperature and pressure are fiercely high; few would argue that any other form of mass has a chance to exist other than radiation itself which is a big bang’s photon! The author has subsequently linked gamma ray photons to a big bang [4].

When a light photon is not paired, it possesses pure kinetic energy/radiation power with little gravitational effect (massless paradox), e.g. a cosmic ray! If it is paired e.g. photon bonding or photosynthesis, it possesses positional energy/gravitation (mass paradox for some people). The usual term of gravity means earth’s gravity affects objects that are positioned on earth, but it really means that positioned objects are orbiting around earth simultaneously with or without physical contacts.

Any objects may lose their gravity if they leave their orbital status, e.g. a free fall of a raccoon. They will, however, regain their gravity when they resume their orbital status, e.g. a grounded raccoon. The single orbiting energy/power unifies our matter and particles, because particles possess orbital power/gravity as well when they are paired or orbiting each other. They will, however, lose their gravity power if they leave orbital status (divorce) and fly out.

Our current observable universe is spectacular; however, if we are willing to do some detective work, we will find out that all mass with gravitational energy can be traced down to photons. Meanwhile, all electromagnetic power and nuclear force can be traced down to photons as well!

The nuclear force is an attraction/bonding between nucleons at distances of about 1 femtometer (fm, or 1.0×10^{-15} metres) between their centers. It decreases to minute force at distances beyond about 2.5 fm. At distances less than 0.7 fm, however, the nuclear force becomes repulsive. The repulsive force is responsible for the physical size of nuclei, where the author deduces that the photon as an energy carrier has its actual physical size. The nuclear force apparently manifests photon bonding on a large scale!

The author simplifies the basic forces existing in our universe as 2 types. 1. Gravitation. 2. Electromagnetic power. The gravitation and electromagnetic power is interchangeable which can be traced down to a single particle-photon.

The neutrino background is still present today, with about 56 electron neutrinos, 56 electron anti-neutrinos, 56 muon neutrinos, etc., per cubic centimeter, for a total of 337 neutrinos per cubic centimeter in the Universe (45%). The photons of the CMBR are slightly more numerous with 411 photons/cc (55%).

By carefully analyzing cosmological data, such as the cosmic microwave background radiation, it indicates that the summed masses of the three neutrinos must be less than 0.3 eV [5]. The sum of the three neutrino masses apparently is less than one millionth that of the electron [6]. The electron mass has a value of about 9.11×10^{-31} kilograms or about 5.486×10^{-4} atomic mass units, equivalent to an energy of about 8.19×10^{-14} joules or about 0.511 mega-electronvolts [7].

The Neutrinos are the most abundant “structured” raw material (vs. single cosmic photons) available in our cosmos which matches its top candidacy for our dark matter/black hole! The author has reasoned our universe’s dark matter is mainly made of neutrinos!

Many people are overwhelmed by the standard table of particles. Following the path of Einstein’s legendary of “One” Equation theory ($E=MC^2$) for all, the author postulates an incredible simple solution for a busy bee- “two” particle model theory, which is photon and neutrino!

In reality, the radiation and its bigger brothers/sisters e.g. protons, neutrons, electrons, atoms are all we need to know in our reality of engineering for goods. Anything in between is just transient with few practical applications. The photons, however, are uniquely important. The author has deduced that photons can be used in optical computing [4,8,9] and dark matter engineering along with medicine and defense operating system [4].

The Universe Inflation and Focal Collapse/Crunch

There is another space’s evidence supporting our big bang theory. It is swirl-like/light polarization imprint on light less than one-trillionth of a second old from our big bang [10]. Such light polarization becomes possible when a big bang’s light encounters mass existing during a big bang. The big bang or spontaneous combustion lights encounter pre-existing mass which supports author’s one universe, endless cycle theory [11]. If our space were a void, the light’s polarization simply would not happen. The author’s model of universe- “one universe endless cycles” is also supported by discovery of Methuselah star, HD 140283 which is “older” than our current universe. HD 140283 appeared to be 16 billion years old, more than two billion years older than the rest of the cosmos (measured to be 13.78 ± 0.037 billion years old)[12]. It is simply not paradox; it is another evidence supporting the universes endless cycle in a realm of gravity and emulsion [4].

The evolution of a big bang simply means that some of its greatest kinetic energy starts to be captured into its form of orbital energy/gravity (including a nuclear force thru nuclear emulsion which is a form of gravity!) during its cooling off stage, when galaxies start to be created. The destiny of a big bang is another big bang! The gravity along with power of emulsion (another form of gravitation) will eventually attract enough mass which will collapse/crunch into an ever increasingly big new pre-big bang black hole!

The more mass is collected, the bigger a pre-big bang black hole grows, which manifests stronger gravity-directly evidenced by our observation of accelerated universe expanding! The accelerated speed is fueled by growing mass/increasing gravity power! Our observed universe has passed a new born stage of post big bang, passed a maturing stage of numerous galaxies forming. Our observed universe is entering a big bang or spontaneous combustion preparing stage. The accelerated expanding is a direct evidence of stronger gravity pull - larger and larger mass/black hole are forming! For those who use accelerating universe as a reason doubting the big bang theory, the author can assure those doubters that the opposite is true!

Furthermore, our galaxies are inflating because of the star’s photons. Without radiations from stars, our galaxies mass may collapse/crunch into dark matter which is indirectly supported by supernova effects [13].

The initial universe’s inflation is powered by a big bang’s photons; the secondary inflation which occurs in galaxies is fueled by their star’s photons. The focal collapse/crunch is due to the fact that their stars run out of fuels, which subsequently age galaxies to their dwarf’s stage/senior galaxy citizen, which are mostly made of dark matter along with fewer stars. It is evidenced by discovering dwarf galaxies in the current universe [14].

Our universe is simply trillions and trillions of light years big (infinite!), there are numerous focal collapses/crunch which are preparing for a next big bang. 140 billion light years is just a tiny drop of water in an infinitely gigantic size of our universe.

The Particle evolution in the universe

It has been estimated that dark matter may make up 84.5% of the total matter in the universe [15]. The big bang’s radiation or high energy photons or gamma rays will penetrate any mass that exist during a big bang explosion while some were polarized. For any gamma ray photons to be trapped or paired at any sub-nucleon level, those storming photons need to be “slowed down” first! Otherwise, the emulsion will not work with storming rays at the speed of light! The missing link is how lights can be slowed down; now the puzzle is finally solved! At a couple degrees above absolute temperature zero, the lights appear “slowed down” significantly where ubiquitous emulsion stands for a chance to work!

The photon and neutrino carry no electric charge, but the electron carries positive or negative charge. The only mechanism that can be deduced is “polarization of photon bonding”. The neutrino is neutral or “even bonding” of photons. The positive or negative charged electron is polarized or “non-evenly bonding” of photons, which is heavier or massive on one end than the other end! We need to reject the idea of “anti-matter” or “anti-particle” which is the cause of fundamental confusion when we study the basic mechanism of particle and mass!

Our universes background temperature is 2.7 Kelvin. It might go further down when our region of the universe is ripe for a next big bang; however our background temperature will never reach absolute temperature zero [3].

The big bang Nucleosynthesis starts with merging /coupling of big bang’s high energy particles/photons in the soup of electrons and Cosmic Microwave (initial big bang’s kinetic energy along with emulsion force)→ dark matter/neutrinos and electrons protons and neutrons/primordial nucleons formation (some big bang’s kinetic energy transfer to positional or orbital energy also known as gravity) →

the “initial” or unstable nucleus’s decay/radioactive decay → dark matter/neutrinos with gravity formation/ stabilization + λ ray bursts → mass gathering due to dark matter’s gravity → visible galaxy formation.

The dark matter/neutrinos (gravity types) may go thru “initial formation” first, then “stabilization” with radioactive decay: (Cowan-Reines neutrino experiment) beta negative decay reacted with protons to produce neutrons and positrons which quickly combine with electrons, releasing gamma rays [16].

The significant part of mass after a big bang apparently is stuck in the most basic form of mass-dark matter/neutrinos, the paired/bundled photons chilling with their mate-electrons. The halo of rich electric activities (e.g. x-ray), therefore, will be expected from any dark matter (gravity types) of substantial size! The author reasonably expects more activities to happen among electrons within or around dark matters/neutrinos, which may strike and trigger “dark matter (gravity types) signature” X ray. The author’s view is supported by X-ray emission observed from center of galaxies [17].

In medicine, we often choose to use Positron emission tomography (PET) scan to detect “highly active” cancer cells. The highly active molecule chosen for PET tracer is fluoro-deoxy-glucose (FDG), an analogue of glucose. The high concentration of tracer/fluoro-deoxy-glucose indicates highly metabolic activity which corresponds to the highly regional glucose uptake-cancer cells. It is the standard of medical care for using this tracer to map the cancer metastasis. The PET scan detects pairs of gamma ray photons emitted indirectly by a positron-emitting radionuclide (tracer), which is introduced into the body such as FDG [1]. The current physics equation for the process is as follows: $e^- + e^+ \rightarrow \gamma + \gamma$. The electron (e^-) and a positron (e^+) are the decay products from neutron thru double beta decay.

It is so obvious that electrons are made from photons or γ photons! It is another piece of vital evidence supporting the author’s deducing that our big bang is γ ray bust!

The author believes the cosmic background wave photons and space radiation make up the rest of “dark matter with little gravity” since most scientists turn their eyes away from photons’ mass status.

Without any fancy language, the path of particles in the universe is fairly simple: radiation/photon → dark matter/neutrinos → visible matter/inorganic matter → organic matter → you → collapse → pre big bang dark mass/neutrinos → big bang → → you again!

The energy evolution in the universe

The universe is a complete and enclosed system, because there is nothing existing outside our universe which may interfere with our universe’s matter/energy. The conservation law of mass and energy perfectly applies the universe as a unit. We can safely say that the universe’s energy and mass are constant.

$$E_{\text{bigbang}} = E_k + E_p$$

The E_k is the sum of kinetic energy present in the current universe. E_p is the sum of positional energy present in the current universe [4].

When a light/photon is not coupled, it possesses pure kinetic energy/radiation power with little gravitation effect. If it is coupled e.g. photon bonding or photosynthesis, it possesses positional energy/gravitation [4]. The destiny of a single photon/ray is to “marry” another photon/ray; the destiny of a “married” photon/ray is to be separated from its partner. The endless cycle of “marry” and “separation” of particles closely mirrors the endless cycle of energy. The

destiny of kinetic energy is to be transformed into positional energy; the destiny of positional energy is to be transformed into kinetic energy.

The conservation law of energy dictates that all nuclear power (strong or weak) existing after a big bang derives from electromagnetic power which is originated from a big bang’s radiation-photons as well.

Instead of 4 basic forces, the author promotes 2 fundamental forces in the universe. 1. Gravitational/orbiting force. 2. Electromagnetic/radiation forces. Both originated from “One” source-photon!

The role of bonding in physics and spirit/mind

The organic matters branch from inorganic matters. The process requires light energy. The light energy can come from solar or earth itself. The most popular photosynthesis/photon bonding requires green chlorophyll pigments. In plants, these proteins are held inside organelles called chloroplasts, which are most abundant in leaf cells, while in bacteria they are embedded in the plasma membrane.

The first photosynthetic organisms probably evolved early in the evolutionary history of life and most likely used reducing agents such as hydrogen or hydrogen sulfide as sources of electrons, rather than water [18]. Cyanobacteria appeared later, and the excess oxygen they produced contributed to the oxygen catastrophe [19], which rendered the evolution of complex life possible.

The organic matters are mass possessing both kinetic energy and positional energy. To become alive and grow, the living beings require additional matters that possess almost pure forms of kinetic energy - light energy. However, nothing will stay alive without the bonding process.

The bonding process is a key factor for a structured matter evolution. The bonding is therefore a key factor for human life. Other than physics, the human mind needs bonding factor too. Such bonding factor is simply known as a focus factor in human mind/spirit. Such focus factor can be real or phony. In our mind or spiritual life, both will do the trick to provide a healthy focus preventing our mind from scattering. As a matter of fact, our universe’s progress (endless circles) is solely operated by the laws of physics; whatever we believe will not make any difference.

Results Analysis

In At the beginning of a big bang, the temperature and pressure are fiercely high; few would argue that any other form of matter may stand a chance to exist other than radiation itself which is a photon. The author has subsequently linked gamma ray’s photons to a big bang [3]. At a couple degrees above absolute temperature zero, the lights appear “slowed down” significantly where ubiquitous emulsion stands for a chance to work! [1]. The most primitive mass/dark matter/neutrinos starts to form thru photon bonding [2]. Without any fancy language, the path of a particle universe is deduced as follow: radiation/photon → dark matter/neutrinos → visible matter/inorganic matter → organic matter → you → collapse → pre big bang dark mass → big bang → → you again!

Following the path of Einstein’s legend of “One” Equation for all, instead of the standard model of particle; the author promotes 2-particle model which are a photon and neutrino for practical application at sub-nucleon level.

The universe is a complete and enclosed system, because there is nothing existing outside the universe which may interfere with the universe's matter/energy. The conservation law of mass and energy perfectly applies the universe as a unit. We can safely say that universe's energy and mass are constant.

$$E_{\text{bigbang}} = E_k + E_p$$

The E_k is the sum of kinetic energy present in the current universe. E_p is the sum of positional energy present in the current universe [4].

The conservation law of energy dictates that all nuclear power (strong or weak) existing after a big bang derives from electromagnetic power which is originated from a big bang's radiation-photons.

Instead of 4 basic forces, the author simplifies it for 2 fundamental forces for practical application. 1. Gravitation/orbiting energy. 2. Electromagnetic/radiation forces. Both originated from "one"- photon!

Discussion

This Basic physics has provided us with a remarkable understanding of the mechanics behind everything on earth. Our nature provides us with many facts that help us uncover the mechanism with the help of logic based in the laws of experiment-proven physics. In this paper, the author tries to reason things based on nature's known facts rather than imaginary scenery, such as riding on a train of light speed with flash lights turning on. No one would stand a chance to flash his lights if he were to be accelerated by the Large Hadron Collider (LHC) to a light of speed in a vacuum.

In this paper, the author tries to use plain language with common sense (no twisting adjective terminology) to uncover our universe's mechanism by mapping its mass and energy evolution. The conservation law of mass and energy perfectly applies our universe as a unit. Therefore, the author reasons: 1. The conservation law of mass dictates that a photon is the "single" unified origin for all mass. 2. The conservation law of energy dictates that photon energy/radiation is the "single" unified origin for all electromagnetic power along with nuclear forces as well as photon's mass which serves the "single" unified origin for all gravitational power exerted by our universe's mass (detectable or undetectable).

The conservation law of mass and energy perfectly supports Einstein's "One" Equation for all, because our universe's story is all about changing in mass or energy (loss or gain in a void/space) while the velocity or "time-scaled" process is the result from such said mass/energy's changing; it is not the other way around! Other words, artificial time is irrelevant to mass/energy changing. In addition, since photon is the "single" unified origin for both mass and energy, it is not hard to understand the fact that no particle can be in the state of "rest". In other words, the mass of different state is an "absolute" with Newtonian "certainty". However, the insertion of "rest mass" fundamentally "shaketivitize" the Newtonian physics and lands many bright minds in a fantasy world of "uncertainty". To assign a number value e.g. zero to a fabricated concept of "rest mass" further drowns everyone who is near to it.

If we were to set aside our urge for sophistication and fantasy for a genie, following the path of Einstein's legend of "One" Equation theory

($E=MC^2$), you will see that a photon is a "single" unified worship for all branches of sciences along with philosophy and religion. The universe is just another glorified "two in one package"-space (void) and photons. Time is a smart organizer invented by high level organic intelligence for calculation convenience. Our physical life is part of a photons' evolution while our spiritual mind is bouncing between reality and fairy tales.

The author promotes photon research for its practical application in future computer, medicine, and military fields along with the universe's mechanical study.

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